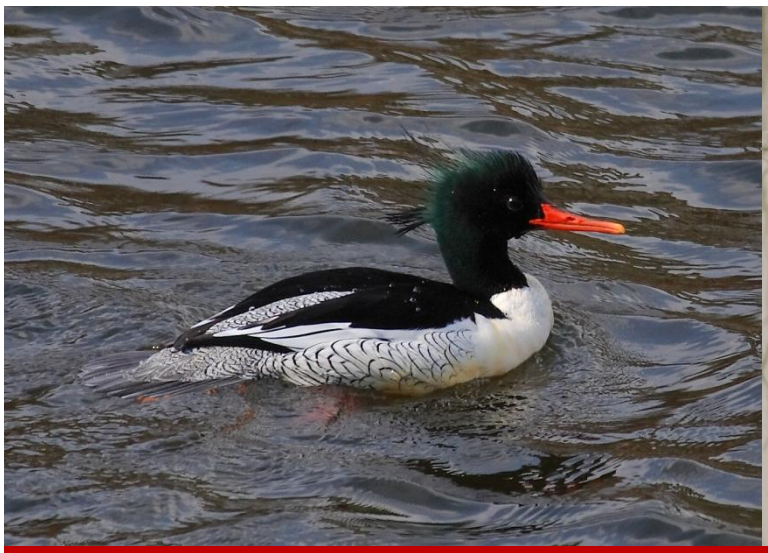
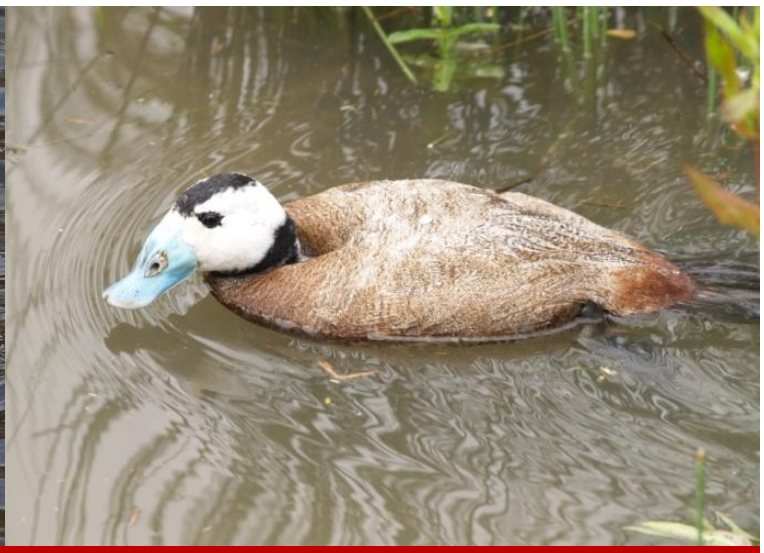
Number 16, December 2013

# TWSG News

Bulletin of the Wetlands International – IUCN SSC
**Threatened Waterfowl Specialist Group**





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**Front cover photographs:** Scaly-sided Merganser by Peiqi Liu; White-headed Duck by John Day

**Back cover photographs:** Blue Duck by Richard Taylor Jones; Lesser White-fronted Goose by WWT Staff



# About the Threatened Waterfowl Specialist Group

The Threatened Waterfowl Specialist Group (TWSG; formerly Threatened Waterfowl Research Group) was established in October 1990 and is coordinated by the Wildfowl & Wetlands Trust (WWT) as part of the Wetlands International - IUCN SSC Waterbird Network. To date, the TWSG has helped bring about major advances in the conservation of many threatened waterfowl, such as the Hawaiian Goose, Red-breasted Goose, White-headed Duck and White-winged Duck.

Membership worldwide includes 253 individuals from 67 countries. We encourage members active in threatened waterfowl conservation to submit articles to the group's bulletin, to contribute to Action Plans and to take part in activities such as workshops and other international meetings. The most active members are also members of the IUCN SSC.

**TWSG-Forum: list-server of the Threatened Waterfowl Specialist Group**
The TWSG-Forum list-server provides a vehicle for the on-line exchange of information about globally threatened or near-threatened Anseriformes. To subscribe, please contact the Chair at the address below. To circulate a message to all TWSG Forum members, send your message to: TWSG-Forum@wwt.org.uk. When submitting information please note that we may include such items in future issues of *TWSG News*.

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# Contents

# Editorial

Firstly, I would like to apologise. Profusely! For this being the first TWSG News we have published in six years.

Secondly, I would like to thank all of those who have contributed to it – the authors of the articles and news items, our Assistant Coordinator Glyn, who compiled the first drafts, and Murray Williams, who edited the second drafts, and to Colette Hall who did the typesetting. My heartfelt thanks to all.

I would also like to highlight two of the species featured in this bulletin – Scaly-sided Merganser and Brown Teal.

Dr. Diana Solovyeva has been working on Scaly-sided Mergansers in Far East Russia since the year 2000. In that time she has erected over 200 next boxes on 13 rivers in the Sikhote-Alin Mountains and proved that nest box occupation is higher on logged than on unlogged rivers (presumably because there are fewer natural nest cavities on logged rivers). Over 700 ducklings have hatched in her nest boxes. With her husband Sergey, she has also built a Scaly-sided Merganser Field Station in Kishinevka village on the Kievka River, work which Dr. Solovyeva started in 2008, part-funded by herself with local government support. As well as providing a base for Scaly-sided Merganser fieldworkers, this will provide an important educational and public awareness resource for local people, including teachers and schoolchildren, hunters and hunting managers, and fishermen. As it is situated on the main road between Lazo and Petrov Bay (one of the most popular coastal resorts in the Primorye region and a famous tourist site which attracts 4–5,000 people each year), it will also raise public awareness amongst tourists, an audience rarely engaged in threatened species work.

Importantly, Dr. Solovyeva and her team have built up considerable public support for the Scaly-sided Merganser conservation programme – with over 70 people now involved from a variety of backgrounds (local people and schoolchildren, environmentalists, hunters, fishermen and professional ornithologists). Furthermore, the project has provided employment for up to six local people. The project has been funded mainly by WWT, the Taiwan Forestry Bureau and the Rufford Small Grants for Nature Conservation (www.rufford.org).

As far as I am aware, the Rufford Foundation is unique in that it provides up and coming conservationists from developing countries with a potential source of long-term funding. People can apply for two small initial grants (of up to £6,000) followed by a larger booster grant (up to £12,000), continuation grant (up to £25,000) and completion grant (also up to £25,000). This is to be hugely commended. Such long-term funding for conservationists from developing countries can achieve a huge amount of conservation gain as well as investing in the conservationists' futures and careers. Whoever came up with this funding model deserves a medal!

The Brown Teal population in New Zealand has increased from 1,000 in 2002 to 2,000–2,500 birds in 2013 due to a dedicated conservation and reintroduction programme. As a consequence, a downlisting of conservation status from Endangered to Near Threatened is being considered by BirdLife International. This outstanding conservation success is the result of a prolonged collaboration between the New Zealand Department of Conservation's Brown Teal (Pāteke) Recovery Group and an expanding group of community conservation groups, committed individuals and visionary landowners. A private website (brownteal.com) provides up-to-date news on all aspects of the conservation and reintroduction programme.

Finally, I would like to thank the inimitable Dr. Murray Williams who recently stepped down as our Regional Assistant Chair for Oceania. Although he would probably not agree with me, Murray is the world's leading threatened waterfowl conservationist, having played a leading role in saving all of New Zealand's threatened waterfowl – Brown Teal, Campbell Island Teal, Auckland Island Teal and Blue Duck – all of which are on the road to recovery despite the huge threats they face – largely from introduced predators. Murray has been an inspiration to me over the past two decades and has been a constant source of sagacious advice. So – thank you Murray for all you have done – for me, for the TWSG and for the world's threatened waterfowl.

**Baz Hughes**

# Threatened waterfowl species, subspecies and populations

In the following list of globally threatened and near threatened Anseriformes species, sub-species and populations, species categorisations follow the 2013 IUCN Red List of Threatened Species (IUCN 2013) whilst sub-species and populations were categorised during the compilation of the IUCN-SSC Anseriformes Action Plan (TWSG in prep.). The TWSG would welcome comment on this list of threatened Anseriformes, especially notification of new data which may lead to re-categorisation of any taxa.

The IUCN Red List criteria met by each species are listed in the table: see Appendix for key to IUCN criteria codes. An arrow indicates that the species has been reclassified since *TWSG News* 15 was published in 2006 (⬆ = up-listed; ⬇= down-listed) and the previous category is also shown (CE = Critically Endangered; E = Endangered; V = Vulnerable; NT = Near Threatened; and LC = Least Concern).

## Species

| | | Common name | Scientific name | IUCN criteria |
|---|---|---|---|---|
| | | **Extinct since AD 1600** | | |
| | | New Zealand Swan | *Cygnus sumnerensis* | |
| | | Mauritian Shelduck | *Alopochen mauritianus* | |
| | | Réunion Shelduck | *Mascarenachen kervazoi* | |
| | | Chatham Island Shelduck | *Pachyanas chathamica* | |
| | | Mauritian Duck | *Anas theodori* | |
| | | Amsterdam Island Duck | *Anas marecula* | |
| | | Labrador Duck | *Camptorhynchus labradorius* | |
| | | Auckland Islands Merganser | *Mergus australis* | |
| | | **Critically Endangered** | | |
| | | Crested Shelduck | *Tadorna cristata* | D |
| | | Laysan Teal | *Anas laysanensis* | B1ac(iv) |
| | | Pink-headed Duck | *Rhodonessa caryophyllacea* | D |
| ⬆ | V | Baer's Pochard | *Aythya baeri* | A2cd+3cd+4cd |
| | | Madagascar Pochard | *Aythya innotata* | D |
| | | Brazilian Merganser | *Mergus octosetaceus* | C2a(i) |
| | | **Endangered** | | |
| ⬆ | V | Red-breasted Goose | *Branta ruficollis* | A2bcd+3bcd+4bcd |
| | | Blue Duck | *Hymenolaimus malacorhynchos* | C2a(i) |
| | | White-winged Duck | *Cairina scutulata* | A2cd+3cd+4cd;C2a(i) |
| | | Hawaiian Duck | *Anas wyvilliana* | B1ab(ii,iii,iv,v) |
| | | Meller's Duck | *Anas melleri* | C2a(ii) |
| | | Madagascar Teal | *Anas bernieri* | C2a(ii) |
| ⬇ | CE | Campbell Islands Teal | *Anas nesiotis* | D |
| | | Brown Teal | *Anas chlorotis* | B1ab(iii) |
| ⬆ | LC | Velvet Scoter | *Melanitta fusca* | A2bcde+3cde+4bcde |
| | | Scaly-sided Merganser | *Mergus squamatus* | C2a(ii) |
| | | White-headed Duck | *Oxyura leucocephala* | A2bcde+4bcde |
| | | **Vulnerable** | | |
| | | West Indian Whistling-duck | *Dendrocygna arborea* | B2ab(i,ii,iii,iv) |
| ⬇ | E | Swan Goose | *Anser cygnoides* | A2bcd+3bcd+4cd |
| | | Lesser White-fronted Goose | *Anser erythropus* | A2bcd+3bcd+4bcd |
| | | Hawaiian Goose | *Branta sandvicensis* | D1 |

| | Common name | Scientific name | IUCN criteria |
|---|---|---|---|
| ⬆ NT | Blue-winged Goose | *Cyanochen cyanoptera* | C2a(ii) |
| ⬆ NT | White-headed Steamer Duck | *Tachyeres leucocephalus* | C2a(ii) |
| | Salvadori's Teal | *Salvadorina waigiuensis* | C2a(i) |
| | Eaton's Pintail | *Anas eatoni* | A3e |
| | Philippine Duck | *Anas luzonica* | A2bcd+3bcd+4bcd |
| | Auckland Island Teal | *Anas aucklandica* | D1 |
| | Marbled Teal | *Marmaronetta angustirostris* | A2cd+3cd+4cd |
| | Steller's Eider | *Polysticta stelleri* | A2bcd+3bcd+4bcd |
| ⬆ LC | Long-tailed Duck | Clangula hyemalis | A4bce |
| | **Near Threatened** | | |
| | Northern Screamer | *Chauna chavaria* | C2a(i) |
| | Emperor Goose | *Anser canagica* | A2de+4cde |
| | Orinoco Goose | *Neochen jubata* | A2cd+3cd+4cd |
| | Falcated Duck | *Anas falcata* | A2bd+3d+4bd |
| | Spectacled Duck | *Anas specularis* | C2a(i) |
| | Ferruginous Duck | *Aythya nyroca* | A2cd+3cd+4cd |
| ⬆ LC | Black Scoter | *Melanitta americana* | A2bce+3bce+4bce |
| ⬆ LC | Maccoa Duck | *Oxyura maccoa* | C1 |
| | Blue-billed Duck | *Oxyura australis* | C2a(ii) |
| | **Least concern (only those species that were previously listed in a higher category are shown here)** | | |
| ⬇ V | Baikal Teal | *Anas formosa* | |

## Sub-species

| Common name | Scientific name | IUCN criteria |
|---|---|---|
| **Extinct since AD 1600** | | |
| Coue's Gadwall | *Anas strepera couesi* | |
| Mariana Mallard | *Anas platyrhynchos oustaleti* | |
| Rennell Island Grey Teal | *Anas gibberifrons remissa* | |
| Chatham Island Teal | *Anas chlorotis ssp. nov.* | |
| Niceforo's Pintail | *Anas georgica niceforoi* | |
| **Critically Endangered** | | |
| Borrero's Cinnamon Teal | *Anas cyanoptera borreroi* | C2b |
| **Endangered** | | |
| Madagascar White-backed Duck | *Thalassornis leuconotus insularis* | C2b |
| New Zealand Grey Duck | *Anas superciliosa superciliosa* | A1bce; A2bce |
| Tropical Cinnamon Teal | *Anas cyanoptera tropica* | C1 |
| Andaman Teal | *Anas gibberifrons albogularis* | C2b |
| Galapagos Pintail | *Anas bahamensis galapagensis* | C2b |
| Crozet Islands Pintail | *Anas eatoni drygalskii* | B1+2abde |
| Colombian Ruddy Duck | *Oxyura jamaicensis andina* | C1 |
| **Vulnerable** | | |
| Recherche Cape Barren Goose | *Cereopsis novaehollandiae grisea* | D1 |
| Middendorf's Bean Goose | *Anser fabalis middendorffi* | A1b |
| Thick-billed Bean Goose | *Anser fabalis serrirostris* | A1b |
| Tule Greater White-fronted Goose | *Anser albifrons gambeli* | D2 |
| Dusky Canada Goose | *Branta canadensis occidentalis* | A1c; C1; C2b; D2 |

| Common name | Scientific name | IUCN criteria |
|---|---|---|
| Peruvian Torrent Duck | *Merganetta armata leucogenis* | C2a |
| Colombian Torrent Duck | *Merganetta armata colombiana* | C2a |
| Australian Cotton Pygmy Goose | *Nettapus coromandelianus albipennis* | C2b |
| Merida Teal | *Anas andium altipetens* | C1 |
| Kerguelen Pintail | *Anas eatoni eatoni* | A2e; C2b |
| **Near Threatened** | | |
| American Comb Duck | *Sarkidiornis melanotus sylvatica* | A1cd |
| Florida Duck | *Anas fulvigula fulvigula* | A2ce |
| Australian Black Duck | *Anas superciliosa rogersi* | A2e |
| Lesser Grey Duck | *Anas superciliosa pelewensis* | A1acde |
| Andean Teal | *Anas andium andium* | C2a |
| South Georgia Pintail | *Anas georgica georgica* | D1 |
| South American Pochard | *Netta erythropthalma erythropthalma* | A1c |
| Pacific Eider | *Somateria Mollissima v-nigra* | A1a |
| Asiatic White-winged Scoter | *Melanitta fusca deglandi* | A1a |

## Populations

| Common name | Scientific name | Population | IUCN criteria |
|---|---|---|---|
| **Extinct since AD 1600** | | | |
| Not evaluated | | | |
| **Critically Endangered** | | | |
| Ruddy-headed Goose | *Chloephaga rubidiceps* | Mainland South America | C2b |
| **Endangered** | | | |
| None | | | |
| **Vulnerable** | | | |
| Black-necked Swan | *Cygnus melanocorypha* | Falkland Islands | D1 |
| Comb Duck | *Sarkidiornis melanotus* | S/SE Asia | C2b |
| Chiloe Wigeon | *Anas sibilatrix* | Falkland Islands | D1 |
| Harlequin Duck | *Histrionicus histrionicus* | Atlantic Basin | C2b |
| Barrow's Goldeneye | *Bucephala islandica* | Iceland | D1; D2 |
| **Near Threatened** | | | |
| Fulvous Whistling Duck | *Dendrocygna bicolor* | S Asia | A1c |
| Brent Goose | *Branta bernicla* | Parry Islands/Puget Sound | A1ad; C1; C2b |
| Yellow-billed Pintail | *Anas georgica* | Falkland Islands | D1 |
| Silver Teal | *Anas versicolor* | Falkland Islands | D1 |
| Harlequin Duck | *Histrionicus histrionicus* | Pacific | A1a |
| **Data deficient** | | | |
| Barrow's Goldeneye | *Bucephala islandica* | Greenland/Eastern North America | |

## References

IUCN 2013. *2013 IUCN Red List of Threatened Species*. Online database. www.iucnredlist.org

TWSG. In prep. *Global Action Plan for the conservation of Anseriformes (ducks, geese, swans and screamers)*. IUCN, Gland, Switzerland.

# News reports

## New Zealand Brown Teal News

Neil Hayes (brownteal@actrix.co.nz)
Trustee, Brown Teal Conservation Trust, New Zealand

Captive Brown Teal - an essential ingredient towards saving the species (Neil Hayes).

Since the New Zealand Department of Conservation's audit of the Brown Teal *Anas chlorotis* recovery programme in 2000 considerable progress has been made towards securing a future for Brown Teal.

The most dramatic success in the recovery programme has been at Port Charles near the top of the Coromandel Peninsula, where four annual releases of captive reared Brown Teal, totalling 240 birds, have taken place since 2002; with the release programme ending in 2006. The latest population census on the peninsula shows that the teal population has risen from *c* 15 birds in 2000 to *c* 1000 in 2011. Such dramatic population growth is the result of a major predator control programme, survival of released birds, an extensive habitat enhancement programme, coupled with the support and direct involvement of local residents.

In Northland, which is the only other area on the New Zealand mainland where Brown Teal exist in any number, the Brown Teal population has risen from *c* 200 to *c* 500 since 2000 – this recovery also being generated by predator control programmes and the release of captive reared teal.

Great Barrier Island is the other main Brown Teal site, but whilst the dramatic decline of Brown Teal elsewhere has been retarded on the island there has been little growth in the population; in spite of major predator control programmes, the absence of mustelids, hedgehogs and waterfowl hunting. Research to determine why there is no population growth is urgently needed. The Great Barrier Island teal population is *c* 800, so that when coupled with the number of teal on offshore islands the total population throughout New Zealand is *c* 2500.

But there are is still much to be done if Brown Teal are to be saved from extinction and an independent review of the recovery programme is currently underway, as there is a strong belief that a number of new strategies are in need of urgent implementation if a long-term future for this endemic species is to be secured.

## Notes on Eaton's Pintail from Kerguelen

Regis Perdriat (regis.perdriat@lpo.fr)
Soigneur Médiateur, Réserve Naturelle des Sept-les, Station LPO de l'Ile Grande, France

Eaton's Pintail *Anas eatoni* is a small surface-feeding duck endemic to the French southern Indian ocean islands (Terres Australes et Antarctiques Françaises), Crozet and Kerguelen.

In appearance this species is similar to the Northern Pintail *A. acuta* female but darker. It lives near freshwater lakes and rivers, marshes and peatbogs used by Sea Elephants *Mirounga leonina*. During winter it is more often seen along the coast, in small bays, and less inside its breeding territories; it seems to stay in small groups during the breeding period but outside of this period it may form flocks of hundreds, especially during the moulting time.

Two sub-species are recognised in the archipelagos: *A. eatoni eatoni* in Kerguelen and *A. eatoni drygalskii* in Crozet.

Eaton's Pintail feeds mainly on plants (Kerguelen Cabbage *Pringlea antiscorbutica* seeds for example), insects, worms and crustaceans. Breeding usually takes place between November and March (the austral summer). Females (the species seems to be monogamous) lay at least 5–8 eggs in a nest made with small feathers and vegetation, always hidden in deep grass.

During the two last centuries, Eaton's Pintail has been hunted by sealers and by scientists. In Kerguelen Island, since 1950, hundreds of birds were killed for the Port-aux-Français scientific base's food supply although this practice has now stopped and the species is no longer hunted. With the risk of predation from invasive mammals such as Feral Cats *Felis catus* and Black Rats *Rattus rattus* also a problem,

the species may be threatened with extinction. However, Eaton's Pintail is not scientifically studied (there is no real survey for this species on the archipelago) and the last evaluation dating from 1982 to 1985 (15,000–20,000 pairs in Kerguelen, 600–700 for Crozet) must be regarded with caution. Pintail populations are linked to population trends in petrels, the main prey of cats and rats.

Eaton's Pintail has been classified as Vulnerable by IUCN since 2000 (Low Risk previously). Specially protected areas exist for some of the offshore islands but not for the main land of Kerguelen where introduced predators remain.

## Conservation efforts for Red-breasted Goose in Romanina

Lavinia Raducescu (lavinia.raducescu@sor.ro)
Coordinator of the Red-breasted Goose International Working Group, 2006 to 2010

### Introduction

The Red-breasted Goose *Branta ruficollis* is a globally threatened species, classified as Endangered. An International Species Action Plan was compiled in 1996, at which time an International Working Group was also established. In 2003, the Common Monitoring and Research Programme for Red-breasted Goose was launched as an initiative among BirdLife partners in the species' wintering range, primarily Bulgaria, Romania and Ukraine. Its general goal is to provide up-to-date information on the status of the species and its habitats, movements, ecology and conservation needs, to facilitate the drawing up and implementation of adequate conservation actions.

In Romania, Red-breasted Geese are present from the last week of October until the end of March. The majority are found in Dobrogea, the eastern-most region of the country, lying between the Danube Delta and Bulgaria, and bordering the Black Sea. The geese roost on the lakes in Dobrogea and feed in wheat, corn and rape fields situated nearby.

### Conservation initiatives

A key roost for Red-breasted Geese in Romania is Techirghiol Lake, a saltwater lake linked to the sea. Since 1990, the water of this lake has become increasingly fresh, with the potential that this important roost site may become unavailable to the geese during extreme cold winters when it freezes. Consequently, the project 'Improving wintering conditions for Red-breasted Geese at Techirghiol' was undertaken between 2005–2008 by the National Administration of Romanian Waters, Dobrogea Littoral Water Directorate, in partnership with the Romanian Ornithological Society and the Techirghiol Mayoralty. The project was financed by the European Union's Life fund.

The project enabled major works to be undertaken at the lake to address water quality, including drilling, the construction of two dams, and the installation of pumps and a 9 km pipeline, to evacuate the fresh water. During the period of the project, the lake became an Important Bird Area (IBA), and was designated as a Ramsar Site and as a Special Protection Area (SPA) (under the EU Birds Directive). A Management Plan for the area was written and in order to reduce disturbance caused by visitors a birdwatching tower was built. Meetings were held with local hunters and farmers and an information centre was built in Techirghiol. Also, 28 ha of arable land near the lake were bought and are now farmed to provide feeding for wintering geese. A National Action Plan for the conservation of Red-breasted Geese in Romania was also developed. A comprehensive monitoring programme was undertaken during the winters 2004/05 to 2006/07. This included synchronized international counts with Bulgarian and Ukrainian ornithologists twice per month, dawn counts at all major Romanian roost sites, and both roost and daytime counts of feeding birds in the Techirghiol area.

Two international workshops were undertaken as part of the project, involving representatives from throughout the range of Red-breasted Geese, including Azerbaijan, Bulgaria, Kazakhstan, Romania, Russia and Ukraine, as well as experts from NGOs in Western Europe, Wetlands International, and AEWA. The first workshop, in Tulcea, Romania in August 2005, developed an International Work Plan. The aim of the second, in Constanta in February 2008, was two-fold. As well as reporting the results of the Life Project, the workshop sought to develop a new International Species Action Plan, under the auspices of AEWA.

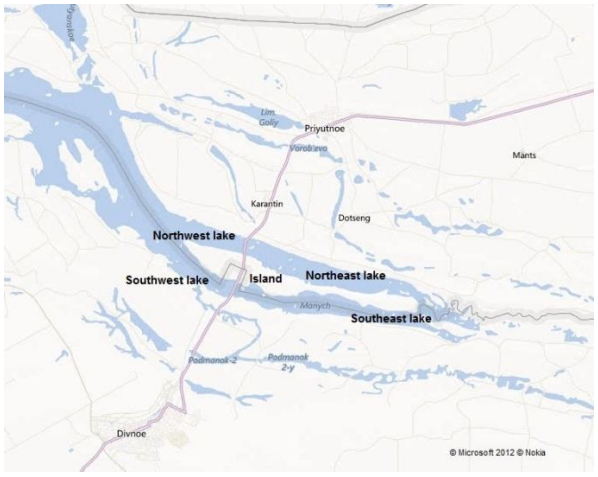
The International Species Action Plan was adopted by AEWA in May 2012. See page 9 for a summary of the plan.

# White-headed Ducks in Manych Wetland, Russia, 2009

Jeff Gordon (*jeffandolga@gmail.com*)

I visited the Manych Wetland, Stavropol Region, Russia, from 22 March 2009 to do the annual count of White-headed Duck *Oxyura leucocephala*. The projected weather forecast was looking good from the 22 March onwards, ideal for counting waterfowl. I lived in Essentuki, Stavropol Region, but three years before decided to buy a dacha at Divenoe, Stavropol Region, which is located at the centre of the Manych Wetland.

White-headed Duck congregate around a large island, named as Left Island, midway between the boundary of Stavropol Region and Kalmykia Republic. The island is divided by a road which runs south to north across its middle. To enable identification of the areas, I call the waters surrounding the island Northeast Lake, Northwest Lake, Southeast Lake and Southwest Lake. White-headed Duck have in the past occurred on all the lakes but the two southern lakes seem to be preferred; see map below.




Manych Wetlands, Stavropol Region, Russia.

It was too windy on 22–23 March to do an accurate count, but on the 24 March I counted 346 birds on the Southeast Lake. The 25 March was a beautiful, calm day and on the Northeast Lake I counted 2850 birds, whilst numbers on the Southeast Lake had risen to 580 birds; total of 3430 as reported on MEBirdNet@yahoogroups.com and WestPalBirds@yahoogroups.com.

The following few days were too rough for counts to be made but on the 30 March conditions were again ideal. The Southeast Lake held 1860 birds whilst the Southwest Lake held 300. The Northwest Lake held no birds whilst the Northeast Lake held many birds but it was too late to do a complete count. If we assume that the number of birds was similar to the 25 March then the total count on the 30 March may well have been 5010. Of course some birds may well have moved from the Northeast Lake to the Southeast Lake during the three days between counts so the figure quoted (5010) may be an over estimation. However, as stated, many birds were still present on the Northeast Lake so the figure of 5010 may indeed be accurate or be an under estimation if more birds had joined those present on the Northeast Lake. In the past, many birds had been well up on the Southwest Lake, many kilometres from the western extremity of the island. Due to the track conditions I was unable to do a count of this area during this visit.

On the 11 April there were *c* 3800 birds. The weather was mild indicating that some birds may have left for their nesting grounds.

The birds return to Manych in the autumn. On the 16 August I counted only 8 birds present but the numbers had increased to *c* 400 by the 5 September. On the 9 October I estimated that there were *c* 4200 birds present.

I left Russia permanently in January 2010 for the UK. I sold all my properties and now live in Thetford, Norfolk. My one regret is the birding; Russia is a fabulous place for wildlife with Manych the icing on the cake!

