



Migration and international conservation of waders

conference of the Wader Study Group in Odessa, 13 - 17 April 1992

ABSTRACTS OF TALKS

STOP-OVER STRATEGY OF RUFF DURING THE SPRING MIGRATION

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During spring 1988 - 1992 over 1000 Ruffs were ringed in Northern Italy, with a relatively regular effort every year. Up to three sites each year were studied with night-time catches at least once a week. Each site turned out to support different body mass categories of birds. There were differences in body mass among sites, but not among years or periods of the same year. The analysis of body mass, combined with that of sightings of locally dyed birds, allows the identification of different stop-over strategies related to habitat conditions and pattern of migration. Clear links among what we observe at different sites are, however, still missing.

THE UK ESTUARIES REVIEW: RESOURCE ASSESSMENT FOR COASTAL WETLAND CONSERVATION

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Britain's estuaries are unrivalled in western Europe for their number and diversity of form and wildlife. Britain has international commitments to maintain and enhance the habitats and wildlife of its many internationally important estuaries: for example at least 68 of Britain's 155 estuaries support internationally important numbers of wintering waders and wildfowl, and many others support nationally important waterfowl populations. Estuaries have, however, been used by mankind for many centuries for a great variety of purposes, and many of these human uses have led to progressive damage and destruction of estuaries and their wildlife.

An understanding of the distribution of the estuarine resource and the wildlife that depends upon it is an essential precursor to assessing patterns of human pressure on estuaries and how these pressures influence the effectiveness of current conservation measures (both national and international). Such understanding of resource distributions are needed to underpin the development of flyway conservation measures, as well as for guiding local and national conservation strategy.

Concern over the pressures on British estuaries led the British Nature Conservancy Council to establish in 1988 its Estuaries Review with the objective of providing the basis for the develop-

ment of a conservation strategy for British estuaries. The review collected comparable information on the wildlife of all 155 British estuaries, and the conservation status and the patterns of over 200 human activities on each of these estuaries. Much of this information was collated on a computer database, some from new data collection exercises and some by establishing links with other existing resource databases (e.g. wintering waterfowl counts). The review analysed the information to produce national distributions of each feature of interest, and this national overview was published in 1991 as a major report *Nature conservation and estuaries in Great Britain*. Using examples from the review the paper will explain the way in which the review work was undertaken, describes the key elements for undertaking such work, and comments on some of the problems encountered in undertaking the review.

We are now compiling the information collected by the Estuaries Review to provide an Inventory of British estuaries (being published later in 1992) which provides a standardised summary of key conservation features for each British estuary. This is intended to be of particular use to those developing conservation and management plans for individual wetlands. The work of the Estuaries Review is now being developed by the Joint Nature Conservation Committee into a Coastal Review covering the coastal zone of the United Kingdom.

SHOREBIRD STUDIES AT ALERT, N.W.T., CANADA: NUTRIENT RESERVES, BEHAVIOUR AND ENERGETICS FROM ARRIVAL TO BREEDING

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Since 1986 we have been studying the behaviour, nutrient reserves and energetics of shorebirds (chiefly Knot *Calidris canutus* and Turnstone *Arenaria interpres*) at Alert (83° 20'N) on northern Ellesmere Island, Canada - one of the most northerly shorebird breeding areas in the world. Only a few shorebird species breed regularly here and densities are very low. The commonest breeders are Turnstone and Knot, and our studies have confirmed breeding by Sanderling *Calidris alba*, and occasional breeding by Baird's Sandpiper *C. bairdii* and probably White-rumped Sandpiper *C. fuscicollis*. Our main interest has been in establishing in Knots and Turnstones the

extent to which the fat and protein reserves accumulated on late spring staging areas are retained when birds arrive on their breeding grounds and how much of any remaining reserves are needed for survival through adverse weather before breeding can begin. Alert is a particularly useful place to study this rather neglected arrival period since shorebirds aggregate in the early season on snow free areas (especially the rubbish dump and sewage outfall) around the base, and can be caught there.

The paper briefly describes our main findings to date. Birds leave their late spring staging areas in the last week of May, and arrive at Alert from about 27 May (Turnstone) and 30 May (Knot). Most birds arrive in the early days of June, during the period of main snow-melt in most years. On arrival they have retained about half the fat reserves carried when they leave staging areas, and also they have retained protein reserves big enough to supply most of the demands of egg production. Over the next two weeks, by which time most birds have started nesting, the mass of Knots declines but that of Turnstones fluctuates erratically. Birds are still carrying fat and protein reserves at the start of nesting. A mid-season visit in 1991 found that most shorebirds were still incubating eggs in mid-July, but a brood of newly-hatched Knot chicks on 1 July suggests that some birds start egg-laying as early as the during the first week of June.

On most days birds feed for about 75% of their time, but during severe weather when windchill is high in the week after arrival both Knots and Turnstones become inactive, apparently to reduce energy expenditure. In the following week, however, when birds are close to egg-laying the opposite occurs, with birds feeding for longer as windchill increases. Estimated daily energy expenditure during the first two weeks of June are high, averaging about 3.5xBMR in Knots, 4.25xBMR in Turnstone and 4.7xBMR in Sanderling.

Some recent evidence suggests that Knots surviving particularly severe arctic summers in the early 1970s (when the total population declined dramatically) are those that leave spring staging areas with relatively large nutrient reserves. Our studies at Alert indicate a major role even in milder summers for these nutrient reserves in balancing energy budgets soon after arrival on breeding grounds.

TOWARDS A FLYWAY CONSERVATION STRATEGY FOR WADERS

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but 22.4% fly to the south-east (probably to Chinese wintering areas). At the lower Sarysu river the majority of waders fly south-east (towards Indian wintering grounds). A smaller number of birds fly to the south-west and west (towards the Aral and the Caspian Seas). The migration route of waders at the Chushkakol lake divides equally towards Indian (along Syr-Darja) and Caspian wintering grounds.

THE INTERNATIONAL SIGNIFICANCE OF WETLAND HABITATS OF THE MOROSHECHNAYA RIVER (WEST KAMCHATKA, RUSSIA)

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The West-Kamchatka lowland that stretches for hundreds of kilometers along the Sea of Ochotsk, is of great importance for waders using the East-Asian flyway. Lower parts of the Moroshechnaya river (56-57 N) are the most numerically important as an area used for migration stopover. During migration 27 wader species were recorded there, including the rare *Tringa guttifer* and *Eurynorhynchus pygmeus*. In spring the total number of waders in the estuary of the Moroshechnaya river is estimated at more than 500,000 birds. Ten species, including *Haematopus ostralegus osculans*, *Pluvialis dominica*, and *Numenius madagascariensis* breed here. Thousands of *Limosa limosa* and *Calidris tenuirostris*, hundreds of *N.madagascariensis*, and tens of other waders appear in the estuary of the Moroshechnaya river in July. At least 100,000 *N. phaeopus* and *L. lapponica* pass through this area during late summer-autumn. In total, at least 1 million waders and tens of thousands of wildfowl visit the Moroshechnaya river estuary on their autumn migration. These wetlands are undoubtedly of international importance and should receive protected status.

GENERAL PATTERN OF DUNLIN MIGRATION SEEN FROM DIFFERENT PARTS OF EUROPE

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Although the Dunlin has been studied intensively for many years, its migration system seems still to be unclear in many points. There are some reasons for this:

- ◆ Dunlins have not been well studied within their huge breeding grounds. Features enabling to distinguish different biogeographical populations when the birds are outside their breeding grounds are not known well enough.
 - ◆ Different groups of Dunlins may occur together during the post-breeding season. While studying the migration of Dunlins, the researchers do not know the exact origin of the birds in their study site.
- Some recent publications and unpublished results, concerning different areas of post-breeding occurrence of the Dunlin are discussed. It has

not yet been possible to create the complete picture of the movements of Dunlins between their breeding and wintering areas. This picture, however, has been completed steadily, and every year has brought new information about the species; mostly as a result of the cooperation between "Dunlin-people" from many parts of Europe. Some international projects have already been realized and others are in process. Further international cooperation is especially necessary, also with new people working with Dunlins in other, less known, areas.

AVOCETS ON THE EAST ATLANTIC FLYWAY

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The northwest European population of the Avocet *Recurvirostra avosetta* consists of about 67,000 individuals (Smit & Piersma, *IWRB Special Publ.* 8). More than half of them breed on the coast of the Wadden Sea of The Netherlands, Germany, and Denmark. With the help of sightings of individually colour-ringed Avocets from a breeding population in Schleswig-Holstein, some aspects of the movements of Avocets during the non-breeding season are described, and important gaps in knowledge are identified. Most north-west European Avocets winter on the west coasts of France and the Iberian Peninsula. Especially in cold winters, however, many birds migrate to unknown wintering places. The protection status of the key sites for moulting and overwintering is briefly reviewed, and some of the major threats to these sites and their Avocet populations are mentioned.

THE SYSTEM OF WATERFOWL COUNTING IN THE UNITED KINGDOM

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Effective conservation requires targeted action based on high quality data. The British experience in protecting wader habitats will be outlined. A network of volunteer ornithologists undertake regular counts on wetlands through Britain. This information is then collected by national organisations such as the Wildfowl and Wetlands Trust and the British Trust for Ornithology, under contract to the UK statutory conservation agency (the Joint Nature Conservation Committee). The information is used to protect key sites under national legislation (as Sites of Special Scientific Interest), and where appropriate, under international conventions (as Ramsar sites or as EC Special Protection Areas). Data on population levels and trends are used to advise the UK government on any necessary changes in the protected status, as well as to fulfill international obligations and to contribute to international data bases. The co-ordination of the system will be summarised.

