

# DISEASE SURVEILLANCE

## AVIAN INFLUENZA IN MIGRATORY BIRDS IN MONGOLIA

RESULTS OF EXTENSIVE SURVEYS 2006

Prepared by Martin Gilbert,  
Wildlife Conservation Society



# Disease Surveillance: Avian Influenza in Migratory Birds in Mongolia

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In Partnership with:  
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## **Executive Summary**

Since its emergence in 1997 and subsequent re-emergence in 2003, a highly pathogenic strain of avian influenza virus (AIV) subtype H5N1 has represented a serious threat to health of human and domestic poultry populations and disrupted economic stability across Asia, Africa and Europe. Prior to 2005 this strain of avian influenza had only occurred sporadically in wild bird populations. However, in spring 2005, an outbreak among migratory waterfowl at Qinghai Lake in China heralded a change in this situation with subsequent outbreaks reported in wild birds in Mongolia, Russia, Asia Minor and Europe.

This report details the results of an extensive survey of wetlands across Mongolia from July – October 2006 designed to:

1. Detect further presence of AIV subtype H5N1 among free-living water bird populations in Mongolia;
2. Determine the prevalence and geographic distribution of AIV subtypes, and other avian viruses, including Newcastle disease virus (NDV) in free-living water bird populations;
3. Record the diversity and size of bird populations present at survey sites;
4. Characterize the abiotic features of survey sites, to identify features that may predispose sites to AIV subtype H5N1 outbreaks;
5. Collect live virus for use in characterization and vaccine development.

A total of 42 lakes and wetland sites were surveyed (14 in Eastern Mongolia, and 28 in Central and Western Mongolia), covering over 7,000 km, including sites in 11 aimags. Systematic searches along shoreline transects at each of these sites totaling 338.5 km, resulted in the location of 655 dead, 14 sick and two injured birds of at least 42 species (decomposition precluded identification of all carcasses to species level). A further nine dead birds were located on route between survey sites, of which five were the result of collision with motor vehicles.

Tracheal and cloacal swabs were collected from 68 individual clinically healthy birds (of 15 species), 37 dead birds (of 16 species), 12 sick birds (of seven species), and two injured birds (of two species) at survey sites. Further samples were collected from a dead Great Cormorant located opportunistically on the roadside while traveling between survey sites. Environmental faecal samples collected from single-species congregations of birds were collected from 14 species and totaled 3,330 faecal swabs. Serum samples were collected from 48 healthy individuals (of eight species), four dead individuals (of four species), 12 sick individuals (of seven species) and two injured birds (of two species).

Only five of 120 birds sampled individually (including dead, sick, injured and healthy birds) were found to be positive for Influenza A virus. Of these all were negative for H5 and no viruses could be isolated. Of 620 pooled environmental faecal samples (each containing five faecal swabs) screened for Influenza A, 39 were found to be positive. Highest prevalence was found among Whooper Swans (individual prevalence within sample population of 0.04 – 0.18), samples collected from mixed swans (0.02 – 0.11), Black-headed Gulls (0.02 – 0.11) and Mongolian Gulls (0.02 – 0.09). Only one of these samples tested positive for haemagglutinin subtype H5 (from a pool collected from Red Crested Pochards), and only three viruses were recovered from embryonated chicken eggs. Each of these viruses showed growth characteristics of low pathogenic viruses and have been submitted for subtyping.

Numbers of sick and dead birds per kilometer recorded along shoreline transects were used as a comparative measure of mortality and morbidity at each site. Levels of mortality at three sites (Khar Nuur, Dorgen Nuur and a small lake Southeast of Boontsagaan Nuur) were comparable with that recorded at a known H5N1 outbreak in Erhel Nuur in 2005 (5.11 – 7.09 dead + sick birds  $\text{km}^{-1}$ ). Faecal samples collected at one of these sites and tracheal and cloacal samples from sick and recently dead birds at a second were negative for Influenza A using rRT-PCR. Numbers of dead birds at a fourth site along Tes Gol Delta at Uvs Nuur, greatly exceeded the densities recorded at all other sites (265 bird carcasses equivalent to 30.05 dead + sick birds  $\text{km}^{-1}$ ). No samples of diagnostic quality could be obtained at this site and so the cause of mortality cannot be confirmed.

In conclusion, no definitive evidence of outbreaks of highly pathogenic strains of avian influenza virus was found during the survey, suggesting that AIV subtype H5N1 is not widespread among populations of wild waterfowl in Mongolia. However, two isolates obtained during May 2006 were made by another research team at two lakes in central and northern Mongolia. Mortality associated with influenza A had also been recorded at these lakes in July and August 2005, with highly pathogenic AIV subtype H5N1 isolated at one of these sites (Erhel Lake). This suggests that there may be some site specificity in H5N1 outbreaks among wild birds in Mongolia, and more intensive surveillance is recommended at these sites in the future.

## **Section 1. Introduction**

### *1.1. GAINS*

The US Agency for International Development and the Centers for Disease Control are providing support to the Wildlife Conservation Society (WCS) to administer the wild bird Global Avian Influenza Network for Surveillance (GAINS) program. The primary objectives of GAINS are to expand operational field capabilities, improve the understanding of viral strains and transmission of influenza viruses in wild birds, and to disseminate information to all levels of governments, international organizations, the private sector and the general public.

One of the central themes of GAINS is the establishment of a global wild bird surveillance network by: improving the collection, coordination, and laboratory evaluation of samples from wild birds in order to identify locations of avian influenza viral strains; identifying genetic changes in virus isolates; enhancing links with wild bird distribution and migration information, and providing an early warning system for global spread of highly pathogenic avian influenza (HPAI) that threatens domestic poultry and human health as well as biodiversity (particularly avian).