The Manych Wetlands cover a large area and Jeff told us that he may well have missed birds [because it is such a big site] during his surveys, particularly if the weather was poor. However, the following table shows the total counts Jeff recorded during the time he monitored the site; from March 2006 to September 2009.

Numbers of White-headed Duck recorded at the Manych Wetlands, March 2006 to September 2009.

| Date | Number of birds | Date | Number of birds |
|---|---|---|---|
| 17/03/2006 | 130 | 07/09/2008 | 1 |
| 18/03/2006 | 130 | 21/11/2008 | *c* 350 |
| 01/04/2006 | *c* 3850 | 25/03/2009 | 3430 |
| 21/10/2006 | *c* 1760 | 30/03/2009 | *c* 5010 |
| 20/11/2006 | 69 | 11/04/2009 | *c* 3800 |
| 11/03/2007 | *c* 180 | 16/08/2009 | 8 |
| 06/04/2007 | *c* 3500 | 05/09/2009 | *c* 400 |
| 14/10/2007 | *c* 670 | 09/10/2009 | *c* 4200 |
| 03/04/2008 | *c* 1380 | | |

# International Single Species Action Plan for the conservation of the Red-Breasted Goose: 2011–2020

The AEWA Single Species Action Plan for the Red-breasted Goose *Branta ruficollis* was adopted under Resolution 5.8 (*Adoption and implementation of International Single Species Action Plans and Species Management Plans*) at the fifth Session of the Meeting of the Parties to AEWA in La Rochelle, France, May 2012.

The Action Plan was published by the AEWA secretariat in as *AEWA* Technical Series No. 46 and will become available to downloaded from www.unep-aewa.org/publications/ssap/index.htm.

## Executive summary (*cited from Cranswick et al 2010*)

The Red-breasted Goose is a globally threatened species. It is classified as Endangered on the IUCN Red List. The species suffered a large and rapid decline in population size following 2000, and is now highly concentrated at a relatively low number of sites, increasing its vulnerability to threats. It is assigned a high level of protection under international environmental agreements and legislation.

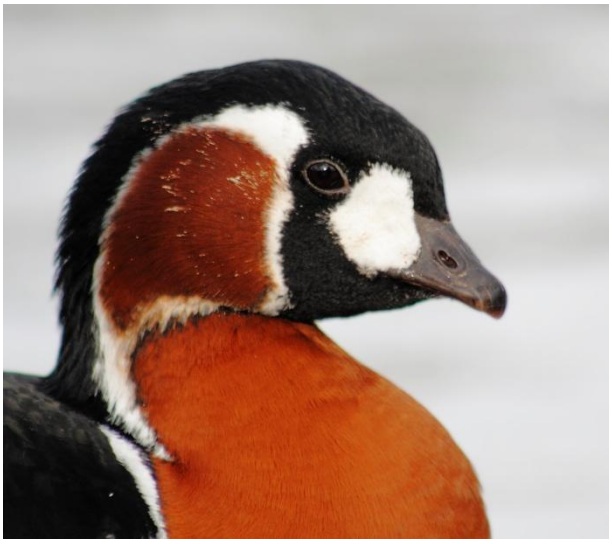
The Red-breasted Goose breeds in Arctic Russia and migrates to winter around the northern and western coasts of the Black Sea. It occurs almost entirely in five countries – Bulgaria, Kazakhstan, Romania, the Russian Federation and Ukraine – which therefore have a special responsibility for the conservation of the species.

This plan identifies the key actions required to improve the conservation status of the Red-breasted Goose. Experts from all range states identified the most important threats to the species, and have determined a series of actions to remove the threats or mitigate their effects.

The aim of the plan is to remove the Red-breasted Goose from the IUCN Red List. The objective is to down-list the IUCN Red-list status of Red-breasted Goose from Endangered to Vulnerable within the ten-year lifetime of the plan. To meet this objective, the plan sets out a series of results to be achieved by 2020:

Result 1: Sufficient feeding opportunity available in staging and wintering areas.

Result 2: Impact of development in the wintering and staging areas minimised through strategic planning.



Red-breasted Goose (Dominic Heard)

Result 3: Detrimental development in breeding grounds minimised.

Result 4: Risk of poisoning by rodenticides significantly reduced.

Result 5: Direct and indirect mortality from hunting significantly reduced.

Result 6: A site network of protected areas functioning effectively.

Result 7: The species' status, and the effect of action plan implementation, assessed by monitoring numbers and demography.

Result 8: The severity of the threat from lead poisoning evaluated.

A series of actions are identified to deliver each of the results. Climate change is predicted to have a number of direct effects and also to exacerbate other threats. Whilst tackling climate change is beyond the scope of this action plan, issues for the Red-breasted Goose are highlighted so that appropriate mitigation or adaptive management can be considered when implementing actions.

Relevant authorities and statutory bodies, and a range of key stakeholders, are encouraged to work collaboratively to implement the actions. International cooperation and coordination will be essential. Progress towards both delivery of the actions and achievement of the results should be reviewed on a regular basis. Barriers to implementation should be identified and overcome to ensure that the objective of the plan is met.

Citation: Cranswick, PA, L Raducescu, GM Hilton & N Petkov. 2010. *International Single Species Action Plan for the conservation of the Red-breasted Goose* Branta ruficollis, 2011–2020. Wildfowl & Wetlands Trust/BirdLife International.

# International Single Species Action Plan for the Conservation of the Lesser White-fronted Goose (Western Palearctic Population)

The AEWA Single Species Action Plan for the Lesser White-fronted Goose *Anser erythropus* was adopted under Resolution 4.16 (*Adoption and implementation of International Single Species Action Plans*) at the Forth Session of the Meeting of the Parties to AEWA in Antananarivo, Madagascar, September 2008.

The Action Plan was published by the AEWA secretariat in October 2008 as *AEWA* Technical Series No. 36 and can be downloaded from www.unep-aewa.org/publications/ssap/index.htm.

## Executive Summary (*cited from Jones et al 2008*)

**Lesser White-fronted Goose – a species under threat**

The Lesser White-fronted Goose *Anser erythropus* is globally threatened, being recognised as Vulnerable by IUCN and ranked by BirdLife International as 'SPEC 1' within Europe, denoting a European species of global conservation concern. It is listed on Annex 1 of the European Council Directive on the conservation of Wild Birds (79/409/EEC, 2 April 1979), in Column A of the Action Plan under the African-Eurasian Migratory Waterbird Agreement (AEWA) and in Annex II 'Strictly protected species' of the Bern Convention. Lesser White-fronted Geese are long-distance Palearctic migrants, currently breeding discontinuously in the sub-arctic zone from northern Fennoscandia to eastern Siberia. The wintering/staging areas and migration routes are only partially known.

**Population and range decline**

The global population of Lesser White-fronted Goose has declined rapidly since the middle of the 20th century. The decrease in numbers has been accompanied by fragmentation of the breeding range and is continuing to affect all populations, giving rise to fears that the species may go extinct. Overhunting and habitat loss are considered to be the main threats. BirdLife International estimates a decrease in numbers in the range of 30% to 49% during the period 1998–2008. Four subpopulations can be recognised, three of which are surviving components of the species' formerly more extensive breeding range:

- Fennoscandian population (breeding in the Nordic countries and the Kola Peninsula of north-westernmost Russia);
- Western main population (nesting in northern Russia to the west of the Taimyr Peninsula); and
- Eastern main population (nesting from the Taimyr Peninsula eastwards and wintering in China).

The fourth subpopulation has been created by the release of captive-bred birds within the former range of the Fennoscandian population in Sweden and by the establishment of a human-modified flyway. The Fennoscandian and Western main populations underwent significant declines during the 20th century and continue to decrease, due primarily to hunting pressure and habitat loss along migration routes and in the wintering areas. The supplemented/reintroduced population appears to be increasing slowly, but views differ markedly on the ethical and scientific merits of the conservation measures applied to this species and their potential implications (*eg* hybridisation risk with other species).

**Scope of this Action Plan**

This Action Plan deals with conservation of two of the three wild populations – namely the Fennoscandian population and Western main population – given that the Eastern main population does not occur within the AEWA Agreement Area or the territory of Member States of the European Union. The Eastern main population is therefore only mentioned when a global context or comparison is required. The Action Plan also takes into account the population derived from captive-bred birds and used for restocking in Swedish Lapland, migrating to winter in the Netherlands. According to previous agreements between the Fennoscandian Range States and in line with AEWA's mission, the main focus of this plan is the conservation of the wild populations.

**Principal Range States**

| EU Principal Range States | Non-EU Principal Range States |
|---|---|
| Bulgaria (F, WM) | Azerbaijan (WM) |
| Estonia (F) | Iraq (WM) |
| Finland (F) | Islamic Republic of Iran (WM) |
| Germany (F, WM) | Kazakhstan (F,WM) |
| Greece (F) | Norway (F) |
| Hungary (F) | Russian Federation (F,WM) |
| Lithuania (F) | Syrian Arab Republic (WM) |
| Netherlands (R) | Turkey (F,WM) |
| Poland (F,WM) | Turkmenistan (WM) |
| Romania (WM) | Ukraine (F,WM) |
| Sweden (F,R) | Uzbekistan (WM) |

The letters in brackets denote the relevant populations of Lesser White-fronted Goose (F = Fennoscandian; WM = Western main; R = supplemented/reintroduced):

Lesser White-fronted Geese occur regularly in at least 22 States within the European Union and/or AEWA Agreement Area. These are referred to as 'Principal Range States' in the Action Plan and have the major responsibility for its implementation.

**Threats**

There is strong evidence that the most important factors driving the continued decline in numbers and fragmentation of the range of the Lesser White-fronted Goose (both the Fennoscandian and Western main subpopulations) are those that cause high mortality among fully grown birds. These factors operate primarily on the staging and wintering grounds, given that studies in the breeding range have failed to detect any adverse impacts that are of significant magnitude to explain the population crash. Although the species is legally protected, on paper at least, across virtually its entire range, hunting is considered to be the primary cause of mortality and the single most important threat that this Action Plan has to tackle. The loss and degradation of suitable habitat is currently considered to be an important but secondary threat to survival of full-grown birds. However, its significance as a likely driver for the historical declines and range changes during the 20th century should not be underestimated.

**Focus and content of the Action Plan**

**Action Plan Goal**

To restore the Lesser White-fronted Goose to a favourable conservation status within the AEWA Agreement Area.

**Action Plan Purpose**

To stop and reverse the current population decline and range contraction.

**Results required for delivering the Purpose and Goal**

Result 1: Mortality rates are reduced.

Result 2: Further habitat loss and degradation are prevented.

Result 3: Reproductive success is maximised.

Result 4: No introgression of DNA from other goose species into the wild population occurs as a result of further releases and DNA introgression from already released birds from captive breeding programmes is minimised.

Result 5: Key knowledge gaps filled.

Result 6: International cooperation maximised.

For each Result, Objectively Verifiable Indicators, Means of Verification, Priority and Timescale are identified, in addition to the specific activities needed to achieve the desired Result.

**Principles of Implementation**

An International Lesser White-fronted Goose Working Group shall be established, consisting of governmental representatives of all Range States. The governmental representatives shall be free to bring in their own experts and to call on their support as required. The Working Group shall be chaired by the AEWA Secretariat (subject to additional, dedicated human and financial resources being made available to the Secretariat) and will operate in accordance with Terms of Reference to be developed by the AEWA Secretariat, approved by the Range States and endorsed by the AEWA Technical Committee.

1. The main priority for the conservation of the Lesser White-fronted Goose is the maintenance of the wild populations breeding in Fennoscandia and Russia.
2. The efficiency of conservation measures is to be assessed by the International Lesser White-fronted Goose Working Group.
3. Implementation and future modification of this International Single Species Action Plan – and all related decisions – shall be undertaken with transparency and accountability so that progress can be subject to scientific scrutiny at any time.
4. Each Range State shall consider support for 'on-the-ground' conservation measures, particularly along the Lesser White-fronted Goose flyway(s) that traverse(s) its territory.
5. Particular attention shall be paid to mortality due to hunting and urgent targeted measures shall be implemented to reduce the magnitude of this threat, the success of which shall be promptly and regularly reviewed and evaluated.
6. Supplementing wild populations with captive-bred birds shall be considered if other conservation measures are not as successful as needed and should populations continue to decline. As with any other captive breeding, reintroduction or supplementation initiatives, this project will be subject to consideration and practical advice by the Committee for captive breeding, reintroduction and supplementation of Lesser White-fronted Geese in Fennoscandia.
7. The SSAP should be regularly adapted and updated every 5 years.

Citation: Jones, T, K Martin, B Barov, S Nagy (compilers). 2008. *International Single Species Action Plan for the Conservation of the Western Palearctic Population of the Lesser White-fronted Goose* Anser erythropus. AEWA Technical Series No.36. Bonn, Germany.

# International Single Species Action Plan for the conservation of the Maccoa Duck

The AEWA Single Species Action Plan for the Maccoa Duck *Oxyura maccoa* was adopted under Resolution 4.16 (*Adoption and implementation of International Single Species Action Plans*) at the Forth Session of the Meeting of the Parties to AEWA in Antananarivo, Madagascar, September 2008.

The Action Plan was published by the AEWA secretariat in April 2007 as *AEWA* Technical Series No. 14 and can be downloaded from www.unep-aewa.org/publications/ssap/index.htm.

## Executive Summary (*cited from Berruti et al 2007*)

The Maccoa Duck *Oxyura maccoa* is a localised, relatively scarce species confined to Africa, with northern (Ethiopia, Kenya, Tanzania and Eritrea) and southern (Angola, Namibia, Botswana, Zimbabwe, South Africa and Lesotho) populations. Previous estimates of its population size, particularly northern populations, were not based on hard data. These reports gave an impression that this species was far more numerous than the actual situation. Similarly, its distribution was described as including several countries for which there were either no records, or very few, giving a false impression of a wider distribution.

Apart from correcting the status of both populations to reflect its true abundance and distribution, information on trends in populations are presented. The northern populations appear to be in rapid decline. The southern population has now stabilised, after a period of increase in range and abundance following colonisation of artificial impoundments. The first national estimate of the population size of Maccoa Ducks in South Africa based on count data is given. At 4500–5500 birds, South Africa has the largest national population of this species, however, there is some evidence that the South African populations may now be in decline. The revised global population estimate is 9000–11,750 birds.

Both the estimates of the total population size and rate of declines in at least the northern population indicate that the status of this species should be elevated to Near Threatened globally, and more precise work on Southern African populations may show this species to have a global status of Vulnerable with a global population less than 10,000 birds. Regardless, it is clear that the conservation status of this species is worse than previously understood, and both research and conservation actions are required to quantify the conservation risks.

A primary element of future action is creating awareness amongst conservation organisations at international and national level on the need for concern about this species.

Because of a lack of information and lack of definition of threats, many of the proposed activities will depend on a more accurate assessment of threats and a better understanding of the biology of the Maccoa Duck, particularly its movements between breeding and non-breeding seasons.

The Maccoa Duck mainly feeds on benthic invertebrates, and thus has a higher position in the trophic chain compared to most ducks, which often feed, to a larger extent, on plant foods. Therefore the Maccoa Duck may be a better indicator than most wetland bird species of pollution resulting from biological concentration of contaminants up the food chain, and may also be a useful indicator of wetland quality.

The northern and southern populations appear to be subjected to different sets of threats. Northern populations appear to be subject to factors resulting largely from the subsistence activities of local communities. The perceived threats to the southern populations are the result of the increasing commercialisation of agriculture and intensification of industry (*eg* pollution) and development of urbanisation with demands for leisure activities and disposal of wastes.

The Workshop [action-planning workshop held in March 2005 in Wakkerstroom, South Africa] saw the formation of the Maccoa Duck Action Group with AGRED (African Gamebird Research Education and Development Trust) offering a secretariat for co-ordinating communication and action. The possibility that this group may evolve into an International Species Working Group under AEWA is discussed.

Citation: Berruti, A, N Baker, D Buijs, BD Colahan, C Davies, Y Dellegn, J Eksteen, H Kolberg, A Marchant, Z Mpofu, P Nantongo-Kalundu, P Nnyiti, K Pienaar, K Shaw, T van Tyali, J Niekerk, MJ Wheeler & SW Evans (eds). 2007. *International Single Species Action Plan for the Conservation of the Maccoa Duck* (Oxyura maccoa). AEWA Technical Series No. 14. Bonn, Germany.

The Maccoa Duck was reclassified as 'Near Threatened' by IUCN in 2007 (2012 IUCN Red List of Threatened Species. Online database. www.iucnredlist.org).

# Review of waterbird re-establishment in the AEWA region

According to the AEWA Action Plan, the Agreement Secretariat shall prepare a series of international reviews necessary for the implementation of the Action Plan, including, *inter alia*, a review of waterbird re-establishment in the Agreement area. Information from Range States on the implementation of re-establishments was collected through questionnaires.

The review was written by Rebecca Lee and Baz Hughes of the Wildfowl & Wetlands Trust (UK) and approved by the AEWA Technical Committee at its 8th meeting in March 2008 in Bonn, Germany and endorsed by the AEWA Standing Committee at its 5th meeting in June 2008 (also in Bonn) for submission at the fourth session of the Meeting of the Parties (MOP) to AEWA. Conclusions and recommendations from the review served as a basis for draft Resolution 4.4 (*Developing international best practice for the conservation of threatened waterbirds though action planning and reestablishment*). The review was welcomed at MOP4 in September 2008 in Antananarivo, Madagascar, where Resolution 4.4 was formerly adopted.

The full report can be downloaded at: www.unep-ewa.org/meetings/en/mop/mop4_docs/meeting_docs/mop4_11_re_establishment_review.doc.

## Executive summary (*cited from Lee & Hughes 2008*)

Definitions:
*Re-introduction*: an attempt to establish a species in an area which was once part of its historical range, but from which it has been extirpated or become extinct.
*Re-establishment*: a successful re-introduction.
*Re-establishment project*: a synonym for re-introduction; a project that attempts to successfully establish a species in an area which was once part of its historical range, but from which it has been extirpated or become extinct.

Re-establishment has received increased attention as a conservation tool over the last two decades resulting in an increase in re-establishment projects worldwide (World Conservation Union and Species Survival Commission Re-introduction Specialist Group (IUCN/SSC RSG) 1995). As re-establishments are sometimes recommendations of action plans and other conservation initiatives it is vital that their occurrence, progress and outcomes are recorded (1) to inform future re-establishment projects for related species and populations, and (2) to allow the implementation of action plans and other conservation initiatives to be monitored. This report reviews waterbird species re-establishment projects, as per item 7.4 (f) of the African-Eurasian Waterbird Agreement (AEWA) Action Plan.

Seven major objectives were addressed: identifying the species and populations for which re-establishment has been recommended as a conservation measure; identifying the waterbird conservation initiatives with provisions on re-establishment; creating a meta-database containing all relevant data on re-establishments of waterbirds in the AEWA region; assessing existing re-establishment projects against IUCN guidelines; assessing the status of and progress in the implementation of re-establishments by Range States and other stakeholders; and producing recommendations for the future use of re-establishment as a conservation tool.

The review found that re-establishment has been recommended as a conservation measure for six waterbird species in international and national actions plans published since 1995: Lesser White-fronted Goose *Anser erythropus*, Ferruginous Duck *Aythya nyroca*, Crested Coot *Fulica cristata*, White-headed Duck *Oxyura leucocephala*, Maccoa Duck *Oxyura maccoa*, and Corn Crake *Crex crex*. Each of these species, except Maccoa Duck, has been the subject of one or more re-establishment project within the AEWA region. Most projects have failed to result in self-sustaining populations, though varying levels of success have been reported for projects to re-introduce the White-headed Duck in Spain, Ferruginous Duck in Italy, Lesser White-fronted Goose in Sweden, and Corn Crake in the United Kingdom.

Of the 59 conservation initiatives reviewed, 15 had provisions on re-establishment. These initiatives included national and international action plans, international conventions and agreements, and conservation assessment and management plans. The re-establishment recommendations ranged from calling for re-introductions in previously occupied areas according to IUCN guidelines, to calling for particular numbers of birds to be released in particular areas.

A potentially web-accessible meta-database was constructed and populated with data relevant to re-establishments of waterbirds in the AEWA region, incorporating information on species/population, Range States, conservation initiatives, re-establishment projects, references, re-establishment contacts, and data collected as part of a questionnaire survey.

The assessment of existing re-establishment projects found that compliance to IUCN re-introduction guidelines varied from 23% for a White-headed Duck re-introduction in Hungary to 88% for a Corn Crake re-introduction in the United Kingdom. Evaluating success and comparing this with level of compliance indicated that projects showing greater compliance to IUCN guidelines were more likely to be successful.

Re-establishment projects have been implemented for four of the five species for which re-establishment has been recommended in an international single species action plan (ISSAP). The only species where re-establishment has not been implemented despite a recommendation is Maccoa Duck. Re-establishment projects have been conducted for 33% of the threatened species and 3% of the non-threatened species covered by AEWA.

A number of factors were identified as particularly important to success. These were the completion of a comprehensive feasibility study; pre-release acclimatization of birds to their release area; good quality habitat with the original causes of decline eliminated or reduced; long-term financial and political support; and identification of short and long-term indicators of success.

In order to improve the success of re-establishment as a conservation tool for waterbirds in the AEWA region this report recommends that:

1. Re-establishment projects are conducted in strict accordance with the IUCN Guidelines for Re-introductions (IUCN/SSC RSG 1995).
2. The IUCN Guidelines for Re-introductions (IUCN/SSC RSG 1995, Appendix 3) are adapted for waterbird species and supplemented with checklists of activities for practitioners to complete.
3. The IUCN/SSC Re-introduction Specialist Group (IUCN/SSC RSG) is consulted prior to any re-establishment project.
4. Re-establishment projects are conducted by groups of organisations and experts with diverse skills bases.
5. Networks or groups of experts with knowledge relevant to the re-establishment of a specific species are assembled to act as advisory groups for re-establishment projects of that species.
6. During pre-project activities, particular attention is paid to completing a comprehensive feasibility study and securing long-term financial and political support.
7. During re-introduction activities, particular attention is paid to ensuring birds are acclimatized to their release area, a sufficient amount of good quality habitat is available where the original causes of decline have been eliminated or sufficiently reduced, and short and long-term indicators of success are identified.
8. AEWA National Focus Points maintain a national register of re-establishment projects occurring or planned to occur wholly or in part within their Ranges States.
9. All re-establishment projects are described to the IUCN/SSC RSG.
10. The AEWA re-establishment database is maintained.
11. A standard set of evaluation criteria for waterbird re-establishment projects is developed.

Citation: Lee, R & B Hughes. 2008. *Review of waterbird re-establishment in the AEWA region*. WWT report to AEWA.

## Guidelines on the translocation of waterbirds for conservation purposes: complementing the IUCN guidelines

In Resolution 4.4 (see news item on page 13), the Meeting of Parties to AEWA requested that the Technical Committee develop '*...supplementary guidelines for the reestablishment of waterbirds...'* and *'...a reporting structure, including a standard set of evaluation criteria, to encourage practitioners to provide detailed information about each project stage and to make this information widely accessible...*'. These guidelines on the translocation of waterbirds for conservation purposes were, therefore, produced, and endorsed at the 5th Meeting of Parties to AEWA at La Rochelle, France in May 2012.

The full report will become available to download at www.unep-aewa.org/publications/conservation_guidelines.htm.

**Summary** (*cited from Lee et al 2012)*
Translocation has received increased attention as a conservation tool over the last two decades resulting in an increase in translocation projects worldwide aiming to re-establish extinct or depleted wild populations (IUCN 1998). The *Guidelines for the translocation of waterbirds for conservation purposes: complementing the IUCN guidelines* have been developed to provide guiding principles for the translocation of waterbirds for conservation purposes, expanding on the generic guidelines provided by the *IUCN Guidelines for Re-introductions* (IUCN 1998). These guidelines provide information on determining the

aims and objectives of a translocation, assessing justification and feasibility, the planning process, project implementation, assessing success and reporting outcomes.

While translocation techniques are improving continuously and for some species have clearly represented the difference between survival and extinction in the short-term, translocation projects are still associated with numerous problems and consequently still have a low success rate. Problems that are significant include (1) difficulty establishing self-sustaining captive populations, (2) poor success in release attempts, (3) high costs, (4) introgression of alien DNA, (5) pre-emption of other conservation measures, (6) disease outbreaks and (7) maintaining administrative continuity.

For these reasons, translocation projects should not be undertaken lightly, and should only be conducted as part of wider conservation programmes. Effective integration between any translocation efforts and wider conservation efforts for existing wild populations should be sought wherever possible. It is vital that anyone considering a translocation project understands that translocation projects, almost without exception, are long-term, are expensive, require a multi-disciplinary team with a wide range of expertise, and can carry significant risks to wild populations. And perhaps most importantly, if a translocation does not occur as part of a wider conservation programme, it is very unlikely to have any long-term positive outcomes for the target species.

Prior to any planning or implementation, it is essential that a justification assessment is conducted to determine if the project is needed and appropriate. The assessment should consider the following key questions:

1. Is the species/population extinct or facing a high risk of extinction/extirpation in the wild? Or has the species/population undergone a significant decline and is currently in a depleted state in a particular area, either in terms of distribution or numbers?
2. Are existing conservation measures insufficient for recovery within a reasonable timescale?
3. Would the project's benefits outweigh potential costs and negative impacts?
4. Could the desired outcomes be achieved by an alternative, less expensive method, i.e. would the project be cost-effective?
5. Would the project's aims and objectives be in line with existing, relevant conservation plans and policies, particularly the *IUCN Guidelines for Re-introductions* (IUCN 1998) and any existing conservation Action Plans or other conservation initiatives?

If a project is considered justified, a comprehensive feasible assessment should be conducted to determine if the project has a reasonable chance of success based on available knowledge, skills, attitudes and resources. The assessment should consider the following key questions:

*Biological, environmental and technical considerations*

- Is a suitable source of birds available?
- If required, are captive breeding and rearing techniques for the species known?
- Are transport and release techniques for the species known?
- Is suitable habitat available in which to release the animals?
- Have the previous causes of decline been sufficiently reduced or eliminated?
- Is there sufficient knowledge of the species' natural history?

*Socio-economic, political and legal considerations*

- Does stakeholder support exist?
- Will the project conform to relevant laws and regulations?

*Resource considerations*

- Are sufficient financial resources available?
- Are sufficient technical resources available?

Following the decision to proceed with a translocation project, important planning and preparation activities should be completed:

- Construction of a multi-disciplinary team;
- Securing long-term political and financial support, and obtaining required licences and permits;
- Background research on biological and technical aspects such as capture, captive breeding and rearing (if required), release techniques, disease risks and health management;
- Careful and thorough project planning and budgeting; and
- Preparation of required facilities, sourcing equipment and training personnel;
- Establishment of a captive breeding population, if required; and
- Initiation of habitat management and engagement activities.

Pre-release and release activities include sourcing and preparing birds for release, releasing birds according to a carefully designed release strategy, as well as ongoing habitat management and engagement activities.

A translocation project is not complete upon the release of birds – a range of post-release activities are required, including interventions as necessary, monitoring, assessment of outcomes and evaluation of success, and reporting. These activities should be factored into project planning and budgeting.

Lessons learned from all the stages and activities in a translocation project should be carefully assessed and used to develop and improve on project plans and techniques. Lessons learned should be shared as widely as possible to inform future translocations of the target species and related species as well as the conservation community as a whole.

## Reference

IUCN. 1998. *Guidelines for Re-introductions*. IUCN, Gland, Switzerland.

Citation: Lee R, PA Cranswick, RL Cromie, GM Hilton, NS Jarrett & B Hughes. 2012. *AEWA Guidelines for the Translocation of Waterbirds for Conservation Purposes: Complementing the IUCN Guidelines*. AEWA Technical Series No. 13. Bonn, Germany.

# Articles

## Capture and marking the Brazilian Merganser in the Serra da Canastra region of Minas Gerais, Brazil

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*Keywords: Brazil, Brazilian Merganser, capture, marking, Mergus octosetaceus, radio-tracking, Serra da Canastra.*

Brazilian Merganser (Adriano Gambarini)

The Brazilian Merganser *Mergus octosetaceus* is one of six species of waterfowl considered Critically Endangered (IUCN 2008). This species depends on well-preserved environments, clean, clear water rivers and streams with rapids. It occurs in extremely low numbers at a few, isolated localities in south-central Brazil and adjacent areas in Argentina and Paraguay. There are only scarce records for the latter two countries (Hughes *et al* 2006).