ECOSYSTEM RESEARCH PROJECT ON DISTURBANCES OF BY HUMAN ACTIVITIES IN THE WADDEN SEA

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On the East-Atlantic-Flyway the Wadden Sea is an important resting place for migratory waders, geese and ducks on their way to or from their breeding grounds in the arctic. It is also a breeding place for several endangered species of waders, gulls and terns. On the other hand the pressure of human activities on this ecosystem has increased in the last decades. In the North-German part of the Wadden Sea area an applied ecosystem research project started in 1989. One main topic of the ornithological studies in this project is an assessment of the influence of man-related disturbances on birds.

The most important sources of disturbance in the Wadden Sea are tourism, military and civil air traffic, boats and coastal protection measures. Hunting is forbidden, but an oil-drilling platform and military training grounds also cause conflicts with nature conservation.

Methods for measuring the pressure of different human activities on the birds in the Wadden Sea are discussed. As an example the influence of tourism on nest distribution and breeding success of the endangered Kentish Plover (*Charadrius alexandrinus*) is demonstrated.

This study is supported by the Federal Environmental Agency, Environmental Research Plan of the Minister for the Environment, Nature Conservation and Nuclear Safety of the Federal Republic of Germany (Grant 108 02 085/01), and by the state of Schleswig-Holstein.

SUMMER MOVEMENTS OF WADERS ACROSS THE SAMUR RIVER DELTA: PRELIMINARY DATA AND REVIEW OF THE PROBLEM FOR THE CASPIAN SEA REGION

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The existence of summer movements is well-known for many species of waders. Nevertheless, the scale of this phenomenon is still unclear for different species, or in different places. During studies from 25 May to 3 July 1991 in the Samur river delta, Daghestan (41° 46'N, 48° 32'E) 18 species of waders were recorded. These included six species breeding in Daghestan. The maximum numbers for the majority of species were counted between the second half of June and the beginning of July. Birds were observed either flying along the coast in a south-eastern direction or on stopovers at the coast and on empty fishery ponds at the mouth of the Samur river. The most numerous species were *Tringa totanus* (up to 150 birds a day), *Himantopus himantopus* and *Tringa glareola* (up to 70 birds a day), *Numenius arquata* (up to 60), *Tringa nebularia* (up to 50), *Tringa ochropus* (up to 40), and



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Actitis hypoleucos (up to 30). Several large flocks

of *Tringa stagnatilis* (45 and 40 birds), *Limosa limosa* (40 and 27 birds), *Numenius phaeopus* (10, 27 and also single birds), and *Philomachus pugnax* (16 and 25 birds) were observed. These birds were probably non-breeders and failed breeders. The Samur river delta is not, however, a favoured locality for most and larger movements probably occur elsewhere on the Western Caspian coast. The scales of these movements in the Caspian Sea region are discussed on the basis of authors' observations and analysis of the literature.

POPULATION DYNAMICS AND CHANGES OF BREEDING RANGE LIMITS OF WADERS IN THE ARID ZONE OF CENTRAL ASIA

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The topic is described with the example of the Asiatic Dowitcher. Its main breeding range lies within the limits of arid zone in Southwestern Siberia, Mongolia and China. To the north, up to 56-57°N, it is found patchily (in isolated breeding grounds) on the parcels of relict steppe. At the end of 19th century and the beginning of the 20th century several hundred pairs were breeding at the northern limits of the species range. Their number during this period was probably constant. Since the middle of 1970s numbers have increased up to 6,000 birds. This has occurred mainly due to extreme drought in southern parts of the breeding range and an expansion of at least 1,000 km of the northern range boundary. This increase occurred very rapidly (during 1-2 years). The following decrease was slow, lasting more than 10 years. Currently (1990-91) the numbers of this species is similar to those at the beginning of the century. A slow decrease in numbers in the northern part of breeding range after restoration of favorable conditions (humidity level) in southern parts indicates that high site-tenacity of the species exists together with high mobility of some birds. The species expansion is characterized by marked "throw-outs" in extreme periods; their scale depends on the size of areas suffering from the drought. Dynamic spatial structure is a basic adaptation of some species to existence on the expanse of water in the arid regions. It is formed on the basis of local movements within separate parts of the breeding range, together with large-scale migrations, which depend on sharp changes of ecosystems.

PEATLANDS AS A HABITAT FOR RARE WADERS IN TVER REGION OF THE UPPER VOLGA

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Thirty-one wader species were recorded in Tver region, and 19 of these species breed there. Eleven species are considered as rare, and 10 of these rare species breed in different peatlands. Golden Plover *Pluvialis apricaria* and Whimbrel

Numenius phaeopus breed only on up-river bogs,

and Marsh Sandpiper *Tringa stagnatilis* and Great Snipe *Gallinago media* only on fens. Ruff *Philomachus pugnax*, Redshank *Tringa totanus*, Black-tailed Godwit *Limosa limosa* and Curlew *Numenius arquata* are widely distributed on peat-bogs and have their maximum density on fens. Single breeding records of Jack Snipe *Limnocyptes minima* are known for eutrophic and mesotrophic bogs. In the last decade Terek Sandpipers *Xenus cinereus* have started to breed on transformed peatlands. The wader species composition and abundance vary considerably among peatlands of different types due to differences in their size, forest-cover and the presence of open water areas. The large up-river bogs with complex habitats from marginal eutrophic parts to central areas with peat-ridges and open water areas have the highest diversity of rare breeding waders (up to 7 species), although their density is rather low - 2.1 ± 0.3 pairs per square km. The most marked fluctuations in numbers are found on the small bogs and in dry years some species do not breed there at all. Egg and chick predation is higher on long narrow bogs than on rounded ones of the same size. In the most recent decades the increases in Hooded Crow *Corvus cornix* numbers at the bogs has negatively influenced the breeding success of wader species. Overall 160 bogs in the region were excluded in 1980s from drainage and peat-industry plans: all forest-cuttings are planned to stop here by 1993. With the development of anthropogenic activities in the region the value of peatlands as a habitat for rare wader species will probably increase in the near future.

VARIATION IN THE BODY MASS OF RUFFS *PHILOMACHUS PUGNAX* IN RELATION TO MIGRATION

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For about 20 years the OAG Münster has studied wader migration in the sewage farms of Münster (Germany), a stop-over site for many wader species on migration. As a part of this research over 6,000 Ruffs have so far been ringed and measured during both migration periods. Additionally about 2,000 Ruffs were caught at their West African wintering grounds in the Senegal delta during the winters from 1985 to 1988. The body masses of Ruffs vary greatly through the year. In this paper we describe the mass variation of Ruffs during their preparation for migration ("pre-migratory fattening") both on wintering grounds and at a central European stop-over site. The data concerning migration strategy are compared with results from other sites (e.g. East Africa).

THE ROLE AND IMPORTANCE OF NON-GOVERNMENTAL BIOLOGICAL STATIONS IN GERMAN NATURE CONSERVATION

OAG Münster

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Corresponding to the 'Two-Pillar-Model' of representation and cooperation in some international nature conservation organisations (e.g. IWRB, IUCN), many private Biological Stations have been established in Germany during the last two decades. The Biological Stations are organised either as a registered society or as sub-organisations of German NGOs. They finance themselves by diverse sources, e.g. member contributions, public or private donations, execution of expert opinions and especially the management and care of nature reserves. The basic idea of private Biological Stations is the principle of 'subsidiarity'; this means that the State should delegate as many works as possible to such private initiatives and should restrict itself to sovereign acts.

VARIABILITY OF THE SALT GLAND INDICES OF WADERS AT THE BALKHASH-ALAKOL BASIN, KAZAKHSTAN

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An analysis of the volume of the overorbital gland of 30 wetland bird species (16 waders), which were caught during 1990-1991, revealed a good accordance of a "linear" index and a "weight" index (the Tekhnau (1932) index): $r = 0.916$. Taking into account that the size of the salt glands reflects the adaptation level of birds to a variety of saline conditions, the indices may be used for following purposes: (1) to work out the typology of species composition in the salty lowlands of arid zones; (2) to explain some cases of waders habitat selection; and (3) to suppose the prevalence of directions of movements in the postbreeding season. We found higher indices in young Redshank *Tringa totanus* and Kentish Plover *Charadrius alexandrinus* in comparison to adults. This indicates indirectly the existence of an age dependant food specialisation. An age inversion of the same indices was not found in Temminck's Stint *Calidris temminckii*. Considerable compensatory parallel change of weight indices of kidney and salt gland during migration period was not confirmed.

THE GREAT ARCTIC RESERVE - LARGE SCALE NATURE PROTECTION IN NORTHERN SIBERIA

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The Taymyr Peninsula in northern Siberia is an important breeding area for many wader and wildfowl species. Taymyr is the northern limit of different flyways. The strong ornithological links between Taymyr and the international Wadden Sea, one of the key sites of the East Atlantic Flyway, were the main reason for a series of joint expeditions by the WWF-Wattenmeerstelle and the Soviet Academy of Sciences. The results of these expeditions have contributed to the data



base for the fast developing nature conservation activities launched by WWF in co-operation with Soviet bodies. The vast areas of different tundra types on Taymyr are one of the largest remaining wilderness areas of the world. Although only very sparsely inhabited, the habitats on Taymyr are threatened. Among these threats are increased shipping activities on the coast, garbage and waste problems of the settlements and even individual hunters, physical destruction of the tundra by vehicles, mineral exploitation and hunting tourism.

A series of conferences attended by all local and national authorities responsible for Taymyr resulted in a plan for the establishment of the Great Arctic Reserve in 1993. This reserve will consist of 9 sub-units with a total area of 8 million ha, of which 3 million ha are already established reserves. The Great Arctic Reserve will be a part of a Biosphere Reserve covering all Taymyr.

