

An International Breeding Conditions Survey of Arctic Waterfowl: Progress Report

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This report summarises progress achieved in the period from September 1997 - May 1998 on a joint International Wader Study Group/Wetlands International project, aimed at collating in a database information on environmental conditions on the breeding areas of arctic nesting waterfowl. Main efforts during this phase were aimed at completing the pilot stage and preparing for the project's full-scale implementation after the 1998 field season. This involved 1. development of database structure (data model); 2. beginning entry of existing data; and 3. revision of the questionnaires on the basis of comments provided on the pilot sheet. The database currently includes sections with 1. personal respondents' data; 2. study location data (linked to GIS); 3. general breeding conditions information and weather data; 4. data on abundance and breeding performance of individual bird species and animal groups; and 5. bibliographic data. Revision of the questionnaire affected most the sections describing survey site and fauna in the study area (including breeding performance), which became more detailed. As few of the environmental factors of interest in the Arctic were discovered to be specific to waterfowl and of little value for other groups of terrestrial birds, to avoid unnecessary narrowing of the project scope its title has been changed to "**ARCTIC BIRDS: an international breeding conditions survey**". Future actions on the project will include collecting forms in autumn 1998 with a view to printing a newsletter early in 1999 with a review of bird breeding conditions in the Arctic in 1998.

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INTRODUCTION

A joint Wader Study Group/International Waterfowl Research Bureau (now Wetlands International) project was announced in 1995 to collate information on environmental conditions on the breeding areas of arctic nesting waterfowl. It successfully passed the initial phase aimed at broad circulation of a two-part pilot questionnaire and seeking contacts in the arctic countries. The importance of this venture was recognised and the prospects of establishing it on a more permanent basis were discussed at annual WSG conferences in Portugal, Belgium, and Denmark. However, a possibility to further develop the project did not arise until the second half of 1997, when funding was provided for the 1997-1999 period by the Dutch Government through Wetlands International. This report summarises progress achieved in the period from September 1997 - May 1998.

RATIONALE

So far, much of the understanding of the population dynamics of arctic waterfowl has come from individual studies in small areas of the arctic, or from *post hoc* interpretation of broad patterns of weather conditions, as well as evidence from banding recoveries and winter population counts. Setting these individual studies in a broader context would contribute much to their use in understanding wider geographical patterns

in waterfowl populations.

Developing a mechanism for the delivery of an annual assessment of breeding densities and productivity throughout breeding ranges, in relation to climatic, depredatory and other relevant factors, would be of great value in aiding the fundamental understanding of the contribution of this part of the annual cycle to the population dynamics of arctic waterfowl. This in turn would be of substantial benefit in providing baseline information in the development of international conservation efforts for migratory waterfowl. Such information could, for example, be used to establish the extent of variation in densities and productivity in different parts of breeding ranges and the identification of key zones for conservation attention. Such material could lead also to more informed assessment of the likely effects of global climate change on peripheral and core parts of waterfowl breeding ranges.

At a global pan-arctic scale there are currently opportunities for using the medium of the International Wader Study Group and its links, not only with Wetlands International (for whom it acts as the Wader Specialist Group) and other international agencies, but also with active field-workers in all arctic countries to aid co-ordination of the programme. Although



many results from parts of such a programme may be published separately, a major added value of such a co-ordinated exercise is the opportunity for drawing together the results from each project, year and site into a comprehensive and widely available single source of arctic waterfowl breeding information. The main focus of the database was on waders and waterfowl, but inclusion of data on other groups of terrestrial birds will help to build up an improved picture of arctic bird diversity, and will help to set the waterfowl information in its broader context.

RESULTS OF THE CURRENT PHASE OF THE WORK PROGRAMME (SEPTEMBER 1997 - MAY 1998).

Main efforts during this phase were aimed at preparing for its full-scale implementation after the 1998 field season, namely development of the database structure (data model) to reflect data sheet information, entry of existing data and revision of data sheets on the basis of comments provided on the pilot sheet.