The Serra da Canastra region in western Minas Gerais supports the largest known population of this species. The Terra Brasilis Institute (TBI) has conducted scientific research in this region focused on species and ecosystem conservation since 2001. Activities have included population surveys, work on reproductive biology, and several awareness and environmental education actions.

Since 2005, TBI has monitored several territorial pairs on sections of rivers and streams in the region. These initial efforts focused on finding nests, following family groups through fledging, and describing daily and seasonal habitat use and movement patterns. However, because no birds were marked, we could not identify individuals. Only with marked individuals is it possible to more precisely determine relevant biological aspects of this species fundamental for efficient conservation planning: including territory size, mating system, breeding success, dispersal and colonization of new territories. Additionally, a marked sample of birds would allow us to develop estimates of the population size that include a measure of precision.

Consequently, we carried out two capture expeditions in the region of Serra da Canastra during 2008. In both cases, we captured birds using 127 mm mesh mist nets stretched across the river channel and used river rock to secure the net to the bottom. After locating the family, one team stayed with the birds while another headed downstream to erect the net. The birds were then guided towards the net by members of the team walking on the banks of the river.

The first capture expedition occurred during March on the Peixe River near the town of São Roque de Minas. It resulted in the capture of three birds, a territorial pair and one juvenile. We attached a tail-mounted radio transmitter to each bird and released them in the same place they had been captured. The juvenile female's radio stopped functioning ten days after release. The adult female and male's radios fell off after 29 and 72 days, respectively. However, it was possible to consistently monitor the entire family group for 72 days using the male's radio.

Despite the limited sample size and short monitoring period, preliminary results indicated the potential of using radio telemetry to increase our understanding of Brazilian Merganser biology. Additionally, our monitoring efforts helped identify the technological and logistical problems associated with tracking birds that rarely leave the same rivers stretches, use large stretches of river on a daily basis, move rapidly from one point to another, and frequently use habitats where signal reception range is limited.

The second capture expedition was planned based on our experiences in April and included marking birds with coloured and metal rings and attaching radio transmitters. To capture and ring both adult and young individuals, the second capture period occurred during September and October; a period when most young are flightless but have developed sufficiently to be ringed and carry a radio attachment. We focused our capture efforts on the Peixe and São Francisco Rivers in the municipality of São Roque de Minas. We captured 17 individuals and fitted all with rings and five with tail-mounted radio transmitters. Selecting the individuals that would carry a radio transmitter took into account the goal of marking at least one individual of each family and the condition of the individual's tail feathers. We also collected blood samples for genetic analyses and, whenever possible, regular biometric measures.

During both expeditions, we captured 20 individuals, nine adults and 11 young (Table 1). However, we saw 33 individuals in the families we targeted for capture; three birds in March and 30 in September and October. The results indicate 100% success (n = 3) for the first expedition and 57% success for the second (n = 17), with 71% success overall. We suspect the adult male captured in March was recaptured during the second occasion.

The mean mass of captured birds (± SE) was 737 ± 17g (range 720–760g) for adult females and 806 ± 80g (720–920g) for adult males. The mass of young birds varied between 520g and 680g (Table 2) and was greatly influenced by age. Of the 11 young birds captured, only six were aged. The remaining five young birds were captured together apparently being part of the same family (São Francisco/IV river; Table 1). However, the weight for these young varied considerably (females = 550g; males = 570g, 640g, 650g and 680g).

Since release, we have monitored all birds periodically. The rings, especially the colour rings, have been visible both when the birds are at rest on the rocks and during short flights, indicating that it is possible to identify individual Brazilian Mergansers through ringing. After two months of monitoring, preliminary data suggest new insights on the biology of this species, providing important data for its conservation in the Serra da Canastra region. These results will make an important contribution to the implementation of the Brazilian Merganser Action Plan and improve the research protocol on the species.

Table 1: Numbers of Brazilian Merganser captured in March and September/October 2008 in the Serra da Canastra region, Minas Gerais, Brazil.

| River/family | Number of individuals in family group | Number of individuals captured and marked | | Capture success (%) |
|---|---|---|---|---|
| | | Adults (males/ females) | Young (males/females) | |
| ***March expedition*** | | | | |
| Peixe | 3 | 1 / 1 | 0 / 1 | 100.00 |
| ***September/October expedition*** | | | | |
| Peixe | 5 | 1* / 0 | 0 / 2 | 60.00 |
| São Francisco/ I | 8 | 1 / 0 | 1 / 1 | 37.50 |
| São Francisco/ II | 4 | 1 / 1 | 1 / 0 | 75.00 |
| São Francisco/ III | 2 | 1 / 1 | 0 / 0 | 100.00 |
| São Francisco/ IV | 11 | 0 / 1 | 4 / 1 | 54.55 |
| **TOTAL** | **33** | **9** | **11** | **71.17** |

* Believed to be the same individual as the one caught during the March expedition; since both were captured in the same territory.

Table 2: Age and body mass of the young birds captured in the Serra da Canastra region, Minas Gerais, Brazil.

| River/family | Number of days after leaving the nest | Average weight (grams) |
|---|---|---|
| São Francisco/ I | 55 | 540 |
| São Francisco/ II | 70 | 680 |
| Peixe (March 08) | 260 | 650 |
| Peixe (October 08) | 75 | 520 |

## Acknowledgments

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We are also grateful to Ricardo Corassa Arrais (Instituto Pró-Carnívoros), Yara Barros and Marcelo Almeida (ICMBio) for their valuable help and expertise during the expeditions and to Adriano Gambarini for his help in photography. Biological material collection was developed under licences - SISBIO/IBAMA license no. 12662-2 and Cemave license no. 3042.

## References

Hughes, B, B Dugger, HJ Cunha, I Lamas, J Goerck, L Lins, LF Silveira, R Andrade, SF Bruno, S Rigueira & YM Barros. 2006. Action Plan for the Conservation of the Brazilian Merganser. *Ibama Threatened Species Series* 3: 86 pp. Ibama, Brasília, Brazil.

IUCN 2008. 2008 IUCN *Red List of Threatened Species*. www.iucnredlist.org. Downloaded on 19 November 2008.

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Capture, marking and release of Brazilian Mergansers and the expedition team, Serra da Canastra 2008 (Adriano Gambarini)

# Survey of White-headed Ducks and Red-breasted Geese at Manych Lake System, Russia

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**Summary —** During 13–17 November 2006, a field survey was conducted in Kalmykia, Russian Federation, to count the globally threatened White-headed Duck *Oxyura leucocephala* and Red-breasted Goose *Branta ruficollis*. Several single counts were carried out on and around the East Manych and Manych-Gudilo Lakes, partially protected by the Chernye Zemli Biosphere Reserve (ChZBR). A total of 370 White-headed Ducks, including 98 adult males and 272 females/juveniles, and 5615 Red-breasted Geese were found.

*Keywords: Branta ruficollis, counts, juveniles, Manych, Manych-Gudilo, Oxyura leucocephala, Red-breasted Geese, Russia, sex-ratio, White-headed Duck*

## Background

The survey was urgently organized in response to personal communication from the Chernye Zemli Biosphere Reserve (ChZBR) about large concentrations of White-headed Ducks on East Manych Lake. Investigations were carried out between 13–17 November 2006 on and around the Manych Lakes, within Republic of Kalmykia. The field trip was financially supported by the Wildfowl & Wetlands Trust and Russian Academy of Sciences.

BirdLife International (2008) classifies the White-headed Duck as endangered: its migratory population wintering in the East Mediterranean and South-west Asia is estimated as between 5000 and 10,000 individuals (Wetlands International 2006). The AEWA/CMS International Action Plan for the Conservation of the White-headed Duck (Hughes *et al* 2006) identifies the organization of national censuses during breeding and migratory seasons as priority activities.

Red-breasted Goose is listed as Vulnerable (BirdLife International 2008). The third edition of Waterbird Population Estimates (WPE) (Wetlands International 2002) estimated the global population at 88,000 individuals, but the next WPE edition (Wetlands International 2006) reduced it to only 38,500 individuals.

The main project objectives were:

1. to conduct a survey of White-headed Ducks to estimate the total numbers present and the sex-ratio; and
2. to count Red-breasted Geese at the study area and identify the numbers of adults and juveniles.

Red-breasted Geese (WWT)

## Study area

The survey covered the territory along the lakes Manych-Gudilo and East Manych, and extended from northwest to southeast at a length of approximately 100 km between points with coordinates 46° 41'N, 42° 36'E and 45° 99'N, 43° 45'E; the centre of site is 46° 33'N, 42° 83'E (Figure 1). This area is situated 70–90 km west and southwest of the city of Elista, the capital of Kalmykia, on the boundaries with Rostov administrative region (*Oblast'*) and Stavropol Province (*Krai*).

Lakes Manych-Gudilo and East Manych are the largest lakes in the North Caucasus. These are located on the Manych depression, between the high right bank of the Volga River and the Ergeni highlands in the north and the Stavropol highlands in the south. The lakes have shown large fluctuations in salinity and flooding caused by both natural and man-made factors. The salt concentration in waters is highest in the central part of Lake East Manych where it reaches a maximum level of 17-30 g/l. The width of the lakes ranges from 1.5–10 km. Islands

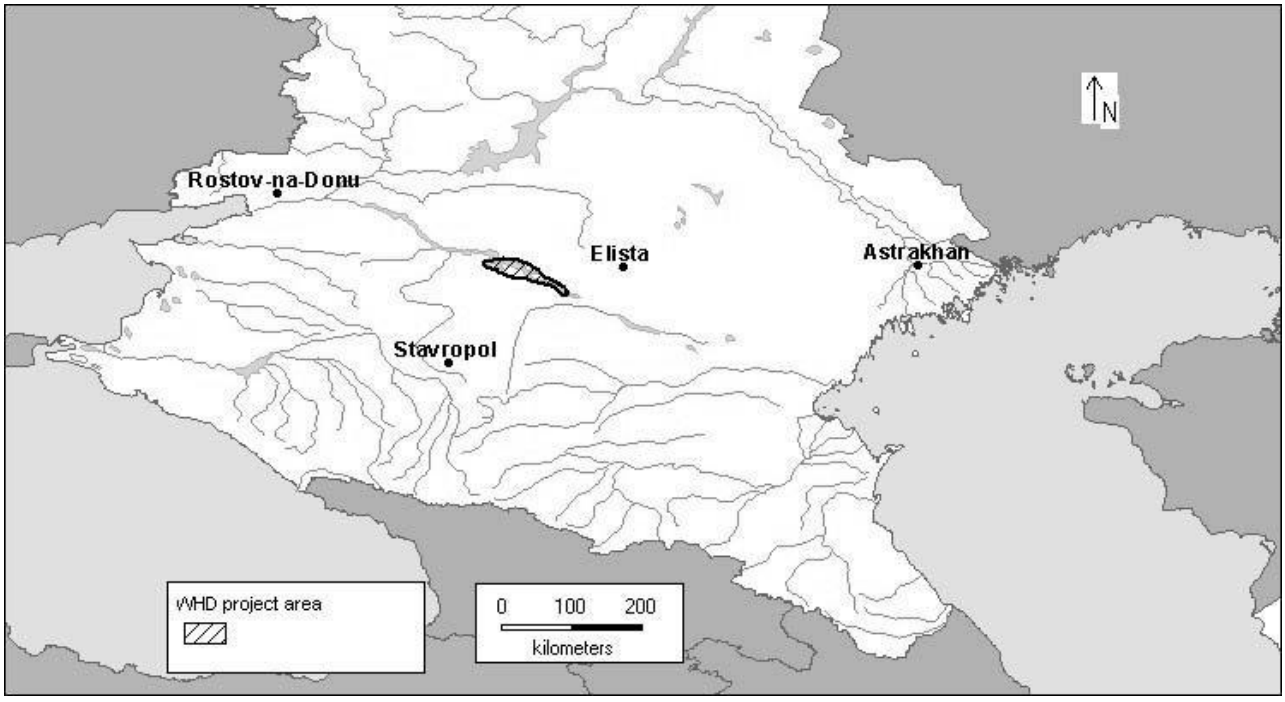


Figure 1. Location of an area surveyed, 13–17 November 2006.

vary in area from few to several hundred hectares. The natural vegetation belongs to the Trans-Volga – Kazakhstan bunchgrass steppes with *Stipa lessingiana*, *S. capillata*, *Arenaria koriniana*, *Poa bulbosa*, *Tulipa gesneriana* and others. The majority of lands are used for growing of spring and winter cereals or as pastures for grazing.

The Manych Lakes are known to be very important staging areas for waterbirds during their seasonal migrations. In warm winters these lakes and surrounding farmlands can also support huge numbers of wintering geese, ducks and coots. In 1994 the Lake Manych-Gudilo was designated as a Ramsar Site. An area of 50,000 ha is protected as an Ornithological site of ChZBR, of which 27,600 ha is water. Close to the north-western border of the Manych-Gudilo Site is Rostovsky Nature Reserve (Gribova & Neuhausl 1989, Krivenko 1999, Badmaev & Badmaev 2005, Solokha 2006).

During the survey the weather was changeable from what is typical for this region in late autumn. Morning air temperatures varied from +2.5 to +5 degrees Celsius. The wind was from moderate to strong, mainly from the east. Most of the days were rainy.

## Methods

Observations were carried out at Manych-Gudilo and East Manych Lakes, as well as on surrounding farmlands. The expedition covered a total distance of nearly 1000 km, including all the way to Elista. The survey team consisted of three waterbird experts and a volunteer.

High-quality optical equipment (binoculars, spotting scopes) and colour field guides were used for identification and counting of birds. A GPS receiver was used to mark the locations of White-headed Duck and Red-breasted Goose flocks. For spatial presentation of results we plotted the data on a GIS map of Russian protected areas using *DIVA-GIS* software. White-headed Ducks were identified and counted by scanning flocks of waterbirds on the water.

Two forms of the ground census were used to count Red-breasted Geese:

1. Early morning counts of geese of two species (Greater White-fronted *Anser albifrons* and Red-breasted Geese) flying from the roosts located on islands to the farmlands to feed. However, counting of Red-breasted Geese in flight was not very efficient, because often it was difficult to separate and identify this species, especially in mixed flocks. This count was mainly used for rough estimations of the total numbers of roosting geese.

2. Counting of Red-breasted Geese at their feeding sites. Large areas of pastures and winter crops were covered using a vehicle. Counts of flocks encountered were carried out from a distance of 0.6-1 km. Binoculars and spotting scopes were used to make a separate count of Red-breasted Geese or, in case the birds were disturbed and flew away, to estimate the overall number of birds in mixed flocks and proportion of each of two species for subsequent calculation of Red-breasted Goose numbers. This field method was more accurate than method 1. Due to poor visual conditions and distant

observations for Red-breasted Goose flocks it was impossible to separate adult birds from juveniles.

# Results

## White-headed Duck

***Previous observations (30 October to 2 November 2006)***

Our survey was organized in response to an urgent communication from Viktor Badmaev about high numbers of White-headed Ducks found during an anti-poaching raid (Table 1, Figure 2).

A total of 6292 White-headed Ducks were counted between 30 October and 2 November, with no sex-ratio determined. Two weeks later, most of these had apparently moved away, migrating further west, and only a flock on Liman Dolgonky was been repeatedly during our survey.

***Data collected 13–17 November 2006***

A total of 370 White-headed Ducks were counted on 15 November 2006, including 98 adult males and 272 females/juveniles. White-headed Ducks were found on East Manych Lake at Liman (Bay) Dolgonky (46° 192' N, 42° 993' E) on 13 and 15 November, when 18 birds (partial count) and 368 birds were counted, respectively. Two birds were also seen near the Priyutnensky Bridge (46° 085' N, 43° 355' E) on 15 November (Figure 2). Among the 368 counted at Liman Dolgonky, 97 were males and the rest (271 individuals) were females/juvenile birds. The two found the same day near the Priyutnensky Bridge included one male and one female/juvenile.

## Red-breasted Goose

During the reporting period Red-breasted Geese occurred in mixed flocks with Greater White-fronted Geese. Roosting geese were found on islands of the East Manych and Manych-Gudilo Lakes, while grazing flocks were observed on the neighbouring pastures and winter crops (Table 2 and Figure 2). The total for the survey in Kalmykia, of 5615 geese, is considered a minimal estimation.

Table 1. Number of White-headed Duck counted at East Manych Lake, 30 October to 2 November 2006.

| Date | Site | Coordinates | | Number of White-headed Duck |
|---|---|---|---|---|
| 30 October | Divninsky Bridge | N 45.995 | E 43.425 | 3036 |
| 30 October | Northern part of lake | N 46.30 | E 42.95 | 2650 |
| 31 October | Liman Lopilovsky | N 46.22 | E 42.98 | 282 |
| 2 November | Liman Dolgonky | N 46.192 | E 42.993 | 324 |

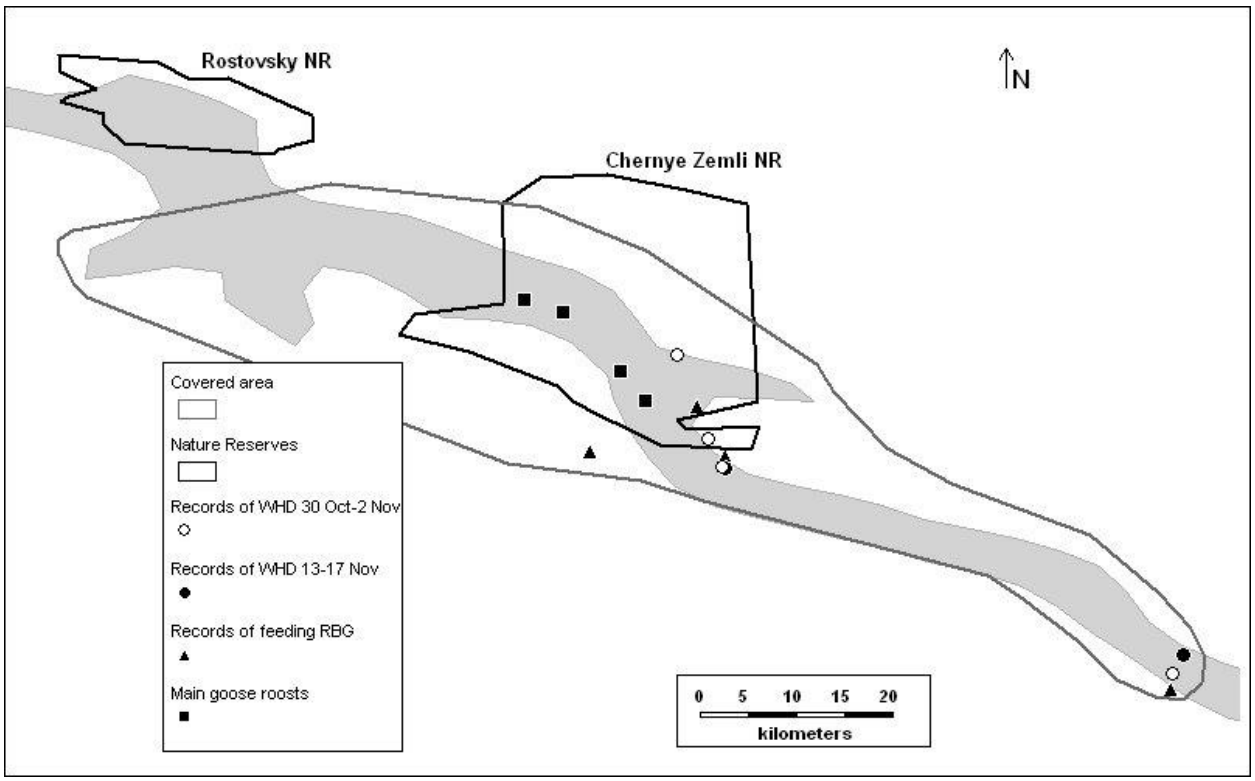


Figure 2. Locations of White-headed Ducks and Red-breasted Geese on Manych Lakes during main trip from 13–17 November 2006, with records of White-headed Ducks from 30 October–2 November 2006.

Table 2. Observations of Red-breasted Geese on the East Manych and Manych-Gudilo Lakes from 13–17 November 2006. Numbers marked (*) are used for estimation of total count.

| Date & time | Site | Coordinates | Number of Red-breasted Geese | Comments |
|---|---|---|---|---|
| 14 Nov, early morning | East shore of E Manych (Kirista), islands | 46°25'N 42°96'E | 1580 | Mixed flocks flying away from roosts |
| 15 Nov. early morning | East shore of E Manych (Kirista), islands | 46°25'N 42°96'E | 1750* | Good count in flocks flying away for feeding |
| 15 Nov, late morning | East shore of E Manych (Kirista) | 46°25'N 42°96'E | 1610* | Good count in flock grazing on shore |
| 15 Nov, afternoon | Liman Dolgonky, north shore of E Manych | 46°19'N 42°99'E | 55* | Feeding flock |
| 16 Nov, morning | South shore of Manych-Gudilo(*Kordon*), islands | 46°33'N 42°77'E | No exact data | Roosting geese flying out for feeding |
| 16 Nov, midday | Dunda River, south shore of Manych-Gudilo | 46°21'N 42°86'E | 800 | Partial count |
| 16 Nov, afternoon | S Manych-Gudilo between *Kordon* and *Pyatisotka* | - | 0 | No geese encountered |
| 17 Nov, morning | South shore of Manych-Gudilo (*Kordon*), islands | 46°33'N 42°77'E | 3000–4000 | Count of roosting and flying geese |
| 17 Nov, morning | Dunda River, south of Manych-Gudilo | 46°21'N 42°86'E | 2100* | Complete count of flock |
| 17 Nov, afternoon | Divninsky Bridge, E Manych | 45°98'N 43°42'E | 100* | Mixed flock grazing on winter crops |

## Conclusion

- ChZBR provides good protection for both the White-headed Duck and Red-breasted Goose, as well as for the other waterbirds.
- A survey of White-headed Ducks at Manych Lakes needs to be conducted in spring when birds can stage for longer and this will be easier to count.
- The Red-breasted Goose count on the East Manych and Manych-Gudilo Lakes needs to be synchronized with counts on the other important sites, such as Veselovskoye Reservoir, Sostinsky Lakes, and other wetlands.
- There is a need to repeat the goose count in mid-December, because the current warm weather will be likely to encourage many geese to stay within Kalmykia, as in December 2004.

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## References

Badmaev, VD & VE Badmaev. 2005. *Wintering waterfowl of the Ornithological Site of the Chernye Zemli Biosphere Reserve. In: Waterfowl of Northern Eurasia*: Abstracts presented to the Third International Symposium (October, 6–10, 2005, Saint-Petersburg, Russia). pp. 23–25. Saint-Petersburg. [In Russian].

BirdLife International. 2008. *Threatened Birds of the World 2006*. Species factsheets available at www.birdlife.org.

Gribova, SA & R Neuhausl. (Chief eds.). 1989. *Map of Reconstructed Vegetation of Central and Eastern Europe*. Russian Academy of Science.

Hughes, B, JA Robinson, AJ Green, ZWD Li & T Mundkur. (Compilers). 2006. *International Single Species Action Plan for the Conservation of the White-headed Duck* Oxyura leucocephala. CMS Technical Series No. 13 & AEWA Technical Series No. 8. Bonn, Germany.

Krivenko, VG. editor. 1999. *Wetlands in Russia, Volume 1: Wetlands of International Importance*. Wetlands International – AEME Publ. 52, pp194.

Solokha, A. 2006. *Results from the International Waterbird Census in Central Asia and the Caucasus 2003–2005*. Wetlands International, Moscow, Russia.

Wetlands International. 2002. *Waterbird Population Estimates – Third Edition*. Wetlands International, Wageningen, The Netherlands.

Wetlands International. 2006. *Waterbird Population Estimates – Fourth Edition*. Wetlands International, Wageningen, The Netherlands.

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Red-breasted Goose was reclassified as 'Endangered' in 2007(2012 IUCN *Red List of Threatened Species*. www.iucnredlist.org) and the population is now estimated at 44,000 individuals (Wetlands International. 2012. *Waterbird Population Estimates*. wpe.wetlands.org

# Whio or Blue Duck, update 2008

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*Keywords: Blue Duck, captive breeding, Hymenolaimus malacorhynchos, New Zealand, recovery, Whio*

Blue Duck (Murray Williams)

The shrill warning whistle of the male Whio is synonymous with our backcountry and can be heard over the babble and chatter of the harsh river environments that the ducks inhabit. Similarly the warning calls of Whio declines have also been heard and recognition of the need for action to ensure the survival of this river icon has been heeded. Although Whio are commonly seen every day on the $10 bill their presence, distribution and abundance have significantly declined throughout New Zealand backcountry mountain forest streams.

Whio or Blue Duck *Hymenolaimus malacorhynchos* is an ancient and iconic river species that is undoubtedly endangered. Its population is estimated to be 1200 pairs currently. It is nationally endangered according to the New Zealand Threatened Classification System. This is the second highest threat category.

Whio reside on fast-flowing rivers year-round, one of New Zealand's wildest environments, but despite this their new born ducklings are able to cope in the torrents. They are one of only a handful of species which allow close observation while retaining a trusting behaviour and naivety characteristic of un-hunted game.

Whio populations have been limited historically by avian predators (Falcon *Falco novaeseelandiae*, Australasian Harriers *Circus approximans*, and the extinct owl *Sceloglaux albifacies*), eels, and natural weather events like floods and avalanches. Flood events have been shown to have a significant impact on their breeding success and productivity. Will a change in our weather patterns increase the occurrence of more dramatic storms? The clearance of forests and damming of rivers have also had a significant impact on Whio distribution. More recently, introduced mammalian predators such as Stoat *Mustela erminea* pose the greatest threat to Whio in all habitats. The duck's fleshy bill and webbed feet is no match for combating the teeth of stoats, ferrets, cats and dogs. The recent inadvertent introduction of the alga *Didymosphenia geminata* into our river systems poses a new threat to Whio for it smothers areas where the ducks forage for aquatic invertebrates.

Unlike many of New Zealand's threatened species whose security can be ensured by removing them from their threats to an offshore island, this is not the case for Whio as there are no islands large enough to provide their riverine habitat. The recovery of Whio is largely left up to *in-situ* management and control of threats in and around the backcountry waterways. The Whio Recovery Group has identified stoats as the main controllable threat to Whio and at all our sites the primary focus is on minimising the density of stoats to enhance population survival and breeding success.

The Department of Conservation (DOC) is currently writing its next ten-year Whio Recovery Plan to provide strategic direction for Whio recovery and the allocation of resources, and to aid raising the public's awareness of the recovery process. The long-term goal of the Whio Recovery Plan is to 'ensure the retention of viable wild Whio populations throughout their natural range'. This can be achieved by initially securing Whio at eight priority security sites through the management and control of introduced predators. Thereafter the priority will shift in the next ten years to another tier of recovery sites distributed more widely across the Whio's natural range. These recovery sites are where additional Whio protection is already occurring through other ecosystem protection, community initiatives, or where a new site may need to be selected to maintain the distribution of Whio within a region. Currently there are 15 recovery sites strategically spread across the regions which will enable the Whio population to recover and provide links to each other to ensure gene flow.
At the eight priority security sites the intent is to ensure there are 50 pairs of Whio on sequential territories along a river, or on multiple neighbouring

rivers connected by juvenile dispersal. These populations will be required to be self sustaining. There are four prority sites in North Island (Te Urewera Mainland Island, Whirinaki Forest, Tongariro Forest and Manganui-o-te-Aou/ Retaruke) and four in South Island (Opara/Ugly, Wangapeka/Fyfe, Styx/Arahura and Clinton/Arthur/Cleddau/Worsley). Five of these sites are already fully operational, working in synergy with other protection programmes targeting other threatened forest birds and invertebrates.

