East Atlantic Flyway assessment 2017

The status of coastal waterbird populations and their sites

THE WADDEN SEA FLYWAY INITIATIVE

Wetlands INTERNATIONAL

BirdLife INTERNATIONAL

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Foreword

The importance of the Wadden Sea as a stepping stone for migratory birds of the East Atlantic Flyway and for many breeding waterbirds was a major justification for the inscription as UNESCO World's Natural Heritage Site. Reporting on the status and trends in bird populations is, therefore, a request of UNESCO. The report presented here of the total count of migrating and breeding waterbirds along the flyway required close cooperation of many countries and people. It was carried out in 33 countries, 11 in Europe and 22 in Africa, with around 1500 observers. This co-operation in itself is a major international achievement for environmental protection.

The present 2nd report under the umbrella of the Wadden Sea Flyway Initiative presents the results of the total counts of 2017 that compiles data from along the whole flyway. It gives an assessment on the flyway level and includes as new features an inventory of environmental information. This report shows which human activities have major impacts on the bird populations in different regions. Trends of changing bird populations are analysed by comparison to data of the previous total count in 2014 and are presented in the separate chapter "Trends of waterbird populations in the Wadden Sea in comparison with flyway trends".

This report clearly shows the value and necessity of collecting and assessing data on the flyway level at regular intervals for a longer period. Some preliminary conclusions that were drawn in the 2014 report are not supported by data published in this 2017 report. It was found by the present data analysis that more bird populations showed significant increases than a decline in numbers. Some hopeful developments are, however, contrasted by indications of problem areas. Particularly, warming in boreal and Arctic regions are affecting populations breeding in the Arctic. Climate change is a significant pressure acting mainly on a global level, while on the regional level different human activities dominate.

In the Wadden Sea area the 2017 update shows in contrast to the previous report a more favourable picture for migrant and wintering populations. This positive development may have its causes in better conditions in the Wadden Sea itself or in other regions visited by the birds. On the other hand, the breeding bird populations within the Wadden Sea are continuing there negative development most likely linked to pressures within the Wadden Sea itself. Such observations indicate the complexity of the system and the vulnerability to different pressures either elsewhere or within the Wadden Sea. Birds are very sensitive indicators of change teaching us that different regional or temporal developments are connected and act together.

The Flyway activities of the governments of the Netherlands, Germany and Denmark are co-ordinated under the Wadden Sea Flyway Initiative (WSFI) managed by the Common Wadden Sea Secretariat in Wilhelmshaven, Germany. As chair of the Board of the Trilateral Wadden Sea Cooperation I would like to thank everyone who has contributed to this important report. The huge effort of synchronous counting required excellent organisation, planning, and many committed and professional people. I hope that the existing network will continue and will help us to draw management conclusions for the effective protection of migrating and breeding water birds and also the Wadden Sea ecosystem.

Prof. Dr. Karin Lochte
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General

An assessment of the status of waterbird populations and environmental conditions at their sites along the whole East Atlantic Flyway requires a significant cooperation and involvement of organisations, coordinators and field workers, all of whom are sincerely thanked for their important contribution and dedication. National coordinators and other key persons who provided data for this report and especially for the 'total' count of 2017 are thanked further below. It is not possible to thank individually all those who carried out surveys or collated information, but we strongly acknowledge this enthusiastic network of people along the flyway and across continents. More detailed information about the involvement of people, institutions and results in Africa can be found in Agblonon *et al.* 2018.

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Principal sources of data by country

Norway Data used as reported to the International Waterbird Census (IWC). National Coordinator is Svein-Hakon Lorentsen (Norwegian Institute for Nature Research NINA).

Sweden Data used as reported to the IWC. National coordinator is Leif Nilsson (University of Lund).

Finland Data used as reported to the IWC. National coordinator is Aleksi Lehikoinen (Finnish Museum of Natural History).

Estonia Data used as reported to the IWC. National coordinator is Leho Luigujoe (Institute of Zoology and Botany).

Latvia Data used as reported to the IWC. National coordinator is Antra Stipniece University of Latvia, Institute of Biology).

Lithuania Data used as reported to the IWC. National coordinator is Laimonas Sniauksta (Lithuanian Ornithological Society).

Poland Data used as reported to the IWC. National coordinator is Wlodzimierz Meissner (University of Gdansk) who also provided the data for the environmental monitoring.

Germany For Flyway information about bird numbers the data used is as reported to the IWC. Federal Coordinator of IWC is Johannes Wahl (Dachverband Deutscher Avifaunisten). Information on Wadden Sea trends and environmental factors information in Schleswig-Holstein was provided by Klaus Günther (Schutzstation Wattenmeer) and in Niedersachsen by Jürgen Ludwig (Staatliche Vogelschutzwarte) and Gregor Scheiffarth (National Park Wattenmeer Niedersachsen).

Denmark Data used as reported to the IWC. National Coordinator of IWC is Preben Clausen (University of Aarhus). Coordination in the Danish Wadden Sea is carried out by Thomas Bregnballe (University of Aarhus) who also provided the information on environmental conditions.

United Kingdom Data used as reported to the IWC. National Coordinator of IWC is Teresa Frost (British Trust for Ornithology BTO), on behalf of the Wetland Bird Survey, organised and funded by BTO, Wildlife and Wetlands Trust, Royal Society for the Protection of Birds and Joint Nature Conservation Committee.

Ireland Data used as reported to the IWC. National co-ordinator is Niamh Fitzgerald (BirdWatch Ireland BWI), on behalf of The Irish Wetland Bird Survey which is a joint project of the National Parks & Wildlife Service of the Department of Culture, Heritage & the Gaeltacht and BWI. Environmental monitoring data was provided by Lesley Lewis and Helen Boland (both BWI).

The Netherlands Data used as reported to the IWC. National Coordinator of IWC is Menno Hornman (Sovon). Coordination in the Dutch part of the Wadden Sea is carried out by Romke Kleefstra (Sovon). Data on environmental conditions was provided by André van Kleunen (Sovon) and Floor Arts (Delta Project Management).

Belgium Data used as reported to the IWC. For this coastal review data from Flanders is used. Coordinator of IWC in Flanders is Koen Devos (Instituut voor Natuur- en Bosonderzoek INBO) who also provided the data about environmental conditions.

France Data used as reported to the IWC. National Coordinator of IWC is Clémence Gaudard (Ligue de Protection des Oiseaux LPO). Support with the environmental data was provided by Gwenael Quaintenne, Frederic Robin and Laurent Couzi (all LPO).

Spain Data used as reported to the IWC. National Coordinator of IWC is Blas Molina (Sociedad Española de Ornitología).

Portugal Data used as reported to the IWC. National coordinator is Vitor Encarnação (Instituto da Conservação da Natureza - DSCN) who also provided the data on environmental conditions.

Morocco Data used as reported to the IWC. National coordinator is Mohamed Dakki (CEMO, Grepon). He and Asmaâ Ouassou also provided the environmental monitoring data. The waterbird counts in Morocco are part of and supported by the Mediterranean Waterbird Network as coordinated by Laura Dami (Station Biologique Tour du Valat).

Mauritania Data used as reported to the IWC. Counts were organized at the Parc National du Banc d'Arguin (PNBA) by Amadou Kidé (PNBA) who also provided the data on environmental conditions (see Kidé & Diakhite 2018 for more details on the count of 2017). In the Mauritanian part of the trans-boundary Biosphere Reserve of the Senegal River, the counts and environmental data were provided by Zeine El Abidine Sidaty (Parc National Diawling; see Magrega *et al.* 2017 for more details of the 2017 count).

Senegal Data used as reported to the IWC. National coordinator of the IWC is Samuel Dieme, data management by Aminita Sall Diop (Direction des Parcs Nationaux). More details about the counts in 2017 are in Diop & Kane 2017.

The Gambia Data used as reported to the IWC. National coordinator of the IWC is Abdoulie Sawo (Department of Parks and Wildlife Management). For more details of the 2017 count, see Sawo 2017.

Guinea-Bissau Data used as reported to the IWC with extrapolations from samples to totals per main site. National coordinator of the IWC is Jãozinho Sá (Bureau de la Planification Côtière GPC). More details of the count can be found in Sá & Regalla 2017.

Guinea Data used as reported to the IWC, National Coordinator is Namory Keita with the help of Balla Mousa Condé (Division Faune et Protection de la Nature). For details of the count in 2017 see Magassouba 2017.

Sierra Leone Data used as reported to the IWC, National Coordinator is Papanie Bai-Sesay (Conservation Society of Sierra Leone). For details of the count in 2017 see Bai-Sesay 2017.

Liberia Data used as reported to the IWC, National Coordinator is Jerry Garteh (Society for the conservation of Nature in Liberia). Details of the count in January 2017 are in Garteh 2017.

Ivory Coast Data used as reported to the IWC, National Coordinator in 2017 was Damo Edmond Kouadio (Ministry of Water and Forests, direction de la faune et des ressources cynegetiques). Present National coordinator is Salimata Kone. Counts in January 2017 are described in Kouadio 2017.

Ghana Data used as reported to the IWC. National Coordinator is Charles Christian Amankwah (Wildlife Division of Forest Commision) in cooperation with Jones Quartey (Centre for African Wetlands). For details of the count in 2017 see Quartey & Amankwah 2017.

Togo Data used as reported to the IWC, National Coordinator is Maurice Agbeti (Ministère de l'Environment, direction de la Fauna et de la Chasse). Details of counts in 2017 are in Agbeti 2017.

Benin Data used as reported to the IWC, National Coordinator is Hughes Akpona (Direction Generale de la Fauna et de la Chasse. Details of the count can be found in Lougbegnon *et al.* 2017.

Nigeria Data used as reported to the IWC, National Coordinator is Joseph Onoja (Nigerian Conservation Foundation). Details in Onoja 2017.

Cameroon Data used as reported to the IWC. National Coordinator is Gordon Ajonina (Cameroon Wildlife Conservation Society). The counts of 2017 are reported in Ajonina *et al.* 2017.

Sao Tomé & Principe National coordinator of the IWC is Antonio Meyer. In the framework of the count of January 2017 data about waterbirds were collected by the Centre for Ecology, Evolution and Environmental Changes. Details in Faustino de Lima 2017.

Gabon Data used as reported to the IWC. National coordinator is Alphonsine Mfoubou Koumba (Ministère des Eaux et Forets). For details of the count in 2017 see Mfoubou Koumba 2017.

Congo (Brazzaville) Data used as reported to the IWC. National Coordinator is Jerome Mokoko Ikonga (Wildlife Conservation Society of Congo). For details of the count in 2017 see Mokoko Ikonga 2017.

Democratic Republic of Congo The count on the coast in January 2017 was coordinated by Pierre Mavuemba Tuvi (Institut Superieur de Navigation et de Pèche). Details of the count of 2017 are described in Mavuemba Tuvi 2017.

Angola Data used as reported to the IWC. National coordinator is Migual Xavier (Ministerio do Ambiente). Details of the 2017 count are in Xavier 2017.

Namibia Data used as reported to the IWC. National Coordinator is Holger Kolberg (Ministry of Environment and Tourism). Details of the 2017 count are in Kolberg 2017.

South Africa Data used as reported to the IWC. National Coordinator in 2017 was Jerome Ainsley (Animal Demography Unit, University of Cape Town). Details of the 2017 count are in Underhill 2017.

Summary

Coastal wetlands are famous for the large numbers of waterbirds they hold, often coming from far during their migration or forming large breeding colonies. When viewing such spectacles of thousands of birds, the impression could arise that they are plenty and doing well. However, coastal wetlands are rather scarcely distributed across the globe and the waterbirds using them are specialists concentrating at these few sites but not at all numerous everywhere. This renders these wetlands of crucial importance to them. Loss or decreasing quality of such sites can have huge impacts as the birds using them have few other places to go. Migratory species, which most waterbirds are, even depend on a string of wetlands during their annual itinerary between breeding, staging and wintering sites. Such a string of wetlands used by multiple populations of migratory birds following more or less the same routes is called a flyway.

The intricate connections between the breeding, staging and wintering sites of the bird populations involved form the rationale behind flyway cooperation. When the Wadden Sea, one of the important sites in East Atlantic Flyway, was inscribed on the World Heritage Site list in 2009, this came with the request to increase cooperation along the flyway for better conservation and management. In response to this the Wadden Sea Flyway Initiative (WSFI) was launched, and one of the subjects intended to benefit from international cooperation was monitoring. In many countries and many sites along the flyway monitoring was already in place, but as changes in the bird use of any given site may be caused locally as well as by factors operating elsewhere along the migration route. The overall conservation status of the bird populations can only be evaluated when information at the scale of the entire flyway is available.

Under the auspices of the WSFI, a cooperation between national organisations responsible for bird monitoring, both governmental and non-governmental, and Wetlands International and BirdLife International was established to increase the monitoring effort along the coastal East Atlantic Flyway. It was decided that in addition to monitoring of bird numbers, efforts should be increased to also monitor environmental conditions and (human-induced and natural) pressures on the functioning of sites and their birds. On the longer term, demographic parameters of the bird populations should be included in the monitoring as well. These two additions can help identifying causes behind observed changes in bird distribution and numbers, and provide the first clues as to where management measures may be most effective. Such an 'integrated monitoring' system, together with targeted research on mechanisms and causes of changes and on the effectivity of conservation measures, will provide the knowledge needed for adaptive management of sites within a flyway framework.

The intensified cooperation along the East Atlantic Flyway started in 2013 with a scheme consisting of annual monitoring of a sample of coastal sites along the Atlantic coast of Africa complemented by a comprehensive 'total count' every three years, aiming to cover all sites. In most European countries all important sites are already monitored on a yearly basis. At present, the International Waterbird Census (IWC) coordinated by Wetlands International in January of each year, yielding data about non-breeding numbers, is used as the primary data source for trends in bird numbers on the flyway scale. Existing continent- and flyway-scale programmes assessing breeding population sizes of some species are important as well and will likely increase in the future. In 2013-2017, a 'total count' was organized in 2014 and sample monitoring in 2013, 2015 and 2016. The results of the 'total count' of 2017 are assessed in the present report, and compared with earlier results of the IWC going back to 1975.

The 'total count' of the coastal East Atlantic Flyway in January 2017 was carried out in 33 countries of which 11 in Europe and 22 in Africa, and involved about 1,500 observers (1,100 in Europe, 400 in Africa). In each country, national coordinators organized the network of observers and collated the information on bird numbers and environmental conditions. The latter largely followed a system developed by BirdLife International for their Important Bird and Biodiversity Areas (IBA) programme. In addition to funding (often from governments) to carry out the national monitoring programmes, funding for international coordination, reporting and additional support to some countries was received from the 'Programma Rijke Waddenzee' in The Netherlands. Substantial co-funding was also received from the MAVA foundation, Vogelbescherming Nederland, World Wildlife Fund The Netherlands, National Wadden Sea parks in Germany, Wetlands International, BirdLife International and WEBS in the UK.

The results of the 2017 'total count' are reported in several chapters and annexes in this report. The basic monitoring results can be found in the annexes; results per bird species in Annex 1 and results of monitoring environmental conditions, pressures and conservation measures in Annex 2. In the chapters of the main text, the results are analysed for patterns and conclusions are formulated concerning the status and trends of waterbirds in the coastal East Atlantic Flyway as a whole (chapter 2), trends in bird numbers in the Wadden Sea in relation to developments at the flyway scale (chapter 3), and the assessment of main pressures and conservation measures (chapter 4).

With respect to the numerical development of bird populations of the coastal East Atlantic Flyway as a whole, the picture seems not that bad at present. Almost twice as many populations show a significant increase than show a decline both on the long- and on the short term. This is based on 95 populations from 72 species forming a

Sanderling | **Bécasseau sanderling** *(Calidris alba)*

cross-section with respect to taxonomy, breeding and wintering regions, diet and migration strategies. If we break these totals down to functional groups however, we see that populations using intertidal mudflats, depending on benthic food and breeding in the arctic climate zone do less well than populations using other habitats, feeding on plants or fish, and that are short distance migrants or residents. Waders (shorebirds), especially those breeding in the Siberian Arctic, form a taxonomic group showing particularly unfavourable trends.

In the 2014 assessment it became clear that both for populations using the Wadden Sea during migration or wintering and for populations breeding there, the trends within the Wadden Sea were predominantly more negative than those in the entire flyway. This indicated the existence of limiting factors within the Wadden Sea which were more important than causes operating elsewhere. With this 2017 update, trends within the Wadden Sea improved for migrant and wintering populations, and in several cases became more positive than those in the entire flyway, possibly indicating that conditions in the Wadden Sea have improved. For bird populations breeding in the Wadden Sea however the situation has not improved and local trends remain less favourable on average than those at the flyway scale. This function of the Wadden Sea therefore still seems to form a weak link.

As part of the coordinated monitoring effort across the flyway in January 2017, we collected environmental information from over 70 important sites in Europe and Africa. We found that farming (at the edges of the sites) and fishing are two of the most widely recorded uses of coastal wetlands, whilst many sites are also used for recreation and becoming part of a more urban landscape. Key pressures identified were pollution (from various sources), fisheries, farming, whilst urbanisation also brings a range of pressures. Agricultural and pollution pressures were found to be particularly relevant in NW-Europe, Iberia and Morocco. Overfishing (including of shellfish) and pollution were identified in West Africa, with urbanisation of wetlands also recorded as a frequent pressure in the Gulf of Guinea and Southern Africa. At a more global scale, climate change pressures are highly significant, particularly through sea-level rise and warming in boreal and arctic latitudes.

These pressures cannot be linked causally to the bird patterns through monitoring alone. However with the increased knowledge of environmental conditions and pressures along the flyway some plausible hypotheses can be formulated. Evidence is accumulating that global warming is affecting long-distance migrants particularly and the ones breeding in the arctic zone foremost. Our results, with arctic-breeding waders especially decreasing, confirm that this group experiences increasingly difficult circumstances. The fate of certain breeding birds in the Wadden Sea can also be partly linked to global warming, with more frequent loss of clutches due to an increase in high flood incidents. Local often human induced pressures are superimposed on this global warming process. The environmental monitoring indicates pressures on coastal ecosystems through urbanisation, farming, tourism, fisheries and pollution ranging from industrial and household effluents to garbage and litter. If we can reduce their impact we will be able to increase the resilience of populations using the flyway.

Clearly, conservation measures along the flyway are important to secure a network of sites necessary for migratory birds. Key measures include the legal protection of sites at both international and national levels, improving policies, regulation and site management, restoring habitats and engaging local communities in conservation. This must also include systematic monitoring of the status of sites and their birds to inform policy and management.

Résumé

Les zones humides côtières sont réputées pour le grand nombre d'oiseaux d'eau qui y stationnent, venant souvent de loin lors de leur migration ou formant de vastes colonies de reproduction. En regardant de tels spectacles de milliers d'oiseaux, on peut avoir l'impression qu'ils sont nombreux et se portent bien. Cependant, les zones humides côtières sont assez peu réparties à travers le monde et les oiseaux d'eau qui les utilisent sont des spécialistes concentrés sur ces quelques sites et qui ne sont pas du tout nombreux partout. Cela confère à ces zones humides une importance cruciale. La perte ou la dégradation de la qualité de ces sites peut avoir des conséquences énormes, car les oiseaux qui les utilisent n'ont guère d'autres endroits où aller. Les espèces migratrices, la plupart des oiseaux d'eau en sont, dépendent même d'une série de zones humides au cours de leur itinéraire annuel entre sites de reproduction, de repos et d'hivernage. Une telle série de zones humides utilisées par de multiples populations d'oiseaux migrateurs empruntant plus ou moins les mêmes itinéraires est appelée voie de migration.

Les liens complexes existant entre les sites de reproduction, de repos et d'hivernage des populations d'oiseaux impliquées constituent la raison d'être de la coopération en matière de voies de migration. Lorsque la mer des Wadden, l'un des sites importants de la voie de migration de l'Atlantique Est, a été inscrite sur la liste du patrimoine mondial en 2009, la nécessité de renforcer la coopération le long de la voie de migration a été mise à jour, afin d'en améliorer la conservation et la gestion. En retour, l'Initiative de la voie de migration de la mer des Wadden (WSFI) a été lancée et le suivi a été érigé comme aspect devant tirer profit de la coopération internationale. Dans de nombreux pays et sur de nombreux sites le long de la voie de migration, le suivi était déjà en place, mais étant donné que des changements dans l'utilisation par les oiseaux d'un site donné peuvent être causés localement ainsi que par des facteurs exogènes le long de la route de migration, l'état de conservation générale des populations d'oiseaux ne peut évalué que lorsque des informations à l'échelle complète de la voie de migration sont disponibles.

Sous les auspices du WSFI, une coopération entre les organisations nationales responsables du suivi des oiseaux, tant gouvernementales que non gouvernementales, Wetlands International et BirdLife International, a été initiée pour accroître les efforts du suivi le long de la voie de migration côtière Est-Atlantique. En plus du suivi du nombre d'oiseaux, il a été décidé d'intensifier les efforts pour surveiller également les conditions environnementales et les pressions (anthropiques et naturelles) sur le fonctionnement des sites et des oiseaux qu'ils abritent. A plus long terme, les paramètres démographiques des populations d'oiseaux devraient, également, être inclus dans le monitoring. Ces deux ajouts peuvent aider à identifier les causes des changements observés dans la répartition et le nombre d'oiseaux et à fournir les premiers indices sur les endroits où les mesures de gestion peuvent être les plus efficaces. Un tel "système de suivi intégré", associé à une recherche ciblée sur les mécanismes et les causes des changements et sur l'efficacité des mesures de conservation, fournira les connaissances nécessaires à la gestion adaptative des sites dans le cadre de la voie de migration.

L'intensification de la coopération le long de la voie de migration Est-Atlantique a débuté en 2013 avec un programme consistant en un suivi annuel d'un échantillon de sites côtiers le long de la côte atlantique de l'Afrique, complété par un « dénombrement intégral » complet tous les trois ans, visant à couvrir tous les sites. Dans la plupart des pays européens, tous les sites importants font déjà l'objet d'un suivi annuel. A l'heure actuelle, le recensement international des oiseaux d'eau (IWC) coordonné par Wetlands International en janvier de chaque année, fournissant des données sur les nombres non reproducteurs, est utilisé comme principale source de données pour les tendances du nombre d'oiseaux à l'échelle de la voie de migration. Les programmes existant à l'échelle du continent et des

voies de migration qui évaluent la taille des populations reproductrices de certaines espèces sont également importants et vont probablement augmenter à l'avenir. Dans la période 2013-2017, un « dénombrement intégral » a été organisé en 2014 et un suivi des échantillons en 2013, 2015 et 2016. Les résultats du « dénombrement intégral » de 2017 sont évalués dans le présent rapport et comparés aux résultats antérieurs du Recensement international des oiseaux d'eau (IWC) remontant à 1975.

Le « dénombrement intégral » de la voie de migration de la côte Est Atlantique en janvier 2017 a été effectué dans 33 pays, dont 11 en Europe et 22 en Afrique. Il a impliqué environ 1 500 observateurs (1 100 en Europe, 400 en Afrique). Dans chaque pays, les coordinateurs nationaux ont organisé le réseau d'observateurs et rassemblé les informations sur le nombre d'oiseaux et les conditions environnementales. Un système mis au point par BirdLife International, pour le programme Zones importantes pour les oiseaux et la biodiversité (ZICO), a été utilisé. En plus du financement (souvent par les gouvernements) pour mener à bien les programmes nationaux de suivi, le Programme « Rijke Waddenzee aux Pays-Bas » a également fourni des fonds pour la coordination internationale, le rapportage et un appui additionnel à certains pays. Un financement substantiel a également été reçu de la fondation MAVA, de Vogelbescherming Nederland, du World Wildlife Fund Pays-Bas, des parcs nationaux de la mer des Wadden en Allemagne, de Wetlands International, de BirdLife International et de WEBS du Royaume-Uni.

Les résultats du « dénombrement intégral » de 2017 sont présentés dans plusieurs chapitres et annexes du présent rapport. Les données de base du suivi se trouvent dans les annexes ; Résultats par espèce d'oiseau dans l'Annexe 1 et résultats du suivi des conditions environnementales, des pressions et des mesures de conservation de l'environnement figurent à l'Annexe 2. Dans les chapitres du texte principal, les résultats sont analysés pour en dégager les tendances et des conclusions sont formulées concernant le statut et les tendances d'évolution des oiseaux d'eau dans les zones côtières de la voie de migration de l'Atlantique Est dans son ensemble (chapitre 2), tendances du nombre d'oiseaux dans la mer de Wadden en relation avec l'évolution à l'échelle de la voie de migration (chapitre 3) et évaluation des principales pressions et mesures de conservation (chapitre 4).

En ce qui concerne l'évolution numérique des populations d'oiseaux de la voie de migration de la côte de l'Atlantique Est, la situation ne semble pas si défavorable à l'heure actuelle. Presque le double du nombre de populations sujettes à déclin, à la fois à long et à court terme, montre une augmentation significative. Ceci est basé sur 95 populations de 72 espèces formant un échantillon représentatif de la taxonomie, des régions de reproduction et d'hivernage, du régime alimentaire et des stratégies de migration. Cependant, si nous divisons ces totaux en groupes fonctionnels, nous constatons que les populations utilisant des vasières intertidales, dépendant de la nourriture benthique et de la reproduction dans la zone climatique arctique, réussissent moins bien que les populations utilisant d'autres habitats, se nourrissant de plantes ou de poissons et sont migrateurs de courte distance ou résidents. Les échassiers (oiseaux de rivage), en particulier ceux qui nichent dans l'Arctique sibérien, forment un groupe taxonomique aux tendances particulièrement défavorables.

Lors de l'évaluation de 2014, il est apparu clairement que tant pour les populations utilisant la mer de Wadden pendant la migration ou hivernant que pour les populations s'y reproduisant, les tendances étaient principalement plus négatives que celles de la voie de migration complète. Cela indiquait l'existence de facteurs limitants dans la mer de Wadden qui étaient plus importants que les causes qui agissaient ailleurs. Avec cette mise à jour de 2017, les tendances dans la mer de Wadden se sont améliorées pour les populations migrantes et hivernantes et, dans plusieurs cas, sont devenues plus positives que celles de la voie de migration complète, indiquant, peut-être, que les conditions dans la mer de Wadden se sont améliorées. Pour les populations d'oiseaux nicheurs dans la mer de Wadden, la situation ne s'est toutefois pas améliorée et les tendances locales restent, en moyenne, moins favorables que celles à l'échelle de la voie de migration. Cette fonction de la mer de Wadden semble donc encore constituer un maillon faible.

Dans le cadre des efforts de suivi coordonnés effectués sur la voie de migration en janvier 2017, nous avons collecté des informations environnementales sur plus de 70 sites importants en Europe et en Afrique. Nous avons constaté que l'agriculture (aux abords des sites) et la pêche sont deux des utilisations les plus largement répertoriées des zones humides côtières, alors que de nombreux sites sont également utilisés à des fins de loisirs et s'intègrent dans un paysage plus urbain. Les principales pressions identifiées étaient la pollution (de diverses sources), la pêche, l'agriculture, tandis que l'urbanisation entraînait également toute une gamme de pressions. Les pressions exercées par l'agriculture et la pollution se sont avérées particulièrement pertinentes dans le nord-ouest de l'Europe, dans la péninsule ibérique et au Maroc. La surpêche (y compris des mollusques et crustacés) et la pollution ont été identifiées en Afrique de l'Ouest et l'urbanisation des zones humides a également été enregistrée comme une pression fréquente dans le golfe de Guinée et en Afrique australe. A une échelle plus globale, les pressions liées aux changements climatiques sont très importantes, notamment en raison de l'élévation du niveau de la mer et du réchauffement des zones boréales et arctiques.

Ces pressions ne peuvent pas être liées de manière causale aux espèces d'oiseaux uniquement par le biais du suivi. Cependant, avec la connaissance accrue des condi-

tions environnementales et des pressions le long de la voie de migration, certaines hypothèses plausibles peuvent être formulées. Les preuves s'accumulent que le réchauffement climatique affecte particulièrement les migrants de longue distance et ceux qui se reproduisent dans la zone arctique. Nos résultats, avec une diminution particulièrement marquée des échassiers nicheurs de l'Arctique, confirment que ce groupe connaît des conditions de plus en plus difficiles. Le sort de certains oiseaux nicheurs dans la mer de Wadden peut également être, en partie, lié au réchauffement de la planète, avec des pertes plus fréquentes de couvées en raison de la multiplication des inondations. Des pressions locales, souvent d'origine humaine, se superposent à ce processus de réchauffement planétaire. Le suivi de l'environnement révèle des pressions sur les écosystèmes côtiers dues à l'urbanisation, à l'agriculture, au tourisme, à la pêche et à la pollution, allant des effluents industriels et ménagers aux déchets et ordures. Si nous pouvons réduire leur impact, nous pourrons accroître la résilience des populations d'oiseaux utilisant la voie de migration.

Il est clair que les mesures de conservation le long de la voie de migration sont importantes pour sécuriser un réseau de sites nécessaires aux oiseaux migrateurs. Les mesures clés comprennent la protection juridique des sites aux niveaux international et national, l'amélioration des politiques, de la réglementation et de la gestion des sites, la restauration des habitats et la participation des communautés locales à la conservation. Cela doit également inclure une surveillance systématique de l'état des sites et de leurs oiseaux pour éclairer les politiques et la gestion.

Hans Schekkerman

Discussing count results Banc d' Arguin, Mauritania.

Common Shelduck | **Tadorne de Belon** *(Tadorna tadorna)*
Terschelling, Netherlands (Arie Ouwerkerk / Agami)

1. Introduction

Marc van Roomen, Szabolsc Nagy, Geoffroy Citegetse & Hans Schekkerman

The East *Atlantic* Flyway (fig. 1.1) is one of the major flyways for waterbirds connecting breeding areas with staging sites and their non-breeding wintering grounds during their annual cycle. It stretches from the Arctic (Northwestern Canada to Central Siberia) through Western Europe (mainly Atlantic and North Sea areas) to the entire western coastline of Africa. The combination of the quantity and quality of breeding habitat and major wetlands dotted along this flyway form the crucial basis for a sustainable future for the bird species using this flyway (table 1.1).

This region is also used by a substantial human population, with numerous cities, industries and activities all along the coastal zone. The flyway region provides important ecosystem services in the form of food, prevention of flooding, renewable energy and leisure opportunities. In some areas, people and wildlife, including migratory birds, co-exist in reasonable harmony, but in other areas human activities exert a strong pressure on wildlife and their sites. For migratory birds, impactful activities include fisheries, pollution, disturbance and conversion of coastal wetlands to alternative uses like agriculture and urbanisation.

This means that for proper co-existence between human presence and biodiversity, of which birds are important indicators, conservation and management measures need to be applied. This requires careful decision making and adaptive management. These processes need to be based on and informed by knowledge about the state and trends of the bird populations themselves and the environment they use. This will help to signal problems, define priorities and evaluate measures taken. In addition to information from individual sites it is, particularly for migrating populations, crucial to have a flyway perspective, as the same individual birds use a chain of habitats and sites far apart in different countries, and the combination of conditions at all these sites will determine a favourable or unfavourable conservation status.

The Wadden Sea is a major coastal wetland forming an important breeding, staging and wintering site for waterbird populations along the East Atlantic Flyway. With the designation of the Wadden Sea as a World Heritage site in 2009, the World Heritage Committee requested a strengthening of cooperation with state parties along the flyway concerning on management and research activities for conserving migratory species. As a follow up, during a workshop in Wilhelmshaven in 2011, it was recommended

Figure 1.1. The three flyways in the African-Eurasian region as based on migratory shorebirds (Delany et al 2009) with the East Atlantic Flyway in blue. *Les trois voies de migration de la région Afrique-Eurasie basées sur les oiseaux de rivage migrateurs (Delany et al 2009) avec la voie de migration Est-Atlantique en bleu.*

to increase the cooperation in monitoring along the flyway for the benefit of conservation and management of Wadden Sea populations and other Palearctic and African species using the same sites (Boere & van Roomen 2011). Upon this recommendation, a proposal for integrated monitoring along the East Atlantic Flyway was formulated (van Roomen *et al.* 2013). The activities should focus on monitoring bird abundance (population sizes, trends and distribution), the biological processes causing the changes in numbers (reproduction and survival) and the environmental conditions and pressures impacting on these processes. The latter two can help identifying causes behind observed changes in bird distribution and numbers, and provide the first clues as to where management measures may be most effective. This combination of information (summarised as 'integrated monitoring'), together with targeted research on mechanisms and causes of changes and on the effectivity of conservation measures, should provide the knowledge base for effective management and conservation allowing co-existence of biodiversity and human use along the flyway.

This ambitious aim started with improving abundance monitoring and environmental monitoring through a cooperation between the Wadden Sea Flyway Initiative, Wetlands International and BirdLife International, with national coordinators involved in each country. The monitoring aims for annual data collection in at least a selection of sites depending on local conditions and possibilities. In most European countries nearly all important sites are monitored on a yearly basis, but this is not the case along the Atlantic coast of Africa where resources are more

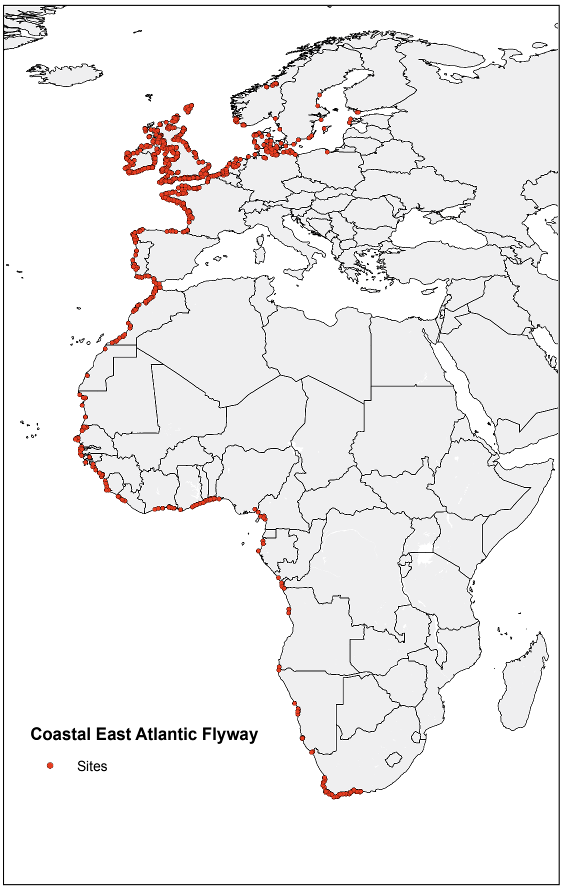


Figure 1.2. Sites considered part of the 'coastal East Atlantic Flyway'. *Sites considérés comme faisant partie de la voie de migration de la côte Est-atlantique*.

Arnold Meijer / Blue Robin

Curlew Sandpiper | **Bécasseau cocorli** *(Calidris ferruginea)* & **Pied Avocet** | **Avocette élégante** *(Recurvirostra avosetta)*

Habitat type	Description
Arctic tundra, boreal forests and wetlands	Vital staging / stopover and wintering sites, offering important feeding resources along the flyway and supporting high waterbird concentrations.
Estuaries, river deltas	Often comprise a range of habitats, such as mudflats, coastal lagoons, lakes, marshes, reed beds, mangroves and floodplain forests.
Coastal lagoons	May be freshwater, marine or brackish; excellent refuges for waterbirds.
Beaches, sandbars, sandy islands	Dynamic habitats widely important for roosting but rather low in food resources; sandy islands provide important breeding habitat for many terns, gulls and other birds.
Saltmarsh	Productive temperate wetlands providing important feeding grounds for many birds.
Mangroves	Tropical tidal forests with important role in coastal defence, providing breeding areas for fish and roosting and breeding areas for many waterbirds.
Lakes, freshwater marshes	The type and density of aquatic vegetation varies widely; some areas have been converted to use as managed grasslands, meadows and other secondary open habitat.
Floodplains, farmlands	Coastal floodplains may support high concentrations of waterbirds; they are often used for agriculture and grazing.
Rocky outcrops, cliffs, oceanic islands	Being relatively inaccessible, they provide important breeding areas for a range of birds, especially seabirds.

Table 1.1. Principal habitats of the East Atlantic Flyway for migratory waterbirds. *Principaux habitats de la voie de migration de l'Atlantique Est pour les oiseaux d'eau migrateurs.*

limited. Therefore once every three years a more comprehensive survey is organised which the aims to collect data from all sites . After such a 'total count' year, a flyway assessment is updated. Besides the effort on a simultaneous flyway census, countries are encouraged to increase the coverage and frequency of monitoring visits to individual sites also during the interval between the triannual surveys.

This monitoring scheme started in 2013 with a 'total count' in 2014 and a first flyway assessment appearing in 2015 (van Roomen *et al.* 2015). After continuation of yearly data collection 2015 and 2016 a new 'total count' was organized in 2017 and the present report provides the second flyway assessment. In principle the assessment of bird numbers involves both counts of breeding and non-breeding birds, depending on the species and population. However, so far the emphasis has been on non-breeding counts (mostly carried out in January as part of the International Waterbird Census (IWC) coordinated by Wetlands International) as these are available on a yearly basis, which is not the case for most of the required breeding bird data. Abundance trends have been assessed for a selection of bird populations that make extensive use of coastal sites along the East Atlantic Flyway, but data from throughout the biogeographic range of these populations have been used to calculate the flyway trends (fig. 1.2). Despite the fact that this monitoring initiative started officially in 2013, information dating far back was also available from many sites and could be used to describe developments going back to the late seventies or early eighties of the previous century. The description of environmental conditions and pressures largely follows a system developed by BirdLife International for their Important Bird and Biodiversity Areas (IBA) programme.

This report consists of three main chapters summarising the most important findings with respect to bird trends along the flyway (chapter 2), an assessment of the results in the framework of relations of bird populations with the Wadden Sea (chapter 3), and a description of environmental conditions, pressures and conservation along the flyway (chapter 4). Two large Annexes provide more detailed information on the abundance monitoring for each species (Annex 1) and on the environmental monitoring at a selection of sites (Annex 2). Further annexes provide methodological details and backgrounds to chapters 2-4.

Harvey van Diek

Slender-billed Gull | **Goéland railleur** *(Chroicocephalus genei)*
Spain (Arnold Meijer / Blue Robin)

2. Patterns in trends of waterbird populations using the coastal East Atlantic Flyway, update 2017

Echantillons dans les tendances des populations d'oiseaux d'eau utilisant la côte de la voie de migration de l'Atlantique Est, mise à jour de 2017

Hans Schekkerman, Khady Gueye Fall, Szabolcs Nagy & Marc van Roomen

Summary

In this chapter, long-term (18-42 year) and short-term (10 year) trends of 95 waterbird populations of the coastal East Atlantic Flyway are summarised, and general patterns in increase and decrease are explored on the basis of ecological characteristics of species. The trends used are considered to be reasonably good and represent a cross-section of species with respect to taxonomy, breeding and wintering regions, diets and migration strategies. Details per species and population and trend types used can be found in Annex 1 of this report. Almost twice as many of the populations considered show a significant increase than show a decline both on the long- and on the short term, and the mean annual rate of change across all trends was slightly positive although not significantly different from a stable trend. The trait-based analysis suggested a strong taxonomic pattern in variation of population trends, with waders, particularly those breeding in the Siberian Arctic, showing particularly negative trends, and geese, flamingos and pelicans the most favourable development on average. Related to this finding, populations using intertidal mudflats and depending on benthic food do less well than populations using other habitats, feeding on plants or fish. Waterbird populations breeding and wintering in Southernmost Africa also seem to be doing less well.

Résumé

Dans ce chapitre, les tendances à long terme (18 à 42 ans) et à court terme (10 ans) de 95 populations d'oiseaux d'eau de la voie de migration de la côte de l'Atlantique Est sont résumées, et les tendances générales en matière d'augmentation et de diminution sont explorées sur la base de caractéristiques écologiques des espèces. Les tendances sont considérées comme relativement bonnes et représentent un échantillon représentatif d'espèces en ce qui concerne la taxonomie, les régions de reproduction et d'hivernage, les régimes alimentaires et les stratégies de migration. Les détails, par espèce et population, ainsi que les types de tendance utilisés, figurent à l'annexe 1 du présent rapport. Près du double de la population considérée présente une augmentation significative, plutôt qu'un déclin, à la fois à court et à long terme, et le taux de variation annuel moyen de toutes les tendances était légèrement positif, sans toutefois être significativement différent de celui d'une tendance stable. L'analyse basée sur les caractéristiques a suggéré une forte tendance taxonomique dans la variation des tendances de la population, les échassiers, en particulier ceux qui se reproduisent dans l'Arctique sibérien, présentent des tendances particulièrement négatives, tandis que les oies, les flamants roses et les pélicans constituent l'évolution la plus favorable en moyenne. Dans le même temps, les populations utilisant des vasières intertidales et dépendant de la nourriture benthique se comportent moins bien que les populations utilisant d'autres habitats, se nourrissant de plantes ou de poissons. Les populations d'oiseaux d'eau en phase de nidification et d'hivernage dans l'extrême sud de l'Afrique semblent également s'en tirer moins bien.

2.1 Introduction

This chapter summarises general patterns in the trends of waterbird populations occurring along the coastal East Atlantic Flyway. These trends are presented and discussed species-by-species in Annex 1. Besides presenting a global summary of populations showing increasing, stable or decreasing trends, we explored the existence of common patterns in increase and decrease across populations with similar ecological characteristics. By comparing trends between various groupings of species (or populations within species), patterns may emerge that point to factors affecting multiple bird populations in similar ways across the whole of the coastal East Atlantic Flyway region, or in specific parts of it. Identifying such patterns may provide a first clue to possible causes, and identify priority areas for conservation.

Short	Description	levels (classes)
taxon	Bird order or family	geese / ducks / pelicans, cormorants & allies / herons / flamingos / grebes / waders / gulls / terns
clim-br	Breeding climate zone: climate region of main breeding range	arctic / boreal (Iceland + Eurasian taiga zone) / north-temperate / Mediterranean / tropical / south-temperate (Namibia + South-Africa)
clim-nbr	Non-breeding climate zone: climate region of main non-breeding range	north-temperate / Mediterranean / tropical / south-temperate (Namibia + South Africa) / wide (including at least both north-temperate and tropical)
migrat	Migration distance	resident / short-distance / medium-distance / long-distance / variable (including both short- and long-distance migrants)
arc-reg	Arctic breeding region (for populations breeding in the Arctic)	Nearctic (Canada, Greenland) / N-Europe / Siberia (east of Urals) / elsewhere (outside Arctic)
conc-nbr	Degree of spatial concentration in the non-breeding season	none (widespread) / moderate / strong (large share of population in ≤5 major sites)
forhab-br	Foraging habitat in breeding season	terrestrial / freshwater / mixed (both fresh and saline) / saline intertidal / saline subtidal and offshore
forhab-nbr	Foraging habitat in non-breeding season	terrestrial / freshwater / mixed (both fresh and saline) / saline intertidal / saline subtidal + offshore
diet-br	Diet in breeding season	plants / invertebrates + plant (seeds) / invertebrates + algae (diatoms) / invertebrates / small fish + invertebrates / fish / wide spectrum (often including fish and scavenging)
diet-nbr	Diet in non-breeding season	plants / invertebrates + plant (seeds) / benthos (intertidal invertebrates, often mostly worms) / benthos mainly bivalves / benthos + algae (diatoms) / benthos + small fish / fish / wide spectrum (often including fish and scavenging)
size	Body size class	<0.1kg (small waders) / 0.1-0.5kg (teal, medium-sized waders, small gulls, terns) / 0.5-1.5kg (ducks, herons, large waders, large gulls) / >1.5kg (geese, pelicans, cormorant, greater flamingo)
popsize	Flyway population size class (no. of individuals)	<5,000 / 5,000-25,000 / 25,000-100,000 / 100,000-500,000 / >500,000

Table 2.1. Traits used in the exploration of associations between population characteristics and trends. *Caractéristiques utilisées dans l'exploration des associations entre les caractéristiques et les tendances de la population.*

2.2 Data and analysis

The raw data used in this analysis consists of the long- and short term trends in the numerical size of waterbird populations up to 2017, as presented in Annex 1 of this report. In total, trends for 95 populations of 74 species were included. For details about the count data underlying the trends, trend types and methods of trend calculation, see Annex 1. For representation in this chapter, all trends were expressed as the average % change per year over the trend period (lasting 18-42 years for long-term trends, 10 years for short-term trends). Trends as used in this chapter are a combination of international 'flyway' or 'biogeographical' population trends or trends within a part of the coastal East Atlantic Flyway but not covering the whole winter range of that population. For a few species (Whimbrel, White-Fronted Plover, European Herring Gull, Lesser Black-backed Gull, Little Tern and Common Tern) two or more populations are merged to one flyway trend as data to calculate separate trends were lacking. In most cases the trends are based on data from the International Waterbird Census, except in Cape Cormorant, Eurasian Curlew, Eurasian Spoonbill, Gull-billed Tern and Roseate Tern, were trends were used based on breeding bird data (more details in Annex 1). The trends selected are considered to be reasonably reliable and represent a cross-section of species with respect to taxonomy, breeding and wintering regions, diets and migration strategies.

General patterns in trends were explored primarily by calculating means and comparing across groups of multiple populations (species) with similar ecological characteristics.

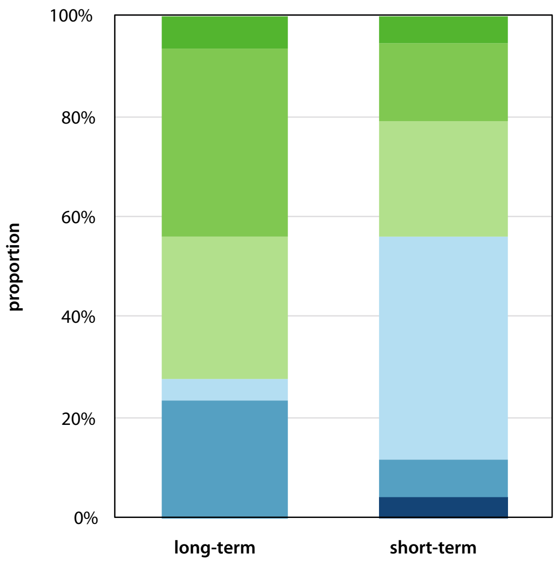
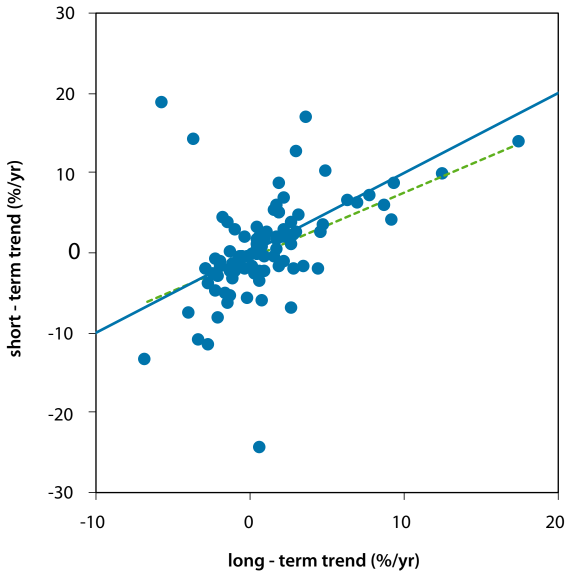


Figure 2.1. Trend classifications of 95 long- and short-term trends considered in this report. The boundary between 'moderate' and 'strong' increases or declines is a change of 5% per year. Trends are considered 'stable' if the 95% confidence interval around the trend includes 0% change and does not include 5% change in either direction. If it does include 5% change, the trend is 'uncertain'. *Classifications de 95 tendances, à long et à court terme, considérées dans ce rapport.*

Figure 2.2. Associations between short- and long term trends in 95 waterbird populations. The correlation is significant (rs=0.477, d.f.=93, P<0.001). The dashed line describes the relationship, the solid line denotes identical trends on both time scales (y=x). Short-term trend show a greater range of variation than long-term trends, hence the different scales. *Associations entre les tendances, à court et à long terme, de 95 populations d'oiseaux d'eau. La corrélation est significative (rs = 0,477, d.f. = 93, p <0,001).*



For this analysis, 12 different traits were defined (table 2.1) and each population was assigned a score or class for each trait (see Annex 3 for a complete list).

Differences in trends between ecological groups (trait classes) were tested by analysis of variance (ANOVA) and regression (Linear Models). All trends were treated as independent data points in this explorative analysis; no adjustments were made for the fact that some species are represented by more than one population. For multivariate analyses, an all-subsets regression approach was applied in which models were built including all possible combinations of the trait variables. The resulting models were ranked and assessed on the basis of Akaike's Information Criterion (AIC).

2.3 Results

Overall patterns in increase and decrease

On the long-term time scale, the majority of all 95 trends considered fell in the favourable trend categories 'increasing' (44%) and 'stable' (28%) (figure 2.1). Declining populations made up 23% of the total, with none in the most unfavourable category of 'strong decline'. Uncertain trends were found in just 4 populations (4%). The mean annual rate of change across all populations was +1.23 %/year, with 95% confidence interval (C.I.) -0.5 to +2.0 %/year, i.e. not significantly different from a stable situation (0 %/year).

On the short term, 21% of all trends showed an increase, 23% were stable and 11% declining, of which 4% strongly (figure 2.1). Compared to long-term trends, a far greater share of short-term trends (44%) fell in the 'uncertain' category. This is a logical consequence of the shorter time period, over which short-term fluctuations in bird numbers and random errors in the counts can exert a stronger influence. As a result, short-term trends were more variable between populations than long-term trends (figure 2.2). However, the two were positively correlated, i.e. populations that increased on the long term also tended to increase during the last 10 years and *vice versa*. Due to the large proportion of uncertain trends it is hard to say whether short-term trends were in general more or less favourable than long-term trends of the same species. Although two-thirds of all short-term trends were less favourable (i.e. weaker increase or stronger decrease) than the long-term trend shown by the same population, the ratio of significant declines to significant increases was not different between short- and long-term trends (1.8 vs. 1.9, chi-square test: X^2=0.01, P=0.91), and the mean annual rates of change

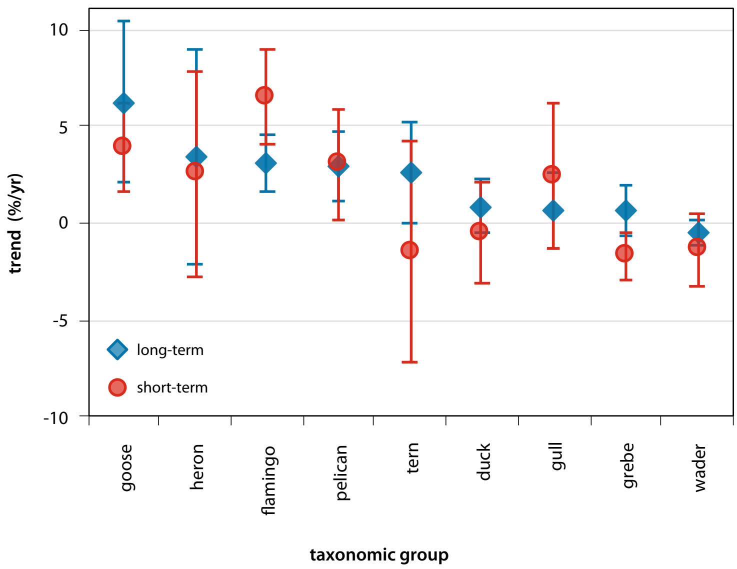


Figure 2.3. Average long- and short-term trends within various taxonomic groups (bird families or orders). Bars denote 95% confidence interval of the mean. Groups are ordered by decreasing long-term trend values. *Tendances moyennes, à court et à long terme, au sein de divers groupes taxonomiques (familles ou ordres).*

Long-term trends			
Variable	**d.f.**	**R^2 (%)**	**P**
diet breeding	7	22.1	<0.001
taxonomic group	9	21.3	0.01
diet non-breeding	9	16.5	0.04
habitat non-breeding	5	14.7	0.01
body size	4	11.6	0.01
population size	5	10.6	0.04
climate zone breeding	6	7.4	0.23
habitat breeding	5	5.4	0.28
arctic breeding region	4	4.9	0.20
concentration non-breeding	3	3.2	0.22
migration distance	5	1.4	0.87
climate zone non-breeding	5	1.1	0.91

Short-term trends			
variable	**d.f.**	**R^2 (%)**	**P**
taxonomic group	9	13.97	<0.001
climate zone breeding	6	11.65	0.01
population size	5	6.65	0.04
arctic breeding region	4	6.60	0.10
diet breeding	7	6.32	0.01
diet non-breeding	9	5.01	0.01
habitat non-breeding	5	3.84	0.04
habitat breeding	5	3.84	0.23
body size	4	3.62	0.28
concentration non-breeding	3	2.72	0.22
migration distance	5	2.57	0.87
climate zone non-breeding	5	2.55	0.91

Table 2.2. Effects of single population traits on long- and short-term trends of 95 waterbird populations. Variables are ordered by decreasing % explained variance (R^2); the horizontal line separates traits with a significant effect (P<0.05). *Effets des caractéristiques d'une seule population sur les tendances à court et à long terme de 95 populations d'oiseaux d'eau. Les variables sont classées par% décroissant de la variance expliquée (R2) ; la ligne horizontale sépare les caractéristiques ayant un effet significatif (p <0,05).*

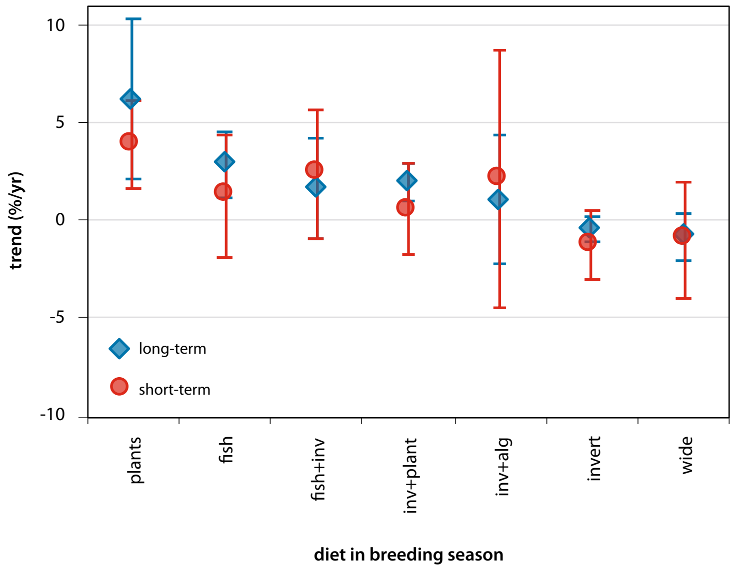


Figure 2.4. Mean long- and short-term trends of populations characterised by diet in the breeding season. Bars denote 95% confidence interval of the mean. *Tendances moyennes, à court et à long terme, des populations caractérisées par un régime alimentaire pendant la saison de reproduction.*

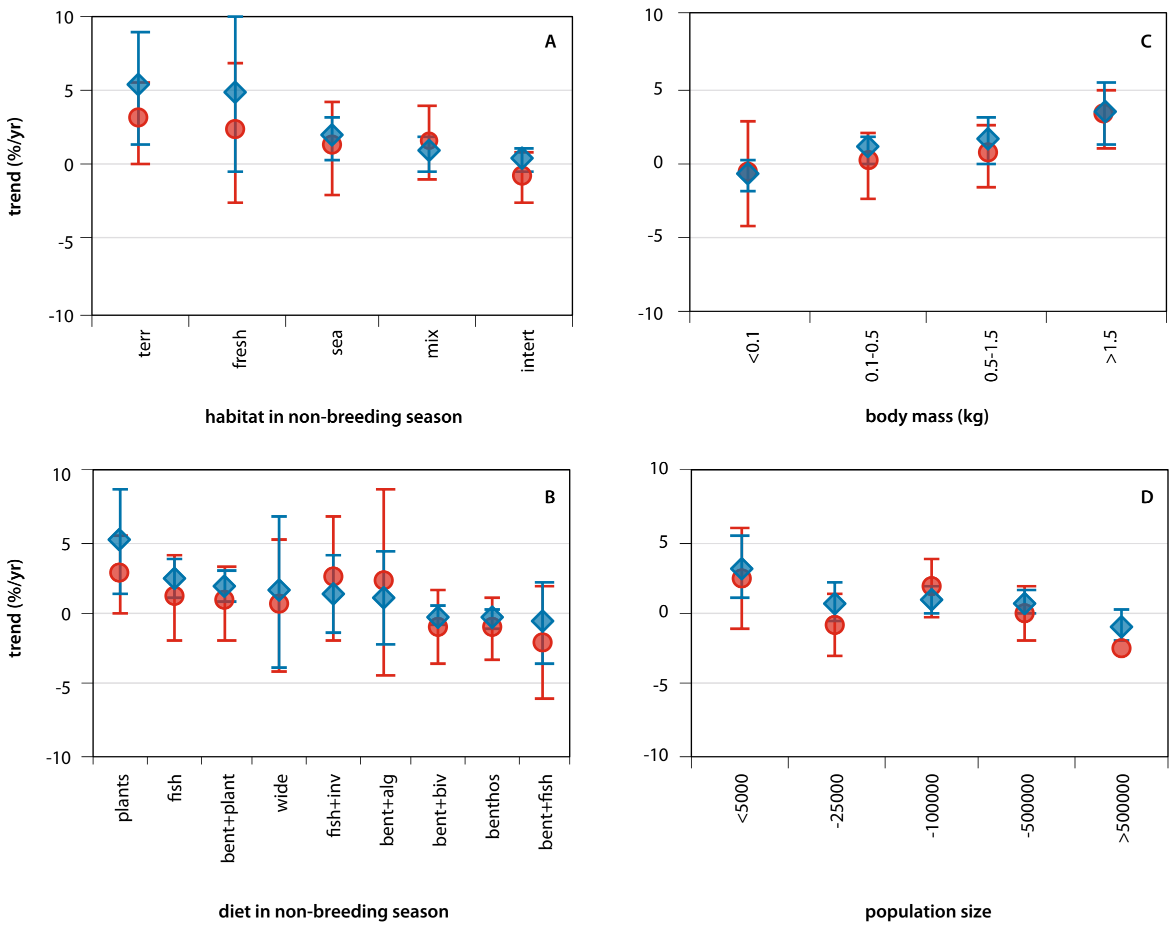


Figure 2.5. Mean long- and short-term trends of populations characterised by (a) foraging habitat in the non-breeding season (terrestrial, freshwater, sea, mixed, intertidal), (b) diet in the non-breeding season, (c) body mass and (d) population size. Bars denote 95% confidence interval of the mean. *Tendances moyennes, à court et à long terme, des populations caractérisées par (a) un habitat d'alimentation en dehors de la saison de reproduction (terrestre, d'eau douce, marine, mixte, intertidal), (b) un régime alimentaire en dehors de la saison de reproduction, (c) la masse et (d) taille de la population.*

were not significantly different either (paired t-test: t_{94}=1.37, P=0.17). The overall mean of the short-term trends was +0.48 %/year (95% C.I. -0.8 to +1.7 %/year), again not significantly different from a stable situation.

Trend patterns among taxonomic groups

The long-term trends showed significant variation among waterbird populations belonging to different families/orders (ANOVA, $F_{8,86}$=2.92, P=0.006). Waders (Charadrii, also known as shorebirds) showed the least favourable trend and were the only taxonomic group with a negative mean annual long-term rate of change (figure 2.3). The most positive mean trends were found in geese, flamingos, pelicans and herons (though in the latter with large variation, overlapping 0% change).

Although differences in short-term trends between taxonomic groups were not significant ($F_{8,86}$=1.75, P=0.01), the overall pattern was broadly similar to that on the long term, with waders showing the least and geese and flamingos the most favourable trends. Among grebes, terns, geese and ducks the short-term trends tended to be more negative than long-term trends, indicating an unfavourable recent change in the direction of population trajectories. A fair amount of uncertainty surrounds the trends of terns however; the current trends are based on winter counts which may not adequately cover the populations as a whole due to considerable numbers feeding offshore. The change in the average trend among geese is caused by several populations levelling off after a period of strong increase. In flamingos there seems to have been a recent change in a positive direction, i.e. an accelerated increase.

Trends and ecological traits

Among models based on a single ecological trait (table 2.2), breeding season diet and taxon were the variables explaining the largest fraction of the variation in long-term trends among populations. The effect of taxon was discussed above, that of breeding season diet is illustrated in figure 2.4. The least favourable trends are found among species feeding on invertebrates and those with a wide spectrum diet (usually including fish but also offal and other food types). The group of invertebrate feeders consists largely of waders, thus mirroring the picture emerging from the taxonomic grouping discussed above. 'Wide spectrum' foragers showing declines comprise the Goliath Heron and four species of large gulls. The most favourable trends were shown by herbivorous waterbirds (geese and some ducks, reflecting the pattern found in the taxonomic grouping), and to a lesser extent also by species feeding on fish or a combination of fish and invertebrates.

Other variables explaining significant parts of the variation in long-term trends were non-breeding habitat, non-breeding diet, body size, and population size (figure 2.5). With respect to non-breeding habitat and diet, the least favourable trends are found in populations of species foraging on the benthic fauna of intertidal habitats: bivalves, worms and crustaceans living on (and in) tidal mudflats.

This group comprises mainly shorebirds. Favourable trends are found in species foraging on plants in terrestrial habitats (i.e. the aforementioned geese) and species feeding in freshwater habitats and at sea. Both groups include many piscivorous waterbirds, which indeed showed relatively positive long-term trends on average.

Mean annual rates of change also showed a clear increase with body size, which again largely coincides with taxonomy: the smallest size class distinguished consists

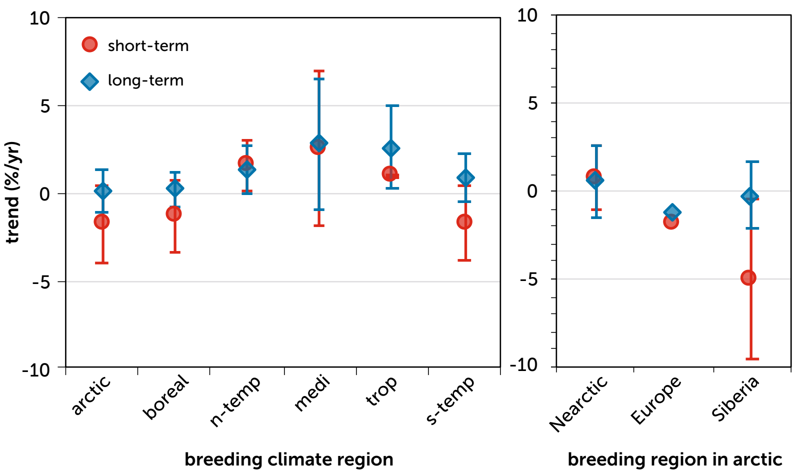


Figure 2.6. Mean long- and short-term trends of populations characterised by their breeding climate zone (left panel) and, for arctic-breeding species, geographic breeding region (right panel). Bars denote 95% confidence intervals. *Tendances moyennes, à court et à long terme, des populations caractérisées par leur climat de zone de reproduction (graphique de gauche) et, pour les espèces se reproduisant dans l'Arctique, leur région de reproduction géographique (graphique de droite). Les barres représentent les intervalles de confiance à 95%.*

entirely of waders, and the largest of geese, pelicans and Greater Flamingo. With respect to population size, the smallest populations (<5000 individuals) tend to do better than average, and the largest populations (>500,000 individuals) to do less well.

Variables explaining most of the variability in short-term trends were (again) taxonomic group and breeding climate region (table 2.2). With respect to the latter, the pattern emerges that populations breeding in the north-temperate and Mediterranean zones and in Subsaharan Africa are doing rather well on average, while the mean short-term development is negative in populations breeding in the Arctic, the boreal zone (of bogs and forests), and in southernmost Africa (figure 2.6). These unfavourable developments seem to be a relatively recent phenomenon, as the long-term trends of these groups were close to stable on average. The recent overall decline of arctic wader populations is mostly confined to the eastern, Siberian part of the arctic zone; it is less apparent in populations breeding in northern Europe and

Nterms	AIC	R^2	d.f.	taxon	size	clim-br	arc-reg	clim-nbr	migrat	hab-br	hab-nbr	diet-br	diet-nbr	popsize	conc-nbr
3	109,8	36,3	15	-	-	-	-	-	-	-	0,06	0,03	-	0,03	-
2	111,2	28,8	11	-	-	-	-	-	-	-	-	0,00	-	0,10	-
4	111,4	39,8	18	-	0,22	-	-	-	-	-	0,04	0,07	-	0,02	-
3	111,5	30,2	12	-	0,08	-	-	-	-	-	0,03	-	-	0,04	-
1	111,6	22,1	7	-	-	-	-	-	-	-	-	0,00	-	-	-
4	112,0	37,7	17	-	-	-	-	-	-	-	0,05	0,07	-	0,02	0,41
4	112,2	40,7	19	-	-	-	-	0,24	-	-	0,04	0,01	-	0,01	-
3	112,2	28,0	11	-	-	-	-	-	-	-	0,01	-	-	0,03	0,12
4	112,7	32,4	14	-	0,16	-	-	-	-	-	0,02	-	-	0,04	0,27
5	112,7	43,5	21	-	-	-	-	0,12	-	-	0,03	0,04	-	0,01	0,17

Table 2.3. The ten best performing linear models (ranked according to Akaike's Information Criterion AIC) describing variation in long-term trends among 95 waterbird populations by their ecological characteristics. Models below the horizontal line indicating a difference of 2 AIC units are considered to perform less well than the top model. Also shown are the number of terms (traits) in each model, the degrees of freedom involved (d.f.), and the % variance explained (R2). Traits included in each model are indicated with P-values for their significance. *Les dix modèles linéaires les plus performants (classés selon le critère d'information d'Akaike) décrivant la variation des tendances, à long terme, parmi 95 populations d'oiseaux d'eau en fonction de leurs caractéristiques écologiques.*

Nterms	AIC	R2	d.f.	taxon	size	clim-br	arc-reg	clim-nbr	migrat	hab-br	hab-nbr	diet-br	diet-nbr	popsize	conc-nbr
1	87,4	11,7	6	-	-	0,05	-	-	-	-	-	-	-	-	-
1	87,7	6,6	4	-	-	-	0,1	-	-	-	-	-	-	-	-
1	89,1	2,7	3	-	-	-	-	-	-	-	-	-	-	-	0,28
2	89,5	13,9	8	-	-	0,06	-	-	-	-	-	-	-	-	0,32
1	89,7	6,7	5	-	-	-	-	-	-	-	-	-	-	0,18	-
2	89,8	15,9	9	-	-	0,1	0,23	-	-	-	-	-	-	-	-
2	89,8	8,9	6	-	-	-	0,12	-	-	-	-	-	-	-	0,34
2	89,8	18,2	10	-	-	0,04	-	-	-	-	-	-	-	0,16	-
1	90,3	3,6	4	-	0,34	-	-	-	-	-	-	-	-	-	-
3	90,7	21,9	12	-	-	0,04	-	-	-	-	-	-	-	0,08	0,14

Table 2.4. The ten best performing linear models describing variation in short-term trends among 95 waterbird populations by their ecological characteristics. Conventions as in table 2.3. *Les dix modèles linéaires les plus performants décrivant la variation des tendances, à court terme, parmi 95 populations d'oiseaux d'eau en fonction de leurs caractéristiques écologiques. Conventions comme dans le tableau 2.3.*

Arie ouwerkerk / Agami

Bar-tailed Godwit | **Barge rousse** *(Limosa lapponica)* & **Dunlin** | **Bécasseau variable** *(Calidris alpina)*

absent in those breeding in Greenland and NW-Canada (figure 2.6).

Other traits with significant effects were diet in the breeding season, diet and habitat outside the breeding season, and population size, all with effects as described above for long-term trends.

We also explored potential combined effects of multiple traits on population trends, by constructing models with all possible combinations of the traits. The best model for long-term trends included three traits: non-breeding season habitat, breeding season diet, and population size (table 2.3). Each of these traits was included in four of the five top models, that did not differ much in the degree to which they fit the data. A fourth trait included in two of these models was body size. Effect directions were generally as described above for the separate traits.

Among short-term trends (table 2.4), two top models including one trait each fit almost equally well, and included breeding climate zone and arctic breeding region respectively. A third model differing less than 2 AIC units from the top one included the degree of spatial concentration during the non-breeding season. Effects were as described for the single-trait models: unfavourable trends in populations breeding in the (particularly Siberian) Arctic and in Southern Africa, and relatively favourable trends in those concentrated in just a few non-breeding sites.

Taxon did not appear as a term in the highest-ranking models in this multi-trait analysis for either long- or short-term trends. Although some models including taxon were among the best-scoring in terms of proportion of variance explained, in the ranking according to AIC they were penalised for the degrees of freedom used up by the 9 taxonomic groups distinguished. Also, the analysis detected aliasing between taxon and several other variables.

2.4 Discussion

The analysis presented in this chapter does not encompass all waterbird populations occurring in the East Atlantic Flyway, but only those for which reliable flyway population trends or regional coastal East Atlantic flyway trends could be calculated. This selection includes the majority of the species and populations for which the coastal regions of Atlantic Europe and Africa form an important breeding or non-breeding area. Genuine seabirds (divers, seaducks, auks, gannets, tubenoses) are not included, and neither are populations of waterbird species being mainly inland (several geese, swans, ducks, herons, waders, coot etc.). This limitation should be borne in mind when interpreting the 'general patterns' emerging from the analysis: they are 'general' across the trends included in the dataset, not necessarily general or exhaustive for all waterbirds of the East Atlantic Flyway.

Within the large sample of trends considered, the overall pattern of trends is relatively favourable: almost twice as many populations show a significant increase than a decline both on the long- and on the short term, and the long-term mean annual rate of change across all trends was slightly positive although not significantly different from a stable trend. Nevertheless, some populations are doing less well than others. Examples of populations showing a particularly strong long-term decline are South African Shelduck, Spotted Redshank, Slender-billed Gull and Little Stint, while the short-term trends of African Royal Tern and Curlew Sandpiper raise additional concerns.

Many different causes may underlie the observed trends, and these may often be specific to certain species or populations. However, when taking a broader view across the whole set of species, some common patterns emerge. The most eye-catching such pattern is the unfavourable development of populations of waders (shorebirds), the only taxonomic group with a negative average long-term trend. Moreover, the average trend for this group has become more negative on the short-term, indicating that its decline has recently accelerated. The unfavourable development of waders is associated with several of the findings of our trait-based analysis, in which a number of ecological traits emerged as influential that are shared (mainly) by wader species: breeding in the Arctic, a breeding season diet of invertebrates, a non-breeding diet dominated by benthic fauna of intertidal habitats, and a small body size. This aliasing of traits makes it difficult to interpret potential causes underlying the pattern, e.g. by pinpointing particular stages in the annual cycle or specific geographical regions where problems may arise. An alternative interpretation of this result could however be that it indicates that waders suffer from multiple pressures, i.e. Arctic breeders are affected by the changing conditions in the Arctic, temperate breeders from agricultural intensification, and benthic feeders in general encounter problems on their mudflat habitats.

One potentially important pointer with respect to possible causation is the finding that especially in the more recent period, wader populations breeding in Siberia tend to do less well than those breeding further West in the Arctic, even while these show extensive overlap in their winter ranges. Populations in this group which are doing particularly poorly are Curlew Sandpiper and Little Stint, but short-term trends are also declining in *canutus* Red Knots, *taimyrensis* Bar-tailed Godwits and Grey Plover. Although at present we can only speculate on possible causes, two broad-scale changes are known to have occurred in the Siberian Arctic. The first is climate warming (Comiso 2003, Ji *et al.* 2014), leading to higher spring and summer temperatures, earlier snow melt, and a shifting window of peak food availability for chick-rearing (Hoye *et al.* 2007, Tulp & Schekkerman 2008, Reneerkens *et al.* 2016). Bar-tailed Godwits breeding on the Taimyr Peninsula have difficulties responding to this seasonal shift (Rakhimberdiev *et al.* 2018), and young Red Knots produced in the same region have declined in size (possibly as a result of malnutrition), making it more difficult for them to reach their buried benthic prey in the West-African wintering sites (van Gils *et al.* 2016). However, climate warming has also affected northernmost Europe, Greenland and NW-Canada (e.g. Jie at al. 2014, Reneerkens *et al.*

Vincent Legrand / Agami

Bar-tailed Godwit | Barge rousse *(Limosa lapponica)* & **African Royal Tern | Sterne royale (Afrique)** *(Thalasseus maximus albididorsalis)*

2016), and so does not seem to explain why waterbird declines are concentrated in the Siberian part of the Arctic. Further analyses should elucidate whether differences in the degree of climate warming between arctic regions can explain this. A change more unique to the Siberian Arctic has been the strong weakening since the 1990s of large-scale cyclic fluctuations in the abundance of lemmings, the main prey of Arctic key predators for which waterbird eggs and chicks form an important alternative prey when the rodents are scarce (Summers 1986, Underhill *et al.* 1993). Nolet *et al.* (2013) showed that this faltering of Lemming cycles has driven the levelling-off of the population growth of Dark-bellied Brent Geese by reducing the frequency of top lemming years in which the geese can reproduce almost free from predation. It is plausible that waders breeding in this region similarly suffer from the loss of true 'boost years' to population growth, as their reproductive output has also been strongly associated with lemming cycles in the past (e.g. Schekkerman *et al.* 1998, Blomqvist *et al.* 2002). Why Siberian lemming cycles have faltered is unclear, but this may be associated with changes in winter climate (Gilg *et al.* 2009).

A second main pattern discernible in the trend data is the favourable development of herbivorous ducks and particularly geese. For the latter group, the underlying causes are fairly well known. In the first half of the 20th century, many goose populations were at a low level due to loss of natural habitats and overexploitation through hunting. From the 1950s, progressive hunting restrictions and provisioning of refuges enabled a recovery which was further boosted by a large-scale shift to foraging on agricultural land where plant productivity strongly increased, also during winter, due to land improvement and fertilisation (Fox & Madsen 2017, Fox & Abraham 2017). In recent decades, the rapid growth of several goose population has levelled off, mainly through declines in breeding productivity, which in some species are linked to changes in arctic breeding areas (Nolet *et al.* 2013, Jongejans *et al.* 2015) but also represent density-dependent processes gaining influence as populations have increased. In some populations further population growth is also limited by active management, in an attempt to contain or reduce the rising costs of damage to agricultural crops.

Other taxa doing relatively well are pelicans, flamingos, and several herons. Here we may see positive effects of wetland conservation measures and the widespread creation of nature reserves which may have benefitted a particularly large fraction of the populations of colonial breeding species.

An as yet unexplained main pattern seems to be the relatively poor performance of waterbird populations breeding in Southern Africa. South African Shelduck is a species doing particularly poorly, but recent trends for Pied Avocet and several coastal species (Hartlaub's and Kelp Gulls, Cas-

Ralph Martin / Agami

Brent Goose | **Bernache cravant** *(Branta bernicla)*

Daniele Occhiato / Agami

Curlew Sandpiper | **Bécasseau cocorli** *(Calidris ferruginea)*

pian Tern) are also unfavourable. At present it is not clear which environmental factors or pressures may underlie this.

It can also be informative to consider which ecological traits do *not* show significant effects in our analysis. For both long- and short-term trends, climate zone of the non-breeding area, migration distance, and concentration in few sites during the non-breeding season were not associated with variation in trends between waterbird populations. So populations migrating long distances and wintering in coastal Subsharan Africa do not do worse on average than populations remaining in Western Europe in winter. And despite a greater expected vulnerability of populations concentrating in a small number of key sites to localised pressures and 'disaster events', these populations do not seem to be unduly affected by negative developments in these sites at present and in general. A vulnerability to such developments remains, however and some may be occurring at particular key sites without affecting the general pattern.

Wadden Sea
Vlieland, Netherlands (Arnold Meijer / Blue Robin)

3. Trends of waterbird populations in the Wadden Sea in comparison with flyway trends

Tendances des populations d'oiseaux d'eau dans la mer de Wadden versus tendances de la voie de migration

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Summary

The international Wadden Sea is of considerable importance for many of the waterbird populations occurring in the East Atlantic Flyway. The area is important not only as a staging and wintering area but also as a breeding site. The present update on trends in numbers of coastal breeding birds in the Wadden Sea confirms that several species are still in decline despite positive trends at the flyway level. Poor breeding performance in the Wadden Sea seems to be the most frequent and most serious cause for the observed declines. Among migratory birds, the proportion of benthic feeding populations for which the Wadden Sea trend is more positive than the Flyway trend has increased and this is much more favorable than the situation in 2014. However still several populations using the Wadden Sea during migration and or winter are declining here at a higher rate than in the flyway, among them Eurasian Wigeon, Mallard, Common Eider, Eurasian Oystercatcher, Pied Avocet, , Dunlin and the *robusta* subspecies of Common Redshank.

