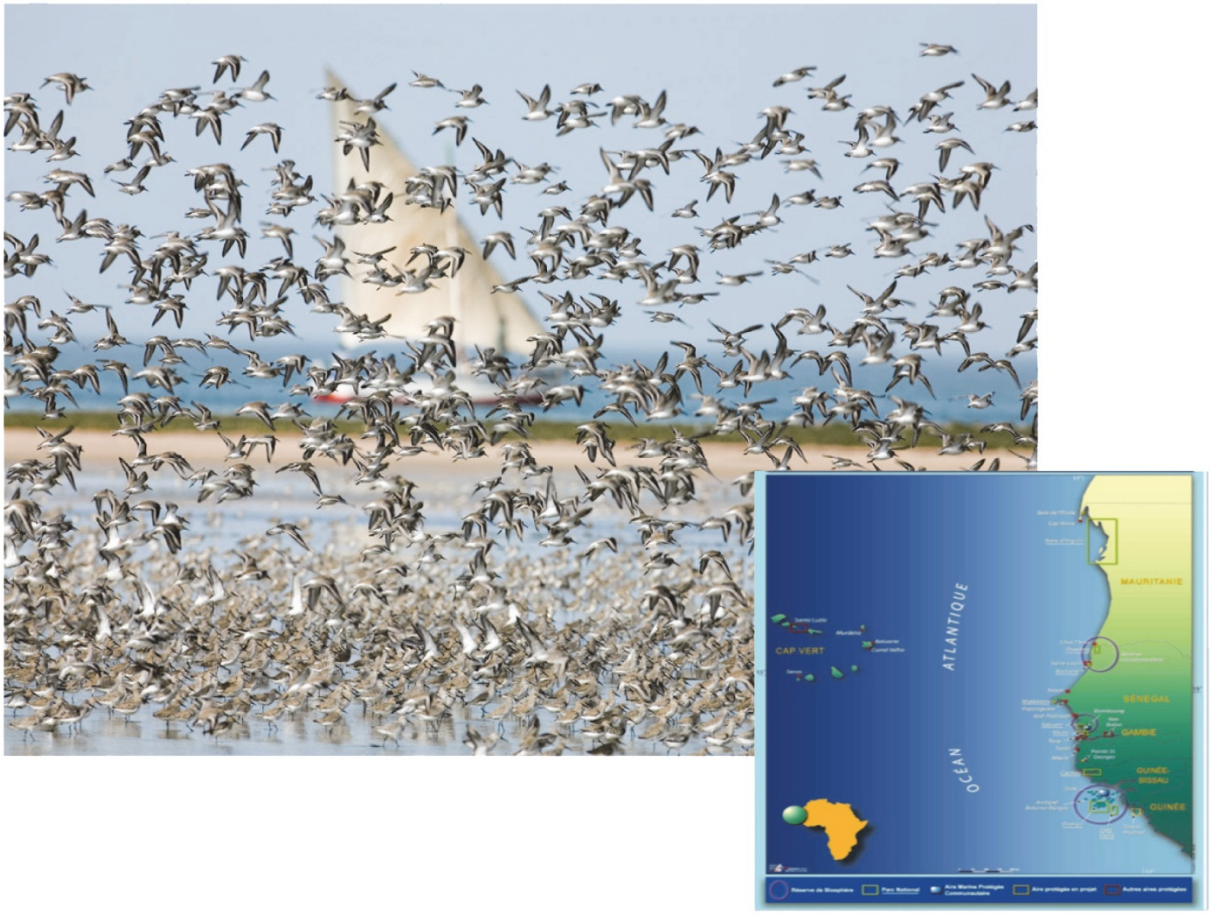
Waterbird Monitoring Strategy for the West African coastal zone from Mauritania to Sierra Leone

Version, October 2013



Developed by the Wadden Sea Flyway Initiative, BirdLife International and Wetlands International

Colophon

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1. INTRODUCTION

1.1. Aims of the strategy

Background

1. The wetlands of the West African coastal zone are among the world's natural wonders and are of global importance for their waterbird populations. Countries in the region require monitoring data about these sites as the basis of management decisions, national conservation strategies and international obligations (Altenburg *et al*. 1982, Diagana & Dodman 2007, Dodman *et al*. 2007, Triplet & Yesou 1998, Schepers *et al*. 1998, Trolliet & Fouget 2004, van der Winden et al 2007, Zwarts 1988).
2. BirdLife International's Important Bird Areas (IBA) programme (Fishpool & Evans 2001) and Wetlands International's International Waterbird Census (IWC, Delany *et al*. 1999) provide monitoring data and information which inform site management and conservation policy, but these programmes can be improved in the region.
3. Conservation of migratory waterbirds requires rigorous monitoring of all the key sites in their breeding, stop-over and wintering areas, and the assessment of their conservation status in the flyway as a whole.
4. The Wadden Sea Flyway initiative aims to promote and enhance Integrated monitoring along the whole coastal East Atlantic Flyway (van Roomen *et al*. 2013). This Strategy for monitoring in West Africa results from priorities identified as gaps in the monitoring along the East Atlantic Flyway.