There are a number of various control methods for stoats being tested within the security sites. The various configurations of trapping methods being tested include spatial treatments where traps are placed on ridges and spurs and along watercourses, placed as tram-lines (three lines of traps) on either side of the river, and placed as single lines down the river in the U shaped glacial valleys of Fiordland. From previous biological research we have learned that Whio live at low densities along linear habitats, so 50 pairs of Whio will probably extend along at least 80 km of river. The scale of stoat control therefore is daunting, but with good infrastructure and keen people driving the programmes it is entirely achievable and simple - control stoats to low levels, and Whio populations will increase. A recent rat and stoat control effort in Tongariro Forest showed the benefit of controlling Whio threats; this priority site produced 86 ducklings of which 67 were fledged.

We have demonstrated that we can re-establish populations: this was successfully conducted on Mount Taranaki where there are now 30 pairs of birds. These birds have been sourced through the Whio captive-breeding programme which is managed for DOC by a very keen group of enthusiasts. DOC is also experimenting with a new tool for augmenting populations, Whio Nest Egg (WHIONE). Clutches of eggs are harvested from areas outside of predator control areas (which could otherwise be lost to floods or predators), reared in captive-breeding facilities to ensure their survival to fledglings, then released back into the predator controlled sites to help build the population. The effectiveness of this is still being appraised.

We are still developing an understanding of Whio demography, the survival of nests, juveniles, adult females, and habitat use. The research, being conducted in the Te Urewera Mainland, indicates that in the unprotected areas there is up to 50% mortality of females and nesting success is as low as 20%. Auckland University and DOC are working together to assess the nature and extent of juvenile dispersal and their survival using satellite tracking to locate dispersed juveniles. Fledged juvenile Whio in the Te Urewera National Park have been found to travel up to 20 km from the area where they were born; the greatest distance travelled has been 86 km by a fledgling in Wangapeka Kahurangi National Park. The results of previous studies, and these preliminary results, indicate the mortality of fledglings entering untreated areas is very high. What this research will define is the demographic needs of a Whio population and their spatial use of the habitats so we can better understand how to protect them, and over what area.

The Managanui-o-te-Ao/Retaruke, one of our eight priority security sites provides a glowing example of what can be achieved with community involvement and the cooperative support of the local authorities and private landowners. Here, predator control has been greatly increased as a consequence of sponsorship funding, community participation, and the involvement of the local tribe of New Zealand's indigenous people. It is through these relationships and the sharing of common goals, that Whio protection can be achieved on a wide scale.

Whio are recognised as icons of New Zealand rivers and have come to serve as ambassadors for the water quality, health, and completeness of the waterways of New Zealand. They reflect how well we have maintained the quality of these habitats. The answer to the recovery of Whio is simple: control stoats to low levels across their habitats and maintain high water quality, and recovery will occur.

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# Campbell Island Teal: Has re-establishment been achieved?

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*Keywords: abundance, Anas nesiotis, Campbell Island Teal, captive breeding, distribution, New Zealand , re-establishment*

Campbell Island Teal (Murray Williams)

Three releases of Campbell Island Teal *Anas nesiotis* were made during 2004–2006 onto the species' sole sub-antarctic island home. In all, 150 birds directly and indirectly sourced from a protracted captive breeding programme (see *TWSG News* 9,12 & 15) were set free at one of four coastal sites similar to those which, on nearby sub-antarctic Auckland Island, are exploited by its endemic flightless duck the Auckland Island Teal *Anas aucklandica*.

Prior trial releases of 24 captive-raised teal onto a rat-free southern New Zealand island (Codfish Island) were stunningly successful. All birds survived their first year after release and the population expanded so rapidly that within four years 50 birds were cropped for direct transfer to Campbell Island. Thus, releases of both captive and wild-raised teal onto Campbell Island were made with a high expectation of success following the removal of all mammals from the island in 2001.

Campbell Island is remote. Being approximately 600 km south of New Zealand, transport to or from the island is both problematic and hideously expensive, and this has hindered monitoring of the 2004–2006 teal releases. Brief attempts to monitor the initial radio-tagged birds in February 2005, seven months after their liberation, indicated 70% were then alive but produced no evidence of breeding. A similarly-timed short visit in 2006 recorded a minimum of 60% of the new cohort of releases to be alive. Two nesting attempts were detected but few of the 2004 birds were encountered. The third release, in late 2006, was not monitored.

The former captive breeding stock still runs free on Codfish Island and some are regularly seen. No attempt has been made to census this population, however. On Campbell Island, an occasional brood of ducklings were observed in 2006 and 2007 near the island's base camp but the teal's distribution and abundance beyond that remained unknown.

In late November 2008, a team of six staff from the Department of Conservation at Victoria University, New Zealand, spent seven weeks on Campbell Island to determine teal distribution and abundance. Their visit coincided with the teal's likely nesting time and the territorial males were expected to respond vigorously to broadcast calls of both males and females. In addition the team had two dogs experienced at working with the related Brown Teal *A. chlorotis* in northern New Zealand. The results of this survey would determine whether further releases onto Campbell Island were required, either through a renewal of the captive breeding programme or from birds cropped directly from Codfish Island.

The 2008 expedition obtained 133 encounters with teal at 115 locations and this was interpreted to represent 102 different individuals. Fifty were seen well enough to determine that 23 (46%) of them carried rings identifying them as released birds; the remainder were assumed to have been bred on the island. Five active nests and one deserted nest were also found. The birds were encountered along sheltered coastlines and in close association with most of the island's watercourses.

The Department of Conservation considered the expedition's findings were sufficient to declare re-establishment of Campbell Island Teal had been achieved. There are no plans for further follow-up monitoring but sightings of teal by summer tourists to the island will be used as an indicator of progress.

So…job done? Perhaps, but there is another conservation conundrum looming on the horizon. The captive breeding programme had a most slender genetic base; although seven wild-caught males contributed to the captive programme, all birds released onto Campbell Island are descended from just one female. None of three other females originally taken into captivity laid. A genetic appraisal

of nine founders in 1996, using mini-satellite DNA fingerprinting, showed them to share 82% (yes, 82%) of fingerprint bands. Most likely the tiny Dent Island remnant population from which they were extracted was itself founded by very few birds and had been without immigrants since rats reached Campbell Island and exterminated teal there almost 200 years ago.

The importance of genetic diversity within newly-established populations is being reinforced by many contemporary studies. However, for Campbell Island Teal there is no new diversity available: the Dent Island remnant is all there is. But perhaps not! Nearby Auckland Island teal are close relatives and descended from the same 'brown teal' forbears. They are similarly small, similarly flightless, display similar behaviour, and exhibit a similar ecology. Deliberate release of a few Auckland Island teal onto Campbell Island may offer a route for 'repair' should consequences of genetic impoverishment become apparent amongst the Campbell Island Teal. A dangerous...or a sensible...idea?

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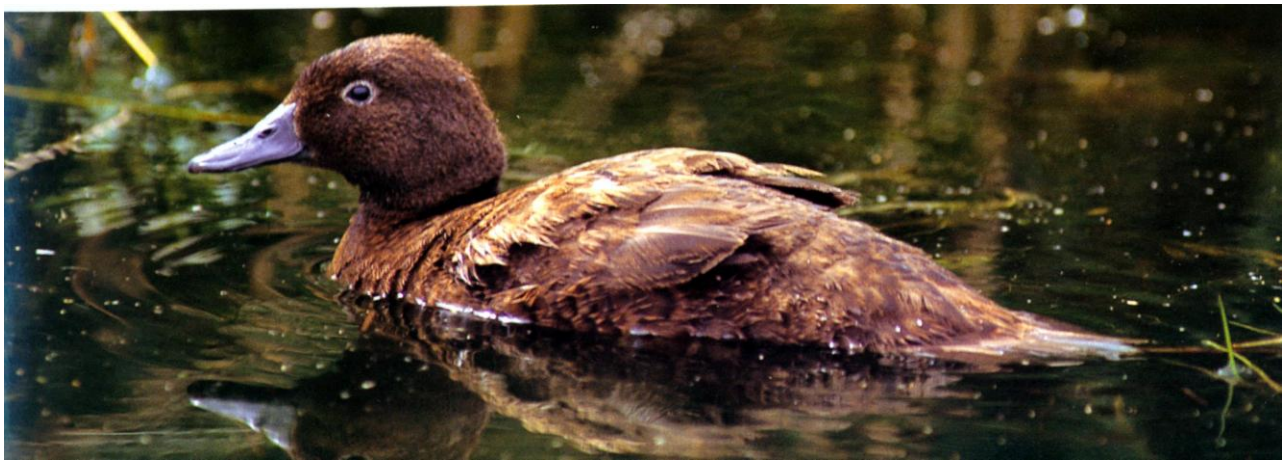

Campbell Island Teal (Murray Williams)

# Brown Teal captive breeding comes under genetic scrutiny

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*Keywords: Anas chlorotis, Brown Teal, captive breeding, DNA, genetic diversity, reinroduction New Zealand*

Brown Teal (Murray Williams)

Using captive facilities to provide waterfowl for the establishment of new populations or to supplement faltering ones is a widespread conservation approach. Past challenges to ensure that those released survived their initial joy of freedom have been largely overcome by learning from the collective outcomes of well-documented releases. Attention is now shifting to ensuring long-term persistence, and especially to the genetic diversity with which these new populations have been provided. Recent studies by Fraser (2008) and Munoz-Fuentes *et al* (2008) are timely reminders of the need for genetic diversity within captive stocks to be constantly appraised.

New Zealand's Brown Teal *Anas chlorotis* captive breeding programme, involving numerous private waterfowl breeders, has been remarkably successful at producing birds for release - approximately 2000 birds over 30 years - derived from only 76 birds extracted during that time from Great Barrier Island, the larger of the two remaining wild populations.

Brown Teal conservation is entirely dependent on captive propagation (see articles in *TWSG News* 5, 10 & 15) and, despite numerous annual releases, it is only in the last decade that five populations have been created, one on the mainland, three on tiny islands, and one in a fenced sanctuary. In the early 1990s, one wild population (Northland) was supplemented by several releases of captive raised birds.

Genetic diversity within the two wild populations, the present captive population, and in four of the created populations, has recently been appraised by Victoria University (Wellington) masters student Gemma Bowker-Wright. Using freshly-plucked feathers as her raw material, Gemma amplified DNA from the skin clinging to the feather bases. She then evaluated mitochondrial control region haplotype diversity and amplified four microsatellite loci (only two were polymorphic) to identify allele frequencies and heterozygosity.

Mitochondrial control region haplotype diversity results were striking (Table 1). Only two haplotypes were detected within the Great Barrier Island population, one at very low frequency. This is consistent with historic literature indicating teal were very rare on the island about 100 years ago. The Great Barrier population is the sole source of all captive stock and the rarer haplotype is not present in the captive population or in any of the four new populations sampled. Greater diversity (11 haplotypes) remains in Northland, but the most common is that introduced from Great Barrier Island as a consequence of historic captive-sourced supplementations.

Table 1. Mitochondrial DNA haplotype diversity within wild, captive and created populations of Brown Teal.

| | **Populations (estimated size)** | | | |
|---|---|---|---|---|
| | **Northland (300)** | **Great Barrier Island (600)** | **Captive (76)** | **Created (1x 220, 3 x 20)** |
| Sample (*N*) | 51 | 35 | 20 | 38 |
| Number of haplotypes | 11 | 2 | 1 | 1 |
| 1$^{ry}$ haplotype | 33% | 98% | 100% | 100% |
| 2$^{ry}$ haplotype | 32% | 2% | 0% | 0% |
| 3$^{ry}$ haplotype | 11% | 0% | 0% | 0% |

Table 2. Allelic diversity and richness at two polymorphic loci in wild, captive and created Brown Teal populations.

| Population | *N* | Number of alleles at locus 1 | Number of alleles at locus 2 | Allelic richness |
|---|---|---|---|---|
| Northland (wild) | 36 | 8 | 13 | 4.4 |
| Great Barrier Island (wild) | 30 | 7 | 10 | 4.24 |
| Captive | 34 | 7 | 7 | 4.1 |
| Moehau (created) | 25 | 4 | 7 | 3.3 |
| Karori (created) | 12 | 5 | 5 | 3.4 |
| Tiritiri (created) | 8 | 2 | 3 | 2.4 |
| Mana (created) | 3 | 1 | 1 | 1.0 |

At the two polymorphic microsatellite loci, allelic diversity was greatest in Northland, the captive population retained most of the diversity detected from Great Barrier Island, but the new populations were significantly depleted (Table 2). Despite multiple releases at Moehau, the largest of the established populations, the full allelic diversity detected within the captive population appears not to have been transferred.

These data provide cause to reconsider the composition of the Brown Teal captive population, and its management. Presently, it grossly under-represents the slender genetic diversity remaining among wild Brown Teal simply because it has been sourced from one, not both, of the wild populations. Additionally, they provide a clear demonstration of how, despite best intentions, single or even multiple sampling of the captive population for releases can fail to ensure that releases encapsulate the full genetic variation available. Two new populations arose from single releases and the other two had two and three releases, yet none presently reflects the captive population's allelic diversity.

There is also one further salutary lesson, the wisdom of undertaking supplementation ahead of evaluating all of its likely consequences. Approximately 15 years after supplementation of the Northland population ceased, birds bearing the unmistakable marker of the Great Barrier Island maternal lineage now comprise approximately one-third of the population. Is genetic diversity within this, presently the most diverse of the two wild populations, slowly being compromised?

These genetic appraisals are concentrated on neutral genetic markers, those considered not to be under active selection. There is a widely-held assumption that loss of neutral variation also indicates losses across the genome, including genes under active selection like those associated with the immune system. One such system, widely studied, is MHC. Is a sufficiently high level of MHC diversity being maintained despite the bottleneck which the captive breeding and release programme appears to be introducing? Understanding this for Brown Teal, and the many other waterfowl species whose conservation is supported by captive breeding, seems to be an important step toward ensuring that newly-established populations will persist.

Full results of Gemma's research can be found in Bowker-Wright *et al* (2012).

## References

Bowker-Wright, GM, BD Bell, PA Ritchie & M Williams. 2012. Captive breeding and release diminishes genetic diversity in Brown Teal *Anas chlorotis*, an endangered New Zealand Duck. *Wildfowl* 62: 176–189.

Fraser, DJ. 2008. How well can captive breeding programmes conserve biodiversity? A review of salmonids. *Evolutionary applications* 1: 535–586.

Munoz-Fuentes, V, AJ Green, & MD Sorenson. 2008. Comparing the genetics of wild and captive populations of White-headed Ducks *Oxyura leucocephala*: consequences for recovery programmes. *Ibis* 150: 807–815.

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# Artificial nest sites for Scaly-sided Merganser – a way to breeding habitat restoration

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***Summary*** – Habitat degradation due to deforestation of riverine forest could be compensated with artificial nest sites for cavity-nesting ducks. Occupation of artificial sites by Scaly-sided Merganser *Mergus squamatus* differed significantly between logged and un-logged rivers. This paper details construction of nest tubes for Scaly-sided Merganser, rates of destruction for nest-boxes and nest-tubes, and recommendations for artificial nest maintenance. Two types of artificial nests (tubes and boxes) are of equal attractiveness to Scaly-sided Mergansers: occupation of tubes (13.0%) did not differ from boxes (12.5%). A significant difference in occupation by Scaly-sided Merganser was found for the first versus third, fourth and sixth years of artificial site existence; second and fifth years did not differ significantly from the first year.

*Keywords: Mergus squamatus, nest-boxes, nest-tubes, Russia, Scaly-sided Merganser*

## Introduction

Scaly-sided Mergansers breed in southeast Russia, North Korea and northeast China. Most of the world population (over 95%) breeds in Russia. Some birds winter on rivers in south-east Russia, but most winter in central and southern China. Small numbers also winter in Japan, South Korea and Taiwan, and there are a few records from Myanmar, Thailand and northern Vietnam (BirdLife International 2001). Scaly-sided Merganser is listed as Endangered by IUCN and as 'rare' in Red Data Book of Russian Federation and the first-ranked category in the List of Protected Wildlife of National Importance in China. Scaly-sided Mergansers breed along rivers with old growth riverine forest, mainly within the temperate conifer-broadleaf forest zone. Old-growth forest provides this hole-nesting duck with an abundance of potential nest-sites, particularly in older, rotting trees (Kolomiytsev 1992, Zhao *et al* 1995).

First attempts to attract Scaly-sided Mergansers to artificial nests were made in 1962 in the Lazovskiy State Reserve, Kievka River, Primorye, when 20 nest-boxes were erected along the river for Mandarin Duck *Aix galericulata* (Polivanov 1981). Nest-boxes were occupied by Mandarin Duck but no case of occupation by Scaly-sided Merganser was reported. At that time (early and mid 1960s) the Scaly-sided Merganser was rare in the Kievka basin and its breeding there was not proven (Litvinenko & Shibaev 1971). No population estimates are available for that period, but it seems that there were less than five pairs nesting in Kievka basin in the 1960s. Nikolay Kolomiytsev (1986, 1992) started an artificial nest programme to address Scaly-sided Merganser recovery at the Kievka River in 1981 and mergansers started to occupy nest-boxes 3–4 years after their placement. This programme lasted until 1988, however some of the boxes may have continued to be used after the programme finished. Numbers of Scaly-sided Merganser reached 11–17 pairs in Kievka basin in 1981–1988 (Kolomiytsev 1992). Kolomiytsev (1986) suggested a special type of artificial nest for Scaly-sided Merganser, a nest-tube: his tube was a 90 cm long hexagonal wooden barrel, open in the top. Kolomiytsev reported this type of nest site was preferable to Scaly-sided Merganser. Our artificial nests programme started in 2000 on several rivers in Primorye, including the Kievka basin. Between 55–80 pairs of mergansers were found in the Kievka basin in 2000–2008, a pronounced increase in numbers since the 1980s and even more since the 1960s. Here we present the first results of the artificial nest programme for Scaly-sided Merganser in the Primorye including:

- improved construction of nest-tube and recommendations for nest site maintenance;
- rate of artificial nest destruction;
- occupation of artificial nest sites depending on logging history;
- comparison of tubes versus boxes;
- artificial nest site occupation over time.

## Methods

### Artificial-nest construction

Following recommendations by Kolomiytsev (1986) we selected tubes as priority artificial nest-sites for Scaly-sided Merganser. The first series of seven tubes was made by gouging from an 80 cm long broadleaf log, which was both time and labour consuming. The later series of tubes were easier to build; each had an eight-sided bottom 50 mm thick and walls made of coniferous slab (Figure 1). The tube was 85 cm in length and the internal cavity was 27–29 cm in diameter. In 2001 the walls were fixed with metal nails and wire was used on top of the tube. In 2004 we used screws and a metal strip for fixing the walls (Figure 1). Tubes were attached to branches at an angle of 30–90° to horizontal. The branch was cut flush to the tube entrance.

Nest-boxes were erected in 2003 in order to investigate whether the tube was a favoured nest site of Scaly-sided Merganser. Nest-boxes had a base of 300 x 350 mm and length of 600 mm with an oval entrance of 80 x 120 mm. Boxes were made from wooden boards and painted.

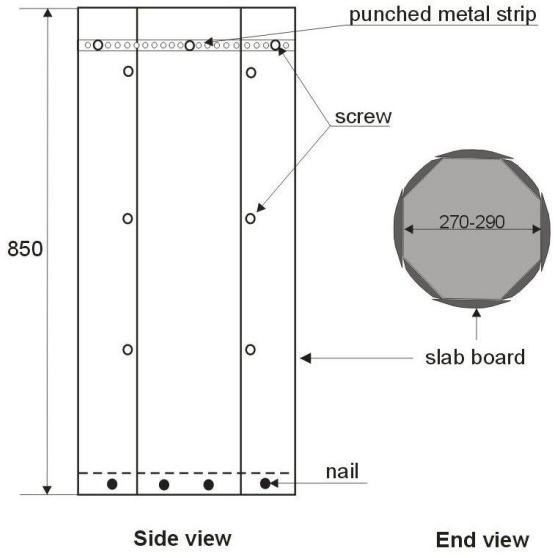


Figure 1. Construction of nest-tube for Scaly-sided Merganser. Sizes and fastening elements are indicated.

### Study area

In the Primorye, Scaly-sided Mergansers inhabit clean mountain rivers of both the eastern and western slopes of the Sikhote-Alin' Range. Typical riverine forest was conifer-broadleaf with predominance of poplar *Populus maximowiczii*, elm *Ulmus propinqua*, black pine *Pinus koraiensis*, lime *Tilia amurensis* and *T. mandshurica* and Mongolian oak *Quercus dentate.* After intensive deforestation which started 150 years ago and lasted until the 1980s, river valleys represent a mixture of fields, remains of native forest and pieces of young forest. An additional source of forest degradation is the regular forest fires following burning of grass in fields. Only tolerant Mongolian oak can survive the fires and thus field vicinities are often covered with oaks.

### Artificial nest programme area

The artificial nest programme was undertaken on the rivers Avvakumovka (with tributaries Mineral'naya and Vasilkovka), Iman (with tributaries Berezovaya and Krasnaya), Kievka (with tributaries Lazovka and Krivaya), Margaritovka and Pavlovka (Figure 2). A total of 148 artificial nests were placed in 2000–2004 (Table 1). We distinguished between rivers with logged forest on their banks (later logged rivers) and rivers with untouched or almost untouched old-growth forest on their banks (un-logged rivers). Sometimes a part of a river was considered as logged and a part as un-logged, *eg* on the Pavlovka River where the upper reaches contain old-growth riverine forest while the lower reaches are agricultural lands. Seven nest-tubes were erected in spring 2000 and 49 tubes in spring 2001. In spring 2003, 30 nest-boxes were placed in close proximity (within 200 m) to 30 of the 2001 nest-tubes. Taking into account the breeding density of Scaly-sided Merganser (a mean of one pair per 2 km of river) each pair received a choice between a tube and box (Shokhrin & Solovieva 2002). In autumn 2004 we erected 61 more tubes.

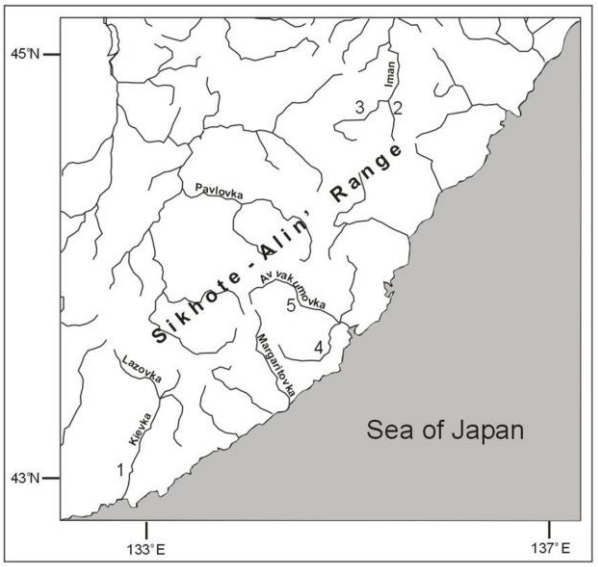


Figure 2. Map of study area in Primorye. Rivers with artificial nests are indicated on the map, with their tributaries numbered as follows: 1–Krivaya R; 2–Krasnaya R; 3–Berezovaya R; 4–Vasilkovka R; 5–Mineral'naya R.

### Nest site checking

Artificial nests were checked in early to mid- May, 2000–2008. Nest sites on logged rivers, on the Mineral'naya River and on un-logged parts of Margaritovka and Pavlovka Rivers were checked annually except in 2002, while other un-logged rivers were checked irregularly. Twenty nests on the Iman River catchment were checked once in 2001 and not used in analyses. Indicators of occupation, *eg* down

Table 1. Number of artificial nests (tubes and boxes) for Scaly-sided Merganser placed in 2000–2004 on logged and un-logged rivers of the Primorye.

| Nest site type | Nest-tubes | | Nest -boxes | | Total |
|---|---|---|---|---|---|
| | 2000 | 2001 | 2004 | 2003 | |
| **Logged rivers or river parts** | | | | | |
| Avvakumovka | 0 | 10 | no | 10 | 20 |
| Kievka | 0 | 10 | 16 | 11 | 37 |
| Krivaya | 0 | 0 | 6 | 0 | 6 |
| Lazovka | 0 | 1 | 1 | 2 | 4 |
| Margaritovka | 0 | 1 | no | 1 | 2 |
| Pavlovka | 0 | 0 | 10 | 0 | 10 |
| **Total** | **0** | **22** | **33** | **24** | **79** |
| **Un-logged rivers or river parts** | | | | | |
| Berezovaya | 0 | 2 | 0 | 0 | 2 |
| Iman | 6 | 13 | 0 | 0 | 19 |
| Krasnaya | 1 | 4 | 0 | 0 | 5 |
| Margaritovka | 0 | 5 | 5 | 5 | 15 |
| Mineral'naya | 0 | 3 | 0 | 2 | 5 |
| Pavlovka | 0 | 0 | 10 | 0 | 10 |
| Vasilkovka | 0 | 0 | 13 | 0 | 13 |
| **Total** | **7** | **27** | **28** | **7** | **69** |

and feathers, egg-shells, vegetation, droppings and remains of insect nests, were collected and identified during the checking. Nesting of Scaly-sided Merganser occurred from late-March to late-June and was variable among females. Occupation of an artificial nest site was documented if we found (1) a live clutch of this species (laying or incubating stage); (2) dumped egg of this species; (3) abandoned or depredated clutch of this species; (4) occupation in year *n* was reported if full downy lining and egg-shell pieces were found in the year *n*+1. There were three cavity-nesting duck species breeding in the study area: Scaly-sided Merganser, Mandarin Duck and Mallard *Anas platyrhynchos* and a collection of lining (down and small feathers) for each species was made. This collection was used for distinguishing duck species when the nest was first inspected in the year after the breeding year.

Different animals sometimes used artificial nests for reproducing and wintering. We distinguished between spring occupations (mid-March to late-June) when Scaly-sided Merganser use nest-sites, summer occupations (July and August) after Scaly-sided Merganser breeding, and winter occupations (November to mid-March). Each seasonal occupation was considered as a separate event when calculating the occupation rate. A nest site was considered unavailable for duck nesting during a season if there was either a winter nest of Red Squirrel *Sciurus vulgaris* or Flying Squirrel *Pteromys volans*, or a hornet *Vespa* sp nest from the previous summer, found during the checking.
We always cleaned the tubes and boxes by removing winter and summer nests. However, cleaning occurred in May, which was too late for occupation by nesting ducks. From 2006, we cleaned artificial nests on Kievka, Lazovka and Krivaya rivers prior to Scaly-sided Merganser nesting in late March, thereby increasing site availability on these rivers. Numbers of nest sites available for ducks at the beginning of a nesting season varied between years as spring occupation of nest sites by breeding owls, falcons, squirrels, and ants also made sites unavailable for ducks. Unavailable sites were excluded from the analyses of occupation rates by Scaly-sided Merganser.

## Results

**Artificial nest destruction**
Artificial nests (n=128) disappeared due to (1) destruction by people (4.7%); (2) drying or falling of the tree or branch (10.2%); and (3) destruction with age and by woodpeckers. In the last case, the coniferous slab was found to be attractive for beetle larvae and thus for woodpeckers that destroyed nest-site walls. Boxes were usable for five years while the oldest tubes worked for seven years. There is no difference in survival of boxes and tubes during their first five years but rapid destruction of tubes started in the sixth year and <40% of tubes survived to their seventh year (Figure 3). Poplar and willow were the least firm trees; all cases of unexplained falling of a tree to which an artificial nest site was attached occurred in poplars and willows. Explainable cases were linked to the typhoon of late August 2006 which changed river-beds and during which all species of trees fell.

**Effect of deforestation**

Artificial nests improved the breeding habitats of Scaly-sided Merganser and other animals. Occupation of artificial sites by mergansers was significantly higher in logged than un-logged rivers (t-test, t = 4.08, df 97, $p<0.01$). Besides Scaly-sided Merganser several other animals were found to use artificial nests (Table 2). We estimated a deficit of cavities on logged rivers versus un-logged rivers by comparing the use of artificial nests by all cavity users. Site occupation was significantly higher in logged than un-logged rivers (t-test, t =6.70, df 29, $p<0.01$). Occupation rate is the number of nest sites occupied by a given user divided by the number of nest-sites available in the season.