Resumé

La mer internationale de Wadden revêt une importance considérable pour de nombreuses populations d'oiseaux d'eau présentes dans la voie de migration de l'Atlantique Est. La zone est importante, non seulement en tant que zone de repos et d'hivernage, mais également en tant que site de reproduction. La présente mise à jour sur les tendances du nombre d'oiseaux nicheurs côtiers dans la mer de Wadden confirme que plusieurs espèces sont toujours en déclin malgré les tendances positives observées au niveau de la voie de migration. Les mauvaises performances de reproduction dans la mer de Wadden semblent être la cause la plus fréquente et la plus grave des déclins observés. Parmi les oiseaux migrateurs, la proportion de populations d'alimentation benthique pour lesquels la tendance de la mer de Wadden est plus positive que celle des voies de migration a augmenté, ce qui est beaucoup plus favorable que la situation en 2014. Cependant, plusieurs populations d'oiseaux qui utilisent encore la mer de Wadden pendant la migration ou en hiver sont en déclin, à un taux plus élevé, que dans la voie de migration. Parmi ceux-ci, on trouve le Canard siffleur, le Canard colvert, l'Eider à duvet, l'Huîtrier Pie, l'Avocette élégante, le Bécasseau variable et la sous-espèce robusta *du Chevalier gambette.*

3.1 Introduction

For more than 30 of the populations of waterbirds making use of the East Atlantic Flyway, the international Wadden Sea, situated along the coasts of Denmark, Germany and The Netherlands, is of considerable importance as a moulting, stopover and wintering site. Up to 6.1 million birds can be present in the Wadden Sea at the same time, and an average of 10 to 12 million birds pass through it each year (CWSS 2008). The Wadden Sea is also an important breeding area for several species of waterbirds.

Changes in the breeding populations as well as in numbers and distribution of birds outside the breeding season in the international Wadden Sea have been followed systematically in the framework of the Trilateral Monitoring and Assessment Program (TMAP), using standardized routines for fieldwork and data processing (Koffijberg *et al.* 2015, Blew *et al.* 2016). In order to search for explanations and backgrounds for the trends observed, it is relevant to compare the 'local' Wadden Sea trends with international trends at the flyway scale. For instance, if Wadden Sea trends and flyway trends are in line with each other, the drivers of changes in numbers are more likely to be global in nature, whereas if local trends differ from flyway trends, processes within the Wadden Sea are more likely to be of importance.

In this chapter, population trends of waterbirds in the international Wadden Sea are compared with the trends of the same populations in the entire flyway. In the following account, we first compare the trends in the breeding populations in the Wadden Sea with those in the overall flyway,


Ralph Martin / Agami

Observing waders at mudflats in the Wadden Sea.


Harvey van Diek

Pied Avocet | **Avocette élégante** *(Recurvirostra avosetta)* and then we compare the trends in numbers present in the Wadden Sea outside the breeding season with the trends at the flyway level.

3.2. Methods

3.2.1 Monitoring of breeding populations

Monitoring of breeding birds within TMAP has been carried out for a selection of coastal breeding birds since 1991 and is coordinated by the Joint Monitoring of Breeding Birds group in the Wadden Sea (JMBB). The most recent update on trends of breeding birds was published in the latest Quality Status Report and covered the period 1991-2013 (Koffijberg *et al.* 2017). However, to match the period covered in the current flyway monitoring (up to 2016/17), we used existing national trend assessments from the Dutch Wadden Sea, which were available up to and including 2016. For 11 of the species, the Dutch part of the Wadden Sea held the majority or a very large proportion of breeding pairs present in the international Wadden Sea. Hence, for these 11 species the trends in the Dutch Wadden Sea were compared to the relevant flyway trends. The methods applied in the trend calculations are given by Koffijberg *et al.* (2015).

3.2.2 Monitoring of migratory birds

Monitoring of 34 migratory waterbird species in the international Wadden Sea has taken place for 30 years now. The Joint Monitoring of Migratory Birds (JMMB) in the Wadden Sea consists of (a) at least two synchronous, complete counts each year (one in January and one in another month shifting from year to year), (b) frequent (bi-monthly to monthly) spring tide counts at 60 counting sites in various parts of the international Wadden Sea, (c) aerial counts of Eider in winter, and (d) a combination of aerial and ship-based counts of Shelduck during wing moult in July-August. These surveys allow statistically sound estimation of trends. For a more detailed description see Blew *et al.* (2005, 2007) and Laursen *et al.* (2010).

Despite a large dataset with lots of count data available, coverage is not always complete. A fairly large proportion of individuals of some species like Sanderling and Knot may not be included in counts because they roost at sandbanks far from observation points on land; some of these sites however are covered by irregular counts from airplanes (e.g. Kempf *et al.* 2015; Weiß *et al.* 2016). The vast majority of sites are counted by volunteers and missing counts are present in the dataset. The program UINDEX is applied to estimate ('impute') bird numbers for missing counts, taking into account site-, year- and month-effects (Underhill & Prys-Jones, 1994). The counted and imputed values for each month form the basis for the calculation of yearly averages for the respective bird-years, covering the period from July to June of the following year (Blew *et al.* 2016). Trends are calculated using the program TrendSpotter (Visser 2004; Soldaat *et al.* 2007) for the entire 30 year period ('long-term trend') and for the last 10 years for which data are available ('short-term trend'). A few species occur in fairly low and highly fluctuating numbers which do not allow a proper trend assessment for the short-term period (trends are not significant).

Wadden Sea trends were compared to trends and population sizes at the flyway scale as presented in this report (e.g. Annex 1).

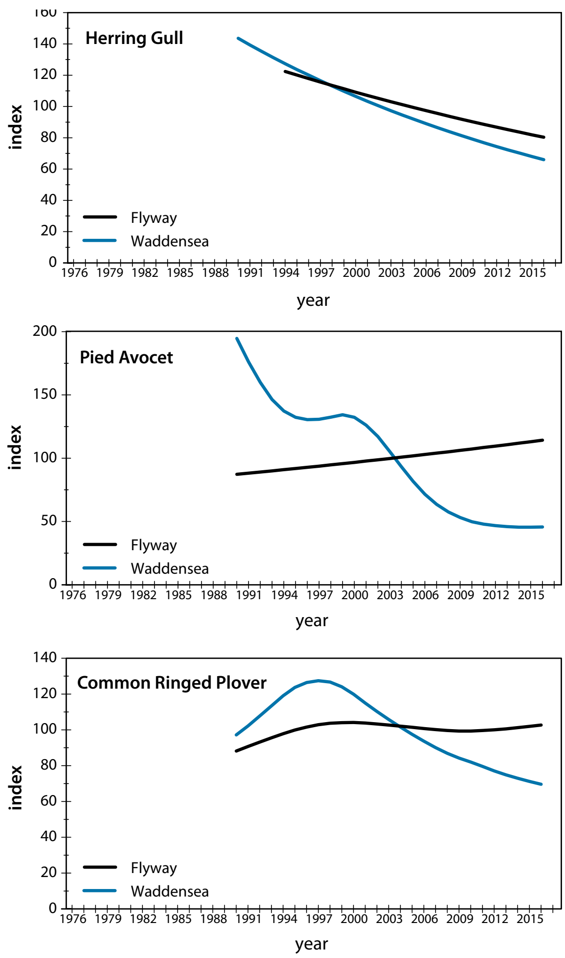

Figure 3.1. Examples of trends in numbers of breeding pairs in the Dutch part of the Wadden Sea (blue line, 1990-2016) and in the appropriate flyway populations of these species (black line, 1990-2016, see appendix 1 of this report) for European Herring Gull (flyway trend based on combined *argentatus* and *argenteus* populations), Pied Avocet and Common Ringed Plover (*hiaticula* population). *Exemples de tendances concernant le nombre de couples nicheurs dans la partie néerlandaise de la mer de Wadden (ligne bleue, 1990-2016) et dans les populations de voie de migration appropriée de ces espèces (ligne noire, 1990-2016).*

3.3. Results

3.3.1 Breeding populations

Among the group of eight benthivorous species, European Herring Gull, Eurasian Curlew and Common Redshank declined at almost the same rate in the Wadden Sea as in the flyway (for European Herring Gull see fig. 3.1). This is also illustrated in fig. 3.2 where the rate of change in breeding numbers of the eight benthivorous species in the Dutch Wadden Sea is compared with the rate of change in the flyway population. This shows that of two benthivore species, Eurasian Oystercatcher and Black-headed Gull, numbers declined both in the Wadden Sea and in the overall flyway but the rate of decline was faster in the Wadden Sea. The three other benthivore species - Common Eider, Pied Avocet and Common Ringed Plover - have all declined in the Dutch Wadden Sea although they increased at the flyway level (fig. 3.2). The differences in trends are shown in detail for Pied Avocet and Common Ringed Plover in fig. 3.1.

For a few species breeding populations have increased in the Wadden Sea and almost at the same rate as at the flyway level. This is the case for Great Cormorant and Eurasian Spoonbill. The Wadden Sea population of Great Black-backed Gull has increased rapidly, in contrast to a long-term slow decline at the flyway level, but the numbers breeding in the Wadden Sea are still very small.

3.3.2 Migratory birds

Trends in the Wadden Sea

Analysis of the long-term trends (30 years from 1987/1988 to 2016/2017) of migratory birds in the international Wadden Sea revealed that overall 8 populations have shown an increase, 13 populations are stable and 15 populations are decreasing (fig. 3.3). On the short-term (last ten years, 2007/08 - 2016/17) 7 populations have increased, 17 populations are stable, 9 populations have decreased and; for 3 populations the trend is uncertain. (fig. 3.3). The short-

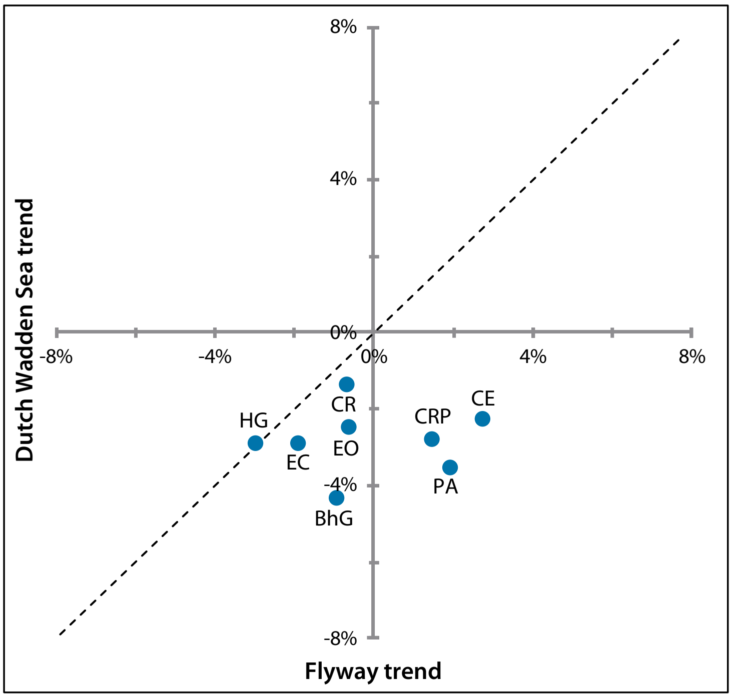

Figure 3.2. Average annual change in flyway populations (horizontal axis, 2008-2017 or 2007-2016 depending on population), in relation to annual changes in the breeding populations in the Dutch part of the Wadden Sea (vertical axis, 2007-2016) for eight benthivorous species: European Herring Gull (HG), Black-headed Gull (BhG), European Oystercatcher (EO), Eurasian Curlew (EC), Common Redshank (CR), Common Ringed Plover (CRP), Pied Avocet (PA) and Common Eider (CE). Data points below the diagonal line represent trends which are more positive in the flyway as a whole than in the Dutch Wadden Sea. *Variation annuelle moyenne des populations de la voie de migration (axe horizontal, 2008-2017 ou 2007-2016 selon la population), en relation avec les variations annuelles des populations nicheuses dans la partie néerlandaise de la mer de Wadden (axe vertical, 2007-2016) pour huit espèces benthivores.*

Figure 3.3. > Long- and short-term trends of 36 waterbird populations occurring in the Wadden Sea and their respective flyway trends. The long-term trends cover 30 seasons (1987/88 - 2016/17) and the short-term trends cover 10 seasons (2007/08 - 2016/17). Flyway trends refer to the short-term trend based on the most recent ten years up to 2016/17. Empty cells denote trends that were uncertain. *Les tendances, à court et à long terme, de 36 populations d'oiseaux d'eau présentes dans la mer de Wadden et leurs tendances respectives en matière de voie de migration. Les tendances à long terme couvrent 30 saisons (1987/88 - 2016/17) et les tendances à court terme couvrent 10 saisons (2007/08 - 2016/17). Les tendances de la voie de migration se réfèrent à la tendance à court terme basée sur les dix dernières années jusqu'en 2016/17. Les cases vides indiquent des tendances incertaines.*

Species	Wadden Sea 30 year trend	Wadden Sea 10 year trend	Flyway 10 year trend
Great Cormorant	↑↑	→	
Eurasian Spoonbill	↑↑	↑↑	↑↑
Barnacle Goose	↑↑	↑	↑
Brent Goose	↓	→	
Common Shelduck	↓	→	→
Eurasian Wigeon	↓	↓	→
Common Teal	→	↑	↑
Mallard	↓	↓	→
Northern Pintail	↑	↑	→
Northern Shoveler	↑	↑	↑
Common Eider (25y trend)	↓	↓	
Eurasian Oystercatcher	↓	↓	→
Pied Avocet	↓	↓	
Common Ringed Plover			
C. p. hiaticula	↓	↓	↑
C. p. psammodroma	↑	↑	→
Kentish Plover	↓		→
Grey Plover	→	→	↓
Red Knot			
C. c. canutus	→	→	↓
C. c. islandica	↓	→	→
Sanderling	↑	↑	↑
Curlew Sandpiper	→		↓↓
Dunlin	↓	↓	→
Bar-tailed Godwit			
L. l. taymyrensis	→	→	↓
L. l. lapponica	→	→	↑
Whimbrel	→	→	↑
Eurasian Curlew	→	→	↓
Spotted Redshank	↓	→	
Common Redshank			
T. t. totanus, N Europe	↓	↓	↓
T. t. robusta	→	↓	
Common Greenshank	→	→	→
Ruddy Turnstone			
Greenland & NE Canada	↑		→
Fennoscandia - Western Russia	→	→	→
Black-headed Gull	→	→	→
Mew Gull	→	→	→
European Herring Gull	↓	→	
Great Black-backed Gull	↓	→	

↑↑ strong increase
↓↓ strong decrease
Uncertain

↑ moderate increase
↓ moderate decrease
→ stable

term flyway trends for these populations show 8 increasing populations, , 14 stable populations, 6 decreasing populations and 8 populations with uncertain trend (fig. 3.3).

The following six species/populations have increased in the international Wadden Sea on both the long and the short term: Eurasian Spoonbill, Barnacle Goose, Northern Pintail, Northern Shoveler, Common Ringed Plover (*psammodroma*) and Sanderling. On the other hand, eight species/populations have decreased in the Wadden Sea on the long as well as the short term, namely Eurasian Wigeon, Mallard, Common Eider, Eurasian Oystercatcher, Pied Avocet, Common Ringed Plover (*hiaticula*), Dunlin and Common Redshank (*totanus*). Seven species improved in trend from the long term to the short term trend: Brent Goose, Common Shelduck, Common Teal, Red Knot (islandica), Spotted Redshank, European Herring Gull and Great Black-backed Gull.

Flyway trends in dependence of Wadden Sea use

Most flyway populations of which a large proportion uses the Wadden Sea at some moment outside the breeding season tended to show declines in the 10-year period up to and including 2013/14 (van Roomen *et al.* 2015). The annual changes of the populations in this group have not become less negative after updating the trends with the three most recent seasons up to 2016/17 (fig. 3.4). However the new data seems to indicate that within the group of species making no or little use of the international Wadden Sea, trends at the flyway level have on average become more negative in recent years (left and middle category of fig. 3.4; note however the large uncertainty ranges). Hence, the tendency for negative flyway trends no longer seems to be correlated with a strong usage of the Wadden Sea.

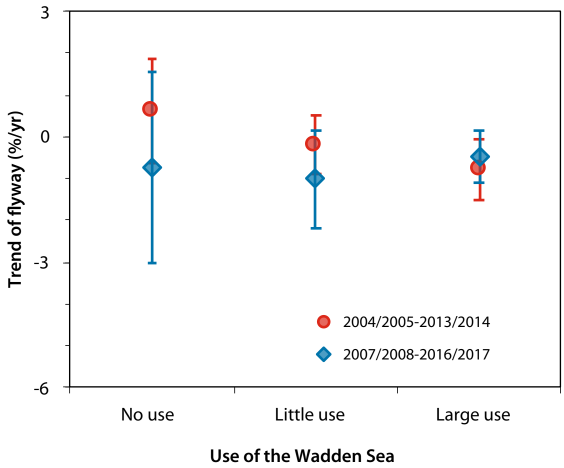

Figure 3.4. Trends of waterbird populations in relation to the degree to which they use the international Wadden Sea outside the breeding season. Dots show the mean of the average annual change in flyway populations as calculated over the seasons 2004/05-2013/14 (red dots) and over 2007/08-2016/17 (blue diamonds) for populations making no use (n=6), little use (n=12) or large use (n=16) of the Wadden Sea. 'Little use' of the Wadden Sea is here defined as 1-15% of the total flyway population occurring in the Wadden Sea at any time, with higher proportions denoted as 'large use'. Error bars indicate 1 SE on either side of the mean. *Tendances des populations d'oiseaux d'eau en fonction de leur utilisation de la mer internationale de Wadden en dehors de la saison de reproduction. Les points indiquent la moyenne de la variation annuelle moyenne de la population des voies de migration calculée pour les saisons 2004/05 - 13/20/14 (points rouges) et 2007 / 08-2016 / 17 (losanges bleus) pour les populations non utilisatrices (n = 6), faible utilisatrices (n = 12) ou grandes utilisatrices (n = 16) de la mer des Wadden.*

Ralph Martin / Agami

Trends in the Wadden Sea compared with flyway trends

A comparison between the Wadden Sea trends and the flyway trends can indicate local or flyway level (i.e. global) reasons for population developments. If a population does worse or better in the Wadden Sea than in the flyway as a whole, the reason is more likely to be found in the Wadden Sea itself. If Wadden Sea trends and flyway trends are the same the reason is more likely of a global origin.

In table 3.3 the trend categories were more positive at the flyway level than in the Wadden Sea in seven populations: Eurasian Wigeon, Mallard, Eurasian Oystercatcher, *hiaticula* Common Ringed Plover, Dunlin, *lapponica* Bar-tailed Godwit and Whimbrel. On the contrary, the Wadden Sea trend was more positive than the flyway trend for Northern Pintail, *psammodroma* Common Ringed Plover, Grey Plover, *canutus* Red Knot, *taymyrensis* Bar-tailed Godwit and Eurasian Curlew. This many populations in which Wadden Sea trend and flyway trend differs suggests dominance of causes within the Wadden Sea.

In fig. 3.5 the Wadden Sea trend slopes are compared with those at the flyway level for individual species or populations with a diet dominated by benthic invertebrates. Overall, there is no clear correlation between the Wadden Sea trends and the trends at the flyway level. This is also suggesting that factors operating within the Wadden Sea affect the observed changes in the Wadden Sea more. Points that are close to the line y=x are species/populations for which the trends in the Wadden Sea are similar to the trends at the flyway level. For these species underlying drivers may operate on larger spatial scales.

Non-breeding trends of populations in the international Wadden Sea are shown for a few species in fig. 3.6 together with the trends for the relevant populations at the flyway level. The graphs indicate that for some of the species, the trends in numbers in the Wadden Sea have changed in a positive direction in recent year; e.g. the rate of increase

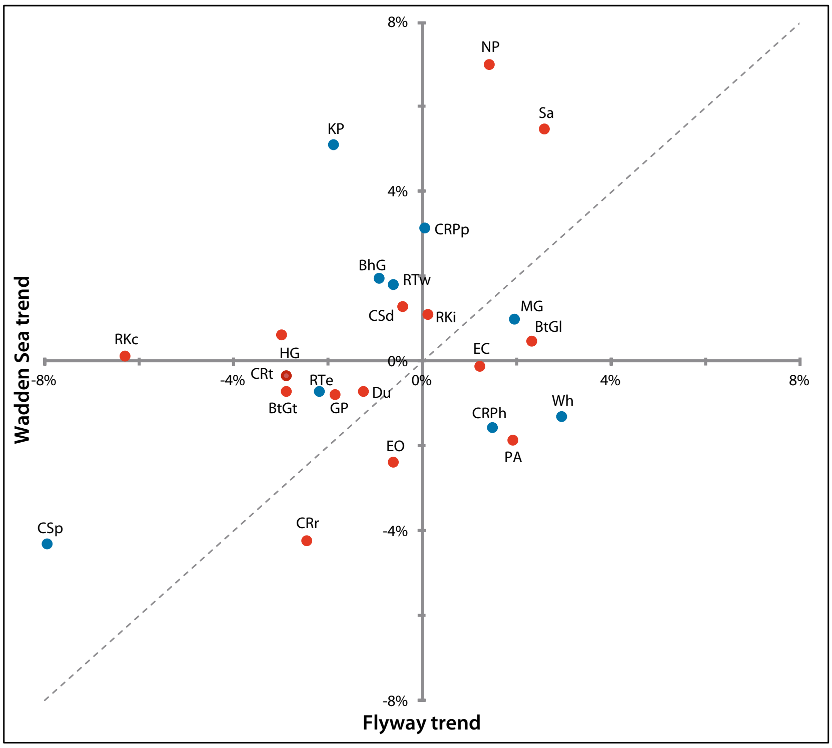

Figure 3.5. Average annual change in utilization of the international Wadden Sea by benthivorous species/ populations (vertical axis) in 2007/08-2016/17, in relation to annual change in the flyway populations (horizontal axis). Red dots denote populations using the Wadden Sea to a large extent (≥15% of the flyway population present in the Wadden Sea at any time of the year) and blue dots denote populations using the Wadden Sea to a smaller extent (<15%). Dots below the dotted line (x=y) indicate that the flyway trend is more positive than the Wadden Sea trend; dots above this line indicate more positive Wadden Sea trends. Abbreviations refer to populations as follows: BhG = Black-headed Gull; BtGl = Bar-tailed Godwit *lapponica*; BtGt = Bar-tailed Godwit *taymyrensis*; CRPh = Common Ringed Plover *hiaticula*; CRPp = Common Ringed Plover *psammodroma*; CRr = Common Redshank *robusta*; CRt = Common Redshank *totanus*; CSd = Common Shelduck; CSp = Curlew Sandpiper; Du = Dunlin *alpina*; EC = Eurasian Curlew; EO = Eurasian Oystercatcher; GP = Grey Plover; HG = Herring Gull *argentatus*; KP = Kentish Plover; MG = Mew Gull; NP = Northern Pintail; PA = Pied Avocet; RKc = Red Knot *canutus*; RKi = Red Knot *islandica*; RTe = Ruddy Turnstone N-Europe; RTw = Ruddy Turnstone Nearctic; Sa = Sanderling; Wh = Whimbrel *phaeopus*. *Variation annuelle moyenne de l'utilisation de la mer internationale de Wadden par espèces / populations benthivores (axe vertical) en 2007 / 08-2016 / 17, par rapport à la variation annuelle des populations des voies de migration (axe horizontal).*

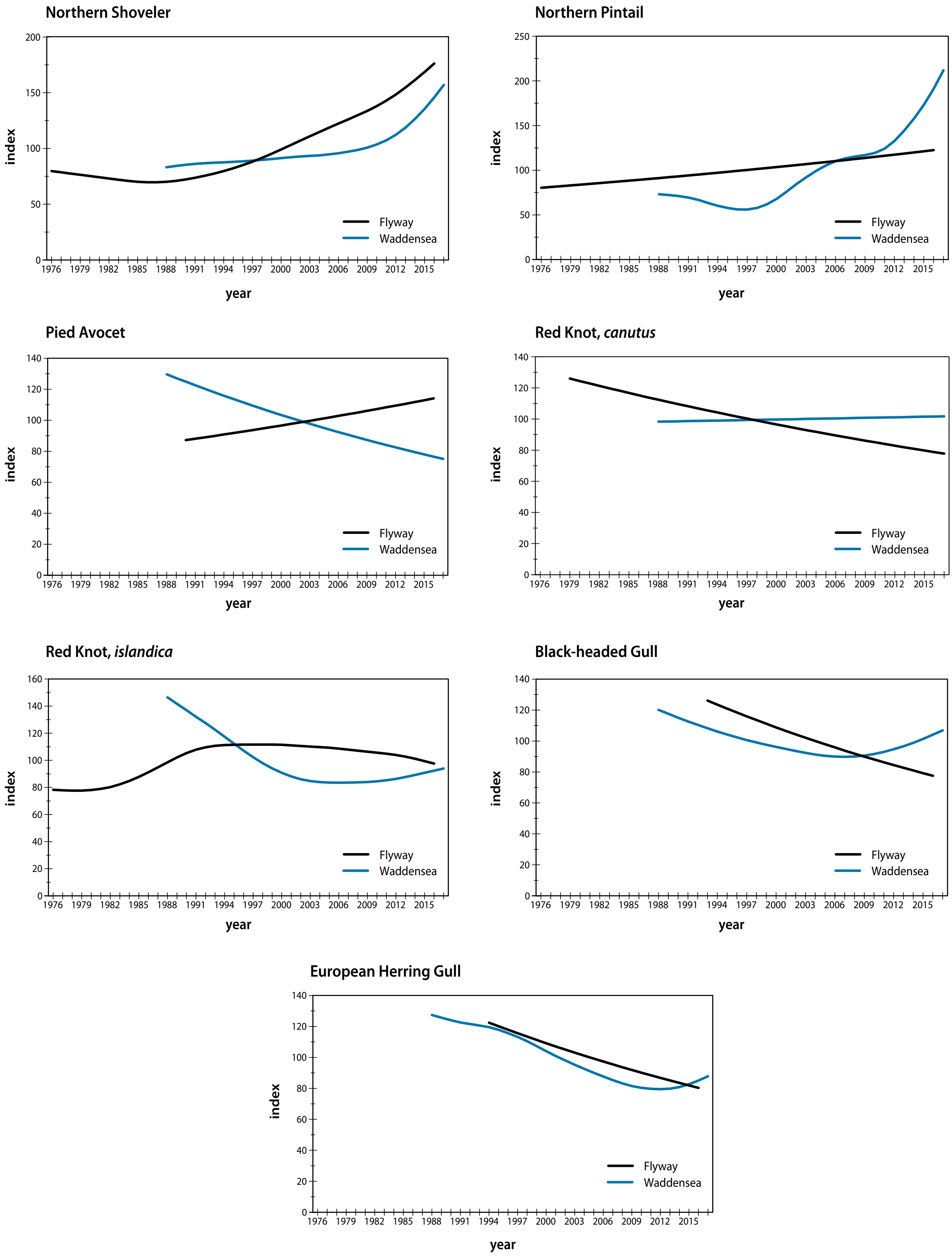

Figure 3.6. Trends in numbers of selected species/populations occurring in the international Wadden Sea outside the breeding season (blue line, 1987/88-2016/17) and of the corresponding flyway population (black line, up to 2016 or 2017). *Tendances du nombre d'espèces / de populations sélectionnées présentes dans la mer internationale de Wadden en dehors de la saison de reproduction (ligne bleue, 1987 / 88-2016 / 17) et de la population correspondante dans la voie de migration (ligne noire, jusqu'en 2016 ou 2017).*

Harvey van Diek

Eurasian Oystercatchers with ferry to Wadden Sea Island.

has accelerated for Northern Shoveler and Northern Pintail. Black-headed Gull and European Herring Gull were in decline for many years but their numbers in the Wadden Sea are now increasing. The *islandica* population of Red Knot was in fast decline in the Wadden Sea during the 1990s but there is now a slight tendency for a change to more stable numbers or even an increase. The *canutus* population of Red Knot shows a stable trend in the Wadden Sea while it is declining in the flyway.

Earlier trend analyses of migratory and wintering waterbirds in the international Wadden Sea showed that among the benthic feeding species numbers declined faster within the Wadden Sea compared to trends at the flyway level (e.g. van Roomen *et al.* 2015). There are now indications that this pattern may have changed for the better. The 2014 assessment showed that 62% of all benthivore populations showed Wadden Sea trends that were less positive than the flyway trends, this proportion has declined to 33 % in this updated assessment.

3.4 Discussion

3.4.1 Breeding populations

The Wadden Sea is an important breeding area for several of the waterbird species in the East Atlantic Flyway. For instance for Common Shelduck, Eurasian Oystercatcher, Pied Avocet, Common Redshank, Black-headed Gull, Lesser Black-backed Gull, Sandwich Tern and Common Tern, the Wadden Sea supports an important share of the breeding population in northwestern Europe. For many species the Wadden Sea is an attractive breeding area due to the accessibility of suitable breeding habitats on islands, in salt marshes, coastal wetlands, dune areas and coastal grasslands, in combination with an availability of abundant food stocks in the intertidal and offshore areas. For example, the colonially breeding gulls and terns particularly use the North Sea for feeding.

The comparison of trends presented here document that some species (especially benthivorous species) have declined in the Dutch Wadden Sea even though positive trends are recorded at the flyway level. It has not been possible to include all species in the present comparisons, but recent analyses point at the general trend that breeding populations are not doing well in the Wadden Sea compared to elsewhere along the flyway (e.g. Koffijberg *et al.* 2015, 2017). Many breeding birds seem to suffer from a variety of local and regional problems leading to low breeding performance (Koffijberg *et al.* 2017). Examples include the Pied Avocet and the fish-eating Common Tern which have shown long-term declines in almost all parts of the Wadden Sea (see also Dänhardt *et al.* 2018). Even when compared to other drivers, poor reproductive rates clearly stand out in most species as an important mechanism of the declines observed at present (van der Jeugd *et al.* 2014, Koffijberg *et al.* 2017).

Several management measures have been proposed to stop or slow down the ongoing declines and conservation efforts have been initiated in many parts of the Wadden Sea (Koffijberg *et al.* 2016, van Ulzen & Mulder 2018). Potential measures were discussed among bird experts and site-managers and a framework for suggested actions was later adopted by the Wadden Sea Board (Koffijberg *et al.* 2016). Implementation has been taken up, nonetheless, for several breeding bird species a number of challenges are still involved in improving breeding conditions. For example, an increasing predation pressure on clutches seems to be difficult to manage, and there is a need for developing habitat management strategies that lead to less predation.

3.4.2 Migratory birds

For nine of the 36 migratory waterbird populations monitored in the Wadden Sea, this area can be considered their most important stop-over site during migration, wintering or moulting since more than 50% of their entire flyway population uses the Wadden Sea during some part of the year (Blew *et al.* 2016, Laursen *et al.* 2010). Of a further 14 species more than 10% of the flyway population uses the Wadden Sea at some point during the annual cycle. It is therefore highly relevant to follow how the conditions in the Wadden Sea develop over time.

The trends we have presented here reflect the developments in how the individual bird species or populations utilize the Wadden Sea. They are based on count data from all months of the year. Trends in the Wadden Sea are therefore not only affected by the maximum number of individuals recorded at a specific time of the year but also by the length of the period that birds make use of the Wadden Sea. For example, a year with a mild winter may - for some species - lead to a more positive overall value for that year because more individuals remain in the Wadden Sea instead of migrating further. Thus, a decline in a Wadden Sea trend can develop through a decline in the number of individuals that use the Wadden Sea and/or through a shortening of the period in which they stay in the Wadden Sea.

In the present update of trends we found that among the populations in decline in the Wadden Sea and for which the short-term trend at the flyway level is known, eight populations are doing worse in the Wadden Sea than in the flyway as a whole. These eight populations are Eurasian Wigeon, Mallard, Common Eider, Eurasian Oystercatcher, Pied Avocet, *hiaticula* Common Ringed Plover, Dunlin and *robusta* Redshank. The reasons why these species are performing poorly in the Wadden Sea are not

Harvey van Diek

Eurasian Curlew | **Courlis cendré** *(Numenius arquata)*

Menno van Duijn / Agami

Bar-tailed Godwit | **Barge rousse** *(Limosa lapponica)* & **Eurasian Oystercatcher** | **Huîtrier pie** *(Haematopus ostralegus)*

clearly understood. The Eurasian Oystercatcher depends on the availability of bivalves (Blue Mussel and Cockle) but is also affected negatively by severe winters. Some studies have shown that food availability for Eurasian Oystercatcher was negatively affected by cockle dredging and mussel fishery (e.g. Ens 2006). Two hard winters may have contributed to lower staging numbers (e.g. mass mortality in February 2012, Schwemmer *et al.* 2014). On the other hand wintering numbers in the Wadden Sea depend partly also on local breeding numbers and large declines of breeding numbers are found in agricultural areas. The steady decline in the trend of Pied Avocet in the Wadden Sea (fig. 3.6) is probably linked to the continuing decline of the breeding population in most parts of the Wadden Sea, although this declines seems to have slowed down recently (fig. 3.1).

There is also no clear explanation behind the tendency among some species for a recent increase in their use of the Wadden Sea. It might however be linked to a combined effect of changes in food abundance and climate. For example, some of the species (like Northern Pintail and Black-headed Gull) may have responded to changes in the climate by remaining in the Wadden Sea for longer during late autumn-winter rather than moving from continental Europe to the United Kingdom in mid-autumn.

Greater Flamingo | **Flamant rose** *(Phoenicopterus roseus)*
Spain (Arnold Meijer / Blue Robin)

4. Pressures and conservation measures for waterbirds along the East Atlantic Flyway

Pressions et mesures de conservation pour les oiseaux d'eau le long de la voie de migration de l'Atlantique Est

Tim Dodman, Geoffroy Citegetse, Jaime García Moreno, André van Kleunen & Marc van Roomen

Summary
As part of a coordinated monitoring effort across the flyway, we collected environmental information from 73 important sites in Europe and Africa during January 2017. Key pressures identified were pollution (from agricultural and industrial sources), urbanisation and fisheries, all affecting habitat and food availability and quality. At a wider level, climate change pressures are highly significant, especially through sea-level rise affecting habitat availability and global warming affecting food availability in arctic breeding regions. Agricultural and pollution pressures were found to be particularly relevant in Northwest Europe and Iberia-North Africa. Overfishing (including of shellfish) and pollution were identified pressures in West Africa, with urbanisation of wetlands also recorded as a frequent pressure in the Gulf of Guinea and Southern Africa.

Clearly, conservation measures are important to secure a network of sites necessary for migratory birds. Key measures include the legal protection of sites at both international and national levels, improving policies, regulation and management of sites, restoring habitats and engaging local communities in conservation.

Although parts of the coastal zone are dynamic in nature, the pace of change to sites and habitats is increasing, putting a greater bonus on countries to work together to conserve a network of sites required by migratory birds. This must include regular structured monitoring of the status of sites and strengthening commitment to conservation. Limiting the pressures through policy, site action and building awareness is vital to secure a network of safe havens for migratory waterbirds.

Resumé
Dans le cadre d'un effort de suivi coordonné sur la voie de migration, nous avons collecté des informations environnementales sur 73 sites importants en Europe et en Afrique en janvier 2017. Les principales pressions identifiées étaient la pollution (d'origine agricole et industrielle), l'urbanisation et la pêche, qui ont tous une incidence sur la disponibilité et la qualité de l'alimentation et de l'habitat. A un niveau plus large, les pressions liées au changement climatique sont très importantes, notamment en raison de l'élévation du niveau de la mer qui affecte la disponibilité de l'habitat et du réchauffement climatique qui affecte la disponibilité de la nourriture dans les régions de reproduction de l'Arctique. Les pressions exercées par l'agriculture et la pollution se sont avérées particulièrement pertinentes dans le nord-ouest de l'Europe et dans la région péninsule ibérique-Afrique du Nord. La surpêche (y compris des mollusques et crustacés) et la pollution ont été identifiées comme des pressions en Afrique de l'Ouest. L'urbanisation des zones humides a également été enregistrée comme une pression fréquente dans le golfe de Guinée et en Afrique australe.

De toute évidence, les mesures de conservation sont importantes pour sécuriser un réseau de sites nécessaires aux oiseaux migrateurs. Les mesures clés comprennent la protection juridique des sites aux niveaux international et national, l'amélioration des politiques, de la réglementation et de la gestion des sites, la restauration des habitats et la participation des communautés locales à la conservation. Bien que certaines parties de la zone côtière soient de nature dynamique, le rythme de modification des sites et des habitats augmente, ce qui incite davantage les pays à travailler ensemble pour conserver un réseau de sites requis par les oiseaux migrateurs. Cela doit inclure un suivi structuré régulier de l'état des sites et un renforcement de l'engagement en faveur de la conservation. Limiter les pressions par des politiques, des actions sur les sites et une sensibilisation accrue, est essentiel pour sécuriser un réseau de sanctuaires pour les oiseaux d'eau migrateurs.

4.1. Introduction
This chapter will give an overview of the pressures to waterbirds and their sites along the East Atlantic Flyway, as well as of some key conservation issues and measures underway. It is partly based on the ongoing monitoring of these aspects as described in Annex 2, and partly on other sources. It aims to give a comprehensive summary of the most important issues, giving direction for future conservation measures and management. At the flyway level, priority for conservation effort should be given to those species and populations that are in decline, as indicated in


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Food shortage can cause mortality in Eider Ducks in some years.


Harvey van Diek

Kite surfing can cause considerble disturbance.

chapter 2 and Annex 1. A programme of simple environmental monitoring was conducted in January 2017 at the non-breeding sites of the flyway to help identify pressures on migratory waterbirds.

The Driving Force - Pressures - State - Impacts - Responses framework (DPSIR) modified for the marine environment by Oesterwind *et al.* (2016) after Gabrielsen & Bosch (2003) presents well the conceptual framework in which this monitoring takes place (fig. 4.1). Driving forces (e.g. the need for food by humans) can result in pressures (e.g. overfishing), which change the state of the ecosystem (e.g. reduced fish biomass as food for waterbirds), which then has consequences or impacts that require a management response. Effective responses in turn should over time lessen the driving forces.

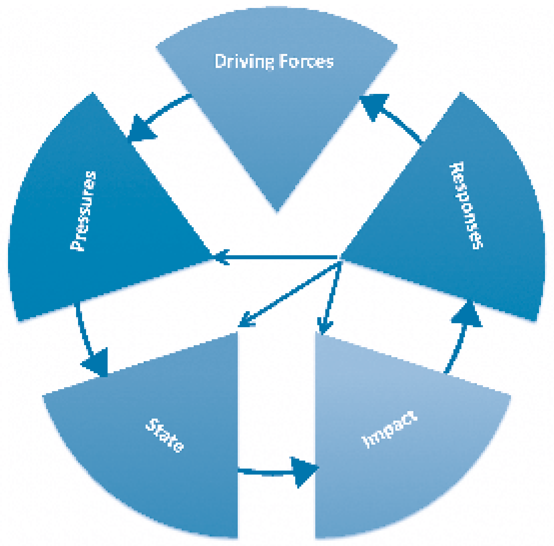

Figure 4.1. The Driving Force - Pressures - State - Impacts - Responses framework (DPSIR) modified for the marine environment by Oesterwind *et al.* (2016) after Gabrielsen & Bosch (2003). *La force motrice - Pressions - État - Impacts - Cadre de réponses (DPSIR)*

4.2 Materials and Methods

The methods used to assess the pressures and conservation measures as relevant to waterbirds and their sites are described in detail in Annex 2. Below is a short summary.

National coordinators of the countries involved in the flyway monitoring were requested to fill out Excel environmental monitoring forms at their main sites. Field crew preferably prepared draft forms when visiting the sites, with all forms subsequently validated by the national coordinator. The monitoring followed a stepwise approach starting with the characterisation of natural factors and human activities, followed by an assessment of their impact on waterbirds, and conservation measures taken. Scoring was based on the monitoring system for Important Bird Areas by BirdLife International, with some modifications. All scoring was qualitative and based on expert opinion. Submitted results were later analysed by a core team, who also made corrections and additions of some new data. A total of 88 important sites, representing about 60% of all waterbirds at the 1300 sites used during non-breeding along the whole coastal flyway, were selected for the collection of environmental information, with data received from 73 sites spread over 22 countries. These sites were allocated to the following geographical regions:

- Northwest Europe: Denmark - Atlantic France
- Iberia - North Africa: Iberia - Morocco
- West Africa: Mauritania - Sierra Leone
- Gulf of Guinea: Liberia - DR Congo
- Southern Africa: Angola - South Africa

Data on human activities potentially relevant to the abundance of waterbirds were collected by scoring their presence. The activities scored were agriculture, built-up areas, transportation, energy production/mining, exploitation of fauna and flora (including fishing and hunting) and tourism. From these human activities or the consequences of those activities it was assessed if they exert pressures on waterbirds at the site. In assessing the impact of the pressure, scores were assigned for when it takes place (timing), where it takes place (scope), and the strength of the pressure (severity) (BirdLife International 2006). 'Direct threats' are considered as synonymous with pressures. Although climate change is also attributed to human activities and a pressure for waterbirds, it was not included in the analysis of site pressures, as at a site level it is largely considered as a driver adding to other pressures.

To evaluate the extent and effectiveness of conservation measures, categories of protection status and of measures related to agriculture, spatial planning, energy exploitation, hunting and fishing, recreation invasive species, pollution, as well as specific management and habitat restoration measures were employed. However only the questions about protection status were fully answered and these results were used in this chapter.

4.3 Human use of the coastal wetlands of the East Atlantic Flyway

The Atlantic coastal zone of Europe and Africa is a productive region with a wide range of user groups. Key industries include fishing, energy production and tourism. Coastal wetlands are also widely used, and often their use must fit in amongst utilisation of the wider landscape and seascape. Farming and fishing are two of the most widespread uses reported from the 2017 environmental monitoring (Annex 2).

Farming is a widespread activity in and around the wetlands at the coastal zone. Some coastal areas tend to be more heavily utilised, especially where river deltas and

Harvey van Diek

Windfarms near large waterbird concentrations is a riskfull combination.

coastal lagoons present more water resources than inland areas. In European countries farming has intensified considerably, particularly in areas surrounding wetlands, which are widely impacted by agricultural run-off of effluents from fertilizers and plant protection chemicals. In some Western European countries original wetland nature has been restored within a limited number of farmland areas in or bordering wetlands.

The Atlantic coastal zone of Europe and Africa supports a significant human population and major cities as diverse as Amsterdam and Luanda. All urban areas place significant pressure on the natural resources of surrounding areas, and urbanisation is a widespread development, particularly in Africa, as populations and migrations to cities increase. The eastern Atlantic region contains numerous marine traffic routes with large volumes of goods transported to and from coastal ports and along the lower reaches of larger rivers. Some of the busiest ports in the world occur here, such as Rotterdam, and some of the busiest in Africa, such as Lagos.

Energy production is prevalent along the East Atlantic Flyway. Oil and gas production is well established, especially in the North Sea in Europe and in the Gulf of Guinea in Africa, whilst prospections and newer developments are also underway, for instance between Senegal and Guinea (OECD/SWAC 2014). Coastal and offshore renewables are most prominent in the North Sea and around the Wadden Sea; wind energy infrastructures are increasing, often sited offshore but also near coastal wetlands. Other renewables are also under development, such as tidal barrages and solar farms.

Fisheries is one of the most widespread uses of coastal wetlands along the East Atlantic Flyway, ranging from offshore and inshore activities to fishing within the wetlands themselves. Offshore fisheries are major commercial ventures across most of the region, and the North East Atlantic, Mediterranean and West Africa are considered global fishing hotspots (Grooten & Almond 2018). Other forms of exploitation of coastal wetlands include shellfish gathering, hunting and trapping of wildlife and the harvesting of wild plants. Wetland grasses and reeds have been used for centuries for thatch and many other purposes. Other related uses include the production of honey.

Many coastal wetlands are valuable tourism assets for local and national tourism, whilst some regularly host international visitors. However, international tourism is susceptible to global and local trends, and revenues may not be dependable over the years. Some sites are also susceptible to overuse by tourists, and not all touristic activities are compatible with nature conservation. The most popular tourist areas in or near wetlands are located in Europe, but some are also present along the African coastline.

4.4 Principal pressures to waterbirds along the East Atlantic Flyway

Climate change

It has been clearly demonstrated that the earth's climate is changing, with global temperature rises noted over past decades, largely attributable to increasing levels of carbon in the atmosphere. The levels and impacts of climate change within the region covered by the East Atlantic Flyway vary, and average temperature rises are most notable in the Arctic (Ji *et al.* 2014). The patterns of climate change are complex, and many northern areas will be influenced by changes in the Gulf Stream of the North Atlantic. Sea level rise is likely to have a particular impact in the future, especially on shallow coastal wetlands and the flooding of roosting and breeding sites. Climate change can have

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Dunlin | **Bécasseau variable** *(Calidris alpina)* direct impacts on birds through affecting food availability, but it also influences or exacerbates other pressures.

Summary of pressures along the flyway

The main pressures found to exert a high or medium pressure at the 73 sites that participated in environmental monitoring in 2017 are illustrated in fig. 4.2. The most frequently reported main pressures to waterbirds were the impacts at their key sites of pollution, taking together agricultural effluents and domestic and urban wastewater. This reflects the fact that many important sites for waterbirds are close to major centres of urbanisation and/or within intensive agricultural landscapes causing eutrophication and risks from chemical substances. This does not mean that pollution is a key pressure at all sites; for instance it was not mentioned for the Banc d'Arguin, Mauritania. The impacts of fisheries (fish and shellfish), especially from overfishing / overharvesting and influencing the habitat quality for non-target species, were the next most frequently recorded pressures. The effects can be manifold and can negatively influence food availability and quality for many waterbird species. However, some fisheries activities can also increase food availability for fish-eating birds; for instance smaller fish can become more numerous when fisheries target larger predatory fish. This could be a factor contributing to increasing numbers of herons, gulls and terns as found in chapter 2. Such increases in bird numbers can however have negative impacts on the natural functioning of the whole ecosystem and present mostly a short-term effect. Urbanisation was the stand-alone most frequently reported main threat, again indicating the proximity of many sites to urban centres and the general growth of these centres, often resulting in degradation and/or reduction of wetland habitat. Other noteworthy threats were the impacts of energy production, hunting and trapping and invasive alien species.

Principal pressures and threats per region

Arctic and Subarctic

Global warming is strongest in the polar regions of the planet, especially in the Arctic (Ji *et al.* 2014), which shows high rates of advance in spring phenology, such as melting of snow and appearance of plants and insects. Migratory birds need to match the timing of their breeding with these new developments or risk low breeding success. Recent studies show that long distance migratory Bar-tailed Godwits reduce their refuelling time in Europe in order to arrive earlier to their Arctic breeding grounds (Rakhimberdiev *et al.* 2018). Thus, in addition to actual changes taking place in the high Arctic in terms of breeding habitat availability (which are not yet fully understood), this highlights the crucial role that productive staging sites can play in the annual cycle of long distance migrants.

By contrast, in some Arctic areas higher temperatures can lead to greater precipitation with snowfall in the early summer. Sanderlings in northeast Greenland have been shown to experience a higher risk of egg predation early in the summer when the area of tundra covered by snow was still large (Reneerkens *et al.* 2016), whilst very late snow melt in 2018 rendered almost the whole area unsuitable for breeding (Reneerkens 2018). Note that environmental monitoring was not conducted in the Arctic or Subarctic as part of this assessment.

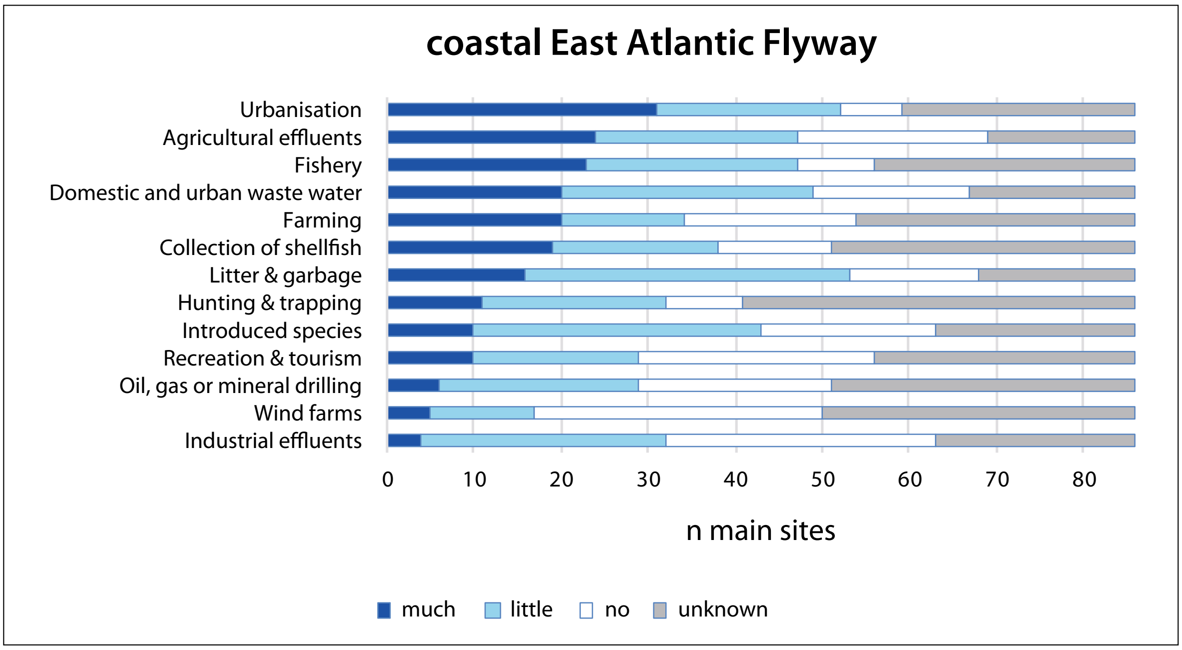


Figure 4.2. High and medium pressures reported from the 73 participating sites along the East Atlantic Flyway between Denmark and Namibia. *Des pressions élevées et moyennes ont été signalées dans les 73 sites participant situés le long de la voie de migration Est-Atlantique, entre le Danemark et la Namibie.*

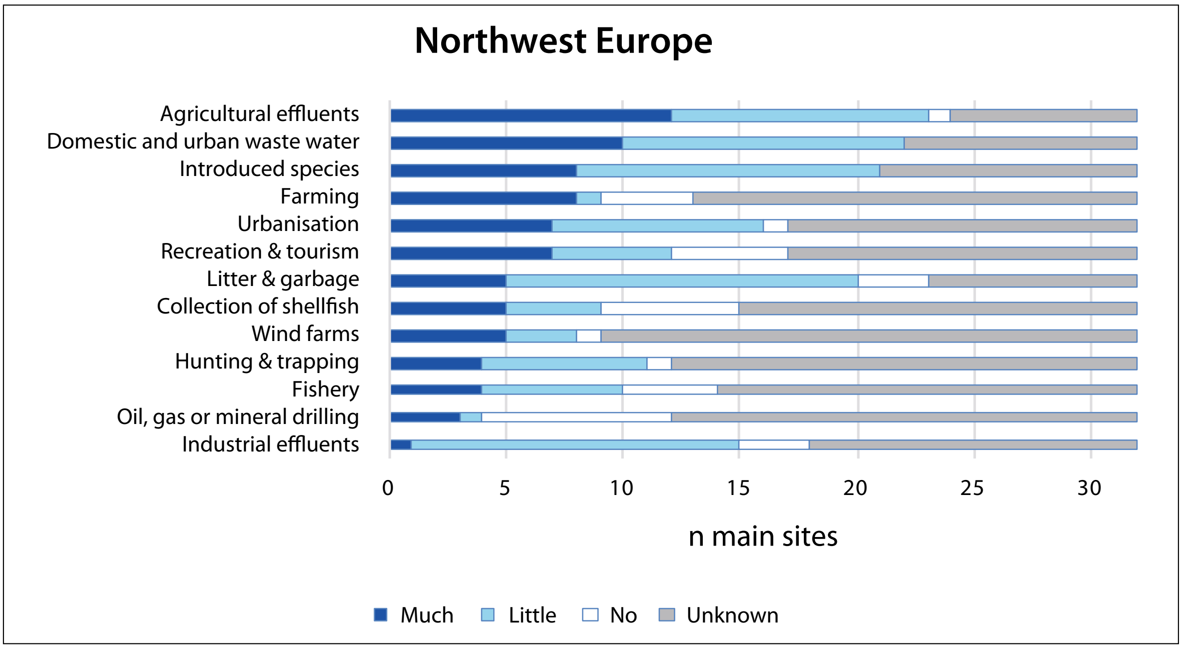


Figure 4.3. Pressures recorded for 25 sites in Northwest Europe, with data from Denmark, Poland, Germany, The Netherlands, Belgium, Ireland and France. *Pressions enregistrées sur 25 sites en Europe du Nord-Ouest, avec des données provenant du Danemark, de la Pologne, de l'Allemagne, des Pays-Bas, de la Belgique, de l'Irlande et de la France.*

Northwest Europe

Agro-industrial farming / plantations and livestock rearing have a medium to high impact on a range of species, including Black-tailed Godwit, Eurasian Curlew, Horned Grebe, Northern Shoveler and Northern Lapwing. Issues include the intensification of land use through scaling up, mechanisation, use of pesticides, draining and impoverishment of the herbal richness of the landscape. Meadows have been widely transformed into monocultures that are harvested more frequently and earlier in the year, resulting in the destruction of many nests and reduced availability of arthropod food. In addition, the predator abundance is likely higher than in the past whilst the habitat offers less opportunities for refuge.

Another widespread problem for waterbirds in Northwest Europe is the water management regime: dams and surface water abstraction can have a medium impact on birds such as Common Snipe and Northern Lapwing, which have declined in areas affected by drainage, as well as some ducks, including Northern Pintail. Seabirds can also be seriously (if unintentionally) affected by fishing activities, but waterbirds may also be affected. The Eurasian Oystercatcher, for instance, has suffered from the disappearance of mussels and other shellfish, though current measures are improving the situation. There have been efforts to ban hunting of some species, but recently the French government has announced that it will authorise hunting of shorebirds. Human intrusion also affects waterbirds, especially where tourism and recreation have increased, leading to reduced breeding of species such as Eurasian Curlew, Common Ringed Plover and colonial-breeding terns. As climate change accentuates, its impact will also be felt more widely. For example, more spring storms will result in many nests washed away.

Results of environmental monitoring from Northwest Europe are somewhat limited by a low number of sample sites, but they suggest that pollution from agricultural run-off and urban centres are most relevant, followed by invasive species, farming, overfishing (of both fish and shellfish), urbanisation and recreation / tourism (fig. 4.3). Concerning energy impacts, wind farms appear to exert a higher pressure than oil and gas developments, most likely because they may be in close proximity to some sites.

Iberia - North Africa

For Iberia and North Africa, threat data were submitted by Morocco and partially by Portugal. Pollution was found to be the most relevant pressure at coastal wetlands, especially from agricultural effluents, followed by urbanisation, fishing (especially for shellfish), farming and hunting & trapping (fig. 4.4).

West Africa

In the coastal and marine zone from Mauritania to Sierra Leone and Cabo Verde, the MAVA Foundation identified six major interlinked threats as barriers to the conservation of sea turtles, coastal wetlands, seabirds, mangroves, seagrass beds and small pelagic fish: human disturbance, oil pollution, infrastructures (including industrial development, oil and gas), lack of knowledge, bycatch and over-

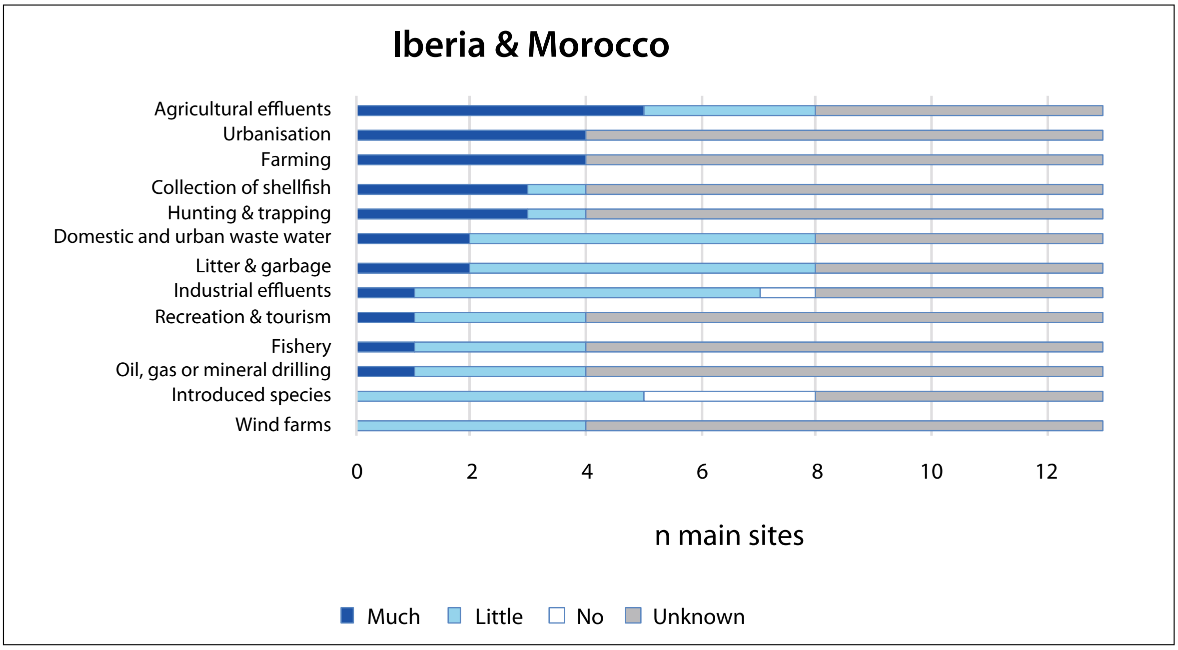


Figure 4.4. Pressures recorded from eight sites in Portugal and Morocco. *Pressions enregistrées sur huit sites au Portugal et au Maroc.*

fishing (MAVA 2016). Stakeholders involved in the development of the Regional Partnership for Coastal and Marine Conservation (PRCM) 2018-2027 Strategic Plan identified the four principal threats to marine biodiversity as: unsustainable fisheries, climate change, impacts of oil and gas operations and coastal infrastructures (PRCM 2018).

Results from the 2017 environmental monitoring also indicate that overfishing is a key pressure, both for fish and for collection of shellfish (fig. 4.5). Pollution is also identified as an important pressure, through agricultural effluents, litter and garbage and domestic urban wastewater, although oil pollution was not mentioned as a major pressure, in contrast to MAVA and PRCM analyses, which included a closer focus on the wider marine environment. The most important threat noted for the Banc d'Arguin, the most important site for migratory waders, was overfishing, especially of sharks and rays, which could subse-

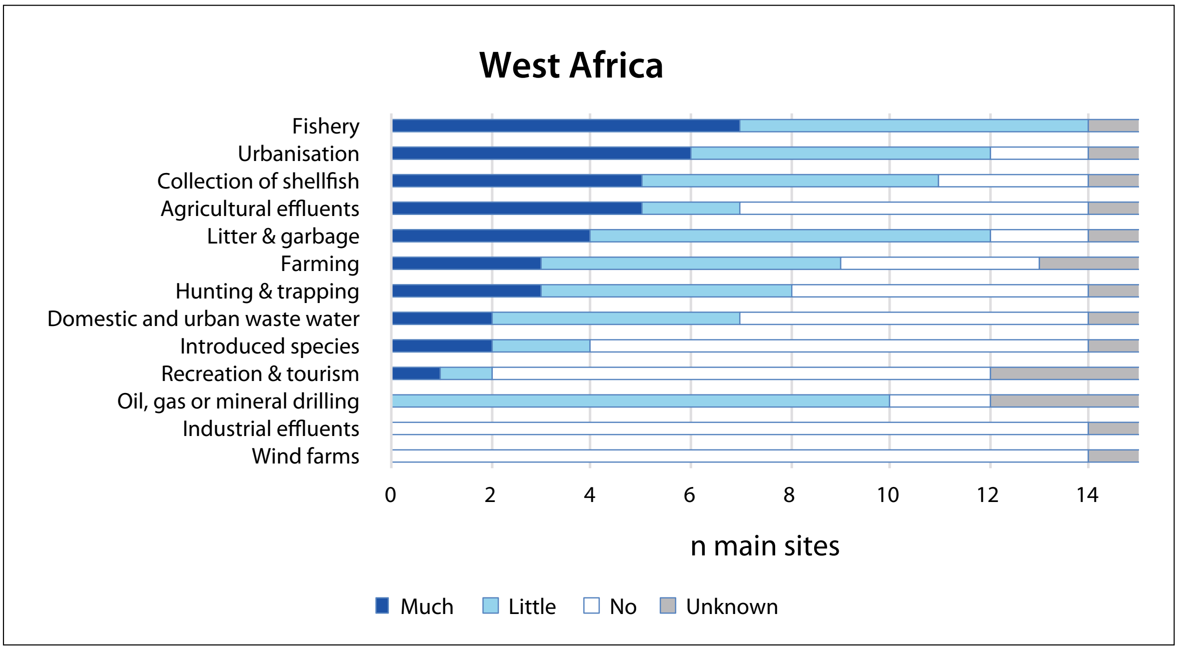


Figure 4.5. Pressures recorded from 15 sites in West Africa. *Pressions enregistrées sur 15 sites en Afrique de l'Ouest.*

quently impact the food availability for waders (El-Hacen 2018). The West African fishery is under intense pressure, and managing this fishery sustainably through sound marine spatial planning, and controlling illegal, unreported and unregulated (IUU) fishing is crucial for many coastal and marine species, as well as to millions of people.

Introduced species were only recorded as a higher pressure at two sites, both in the Senegal Delta, where the proliferation of invasive plants has altered habitats, especially since the construction of the Diama Dam and related hydrological works altered natural flooding and prevented the natural flow of saltwater upriver. The spread of invasive plants, especially *Typha*, has most likely directly contributed to a decline in waterbirds in the lower delta (Nature Mauritanie, in prep.). Some species of waterbirds are targeted for hunting, especially ducks, whilst others are targeted for trade, e.g. Black Crowned-crane.

The Western Africa coastal zone supports internationally important breeding bird colonies. Breeding terns and gulls from Mauritania to Guinea are most threatened by loss, erosion and wave encroachment of breeding islets, whilst disturbance, egg collection and predation may also occur, e.g. at Sine Saloum, Senegal (Veen *et al.* 2013). The region's mangroves are directly threatened by harvesting especially for fuel wood and by new infrastructural developments, although mangroves are on the increase in some coastal estuaries. In the rice and mangrove zone from Casamance to Sierra Leone, the abandonment of traditional ricefields and cutting of mangroves for new ricefields or plantations renders less suitable habitat for migratory waterbirds.

Gulf of Guinea

Many of the threats that impact coastal wetlands and waterbirds of Western Africa between Mauritania and Sierra Leone are also relevant in the coastal zone of the Gulf of Guinea. However, oil pollution and other impacts related to oil and gas extraction, transport and refining exert a much greater environmental impact in this region, especially in the coastal zone between Nigeria and Gabon. The Niger Delta has suffered numerous oil spills from damaged pipes and other sources from its numerous installations (fig. 4.6), and tidal flats, such as those of the Cross River, are also affected. Serious oil spills within the delta can clog up creeks and other waterways, rendering these habitats inhospitable to waterbirds, as well as other wildlife and people alike. There are also records of oil spills at sea, and the capacity to deal with such events is often lacking.

Other problems that impact the Nigerian coastal zone are beach erosion, flooding, deforestation, sand mining, pollution, saltwater intrusion, subsidence, introduction of exotic species and depletion of coastal resources and deforestation (CEDA 1997). Such threats are commonplace in most countries of the Gulf of Guinea to varying degrees. Coastal erosion is widespread along the coast, and very costly when seeking remedial actions. Erosion increases when mangroves are felled, usually for agricultural purposes, oil exploration activities and as a source of fuel for firewood. Sand mining also contributes to increased coastal erosion; Lagos Lagoon has been extensively dredged to provide sand for reclaimed land in Lagos. Invasive alien plants include water hyacinth, which proliferates in waters prone to eutrophication, and nypa palm, which replaces mangroves in some areas.

Conversion of natural areas to agriculture, such as oil palm plantations, is a constant threat within the coastal zone. Local NGOs in the Ndian region of Cameroon, for instance, have had to battle hard to curb the introduction of large-scale oil palm plantations close to the major Ndian Estuary. Wildlife harvesting and trade are also more serious threats to biodiversity, especially bushmeat (primarily mammals), which is widely sold and eaten, with very little attempt to control it.

The picture of pressures to waterbirds resulting from the 2017 environmental monitoring (fig. 4.7) presents a some-

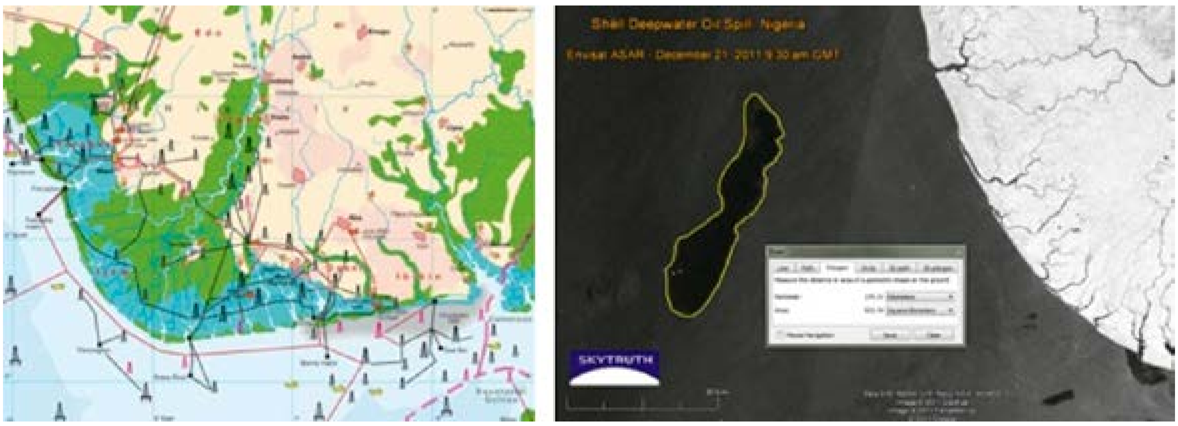


Figure 4.6. Oil installations in the Niger Delta (left, Wiese *et al.* 2010) and an offshore oil spill in 2011, Nigeria (right, Scoville-Weaver 2011). *Installations pétrolières dans le delta du Niger (à gauche, Wiese et al. 2010) et déversement d'hydrocarbures offshore en 2011 au Nigeria (à droite, Scoville-Weaver 2011).*

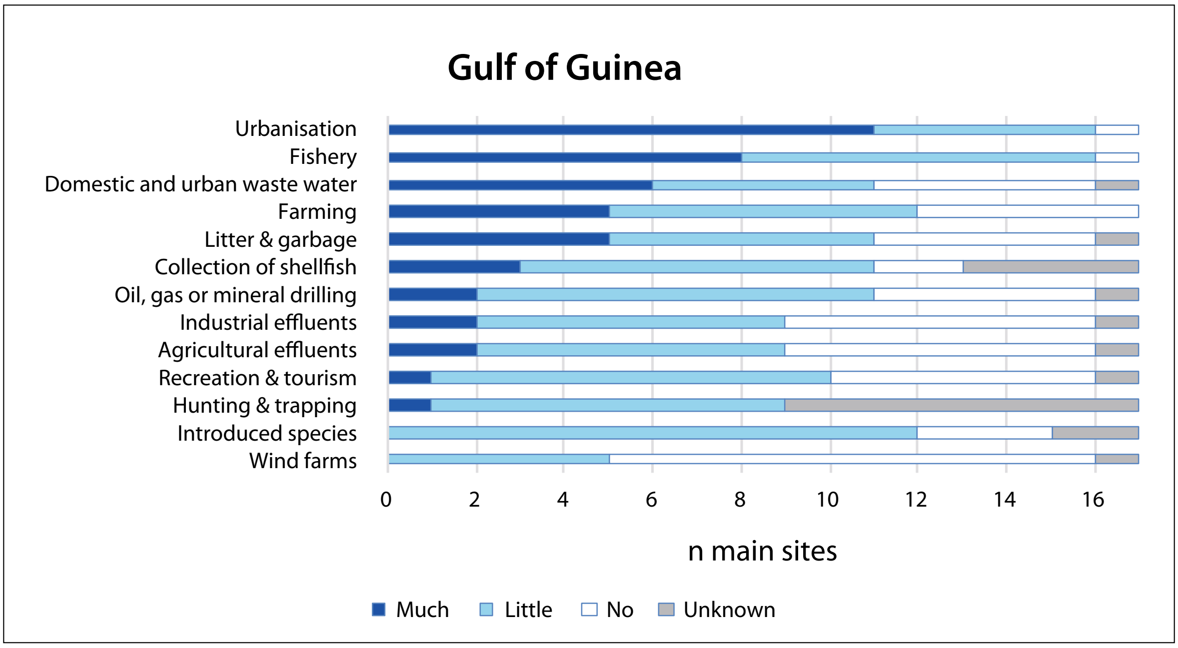


Figure 4.7. Pressures recorded for 17 sites in the Gulf of Guinea. *Pressions enregistrées sur 17 sites dans le golfe de Guinée.*

what different picture to these more general coastal zone threats, probably due to the selection of protected areas, where impacts of the energy industry are less direct. Urbanisation was the most frequently recorded high pressure, and indeed, some coastal wetlands are very close to major cities. Impacts of overfishing, pollution and farming were also recorded more frequently than other pressures.

Southern Africa

Wetlands of the more populated north and central coastal belt of Angola suffer direct pressures such as urbanisation, recreation, pollution and conversion to other uses. The Ilhéu dos Pássaros, for instance, in Mussulo Lagoon was settled by fishing communities who had been displaced by urban developments elsewhere on the lagoon, despite being part of a protected area. The permanent presence of people and the related disturbance was not compatible with providing a safe zone for birds, including migratory waders. There is also disturbance in the lagoon due to shellfish harvesting, whilst some larger birds at Mussulo

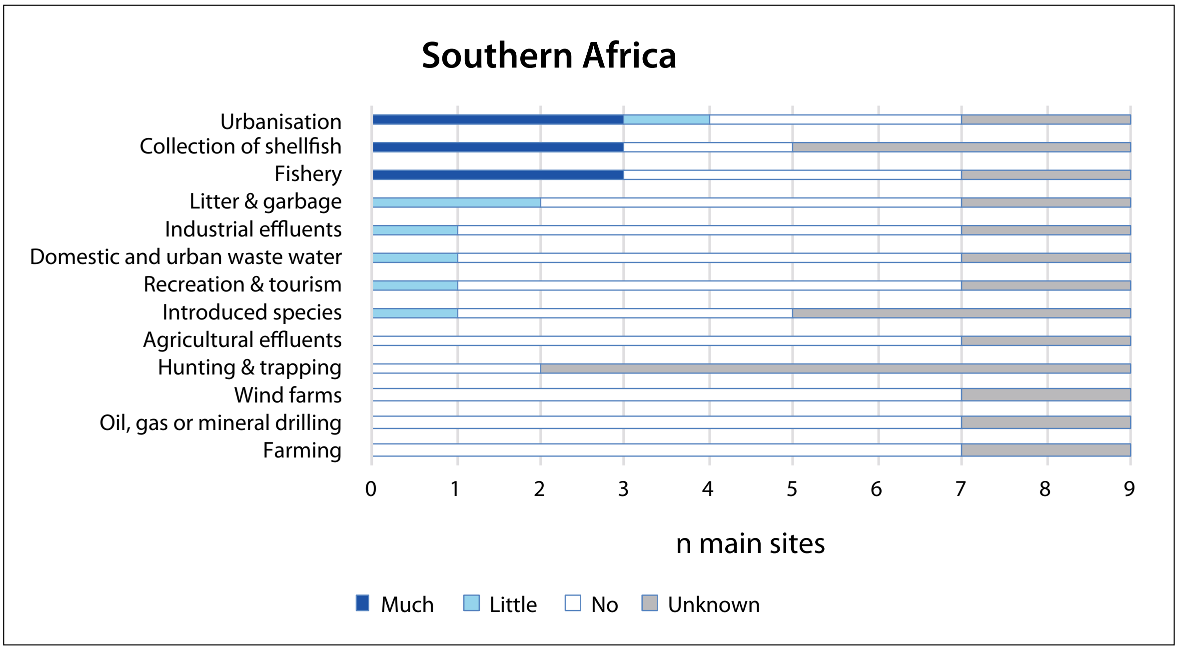


Figure 4.8. Pressures recorded for 7 sites in Southern Africa (Angola & Namibia). *Pressions enregistrées sur 7 sites en Afrique australe (Angola et Namibie).*

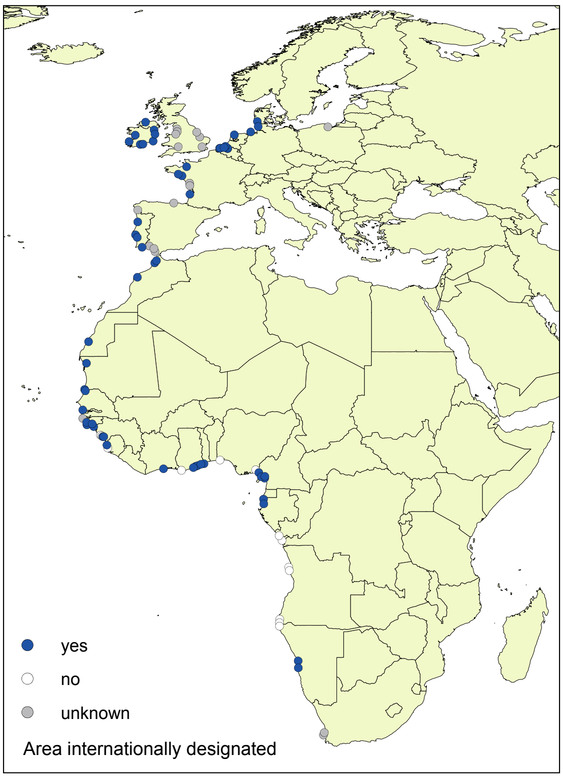
such as pelicans and flamingos are hunted, and a neighbouring island is under consideration for tourism development (Xavier & Dala 2016). Overfishing, including shellfish gathering, and urbanisation were recorded as the most relevant threats to waterbirds from sites included in the 2017 environmental monitoring (fig. 4.8).

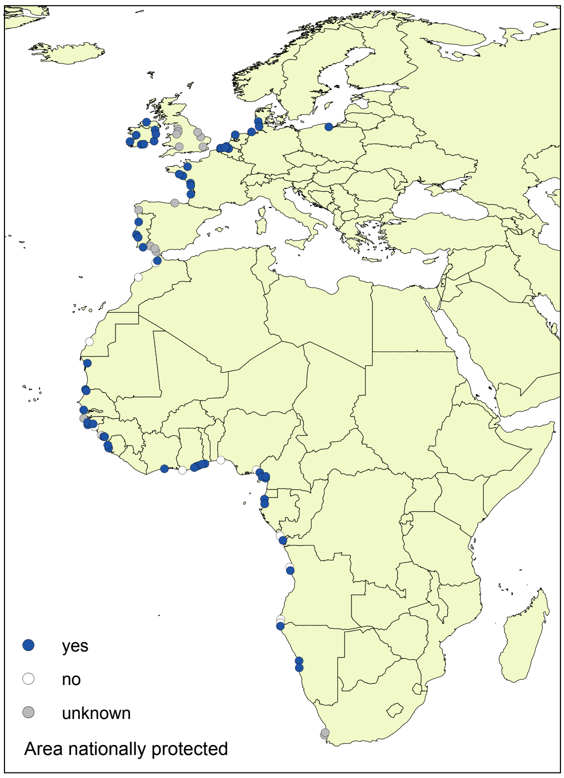
Other coastal wetlands in the region are similarly threatened by urbanisation and development, including in Namibia's Walvis Bay, where conflicts have arisen concerning housing developments. One conservation problem at Namibia's Sandwich Harbour is the constant illegal low flying undertaken by tour companies, often disturbing the flamingos and cormorants (BirdLife International 2018). Key threats to water resources in the Orange River Basin include over extraction / water scarcity, climate change impacts, pollution and land degradation. Water availability in this and other rivers in the region is sometimes critical during periods of low rainfall. At the coast, the most significant threat to the Orange River mouth wetland is the loss of inflow of water and sediment due to the upstream damming of the river (Diederichs *et al.* 2005).

4.5 Conservation measures along the East Atlantic Flyway

Conservation of coastal habitats along the East Atlantic Flyway is key for maintaining the network of critical sites on which migratory waterbirds depend for breeding, wintering, foraging and fuelling during their annual cycle. At different sites along the flyway, governments, local communities, national and International organisations are taking actions to protect, maintain, restore and advocate for waterbirds and their habitats. However, more efforts and activities are still needed. Some sites benefit from government conservation measures, whilst others are managed by community groups and benefit from conservation engagement of NGOs. However, some sites have no protection status at all, whilst the level of actual conservation effort at protected areas varies considerably between sites. Different activities including long-term research and monitoring, restoration, environmental education and awareness-raising are conducted at a number of sites. However, the implementation of policies to control development activities is still a challenge for the long-term conservation of flyway populations as well as for sustainable development.