Aims & objectives

1. The purpose of this monitoring strategy is to improve the level of knowledge for conservation and management through intensified, expanded and harmonized monitoring of waterbird species and their sites using IBA and IWC methodology.
2. The IWC Programme will provide data on waterbird numbers, distribution and population trends at different spatial scales. As such it can be seen as a method of describing the state of the sites based on bird numbers.
3. The IBA Programme will provide data on the state of wetland sites (in addition to bird numbers, also the state of the habitat itself), the pressures which threaten them, and data on conservation responses taken at the sites.
4. Through continuing monitoring by IWC and IBA methodology, priorities for management and conservation actions can be decided and the effectiveness of measures taken can be followed. This monitoring will provide a basis for more effective management and conservation of the waterbirds and wetlands of the West African coastal zone.
5. By using the data together with data from other sites along the Atlantic Coast of Africa and Europe, information can be summarized at different spatial scales and the conservation status of waterbirds at flyway level can be assessed.
6. The strategy focuses on the coastal zone of seven countries (Mauritania, Senegal, Gambia, Guinee-Bissau, Guinee, Sierra Leone and Cape Verde) in West Africa but it will be applicable, with minor modification, to other parts of the Atlantic coast of Africa and to inland sites of these countries as well.
7. The strategy aims to establish long-term monitoring, looking forward towards 2026.

1.2 Cooperation with national and international programmes

1. The waterbird monitoring strategy is based on existing projects and programmes in the region and will add value to their outputs.
2. Development of the internationally coordinated, but nationally focussed IBA and IWC programmes will provide a solid information base for the management and conservation of wetlands and waterbirds at national level, while contributing to the international obligations of each country.
3. The focal countries are the same as those in BirdLife International's CMB Project, which is developing networks of NGO's and Goverment agencies for bird and nature conservation in the region.
4. The implementation of the monitoring strategy will be carried out in cooperation with the capacity building programme under the Wadden Sea Flyway Initiative as well.

1.3 Definitions used in this document

West Africa from Mauritania to Sierra Leone
The region covered by this strategy comprises coastal wetland sites in Cape Verde, The Gambia, Guinea, Guinea-Bissau, Mauritania, Senegal and Sierra Leone.

Atlantic coast of Africa
All countries from Africa bordering the Atlantic Ocean. They are part of the East Atlantic Flyway. Complementary activities in countries to the north and south of Mauritania to Sierra Leone, as far north as Morocco and as far south as South Africa will be encouraged.

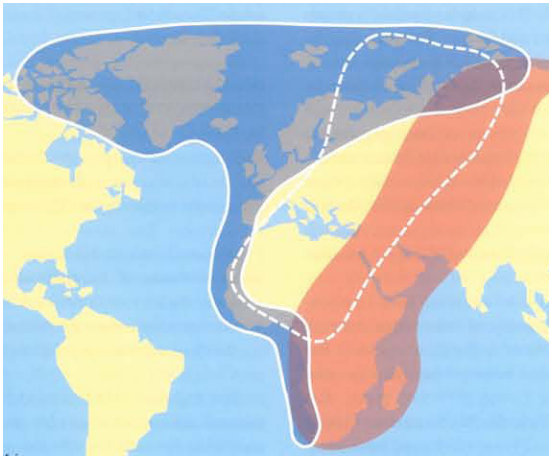
Coastal zone
This includes sites under tidal influence or within 30 km of the coasts. Sites further from the sea that are part of wetland complexes affected by tidal processes will also be included.

Non-breeding waterbirds
This term refers to waterbirds outside the breeding phase of their life-cycle. It includes intra-African migrant and non-migratory waterbird species as well as those which breed in Arctic, boreal, temperate and Mediterranean regions and migrate to Africa after the breeding season each year, returning north to breed the following year. This strategy focusses on species which congregate at specific wetland sites outside the breeding season.

Colonially breeding waterbirds
Waterbird species which congregate to breed in colonies offer good possibilities for monitoring. In the West African coastal zone from Mauritania to Sierra Leone, the following families include species with a tendency to breed colonially: Pelicans, Cormorants, Herons and Egrets, Storks, Ibises and Spoonbills, Flamingos, Gulls and Terns.

Colonial breeding seabirds
Three seabird families included in AEWA Agreement (Tropicbirds, Boobies and Frigatebirds) also occur in the West African coastal zone and should be included in monitoring.

Figure 1. *The region covered by the Strategy* showing the East Atlantic flyway, the Atlantic coast of Africa, and the focal region of the strategy



A. East Atlantic Flyway, below in blue

B. Western half of Africa with the countries bordering the Atlantic Ocean

C. West African coastal zone from Mauritania to Sierra Leone. Key sites are indicated.

2. INFORMATION NEEDS, KNOWLEDGE GAPS AND METHODS AVAILABLE

2.1 Information needs

2.1.1 National policies and international obligations

1. Coordinated monitoring of wetland sites and waterbirds at national level contributes strongly to effective national level conservation and protection measures and nature conservation legislation. This contributes to National Biodiversity Strategies and actions following from them.
2. A synthesis of results from all sites will underpin national site conservation priorities and policies and will allow the effectiveness of such policies to be measured.
3. All countries that sign up to the Multilateral Environmental Agreements and other forms of international cooperation (see table 1) such as the Abidjan Convention (focussing on the Atlantic coast of Africa), Convention on Biodiversity (CBD), Ramsar Convention on Wetlands, and the African Eurasian Migratory Waterbird Agreement (AEWA) embrace authoritative, internationally agreed standards for biodiversity management in their countries. The implementation of many resolutions and action plans included in these instruments calls for proper national-level monitoring. National reports, mostly at a three-yearly intervals, need to be prepared, giving data on the status of biodiversity and level of protection of sites.