**Effect of artificial nest type**

Since the occupation rate on logged rivers was found to be eight times higher that on un-logged rivers we used only artificial sites situated on logged rivers for estimation of nest type effect. From the experiment, when 30 nest-boxes were placed close to 30 nest-tubes, we used only 22 tube/box pairs situated on logged rivers. Scaly-sided Merganser occupied 13% of the tubes and 12.5% of the boxes.

**Effect of nest site age**

Occupation of artificial nests (boxes and tubes combined, only logged rivers) varied with nest site age (Figure 4). Occupation in the first year was lower than in subsequent years. However, a significant difference was found for the first versus third (t-test, t = 2.97 df 84 $p<0.05$), fourth (t-test, t = 2.56 df 65 $p<0.05$), and sixth years (t-test, t = 2.63 df 41 $p<0.05$); second and fifth years did not differ significantly from the first year.

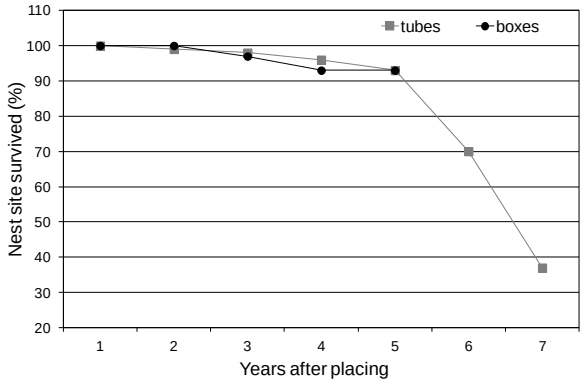


Figure 3. Survival rate of nest-tubes and nest-boxes after years of placement.

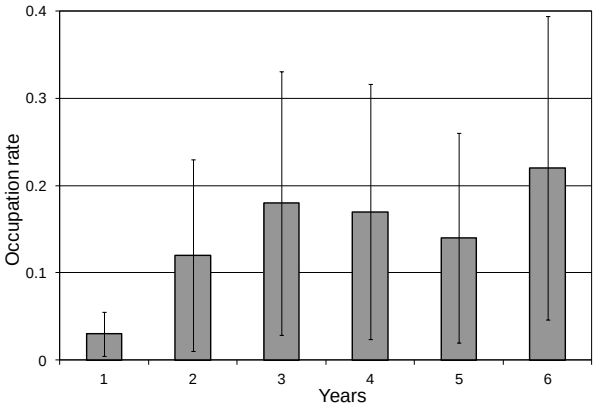


Figure 4. Occupation of artificial nests by Scaly-sided Merganser depending on year of nest site existence (mean occupation rate, with standard deviation).

Table 3. Animal species using artificial nests sites in Primorye, 2000–2008.

| Species | Spring | Summer | Winter |
|---|---|---|---|
| ***Insects*** | | | |
| Ant *Leometopus orientalis* or *Componotus* sp. | + | + | |
| Hornet *Vespa* sp. | | + | |
| Wasp *Vespula* sp. and *Dolichovespula* sp. | | + | |
| ***Birds*** | | | |
| Mallard *Anas platyrhynchos* | + | | |
| Mandarin Duck *Aix galericulata* | + | | |
| Common Kestrel *Falco tinnunculus* | + | | |
| Ural Owl *Strix uralensis* | + | | + |
| Long-eared Owl *Asio otus* | + | | |
| Eastern Tit *Parus minor* | + | | |
| ***Mammals*** | | | |
| Red squirrel *Sciurus vulgaris* | + | | + |
| Flying squirrel *Pteromys volans* | + | | + |

## Discussion

The idea that nest-tubes are more attractive for Scaly-sided Merganser than nest-boxes was not proven during this study. Tubes seemed to be shorter-lived than boxes, although no difference was found due to the short period of observation. Additionally, a tube requires more labour during installation because of the need to locate a tree with a suitable branch (angle, orientation, height). However, we found that Scaly-sided Merganser nest success was twice as high in tubes versus boxes, mainly due to nest abandonment by the female, and competition for tubes was lower than for boxes. Further experiments with nest-boxes of other sizes and of improved construction are required to determine the most suitable artificial nest structure for Scaly-sided Merganser.

There was previous doubt that deforestation affected breeding of Scaly-sided Merganser and our study provided reliable comparisons of logged and un-logged habitats for the first time. Artificial nest site occupation by Scaly-sided Mergansers was eight times higher on logged than unlogged rivers and four times higher for other species. At this point we are completing our experiment with artificial nests on un-logged rivers.

Scaly-sided Mergansers were found to avoid newly erected artificial nests. Ringing of nesting females showed that a female was familiar with several nest-sites, including artificial ones, along at least 3–5 km of the river. An adaptation period seems to be required for a female to occupy a new site. No significant increase in occupation occurred two years after the artificial nest site was in place.

## Conclusions and recommendations

Habitat degradation via logging of riverine forest could be improved by the installation of artificial nest sites for cavity-nesting ducks. We recommend the construction and placement of nest-tubes for Scaly-sided Merganser, although boxes are also suitable for this species. We recommend not using poplars and willows as host trees. Maintenance of artificial nest sites should include annual cleaning of sites from winter nests of squirrels and from summer hornet nests. It is better to clean and renew nest-sites in February to early March prior to arrival and nesting onset in Scaly-sided Merganser.

## Acknowledgements

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## References

BirdLife International. 2001. Scaly-sided Merganser. *Threatened birds of Asia: the BirdLife International Red Data Book*. BirdLife International, Cambridge, UK.

Kolomiitsev, NP. 1986. Factors limiting the number of Scaly-sided Merganser, and recommendations to this species conservation. In: Research into the birds of the USSR, their conservation and rational use*: Proceedings 1st Congress of the All-Union Ornithological Society and 9th All-Union Ornithologicial Conference, Leningrad, part 1.* (in Russian)

Kolomiitsev, NP. 1992. On biology of Scaly-sided Merganser in the Kievka-River basin (Southern Prymorye).Pp 68–83 in Sokolov, V.E. (ed.). *Ornitologicheskie issledovaniya v zapovednikakh*. Nauka, Moscow. (in Russian)

Litvinenko, NM & YV Shibaev. 1971. The bird fauna of the Sudzukhe State Reserve and the Sudzukhe River valley. Pp. 127-186 in Polivanov, V.M. (ed). *The ecology and bird fauna of the south of the Far East of the USSR*. Far East Science Centre, USSR Academy of Sciences, Vladivostok. Proc. Kedrovaya pad State Reserve, 1971 (2). (in Russian)

Polivanov, VM. 1981. *Ecology of hollow nesting birds of the Primorye*. Moscow. 172 pp. (in Russian)

Shokhrin, V & D Solovieva. 2002. Scaly-Sided Merganser breeding population increase in Far East Russia. *TWSG News* 14: 43–51.

Zhao Z, X Han, S Zhang & J Wu. 1995. Breeding ecology of the Chinese Merganser in the Changbai Mountains, China. *Journal of Field Ornithology* 66: 54–59.

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# Non-breeding season surveys for Scaly-sided Mergansers in Anhui, Fujian, Guangdong and Jiangxi provinces, China

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*Keywords: China, Mergus squamatus, non-breeding, Scaly-sided Merganser, survey*

## Introduction

The Scaly-sided Merganser *Mergus squamatus* is globally threatened, listed as Endangered by IUCN, with an estimated population of 1000–2500 birds (Wetlands International 2006). It is undergoing a continuing and rapid decline as a result of habitat loss, illegal hunting and disturbance (BirdLife International 2008). Although most mergansers are believed to spend the non-breeding season in central and southern China, only a relatively small proportion of the population has been located in this region (He *et al* 2002, He *et al* 2006; see Table 1 on page 37 for recent sightings).

## Study site

In early February 2006, and January and February 2008 we surveyed Scaly-sided Mergansers in southern Anhui, northeastern and southern Jiangxi, eastern Guangdong and northwestern Fujian (Figure 1), covering a total river length of *c* 1000 km and visiting 11 reservoirs.

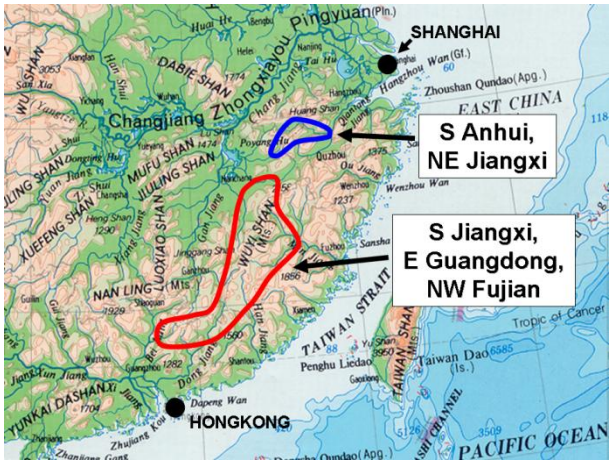


Figure 1. General location of the survey areas in southeastern China; the 2004 survey boundary is shown in blue and the 2006 survey boundary in red.

## Results

We located 71 Scaly-sided Mergansers at five different sites during the two surveys. The maximum flock size encountered was 25. Mergansers were only found in Jiangxi rivers, although these represented just 30% of the total river length surveyed in the four provinces. Mergansers appear to be mainly confined to a relatively small area in eastern Jiangxi. Despite the extensive survey we only found two new sites; our sightings elsewhere were in locations at which mergansers had been recorded previously.

Scaly-sided Merganser (Peiqi Liu)

A variety of rivers of varying widths and habitats were surveyed. Some were fast flowing, many had sand banks and a few had emergent rocks. Only 1489 waterbirds were counted along rivers, indicating that these habitats were generally unsuitable for birds, probably due to low productivity. Virtually all rivers were heavily disturbed. Dams were frequently encountered on rivers, the smaller dams acting as reservoirs whilst most of the larger ones were associated with hydro-electric power stations. The main impact of the dams was to reduce the length of free flowing water due to the formation of an upstream pool.

## Discussion

The majority of reservoirs in the region visited were in hilly and mountainous areas. We attribute the absence of mergansers, and waterbirds in general, to the lack of suitable habitat in reservoirs due to steep shores and deep water.

The habitats used by mergansers in China appeared to differ from those used in North and South Korea; the rivers were generally wider and some flowed more slowly. Our observations confirmed previous comments about the extreme wariness of the species. As most Chinese rivers suffer greatly from various

forms of disturbance, this may explain why we encountered relatively few birds and indicates that future surveys should focus on searching undisturbed, free-flowing rivers. This suggestion is upported by the results of comprehensive surveys of wetlands throughout the Yangtze floodplain in the 2003/04 and 2004/05 winters, when the only Scaly-sided Mergansers located were those listed in Table 1 on page 37 (Barter *et al* 2004, Barter *et al* 2006).

It is concluded that:

1. the core merganser wintering region appears to be in eastern Jiangxi and birds seem to be site faithful.
2. rivers throughout the survey region are generally heavily disturbed and suffer greatly from modified flows, and support few waterbirds.
3. reservoirs in hilly/mountainous regions seem unsuitable for mergansers and other waterbirds; and the common habitat features of the merganser sites were flowing rivers with clear water and low disturbance levels.

## References


Bai, QQ. 2008. The finding of wintering Chinese Merganser in Dandong, Liaoning. China *Crane News* 12: 33–34.

Barter, M, L Chen, L Cao & G Lei. 2004. *Waterbird Survey of the Middle and Lower Yangtze River Floodplain in Late January and Early February 2004*. China Forestry Publishing House, Beijing, China.

Barter, M, G Lei & L Cao. 2006. *Waterbird Survey of the Middle and Lower Yangtze River Floodplain (February 2005)*. China Forest Bureau Publishing Company, Beijing.

BirdLife International 2008. Species factsheet: *Mergus squamatus*. Downloaded from http://www.birdlife.org on 20/4/2008.

Cao, L & M Barter. 2006. *Scaly-sided Merganser survey in south Anhui and north-east Jiangxi Provinces.* Unpublished Report. University of Science and Technology of China, Hefei, China.

China Birdwatch. 2007. *Report on sighting of six Scaly-sided Mergansers, April 2007*. pp23.

China Ornithological Society. 2004. *China Bird Report 2003*. China Ornithological Society, Beijing, China.

He, FQ, D Melville, XJ Gui, YH Hong & ZY Liu. 2002. Status of the Scaly-sided Merganser in Mainland China in the 1990s. *Waterbirds* 25: 462–464.

He, FQ, JS Lin, B Yang, HD Jiang & HF Cheung. 2006. Current distribution and status of the wintering Scaly-sided *Merganser Mergus squamatus* in China. *Chinese Journal of Zoology* 41: 52–56.

Solovieva, D. 2007. *Survey and conservation of Scaly-sided Merganser* (Mergus squamatus) *in Russia.* Unpublished Report to Wildfowl & Wetlands Trust, Slimbridge, UK.

Wetlands International 2006. *Waterbird Population Estimates – Fourth Edition.* Wetlands International, Wageningen, The Netherlands.

Yu, CH, ZY Sun & ZR Wang. 2008. Winter distribution of Chinese Merganser in Jiangxi. China *Crane News* 12: 35–36.


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The population estimate for Scaly-sided Merganser is now estimated at 4,660 individuals (Solovyeva, DV, A Peiqiliu, AI Antonov, AA Averin, VV Pronkevich, VP Shokhrin, SL Vartanyan & PA Cranswick. 2013. The population size and breeding range of the Scaly-sided Merganser *Mergus squamatus*. *Birdlife Conservation International* 0: 1–13.)

Table 1. Recent records of Scaly-sided Mergansers in China during the non-breeding season, 2003/04 and 2004/05 (* indicates that approximate coordinates are presented in the table).

| Site | Province | Date | Number of birds | Longitude | Latitude | Reference |
|---|---|---|---|---|---|---|
| An Le He | Jiangxi | Feb 2004 | 6 | 117.7219 | 29.0708 | Barter *et al* 2004. |
| An Le He | Jiangxi | Feb 2006 | 6 | 117.7853 | 29.0906 | Cao & Barter 2006. |
| An Le He, S of Wuyuan | Jiangxi | Dec 2004 | 60 | 117.8400 | 29.1672 | He *et al* 2006. |
| An Le He, S of Wuyuan | Jiangxi | Feb 2005 | 33 | 117.8400 | 29.1672 | Barter *et al* 2006. |
| An Le He, S of Wuyuan | Jiangxi | Feb 2006 | 25 | 117.8400 | 29.1672 | Cao & Barter 2006. |
| Dexing* | Jiangxi | Jan 2007 | 1 | 117.8400 | 29.0800 | www.moobol.com/ms/85/live8597.shtml |
| Ta He* | Jiangxi | Nov 2007 | 100 | 117.0300 | 28.2500 | blog.soogou.net/html/00/n-8200.html |
| Ta He* | Jiangxi | Jan 2008 | 53 | 117.0300 | 28.2500 | place.jxwmw.cn/system/2008/01/04/010023787.shtml |
| Yiyang, Xin Jiang | Jiangxi | Nov 2003 | 31 | 117.3481 | 28.3753 | China Ornithological Society 2004. |
| Yiyang, Xin Jiang | Jiangxi | Jan 2004 | 58 | 117.3481 | 28.3753 | He *et al* 2006. |
| Yiyang, Xin Jiang | Jiangxi | Feb 2004 | 25 | 117.3481 | 28.3753 | Barter *et al* 2004. |
| Yiyang, Xin Jiang | Jiangxi | Dec 2004 | 39 | 117.3481 | 28.3753 | He *et al* 2006. |
| Yiyang, Xin Jiang | Jiangxi | Feb 2005 | 11 | 117.3481 | 28.3753 | Barter *et al* 2006. |
| Yiyang, Xin Jiang | Jiangxi | Dec 2005 | 34 | 117.3481 | 28.3753 | He *et al* 2006. |
| Guixi, Xin Jiang* | Jiangxi | Mar 2006 | 15 | 117.1900 | 28.2900 | He *et al* 2006. |
| Dongting Lake* | Hunan | Nov 2006-Mar 2007 | 1 | 112.9500 | 29.3000 | Solovieva 2007. |
| Huangshi Reservoir* | Hunan | Mar 2008 | 1 | 111.3700 | 29.0800 | hn.rednet.cn/c/2008/03/19/1464473.htm |
| Conghua* | Guangdong | Jan 2006 | 1 | 113.7800 | 23.7600 | He *et al* 2006. |
| Feng Shu Ba Reservoir* | Guangdong | Nov 2006-Mar 2007 | 1 | 115.3833 | 24.4667 | Solovieva 2007. |
| Lifang* | Fujian | Feb. 2007 | 6 | 117.4519 | 27.4033 | China Birdwatch 2007. |
| Lu Xi He | Jiangxi | Winter 2007 | 88 | 115.3000 | 28.8500 | Yu *et al*. 2008. |
| Yalu Jiang | Liaoning | Winter 2007 | 1,2 | 124.7333 | 40.3500 | Bai 2008. |

Additional records: 60 on An Le He during 40 km survey in December 2004; highest count of 41 on An Le He in 2005/06 winter (He *et al* 2006).

# Real stories of poaching of the Scaly-sided Merganser

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*Keywords: gill-net, Mergus squamatus, poaching, Russia, Scaly-sided Merganser*

## Introduction

The Scaly-sided Merganser *Mergus squamatus* is an extremely rare seaduck species breeding in a restricted area in South-East Russia and North-East China. It spends the winter in China and North Korea. The majority of the breeding population of about 1000-1100 breeding pairs occurs in the Primorye region of Russia. The Scaly-sided Merganser is listed as Endangered by IUCN, and is protected in Russia, China and South Korea. Despite the declared protection of Scaly-sided Merganser in Russia, however, human related mortality of this rare bird in its breeding grounds is worrying.

The Scaly-sided Merganser project has been in progress in the Primorye since 2000. During our work we have collected information on the threats to this species and we have found direct poaching, both shooting and killing of birds in fish gill-nets, to be the major factors affecting the population. Below we present real stories that took place in the area.

## Story one: quantitative

The waterfowl spring hunting season was open from 1–8 April 2008 in South Primorye. However, the spring was early, cold and long: all northern breeding ducks that can be hunted, such as Mallard *Anas platyrhynchos*, Pintail *A. acuta* and Teal *A.crecca,* passed along the coast of South Primorye in March. Breeding Scaly-sided Mergansers started to arrive early in this year also; first breeding females appeared by 15 March but their mass migration occurred on 4–5 April when the weather became warm and sunny. A group of six hunters arrived at the Kievka River mouth for the weekend of 5–6 April to shoot ducks. Duck migration was weak and the disappointed hunters chose to shoot arriving Scaly-sided Mergansers, killing 11. There were 7–10 groups of hunters in the Kievka mouth that weekend, altogether about 50 people. In estimating the game bag for each hunter there may have been 90 Scaly-sided Mergansers killed during one weekend at one breeding river. The hunters knew about the protected status of their quarry and had seen our posters with their strong message not to kill this particular duck, which is why they removed the feathers from all their ducks to avoid trouble with the police!

## Story two: edifying

During the spring survey for breeding pairs on the Pavlovka River our team had to walk along half-frozen stretches of river. It was 8 April 2007 and the spring waterfowl hunting season was open there. Valery Shokhrin met a hunter and asked him how the hunting was going. The shooter showed a male Scaly-sided Merganser to Valery. In reply to the question "what sort of duck is it?", the hunter pulled out a license and read that it was a male Mallard. The man was sure that if the duck was so numerous (Pavlovka supports one of the highest densities of the Scaly-sided Merganser) in the area, it must be a common species, most probably the Mallard. He never thought rare and protected ducks could inhabit his native area. This opinion has proved to be typical of native people in Primorye: they rarely believe that one of the most common ducks on some rivers could be endangered.

## Story three: gastronomic

A doctor from a small town, Vostok-2, in North Primorye went to the forest on 4 June 2008. It was out of the hunting season and the man wanted just to have a look, although he carried a gun, just in case. He was very surprised to find a duck mist net crossing the river Dal'nyaya and to meet Sergey Vartanyan who was hiding near the net. During the conversation the doctor showed good knowledge of local ducks. When Sergey mentioned that Scaly-sided Merganser isn't tasty and should smell of fish, the doctor exclaimed: "I have heard this rubbish many times. Absolutely not, it is tasty; you just need to cook it properly. Last week I shot a couple, they were very nice". 'Last week' was late May, so breeding birds were shot for the doctor's dinner! Probably just the 'bad luck' of meeting Sergey saved another couple of mergansers this time.

## Story four: scientific

An adult female merganser was caught and ringed by us on 3 April 2007 on the Kievka River: the female was accompanied by a male who had also been caught. A year later on 15 May 2008 (a month after the waterfowl spring hunting season!) this female was shot on the Iman River, 450 km away from the initial catching location. Poachers were so well

educated that they reported an egg in this female's oviduct and they were kind enough to return the ring to the Biological-Soil Institute in Vladivostok. However, they were not kind enough not to shoot a breeding bird! This ring recovery showed us that the Kievka River, our main study plot, is a part of the Scaly-sided Merganser flyway from the coast of the Sea of Japan to inner rivers of the Primorye and maybe further north and west. Poachers in this story thus shot the mergansers passing the Kievka on migration to their remote breeding grounds.

## Story five: fishing

On 26 May 2008, a Scaly-sided Merganser hen successfully hatched ten young in our nest-box on the Kievka River. In mid August 2008 this female was killed in a fishing gill-net 15 km downstream from the nest. The ring was returned to the staff of the Amur Tiger Project. The fisherman didn't mention any young with this female and we just hope that the offspring had successfully fledged before mid-August.

## Story six: almost lucky!

In June 2005 a female hatched nine ducklings in a nest-box. Later in the summer this female got into a fish net 5 km away from the nest, but was released by a fisherman. Four ducklings were together with the female and they avoided the fish net. Next year in 2006 this hen returned to the same nest-box. Unfortunately she died at the nest from a disease.

All these real stories show the scale of human impact on the restricted population of Scaly-sided Merganser in Russia. Illegal shooting and illegal gill-nets (salmon gill-netting is prohibited on the rivers of the Primorye) affect breeding pairs, brood rearing females and their broods. Now we know that this species spends up to eight months a year on the rivers of the breeding area, arriving in mid-March and departing in mid-November. We think all cases of unexplainable disappearance of nesting hens (at least four cases have been reported when females laid full clutches of eggs, in some cases even incubated them and then disappeared) were due to shooting during incubation recess. There is a slight chance these hens were taken by avian predators.

Since 1999 the Russian Government reconstructed its Nature Conservation Service eight times. Step by step the Service lost independence and the ability for law enforcement. By the beginning of 2008 the situation had become critical: no people are responsible for the control of hunting and fishing occurring in the regions. The Service became consultative and informative rather than patrolling and punitive. As a result poachers feel comfortable on the rivers and coasts, in the forest and mountains, and they keep on killing rare animals.

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Scaly-sided Merganser (Graham Maples)

# Survey of the breeding population of Scaly-sided Merganser in the Changbai Mountains, China, 2008

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*Keywords: breeding density, breeding survey China, Mergus squamatus, Scaly-sided Merganser*

## Introduction

The Scaly-sided Merganser *Mergus squamatus* is recognized as a globally threatened species and is included in the Red Data Books of IUCN (Endangered), China (first-ranked category) and Russia (category 3 – rare). The Changbai Mountain range (Chinese side) is one of the key breeding grounds of this bird; however, the current status of the Scaly-sided Merganser in this range is not clear as studies are lacking from recent years. For better conservation of this species, systemic studies and monitoring programmes should be carried out urgently on its breeding population in Changbai Mountains. In the spring of 2008, we successfully applied for a grant from the Rufford Small Grant for Nature Conservation to undertake a survey on the Merganser breeding population in these mountains.

In the spring and summer seasons of 2008, we surveyed breeding pairs and broods in the Changbai Mountains. Eleven river stretches in the mountain range were repeatedly surveyed (with a total survey distance of 625 km) and a total of 711 individuals of Scaly-sided Mergansers were recorded.

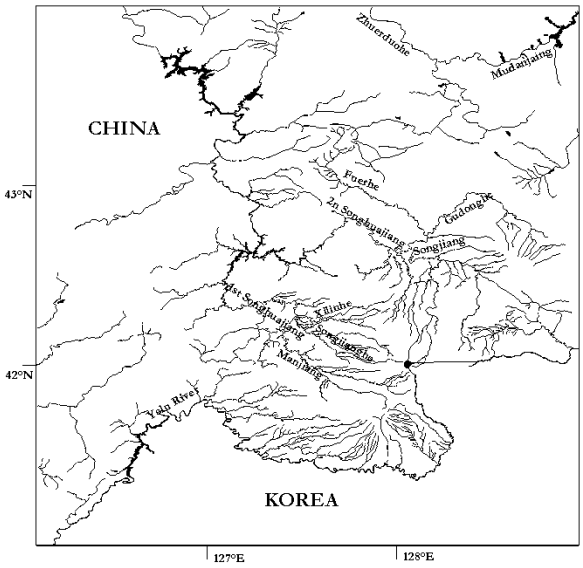


Figure 1. Study area and survey stretches in the Changbai Mountains in 2008.

## Study area

There are plenty of rivers in the Changbai Mountains ranging from 41°N 125°E to 45°N 132°E. Most of these rivers belong to three main river systems sourced from the Changbai volcano peak: the Yalujiang River, Songhuajiang River and Tumenjian River. Using historical data of the distribution of Scaly-sided Merganser, we selected survey stretches mainly along source tributaries of the Songhuajiang River as these tributaries seemed to be the distribution centre of the breeding population of Scaly-sided Merganser in the mountain range. Further, we selected two stretches along the source of the Mudanjiang River and another one on the Yalujiang River. The span of the study area was 280 km (from northeast to southwest).

## Methods

Surveys were carried out using boats on all the river stretches. Before the field surveys, we carefully studied the selected rivers of the Changbai Mountains using *Google Earth* and pre-detections using the method described in Shokhrin & Solovieva (2003) and Solovieva *et al* (2006). During surveys, data on breeding pairs, trios, single males, single females, sub-adult males, brood rearing females, flocked birds and bird ages were recorded. The breeding pair (brood) density is expressed as pairs (broods)/km ± 1 SD. The individual density is expressed as birds/km ± 1 SD.

The breeding pair survey started at the beginning of April when all rivers are free from ice. The brood survey started in the middle of July when most ducklings will have hatched, but before they are fledged. As broods often roosted out of sight during the hot daylight hours (Solovieva 2006), our surveys were conducted during morning (07:00h–11:00h) and evening (17:00h–19:00h) periods on sunny days and all daytime (08:00h–17:00h) on cloudy days. As the adult females were moulting in the brood survey period, it was very difficult to tell adults from fledging ducklings in the far distance.

We identified the adults from the juvenile birds by the following features:

1. Colour of beaks. The beaks of adults are redder and more brilliant than those of young birds in the first year.
2. Reaction to dangers. In the brood survey period, some adults can still fly some distance but most juveniles cannot fly and can only thrash on the surface of the water.
3. Calling. The frequency of the adult's call is much lower than the duckling's. The call of a young bird is like a whistle in summer while the calling of an adult is much hoarser than that of a young bird.

## Results

### Breeding Density

During the breeding pair survey nine stretches of river, covering a total of 268.5 km, were surveyed; 266 individuals, including an estimated 102 pairs, of Scaly-sided Merganser were counted. Results from the survey are given in Table 1; we made an estimation of the number of breeding pairs in each stretch surveyed. The breeding and individual densities are given in Table 2. The average density of the Scaly-sided Merganser over all the rivers we surveyed was 0.91±0.89 birds/km and the average breeding pair density was 0.35±0.35 pairs/km.

### Sex-age Structure

When estimating the number of breeding pairs, we counted female Scaly-sided Mergansers seen in flocks with sub-adult males as non-breeding females. If there were adult males in the flock, we counted these as representing a pair. The composition of the flocks recorded during the breeding pair survey are given in Table 3. During this survey, we counted eight flocks with a total of 50 birds. The proportion of flocked birds was 18.8%.