Along the East Atlantic Flyway, there is a network of coastal sites that are designated as Wetlands of International Importance under the Ramsar Convention, as Special Protected Areas under the EU Birds Directive, as World Heritage Sites under UNESCO, as Critical sites under AEWA, as Important Bird and Biodiversity Areas by BirdLife International and as national parks under national legislation or under other national classifications. Other government or organisational initiatives are additional instruments to support the conservation of designated sites. Some regional flyway initiatives include the Wadden Sea Flyway Initiative (WSFI), the Arctic Migratory Birds Initiative (AMBI),





Figures 4.9 and 4.10. International (left) and national (right) designations for site protection along the flyway. *Désignations internationales (à gauche) et nationales (à droite) pour la protection de sites le long de la voie de migration.*

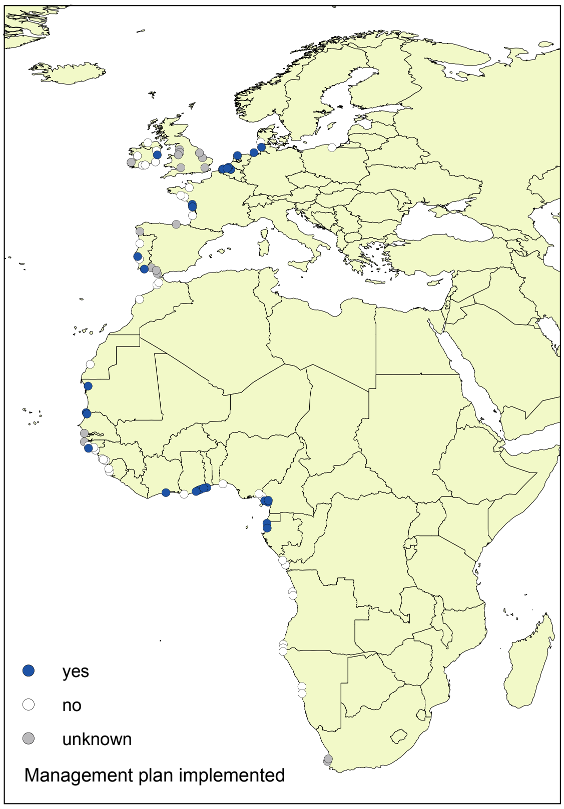


Figure 4.11. Implementation of management plans at selected sites along the flyway; management plans appear to be implemented at relatively few sites in Africa. *Mise en œuvre de plans de gestion sur des sites choisis le long de la voie de migration ; les plans de gestion semblent être mis en œuvre sur relativement peu de sites en Afrique.*

the BirdLife East Atlantic Flyway Initiative (EAFI) and Migratory Birds for People (MBP). A list of key Multilateral Environmental Agreements and initiatives most relevant for flyway conservation is provided in Annex 4.

Legal protection of sites

Sites with international and national designations are quite widespread along the East Atlantic Flyway, with effectiveness most prominent in Western Europe (figs 4.9 and 4.10); this may be related to levels of effective governance (Amano *et al.* 2017). Recent site designations for protection in Senegal are Kalissaye Nature Reserve as a Ramsar Site, Tocc Tocc Community Nature Reserve as a protected area and Technopole as a protected wetland. The Danish section of the Wadden Sea was also added to the World Heritage Site list, whilst the Bijagós Archipelago in Guinea-Bissau is in the process of expanding the Ramsar site area and seeking World Heritage Site status.

Policy, regulation and management

In most countries of the flyway, policies and regulation procedures are generally determined at the national level, supported by relevant international frameworks. In the EU countries, the Birds and Habitat Directives provide powerful legislation, with facilities to admonish countries that flaunt them. However, there are widespread issues in the development and adoption of policies catering properly for wetlands and waterbirds, as well as in their enforcement. Such issues are priority focal areas within the AEWA Plan of Action for Africa 2019-2027 (AEWA 2018). Some countries have elaborated fishing policies (including shellfish), such as Mauritania, as well as national wildlife laws to control illegal hunting activities. However, implementation and enforcement remains a major challenge. Limited resources to enforce the law persist especially in Africa, whilst the mandates and responsibilities among regulatory institutions are not always clear. At some sites there are measures to control the quantity of fish caught and the quality of fishing equipment (nets and approved mesh size). Although Environmental Impact Assessments for new constructions or renewing existing infrastructures are required in most countries, they are often only weakly enforced, as are various planning bylaws. EU nature legislation, most notably the Birds Directive and the Habitats Directive, forms the backbone of biodiversity policy and the legal basis for the nature protection network in Europe. Natura 2000 sites cover over 18% of the EU's land area and more than 6% of its marine area.

At the site level, only one third of the sites monitored have developed or updated and implemented management plans and procedures to implement them. Most key sites in Europe that have working management plans have staff and other resources to implement them, but this is less common in Africa (fig. 4.11). Although sites such as Diawling National Park, Djoudj National Park and Trois Marigots in Mauritania and Senegal have management plans, resources and procedures for their implementation are sometimes lacking. Species Action Plans (SAPs) are useful tools that identify the needs and actions for managing species, although there are often issues in their implementation, which should include the development of supporting national SAPs.

Habitat restoration

Restoring degraded habitats is an important conservation step, which can also engage communities, although it is almost always more costly than preventing the degradation of natural habitats. Some organisations support activities such as mangrove reforestation and establishment of woodlots at different sites along the flyway in Africa, which can improve breeding, resting and feeding areas of waterbirds and reduce the negative effects of erosion. The mechanical removal of invasive plants such as reeds / cattails (*Typha* family), Water Hyacinth and Tamarisk are also applied at some sites. In Diawling National Park, Nature Mauritanie is involved with local communities and the park authority to remove Tamarisk and restore the site by planting mangroves. Wetlands International works with local communities, local NGOs and park authorities to restore mangroves in the Saloum Delta National Park (Senegal) and in the Niger Delta (Nigeria). In Morocco, GREPOM (the BirdLife Partner) is rehabilitating the Lixus Saltpan in Larache. Restoring or providing breeding or resting sites for birds is also a solution at some sites. A wall is under construction to protect Songhor Lagoon in Ghana from coastal erosion. The collection of garbage is also organised at some sites, such as Mussulo Lagoon, Angola.

Engaging communities in conservation

Various educational activities and sensitisation on issues such as sustainable farming, controlled fishing and regulated tourism are conducted through outreach materials, radio broadcasting emissions and other media. Community groups such as fishing committees can become engaged in conservation through alternative livelihood activities.

Research and monitoring

Continuous monitoring of biodiversity, habitats and protection measures are conducted at various sites along the flyway. In addition to the IWC, periodic waterbird monitoring is ongoing at a number of sites, e.g. monthly assessments at Kalissaye Ornithological Reserve and the Niayes in Senegal, whilst several European countries have nationwide monthly monitoring programmes, such as the Wetland Bird Survey in the UK. The results contribute not only to decision-making but also to the allocation of conservation efforts along flyways. These efforts partly result from capacity building of site managers and monitors trained through the cooperation of Wadden Sea Flyway Initiative, BirdLife International and Wetlands International.

4.6 Discussion and recommendations

Along the entire flyway there is ongoing change at a very fast pace. We see in the high Arctic the effects of climate change unfolding with a speed that has surprised even the experts. Farming is becoming so intensified in parts of Western Europe that there is talk of 'green deserts'. Renewable energy infrastructures are being set up offshore and near coastal wetlands in the North Sea, but also start to appear off the coast of Africa. Urbanisation and development is quickly unfolding, often in a poorly planned fashion, particularly along the West African coast. These and other developments put a strong pressure upon the many sites that migratory birds need to complete their annual cycle, and they are only likely to increase as the human population grows, with its concomitant need for resources.

With changes taking place at such a fast pace, it is important to regularly take the pulse of bird populations


Hans Schekkerman

Group photo of the observers of the Banc d' Arguin count, January 2017.

along the entire flyway, and of the pressures they face. Conservation of migratory birds is a challenging issue, as it requires a collective effort to ensure birds can have safe havens, food and shelter throughout the entire length of their flyways. Being successful in one or two places is insufficient - the route is only as strong as its weakest link. Thanks to the ongoing monitoring of waterbirds it has been possible to corroborate beyond doubt the suspected declines of some species and populations (see chapters 2 and 3, Annex 1) and therefore to make recommendations and undertake actions to reduce the pressures. We also know that the actions carried out are still insufficient to change the trends.

Monitoring network

The continued development of networks of capable observers to support monitoring, and of local organisations that can process data and react to them, is still a priority, particularly in Africa. It is also necessary to ensure that systematic monitoring is extended routinely to habitats and pressures, instead of achieving it through special dedicated efforts. This way, environmental monitoring can grow and improve, learning lessons from the field. Collaboration with local research institutions, complemented with Earth observations, could further help to ensure reliable and regular habitat monitoring.

There are limitations to the coverage of sites monitored along the flyway, especially at very large sites and due to a limited number of observers. Such gaps could be complemented by remote sensing to track the changes in habitats. Specific monitoring of species and sites in danger should also be organised along the flyway building collaboration between sites mangers and organisations.

Strong site networks

A stronger commitment is necessary among all countries that share the flyway, particularly of wealthier countries that have the capacity to invest in the conservation of ‘their’ birds. However, such efforts will be insufficient if they do not lead to a network of safe sites along the entire flyway. Moreover, there is the added challenge of ensuring that the network is sufficiently resilient to the changes set in motion by the alteration of climate patterns. Some Palearctic breeding birds are already shifting their wintering ranges, with some species remaining in Europe rather than flying all the way to West Africa, such as the White Stork (Flack *et al.* 2016).

Limiting the pressures

In this chapter, a range of pressures impacting waterbirds and wetlands of the East Atlantic Flyway have been described. Of these, changes in sites and habitats due to various pressures resulting from a changing climate are likely to be foremost, with warmer conditions impacting breeding sites for waders in the Arctic and rising sea-levels having potentially dramatic effects on mudflats. There are

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Recreation can cause disturbance to high tide roosts of waders.

Geoffroy Citegetse

Involving youth in local wetland activities to increase awareness.

also widespread growing pressures on sites from an ever-increasing human population, especially in Africa. Thus, issues such as urbanisation and pollution were noted as being commonplace pressures to wetlands along the flyway. Although such pressures may not yet be impacting waterbird populations widely, the continued loss and degradation of sites poses a major challenge for the future. Such issues need to be monitored regularly to inform and guide future management. There are also limitations to effective management of sites related to capacity and governance.

These issues need to be addressed at all levels to ensure a comprehensive network of well-managed sites along the whole flyway, and personnel with abilities and resources to monitor and manage them. Investment in and commitment to site conservation to secure 'safe sites' for migratory birds is required, whilst implementing and enforcing policies is needed across the flyway. Building a greater awareness and appreciation of the sites and their natural functions is also essential in creating respect for and local pride in these havens for migratory birds. Whilst global issues such as climate change cannot be easily turned around, there is scope for planning, working together and being better prepared along the East Atlantic Flyway, in order to limit the pressures, secure the site network and ultimately assure the survival of the remarkable waders and other birds that depend on this.

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Whimbrel | **Courlis corlieu** *(Numenius phaeopus)*
Portugal (Arnold Meijer / Blue Robin)

Annex 1. Trends and distribution of waterbird populations using the coastal East Atlantic Flyway, update 2017

Tendances et répartition des populations d'oiseaux d'eau utilisant la voie de migration de la côte Atlantique Est, mise à jour 2017.

Marc van Roomen, Tom Langendoen, Szabolcs Nagy, Erik van Winden, Khady Gueye Fall & Erik Kleyheeg

A1.1 Introduction

In this Annex the basic results of ongoing abundance monitoring of waterbirds using the coastal East Atlantic Flyway are reported. It is as such a follow-up of the results reported until 2014 (van Roomen *et al.* 2015). This annex updates trend and distribution information up to and including 2017 as much as possible, although for populations wintering in Europe it is mostly until 2016 due to data availability. For the sake of completeness and consistency, the estimates of population sizes until 2012-2014, as reported in Wetlands International (2018) and partly based on van Roomen *et al.* (2015), are repeated here. In comparison with the update until 2014 we now include more species and populations, increasing the scope of view of the importance of the coastal East Atlantic Flyway for populations from Europe, Asia and Africa.

Users of the information in this annex need to pay attention to the distinction between trends which can be considered as representative for an entire flyway population of a species, and trends which only represent the development within a part of the coastal East Atlantic study area (more details in material and methods). Secondly, the current update predominantly only uses results of midwinter counts of non-breeding numbers (mainly from January) as collected within the International Waterbird Census (IWC) as a basis for trend calculation. The reason for this is that breeding bird data that was used to describe trends of some populations in the 2014 update was not available for the recent years (more details in material and methods). Also, users need to distinguish between flyway populations for which trends based on midwinter counts best quantify the population development and populations for which trends are better described by breeding bird numbers (Hearn *et al.* 2018) but for which the trend based on midwinter counts can probably act as a proxy (more details in material and methods). Thirdly the flyway trends in this Annex can be different from the ones reported in Wetlands International (2017) and Wetlands International (2018) for the same populations. This is mostly caused by data from more recent years being included in the current trend update and a stricter data selection for Africa. It is partly also caused by a different approach to imputing missing counts in Africa and method of trend analysis.

A1.2 Material and methods

A1.2.1 Geographical region, species and populations

The choice of geographical region, species and populations covered in this Annex is the result of an iterative process partly influenced by different aims and partly also by pragmatic choices. The East Atlantic Flyway as defined for (coastal) wader populations is depicted in fig. 1.1 in chapter 1. This flyway is defined from the Arctic including Northeast Canada, Greenland, Svalbard, North Russia and Siberia east to and including the Taimyr Peninsula. It includes the Scandinavian countries and Iceland and the coastal region of the other countries bordering the Baltic Seas. From there it includes Ireland, United Kingdom and Denmark and then southward including all coastal regions of countries bordering the North Sea and the Atlantic Ocean all the way south to the Cape of Good Hope in South Africa. Several selections of waterbird species and populations use this study area and are included in this report:

1. Flyway populations of waterbirds making use of the core estuarine habitats of the Wadden Sea (van Roomen *et al.* 2013). Many of these populations principally use the coastal East Atlantic Flyway as defined above during winter but for some populations also other countries in Central and Eastern Europe, West Mediterranean and inland Africa are part of their winter range.
2. Other waterbird flyway populations occurring largely (in winter/non-breeding) within this defined East Atlantic Flyway plus the countries included to cover the winter/non-breeding ranges of Wadden Sea populations (see also van Roomen *et al.* 2013, with additions). The *islandica*

Pied Avocet | **Avocette élégante** *(Recurvirostra avosetta)*

subspecies of Black-tailed Godwit, *monicae* subspecies of Grey Heron, and African Skimmer belong to this selection as well, but are not included in this report (in contrast to van Roomen *et al.* 2015) as data for a reliable update of their trends based on the IWC were lacking.

3. Other flyway populations belonging to species of selection 1 and 2 of which a part of their range during winter/ non-breeding is within the East Atlantic Flyway as defined here, but also partly or mainly lies in other flyways (Mediterranean or West Asia - East Africa flyways).

These selections of species and populations are listed in table A1.1. Taxonomy and population subdivision follow Wetlands International (2018). Names of populations may differ from those in Wetlands International (2018) to better describe the flyway used by the population by including breeding and wintering ranges in the name (format: 'breeding range' / 'wintering range'; if only one range is indicated both breeding and wintering occur there). In the case of subspecies, the subspecific scientific name is given and a range description if needed to separate from other populations.

A1.2.2 Abundance data

For this trend and distribution update mostly data from IWC counts (predominantly made in January) were used. For participating countries and lead organisation involved, see the acknowledgements of this report.

The flyway trend analyses in van Roomen *et al.* (2015) included a mixture of data from IWC counts and breeding bird counts, depending on the population. The dominant source of the breeding bird data at that time was the Article 12 reporting for the EU Birds Directive (EEA 2015), supplemented with similar data collected for non-EU countries in the framework of the European Red List of Birds (BirdLife International 2015). This data is collated once every six years and a new update is expected in 2020. Therefore, pending availability of yearly breeding numbers data for more relevant waterbird populations (in particular colonial species) than currently covered by the Pan-European Common Bird Monitoring Scheme (PECBMS, www.ebcc.info/pecbm.html), this current flyway assessment focuses on data from the IWC counts (with a few exceptions).

Table A1.1 Waterbird species and populations included in this report. Given are the reason for inclusion ('species selection', see text categories), if the population was included in the 2015 assessment (van Roomen *et al.* 2015) with data up to 2014 ('2014 pop'; w = based on IWC data, b = based on breeding bird data), the recommended method for flyway trend monitoring based on Hearn *et al.* 2018 (wjan = January counts of non-breeding birds, wjul = July counts of non-breeding birds, g = goose counts, b = breeding bird counts, L = other method), the data used for the trends in this report (w = January non breeding, b = breeding numbers) and the trend type included in this report (see text for explanation). Taxonomy and population devison follow Wetlands International (2018), but the names of the populations can differ (see text for explanation). Species indicated with ** include a combination of populations. *Espèces d'oiseaux d'eau et populations incluses dans ce rapport.*

Population	species selection	2014 pop	Hearn et al 2018	2017 pop	2017 trendtype
White-faced Whistling-duck, W Africa	2		wJan	w	3
White-faced Whistling-duck, E & S Africa	3		wjul		4
Brent Goose, *bernicla*, Siberia/W Europe	1	w	g	w	1a
Brent Goose, *hrota*, Svalbard/NW Europe	1	*	g		4
Brent Goose, *hrota*, Canada & Greenland/NW Europe	2		g		4
Barnacle Goose, Siberia & NW Europe/NW Europe	1	w	g	w	1b
Barnacle Goose, East Greenland/NW Europe	2		g		4
Barnacle Goose, Svalbard/NW Europe	2		g		4
Greylag Goose, *anser*, NW Europe/NW & SW Europe	2		g	w	1b
Greylag Goose, *anser*, Iceland/NW Europe	2		g		4
Greylag Goose, *anser*, NW Scotland	2		g		4
Common Eider, *mollissima*, Baltic, W Europe	1	b	wJan	w	1b
Common Eider, *mollissima*, Brittain & Ireland	2		wJan	w	1a
Common Eider, *mollissima*, Norway & White Sea	2		wJan		4
Common Eider, *islandica*, Iceland	2		b		4
Common Eider, *islandica*, Greenland	2		b		4
Common Eider, *faroeensis*, Faroe, Shetland & Orkneys	2		b		4
Common Shelduck, NW Europe	1	w	wJan	w	1a
Common Shelduck, Black Sea & Mediterranean	3		wJan	w	3
South African Shelduck, S Africa	2		wJan	w	3
Cape Shoveler, S Africa	2		wJan	w	3
Northern Shoveler, NW & E Europe & Siberia /NW & C Europe	2		wJan	w	1a
Northern Shoveler, E Europe & Siberia/W Mediterranean & W Africa	3		wJan	w	3
Eurasian Wigeon, N Europe & Siberia/NW Europe	1	w	wJan & g	w	1a
Eurasian Wigeon, NE Europe & Siberia/Black Sea &Mediterranean	3		wJan & g	w	3
Mallard, *platyrhynchos*, NW & E Europe & Siberia/ NW Europe	2		wJan	w	1a
Mallard, *platyrhynchos*, E Europe & Siberia/ West Meditrerranean	3		wJan	w	3
Cape Teal, S Africa	2		wJan	w	3
Northern Pintail, N Europe & Siberia/NW Europe	1	w	wJan	w	1a

Population	species selection	2014 pop	Hearn et al 2018	2017 pop	2017 trendtype
Northern Pintail, NE Europe & Siberia/W Mediterranean & W Africa	3		wJan	w	3
Common Teal, *crecca*, NW & E Europe & Siberia/ NW Europe	2		wJan	w	1a
Common Teal, *crecca*, E Europe & Siberia/ W Mediterranean	3		wJan	w	3
Great Crested Grebe, *cristatus*, NW Europe & W Mediterranean	2		wJan	w	1a
Great Crested Grebe, *infuscatus*, S Africa	3		wJan		4
Horned Grebe, *auritus*, N Europe/NW Europe	2		b	w	1c
Horned Grebe, *auritus*, NE Europe & Siberia/W & E Europe	3		b	w	1c
Black-necked Grebe, *nigricollis*, Europe/S & W Europe & N Africa	3		wJan	w	1a
Black-necked Grebe, *gurneyi*, S Africa	2		wJan	w	3
Greater Flamingo, W Mediterranean	2		wJan	w	1a
Greater Flamingo, W Africa	2	*	wJan	w	1a
Greater Flamingo, S Africa	3		wJan		4
Lesser Flamingo, W Africa	2	w	wJan	w	1a
Lesser Flamingo, S Africa	3		wJan	w	3
African Spoonbill, Sub-Saharan Africa	3		wJan	w	3
Eurasian Spoonbill, W Europe/W Europe & W Med & W Africa	1	b	b	b	1a
Eurasian Spoonbill, *balsaci*, Mauritania	2	b	b		4
African Sacred Ibis, Sub-Saharan Africa	3		wJan	w	3
Goliath Heron, Sub-Saharan Africa	3		wJan	w	3
Great White Egret, Europe & N Africa	3		wJan & g	w	3
Great White Egret, *melanorhynchos*, Sub-Saharan Africa	3		wJan	w	3
Western Reef-egret, *gularis*, W Africa	2	w	wJan	w	1b
Pink-backed Pelican, Sub-Saharan Africa	3		wJan	w	3
Great White Pelican, W Africa	3	w	wJan	w	1b
Great White Pelican, S Africa	3		wJan	w	3
Long-tailed Cormorant, *africanus*, W Africa	3		wJan	w	3
Long-tailed Cormorant, *africanus*, S & E Africa	3		wJan		4
Great Cormorant, *carbo*, NW Europe	2		b		4
Great Cormorant, *sinensis*, W & C Europe	1	b	wJan	w	1a
Great Cormorant, *sinensis*, E Europe/W Mediterranean	3		wJan		4
Great Cormorant, *maroccanus*	2		wJan		4
Great Cormorant, *lucidus*, W Africa	2	w	wJan	w	1b
Great Cormorant, *lucidus*, S Africa	3		wJan	w	3
Cape Cormorant, S Africa	2		b	b	1a
African Darter, *rufa*, W Africa	3		wJan	w	3
African Darter, rufa, S & E Africa	3		wJan		4

Population	species selection	2014 pop	Hearn et al 2018	2017 pop	2017 trendtype
African Oystercatcher, S Africa	2	*	wJan	w	1a
Eurasian Oystercatcher, NW Europe/East-Atlantic	1	w	wJan	w	1a
Pied Avocet, NW Europe/East-Atlantic	1	w	wJan	w	1a
Pied Avocet, S Africa	3		wJan	w	3
Grey Plover, W Siberia/East-Atlantic	1	w	wJan	w	1a
Grey Plover, C & E Siberia/SW Asia - S Africa	3		wJan	w	3
Common Ringed Plover, *hiaticula*, NW Europe/ SW Europe & N-Africa	1	b	wJan	w	1a
Common Ringed Plover, *psammodromus*, Canada to Iceland/W & S Africa	1	w	wJan	w	1b
Common Ringed Plover, *tundrae*, NE Europe & Siberia/ SW Asia - S Africa	3		wJan		4
Kittlitz's Plover, W Africa	3		wJan	w	3
Kittlitz's Plover, S Africa	3		wjul	w	3
White-fronted Plover, *hesperius*, W Africa	3		L		4
White-fronted Plover, *mechowi*, C Africa	2		L		4
White-fronted Plover, *arenaceus*, NS Africa	2		L		4
White-fronted Plover, *marginatus*, S Africa	2		L		4
** **White-fronted Plover**, East Atlantic Africa		*		w	2
Kentish Plover, W Europe & W Mediterranean/ East-Atlantic	1	w	wJan	w	1b
Chestnut-banded Plover, *pallidus*, S Africa	2		wjul	w	1b
Whimbrel, *islandicus*, Iceland, Faroes & Scotland/ W Africa	2	*	b		4
Whimbrel, *phaeopus*, Northern Europe/W Africa	2	b	b		4
** **Whimbrel**, *islandicus & phaeopus*, East Atlantic				w	2
Eurasian Curlew, NW Europe/NW Europe, N & W Africa	1	b	b	b	1a
Eurasian Curlew, *orientalis*, Western Siberia/SW Asia - S Africa	3		wJan		4
Bar-tailed Godwit, *lapponica*, N Europe /W Europe	1		wJan	w	1a
Bar-tailed Godwit, *taymyrensis*, N Siberia /W & S Africa	1		wJan	w	1b
Ruddy Turnstone, Nearctic /W Europe & NW Africa	1	w	wJan	w	1b
Ruddy Turnstone, N Europe/W Africa	1	w	wJan	w	1b
Red Knot, *islandica*, Nearctic /W Europe	1	w	wJan	w	1a
Red Knot, *canutus*, NSiberia/W & S Africa	1	w	wJan	w	1b
Curlew Sandpiper, NW Siberia /W Africa	1	w	wJan	w	1b
Curlew Sandpiper, NE Siberia/SW Asia - S Africa	3		wJan	w	3
Sanderling, *alba*, Nearctic/W Europe & W Africa	1	w	wJan	w	1b
Sanderling, *alba*, N Siberia/SW Asia - S Africa	3		wJan	w	4
Dunlin, *alpina*, NE Europe & NW Siberia /W Europe & NW Africa	1	w	wJan	w	1a
Dunlin, *schinzii*, Iceland /NW & W Africa	2	w	wJan	w	1b
Dunlin, *schinzii*, Britain & Ireland/SW Europe & NW Africa	2	b	b		4

Population	species selection	2014 pop	Hearn et al 2018	2017 pop	2017 trendtype
Dunlin, *schinzii*, Baltic/NW Europe	2	b	b		4
Dunlin, *arctica*, Greenland/W Africa	2	*	b		4
Purple Sandpiper, W Greenland	2		b		4
Purple Sandpiper, *littoralis*, Iceland	2		b		4
Purple Sandpiper, N Europe & W Siberia/NW Europe	2		b		4
Purple Sandpiper, NE Canada & E Greenland/ NW Europe	2		b		4
** **Purple Sandpiper**, NE Canada - W Siberia/ East Atlantic				w	2
Little Stint, N Europe, NW Siberia/N & W Africa	2	w	wJan	w	1b
Little Stint, NE Siberia/SW Asia - S Africa	3		wJan	w	3
Spotted Redshank, NE Europe /SW Europe, N & W Africa	1	w	wJan	w	1b
Common Greenshank, N Europe/ W & SW Europe, NW & W Africa	1	w	b	w	1b
Common Greenshank, NW Siberia/SW Asia - S Africa	3		wJan	w	3
Common Redshank, *robusta*, Iceland & Faroes / NW Europe	1	w	b	w	1c
Common Redshank, *totanus*, Britain, Ireland, NL & France /W Europe	1	b	b	w	1c
Common Redshank, *totanus*, N Europe /W Africa	1	w	b	w	1b
Common Redshank, *totanus*, C & E Europe/ C & S Africa	3		b		4
Slender-billed Gull, W Mediterranean	3		wJan	w	3
Slender-billed Gull, W Africa	2	w	wJan	w	1a
Black-headed Gull, W Europe/W Europe, W Med - W Africa	1	b	wJan	w	1a
Hartlaub's Gull, S Africa	2		wJan	w	1a
Grey-headed Gull, *poiocephalus*, W Africa	3	w	wJan	w	3
Grey-headed Gull, *poiocephalus*, S Africa	3		wJan	w	3
Mediterranean Gull, W Europe, Mediterranean & NW Africa	3		wJan	w	1b
Audouin's Gull, Mediterranean/N & W Africa	2		b	w	1c
Mew Gull, *canus*, NW & C Europe /NW Europe & W Med.	1	b	b	w	1c
Kelp Gull, *vetula*, W Africa	2		wJan		4
Kelp Gull, *vetula*, S Africa	2		wJan	w	1b
Lesser Black-backed Gull, *graellsii*, NW Europe /East Atlantic	2		b		4
Lesser Black-backed Gull, *intermedius*, W Europe / East Atlantic	2		b		4
** **Lesser Black-backed Gull**, *graellsii* & *intermedius*, East Atlantic				w	2
European Herring Gull, *argenteus*, NW Europe/East Atlantic	2	b	b		4
European Herring Gull, *argentatus*, W Europe /East Atlantic	1	b	b		4
** **European Herring Gull**, *argenteus* & *argentatus*, NW Europe				w	2

Population	species selection	2014 pop	Hearn et al 2018	2017 pop	2017 trendtype
Great Black-backed Gull, N & W Europe	3		wJan	w	1b
Gull-billed Tern, *nilotica*, W Europe/W Africa	2	b	b	b	1a
Little Tern, Europe north of Mediterranean /East Atlantic	1	b	b		4
Little Tern, West Mediterranean/ East Atlantic	2		b		4
Little Tern, W Africa	2		b		4
** **Little Tern**, East Atlantic				w	2
Damara Tern, Namibia & South Africa	2	*	b	w	1c
Caspian Tern, Baltic/W Medit & inland W Africa	3		b		4
Caspian Tern, coastal W Africa	2	w	b	w	1c
Caspian Tern, S Africa	3		wJan	w	3
Common Tern, N & E Europe /East Atlantic	3	b	b		4
Common Tern, S & W Europe/East Atlantic	1	b	b		4
Common Tern, W Africa	2		b		4
** **Common Tern**, East Atlantic				w	2
Roseate Tern, W Europe/East Atlantic	2	b	b	b	1a
Sandwich Tern, *sandvicensis*, W Europe /East Atlantic	1	b	b	w	1c
Royal Tern, *albidorsalis*, W Africa	2	*	b	w	1c
Greater Crested Tern, *bergii*, S Africa	3		wJan	w	1b

Luckily enough, for trends, the use of IWC data is in most cases also the preferred method (see Hearn *et al.* (2018) and table A1.1). However for Cape Cormorant, Eurasian Curlew, Eurasian Spoonbill, Gull-billed Tern and Roseate Tern, trends from breeding bird surveys were used (van Roomen *et al.* 2015). In the current report estimates of population sizes follow Wetlands International (2018), in which a combination of breeding bird data, IWC data and literature references is used, covering a period up to 2012-2014.

Figs. A1.1 and A1.2 show the spatial and temporal extent of IWC data used for trends in this report. Starting and ending years for the trend estimates were chosen depending on data availability for each species and population.

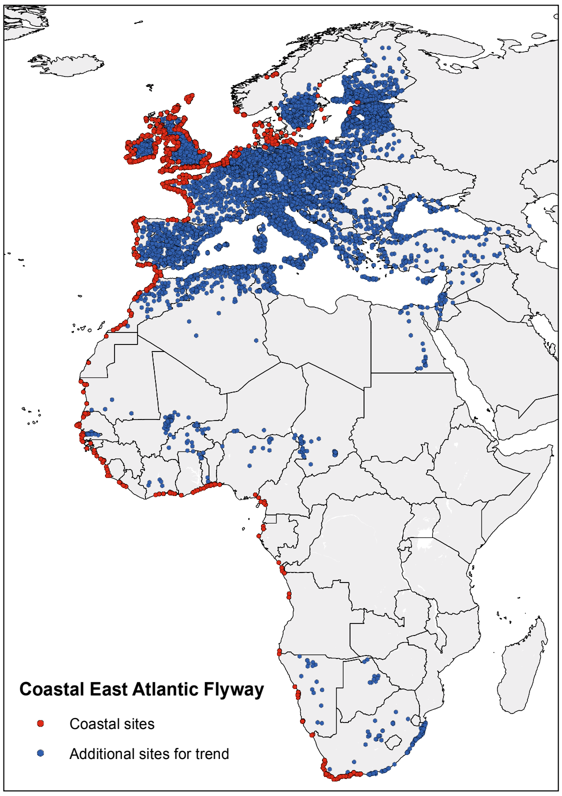
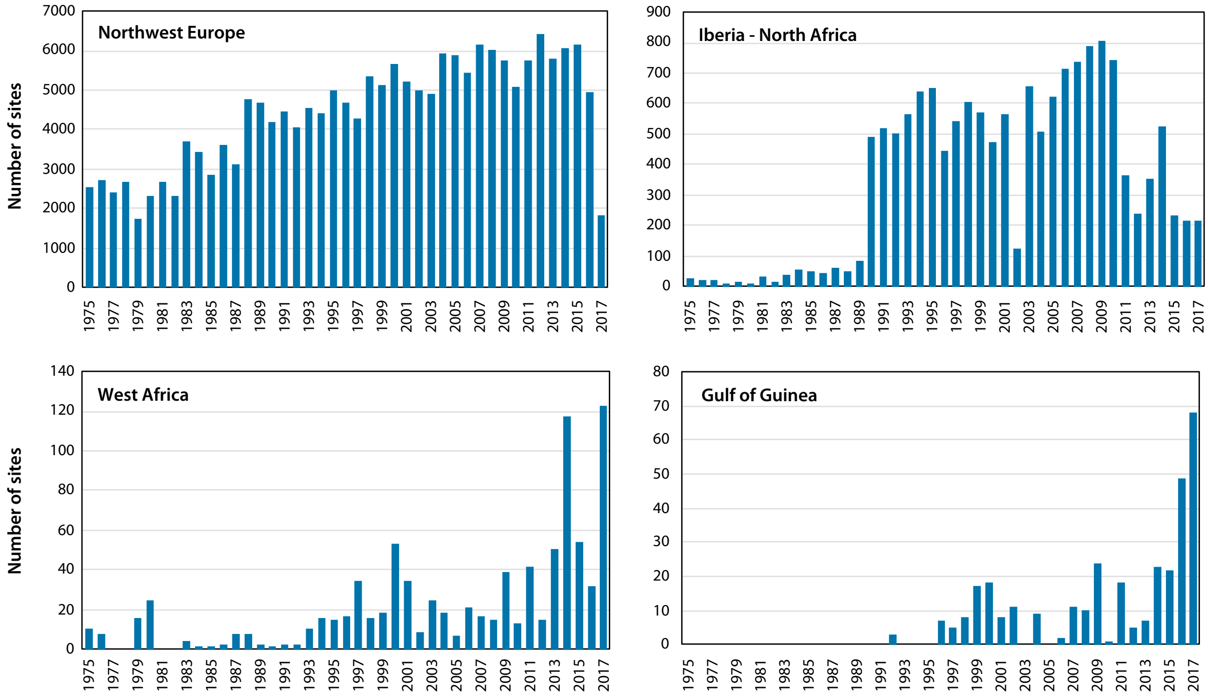


Figure A1.1. Distribution of sites included in the trend analyses for one or more populations (red and blue dots). Sites within the coastal East Atlantic Flyway are indicated in red. The map covers the period 1975-2017. *Répartition des sites inclus dans les analyses de tendance pour une ou plusieurs populations (points rouges et bleus). Les sites de la voie de migration de la côte est-atlantique sont indiqués en rouge. La carte couvre la période 1975-2017.*



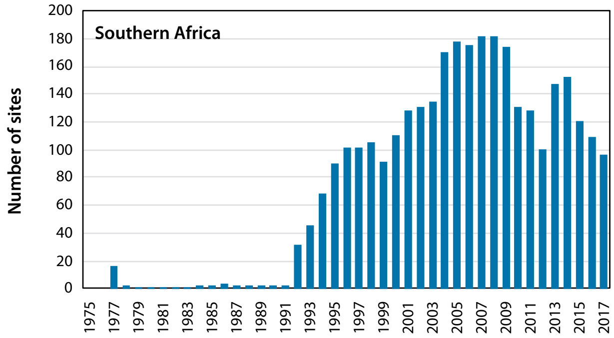


Figure A1.2. Numbers of sites per year with IWC count data available in March 2018 when analyses for this report started, per region. The number of waterbird species included in the counts increased during 1975-2017 depending on region and site. *Nombre de sites, par an, pour lesquels les données de comptage IWC sont disponibles en mars 2018 au début des analyses pour ce rapport, par région. Le nombre d'espèces d'oiseaux d'eau incluses dans les dénombrements a augmenté entre 1975 et 2017, selon la région et le site.*

A1.2.3 Analyses

Trends

Selection of sites and allocation to populations

In Europe, all sites with at least a positive count for the species before and after 2013 were selected for the trend analysis. In Africa, we selected sites with a more or less consistent site boundary definition and several more or less reliable counts over time (based on expert judgement).

Generally, site allocation to flyway populations followed the new procedures used for the AEWA Conservation Status Review (7th edition, Wetlands International 2017, 2018), with each country allocated to a single population, with exceptions for Germany, France and South Africa, where sites are allocated to different flyways by region within the country.

Allocation of zero counts and missing values

To allocate zero and missing values, we also followed the procedures used for the AEWA Conservation Status Review (Wetlands International 2017, 2018). For the purpose of trend analyses, we consider the IWC as a full list method for waterbirds because observers are requested by the national coordinators to record all species of waterbird they have seen. Unreported species were considered absent (zero), unless a relevant multispecies group (e.g. 'unidentified ducks') was reported during the count or during the years before counts of a particular species group started in a country (missing value).

Imputing of missing values

We estimated missing values using the R version of the program TRIM (Bogaart *et al.* 2016). We first attempted to fit models with the following settings: Model 2 (i.e. year-effect), automatic change-point removal, serial correlation and overdispersion. For populations with insufficient data, models were then tried without the conditions of serial correlation and/or automatic change-point removal. In Europe, imputing took place within the country as a stratum in the period between the first and the last year the country had positive count for the species. For many African countries, there are more years without any counts so countries were combined into regions (West Africa, Gulf of Guinea and Southern Africa) as an imputing stratum.

Trend analyses

Results of the counts and imputing were taken together to totals for a year. Years in which less than 30% of the total number for a species was actually counted (as opposed to imputed) were removed. Based on expert judgement also some unrealistically low or high 'outlyers' were removed in some species. The program TrendSpotter was used for trend detection and description giving trend lines, 95% confidence intervals and trend classification (Visser 2004, Soldaat *et al.* 2007). The trend for the long term (start year dependent on data availability) and short term (most recent 10 years) were calculated in two separate runs. Based on the number of data points a linear of flexible long-term trend was calculated. Short term trends were always calculated as a linear trend. Year points and trends were indexed across the average of the time series.

Trend types

The following trend types are distinguished based on data quality and area coverage (for allocation of types to population see table A1.1):

1a Probably good flyway trend with entire range (winter and sometimes breeding) of the flyway population covered with the right method (as defined in Hearn *et al.* 2018) at the most appropriate sites and during sufficient years.

1b Probably reasonable flyway trend with a part of the whole range covered with the right method at a selection of appropriate sites or with enough coverage of the range but for a limited number of years.

1c Probably reasonable flyway trend with entire or substantial part of winter range covered by the IWC, but where breeding bird numbers are the recommended basis for flyway trends (Hearn *et al.* 2018). The trend based on the IWC is considered as likely a reasonable proxy for the flyway trend.

2 No flyway trend could be calculated for individual flyway populations of a species with the data available for this report, but a combined trend could be calculated for two (or more) flyway populations co-occurring in their winter range along the East Atlantic Flyway.

3 No flyway trend could be calculated as the flyway population range extends far outside our study area, but a local trend could be calculated for that part of the winter range of the population that overlaps with the coastal East Atlantic Flyway.

4 No flyway trend is used, available or could be calculated because of other reasons.

Distribution

The distribution maps give breeding and non breeding range of each species (based on BirdLife International & Handbook of Birds of the World 2017). Flyway population

Rob Riemer / Agami

Red Knot | **Bécasseau maubèche** *(Calidris canutus)* boundaries are given for flyway populations with good or reasonably good flyway trends (types 1a, 1b, 1c). For trends of type 2 (for combinations of more than one flyway population) the flyway boundaries of the separate populations are given. Population boundaries were taken from the Critical Site Network tool (Wetlands International & BirdLife International (2018) .

A yearly winter (mostly January) count value per species was used for each main site in the coastal East Atlantic Flyway if available. If needed IWC count values for count units and subsites belonging to the same main site were taken together. The yearly totals of 2014-2017 per main site were averaged, but only if the yearly estimate was considered more or less complete; otherwise the most complete two counts were used. In addition to the numerical distribution of the species across the main sites along the coastal East Atlantic Flyway (red dots), the position of the inland sites from which data is used for the flyway trend is also given in the distribution maps (blue dots). 'Main sites' are defined as separate complete wetland sites within the landscape; they can be very large or small, can be very important for waterbirds or not, and may include multiple counting units or subsites.

A1.3 Results: species accounts

The following succinct species accounts give some background on recognised flyway populations, distribution, and ecology. Few references are included to sources of particular species information. Information is based on the *Handbook Birds of the World* (del Hoyo *et al.* 1992, 1994, 1996), *Atlas of Anatidae populations in Africa and Western Eurasia* (Scott & Rose 1996), *Atlas of Wader populations of Africa and Western Eurasia* (Delany *et al.* 2009), and van Roomen *et al.* (2015). The main results consists of a table with summarised data on trends and population size, a map giving the distribution during January 2014-2017, and trend graphs.

As most trends are based on a sample of the total population, they are presented as indices in which the average of the time serie is taken as 100. Population sizes for non-AEWA populations are not given as they are not recently updated. For population trends based on breeding birds the trend in van Roomen et al. 2015 is used and the trend graph is not repeated in this report. Lacking trend indications in the tables are or not available or only as a combined population given in the table.

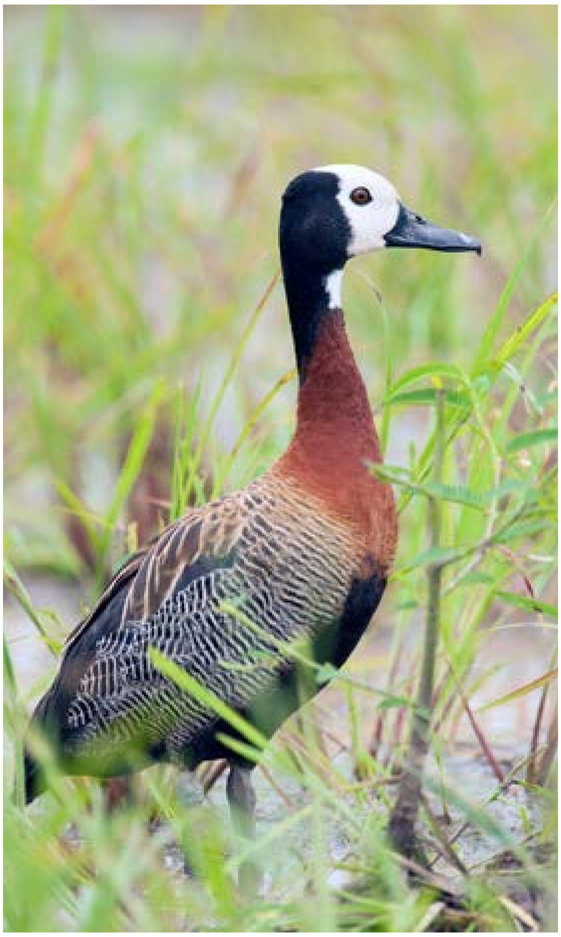
Peter de Boer

Preparing the counts for the next day at Bijagos Archipel, Guinea Bissau.

White-faced Whistling-duck | Dendrocygne veuf | *Dendrocygna viduata*

Populations, distribution and ecology

Within the study region two biogeographical populations occur, one in coastal West Africa and one mostly concentrated in coastal South Africa. White-faced Whistling-ducks inhabit a wide variety of freshwater wetlands and breed as solitary pairs or in loose colonies. Outside the breeding season, they are nomadic and gregarious, with feeding flocks of up to several thousands of individuals. Their diet consists mainly of grasses, seeds and tubers of aquatic plants, and aquatic invertebrates.



Wil Leurs / Agami

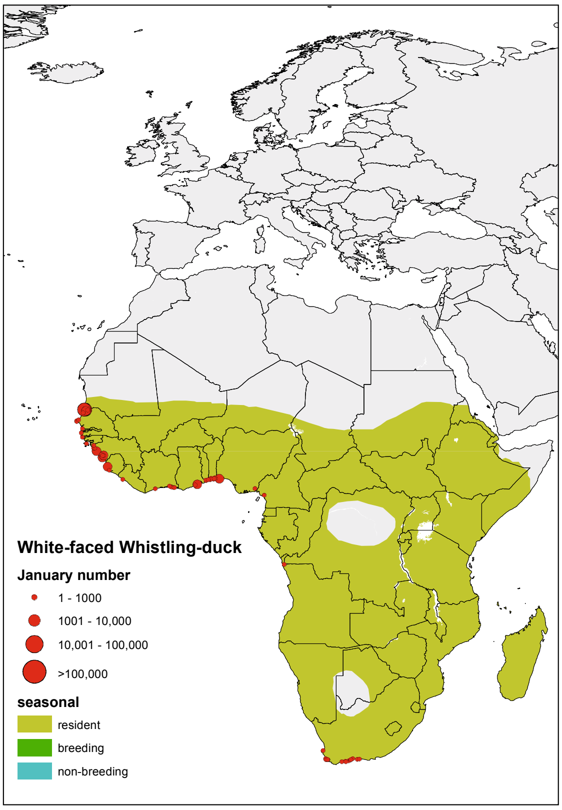


Figure A1.3. Distribution of White-faced Whistling-duck in the coastal East Atlantic Flyway in January 2014-2017. *Répartition du Dendrocygne veuf dans la voie de migration de la côte de l'Atlantique Est en janvier 2014-2017.*

Trend and population size

population White-faced Whistling-duck	data	type	period-L	trend-L	assessment-L	period-S	tren-S	assessment-S	period popsize	popsize-min	popsize-max
W Africa	w	3	1986-2017	1,04	moderate increase	2008-2017	0,98	uncertain	1999-2008	600000	700000

Table A1.2. Summary of trend and population size for White-faced Whistling Duck. Given is the data type used for the trend (w = January counts, b = breeding bird counts), the trend type (see material and methods for explanation), the time period of the long term trend (period-L), the slope (trend-L) and the trend category (assessment, following Soldaat et al. 2007), the same for the short-term trend ('-S'), and the time period and minimum and maximum estimates of the population size estimate (according to Wetlands International 2018). *Résumé de la tendance et de la taille de la population de Dendrocygne veuf. Le type de données utilisé pour la tendance (w = comptes de janvier, b = comptes d'oiseaux nicheurs), le type de tendance (voir les explications et méthodes), la période de la tendance à long terme (période-L), la pente (tendance-L) et la catégorie de tendance (évaluation, d'après Soldaat et al. 2007), identiques pour la tendance à court terme (« -S »), ainsi que pour les estimations temporelles et minimales et maximales de la taille de la population (selon Wetlands International 2018).*

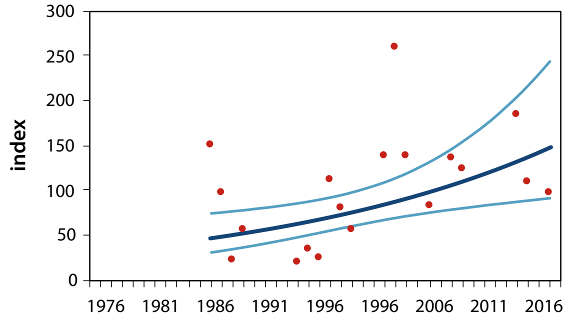


Figure A1.4. Trend of White-faced Whistling-duck in coastal West Africa. Red dots give the indexed year results, dark blue line the trend, with 95% confidence limits as light blue lines. *Tendance du Dendrocygne veuf sur la côte ouest africaine. Les points rouges donnent les résultats de l'année indexée, la ligne bleu foncé la tendance, avec des limites de confiance de 95% sous forme de lignes bleu clair.*

Brent Goose | Bernache cravant | *Branta bernicla*

Populations, distribution and ecology

Within the study region three flyway populations occur, belonging to two different subspecies (*B. b. bernicla* and *B. b. hrota*). The largest numbers within the flyway consist of the dark-bellied subspecies *B. b. bernicla*, which breeds on coastal tundra in western and central Siberia and winters mainly in coastal Northwest Europe, from the Dutch Wadden Sea to western France. Small numbers migrate further along the coast. Birds of the pale-bellied subspecies *B. b. hrota* breeding on Svalbard winter mainly in Denmark, while those breeding in Greenland and Northeast Canada winter in Ireland. The species is fully migratory, arriving on the breeding grounds in early June. Breeding occurs in small, loose colonies or dispersed in single pairs. The preferred breeding sites are grassy coastal meadows or islands where large raptors, snowy owls or gulls are present that can deter mammalian predators. Non-breeding birds inhabit estuaries, bays and coastal saltmarshes, with increased use of cultivated grasslands and winter cereal fields in recent decades.

Arnold Meijer / Agami

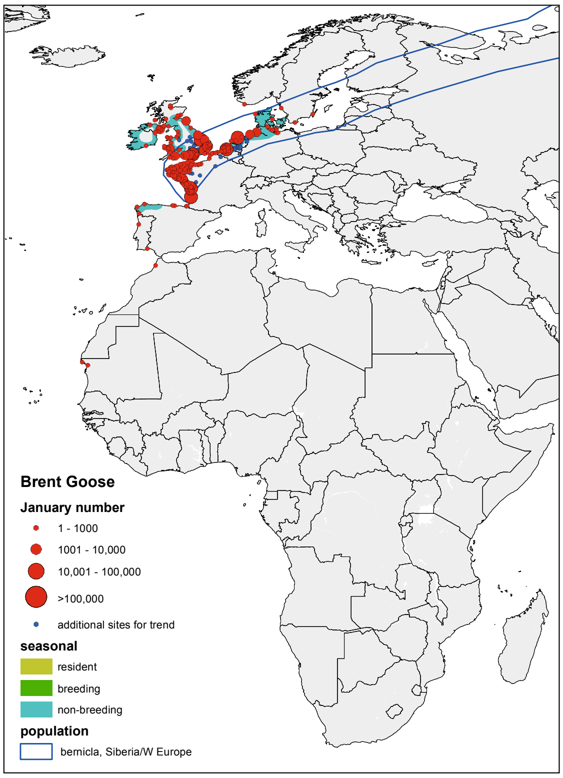


Figure A1.5. Distribution of Brent Goose in the coastal East Atlantic Flyway in January 2014-2017 (red dots). Blue lines indicate the population limit of the population for which the flyway trend is presented. Inland sites also used for this trend calculation are indicated with blue dots. *Répartition du Bernache cravant dans la voie de migration côtière Atlantique Est en janvier 2014-2017 (points rouges). Les lignes bleues indiquent la limite de population de la population pour laquelle la tendance de la voie de migration est présentée. Les sites intérieurs également utilisés pour ce calcul de tendance sont indiqués par des points bleus.*

Trend and population size

population Brent Goose	data	type	period-L	trend-L	assessment-L	period-S	tren-S	assessment-S	period popsize	popsize-min	popsize-max
bernicla, Siberia/W Europe	w	1a	1976-2016	1,02	moderate increase	2008-2016	1,02	uncertain	2011-2011	211000	211000

Table A1.3. Summary of trend and population size for Brent Goose. For explanation see table A.1.2. *Résumé de la tendance et de la taille de la population du Bernache cravant. Voir le tableau A.1.2. pour explication*

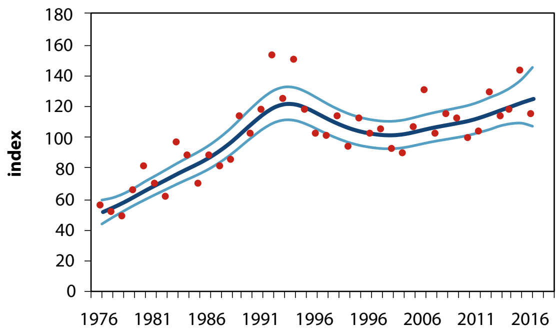


Figure A1.6. Population trend of Brent Goose, population *B.b. bernicla*. For explanation see fig. A1.4. Data from Ebbinge et al. in prep. *Tendance de la population de Bernache cravant, population* B.b. Bernicla. *Pour l'explication, voir fig. A1.4.*

Barnacle Goose | Bernache nonnette | *Branta leucopsis*

Populations, distribution and ecology

Within the study region three flyway populations are distinguished. The largest numbers are made up by the population breeding on coastal tundra in arctic Russia in the Baltic, and wintering mainly in The Netherlands, where also a rapidly increasing resident breeding population has established itself in recent decades. The second population breeding in Svalbard migrates via Norway to southern Scotland, while the population breeding in Greenland winters in Ireland and Britain. Arctic breeding sites are typically rocky outcrops, slopes, crags, cliffs or coastal islands near wetlands or coastlines. Non-breeding birds inhabit coastal meadows, saltmarshes and and tidal mudflats, with increasing use of cultivated grasslands for feeding in recent decades.

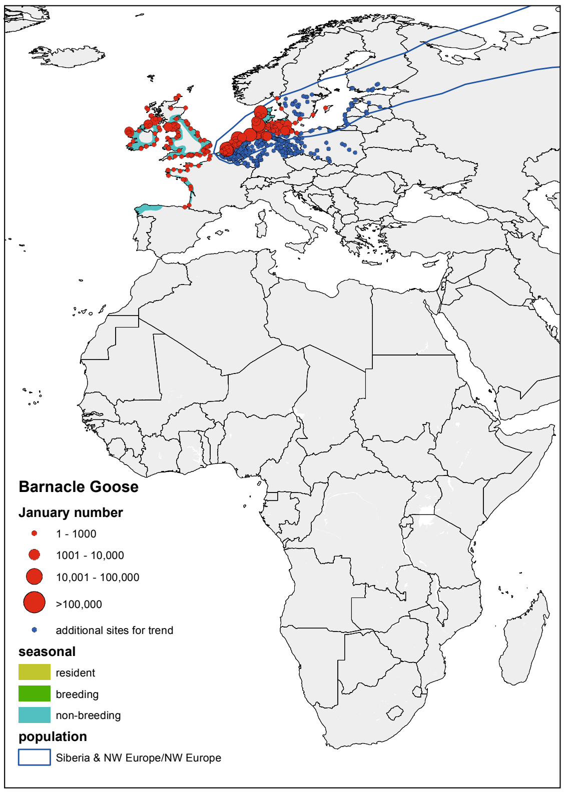


Figure A1.7. Distribution of Barnacle Goose in the coastal East Atlantic Flyway in January 2014-2017. For explanation see fig. A1.5. *Répartition du Bernache cravant dans la voie de migration de la côte de l'Atlantique Est en janvier 2014-2017. Pour l'explication, voir fig. A1.5.*

Markus Varesvuo / Agami

Trend and population size

Population Barnacle Goose	data	type	period-L	trend-L	assessment-L	period-S	tren-S	assessment-S	period popsize	popsize-min	popsize-max
Siberia & NW Europe/NW Europe	w	1b	1976-2016	1,07	strong increase	2008-2016	1,06	moderate increase	2015-2015	1200000	1200000

Table A1.4. Summary of trend and population size for Barnacle Goose. For explanation see table A.1.2. *Résumé de la tendance et de la taille de la population du Bernache cravant. Pour l'explication, voir le tableau A.1.2.*

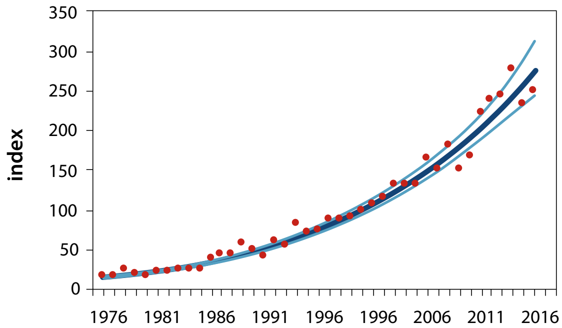


Figure A1.8. Population trend of Barnacle Goose, population Siberia & NW Europe/NW Europe. For explanation see fig. A1.4. *Tendance de la population du Bernache cravant, population Sibérie et Europe du Nord-Ouest / Europe du Nord-Ouest. Pour l'explication, voir fig. A1.4.*

Arnold Meijer / Blue Robin

Greylag Goose | Oie cendrée | *Anser anser*

Populations, distribution and ecology

At least three distinct populations occur with relevance for the East Atlantic Flyway. The largest populations occurs from northern Norway across continental Western Europe to Morocco. Nordic populations migrate to winter in Spain, while increasing resident populations occur in temperate regions. The Icelandic breeding population winters in Ireland and the United Kingdom. A third population breeds and winters in northwest Scotland. The species breeds in loose colonies in a wide variety of wetlands, close to potential feeding sites such as meadows, grasslands or agricultural fields. During the non-breeding season, the species is highly gregarious and flocks can be found on lowland farmland or in swamps, lakes, saltmarshes and coastal lagoons. Greylag Geese are herbivorous, feeding on grass, on roots and above-ground parts of herbaceous marsh vegetation, aquatic plants and on cereals and potatoes.

Arnold Meijer / Blue Robin

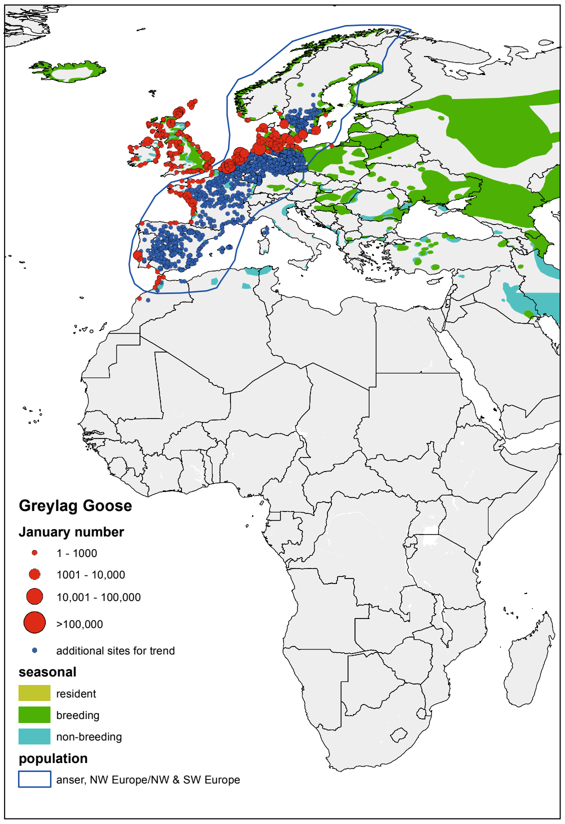


Figure A1.9. Distribution of Greylag Goose in the coastal East Atlantic Flyway in January 2014-2017. For explanation see fig. A1.5. *Répartition de l'Oie cendrée dans la voie de migration côtière Atlantique Est en janvier 2014-2017. Pour l'explication, voir fig. A1.5.*

Trend and population size

Population Greylag Goose	data	type	period-L	trend-L	assessment-L	period-S	tren-S	assessment-S	period popsize	popsize-min	popsize-max
anser, NW Europe/NW & SW Europe	w	1b	1976-2016	1,10	strong increase	2008-2016	1,04	moderate increase	2014-2014	960000	960000

Table A1.5. Summary of trend and population size for Greylag Goose. For explanation see table A.1.2. *Résumé de la tendance et de la taille de la population d'Oie cendrée. Pour l'explication, voir le tableau A.1.2.*

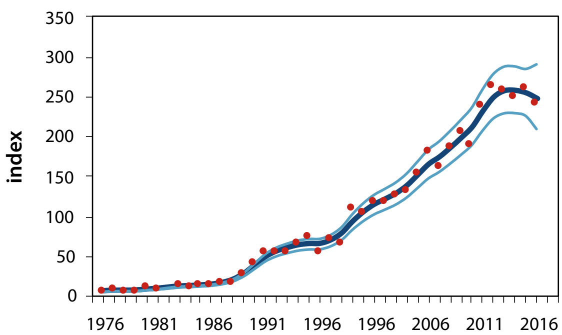


Figure A1.10. Population trend of Greylag Goose, population NW Europe/NW & SW Europe. For explanation see fig. A1.4. *Tendance de la population d'Oie cendrée, population du nord-ouest de l'Europe / nord-ouest et sud-ouest de l'Europe. Pour l'explication, voir fig. A1.4.*

Markus Varesvuo / Agami

Common Eider | Eider à duvet | *Somateria mollissima*

Populations, distribution and ecology

The Common Eider, a Holarctic breeder, has five distinct sub-populations in Europe of which three occur within the East Atlantic Flyway: (1) the Baltic-Wadden Sea population, (2) the Britain-Ireland population and (3) the Norway - NW Russia population. We present trends for the Baltic-Wadden Sea and Britain-Ireland populations. Breeding within the Baltic-Wadden Sea population occurs in coastal areas in the Baltic and the Wadden Sea. It is a partial or short-distance migrant and wintering areas are mainly within this breeding range and south to Atlantic France. Breeding habitats are offshore islands and islets with grassy or dense, low vegetation (shrubs and bushes) or rocks. Breeding occurs in loose colonies of up to a few thousand pairs. Outside the breeding season, the species is highly gregarious and concentrates in shallow coastal seas and estuaries. Its diet in the Wadden Sea predominantly consists of large benthic molluscs, predominantly mussels (*Mytilus* sp.) and to lesser extent cockles (*Cerastoderma sp.*). More recently, American Razor Shell (*Ensis sp.*) has also been recorded in the diet.

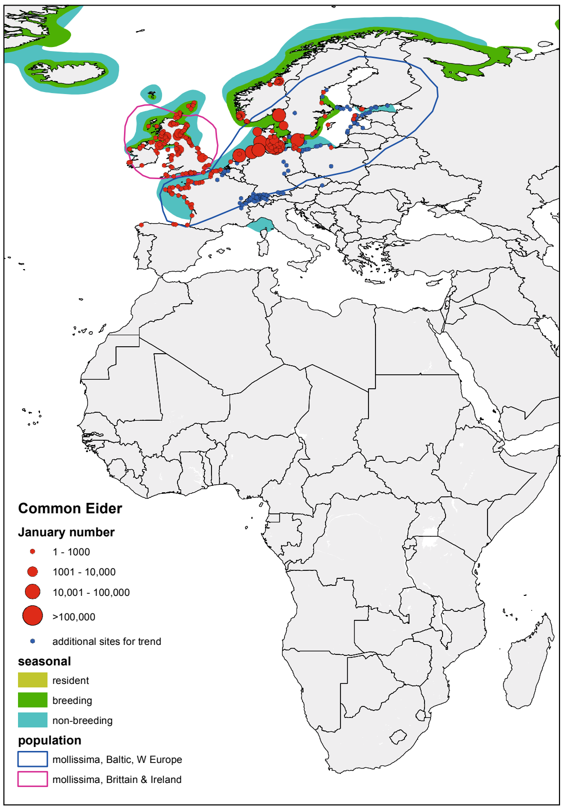


Figure A1.11. Distribution of Common Eider in the coastal East Atlantic Flyway in January 2014-2017. For explanation see fig. A1.5.
Répartition de l'Eider à duvet dans la voie de migration du littoral Atlantique Est en janvier 2014-2017. Pour l'explication, voir fig. A1.5.

Trend and population size

Population Common Eider	data	type	period-L	trend-L	assessment-L	period-S	tren-S	assessment-S	period popsize	popsize-min	popsize-max
mollissima, Baltic, W Europe	w	1b	1980-2016	0,99	stable	2008-2016	1,03	uncertain	2003-2010	930000	930000
mollissima, Brittain & Ireland	w	1a	1990-2016	1,00	stable	2008-2016	0,98	stable			

Table A1.6. Summary of trend and population size for Common Eider. For explanation see table A.1.2. *Résumé de la tendance et de la taille de la population d'Eider à duvet. Pour l'explication, voir le tableau A.1.2.*

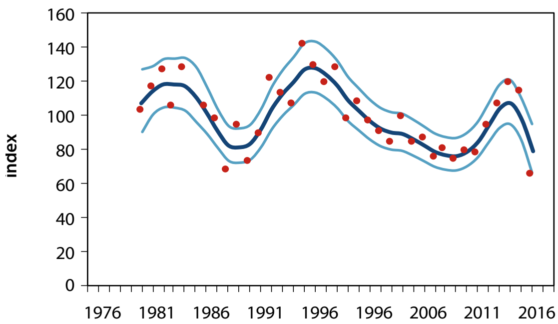


Figure A1.12. Population trend of Common Eider, population *S. m. mollissima*, Baltic, W Europe. For explanation see fig. A1.4. *Tendance de la population d'Eider à duvet, population* S. m. mollissima, *Baltique, W Europe. Pour l'explication, voir fig. A1.4.*

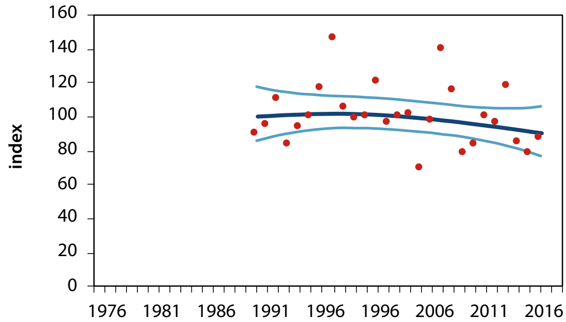


Figure A1.13. Population trend of Common Eider, population *S. m. mollissima*, Brittain and Ireland. For explanation see fig. A1.4. Data from Frost et al. 2018. *Tendance de la population d'Eider à duvet, population* S. m. mollissima*, Betagne et l'Irlande. Pour l'explication, voir fig. A1.4.*

Rob Riemer / Agami

Common Shelduck | Tadorne de Belon | *Tadorna tadorna*

Populations, distribution and ecology

The Common Shelduck has two distinct populations in Europe: in North-west Europe and in the (Eastern)Mediterranean. The north-western population is the most relevant to the East Atlantic Flyway. The species breeds in countries around the North Sea and the Baltic, Norway and Iceland, and in low numbers south to France and Spain. Large populations breed in the UK, The Netherlands, Germany, Denmark and Sweden. After the breeding season in which the species is mostly dispersed it congregates in huge flocks to moult at specific sites, sometimes after traveling several hundreds of kilometers. Breeding occurs in coastal dune areas where it uses burrows, but also inland along rivers and lakes. Common Shelduck are partially migratory and wintering occurs in the same range as breeding. The moulting and wintering habitat is saline lagoons, estuaries and mudflats where it feeds mainly on small molluscs and other aquatic invertebrates, including small crustaceans (*Corophium volutator*).

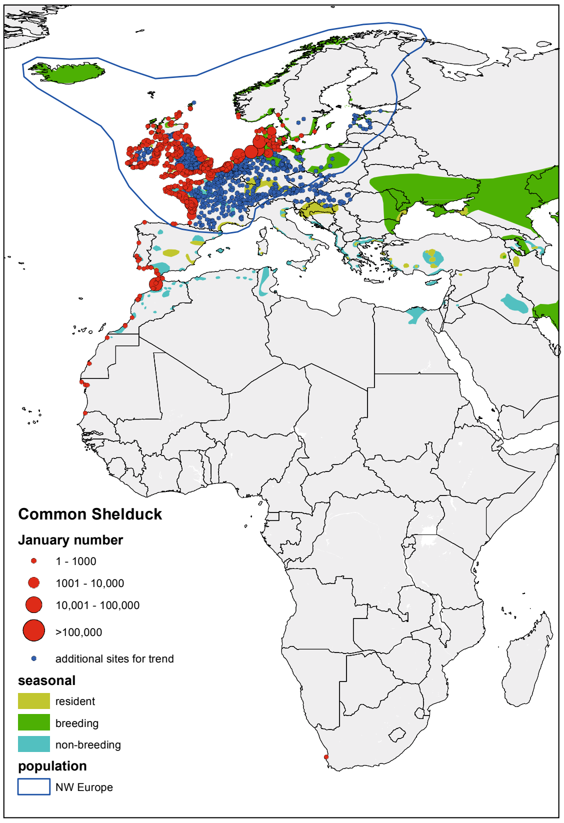


Figure A1.14. Distribution of Common Shelduck in the coastal East Atlantic Flyway in January 2014-2017. For explanation see fig. A1.5. *Répartition du Tadorne de Belon dans la voie de migration côtière Atlantique Est en janvier 2014-2017. Pour l'explication, voir fig. A1.5.*

Trend and population size

Population Common Shelduck	data	type	period-L	trend-L	assessment-L	period-S	tren-S	assessment-S	period popsize	popsize-min	popsize-max
NW Europe	w	1a	1976-2016	1,01	moderate increase	2008-2016	1,00	stable	2008-2012	250000	250000
W Mediterranean	w	3	1981-2016	1,05	moderate increase	2008-2016	1,05	uncertain	2014-2014	260000	260000

Table A1.7. Summary of trend and population size for Common Shelduck. For explanation see table A.1.2. *Résumé de la tendance et de la taille de la population de Tadorne de Belon. Pour l'explication, voir le tableau A.1.2.*

Arnold Meijer / Blue Robin

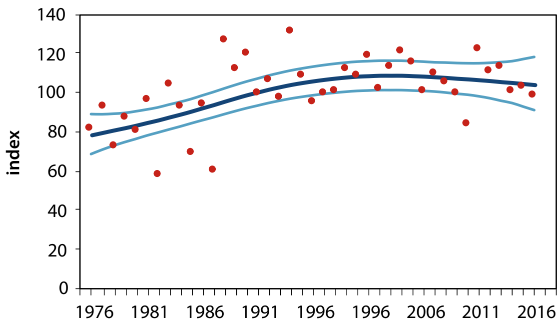


Figure A1.15. Population trend of Common Shelduck, population NW Europe. For explanation see fig. A1.4. *Tendance de la population de Tadorne de Belon, population du nord-ouest de l'Europe. Pour l'explication, voir fig. A1.4.*

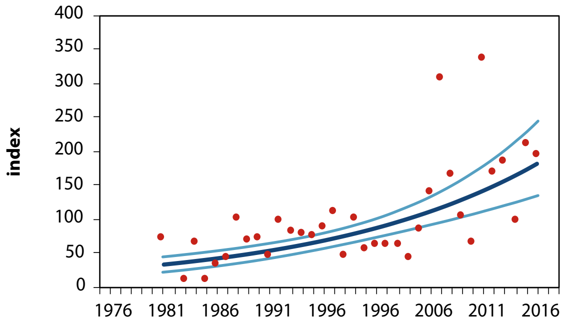


Figure A1.16. Trend of Common Shelduck in the Iberia - Morocco part of the coastal East Atlantic Flyway. For explanation see fig. A1.4. . *Tendance du Tadorne de Belon dans la péninsule ibérique et au marocaine, partie de la voie de migration du littoral atlantique est. Pour l'explication, voir fig. A1.4.*

South African Shelduck | Tadorne à tête grise | *Tadorna cana*

Populations, distribution and ecology

Within the study region one biogeographical population occurs, confined to Namibia and South Africa. South African Shelduck are partly migratory with substantial numbers undertaking seasonal movements to flock together in groups of hundreds to several thousands of individuals on large deep water lakes and reservoirs for moulting. Breeding occurs in old mammal burrows or other cavities close to small, permanent fresh and brackish lakes, pools and rivers, in both upland and lowland. South African Shelduck feed on seeds, algae, insect larvae and crustaceans.

Karel Mauer / Agami

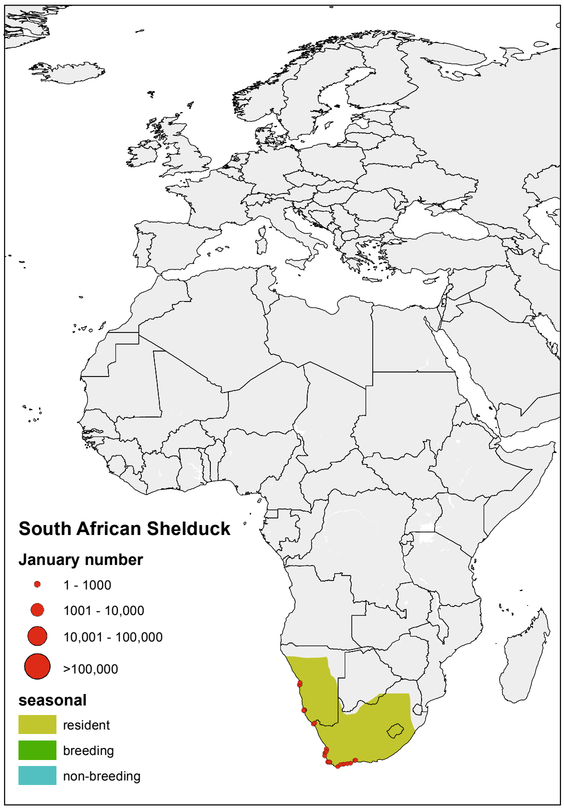


Figure A1.17. Distribution of South African Shelduck in the coastal East Atlantic Flyway in January 2014-2017. *Répartition du Tadorne à tête grise sur la voie de migration côtière Atlantique Est en janvier 2014-2017.*

Trend and population size

Population South African Shelduck	data	type	period-L	trend-L	assessment-L	period-S	tren-S	assessment-S	period popsize	popsize-min	popsize-max
S Africa	w	3	1996-2017	0,93	modertae decline	2008-2017	0,87	steep decline	1996-1996	50000	50000

Table A1.8. Summary of trend and population size for South African Shelduck. For explanation see table A.1.2. *Résumé de la tendance et de la taille de la population de Tadorne à tête grise. Pour l'explication, voir le tableau A.1.2.*

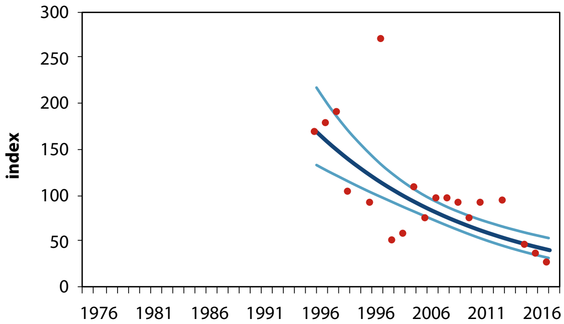


Figure A1.18. Trend of South African Shelduck in the Namibia - South Africa part of the coastal East Atlantic Flyway. For explanation see fig. A1.4. *Tendance du Tadorne à tête grise en Namibie – partie de l'Afrique du Sud de la voie de migration de la côte de l'Atlantique Est -. Pour l'explication, voir fig. A1.4*

Cape Shoveler | Canard de Smith | *Spatula smithii*

Populations, distribution and ecology

Within the study region one biogeographical population occurs, confined southern Africa. The species is largely sedentary with occasional nomadic movements and perhaps some seasonal migration, but its movements are poorly understood. Breeding occurs in single pairs or loose groups in shallow freshwater or brackish habitats. Deep lakes, fast-flowing rivers, farm dams and reservoirs are avoided except as temporary refuges. The species is omnivorous, feeding on seeds and vegetative parts of aquatic plants, snails, insects, molluscs, crustaceans and amphibian larvae. Animal matter makes up a larger proportion of the diet than plant matter, and feeding therefore often occurs on waters rich in planktonic organisms, such as sewage disposal ponds.

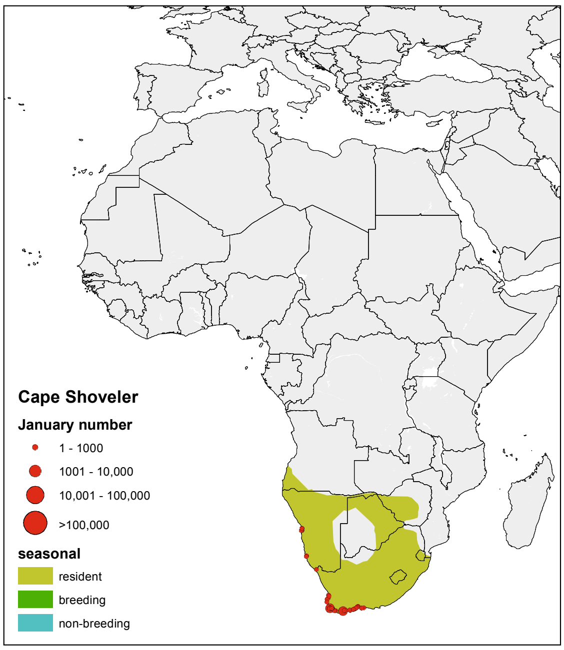


Figure A1.19. Distribution of Cape Shoveler in the coastal East Atlantic Flyway in January 2014-2017. *Répartition du Canard de Smith dans la voie de migration de la côte de l'Atlantique Est en janvier 2014-2017.*

Trend and population size

Population Cape Shoveler	data	type	period-L	trend-L	assessment-L	period-S	tren-S	assessment-S	period popsize	popsize-min	popsize-max
S Africa	w	3	1992-2017	1,03	moderate increase	2008-2017	0,98	uncertain			

Table A1.9. Summary of trend and population size for Cape Shoveler. For explanation see table A.1.2. *Résumé de la tendance et de la taille de la population de Canard de Smith. Pour l'explication, voir le tableau A.1.2.*

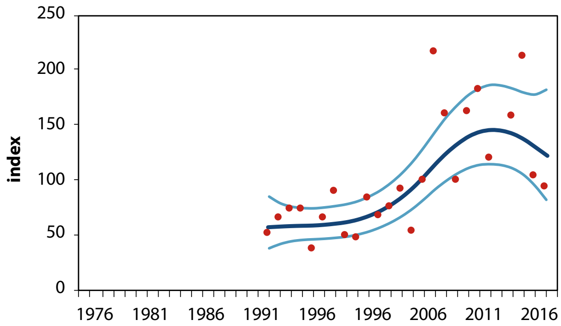


Figure A1.20. Trend of Cape Shoveler in the Namibia - South Africa part of the coastal East Atlantic Flyway. For explanation see fig. A1.4. *Tendance du Canard de Smith en Namibie- une partie de l'Afrique du Sud dans la voie de migration de la côte de l'Atlantique Est. Pour l'explication, voir fig. A1.4.*

Karel Mauer / Agami

Northern Shoveler | Canard souchet | *Spatula clypeata*

Populations, distribution and ecology

This Holarctic species is highly migratory. There seems to be considerable overlap in the breeding areas of sub-populations wintering in Europe and West Africa. The NW-European wintering population is most important for the Wadden Sea, whilst other Northern Pintail populations winter In the Mediterranean and the Sahel zone of Western Africa. The species breeds in shallow freshwater marshes, lakes and along rivers in open habitats (e.g. tundra), with a dense (semi)aquatic vegetation layer. Large numbers mainly breed in the boreal zones of Fenno-Scandinavia, with the highest numbers in Finland and probably Russia. After the breeding season, large numbers congregate to moult, some in Western Europe. After the moult, the species migrates further south, the NWEuropean population as far as southern France. Wintering and moulting habitats include coastal lagoons, saline marshes, estuaries and tidal flats but also freshwater wetlands. The species is omnivorous with seeds, algae, grasses, and benthic invertebrates in its diet.