The surveys described within this report were completed as part of the larger GAINS initiative, and the results have been made available through the GAINS web portal on <http://www.gains.org/>

### *1.2. Historical perspective*

Since its emergence in 1997 and subsequent re-emergence in 2003, a highly pathogenic strain of avian influenza virus (AIV) subtype H5N1 has led to the deaths of at least 154 people in 10 countries (World Health Organization, 29 November 2006). The virus has also been responsible for losses of many millions of domestic poultry through infection or control measures, significantly impacting economic growth and food security of affected countries. Prior to 2005, outbreaks in wild birds were sporadic, associated with high mortality and thought to relate to spillover from infected domestic poultry. The situation changed dramatically in April 2005, with the onset of an outbreak of AIV subtype H5N1 in wild migratory water birds at Qinghai Lake in northern China. Mortality was first detected in breeding Bar-headed Geese *Anser indicus*, but later affected smaller numbers of Great Cormorant *Phalacrocorax carbo*, Ruddy Shelduck *Tadorna ferruginea*, Pallas Gull *Larus ichthyaetus* and Brown-headed Gull *Larus brunnicephalus*. Over the course of 2 months, over 6,000 wild birds were reported to have died (Chen et al., 2005, Chen et al., 2006, Liu et al., 2005).

In the response to the outbreak at Qinghai Lake, the WCS Field Veterinary Program proposed an emergency expedition to assess the health of wild birds following similar migratory routes to those affected at Qinghai and determine whether further outbreaks were occurring. To this end, the WCS assembled a multi-sectoral team of Mongolian scientists and overseas experts to undertake a field survey of wild populations in Mongolia, an area immediately north of the Qinghai outbreak. The surveys, with financial support from the WCS and United Nations Food and Agriculture Organization (FAO), covered nine sites in central and western Mongolia. Laboratory support was provided by the United States Department of Agriculture – Agricultural Research Service, in Athens GA.

During the course of the 2005 survey, faecal samples were obtained from 862 live birds of five species across all sites. The species selected for sampling included those known to have succumbed to the virus in Qinghai Lake (Ruddy Shelduck, Bar-headed Goose), species closely related to those affected in Qinghai (Black-headed Gull *Larus ridibundus*, Mongolian Gull *Larus vagae mongolicus*), birds captured opportunistically (Eurasian Wigeon *Anas*

*penelope*), and Mongolian species where mortality was reported during the course of the survey period (Whooper Swan *Cygnus cygnus*). Where possible, attempts were made to capture live birds to draw blood and obtain oropharangeal and cloacal swabs. Further sampling and necropsy examinations were preformed on birds found freshly dead. Number and species of live birds were recorded at each site.

The survey team obtained isolates of H5N1 from a single Whooper Swan examined *post mortem* at Erhel Nuur, Khovsgol Aimag (A/Whooper Swan/Mongolia/244/05 (H5N1) (Mongolia/05)). Conversely, H5N1 was not identified in any faecal samples or samples obtained from birds captured live. The State Central Veterinary Laboratory (SCVL) obtained four further isolates from Erhel Nuur (including three dead Whooper swans and a dead Bar-headed Goose) that were later confirmed to be subtype H5N1 at the OIE Reference Laboratory for avian influenza at Hokkaido University, Japan (OIE report: [http://www.oie.int/eng/info/hebdo/AIS\\_55.HTM#Sec0](http://www.oie.int/eng/info/hebdo/AIS_55.HTM#Sec0)). A further Influenza A isolate was reported in August from a sick swan at Khunt Nuur, Bulgan Aimag (OIE report: [http://www.oie.int/eng/info/hebdo/AIS\\_58.HTM#Sec4](http://www.oie.int/eng/info/hebdo/AIS_58.HTM#Sec4)), but no further details of subtype were given.

### 1.3. Site selection

A combination of several features makes Mongolia an ideal location for understanding the epidemiology of AIV in wild birds. Firstly, Mongolia supports large populations of migratory waterfowl and shorebirds. These include species that breed across Mongolia's extensive network of wetlands during the boreal summer, departing to spend the winter in milder climates collectively encompassing areas of Australasia, the Indian Subcontinent, Africa, Southeast Asia, Southern and coastal China, the Korean peninsula, and Japan. Other species visit Mongolia for short periods to refuel while on passage to and from more northerly breeding areas. Mongolia also represents an important site for molting Anseriformes (ducks, geese and swans) that congregate during the post-breeding period when early frosts force them to vacate Siberian breeding sites.

A further advantage inherent in studies of AIV in wild birds in Mongolia is the opportunity to study virus in wild populations in isolation from domestic poultry. Mongolia has a small domestic poultry industry with a standing population of less than 100,000 birds(Sims, 2005), with most birds reared for egg production in moderately biosecure facilities located in urban centers. With little precedent for backyard production, the potential for wild birds being exposed to domestic sources of virus is negligible, allowing conclusions to be drawn on the status of AIV in wild birds.

### 1.4. Objectives of 2006 surveys

Following the success of the 2005 mission, a more extensive programme of surveillance was proposed in 2006. There were five primary objectives:

1. Detect further presence of AIV subtype H5N1 among free-living water bird populations in Mongolia;
2. Determine the prevalence and geographic distribution of AIV subtypes, and other avian viruses, including Newcastle disease virus (NDV) in free-living water bird populations;
3. Record the diversity and size of bird populations present at survey sites;
4. Characterize the abiotic features of survey sites, to identify features that may predispose sites to AIV subtype H5N1 outbreaks;
5. Collect live virus for use in characterization and vaccine development.

In order to meet these objectives an extensive approach was selected, conducting standardized surveys at multiple sites over a wide geographical area.

The prevalence of AIV subtype H5N1 is likely to be very low in wild bird populations (probably <1%). As a consequence, very large sample sizes are required for detecting virus among live healthy birds. However, AIV subtype H5N1 infections are also associated with high mortality in many wild species (Ellis et al., 2004, Chen et al., 2006, Chen et al., 2005, Liu et al., 2005). For this reason, 2006 surveys focused on collecting samples from sick and dead birds, as this represented the most sensitive strategy for detecting the presence of AIV subtype H5N1 at a survey site (Objective 1).

Several approaches were taken to determine the prevalence of AIV subtypes and NDV, including collection of faecal samples from congregatory water birds and live bird capture. Faecal sampling has been shown to be an effective method of detecting a range of AIV subtypes (Munster et al., 2006), but may be less sensitive as a method of detecting highly pathogenic subtype H5N1 (Brown et al., 2006).

## Section 2. Methods

### 2.1. Site Selection

Surveys were carried out in two stages (Figure 1), the first covering sites in the Eastern Steppe from 22 July to 14 August 2006, and Central and Western Mongolia from 25 August to 6 October 2006. Surveys focused on lakes of variable size, with sites selected on the basis of previous surveys in 2005, advice from local ornithologists (indicating sites where birds were known to congregate), and sites located opportunistically while on route.