During the breeding pair survey, we counted 77 adult males and 40 sub-adult males (which represents 34.2% of the total number of males recorded and 15.0% of the overall total number of birds) (Table 4). Ten pairs were formed with sub-adult males; representing 9.8% of the total number of pairs.. A total of 15 trios were counted during the survey; which equals 14.7% of the total number of pairs. No trios were formed with sub adult males.

Table 1. Numbers of Scaly-sided Merganser and the estimated number of breeding pairs recorded during the breeding pair survey in the Changbai Mountains in 2008.

| River | Number of pairs | Number of trios | Number of single males | Number of single females | Number of flocked birds | Estimated number of pairs |
|---|---|---|---|---|---|---|
| 1st Songhuajiang | 22 | 5 | | 2 | 26 | 27 |
| Songjianghe | 6 | 2 | 1 | 2 | 10 | 9 |
| Manjiang | 10 | 1 | 1 | 1 | | 12 |
| Fuerhe | 23 | 4 | 7 | | 10 | 34 |
| Songjiang | 10 | 2 | 2 | 5 | | 14 |
| Mudanjiang | | | | | 4 | 0 |
| Zhuerduohe | | | | | | 0 |
| 2nd Songhuajiang | 1 | 1 | 1 | 2 | | 3 |
| Yalujiang | | | | 3 | | 3 |
| **Total** | **72** | **15** | **12** | **15** | **50** | **102** |

Table 2. Scaly-sided Merganser density (birds/km) and breeding density (pairs/km) surveyed in the Changbai Mountains in 2008.

| River | Number of birds | Estimated number of pairs | Survey distance (km) | Breeding density | Individual density |
|---|---|---|---|---|---|
| 1st Songhuajiang | 87 | 27 | 38 | 0.711 | 2.289 |
| Songjianghe | 31 | 9 | 29.5 | 0.305 | 1.051 |
| Manjiang | 25 | 12 | 34 | 0.353 | 0.735 |
| Fuerhe | 75 | 34 | 33 | 1.030 | 2.273 |
| Songjiang | 33 | 14 | 26 | 0.538 | 1.269 |
| Mudanjiang | 4 | 0 | 21 | 0 | 0.190 |
| Zhuerduohe | 0 | 0 | 26 | 0 | 0 |
| 2nd Songhuajiang | 8 | 3 | 29 | 0.103 | 0.276 |
| Yalujiang | 3 | 3 | 32 | 0.094 | 0.094 |
| **Total/Average** | **266** | **102** | **268.5** | **0.35** | **0.91** |

**Brood Density**

In total 11 rivers, covering a total of 356 km were surveyed for the brood survey; 445 individuals and 49 broods (includes amalgamated broods) of Scaly-sided Merganser were recorded. The results of the survey data are given in Table 5. The average brood density of all the stretches surveyed was 0.15±0.18 broods/km. Average brood size (not including amalgamated broods) was 7.83±2.92 birds/brood (n=47).

Table 3. Scaly-sided Merganser flocks counted during the breeding pair survey in the Changbai Mountains in 2008.

| River | Flock components | Flocked birds |
|---|---|---|
| 1st Songhuajiang | 4 sub adult males+3 females | 7 |
| 1st Songhuajiang | 4 sub adult males+5 females | 9 |
| 1st Songhuajiang | Sex-age unidentified flock | 10 |
| Songjianghe | 1 adult males+3 females | 4 (could be 1 pair or 1 trio) |
| Songjianghe | 2 sub adult males+4 females | 6 |
| Fuerhe | 4 females | 4 |
| Fuerhe | 4 sub adult males+2 females | 6 |
| Mudanjiang | 3 sub adult+1 female | 4 |
| **Total (Proportion of the total number of birds; *n* = 266)** | | **50 (18.8%)** |

Table 4. Scaly- sided Merganser sex and age structure recorded during the breeding pair survey in the Changbai Mountains, spring 2008.

| River | Number of males | Number of sub-adult males | Pairs formed by sub-adult male | Number of trios |
|---|---|---|---|---|
| 1st Songhuajiang | 35 | 8 | | 5 |
| Songjianghe | 12 | 4 | 2 | 2 |
| Manjiang | 12 | 4 | 4 | 1 |
| Fuerhe | 38 | 15 | 2 | 4 |
| Songjiang | 14 | 6 | 2 | 2 |
| Mudanjiang | 3 | 3 | | |
| Zhuerduohe | 0 | 0 | | |
| 2nd Songhuajiang | 3 | 0 | | 1 |
| Yalujiang | 0 | 0 | | |
| **Total** | **117** | **40** | **10** | **15** |

Table 5. The number of broods and the brood densities recorded during brood surveys in the Changbai Mountains in summer 2008.

| River Stretch | Survey Distance | Number of broods | Number of birds | Brood Density |
|---|---|---|---|---|
| Zhuerduohe | 26 | 0 | 0 | 0 |
| Mudanjiang | 21 | 0 | 0 | 0 |
| Gudonghe | 37 | 0 | 0 | 0 |
| Fuerhe | 47 | 13 | 105 | 0.213 |
| Songjiang | 26 | 1 | 4 | 0.038 |
| 2nd Songhuajiang | 29 | 2 | 12 | 0.069 |
| Songjianghe | 40 | 19 | 171 | 0.425 |
| 1st Songhuajiang | 38 | 2 | 13 | 0.053 |
| Xilinhe | 30 | 5 | 42 | 0.167 |
| Manjiang | 30 | 13 | 98 | 0.433 |
| Yalujiang | 32 | 0 | 0 | 0 |
| **Total/Average** | **356** | **55** | **445** | **0.15** |

## Discussion

**Scaly-sided Merganser densities and river water types in the Changbai Mountains in 2008**

A comparison of brood densities with breeding pair densities is given in Figure 2. The brood densities weakly correlated with breeding densities (r = 0.27) on the nine river stretches surveyed both in spring and summer in the Changbai Mountains in 2008. The high brood densities (>0.3 broods/km) did not occur on those stretches with high breeding pair densities (>0.4 pairs/km). Conversely, the low brood densities (<0.1 broods/km) occurred on two stretches, Songjiang and 1st Songhuajiang, which were high in breeding pair densities in spring. We did not find any Scaly-sided Merganser broods in the second half of the first Songhuajiang stretch where the breeding pair density in spring was as high as 1.46 pairs/km. The two broods found in this survey stretch were recorded in the first half where no breeding pairs were found in spring. The two highest brood densities occurred on two studied stretches, Songjianghe and Manjiang, with medium breeding pair densities (0.1–0.4 pairs/km). In these two stretches, the brood densities were actually higher than breeding pair densities.

The water types of the stretches surveyed in 2008 are given in Table 6. From Figure 2 and Table 6, we can conclude that before ducklings are fully fledged, Scaly-sided Merganser broods much prefer rivers with flowing water, whereas the source lakes or large reservoirs with steady water and wide surfaces are preferred by breeding birds and pre-migration flocks. Scaly-sided Merganser breeding pairs may fly far from their nest sites but the broods usually would not move too far (over 10 or 20 km) from the habitats they had selected when the ducklings were young. From this point, we conclude that in the Changbai Mountains there must have been a redistribution of birds during the pre-hatching period.

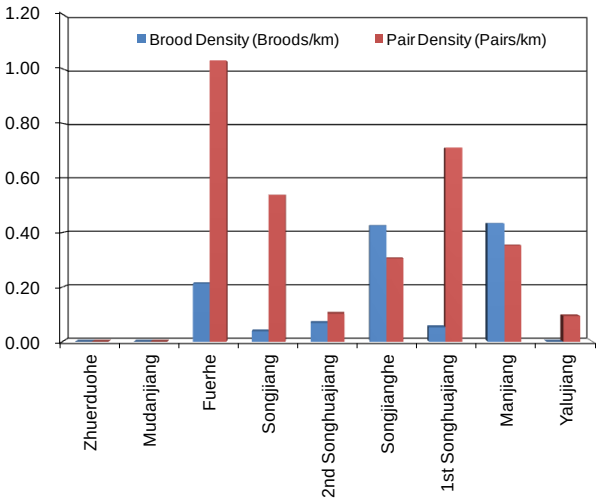


Figure 2. Scaly-sided Merganser densities on nine river stretches surveyed both in Spring and Summer in the Changbai Mountain Range, China, in 2008.

Table 6. Water type of rivers surveyed in the Changbai Mountains, China, 2008.

| Stretch surveyed | Water Type |
|---|---|
| Zhuerduohe | Flowing river along all the stretch surveyed |
| Mudanjiang | Flowing river along all the stretch surveyed |
| Gudonghe | Flowing river along all the stretch surveyed |
| Fuerhe | Flowing river along all the stretch surveyed |
| Songjiang | Source lake formed from reservoir with steady water and wide surface |
| 2nd Songhuajiang | Flowing river along all the stretch surveyed |
| Songjianghe | 3/4 stretch in up reach is flowing river, 1/4 in low reach is reservoir |
| 1st Songhuajiang | 3/4 stretch in up reach is flowing river, 1/4 in low reach is reservoir |
| Xilinhe | Flowing river along all the stretch surveyed |
| Manjiang | 3/5 in up reach is flowing river, 2/5 in low reach is reservoir |
| Yalujiang | Wide river with fast flowing water |

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## References

Shokhrin, V & D Solovieva. 2003. Scaly-sided Merganser breeding population increase in Far East Russia. *TWSG News* 14: 43–51.

Solovieva, D, V Shokhrin, S Vartanyan, A Dongdua & N Vartanyan. 2006. Scaly-sided Merganser survey in Primorye, Russia, 2003–05. *TWSG News* 15: 60–69.

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# White-headed Duck in region of Murcia, Spain

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*Keywords: artificial wetlands, Murcia, Oxyura leucocephala, Spain, White-headed Duck*

## Introduction

The White-headed Duck *Oxyura leucocephala* has only recently been recorded in the Region of Murcia, southeast Spain. The absence of historical records is, however, probably due to the lack of natural wetlands adequate for the species' survival. Presently, the White-headed Duck is found only on artificial wetlands, mostly those related to the management of sewage water. Available data presented here show the relevance of some of these artificial wetlands for the species in the Iberian context.

## Distribution in the region of Murcia

Historical 19th Century records do not record the presence of White-headed Duck in the region (Guirao 1859). The first observations of them in the Region of Murcia were in 2000, in the flood regulation reservoir of Santomera (ANSE 2006, Guardiola 2006) and on pools for irrigation water storage on the Campo de Cartagena (Campillo *et al* 2008). Since these first records, the species has progressively colonized a set of artificial wetlands in the region.

At present, the species is regularly recorded on six artificial wetlands: Moreras (Mazarrón municipality), Campotéjar (Molina de Segura municipality), sewage water treatment plants of Alhama de Murcia and Alguazas, Santomera Reservoir and Cabezo Beaza (Cartagena municipality). It breeds at the first four localities (Guardiola 2006, Ballesteros 2011) (Figure 1). An example of an artificial White-headed Duck site is shown in Figure 2.


Figure 1. Location of artificial wetlands in Spain.

Figure 2. Example of an artificial White-headed duck nest site, Cabezo Beaza.

## Population

With the exception of the sewage water treatment plant at Alguazas, annual counts were regularly conducted at these artificial wetlands between 2000 and 2008; recording annual abundance and the total number of ducklings hatched. Groups of over 300 individuals were recorded at the Santomera Reservoir as well as in Cabezo Beaza (ANSE 2006, Guardiola 2006, García & Ballesteros 2007, Campillo *et al* 2008). The maximum for the whole region (September 2005) was 500 individuals, about 25% of the Iberian population (Ballesteros 2008). The number of breeding females was not estimated but in 2006 a total of 129 ducklings hatched: 49 on Campotéjar and 80 on Moreras (García & Ballesteros 2007).

Following Ballesteros (2008), the artificial wetlands of Murcia are obviously alternative sites for the species when localities in Region of Valencia (east and north of Murcia) and Andalusia (west and south) are experiencing adverse hydrological conditions.

## A concrete case: the sewage water treatment plant of Cabezo Beaza

The presence of White-headed Duck on the sewage water treatment plant of Cartagena on Cabezo Beaza has been known since at least 2003. The post-nuptial and winter concentrations are the most important with over 300 individuals here (Campillo *et al* 2008).

Since June 2006, the Association of Naturalists of South-eastern Spain (ANSE) has carried out periodic censuses, with the objective of characterising the bird community and its importance in the regional context. During 103 censuses, carried out from June 2006 to September 2012, 8203 individuals were recorded with an average of 79 birds. Peak counts were recorded during the first half of August 2006 (298 individuals) and second half of December 2007 (314 individuals). In all years, the lowest counts were recorded between the second half of February and the end March or in the first half of July (Figure 3). In October 2006 and 2007 there were secondary peaks, coinciding with the first movements toward winter quarters after moult (Campillo *et al* 2008).

## Protection, conservation and management measures

The importance of these artificial wetlands as breeding and wintering sites for White-headed Ducks has not been accompanied by adequate protection and management until recently. Nevertheless, the first steps towards the protection of these sites are being taken. After pressure from environmental groups, the two main breeding sites at Moreras and Campotéjar were designated as Ramsar sites in 2011 (BOE 2003). Also, the water authority (Confederación Hidrográfica del Segura, CHS) wants to carry out a restoration and management project at Moreras (Sánchez-Balibrea *et al* 2008b), but this has been stopped for economical reasons.

Because of their relatively recent colonization, White-headed Duck is not included in the *Catalogue of Threatened Species of Wildlife of the Region of Murcia* (Regional Law 7/95) or the *Red Book of Vertebrates of the Region of Murcia* (Robledano *et al* 2006), but the inclusion on the regional catalogue is provided.

ANSE has developed several initiatives for monitoring, conservation and dissemination of information about White-headed Ducks (ANSE 2008, Campillo *et al* 2008, Sánchez-Balibrea *et al* 2008a). The most relevant actions are periodic censuses on artificial wetlands, demands for protection of sites of interest for the species, collaboration with irrigation water users for improving breeding habitat, provision of information materials and the participation in the design of a restoration project at one artificial wetland. We are currently developing a project with the support of Fundación Biodiversidad, a foundation of the Agricultural, Foods and Environment Ministry, to create two new wetlands (one in Murcia and another in the neighbouring province of Alicante) for the endangered Marbled Duck *Marmaronetta angustirostris* and White-headed Duck (ANSE 2012); please see the ANSE website (www.asociacionanse.org/en/proyectos/humedal-de-los-carrizales) for further details of this project.

Since 2010, the regional administration has been developing a LIFE project for the conservation of the White-headed Duck, focusing on the nesting localities. Unfortunately, the wintering localities, like Beaza, are not included (Anonymous 2011).

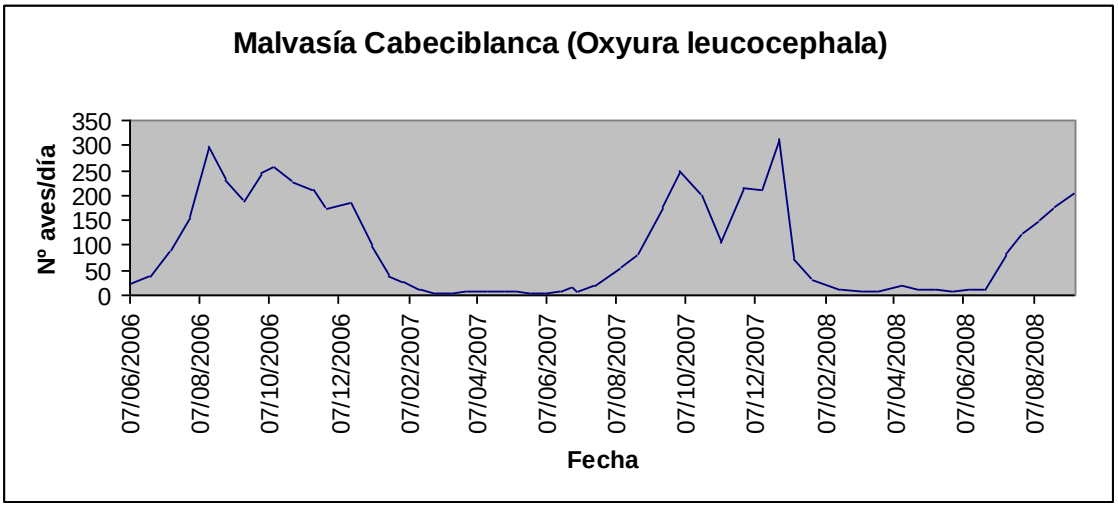


Figure 3. Numbers of White-headed Duck recorded during censuses at the sewage water treatment plant of Cabezo Beaza, 2006–2012.

## References


Anonymous. 2011. *Conservación de* Oxyura leucocephala *en la Región de Murcia, España. LIFE09 NAT/ES/000516*. Ingeniería del Entorno Natural. www.lifemalvasiamurcia.es.

ANSE. 2006. *Principales localidades con presencia regular de Malvasía cabeciblanca (*Oxyura leucocephala*) y Cerceta pardilla (*Marmaronetta angustirostris*) en la Región de Murcia.* Inédito. Documento elaborado para la responsable de las Estrategias Nacionales de Conservación de Malvasía cabeciblanca y Cerceta pardilla.

ANSE. 2008. *Humedales artificiales y zonas agrícolas: Nuevas oportunidades para las aves*. www.asociacionanse.org/acuaticas/acuaticas/portada.html.

ANSE. 2012. *ANSE y AHSA amplían la laguna de Los Carrizales (Elche) con la colaboración de la Fundación Biodiversidad.* www.asociacionanse.org/carrizales/20121024.

Ballesteros, G. 2008. *La malvasía cabeciblanca (*Oxyura leucocephala*) en la Región de Murcia. Evolución poblacional y selección de habitat, 2000–2008*. Póster presentado al IV Congreso de la Naturaleza de la Región de Murcia.

Ballesteros, G. 2011. *Resumen mensual de trabajos realizados Diciembre – 2011. PROYECTO LIFE09/NAT/000516 Conservación* Oxyura leucocephala *en la Región de Murcia.* www.lifemalvasiamurcia.es/pdf/diciembre2011.pdf.

BOE. 2003. Resolución de 25 de enero de 2011, de la Dirección General de Medio Natural y Política Forestal, por la que se publica el Acuerdo de Consejo de Ministros de 7 de enero de 2011, por el que se autoriza la inclusión en la lista del Convenio de Ramsar (2 de febrero de 1971), relativo a humedales de importancia internacional especialmente como hábitat de aves acuáticas, de las siguientes zonas húmedas españolas: Ría de Villaviciosa, Lagunas de Campotejar, Lagunas de las Moreras, Saladas de Sástago-Bujaraloz y Tremedales de Orihuela. *Boletín Oficial del Estado* No 30.

Campillo, I, A Fernández-Caro, T García, AJ Hernández, R Howard, JM Ibañez, JF Martínez, C Requena, J Sánchez-Balibrea & D Zamora. 2008. *La Malvasía cabeciblanca* (Oxyura leucocephala) *en la EDAR de Cartagena.* Inédito.

García Morell, M. & G Ballesteros. 2007. La malvasía se abre camino en Murcia. *Murcia enclave ambiental* No12: 16–23

Guardiola, A. (Ed.). 2006. Citas de Pedro Avellaneda Molina, Pedro Antonio Sánchez Ruiz, Fernando Ochotorena Ramírez, José Antonio Sánchez Zapata, Miguel Ángel Núñez Herrero y Ana Hernández Girao, Vicente Hdez Gil, Ángel Guardiola Gómez. *Anuario Ornitológico de la Región de Murcia.* Informe 1/2005. usuarios.lycos.es/aorm/.

Guirao, A. 1859. Catálogo metódico de las aves observadas en una gran parte de la provincia de Murcia. *Bol. R. Acad. de Ciencias de Madrid.* 4: 70–109.

Robledano, F, V Hernández Gil. & JF Calvo Sendín. 2006. *Libro rojo de los vertebrados de la Región de Murcia.* Consejería de Industria y Medio Ambiente.

Sánchez-Balibrea, JM, A Fernández-Caro, JF Martínez, P García AJ Hernández, D Zamora, A Sallent, M Ferrández Sempere, G González & JA Barba. 2008a. Informe final del proyecto *Conservación de humedales en zonas semiáridas*. Año 2007. ANSE. Proyecto financiado por la Fundació Territori i Paisatge.

Sánchez Balibrea, J, P García Moreno, JF Martínez Pérez. & M Ferrández Sempere. 2008b. *Propuestas para la mejora ambiental e interpretativa del humedal y Rambla de las Moreras (Mazarrón). Asociación de Naturalistas del Sureste para la Confederación Hidrográfica del Segura.* Inédito.


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# Status of the White-headed Duck in Urumqi, China

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*Keywords: China, Oxyura leucocephala, population,status White-headed Duck*

The White-headed Duck *Oxyura leucocephala* is the only stiff-tailed duck (Oxyurini) indigenous to the Palearctic. It is restricted to a small area of Central Eurasia and North Africa and currently has the distinction of being globally 'Endangered'. Mid-winter counts in Eurasia indicate that the population of the duck has undergone a significant decline in recent ten years (BirdLife International 2012). The global population decreased from over 100,000 individuals in the early twentieth century to 8000–13,000 in 2002 (Li & Mundkur 2003, Hughes *et al* 2006). Following large-scale development of western China, the White-headed Duck population has also decreased rapidly in Central Asia.

In China, it is historically rare, with only four records in the past 60 years from the Kashi and Junggar Basin (western Xinjiang Uygur Autonomous Region), Hong Hu (near the Yangtze River in Hubei Province) and Erdos (near the Yellow River in the Inner Mongol Autonomous Region) (Figure 1; Cheng 1987, Ma 2001, Zheng 2005).

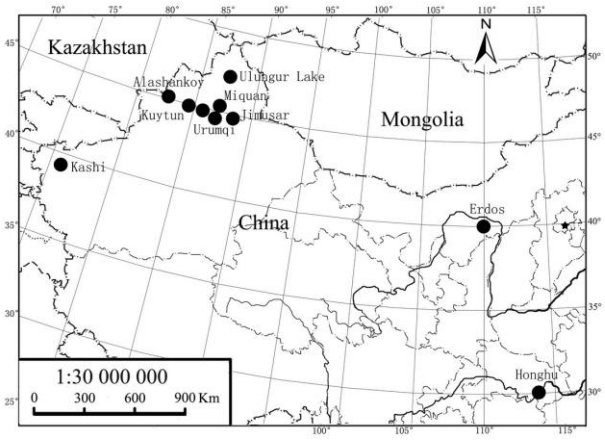


Figure 1. Distribution of White-headed Ducks in western China from 1943 to 2012.

Between 2006 and 2008 there were 115–125 sightings of White-headed Ducks on ten wetlands in the north of Xinjiang, western China (Table 1; Ma 2010).

The ducks appear in Xinjiang in early April, and breed from late April to August. They occur on ponds, reservoirs, reedbeds, freshwater pits, fish ponds, small sumps, cesspools, waste water and sewage treatment ponds. Sometimes they breed in

White-headed Duck (Zheqing Liu and Rui Xing)

reed marshes together with Black-necked Grebes *Podiceps nigricollis*, Ferruginous Ducks *Aythya nyroca* and Common Coot *Fulica atra*, often on degraded wetlands in dry lowland steppes and semi-deserts (Holt 2006, Ma & Mei 2007, Douglas 2007, Gou & Zhang 2007). Clutch size at Kuitun and Urumqi is 4–6 eggs. They gather in September, prior to migration, and by November most have left Urumqi (Figure 2).

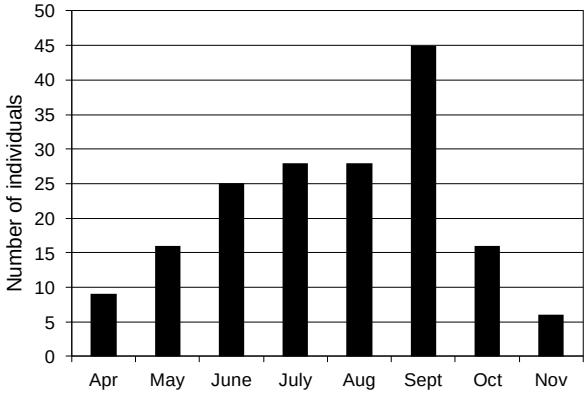


Figure 2. Seasonal occurrence of White-headed Ducks in Urumqi, China in 2007.

As well as China, the White-headed Duck occurs in 11 countries in Central Asia (Afghanistan, India, Iran, Kazakhstan, Kyrgyz Republic, Mongolia, Pakistan, Russia, Tajikistan, Turkmenistan and Uzbekistan (Li & Mundkur 2003, Hughes *et al* 2006). The principal threats to the species and its wetland habitats have been identified and priority actions

White-headed Duck (Zheqing Liu and Rui Xing)

have been recommended in these countries. The main focus should be to conserve the wetlands on which this and many other waterbird species are dependent.

However, in China the White-headed Duck is not yet included in the List of Nationally Important Wildlife for Protection and the Chinese government has not established any nature reserves for the species. Local people almost understand almost nothing of this species, nor of conservation in general. At present, the main threats are illegal poaching, egg-taking, livestock farming and wildfire, destruction of nests and habitat loss. Over-cultivation, water resource shortage, drowning in fishing nets, the effects of global climate change, wetland exploitation and pollution are big problems in the west.

From 2007 to 2012, the population of White-headed Duck decreased rapidly in Urumqi (Figure 3). Human disturbance, pollution and habitat destruction are thought to have caused this decline. A proposed suburban development at Bainiaohu announced on 31 July 2012 may be the last blow to the breeding population, as Bainiaohu is the main

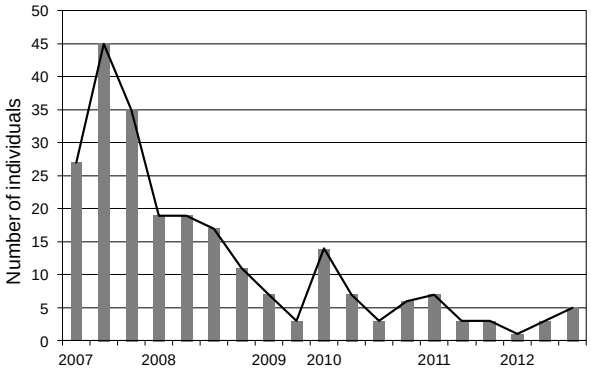


Figure 3. Population trend of White-headed Ducks in Urumqi, 2007–2012.

breeding site in the region. Conservationists in Xinjiang have suggested that a nature reserve be created at the site. The government and developers have subsequently invited them to discuss the management of the site. The Chinese government and international partners need to increase their efforts to protect this endangered species, including the legal protection of the sites it uses. The species should also be incorporated into local education programmes.

Table 1. Sightings of White-headed Duck in Xinjiang, 2006 to 2008.

| Site | County | Location | Elevation | Date | Number | Others |
|---|---|---|---|---|---|---|
| Moguhu | Shihezi | 44°27'N, 85°55' E | 360 m | Oct–Nov 2006 (27 Sept 2007) | 8~11 (8) | Urban wastewater |
| Qinggeda Lake | Wujiaqu | 44°05'N, 87°33'E | 470 m | 21 Oct 2006 | 2 | Wastewater wetland |
| Wuyi Reservoir | Bole | 44°54'N, 82°03'E | 520 m | 31 Oct 2006 | 2 | Fresh water |
| Shuiku | Jimusaer | 44°08'N, 89°10'E | 600 m | 27 April 2007 | >2 | Fresh water, breeding site |
| Bainiaohu & Jiujiawan | Urumqi | 43°50'N, 87°30'E | 800 m | May–Oct 2007 | 45 (+6) | Includes 4–6 chicks / one nest located |
| Bayi Reservoir | Wujiaqu | 44°13'N, 87°40'E | 450 m | 5 May 2007 | 1 | Fresh water |
| Wushuichi | Kuitun | 44°30'N，84°55'E | 350 m | July–Sept 2007 | 13~20 | Includes 5–6 chicks/ one nest located |
| Taqiaowan | Miquan | 44°02'N，87°37'E | 530 m | 4 Oct 2007 (7 Nov 2007) | 4 (1) | Wastewater wetland, birds on migration |
| Alashankou | Jinghe | 45°10'N, 82°36'E | 250 m | 3 Nov 2007 | 2 | Waste water wetland, birds on migration |
| Bainiaohu | Urumqi | 43°50'N, 87°30'E | 800 m | April–Oct 2008 | 26 | Breeding site |
| Ulungu Lake | Fuhai | 47°00'N, 87°20'E | 500 m | 3 June 2008 | 1 | Fresh water |
| **Total** | | **10 Sites** | | | **115–125** | |

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## References

BirdLife International. 2012. *Species factsheet:* Oxyura leucocephala. Downloaded from www.birdlife.org.uk.