Ralph Martin / Agami

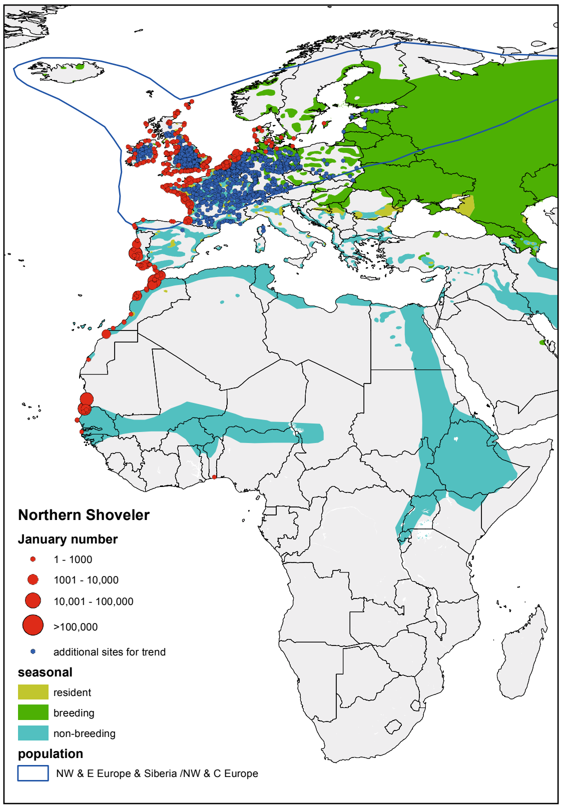


Figure A1.21. Distribution of Northern Shoveler in the coastal East Atlantic Flyway in January 2014-2017. For explanation see fig. A1.5. *Répartition du Canard Souchet dans la voie de migration de la côte de l'Atlantique Est en janvier 2014-2017. Pour l'explication, voir fig. A1.5.*

Marc Guyt / Agami

Trend and population size

Population Northern Shoveler	data	type	period-L	trend-L	assessment-L	period-S	tren-S	assessment-S	period popsize	popsize-min	popsize-max
NW & E Europe & Siberia /NW & C Europe	w	1a	1976-2016	1,02	moderate increase	2008-2016	1,09	moderate increase	2014-2015	60000	70000
E Europe & Siberia/W Mediterranean & W Africa	w	3	1990-2016	1,01	stable	2008-2016	1,02	uncertain	2000-2013	450000	600000

Table A1.10. Summary of trend and population size for Northern Shoveler. For explanation see table A.1.2. *Résumé de la tendance et de la taille de la population de Canard Souchet. Pour l'explication, voir le tableau A.1.2.*

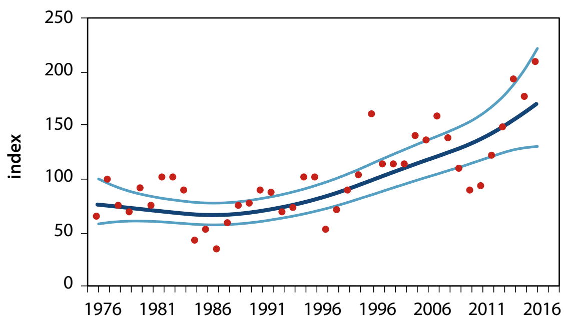


Figure A1.22. Population trend of Northern Shoveler, population NW & E Europe & Siberia/NW & C Europe. For explanation see fig. A1.4. *Tendance de la population de Canard souchet, population du Nord-Ouest et de l'Est de l'Europe et de la Sibérie / Nord-Ouest de l'Europe. Pour l'explication, voir fig. A1.4.*

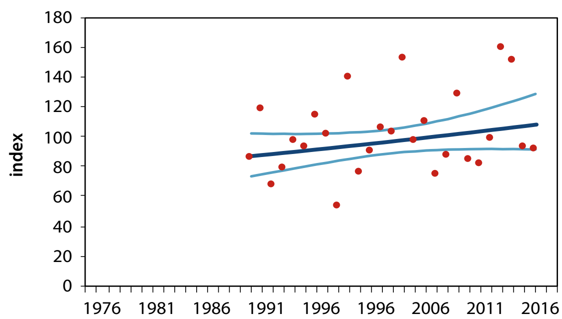


Figure A1.23. Trend of Northern Shoveler in the Portugal - Senegal part of the coastal East Atlantic Flyway. For explanation see fig. A1.4. *Tendance du Canard souchet au Portugal - au Sénégal, partie de la voie de migration de la côte de l'Aatlantique Est. Pour l'explication, voir fig. A1.4.*

Eurasian Wigeon | Canard siffleur | *Anas Penelope*

Populations, distribution and ecology

The Eurasian Wigeon occurs in two sub-populations in Europe: a NW-European wintering population and a Black Sea-Mediterranean wintering group. The breeding origins of these two groups overlap, however, over large areas of northern Russia. For the East Atlantic Flyway, mainly the NWEuropean wintering population is considered here. This population breeds mainly in the boreal zone of Fennoscandia, with large numbers in Finland, Sweden and Russia, and much lower numbers in countries further south to the North Sea. Wintering mainly occurs in western Europe. Breeding habitat consists of freshwater wetlands such as marshes, small lakes, mires in sparsely forested areas, avoiding tundra. Wintering occurs in marine habitats such as salt-marshes, saline lagoons and estuaries and also extensively on agricultural grasslands. The species is largely herbivorous, but in the breeding season relies also on invertebrates. During winter it mainly feeds on grasses.

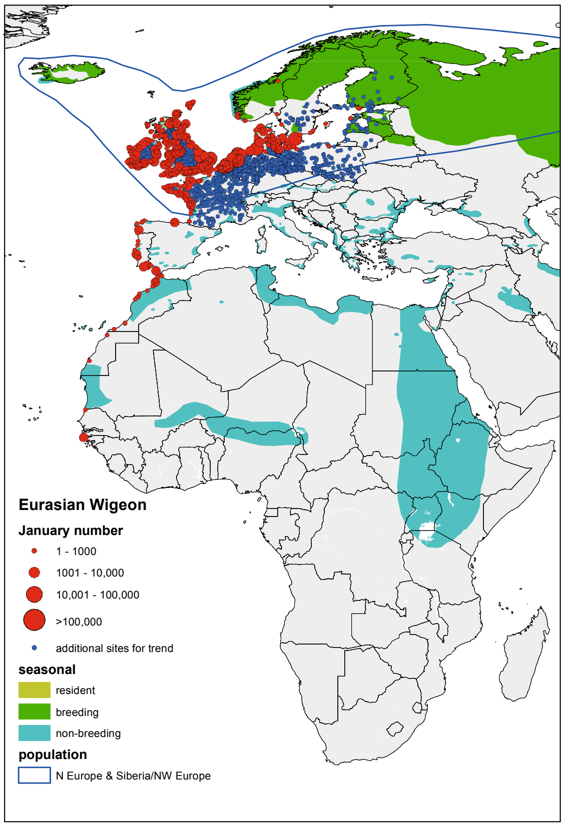


Figure A1.24. Distribution of Eurasian Wigeon in the coastal East Atlantic Flyway in January 2014-2017. For explanation see fig. A1.5. *Répartition du Canard siffleur dans la voie de migration de la côté de l' Atlantique Est en janvier 2014-2017. Pour l'explication, voir fig. A1.5.*

Arie Ouwerkerk / Agami

Trend and population size

Population Eurasian Wigeon	data	type	period-L	trend-L	assessment-L	period-S	tren-S	assessment-S	period popsize	popsize-min	popsize-max
Europe & Siberia/NW Europe	w	1a	1976-2016	1,02	moderate increase	2008-2016	0,99	stable	2003-2012	1300000	1500000
NE Europe & Siberia/Black Sea/ Mediterranean	w	3	1990-2016	0,98	stable	2008-2016	0,93	uncertain	2007-2013	390000	490000

Table A1.11. Summary of trend and population size for Eurasian Wigeon. For explanation see table A.1.2. *Résumé de la tendance et de la taille de la population de Canard siffleur. Pour l'explication, voir le tableau A.1.2.*

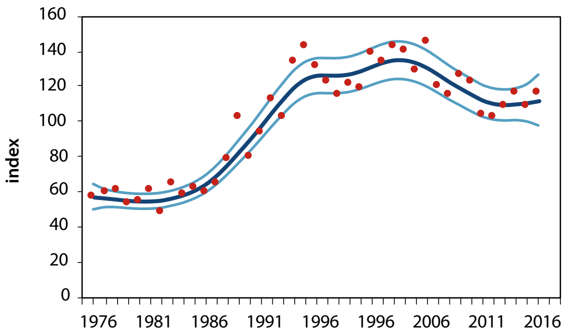


Figure A1.25. Population trend of Eurasian Wigeon, population N Europe & Siberia/NW Europe. For explanation see fig. A1.4. *Tendance de la population de Canard siffleur, population du Nord de l'Europe et de la Sibérie / Nord-Ouest de l'Europe. Pour l'explication, voir fig. A1.4.*

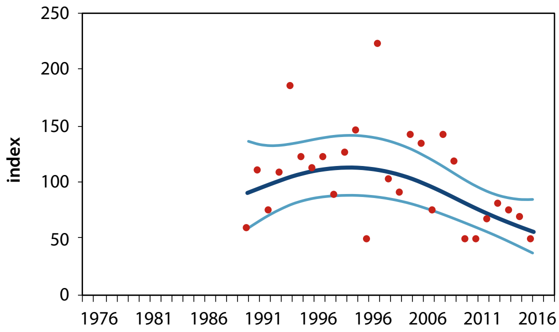


Figure A1.26. Trend of Eurasian Wigeon in the Iberia - Morocco part of the coastal East Atlantic Flyway. For explanation see fig. A1.4. *Tendance du canard siffleur dans la région ibérique - marocaine de la voie de migration de la côte de l'Est-Atlantique. Pour l'explication, voir fig. A1.4.*

Marc Guyt / Agami

Arnold Meijer / Blue Robin

Mallard | Canard colvert | *Anas platyrhynchos*

Populations, distribution and ecology

Along the East Atlantic Flyway there are two flyway populations based on the wintering distribution, but likely with overlapping breeding ranges. The NEuropean populations includes mallards wintering south to northern France, with largest concentrations along the Baltic coast, in The Netherlands and the United Kingdom, and along the French Atlantic coast. The southern population includes birds wintering in Central Europe, the Mediterranean region and North Africa. The species is partially migratory, with many northern-breeding birds migrating south in winter to mix with resident birds in temperate regions. The species occurs on nearly all wetland types with shallow water and some cover, but avoids fast-flowing or oligotrophic waters. Mallards are omnivorous and opportunistic, adjusting their diet to the seasonally variable availability of animal and plant matter. This means that their summer diet consists mainly of invertebrates and their winter diet of seeds and vegetative parts of aquatic and terrestrial plants.

Arnold Meijer / Blue Robin

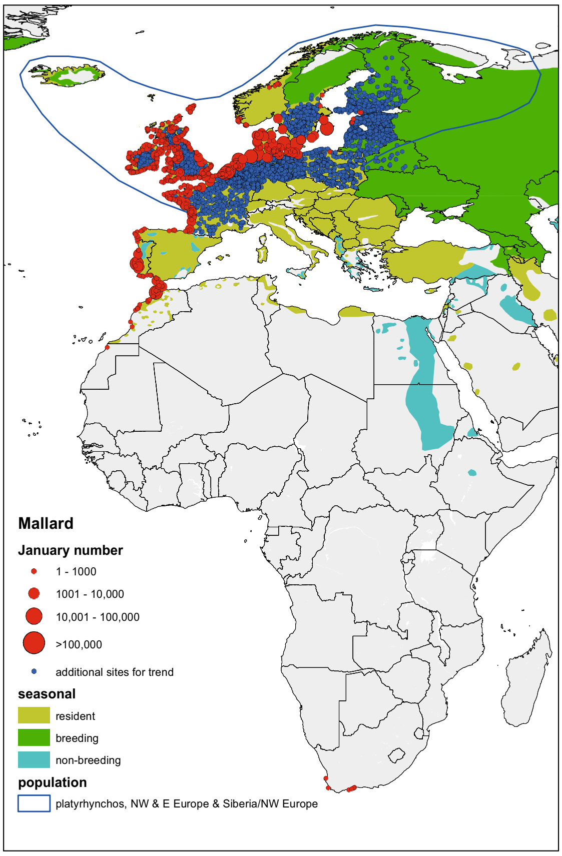


Figure A1.27. Distribution of Mallard in the coastal East Atlantic Flyway in January 2014-2017. For explanation see fig. A1.5. *Répartition du Canard colvert dans la voie de migration de la côte de l'Est-Atlantique en janvier 2014-2017. Pour l'explication, voir fig. A1.5.*

Trend and population size

Population Mallard	data	type	period-L	trend-L	assessment-L	period-S	tren-S	assessment-S	period popsize	popsize-min	popsize-max
platyrhynchos, NW & E Europe & Siberia/NW Europe	w	1a	1976-2016	1,00	stable	2008-2016	0,99	stable	2000-2012	4200000	6700000
platyrhynchos, E Europe & Siberia/W Meditrerranean	w	3	1990-2016	1,04	moderate increase	2008-2016	0,99	uncertain	2000-2012	1300000	1500000

Table A1.12. Summary of trend and population size for Mallard. For explanation see table A.1.2. *Résumé de la tendance et de la taille de la population de Canards colvert. Pour l'explication, voir le tableau A.1.2.*

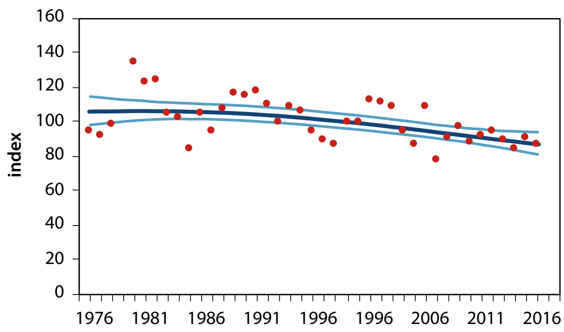


Figure A1.28. Population trend of Mallard, population NW & E Europe & Siberia/NW Europe. For explanation see fig. A1.4. *Résumé de la tendance et de la taille de la population de Canards colvert. Pour l'explication, voir le tableau A.1.2.*

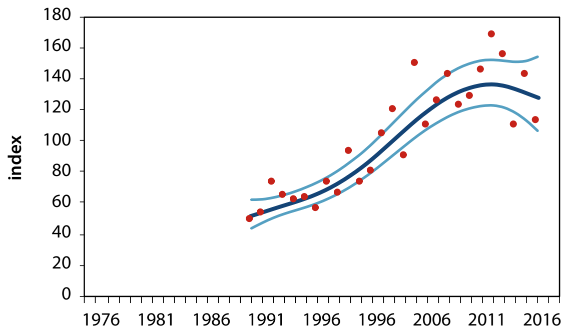


Figure A1.29. Trend of Mallard in the southern Atlantic France, Iberia & Morocco part of the coastal East Atlantic Flyway. For explanation see fig. A1.4. *Tendance de la population de Canard colvert dans le sud de l'Atlantique en France, dans la péninsule ibérique et au Maroc dans la voie de migration de la côte de l'Atlantique Est. Pour l'explication, voir fig. A1.4.*

Cape Teal | Canard du Cap | *Anas capensis*

Populations, distribution and ecology

Only one of three biogeographical populations occurs within the limits of the East Atlantic Flway: the southern African population. The species is fairly common and widespread within its population limits, except Botswana. Cape Teal can undertake considerable movements related to the availability of water, but no regular migration is apparent. The species shows a preference for shallow, brackish to saline waters with muddy shores, including lagoons, salt lakes, salt pans and sewage ponds. Large flocks are rare and breeding occurs in single pairs or small concentrations of less than 10 individuals. The species is omnivorous, feeding on aquatic invertebrates and seeds and vegetative parts of aquatic plants.

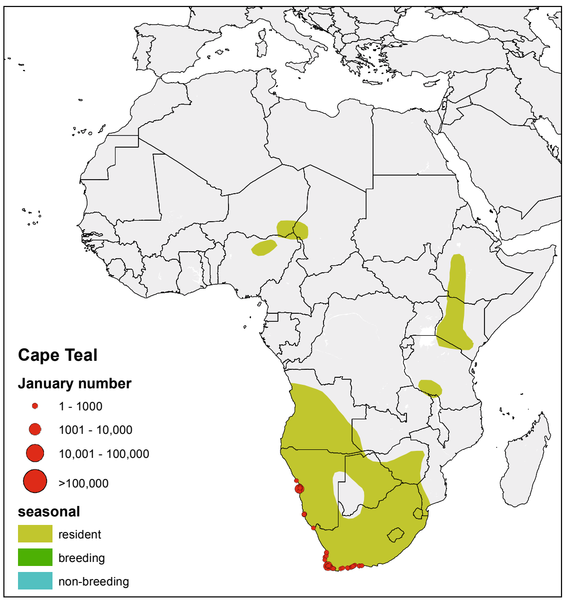


Figure A1.30. Distribution of Cape Teal in the coastal East Atlantic Flyway in January 2014-2017. *Répartition du Canard du Cap dans la voie de migration de la côte de l'Atlantique Est en janvier 2014-2017.*

Trend and population size

Population Cape Teal	data	type	period-L	trend-L	assessment-L	period-S	tren-S	assessment-S	period popsize	popsize-min	popsize-max
S Africa	w	3	1985-2017	1,05	moderate increase	2008-2017	0,98	uncertain	1993-2014	20000	75000

Table A1.13. Summary of trend and population size for Cape Teal. For explanation see table A.1.2. *Résumé de la tendance et de la taille de la population de Canard du Cap. Pour l'explication, voir le tableau A.1.2.*

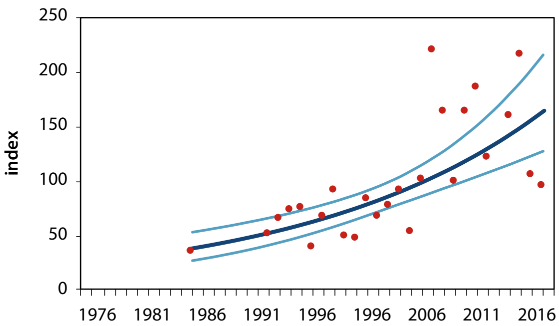


Figure A1.31. Trend of Cape Teal in the Angola - South Africa part of the coastal East Atlantic Flyway. For explanation see fig. A1.4. *Tendance démographique du Canard du Cap dans la partie Angola - Afrique du Sud de la voie de migration de la côte de l'Atlantique Est. Pour l'explication, voir fig. A1.4.*

Oscar Diez / Agami

Northern Pintail | Canard pilet | *Anas acuta*

Populations, distribution and ecology

Within the study region, two flyway populations are distinguished based on the wintering distribution, although their breeding areas likely largely overlap. The NW-European population includes birds wintering in the Baltic and North Sea regions, the United Kingdom and Ireland and the Atlantic coast of France. The other population consists of wintering concentrations in the Mediterranean region and West Africa. The species is strongly migratory and breeds in shallow freshwater marshes, small lakes and rivers, preferably with dense vegetation in open country, from temperate regions in eastern Europe north to the Russian Arctic. In winter, the species congregates in large flocks on brackish coastal lagoons, estuaries and deltas, and on large inland lakes. Northern Pintails are omnivorous and opportunistic feeders, including in their diet algae, seeds, tubers, vegetative parts of aquatic plants and grasses, aquatic invertebrates, amphibians and small fish.

Glenn Bartley / Agami

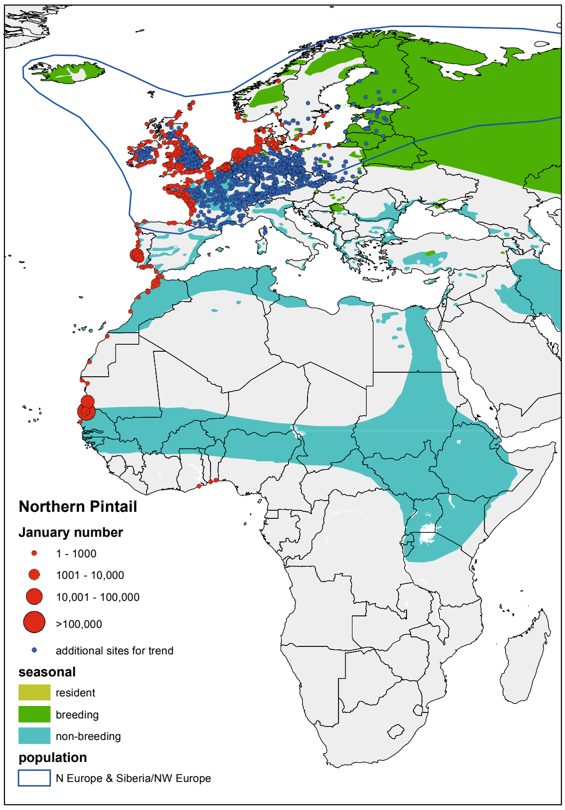


Figure A1.32. Distribution of Northern Pintail in the coastal East Atlantic Flyway in January 2014-2017. For explanation see fig. A1.5. *Répartition du Canard pilet dans la voie de migration de la côte de l' Atlantique Est en janvier 2014-2017. Pour l'explication, voir fig. A1.5.*

Trend and population size

Population Northern Pintail	data	type	period-L	trend-L	assessment-L	period-S	tren-S	assessment-S	period popsize	popsize-min	popsize-max
N Europe & Siberia/NW Europe	w	1a	1976-2016	1,01	moderate increase	2008-2016	1,01	stable	2008-2012	65000	65000
NE Europe & Siberia/W Mediterranean & W Africa	w	3	1986-2017	1,01	stable	2008-2017	0,96	uncertain	2000-2013	450000	750000

Table A1.14. Summary of trend and population size for Northern Pintail. For explanation see table A.1.2. *Résumé de la tendance et de la taille de la population de Canard pilet. Pour l'explication, voir le tableau A.1.2.*

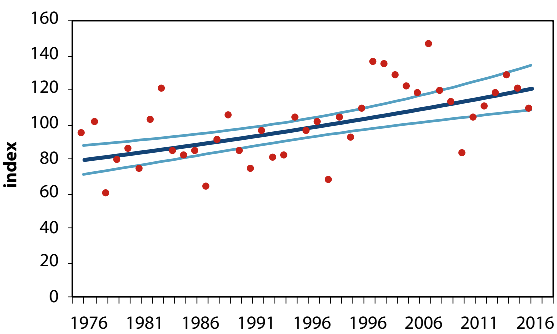


Figure A1.33. Population trend of Northern Pintail, population N Europe & Siberia/NW Europe. For explanation see fig. A1.4. *Tendances de la population du Canard pilet, population du Nord de l'Europe et de la Sibérie / Nord-Ouest de l'Europe. Pour l'explication, voir fig. A1.4.*

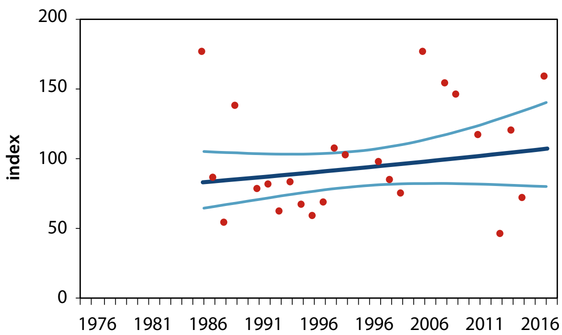


Figure A1.34. Trend of Northern Pintail in the Portugal - Guinea part of the coastal East Atlantic Flyway. For explanation see fig. A1.4. *Tendance de la population du Canard pilet dans la partie Portugal - Guinée de la voie de migration de la côte de l' Atlantique Est. Pour l'explication, voir fig. A1.4.*

Common Teal | Sarcelle d'hiver | *Anas crecca*

Populations, distribution and ecology

Two flyway populations are distinguished within the East Atlantic Flyway, although it is doubtful if they represent truly distinct populations. The NW-European population includes breeding birds from northern Europe east to western Russia with wintering grounds in western Europe. The other population includes birds breeding east to the Ural mountain range and wintering in the Mediterranean region and North Africa. Breeding birds from northern Europe are highly migratory, while birds from the more temperate regions are largely sedentary. During the breeding season the species has a preference for shallow, permanent water, especially in woodland with dense herbaceous cover and with abundant emergent vegetation. In the non-breeding period, Common Teal are found in marshes, lakes and other sheltered waters with high productivity and abundant vegetation, but also along the coast in saline and brackish lagoons, deltas and saltmarshes. For foraging, marshes with mudflats are preferred over saline or open-water habitat. In spring and summer the species feeds mainly on animal matter, such as molluscs, worms, insects and crustaceans. In winter it switches to aquatic plant seeds, grasses, sedges and agricultural seeds.

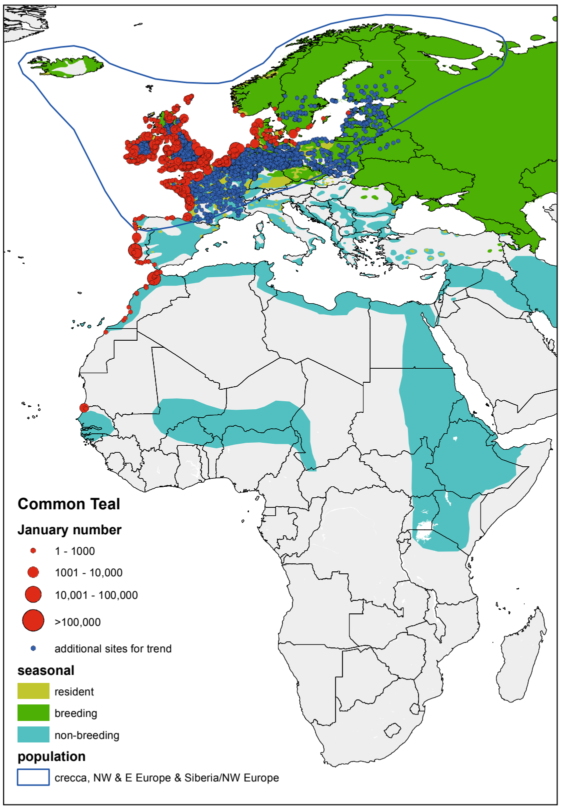


Figure A1.35. Distribution of Common Teal in the coastal East Atlantic Flyway in January 2014-2017. For explanation see fig. A1.5.
Répartition de la Sarcelle d'hiver dans la voie de migration de la côte de l'Atlantique Est en janvier 2014-2017. Pour l'explication, voir fig. A1.5.

Arnold Meijer / Blue Robin

Trend and population size

Population Common Teal	data	type	period-L	trend-L	assessment-L	period-S	tren-S	assessment-S	period popsize	popsize-min	popsize-max
crecca, NW & E Europe & Siberia/NW Europe	w	1a	1976-2016	1,02	moderate increase	2008-2016	1,05	moderate increase	2008-2012	500000	500000
crecca, E Europe & Siberia/W Mediterranean	w	3	1990-2016	1,00	stable	2008-2016	0,96	moderate decline	2000-2012	1000000	1000000

Table A1.15. Summary of trend and population size for Common Teal. For explanation see table A.1.2. *Résumé de la tendance et de la taille de la population de Sarcelle d'hiver. Pour l'explication, voir le tableau A.1.2.*

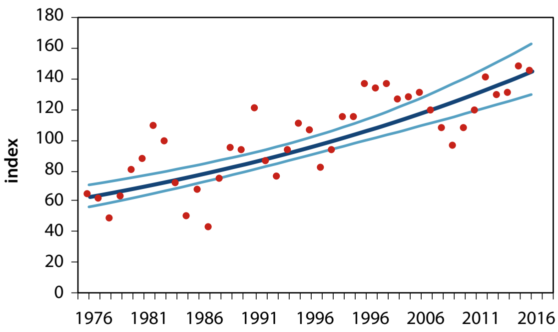


Figure A1.36. Population trend of Common Teal, population NW & E Europe & Siberia/NW Europe. For explanation see fig. A1.4. *Tendance démographique de la population de Sarcelle d'hiver, population Europe du Nord-Ouest et de l'Europe et Sibérie / Europe du Nord-Ouest. Pour l'explication, voir fig. A1.4.*

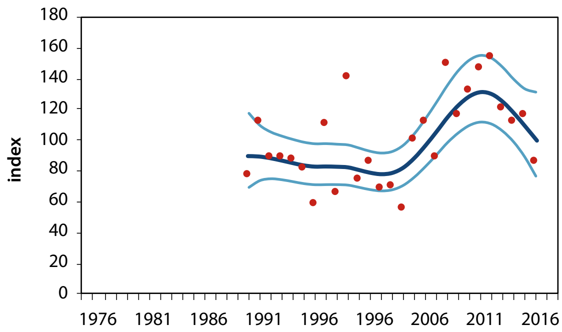


Figure A1.37. Trend of Common Teal at Iberia & Senegal part of coastal East Atlantic Flyway. For explanation see fig. A1.4. *Tendance de la population de la Sarcelle d'hiver dans la péninsule ibérique et le Sénégal, partie de la voie de migration de la côte de l'Atlantique Est. Pour l'explication, voir fig. A1.4.*

Daniele Occhiato / Agami

Great Crested Grebe | Grèbe huppé | *Podiceps cristatus*

Populations, distribution and ecology

Two biogeographical populations of Great Crested Grebe occur in the study area, one is the NW- & W- European population of the Eurasian subspecies *P. c. cristatus* and one is the Southern African subspecies *P. c. infuscatus*. The latter population is relatively small and has scattered breeding colonies in East and South Africa. In Europe, the species breeds from western Russia and the southern half of Scandinavia to North Africa and is migratory in the northeastern parts of its range. In central and western Europe the species is mostly sedentary, although a large part of the population moves to large open waters, including inshore coastal waters, for moulting and wintering. Congregations up to several thousands individuals can occur during the non-breeding season, although many remain solitary. Breeding occurs in a variety of freshwater and brackish waters, such as pool and lakes, backwaters of slow-flowing rivers and artificial waterbodies. The diet consists mainly of small and medium-sized fish, but the species also feeds on insects, crustaceans, molluscs and amphibians.

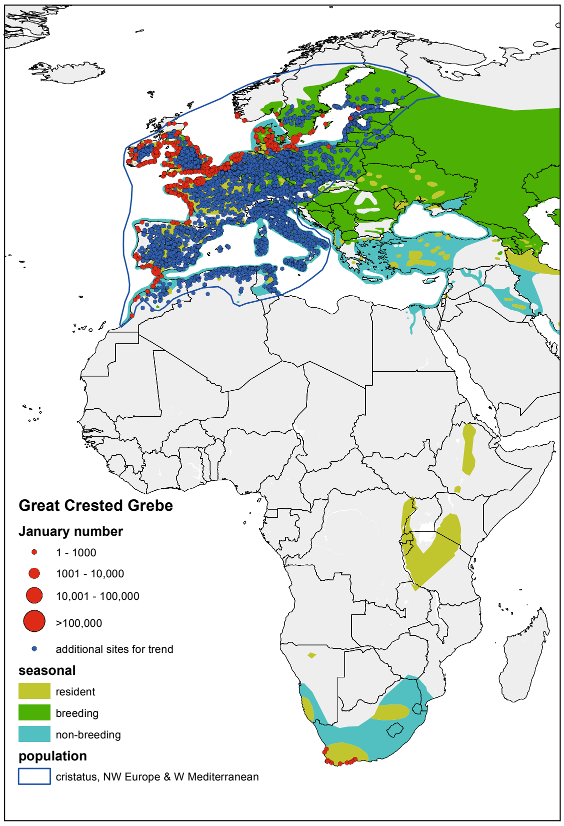


Figure A1.38. Distribution of Great Crested Grebe in the coastal East Atlantic Flyway in January 2014-2017. For explanation see fig. A1.5. *Répartition du Grèbe huppé sur la voie de migration de la côte de l'Est-Atlantique en janvier 2014-2017. Pour l'explication, voir fig. A1.5.*

Trend and population size

Population Great Crested Grebe	data	type	period-L	trend-L	assessment-L	period-S	tren-S	assessment-S	period popsize	popsize-min	popsize-max
cristatus, NW Europe & W Mediterranean	w	1a	1987-2016	1,01	moderate increase	2008-2016	0,98	stable	2000-2014	470000	716000

Table A1.16. Summary of trend and population size for Great Crested Grebe. For explanation see table A.1.2. *Résumé de la tendance et de la taille de la population de Grèbe huppé. Pour l'explication, voir le tableau A.1.2.*

Ran Schols / Agami

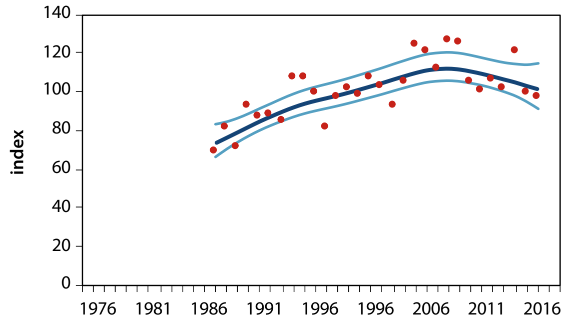


Figure A1.39. Population trend of Great Crested Grebe, population *P. c. cristatus*, NW Europe & W Mediterranean. For explanation see fig. A1.4. *Tendance de la population de Grèbe huppé, population* P. c. cristatus*, Nord-Ouest de l'Europe et Ouest de la Méditerranée. Pour l'explication, voir fig. A1.4.*

Arnold Meijer / Blue Robin

Horned Grebe | Grèbe esclavon | *Podiceps auritus*

Populations, distribution and ecology

Two flyway populations are distinguished in the East Atlantic Flyway: one breeding in the northern Atlantic and wintering along the Atlantic coast of Norway, Scotland and Ireland, and one breeding from Sweden east into the boreal zone of Russia and wintering in the Black Sea, Mediterranean and Western Europe. Breeding occurs on small, shallow, well-vegetated fresh or brackish waters, such as pools, marshes and secluded sections of rivers and lakes in forested areas. In winter, the species is mainly coastal, visiting sheltered bays, lagoons and estuaries, but may also occur on large lakes or river systems. The diet consists of fish and a wide range of aquatic invertebrates, with fish and crustaceans forming a larger part of the diet for birds wintering at sea.

Markus Varesvuo / Agami

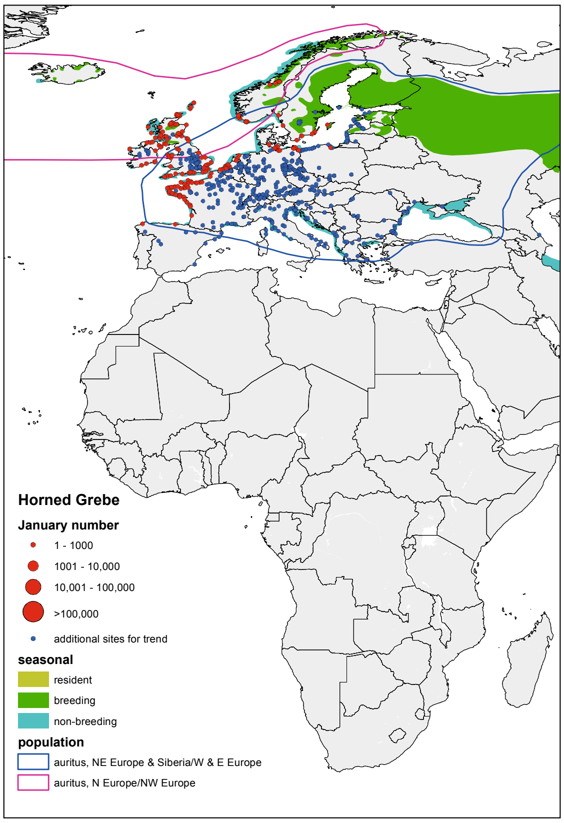


Figure A1.40. Distribution of Horned Grebe in the coastal East Atlantic Flyway in January 2014-2017. For explanation see fig. A1.5. *Répartition du Grèbe esclavon sur la voie de migration de la côte de l'Est-Atlantique en janvier 2014-2017. Pour l'explication, voir fig. A1.5.*

Trend and population size

Population Horned Grebe	data	type	period-L	trend-L	assessment-L	period-S	tren-S	assessment-S	period popsize	popsize-min	popsize-max
auritus, N Europe/NW Europe	w	1c	1995-2016	1,01	stable	2008-2016	0,98	uncertain	2005-2012	4600	5000
auritus, NE Europe & Siberia/W & E Europe	w	1c	1995-2016	0,98	moderate decline	2008-2016	0,99	stable	2000-2012	15000	23000

Table A1.17. Summary of trend and population size for Horned Grebe. For explanation see table A.1.2. *Résumé de la tendance et de la taille de la population de Grèbe esclavon. Pour l'explication, voir le tableau A.1.2.*

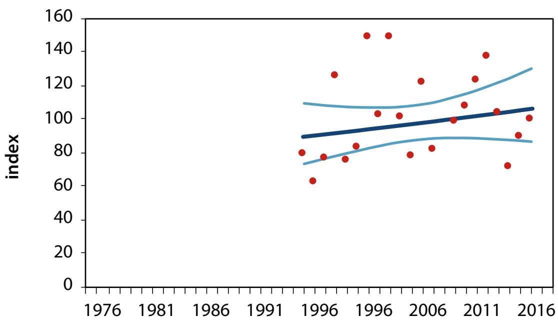


Figure A1.41. Population trend of Horned Grebe, population *P. a. auritus* N Europe/NW Europe. For explanation see fig. A1.4. *Tendance de la population de Grèbe esclavon, population* P. a. auritus *N Europe / Europe du Nord-Ouest. Pour l'explication, voir fig. A1.4.*

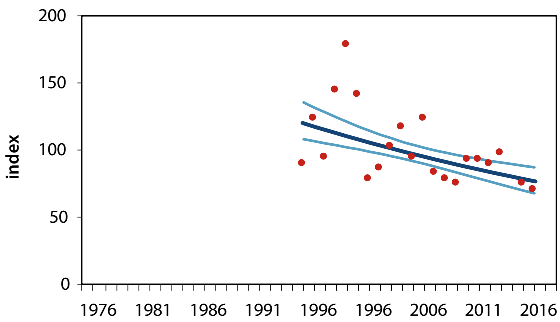


Figure A1.42 Population trend of Horned Grebe, population *P. a. auritus* NE Europe & Siberia/W & E Europe. For explanation see fig. A1.4. *Tendance de la population de Grèbe esclavon, population* P. a. auritus *NE Europe & Sibérie / O & E Europe. Pour l'explication, voir fig. A1.4.*

Black-necked Grebe | Grèbe à cou noir | *Podiceps nigricollis*

Populations, distribution and ecology

In the northern part of the study area, the species is considered to form single population, breeding in small or large colonies from western Europe to West Asia, though being almost absent in Scandinavia. Except for some breeding populations in the far southwestern of its range, the species is fully migratory, spending the winter mainly in the coastal regions of the Mediterranean Basin and western Europe. The breeding habitat consists of eutrophic, well-vegetated freshwater marshes and lakes, ponds, sewage farms, river backwaters and floodplains. In winter, the species moves to saline ponds and lakes, coastal estuaries, inshore bays and channels, where it is highly gregarious. The diet consists of aquatic insects, midges, brine-flies, molluscs, crustaceans, amphibians, worms, snails and small fish. In Southern Africa another population occurs, of the subspecies *P. n. gurneyi*.

Ralph Martin / Agami

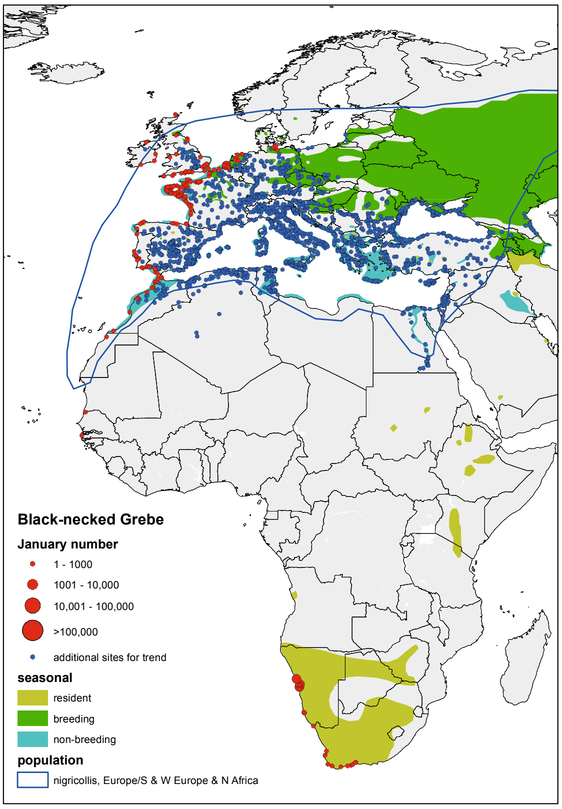
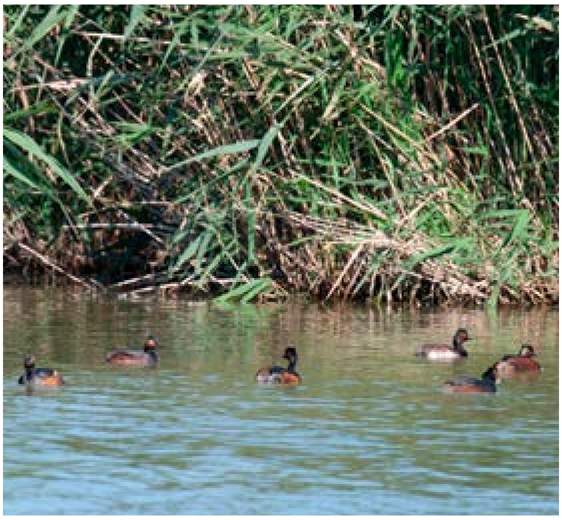


Figure A1.43. Distribution of Black-necked Grebe in the coastal East Atlantic Flyway in January 2014-2017. For explanation see fig. A1.5. *Répartition du Grèbe à cou noir dans la voie de migration de la côte de l'Atlantique Est en janvier 2014-2017. Pour l'explication, voir fig. A1.5.*



Trend and population size

Population Black-necked Grebe	data	type	period-L	trend-L	assessment-L	period-S	tren-S	assessment-S	period popsize	popsize-min	popsize-max
nigricollis, Europe/S & W Europe & N Africa	w	1a	1992-2016	0,99	moderate decline	2008-2016	0,98	stable	2000-2013	139000	233000
gurneyi, S Africa	w	3	1992-2017	1,02	stable	2008-2017	1,00	uncertain	1991-2013	15000	30000

Table A1.18. Summary of trend and population size for Black-necked Grebe. For explanation see table A.1.2. *Résumé de la tendance et de la taille de la population de Grèbe à cou noir. Pour l'explication, voir le tableau A.1.2.*

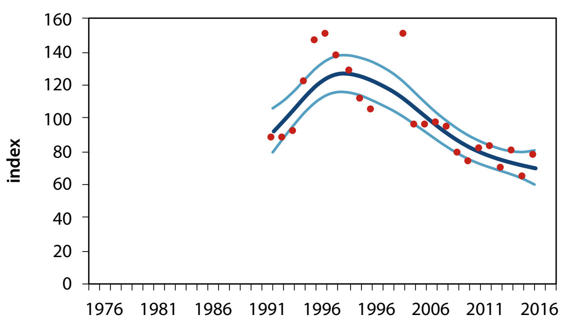


Figure A1.44 Population trend of Black-necked Grebe, population *P. n. nigricollis*, Europe/S & W Europe & N Africa. For explanation see fig. A1.4. *Tendance de la population de Grèbe à cou noir, population* P. n. nigricollis, *Europe / S & O Europe & Afrique du Nord. Pour l'explication, voir fig. A1.4.*

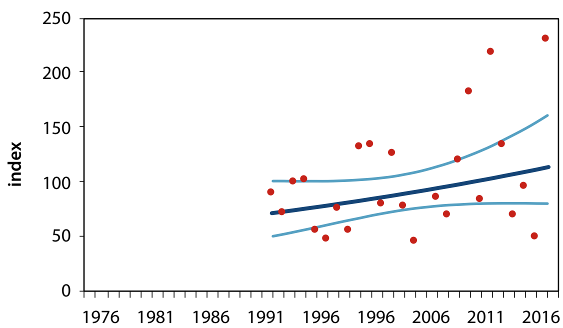


Figure A1.45. Trend of Black-necked Grebe in Namibia - South Africa part of coastal East Atlantic Flyway. For explanation see fig. A1.4. *Tendance de la population du Grèbe à cou noir en Namibie - Afrique du Sud, partie de la voie de migration de la côte de l'Atlantique Est. Pour l'explication, voir fig. A1.4.*

Greater Flamingo | Flamant rose | *Phoenicopterus roseus*

Populations, distribution and ecology

Greater Flamingos have an extensive range in southern Europe, Africa and Asia. In the coastal East Atlantic Flyway one population is present year-round; the local breeding population of West Africa occurring from Mauritania to Sierra Leone. Limited overlap exists during the non-breeding season with the population of the west Mediterranean (Iberian peninsula, Italy, France and parts of North Africa). Another population in Southern Africa makes partial use of coastal sites. The species shows nomadic behaviour depending on the availability of suitable breeding and foraging areas. Breeding in West Africa occurs in large colonies. Foraging occurs in shallow saline or alkaline water bodies such as lagoons, saltpans, and lakes, but also intertidal mudflat areas. It feeds on crustaceans, diatoms and other small food items, especially brine shrimp *Artemia*.

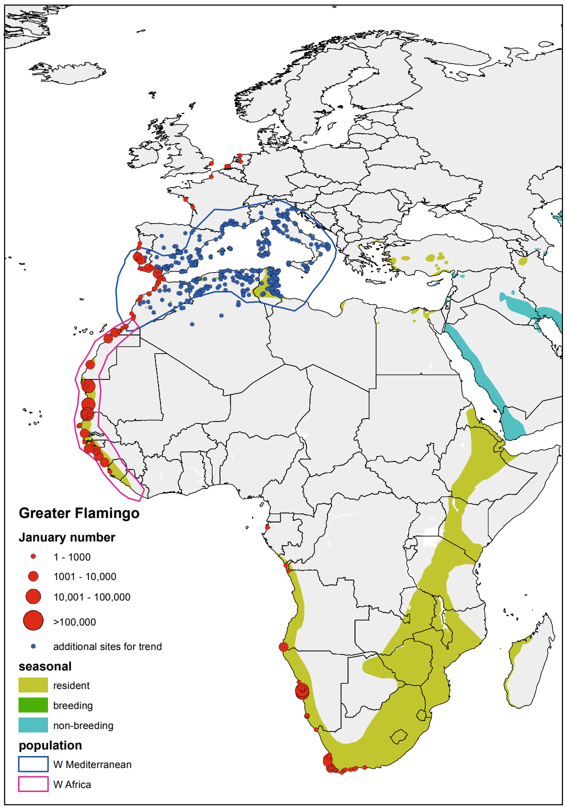


Figure A1.46. Distribution of Greater Flamingo in the coastal East Atlantic Flyway in January 2014-2017. For explanation see fig. A1.5.
Répartition du Flamant rose dans la voie de migration de la côte de l'Est-Atlantique en janvier 2014-2017. Pour l'explication, voir fig. A1.5.

Arnold Meijer / Blue Robin

Trend and population size

Population Greater Flamingo	data	type	period-L	trend-L	assessment-L	period-S	tren-S	assessment-S	period popsize	popsize-min	popsize-max
W Mediterranean	w	1a	1991-2016	1,05	moderate increase	2008-2016	1,10	moderate increase	2009-2014	135000	165000
W Africa	w	1b	1997-2017	1,02	moderate increase	2006-2017	1,05	moderate increase	2005-2005	45000	95000

Table A1.19. Summary of trend and population size for Greater Flamingo. For explanation see table A.1.2. *Résumé de la tendance et de la taille de la population de Flamant rose. Pour l'explication, voir le tableau A.1.2.*

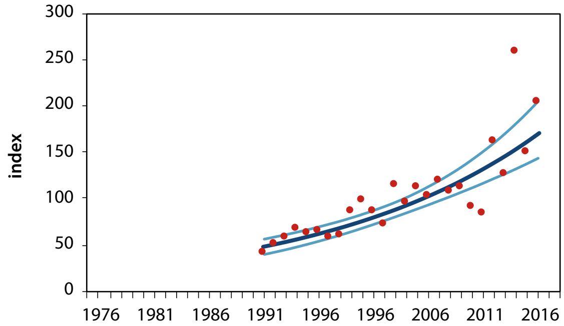


Figure A1.47. Population trend of Greater Flamingo, population W Mediterranean. For explanation see fig. A1.4. *Tendance de la population de Flamant rose, population Ouest méditerranéenne. Pour l'explication, voir fig. A1.4.*

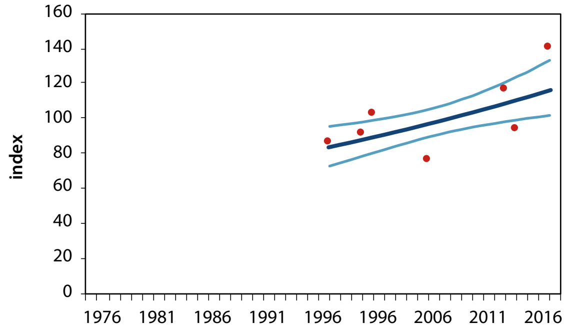


Figure A1.48. Population trend of Greater Flamingo, population W Africa. For explanation see fig. A1.4. *Tendance de la population de Flamant rose, population Ouest africaine. Pour l'explication, voir fig. A1.4.*

Lesser Flamingo | Flamant nain | *Phoeniconaias minor*

Populations, distribution and ecology

The Lesser Flamingo has a patchy distribution throughout Africa and western Asia. In West Africa the species breeds in a few sites but large year-to-year variation occurs due to variable habitat conditions. In the non-breeding season it can occur along the whole coastal area from Mauritania to Guinea. Further south, there is an other population ranging from the coasts of Angola southwards to South-Africa and inland. The species is highly gregarious, often occurring together with the Greater Flamingo. Nesting occurs on large saline or alkaline lakes, lagoons and salt pans, and the same habitats are visited outside the breeding season. The species is a specialist and forages mainly on blue-green algae and diatoms in saline or alkaline waters.

Marc Guyt / Agami

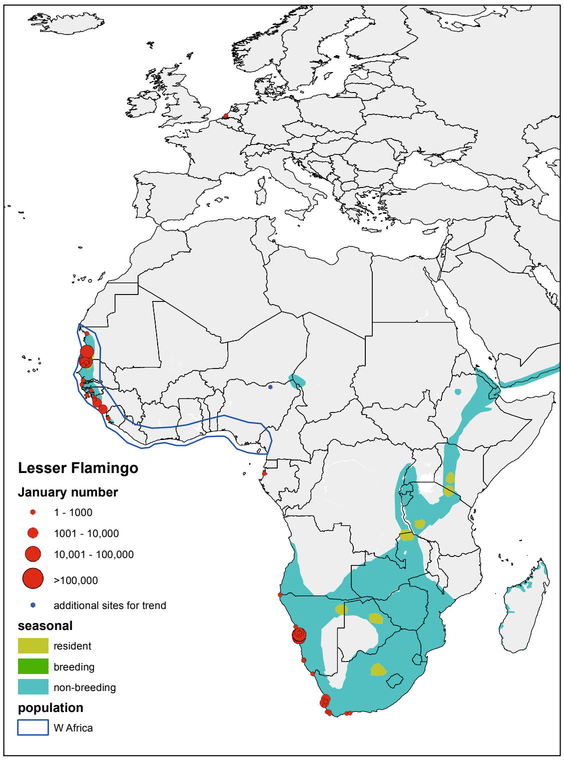


Figure A1.49. Distribution of Lesser Flamingo in the coastal East Atlantic Flyway in January 2014-2017. For explanation see fig. A1.5. *Répartition du Flamant nain dans la voie de migration de la côte de l'Est-atlantique en janvier 2014-2017. Pour l'explication, voir fig. A1.5.*

Pete Morris / Agami

Trend and population size

Population Lesser Flamingo	data	type	period-L	trend-L	assessment-L	period-S	tren-S	assessment-S	period popsize	popsize-min	popsize-max
W Africa	w	1a	1991-2017	1,03	moderate increase	2008-2017	1,05	uncertain	2010-2015	25000	30000
S Africa	w	3	1977-2017	1,02	moderate increase	2008-2017	1,07	uncertain	2001-2001	120000	200000

Table A1.20. Summary of trend and population size for Lesser Flamingo. For explanation see table A.1.2. *Résumé de la tendance et de la taille de la population de Flamant nain. Pour l'explication, voir le tableau A.1.2.*

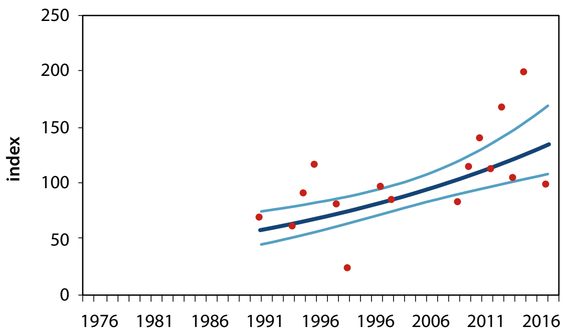


Figure A1.50. Population trend of Lesser Flamingo, population W Africa. For explanation see fig. A1.4. *Tendance de la population de Flamant nain, population Ouest africaine. Pour l'explication, voir fig. A1.4.*

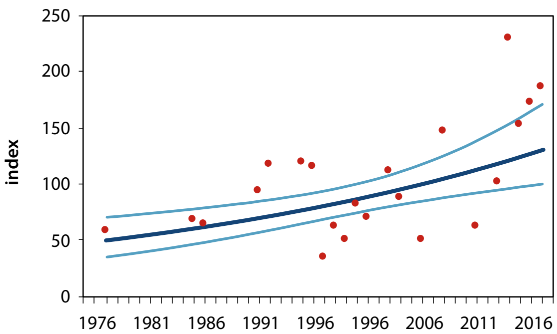


Figure A1.51. Trend of Lesser Flamingo in Angola - South Africa part of coastal East Atlantic Flyway. For explanation see fig. A1.4. *Tendance de la population du Flamant nain en Angola - Afrique du Sud, partie de la voie de migration de la côte de l'Atlantique Est. Pour l'explication, voir fig. A1.4.*

African Spoonbill | Spatule d'Afrique | *Platalea alba*

Populations, distribution and ecology

Within the East Atlantic Flyway concentrations of African Spoonbill are mainly found in West Africa and South Africa. The species breeds in small groups, often in colonies with other species, in large, shallow lakes and rivers, pans, marshes, floodplains and artificial waters, and less often in coastal lagoons, creeks and estuaries. The species likely makes nomadic movements in response to rainfall, rather than being migratory. In the non-breeding season, birds are gregarious in small parties up to several dozens, sometimes hundreds of individuals. The diet consists of small fish and aquatic invertebrates.

Marc Guyt / Agami

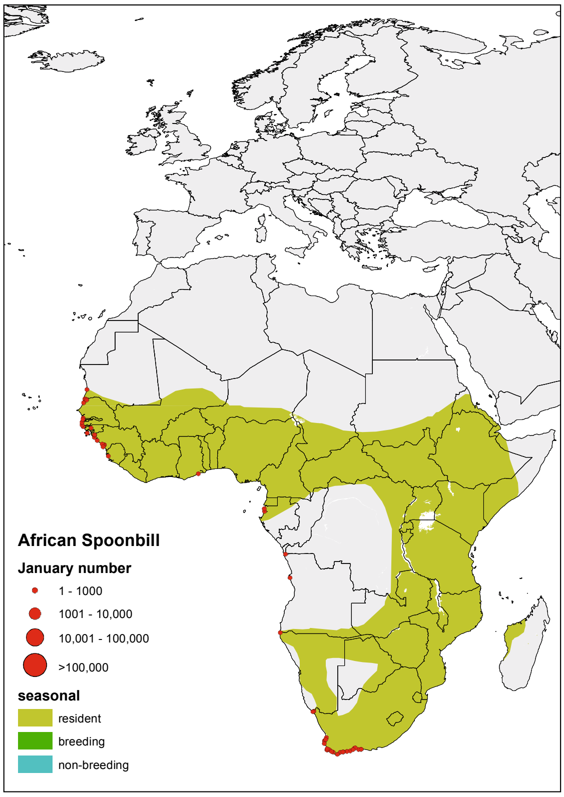


Figure A1.52. Distribution of African Spoonbill in the coastal East Atlantic Flyway in January 2014-2017. *Répartition de la spatule africaine dans la voie de migration du littoral atlantique est en janvier 2014-2017.*

Trend and population size

Population African Spoonbill	data	type	period-L	trend-L	assessment-L	period-S	tren-S	assessment-S	period popsize	popsize-min	popsize-max
Sub-Saharan Africa	w	3	1993-2017	0,98	stable	2008-2017	0,92	uncertain	2003-2012	30000	65000

Table A1.21. Summary of trend and population size for African Spoonbill. For explanation see table A.1.2. *Résumé de la tendance démographique et de la taille de la population de spatules africaines. Pour l'explication, voir le tableau A.1.2.*

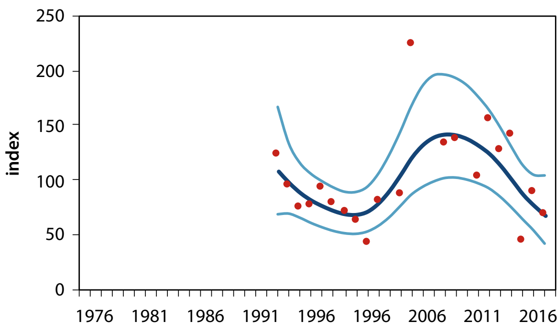


Figure A1.53. Trend of African Spoonbill in the African part of the coastal East Atlantic Flyway. For explanation see fig. A1.4. *Tendance démographique de la spatule africaine dans la partie africaine de la voie de migration du littoral atlantique est. Pour l'explication, voir fig. A1.4.*

Eurasian Spoonbill | Spatule blanche | *Platalea leucorodia*

Populations, distribution and ecology

The Eurasian Spoonbill has two populations in the East Atlantic flyway, a population of the nominate subspecies *leucorodia* breeding in Western and South-western Europe and wintering in Western Africa and increasingly in the western Mediterranean, and a resident population of the subspecies *balsaci* on the Banc d'Arguin in Mauritania. The species is gregarious all year round and breeds either in colonies on the ground or in emergent vegetation (reedbeds) or in trees/shrubs. Foraging occurs mainly in shallow fresh and saltwater, usually with a mud, clay or sandy substrate, floodplains, lakes, lagoons and mudflats. Preferred food items are generally fish and crustaceans.

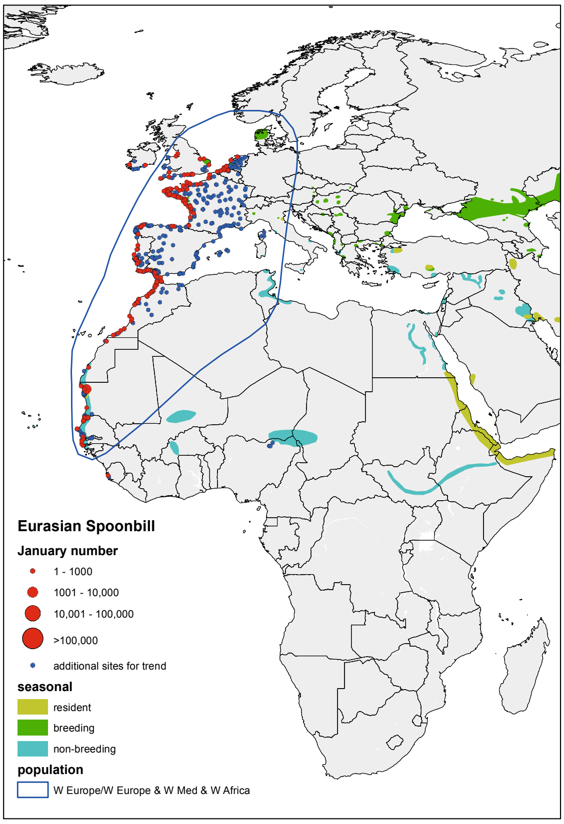


Figure A1.54. Distribution of Eurasian Spoonbill in the coastal East Atlantic Flyway in January 2014-2017. For explanation see fig. A1.5. *Répartition de la Spatule blanche dans la voie de migration de la côte de l'Est Atlantique est en janvier 2014-2017. Pour l'explication, voir fig. A1.5.*

Trend and population size

Population Eurasian Spoonbill	data	type	period-L	trend-L	assessment-L	period-S	tren-S	assessment-S	period popsize	popsize-min	popsize-max
W Europe/W Europe & W Med & W Africa	b	1a	1980-2012	1,10	strong increase	2000-2012	1,09	strong increase	2006-2012	14200	18900

Table A1.22. Summary of trend and population size for Eurasian Spoonbill. For explanation see table A.1.2. *Résumé de la tendance et de la taille de la population de la Spatule blanche. Pour l'explication, voir le tableau A.1.2.*

Arnold Meijer / Blue Robin

African Sacred Ibis | Ibis sacré | *Threskiornis aethiopicus*

Populations, distribution and ecology

The natural distribution of this species within the East Atlantic Flyway ranges from Mauritania south to South Africa, but a feral population occurs in France. In Africa, the species makes nomadic or partially migratory movements and breeds during or shortly after rains, although breeding may also occur during the dry season in flooded areas. Nesting occurs on large mixed-species colonies of up to 2000 pairs in a variety of inland and coastal wetland habitats, including marshes, sewage works, forested rivers, grasslands, coastal lagoons, saltpans, mangroves and offshore islands. The diet is highly opportunistic, consisting largely of insects, crustaceans, worms, molluscs, fish, frogs, carrion, offal and seeds, occasionally reptile and bird eggs and nestlings.

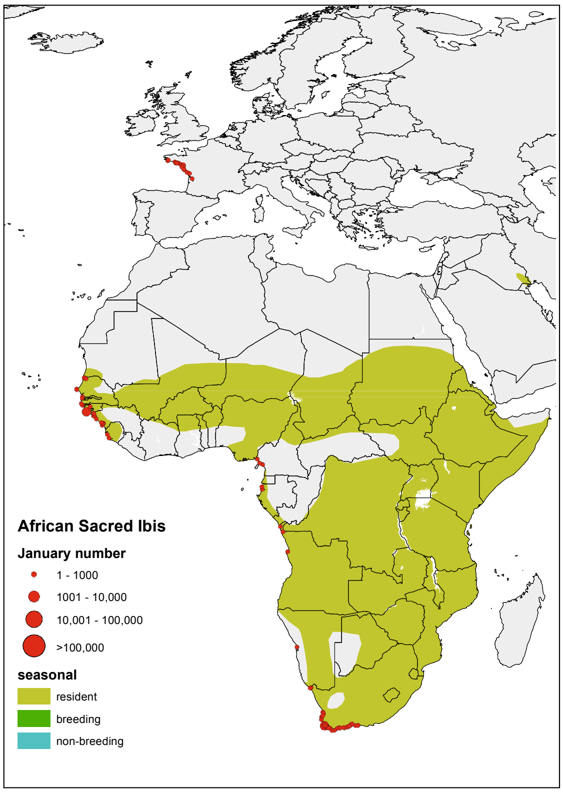


Figure A1.55. Distribution of African Sacred Ibis in the coastal East Atlantic Flyway in January 2014-2017. *Répartition de l'Ibis sacré africain sur la voie de migration de la côte del' Atlantique Est en janvier 2014-2017.*

Trend and population size

Population African Sacred Ibis	data	type	period-L	trend-L	assessment-L	period-S	tren-S	assessment-S	period popsize	popsize-min	popsize-max
Sub-Saharan Africa	w	3	1994-2017	1,00	stable	2008-2017	1,00	stable	2001-2001	200000	450000

Table A1.23. Summary of trend and population size for African Sacred Ibis. For explanation see table A.1.2. *Résumé de la tendance et de la taille de la population d'Ibis sacré africain. Pour l'explication, voir le tableau A.1.2.*

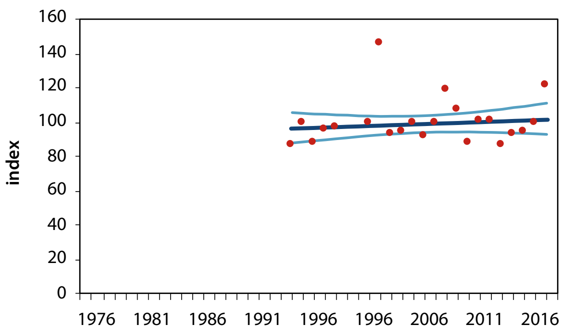


Figure A1.56. Trend of African Sacred Ibis in the African part of the coastal East Atlantic Flyway. For explanation see fig. A1.4. *Tendance de l'Ibis sacré africain dans la partie africaine de la voie de migration de la côte de l'Atlantique Est. Pour l'explication, voir fig. A1.4.*

Marc Guyt / Agami

Goliath Heron | Héron goliath | *Ardea goliath*

Populations, distribution and ecology

A single biogeographical population occurs in the study area, from Mauritania south to South Africa. The species is not migratory, although nomadic movements may occur. It breeds mainly in solitary pairs and remains mostly solitary in the non-breeding season. It inhabits saline and fresh waters with a preference for shallow water along the shores of lakes, rivers and lagoons, where it often forages in deep water near floating vegetation. It also inhabits marshes, tidal estuaries, reeds, mangroves and waterholes. The species feeds mainly on large fish, but also takes small vertebrates, crustaceans and carrion.

Daniele Occhiato / Agami

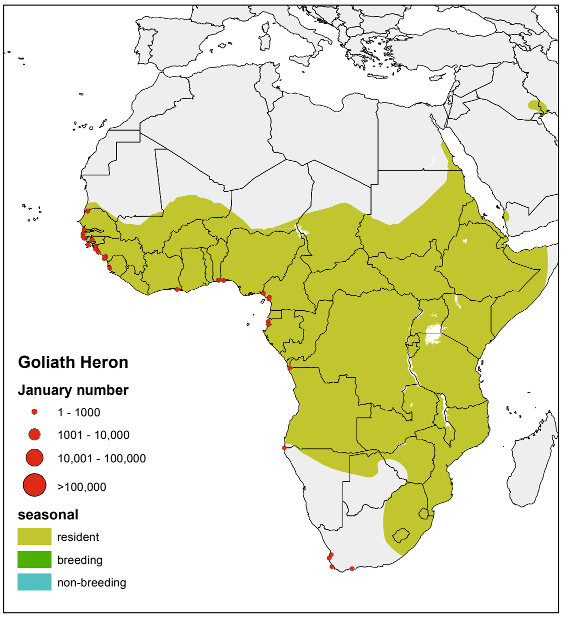


Figure A1.57. Distribution of Goliath Heron in the coastal East Atlantic Flyway in January 2014-2017. *Répartition du Héron goliath sur la voie de migration de la côte de l' Atlantique Est en janvier 2014-2017.*

Trend and population size

Population Goliath Heron	data	type	period-L	trend-L	assessment-L	period-S	tren-S	assessment-S	period popsize	popsize-min	popsize-max
Sub-Saharan Africa	w	3	1993-2017	0,98	stable	2009-2017	0,98	uncertain			

Table A1.24. Summary of trend and population size for Goliath Heron. For explanation see table A.1.2. *Résumé de la tendance et de la taille de la population de Héron goliath. Pour l'explication, voir le tableau A.1.2.*

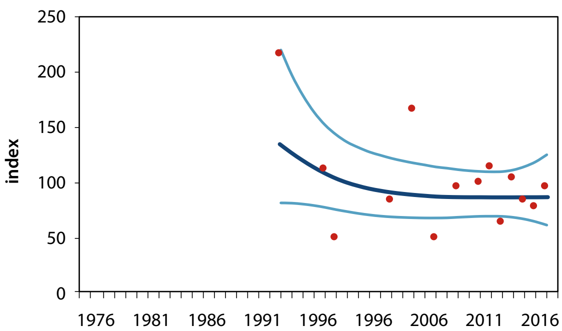


Figure A1.58. Trend of Goliath Heron in the African part of the coastal East Atlantic Flyway. For explanation see fig. A1.4. *Tendance du Héron Goliath dans la partie africaine de la voie de migration de la côte de l'Atlantique Est. Pour l'explication, voir fig. A1.4.*

Daniele Occhiato / Agami

Great White Egret | Grande Aigrette | *Ardea alba*

Populations, distribution and ecology

Within the East Atlantic Flyway there are two populations, one in Europe/North Africa and one in sub-Saharan Africa. Birds of both populations make post-breeding dispersive movements, with the European population begin largely migratory and the African populations largely sedentary. Breeding typically occurs in colonies of tens to hundreds of pairs, sometimes mixed with other species. Its habitat consists of all kinds of natural and artificial inland and coastal waters, although coasts are frequented more in the non-breeding season. During the non-breeding season the species may forage solitarily, in small groups or occasionally in large flocks of hundreds of individuals where food is abundant. The diet consists of aquatic and terrestrial vertebrates, including fish, amphibians, reptiles, mammals and birds, and invertebrates such as insects and crustaceans.

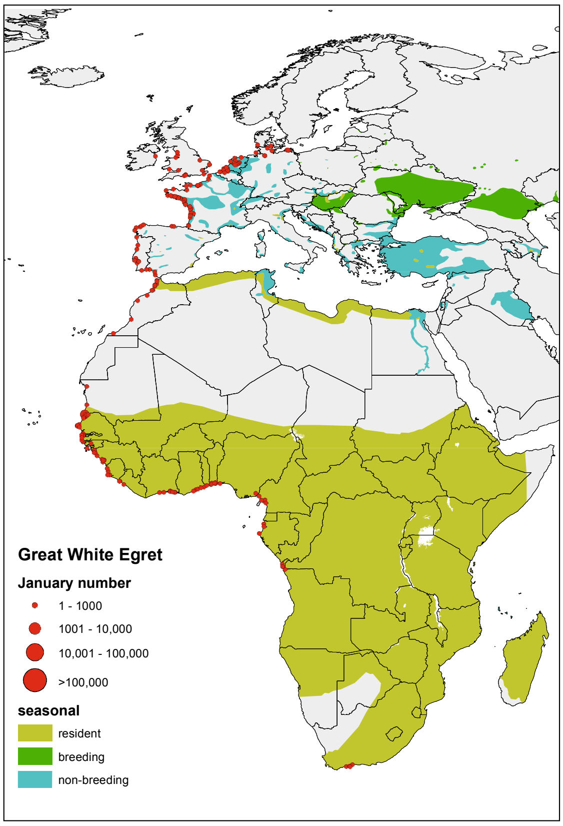


Figure A1.59. Distribution of Great White Egret in the coastal East Atlantic Flyway in January 2014-2017. *Répartition de la Grande aigrette dans la voie de migration de la côte de l'Est-atlantique en janvier 2014-2017.*

Trend and population size

Population Great White Egret	data	type	period-L	trend-L	assessment-L	period-S	tren-S	assessment-S	period popsize	popsize-min	popsize-max
Europe & N Africa	w	3	1993-2016	1,19	strong increase	2008-2016	1,15	strong increase	2000-2014	61000	99000
melanorhynchos, Sub-Saharan Africa	w	3	1997-2017	1,02	moderate increase	2009-2017	1,02	uncertain	2001-2001	100000	500000

Table A1.25. Summary of trend and population size for Great White Egret. For explanation see table A.1.2. *Résumé de la tendance et de la taille de la population de Grande aigrette. Pour l'explication, voir le tableau A.1.2.*

Reint Jacob Schut / Agami

Daniele Occhiato / Agami

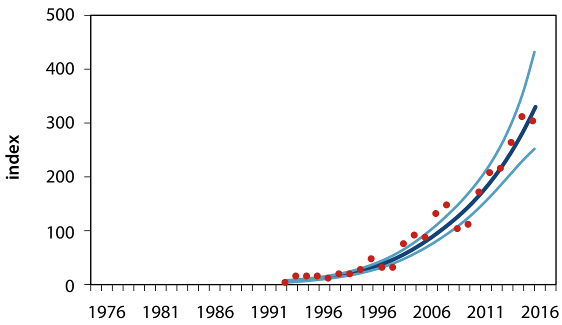


Figure A1.60. Trend of Great White Egret in the European part of coastal East Atlantic Flyway. For explanation see fig. A1.4. *Tendance de la Grande aigrette dans la partie européenne de la voie de migration de la côte de l'Atlantique Est. Pour explication, voir fig. A1.4.*

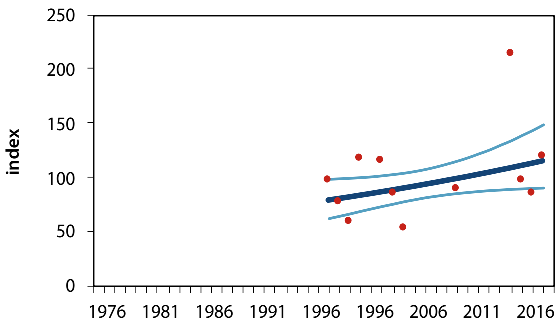


Figure A1.61. Trend of Great White Egret in African part of the coastal East Atlantic Flyway. For explanation see fig. A1.4. *Tendance de la Grande aigrette dans la partie africaine de la voie de migration de la côte de l'Atlantique Est. Pour l'explication, voir fig. A1.4.*

Western Reef-egret | Aigrette à gorge blanche | *Egretta gularis*

Populations, distribution and ecology

The Western Reef-egret, population *E. g. gularis* is confined to Western Africa, where it occurs along the whole coastline and at some inland sites from Morocco to Gabon. The preferred foraging sites are small pools in mudflat areas, sandy or rocky shores and reefs. It nests on the ground, in mangrove trees or in reedbeds either solitarily or in small colonies. The food is variable: fish, crustaceans, earthworms and other invertebrates.

Ralph Martin / Agami

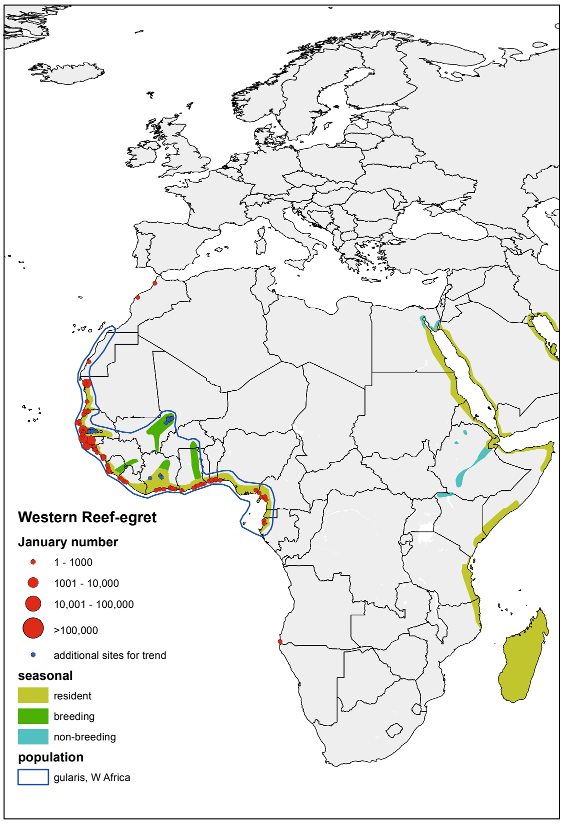


Figure A1.62. Distribution of Western Reef Egret in the coastal East Atlantic Flyway in January 2014-2017. For explanation see fig. A1.5. *Répartition de l'Aigrette à gorge blanche sur la voie de migration de la côte de l'Est-atlantique en janvier 2014-2017. Pour l'explication, voir fig. A1.5.*

Hans Schekkerman

Trend and population size

Population Western Reef-Egret	data	type	period-L	trend-L	assessment-L	period-S	tren-S	assessment-S	period popsize	popsize-min	popsize-max
gularis, W Africa	w	1b	1997-2017	0,98	moderate decline	2009-2017	1,04	moderate increase	1991-2014	10000	50000

Table A1.26. Summary of trend and population size for Western Reef-Egret. For explanation see table A.1.2. *Résumé de la tendance et de la taille de la population d'Aigrette à gorge blanche. Pour l'explication, voir le tableau A.1.2.*

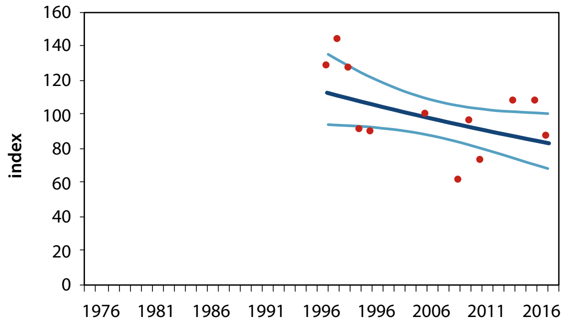


Figure A1.63. Population trend of Western Reef Egret, population *E. g. gularis* W Africa. For explanation see fig. A1.4. *Tendance de la population d'Aigrette à gorge blanche, population* E. g. gularis *O Africa. Pour l'explication, voir fig. A1.4.*

Ralph Martin / Agami

Ralph Martin / Agami

Pink-backed Pelican | Pélican gris | *Pelecanus rufescens*

Populations, distribution and ecology

A single biogeographical population occurs in the East Atlantic Flyway with the main concentrations within the study area in West Africa. The species is largely nomadic, making dispersive movements related to water and food availability. Nesting occurs in groups of several dozens to hundreds of individuals, while the species prefers to forage solitarily or in small groups. It is gregarious year-round. Breeding habitat includes a wide range of aquatic habitats, usually shallow with emergent vegetation, such as fresh-water lakes, swamps, slow-flowing rivers and pools. The species is found less often in saline lakes, coastal bays and estuaries. The diet consists entirely of fish.