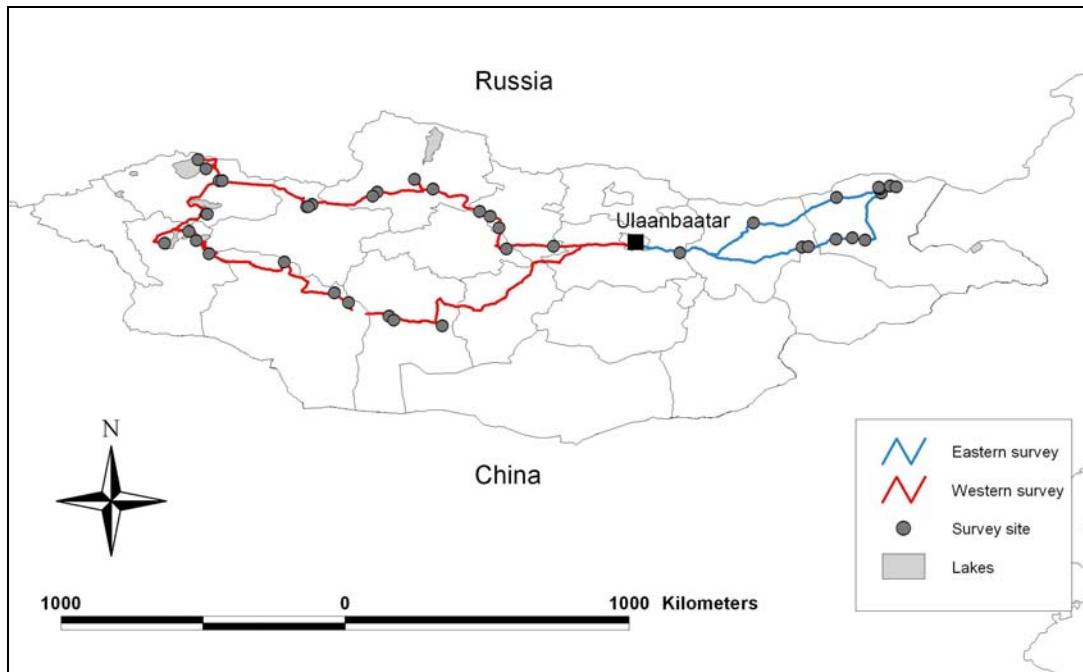


Figure 1. Map depicting 2006 survey sites and route.

### 2.2. Field surveys

#### 2.2.1. Live bird surveys

Standardized counts were performed at each site using the guidelines presented in Delaney (2005). Point counts of all species observed were made from one or more vantage points around the lake shore, taking care to avoid double counting. Visibility, weather and wind strength were recorded. Wherever possible, counts encompassed the whole lake, however, where lake size, geography or visibility prevented this an estimate of survey area was made using digitized maps and hand held global positioning systems (GPS). Point counts were supplemented with active searching to provide a more comprehensive list of species present at each site.

#### 2.2.2. Mortality/morbidity surveys and necropsy

Shoreline transects were delineated at each site and were systematically searched for sick and dead birds. Where possible these transects completely circumnavigated the water body, or at least exceeded 5 km on larger lakes. Transects and location of sick and dead birds were geo-referenced. An index of mortality/morbidity was obtained by dividing the total number of sick and dead birds located with the length of transect traversed (sick and dead birds  $\text{km}^{-1}$ ).

Wherever possible, sick and dead birds were identified to species, sex, age and approximate time since death (as less than one day, more than one day but less than one week, more than one week but less than one month and more than one month). Obvious signs of predation or scavenging were recorded and a photo record made of each bird. Where species could not be determined due to carcass condition identity was recorded to highest taxonomic level possible (e.g. "duck sp.") or simply listed as "unknown".

Personnel involved in searching transects wore protective rubber boots, while N95 respirators and latex gloves were worn whenever live or dead birds were handled. Blood was drawn from all sick birds, which were then euthanized using an intravenous overdose of barbiturate. Necropsy examinations were performed on all sick and freshly dead birds. Disposable coveralls and eye shields were worn in addition to boots, N95 respirators and latex gloves when sampling sick birds and during necropsy. Tissues samples were fixed in 10% formalin (changed twice at 2 week intervals). A list of necropsy tissue samples collected is given in Appendix IV. Further samples of lung, spleen, brain and pancreas were collected in viral transport medium from selected cases and frozen in the field using liquid nitrogen.

All carcasses and consumables used in necropsy examination were burned on site and buried at a depth of at least 50 cm. Rubber boots were disinfected with a 10% bleach solution between sites.

#### 2.2.3. Water quality

An assessment of water quality was made following the standard protocols outlined by the U.S. Geological Survey Techniques of Water-Resources Investigations (Radtke et al., 2005, Wilde, 2006, Wilde et al., 2006). A YSI model 63 handheld water meter (YSI Corp. Yellow Springs, OH) was used to measure pH, salinity, conductivity and temperature. The instrument was calibrated at each site using two pH buffers (pH 7.0 and 10.0) and one conductivity standard (1,000  $\mu\text{S}/\text{cm}$  for fresh water and 10,000  $\mu\text{S}/\text{cm}$  for brackish water). Buffers were allowed to equilibrate to the temperature of water under test. The probe was cleaned thoroughly between sites using de-ionized water and placed in a storage solution until required again at the next site.

Water quality readings were collected in-situ, at three locations on each lake. The probe was immersed to a depth of 15 to 31 cm. in water depths of 24 to 62 cm. The median reading for each parameter was taken from each location, and mean conductivity (recorded to the nearest 0.001  $\mu\text{S}/\text{cm}$  compensated to 25°C), mean salinity (recorded to the nearest 0.1 ppt) and mean temperature (recorded to the nearest 0.1°C) taken across all three locations. Mean pH (recorded to the nearest 0.1) was taken by first converting median pH at each location to hydrogen ion activation (using activity =  $10^{-\text{pH}}$ ), calculating the mean activity across all three locations and then converting back to pH units (using pH = (-) (log10)(mean H<sup>+</sup> activity)).