MIGRATION OF WADERS IN THE KHA-BAROVSK REGION, THE FAR EAST

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In the area of the Lower Amur River two migration corridors for waders are known - along the sea coast and across the mainland. The overland route divides near the city of Komsomolsk and runs along the Evoron and Chukchagir lakes and the Nimelen and Tugur rivers, as well as along the Lower Amur valley. On the inland route a total of 1,850-2,050 waders were counted along a 500 m strip at the Evoron lake during one and a half months (4-hours observations each day) of spring migration 1986-88. In 1988-1990 at the sea coast spring migration had low intensity: 50-80 waders per sq.km of the intertidal zone of Tugur Bay. Greenshank *Tringa nebularia* and Black-tailed Godwit *Limosa limosa* were the most numerous species. In contrast to spring, during autumn migration mean density at Tugur Bay was 600-700 waders per sq.km, and a total of 3,000-6,000 waders were counted along the 10 km coastline route. Great Knot *Calidris tenuirostris* (46%) and Terek Sandpiper *Xenus cinereus* (30%) were the most numerous, while at some periods Black-tailed Godwit and Dunlin *Calidris alpina* prevailed.

FOLLOWING BIRD NUMBERS WHEN THEY KEEP CHANGING: IS MONITORING OF MIGRATORY WADERS POSSIBLE?

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Most ornithologists working in temperate regions face very unstable conditions when investigating wildfowl or waders. The birds can be passing through rapidly, or stopping for some time. This ranges from only short moments to weeks or even months. In general numbers are less stable than in overwintering areas, where migration comes to an end at least for some time.

The data usually obtained from counts give a range of information from species passing, their relative abundance, maximum numbers, seasonal phenology up to the intensity of usage, the latter usually measured as bird days. More difficult to obtain is information about absolute numbers and the staging time, as this has to involve methods such as colour-marking in addition to the counts. Collecting data on the development of numbers over many years is commonly called monitoring. In order to monitor bird numbers it is necessary to evaluate carefully the counting scheme to be used. Many regular counts, their number depending on the local situation and the target species, carried out over many years, are necessary for this. There is a big difference of methods between monitoring of wintering and migratory bird populations. Monitoring can aim at measuring changes in wetland quality, using long-term counts of just one area. Only the monitoring of very large areas will allow detecting also the changes in the bird's population size.

An extensive monitoring scheme that has produced high quality data since 1970 has been established in Great Britain; the JNCC/RSPB/BTO Birds of Estuaries Enquiry covers waders in most of the British estuaries. This scheme is planned for and deals primarily with wintering birds. The IWRB's midwinter counts also refer to wintering populations. These counts cover an almost worldwide geographical range. Long running counting schemes for migratory waders exist only for smaller areas such as Tipperne/Denmark. A scheme operating in the North German Wadden Sea and therefore dealing with very large numbers of migratory but long staying birds was started in 1987. The timespan of this project is too short to present serious monitoring results, but the method used and some more descriptive results are discussed.

NEW WAYS IN MANAGING NATURE PROTECTION: A SMALLER ARMY BRINGS MORE YOUNG PEOPLE TO ENVIRONMENTAL WORK

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In many countries young people are allowed to refuse army service, if they do social service instead. In Germany such social service can be, among others, the work in environmental or nature protection.

Using the example of the 2700 sq.km of National Park in the North German Wadden Sea it is shown how useful this possibility can be for nature protection. About 50 army refusers, which are called "Zivis" in this talk, do in fact most of the work which has to be done professionally in the National Park.

This includes most of the educational work, most of the work in guarding sensitive areas and a significant part of the scientific fieldwork. This also includes about half of all the bird counts which are carried out in this part of Western Europe's most important wader and waterfowl area.

The project has meanwhile proved to be extremely successful for several reasons. It seems worthwhile to consider initiating similar projects in other countries where "Zivis" - or their use for nature protection - are still unknown. This seems especially possible under the circumstances of large scale disarmament that we face today.

NESTING DENSITY DYNAMICS AND SITE TENACITY IN WADERS OF THE MIDDLE AND NORTHERN YAMAL

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Nesting density monitoring and colour ringing was made on control plots of the ornithological field stations "Hanowey" (1982-1991, Middle Yamal, north of shrub tundra, 68°40'N) and "Yaibari" (1988-1991, Northern Yamal, south of arctic tundra, 71°04' N). Species with a high site tenacity index demonstrated a more stable density.

Species	Density limits		nests/square km Mid.Yamal	Site tenacity % mean±SD N.Yamal
	Mid.Yamal	N.Yamal		
<i>Pluvialis squatarola</i>	0 - 0.04		2.2 - 3.6	-58±10
<i>Pluvialis fulva</i>	0 - 0.04		0.1 - 0.2	--
<i>Pluvialis apricaria</i>	0.3 - 0.8		0	42±18-
<i>Charadrius hiaticula</i>	0.09 - 0.2		0 - 0.08	53±14-
<i>Tringa glareola</i>	3.7 - 8.1		0	62±9-
<i>Arenaria interpres</i>	0 - 0.1		-	-
<i>Philomachus pugnax</i>	3.1 - 18.1		0 - 5	0-
<i>Calidris minuta</i>	0 - 16.2		37 - 95	00
<i>Calidris temminckii</i>	1.9 - 5.6		7 - 9	58±1010±9
<i>Calidris ferruginea</i>	once		0.2 - 1.3	--
<i>Phalaropus lobatus</i>	15 - 32.1		3 - 6	+-
<i>Calidris alpina</i>	0.7 - 2	24 - 33	37±12	68±4



THE IMPORTANCE OF THE WESTERN CASPIAN COAST FOR MIGRATING AND WINTERING WADERS

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Between 1981-91 44 migrating and 28 wintering species of waders were recorded on the western Caspian coast. On wetlands in the northern part of the Agrachan Peninsula more than 5,000 waders were counted in late October at one place, with the great majority being Dunlin *Calidris alpina*. On the 4 km sandy beach in the southern part of the Agrachan Peninsula about 5,000 waders can occur at any one time in autumn, with Sanderling *Calidris alba* (48%) and Dunlin most abundant. In April-May up to 1,000 waders gather here, including over 600 Terek Sandpipers *Xenus cinereus*. On the 4 km sandy beach at the Samur river mouth about 500 Sanderlings and 500 Little Stints *Calidris minuta* may gather in some years in August. Over 200 Wood Sandpipers *Tringa glareola* and 200 Common Snipe *Gallinago gallinago* also stop here on a 90 ha empty fishery pond. On wetlands at Kirov Bay about 30,000 waders accumulate in August, with Black-tailed Godwit *Limosa limosa* (40%), Curlew Sandpiper *Calidris ferruginea* (19%) and Kentish Plover *Charadrius alexandrinus* (12%) most abundant. Other regions of the Western Caspian Coast are largely unsuitable for waders: the coast to the north of the Agrachan Peninsula is completely covered by reeds and all of the southern coast suffers from many human activities. Moreover, current sea-level changes and coast erosion have led to the disappearance of the beach flats. Winter concentrations of waders in Kirov Bay are now apparently the largest on the Caspian Sea. In 1984-86 about 7,000 Redshanks *Tringa totanus*, 4,000 Dunlins and 2,000 Black-tailed Godwits were counted there. Numbers of wintering Avocets *Recurvirostra avosetta* and Curlews *Numenius arquata* decreased between 1967 and 1986, but the number of Black-tailed Godwits has increased markedly.

BROOD AGGREGATIONS IN WADERS AT NORTHERN TAIMYR

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Observations were carried out in 1991 near the Knipovich Bay, northern Central Taimyr. Broods of five wader species moved around in loose aggregations mostly within a distance of communal reaction on appearance of a predator (the observer). Among them Grey Plover *Pluvialis squatarola* and Turnstone *Arenaria interpres* are active in chasing off avian predators ("bold" species). These species rarely or never join conspecifics or are found alone, but often occur in mixed aggregations, but their occurrence in mixed aggregations is not a result of their gregarious behaviour. Rather their "protective umbrella" is

probably used by other species. Among "timid" species (alarming, but not attacking) the Curlew Sandpiper *Calidris ferruginea* is the most gregarious: 86.8% of broods were recorded in aggregations, 61% of broods were associated with other species and 57.9% of broods in aggregations were conspecifics. Therefore, inter- and intraspecific aggregations are equally important for Curlew Sandpipers. Broods of the Knot *C. canutus* and the Sanderling *C. alba* are found significantly less often in associations. Sanderlings joined mixed species aggregations especially rarely and probably appear there mainly by chance. The probability of finding at least two broods in an aggregation is decreasing in the order Curlew Sandpiper, Knot, Sanderling, Turnstone and Grey Plover. A statistical approach to the structure of aggregations has shown a positive (but not statistically significant) trend for broods of Curlew Sandpiper, Knot and Grey Plover to be in aggregations. The number of Knot broods in an aggregation rises in presence of Curlew Sandpiper. According to observations of colour-marked birds some aggregations are stable in composition for at least a week, while others can regroup.

TRADITIONAL FARMING IN THE SCOTTISH HEBRIDEAN ISLANDS - ITS ROLE IN CONSERVING BREEDING WADER POPULATIONS

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Large and diverse populations of breeding waders occur on Scotland's Hebridean islands. Some of the areas of highest nature conservation importance occur on unique landforms called 'machair' - highly calcareous grasslands in coastal areas managed in a long established fashion using a rotational system of cultivation. Surveys of breeding waders have shown that wetland habitats within this traditionally farmed landscape are particularly important throughout the nesting season. However, such traditionally formed areas have low economic profitability and are under threat either from abandonment, or from agricultural intensification using modern methods. Both trends would have severe and adverse consequences for breeding waders. The challenge for conservation and farming organisations is to develop systems of financial support which will maintain these long-established landscapes to the benefit of not only breeding waders, but also the human populations that maintain the habitat on which they depend.