Table 1. Participation by focal countries under this Strategy in Multilateral Environmental Agreements and other international cooperation

	CBD	AEWA	Ramsar	Abidjan
Cape Verde	Y		Y	
The Gambia	Y	Y	Y	
Guinea	Y	Y	Y	Y
Guinea-Bissau	Y	Y	Y	
Mauritania	Y		Y	
Senegal	Y	Y	Y	Y
Sierra Leone	Y		Y	Y

2.1.2 Site level conservation and management

1. Effective site management requires monitoring of the important biodiversity present, of possible threats to the conservation status of the site and its species and of conservation and management measures taken.
2. By monitoring, (meaning repeated, standardised measurements over time) changes in conservation status can be detected and effectiveness of measures taken can be followed.
3. This monitoring can be used as the basis for adaptive management which allows management priorities to be decided and appropriate conservation policies to be established according to the situation and the need at a particular time.

2.1.3 Waterbird monitoring to aid conservation

1. One of the important criteria for the selection of key sites at national and international levels is the so called 1% threshold developed under the Ramsar convention. This 1% threshold is 1% of the estimated population size of a particular flyway or biogeographical population. These population sizes can only be estimated and updated after coordinated and simultaneous counts of most of the sites of the particular species and population.

2. An important tool for site managers and national policies is the trend in numbers of international populations of each species. It gives information on the overall conservation status of populations across all the sites they use. By comparing population trends at site or national level with these international level trends, assessment of how the conservation status of all the species at a site, or all the sites in a country are doing in comparison with the international trend becomes possible. Information on bigger increases or decreases at site level in comparison with the international trend can reveal better insight into the possible causes behind these trends. These international trends can only be estimated by repeated counts at a representative selection of sites across their range.
3. At international level, information on total population sizes and trends are very important for assessment of conservation priorities globally and in the African-Eurasian region. They are used in the international IUCN/BirdLife Red List, in the Wetlands International Conservation status report for AEWA, and in the World Population Estimates report for the Ramsar Convention. Within AEWA, the number of populations for which good quality data are available to allow assessment of conservation status is still small.
4. Data on waterbird numbers and trends can be used as indicators for developments in other site properties, both related to abiotic and biotic factors or factors related to human use. As such waterbird monitoring is a very cost effective way to follow developments of many other different factors related to management and conservation.

2.2 Monitoring methods available

2.2.1 Monitoring of non-breeding waterbirds

1. The International Waterbird Census monitors waterbird numbers and trends worldwide using a simple methodology (www.wetlands.org).
2. Sites are visited preferably at least once per year and counts are made of each waterbird species using standardized visit dates, site boundaries, counting routes and vantage points (Delany 2008, 2010).
3. The most important period for organizing counts is January, to coincide with international monitoring efforts.
4. Counts in July are also carried out throughout Africa, to allow monitoring of African populations while European-breeding populations are away in the north.
5. It is also worthwhile to carry out counts at other times of the year that capture important congregations of waterbirds at sites for instance during migration periods.
6. Data are noted in the field and later filled in on standardized recording forms or using a digital online system (www.observado.org) and are submitted to the national count coordinators. The national coordinators will in turn, submit the data to the international coordinator for the African-Eurasian region. This can also be done through internet.

2.2.2 Monitoring of site conditions

1. The IBA programme aims to identify sites critical for the long-term viability of wild bird populations and monitor their conservation status. (www.BirdLife.org).
2. The IBA monitoring framework (BirdLife International 2006) provides a standardised way to assign scores for threats to IBAs ('Pressures'), the condition of IBAs ('State') and conservation actions taken at IBAs ('Responses') (Figure 2).
3. Data are recorded on standardized recording forms. These are sent to national IBA coordinators who summarize the different information for individual sites and enter these into the internet based World Bird Data Base (WBDB).

2.2.3 Monitoring of colonially nesting waterbird and seabird species

1. In the coming years monitoring of breeding terns, gulls and other seabirds in the region will be organized through the Alkyon project from FIBA.
2. Important guidance on which methods to use is available (Veen *et al.* 2006).

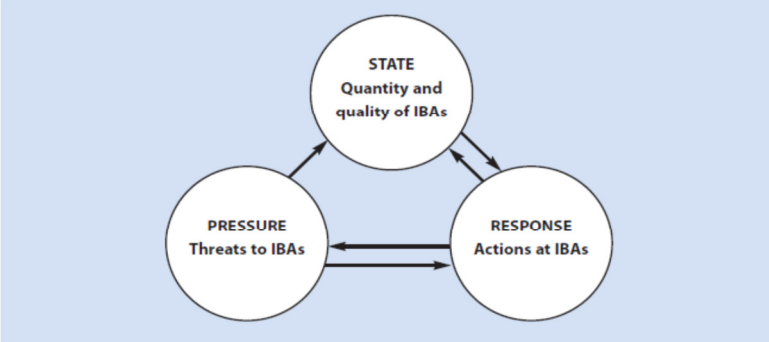


Figure 2. The relationship between indicators of pressure, state and response in the IBA programme (BirdLife International 2006)

2.3 Current state of monitoring in the region

1. The historical and extent of the participation of each country in the IWC and IBA monitoring schemes can be found in table 2. Despite differences between countries, considerable efforts are already made. For the IWC it is known that some older counts of especially key sites are not in the IWC database yet (Banc d' Arguin, Archipel de Bijagos). Also consistency between years, in counting the same sites can be improved. For the IBA programme, monitoring is carried out in countries with a BirdLife partner.
2. A number of the important sites in the region have been visited by expeditions from Europe in cooperation with local partners. These counts of non-breeding birds are not repeated on a regular basis or some key sites have been counted in different years which makes the interpretation of results difficult.
3. For most breeding birds no long term monitoring is carried out yet.