#### 2.2.4. Capture

Live healthy birds were captured using a number of methods including mist nets, and leg nooses. Moulting waterfowl were captured with the use of drive techniques, herding birds into a catch cage. Moulting swans were captured by herding away from water with capture by hand after a short pursuit.

### 2.3. Sample collection

Samples were collected from all live healthy birds captured and all sick and dead birds recovered in suitable condition. Tracheal and cloacal swabs were collected from each bird and stored in viral transport media. Oropharyngeal swabs were collected in place of tracheal swabs in smaller species such as passerines and small shorebirds (eg. *Calidris* spp.). Environmental faecal samples were collected opportunistically in areas where single species congregations ensured that faeces could be linked to species with certainty. Samples were frozen in the field using liquid nitrogen either immediately post collection or within six hours. Where immediate cryopreservation was not possible, samples were held in a field refrigerator at 4 Celsius. Cold chain was maintained through export and delivery of the samples to the USDA Southeast Poultry Research Laboratory, Georgia, United States.

### 2.4. Diagnostics

#### 2.4.1. RT-PCR and Virus Isolation

Swab samples were stored in the laboratory at -70°C until they were processed for RNA. Total RNA was extracted with a procedure optimized for cloacal swab samples. The RNA

was screened for AIV by real-time RT-PCR (rRT-PCR) using the USDA standard protocol (Spackman et al., 2002) with the Cepheid Smart Cycler II, real-time RT-PCR instrument. The rRT-PCR test was run with an internal positive control (Das et al., 2006) to ensure that inhibitors were not causing false negative results. All rRT-PCR positive samples were processed for virus isolation in embryonated chicken eggs and were tested for H5 subtype virus by the USDA H5 rRT-PCR test. Amnio-allantoic fluid from eggs inoculated for virus isolation which were positive for hemagglutination, an indicator of the presence of virus, were processed for RNA and run on the AIV rRT-PCR to confirm virus presence. If the AIV rRT-PCR was negative the samples were tested for avian paramyxovirus type-1 by rRT-PCR and were cultured for the presence of bacteria.

#### 2.4.2. Histopathology

All tissues were fixed in 10% neutral buffered formalin, processed routinely, embedded in paraffin, cut at 5 microns and stained with hematoxylin and eosin. Special staining for pathogens was performed, as indicated, in several cases. All cases were reviewed by WCS Veterinary Pathologists, both of whom are certified as Diplomates by the American College of Veterinary Pathologists.

#### 2.4.3. Synbiotics

Synbiotic Rapid tests (Synbiotic Corporation, San Diego, CA) were used to test sick, freshly dead and a selection of live healthy birds. This lateral flow assay is designed to detect Influenza Type A antigen using two antibodies specific to the P56 nucleoprotein of Influenza Type A viruses. The first of these antibodies forms a complex with antigen in the sample, which migrates along the test strip to be captured by the second antibody along a reaction line. Accumulation of this complex causes the formation of a clear pink/purple band on the test strip. A second control band of identical colour indicates that the test was performed correctly.

The test was performed following manufacturers instructions using tracheal and cloacal swabs preserved in viral transport media. In most cases the test was performed within minutes of sample collection, but in some cases (notably in Whooper Swans), samples were frozen in liquid nitrogen before testing.

### **Section 3. Results**

#### *3.1. Site selection*

Surveys were conducted in a total of 42 sites (14 in Eastern Mongolia, and 28 in Central and Western Mongolia, Figure 1). These included 6 sites surveyed in 2005. In total, the survey team covered over 7,000 km, including 11 of the 21 aimags (provinces).

#### *3.2. Field surveys*

##### *3.2.1. Live bird surveys*

A total of 112,746 individuals of 159 species were observed at survey sites. Details of species and numbers observed are given in Appendix II.

Adult Red-necked Stints *Calidris ruficollis* wearing orange leg flags were observed at three sites in eastern Mongolia (Site 2 on 23 July, Site 10 on 29 July, Site 8 on 7 August 2006). These records were reported to the Australasian Wader Studies Group who confirmed that these individuals had been marked in Victoria, Australia sometime after 1990 (a distance of over 10,000 km).

Significant numbers of globally threatened species were observed at several sites during the survey, and numbers of congregatory waterbirds exceeded the threshold of 1% of the regional population at several lakes warranting listing as Important Bird Areas (IBAs) under the standard global criteria developed by BirdLife International. Based on observations made during these surveys 16 previously unlisted sites were proposed as future IBAs, warranting special protective measures at a workshop hosted by BirdLife International and Wildlife Science and Conservation Centre of Mongolia, Ulaanbaatar 19 – 20 April 2007 (Table 1).

<b>Site Number</b>	<b>Site Name</b>	<b>IBA criteria</b>
2	Guremin Nuur	A1
4	Ereenii Burd Nuur	A1
5	Khotongiin Nuur	A1
6	Shaazan Nuur	A1
7	Chuchin Nuur	A1
8, 9, 10	Kaichin/Khorin/Delger Tsaagan Nuur	A1, A3iii
12	Bus Nuur	A1, A3iii
13	Turgenii Ikh Nuur	A1
14	Binder Tsaagan Nuur	A1
17	Khunt Nuur	A3iii
18	Small lake in Khuljiin Khondii	A1
19	Sharga Nuur	A1
24 (inc.25)	Oygon Nuur (inc. Shorbog Nuur)	A1, A3iii
37	Ereen Nuur	A1, A3iii
38	Taigam Nuur	A3iii
42	Kholboolj Nuur	A1

**Table 1. A summary of previously unlisted wetlands proposed for recognition as Important Bird Areas (IBAs) using internationally recognized criteria including presence of significant populations of globally threatened species (A1), and sites holding more than 1% of the biogeographic population of congregatory bird species (A3ii).**