INTERNATIONAL CONSERVATION PLANS FOR MIGRATORY WATERFOWL: THE GREENLAND WHITE-FRONTED GOOSE PLAN

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One means of focussing international cooperation for the conservation of migratory birds is through international conservation plans. The need for such plans is specified in the Western Palearctic Waterfowl Agreement of the Bonn Convention on migratory animals.

An international plan has been drafted for the population of Greenland White-fronted Geese. This brings together conservation needs on the nesting areas in Greenland, on the migratory staging areas in Iceland and on the wintering grounds in the United Kingdom and Ireland. The draft plan has been prepared in cooperation with these Range States and will be discussed at an international workshop in March 1992.

The process of the plan preparation will be described as well as an outlining the major plan aims and how they will benefit the conservation of this small population. The potential for preparing such plans for other wildfowl and waders will be discussed.

VARIATION IN NUMBERS OF MIGRATING WADERS ON THE AYNOVY ISLES, WEST MURMAN, DURING 1963-1990

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Sixteen wader species occur at the Aynovy Isles during migration. This paper presents the quantitative characteristics of migration for the 5 most numerous species. Every 3-5 days during spring and autumn migration, feeding and resting birds were counted along the shore of the Bolshoy Aynov Isle on a route of about 7 km long. The average number of birds recorded for one count was taken as an index of the abundance of the birds. In the table the mean numbers of each species in each year are given.

There is no marked change in number of the Red-necked Phalarope, although this species shows the greatest year-to-year variability in the migration intensity. Numbers of Little Stint and Dunlin have increased from the first to the last decade. The largest numbers of Ruff and Purple Sandpiper have been in the period 1963-1970s, but in



the last two decades their numbers have decreased.

AGE DIMORPHISM IN THE WING SHAPE OF WADERS

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Populations of birds with long-distance migrations are known to have more pointed wings than those with less distant migrations (Seebohm rule). In addition, for certain bird groups the phenomenon of age changes in wing shape is known but has not previously been examined in waders. Investigations were made on Lapwing *Vanellus vanellus*, Oystercatcher *Haematopus ostralegus* and Dunlin *Calidris alpina*. It was found that in all these species young birds have a greater wing-pointedness index than old birds. Changes of the wing shape occur only after the first complete moult, and not after later moults. Differences in the wing-pointedness in young and adult birds reflect various strategies in the use of flying apparatus by birds of different age groups. More pointed wings allow a young bird to migrate further with less energy expenditure. Such longer distance migration is known, for example, in young Lapwings (Dobrynina 1985).

MIGRATORY WATERFOWL CONSERVATION: THE NEED FOR INTERNATIONAL COOPERATION

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Most waterbird species are migratory, travelling long distances and crossing many borders in order to complete their annual cycle. Throughout their range they are dependant on networks of wetlands and specific habitats for breeding, wintering and staging areas. The disturbance, degradation and loss of wetlands and other habitats essential during their annual cycle, as result of human activities, are the major threats to migratory waterbirds. In addition, many waterbird species are hunted throughout the flyway. Addressing these pressures can only be achieved by international cooperation in research, monitoring and conservation action (legislation, management, etc.). The destruction of habitats or unregulated hunting in a single range state may influence the entire population throughout the flyway. Therefore, it is essential and at the same time a great challenge to design and implement integrated conservation plans at flyway level. Such conservation plans must take account of the uneven distribution of funding and expertise in the different range states and should cover diverse topics including monitoring, research, habitat conservation and management, hunting regulation, training, education and awareness. This will require a coordinated approach by governments and non-governmental organisations, scientists and administrators working in partnership for a common goal.

In Europe, the Greenland White-fronted Goose International Conservation Plan is the first example of such a plan. This plan was developed for and discussed at the recent workshop on the Greenland White-fronted Goose in Wexford, Ireland (4-6 March 1992). The implementation of this plan will be the start of a whole series of conservation plans of this kind to be developed within the Western Palearctic flyway. IWRB proposes to act as a technical coordinating organisation, in order to stimulate and develop similar initiatives which, hopefully, can be implemented through the future Western Palearctic Waterfowl Agreement under the Bonn Convention.

IWRB'S MONITORING PROGRAMME

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Because of the great mobility of migratory waterfowl, effective monitoring requires simultaneous surveys along entire flyways. In 1967 IWRB launched the International Waterfowl Census (IWC) in North-West Europe, aiming to assess the distribution, population size and trends of wintering waterfowl. Since then the IWC steadily expanded, now covering the Western Palearctic, Asia, Africa and the Neotropics.

In 1990 IWRB started with a major review of the integral monitoring scheme in general. Since 1991 work was focused mainly on a complete reorganisation of the Western Palearctic Wildfowl Census, more particularly on the efficiency of the database. The entire review will be finalised by the end of 1992.

The final aim is to improve the feedback towards all those who are cooperating in the census and to publish trend analyses on a more regular basis. The latter is important to identify threatened waterfowl species and populations as well as wetlands and to provide more rapid feedback of results to governmental and non-governmental agencies in order that conservation measures will be undertaken. This will be very important to provide up to date information for the Western Palearctic Waterfowl Agreement, which hopefully will be signed by the end of 1992.

In order to improve this feedback the methodology of the IWC needed to be reviewed. A draft set of criteria has been worked out to reduce the numbers of sites to a minimum but representative sample for the Western Palearctic, which can be counted annually. This draft set of criteria has been tested in an extensive way on the French data set, using France as a pilot study. Afterwards this procedure has been carried out country by country, and will be finished for the entire Western Palearctic by mid 1992.

Since 1991 the census has been extended to all waterfowl species. Furthermore, in 1992 IWRB will publish the first Annual Report for the Western Palearctic, following the examples of the Asian, African and Neotropical Annual Reports. From 1993 onwards only data of the reduced site lists will be included in the IWC database and Annual Reports. An overview report on detailed trend analyses of the Western Palearctic IWC

results will be published in 1993.

SEASONAL CHANGES OF WADER NUMBERS AND CYCLES OF LEMMINGS IN TUNDRA ZONE OF THE WEST-SIBERIAN PLAIN

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Censuses of waders and small mammals were carried out in 1986-1990. The peaks of 3-year cycles in the brown lemming *Lemmus sibiricus* Kerr were recorded in 1985, 1988 and 1991, declines in 1986 and 1989, and low numbers and the beginning of increase in 1987 and 1990. Comparison of wader numbers in early summer (16 June - 31 July) and late summer (1-31 August) showed that their dynamics were determined not only by the reproductive success but also by existence and the timing of postbreeding movements and migration of local birds. Some wader species migrate further north in July-August. As a result, their numbers in the subarctic tundra decrease during the summer (except in years of high lemming abundance), but numbers in arctic tundra increase in August 3-4 times. Number of waders in August 1988 in northern subarctic tundra remained constant, while in 1989 and 1986 decreased by 8 and 1.9 times respectively. In the middle part of the subarctic tundra during the summer 1987, the wader population decreased 2.2 times. The total calculated number of waders on the tundra of the West-Siberian Plain during the first half of the summer is about 20 million birds, with 26% in arctic tundra, and 40%, 19% and 15% in the northern, middle and southern parts of the subarctic tundra respectively. The average (for 5 years) increase in wader numbers during the second half of the summer was 26%.

AGE OOMETRY OF THE REDSHANK *TRINGA TOTANUS* L. IN THE SOUTH OF THE UKRAINE

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Studies on the Redshank *Tringa totanus* at the Tiligulsky Bay (north-western Black Sea Region) showed a strong inverse relationship between egg volume and the age of females. Egg volume decreases from 23-25 cubic cm in first-year birds to 17-18 cubic cm in the oldest individuals. The relationship does not follow the generally accepted pattern in which the largest eggs are laid by females of an "optimal" age. Also the eggshell becomes thinner in older birds to the extent that it can even be visually noted. This phenomenon is probably a result of the accumulation of pesticides or other organic pollutants in the bodies of older waders, and which is then reflected in the process of egg-production. As a result the offspring of older birds may become smaller and this may be of evolutionary importance. The hypothesis needs verification.





ABSTRACTS OF POSTERS

NUMBER AND STATUS OF WADERS ON THE ISLANDS DOLGY AND KRUGLYN IN THE WESTERN PART OF YAGORLYTSKY BAY

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Among 36 wader species recorded in the Black Sea Reserve 23 (63.9%) are migrants. The islands Dolgy and Krugly in the western part of the Yagorlytsky Bay play a noticeable role for migrating waders and in the post-breeding movements of local birds. In mild and normal winters when the Bay remains unfrozen *Numenius arquata* and occasionally *Numenius phaeopus* remain at Dolgy island. Spring migration begins as early as February. The most numerous species are *Philomachus pugnax* with up to 1,500-2,000 birds being counted along every 5 km of the coast. Other common migrants are *Pluvialis squatarola*, *P. apricaria*, *Charadrius alexandrinus*, *Recurvirostra avosetta*, *Tringa totanus*, *Limosa limosa* and *Arenaria interpres*. Breeding waders are not numerous on the islands. *Recurvirostra avosetta* breeds in fluctuating numbers (5-126 pairs). The population of *Haematopus ostralegus* (6-8 pairs annually) and *T. totanus* (9-25 pairs annually on the Dolgy island only) is stable. The fourth breeding species is the Kentish Plover *Charadrius alexandrinus*.