Table 2. *Duration and level of participation of countries of the West African coastal zone in the IWC and IBA monitoring programmes (situation in December 2012).*

	First IWC counts in database	Most recent IWC counts in Database	No. of years IWC data	No. of IBAs (Fishpool & Evans 2001)	Participating in IBA monitoring
Cape Verde	2006	2006	1	12	Yes
The Gambia	1998	2009	6	13	No
Guinea,	1999	2012	8	18	No
Guinea-Bissau	2001	2001	1	10	Yes
Mauritania	1972	2012	24	24	No
Senegal	1958	2009	33	17	No
Sierra Leone	1992	2012	10	10	Yes

2.4 Conclusions and recommendations

1. The IBA and IWC programmes provide an excellent framework for monitoring wetlands in the West African coastal zone, but their implementation to date has been insufficiently regular or complete.
2. An improvement in the frequency and rigour of work under these existing programmes, achieved through a programme of capacity development, will allow much improved monitoring as a basis for conservation and management activities at local, national and international levels.
3. The monitoring of breeding birds is in its early stage but the new activities through the Alcyon project can be a kick start for a monitoring project of this important group of species.
4. An intensive communication and financial strategy needs to ensure that monitoring can be continued into the future as contribution to future management and conservation of West African coastal wetlands and its species.

3. DESCRIPTION OF THE MONITORING STRATEGY FOR COASTAL SITES IN WEST AFRICA

3.1 General Outline of the strategy

3.1.1 Non-breeding waterbirds and the conditions of their sites

1. Monitoring of waterbirds in the non-breeding season will involve two approaches (a. and b. below) using similar methodology but each visiting a complementary suite of sites:
    a. Yearly counts in January at a sample of small and accessible sites (or sub-sites/ monitoring units from large sites) to provide the basis of waterbird population trends. If possible some of these sites can also be counted more frequently during the season to get data on seasonal patterns and on site specific seasonal maxima, also from intra- African migrant and resident species, July is a priority month for additional visits. See Figure 3 for an example of a counting scheme at sites with varying intensity.
    b. Total counts every six years in January at as many sites as possible, including all the most important ones. The results of this total count will give information on total bird numbers in the region, and information on key-sites which cannot be counted in the yearly programme. It will also be possible to use data from these counts to validate the trend from the yearly counts (see Figure 4). In Annex 1 an overview of important wetland sites in coastal West Africa from Mauritania to Sierra Leone can be found which needs to be covered during a total count.

2. Pressure, Response and additional State information for IBA monitoring will be collected during IWC monitoring (January – July) where appropriate. Additional visits for IBA monitoring may be necessary, for example to record breeding birds, or non-breeding numbers during migration, and threats in other periods of the year. It is hoped that these extra visits will be used for a waterbird count as well (see figure 4).

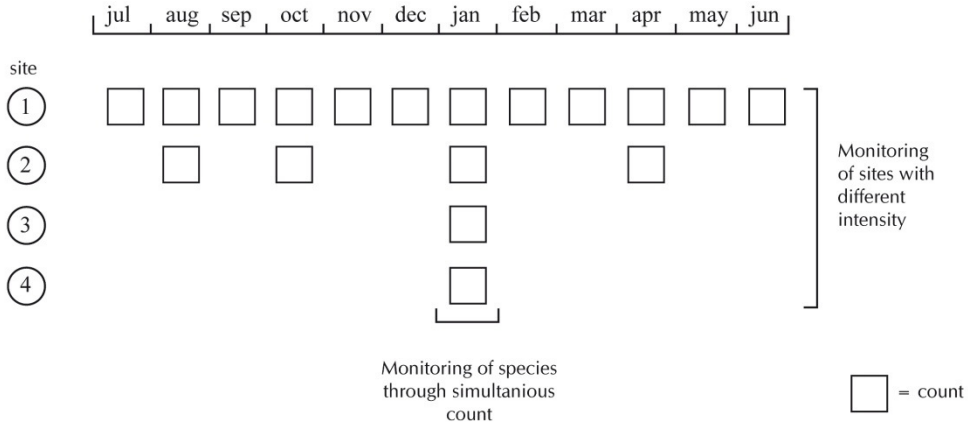


Figure 3 Counting of sites with a varying frequency. In January all sites are counted giving the possibility to add the results together (something which is advisable for July as well). The counts in the other months give additional information on seasonal patterns and maximum numbers of birds using the site.