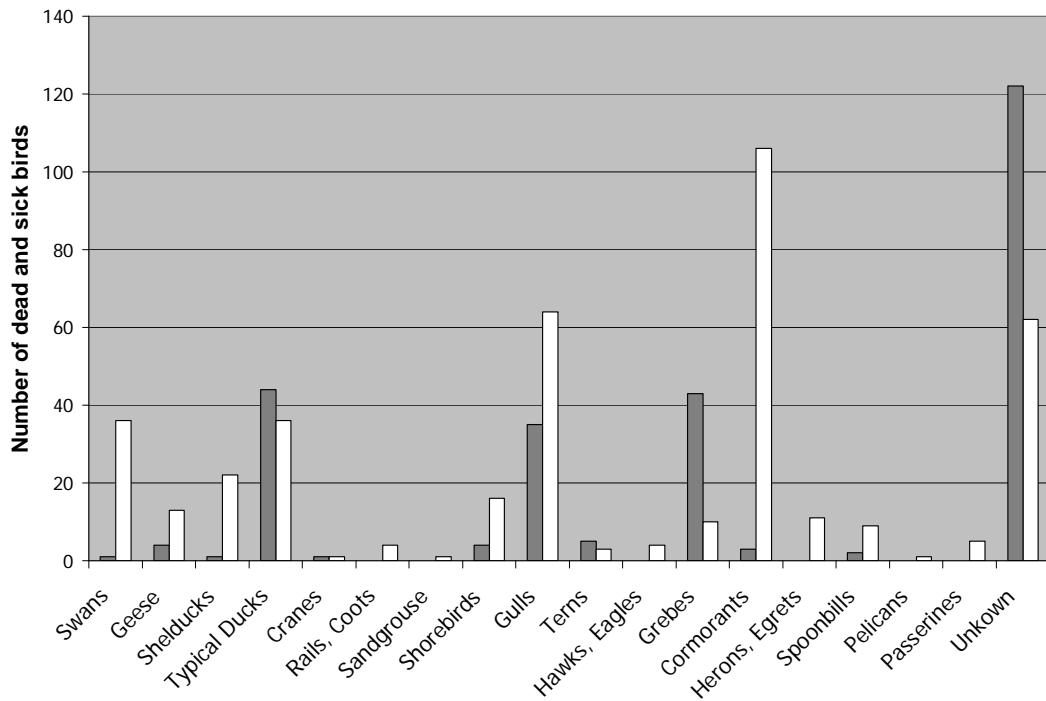
##### *3.2.2. Mortality/morbidity surveys and necropsy*

Combined shoreline transects of 338.5 km were searched across all survey sites, resulting in the location of 655 dead, 14 sick and two injured birds (Table 2) representing at least 42 species (it was not possible to identify all carcasses to species level due to decomposition in some cases). A further nine dead birds were located on route between survey sites, of which five were the result of collision with motor vehicles. Numbers of sick and dead birds located, grouped by taxonomic group are illustrated in Figure 2.

Site no.	Site name	No. of dead birds	No. of sick birds	Transect length (km)	Dead/sick birds km <sup>-1</sup>
1	Ikh Gun Nuur	0	0	3.48	0.00
2	Guremiin Nuur	2	0	9.03	0.22
3	Small Pool near Khar Chuluut Uul	0	0	1.01	0.00
4	Ereenii Burd Nuur	1	0	6.71	0.15
5	Khotongiin Nuur	2	0	11.00	0.18
6	Shaazan Nuur	1	0	6.39	0.16
7	Chuhiin Nuur	0	0	5.79	0.00
8	Khaichiin Tsagaan Nuur	9	1	13.10	0.76
9	Khorin Tsagaan Nuur	5	1	8.34	0.72
10	Delger Nuur	3	0	7.58	0.40
11	Suujiin Tsagaan Nuur	10	0	5.31	1.88
12	Bus Nuur	9	0	7.58	1.19
13	Turgenii Ikh Nuur	2	0	7.13	0.28
14	Binder Tsagaan Nuur	4	0	2.28	1.75
15	Dashinchilen Tsagaan Nuur	1	0	7.89	0.13
16	Ogii Nuur	3	1	10.07	0.40
17	Khunt Nuur	1	0	4.74	0.21
18	Small lake in Khuljiin Khondii	0	0	1.29	0.00
19	Sharga Nuur	7	0	20.55	0.34
20	Achmagg Nuur	2	0	6.42	0.31
21	Erhel Nuur	59	1	23.70	2.53
22	Ulaan Nuur	4	1	4.05	1.23
23	Tunamal Nuur	7	0	17.06	0.41
24	Oygon Nuur	3	0	2.74	1.09
25	Shorbog Nuur	8	0	7.73	1.03
26	Nogoon Nuur	0	0	6.87	0.00
27	Sharbart Nuur	5	0	3.97	1.26
28	Baga Nuur	22	0	10.50	2.10
29	Uvs Nuur - Tes Gol Delta	265	0	8.82	30.05
30	Uvs Nuur - Mouth of Narun Gol	29	0	14.63	1.98
31	Zost Nuur	23	5	9.78	2.86
32	Airag Nuur	9	1	8.69	1.15
33	Dalay Nuur	5	0	5.28	0.95
34	Khar Us Nuur	5	0	4.97	1.01
35	Khar Nuur	30	0	5.16	5.81
36	Dorgen Nuur	37	0	5.22	7.09
37	Ereen Nuur	9	0	9.61	0.94
38	Taigam Nuur	13	1	7.27	1.93
39	Small lake nr. Bayan Undur Bag (Bupzuua)	2	0	2.24	0.89
40	Boontsagaan Nuur	21	0	20.53	1.02
41	Small lake SE of Boontsagaan Nuur	31	1	4.77	6.71
42	Kholboolj Nuur (Laesan Lake)	6	1	9.23	0.76

**Table 2. Total sick and dead birds found along shoreline transects at study sites. Numbers of sick and dead birds located per kilometer are given to provide an index of mortality/morbidity to facilitate comparison between sites.**

Indices of mortality/morbidity (dead + sick birds km<sup>-1</sup>) varied from 0 to 30.05 birds km<sup>-1</sup>. Only five sites failed to yield any sick or dead birds, and mortality morbidity indices exceeded 2.00 birds km<sup>-1</sup> at only seven sites. Of these, relative mortality had been particularly high at one site (Uvs Nuur - Tes Gol Delta), where 265 dead birds were found along 8.82 km of shoreline.



**Figure 2. Numbers of dead and sick birds located during shoreline transects at survey sites.** Species are grouped along general taxonomic lines for clarity. Dead birds found along transects at Uvs Nuur along the Tes Gol delta are indicated separately (shaded bars), from those at all other sites (white bars).

### 3.2.3. Water quality

An assessment of water quality was made in 33 of the 42 sites surveyed. Damage to the delicate pH probe prevented assessment of water quality at all sites. Water quality statistics are summarized in Appendix III.