PRELIMINARY DATA ON THE DIET OF MIGRATING RUFFS IN N ITALY

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Gizzards from all Ruff *Philomachus pugnax* casualties obtained during 5 ringing seasons were examined. A few birds found dead (lead poisoned?) not far from the netting sites were also analysed. The results stress the importance of aquatic food, apart from very few cases of specialized agricultural grain feeders. Aren't Italian wetlands wet enough not for migrating waders?

THE WADER POPULATION ON THE COAST OF NORTH-EASTERN SAKHALIN

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Northeastern Sakhalin is an important place for waders on passage in spring and autumn. Breeding wader populations are rather small and in general only 1-2 species inhabit each biotope. Breeding has been recorded for 6 species and their numbers in different years depend on availability of territories suitable for nesting, and on the

weather conditions. *Charadrius dubius* nests on the coastal dunes in similar numbers throughout (0.2-0.4 pairs/km of transect). *Tringa glareola* is the most numerous wader species. It inhabits a large range of landscapes in densities of 1-10 pairs/km, but most frequently densities are usually 2-3 pairs/km. Numbers in the dry seasons of 1988-1989 were only half those of 1990-1991. *T. guttifer* is found at stream outfalls and on the Bay coast from May until October. Numbers breeding have increased each year to a maximum in 1991 of 0.1-0.2 pairs/km. *T. totanus* nests locally in constant numbers (1-3 pairs/km) on small wet grasslands close to colonies of *Sterna aleutica*. *Calidris alpina* nests on marshes of tundra-like appearance (0.5-2 pairs/km). Early nesting in dry seasons ensures the stability of the species population. *Gallinago gallinago* inhabits marshy areas. In 1990-1991 its density was 1-3 pairs/km, but in 1988-1989 densities were much lower.

FLUCTUATIONS IN WADER POPULATIONS AT THE DELTA COMPLEXES OF THE NORTHERN SUBARCTIC

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Wader counts were carried out in the summer seasons of 1984, 1985 and 1987 on a route totalling 960 km long in the central part of the Lena River Delta, northwestern Yakutia. Fifteen breeding wader species were recorded (40% of breeding avifauna), and among them Sandpipers *Calidridinae* dominated (40%). The most abundant wader almost everywhere was *Phalaropus fulicarius*, with co-dominants, depending on the habitat, being *Calidris minuta*, *C. melanotos*, *C. temminckii* and *Philomachus pugnax*. In the first half of the reproductive period wader densities were high (266-418 birds/sq.km) and comparatively constant. During this time the number of different species and the total wader population is characterised by sharp intra-seasonal dynamics with a peak during the breeding period. The total population of breeding waders during 3 seasons (15 June to 15 July) varied annually up to two-fold. For individual species, such as *Calidris minuta*, *C. temminckii*, *Philomachus pugnax*, *Arenaria interpres*, and *Gallinago gallinago* the size of fluctuations in numbers were, however, more pronounced and were mainly influenced by weather conditions. Species breeding on the banks and in the river-valley were also noticeably influenced by spring floods. Only two species - *Pluvialis squatarola* and *Calidris alpina* - had relatively stable populations. A few *Phalaropus lobatus* breed here at the edge of its breeding range in some years.

THE INFLUENCE OF WATER LEVELS OF SALINE LAKES ALONG THE SAMARA RIVER VALLEY, UKRAINE, ON FLUCTUATIONS IN NUMBERS OF BLACK-WINGED STILTS AND AVOCETS

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On the third terrace of the Samara River valley a network of shallow saline lakes, each of 2-38 ha, has formed. Numbers of breeding Avocets *Recurvirostra avosetta* (2-40 pairs) and Black-Winged Stilts *Himantopus himantopus* (4-59 pairs) fluctuate in response to changes of lake water levels. During the Samara River flood, which takes place every 4-5 years the lakes become full-flowing, and numerous islets and sandy bars disappear. These raised water levels lead to a reduction in the numbers of breeding Avocets, to 2-8 pairs, and Black-winged Stilts, to 4-12 pairs. In the following years falling water levels, during which the lake water area reduces by 15-25% from its flood area, provides favourable conditions for nesting by both species. In such years the number of breeding Avocets increases to 13-24 pairs and of Black-Winged Stilts to 24-59 pairs. Further reductions in water levels, with decrease of the water area by 50-70% occurs over a period of 8-10 years leads to the formation of numerous islets and sandy bars, overgrown with hygrophylous and mesophylous plants. Under such conditions the number of Black-Winged Stilt decreases sharply to only 4-8 pairs, and the number of breeding Avocets increases to 35-42 pairs.

FLUCTUATIONS IN THE NUMBERS OF BREEDING WADERS DURING DIFFERENT STAGES OF RESERVOIR FORMATION

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Reservoir cascades on the Dnieper river have created breaks in the historically-formed ecosystems and have caused the development of new ecological conditions. Four phases of reservoir development can be identified. The first period is connected with the original conditions on the river. During this period 7-15 wader species were recorded breeding in different areas along the Dnieper. Their breeding density ranged from 24-38 birds/ha in different habitats. During the second phase (ecosystem deforestation) increased areas can be used for nesting and the density of breeding waders exceeded 32-48 birds/ha. During the third development phase, the initial and total filling of the reservoirs, the density of breeding waders increased to 42-50 birds/ha. After that the process of shore destruction and the increase in anthropogenic influences together with stabilization of the water level regime in the fourth phase result in the density of breeding waders being reduced to 14-18 birds/ha.

LAND-CLAIM AND RECREATIONAL PRESSURE ON BRITISH ESTUARIES

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Britain's estuaries are unrivalled in western Europe for their number and diversity of form and wildlife. Britain has international commitments to maintain and enhance the habitats and wildlife of its many internationally important estuaries. Estuaries have been used by mankind for many centuries for a great variety of purposes, and many of these human uses have led to progressive damage and destruction of estuaries and their wildlife.

Concern over these pressures led the British Nature Conservancy Council to establish in 1988 its Estuaries Review with the objective of providing the basis for the development of a conservation strategy for British estuaries. The review collected information on the wildlife of all 155 British estuaries, and the conservation status and the patterns of over 200 human activities on each of these estuaries. Using examples from this review the poster describes the extent of past, present and proposed habitat loss and its implications for wildlife, and the distribution of some selected recreational uses of estuaries. At least 85% of British estuaries have lost intertidal habitats through human activities, and at least 25% of all intertidal land has been claimed during the last 2,000 years. Many current land-claims are for rubbish and waste disposal, and in 1989 135 further land-claim proposals affected 55 estuaries. Land-claim leads to overall loss of estuarine habitat, reduction in the biomass and production in an estuary, reduced feeding time for waterfowl (with increased risk of severe weather mortality), decreases in waterfowl populations on some estuaries, and the focussing of development and recreation onto ever smaller estuarine areas. Land-claim and industrial activities such as harbours and docks, and the maintenance dredging of shipping channels occurs most frequently on large estuaries, but the pressure from land-claim may be highest on small estuaries. Many recreational activities, such as sailing, walking, swimming and bird-watching are even more widespread and take place on over three-quarters of British estuaries. Associated with these uses is the increasingly widespread construction of shore-based facilities such as boating marinas. By 1989 there were already marinas on 30% of British estuaries and proposals for more affect 27% of estuaries including 18 that have no marinas as yet. Like land-claim, the pressure of existing and proposed marinas seems to be greatest on small estuaries although current marinas most frequently serve the recreational boating needs on medium-sized estuaries (1,000-10,000 ha). Recreation, especially where it is carefully zoned so as to avoid sensitive wildlife locations or times of year, often has little apparent impact on estuarine wildlife. At the wrong times and places, however, it can and does cause disturbance to habitats and animals, and leads to habitat loss and damage from dredging and amenity developments such as tidal barriers, housing and car-parks and marinas. Future estuarine safeguards in Britain require the development of integrated conservation and management strategies for individual estuaries in a national and international framework, and aimed at sustainable use of the important remaining

estuarine areas. There are an increasing number of new initiatives, often involving collaboration between local government, statutory wildlife, countryside and sea defence agencies, and voluntary conservation groups.

THE RELATIONSHIP BETWEEN THE SURFACE AREA OF HABITAT AND THE NUMBER OF WADER SPECIES DURING SPRING MIGRATION IN NORTHEAST YAKUTIA

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The research was conducted in the Lower Kolyma district of Yakutia in May-June 1987, 1988 and 1990. Spring migration of 13 wader species commences on average on 29+0.4 May and lasts for 9.7+0.5 days. The wader species use five types of habitats for resting and foraging. A linear relationship exists between the relative surface area of each habitat type (percent of area mapped, S), and the number of wader species recorded in each habitat, $N: N = 0.143S + 1.735$; $r=0.81$).

LONG-TERM FLUCTUATIONS IN THE WADER POPULATIONS OF THE LAPLAND RESERVE, KOLA PENINSULA

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Twelve species of waders have been added to the fauna of Lapland Reserve and nearby areas since the 1950s, making a total list of 29 wader species. Six of these 12 new species (*Arenaria interpres*, *Limicola falcinellus*, *Calidris alpina*, *C. minuta*, *C. maritima*, and *Haematopus ostralegus*) cross the Reserve on their way to the sea coast and tundras. Others are of southern origin. *Vanellus vanellus* and *Tringa ochropus* began to breed regularly in the 1960s and 1980s respectively. *Limosa limosa* bred in 1930s but there have been no records since 1969. Among common species the population of *Tringa nebularia* has declined twofold, and that of *Numenius phaeopus* declined fourfold, during the last 50 years. *Pluvialis apricaria*, *Phalaropus lobatus*, and *Gallinago gallinago* were rare non-breeders in 1930s, but since the 1960s *G. gallinago* and *P. apricaria* have become regular breeding species, while *Ph. lobatus* visits the reserve regularly and breeds in small numbers. Two-to-six year cyclicity in number changes have been found in *Tringa nebularia*, *T. erythropus*, *Actitis hypoleucos* and *G. gallinago*. Number fluctuations in *Philomachus pugnax* are non-periodic. These fluctuations are correlated with vole and lemming number cycles and with the weather.