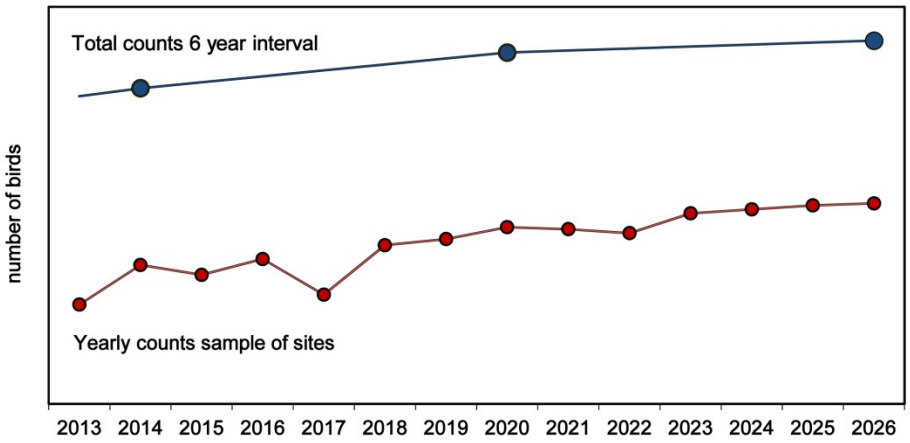


Figure 4 Comparison of theoretical trends based on yearly and six yearly counting programme.

3.1.2 Colonially breeding waterbirds and seabirds

1. An initial requirement for monitoring colonially breeding species will be an inventory of all the waterbird breeding colonies to be included in the strategy. Priority will be given to colonies at sites holding internationally important numbers, and at sites already monitored by the IWC and IBA programmes.
2. Secondly like in non-breeding waterbirds, it is recommended that for instance once in six years a total count will be organized and some colonies counted yearly.

3.2. Monitoring non-breeding waterbirds and their sites

3.2.1 Priority sites

1. The strategy will address sites under tidal influence or within 30 km of the coasts of the seven focal countries. Sites further from the sea that are part of major wetland complexes affected by tidal processes will also be included.
2. The following criteria are suggested for selecting the sites to be included under the "total count (see also Annex 1) ", i.e., all key sites to be monitored at intervals of three to six years:
    a. Sites already designated as Wetlands of International Importance under the Ramsar Convention, or having other International designations.
    b. Additional IBAs holding important waterbird concentrations.
    c. Sites at which waterbird counts have taken place and where 1% or more of a waterbird population has been recorded.
    d. National Parks and other sites having national-level designations for their waterbird interest.
    e. Unknown sites judged by experts to be worth visiting for assessment of their importance

3. For the sites which will be counted annually. First of all in January and maybe also additional counts with a priority of July, the above criteria should also be used in general but additionally the sites should usually:

a. be small enough to be counted by one or two teams of observers in a few hours.
b. include sub-sites of larger, more complex sites.
c. be accessible, to allow frequent visits with minimum effort.

3.2.2 Which species and data

1. For the to be counted species the following criteria, in order of priority, are suggested as suitable for the selection:
    a. All waterbird species which are congregatory and use habitats which are suitable to count.
    b. Additional species for which the sites qualify as IBAs and are easy to count together with the waterbirds.
    c. A small group of additional bird species, mainly some wetland dependent raptors, which are easy to count as well and represent important indicators of wetland values. (the same may be true for aquatic mammals?).
    d. All other waterbird species included in the Wetlands International publication *Waterbird Population Estimates - fourth edition* (2006), this includes species with a cryptic behaviour in habitat that is difficult to survey. All individuals seen will be noted, however counts will not be complete for these species.
2. A photo field guide for the identification of species of coastal wetlands in the region is under preparation as a further step to implement this monitoring strategy in the region (Barlow *et al*. in prep).
3. BirdLife International has established standard methods for assessing and scoring Pressure, State and Response data at IBAs. Detailed guidelines are available in BirdLife International (2006).
4. Wetlands International has coordinated IWC using the same methods since the 1960s for which detailed guidelines are available in Delany (2010).

3.3 Coordination, Data capture, Analyses and Outputs

3.3.1 Coordination

1. The coordinators of IBA and IWC monitoring in each country and the observers who carry out the fieldwork are key to the success of this strategy. A process for recruiting, training and assessing suitable coordinators should be established.
2. The responsibilities of the national IBA and IWC coordinators are to coordinate networks of people and other resources to collect data and information allowing the production of national level overviews of the status and trends of waterbird populations and their key sites to feed into national and international decision-making processes.
3. If the IBA and IWC programmes in each country are not coordinated by the same person, it is essential that they communicate regularly with each other to ensure harmonization of effort. Formal ways of working together, such as National Monitoring Committees can bring a variety of stakeholders together and improve harmonization of efforts.
4. Establishing and maintaining networks of observers are crucial aspects of the work of the coordinators, and their ability to enthuse and encourage potential and actual participants in the surveys will be vitally important.
5. Identifying and recruiting participants in the surveys will involve approaching and engaging individuals from appropriate governmental and non-governmental organizations, educational institutes and local communities.