Without exception, all lakes tested were alkaline, with measured pH ranging from 7.63 (site 34) to 9.99 (site 37).

The majority of sites surveyed (25:33) were considered brackish (0.5 – 30 ppt), with seven considered freshwater (<0.5 ppt), and only one (site 39) considered saline (>30 ppt). Specific conductivity ranged from 0.201 mS (site 37) to 60.756 mS (site 39).

As expected, water temperature generally declined during the study period, although there was some covariation that may have been due to physical features of lake systems (eg. surface area, and depth). Highest maximum temperature of 27.6°C was recorded at site 11 on 2 August, with a lowest minimum recording of 7.5°C at site 25 on 8 September.

### 3.2.4. Capture

Live captures of 68 individual clinically healthy birds were made at six sites, representing 15 species. Individual faecal samples were collected from a further two individual birds of two species.

From 1 – 5 August, 11 Whooper Swans were captured at Sites 9 and 10 as part of a collaborative study with the FAO, United States Geological Survey (USGS) and Mongolian Academy of Sciences. Morphometric data collected from an additional swan captured on 5 August at Site 9 was consistent with the bird being a Tundra Swan. However, bill coloration was atypical for the species (with yellow bill base forming a pointed wedge shape). Although there is known to be considerable variation in the bill coloration of Tundra Swans, it is also

possible that this individual may have represented a Whooper x Tundra Swan (*Cygnus cygnus/columbianus*) hybrid. Blood and Mallophagous lice were collected to aide in species identification.

Satellite transmitters with GPS capabilities (Microwave Telemetry Ltd. Columbia, MD) were fitted to 10 swans (including the possible hybrid) using backpack harnesses. Positions obtained from these transmitters can be accessed on the web at:  
<http://www.werc.usgs.gov/sattrack/whooperswan/overall.html>.

Following the placement of packs, signals were received from all ten units deployed and showed localised movements. These movements mainly occurred between the two capture lakes where the fieldwork took place. During late August and September, birds began to disperse more widely with some local movement as far as 160 km from the tagging site. Four birds were observed to move in a northerly direction across into Russia. By late September - early October signals were still being received from seven transmitters indicating a southerly movement of all birds. The majority of birds ( $n = 5$ ) travelled due south, approximately 700 km to a staging lake just north of Beijing, China where they remained for 2 - 3 weeks. By the beginning of November, these birds moved in a south-easterly direction with a few stops inland, but continuing to the Bohai Bay/Yellow Sea coast where they staged in widely separated localities. Of the two birds showing alternative strategies, one moved via a more easterly route and reached the Korean peninsula approximately 1 - 2 weeks before the main group. Another showed a more westerly route but its signal was lost shortly afterward in South-East Mongolia on 9 October. The birds have subsequently remained along this coast with one bird wintering on Shandong Peninsula on the Chinese coast and the rest along the Korean peninsula, in either North or South Korea.

On 30 July 31 moulting Swan Geese were captured using drive nets as part of a collaborative study with USGS and Mongolian Academy of Sciences. The captured geese were measured, marked using neck collars and blood and swabs were collected from 29. Of these birds, 10 were fitted with satellite transmitters with GPS capabilities (Microwave Telemetry Ltd. Columbia, MD) using backpack harnesses. From 31 July – 2 August six of the captured geese (including five with satellite tags) were picked up incapacitated in the vicinity of the capture site. These birds were bright and alert, but showed severe ataxia and paraplegia consistent with exertional myopathy. Over the following days a further four marked Swan Geese were found dead at the site of which two were fitted with satellite transmitters.

The six incapacitated geese were given supportive care, with subcutaneous fluids, dexamethasone and physical therapy for up to five days. Of these, five birds showed no signs of improvement and were euthanized. The remaining bird resumed walking by 5 August, and was released. Necropsy examinations were performed on four of the euthanized geese, and tissue samples fixed for histopathology. Birds were found to be in poor body condition, with muscle blanching and striations to the distal muscles of both legs.

As a result of observed mortalities, further captures of Swan Geese were suspended. Increased holding times were thought to be the main predisposing factor leading to capture myopathy in these birds. Holding times were significantly longer in birds that were fitted with satellite transmitter harnesses, and in a subset of birds that were enclosed in a pen for a period to help lure additional birds into the drive nets.

Data from the three Swan Geese that showed no signs of myopathy can be accessed on <http://www.werc.usgs.gov/sattrack/swangoose/overall.html>. Of these, one continued to move in the vicinity of the capture lake until its transmitter ceased functioning on 19 September. A second migrated south, crossing the international border between China and North Korea on 6 November, spending several weeks on the Yellow Sea coast before its transmitter ceased functioning on 30 November 2006. The third bird migrated south to Jiangxi province, China,

where it spent the winter at Poyang Hu Wetland (Important Bird Area CN357), before beginning its northward migration in late March 2007.

### *3.3. Sample collection*

Tracheal and cloacal swabs were collected from 37 dead birds (of 16 species), 12 sick birds (of seven species), and two injured birds (of two species) at survey sites. Further samples were collected from a dead Great Cormorant located opportunistically on the roadside while traveling between survey sites.

Environmental faecal samples from single-species congregations of birds were collected from 12 species and totaled 3,110 faecal swabs. These samples were pooled in groups of five swabs per tube. An additional 220 faecal swabs (also pooled in groups of five) were collected from swans at site 42 that held all three species (Mute, Whooper and Tundra Swan), and could not be identified to species. An additional two faecal samples were collected from individual birds where defecation was observed.

Serum samples were collected from 48 healthy individuals (of eight species), four dead individuals (of four species), 12 sick individuals (of seven species) and two injured birds (of two species). These have been archived at the Southeast Poultry Research Laboratory for future analysis.

### *3.4. Diagnostics*

#### *3.4.1. RT-PCR and Virus Isolation*

Tracheal, oropharyngeal, faecal and cloacal swabs were submitted from 121 individual birds (including all dead, sick, injured and healthy birds sampled). Of these, 120 were screened for Influenza A using rRT-PCR, from which five were found to be positive (Table 3). All were found to be negative for haemagglutinin subtype H5, and no viruses were recovered from embryonated chicken eggs.