STATUS OF THE GALLINAGO SPECIES AT KUZBASS INDUSTRIAL REGION, SOUTHERN SIBERIA

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Observations were made during the last 12 years. Four species of snipe (*Gallinago gallinago* L., *G. megala* Sw., *G. stenura* Bp. and *G. media* L.) are known from the Kuzbass industry area. Forest species (*G. megala* and *G. stenura*) have the largest numbers in the boreal zone. In the study area eight habitat types are used by *G. megala*. Its densities vary from 2-5 pairs/sq.km in birch-aspen areas of forest-steppe to 34.8-62.6 pairs/sq.km in industrial clear-cuts in mountain boreal forests. *G. stenura* is less numerous in the study area. Anthropogenic forest changes, mainly the creation of clear-cuts of various ages, lead to an increase in the numbers and range of these species. *G. gallinago* and *G. media* are widely distributed in the region. Their preferred habitats are marshy areas in the river-valleys and the shores of the lakes, swampy lowlands near water ponds in forest-steppe and the foothills of the mountains. In such areas the number of *G. gallinago* varies from 6-9 pairs/sq.km in forest-steppe to 18 pairs/sq.km in mountain forests. Densities of *G. media* in marshy areas of forest territory exceed 6 pairs/sq.km. A lack of large marshy areas results in these species breeding on extremely small territories, so neither *G. gallinago* nor *G. media* aggregate when breeding. In general only 1-3 displaying birds are found at each display site, and only in a few sites are there as many as 7-12 birds. Drainage and ploughing of marshy areas has led everywhere to a decline in breeding numbers of these two species.

WADER MIGRATION IN THE NORTH-WESTERN PART OF THE BLACK SEA REGION

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On-land counts of waders were made at the Black Sea Nature Reserve and its buffer zone in 1986-1991. Data on biotope distribution, diversity of species and the dynamics of numbers of migratory waders were obtained. In spring waders are the most numerous waterfowl migrants in terms of the number of species. In the peaks of their spring migration (end of March - beginning of April) and autumn migration (August) waders are the second most numerous group after wildfowl. In comparison with the data for previous years (Klimenko 1950; Ardamatskaya & Semenov 1977) the number of migrating wader species has decreased from 41 to 39. The numbers of migrant waders has also decreased significantly. The numerous spillways of irrigation water into the bays and lakes of the Reserve have caused changes in the species composition of algae and ground invertebrates. This and other anthropogenic factors have caused the decrease in



attractiveness of the Reserve for waterfowl and threaten the existence of this area as a Site of International Importance.

WADERS OF SEWAGE WATER RESERVOIR IN THE AKSAY TOWN (URALSKY REGION)

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With the reduction of natural lakes, artificial water reservoirs filled with industrial sewage water increase in their importance for waders. Research on breeding and migrant waders was carried out during April-June and August-September in 1989-1991 on the sewage water reservoir in the Aksay town (NW Kazakhstan). This reservoir is situated on the outskirts of the town among steppe and fodder crop fields. It is an 8 ha closed pond surrounded by vast shallow-water floods which provide habitat for nesting and foraging waders. Twenty-seven wader species were recorded. Eight species were breeding and 19 species were migrants. Wader counts were carried out in an area of 56.4 sq.km. The most abundant breeding species were *Vanellus vanellus* (172.9 birds/sq.km, in June; 454.4 birds/sq.km in September), *Tringa totanus* (147.1 birds/sq.km in June), and *Tringa stagnatilis* (115.7 birds/sq.km in June). The most abundant migrants were *Philomachus pugnax* (162.9 birds/sq.km in June; 140.0 birds/sq.km in August), *Phalaropus lobatus* (508.0 birds/sq.km in August) and *Actitis hypoleucos* (116.0 birds/sq.km in August). The numbers of waders on the sewage water reservoir during migration and breeding periods are twice those on natural ponds of the region in the area between the Ulva and Ilel rivers.

THE NUMBER, REPRODUCTIVE SUCCESS AND GENETIC STRUCTURE OF LAPWINGS *VANELLUS VANELLUS* IN URBAN AREAS

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The research was conducted in 1980-1989 on constant squares in the green zone of Lipetsk (the Central Chernozom Region). 154 nests were observed regularly until hatching. The number of Lapwings breeding in the study area decreased markedly, from 90-100 to 10-15 pairs. The causes of this decline are intensive cattle grazing, predation of clutches by Hooded Crows, Magpies and Rooks, and recreational pressure. When moderate grazing, by 100-150 head of cattle, occurs on the area of 400 ha, 50-60 pairs of Lapwings nested each year. But after the cattle herd increased up to 1000 head the number of breeding Lapwings decreased to 10-15 pairs. Average clutch size in 1980-1983 was 3.87±0.09, and the reproductive success was 46.15%. Over the next 12 years (1984-1986) the clutch size decreased to 3.34±0.29 and the reproductive success also decreased, to 38.17%. In 1987-89

clutch size (3.22±0.30) and reproductive success (28.2%) were further reduced. We consider non-metrical characteristics of eggs (colour and shell picture) to be a reliable genetic marker of spatial bird groups. For Lapwings there is a dependence between the scale of intra-population variety (M) and the number of breeding pairs. Hence in 1982, when the number of breeding birds was at its highest (100 pairs), M = 2.40±0.09. In more recent years M has not exceeded 2.26.

DISTRIBUTION, NUMBERS AND BIOLOGICAL ASPECTS OF KENTISH PLOVERS IN THE SOUTH UKRAINE

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The nominate subspecies of the Kentish Plover *Charadrius a. alexandrinus* nests in the southern Ukraine. In this region, the distribution of Kentish Plovers is mainly confined to the Black Sea coast and to the banks and estuaries of the rivers. The species has been found both in small groups and in colonies up to 300 - 400 pairs. According to literature data (Chernichko 1988), the numbers of Kentish Plovers within the Azov - Black Sea region was assessed to be 8 - 10,000 pairs. Our evidence shows that these numbers have greatly decreased during the last years. At present there are not more than 4 - 5,000 pairs. Kentish Plovers arrive early in the southern Ukraine: in the middle or end of March, or in early April (Kujalnitckij Liman: 19 March 1981; 1 April 1985). In the Kujalnitckij Liman, the first clutches were found on the following dates: 1984: 11 April; 1982: 26 April. The first clutch in the lower reaches of the Tiligul'skij Liman was discovered on 8 April 1986. The birds stay in their breeding territories until late August or early September. Migrating birds were seen throughout September and October. The authors offer measures to protect this species.

MAPPING OF THE STRUCTURE OF THE BREEDING RANGES OF SOME TUNDRA WADERS IN RUSSIA

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A series of maps (scale 1:8,000,000) showing the structure of waders breeding range with explanatory texts have been compiled on the basis of literature and unpublished data from different northern regions of Russia. Recent methods of zoological mapping are used (Brunov et al. 1982). Seven wader species: Red-Necked Phalarope *Phalaropus lobatus*, Grey Phalarope *Ph. fulicarius*, Temminck's Stint *Calidris temminckii*, Curlew Sandpiper *C. ferruginea*, Pectoral Sandpiper *C. melanotos*, Knot *C. canutus* and Sanderling *C. alba* were chosen as study species because more detailed information for these species is available. On the maps precise

borders of breeding ranges are shown, as well as previously unknown breeding places. As well as data on the distribution, information on numbers and some details of the birds' biology are used in mapping, and the landscape extrapolation method is taken as a basis of the work. In the breeding range of the species the optimum area was determined. This area is the most important for the productivity of the species, where the species has maximum numbers, where the species occupies its greatest habitat spectrum and where it has the smallest fluctuations in number. With the help of such maps it is possible to:

- 1) study peculiarities of distribution in the breeding range of each species;
- 2) compare ranges of ecologically similar species and to determine the allopatry and sympatry in their optimum ranges; and
- 3) compare the structures of breeding ranges in geographically or genetically related groups of species.

POST-FLEDGING MOVEMENTS OF OYSTER-CATCHER BROODS IN THE NORTH OF KANDALACKSHA BAY (THE WHITE SEA REGION)

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To clear up the peculiarities of post-fledging movements in young Oystercatchers *Haematopus ostralegus* L. we banded and individually colour-marked 59 chicks (aged 15-30 days) on 12 islands in the north of Kandalaksha Bay. On the basis of 67 observations (of 38 fledged young) a map of movements was prepared. Two main reasons for the movements can be suggested:

1. Most birds fly from one island to another in a southern direction. This may be a general pre-migration behaviour by the birds.
2. Separate broods move to the islands with high food-supply (mainly to the intertidal parts of Ryazkov and Dyevytchya Luda islands), where they concentrate into large flocks. These movements start 3-4 days or later after fledging, and we consider the movements to be related to the quality of the territories previously occupied by the broods. Young from neighbouring territories can form small aggregations of 3-5 birds and residents usually dominate in such groups. These residents feed in preferable micro-habitats and show noticeable aggressive behaviour towards other members of the group. Birds move either as single broods (mostly 1-2 young with one adult - broods of 3 young are rare), or in small groups, formed by birds from neighbouring territories. If the flock includes birds from different islands different broods keep separate from each other by their behaviour.