3.3.2 Methods of data capture, storage and curation

Current data

1. Recording of data during fieldwork visits will generally use the simple and reliable notebook and pencil, with data being transcribed onto standard hardcopy recording forms after each visit. A copy of the recording form should be taken into the field to ensure that all required data categories are included in recording.
2. All data will be checked and sent, in hardcopy or electronically, by prior arrangement, to the national coordinators of the IWC and IBA programme in each country. Recent developments within the IWC make it possible in the near future that counters can submit their counts through the internet (www.observado.org) to national coordinators.
3. It need to be decided to whom the data on colonially nesting species will be sent as coordination structures are not yet in place.
4. National coordinators should ensure that national IWC and IBA databases are compatible with international standards, and should submit their country's data to the international IWC and IBA databases as soon as all the data have been compiled each year.
5. The national databases can be used by agencies in each country as a basis for management and policy decisions, and for reporting to the Multilateral Environmental Agreements.

Historical data

1. To maximize the usefulness of the data collected under this strategy, it will be important to ensure that all data collected by past projects in the region are available for comparative analysis.
2. At present, data collected by ONCFS, WIWO and national agencies such as National Park authorities are incompletely computerized, and many of the published results are in reports which are not widely available.
3. Historical data should be compiled into a single database (The IWC database being the most appropriate) and an online archive should be created which includes all relevant publications in pdf format. This archive should also be available on electronic media suitable for users with unreliable internet connections.

Methods to be used in analyses

1. Standard database software can be used for simple and effective data summaries at site and national level. In the near future it is anticipated that national coordinators will be able to interact directly with the IWC database and make use of simple queries to extract and summarize their country data.
2. For more sophisticated analyses and in particular for analyses of waterbird population trends, specialized software will be required. It will be important for each national coordinator to be trained in the use of this software, or to have ready access to appropriate technical expertise to allow site and country-level analyses.

3.3.3 Data sharing

1. It will be important that at national level, National Coordinators have access to their data to bring this information into national reports etc. This can be done by maintaining dedicated national databases, or by using the functionalities in the WBDB and IWC database (in the near future) to retrieve and use data.
2. Within countries different organizations, both government and non-government, are mostly involved in the collection of monitoring data. It is important that they work together and exchange their data for the benefit of national overviews and preventing double work.
3. Wetlands International and BirdLife International will use the data of the IWC and IBA program for international analyses and overviews giving added value to the national data.

4. All participating organizations are encouraged to adopt an open attitude to data sharing; however they always remain owners of their own data.

3.3.4 Presentation of results

1. National coordinators should send summarized data as feedback to all individuals involved in the monitoring. These data will be included with other information in (at least) annual newsletters to be prepared by coordinators in each country for the benefit of participants in the monitoring.
2. Wetlands International and BirdLife International will summarize and review the data each year and send feedback of an appropriate type and style to the national coordinators for onward communication to the counters.
3. More formal and authoritative international reports will be produced periodically to meet the information needs about waterbirds and wetlands of the West African coastal zone and along the flyway.

3.3.5. Website

1. The outputs resulting from this strategy will be available on the websites of Wetlands International and BirdLife International. Information on sites will be available in the Critical Site Network Tool. An information service on international flyway trends needs to be established. In future it will be desirable to create a website to facilitate cooperation in the monitoring of waterbirds and wetlands along the East Atlantic Flyway, to present results and to increase the cooperation among stakeholders.
2. Websites can also be an effective method for communication at national level. The Coordinated Waterbird Counts (CWAC) website, maintained by the Animal Demography Unit at the University of Cape Town, provides a good example to follow: http://cwac.adu.org.za/
3. Not all participants in the monitoring will have equal access to computer equipment and online resources, and it will also be necessary to make use of simpler hardcopy communication and presentation tools.

3.3.6 Reports

1. Reporting of a high scientific standard that is relevant to conservation policies at local, national and international level is a requirement of any monitoring programme.
2. Scientific reporting on the waterbirds and wetlands of West Africa has to date been partial, incomplete and uncoordinated, and there is considerable scope for presenting new, fuller, better coordinated results in ways that will greatly enhance understanding of numbers, distribution and population trends of waterbird species that use sites in the West African coastal zone.
3. These results will feed into improved reporting to meet the requirements of the Convention on Biological Diversity, the African-Eurasian Migratory Waterbird Agreement and the Ramsar Convention on Wetlands.

3.4 Capacity Assessment and development

3.4.1 Capacity needed

1. The strategy will succeed when enough appropriate individuals have acquired the necessary fieldwork and data handling skills, and the organizations and institutes for which they work are collecting and exchanging data in agreed ways.
2. For the total counts, once in 6 years, also capacity from foreign experts need to be used for training and additional help in counting. This effort can decrease while local capacity is increasing.

3.4.2 Training needs

1. After potential organizations and participants under the strategy have been identified, and after these people have been approached and engaged, the next step will be training them in monitoring skills as required under this strategy.
2. Much training material is available to train potential observers (Dodman & Boere 2010, ONCFS training material).

3.4.3 Available equipment and gaps/needs

1. Good quality optical equipment, especially binoculars and telescopes, are essential for successful bird survey work.
2. Simple methods of communication and information exchange are possible, but a certain number of computers with internet connections are also required at least for data exchange, analysis and reporting.
3. For bird counting, every individual needs a pair of good 8x or 10x binoculars, a notebook and pencil.
4. Telescopes and bird identification guides can be shared between observers if necessary, but there should be at least one of each for each counting team. To be effective, telescopes need good tripods and panheads.
5. Vehicles are usually needed to gain access to sites, also boats are often needed for access to the coastal sites in this region. .
6. At each site, an inventory of the equipment needed should be drawn up and compared to that actually available. The equipment still needed to undertake surveys should then be listed and possibilities for buying or renting should be investigated.