Cheng, T.H. 1987. A synopsis of the avifauna of China. *Science Press*. Beijing.

Douglas, M. 2007. *Lake Aibi field investigation 29 October – 3 November 2007*. In press.

Gou, J. & YD Zhang. 2007. White-headed Duck *Oxyura leucocephala* breeding in northern Xingjiang, China. *BirdingAsia* 8: 80–81.

Holt, PI. 2006. *Birding in Xinjiang, China*. In press.

Hughes, B, JA Robinson, AJ Green, ZWD Li & T Mundkur. (Compilers). 2006. *International Single Species Action Plan for the Conservation of the White-headed Duck* Oxyura eucocephala. CMS Technical Series No. 13 & AEWA Technical Series No.8. Bonn, Germany.

Li, ZWD & T Mundkur. 2003. *Status overview and recommendations for conservation of the White-headed Duck* Oxyura leucocephala *in Central Asia*. Wetlands International, Kuala Lumpur.

Ma, M. 2001. A Checklist of the Birds in Xinjiang, China. *Science Press*. Beijing.

Ma, M. 2010. Bird expansion to east and the variation of geographical distribution in Xinjiang, China. *Arid Land Geography* 33: 540–546.

Ma, M. & Y Mei. 2007. White-headed Ducks and Long-tailed Ducks recorded in Xinjiang, China. *Zoological Research* 28: 673–674.

Zheng, GM. 2005. A checklist on the classification and distribution of the birds of China. *Science Press*. Beijing.

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Family of White-headed Duck in Bainiaohu, Urumqi, China (Yaotian Wang).

White-headed Ducks at Bainiaohu, Urumqi, China (Rui Xing).

White-headed Duck habitat in Bainiaohu, Urumqi, China (Ming Ma).

High-rise buildings being constructed near Bainiaohu, Urumqi, China (Ming Ma).

# Declive y recuperacion de la Mavasia Cabeciblanca en España

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Summary – We present a review of the current status and threats facing the White-headed Duck *Oxyura leucocphala* population in Spain. Following a dramatic recovery in the 1980s and 1990s, numbers have stabilised with maximum annual counts ranging from 1660 to 2700 between 2001 and 2010, and the number of broods recorded per year ranging from 98 to 319 over the same period. The number of known breeding sites continues to increase, with a recent expansion into new regions such as Murcia. The main threats are from habitat destruction, sudden alterations of habitat as abrupt changes in flood levels, hybridization with Ruddy Duck *Oxyura jamaicensis* (currently prevented by an effective control programme), lead poisoning (from historical lead shot in the sediments), the negative impacts of carp and other introduced species, and the potential long-term effect of an extreme lack of genetic diversity caused by the population bottleneck.

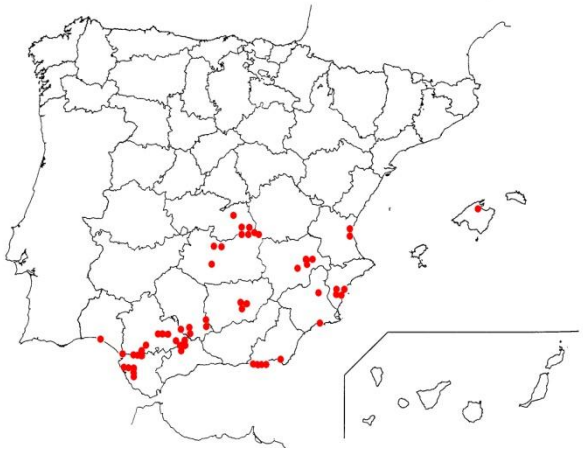
*Keywords: broods, conservation measures, Oxyura leucocephala, Spain, status, threats, White-headed Duck*

*Palabras clave: censo de cría, amenazas, España , medidas de conservación, Oxyura leucocephala, Mavasia Cabeciblanca*

## Valoración de la población Española de la especie: evolución y tendencia poblacional

En España la Malvasía Cabeciblanca *Oxyura leucocphala,* actualmente, se reproduce todos los años en diversos humedales, con abundante vegetación palustre, de varias provincias de España (Mapa 1) (Torres-Esquivias 2003, Torres-Esquivias 2008). Sin embargo durante el siglo XX la población de Malvasía Cabeciblanca experimentó un drástico descenso, llegando en 1977 al mínimo histórico de 22 ejemplares en la laguna de Zóñar (Córdoba). Desde ese año, y tras la aplicación de varias medidas de conservación, la especie comenzó una discreta recuperación, ampliando su área de distribución a varias lagunas de Cádiz y Sevilla, y poco después Huelva y Jaén, superando en 1988 la cifra de 400 ejemplares. En el año 2000 se censaron en España 4489 malvasías, lo que ha supuesto el máximo conteo registrado hasta la fecha (Torres-Esquivias 2004) (Figura 1). A partir de 2001 el número de ejemplares censados en España ha oscilado entre 900 y 2700 (Datos de los censos nacionales coordinados Delegación Provincial de Córdoba-Consejería de Medio Ambiente).

La población actual (2010) está cifrada en unas 1600 malvasías. La tendencia poblacional, una vez recuperado el área de distribución de los años cincuenta, ya no va a ser probablemente de progresivo incremento; más bien es de esperar que se mantenga  muy variable en función de las



Mapa 1. Humedales donde ha criado la malvasia cabeciblanca entre 1997–2010.

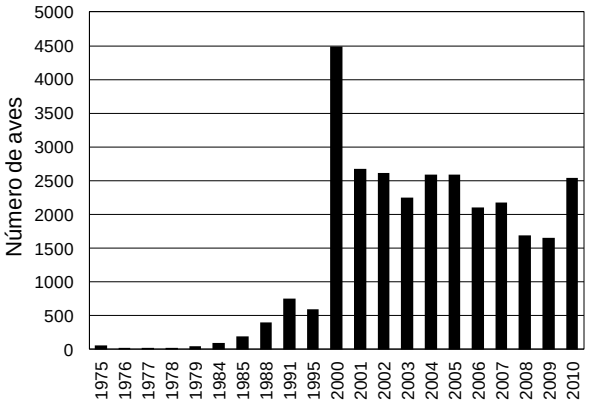



Figura 1. Censos máximos de Malvasía Cabeciblanca en España 1975–2010.

precipitaciones anuales (estocasticidad ambiental) y del estado de los humedales clave para la especie.

Los censos de reproductores de la especie en el periodo 2001-2010 (Figura 2) también han oscilado, probablemente, debido a la variación en la disponibilidad de hábitat adecuado durante la época de reproducción.

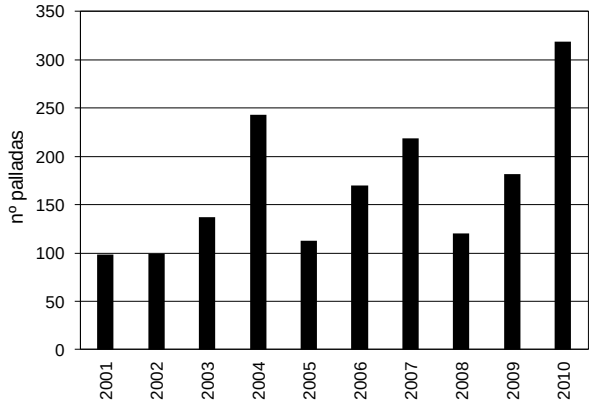



Figura 2. Censo de reproductores de Malvasía Cabeciblanca en España 2001–2010.

La recuperación de la especie en España y las posteriores oscilaciones en el número de ejemplares censados, podría deberse probablemente a que la Malvasía Cabeciblanca vive en un hábitat altamente impredecible, de modo que sus poblaciones suelen experimentar periodos buenos, de rápido crecimiento demográfico, intercalados con periodos desfavorables de alta mortalidad. La tendencia poblacional de la especie, una vez recuperada su área de distribución histórica, será probablemente de fluctuaciones más o menos intensas relacionadas con las precipitaciones anuales y la calidad de las zonas húmedas que habita.

## Amenazas y medidas de conservación llevadas a cabo en España

Hoy en día la principal amenaza para la especie es la destrucción y pérdida de calidad de las zonas húmedas que utiliza tanto en invernada como en época de reproducción. Esta amenaza puede tener y ha tenido efectos desastrosos en la población española. Los cambios ambientales que afectan a la especie se pueden producir por procesos de colmatación, por cambios rápidos en el régimen hidrológico y por la sobreexplotación de los acuíferos, que alteran el régimen de inundación. La contaminación de origen agrícola, industrial y urbano también representa una grave amenaza para la calidad de las aguas. Actividades como el sobrepastoreo, la introducción de especies exóticas invasoras y la quema de carrizales alteran sustancialmente la calidad de los humedales. Las medidas llevadas a cabo han incluido desde la protección, de las zonas húmedas en las que habita la especie mediante diferentes figuras legales, hasta la restauración de humedales degradados, e incluso la creación de charcas artificiales.

Por otro lado, recientemente se ha observado que la Malvasía Cabeciblanca está utilizando charcas artificiales creadas con otros fines tales como lagunas en campos de golf o balsas de depuradoras de aguas residuales. También se han llevado a cabo programas de investigación sobre la selección del hábitat que pueden ser muy útiles en el desarrollo de estrategias de gestión para la especie (Paracuellos 2006, Sebastian-Gonzalez *et al* 2012).

Por el contrario, en los últimos años las malas condiciones hídricas, debidas a conflictos de intereses humanos, de algún humedal clave, como el P.N. El Hondo(Alicante), han tenido consecuencias nefastas sobre el éxito reproductor de la especie.

La Expansión de la Malvasía Canela (*Oxyura jamaicensis*) fue durante unos años considerada la principal amenaza para la especie. Esta expansión ha sido frenada gracias a los efectivos programas de erradicación, pero aún es una amenaza muy importante. La malvasía canela es una especie americana, introducida artificialmente en Europa, en el Reino Unido en 1948. Esta especie híbrida con la Malvasía Cabeciblanca produciendo descendencia fértil y por tanto experimentando introgresión genética (Muñoz-Fuentes *et al* 2007). En 1991 se detectaron los primeros híbridos en España. Si la proliferación que se dio en los años 90 no se hubiera frenado, muy probablemente, en un corto espacio de tiempo, hubiera desaparecido la malvasía cabeciblanca.

La única forma de solucionar este problema era la eliminación del núcleo reproductor existente en el Reino Unido, así como todos los ejemplares que se encontraban en diversos países de Europa.
En España se empezó a actuar en la eliminación de esta especie y sus híbridos en 1984. Desde entonces se han eliminado 256 ejemplares, de ellos 187 malvasías canelas 'puras' y 69 híbridos.

En el Reino Unido se inició en 2005 el proyecto LIFE 'UK Ruddy Duck Eradication Programme' cuyo objetivo es la eliminación total de la especie invasora del país. En enero de 2006 se estimó que la población de malvasias canelas en el Reino Unido era de unos 3900 pájaros adultos. Desde entonces se han eliminado más de 3.800 ejemplares. La población actual (abril-2012-), se estima en unos 60 ejemplares.

En otros países como Francia, Holanda y Bélgica también se han observado ejemplares de malvasía canela y se ha constatado la reproducción en Francia

y en Holanda. La situación en estos países puede ser la misma que se produjo en U.K. si no se toman las medidas necesarias.

La intoxicación por plomo está causando bajas en la población Española de Malvasía Cabeciblanca y otras anátidas (Mateo et al 2001). La actividad cinegética en la mayoría de los humedales ha provocado una elevada concentración de perdigones de plomo en muchos humedales, sobre todo en la Comunidad Valenciana.

En España actualmente está prohibida la utilización de plomo en la munición de caza en todas las zonas húmedas claves para la especie (RD 581/2001).

En la Comunidad Valenciana dentro de las acciones del proyecto Life 'Plan de conservación de la Malvasía Cabeciblanca en la Comunidad Valenciana', llevado a cabo por la Generalitat Valenciana (2001-2005), se redactó un Plan de Actuación sobre la contaminación por plomo en las ZEPAs P.N. El Hondo y P.N. Las Salinas de Santa Pola. Por otra parte se realizaron procesos de extracción de lodos contaminados en la zona de la Reserva Integral del P.N. El Hondo (Jiménez & de Castro 2005).

La actividad cinegética fue una de las principales causas del declive poblacional de la especie en la segunda mitad del siglo XX, pero en la actualidad ha perdido importancia gracias a las medidas de conservación aplicadas en la mayoría de los humedales importantes para la especie. La especie es muy vulnerable a la caza debido a su comportamiento y sus características de vuelo.

La presencia, en altas densidades, de especies exóticas invasoras como la carpa, la perca americana o el cangrejo americano producen importantes alteraciones ecológicas en los humedales eliminando la vegetación subacuática y alterando la composición y abundancia de los invertebrados, reduciendo así la cantidad de alimento disponible para la especie. En el caso de la perca puede incluso darse depredación sobre pollos de malvasía y llegar a molestar a los adultos provocando el abandono del lugar.
En algunos humedales (laguna de Zóñar en Córdoba y laguna de Medina en Cádiz) se llevó a cabo un control de las poblaciones de carpas (*Cyprinus carpio*) mediante Rotenona que dióresultados muy positivos en cuanto a recuperación ecológica de los humedales reapareciendo muchas especies de aves acuáticas entre ellas la malvasía cabeciblanca. Pero transcurrido un tiempo las carpas recolonizarón dichas lagunas.

## Conclusiones sobre el estado de conservación actual de la Malvasía Cabeciblanca

1. Las principales zonas húmedas donde se presenta la especie a lo largo del año poseen algún status de protección (Parque Nacional, Parque Natural, Reserva Natural, ZEPA, Sitio Ramsar, Paraje Natural).
2. La especie cuenta con un Plan de Acción Internacional (Green & Hughes 1996).
3. Castilla-La Mancha cuenta con el Plan de Recuperación aprobado desde 1995. La Comunidad Valenciana cuenta con el Plan de Recuperación aprobado en 2005 (decreto 93/2005) y Andalucía recientemente aprobó el Plan de Recuperación y Conservación de aves de humedales (ACUERDO de 13 de marzo de 2012).
4. La malvasía cabeciblanca, en España, ha experimentado una espectacular recuperación de su población acompañada de una recolonización de su área de distribución histórica. Tal recuperación, probablemente se ha debido a las medidas de protección llevadas a cabo tales como la protección de las zonas húmedas y la prohibición de la caza.
5. Esta espectacular recuperación de la especie también ha sido posible, en parte, a la gran capacidad de adaptación que ha demostrado tener la especie, siendo capaz de utilizar, también, charcas artificiales creadas con otros fines como lagunas en campos de Golf o balsas de depuración de aguas residuales.
6. Aún así la especie sigue siendo muy vulnerable debido, principalmente, a que la mayor parte de su población reproductora se concentra en unos pocos humedales, de modo que cualquier alteración de los mismos podría provocar reducciones alarmantes de sus efectivos, como ocurrió en 2001.
7. La principal amenaza para la especie en los últimos años ha sido la invasión de la malvasía canela. En 1984 se inició en España una campaña de erradicación de esta especie y de los híbridos que está resultando muy eficaz frente a la hibridación. Es imprescindible que este plan siga en marcha hasta la eliminación total de la especie invasora.
8. La erradicación de la malvasía canela en el Reino Unido está resultando muy eficaz y en Francia también se está, al menos, empezando a atacar el problema, pero si no se actúa en otros países como Holanda el problema podría reactivarse en pocos años.

9. La eliminación de especies exóticas de peces como carpas y percas ayudaría en gran medida a la recuperación de la calidad de las zonas húmedas en las que habita la malvasía cabeciblanca.

## Bibliografía


Green, AJ & B Hughes. 1996. *International Action Plan for the White-headed Duck* (Oxyura leucocephala). Pp. 119–145 in B. Heredia, L. Rose and M. Painter, eds. Globally threatened birds in Europe: action plans. Strasbourg: Council of Europe and BirdLife International.

Jiménez Pérez, I & M Delibes de Castro. (eds.) 2005. *Al borde de la extinción: una visión integral de la recuperación de fauna amenazada en España*. EVREN. Valencia, España.

Mateo, R, AJ Green, CW Jeske, V Urios & C Gerique. 2001. Lead Poisoning in the globally threatened Marbled Teal and White-Headed Duck in Spain. *Environmental Toxicology and Chemistry* 20:2860–2868.

Muñoz-Fuentes, V, C Vilà, AJ Green, JJ Negro, MD Sorenson. 2007. Hybridization between white-headed ducks and introduced ruddy ducks in Spain. *Molecular Ecology* 16: 629–638.

Paracuellos, M. 2006. How can habitat selection affect the use of a wetland complex by waterbirds? *Biodiversity and Conservation* 15: 4569–4582.

Sebastián-González E, Fuentes C, Ferrández M, Echevarrías JL & Green AJ. 2012. *Habitat selection of Marbled Teal and White-headed Duck during the breeding and wintering seasons in south-eastern Spain*. Bird Conservation International [on line]

Torres-Esquivias, JA. 2003. Malvasía cabeciblanca, Oxyura leucocephala. Pp 154-155 En, R, Martí y J.C. del Moral, eds. *Atlas de las aves reproductoras de España*,. Dirección General de Conservación de la Naturaleza-Sociedad Española de Ornitología. Madrid.

Torres-Esquivias, JA. 2004. Malvasía cabeciblanca, Oxyura leucocephala. Pp 111-113 En, A. Madroño, C. Gonzalez y J.C. Atienza, eds. *Libro rojo de las Aves de España*. Dirección General para la Biodiversidad-SEO/BirdLife. Madrid.

Torres-Esquivias, JA. 2008. La malvasía cabeciblanca. En, G. Ballesteros, M. Cabrera, J. L. Echevarrías, J. A. Lorenzo, C. Raya, J. A. Torres-Esquivias y C. Viedma. *Tarro canelo, cerceta pardilla, porrón pardo, Malvasía Cabeciblanca y focha moruna en España. Población en 2007 y método de censo*. SEO/BirdLife. Madrid., pp. 54. SEO/BirdLife. Madrid.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# Ruddy Ducks in Europe and the UK eradication programme

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*Keywords: control, eradication, Europe, France, Netherlands, Oxyura leucocephala Oxyura jamaicensis, population, Ruddy Duck, Spain, UK White-headed Duck*

## Introduction

The Ruddy Duck *Oxyura jamaicensis* is a native of the Americas but was introduced to wildfowl collections in the UK in the 1940s. Following escapes and releases, Ruddy Ducks became established in the UK and by 2000 there was an estimated naturalised population of *c* 6000 birds. As the naturalised population in the UK increased, so did the number of records in mainland Europe. Hybridisation in Spain between the globally-threatened White-headed Duck *Oxyura leucocephala* and Ruddy Ducks, presumably originating from the UK, was first recorded in 1991, and this is now regarded as the greatest threat to the long-term survival of the White-headed Duck (Hughes *et al 2006*). The UK Government began research into Ruddy Duck control in 1994 and further research was undertaken between 1999 and 2005. An eradication programme started in September 2005 which was jointly funded by the EU LIFE-Nature programme and the UK Government's Department for Environment, Food and Rural Affairs (Defra). This ended in March 2011 but additional work is being funded by Defra alone with the aim of achieving complete eradication by 2015. This is in line with a commitment made by Contracting Parties to the Bern Convention at the Standing Committee of the Convention in 2010. The eradication programme is being implemented by the Animal Health and Veterinary Laboratories Agency (previously Fera), an Executive Agency of Defra.

For many years it has been recognised that because Ruddy Ducks occur in other European countries besides the UK, close liaison between a range of European countries will be required if this species is to be successfully eradicated throughout Europe and the threat to the White-headed Duck removed permanently. The aim of this article is to provide information on the current status of Ruddy Ducks in key European countries besides the UK.

## Ruddy Ducks in the UK

The years of research into control methods in the UK had stabilised the UK population at about 4400 birds when the eradication programme began in September 2005. Since then the population has fallen significantly year-on-year (Figure 1; Holt *et al* 2012),

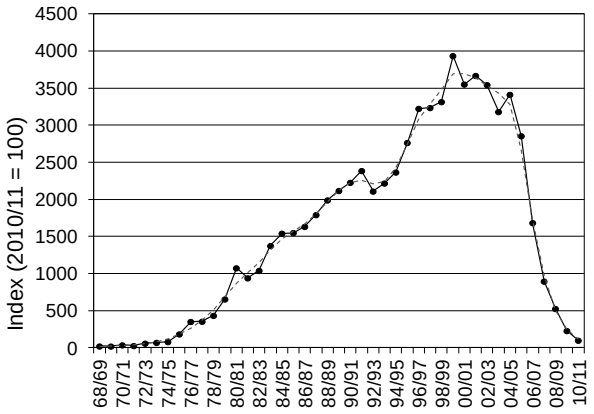


Figure 1. Annual indices and smoothed trend for Ruddy Duck in the UK, 1968/69–2010/11 (Holt *et al* 2012).

and by March 2012 Fera estimated that the UK population was a low as *c* 60 individuals, which remain quite mobile and widely distributed across the UK.

## Ruddy Ducks in France

Ruddy Ducks were first recorded in France in 1974. Since then a sedentary population has become established in the northwest of the country, centred on Lac de Grand Lieu, near Nantes. Control has taken place in France every year since 1997 but despite this wintering numbers had increased from approximately 50 in 1996 to around 350 in 2007. Increased control measures since then appear to have stabilised or slightly reduced the population, although they have not resulted in the large falls seen in the UK. The French government now takes the view that control of the wintering population on Lac de Grand Lieu will not be an effective method of eradication, mainly due to the size of the lake and the need to minimise disturbance on what is an important refuge for wintering waterfowl. However, as a Contracting Party to the Bern Convention, it has agreed to aim for eradication by 2015 and it is expected that pre-breeding and breeding season control will continue on Lac de Grand Lieu (with the aim of culling breeding birds and any resultant young), but that additional emphasis will be placed on other sites which do not have the specific difficulties associated with Lac de Grand Lieu.

## Ruddy Ducks in the Netherlands

Ruddy Ducks were first recorded in the Netherlands in 1973 and by 2006 there were thought to be 15 breeding pairs. The peak winter count in winter 2005/06 was 96 birds, most of which were to be found at two or three main wintering sites. However, subsequent years have seen a decline in the population, despite no control being carried out in the Netherlands (Figure 2). It is assumed that this has been due to movement of birds between the Netherlands and the UK, with shooting in the UK being responsible for the decline. Certainly, during the cold periods experienced across the UK and other parts of western Europe in the winters of 2009/2010 and 2010/11, unexpectedly large flocks of Ruddy Ducks appeared at some sites in the west and southeast of England, such as Rutland Water, (east midlands, England) and the Lee Valley in east London.

An eradication strategy has been drawn up for the Netherlands and the removal of Ruddy Ducks remains feasible given the relatively low numbers present.

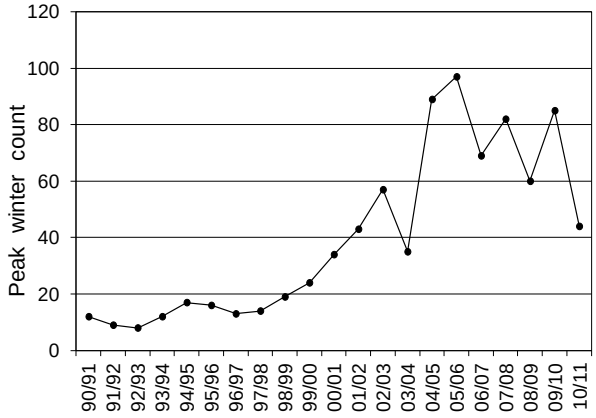


Figure 2. Peak winter counts in the Netherlands, 1990/92 to 2010/11.

## Ruddy Ducks in Spain

As might be expected, given the threat to the Spanish White-headed Duck population, Spain has a very well organised control programme for Ruddy Ducks. Although the first Ruddy Ducks were recorded in Spain in 1984, it was not until 1991 that Ruddy Ducks started to be recorded annually and the first Ruddy Duck x White-headed Duck hybrids seen. The dual aims of the Spanish control programme are to prevent the establishment of Ruddy Ducks in Spain and also to prevent any further hybridisation between Ruddy Ducks and White-headed Ducks. An active monitoring programme carries out surveys at White-headed Duck breeding sites in the spring with the aim of detecting and removing any Ruddy Ducks present. The procedure is repeated at the end of the breeding season when any hybrids observed are also culled, and there is also a reporting procedure which allows site managers and others to report the presence of Ruddy Ducks to the appropriate authorities. In recent years few Ruddy Ducks have been seen in Spain – two were culled in 2011 and one bird was seen in autumn 2012 but disappeared before it could be removed.

Ruddy Ducks (James Lees)

## Ruddy Ducks in other European countries

Ruddy Ducks are occasional breeders in a number of other European countries, although it is unlikely that any have viable populations with the exception of the UK, France and the Netherlands.

There have been between one and three breeding attempts annually in Belgium since 2006, but control measures have ensured that peak winter counts have averaged only five birds over the same period. Interestingly, Ruddy Ducks in Belgium are restricted to the east of the country and it is thought that there may be birds spilling over the border from the Netherlands.

In the Republic of Ireland Ruddy Duck numbers have declined in recent years, with 19 birds recorded on five sites in 1997/98 but only a single record of a single bird in 2009/10 (Irish Wetland Bird Survey data). This reduction coincides with the start of control measures on Anglesey in north-west Wales in 1999. There had been a suggestion that an annual influx of birds into the main wintering site on Anglesey in late autumn or early winter came from Ireland and/or Northern Ireland (Jim Clark pers comm), and this seems to be supported by the data which show not only a decline in sightings in Ireland, but also a decline on the main post-breeding and wintering site in Northern Ireland. Despite no control in the province, peak counts fell from between 80 and 100 in the late 1990s (Wetland Bird Survey data) to as few as five in 2011/12 (count by Allen and Mellon Environmental on behalf of Fera).

## Conclusion

It appears that only three European countries hold viable populations of Ruddy Ducks (UK, France and the Netherlands) and it is important that both France and the Netherlands act quickly to reduce numbers in their countries in the immediate future and to eradicate them in the medium term. Although the UK was probably the original source of these populations, they now appear to be independently viable, and as numbers continue to decline in the UK there is less chance of UK birds recolonising mainland Europe. There is a significant risk that if numbers continue to increase in France and the Netherlands, not only will eradication become significantly more difficult, but Ruddy Ducks might spread to neighbouring countries such as Germany where there is no policy on control. The issue of European-wide eradication is now being dealt with by the Standing Committee of the Bern Convention, and the UK, France and the Netherlands are all expected to progress towards full eradication by 2015, and to provide information on progress annually to the Standing Committee.

## References

Hughes, B, JA Robinson, AJ Green, ZWD Li & T Mundkur (Compilers). 2006. *International Single Species Action Plan for the Conservaiton of the White-headed Duck* Oxyura leucocephala. CMS Technical Series No. 13 and AEWA Technical Series No. 8. Bonn, Germany.

Holt, CA, GW Austin, NE Calbrade, HJ Mellan, RD Hearn, DA Stroud, SR Wotton & AJ Musgrove. 2012. *Waterbirds in the UK 2010/11: The Wetland Bird Survey*. BTO/RSPB/JNCC, Thetford.