THE DISTRIBUTION OF BREEDING WADERS IN THE EXTREME NORTH-EAST OF EUROPEAN TUNDRA

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Among 21 wader species breeding in the Bolshzemelskaya tundra, Yugorsky Peninsula and Vaigach Island, *Charadrius hiaticula*, *Calidris temminckii*, *Philomachus pugnax* and *Phalaropus lobatus* breed everywhere. Breeding of *Calidris maritima* is known only from the arctic tundra of the Vaigach Isl. *Arenaria interpres* is distributed no further south than north-western Yugorsky Peninsula. *Pluvialis squatarola* is recorded at the Lower More-Yu River (up to 20 km from the Sea) and at western Yugorsky Peninsula. The southern limit of the breeding range of *Calidris minuta* is along the northern part of the southern tundra subzone. The southern limits of breeding *Calidris alpina* and *Eudromias morinellus* are in the southern part of the southern tundra subzone. Northern limits of the breeding ranges of *Tringa erythropus*, *Actitis hypoleucos* and *Numenius phaeopus* lie within the southern part of the southern tundra subzone. *Xenus cinereus*, *Gallinago media* and *Lymnocyptes minima* are distributed up to the northern limit of the southern tundra subzone. In some years there are large numbers of these last two species to the south of the subarctic (typical) tundra subzone but breeding has yet to be confirmed in this tundra. Breeding of *Tringa glareola* and *Gallinago stenura* has been proved northwards to the coast of the Yugorsky Peninsula (except some extremely cold years), and for *Pluvialis apricaria* and *Gallinago gallinago* also across Vaigach Isl., although in some unfavourable years these species do not reach the southern limit of the arctic tundra subzone. During a recent range expansion *Gallinago stenura* has reached the western coast of Yugorsky Peninsula, the Khaypudyrskaya Gulf and the middle reaches of the More-Yu River. One case of breeding by *Phalaropus fulicarius* has been recorded from the western coast of the Yugorsky Peninsula.

CURRENT DISTRIBUTION AND POPULATION TRENDS OF SOME RARE WADERS IN BYELORUSSIA

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Breeding by Oystercatcher *Haematopus ostralegus*, Terek Sandpiper *Xenus cinereus* and Ringed Plover *Charadrius hiaticula* has been proved in Byelorussia only during the last two decades. The first nests of Oystercatchers were found in the early 1970s on the Pripiat River and several lakes in the north-western Byelorussia. The population size was estimated in the mid 1980s to be at least 200 breeding pairs in southern part of the country (the Pripiat, Dnieper, Sozh and Lower Berezina Rivers) and about 30 pairs in northern Byelorussia. Some population growth has probably continued into 1990s. Breeding by Ringed Plovers has been noted only in the middle flow of the Pripiat River. About 20 pairs were censused here in mid-1980s and 35-40 pairs in the early 1990s. In 1926 breeding of Terek Sandpipers was proved in the Ukraine near

the Byelorussian border. Since then the species has colonised Byelorussia along the Pripiat River from Chernobyl in the east and the border of Brest and Gomel Regions in the west. No obvious changes in the size of Terek Sandpiper populations have been noted during the last five years. A decrease in the numbers and range of the Stone Curlew *Burhinus oedicnemus* has been recorded since the late 19th century. In the mid-1930s this species bred in Mozyr, Khoyniki, Svetlogorsk and Bragin districts of the Gomel Region. There was only one place in Bragin district where birds bred in 1980-91. Three pairs were censused here in 1983 and only 1 pair in 1991.

WADERS ON SOUTH MOZAMBIQUE COAST

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Thirty-one species of waders were recorded in 1985-89 on the Maputo coast and on Inhaca and Portuguese Islands. The most diverse wader fauna, with 16-21 species, was in November-February; the least diverse, 10-11 species, was in May-July. Eleven species were observed throughout the whole year: White-fronted Plover *Charadrius marginatus*, Kittlitz's Plover *Charadrius pecuarius*, Three-banded Plover *Charadrius tricollarius*, Grey Plover *Pluvialis squatarola*, Turnstone *Arenaria interpres*, Terek Sandpiper *Xenus cinereus*, Wood Sandpiper *Tringa glareola*, Greenshank *Tringa nebularia*, Curlew Sandpiper *Calidris ferruginea*, Sanderling *Calidris alba*, and Whimbrel *Numenius phaeopus*. Seven species were observed from (Northern Hemisphere) autumn to spring: African Jacana *Actophilornis africanus*, Ringed Plover *Charadrius hiaticula*, Sand Plover *Charadrius leschenaulti*, Common Sandpiper *Actitis hypoleucos*, Knot *Calidris canutus*, Black-Winged Stilt *Himantopus himantopus*, and Red-Winged Pratincole *Glareola pratincola*. Four species were observed from winter to spring: Mongolian Plover *Charadrius mongolus*, Marsh Sandpiper *Tringa stagnatilis*, Little Stint *Calidris minuta*, and Ruff *Philomachus pugnax*. Chestnut-banded Plovers *Charadrius pallidus* were recorded irregularly in June, July and December. Six of the eight uncommon species were found in winter: Lesser Jacana *Microparra capensis* (Feb.), Lesser Golden Plover *Pluvialis dominica* (Feb.), European Oystercatcher *Haematopus ostralegus* (Dec.), Curlew *Numenius arquata* (Dec.), Crab Plover *Dromas ardeola* (Dec.), and Water Dikkop *Burhinus vermiculatus* (Jan.). Only two uncommon species were recorded on summer: Blacksmith Plover *Vanellus armatus* (June) and Bar-Tailed Godwit *Limosa lapponica* (Aug.). On the south-western coast of the Inhaca Island about 1,100 waders of 13 species were counted in December. The most abundant were Grey Plover (420 birds), Sand Plover (200), Sanderling (130), Crab Plover (55), Curlew (50) and Kittlitz's Plover (40).

POPULATION CHANGES IN WADERS BREEDING AT THE SLAVYANSK SALT LAKES, EASTERN UKRAINE: OBSERVATIONS FROM 1985-1991

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The Slavyansk salt lakes are a unique natural complex in the Northern Donetsk region. These lakes resemble coastal estuaries in the chemical composition of the water, and in their typically coastal plant and animal species. Good breeding grounds of waders are now scattered, due to strong human influence in the area. In total, about 250 ha are available for waders. The commonest breeding wader species is Redshank *Tringa totanus*. Its breeding density varies between different plots from 0.01-10 pairs/ha and on average remains relatively constant. Between 80-130 pairs of Redshank nested here in 1985-91. Fluctuations in the number of Lapwing *Vanellus vanellus* are closely connected to the amount of precipitation in winter period. In 1986 the total number of nesting Lapwings was 45-50 pairs but in the following years there were only 25 pairs. The number of breeding Black-Winged Stilts *Himantopus himantopus* is variable. First nesting was recorded in 1985 with seven nests and in 1986-1991 between 15 and 35 pairs nested here. The Little Ringed Plover *Charadrius dubius* breeds in small numbers: from 20-22 pairs in 1985 and 1988 to 4-15 pairs in other years. The first breeding (single pairs) by Avocet *Recurvirostra avosetta* was recorded in 1990.

PRODUCTIVITY OF THE COLLARED PRATINCOLE *GLAREOLA PRATINCOLA* ON THE NORTHERN COAST OF THE AZOV SEA

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A dispersed breeding colony of Collared Pratincoles *Glareola pratincola* was observed on the salines of the Elanchick river estuary in 1990. In total 193 eggs were laid in 98 nests. Average clutch size was 1.97, and brood size immediately after hatching was 1.78. 164 chicks hatched, and 162 fledged successfully. Total breeding success was 83.9%. Egg-loss (15%) was the main reason for breeding failure in the Collared Pratincole: 7.2% of eggs were unfertilized, 2.1% of eggs contained dead embryos, 1% were abandoned before incubation and 4.1% at the latest incubation stages (probably because of their late date of laying). The elements of cooperative polyandry were recorded in 74.4% of nests. This arose through three adult birds sharing in incubating, protecting a clutch and feeding the nestlings. This can be considered as a mechanism for increasing breeding productivity.

OYSTERCATCHERS IN THE BLACK SEA NATURE RESERVE

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The Oystercatcher *Haematopus ostralegus* is not a numerous nesting species in the Black Sea Reserve, but breeds on all islands except Egyptsky Island. Maximum numbers on the Konsky Islands in the Yagorlytsky Bay are 15-17 breeding pairs, and there are 25-31 pairs on the islands in Tendrovsky Bay. The total Oystercatcher population in the reserve consists of 35-40 pairs. Numbers of Oystercatchers breeding on the Konsky islands remains relatively constant, but on the islands of Tendrovsky Bay it fluctuates from year to year. In 1986-1987 only 5 pairs, and in 1989 about 31 pairs, were breeding there. The average appearance date on the islands is 15 March (n=8 years). Egg-laying occurs during 16-20 April at Yagorlytsky Bay and 6-12 April at Tendrovsky Bay. In the post-breeding period Oystercatchers move to Tendra Island. 15-50 birds were counted there on a 5 km route in July-August 1988 and 7-10 birds in 1990. Only single individuals remain there in September. The main limiting factors for the Oystercatcher population are the high water level in the bays and predation. The author is greatly obliged to T. Ardamatskaya, A. Kabakov, N. Pyrogov and O. Yaremchenko for the assistance in field research.