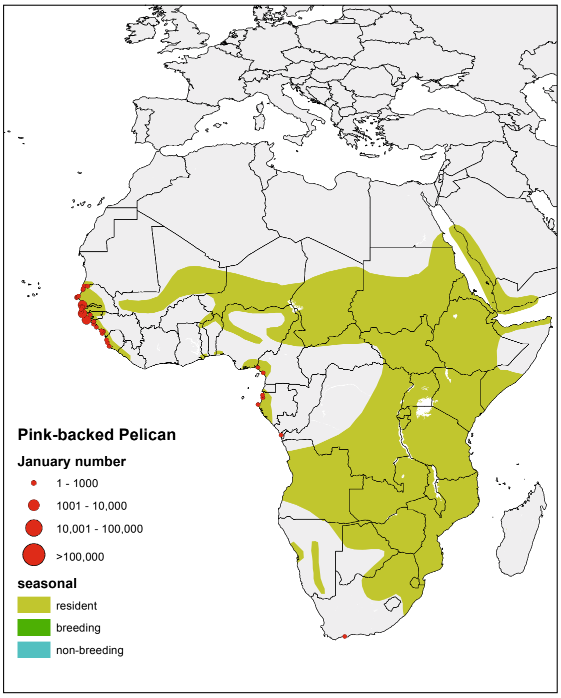


Figure A1.64. Distribution of Pink-backed Pelican in the coastal East Atlantic Flyway in January 2014-2017. *Répartition du Pélican gris dans la voie de migration de la côte de l'Est-atlantique en janvier 2014-2017.*

Trend and population size

Population Pink-backed Pelican	data	type	period-L	trend-L	assessment-L	period-S	tren-S	assessment-S	period popsize	popsize-min	popsize-max
Sub-Saharan Africa	w	3	1992-2017	1,08	moderate increase	2009-2017	1,07	uncertain	2001-2001	50000	100000

Table A1.27. Summary of trend and population size for pink-backed Pelican. For explanation see table A.1.2. *Résumé de la tendance et de la taille de la population de Pélican gris. Pour l'explication, voir le tableau A.1.2.*

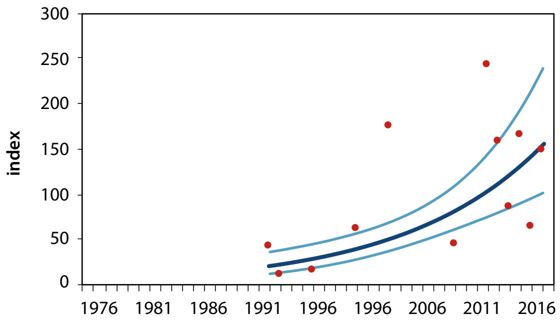


Figure A1.65. Trend of Pink-backed Pelican in African part of the coastal East Atlantic Flyway. For explanation see fig. A1.4. *Tendance du Pélican gris dans la partie africaine de la voie de migration de la côte de l'Atlantique Est. Pour l'explication, voir fig. A1.4.*

Ian Davies / Agami

Great White Pelican | Pélican blanc | *Pelecanus onocrotalus*

Populations, distribution and ecology

Within the study region two biogeographical populations occur; one in coastal West Africa and the Sahelian floodplains east to Chad, and one in southern Africa. Great White Pelicans are large fish-eating colonial breeding birds of which the populations within the study area are largely resident or partly migratory and nomadic. The limits of the ranges of different populations are not well known. The birds in Guinee and Sierra Leone belong most likely also to the West African population. The pelicans in coastal Nigeria, Cameroon and Gabon can be of West African or Southern African origin. The exact limits towards the east are even less clear. The species feeds in coastal creeks, estuaries, floodplain and other inland shallow lakes. The preferred breeding sites are swamps and sandbanks that are secure from disturbance by humans and natural predators.

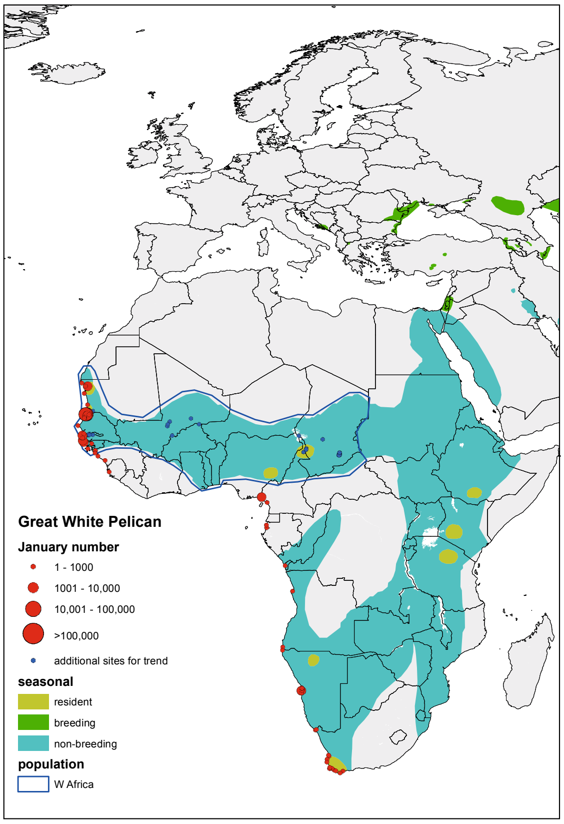


Figure A1.66. Distribution of Great White Pelican in the coastal East Atlantic Flyway in January 2014-2017. For explanation see fig. A1.5. *Répartition du Pélican blanc dans la voie de migration de la côte de l'Est-atlantique en janvier 2014-2017. Pour l'explication, voir fig. A1.5.*

Trend and population size

Population Great White Pelican	data	type	period-L	trend-L	assessment-L	period-S	tren-S	assessment-S	period popsize	popsize-min	popsize-max
W Africa	w	1b	1980-2017	1,05	moderate increase	2008-2017	1,02	uncertain	1975-2014	60000	60000
S Africa	w	3	1992-2017	1,03	moderate increase	2008-2017	1,01	uncertain	1991-2013	21000	24000

Table A1.28. Summary of trend and population size for Great White Pelican. For explanation see table A.1.2. *Résumé de la tendance et de la taille de la population de Pélican blanc. Pour l'explication, voir le tableau A.1.2.*

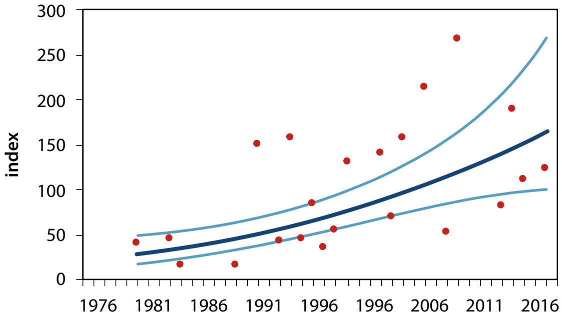


Figure A1.67. Population trend of Great White Pelican, population W Africa. For explanation see fig. A1.4. *Tendance de la population de Pélicans blanc, population Ouest africaine. Pour l'explication, voir fig. A1.4.*

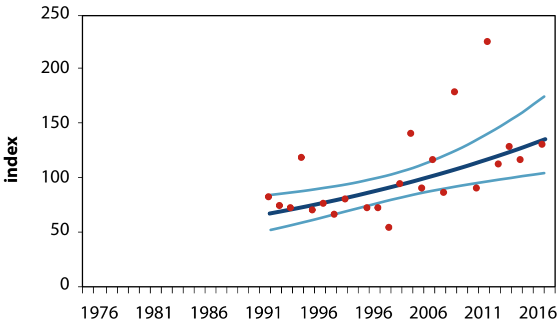


Figure A1.68. Trend of Great White Pelican in the Angola - South Africa part of the coastal East Atlantic Flyway. For explanation see fig. A1.4. *Tendance du Pélican blanc dans la partie, Angola - Afrique du Sud, de la voie de migration de la côte de l'Est-atlantique. Pour l'explication, voir fig. A1.4.*

Wil Leurs / Agami

Long-tailed Cormorant | Cormoran africain | *Microcarbo africanus*

Populations, distribution and ecology

The species is a resident in the study area, making irregular movements in response to water conditions. The peak of nesting activity is associated with periods of rainfall and flooding and breeding typically occurs in small numbers within large mixed-species colonies. The preferred habitat is sheltered, shallow freshwater surrounded by emergent vegetation, including most wetland types except fast-flowing waters. It less often visits saline and marine habitat, although substantial numbers occur in the tidal gullies of the Banc d'Arguin, Mauritania. The species forages singly or in loose groups on any slow-moving prey, including small fish, frogs, crustaceans and aquatic insects.

Roy de Haas / Agami

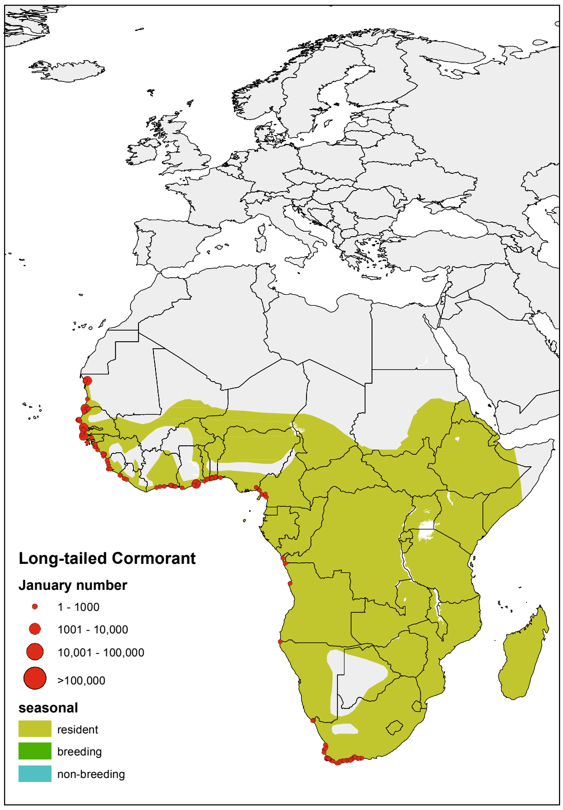


Figure A1.69. Distribution of Long-tailed Cormorant in the coastal East Atlantic Flyway in January 2014-2017. *Répartition du Cormoran africain dans la voie de migration de la côte de l'Atlantique Est en janvier 2014-2017.*

Trend and population size

Population Long-tailed Cormorant	data	type	period-L	trend-L	assessment-L	period-S	tren-S	assessment-S	period popsize	popsize-min	popsize-max
africanus, W Africa	w	3	1997-2017	1,03	moderate increase	2008-2017	1,13	uncertain			

Table A1.29. Summary of trend and population size for Long-tailed Cormorant. For explanation see table A.1.2. *Résumé de la tendance et de la taille de la population de Cormoran africain. Pour l'explication, voir le tableau A.1.2.*

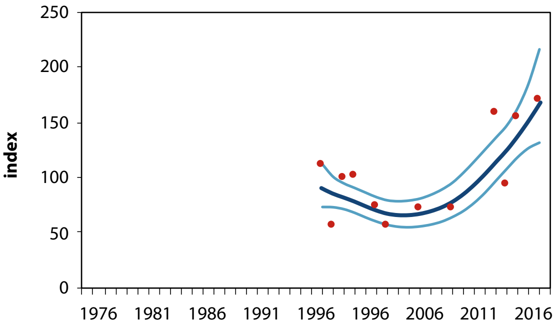


Figure A1.70. Trend of Long-tailed Cormorant in the West African part of the coastal East Atlantic Flyway. For explanation see fig. A1.4. *Tendance du Cormoran africain dans la partie Ouest africaine de la voie de migration de la côte de l'Atlantique Est. Pour l'explication, voir fig. A1.4.*

Great Cormorant | Grand Cormoran | *Phalacrocorax carbo*

Populations, distribution and ecology

The Great Cormorant is found in many parts of Eurasia and Africa. In the East Atlantic Flyway several flyway populations occur. The sub-species *P.c. carbo* occurs mainly along mainly rocky shores of Northwest Europe, and is not considered in this update. The *sinensis* subspecies occurs in continental Europe, breeding in Northern and Western Europe and wintering in Western Europe and South-west-Mediterranean. In the African subspecies *P.c. lucidus* two populations are distinguished in the study region: one in West Africa from Mauritania to Sierra Leone, and one in southern Africa. The endemic subspecies *maroccanus* from Morocco is confined to rocky coasts and not considered in this report. The species occurs in freshwater and marine habitats, is gregarious year-round (in both colonies and feeding flocks) and is a piscivore preying on fish species in shallow coastal waters or freshwater lakes. Breeding sites vary from trees to bare ground in (mixed) colonies. It is capable of performing foraging flights up to 25 km or more from a nesting colony.

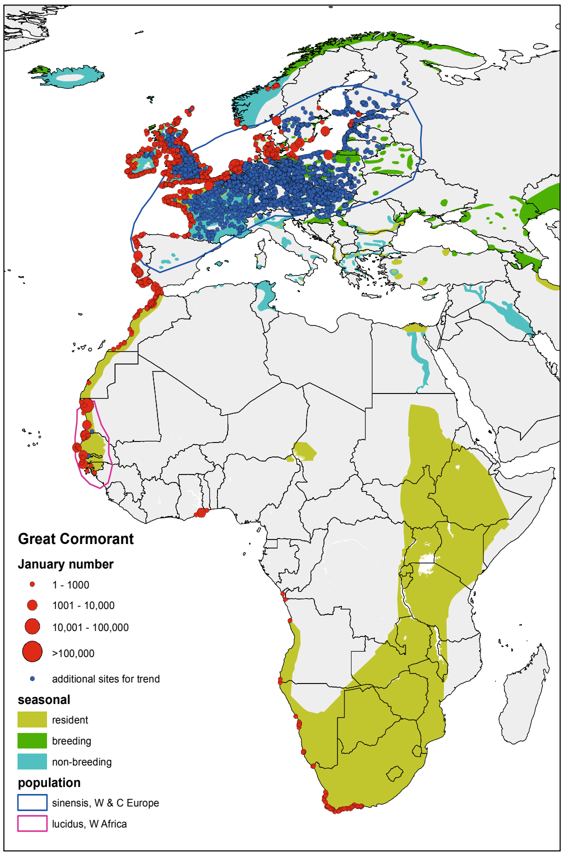


Figure A1.71. Distribution of Great Cormorant in the coastal East Atlantic Flyway in January 2014-2017. For explanation see fig. A1.5. *Répartition du Grand cormoran dans la voie de migration de la côte de l'Est-atlantique en janvier 2014-2017. Pour l'explication, voir fig. A1.5.*

Trend and population size

Population Great Cormorant	data	type	period-L	trend-L	assessment-L	period-S	tren-S	assessment-S	period popsize	popsize-min	popsize-max
sinensis, W & C Europe	w	1a	1988-2016	1,03	moderate increase	2008-2016	1,02	uncertain	2012-2013	615000	615000
lucidus, W Africa	w	1b	2000-2017	1,02	stable	2006-2017	0,99	uncertain	2010-2014	40000	40000
lucidus, S Africa	w	3	1995-2017	0,97	moderate decline	2008-2017	0,98	uncertain	1964-2013	15000	15000

Table A1.30. Summary of trend and population size for Great Cormorant. For explanation see table A.1.2. *Résumé de la tendance et de la taille de la population de Grand cormoran. Pour l'explication, voir le tableau A.1.2.*

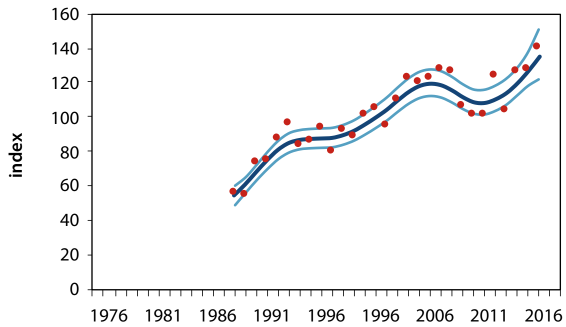


Figure A1.72. Population trend of Great Cormorant, population *P. c. sinensis*, W & C Europe. For explanation see fig. A1.4. *Tendance de la population de Grand cormoran, population* P. c. sinensis, *O & C Europe. Pour l'explication, voir fig. A1.4.*

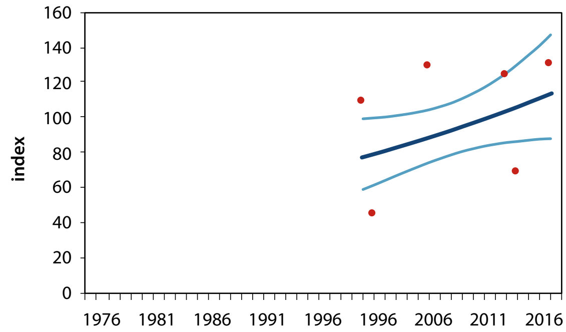


Figure A1.73. Population trend of Great Cormorant, population *P. c. lucidus*, W Africa. For explanation see fig. A1.4. *Tendance de la population de Grand cormoran, population* P. c. lucidus, *O Africa. Pour l'explication, voir fig. A1.4.*

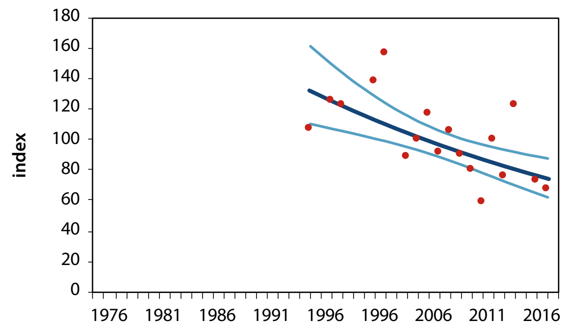


Figure A1.74. Trend of Great Cormorant in the Angola - South Africa part of the coastal East Atlantic Flyway. For explanation see fig. A1.4. *Tendance du Grand cormoran dans la partie Angola - Afrique du Sud de la voie de migration de la côte de l'Est-atlantique. Pour l'explication, voir fig. A1.4.*

Arnold Meijer / Blue Robin

Cape Cormorant | Cormoran du Cap | *Phalacrocorax capensis*

Populations, distribution and ecology

The distribution of this species is limited to the coasts of Angola, Namibia and South Africa, with few breeding colonies but extensive post-breeding dispersive movements along the coast. Breeding occurs in large colonies of up to 120,000 individuals on cliffs and ledges on the mainland and offshore islands. In the non-breeding season the species can also be found in coastal lagoons, estuaries and harbours. Its distribution and breeding activity is highly dependent on food resources, which consists almost entirely of pelagic schooling fish, including mainly pilchard Sardinops ocellata and anchovy *Engraulis capensis*.

Wil Leurs / Agami

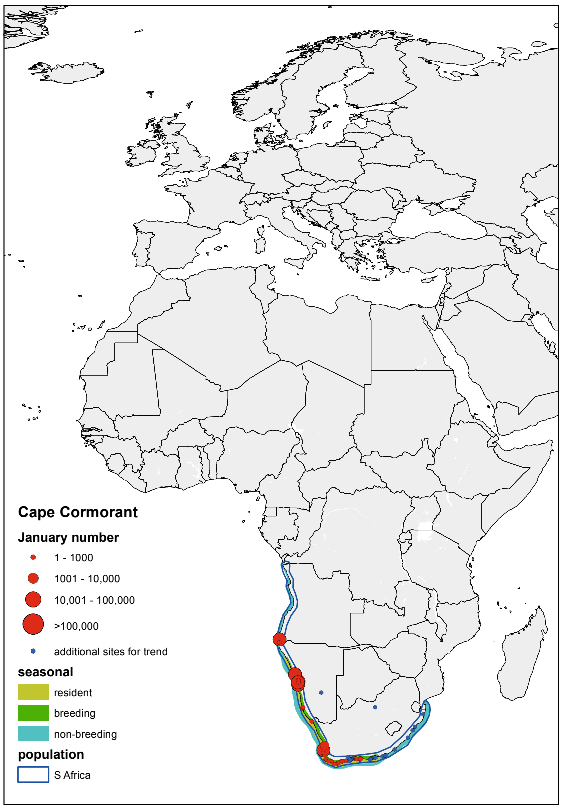


Figure A1.75. Distribution of Cape Cormorant in the coastal East Atlantic Flyway in January 2014-2017. For explanation see fig. A1.5. *Répartition du Cormoran du Cap dans la voie de migration de la côte de l'Est-atlantique en janvier 2014-2017. Pour l'explication, voir fig. A1.5.*

Trend and population size

Population Cape Cormorant	data	type	period-L	trend-L	assessment-L	period-S	tren-S	assessment-S	period popsize	popsize-min	popsize-max
S Africa	b	1b	1979-2012	0,98	moderate decline	2008-2017	1,04	uncertain	2005-2014	351000	351000

Table A1.31. Summary of trend and population size for Cape Cormorant. For explanation see table A.1.2. *Résumé de la tendance et de la taille de la population de Cormoran du Cap. Pour l'explication, voir le tableau A.1.2.*

African Darter | Anhinga d'Afrique | *Anhinga rufa*

Populations, distribution and ecology

This species is mostly sedentary in the East Atlantic Flyway, making opportunistic local movements in response to water conditions. Breeding usually occurs in small numbers in mixed-species colonies near still or slow-flowing shallow freshwater or alkaline waters with reeds and fringed with trees. For foraging The species generally avoids marine habitats, fast-flowing rivers and waters with dense floating vegetation or steep banks. The diet consists mainly of fish, but also includes other small aquatic vertebrates and invertebrates.

Jacques van der Neut / Agami

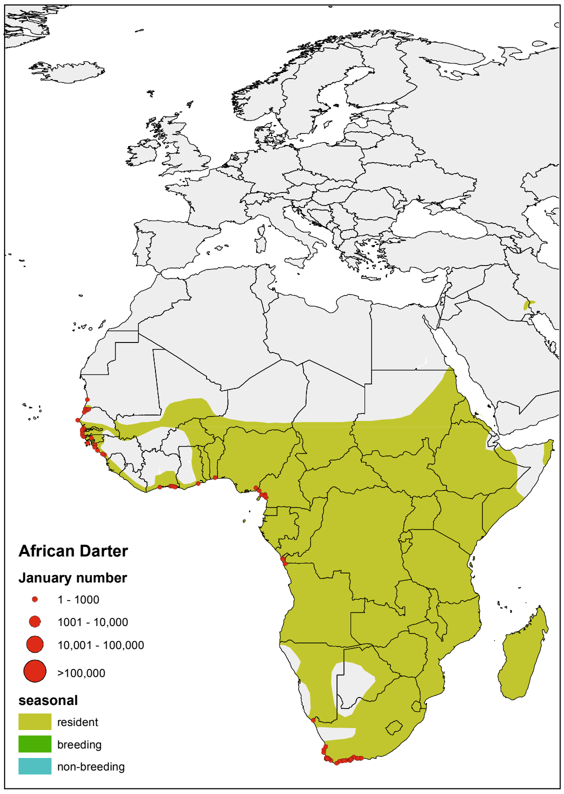


Figure A1.76. Distribution of African Darter in the coastal East Atlantic Flyway in January 2014-2017. *Répartition de l'Anhinga d'Afrique dans la voie de migration de la côte de l'Atlantique-Est en janvier 2014-2017.*

Trend and population size

Population African Darter	data	type	period-L	trend-L	assessment-L	period-S	tren-S	assessment-S	period popsize	popsize-min	popsize-max
rufa, W Africa	w	3	1997-2017	1,03	moderate increase	2008-2017	1,02	stable			

Table A1.32. Summary of trend and population size for African Darter. For explanation see table A.1.2. *Résumé de la tendance et de la taille de la population d'Anhingas d'Afrique. Pour l'explication, voir le tableau A.1.2.*

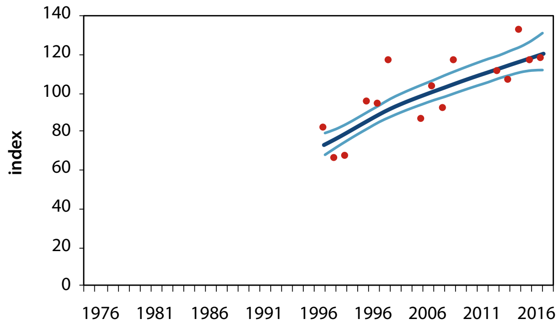


Figure A1.77. Trend of African Darter in Mauritania - Congo part of coastal East Atlantic Flyway. For explanation see fig. A1.4. *Tendance de l'Anhinga d'Afrique en Mauritanie et au Congo dans la voie de migration de la côte de l'Atlantique Est. Pour l'explication, voir fig. A1.4.*

African Oystercatcher | Huîtrier de Moquin | *Haematopus moquini*

Populations, distribution and ecology

The African Oystercatcher is a species with a limited range, occuring only on the coasts of Namibia and South Africa. It occurs along rocky and sandy coasts, either along the shoreline or in estuaries. The adults are largely sedentary with only limited movements outside the breeding season but young birds move relatively long distances. Preferred breeding sites are rocky islands and sandy beaches. The species forages year-round in the intertidal zone and feeds primarily on bivalves. Within the breeding season, the species is solitary, outside the breeding season small groups of up to a few hundred individuals can be found.

Marc Guyt / Agami

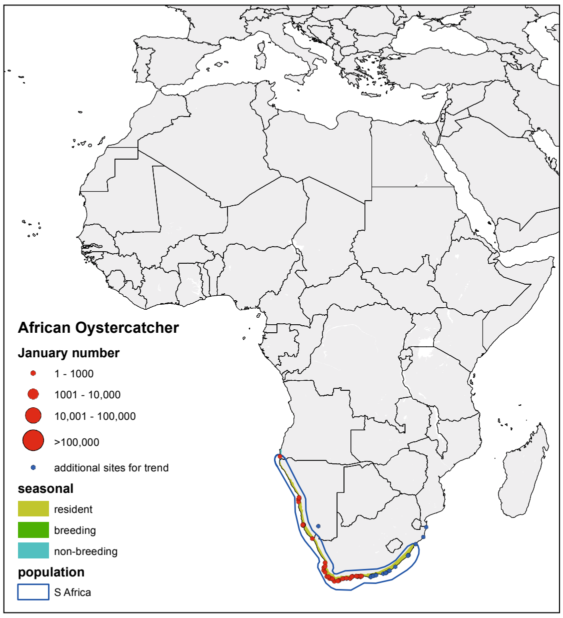


Figure A1.78. Distribution of African Oystercatcher in the coastal East Atlantic Flyway in January 2014-2017. For explanation see fig. A1.5. *Répartition de l'Huîtrier de Moquin dans la voie de migration de la côte de l'Atlantique Est en janvier 2014-2017. Pour l'explication, voir fig. A1.5.*

Trend and population size

Population African Oystercatcher	data	type	period-L	trend-L	assessment-L	period-S	tren-S	assessment-S	period popsize	popsize-min	popsize-max
S Africa	w	1a	2000-2017	1,01	stable	2008-2017	1,00	uncertain	1997-2003	6600	6700

Table A1.33. Summary of trend and population size for African Oystercatcher. For explanation see table A.1.2. *Résumé de la tendance et de la taille de la population d'Huîtrier de Moquin. Pour l'explication, voir le tableau A.1.2.*

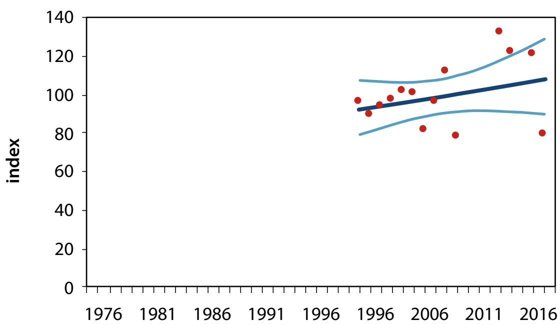


Figure A1.79. Population trend of African Oystercatcher. For explanation see fig. A1.4. *Tendance de la population d'Huîtrier de Moquin. Pour l'explication, voir fig. A1.4.*

Eurasian Oystercatcher | Huîtrier pie | *Haematopus ostralegus*

Populations, distribution and ecology

One flyway-population of the Eurasian Oystercatcher occurs within the East Atlantic Flyway, the nominate subspecies *H. o ostralegus*. The largest breeding numbers occur in the countries around the North Sea (UK, Netherlands, Germany) and in Scandinavia. Further south in Europe, breeding populations are small and dispersed. Many populations are migratory, some over small distances, others over much larger distances (N Europe to NW Africa). The Eurasian Oystercatcher is a typical breeder of coastal habitats but also occurs inland, along lakes and rivers and in farmland. Small populations even occur in urban habitats. The species breeds in various kinds of open habitats such as dunes, saltmarshes, rocky shores, sand beaches, (bare) arable fields and short cut or grazed grasslands. In urban areas, breeding on flat roofs is recorded. Breeding occurs solitarily but densities in suitable habitats can be quite high. Outside the breeding season the species is highly gregarious and forages and roosts in large flocks, congregating mainly on estuarine mudflats and saltmarshes. The preferred food is either bivalves and intertidal worms (in estuarine situations) or earthworms and insect larvae in farmland areas.

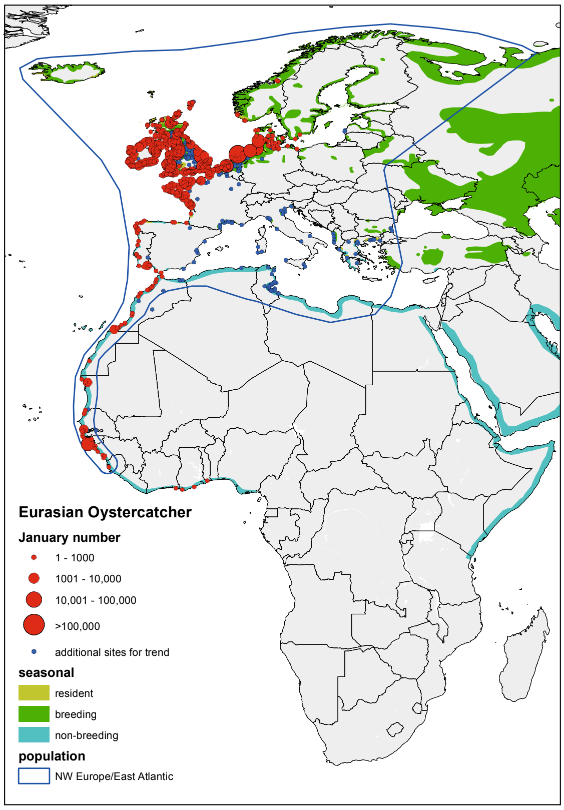


Figure A1.80. Distribution of Eurasian Oystercatcher in the coastal East Atlantic Flyway in January 2014-2017. For explanation see fig. A1.5. *Répartition de l'Huîtrier Pie dans la voie de migration de la côte de l'Atlantique Est en janvier 2014-2017. Pour l'explication, voir fig. A1.5.*

Arnold Meijer / Blue Robin

Trend and population size

Population Eurasian Oystercatcher	data	type	period-L	trend-L	assessment-L	period-S	tren-S	assessment-S	period popsize	popsize-min	popsize-max
NW Europe/East Atlantic	w	1a	1976-2016	1,00	stable	2008-2016	0,99	stable	2000-2013	850000	950000

Table A1.34. Summary of trend and population size for Eurasian Oystercatcher. For explanation see table A.1.2. *Résumé de la tendance et de la taille de la population d'Huitrier pie. Pour l'explication, voir le tableau A.1.2.*

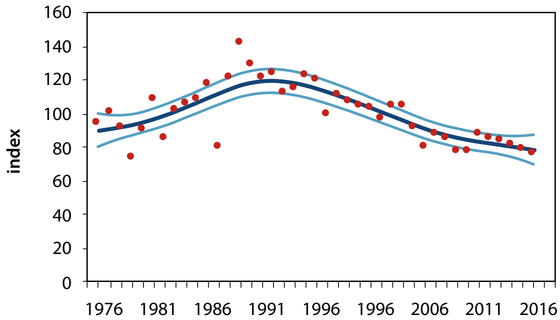


Figure A1.81. Population trend of Eurasian Oystercatcher, population *H. o. ostralegus*. For explanation see fig. A1.4. *Tendance de la population d'Huîtrier pie, population* H. o. ostralegus*. Pour l'explication, voir fig. A1.4.*

Pied Avocet | Avocette élégante | *Recurvirostra avosetta*

Populations, distribution and ecology

The Pied Avocet breeds in many parts of Western and Southern Europe and Southern Africa. It is a highly migratory species. Along the East Atlantic Flyway, two populations have been identified, one along the European and West African coast, and in Southern Africa using many inland sites as well as sites on the Atlantic coast. The breeding birds of Western Europe migrate as far south as West Africa. Breeding of the West European population occurs mainly in Denmark, Germany, The Netherlands, France and Spain. The species is gregarious year-round, it breeds in loose colonies and usually migrates and winters in large flocks. Breeding occurs in sparsely vegetated sites in saline and brackish wetlands. Outside the breeding season, the species occurs on coastal mudflats, lagoons and estuaries. Pied Avocets feed on a wide variety of items such as aquatic insects, crustaceans, small fish and oligochaete and polychaete worms, which they find in shallow water.

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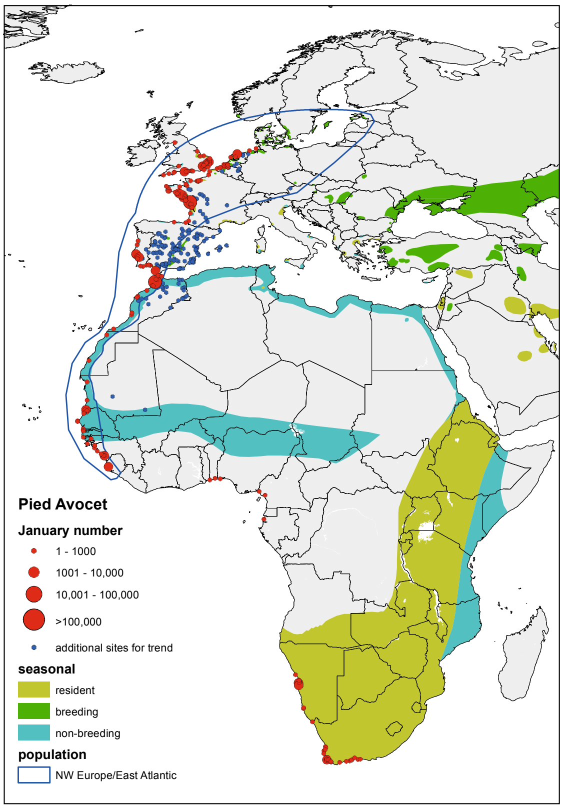

Figure A1.82. Distribution of Pied Avocet in the coastal East Atlantic Flyway in January 2014-2017. For explanation see fig. A1.5. *Répartition de l'Avocette élégante dans la voie de migration de la côte de l'Est-Atlantique en janvier 2014-2017. Pour l'explication, voir fig. A1.5.*

Trend and population size

Population Pied Avocet	data	type	period-L	trend-L	assessment-L	period-S	tren-S	assessment-S	period popsize	popsize-min	popsize-max
NW Europe/East Atlantic	w	1a	1990-2016	1,01	moderate increase	2008-2016	1,02	uncertain	2005-2012	89000	99000
S Africa	w	3	1992-2017	1,03	moderate increase	2008-2017	0,93	uncertain	2007-2007	15000	25000

Table A1.35. Summary of trend and population size for Pied Avocet. For explanation see table A.1.2. *Résumé de la tendance et de la taille de la population d'Avocette élégante. Pour l'explication, voir le tableau A.1.2.*

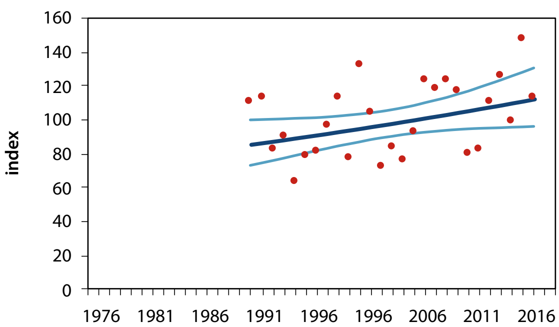

Figure A1.83. Population trend of Pied Avocet, population NW Europe/East Atlantic. For explanation see fig. A1.4. *Tendance de la population d'Avocette élégante, population au Nord-Ouest de l'Europe / Atlantique Est. Pour l'explication, voir fig. A1.4.*

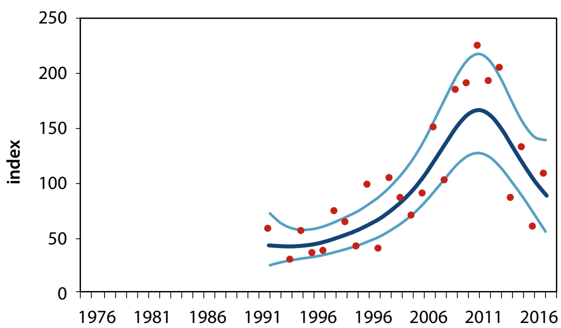

Figure A1.84. Trend of Pied Avocet in the Angola - South Africa part of the coastal East Atlantic Flyway. For explanation see fig. A1.4. *Tendance de l'Avocette élégante dans la partie Angola - Afrique du Sud de la voie de migration de la côte de l'Atlantique Est. Pour l'explication, voir fig. A1.4.*

Grey Plover | Pluvier argenté | *Pluvialis squatarola*

Populations, distribution and ecology

The nominate subspecies *P. s. squatarola* of the Grey Plover breeds in the tundra zone of Siberia east of the Kanin peninsula. This subspecies has two recognized flyway populations, an eastern one, where birds winter in South-west Asia, Eastern Africa & Southern Africa, and the one along the East Atlantic Flyway. During migration, the species occurs in coastal areas in large parts of Western and Southern Europe and Western Africa. During the breeding period the species is solitary, occurring in the high Arctic in various types of open tundra. In the remainder of the year it is a gregarious species occurring mainly on intertidal mudflats and salt marshes. The principal food sources outside the breeding season are polychaete worms, molluscs and crustaceans.

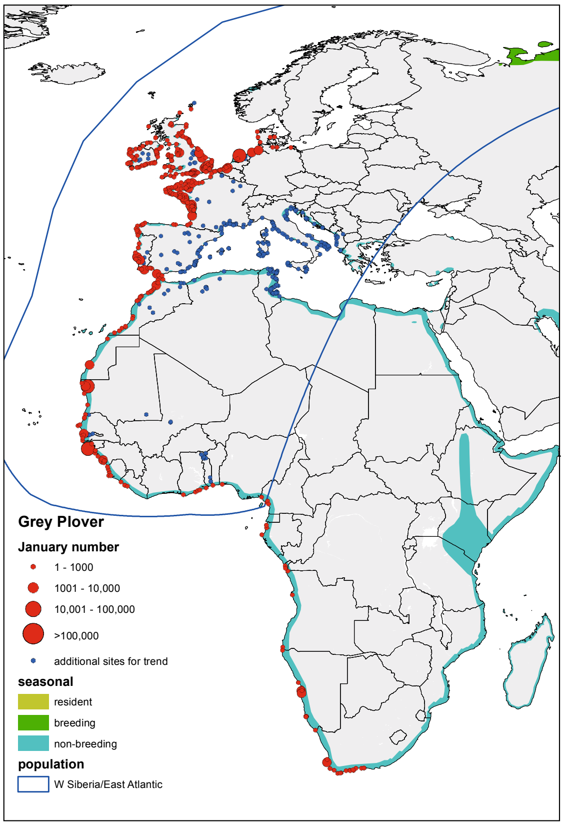

Figure A1.85. Distribution of Grey Plover in the coastal East Atlantic Flyway in January 2014-2017. For explanation see fig. A1.5. *Répartition du Pluvier gris dans la voie de migration de la côte Atlantique Est en janvier 2014-2017. Pour explication, voir fig. A1.5.*

Trend and population size

Population Grey Plover	data	type	period-L	trend-L	assessment-L	period-S	tren-S	assessment-S	period popsize	popsize-min	popsize-max
W Siberia/East Atlantic	w	1a	1979-2016	1,02	moderate increase	2008-2016	0,98	moderate decline	2010-2014	200000	200000
C & E Siberia/SW Asia - S Africa	w	3	1977-2017	0,99	stable	2008-2017	0,94	uncertain	1991-1998	90000	90000

Table A1.36. Summary of trend and population size for Grey Plover. For explanation see table A.1.2. *Résumé de la tendance et de la taille de la population de Pluvier gris. Pour l'explication, voir le tableau A.1.2.*

Markus Varesvuo / Agami

Ralph Martin / Agami

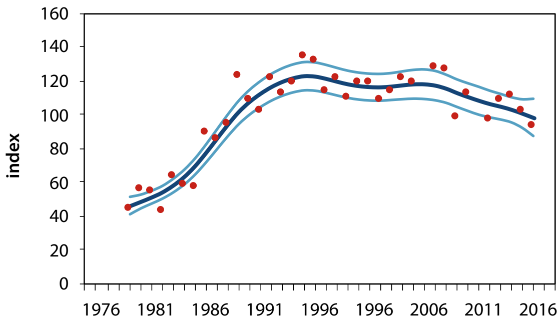

Figure A1.86. Population trend of Grey Plover, population W Siberia/East Atlantic. For explanation see fig. A1.4. *Tendance de la population de Pluviers argenté, population à l'Ouest de la Sibérie / Atlantique Est. Pour l'explication, voir fig. A1.4.*

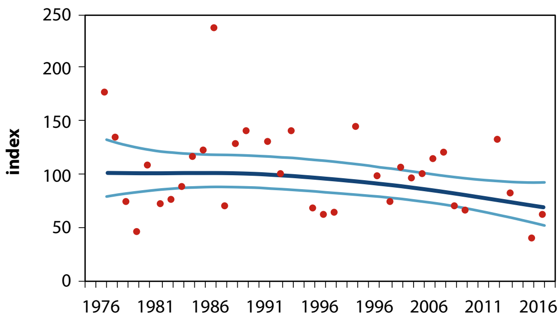

Figure A1.87. Trend of Grey Plover in the Gabon - South Africa part of coastal East Atlantic Flyway. For explanation see fig. A1.4. *Tendance du Pluvier argenté au Gabon - Afrique du Sud, dans la voie de migration de la côte de l'Atlantique Est. Pour l'explication, voir fig. A1.4.*

Common Ringed Plover | Pluvier grand-gravelot | *Charadrius hiaticula*

Populations, distribution and ecology

Three subspecies are recognized within the East Atlantic Flyway, the nominate *C. h. hiaticula* breeding from north-west Europe to northern France, the UK and Ireland, *C. h. psammodroma*, breeding in north-eastern Canada, Greenland and Iceland, and *C. h. tundrae* breeding from northern Fennoscandia east to northern Russia as far as the Bering Straits, and wintering mainly along the west Asian-East African flyway but also reaching the African part of the East Atlantic Flyway. The nominate subspecies is partly sedentary and a short distance migrant and mainly remains in Europe in winter. *Psammodroma* winters along the coast of Western Africa. Breeding occurs mostly in single pairs. Preferred habitat is sand or shingle beaches along the Atlantic coast, sometimes also inland on sand and gravel along big rivers, lakes and reservoirs. Further north it breeds on tundra. Outside the breeding season the species is highly gregarious. It prefers muddy and sandy coasts, e.g. estuaries, tidal mudflats and lagoons. Its diet consists of small invertebrates such as crustaceans and insects, worms and small molluscs.

Arnold Meijer / Blue Robin

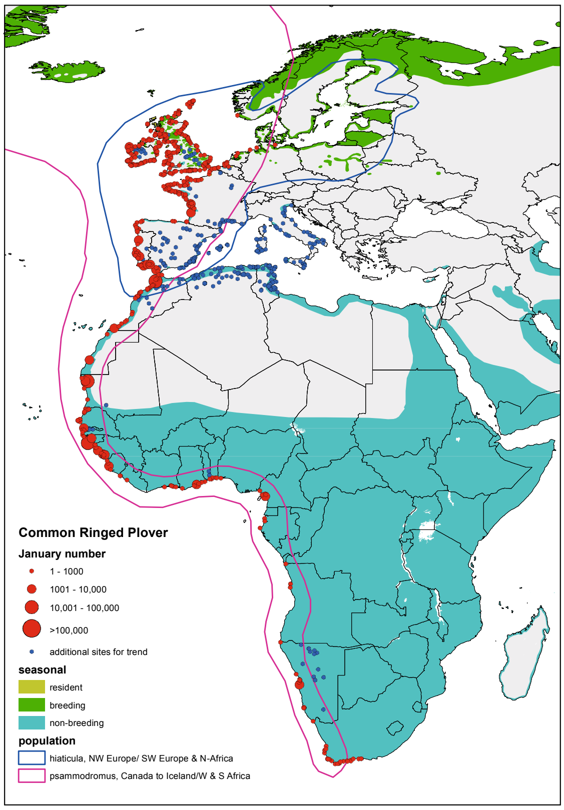

Figure A1.88. Distribution of Common Ringed Plover in the coastal East Atlantic Flyway in January 2014-2017. For explanation see fig. A1.5. *Répartition du Pluvier grand-gravelot dans la voie de migration de la côte del' Atlantique Est en janvier 2014-2017. Pour l'explication, voir fig. A1.5.*

Trend and population size

Population Common Ringed Plover	data	type	period-L	trend-L	assessment-L	period-S	tren-S	assessment-S	period popsize	popsize-min	popsize-max
hiaticula, NW Europe/ SW Europe & N-Africa	w	1a	1990-2016	1,01	stable	2008-2016	1,02	moderate increase	2005-2013	47000	62000
psammodromus, Canada to Iceland/W & S Africa	w	1b	1980-2017	0,99	moderate decline	2006-2017	1,00	stable	2010-2014	240000	240000

Table A1.37. Summary of trend and population size for Common Ringed Plover. For explanation see table A.1.2. *Résumé de la tendance et de la taille de la population de Pluviers grand-gravelot. Pour l'explication, voir le tableau A.1.2.*

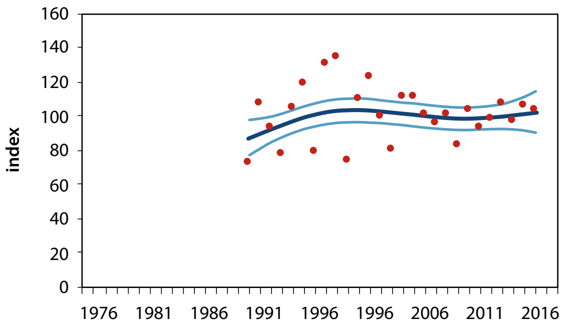

Figure A1.89. Population trend of Common Ringed Plover, population *C. h. hiaticula*. For explanation see fig. A1.4. *Tendance de la population de Pluvier grand-gravelot, population* C. h. hiaticula. *Pour l'explication, voir fig. A1.4.*

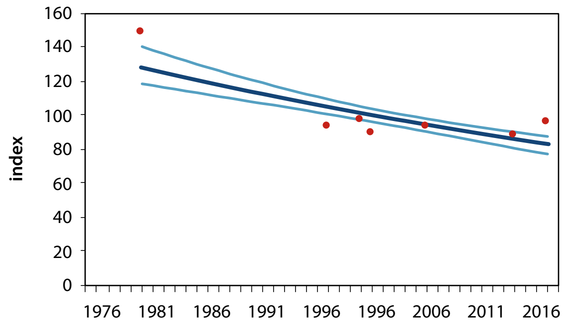

Figure A1.90. Population trend of Common Ringed Plover, population *C. h. psammodroma*. For explanation see fig. A1.4. *Tendance de la population de Pluvier grand-gravelot, population* C. h. psammodrome. *Pour l'explication, voir fig. A1.4.*

Arnold Meijer / Blue Robin

Kittlitz's Plover | Pluvier pâtre | *Charadrius pecuarius*

Populations, distribution and ecology

Within the study area two populations occur: one in West Africa and one in Southern Africa. The species is mostly sedentary, but seasonal movements related to rainfall may occur. During such migrations flocks of up to several hundred individuals may be seen, although the species mostly occurs in smaller flocks. It usually breeds in single pairs, although densities can be high locally. The species primarily inhabits margins of lakes, pools, reservoirs, rivers or floodplains with very short grass or dried mud. Along the coast it prefers dry salt-flats, tidal mudflats and other open habitat types, but avoids rocky coasts. The diet consists of terrestrial and marine invertebrates.

Bas Haasnoot / Agami

Daniele Occhiato / Agami

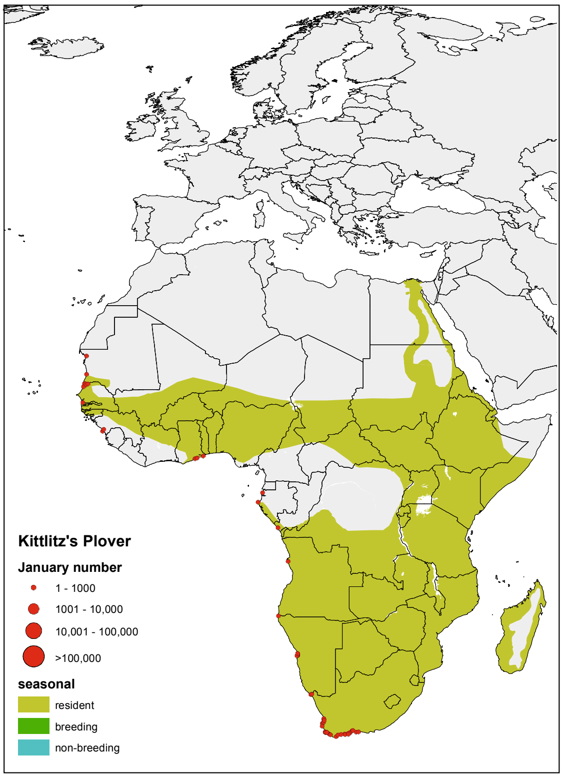

Figure A1.91. Distribution of Kittlitz's Plover in the coastal East Atlantic Flyway in January 2014-2017. *Répartition du Pluvier pâtre sur la voie de migration de la côte de l'Atlantique Est en janvier 2014-2017.*

Trend and population size

Population Kittlitz's Plover	data	type	period-L	trend-L	assessment-L	period-S	tren-S	assessment-S	period popsize	popsize-min	popsize-max
W Africa	w	3	1997-2017	0,95	moderate decline	2009-2017	1,21	strong increase	2001-2001	20000	50000
S Africa	w	3	1994-2017	0,99	stable	2008-2017	1,04	uncertain	2009-2009	120000	250000

Table A1.38. Summary of trend and population size for Kittlitz's Plover. For explanation see table A.1.2. *Résumé de la tendance et de la taille de la population de Pluvier pâtre. Pour l'explication, voir le tableau A.1.2.*

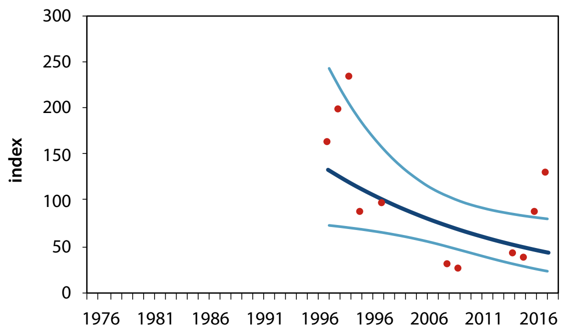

Figure A1.92. Trend of Kittlitz's Plover in West Africa part of the coastal East Atlantic Flyway. For explanation see fig. A1.4. *Tendance du Pluvier pâtre en Afrique de l'Ouest faisant partie de la voie de migration de la côte de l'Atlantique Est. Pour l'explication, voir fig. A1.4.*

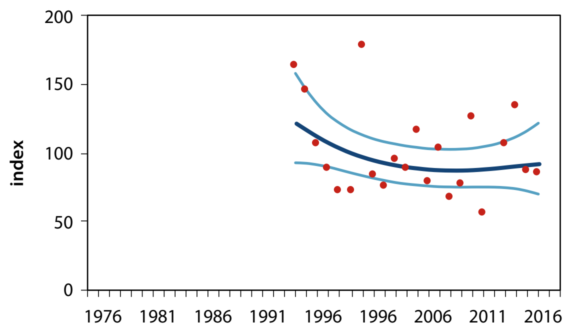

Figure A1.93. Trend of Kittlitz's Plover in Angola - South Africa part of the coastal East Atlantic Flyway. For explanation see fig. A1.4. *Tendance du Pluvier pâtre en Angola - Afrique du Sud, partie de la voie de migration de la côte de l'Est-atlantique. Pour l'explication, voir fig. A1.4.*

White-fronted Plover | Pluvier à front blanc | *Charadrius marginatus*

Populations, distribution and ecology

The White-fronted Plover is an African species occurring in most of sub-Saharan Africa. Along the African East Atlantic coast four populations occur which are here taken together. It is a sedentary and partially migratory species that breeds along the coasts and large rivers. During the breeding season the species is solitary, in the non-breeding periods larger groups can occur up to a few hundred individuals. Its breeding habitat in West Africa consists of sandy beaches and dunes, but it can also be found on a wide variety of other coastal habitats such as estuaries, lagoons and salt-pans. Inland, the species breeds on the sandy shores of large rivers, and it occurs in the same habitats outside the breeding season. Its diet consists of a wide variety of small invertebrate food items like insects, gastropods, molluscs, bivalves, crustaceans, isopods and worms.

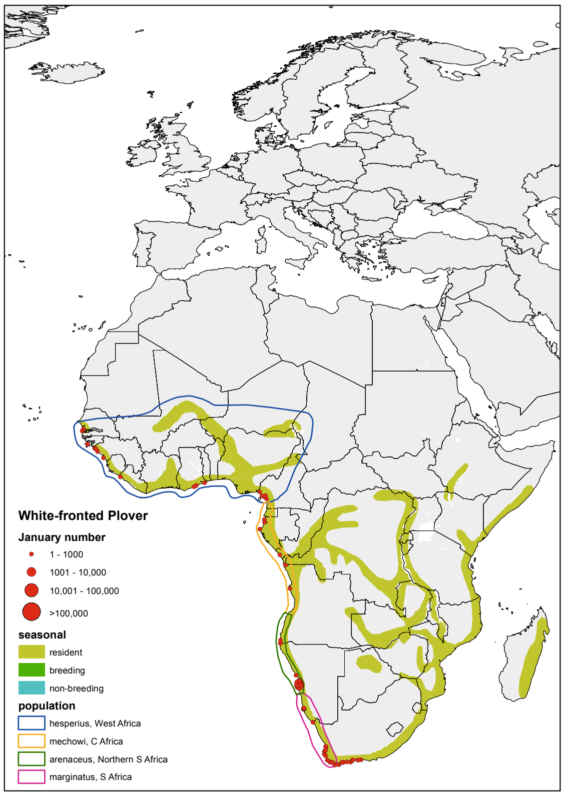

Figure A1.94. Distribution of White-fronted Plover in the coastal East Atlantic Flyway in January 2014-2017. The different populations are taken together for the trend calculation. *Répartition du Pluvier à front blanc dans la voie de migration de la côte de l'Atlantique Est en janvier 2014-2017. Les différentes populations sont prises ensemble pour le calcul de la tendance.*

Trend and population size

Population White-fronted Plover	data	type	period-L	trend-L	assessment-L	period-S	tren-S	assessment-S	period popsize	popsize-min	popsize-max
East Atlantic Africa	w	2	1992-2017	1,01	stable	2009-2017	0,94	uncertain			
hesperius, W Africa									1998-2007	10000	15000
mechowi, C Africa											
arenaceus, NS Africa											
marginatus, S Africa											

Table A1.39. Summary of trend and population size for White-fronted Plover. For explanation see table A.1.2. *Résumé de la tendance et de la taille de la population de Pluvier à front blanc. Pour l'explication, voir le tableau A.1.2.*

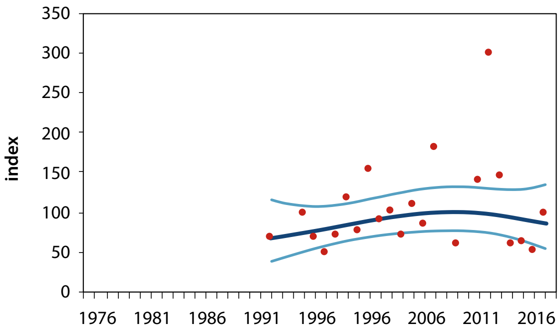

Figure A1.95. Trend of White-fronted Plover, combination of populations of East Atlantic Africa. For explanation see fig. A1.4. *Tendance du Pluvier à front blanc, combinaison de populations de l'Atlantique Est Africain. Pour l'explication, voir fig. A1.4.*

Wil Leurs / Agami

Kentish Plover | Pluvier à collier interrompu | *Charadrius alexandrines*

Populations, distribution and ecology

In the Kentish Plover, two sub-populations of the nominate form are distinguished in Europe: one in western Europe and the western Mediterranean and one in south-eastern Europe and the eastern Mediterranean. The East Atlantic Flyway population range covers breeding areas in Western Europe and the western Mediterranean, and in Africa along the north and west coasts south to Senegal. The range of this population also covers wintering areas of the migratory northern populations in southern Europe, northern Africa, coastal western Africa and the Sahel. The majority of the European East Atlantic Flyway breeding population occurs in France and the Iberian Peninsula.

In the breeding season, the Kentish Plover is mostly a coastal species in this part of its range, breeding in solitary pairs or loose colonies. They mainly forage on sand and silt mudflats and breed on sandy and sparsely vegetated places in e.g. lagoons, dunes, estuaries and salt pans. Outside the breeding season, the species is more gregarious and is usually seen in small flocks. It occurs in the same habitats as during the breeding season and only occasionally uses freshwater habitats. The diet consists mainly of insects, crustaceans (e.g. gammarids), small molluscs and polychaete worms.

Arnold Meijer / Blue Robin

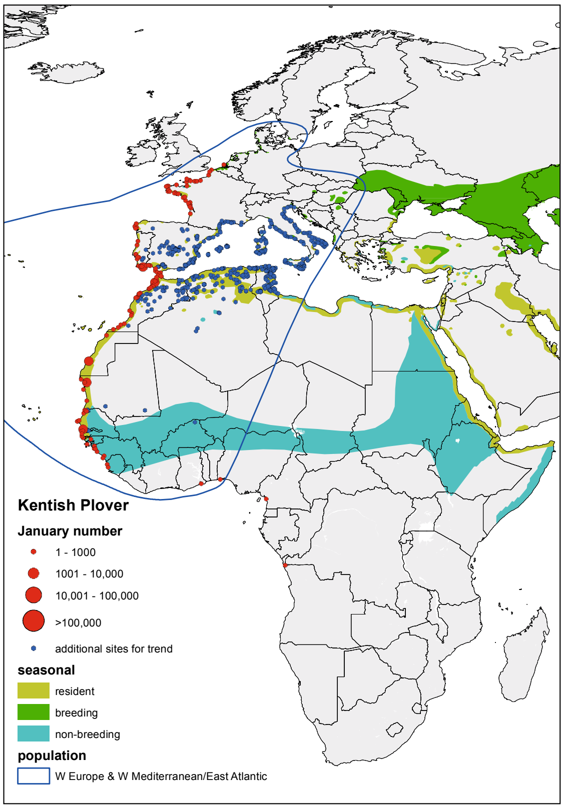

Figure A1.96. Distribution of Kentish Plover in the coastal East Atlantic Flyway in January 2014-2017. For explanation see fig. A1.5. *Répartition du Pluvier à collier interrompu dans la voie de migration de la côte de l'Atlantique Est en janvier 2014-2017. Pour l'explication, voir fig. A1.5.*

Harvey van Diek

Trend and population size

Population Kentish Plover	data	type	period-L	trend-L	assessment-L	period-S	tren-S	assessment-S	period popsize	popsize-min	popsize-max
W Europe & W Mediterranean/East Atlantic	w	1b	1993-2017	0,98	moderate decline	2008-2017	0,98	stable	1997-2013	56000	72000

Table A1.40. Summary of trend and population size for Kentish Plover. For explanation see table A.1.2. *Résumé de la tendance et de la taille de la population de Pluvier à collier interrompu. Pour l'explication, voir le tableau A.1.2.*

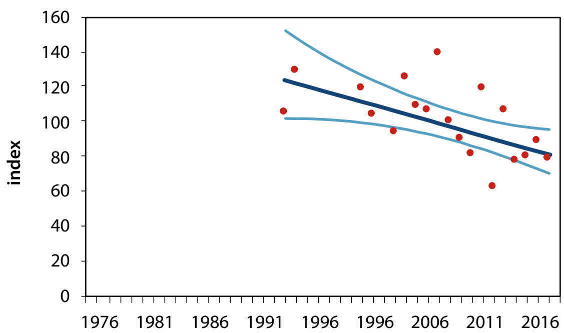

Figure A1.97. Population trend of Kentish Plover, population W Europe & W Mediterranean/East Atlantic. For explanation see fig. A1.4. *Tendance de la population de Pluvier à collier interrompu, population Ouest-européenne et Ouest-méditerranéenne / Atlantique Est. Pour l'explication, voir fig. A1.4.*

Ralph Martin / Agami

Chestnut-banded Plover | Pluvier élégant | *Charadrius pallidus*

Populations, distribution and ecology

The East Atlantic Flyway includes one biogeographical population of Chestnut-banded Plover, representing the nominate subspecies *C. p. pallidus*. It has a patchy distribution and little is known about its movements, but coastal birds in South Africa are probably sedentary, while some of the coastal birds in Namibia probably migrate inland for breeding. The species is typically found in pairs or small groups, but aggregations of several hundred individuals are occasionally observed during the non-breeding season. Breeding takes place in alkaline and saline wetlands, including natural and man-made salt pans. During the non-breeding period the species is usually found in coastal habitats including intertidal mudflats. The diet consists of insect larvae and small crustaceans.

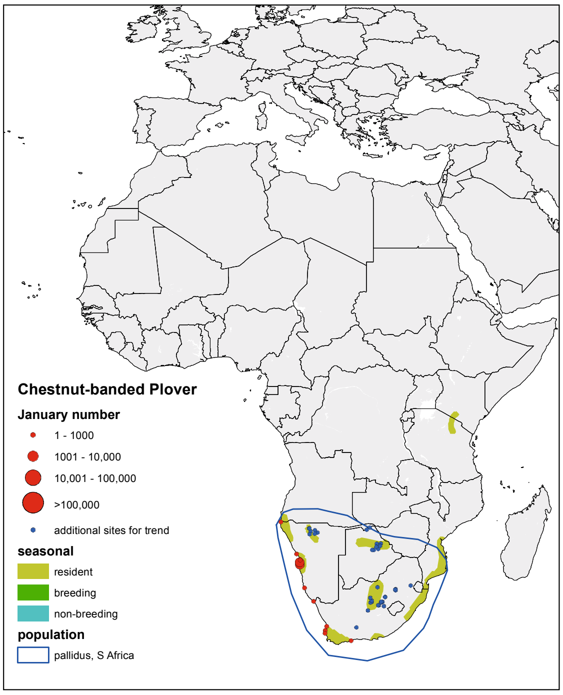

Figure A1.98. Distribution of Chestnut-banded Plover in the coastal East Atlantic Flyway in January 2014-2017. For explanation see fig. A1.5. *Répartition du Pluvier élégant dans la voie de migration de la côte de l'Atlantique Est en janvier 2014-2017. Pour l'explication, voir fig. A1.5.*

Trend and population size

Population Chestnut-banded Plover	data	type	period-L	trend-L	assessment-L	period-S	tren-S	assessment-S	period popsize	popsize-min	popsize-max
pallidus, S Africa	w	1b	1995-2017	1,02	modertate increase	2008-2017	1,02	uncertain	2000-2007	11000	16000

Table A1.41. Summary of trend and population size for Chestnut-banded Plover. For explanation see table A.1.2. *Résumé de la tendance et de la taille de la population de Pluvier élégant. Pour l'explication, voir le tableau A.1.2.*

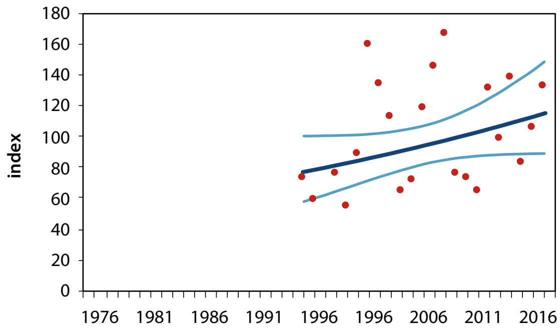

Figure A1.99. Population trend of Chestnut-banded Plover, population *C. p. pallidus*, Southern Africa. For explanation see fig. A1.4. *Tendance de la population de Pluvier élégant, population* C. p. pal*lidus, Afrique australe. Pour l'explication, voir fig. A1.4.*

Pete Morris / Agami

Whimbrel | Courlis corlieu | *Numenius phaeopus*

Populations, distribution and ecology

Two subspecies of the Whimbrel use the East Atlantic Flyway - the nominate *N. p. phaeopus*, breeding in Fennoscandia, the Baltic states and northern Russia and wintering all along the coast of western Africa south to Gabon, and *N. p. islandicus* breeding in Iceland and a small part of Greenland and wintering in the same African region. Large breeding populations occur in Iceland, Finland and (probably) northern Russia. The species breeds in solitary pairs on wet and dry heathlands and wetlands, moors and bogs in Boreal and Arctic regions. Sometimes breeding in open forested areas occurs. During migration and wintering the species prefers sandy and rocky coasts, tidal mudflats and mangroves. During migration it congregates in flocks and besides the mentioned habitats also uses heathland and short grasslands more inland. Important food items during breeding are invertebrates e.g. insects and worms. In coastal habitats during the non-breeding season, the species specialises in feeding on crustaceans such as crabs, but foraging on berries (*Empetrum* sp.) is also not uncommon.

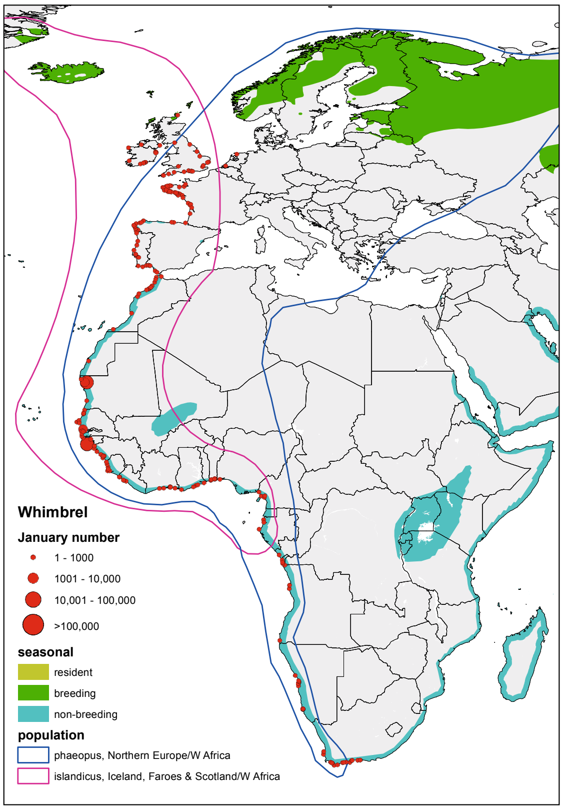

Figure A1.100. Distribution of Whimbrel in the coastal East Atlantic Flyway in January 2014-2017. The different populations are taken together for trend calculation. *Répartition de Courlis corlieu sur la voie de migration de la côte de l'Est-atlantique en janvier 2014-2017. Les différentes populations sont prises ensemble pour le calcul de la tendance.*

Peter de Boer

Trend and population size

Population Whimbrel	data	type	period-L	trend-L	assessment-L	period-S	tren-S	assessment-S	period popsize	popsize-min	popsize-max
islandicus & phaeopus, East Atlantic	w	2	1979-2016	1,01	moderate increase	2001-2016	1,03	moderate increase			
islandicus, Iceland, Faroes & Scotland/W Africa									2000-2014	600000	750000
phaeopus, Northern Europe/W Africa									1995-2013	273000	450000

Table A1.42. Summary of trend and population size for Whimbrel. For explanation see table A.1.2. *Résumé de la tendance et de la taille de la population de Courlis corlieu. Pour l'explication, voir le tableau A.1.2.*

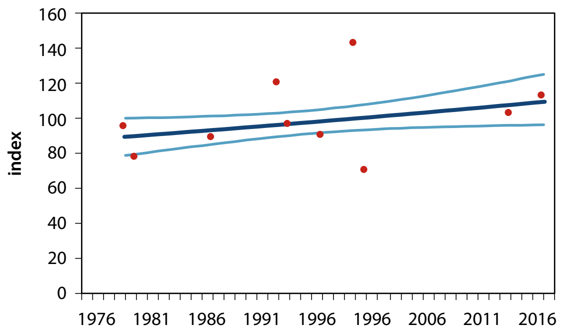

Figure A1.101. Trend of Whimbrel, combination of population *N. p. phaeopus* Northern Europe/W Africa & *N. p. islandica*. For explanation see fig. A1.4. *Tendance de Courlis corlieu, combinaison de la population* N. p. phaeopus *Europe du Nord / Afrique de l'Ouest et* N. p. Islandica*. Pour l'explication, voir fig. A1.4.*

Eurasian Curlew | Courlis cendré | *Numenius arquata*

Populations, distribution and ecology

Eurasian Curlews breed in large parts of Europe. The East Atlantic Flyway breeding population encompasses the total European breeding population of the nominate form. Wintering occurs in western and southern Europe, and partly also on the coast of West Africa south to Guinea-Bissau. Further to the south in East Atlantic Africa the subspecies *N. a. orientalis* winters. Large breeding populations occur in Finland, the UK, Sweden and Russia. The species breeds solitarily on heathland, upland moors, peat bogs, coastal marshlands but also farmland areas (both grasslands and arable fields). During migration and in the winter quarters, it occurs in more coastal habitats such as estuaries, tidal mudflats, mangroves and saltmarshes, but also in agricultural grasslands. The breeding season diet consists of a variety of invertebrate food items like annelid worms and insects and their larvae. On the coast during the winter the species takes polychaete worms, crustaceans (e.g. crabs), and bivalves.

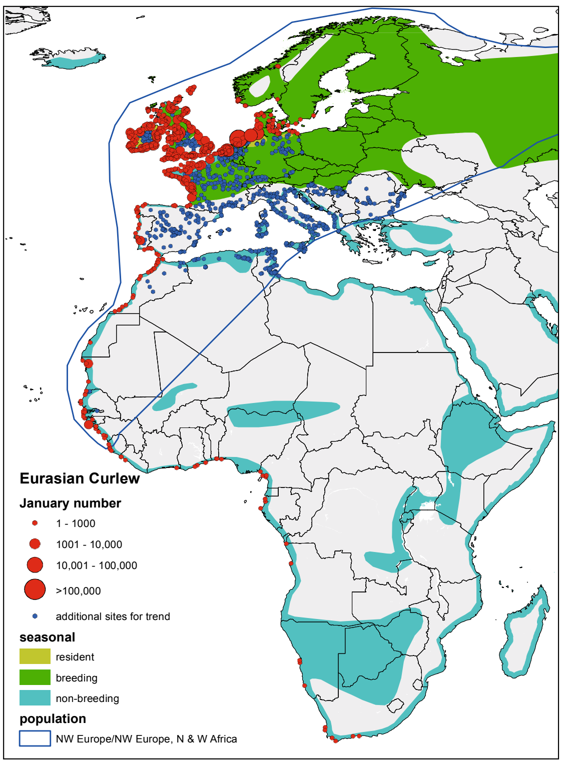

Figure A1.102. Distribution of Eurasian Curlew in the coastal East Atlantic Flyway in January 2014-2017. For explanation see fig. A1.5. *Répartition du Courlis cendré dans la voie de migration de la côte de l'Atlantique Est en janvier 2014-2017. Pour l'explication, voir fig. A1.5.*

Trend and population size

Population Eurasian Curlew	data	type	period-L	trend-L	assessment-L	period-S	tren-S	assessment-S	period popsize	popsize-min	popsize-max
NW Europe/NW Europe, N & W Africa	b	1a	1980-2012	0,99	moderate decline	2002-2012	0,98	moderate decline	1990-2012	637000	876000

Table A1.43. Summary of trend and population size for Eurasian Curlew. For explanation see table A.1.2. *Résumé de la tendance et de la taille de la population de Courlis cendré. Pour l'explication, voir le tableau A.1.2.*

Arie Ouwerkerk / Agami

Bar-tailed Godwit | Barge rousse | *Limosa lapponica*

Populations, distribution and ecology

Two subspecies of the Bar-tailed Godwit use the East Atlantic Flyway, showing a classic leapfrog migration pattern, with breeders from the Siberian high Arctic (*L. l. taymyrensis*) migrating further south than the population breeding in Fennoscandinavia. The nominate *L. l. lapponica* breeds in northern Fennoscandia east to the Kanin Peninsula and migrates and winters in western Europe, with smaller number south to Portugal and Spain. The highest breeding numbers are recorded in Norway and Russia. The *taymyrensis* subspecies migrates through western Europe (mainly the Wadden Sea) to winter in western and southern Africa. Breeding habitats are swampy tundra, heathlands, and open bogs in the far north. The species nests dispersed. During migration and wintering it is highly gregarious and occurs in huge flocks of up to tens of thousands of individuals. Preferred foraging habitats are intertidal mudflats, lagoons and estuaries. Foraging can however also occur on short-grass meadows. The diet of the Bar-tailed Godwit consists mainly of worms.

Han Bouwmeester / Agami

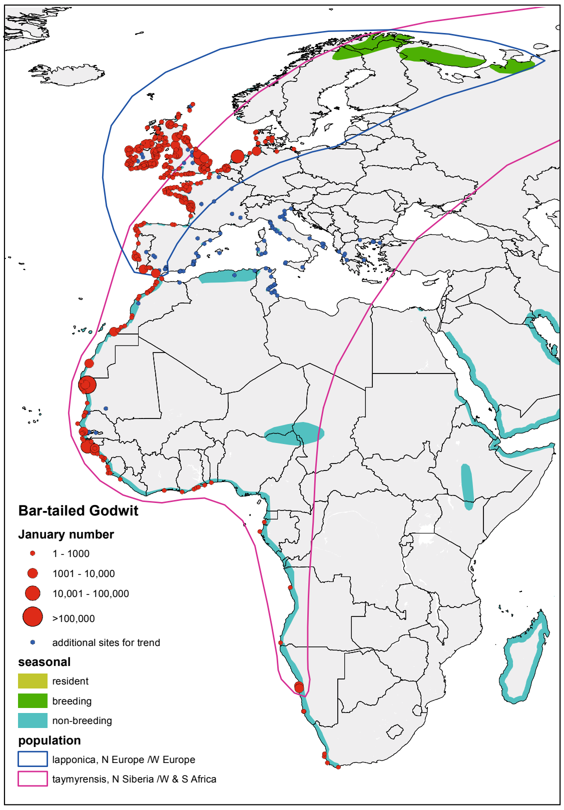

Figure A1.103. Distribution of Bar-tailed Godwit in the coastal East Atlantic Flyway in January 2014-2017. For explanation see fig. A1.5. *Répartition de la Barge rousse dans la voie de migration de la côte de l'Atlantique-Est en janvier 2014-2017. Pour l'explication, voir fig. A1.5.*

Harvey van Diek

Trend and population size

Population Bar-tailed Godwit	data	type	period-L	trend-L	assessment-L	period-S	tren-S	assessment-S	period popsize	popsize-min	popsize-max
lapponica, N Europe /W Europe	w	1a	1976-2016	1,01	moderate increase	2008-2016	1,02	moderate increase	2012-2015	150000	150000
taymyrensis, N Siberia /W & S Africa	w	1b	1979-2017	0,98	moderate decline	2001-2017	0,97	moderate decline	2010-2014	500000	500000

Table A1.44. Summary of trend and population size for Bar-tailed Godwit. For explanation see table A.1.2. *Résumé de la tendance et de la taille de la population de la Barge rousse. Pour l'explication, voir le tableau A.1.2.*

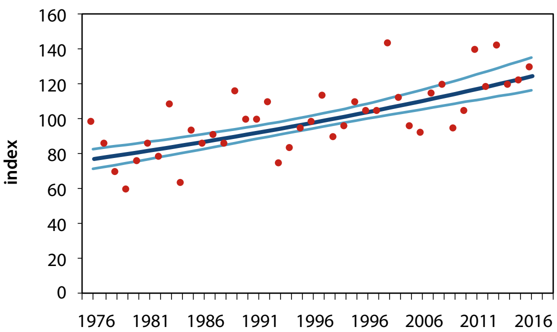

Figure A1.104. Population trend of Bar-tailed Godwit, population *L. l. lapponica*. For explanation see fig. A1.4. *Tendance de la population de Barge rousse, population* L. l. lapponica. *Pour l'explication, voir fig. A1.4.*

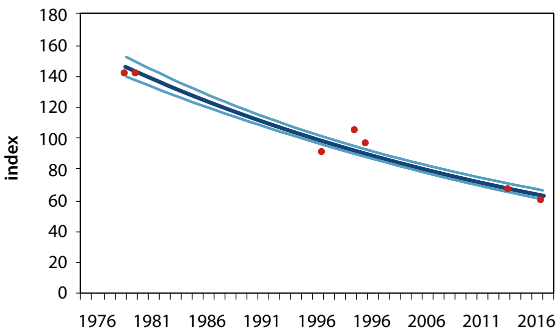

Figure A1.105. Population trend of Bar-tailed Godwit, population *L. l. taymyrensis*, W & S Africa. For explanation see fig. A1.4. *Tendance de la population de Barge rousse, population* L. l. taymyrensis, *O & S Africa. Pour l'explication, voir fig. A1.4.*

Ruddy Turnstone | Tournepierre à collier | *Arenaria interpres*

Populations, distribution and ecology

The Ruddy Turnstone is a high arctic breeding species with a cosmopolitan range. In the East Atlantic Flyway, two sub-populations of the nominate subspecies occur: a Nearctic population breeding in Northeast Canada and Greenland that winters mainly in western Europe, and a Palearctic population breeding in northern Scandinavia and west Russia, including Svalbard, that winters in Western Africa. The species breeds dispersed in tundra and coastal habitats in the high Arctic. During migration and in the winter quarters it is mainly coastal and frequents rocky or shingle shores, also sandy beaches with seaweed, reefs and mudflats. It is mainly insectivorous during the breeding season. Outside the breeding season it mainly feeds on crustaceans, molluscs, annelids, echinoderms and fish, and even takes carrion.