A total of 666 pooled environmental faecal samples (each containing five faecal swabs) representing 13 species were submitted (Table 4). Of these, 620 were screened for Influenza A, of which 39 were found to be positive. Highest prevalence was found among Whooper Swans (individual prevalence within the sample of 0.04 – 0.18), samples collected from mixed swans (0.02 – 0.11), Black-headed Gulls (0.02 – 0.11) and Mongolian Gulls (0.02 – 0.09). Only one of these samples tested positive for haemagglutinin subtype H5 (from a pool collected from Red Crested Pochards), and only three viruses were recovered from embryonated chicken eggs. Each of these viruses showed growth characteristics of low pathogenic viruses and have been submitted for subtyping.

<b>Common name</b>	<b>Scientific name</b>	<b>Individuals sampled</b>	<b>Individuals submitted for RT-PCR</b>	<b>Positive RT-PCR</b>	<b>Influenza A viruses isolated?</b>
Great Crested Grebe	<i>Podiceps cristatus</i>	1	1		
Grey Heron	<i>Ardea cinerea</i>	1	1		
Great Cormorant	<i>Phalacrocorax carbo</i>	23	23		
Tundra Swan	<i>Cygnus columbianus</i>	1	1		
Whooper Swan	<i>Cygnus Cygnus</i>	11	11	1	No
Whooper/Tundra Swan	<i>Cygnus cygnus/columbianus</i>	1	1		
Swan Goose	<i>Anser cygnoides</i>	29	29		
Ruddy Shelduck	<i>Tadorna ferruginea</i>	4	4		
Common Shelduck	<i>Tadorna tadorna</i>	1	1		
Common Teal	<i>Anas crecca</i>	2	1		
Eurasian Wigeon	<i>Anas Penelope</i>	1	1		
Common Pochard	<i>Aythya ferina</i>	1	1		
Tufted Duck	<i>Aythya fuligula</i>	1	1		
Common Goldeneye	<i>Bucephala clangula</i>	3	3	1	No
Kentish Plover	<i>Charadrius alexandrinus</i>	2	2		
Northern Lapwing	<i>Vanellus vanellus</i>	2	2	1	No
Little Stint	<i>Calidris minuta</i>	2	2		
Temminck's Stint	<i>Calidris temminckii</i>	5	4		
Ruff	<i>Philomachus pugnax</i>	3	3		
Broad-billed Sandpiper	<i>Limicola falcinellus</i>	1	1		
Wood Sandpiper	<i>Tringa glareola</i>	1	1		
Common Snipe	<i>Gallinago gallinago</i>	1	1		
Black-winged Stilt	<i>Himantopus himantopus</i>	1	1		
Common Tern	<i>Sterna hirundo</i>	1	1		
Mongolian Gull	<i>Larus vagae mongolicus</i>	4	4		
Black-headed Gull	<i>Larus ridibundus</i>	3	3		
Golden Eagle	<i>Aquila chrysaetos</i>	1	1		
Upland Buzzard	<i>Buteo hemilasius</i>	1	1		
Black Kite	<i>Milvus migrans</i>	1	1		
Asian Short-toed Lark	<i>Calandrella cheleensis</i>	1	1	1	No
Horned Lark	<i>Eremophila alpestris</i>	1	1		
Bluethroat	<i>Luscinia svecica</i>	4	4	1	No
Sand Martin	<i>Riparia riparia</i>	1	1		
Siberian Chiffchaff	<i>Phylloscopus collybita</i>	4	4		
Small Whitethroat	<i>Sylvia minula</i>	2	2		
Eurasian Tree Sparrow	<i>Passer montanus</i>	1	1		

Table 3. A summary of tracheal, oropharyngeal, faecal and cloacal swabs collected and screened for Influenza A using real time RT-PCR and results of viral isolation using embryonated chickens eggs.

<b>Common name</b>	<b>Scientific name</b>	<b>Faecal pools collected (individuals)</b>	<b>Faecal pools submitted for RT-PCR (individuals)</b>	<b>Positive faecal pools</b>	<b>Minimum individual prevalence in sample</b>	<b>Maximum individual prevalence in sample</b>	<b>Influenza A viruses isolated</b>
Great Cormorant	<i>Phalacrocorax carbo</i>	158 (790)	149 (745)	6	0.01	0.04	1 positive
Whooper Swan	<i>Cygnus cygnus</i>	11 (55)	11 (55)	2	0.04	0.18	All negative
Swan spp.	<i>Cygnus spp.</i>	44 (220)	39 (195)	5	0.02	0.11	All negative
Swan Goose	<i>Anser cygnoides</i>	9 (45)	9 (45)	0	0.00	0.00	
Bar-headed Goose	<i>Anser indicus</i>	19 (95)	17 (85)	1	0.01	0.05	Negative
Ruddy Shelduck	<i>Tadorna ferruginae</i>	121 (605)	113 (565)	4	0.01	0.03	All negative
Common Shelduck	<i>Tadorna tadorna</i>	14 (70)	12 (60)	0	0.00	0.00	
Common Teal	<i>Anas crecca</i>	40 (200)	35 (175)	1	0.01	0.03	1 positive
Common Pochard	<i>Aythya ferina</i>	31 (155)	26 (130)	1	0.01	0.03	Negative
Red Crested Pochard	<i>Rhodonessa rufina</i>	42 (210)	40 (200)	3	0.01	0.07	All negative
Demoiselle Crane	<i>Grus virgo</i>	4 (20)	4 (20)	0	0.00	0.00	
Northern Lapwing	<i>Vanellus vanellus</i>	23 (115)	22 (110)	1	0.01	0.04	Negative
Mongolian Gull	<i>Larus vagae mongolicus</i>	76 (380)	71 (355)	7	0.02	0.09	1 positive
Black-headed Gull	<i>Larus ridibundus</i>	74 (370)	72 (360)	8	0.02	0.11	All negative

**Table 4.** A summary of pooled environmental faecal samples (pooled in groups of five) collected and screened for Influenza A using real time RT-PCR. Minimum and maximum prevalence within sample group is calculated by assuming one positive faecal sample and five positive faecal samples per pool respectively. Results of viral isolation using embryonated chicken eggs are given.