CURLEW NUMENIUS ARQUATA IN ORENBURG REGION

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The Curlew is present in the region from the middle of April to the middle of September. It occupies steppe areas of river valleys and the shores of the steppe lakes and ponds. Nests by single pairs occur at a distance of 0.5-1.0 km apart. The breeding density of the species varies from 0.8-13.3 birds/square km, with an average of 1.3 birds/square km. During post-breeding movements in July Curlews occur in flocks of 11-13 individuals. Formerly the Curlew was numerous at the end of the 19th century and the first half of the 20th century (Zarudny 1988; Raisky 1955), but it has become rare. The major decrease in numbers during the in 1950s, caused by the ploughing of virgin lands, has now stopped, and in the last 15 years the population size has remained stable. 38-40 pairs breed in the whole region each year. The average number during the pre-migration period (mid-August) exceeds 370-400 individuals, including young birds and non-breeding adults.

REVIEW OF THE UKRAINIAN WADER FAUNA

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A review of the ornithological literature of the last 150 years reveals a list of 51 wader species which have been recorded in the Ukraine. Among them are 10 species with single records (*Pluvialis dominica*, *Charadrius asiaticus*, *Charadrius*

leschenaultii, *Venellochettusia leucura*, *Holopterus spinosus*, *Phalaropus fulicarius*, *Eurynorhynchus pygmeus*, *Calidris maritima*, *Tringites subruficollis*, *Cursorius cursor*). 29 species breed

and 12 species winter (*Vanellus vanellus*, *Tringa ochropus*, *T. totanus*, *T. stagnatilis*, *Philomachus pugnax*, *Calidris alpina*, *Lymnocyptes minimus*, *Gallinago gallinago*, *Scolopax rusticola*, *Numenius minutus*, *N. arquata*, *Limosa limosa*). 50 years ago the wader list of the Ukrainian fauna embraced only 46 species. 29 of them were breeding, 3 were wintering and 6 species were recorded only once.

THE NUMBERS OF BREEDING WADERS ON SOME LAKES AT THE LOWER AMU-DARYA RIVER REGION, UZBEKISTAN

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26 wader species were recorded in May-June 1990-1991 at the Yangiaryk and Kaladzhin lake systems, Khoresm region of Uzbekistan. The total numbers of waders counted varied from 80-3,000 individuals per day. The ecological conditions of some lakes, particularly lakes Ullishorkul and Shorkul, were favourable for various wader species during their spring migration. Other reservoirs of Kaladzhin lake system are of minor importance for migratory birds. Breeding *Himantopus himantopus* are widely distributed and are the most numerous breeding species. It was found nesting on lakes Abulkul (98 pairs), Zeykul (15 pairs), Shorkul (4 pairs) and Tozakul (2 pairs). *Venellochettusia leucura* breeds on lakes Ullishorkul and Tozakul (7 pairs and 2 pairs respectively), and *Recurvirostra avosetta* were found on lakes Abulkul (17 pairs) and Zeykul (2 pairs). Single nests of *Haematopus ostralegus* were found on lakes Daryalan and Tozakul. These data show that the Yangiaryk and Kaladzhin Lake Systems are of little use for breeding *V. leucura*, *R. avosetta* and *H. ostralegus*. Expansion of reedbeds and intensified anthropogenic influences will not favour an increase in numbers of breeding waders.

WADERS OF THE KHUBSUGUL LAKE, MONGOLIA

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Khubsugul Lake is the deepest alpine lake of Mongolia, and belongs to the Baikal Lake basin.

Together with its high elevation (1645 m above sea level) this influences the habitats and distribution of waders in the lake depression. Among 36 wader species recorded, 18 are breeding species. *Limnodromus semipalmatus* and *Limosa limosa* are extremely rare; *Scolopax rusticola*, *Gallinago megala*, *Eudromias morinellus*, *Philomachus pugnax*, *G. solitaria*, *G. stenura*, and *Tringa nebularia* are rare. *Charadrius dubius*, *Tringa totanus*, *T. glareola*, *T. stagnatilis*, *T. ochropus*, *Actitis hypoleucos*, *Numenius arquata* and *Gallinago gallinago* are common, and *Vanellus vanellus* is the only numerous species. The distribution of breeding species differs. *T. stagnatilis*, *T. glareola*, *T. totanus*, *G. gallinago*, *V. vanellus*, *T. nebularia*, *Ph. pugnax*, *L. semipalmatus*, and *L. limosa* nest in boggy river mouths and on the shores of small lakes. Meadows in the lower reaches of the rivers are inhabited by *N. arquata*, while *A. hypoleucos* and *Ch. dubius* breed on the banks of the rivers and lakes. Bushes in river-valleys provide a habitat for *T. ochropus*, *S. rusticola*, *G. megala*. Alpine bushes and damp meadows are inhabited by *Eu. morinellus*, *G. solitaria* and *G. stenura*.

BREEDING OF KENTISH PLOVERS AND LITTLE RINGED PLOVERS IN THE LOWER TILIGUL LIMAN

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The lower Tiligul Liman (Odessa region) is separated from the Black Sea by a natural barrier. Frequent changes of the hydroregime result in the forming of suitable nesting sites of different Charadriiform birds which, as a rule, nest in mixed colonies. Since 1986 nests of Kentish Plovers *Charadrius alexandrinus* and Little Ringed Plovers *Charadrius dubius* were found in such mixed colonies. Autonomous colonies of these species are probably an exception in the Lower Tiligul Liman.

The greatest number of Kentish Plovers was recorded in 1990 - 80 pairs; the least number was recorded in 1991 - 25 pairs. The first nests were usually found in the beginning of May; the latest nests were found in the middle of July. Sexual differences in measurements of Kentish Plovers were not revealed: Little Ringed Plovers were less numerous than Kentish Plovers. The largest number of Little Ringed Plovers was 15 pairs (1990), the smallest was 6 pairs (1991). By controls of ringed Little Ringed Plovers it could be confirmed that adults change partners in different years of breeding. 25% of the Kentish Plover population in the Lower Tiligul Liman are ringed

sex	wing (mm)	tail (mm)	bill (mm)	head+bill (mm)	tarsus+toe (mm)	weight (g)
female	111.6	46.0	15.0	41.8	48.5	42.7
n	37	25	35	31	21	10
male	111.0	46.1	15.0	41.8	48.5	42.3
n	22	12	19	17	10	8



Both species are not numerous on the northwestern coast of the Black Sea. This probably is standard for the distribution of these species in this part of their breeding range.

MIGRATING DUNLIN: SOME RESULTS OF RINGING AT THE AYNÖVY ISLES

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Migrating Dunlins *Calidria alpina* pass through the Aynovy Isles (69.50 N, 31.35 E). A total of 1,097 adult and 6,295 juvenile Dunlins were ringed here between 1959-1990, and 179 recoveries (2.4%) have been received. There were 156 recoveries of juvenile Dunlins, of which 69% were in their first year of life, and 12%, 8% and 5% when 2, 3 and 4 years old respectively. Reports on older birds (up to 7 years old) are rare. The bulk of recoveries from birds ringed as adults was also received during the first 4 years after ringing (43%, 17%, 13% and 8% respectively). Dunlins ringed during autumn migration move through the north of Norway and further along the western coast of Scandinavia. The geographical distribution of recoveries is north Norway 41%, mid and southern Norway 20%, Great Britain 17%, Denmark 11%, and France 8%. Single reports have been received from Sweden, Finland, Germany, the Netherlands and Poland. Winter recoveries come mainly from the British and French coasts. The most distant Dunlin winter quarters are in Spain and Morocco. During spring migration Dunlins fly through the Baltic Sea region.

OBSERVATIONS ON PALEARCTIC WADERS WINTERING IN THE INNER NIGER DELTA (MALI)

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A field expedition in the inner Niger delta was carried out during the winter 1990-91 to study some aspects of the wintering biology of the Black-winged Stilt *Himantopus himantopus* and to collect information on other wader species. Counts and estimates of wader numbers in different habitats (including rice-fields, rivers, lakes, and temporary floodplains) are discussed according to the available references for this area. Some species unusual for the region were observed.

IMPORTANT AREAS FOR BREEDING WADERS IN ITALY

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13 wader species are found regularly breeding in Italy. A wide range of habitats seems to be used. Analysing recent data concerning distributions and population sizes it was possible to classify the most important areas and habitats. Salt-pans were the most important habitats both for numbers of breeding species and the number of pairs of each species (often of international importance according to current numerical criteria). Salt-pans

are also the most threatened habitats in view of imminent habitat changes.

ON THE BREEDING OF DOTTEREL *CHARADRIUS MORINELLUS* IN THE ALTAI MOUNTAINS OF KAZAKHSTAN

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Data on the breeding biology of Dotterel *Charadrius morinellus* were collected in 1967-1982 in the Kazakhstan territory of the western and southern Altai mountains. Appearance dates on the breeding grounds of Ivanovsky mountain ridge range from 18-26 May when there is still much snow-cover at the mountain tundra (2,000-2,400 m.). In mountain rocky tundra birds choose rather smooth places for nesting, generally ridges up to 6000 m long and 100-150 m wide that are mostly on watersheds or on rounded tops of mountains. Birds nest either in small isolated groups of 3-10 pairs or as single pairs. At altitudes of 2,000-2,200 m clutches are laid 7-10 days earlier, than at altitudes of 2,400 m. In total 11 nests with clutches were found from 10 June to 5 August. Nine nests contained 3 eggs and two contained 2 eggs. Four broods were found from 13 June to 19 July.

MIGRATION OF WADERS IN THE LUNSKI GULF, NORTHEASTERN SAKHALIN, FAR EAST

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During counts of migrating waders in the Lunski Gulf in 1989 - 1991 27 species of waders were recorded. Some rare species were among them. The period of spring migration (late May to early June) was much shorter than the period of autumn migration (July to September). The birds stay for only 2 or 3 days in the gulf. Diurnal migration is much more common in spring than in autumn. The earliest migrants concentrate near snow-free thermal springs. Later in the season they use tidal flats. Early and late migrants are revealed for southward movements.