Arnold Meijer / Blue Robin

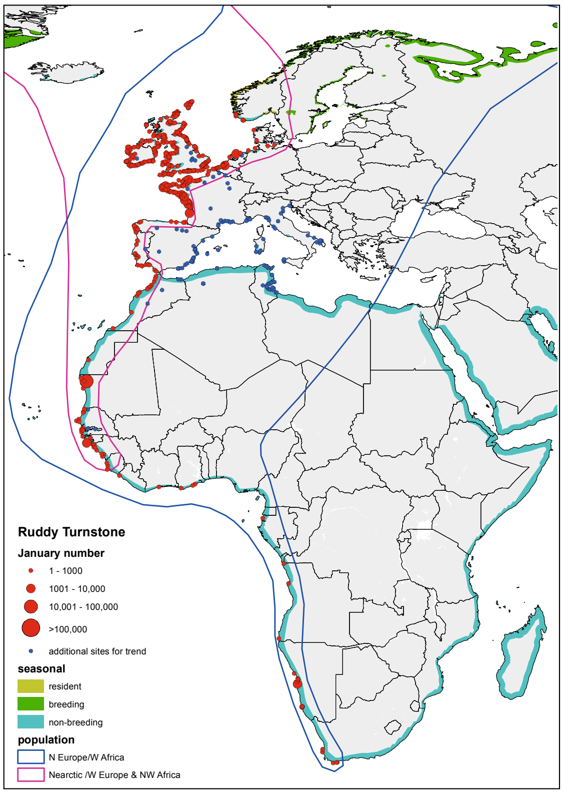

Figure A1.106. Distribution of Ruddy Turnstone in the coastal East Atlantic Flyway in January 2014-2017. For explanation see fig. A1.5. *Répartition de Tournepierre à collier dans la voie de migration de la côte de l'Atlantique Est en janvier 2014-2017. Pour l'explication, voir fig. A1.5.*

Trend and population size

Population Ruddy Turnstone	data	type	period-L	trend-L	assessment-L	period-S	tren-S	assessment-S	period popsize	popsize-min	popsize-max
Nearctic /W Europe & NW Africa	w	1b	1977-2016	1,01	moderate increase	2008-2016	0,99	stable	1990-2000	100000	200000
N Europe/W Africa	w	1b	1979-2017	0,97	moderate decline	2006-2017	0,98	stable	1996-2013	48000	111000

Table A1.45. Summary of trend and population size for Ruddy Turnstone. For explanation see table A.1.2. *Résumé de la tendance et de la taille de la population de Tournepierre à collier. Pour l'explication, voir le tableau A.1.2.*

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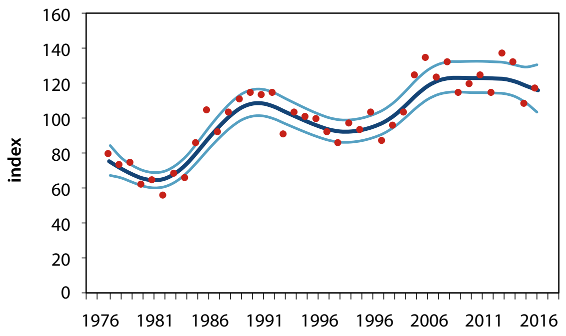


Figure A1.107. Population trend of Ruddy Turnstone, population Nearctic/W Europe & NW Africa. For explanation see fig. A1.4. *Tendance de la population de Tournepierre à collier, population néarctique / Nord-européenne et Nord-Ouest de l'Afrique. Pour l'explication, voir fig. A1.4.*

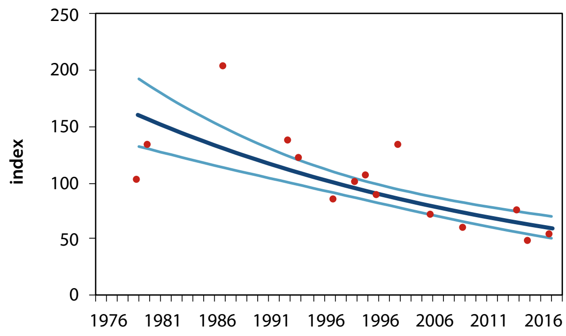


Figure A1.108. Population trend of Ruddy Turnstone, population N Europe/W Africa. For explanation see fig. A1.4. *Tendance de la population de Tournepierre à collier, population N Europe / Afrique de l'Ouest. Pour l'explication, voir fig. A1.4.*

Red Knot | Bécasseau maubèche | *Calidris canutus*

Populations, distribution and ecology

Two subspecies of the Red Knot use the East Atlantic Flyway. The Palearctic nominate *C. c. canutus*, breeds in the Arctic zones of northern Russia (Taymyr Peninsula) and migrates through Europe to the coast of West Africa, and the Nearctic breeding population of Greenland and eastern Canada *C. c. islandica* winters in Western Europe. There is no breeding population in Europe. Breeding occurs dispersed on high Arctic tundra vegetation, mostly in dry upland tundra and gravel. Migration and wintering occurs in large flocks in coastal areas, with a preference for tidal mud- or sand-flats. Insects are the main food items during the breeding season, but early in the season leftover berries, seeds and grass shoots are also eaten. The non-breeding diet is specialised towards small to medium-sized bivalves which are ingested whole and crushed in the muscular gizzard, but knots also take small gastropods and shrimps when available.

Arnold Meijer / Blue Robin

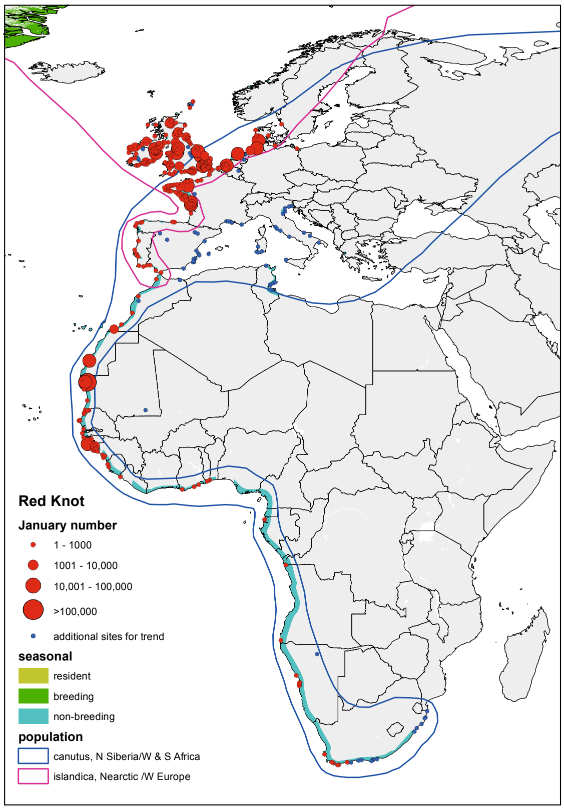


Figure A1.109. Distribution of Red Knot in the coastal East Atlantic Flyway in January 2014-2017. For explanation see fig. A1.5. *Figure A1.109. Répartition du Bécasseau maubèche dans la voie de migration de la côte de l'Est-atlantique en janvier 2014-2017. Pour l'explication, voir fig. A1*

Trend and population size

Population Red Knot	data	type	period-L	trend-L	assessment-L	period-S	tren-S	assessment-S	period popsize	popsize-min	popsize-max
islandica, Nearctic /W Europe	w	1a	1976-2016	1,01	moderate increase	2008-2016	1,00	stable	2000-2012	500000	565000
canutus, NSiberia/W & S Africa	w	1b	1979-2017	0,99	moderate decline	2006-2017	0,94	moderate decline	2010-2014	250000	250000

Table A1.46. Summary of trend and population size for Red Knot. For explanation see table A.1.2. *Résumé de la tendance et de la taille de la population de Bécasseau maubèche. Pour l'explication, voir le tableau A.1.2.*

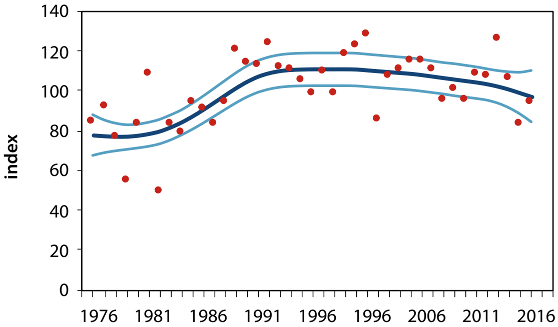


Figure A1.110. Population trend of Red Knot, population *C. c. islandica*. For explanation see fig. A1.4. *Tendance de la population de Bécasseau maubèche, population* C. c. Islandica. *Pour l'explication, voir fig. A1.4.*

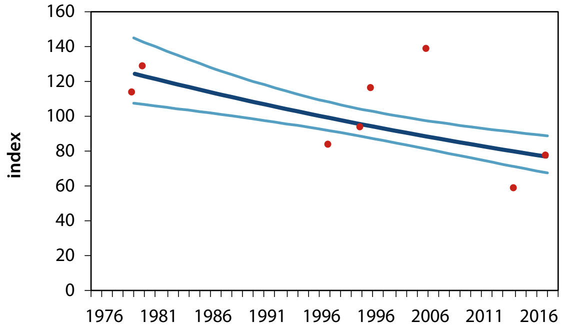


Figure A1.111. Population trend of Red Knot, population *C. c. canutus*. For explanation see fig. A1.4. *Tendance de la population de Bécasseau maubèche, population* C. c. canutus. *Pour l'explication, voir fig. A1.4.*

Arie Ouwerkerk / Agami

Curlew Sandpiper | Bécasseau cocorli | *Calidris ferruginea*

Populations, distribution and ecology

The East Atlantic Flyway population of Curlew Sandpiper breeds in northern Russia (Yamal Peninsula and further east). Part of this population uses the east Mediterranean and Black Sea route to Africa and the other part migrates through western and eastern Europe to western sub-Saharan Africa. Breeding occurs dispersed on lowlands of the high Arctic, with a preference for open tundra with wet marshy areas. In winter, the species is mainly coastal and occurs on brackish lagoons, tidal mud- and sand-flats, estuaries and saltmarshes. Inland habitats such as muddy edges of freshwater wetlands are also used. The species is mainly insectivorous during the breeding season and forages on polychaete worms, molluscs and crustaceans on passage and winter in more saline habitats.

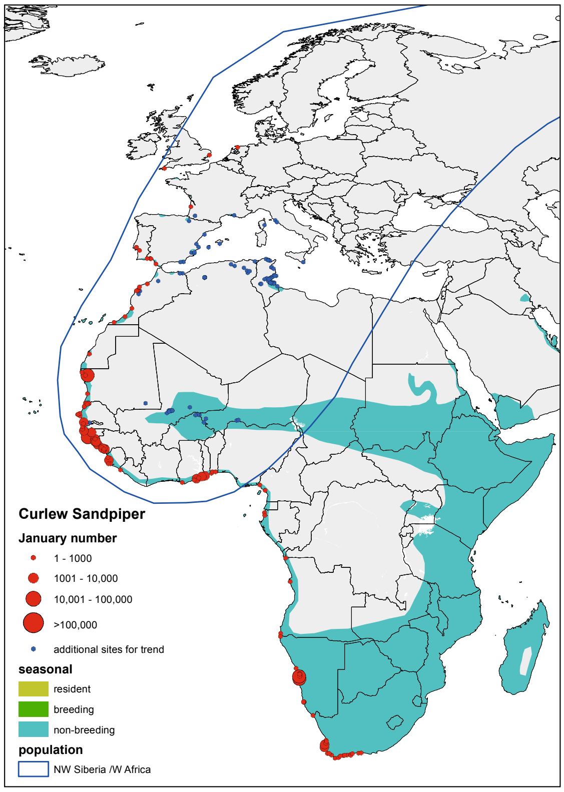


Figure A1.112. Distribution of Curlew Sandpiper in the coastal East Atlantic Flyway in January 2014-2017. For explanation see fig. A1.5. *Répartition du Bécasseau cocorli dans la voie de migration de la côte de l'Atlantique Est en janvier 2014-2017. Pour l'explication, voir fig. A1.5.*

Trend and population size

Population Curlew Sandpiper	data	type	period-L	trend-L	assessment-L	period-S	tren-S	assessment-S	period popsize	popsize-min	popsize-max
NW Siberia /W Africa	w	1b	1979-2017	0,98	moderate decline	2001-2017	0,89	steep decline	2010-2014	350000	450000
NE Siberia/SW Asia - S Africa	w	3	1977-2017	1,01	stable	2008-2017	0,98	uncertain	2003-2012	400000	400000

Table A1.47. Summary of trend and population size for Curlew Sandpiper. For explanation see table A.1.2. *Résumé de la tendance et de la taille de la population du Bécasseau cocorli. Pour l'explication, voir le tableau A.1.2.*

Arnold Meijer / Blue Robin

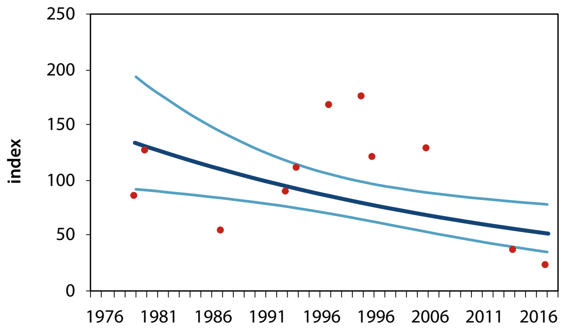


Figure A1.113. Population trend of Curlew Sandpiper, population NW Siberia/W Africa. For explanation see fig. A1.4. *Tendance de la population du Bécasseau cocorli, population du Nord-Ouest de la Sibérie / Afrique de l'Ouest. Pour l'explication, voir fig. A 1.4.*

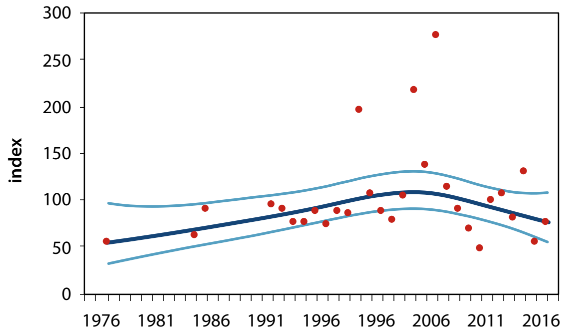


Figure A1.114. Trend of Curlew Sandpiper in the Cameroon - South Africa part of the coastal East Atlantic Flyway. For explanation see fig. A1.4. *Tendance du Bécasseau cocorli dans la partie, Cameroun - Afrique du Sud, de la voie de migration de la côte de l'Atlantique Est. Pour l'explication, voir fig. A1.4.*

Sanderling | Bécasseau sanderling | *Calidris alba*

Populations, distribution and ecology

Two populations of the Sanderling occurs in the East Atlantic Flyway (East Atlantic population and West Asia - Southern Africa population). Breeding of the East Atlantic population occurs in the high Arctic tundra of Greenland and northeast Canada. Whether a part of the breeding birds from the Taymyr peninsula, Siberia also belong to this flyway is debated (Reneerkens *et al.* 2009). Birds of the West Asia - Southern Africa population reach the coastal East Atlantic from Cameroon southwards for wintering, but probably become numerous only in South Africa. The species is strictly coastal and uses specific stopover sites. It breeds dispersed in well-drained barren or stony tundra. The breeding diet consists mainly of insects and spiders, and plant material when insects are too scarce in spring. On passage and in winter, its diet consists of polychaete worms , small molluscs and crustaceans.

Arnold Meijer / Blue Robin

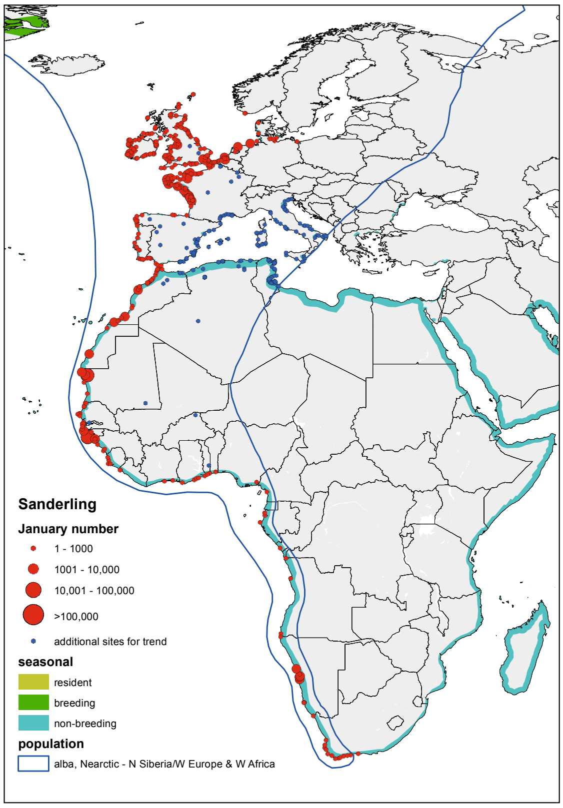


Figure A1.115. Distribution of Sanderling in the coastal East Atlantic Flyway in January 2014-2017. For explanation see fig. A1.5. *Répartition du Bécasseau Sanderling sur la voie de migration de la côte de l'Est-atlantique en janvier 2014-2017. Pour l'explication, voir fig. A1.5.*

Arie Ouwerkerk / Agami

Trend and population size

Population Sanderling	data	type	period-L	trend-L	assessment-L	period-S	tren-S	assessment-S	period popsize	popsize-min	popsize-max
alba, Nearctic - N Siberia/W Europe & W Africa	w	1b	1979-2016	1,02	moderate increase	2008-2016	1,03	moderate increase	2010-2012	200000	200000

Table A1.48. Summary of trend and population size for Sanderling. For explanation see table A.1.2. *Résumé de la tendance et de la taille de la population du Bécasseau sanderling. Pour l'explication, voir le tableau A.1.2.*

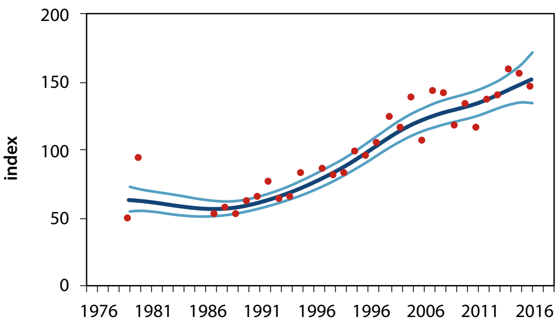


Figure A1.116. Population trend of Sanderling, population Nearctic - N Siberia/W Europe & Western Africa. For explanation see fig. A1.4. *Tendance de la population du Bécasseau sanderling, population néarctique - N Sibérie / Europe occidentale et Afrique de l'Ouest. Pour l'explication, voir fig. A1.4.*

Menno van Duijn / Agami

Dunlin | Bécasseau variable | *Calidris alpine*

Populations, distribution and ecology

The Dunlin has a complicated flyway population/subspecies structure. Five populations can be distinguished that use (part of) the East Atlantic Flyway. (1) Nominate *C. a. alpina*: one sub-population that breeds in northern Scandinavia, northern Russia east to Taymyr and winters mainly in Western Europe, (2) *C.a. arctica*: a relatively small population breeding in northeastern Greenland and wintering in West Africa. (3) *C.a. schinzii*: three sub-populations, one breeding in Iceland and wintering in West Africa, one breeding in Britain and Ireland and wintering in Northwest Africa and Southwest Europe, and one breeding in the Baltic region and wintering in (south)western Europe. Large breeding populations occur in Iceland, Scandinavia and Russia. Birds counted in winter in West Africa probably belong mainly to the Icelandic *schinzii* population, while those in Western Europe and Morocco mainly are *C.a. alpina*. Dunlins breed dispersed (though locally in high densities) but aggregate in huge flocks during migration and in winter. A variety of migration strategies are apparent, from short-distance coastal migration to broad-front long distance migration. Breeding habitats vary according to latitude, but it seems to prefer moist ground near open water, ranging from tussock or peat tundra in the Arctic to wet coastal grasslands and wet upland moorland further south. In the non-breeding season the species mainly prefers estuarine mudflats, although it also occurs in a wide variety of freshwater and brackish wetlands (mainly on migration). It feeds on insects, spiders, mites, earthworms, snails, slugs and seeds in the breeding season and mainly on worms, small gastropods, crustaceans and bivalves in the non-breeding season.

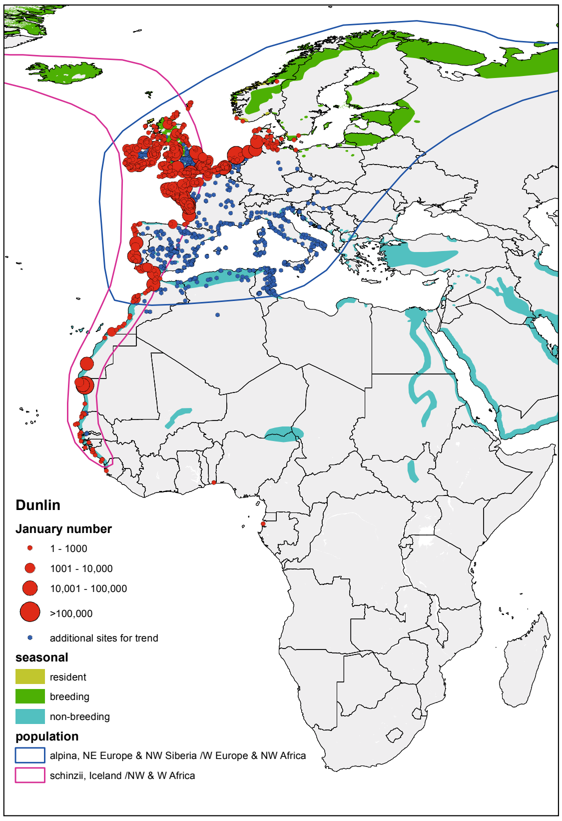


Figure A1.117. Distribution of Dunlin in the coastal East Atlantic Flyway in January 2014-2017. For explanation see fig. A1.5. *Répartition du Bécasseau variable dans la voie de migration de la côte de l'Est-atlantique en janvier 2014-2017. Pour l'explication, voir fig. A1.5.*

Arnold Meijer / Blue Robin

Arie Ouwerkerk / Agami

Trend and population size

Population Dunlin	data	type	period-L	trend-L	assessment-L	period-S	tren-S	assessment-S	period popsize	popsize-min	popsize-max
alpina, NE Europe & NW Siberia /W Europe & NW Africa	w	1a	1976-2016	0,99	moderate decline	2008-2016	0,99	stable	2000-2012	1330000	1330000
schinzii, Iceland /NW & W Africa	w	1b	1979-2017	1,00	stable	2006-2017	0,98	stable	2010-2014	730000	830000

Table A1.49. Summary of trend and population size for Dunlin. For explanation see table A.1.2. *Résumé de la tendance et de la taille de la population du Bécasseau variable. Pour l'explication, voir le tableau A.1.2.*

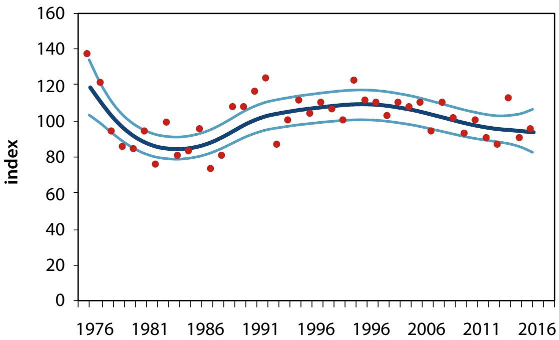


Figure A1.118. Population trend of Dunlin, population *C. a. alpina*. For explanation see fig. A1.4. *Figure A1.118. Tendance de la population du Bécasseau variable, population* C. a. alpina*. Pour l'explication, voir fig. A1.4.*

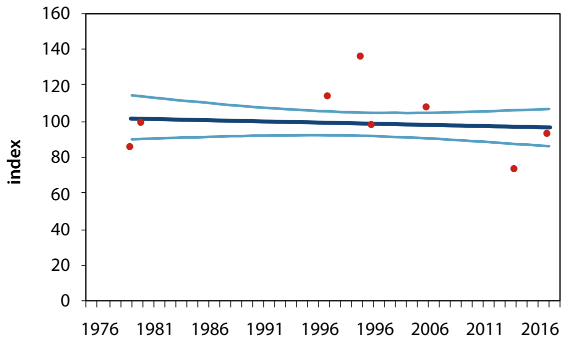


Figure A1.119. Population trend of Dunlin, population *C. a. schinzii*, Iceland/W Africa. For explanation see fig. A1.4. *Tendance de la population de Bécasseau variable, population* C. a. schinzii*, Islande / Afrique de l'Ouest. Pour l'explication, voir fig. A1.4.*

Markus Varesvuo / Agami

Harvey van Diek

Purple Sandpiper | Bécasseau violet | *Calidris maritima*

Populations, distribution and ecology

The East Atlantic coast is used predominantly for wintering by two flyway populations of the Purple Sandpiper: one population breeding in northeastern Canada and Greenland, the other breeding in northern Scandinavia and the Russian Arctic. Both populations winter along the North Sea, Irish Sea and Atlantic coasts of Britain, Ireland, France, Spain and Portugal. Birds from the Eurasian population also winter along the Norwegian coast as far north as the Arctic Circle. Breeding occurs mainly in the Arctic along the coast and in upland areas close to the fringes of snow and ice on wet moss or barren tundra, rocky islands or shingle beaches. During the non-breeding season the species gathers in small flocks along the coast with a preference for rocky shores with strong wave action, and artificial structures such as sea defences and breakwaters.

Arnold Meijer / Blue Robin

The diet in the breeding season consists mostly of insects and springtails *Collembola*, but also includes other invertebrates and some plant material. During the non-breeding season the species feeds mainly on molluscs, small crustaceans, insects, worms, small fish and algae.

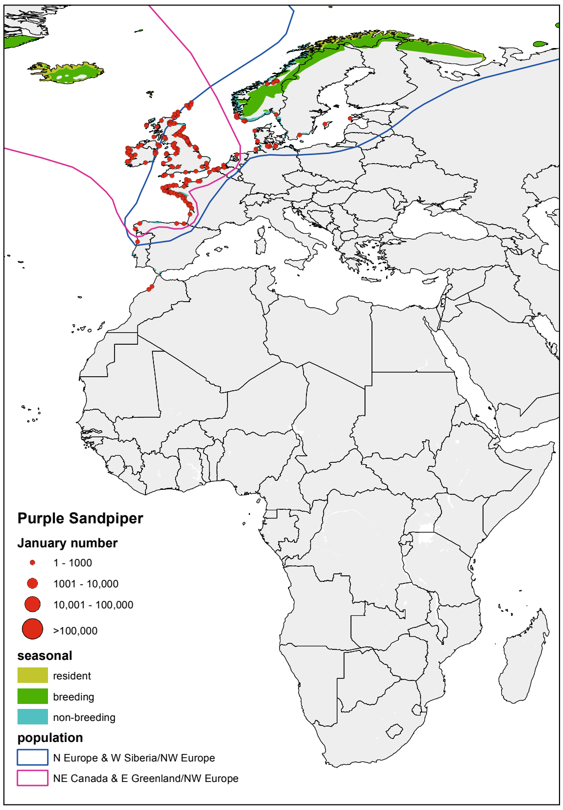


Figure A1.120. Distribution of Purple Sandpiper in the coastal East Atlantic Flyway in January 2014-2017. The populations are taken together for trend calculation. *Répartition du Bécasseau violet dans la voie de migration de la côte de l'Atlantique Est en janvier 2014-2017. Les populations sont prises ensemble pour le calcul de la tendance.*

Trend and population size

Population Purple Sandpiper	data	type	period-L	trend-L	assessment-L	period-S	tren-S	assessment-S	period popsize	popsize-min	popsize-max
NE Canada - W Siberia/East Atlantic	w	2	1995-2016	0,97	moderate decline	2008-2016	0,96	moderate decline			
N Europe & W Siberia/NW Europe									2000-2012	50000	100000
NE Canada & E Greenland/NW Europe											

Table A1.50. Summary of trend and population size for Purple Sandpiper. For explanation see table A.1.2. *Résumé de la tendance et de la taille de la population du Bécasseau violet. Pour l'explication, voir le tableau A.1.2.*

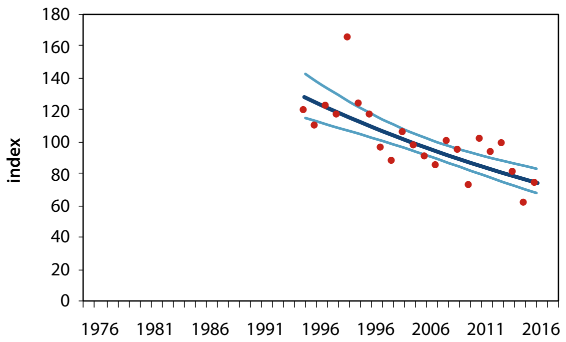


Figure A1.121. Trend of Purple Sandpiper, populations N Europe & W Siberia/NW Europe and NE Canada & E Greenland/NW Europe. For explanation see fig. A1.4. *Tendance du Bécasseau violet, populations du Nord de l'Europe et de l'Ouest de la Sibérie / Nord-Ouest de l'Europe et du Nord-Est du Canada et de l'Est du Groenland / Nord-Ouest de l'Europe. Pour l'explication, voir fig. A1.4.*

Arnold Meijer / Blue Robin

Little Stint | Bécasseau minute | *Calidris minuta*

Populations, distribution and ecology

Two populations are distinguished for the Little Stint along the East Atlantic Flyway. Birds of the North Europe - West Africa population breed in northern Fennoscandia and parts of Russia, the exact borders with the more easterly occurring population (North Siberia - Southern Africa) being unclear. The North Europe - West Africa population migrates on a broad front through Europe and winters in western and central Africa. The North Siberia - Southern Africa populations reaches the East Atlantic Coast in Southern Africa. The highest breeding numbers of this population occur in Russia. The species breeds dispersed though often in high densities on tundra vegetation at low altitudes. It prefers open tundra with dwarf willows or crowberries *Empetrum*. Outside the breeding season it is found in a wide range of freshwater wetlands and on coastal mudflats and seashores. In its African winter range both coastal and inland wetlands are used. The diet in the breeding areas consists primarily of insects. A much wider group of invertebrates, depending on the habitat, is taken outside the breeding season including crustaceans and small molluscs.

Markus Varesvuo / Agami

Markus Varesvuo / Agami

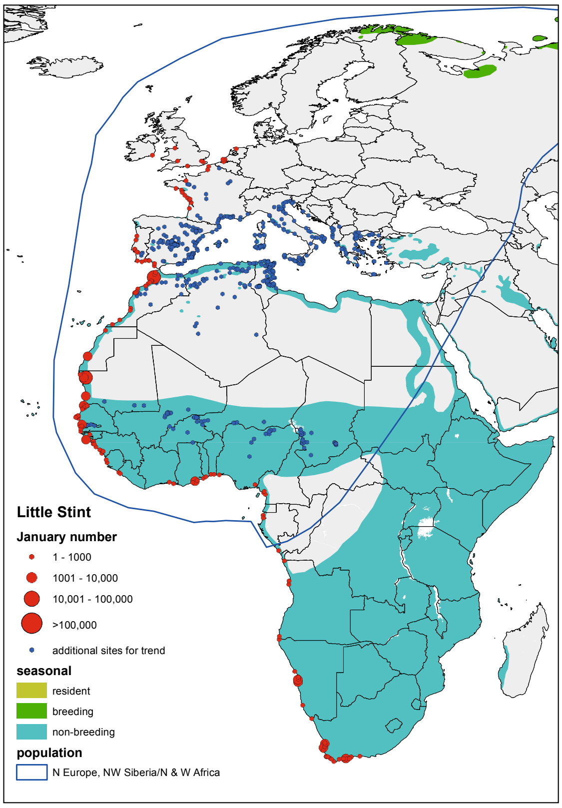


Figure A1.122. Distribution of Little Stint in the coastal East Atlantic Flyway in January 2014-2017. For explanation see fig. A1.5. *Répartition du Bécasseau minute dans la voie de migration de la côte de l'Est-atlantique en janvier 2014-2017. Pour l'explication, voir fig. A1.5.*

Daniele Occhiato / Agami

Trend and population size

Population Little Stint	data	type	period-L	trend-L	assessment-L	period-S	tren-S	assessment-S	period popsize	popsize-min	popsize-max
N Europe, NW Siberia/N & W Africa	w	1b	1980-2017	0,97	moderate decline	2008-2017	0,89	steep decline	2010-2014	300000	300000
NE Siberia/SW Asia - S Africa	w	3	1992-2017	0,96	moderate decline	2008-2017	1,03	uncertain	2000-2014	1000000	5000000

Table A1.51. Summary of trend and population size for Little Stint. For explanation see table A.1.2. *Résumé de la tendance et de la taille de la population du Bécasseau minute. Pour l'explication, voir le tableau A.1.2.*

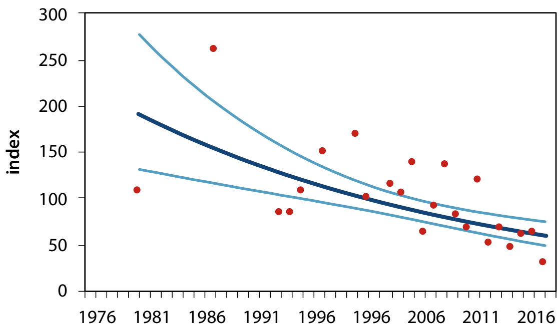


Figure A1.123. Population trend of Little Stint, population N Europe, NW Siberia/N & W Africa. For explanation see fig. A1.4. *Tendance de la population de Bécasseau minute, population du Nord de l'Europe, Nord-Ouest de la Sibérie / Nord et Ouest de l'Afrique. Pour l'explication, voir fig. A1.4.*

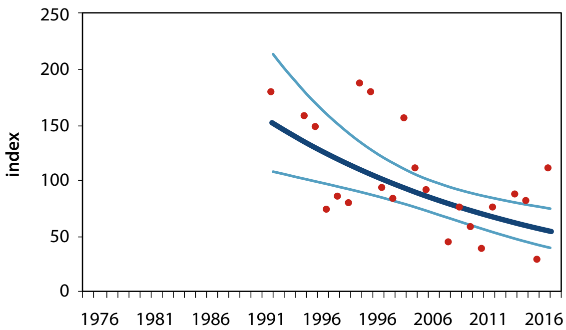


Figure A1.124. Trend of Little Stint in the Angola - South Africa part of the coastal East Atlantic Flyway. For explanation see fig. A1.4. *Tendance du Bécasseau minute dans la partie Angola - Afrique du Sud de la voie de migration de la côte de l'Est-atlantique. Pour l'explication, voir fig. A1.4.*

Spotted Redshank | Chevalier arlequin | *Tringa erythropus*

Populations, distribution and ecology

The Spotted Redshank is a species of the high north, breeding in northern Fennoscandia and further east in Russia. The entire European breeding population belongs to one flyway population and the borders with more eastern populations are uncertain. High breeding numbers occur in Russia, Finland and Sweden. The European breeding population winters around the Mediterranean Sea and along the coast and in inland wetlands of Western Africa (Senegal, Mali, Nigeria, Chad). The Spotted Redshank breeds dispersed in shrub and open tundra and in marshes south of the arctic treeline. On migration, flocks use specific but widely dispersed staging areas in both fresh, brackish and salt wetlands such as lagoons, salt marshes, tidal mudflats, sewage farms and rice fields. The species forages on invertebrates such as aquatic insects, crustaceans, polychaete worms, and regularly also small fish.

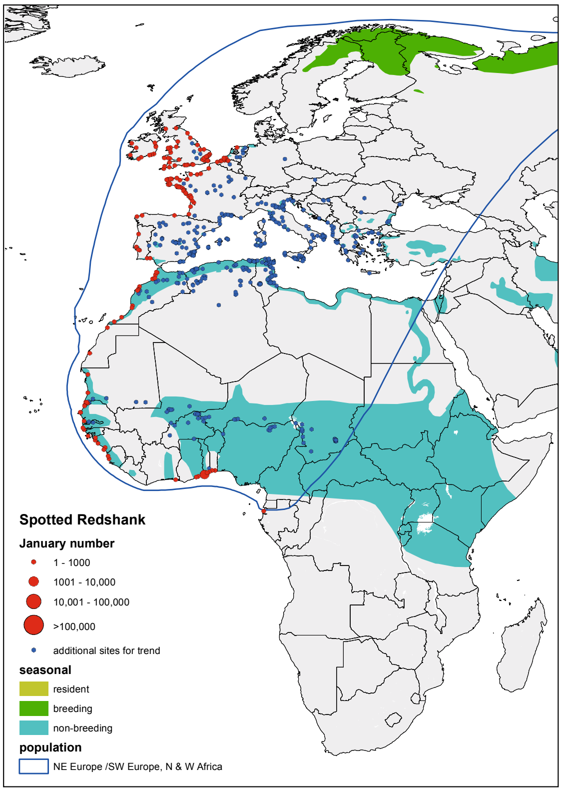


Figure A1.125. Distribution of Spotted Redshank in the coastal East Atlantic Flyway in January 2014-2017. For explanation see fig. A1.5. *Répartition du Chevalier arlequin dans la voie de migration de la côte de l'Atlantique-Est en janvier 2014-2017. Pour l'explication, voir fig. A1.5.*

Trend and population size

Population Spotted Redshank	data	type	period-L	trend-L	assessment-L	period-S	tren-S	assessment-S	period popsize	popsize-min	popsize-max
NE Europe /SW Europe, N & W Africa	w	1b	1997-2017	0,96	moderate decline	2010-2017	0,93	uncertain	2000-2013	61500	162000

Table A1.52. Summary of trend and population size for Spotted Redshank. For explanation see table A.1.2. *Résumé de la tendance et de la taille de la population du Chevalier arlequin. Pour l'explication, voir le tableau A.1.2.*

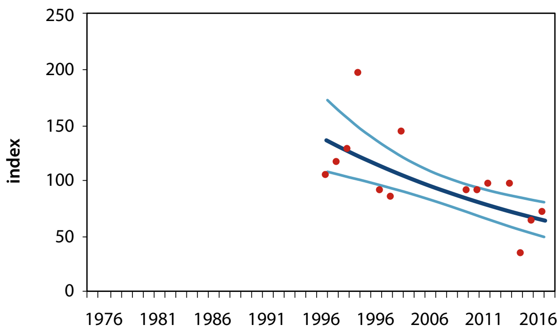


Figure A1.126. Population trend of Spotted Redshank, population NE Europe/SW Europe, N & W Africa. For explanation see fig. A1.4. *Tendance de la population du Chevalier arlequin, population NE Europe / SO Europe, Afrique N & O. Pour l'explication, voir fig. A1.4.*

Saverio Gatto / Agami

Common Greenshank | Chevalier aboyeur | *Tringa nebularia*

Populations, distribution and ecology

The Common Greenshank breeds in boreal and arctic habitats in the north of Europe. This species shows a broad-front migration through Atlantic, continental and Mediterranean Europe and mainly winters in Africa. During this period, birds are found in coastal areas, but also inland in sub-Saharan wetland areas. Breeding occurs solitarily in the boreal forest zone in swampy clearings, bogs, marshes and moorlands and at small lakes. During migration and wintering, the species congregates in small flocks, usually of less than 100 individuals. In the wintering areas in Africa, the species occurs in a variety of freshwater, marine and artificial wetlands. On migration it occurs on tidal mudflats and estuaries, but also frequents inland shallow water wetlands. The diet consists of insects, crustaceans, worms , molluscs, amphibians and small fish.

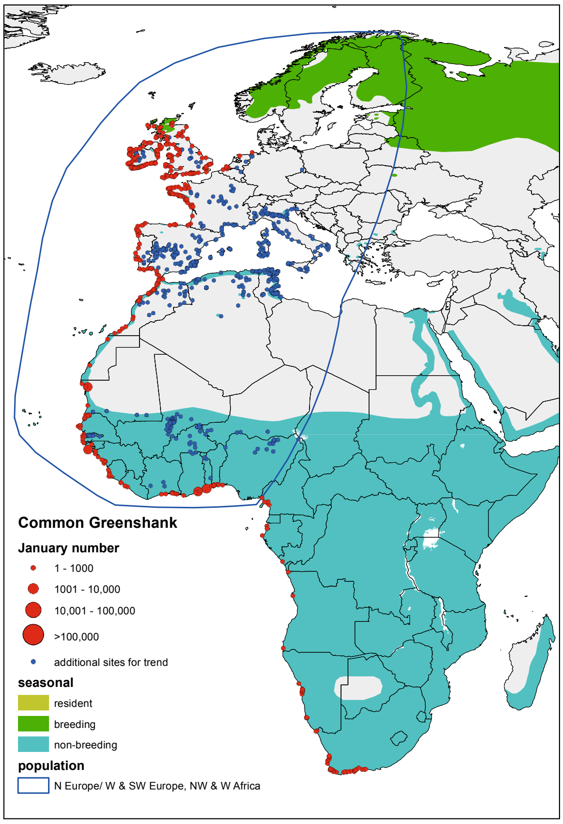


Figure A1.127. Distribution of Common Greenshank in the coastal East Atlantic Flyway in January 2014-2017. For explanation see fig. A1.5. *Répartition du Chevalier aboyeur dans la voie de migration de la côte de l'Atlantique-Est en janvier 2014-2017. Pour l'explication, voir fig. A1.5.*

Trend and population size

Population Common Greenshank	data	type	period-L	trend-L	assessment-L	period-S	tren-S	assessment-S	period popsize	popsize-min	popsize-max
N Europe/ W & SW Europe, NW & W Africa	w	1b	1997-2017	1,00	stable	2009-2017	0,98	stable	1995-2014	230000	470000
NW Siberia/SW Asia - S Africa	w	3	1997-2017	0,98	stable	2008-2017	0,95	uncertain	1990-2000	100000	1000000

Table A1.53. Summary of trend and population size for Common Greenshank. For explanation see table A.1.2. *Résumé de la tendance et de la taille de la population de Chevalier aboyeur. Pour l'explication, voir le tableau A.1.2.*

Ralph Martin / Agami

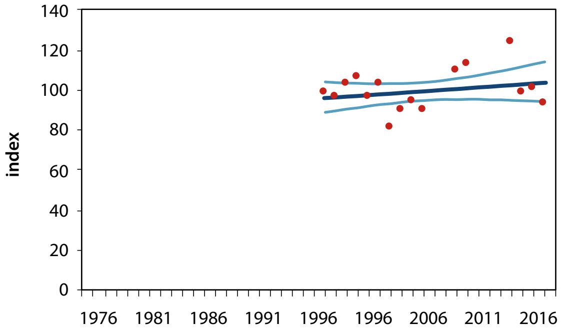


Figure A1.128. Population trend of Common Greenshank, population N Europe/W & SW Europe, NW & W Africa. For explanation see fig. A1.4. *Tendance du Chevalier aboyeur, population du Nord de l'Europe / Europe O et S O, Afrique du N O et O. Pour l'explication, voir fig. A1.4.*

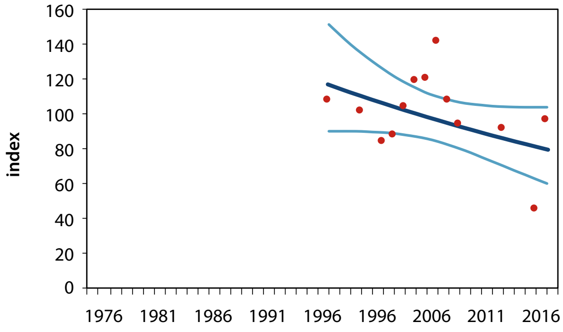


Figure A1.129. Trend of Common Greenshank in Cameroon - South Africa part of coastal East Atlantic Flyway. For explanation see fig. A1.4. *Tendance du Chevalier aboyeur au Cameroun - Afrique du Sud, partie de la voie de migration de la côte de l'Atlantique Est. Pour l'explication, voir fig. A1.4.*

Common Redshank | Chevalier gambette | *Tringa tetanus*

Populations, distribution and ecology

The Common Redshank breeds in large parts of western, northern and eastern Europe. A complex system of flyway populations has been identified, involving four populations assigned to the East Atlantic Flyway: (1) *T. t. robusta* breeding in Iceland and wintering in the North Sea countries and France, (2) *T. t. totanus* breeding in The UK, Ireland and The Netherlands being short distance migrants, (3) a northwestern *T. t. totanus* population breeding in Fennoscandia and the Baltic and mainly wintering on the Atlantic coasts of Iberia, North Africa and West Africa, and (4) an eastern *T. t. totanus* population, breeding in central and north-eastern Europe, and wintering in the Mediterranean area and sub-Saharan Africa, reaching the East Atlantic Coast in Africa from Ghana southward. Breeding occurs in a wide variety of habitats: coastal saltmarshes, inland wet grasslands, swampy heathlands and moors and river or lake borders. In winter, however, the species is largely coastal, frequenting a variety of habitats such as beaches, saltmarshes, tidal mudflats, lagoons and estuaries. The diet consists of insects, spiders and annelid worms in the breeding season and mainly worms, crustaceans and molluscs in other seasons.

Arnold Meijer / Blue Robin

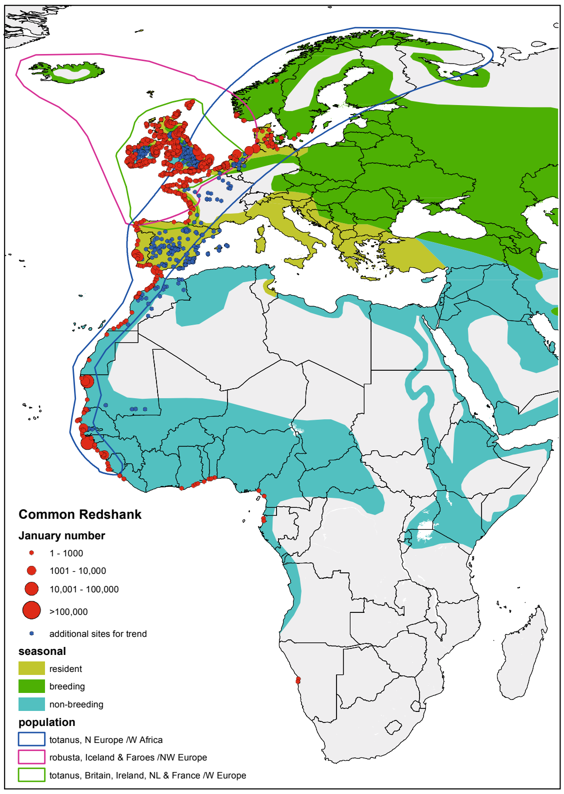


Figure A1.130. Distribution of Common Redshank in the coastal East Atlantic Flyway in January 2014-2017. For explanation see fig. A1.5. *Répartition du Chevalier gambette dans la voie de migration de la côte de l'Est-atlantique en janvier 2014-2017. Pour l'explication, voir fig. A1.5.*

Harvey van Diek

Trend and population size

Population Common Redshank	data	type	period-L	trend-L	assessment-L	period-S	tren-S	assessment-S	period popsize	popsize-min	popsize-max
robusta, Iceland & Faroes /NW Europe	w	1c	1976-2016	0,99	stable	2008-2016	0,98	uncertain	2000-2000	150000	420000
totanus, Britain, Ireland, NL & France / W Europe	w	1c	1976-2016	1,00	stable	2008-2016	0,99	stable	2008-2009	76500	76500
totanus, N Europe /W Africa	w	1b	1979-2017	1,00	stable	2006-2017	0,97	moderate decline	1990-2013	140000	220000

Table A1.54. Summary of trend and population size for Redshank. For explanation see table A.1.2. *Résumé de la tendance et de la taille de la population du Chevalier gambette. Pour l'explication, voir le tableau A.1.2.*

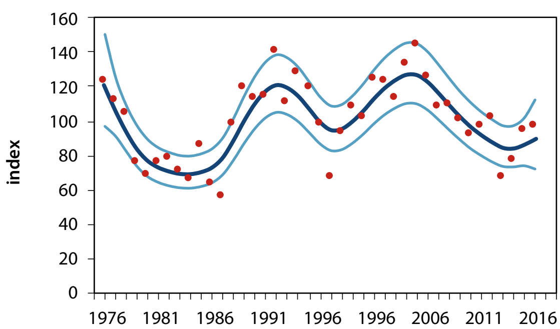


Figure A1.131. Population trend of Common Redshank, population *T. t. robusta*. For explanation see fig. A1.4. *Tendance de la population du Chevalier gambette, population* T. t. Robusta*. Pour l'explication, voir fig. A1.4.*

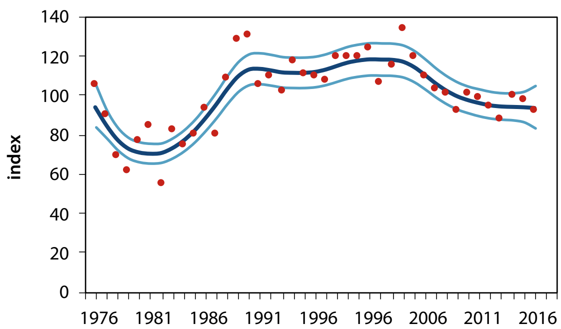


Figure A1.132. Population trend of Common Redshank, population *T. t. totanus*, Britain, Ireland, NL & France/W Europe. For explanation see fig. A1.4. *Tendance de la population du Chevalier gambette, population* T. t. totanus*, Grande-Bretagne, Irlande, Pays-Bas et France / Europe de l'Ouest. Pour l'explication, voir fig. A1.4.*

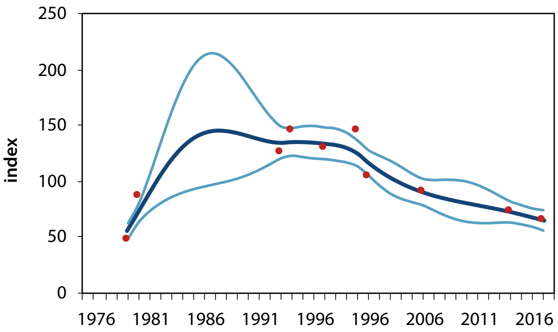


Figure A1.133. Population trend of Common Redshank, population N Europe/W Africa. For explanation see fig. A1.4. *Tendance de la population du Chevalier gambette, population N Europe / Afrique de l'Ouest. Pour l'explication, voir fig. A1.4.*

Slender-billed Gull | Goéland railleur | *Larus genei*

Populations, distribution and ecology

Two biogeographical populations are distinguished within the study area: one including birds breeding and wintering in the Mediterranean region and along the Atlantic coast of northwest Africa, and one including the resident population of coastal West Africa. The species is gregarious year-round and breeds in monospecific or mixed colonies on beaches, sand spits, islands and coastal marshes in shallow tidal waters and inland saline seas or lakes. In the non-breeding season it is almost entirely coastal, visiting shallow inshore waters and salt-pans. The diet consists mainly of fish, but also marine invertebrates and insects.

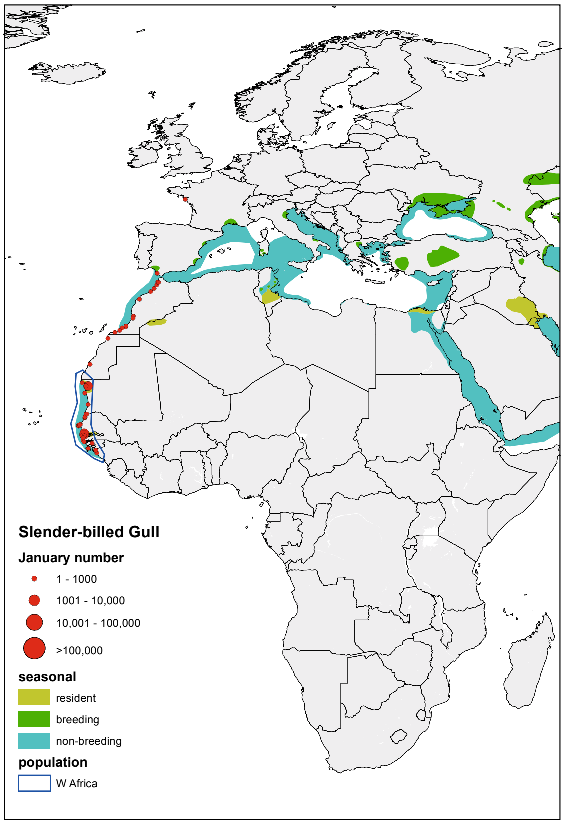


Figure A1.134. Distribution of Slender-billed Gull in the coastal East Atlantic Flyway in January 2014-2017. For explanation see fig. A1.5. *Répartition du Goéland railleur dans la voie de migration de la côte de l'Atlantique Est en janvier 2014-2017. Pour l'explication, voir fig. A1.5.*

Arnold Meijer / Blue Robin

Arnold Meijer / Blue Robin

Trend and population size

Population Slender-billed Gull	data	type	period-L	trend-L	assessment-L	period-S	tren-S	assessment-S	period popsize	popsize-min	popsize-max
W Mediterranean	w	3	1995-2017	1,07	moderate increase	2008-2017	1,06	uncertain	1996-2012	130000	200000
W Africa	w	1a	1997-2017	0,97	uncertain	2009-2017	1,15	strong increase	2003-2014	24000	30000

Table A1.55. Summary of trend and population size for Slender-billed Gull. For explanation see table A.1.2. *Résumé de la tendance et de la taille de la population du Goéland railleur. Pour l'explication, voir le tableau A.1.2.*

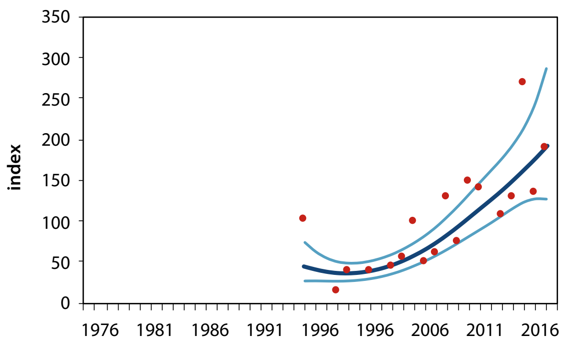


Figure A1.135. Trend of Slender-billed Gull in Morocco part of the coastal East Atlantic Flyway. For explanation see fig. A1.4. *Tendance du Goéland railleur au Maroc faisant partie de la voie de migration de la côte de l'Est-atlantique. Pour l'explication, voir fig. A1.4.*

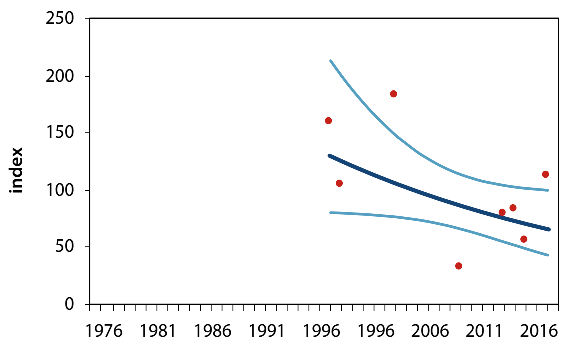


Figure A1.136. Population trend of Slender-billed Gull, population W Africa. For explanation see fig. A1.4. *Tendance de la population du Goéland railleur, population Ouest-africaine. Pour l'explication, voir fig. A1.4.*

Black-headed Gull | Mouette rieuse | *Larus ridibundus*

Populations, distribution and ecology

The Black-headed Gull is a common breeding bird in most countries of Europe. The West and Central European sub-population using the East Atlantic Flyway covers most of Europe including Iceland and the southern tip of Greenland. Large breeding populations (>50,000 pairs) occur in Belarus, the Czech Republic, Denmark, Estonia, Finland, Germany, Lithuania, The Netherlands, Norway, Poland, Sweden and The UK. Northern populations are highly migratory, wintering mainly in countries around the North Sea and in France. Colonial breeding chiefly occurs in inland habitats, however, in The Netherlands a shift from inland to coastal sites has occurred. Breeding habitats range from freshwater wetlands with lush vegetation such as lakes, rivers, marshes with tussocks, lowland peat marshes to marine habitats such as estuaries, lagoons, saltmarshes, dunes and offshore islands. In the non-breeding season its distribution is more coastal, occurring for example in estuaries and other tidal waters, but large flocks also occur on farmland (wet grasslands) and in urban areas (city parks, rubbish dumps). The diet is diverse and the species is quite opportunistic. During the breeding season, the diet for inland populations consists of insects and earthworms, and for marine populations also molluscs, crustaceans and worms. During the non-breeding season some populations rely heavily on anthropogenic food sources, for example in urban areas, or scavenging for fish waste while following trawlers at sea.

Arnold Meijer / Blue Robin

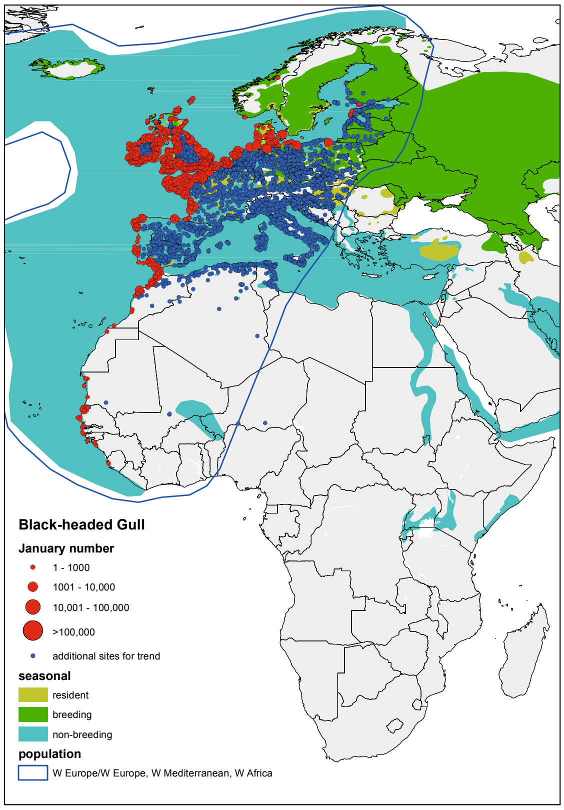


Figure A1.137. Distribution of Black-headed Gull in the coastal East Atlantic Flyway in January 2014-2017. For explanation see fig. A1.5. *Répartition de la Mouette rieuse dans la voie de migration de la côte de l'Est-atlantique en janvier 2014-2017. Pour l'explication, voir fig. A1.5.*

Arnold Meijer / Blue Robin

Trend and population size

Population Black-headed Gull	data	type	period-L	trend-L	assessment-L	period-S	tren-S	assessment-S	period popsize	popsize-min	popsize-max
W Europe/W Europe, W Med - W Africa	w	1a	1993-2016	0,98	moderate decline	2008-2016	0,99	stable	1990-2013	2750000	3550000

Table A1.56. Summary of trend and population size for Black-headed Gull. For explanation see table A.1.2. *Résumé de la tendance et de la taille de la population de la Mouette rieuse. Pour l'explication, voir le tableau A.1.2.*

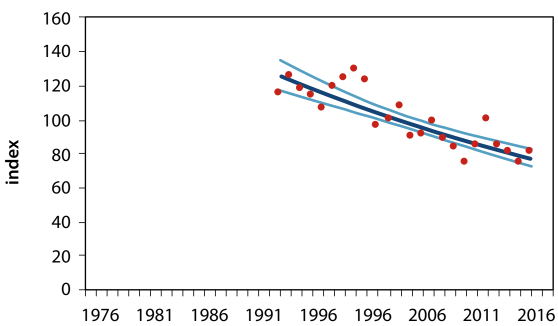


Figure A1.138. Population trend of Black-headed Gull, population W Europe/W Europe, W Mediterranean - W Africa. For explanation see fig. A1.4. *Tendance de la population de la Mouette rieuse, population Ouest européenne / Ouest européenne, Ouest méditerranéenne - Afrique occidentale. Pour l'explication, voir fig. A1.4.*

Hartlaub's Gull | Mouette de Hartlaub | *Larus hartlaubii*

Populations, distribution and ecology

The entire world population of this species breeds along the coast of Namibia and South Africa, where it is mostly sedentary. The species is gregarious year-round, breeding in colonies of up to 1000 pairs, occasionally with Greater Crested Terns or other colonial species, and also forages and roosts in groups during the non-breeding season. The species is strictly coastal and breeds on offshore flat rocky islands near kelp beds in shallow waters, frequenting estuaries, lagoons, beaches and occasionally rubbish rumps and sewage and salt works. it feeds mainly on invertebrates associated with stranded kelp, but also terrestrial insects, fish, earthworms, fruits and garbage.

Marc Guyt / Agami

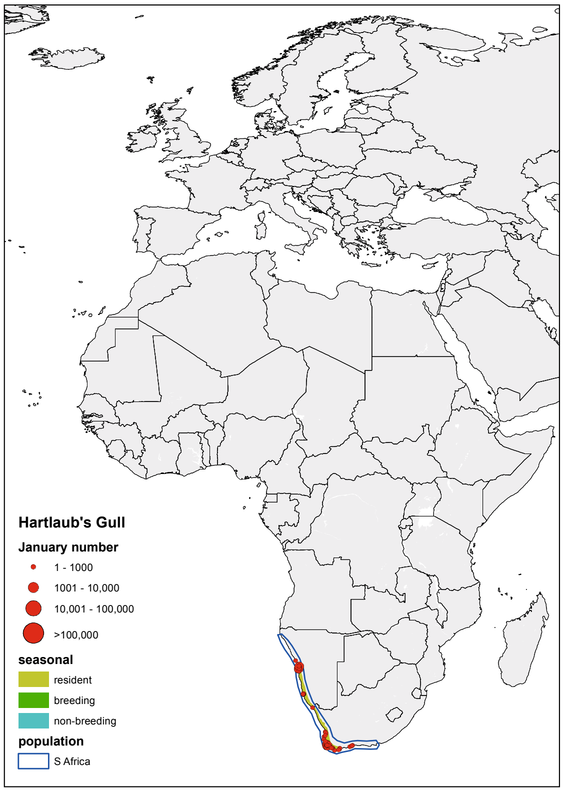


Figure A1.139. Distribution of Hartlaub's Gull in the coastal East Atlantic Flyway in January 2014-2017. For explanation see fig. A1.5. *Répartition de la Mouette de Hartlaub dans la voie de migration de la côte Est-atlantique en janvier 2014-2017. Pour l'explication, voir fig. A1.5.*

Trend and population size

Population Hartlaub's Gull	data	type	period-L	trend-L	assessment-L	period-S	tren-S	assessment-S	period popsize	popsize-min	popsize-max
S Africa	w	1a	1995-2017	0,99	stable	2008-2017	0,95	moderate decline	2002-2002	25000	35000

Table A1.57. Summary of trend and population size for Hartlaub's Gull. For explanation see table A.1.2. *Résumé de la tendance et de la taille de la population de la Mouette de Harlaub. Pour l'explication, voir le tableau A.1.2*

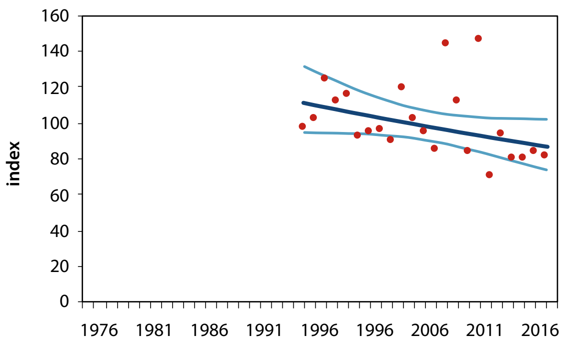


Figure A1.140. Population trend of Hartlaub's Gull. For explanation see fig. A1.4. *Tendance de la population de la Mouette de Hartlaub. Pour l'explication, voir fig. A1.4.*

Grey-headed Gull | Mouette à tête grise | *Larus cirrocephalus*

Populations, distribution and ecology

The Grey-Headed Gull breeds in sub-Saharan Africa and South America. Three flyway populations are distinguished within Africa of which two are considered here. In West Africa this resident species is a coastal colonial breeder, but also occurs on large inland lakes (e.g. in Chad and Mali). Important breeding sites are in Senegal, the Gambia and Guinea-Bissau, where it breeds on rocky offshore islands, coastal dunes, estuaries and harbours. The same habitats are frequented outside the breeding season. Its diet consists predominantly of fish. Grey-Headed gulls further south along the East Atlantic Flyway belong to the Southern and East Africa population.

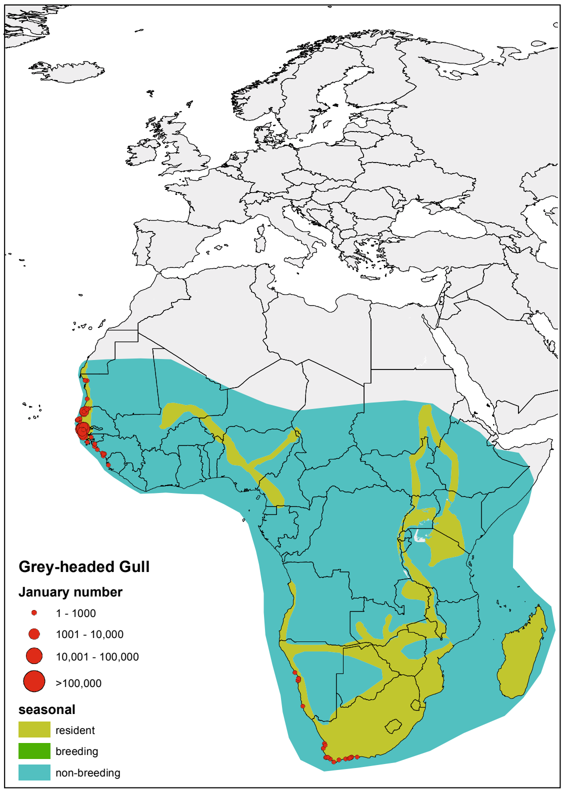


Figure A1.141. Distribution of Grey-headed Gull in the coastal East Atlantic Flyway in January 2014-2017. *Répartition de la Mouette à tête grise dans la voie de migration de la côte de l'Est-atlantique en janvier 2014-2017.*

Trend and population size

Population Grey-headed Gull	data	type	period-L	trend-L	assessment-L	period-S	tren-S	assessment-S	period popsize	popsize-min	popsize-max
poiocephalus, W Africa	w	3	1997-2017	1,04	uncertain	2009-2017	1,18	moderate increase	2010-2014	25000	30000
poiocephalus, S Africa	w	3	1993-2017	1,01	stable	2008-2017	1,01	uncertain			

Table A1.58. Summary of trend and population size for Grey-headed Gull. For explanation see table A.1.2. *Résumé de la tendance et de la taille de la population de la Mouette à tête grise. Pour l'explication, voir le tableau A.1.2.*

Will Leurs / Agami

Will Leurs / Agami

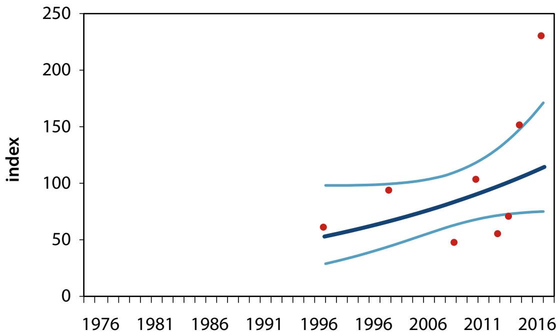


Figure A1.142. Trend of Grey-headed Gull in the West Africa part of the coastal East Atlantic Flyway. For explanation see fig. A1.4. *Tendance de la Mouette à tête grise dans la partie ouest de la voie de migration de la côte de l'Atlantique-Est, en Afrique de l'Ouest. Pour l'explication, voir fig. A1.4.*

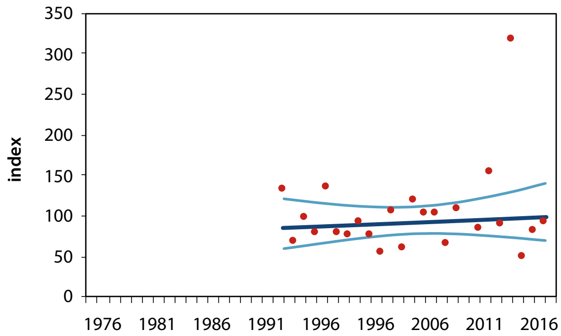


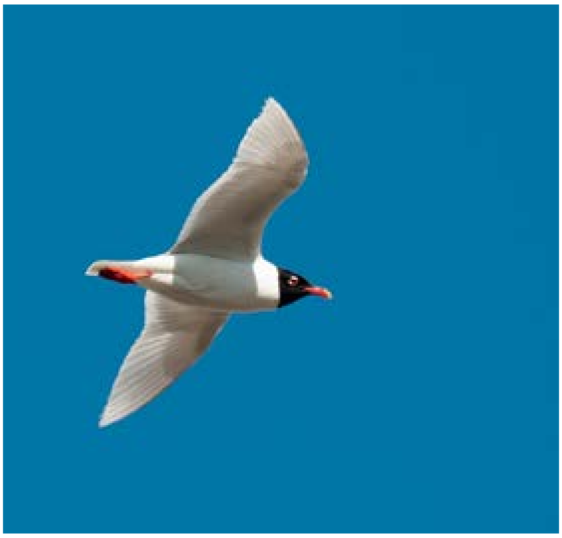
Figure A1.143. Trend of Grey-headed Gull in the Namibia - South Africa part of the coastal East Atlantic Flyway. For explanation see fig. A1.4. *Tendance de la Mouette grise en Namibie - Afrique du Sud - Voie de migration de la côte de l'Atlantique Est. Pour l'explication, voir fig. A1.4.*

Jacques van der Neut / Agami

Mediterranean Gull | Mouette mélanocéphale | *Larus melanocephalus*

Populations, distribution and ecology

This species is considered as a single population with major concentrations in the East Atlantic Flyway found in the Mediterranean basin and along the Atlantic coast of northwest Europe. The species is fully migratory and breeds in large colonies, often close to Sandwich Terns or mixed with Black-headed Gulls. The breeding range has expanded to the northwest in recent decades. Breeding habitat includes coastal lagoons, estuaries and saltmarshes and inland lakes and marshes where the species nests on floodlands, fields, grasslands or sparsely vegetated islands. In the non-breeding season it becomes strictly coastal. The diet composition changes seasonally, with mainly insects, gastropods, fish and rodents during the breeding season and a more opportunistic diet during the rest of the year, consisting of marine fish, molluscs, seeds and earth-worms among others.



Arnold Meijer / Blue Robin

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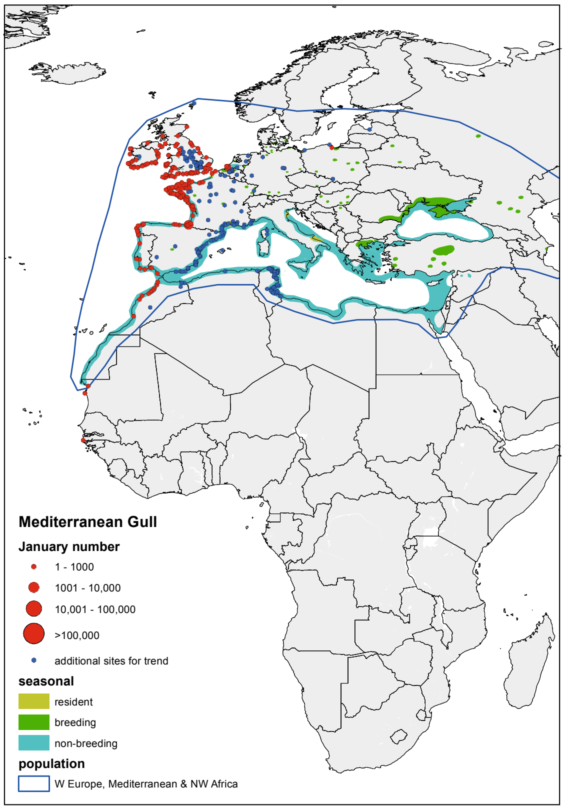

Figure A1.144. Distribution of Mediterranean Gull in the coastal East Atlantic Flyway in January 2014-2017. For explanation see fig. A1.5. *Répartition de la Mouette mélanocéphale dans la voie de migration de la côte de l'Atlantique Est en janvier 2014-2017. Pour l'explication, voir fig. A1.5.*

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Trend and population size

Population Mediterranean Gull	data	type	period-L	trend-L	assessment-L	period-S	tren-S	assessment-S	period popsize	popsize-min	popsize-max
W Europe, Mediterranean & NW Africa	w	1b	1995-2016	1,09	moderate increase	2008-2016	1,06	uncertain	1990-2012	220000	260000

Table A1.59. Summary of trend and population size for Mediterranean Gull. For explanation see table A.1.2. *Résumé de la tendance et de la taille de la population de la Mouette mélanocéphale. Pour l'explication, voir le tableau A.1.2.*

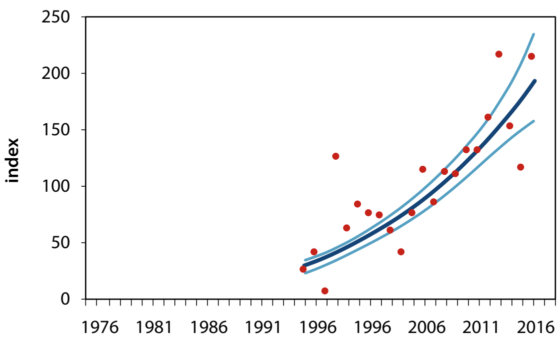

Figure A1.145. Population trend of Mediterranean Gull. For explanation see fig. A1.4. *Tendance de la population de la Mouette mélanocéphale. Pour l'explication, voir fig. A1.4.*

Arnold Meijer / Blue Robin

Audouin's Gull | Goéland d'Audouin | *Larus audouinii*

Populations, distribution and ecology

One biogeographical population exists of this species in the East Atlantic Flyway, including the entire world population. The main breeding colonies of the species are found in the western Mediterranean Sea, the vast majority breeding in Spain. The species spends the winter along the North and West African coast, east to Libya and south to Gambia. Breeding colonies are in variable habitats on rocky cliffs, offshore islands, saltmarshes or sandy peninsulas. During the non-breeding season the species prefers sheltered bays and beaches with freshwater stream mouths. The diet consists mainly of epipelagic fish, although the large colony of the Ebro delta has adopted more terrestrial foraging habits, including feeding on invasive crayfish in rice fields, food discards and fish waste dumped from boats.