DATABASE STRUCTURE AND FUNCTION.

The nature of the data to be accumulated in the database strongly suggested the need for the use of a relational data model, which was fulfilled using Paradox for Windows. The data model currently includes 21 tables which are grouped in the following principal functional assemblages:

- personal respondents' data;
- study location data (linked to GIS);
- general breeding conditions information and weather data;
- data on abundance and breeding performance of individual
- bird species and animal groups;
- bibliographic data (link to bibliographic database to be created using Procite for Windows).

Splitting the data into multiple tables allowed most efficient organisation of the data and minimised the space they occupy, *e.g.* currently the largest table with more than 1000 records on breeding abundance and success of individual species is only 108 kB in size. Given that the database will be populated and managed by a single person, we were not attempting to create a fool-proof and complete application with user-friendly interface and restricted set of predefined queries, but rather concentrated programming efforts on automation of data entry. Following the agreement of a data access policy, an opportunity to make queries via the Internet can be provided. Although the primary source of the most up-to-date data are questionnaires, it is also possible for the database to take published information and the results of personal communications.

A prototype of the GIS companion to the database was created using MapInfo Professional. Now it includes a number of very general hydrographic and political layers, available from the CAFF website and mainly suitable for illustration purposes. Topographic information detailed and complete enough to make certain spatial queries about data is being

compiled for the arctic region on the basis of the Digital Chart of the World layers (produced by the Environmental Science Research Institute), although it is clear that elevation and habitat data need to be searched for elsewhere. This essential GIS component will require further serious development, and any help with data from the community of arctic researchers would be greatly appreciated. Mikhail Soloviev was appointed the database manager responsible for construction, data entry, and provision of access to the data on request.

OVERVIEW OF THE COMMENTS AND PROPOSALS PROVIDED ON THE PILOT FORMS.

The pilot form was in two parts, the first section aiming to summarise general information on environmental conditions and locations where field studies have been undertaken, while a second part, produced in different versions for different parts of the arctic and available on request, enabled more detailed information on the presence and breeding success of individual species to be recorded. There were three versions of Part 2, one for Greenland, Iceland, Svalbard and Scandinavia, one for Alaska and Canada, and one for Russia. We received a total of 59 Part 1 forms and 24 Part 2.

Numerous comments, questions about ambiguities, and filled-in forms were most helpful for improving the forms' structure and perception, and we deeply thank all the contributors. Many of the comments served to refine the questions and allowed us to minimise any ambiguity in answer interpretation. In Part 1 the sections on respondent's personal data and weather patterns in the locality remained almost unchanged, while sections describing the survey site and fauna in the study area (including breeding performance) required substantial alterations.

Most challenging proved to be situation with the lists of landscapes and habitats in the study sites, as respondents had added 11 landscapes and 13 habitats of their own to the eight and nine respectively already present. Moreover, people understood landscape and habitat categories differently, which led to the inclusion of some unlisted types (*e.g.* forest tundra and typical tundra) in both landscape and habitat divisions, and vice versa - certain types from the lists were apparently differently interpreted. The resulting confusion made information on the habitat composition at a given site nearly unmanageable and highlighted an apparent need for complete revision of the habitat section on the form. We decided to work out a list of habitats with a limited number of easily interpreted items which should supplement and not replicate information already present in the questionnaire. This approach allowed us to get rid of the whole landscape section which had contained information on the major vegetation zones of the arctic, easily derivable from appropriate maps. The intention was to make strong emphasis in the habitat section on the fine-scale units which are difficult or impossible to get from zonation and general topographic maps.