3.4.4 Monitoring manual and site protocols

1. Detailed manuals giving guidelines for best practice in IWC and IBA surveys have been published and are available online.
2. Under this strategy a simple manual on the monitoring guidelines will be developed (Delany et al in prep.).
3. Protocols summarizing the best way of covering the Banc d'Arguin and Arquipélago dos Bijagós will also be produced under this strategy. These will present a map with counting units, survey routes, vantage points, important habitat types and similar information to help ensure that counts are conducted in an identical way on each visit.

3.5 Implementation and further development of this Strategy

3.5.1 Implementation (2013 – 2014)

1. Funding (from WSFI and CMB) to carry out monitoring is available until 2014, allowing the counts of a selection of sites in January 2013 and the performing of a total count in January 2014.
2. In November 2012 a training workshop has taken place and participants from all focal countries have been involved in practical monitoring skills. Under the capacity building project from the WSFI several national training courses are organized as well.
3. Networks should be engaged and functioning by the end of 2013 and all equipment, manuals and protocols should be in place and available for use in the January 2014 count.

3.5.2 Future development and sustainability (after 2014)

1. Monitoring demands repeated effort over the long term and this strategy should be the springboard for a permanent, long-term programme.
2. As soon as training and logistics for the 2013 and 2014 surveys are well under way, the project coordinators should devote a high proportion of their time to planning the future of the work, developing the relationships with partners and donors and raising the funds necessary for future implementation of the strategy.

3.5.3 Ensuring engagements of governments in the region itself

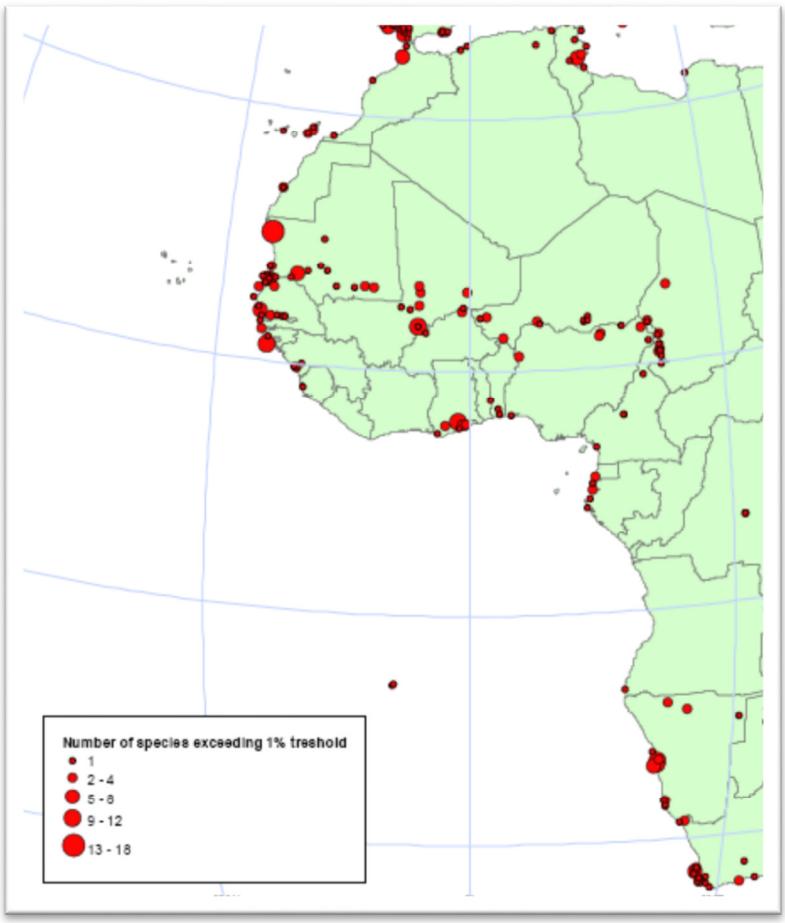
1. It is hoped that the inclusion of governmental organisations and institutes in this strategy will result in access to local governmental support for the programme of work in each country.
2. All participating countries have signed up to the Convention on Biodiversity, the Convention on Migratory Species and the Ramsar Convention on Wetlands, and it is hoped that by the end of the project all will have signed up to AEWA and the Abidjan Convention. Any country whose government takes its international status and responsibilities seriously should ensure that it participates fully in the processes of these international treaties. This means reporting every three or four years to the Conference or Meeting of the Parties to each treaty. Producing these reports requires monitoring to take place at all of the country's sites which are important for biodiversity.

4. WIDER FLYWAY MONITORING

4.1 Wider flyway monitoring needs

1. Figure 5 shows that the West African coastal zone focal area includes the two most important sites for waders on the whole Atlantic coast of Africa and an important cluster of sites spread between Mauritania and Sierra Leone. It is, nevertheless, a relatively small part of the southern portion of the East Atlantic Flyway and it will be important to stimulate monitoring efforts in adjoining regions.