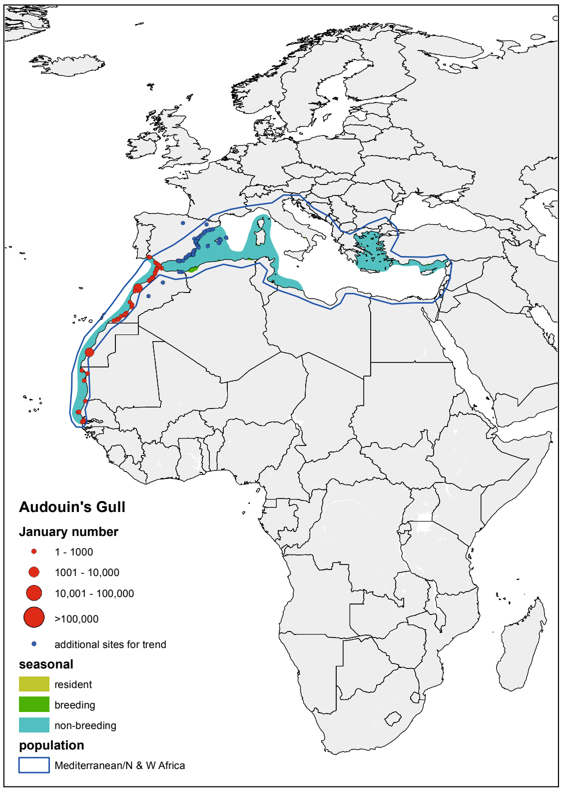

Figure A1.146. Distribution of Audouin's Gull in the coastal East Atlantic Flyway in January 2014-2017. For explanation see fig. A1.5.
Répartition du Goéland d'Audouin dans la voie de migration de la côte de l'Est-atlantique en janvier 2014-2017. Pour l'explication, voir fig. A1.5.

Arnold Meijer / Blue Robin

Trend and population size

Population Audouin's Gull	data	type	period-L	trend-L	assessment-L	period-S	tren-S	assessment-S	period popsize	popsize-min	popsize-max
Mediterranean/N & W Africa	w	1c	1995-2017	0,99	stable	2008-2017	0,97	uncertain	2007-2012	65000	67000

Table A1.60. Summary of trend and population size for Audouin's Gull. For explanation see table A.1.2. *Résumé de la tendance et de la taille de la population du Goéland d'Audouin. Pour l'explication, voir le tableau A.1.2.*

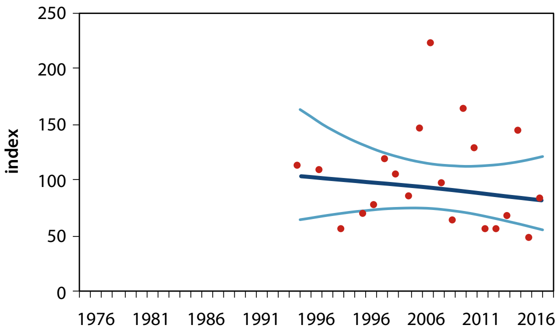

Figure A1.147. Population trend of Audouin's Gull. For explanation see fig. A1.4. *Tendance de la population du Goéland d'Audouin. Pour l'explication, voir fig. A1.4.*

Arnold Meijer / Blue Robin

Mew Gull | Goéland cendré | *Larus canus*

Populations, distribution and ecology

Two subspecies of Common Gull, are distinguished in Europe, nominate *L. c. canus* and *L. c. heinei*. The nominate subspecies occurs in the East Atlantic Flyway, breeding in large areas of northern and eastern Europe and wintering in western and central Europe, including offshore areas. Breeding numbers are high in some Nordic countries such as Denmark, Norway, Sweden, Finland, Estonia and European Russia, but also in Germany and the UK. Breeding occurs in small numbers in many other countries in western and central Europe. The Netherlands and neighbouring countries around the North Sea are the most important wintering areas. This gull species breeds in single pairs and (mixed) colonies in a variety of coastal and inland habitats: dune areas, beaches, grassy islands and rocky or grassy cliff ledges along the coast and small islands or shores of inland waterbodies or in bogs. It occupies similar habitats outside the breeding season, and is often found foraging in agricultural grasslands and on intertidal mudflats, but also in urban habitats and at sea, usually in flocks. The diet consists of earthworms and insects in terrestrial habitats and crustaceans and molluscs in marine habitats.

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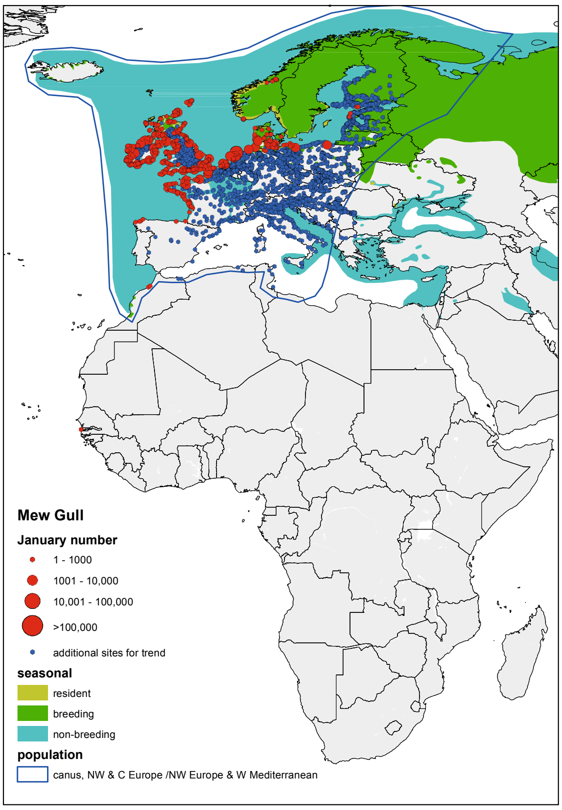

Figure A1.148. Distribution of Mew Gull in the coastal East Atlantic Flyway in January 2014-2017. For explanation see fig. A1.5. *Répartition du Goéland cendré dans la voie de migration de la côte de l'Est-atlantique en janvier 2014-2017. Pour l'explication, voir fig. A1.5.*

Arnold Meijer / Blue Robin

Trend and population size

Population Mew Gull	data	type	period-L	trend-L	assessment-L	period-S	tren-S	assessment-S	period popsize	popsize-min	popsize-max
canus, NW & C Europe /NW Europe & W Med.	w	1c	1994-2016	1,00	stable	2008-2016	1,02	stable	1998-2013	1400000	1900000

Table A1.61. Summary of trend and population size for Mew Gull. For explanation see table A.1.2. *Résumé de la tendance et de la taille de la population du Goéland cendré. Pour l'explication, voir le tableau A.1.2.*

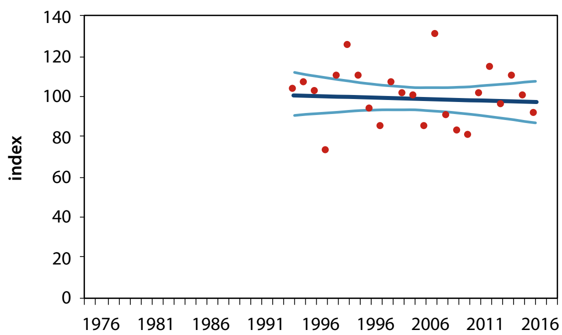

Figure A1.149. Population trend of Mew Gull, population *L. c. canus*, NW & C Europe/NW Europe & W Mediterranean. For explanation see fig. A1.4. *Tendance de la population du Goéland cendré, population* L. c. canus, *NW & C Europe / NO Europe & O Méditerranéen. Pour l'explication, voir fig. A1.4.*

Arnold Meijer / Blue Robin

Kelp Gull | Goéland dominicain | *Larus dominicanus*

Populations, distribution and ecology

Two biogeographical populations are distinguished in the East Atlantic Flyway: one in southern Africa and a small population in coastal West Africa. The species is mostly sedentary, although some birds breeding in Namibia and South Africa may migrate northward during the non-breeding season. The species inhabits coastal harbours, bays, estuaries, beaches and rocky shores, but can also be found at lakes, rivers, reservoirs and pastures near the coast. Breeding colonies may consist of up to several hundred pairs. Foraging usually occurs within 10 km from the coastline on a wide variety of food items, including marine invertebrates, fish, reptiles, amphibians, small mammals and birds.

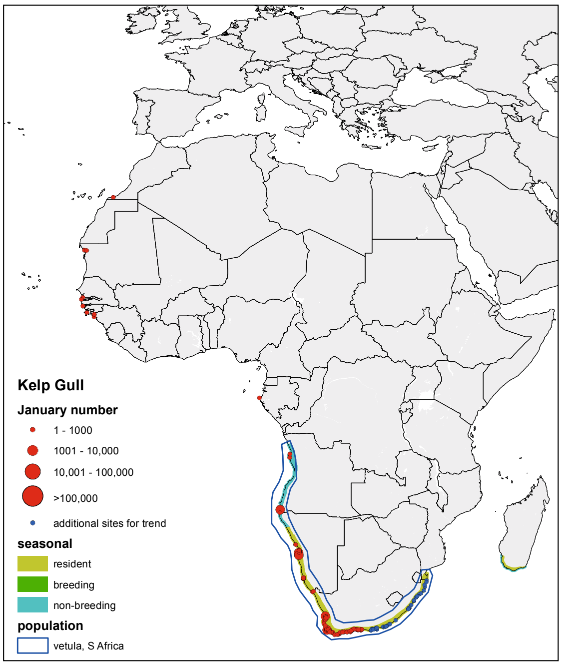

Figure A1.150. Distribution of Kelp Gull in the coastal East Atlantic Flyway in January 2014-2017. For explanation see fig. A1.5. *Répartition du Goéland dominicain dans la voie de migration de la côte de l'Est-atlantique en janvier 2014-2017. Pour l'explication, voir fig. A1.5.*

Trend and population size

Population Kelp Gull	data	type	period-L	trend-L	assessment-L	period-S	tren-S	assessment-S	period popsize	popsize-min	popsize-max
vetula, S Africa	w	1b	1995-2017	0,99	stable	2008-2017	0,95	uncertain	2001-2001	70000	70000

Table A1.62. Summary of trend and population size for Kelp Gull. For explanation see table A.1.2. *Résumé de la tendance et de la taille de la population du Goéland dominicain. Pour l'explication, voir le tableau A.1.2.*

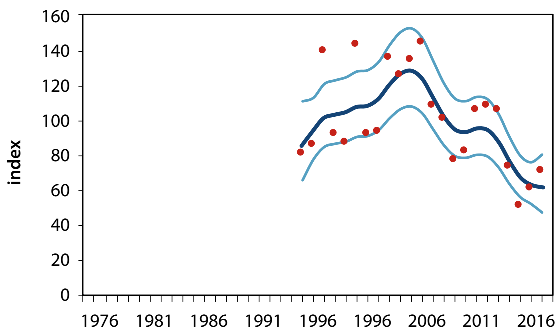

Figure A1.151. Population trend of Kelp Gull, population *L. d. vetula*, Southern Africa. For explanation see fig. A1.4. *Tendance de la population du Goéland dominicain, population* L. d. vetula*, Afrique australe. Pour l'explication, voir fig. A1.4.*

Marc Guyt / Agami

Lesser Black-backed Gull | Goéland brun | *Larus fuscus*

Populations, distribution and ecology

Within the study area two populations are distinguished, representing the two East Atlantic subspecies: *L. f. graellsii* and *L. f. intermedius*, with overlapping breeding and wintering ranges. *Graellsii* breeds mainly on Iceland, the British Isles, The Netherlands, France, Spain and Portugal and winters from southwest Europe to West Africa. *Intermedius* breeds in coastal Norway and southern Sweden, Denmark, Germany and The Netherlands, also wintering in southwest Europe to West Africa. Breeding occurs in colonies, often mixed with other gull species, on coastal grassy slopes, saltmarshes, sand dunes, cliffs, offshore and inland islands, lake margins and increasingly on flat rooftops. During the non-breeding season the species remains gregarious, with flocks on beaches, in harbours, estuaries, lagoons and occasionally inland close to lakes or rivers. The species forages opportunistically year-round in marine habitat, also following fishing vessels, and inland on agricultural fields, rubbish dumps and in cities. The diet includes fish, aquatic and terrestrial invertebrates, eggs, seeds and carrion.

Arnold Meijer / Blue Robin

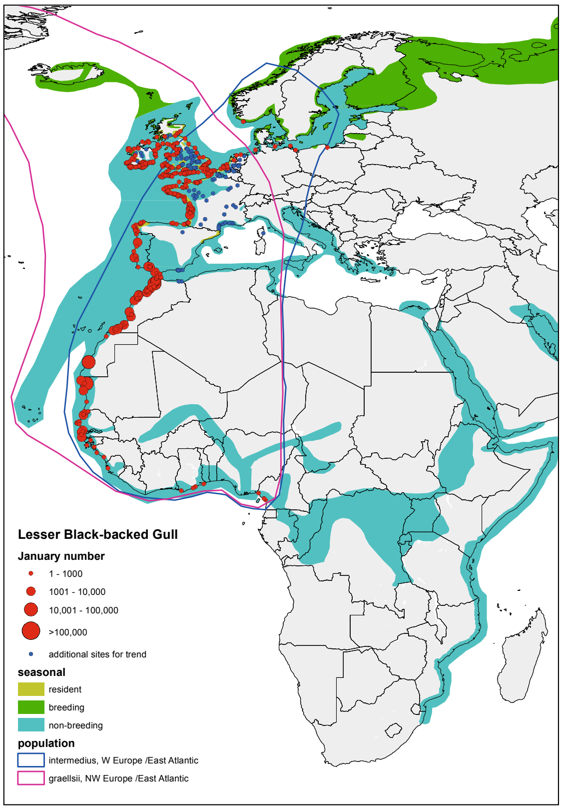

Figure A1.152. Distribution of Lesser Black-backed Gull in the coastal East Atlantic Flyway in January 2014-2017. The populations are taken together for trend calculation. For explanation see fig. A1.5. *Répartition du Goéland brun dans la voie de migration de la côte de l'Atlantique Est en janvier 2014-2017. Les populations sont prises ensemble pour le calcul de la tendance. Pour l'explication, voir fig. A1.5.*

Trend and population size

Population Lesser Black-backed Gull	data	type	period-L	trend-L	assessment-L	period-S	tren-S	assessment-S	period popsize	popsize-min	popsize-max
graellsii & intermedius, East Atlantic	w	2	1993-2017	1,02	moderate increase	2008-2017	1,06	moderate increase			
graellsii, NW Europe /East Atlantic									1981-2012	560000	600000
intermedius, W Europe /East Atlantic									2005-2013	566000	699000

Table A1.63. Summary of trend and population size for Lesser Black-backed Gull. For explanation see table A.1.2. *Résumé de la tendance et de la taille de la population du Goéland brun. Pour l'explication, voir le tableau A.1.2.*

Arnold Meijer / Blue Robin

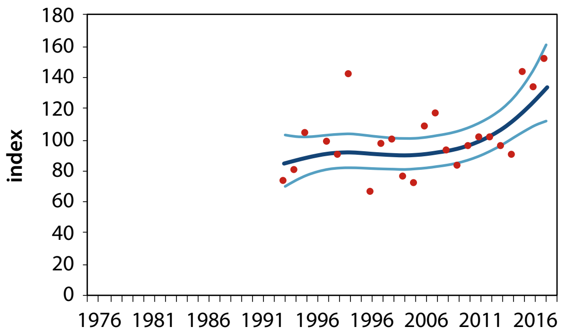

Figure A1.153. Trend of Lesser Black-backed Gull, populations *L. f. graellsii* & *L. f. intermedius*. For explanation see fig. A1.4. *Tendance du Goéland brun, populations* L. f. graellsii & L. f. intermedius. *Pour l'explication, voir fig. A1.4.*

European Herring Gull | Goéland argenté | *Larus argentatus*

Populations, distribution and ecology

The Herring Gull occurs in two subspecies in the East Atlantic Flyway: the nominate *L. a. argentatus* breeding in Fennoscandia and European Russia and *L. a. argenteus* breeding in countries around the North Sea and NW-Europe including Iceland. Large populations of the nominate form breed in Denmark, Norway, Sweden, Finland, Estonia and Russia. They are partial migrants, with some birds wintering further south, for example along the North Sea coasts. Large *argenteus* populations occur mainly in The UK, France and The Netherlands, and are mainly short-distance migrants. Breeding occurs in colonies mostly in or near coastal areas, in a wide variety of habitats, for example islands with grassy vegetation, dune areas, sandy beaches, rocky outcrops and roofs in urban areas. In the non-breeding season a wide variety of habitats is also used, but populations in western Europe seem to prefer tidal mudflats and beaches. The species is opportunistic, certainly in the breeding season, and will take almost any food available. Outside the breeding season it has a preference for bivalves (mussels, cockles) in tidal habitats and along beaches which is more marked than among other gull species.

Arnold Meijer / Blue Robin

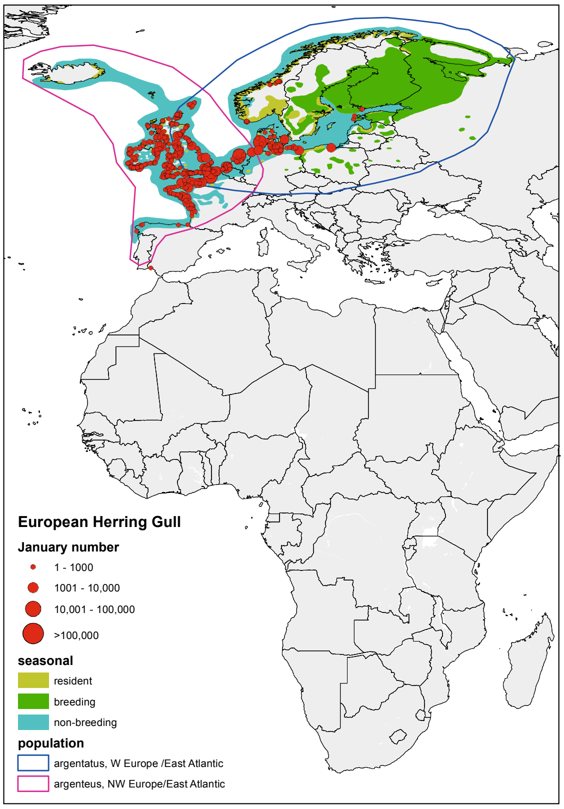

Figure A1.154. Distribution of European Herring Gull in the coastal East Atlantic Flyway in January 2014-2017. The populations are taken together for trend calculation. *Répartition démographique du Goéland argenté dans la voie de migration de la côte de l'Atlantique Est en janvier 2014-2017. Les populations sont prises ensemble pour le calcul de la tendance.*

Arnold Meijer / Blue Robin

Trend and population size

Population European Herring Gull	data	type	period-L	trend-L	assessment-L	period-S	tren-S	assessment-S	period popsize	popsize-min	popsize-max
argenteus & argentatus, NW Europe	w	2	1994-2016	0,98	moderate decline	2008-2016	0,97	uncertain			
argenteus, NW Europe/East Atlantic									1998-2012	710000	790000
argentatus, W Europe /East Atlantic									2000-2013	1300000	1600000

Table A1.64. Summary of trend and population size for European Herring Gull. For explanation see table A.1.2. *Résumé de la tendance et de la taille de la population du Goéland argenté. Pour l'explication, voir le tableau A.1.2.*

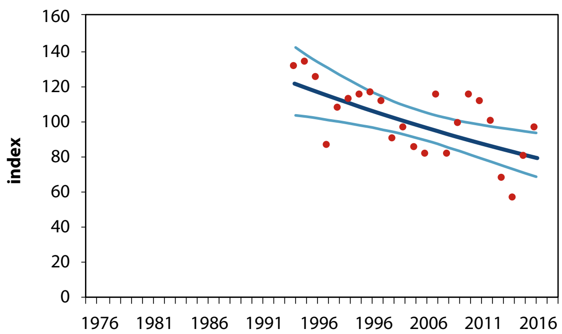

Figure A1.155. Trend of European Herring Gull, populations *L. a. argenteus & L. a. argentatus*. For explanation see fig. A1.4. *Tendance du Goéland argenté, populations* L. a. argenteus & L. a. argentatus. *Pour l'explication, voir fig. A1.4.*

Arnold Meijer / Blue Robin

Great Black-backed Gull | Goéland marin | *Larus marinus*

Populations, distribution and ecology

One population occurs in the East Atlantic Flyway with a distribution spanning the entire coastline from northwest Russia to northwest Africa. The species breeds mainly along the Arctic, Scandinavian, Icelandic, British, Irish and French coasts. The northernmost breeding birds migrate south in winter, with other population showing dispersive movements over shorter distances. Breeding occurs on vegetated islands, rocky shores, sandy beaches or in dunes along rocky or sandy coats and in estuaries, occasionally at undisturbed inland sites. The species is omnivorous and opportunistic, feeding mainly on fish, birds, eggs, small mammals, marine invertebrates and carrion.

Ralph Martin / Agami

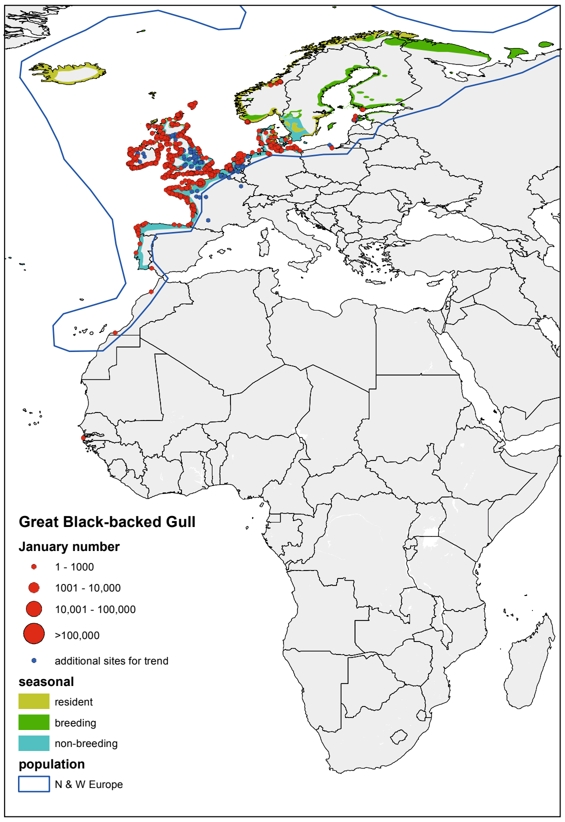

Figure A1.156. Distribution of Great Black-backed Gull in the coastal East Atlantic Flyway in January 2014-2017. For explanation see fig. A1.5. *Répartition du Goéland marin dans la voie de migration de la côte de l'Est-atlantique en janvier 2014-2017. Pour l'explication, voir fig. A1.5.*

Trend and population size

Population Great Black-backed Gull	data	type	period-L	trend-L	assessment-L	period-S	tren-S	assessment-S	period popsize	popsize-min	popsize-max
N & W Europe	w	1b	1994-2016	0,98	moderate decline	2008-2016	0,99	uncertain	1981-2013	340000	378000

Table A1.65. Summary of trend and population size for Great Black-backed Gull. For explanation see table A.1.2. *Résumé de la tendance et de la taille de la population du Goéland marin. Pour l'explication, voir le tableau A.1.2.*

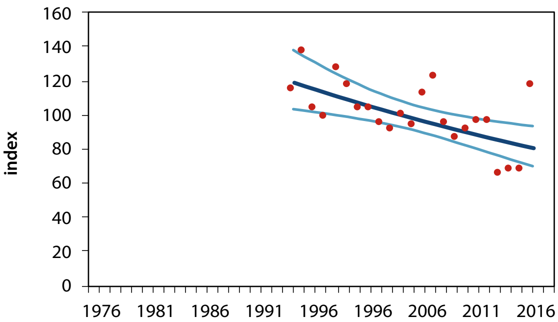

Figure A1.157. Population trend of Great Black-backed Gull, population N & W Europe. For explanation see fig. A1.4. . *Tendance de la population du Goéland marin, population du Nord et de l'Ouest de l'Europe. Pour l'explication, voir fig. A1.4.*

Gull-billed Tern | Sterne hansel | *Sterna nilotica*

Populations, distribution and ecology

The Gull-billed Tern breeds across a wide range in Europe and Africa. The breeders of western Europe and the western Mediterranean area and those of West Africa are considered to belong to the same flyway population. Individuals of the European sub-population are strictly migratory, the African sub-population is largely resident. Breeding numbers in NW-Europe are very small, with larger numbers occurring in France, Italy and Spain. In West Africa, important breeding colonies are known from Mauritania, Senegal and Guinea-Bissau. Most of the European breeding birds probably migrate to West Africa and mix with local breeders. The breeding habitat is highly variable and includes bare or sparsely vegetated places such as islands, banks, dunes, saltmarshes and saltpans. It also occurs in freshwater lagoons, estuaries and inland lakes. Migrating birds are often seen over saltpans, coastal lagoons and various other coastal wetland types, but it also forages over large rivers, lakes and rice fields. It is largely insectivorous but quite opportunistic, taking a wide variety of food items including vertebrates (reptiles, amphibians and fish). In coastal western Africa crabs are taken frequently.

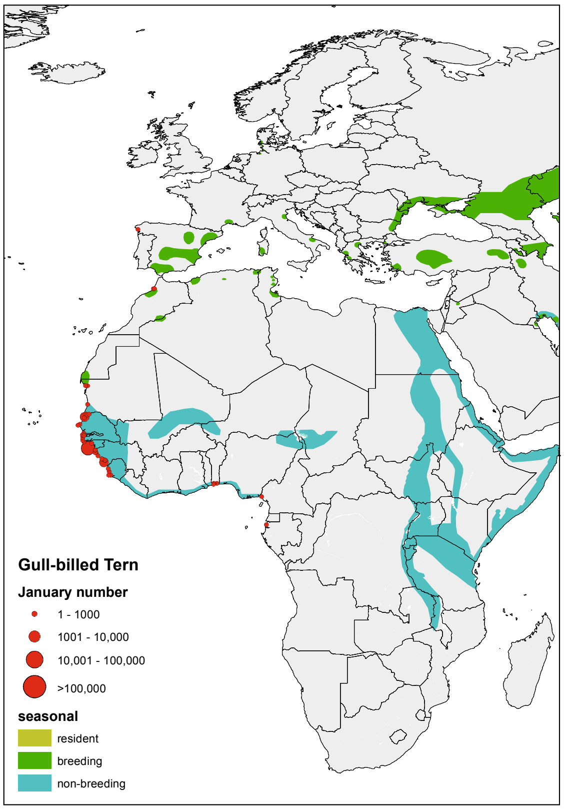

Figure A1.158. Distribution of Gull-billed Tern in the coastal East Atlantic Flyway in January 2014-2017. *Répartition de la Sterne hansel dans la voie de migration de la côte de l'Atlantique Est en janvier 2014-2017.*

Trend and population size

Population Gull-billed Tern	data	type	period-L	trend-L	assessment-L	period-S	tren-S	assessment-S	period popsize	popsize-min	popsize-max
nilotica, W Europe/W Africa	b	1a	1980-2012	1,03	moderate increase	2000-2012	1,02	moderate increase	2002-2012	37000	63000

Table A1.66. Summary of trend and population size for Gull-billed Tern. For explanation see table A.1.2. *Résumé de la tendance et de la taille de la population de la Sterne hansel. Pour l'explication, voir le tableau A.1.2.*

Saverio Gatto / Agami

Little Tern | Sterne naine | *Sterna albifrons*

Populations, distribution and ecology

The Little Tern is a widely, though sparsely distributed species, breeding in Europe and Africa as well as Asia and Oceania. In Europe, relatively small breeding numbers occur in most countries, both coastal and inland. In the East Atlantic Flyway, three populations have been identified covering two subspecies: the nominate with a population in NW-Europe and a population in the W-Mediterranean, and the resident *S. a. guineae* in West Africa. Important breeding populations in (south)western Europe occur in Spain, Italy, France and the UK. The *guineae* population in West Africa breeds in widely dispersed small colonies. In winter, European breeding birds migrate to West Africa. The breeding distribution of the Little Tern is also very dispersed and includes the coast but also the shores and islands of large rivers and lakes. Its preferred breeding sites (small colonies) are small islets of gravel, sand, shells or shingle within rivers, lakes or along beaches, in estuaries and in saltpans on sparsely vegetated or bare places. Outside the breeding season, coastal waters are preferred and foraging occurs in tidal creeks, lagoons and saltpans. Its diet consists mainly of small fish and crustaceans.

Arnold Meijer / Blue Robin

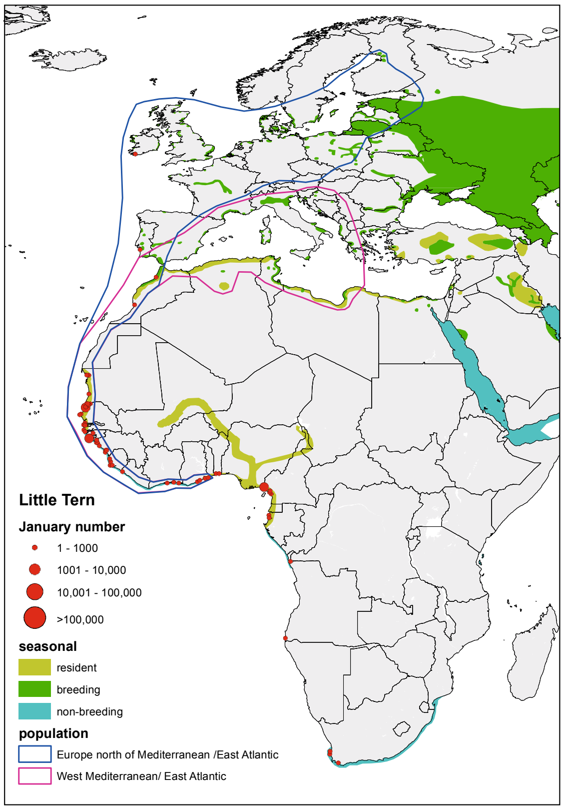

Figure A1.159. Distribution of Little Tern in the coastal East Atlantic Flyway in January 2014-2017. The populations are taken together for trend calculation. *Répartition de la Sterne naine dans la voie de migration de la côte de l'Est-atlantique en janvier 2014-2017. Les populations sont prises ensemble pour le calcul de la tendance.*

Marc Guyt / Agami

Trend and population size

Population Little Tern	data	type	period-L	trend-L	assessment-L	period-S	tren-S	assessment-S	period popsize	popsize-min	popsize-max
East Atlantic	w	2	1993-2017	0,99	moderate decline	2010-2017	0,99	uncertain			
Europe north of Mediterranean /East Atlantic									2000-2012	19000	25000
West Mediterranean/ East Atlantic									2002-2012	21000	28000
W Africa											

Table A1.67. Summary of trend and population size for Little Tern. For explanation see table A.1.2. *Résumé de la tendance et de la taille de la population de la Sterne naine. Pour l'explication, voir le tableau A.1.2.*

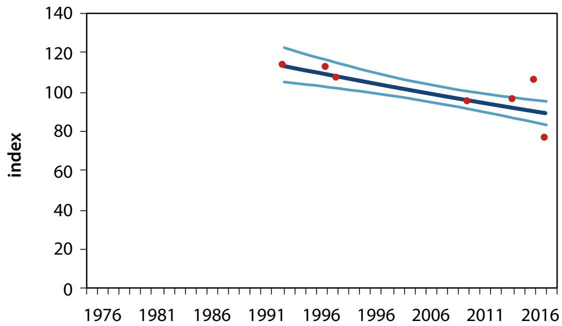

Figure A1.160. Trend of Little Tern, populations NW Europe/East Atlantic, W Mediterranean/East Atlantic and *S. a. guineae*. For explanation see fig. A1.4. *Tendance de la Sterne naine, populations Europe du Nord-Ouest / Atlantique Est, Ouest de la Méditerranée / Atlantique Est et* S. a. guinea*. Pour l'explication, voir fig. A1.4.*

Damara Tern | Sterne des baleiniers | *Sterna balaenarum*

Populations, distribution and ecology

Damara Terns breed in coastal areas of Namibia and South Africa and winter further north and west, probably as far as Ghana and Côte d'Ivoire but with the majority from Cameroon to South Africa. The species breeds in colonies on gravel and in stony places, often some kilometres inland, and also in salt pans and on deserted beaches. Outside the breeding season it occurs on exposed coasts where it forages in shallow water and feeds on small fish.

Pete Morris / Agami

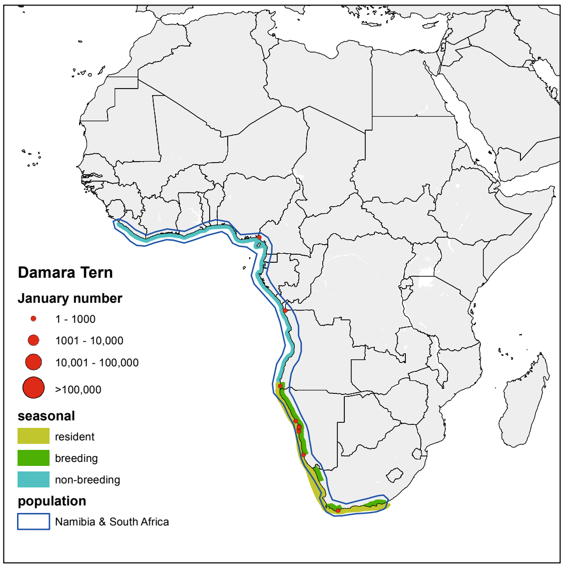

Figure A1.161. Distribution of Damara Tern in the coastal East Atlantic Flyway in January 2014-2017. For explanation see fig. A1.5. *Répartition de la Sterne des baleiniers dans la voie de migration de la côte de l'Atlantique Est en janvier 2014-2017. Pour l'explication, voir fig. A1.5.*

Trend and population size

Population Damara Tern	data	type	period-L	trend-L	assessment-L	period-S	tren-S	assessment-S	period popsize	popsize-min	popsize-max
Namibia & South Africa	w	1c	1992-2017	1,01	stable	2008-2017	1,00	stable	2012-2016	3000	7250

Table A1.68. Summary of trend and population size for Damara Tern. For explanation see table A.1.2. *Résumé de la tendance démographique et de la taille de la population de la Sterne des baleiniers. Pour l'explication, voir le tableau A.1.2.*

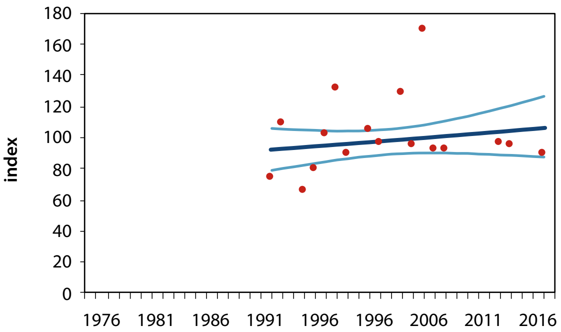

Figure A1.162. Population trend of Damara Tern. For explanation see fig. A1.4. *Tendance de la population de la Sterne des baleiniers. Pour l'explication, voir fig. A1.4.*

Pete Morris / Agami

Caspian Tern | Sterne caspienne | *Sterna caspia*

Populations, distribution and ecology

The Caspian Tern is a cosmopolitan species. Several flyway populations occur in the region. The Baltic breeding population mainly winters inland in Sahelian Africa and in Iberia - Morocco. A Southern African breeding population occurs both inland and at coastal sites. The West African population along the coast range from Mauritania south to Guinea during breeding with further dispersion during non-breeding. Habitat requirements are quite similar year-round: it prefers sheltered coastal waters and estuaries including saltpans, lagoons, inlets, bays, harbours, fresh-water lakes and saline inland wetlands. It often nests on shell and shingle beaches and islands. Roosting occurs on sandbars or shell banks. The diet consists mainly of fish.

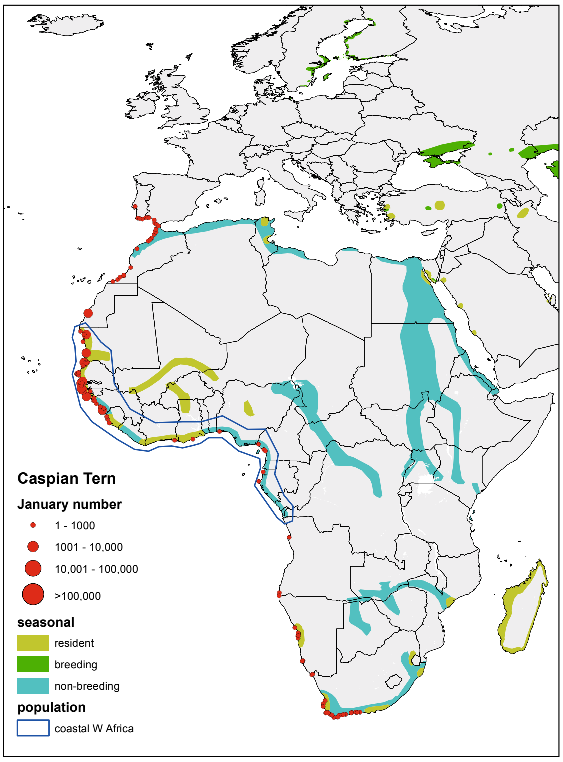

Figure A1.163. Distribution of Caspian Tern in the coastal East Atlantic Flyway in January 2014-2017. For explanation see fig. A1.5. *Répartition de la Sterne Caspienne dans la voie de migration de la côte de l'Atlantique Est en janvier 2014-2017. Pour l'explication, voir fig. A1.5.*

Trend and population size

Population Caspian Tern	data	type	period-L	trend-L	assessment-L	period-S	tren-S	assessment-S	period popsize	popsize-min	popsize-max
coastal W Africa	w	1c	1999-2017	1,13	strong increase	2004-2017	1,10	strong increase	2003-2014	45000	60000
S Africa	w	3	1992-2017	1,00	stable	2008-2017	0,94	uncertain	2013-2013	1900	2000

Table A1.69. Summary of trend and population size for Caspian Tern. For explanation see table A.1.2. *Résumé de la tendance et de la taille de la population de la Sterne caspienne. Pour l'explication, voir le tableau A.1.2.*

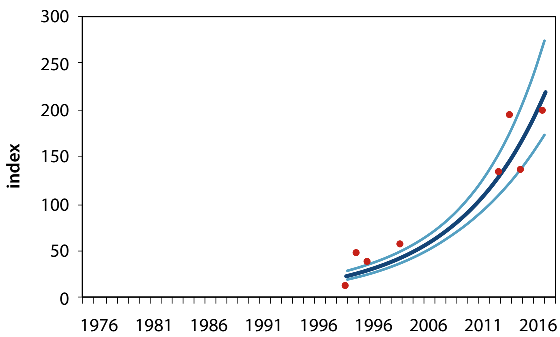

Figure A1.164. Population trend of Caspian Tern, population coastal W Africa. For explanation see fig. A1.4. *Tendance de la Sterne caspienne, population côtière de l'Afrique de l'Ouest. Pour l'explication, voir fig. A1.4*

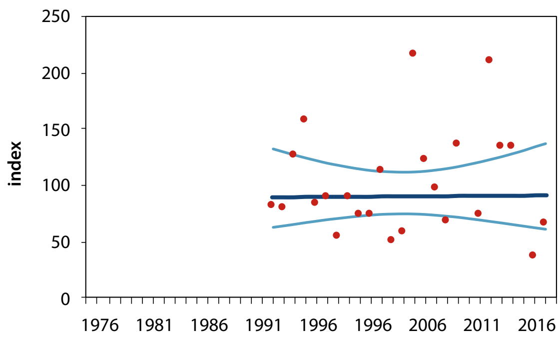

Figure A1.165. Trend of Caspian Tern in the Namibia - South Africa part of the coastal East Atlantic Flyway. For explanation see fig. A1.4. *Tendance démographique de la Sterne caspienne en Namibie et en Afrique du Sud dans la voie de migration de la côte de l'Est-atlantique. Pour l'explication, voir fig. A1.4.*

Hans Schekkerman

Common Tern | Sterne pierregarin | *Sterna hirundo*

Populations, distribution and ecology

The Common Tern is one of the most globally numerous and widespread tern species. In the East Atlantic Flyway, three populations occur, (1) a population breeding in western, central and south-western Europe and also including breeding birds from NW-Africa, (2) a population breeding in northern and eastern Europe and (3) a population breeding in West Africa. The European breeding birds mainly winter in Africa. The Atlantic coastal and marine waters are very important sites for both the local breeders and the birds with a European origin. Breeding in Europe is quite scattered, occurring both in coastal and inland situations. The main populations breed in Belarus, Fennoscandia, Germany, The Netherlands, Russia, Ukraine and the UK. The resident West African population is small and scattered along the coast of countries from Mauritania to Ghana. Migration shows a leapfrog pattern with the northernmost breeders wintering furthest south. Breeding occurs in marine and freshwater habitats, from sea-level to high mountains. Along the coast it prefers rocky surfaces on inshore islands, shingle and sand beaches, dunes and islands in estuaries, lagoons and saltmarshes. Inland it occurs on sand or shingle lake shores and gravel banks on river or lake islands, sand and gravel pits. Its diet is mainly fish and small crustaceans.


Arnold Meijer / Blue Robin

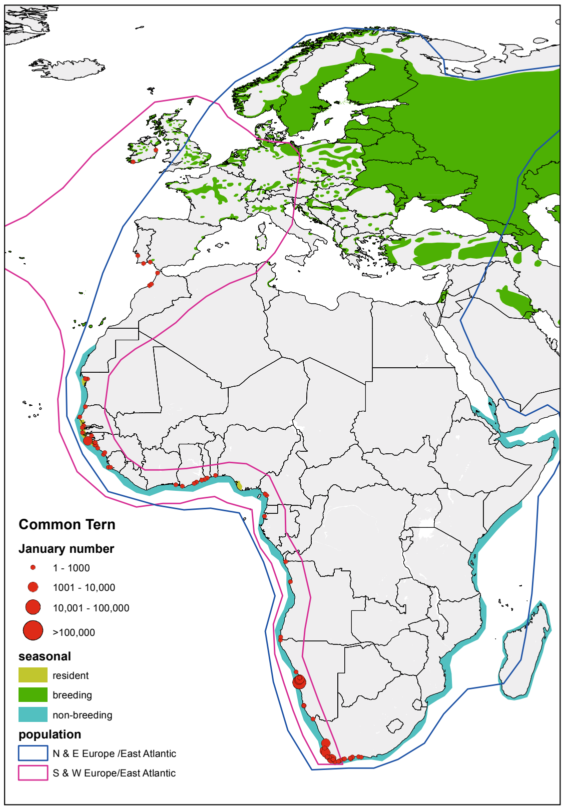

Figure A1.166. Distribution of Common Tern in the coastal East Atlantic Flyway in January 2014-2017. The populations are taken together for trend calculation. *Répartition de la Sterne pierregarin dans la voie de migration de la côte de l'Atlantique Est en janvier 2014-2017. Les populations sont prises ensemble pour le calcul de la tendance.*

Trend and population size

Population Common Tern	data	type	period-L	trend-L	assessment-L	period-S	tren-S	assessment-S	period popsize	popsize-min	popsize-max
East Atlantic	w	2	1993-2017	0,98	uncertain	2008-2017	0,95	uncertain			
N & E Europe /East Atlantic									1990-2013	760000	1600000
S & W Europe/East Atlantic									1997-2012	170000	220000
W Africa											

Table A1.70. Summary of trend and population size for Common Tern. For explanation see table A.1.2. *Résumé de la tendance et de la taille de la population de la Sterne pierregarin. Pour l'explication, voir le tableau A.1.2.*

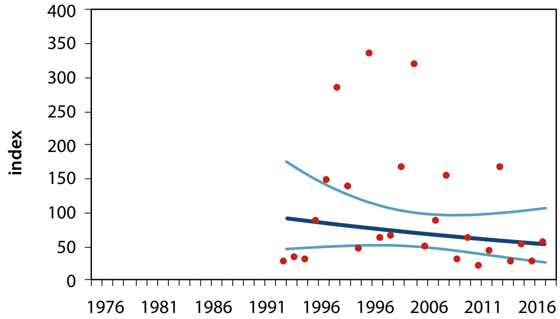

Figure A1.167. Trend of Common Tern, populations N&E Europe/East Atlantic, S&W Europe/East Atlantic and W Africa. For explanation see fig. A1.4. *Tendance de la Sterne pierregarin, populations N & E Europe / Atlantique Est, S & O Europe / Atlantique Est et Afrique de l'Ouest. Pour l'explication, voir fig. A1.4.*

Arnold Meijer / Blue Robin

Roseate Tern | Sterne de Dougall | *Sterna dougallii*

Populations, distribution and ecology

The Roseate Tern is a globally widespread species of mostly tropical and subtropical regions. The most northerly flyway population breeds in Western Europe and is treated in this report. Much further south along the East Atlantic Flyway a breeding population occurs also in South Africa. In Europe, the breeding distribution is scattered on offshore islands in the Atlantic region. The largest populations occur on the Azores and in Ireland, while much smaller numbers occur in mainland Portugal, the UK and France. Wintering occurs along the western African coast with the highest numbers probably in Ghana. Breeding occurs in colonies, often mixed with other tern species such as the Common Tern. It remains gregarious all year round, roosting in flocks and also congregating with other terns and gulls. Breeding occurs on islands and islets with rocky coasts, but also on shingle and sandy beaches. Outside the breeding season, the species remains coastal and pelagic (probably depending on colony location). Populations nesting in temperate regions feed over tide rips, shoals, inlets and upwelling areas. The diet is rather specialized compared to other terns and consists of small pelagic fish species such as Sandeel and Sprat.

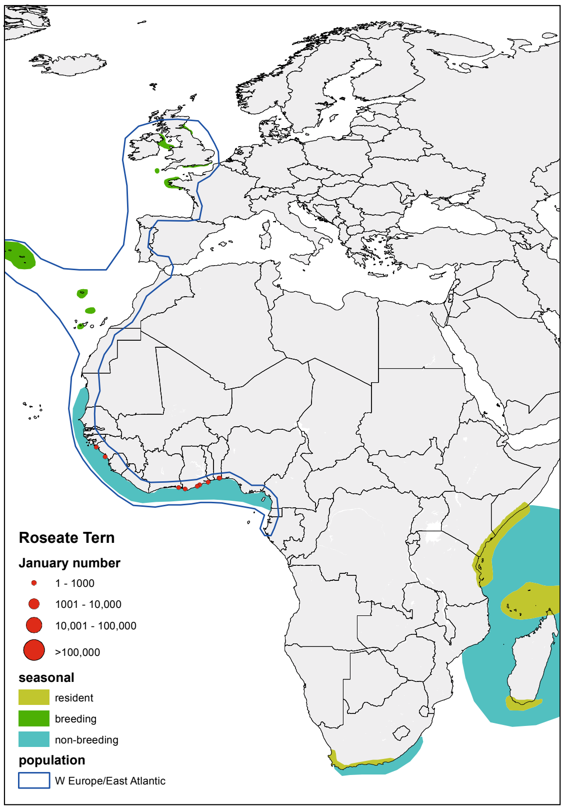

Figure A1.168. Distribution of Roseate Tern in the coastal East Atlantic Flyway in January 2014-2017. *Répartition de la Sterne de Dougall dans la voie de migration de la côte de l'Atlantique Est en janvier 2014-2017.*

Josh Jones / Agami

Trend and population size

Population Roseate Tern	data	type	period-L	trend-L	assessment-L	period-S	tren-S	assessment-S	period popsize	popsize-min	popsize-max
W Europe/East Atlantic	b	1a	1980-2012	1,02	moderate increase	2000-2012	1,05	moderate increase	2006-2012	6800	8650

Table A1.71. Summary of trend and population size for Roseate Tern. For explanation see table A.1.2. *Résumé de la tendance et de la taille de la population de la Sterne de Dougall. Pour l'explication, voir le tableau A.1.2.*

Ralph Martin / Agami

Sandwich Tern | Sterne caugek | *Sterna sandvicensis*

Populations, distribution and ecology

The Sandwich Tern is a strictly coastal species occurring in many parts of Europe and Africa as well as the Americas. The East Atlantic Flyway is used by populations breeding in northern and western Europe and wintering in the west Mediterranean Sea or on the western seaboard of Africa. Large breeding populations (>5,000 pairs) in the East Atlantic Flyway occur in The Netherlands, the UK, Germany, Denmark and France. The species breeds in large colonies and is gregarious throughout the year. Migration occurs along the Atlantic coasts. Probably part of the population winters in the Mediterranean Sea and mixes with individuals of eastern European origin (particularly Ukraine). Ring recoveries of Dutch birds show a clearly coast- bound pattern with birds found along the entire European and African Atlantic coast as far south as South Africa. Colonies occur on sandy islands, sand dunes and rocky islets near suitable foraging grounds (shallow sandy substrates). Outside the breeding season the species is found on the open sea, but also frequent s sandy or rocky beaches. The diet consists of fish (of up to 15 cm in length).

Arnold Meijer / Blue Robin

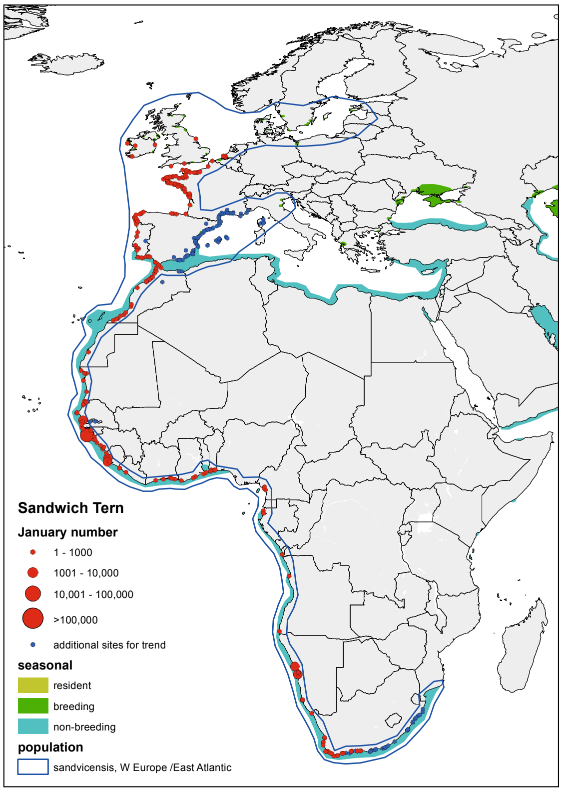

Figure A1.169. Distribution of Sandwich Tern in the coastal East Atlantic Flyway in January 2014-2017. For explanation see fig. A1.5. *Répartition de la Sterne caugek dans la voie de migration de la côte de l'Atlantique Est en janvier 2014-2017. Pour l'explication, voir fig. A1.5.*

Trend and population size

Population Sandwich Tern	data	type	period-L	trend-L	assessment-L	period-S	tren-S	assessment-S	period popsize	popsize-min	popsize-max
sandvicensis, W Europe /East Atlantic	w	1c	1984-2017	1,05	moderate increase	2009-2017	1,02	uncertain	2000-2012	160000	186000

Table A1.72. Summary of trend and population size for Sandwich Tern. For explanation see table A.1.2. *Résumé de la tendance et de la taille de la population de la Sterne caugek. Pour l'explication, voir le tableau A.1.2.*

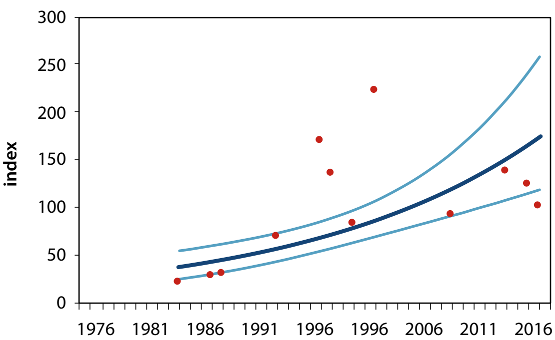

Figure A1.170. Population trend of Sandwich Tern, population W Europe/East Atlantic. For explanation see fig. A1.4. *Tendance de la population de la Sterne caugek, population de l'Ouest de l'Europe / Atlantique Est. Pour l'explication, voir fig. A1.4.*

Royal Tern | Sterne royale | *Sterna maxima*

Populations, distribution and ecology

Royal Terns of the subspecies *S. m. albididorsalis* breed on the West African coast from Mauritania to Guinea and use a wider coastal range outside the breeding season. The species is gregarious year-round. It shows a preference for inaccessible breeding sites such as sandy or coral islands, lacking vegetation and offering a good vantage point. Foraging occurs in coastal waters including estuaries, lagoons and mangroves. The diet consists mainly of small fish, but also squid, shrimps and crabs.

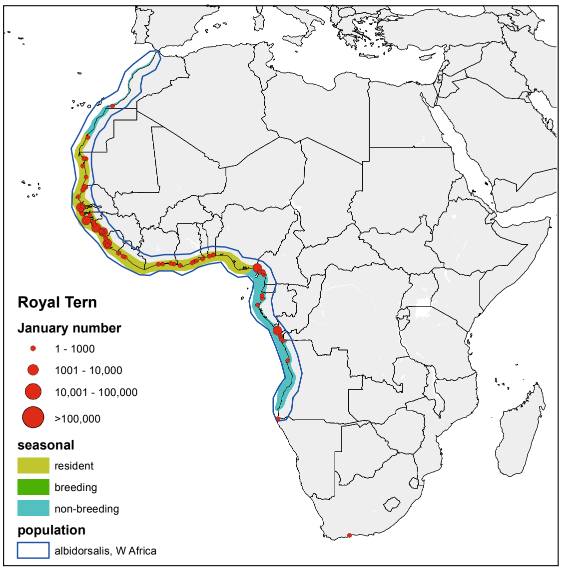

Figure A1.171. Distribution of Royal Tern in the coastal East Atlantic Flyway in January 2014-2017. For explanation see fig. A1.5. *Répartition de la Sterne royale dans la voie de migration de la côte de l'Est-atlantique en janvier 2014-2017. Pour l'explication, voir fig. A1.5.*

Trend and population size

Population Royal Tern	data	type	period-L	trend-L	assessment-L	period-S	tren-S	assessment-S	period popsize	popsize-min	popsize-max
albidorsalis, W Africa	w	1c	1992-2017	1,01	uncertain	2009-2017	0,78	steep decline	2003-2005	255000	315000

Table A1.73. Summary of trend and population size for Royal Tern. For explanation see table A.1.2. *Résumé de la tendance et de la taille de la population de la Sterne royale. Pour l'explication, voir le tableau A.1.2.*

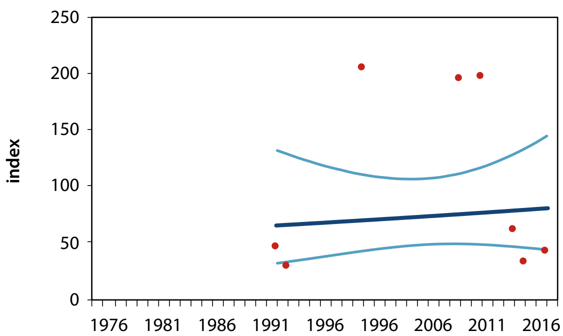

Figure A1.172. Population trend of Royal Tern, population *S. m. albididorsalis*. For explanation see fig. A1.4. *Tendance démographique de la population de la Sterne royale, population* S. m. albididorsalis. *Pour l'explication, voir fig. A1.4.*

Jacques van der Neut / Agami

Greater Crested Tern | Sterne huppée | *Thalasseus bergii*

Populations, distribution and ecology

Greater Crested Terns of the nominate subspecies breed on the coast from Namibia to South Africa and use a wider coastal range outside the breeding season. The species is highly gregarious in the breeding season and roosts in flocks during the non-breeding season, although individuals usually forage alone or in small groups. Nesting occurs mostly on offshore islands, on bare sand, rock or coral. The species forages mainly in shallow coastal waters including estuaries, lagoons and mangroves, but may also venture far out to open sea. The diet consists predominantly of pelagic fish of 10-50 cm length, but also includes squid, shrimps and crabs.

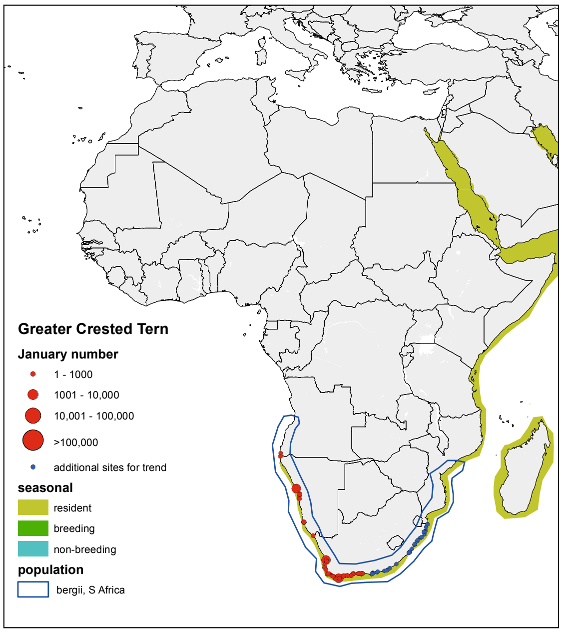

Figure A1.173. Distribution of Greater Crested Tern in the coastal East Atlantic Flyway in January 2014-2017. For explanation see fig. A1.5. *Répartition de la Sterne huppée dans la voie de migration du de la côte de l'Atlantique-Est en janvier 2014-2017. Pour l'explication, voir fig. A1.5.*

Trend and population size

Population Greater Crested Tern	data	type	period-L	trend-L	assessment-L	period-S	tren-S	assessment-S	period popsize	popsize-min	popsize-max
bergii, S Africa	w	1b	1995-2017	1,05	moderate increase	2008-2017	1,03	uncertain	1994-1996	15000	25000

Table A1.74. Summary of trend and population size for Greater Crested Tern. For explanation see table A.1.2. *Résumé de la tendance et de la taille de la population de la Sterne huppée. Pour l'explication, voir le tableau A.1.2.*

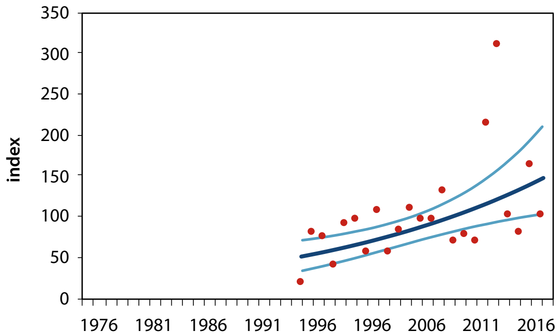

Figure A1.174. Population trend of Greater Crested Tern, population *T. b. bergii* Southern Africa. For explanation see fig. A1.4. *Tendance de la population de la Sterne huppée, population* T. b. bergii *Afrique australe. Pour l'explication, voir fig. A1.4.*

Ralph Martin / Agami

Arie Ouwerkerk / Agami

Bar-tailed Godwits | **Barge rousse** *(Limosa lapponica) in the Wadden Sea near Terschelling, Netherlands*

Audouin's Gull | **Goéland d'Audouin** *(Ichthyaetus audouinii)*
Spain (Arnold Meijer / Blue Robin)

Annex 2. Environmental monitoring of the East Atlantic Flyway, 2017

Suivi environnemental de la voie de migration Est-Atlantique, 2017

André van Kleunen, Claudien Nsabagasani, Geoffroy Citegetse, Tim Dodman & Marc van Roomen

A2.1. Introduction

The East Atlantic Flyway is a recognized route for migratory birds, stretching from the Arctic through Western Europe to the entire western coastline of Africa. The flyway also supports a substantial human population, with numerous cities, industries and activities all along the coastal zone. In some areas, people and wildlife, including migratory birds, co-exist in harmony, but in other areas human activities exert great pressures on the ecosystems and biodiversity. Systematic waterbird censuses are essential to assess the conservation status of waterbird populations. However, proper information on the environmental status of critical sites for waterbirds is also needed to inform policy and management. Only through a combination of both species and site information it is possible to clarify causes of changes in waterbird numbers and point to possible solutions for undesired developments.

The main focus of waterbird monitoring has been on waterbird numbers itself. However in recent years the call for integrated collection of data about pressures and other factors causing changes in bird numbers has increased. In 2013 a framework and programme outline for integrated monitoring of coastal waterbird populations and their sites along the East Atlantic Flyway was developed (van Roomen *et al.* 2013). This programme comprises abundance monitoring, environmental monitoring and monitoring of vital rates. The abundance monitoring and environmental monitoring were further developed adopting the IWC and IBA monitoring methodologies. For the Atlantic coast of Africa further guidance was developed (van Roomen *et al.* 2014). Experiences with these methods and results were collected during pilot counts in January 2013 and a 'total count' in January 2014 (van Roomen *et al.* 2015). While the abundance monitoring yielded useful results enabling comparisons along the flyway, the environmental monitoring data appeared less easy to collect, analyse and report. It became clear that national coordinators and field teams were much more focused on counting birds than on describing environmental circumstances. Therefore an improved method was developed, hopefully more appealing to the coordinators and field teams, asking them a set of specific questions about human use, pressures and

Tim Dodman

Collected rubbish from a coastal beach in Guinea Conacry

Menno Hornman

Observers involved in bird and environmental monitoring in Cameroon conservation measures present at the sites they visited. After workshops in Europe and Africa and some training in Africa, this method was implemented in the 2017 total count of the Coastal East Atlantic Flyway. In this Annex the basic results of this monitoring are reported. In chapter 4 of this report these results, together with other references and expert interpretation, are used to assess the environmental conditions for waterbirds along the flyway, identify the main pressures and point to conservation measures needed.

A2.2. Methods

The methods used for environmental monitoring in 2014 (van Roomen *et al.* 2015) focused directly on human threats to waterbirds, whilst the new methodology follows a stepwise approach starting with the characterisation of natural factors at the sites, then describing human activities present, followed by an assessment of their impact on birds. A fourth category of questions asked whether conservation measures are in place and effective. In the paragraphs below these questions are presented in detail.

A2.2.1. Natural factors

Data on habitat, some special natural characteristics and influential natural processes that could be relevant for waterbird abundance were asked for and assigned with the qualitative scores 'many', 'some' and 'no' :

Habitat	- what is the most important habitat of the site? - marine beach/sea - coastal lagoon/tidal flats/estuarine - river/floodplain - natural lake - natural marsh - man made reservoir/dam - man made fishponds/saltpans - man made agricultural fields
Natural characteristics	- mudflats with foraging waders - shallow water where herons and large-legged waders can forage - small islands with vegetation without humans - small bare islands without humans - seagrass beds or other submerged plants - saltmarsh with foraging waterbirds - semi-natural grassland and/or ricefields with foraging waterbirds - shellfish as food for waders and other waterbirds - fish as food for waterbirds - birds as predators of waterbirds (falcons, other) - mammals as predators of waterbirds (jackals, foxes)
Natural processes	- vegetation change/succession of surrounding wetland - large water level changes (extreme floods, drying out) - high sedimentation levels at the site - high levels of erosion at the site - other important natural processes influencing the birds (describe)

A2.2.2. Human activities

Data on human activities present that could be relevant for the abundance of waterbirds were collected generally semi-quantitatively by scoring their presence at a scale of 0 (absent) to 10 (everywhere/high intensity). The following activities were asked for:

Agriculture	- farming area - farming type (1= crop land, 2 =livestock land, 3 =mixed) - farming intensity - other farming type (specify and score)
Buildings/ built up areas	- houses - industrial area - recreation/tourism area - other (specify and score)
Transportation	- presence of car and train traffic - presence of air traffic - presence of shipping traffic - other (specify and score)
Energy production and mining	- oil, gas or mineral drilling sites - wind farms - other sources of renewable energy - other (specify and score)
Exploitation of fauna and flora	- hunting and trapping - fishing by locals - fishing by outsiders - shellfish gathering - aquatic plants gathering - forest (mangrove) logging - other (specify and score)
Tourism/ military activity	- recreation/tourism - military exercises - other (specify and score)
Modifications of the natural system by humans	- reclamation and/or draining - changed water tables through dams etc. - salinization - siltation - fires - other (specify and score)
Alien species	presence of alien plants, fish, invertebrates
Substances from human presence	- domestic and urban waste water - industrial effluents - agricultural effluents - garbage - other (specify and score)
Other human activities	- specify and score

A2.2.3. Pressures

What is a pressure?

The generally accepted definition of a pressure is: an activity or process that has caused, is causing or may cause the destruction, degradation, and/or impairment of biodiversity values (Salafsky *et al.* 2008). So a pressure could be a human activity (or the consequences of it) in or near a wetland, such as construction of a hydro-electric dam, but also at a larger scale, like global warming. Pressures can affect bird populations in different ways, for instance by direct mortality (e.g. hunting or collision with wind turbine), habitat loss (e.g. urbanisation, expansion of farming), habitat degradation (e.g. intensification of farming, hydrological changes), decrease in food availability (e.g. overfishing), or disturbance (e.g. expansion of recreation in species' habitats). Generally the term pressure is used when it is happening now and the term threat for potential future pressures, but these terms are also used as synonyms.

Which pressures?

Pressure classifications provide a list of both anthropogenic and natural factors that can affect biodiversity, classified by theme. A detailed list of pressures was developed by Salafsky *et al.* (2008) and is applied to the EU Bird Directive reporting (DG Environment 2017). In IBA monitoring a more concise list is used (BirdLife International 2006). From these sources we made a selection aimed at waterbirds and wetlands in the coastal East Atlantic Flyway:

Agriculture	- presence or expansion of farming causing habitat destruction - presence or intensification of farming causing lower habitat quality - other (specify and score)
Built-up areas	- presence or expansion of buildings causing habitat destruction - presence or expansion of buildings causing lower habitat quality - other (specify and score)
Transportation	- roads and/or railroads causing habitat destruction, disturbance etc. - air traffic causing disturbance and lower habitat quality - ship traffic causing disturbance and lower habitat quality - other (specify and score)
Energy production and mining	- oil, gas or mineral drilling causing habitat destruction or deterioration - wind farms causing habitat destruction or deterioration - other renewably energy causing habitat destruction or deterioration - other (specify and score)
Overexploitation	- high hunting pressure on waterbirds - disturbance of waterbirds by hunting other species - overfishing prey fish of waterbirds - over-gathering of prey shellfish of waterbirds - changes in habitat quality or food web for waterbirds through (shell)fishing - overexploitation of aquatic plants affecting habitat or food of waterbirds - presence / increase in aquaculture causing habitat destruction / deterioration - forest (mangrove) logging causing habitat destruction / deterioration other (specify and score)
Human intrusions & disturbance	- recreational/tourism activities causing habitat destruction / disturbance - war / civil unrest / military exercises causing habitat destruction / disturbance - other (specify and score)
Natural system modifications	- habitat destruction or deterioration through land reclamation / drainage - habitat destruction or deterioration through dams / other water management - habitat destruction or deterioration through human induced salinization - habitat destruction or deterioration through human induced siltation - habitat destruction or deterioration through human induced fires - other (specify and score)
Invasive & alien species	- competition for food or other resources or habitat deterioration
Pollution	- habitat change or direct health problems through urban waste water - habitat change or direct health problems through industrial effluents - habitat change or direct health problems through agriculture effluents - habitat change or direct health problems through garbage - other (specify and score)

Impact and scoring

For the assessment of the impact of the pressure we follow the method as developed for Important Bird and Biodiversity Area monitoring (BirdLife International 2006):

Timing	- Did it happen in the past, is it happening now or is it expected to happen in the near future?
Scope	- Which part (area) of the wetland is affected (whole, most, some or small)?
Severity	- How strong is the impact (rapid, moderate, slow)?

In contrast to IBA monitoring we asked for a more detailed scoring range of 1-10 (as in scoring presence of human activities) for scope and severity instead of the 0-3 scale used in BirdLife International (2006), in order to make the monitoring more sensitive to detecting changes (however see under 2.5).

Tim Dodman

A2.2.4. Conservation measures

To evaluate the extent and effectiveness of conservation measures taken the following questions were asked and extent scored at a scale of 1 (absent at site/no effect) to 10 (100% of site/ very effective):

General	- no measures needed for the conservation of the site/species - measures needed, but not taken
Protection status	- area internationally designated (Ramsar, SPA, WHS, biosphere reserve) - area nationally legally protected - management plan made - management plan implemented
Agriculture	- increase in agricultural land use regulated - extensification of farming practices taken - input of nutrients and pesticides/herbicides regulated - compensation/mitigation measures taken - others (specify)
Spatial planning	- increase in regulation of urbanisation regulated - compensation/mitigation measures taken - others (specify)
Energy exploitation	- exploitation of fossil fuels/mining resources regulated - renewably energy exploitation regulated - compensation/mitigation measures taken
Hunting and fishing	- regulation of hunting in place - regulation of fishery in place - regulation of shellfish gathering in place - regulation of aquatic plants gathering in place - regulation of forest/mangrove logging in place - replanting of forest/mangroves - others (specify)
Recreation & military exercises	- regulation/zonation of tourism/recreation - regulation/zonation of military activities - others (specify)
Aquatic environment	- restoring/improving water quality - restoring/improving the hydrological regime - others (specify)
Invasive species	- control measures against invasive species taken - control measures against other problem species taken - others (specify)
Pollution	- urban and industrial waste management - regulation of the emission of airborne eutrophication/acidifying substances - noise reduction measures - others (specify)
Species or species group management	- reintroduction schemes in place - others (specify)
Specific habitat restoration	- counteraction of succession/ habitat management - protection against erosion taken - habitat restoration measures taken - others (specify)
Others	- (specify)

A2.2.5 Data collection and analysis

National coordinators of the countries involved in the flyway monitoring were requested to organise the filling out of the environmental monitoring forms at their selected main sites. The forms should preferably be drafted by the field crew visiting the waterbird census sites in cooperation with local site managers, then subsequently validated by the national coordinator using published sources as well. In practice the filling out of the forms was mostly done by the national coordinators directly based on their knowledge of the sites. Based on the first raw results as send to us, corrections and additions were made by the authors when misinterpretation of some questions or strange scoring was apparent. This involved mostly changes between zeros and unknowns, questions left open or scores standing out in comparison with other sites. When needed feedback from national coordinators was asked for.

We selected 88 important sites (of the 1300 main sites during non-breeding) along the flyway as priority sites for

region	coastal lagoon/ tidal flat/ estuary	agricultural fields	fish-ponds	reservoir	beach, sea	natural lake	natural marsh	river, flood-plain	Total
Northwest-Europe	20	6	2	1	16		1	3	49
Iberia, North Africa	7	2	3		3		4		19
West Africa	8	2	1	2	4	2	2	3	24
Gulf of Guinea	12	1	2		8	1	3	4	31
Southern Africa	4		1		4				9
total	**51**	**11**	**9**	**3**	**35**	**3**	**10**	**10**	**132**

Table A2.1. Overview of habitats recorded at the selected sites per region . Numbers give the number of sites. *Vue d'ensemble des habitats enregistrés sur les sites sélectionnés par région. Les nombres indiquent le nombre de sites.*

the collection of environmental information. These sites represent 60% of all waterbirds wintering along the coastal East Atlantic Flyway and an average of 57% per species (range 10-90%). Of these, we received data from 73 sites spread over 22 countries. No information was provided from South Africa, Spain and the United Kingdom. The data from the submitted forms were merged in a database and some statistics were calculated.

To summarize the results the coastal East Atlantic Flyway was subdivided into the following geographical regions, and the 88 sites were allocated to each of these:

Northwest Europe	- Denmark, Poland, Germany, United Kingdom, Ireland, Netherlands, Belgium, Atlantic France
Iberia & North Africa	- Atlantic Spain, Portugal, Atlantic Morocco
West Africa	- Mauritania, Senegal, Gambia, Guinea Bissau, Guinea, Sierra Leone
Gulf of Guinea	- Liberia, Ivory Coast, Ghana, Togo, Benin, Nigeria, Cameroon, Gabon, Congo, Democratic Republic Congo, Angolan enclave Cabinda
Southern Africa	- Angola, Namibia and South Africa

As we did not receive enough answers to some questions on the environmental forms and some of the results seemed not very credible, we selected subjects with sufficient flyway-wide coverage and consistency for reporting in this Annex. In addition, as some confusion was apparent with the scoring in the new 1-10 scale and to facilitate the production of maps we applied the following:

Natural factors	- eclassified presence to yes/no/unknown
Human activities	- reclassified scores 1-10 to: not present (1), little (2-4), much (5-10)
Pressures	- reclassified scores 1-10 to 0-3 as in BirdLife International (2006) - for timing: 1➞3 (now); 2➞2 (in near future, within four years); 3➞1 (in the long term, beyond 4 years); 4➞0 (in the past) - for scope and severity: 1➞0 (small area or few individual birds affected, <1% deterioration over 10 years); 2-4➞1 (some of area or bird population, 10-50%), slow (1-10%); 5-7➞2 (most of area or bird population (50-90%), moderate (1030%); 8-10➞3 (whole area or bird population (>90%), rapid (>30%). - for combination of all: 0➞no (impact), 1-3➞little (impact), 49➞much (impact)
Conservation measures	- reclassified presence to yes/no/unknown

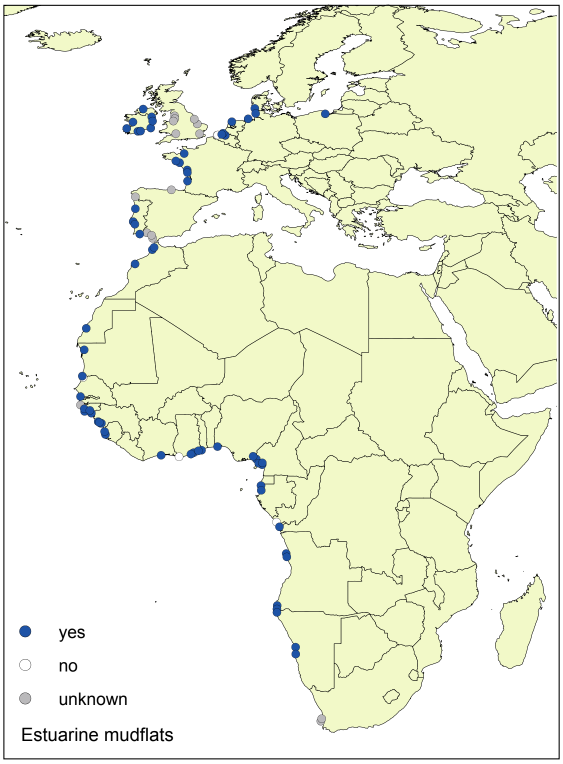

Figure A2.1. Presence of estuarine and tidal mudflats at the selected main sites. *Présence de vasières estuariennes et de vasières à marée sur les principaux sites sélectionnés.*

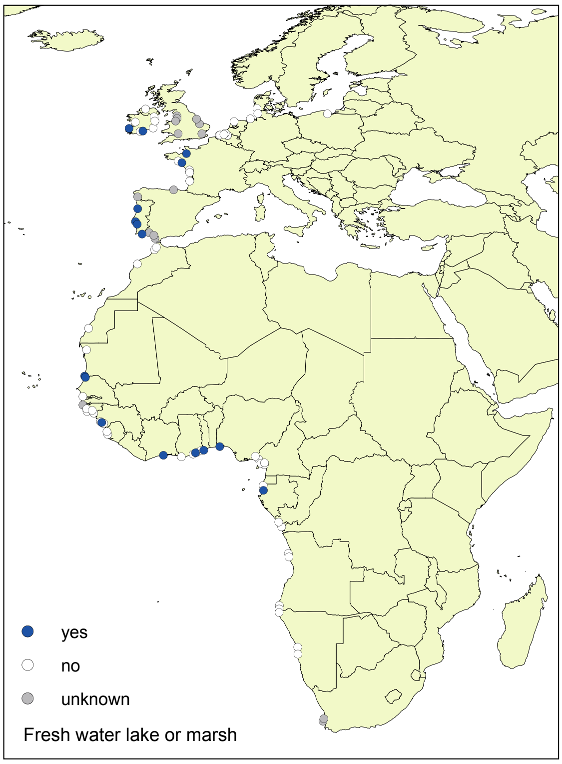

Figure A2.2. Presence of freshwater lakes and marshes at the selected main sites. *Présence de lacs et de marais d'eau douce sur les principaux sites sélectionnés.*

A2.3. Results

A2.3.1. Natural factors

Habitats

All sites selected for analysis were located on or near the coast. Estuarine sites, tidal mudflat areas, coastal lagoons and inshore sea and beaches constituted the dominant habitat types of the selected sites along the flyway between Denmark and South Africa (figs A2.1-A2.2, table A2.1). Freshwater habitats and artificial habitats were also quite widely represented, but in a minority of sites (note that some coastal lagoons described were fresh). Several sites contained more than one habitat type, particularly the larger ones.

Potential predation

Besides food resources (good habitats), (presumed) predation risk is also an important natural factor influencing distribution and numbers of waterbirds, both within and between sites (Thorup & Koffijberg 2016). In addition to actual mortality, changes in behaviour of prey species caused by the presence of predators are also important in this respect. The presence of predators and predation, both raptors (large falcons) and mammals (foxes, jackals) is a common phenomenon in wetlands sites along the East Atlantic Flyway (figs A2.3-A2.4).

A2.3.2. Human activities

Coastal wetlands have always been used by humans for all sorts of activities, ranging from providing livelihood to developing large harbours and economic activities. This section provides an overview of the different types of human activities present in the monitored sites.

Agriculture

Farming, including crop production, market gardening and livestock rearing is a widespread activity in the coastal zone and was reported from most of the selected main sites, except for those in the southern half of Africa. The area dedicated to farming is relatively high in a majority of the African sites. In Europe, the area of farming within the wetlands is usually limited - they are often managed as nature reserves but many are surrounded by large areas of intensively used farmland (figs A2.5- A2.6).