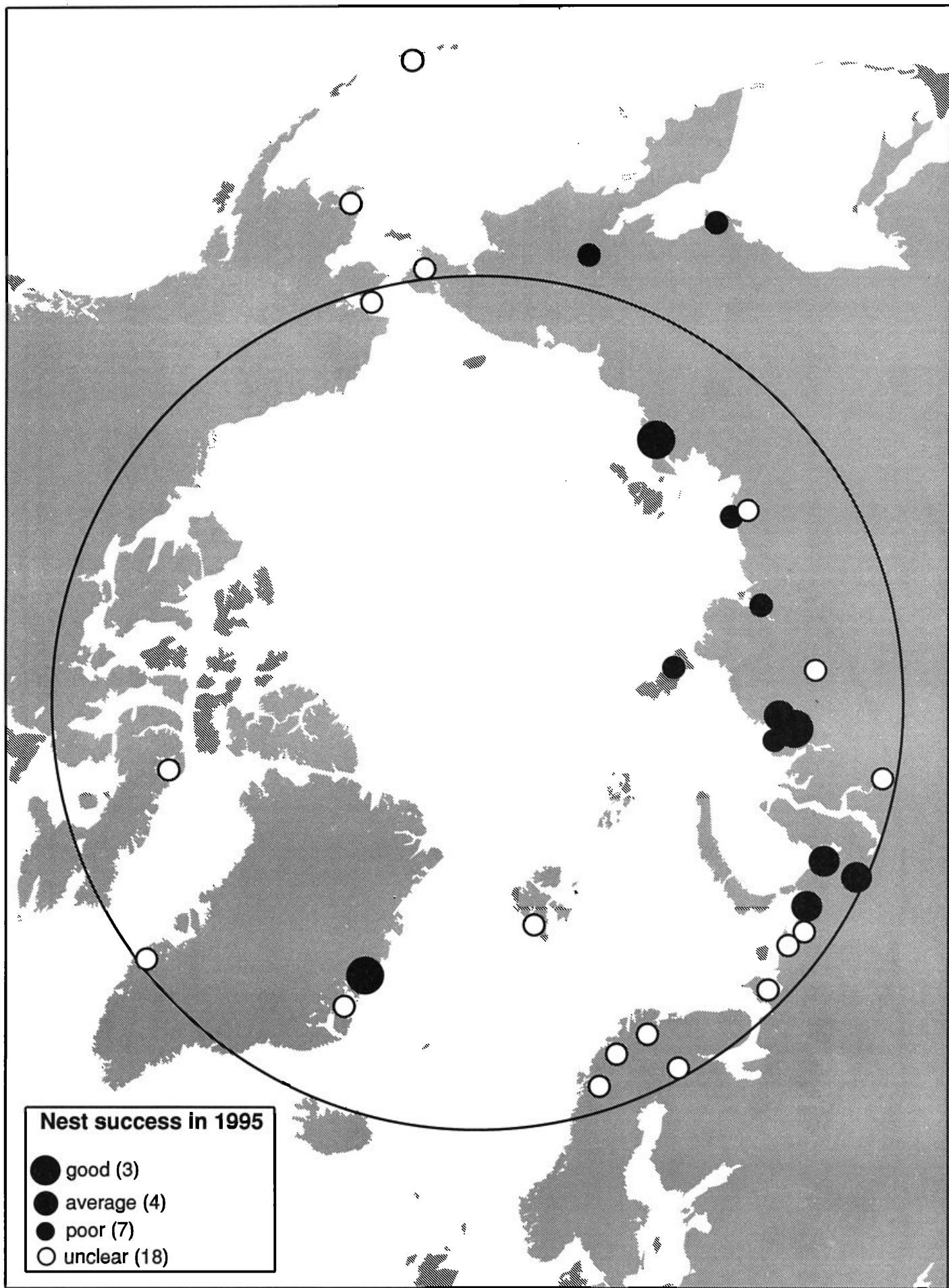


Figure 1. Nest success in 1995.



FUTURE PLANS

A plan for co-ordination of form distribution and collecting has not yet been drawn up. A network of national contact points in both arctic and other countries still needs to be established, with the largest gaps in the Western Hemisphere.

In the autumn we will start collecting forms for the 1998 field season, with a view to printing a newsletter early in 1999 and a review of bird breeding conditions in the Arctic in 1998. The participation of arctic workers and any help with establishing the network of contacts is highly appreciated.

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