Figure 5. The Project area in context: Importance of sites in western Africa for waders (Source: Delany et al. 2009)



4.1.1 Inland sites in West Africa

1. The great floodplains of the West African Sahel zone are hugely important for waterbirds, but the species composition differs from the coastal zone and only Northern Pintail is found in high numbers in both this region and in the Wadden Sea.
2. The International Waterbird Census has taken place intermittently in Burkina Faso, Chad, Mali, Niger and Nigeria and the national coordinators in these countries should be made aware of the intensification of effort under this strategy.
3. The wetlands of Lake Chad, the Inner Niger Delta and smaller complexes such as the Hadejia Nguru wetlands have been counted by French national agencies such as ONCFS in a series of extensive aerial surveys over many decades. It is essential that this effort should continue.

4.1.2 Liberia to South Africa

1. The coast to the south of the project area includes numerous crucially important wetlands including the coastal lagoons of Ghana and the ornithologically little-known but vast coastal delta of the river Niger in Nigeria. Further south, the importance of estuaries in Cameroon and Gabon has been demonstrated by expeditions, but the importance of the coastal zone of Angola remains poorly known. Namibia and South Africa run very effective IWC and IBA programmes, and a number of important sites are regularly monitored.
2. The national coordinators of IWC and IBA programmes in all these countries should be informed of the current strategy and encouraged to participate in future activities, particularly the 2014 Simultaneous Total Census.

4.1.3 Morocco to Tunisia

1. The coast to the north of the project area has been well counted over the years although there is scope for improvements in the consistency of coverage. It will be invaluable if results of midwinter counts in these countries can be analysed and published, and if all the historical count data can be made available for international analyses as well.
2. The national coordinators of IWC and IBA programmes in each of Morocco, Algeria and Tunisia should be informed of the current strategy and encouraged to participate in the 2014 and subsequent Simultaneous Total Censuses.
3. The Tour du Valat Biological Station, France, and their Mediterranean waterbird monitoring programme will be a very valuable partner in these efforts.

4.2 Ecological Monitoring

4.2.1 Vital rates

1. Extensive monitoring of vital rates by local partners is beyond the scope of this strategy for West Africa at present but stakeholders should be made aware of current activities and encouraged to contribute as far as possible. While monitoring of abundance of waterbirds and the environmental condition of the sites is seen as a first priority for the region, monitoring of demographic parameters can be as next step (van Roomen *et al*. 2013).
2. Bird counters are in a good position to look for birds which have been individually marked with colour rings or flags and should record any that they find. This activity can be facilitated by providing a list of known colour marking schemes involving birds on the East Atlantic flyway, including details of colour combinations and codes used for each species.
3. Contact should be made through AFRING and EURING with individuals, institutes or organizations potentially or actively involved in marking waterbirds in the project region.

4.2.2 Feeding conditions

1. Although the monitoring of environmental conditions at sites theoretically also includes the monitoring of food resources and feeding conditions, that monitoring is mostly from a more general nature. A real understanding of the interactions of bird numbers and their food resources requires more extensive sampling and monitoring of for instance benthos and fish. This is beyond the scope of this present strategy document.
2. Real monitoring of food resources is more appropriate within indepth research programmes such as Metawad.

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Annex 1

West African Coastal sites

Country	Sites 1ste priority	Sites 2e priority
Mauritania		
		Cap Blanc
		beach Nouadhibou-Baie d'Arguin
	Baie d' Arguin	
		beach Baie d'Arguin - Banc d' Arguin
	Banc d' Arguin	
		beach Banc d' arguin - Nouakchott
		beach Nouakchott - Aftout es Saheli
	Aftout es Saheli	
	Laguna Chott-Boul	
		ponds Dioup & Keur Massene
	Diawling	
		Senegal river from Dioup - Rosso
		beach laguna Chott-Boul - Senegal River
Senegal		
	Djoudj NP	
		The Trois Marigots
		Ndiael
		Djeuss valley
		lake the Guier
		Nieti Yone river
	Langue de Barbarie NP	
	Guembeul nature sanctuary	
		beach Senegal Delta - Dakar
		Lac Tanma
		Mboro 2
		Lac Rose
		Technopole
		Bargny
		Yene-Tode
		Poponguine
		Lagune Somone
		Mbaling
		Warang
		lagune de Sarene
	Joal-Fadiout	
	Sine Saloum	
	Casamanche	
Gambia		
		Banjul Shoreline

		Bao Bolon Wetland Reserve
		Bolon Fenyo
	Niumi National Park	
	Tanbi Wetland Complex	
	Tanji Bird Reserve & Bijol Islands	
		Gambia River Estuary
		Kartong Atlantic River Mouth
Guinee-Bissau		
		Rio Cacheu
	Rio Mansoa & Geba estuary	
		Lagoas de Cufada
	Ilha de Bolama & Rio Grande de Buba	
	Rio Tombali, Rio Cumbij & Ilha de Melo	
	Arquipelago dos Bijagos	
	Cacine	
Guinee		
	Iles Tristao	
	Rio Kapatchez	
	Konkouré Delta	
		Vasieres de Sonfonia
		Ile et marigot de Taidi
Sierra leone		
	Scarcies Estuary	
	Sierra Leone River Estuary	
	Coast Western Peninsula	
	Yawri Bay	
	Sherbro Island & Turtle islands	
		Thauka & Bagru Creeks
		Konakridee-Tagrin coast