In Western Europe, meadows and grasslands around coastal wetlands, managed principally for livestock and dairy production, provide breeding habitat for coastal waterbirds, such as Common Redshank and Eurasian Oystercatcher, and feeding habitat for European Golden Plover, Eurasian Curlew, Eurasian Wigeon and geese. In North Africa many wetlands, including some in protected areas, are used for farming. Merja Zerga in Morocco is a designated Ramsar Site and a biological and hunting reserve, supporting large concentrations of waterbirds.

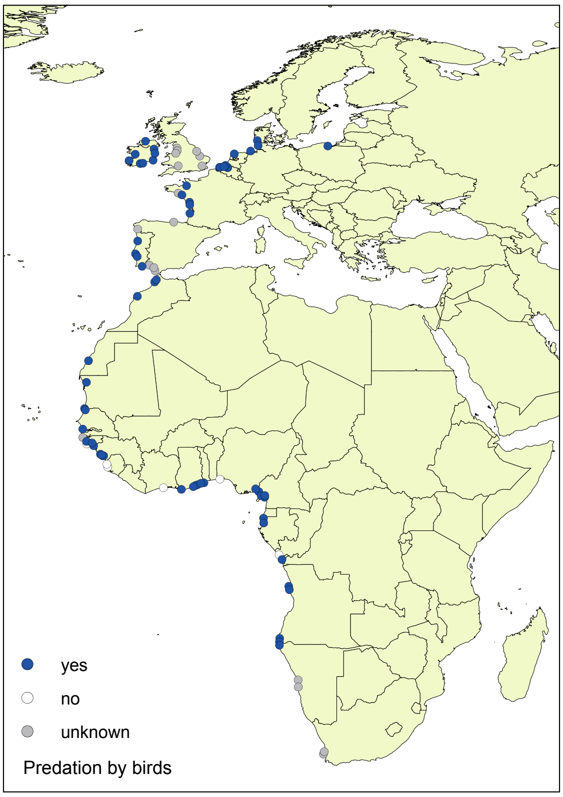

Figure A2.3. Presence of bird predators and predation at the monitored sites. *Présence d'oiseaux prédateurs et prédation sur les sites suivis.*

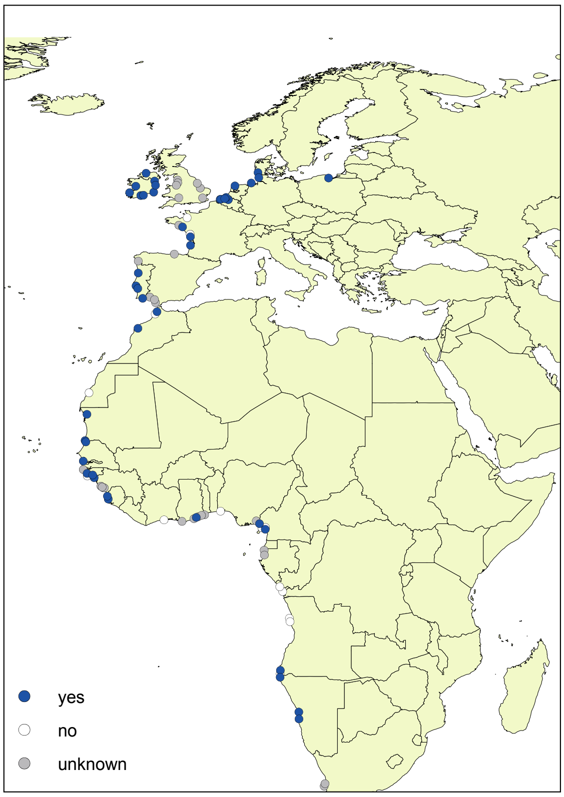

Figure A2.4. Presence of mammalian predators and predation at the monitored sites. *Présence de mammifères prédateurs et prédation sur les sites suivis.*

However, it also supports a significant agricultural community. 90% of local households participate in generally small-scale agriculture, with farmland often irrigated by pumps extracting water from the lagoon, and crops applied with fertilisers and chemicals; cattle and sheep rearing is also widespread (Dakki *et al.* 2011). Farming is also common around coastal wetlands in West Africa. The Senegal Delta supports a significant area of large-scale ricefields alongside local farms and livestock rearing alongside areas set aside for nature conservation, such as Diawling, Djoudj and Ndiaël. From the Casamance to Sierra Leone, rice fields grown behind the protection of mangroves support a variety of waterbirds; they require specialist techniques and much labour, and are often prone to abandonment due to poor water management (Bos *et al.* 2006). In the Gulf of Guinea, intensive agriculture occurs in the coastal belt, but is not specifically associated with wetlands, e.g. palm, cocoa, banana, rubber and other plantations. However, mixed farming is an important activity for residents around wetlands in this and other regions. The main crops grown at Ghana's coastal lagoons include cassava, maize and vegetables, whilst small-scale livestock production is also common (Piersma & Ntiamoa-Baidu 1995). Further south, much of the coastal zone between Angola and South Africa is very dry, providing limited opportunities for farming. Agricultural lands have taken over parts of the Orange River Floodplain at the Namibia - South Africa border, although some of these lands provide food and roost sites for a variety of waterbirds (Anderson 2006).

Urbanisation

The Atlantic coastal zone of Europe and Africa supports a significant human population and major cities. Urbanisation is a widespread development, as populations and migrations to cities increase, resulting in expansion of the city boundaries in surrounding farming areas or coastal habitats. As an example in Africa, urban encroachment into the fringes of Calabar, Nigeria, has a significant impact on agricultural land, lowering food production and rendering farmers unemployed (Yaro *et al.* 2014). Such measures often have knock-on effects in surrounding landscapes, such as conversion of more wetlands to replace lost agricultural lands.

Most selected sites were inhabited by people to some extent, except for some protected areas, (fig. A2.7). At many sites, protection status does not exclude human settlement. Higher levels of industrial activity were recorded at important seaports, such as in Wouri Estuary, Cameroon, Walvis Bay, Namibia, Dublin Bay, Ireland, Antwerp, Belgium and Hamburg, Germany. However, industrialisation was generally low at most selected sites in West Africa (fig. A2.8).

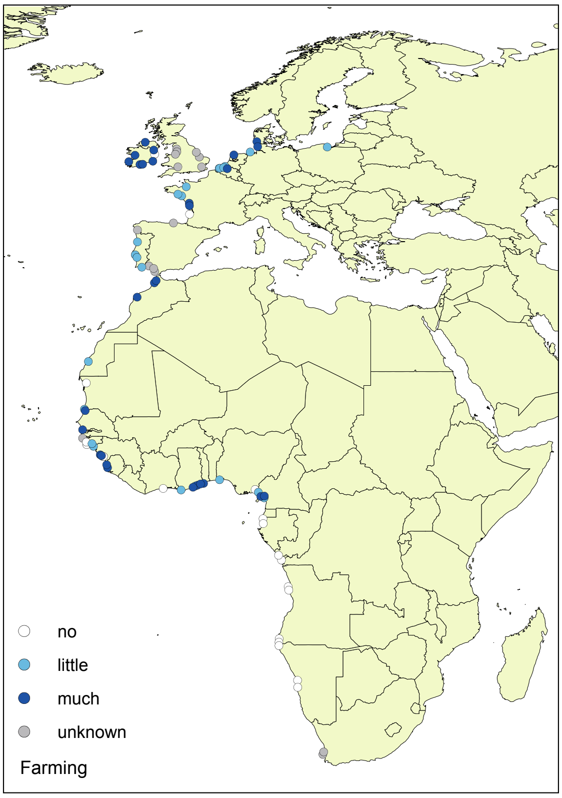

Figure A2.5. Presence of farming in and around the selected sites. *Présence d'agriculture dans et autour des sites sélectionnés.*

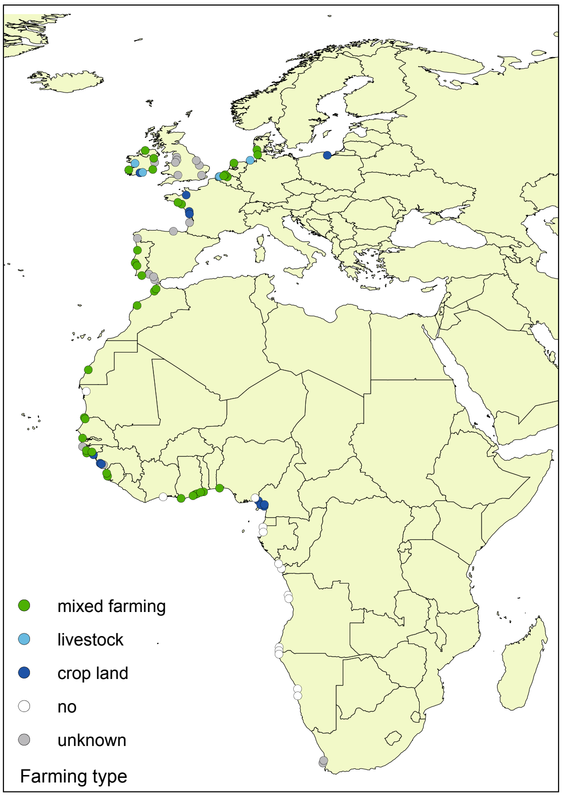

Figure A2.6. Type of farming in and around the selected sites. *Type d'agriculture dans et autour des sites sélectionnés.*

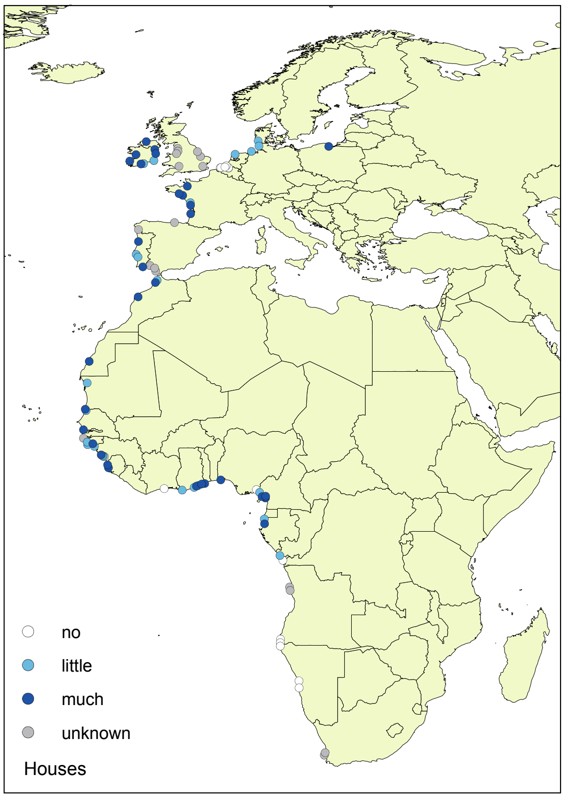

Figure A2.7. The presence of domestic properties at the monitored sites. *La présence de propriétés domestiques sur les sites suivis.*

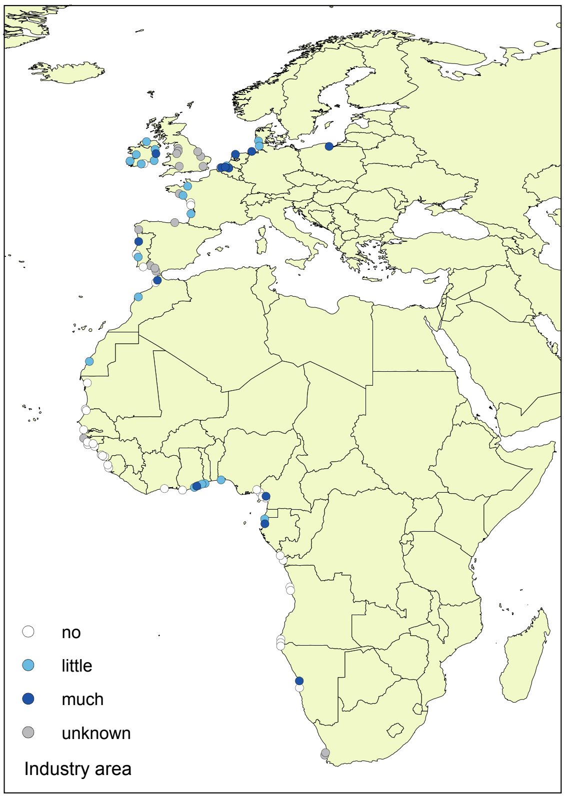

Figure A2.8. The presence of industry at the monitored sites. *La présence de l'industrie sur les sites suivis.*

Energy production and mining

Some coastal waters of the East Atlantic flyway contain large fossil fuel stocks, like the North Sea and Gulf of Guinea. In the monitored sites fossil fuel drilling takes place in a minority of the sites. It is mainly present in the Wadden Sea (where also deep salt mining occurs) and in the Gulf of Guinea.

Exposed coastal wetlands usually constitute windy places and are therefore sometimes targeted for wind energy development. Wind turbines are found in or near the monitored sites at the border of the Wadden Sea, around sites in the Dutch Southwestern Delta and in Belgium. They are much scarcer in the other sites for which we have environmental data, although not completely absent; for instance substantial wind energy parks have been built in countries like Portugal and Morocco.

Fisheries

Fisheries is one of the most widespread uses of coastal wetlands along the East Atlantic Flyway, present from offshore and inshore to within the wetlands themselves (fig. A2.9). Inshore fisheries are common along most coastlines, including fishing for lobsters and crabs. Most of this fishing is done by locals, and it was recorded widely at the selected sites. Offshore fisheries are a major commercial venture across most of the region, with productive major fisheries in areas such as the North Sea, Western and Southern Africa. This is often carried out by foreign fleets, and was recorded quite widely near selected sites in West Africa and the Gulf of Guinea.

Fishing is widespread in most West African coastal wetlands. Many fishermen move quite far along the coast in search for fish, often crossing international borders. The Imraguen communities of Mauritania catch the migratory yellow mullet in the shallow waters of the Banc d'Arguin National Park, sailing in traditional *lanches* whilst motorised boats are banned (thus excluding foreign fleets). However, sharks and rays have been exploited heavily in recent years (El-Hacen 2018). In the Sine Saloum Delta in Senegal, the estuarine fisheries resource has been quite fully exploited for several years (Diaw *et al.* 1993). Lagoon fisheries is a major source of livelihood for people living around Keta Lagoon, Ghana, where Tilapia are mainly caught and sold locally, many being transported to Accra and other urban centres (Piersma & Ntiamoa-Baidu 1995).

Fisheries in Namibia benefits from a rich marine ecosystem fed by the Benguela current, as well as an up-and-coming aquaculture sector (Chiripanhura & Teweldemedhin 2016). The mainly offshore fishery occurs outside of the selected sites; the same fish however also support large populations of resident and migratory waterbirds, including cormorants and terns.

Shellfish gathering was recorded widely at selected sites along the flyway (fig. A2.10), mostly carried out by locals in

Encroachment of settlements into wetlands.

African tidal flats, whilst industrial shellfish breeding and harvesting is common on the Atlantic shores of Western Europe in Portugal, France and The Netherlands.

Hunting and trapping

Apart from fisheries, other forms of exploitation of coastal wetlands include hunting and trapping of wildlife and the harvesting of wild plants. Wetland grasses and reeds have been used for centuries for thatch and many other purposes. Other related uses include the production of honey. Hunting of waterbirds takes place in most regions but was not reported from selected sites in Namibia and Angola. In Belgium, the Netherlands, Germany and Denmark, hunting is limited within the wetlands but occurs in the surrounding agriculture areas. It occurs at a higher intensity in France and Ireland (fig. A2.11). Some waterbirds are exploited for trade, like the Black-crowned Crane in West Africa. Migratory terns are caught on beaches, although this is now much reduced from decades past, when there

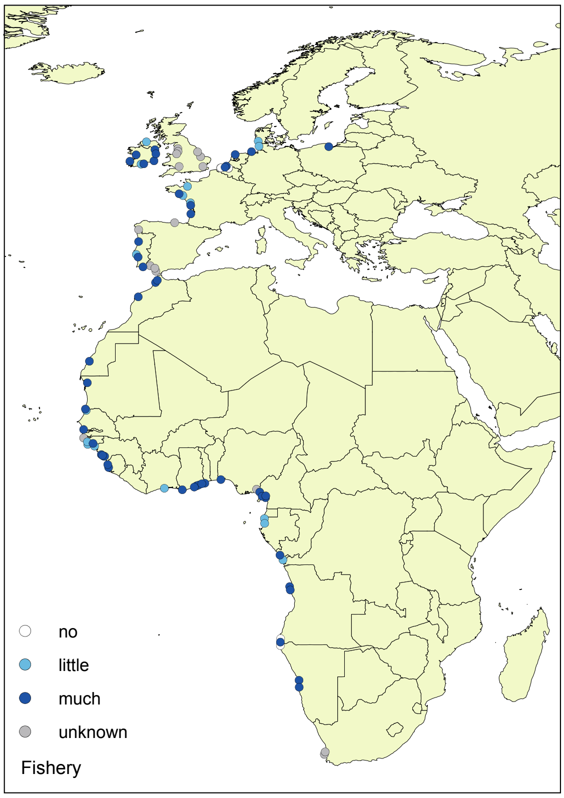

Figure A2.9. Fishery activities at the monitored sites. *.Activités de pêche sur les sites suivis.*

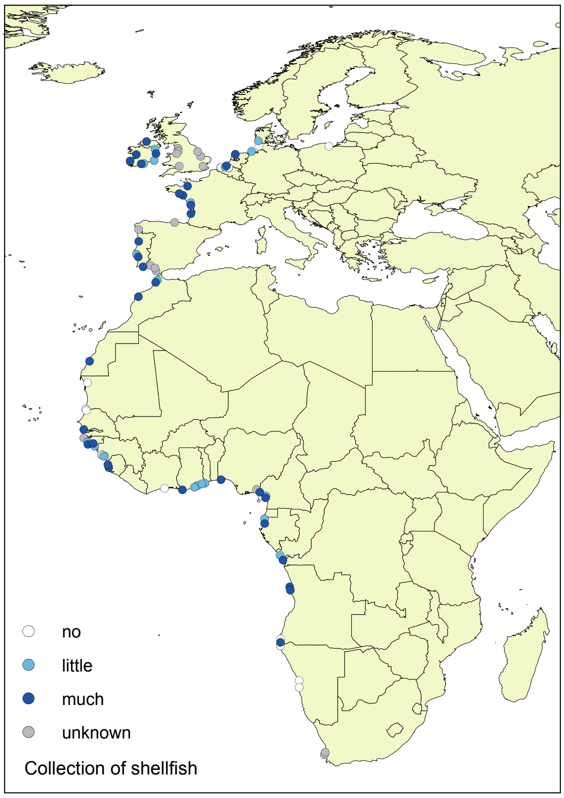

Figure A2.10. Collection of shellfish at the monitored sites. *Collecte de coquillages sur les sites suivis.*

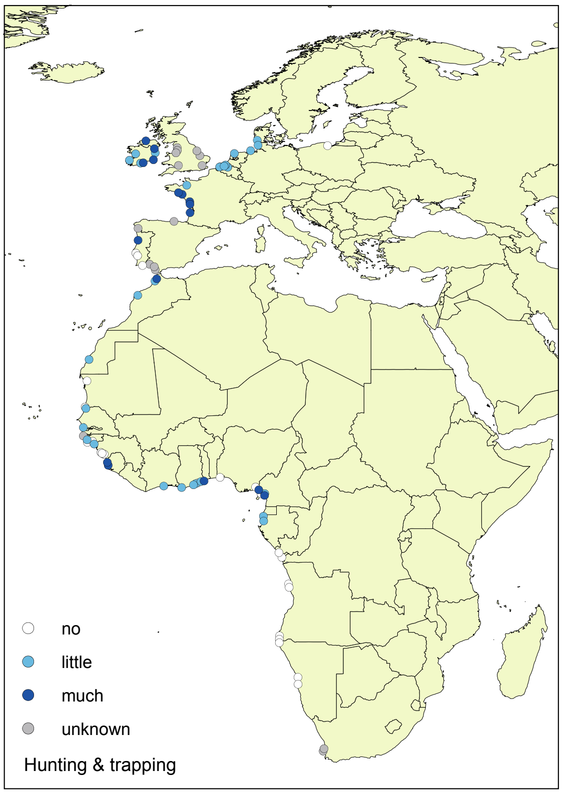

Figure A2.11. Hunting and trapping at monitored sites. *Chasse et piégeage sur des sites suivis.*

was large-scale trapping of terns in Senegal and Ghana (Meininger 1988). Hunting of other animals apart from waterbirds also occurs at the coast. In Africa, manatees are caught at some wetlands, both by hunters and opportunistically in fishing nets (Dodman *et al.* 2007). Rodents are widely caught in forests and wetlands in the Gulf of Guinea.

Recreation and tourism

Many coastal wetlands are valuable tourism assets for local and national tourism, whilst some regularly host international visitors. Tourism and recreation were reported from most selected sites, with highest intensity in Western Europe, due to a combination of higher welfare

Arnold Meijer / Blue Robin

Arnold Meijer / Blue Robin

and the location of many wetlands close to populated areas (fig. A2.12. In Senegal, Djoudj National Park provides tourism services, including boat trips to see impressive colonies of Great White Pelican. In 2002, estimated income to the park from tourism was about € 30,500 (Ly *et al.* 2006). Local tourism is important for nature facilities around the Mussulo Lagoon close to Luanda in Angola. In South Africa, the Langebaan Lagoon is a popular destination within the West Coast National Park, offering a range of activities to visitors compatible with nature conservation and well managed through recreational zonation, which includes a wilderness area closed to the public.

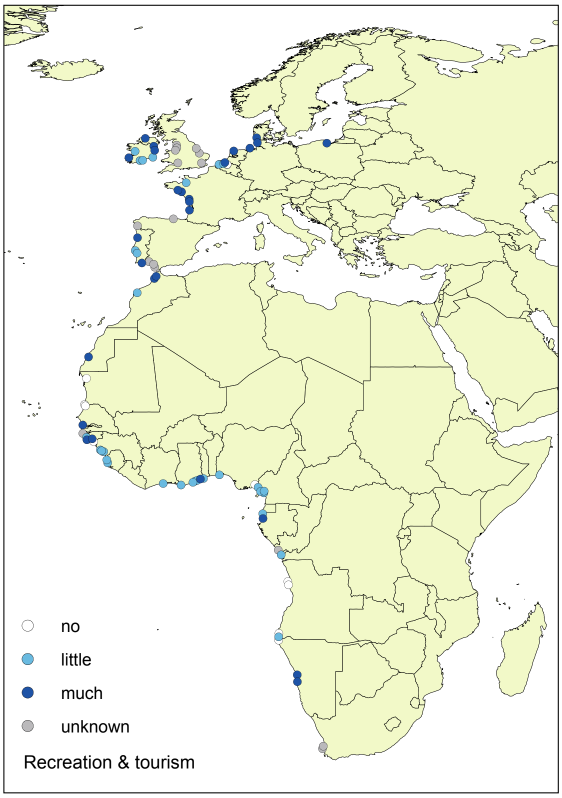

Figure AA.12. Recreation and tourism at monitored sites. *Loisirs et tourisme sur des sites suivis*

A2.3.3. Pressures

Human use of wetlands as described in the previous section can conflict with the function of the area as a staging site or a breeding location for waterbirds, by affecting the area or quality of the habitat, by causing disturbance or by causing direct mortality of waterbirds. In this section an overview is presented of the presence of pressures along the East Atlantic Flyway with particular reference to the selected sites.

Expansion and intensification of agriculture

Expansion and intensification of farming constitute one the most important pressures to birds on a global scale, affecting bird populations through various pathways. Conversion of wetlands to farmland results in a direct decrease of habitat. The use of plant protection chemicals causes a decline in food availability and may have toxic effects on birds. The use of fertilizers can lead to changes in vegetation and to eutrophication of surfaces waters, altering the food chain. Overgrazing by livestock alters the vegetation and may directly affect the breeding effort of birds breeding in pastures.

Selected sites with high impact were mainly reported from Northwest Europe, Iberia and North Africa and West Africa, whilst impacts elsewhere were comparatively low or unreported (fig. A2.13). However, the majority of selected sites are protected areas, so substantial agriculture does not take place within many of them.

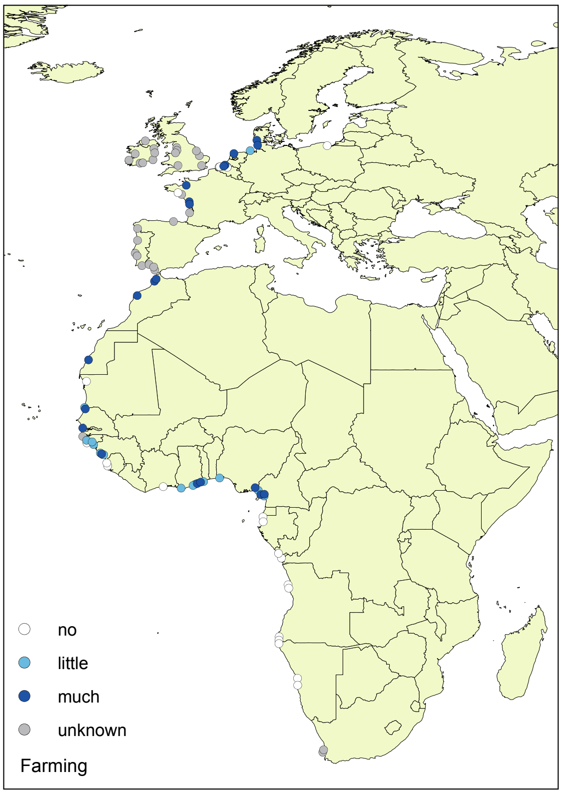

Figure A2.13. Reported impacts of expansion and intensification of farming on waterbirds at the selected main sites. *Impacts signalés de l'expansion et de l'intensification de l'agriculture sur les oiseaux d'eau dans les principaux sites sélectionnés.*

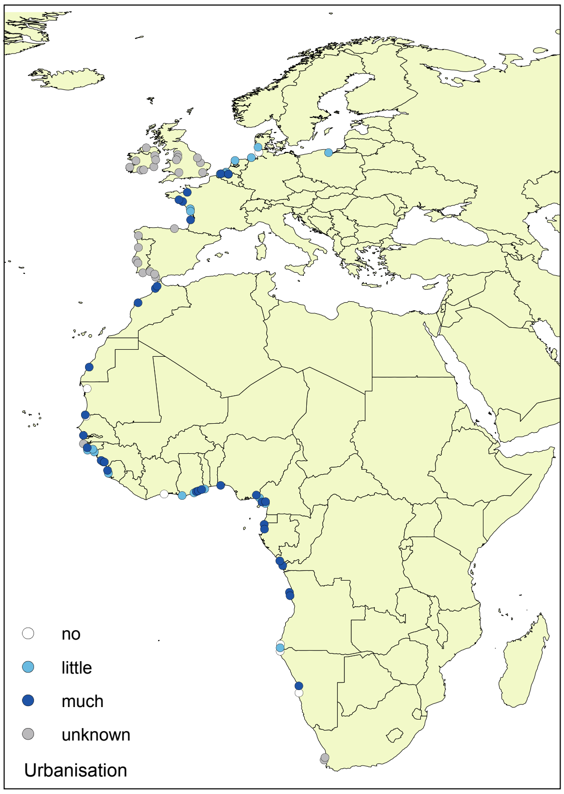

Figure A2.14. Reported impact of urbanisation on waterbirds at the selected main sites. *Impact signalé de l'urbanisation sur les oiseaux d'eau dans les principaux sites sélectionnés.*

Urbanisation

Encroachment of settlements in or near wetlands affects bird populations directly by habitat conversion and indirectly by disturbance, and is also a driver for other threats such as recreation pressure, pollution etc. Within the network of selected sites it has its highest adverse impact on waterbirds in the Gulf of Guinea and West Africa. However the picture for Europe where built up areas were reported from many sites in the previous section, is incomplete (fig. A2.14).

Development and expansion of energy production and mining

Drilling for oil and gas and related activities can affect habitat areas for waterbirds through disturbance and pollution, but it can also lead to geomorphological changes permanently decreasing the suitability of the areas for waterbirds. The reported impact of oil and gas drilling and mining is generally rather low within the monitored sites, with the exception of a few locations in Nigeria and the Wadden Sea. However, the picture is rather incomplete for Europe (fig. A2.15). Also the reported impact from wind

Hans Schekkerman

turbines is comparatively low except for the Wadden Sea and the Atlantic coast of France (fig. A2.16).

Hunting

Many waterbird species are valuable hunting resources, particularly ducks and geese. Direct hunting pressure in some wetlands can be intense and unsustainable, both for legal and illegal hunting and trapping. Lead shot has been a particular problem in Europe, where its use has been widespread, with wildfowl ingesting lead shot and later

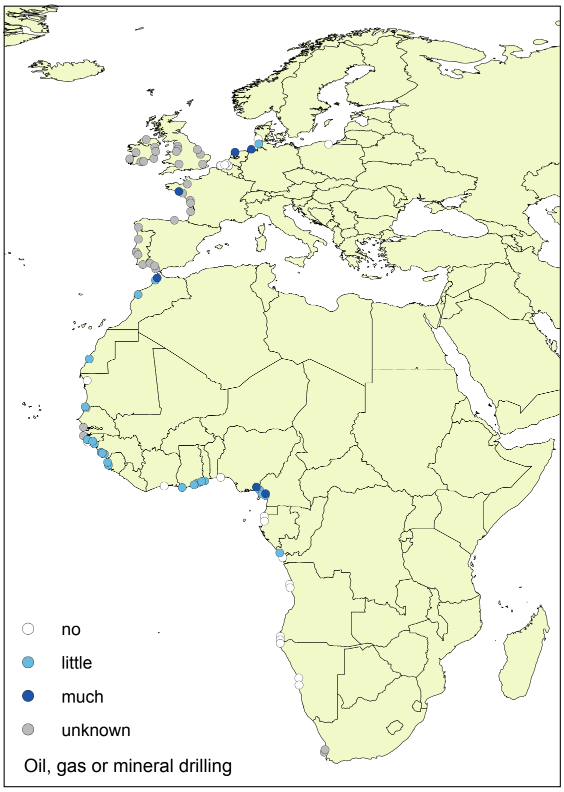

Figure A2.15. Reported impact of oil, gas or mineral drilling on waterbirds at or around the monitored sites. *Impact signalé des forages pétroliers, gaziers ou minéraux sur les oiseaux d'eau, dans les sites suivis ou autour de ceux-ci.*

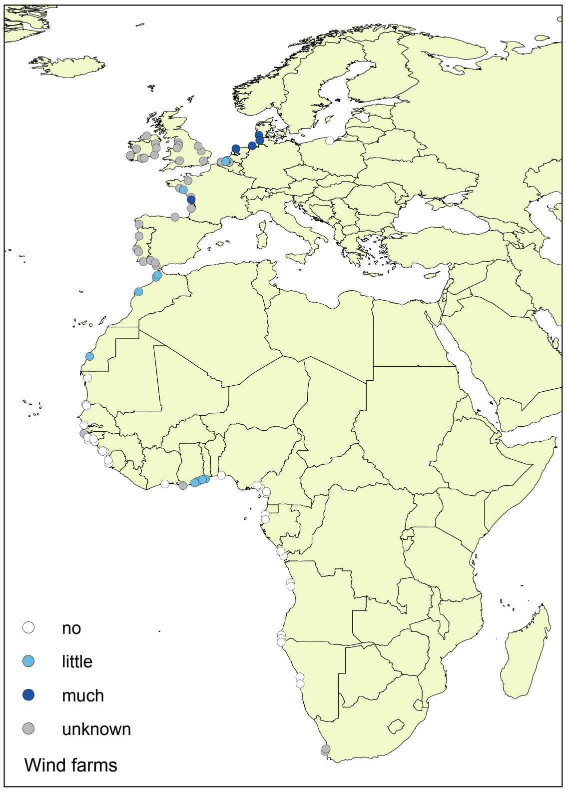

Figure A2.16. Reported impact wind turbines on waterbirds at or around the monitored sites. *Impact des éoliennes sur les oiseaux d'eau signalés dans les sites suivis ou autour de ceux-ci.*

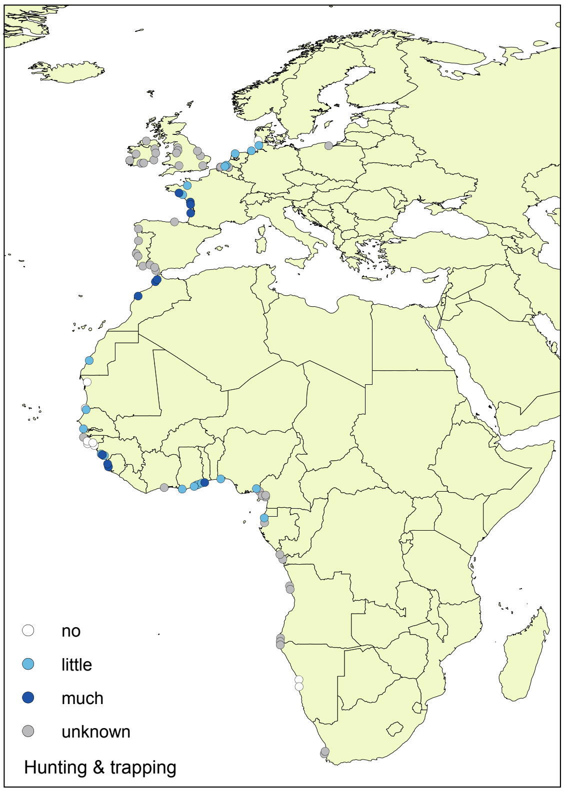

Figure A2.17. The reported direct and indirect impact of hunting on waterbirds at the selected sites. *Impact direct et indirect signalé de la chasse sur les oiseaux d'eau dans les sites sélectionnés.*

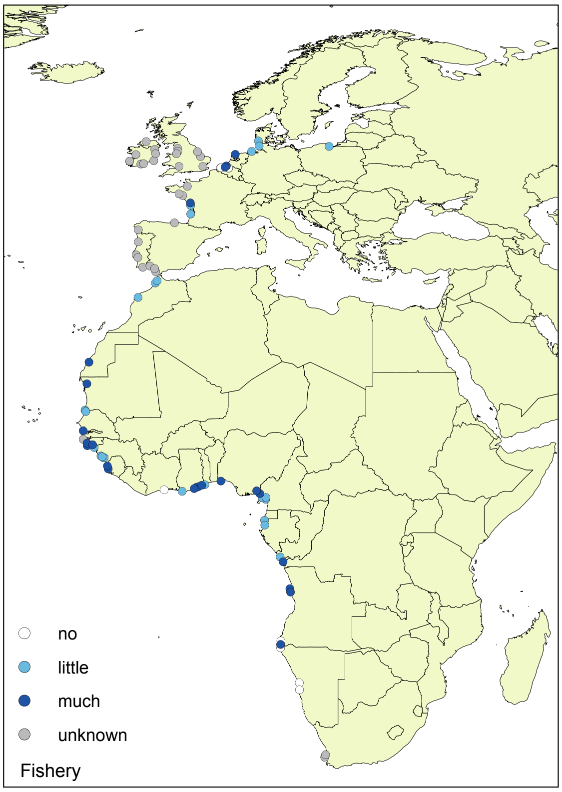

Figure A2.18. The reported impact of (over)fishing on waterbirds at the monitored sites. *L'impact signalé de la (sur)pêche sur les oiseaux d'eau dans les sites suivis.*

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Collecting shellfish from mudflats.

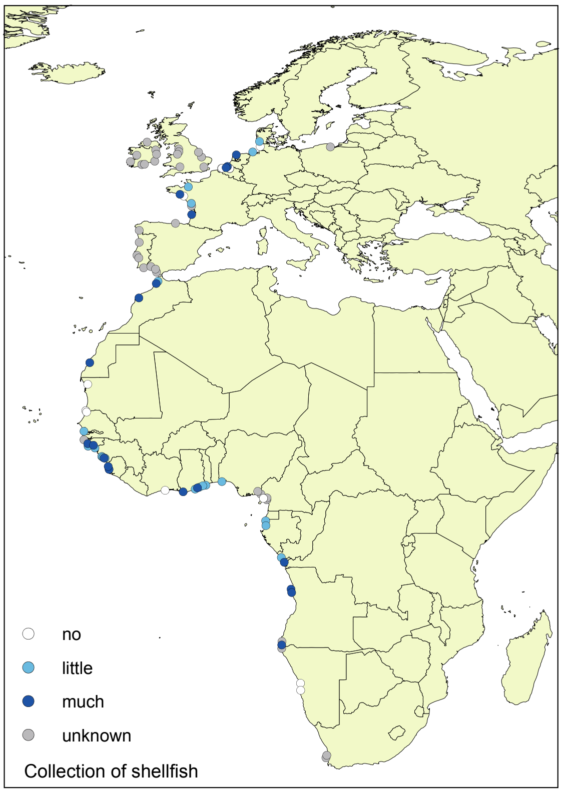

Figure A2.19. The reported impact of shellfish collection on waterbirds at the monitored sites. *L'impact signalé de la collecte de mollusques et de crustacés sur les oiseaux d'eau dans les sites suivis.*

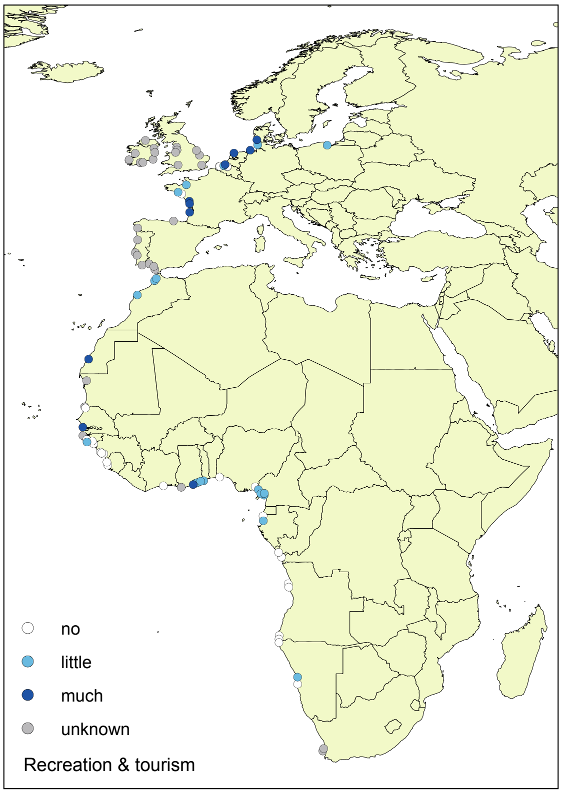

Figure A2.20. The reported impact of tourism and recreation on waterbirds at monitored sites. *L'impact signalé du tourisme et des loisirs sur les oiseaux d'eau dans les sites suivis.*

succumbing to lead poisoning. Although use of lead shot is in decline it remains a widespread problem. The direct impact of hunting on waterbird numbers is high at sites along the Atlantic coast of France and in Morocco, Guinea and Sierra Leone (fig. A2.17). It indirectly affects waterbirds by causing disturbance at more sites. Note that the monitoring is incomplete in Europe and southern Africa.

Overfishing

A direct consequence of overfishing is the collapse of fisheries, with often long-term consequences for people and nature alike, including the disappearance of coastal fishing communities and fish-eating birds. Intense fishing activities in wetlands can also result in so much disturbance that waterbirds can no longer inhabit them. Diving birds are also prone to entanglement in fishing nets. Fish and shellfish constitute important food sources for many waterbird species. Overfishing was reported as one of the main pressures to waterbirds in West Africa, Gulf of Guinea and Dutch coastal wetlands. However limited data were obtained from European sites (fig. A2.18).

In addition to some North African, West African and Gulf of Guinea sites, shellfish harvesting is reported as a pressure from some sites in France and the Netherlands (fig. A2.19). Shellfish gathering by locals is common practice at tidal flats along the African shore and impacts waterbirds mainly by disturbance. Shellfish gathering and aquaculture is more intense in parts of Western Europe were Oyster- and mussel cultures occupy parts of the natural habitat (fig. A2.19).

Recreation and tourism

Tourism and recreation can affect waterbirds directly by the encroachment of tourism facilities in wetlands and indirectly by disturbance of various forms of leisure activities. The impact of tourism on waterbirds is traditionally

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high in densely populated West European countries where many inhabitants have the (financial) means for recreational activities. However in many of these protected wetlands regulations are in place to try to control the pressures. Tourism levels are lower in African coastal areas but their impact on birds can be relatively high due to a lack of regulation. Tourism and recreation impacts were reported quite widely among the selected sites (fig. A2.20.

Non native *Typha* has expanded extensively in the Senegal Delta.

Invasive and other problem species

Freshwater wetlands may be prone to takeover by aquatic weeds, especially when eutrophication has set in due to factors such as enrichment by agricultural run-off and reduced flow rates. Some floating weeds, such as *Salvinia molesta*, can quickly spread throughout a wetland system, often impacting other forms of aquatic life, whilst Nypa palm has spread in the Gulf of Guinea, especially in Nigeria and Cameroon, and *Typha* in the Senegal Delta in Mauritania and Senegal. At sea in tidal areas many invasive animal species are causing increasing problems. Particularly, various macro-benthos species can have big impacts on food chains. For instance, Japanese Oysters *Crassostrea gigas* may have changed food availability for some wader species on the tidal flats in the Wadden Sea and elsewhere in Western Europe (Waser *et al.* 2016; fig. A2.21).

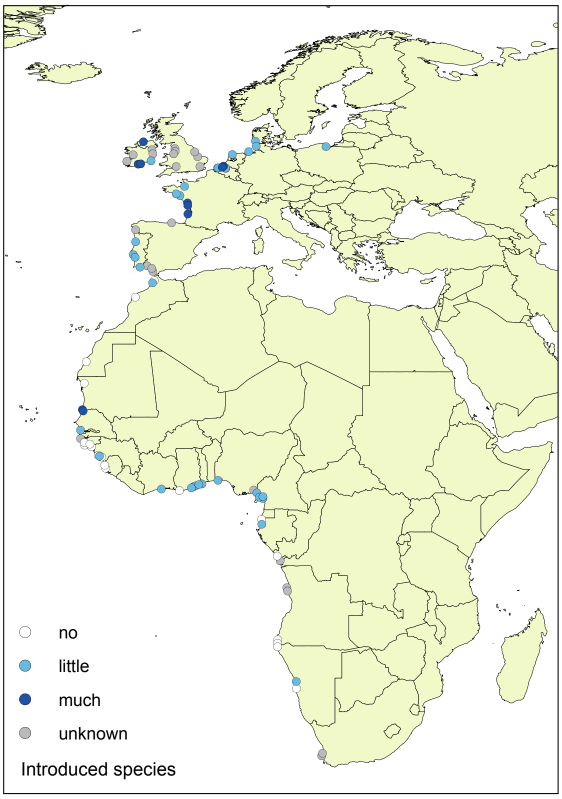

Figure A2.21. Reported impact of introduced species on waterbirds at the monitored sites. *Impact signalé des espèces introduites sur les oiseaux d'eau dans les sites suivis.*

Eutrophication and pollution

Substances originating from human presence like sewage water, effluents from farming practices (fertilizers, plant protection chemicals) and from industry, and litter were reported from various sites along the Flyway. In some areas throughout the East Atlantic Flyway, eutrophication and pollution is a real and constant pressure with constant inflow of domestic waste water (fig. A2.22), agriculture effluents (fig. A2.23), industrial effluents (fig. A2.24) and major presence of litter and garbage (fig. A2.25). Most impacted sites were close to built-up areas.

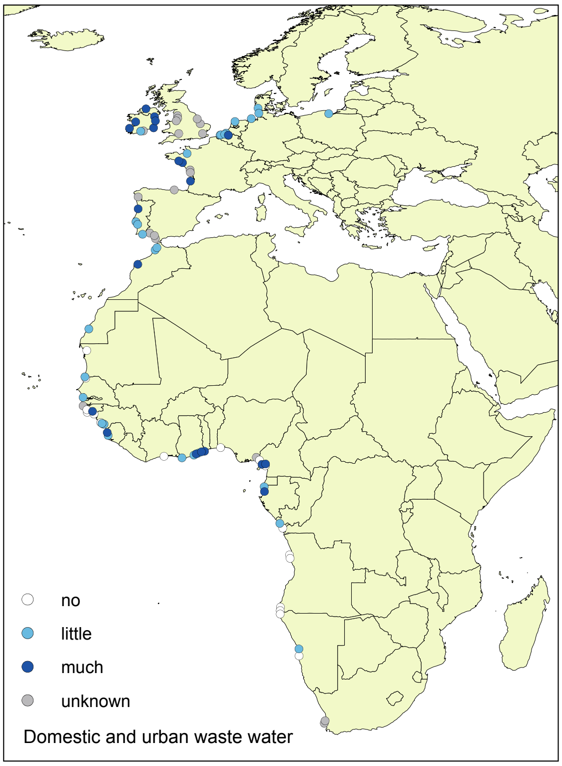

Figure A2.22. The reported impact of domestic waste water on waterbirds at the selected sites. *L'impact signalé des eaux usées domestiques sur les oiseaux d'eau dans les sites sélectionnés.*

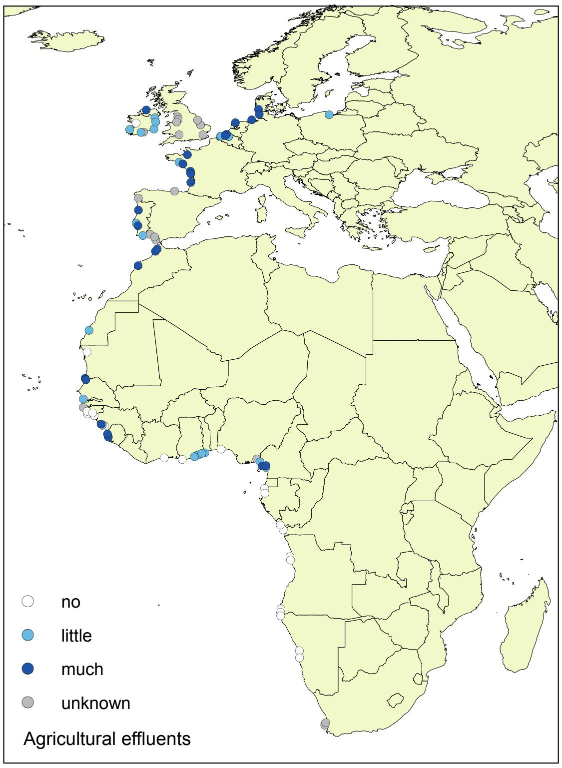

Figure A2.23. The reported impact of agriculture effluents on waterbirds at the selected sites. *L'impact signalé des effluents de l'agriculture sur les oiseaux d'eau dans les sites sélectionnés.*

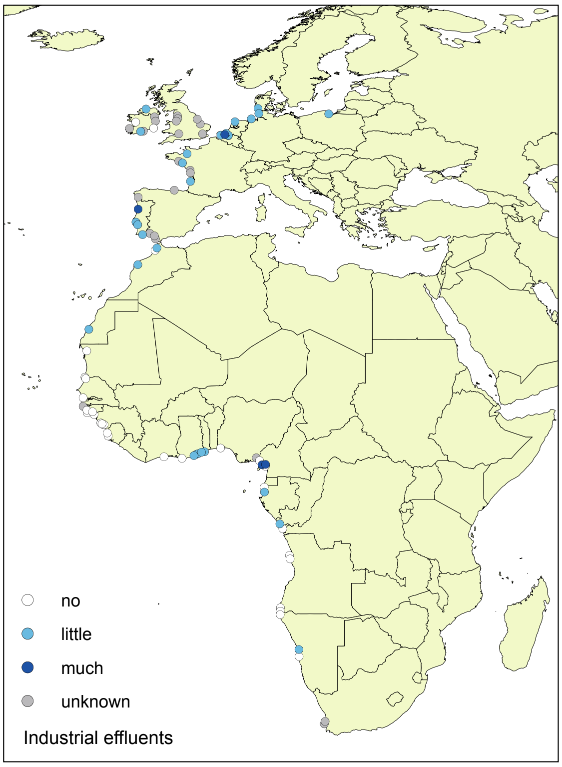

Figure A2.24. The reported impact of industrial effluents on waterbirds at the selected sites. *L'impact signalé des effluents industriels sur les oiseaux d'eau dans les sites sélectionnés.*

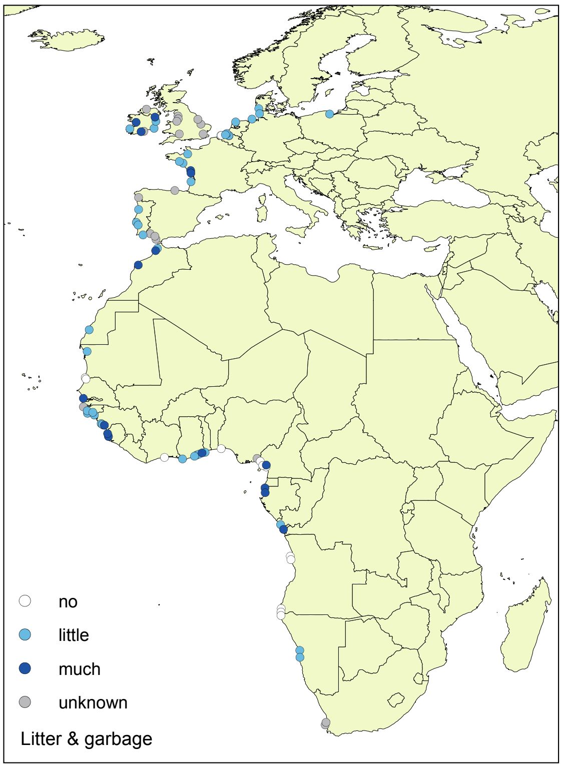

Figure A2.25. The reported impact of litter and garbage on waterbirds at the selected sites. *L'impact signalé des ordures sur les oiseaux d'eau dans les sites sélectionnés.*

A2.3.4. Conservation measures

Conservation of coastal wetlands is vital for the continued survival of waterbirds, particularly for migratory birds which depend on a network of sites. An overview of conservation conventions, initiatives and programmes along the East Atlantic Flyway is provided in Annex 4 of this report.

The monitored sites in Europe from which information was provided are protected effectively by International and national laws or binding agreements. Most of the African sites are protected as well; only two sites in the Gulf of Guinea have no formal protection at all. However, in practice this formal protection is not effective in several African sites in Morocco, Guinee, Sierra Leone, Cameroon and Angola (figs A2.26-A2.28).

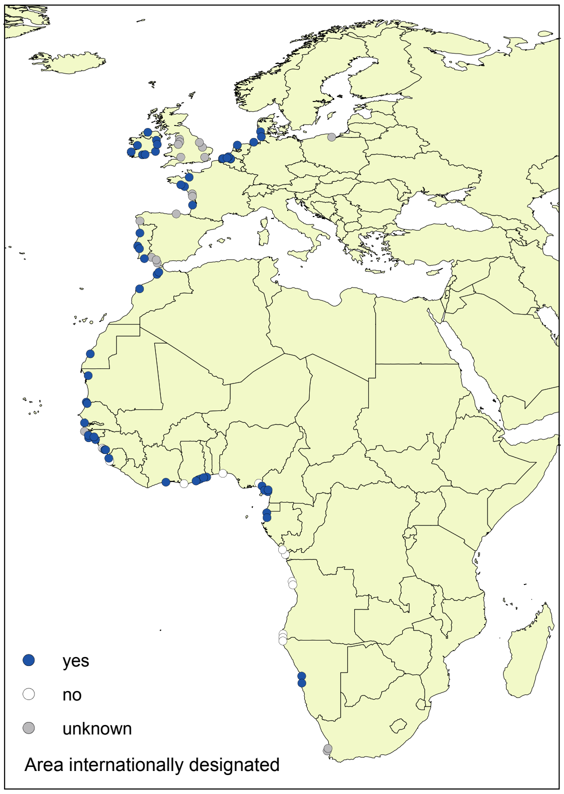

Figure A2.26. Formal international protection status of the monitored sites. *Statut officiel de protection internationale des sites suivis.*

A2.4. Discussion and recommendations

This was the second time that a significant effort was made to collect environmental data from across the flyway in a coordinated and systematic manner. The power of the analysis of environmental monitoring at the flyway level was somewhat limited due to the selection of sites, even though they represent a large share of total waterbird numbers in the flyway. Some of the submitted forms were filled out incompletely and some countries were missing. Although training in methodology was provided, a key remaining issue is the comparability of scores given by

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The best solution for preventing disturbance by recreation is awareness and closing sensitive sites.

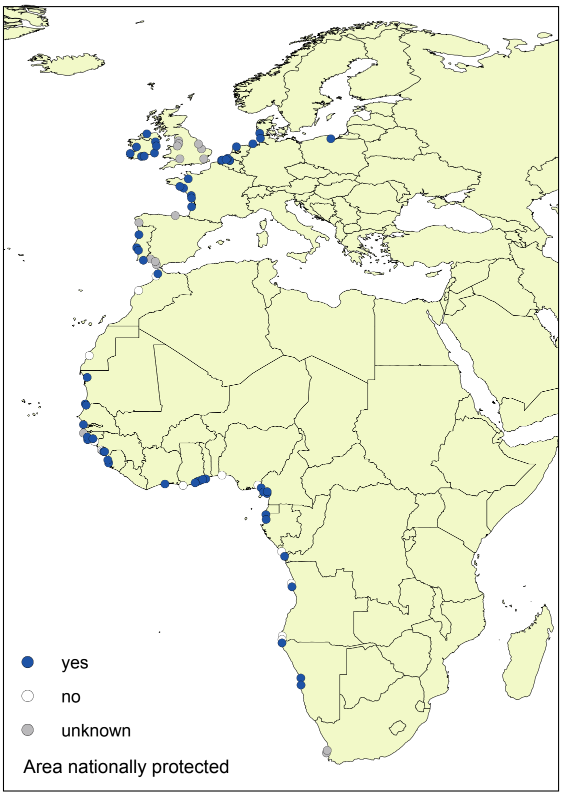

Figure A2.27. Formal national protection status of the monitored sites. *Statut de protection nationale formelle des sites suivis.*

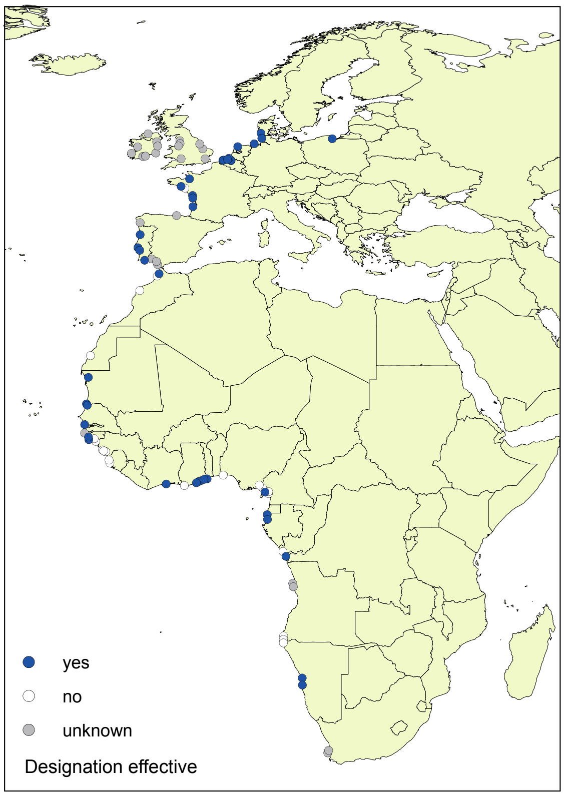

Figure A2.28. Reported effectiveness of protection of the monitored sites. *Efficacité signalée de la protection des sites suivis.*

different participants, with different interpretations of the pressures or with different views on the importance of a threat. Hopefully, these shortcomings can be addressed in the future.

It took quite an effort to collect environmental monitoring forms for the main sites, particularly in Europe. This could be improved by organising more training sessions on environmental monitoring, including in European countries. Ideally, the forms should be more widely and routinely adopted and included in the annual waterbird census, with information preferably filled out during fieldwork together with local site managers.

Many features were scored based on expert option. In the future there may be a role for remote sensing for scoring some factors more objectively. However expert opinion will always be important in future assessments, in particular when scoring impact. This reliance on expert opinion makes the outcomes sensitive to the independent views of the specialist, resulting in some sites / countries scoring higher than others in almost all aspects of site use and threats. Therefore we recommend the drafting of more guidelines giving information about the interpretation of the questions and more attention to the review of results coming in with direct feedback to coordinators and fieldworkers.

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Greater Flamingo | **Flamant rose** *(Phoenicopterus roseus)*

Bar-tailed Godwit | **Barge rousse** *(Limosa lapponica)*
Netherlands (Arnold Meijer / Blue Robin)

Annex 3. Trait assignments for populations used in chapter 2

Attributions de caractères pour les populations d'oiseaux utilisées dans le chapitre 2.

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Population	%/y L	%/y S	taxon	clim br	clim nbr	migra tion	arct reg	conc nbr	forhab br	forhab nbr	diet br	diet nbr	body size	pop. size
White-faced Whistling-duck	3.7	-2.0	duck	trop	trop	resid		0.5	fresh	fresh	inv/plant	bent/plant	0.5-1.5kg	-500000
Brent Goose	2.2	1.9	goose	arct	ntemp	long	S	0.5	terr	terr	plant	plant	>1.5kg	-500000
Barnacle Goose	7.2	6.0	goose	arct	ntemp	long		1	terr	terr	plant	plant	>1.5kg	-100000
Greylag Goose nw-Eu	9.3	3.9	goose	ntemp	ntemp	var		0	fresh	terr	plant	plant	>1.5kg	-25000
Common Eider w DK-NL	-0.8	2.8	duck	ntemp	ntemp	short		0.5	sea	sea	inv	bent/biv	>1.5kg	-500000
Common Eider w UK-IR	-0.4	-1.6	duck	ntemp	ntemp	resid		0	sea	sea	inv	bent/biv	>1.5kg	<5000
Common Shelduck w nw-Eu	0.7	0.1	duck	ntemp	ntemp	short		0	intert	intert	inv/alg	bent/alg	0.5-1.5kg	-500000
South African Shelduck	-6.8	-13.4	duck	stemp	stemp	resid		0.5	intert	intert	inv/alg	bent/alg	0.5-1.5kg	-25000
Cape Shoveler	3.0	-2.1	duck	stemp	stemp	resid		0.5	fresh	fresh	inv/plant	bent/plant	0.5-1.5kg	<5000
Northern Shoveler, w nwc-Eu	2.0	8.5	duck	ntemp	ntemp	med		0	fresh	mix	inv/plant	bent/plant	0.5-1.5kg	-100000
Northern Shoveler, w Med	0.9	1.8	duck	ntemp	medi	long		0	fresh	mix	inv/plant	bent/plant	0.5-1.5kg	-100000
Eurasian Wigeon w nw-Eu	1.7	-0.8	duck	boreal	ntemp	med		0	fresh	terr	inv/plant	plant	0.5-1.5kg	>500000
Mallard w nw-Eu	-0.5	-0.8	duck	ntemp	ntemp	short		0	fresh	fresh	inv/plant	bent/plant	0.5-1.5kg	>500000
Cape Teal	4.6	-2.1	duck	stemp	stemp	resid		0	mix	mix	inv/plant	bent/plant	0.1-0.5kg	<5000
Northern Pintail w nw-Eu	1.1	1.4	duck	boreal	ntemp	med		0	fresh	mix	inv/plant	bent/plant	0.5-1.5kg	-100000
Northern Pintail w Med	0.8	-3.6	duck	boreal	medi	long		0	fresh	mix	inv/plant	bent/plant	0.5-1.5kg	-500000
Common Teal w nw-Eu	2.1	5.0	duck	boreal	ntemp	med		0.5	fresh	mix	inv/plant	bent/plant	0.1-0.5kg	-500000
Great Crested Grebe	1.1	-2.4	grebe	ntemp	ntemp	short		0.5	fresh	mix	fish	fish	0.5-1.5kg	-500000
Horned Grebe b nw-Eu	0.8	-2.3	grebe	boreal	ntemp	short		0	fresh	sea	fish/inv	fish/inv	0.1-0.5kg	<5000
Black-necked Grebe Eu,n-Af	-1.1	-2.3	grebe	ntemp	medi	med		0.5	fresh	sea	fish/inv	fish/inv	0.1-0.5kg	-100000
Black-necked Grebe s-Af	1.8	0.2	grebe	stemp	stemp	resid		0.5	fresh	mix	fish/inv	fish/inv	0.1-0.5kg	-25000
Greater Flamingo, w-Med	5.1	9.9	flam	medi	medi	short		0.5	intert	intert	inv/alg	bent/alg	>1.5kg	-500000
Greater Flamingo w-Af	1.7	5.1	flam	trop	trop	resid		0.5	intert	intert	inv/alg	bent/alg	>1.5kg	-100000
Lesser Flamingo w-Af	3.3	4.5	flam	trop	trop	resid		1	intert	intert	inv/alg	bent/alg	0.5-1.5kg	-25000
Lesser Flamingo s-Af	2.4	6.6	flam	trop	trop	resid		1	intert	intert	inv/alg	bent/alg	0.5-1.5kg	-25000
African Spoonbill	-2.0	-8.3	heron	trop	trop	resid		0.5	mix	mix	fish/inv	fish/inv	0.5-1.5kg	<5000
Eurasian Spoonbill b	9.5	8.6	heron	ntemp	trop	long		0.5	mix	intert	fish/inv	fish/inv	>1.5kg	-25000
African Sacred Ibis	0.2	-0.2	heron	trop	trop	short		0	mix	mix	wide	wide	0.5-1.5kg	-25000

Population	%/y L	%/y S	taxon	clim br	clim nbr	migra tion	arct reg	conc nbr	forhab br	forhab nbr	diet br	diet nbr	body size	pop. size
Goliath Heron	-1.8	-1.8	heron	trop	trop	resid		0	mix	mix	wide	wide	0.5-1.5kg	<5000
Great White Egret w nw-Eu	17.6	13.7	heron	trop	ntemp	short		0	fresh	fresh	fish	wide	0.5-1.5kg	<5000
Great White Egret Af	1.9	1.6	heron	ntemp	trop	resid		0	fresh	fresh	fish	fish/inv	0.5-1.5kg	-25000
Western Reef-egret	-1.6	4.3	heron	ntemp	trop	resid		0	intert	intert	fish/inv	fish/inv	0.1-0.5kg	-25000
Pink-backed Pelican	7.9	7.0	pelic	ntemp	trop	resid		0.5	mix	mix	fish	fish	>1.5kg	<5000
Great White Pelican w-Af	4.7	2.3	pelic	trop	trop	resid		1	mix	mix	fish	fish	>1.5kg	-25000
Great White Pelican s-Af	2.8	1.0	pelic	stemp	stemp	resid		0.5	mix	mix	fish	fish	>1.5kg	<5000
Long-tailed Cormorant w-Af	3.1	12.4	pelic	trop	trop	resid		1	mix	mix	fish	fish	0.5-1.5kg	-25000
Great Cormorant nc-Eu	3.2	2.4	pelic	ntemp	ntemp	med		0	mix	sea	fish	fish	>1.5kg	-500000
White-br. Cormorant w-Af	2.3	-1.4	pelic	trop	trop	resid		1	mix	mix	fish	fish	>1.5kg	-100000
White-br. Cormorant s-Af	-2.7	-2.3	pelic	stemp	stemp	resid		0.5	mix	mix	fish	fish	>1.5kg	-25000
Cape Cormorant	-1.9	-1.9	pelic	stemp	stemp	resid		0.5	sea	sea	fish	fish	0.5-1.5kg	-500000
African Darter w-Af	2.5	1.9	pelic	trop	trop	resid		0	fresh	fresh	fish	fish	0.5-1.5kg	<5000
African Oystercatcher	0.9	0.5	wader	stemp	stemp	resid		1	intert	intert	inv	bent/biv	0.5-1.5kg	<5000
Eurasian Oystercatcher	-0.3	-0.6	wader	ntemp	ntemp	var		0	intert	intert	inv	bent/biv	0.5-1.5kg	>500000
Pied Avocet Eu,nwAf	1.0	1.9	wader	ntemp	wide	var		0	mix	intert	inv	benth	0.1-0.5kg	-500000
Pied Avocet s-Af	2.9	-7.2	wader	stemp	stemp	resid		0.5	mix	intert	inv	benth	0.1-0.5kg	-25000
Grey Plover w Eu,w-Af	2.1	-1.8	wader	arct	wide	long	S	0	terr	intert	inv	benth	0.1-0.5kg	-100000
Ringed Plover *hiaticula*	0.6	1.5	wader	arct	medi	med	E	0	terr	intert	inv	benth	<0.1kg	-100000
Ringed Plover *psammodroma*	-1.2	0.1	wader	arct	trop	long	N	0	terr	intert	inv	benth	<0.1kg	-500000
Kittlitz's Plover w-Af	-5.6	18.8	wader	trop	trop	resid		0	mix	mix	inv	benth	<0.1kg	<5000
Kittlitz's Plover s-Af	-1.2	3.6	wader	stemp	stemp	resid		0	mix	mix	inv	benth	<0.1kg	<5000
White-fronted Plover	1.0	-6.1	wader	trop	trop	resid		0.5	intert	intert	inv	benth	<0.1kg	-25000
Kentish Plover	-1.7	-1.9	wader	medi	medi	short		0	intert	intert	inv	benth	<0.1kg	-100000
Chestnut-banded Plover	1.8	1.7	wader	stemp	stemp	resid		0.5	intert	intert	inv	benth	<0.1kg	-25000
Whimbrel	0.6	2.9	wader	boreal	trop	long		0.5	terr	intert	inv	benth	0.1-0.5kg	-100000
Eurasian Curlew *arquata* b	-1.0	-2.0	wader	boreal	wide	var		0	terr	intert	inv	benth	0.5-1.5kg	-500000
Bar-tailed Godwit *lapponica*	1.2	2.3	wader	arct	ntemp	med	E	0.5	terr	intert	inv	benth	0.1-0.5kg	-500000
Bar-tailed Godwit *taymyrensis*	-2.2	-2.9	wader	arct	trop	long	S	0.5	terr	intert	inv	benth	0.1-0.5kg	>500000
Ruddy Turnstone b Nearc	1.1	-0.6	wader	arct	ntemp	long	N	0	terr	intert	inv	benth	0.1-0.5kg	-100000
Ruddy Turnstone b n-Eu	-2.6	-2.2	wader	arct	trop	long	E	0	terr	intert	inv	benth	0.1-0.5kg	-25000
Red Knot *islandica*	0.6	-0.4	wader	arct	ntemp	long	N	0.5	terr	intert	inv	bent/biv	0.1-0.5kg	-500000
Red Knot *canutus*	-1.3	-6.5	wader	arct	trop	long	S	0	terr	intert	inv	bent/biv	0.1-0.5kg	-500000
Curlew Sandpiper w w-Af	-2.5	-11.6	wader	arct	trop	long	S	0.5	terr	intert	inv	benth	<0.1kg	>500000
Sanderling w Eu,w-Af	2.4	2.6	wader	arct	wide	long	N	0	terr	intert	inv	benth	<0.1kg	-100000
Dunlin *alpina*	-0.6	-1.2	wader	arct	ntemp	med	E	0	terr	intert	inv	benth	<0.1kg	>500000
Dunlin *schinzii*	-0.1	-2.0	wader	arct	trop	long	E	1	terr	intert	inv	benth	<0.1kg	>500000
Purple Sandpiper w nw-Eu	-2.6	-3.9	wader	arct	ntemp	med	E	0	terr	intert	inv	benth	<0.1kg	-25000

Population	%/y L	%/y S	taxon	clim br	clim nbr	migra tion	arct reg	conc nbr	forhab br	forhab nbr	diet br	diet nbr	body size	pop. size
Little Stint w s-Eu,nw-Af	-3.1	-11.2	wader	arct	trop	long	S	0	terr	intert	inv	benth	<0.1kg	-500000
Spotted Redshank	-3.8	-7.7	wader	boreal	trop	long		0.5	fresh	mix	inv	bent/fish	0.1-0.5kg	-25000
Greenshank w Eu,nw-Af	0.4	-1.8	wader	boreal	trop	long		0	fresh	mix	inv	bent/fish	0.1-0.5kg	-100000
Redshank *robusta* b IS	-0.7	-2.5	wader	boreal	ntemp	med		0	fresh	intert	inv	benth	0.1-0.5kg	-100000
Redshank *totanus* b UK,IR	0.0	-0.6	wader	ntemp	ntemp	short		0	fresh	intert	inv	benth	0.1-0.5kg	-100000
Redshank *totanus* b n-Eu	0.4	-2.9	wader	boreal	trop	long		0	fresh	intert	inv	benth	0.1-0.5kg	-100000
Slender-billed Gull w-Med	6.5	6.3	gull	medi	medi	resid		0.5	sea	sea	fish/inv	fish/inv	0.1-0.5kg	<5000
Slender-billed Gull w-Af	-3.4	13.9	gull	trop	trop	resid		0.5	sea	sea	fish/inv	fish/inv	0.1-0.5kg	-100000
Black-headed Gull	-2.1	-0.9	gull	ntemp	ntemp	med		0	mix	mix	fish/inv	bent/fish	0.1-0.5kg	>500000
Hartlaub's Gull	-1.1	-5.4	gull	stemp	stemp	resid		0.5	sea	sea	fish	fish	0.1-0.5kg	-25000
Grey-headed Gull w-Af	3.8	16.8	gull	trop	trop	resid		0.5	sea	sea	fish	fish	0.1-0.5kg	-25000
Grey-headed Gull s-Af	0.6	0.8	gull	stemp	stemp	resid		0.5	sea	sea	fish	fish	0.1-0.5kg	<5000
Mediterranean Gull	9.0	5.8	gull	medi	medi	med		0	sea	sea	fish/inv	fish	0.1-0.5kg	<5000
Audouin's Gull	-1.0	-3.5	gull	medi	medi	short		0.5	sea	sea	fish	fish	0.5-1.5kg	-25000
Mew Gull *canus*	-0.2	2.0	gull	ntemp	ntemp	med		0	mix	mix	fish/inv	wide	0.1-0.5kg	-500000
Kelp Gull	-1.5	-5.1	gull	stemp	stemp	resid		0	intert	intert	wide	wide	0.5-1.5kg	-25000
Lesser Black-backed Gull	1.9	5.6	gull	ntemp	medi	var		0	sea	sea	wide	fish	0.5-1.5kg	-100000
European Herring Gull	-1.9	-3.0	gull	ntemp	ntemp	med		0	intert	intert	wide	wide	0.5-1.5kg	-500000
Great Black-backed Gull	-1.8	-1.4	gull	ntemp	ntemp	short		0	sea	sea	wide	wide	>1.5kg	-25000
Gull-billed Tern b w-Eu,w-Af	3.0	2.0	tern	trop	trop	short		0.5	mix	intert	fish/inv	bent/fish	0.1-0.5kg	-100000
Little Tern	-1.0	-1.5	tern	medi	trop	var		0	sea	sea	fish	fish	<0.1kg	-25000
Damara Tern	0.6	-0.3	tern	stemp	trop	resid		0.5	sea	sea	fish	fish	<0.1kg	<5000
Caspian Tern b w-Af	12.5	9.8	tern	trop	trop	resid		0.5	sea	sea	fish	fish	0.5-1.5kg	<5000
Caspian Tern b s-Af	0.0	-5.8	tern	stemp	trop	resid		0.5	sea	sea	fish	fish	0.5-1.5kg	<5000
Common Tern	-2.1	-4.8	tern	ntemp	trop	long		0	sea	sea	fish	fish	0.1-0.5kg	-25000
Roseate Tern b w-Eu	2.0	4.9	tern	ntemp	trop	long		0	sea	sea	fish	fish	0.1-0.5kg	-25000
Sandwich Tern	4.7	2.4	tern	ntemp	trop	long		0	sea	sea	fish	fish	0.1-0.5kg	<5000
Royal Tern *albidorsalis*	0.9	-24.6	tern	trop	trop	resid		0	sea	sea	fish	fish	0.1-0.5kg	-25000
Greater Crested Tern s-Af	4.9	3.2	tern	stemp	stemp	resid		0.5	sea	sea	fish	fish	0.1-0.5kg	<5000

Sandwich Tern | **Sterne caugek** *(Thalasseus sandvicensis)*
Netherlands (Arnold Meijer / Blue Robin)

Annex 4. Multilateral Environmental Agreements (MEAs) & Initiatives most relevant to migratory waterbirds of the East Atlantic Flyway

Accords environnementaux multilatéraux (AME) et initiatives les plus pertinentes pour les oiseaux d'eau migrateurs de la voie de migration de l'Atlantique Est

Geoffroy Citegetse & Tim Dodman

1. Multilateral Environmental Agreements

The Agreement on the Conservation of African-Eurasian Migratory Waterbirds (AEWA)

AEWA is an intergovernmental treaty dedicated to the conservation of migratory waterbirds and their habitats across Africa, Europe, the Middle East, Central Asia, Greenland and the Canadian Archipelago. It is an Agreement under the **Convention of Migratory Species of Wild Animals (CMS)**. AEWA brings together countries and the wider international conservation community in an effort to establish coordinated conservation and management of migratory waterbirds throughout their entire migratory range. The AEWA Strategic Plan 2019-2027 and the Plan of Action for Africa 2019-2027 were adopted at the AEWA Meeting of Parties in December 2018. These documents help Parties and other stakeholders to orient their interventions for the benefits of waterbirds and their habitats.

Of 119 Range States covered by the Agreement, 77 are currently Parties. Along the East Atlantic Flyway 11 range states are not yet Parties to AEWA, including Greenland, (northeast) Canada and Russia. In an effort to communicate, educate and raise awareness across its range area, AEWA jointly coordinates the annual awareness-raising campaign World Migratory Bird Day (WMBD) to highlight the need for the conservation of migratory birds and their habitats. Several countries along the flyway regularly celebrate the event, including transboundary events, such as in Senegal-Mauritania.

The Ramsar Convention

The Ramsar Convention or the Convention on Wetlands is an intergovernmental treaty that provides the framework for the conservation and wise use of wetlands and their resources through local and national actions and international cooperation, as a contribution towards achieving sustainable development throughout the world. Parties commit to work towards the wise use of all their wetlands, designate suitable wetlands for the list of Wetlands of International Importance (Ramsar sites) and ensure their effective management, and cooperate internationally on transboundary wetlands, shared wetland systems and shared species. Criteria 5 and 6 for identifying Wetlands of International Importance under the Ramsar Convention are based specifically on waterbirds, whilst criterion 2 focuses on globally threatened species. Resolution X.22 of the Convention aims to promote international cooperation for the conservation of waterbird flyways.

Along the East Atlantic Flyway, several Ramsar sites are home to and a stopover for waterbirds. The Convention provides guidance on the management of Ramsar Sites and on the wise use of all wetlands, and builds Partner capacity through tools such as Globwetland Africa. Each year in February, World Wetlands Day is celebrated along the flyway to raise awareness on wetlands and the sustainable use of their resources.

The SenegalWet Initiative is a partnership platform for the conservation and wise use of wetland ecosystems in the Senegal River Basin from Mauritania to the Republic of Guinea.

EU Birds and Habitats Directives

The European Union (EU) Birds Directive provides a legal framework that is binding for all Member States for the protection of all wild birds in the EU, including their eggs, nests and habitats, through the designation of protected areas, ensuring habitats for wild birds, species protection and hunting regulations. The EU Habitats Directive protects habitat and other species of animals and plants, also through the designation of protected areas and species protection, as well as through the Natura 2000 network and site protection. Together, these directives form the cornerstone of Europe's nature conservation policy.

2. Initiatives

The Wadden Sea Flyway Initiative (WSFI)

The Wadden Sea Flyway Initiative is a programme under which the three Wadden Sea countries of The Netherlands, Germany and Denmark fulfil some of their obligations as a UNESCO World Heritage Site. Since 2012, WSFI in close cooperation with BirdLife International (through the Conservation of Migratory Birds project) and Wetlands International have been implementing two projects focused on monitoring and capacity building. A Flyway Vision of the WSFI has been signed by a number of countries and other stakeholders that commit to actions to achieve flyway conservation.

Arctic Migratory Birds Initiative (AMBI)

AMBI is an initiative under the Conservation of Arctic Flora and Fauna (CAFF), comprising governments from the eight Arctic nations. AMBI aims to improve the status and secure the long-term sustainability of declining Arctic breeding migratory bird populations. It has identified as a priority to secure intertidal non-breeding habitat of Arctic waders in the Bijagós Archipelago in Guinea-Bissau within its work plan.

The BirdLife East Atlantic Flyway Initiative (EAFI)

The BirdLife EAFI is a BirdLife Partners' Initiative that contributes to the Flyway Programme of BirdLife International, build collaboration among BirdLife Partners and advances the conservation agenda at the national and international level along the flyway. The goal of the initiative is to ensure sustainable populations of migratory birds along the East Atlantic Flyway in harmony with people and nature. BirdLife Partners support each other, working together on capacity building and site activities.

Migratory Birds for People (MBP)

The Migratory Birds for People network consists of more than 16 partner wetland centres along the East Atlantic Flyway in Europe and West Africa. The initiative is led by Wetland Link International (WLI), which manages a programme of communication support to wetland centres globally on behalf of the Wildfowl & Wetlands Trust (WWT).

Harvey van Diek