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# Lesser White-fronted Goose in the Lena and Olenek Rivers catchment, Siberia

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*Keywords: Anser erythropus breeding, distribution, Lesser White-fronted Goose, numbers, Siberia, status*

## Introduction

The northwestern part of the Lena River catchment and the adjacent catchment of the Olenek River are supposed to be one of the most important breeding sites of Lesser White-fronted Goose *Anser erythropus* in Russia. This supposition is based on data from native people interviewed along the lower reaches of the Olenek River by Morozov & Syroechkovskiy (2002) and through finding moulting non-breeders and possibly a breeding pair in the upper reaches of the Tuyng, the left-side tributary of the Viluyi River, in 1989 (Labutin 1992, Collar *et al* 2001). This paper presents information on the recent status, distribution and numbers of Lesser White-fronted Goose in the region.

## Study area and methods

During the period 1971–2006 we surveyed wetlands and counted birds along 18 river stretches, 7–592 km long, on 16 rivers of the Lena and Olenek River catchments within 64˚51'and 70˚52'N, 106˚39' and 120˚19'E. The maximum width of river stretches surveyed was 300 m. The bulk of the fieldwork was conducted from early July to early August. Counts were made while rafting in two boats combined with a count from walking routes along lakes in the river valleys or watershed depressions.

## Results

Lesser White-fronted Geese were found only on two rivers: the Kuoika River (70˚33'N, 120˚29'E; the left-side tributary of the middle reaches of the Olenyek River) and the Muna River (67˚44'N, 120˚19'E; the left-side tributary of the lower reaches of the Lena River). Both rivers are typical semi-montane middle-sized streams.

At the Kuoika River individuals or pairs and non-breeding geese were recorded at different points for 100 km from its mouth in June 1971 and 1982, and seven broods were counted on a stretch 12 km long on its lower reaches during 1–10 August 2002 (Figure1).

Lesser White-fronted Geese (I Ochlopkov)

At the Muna River, 205 geese were counted over 302 km of 592 km surveyed from 31 June to 15 August 2005: 107 were goslings (with or without adults); 49 were brood rearing adult birds; 12 were likely failed breeding adults and 37 were non-breeding birds. Nine individual broods, including a solitary gosling, were identified, and 19 were in flocks consisting of 2–4 broods of the same age. One brood flock (without adults) included 11 goslings of two clearly different ages. The likely failed breeding adult were solitary birds (two records), pairs (two) and trios (two). The non-breeders were counted in flocks; of six, six, ten and 15 individuals. Adult geese that were able to fly were observed only after 3 August. The first goslings near adult size but not yet able to fly (wing length 240 mm) were observed on 9 August. A brood-rearer captured on 20 July was moulting; its fresh primaries were not more than 20 mm long.

The maximum distance between occurrences of the geese on the Muna River was 70 km. Birds inhabited the river at high density on two stretches within 302 km of the river where the species was found. On the first stretch (37 km long) 84 geese of all ages were counted and on the second (65 km long) 90 geese were counted.

We never observed broods or adult non-breeding birds with broods or flocks of Middendorf's Bean Goose *Anser fabalis middendorffii* which is the most

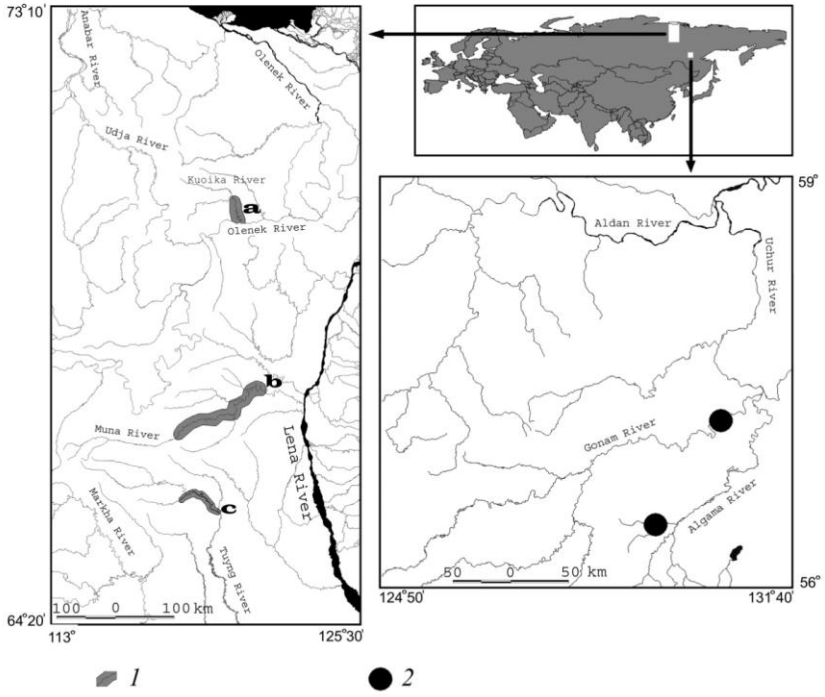


Figure 1. Breeding distribution of Lesser White-fronted Goose in the Lena and Olenek Rivers catchments, E Siberia:1) breeding records - a) at the Kuoika River, b) at the Muna River, c) at the Tuyng River; 2) supposed breeding places.

common goose species there and often inhabits the same river habitats. The average density of Lesser White-fronted Goose on all inhabited stretches (302 km) of the Muna River was 6.8 adult birds and 0.9 broods per 10 km of river. On the first most inhabited stretch (37 km) density averages were 22.7 adult birds and 3.2 broods per 10 km of the river and on the second (65 km), 13.8 and 1.5 respectively. The size of broods being reared by adult geese (n=28) averaged 3.82 ± 0.23 (range 1–6).

No Lesser White-fronted Geese were recorded on the Munakan River, one of largest tributaries of the Muna River, surveyed during 2–20 August 2003 (78 km of rafting) while Middendorf's Bean Geese were numerous there. Further, Lesser White-fronted Geese were not recorded on surveyed lakes in river valleys and watershed depressions. There are no reports besides those of Labutin (1992) showing goose occurrence on tributaries of the Olenek or Lena Rivers, including the middle reaches of the Molodo River (69˚25'N, 122˚30'E, the Lena's tributary, 150 km north from the Muna River) surveyed during 2001–2007 (Egorov & Okhlopkov 2007).

## Discussion

Our results show that the Lesser White-fronted Goose breeds in the Lena River catchment and does not spread to the upper and middle reaches of the Olenek River. The Muna River is the most important breeding site of the species and this paper confirms the Lena River catchment and upper reaches of the Tuyng River (see Labutin 1992) as the second most important site.

It is possible that the Lesser White-fronted Goose also breeds in the southeast part of the Lena River catchment in the upper reaches of the Algama River (56˚19'N, 129˚16'E), based on information from local people there. This possibly is important, as the locals' information regarding Far Eastern Curlew *Numenius madagascariensis* and Hooded Crane *Grus monacha* has been confirmed, and we observed a pair of the geese on the Gonam River (57˚05'N, 130˚37'E) on 23 August 2003.

## References

Collar, NJ, AV Andreev, S Chan, MJ Crosby, S Subramanya,& JA Tobias. 2001. *Threatened Birds of Asia*. BirdLife International, Cambridge.

Egorov, NN, & IM Okhlopkov. 2007. Novye dannye po gnesdovaniyu piskul'ki (Anser erythropus) v Yakutii. *Zoologicheskii zhurnal* 86: 1482–1485 [In Russian].

Labutin, YV. 1992. Gusi Sredne-Sibirskogo pliskogor'ya. Zoogeograficheskie i ekologicheskie issledovanyia zhivotniyh Yakutii. Yakutskii Gosudarstvennyii Universitet, Yakutsk. Pp. 38–42. [In Russian].

Morozov, VV, & EE Syroechkovskiy. 2002. Piskul'ka na rubezhe tiysyachaletii. *Kazarka* 8: 233–276. [In Russian].

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# Marbled Teal on the Ounianga Lakes in Chad

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*Keywords: Chad, Marbled Teal, Marmaronetta angustirostris, observations*

## Introduction

The Marbled Teal *Marmaronetta angustirostris* is categorised as 'Vulnerable' in the whole of its fragmented Palaearctic distribution range (BirdLife International 2000, Iñigo *et al* 2008). Both the western and eastern Mediterranean and southwest Asian breeding areas have contracted due to habitat loss. All efforts to protect the species are, therefore, of major importance (Scott & Rose 1996).

The Western Mediterranean population comprises some 3000-5000 individuals, the majority of which reside in Morocco, Algeria and Tunisia. Only 73–97 pairs still breed in Spain and 2–3 pairs in Sicily (Iñigo *et al* 2008). Marbled Teal from the Western Mediterranean population winter mainly in North African countries, where the species can sometimes be observed as a breeding bird. Many wintering areas north of the Sahara are well-known and documented (*eg* Isenmann & Moali 2000, Isenmann *et al* 2005, ABC 1997 to 2007). Marbled Teal has also been recorded south of the Sahara, from Senegal, Mali through Burkina Faso, Nigeria, Cameroon as far as Chad (*eg* del Hoyo *et al* 1992, Green 1993, Scott & Rose 1996, Borrow & Demey 2004, Iñigo *et al* 2008).

## Marbled Teal in Chad

For Chad, Scott & Rose (1996) mention only the following three key sites: Lake Chad (not annually, maximum numbers 45 in 1970), the Kanem Polder south of the Sahara (on average 35, maximum 45 in 1970) and Lake Bagada north of the Ennedi Mountains on the southern edge of the Mourdi Depression (200 individuals on a single occasion in 1962). Lake Bagada in Wadi Nkaola is only 130 km direct flight distant from Ounianga Serir or 180 km from Ounianga Kebir.

No current published records of Marbled Teal observations exist from the Ounianga Lakes. This is partly due to the restrictions on travel into the area over past decades. Earlier records (Dorst & Jouanin 1954) cite two ducks shot on a small lake, 1 km long and 100–300 m wide and surrounded by reeds (perhaps Lake Boko?), by Colonel De Barmon: a Cape Teal *Anas capensis* on 24 April 1954 and a Marbled Teal on 28 April 1954. They recount how on a visit in February 1953 De Barmon observed ducks on the lake in numbers similar to those in

Marbled Teal (WWT)

1954 (no figures given). Dorst & Jouanin 194 do not exclude the possibility that one or other of these duck species occur on the Ounianga Lakes throughout the year and could also breed there. This report was picked up by Malbrant & Receveur (1955), who cite the Marbled Teal collected by De Barmon on 28 April 1954 and explain that the brackish water and reed beds could provide good breeding conditions for the species.

The ethnologist P. Fuchs (1958), who reached the Ounianga Kebir Oasis during Ramadan in April 1956, describes his arrival as follows: 'A cool breeze wafted up to us from the lake (Lake Yoa). It smelt of reeds and water. A few minutes later we rode along the shore of the lake. Flocks of plump wild ducks, herons…took to flight as we approached them closely.' Unfortunately he did not recount which duck species he had seen.

Two reports from the Ennedi by Kollmannsperger (1959) are also of interest. On 1 September 1957 on a lake in Wadi Rei in central Ennedi he observed some 100 ducks which were greyer and lighter in colour than the Garganey *Anas querquedula* he had shot. On 24 September 1957 at Lake Bagada, just north of the Ennedi, he observed some very shy ducks which took to flight when he approached to within 150–200 m. He unfortunately made no attempt at identification. Both locations are only 130 and 200 km, respectively, from the Ounianga Lakes. Niethammer (1955) knew of further observations by Kollmannsperger in spring 1954: 'On individual water bodies of the Oued Bougouro, which stretches east to west in the Northern Ennedi,

Kollmannsperger saw large groups of waders and ducks…gathered on the most northerly of the waters. The waders were undoubtedly mostly migrants from northern latitudes, and the ducks (*eg* Egyptian Geese *Alopochen aegyptiaca* and Cape Teal) African birds that had evidently wandered beyond their northern breeding boundary.' In retrospect Marbled Teal could well have been among these bird flocks.

## 2009 observations

At the turn of the year 2008/2009 I took part in a three week expedition led by Desert-Tours Touhami to northern Chad. The itinerary included oases and lakes northwest of the Mourdi Depression: morning 4 January 2009 the Demi Oasis, and in the afternoon and evening the uninhabited Teguedei Oasis and Saline followed by Lake Boko. Lake Boko was again visited early on 5 January followed by the south shore of Lake Ounianga Serir Oasis, at midday Lake Katam and in the afternoon the Ounianga Kebir Oasis and the east shore of Lake Ounianga Kebir (called Lake Yoa). Early on 6 January the expedition visited a small lake east of the Ounianga Kebir Oasis and later a stretch of shore on the southern edge of Lake Yoa.

On 5 and 6 January 2009 some 525 Marbled Teal were observed on three of the lakes - a surprisingly high number but nonetheless a minimum figure. Due to the short and random observation stops, and as not all lakes in the complex were visited, a number of Marbled Teal probably remained undetected. Nonetheless, the numbers quoted qualifies the Ounianga Lake complex (from 19°03'N, 20°29'E to 18°54'N, 20°54'E) as an important Marbled Teal site, probably not described to date.

On the morning of 5 January there were at least 165 Marbled Teal on Lake Ounianga Serir (three groups of 90, 50 and ten on the water near the oasis on the south and southwest shores and in small bays, and at least a further 15 individuals on the eastern shoreline). Many of the individuals swimming in front of the southern shore took nourishment (probably invertebrates) from the water surface, turning jerkily and picking with their beaks rapidly to their right and left like phalaropes.

In the afternoon of 5 January at least 320 Marbled Teal in larger groups in front of the cliffs on the eastern shore of Lake Yoa were observed and photographed. The birds sat on or swam close to the shore and flew to the middle of the lake when approached. Smaller groups of the species sat further away on the shoreline.
Early on 6 January, from a rise east of Lake Yoa, at least 40 Marbled Teal were seen sitting on the shore of a smaller lake. No Marbled Teal were observed on either the brackish water of the Teguedei Oasis, or the freshwater Lake Boko (both with extensive reed beds), or the brackish Lake Katam.

From 4–6 January no other duck species were observed. The magnificent scenery of this lake district in the Sahara was enlivened, in addition to a few songbird species, by only a few Cattle Egrets *Bubulcus ibis*, an over-flying immature Black-crowned Night Heron *Nycticorax nycticorax* and the ubiquitous Brown-necked Raven *Corvus ruficollis*.

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## References

ABC. 1997-2007. *Recent Reports in Bulletin of the African Bird Club*.

BirdLife International 2000. *Threatened Birds of the World*. Barcelona and Cambridge, UK. Lynx Edicions and BirdLife International

Borrow, N, & R Demey. 2004. *Birds of Western Africa*. Helm Field Guides, London.

del Hoyo, J, A Elliott & J Sargatal. (Eds.). 1992. *Handbook of the Birds of the Worl:. Volume I*. Lynx Edicions, Barcelona.

Dorst, J, & C Jouanin. 1954. Des Sarcelles aux lacs Ounianga (Terr. du Tchad). *L'Oiseau et la Revue Francaise d'Ornithologie* 24 : 211–212

Fuchs, P. 1958. *Weisser Fleck im schwarzen Erdteil (Meine Expedition nach Ennedi)*. Engelhornverlag, Stuttgart

Green, AJ. 1993. The status and conservation of the Marbled Teal Marmaronetta angustirostris. *IWRB Special Publication* 23, Slimbridge, UK

Iñigo, A, B Barov, C Orhun & U Gallo-Orsi. 2008. *Species action plan for the Marbled Teal.* Marmaronetta angustirostris *in the European Union.* ec.europa.eu/environment/nature/conservation/wildbirds/action_plans/docs/marmaronetta_angustirostris.pdf

Isenmann, P, & A Moali. 2000. *Oiseaux d´Algérie*. Paris.

Isenmann, P, T Gaultier, A El Hili, H Azafzaf, H Dlensi & M Smart. 2005. *Oiseaux de Tunisie*. Paris.

Kollmannsperger, F. 1959. Ornithologische Beobachtungen im Ennedigebirge (1.8.-10.10.1957). *Bonner zool. Beitr.* 10 : 21–67

# Middendorf's Bean Goose on the Vilyuiskoe Plateau, Siberia

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## Introduction

The breeding range of Middendorf's Bean Goose *Anser fabalis middendorffi* in the Lena River catchment is fragmented and the goose does not nest on the Central Yakutian Plain or in the lower reaches of rivers flowing from plateaus and mountain ridges encompassing the plain. Presently it breeds mainly in remote, difficult-to-access areas including the Vilyuiskoe Plateau in the northwest part of the Lena River catchment and the southern part of the Olenek River catchment.

## Method

Between 1987 and 1998, 127 lakes and 15 stretches of 13 rivers of different types were surveyed across the Vilyuiskoe Plateau (Figure 1). In total, 2794 km of rivers were surveyed from boats. We sought to count the number of breeding pairs of Middendorf's Bean Goose. Breeding pairs were recorded from the observation of: 1) a warning pair or individual; 2) a brood (of ≤eight goslings) being reared by a pair or an individual or without attendant adults. A brood of 9–16 goslings being reared by a pair or individual was considered to represent two nesting pairs. Only broods consisting of 1–8 even-aged goslings were included in calculating the average brood size.

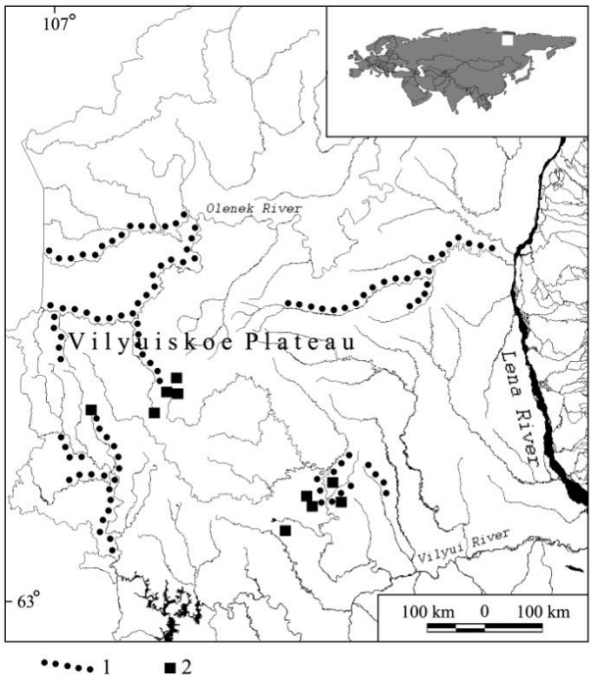


Figure 1. The study area in the Vilyuiskoe Plateau: 1 = rafting river stretches; 2 = surveyed watershed depressions.

Middendorf's Bean Goose (I Ochlopkov)

## Results and discussion

No breeding or moulting Middendorf's Bean Geese were seen on three river stretches or any of the lakes. In total 310 adult geese and 227 goslings were counted during the survey; 106 of the adult geese being brood-rearing birds and others being moulting non-breeders or failed breeders. We saw 42 broods of 2–6 goslings; 64% of which were reared by pair, 26% by single individuals, 2% by trios while 7% were without parents.

One brood being reared by a single adult and seven non-breeders were recorded on two of 64 surveyed lakes in a valley 100 and 300 m from a river.

Local people reported that Great Bilberry *Vaccinium uliginosum* was a frequent food of Middendorf's Bean Geese shot in August. Wolves *Canis lupis* and their tracks occurred commonly in the goose habitats along rivers. We counted 13 wolves, one of

which was lying in ambush for geese, we saw another stalk a flock of Middendorf's Bean Geese and catch a moulting adult.

On the Vilyuiskoe Plateau, Middendorf's Bean Goose is mostly distributed along stretches of rivers of the semi-mountain type and rarely on lakes. In July to early August the rivers were inhabited by broods, breeding and non-breeding adults in the proportion of roughly 2:1:2. The average size of 42 broods was 3.88±1.21 goslings. The average population density on surveyed rivers was 0.3 breeding pairs and 1.1 non-breeding adults per 10 km of river. On pristine or difficult-to-access river stretches the population density averaged 0.4–0.8 breeding pairs per 10 km, but on stretches where geese were affected by hunting, poaching and other man-made disturbance the density declined to 0.0–0.2 breeding pairs per 10 km. The plateau population is apparently affected by wolf predation. When rearing broods in the wide river valleys, much of the population spent their time moving through woodlands, dwelling at lakes and feeding in the Great Bilberry plantations. From the goose numbers we saw on wetlands within 300 m of the river we calculated this part of the population comprised 13–32% of the overall total, indicating that the numbers living beyond a river surveyors view may reach 20–40 % or more depending on conditions of the river valley.

The Vilyuiskoe Plateau is a rich diamond field to be developed over the next 50 years (several diamond pipe and placer deposits have already been mined; two hydro-electric power-stations have been constructed on the Vilyui River and a number of new roads and settlements have arisen). Because Middendorf's Bean Goose has a high average density on many rivers in this area it suggests a possible future threat for the goose.

## References

Degtyaryev, VG, NN Egorov, IM Okhlopkov & MD Tomshin. 2008. Structure of Middendorf's Bean Goose (*Anser fabalis middendorffi*) population on Vilyuiskoe plateau. *Zoologicheskii zhurnal* 87: 1084–1091. [in Russian with English summary]

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# Appendix: IUCN Red List categories and criteria

## Criterion A: Reduction in population size

| Main Criteria | Sub-criteria | Qualifiers | |
|---|---|---|---|
| Reduction ≥90% in 10 years or 3 generations (**CR**)<br>Reduction ≥70% in 10 years or 3 generations (**EN**)<br>Reduction ≥50% in 10 years or 3 generations (**VU**) | **1**. Reduction in the past (observed, estimated, inferred or suspected), where the causes are clearly reversible AND understood AND ceased, *based on a-e opposite* | **a**. Direct observation | **A1a** |
| | | **b**. Index of abundance | **A1b** |
| | | **c**. Decline in area of occupancy, extent of occurrence, and/or quality of habitat | **A1c** |
| | | **d**. Actual or potential levels of exploitation | **A1d** |
| | | **e**. Effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites | **A1e** |
| Reduction ≥80% in 10 years or 3 generations (**CR**)<br>Reduction ≥50% in 10 years or 3 generations (**EN**)<br>Reduction ≥30% in 10 years or 3 generations (**VU**) | **2**. Reduction in the past (observed, estimated, inferred or suspected), where the reduction or its causes may not be reversible OR understood OR have ceased, *based on a-e opposite* | **a**. As a above | **A2a** |
| | | **b**. As b above | **A2b** |
| | | **c**. As c above | **A2c** |
| | | **d**. As d above | **A2d** |
| | | **e**. As e above | **A2e** |
| Reduction ≥80% in 10 years or 3 generations (**CR**) *to 100 years max*<br>Reduction ≥50% in 10 years or 3 generations (**EN**) *to 100 years max*<br>Reduction ≥30% in 10 years or 3 generations (**VU**) *to 100 years max* | **3**. Reduction in the future (projected or suspected), *based on b-e opposite* | **b**. As b above | **A3b** |
| | | **c**. As c above | **A3c** |
| | | **d**. As d above | **A3d** |
| | | **e**. As e above | **A3e** |
| Reduction ≥80% in 10 years or 3 generations (**CR**) *to 100 years max*<br>Reduction ≥50% in 10 years or 3 generations (**EN**) *to 100 years max*<br>Reduction ≥30% in 10 years or 3 generations (**VU**) *to 100 years max* | **4**. Reduction includes the past and the future (observed, estimated, inferred, projected or suspected) where the reduction or its causes may not be reversible OR understood OR have ceased, *based on a-e opposite* | **a**. As a above | **A4a** |
| | | **b**. As b above | **A4b** |
| | | **c**. As c above | **A4c** |
| | | **d**. As d above | **A4d** |
| | | **e**. As e above | **A4e** |

## Criterion B: Small range, fragmented, declining or fluctuating

| Main Criteria | Sub-criteria | Qualifiers | |
|---|---|---|---|
| **1**. Extent of occurrence estimated <100km$^2$ (**CR**) *with at least two of a,b or c*<br><br>Extent of occurrence estimated <5,000km$^2$ (**EN**) *with at least two of a, b or c*<br><br>Extent of occurrence estimated <20,000km$^2$ (**VU**) *with at least two of a, b or c* | **a**. Severely fragmented;<br><br>or<br><br>At 1 location (**CR**)<br><br>At ≤5 locations (**EN**)<br><br>At ≤10 locations (**VU**) | None | **B1a** |
| | **b**. Continuing decline (observed, inferred or projected) *in any of i-v opposite* | **i**. Extent of occurrence | **B1bi** |
| | | **ii**. Area of occupancy | **B1bii** |
| | | **iii**. Area, extent and/or quality of habitat | **B1biii** |
| | | **iv**. Number of locations or subpopulations | **B1biv** |
| | | **v**. Number of mature individuals | **B1bv** |
| | **c**. Extreme fluctuations *in any of i-iv opposite* | **i**. Extent of occurrence | **B1ci** |
| | | **ii**. Area of occupancy | **B1cii** |
| | | **iii**. Number of locations or subpopulations | **B1ciii** |
| | | **iv**. Number of mature individuals | **B1civ** |
| **2**. Area of occupancy estimated <10km$^2$ (**CR**) *with at least two of a, b or c*<br><br>Area of occupancy estimated <500km$^2$ (**EN**) *with at least two of a, b or c*<br><br>Area of occupancy estimated <2000km$^2$ (**VU**) *with at least two of a, b or c* | **a**. As a above | None | **B2a** |
| | **b**. As b above *in any of i-v opposite* | **i**. Extent of occurrence | **B2bi** |
| | | **ii**. Area of occupancy | **B2bii** |
| | | **iii**. Area, extent and/or quality of habitat | **B2biii** |
| | | **iv**. Number of locations or subpopulations | **B2biv** |
| | | **v**. Number of mature individuals | **B2bv** |
| | **c**. As c above *in any of i to iv opposit*e | **i**. Extent of occurrence | **B2ci** |
| | | **ii**. Area of occupancy | **B2cii** |
| | | **iii**. Number of locations or subpopulations | **B2ciii** |
| | | **iv**. Number of mature individuals | **B2civ** |

## Criterion C: Small population declining or fluctuating

| Main Criteria | Sub-criteria | Qualifiers | |
|---|---|---|---|
| Population <250 mature individuals (**CR**) *and either 1 or 2*<br><br>Population <2,500 mature individuals (**EN**) *and either 1 or 2*<br><br>Population <10,000 mature individuals (**VU**) *and either 1 or 2* | **1**. Continuing decline ≥25% in 3 years or 1 generation (**CR**) *to 100 years max*<br><br>Continuing decline ≥20% in 5 years or 2 generations (**EN**) *to 100 years max*<br><br>Continuing decline ≥10% in 10 years or 3 generations (**VU**) *to 100 years max* | None | **C1** |
| | **2**. Continuing decline (observed, projected or inferred) and *a and/or b opposite* | **ai.** All sub-pops ≤50 (**CR**)<br>All sub-pops ≤250 (**EN**)<br>All sub-pops ≤1,000 (VU) | **C2ai** |
| | | **aii.** ≥90% mature individuals in 1 sub-pop (**CR**)<br>≥95% mature individuals in 1 sub-pop (**EN**)<br>All mature individuals in 1 sub-pop (**VU**) | **C2aii** |
| | | **b**. Extreme fluctuations in number of mature individuals | **C2b** |

## Criterion D1: Very small population

| Main Criteria | Sub-criteria | Qualifiers | |
|---|---|---|---|
| Population <50 mature individuals (**CR**)<br><br>Population <250 mature individuals (**EN**)<br><br>Population <1,000 mature individuals (**VU**) | None | None | **D1** |

## Criterion D2: Very small range

| | | | |
|---|---|---|---|
| Area of occupancy typically <20km$^2$ or typically <6 locations (**VU** only - capable of becoming CR or EX in v. short time) | None | None | **D2** |

## Criterion E: Quantitative analysis

| | | | |
|---|---|---|---|
| Probability of extinction in wild >20% in 20 years or 5 gens (**EN**) *to 100 years max*<br><br>Probability of extinction in wild is 10% in 100 years (**VU**) | | | **E** |

**Wetlands International – IUCN SSC Threatened Waterfowl Specialist Group**

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