### 3.4.2. Histopathology

Necropsy examinations were performed on 31 individual birds of 16 species (including 4 Swan Geese with exertional myopathy related to capture). The detailed findings of these examinations are provided in the necropsy reports (Appendix V). The most common finding across the group was the presence of parasites. Two birds also had a meningoencephalitis, of which one was bacterial (a drake Eurasian Wigeon, MN06-107) and the other possibly protozoal, viral or bacterial (a drake Ruddy Shelduck, MN06-066). Possible intranuclear inclusions were observed in the adrenal gland and pancreas of a female Black-headed Gull (MN06-100), possibly suggestive of a viral aetiology (herpes virus would be most likely). No lesions suggestive of avian influenza infection were observed in any of the cases examined.

### 3.4.3. Synbiotics

Synbiotic rapid tests were performed in the field on samples collected from 37 birds of 15 species (including 12 clinically healthy, 11 clinically sick and 14 dead birds, Table 5). Tracheal samples were tested in every case, however, due to supply limitations, cloacal samples were only tested in 24 cases. Tests were performed within minutes of sampling in all cases, with the exception of the Whooper Swan samples. These latter were chilled at 4°C for up to three hours before immersion in liquid nitrogen.

Site	Sampling date	Scientific name	Anima l ID	Health status	Trach. Swab Result	Cloac. Swab Result	PCR Result - Trach.	PCR Result - Cloaca
10	1-Aug-06	<i>Cygnus cygnus</i>	MN06-032	Healthy	Neg	Neg	Neg	Neg
10	3-Aug-06	<i>Cygnus cygnus</i>	MN06-034	Healthy	Neg	Neg	Neg	Neg
10	3-Aug-06	<i>Cygnus cygnus</i>	MN06-035	Healthy	Neg	Neg	Neg	Neg
10	3-Aug-06	<i>Cygnus cygnus</i>	MN06-036	Healthy	Neg	Neg	Neg	Neg
9	3-Aug-06	<i>Cygnus cygnus</i>	MN06-037	Healthy	Neg	Neg	Neg	Neg
9	3-Aug-06	<i>Cygnus cygnus</i>	MN06-038	Healthy	Neg	Neg	Neg	Neg
9	3-Aug-06	<i>Cygnus cygnus</i>	MN06-039	Healthy	Neg*	Neg	Neg	Neg
9	3-Aug-06	<i>Cygnus cygnus</i>	MN06-040	Healthy	Neg	Neg	Neg	Neg
9	3-Aug-06	<i>Cygnus cygnus</i>	MN06-041	Healthy	Neg*	Neg	Neg	Neg
9	3-Aug-06	<i>Cygnus cygnus</i>	MN06-042	Healthy	Neg	Neg	Neg	Pos
9	3-Aug-06	<i>Cygnus cygnus</i>	MN06-043	Healthy	Neg	Neg	Neg	Neg
9	3-Aug-06	<i>C. cygnus / columbianus</i>	MN06-044	Healthy	Neg	Neg	Neg	Neg
8	7-Aug-06	<i>Tadorna ferruginea</i>	MN06-045	Sick	Neg	Neg	Neg	Neg
9	8-Aug-06	<i>Aythya ferina</i>	MN06-048	Dead	Neg	Not tested	Neg	N/A
9	8-Aug-06	<i>Bucephala clangula</i>	MN06-049	Sick	Neg	Neg	Neg	Neg
9	8-Aug-06	<i>Tringa glareola</i>	MN06-050	Dead	Neg	Neg	Neg	Neg

16	27-Aug-06	<i>Phalacrocorax carbo</i>	MN06-051	Sick	Neg	Neg	Neg	Neg
16	27-Aug-06	<i>Larus ridibundus</i>	MN06-052	Dead	Neg	Not tested	Neg	N/A
21	2-Sep-06	<i>Phalacrocorax carbo</i>	MN06-060	Sick	Equiv	Not tested	Neg	N/A
21	2-Sep-06	<i>Aythya fuligula</i>	MN06-062	Dead	Neg	Not tested	Neg	N/A
20	4-Sep-06	<i>Tadorna ferruginea</i>	MN06-066	Dead	Neg	Not tested	Neg	N/A
27	10-Sep-06	<i>Vanellus vanellus</i>	MN06-080	Dead	Neg	Not tested	Neg	N/A
31	17-Sep-06	<i>Phalacrocorax carbo</i>	MN06-099	Sick	Neg	Not tested	Neg	N/A
31	18-Sep-06	<i>Larus ridibundus</i>	MN06-100	Sick	Neg	Not tested	Neg	N/A
31	18-Sep-06	<i>Cygnus columbianus</i>	MN06-101	Dead	Neg	Not tested	Neg	N/A
31	18-Sep-06	<i>Phalacrocorax carbo</i>	MN06-102	Sick	Neg	Not tested	Neg	N/A
31	19-Sep-06	<i>Vanellus vanellus</i>	MN06-103	Sick	Neg	Not tested	Neg	N/A
37	27-Sep-06	<i>Aquila chrysaetos</i>	MN06-106	Dead	Neg	Not tested	Neg	N/A
38	29-Sep-06	<i>Anas penelope</i>	MN06-107	Sick	Neg	Not tested	Neg	N/A
41	1-Oct-06	<i>Phalacrocorax carbo</i>	MN06-113	Sick	Equiv	Neg	Neg	Neg
41	1-Oct-06	<i>Ardea cinerea</i>	MN06-114	Dead	Equiv	Equiv	Neg	Neg
41	1-Oct-06	<i>Phalacrocorax carbo</i>	MN06-115	Dead	Equiv	Equiv	Neg	Neg
41	1-Oct-06	<i>Phalacrocorax carbo</i>	MN06-116	Dead	Equiv	Equiv	Neg	Neg
41	1-Oct-06	<i>Phalacrocorax carbo</i>	MN06-117	Dead	Equiv	Equiv	Neg	Neg
41	2-Oct-06	<i>Anas crecca</i>	MN06-118	Dead	Equiv	Equiv	Neg	Neg
41	2-Oct-06	<i>Phalacrocorax carbo</i>	MN06-119	Dead	Equiv	Equiv	Neg	Neg
42	4-Oct-06	<i>Himantopus himantopus</i>	MN06-121	Sick	Equiv	Equiv	Neg	Neg

**Table 5. Summarizing the results of Synbiotic assays performed. Test results are given as positive (Pos), negative (Neg) or equivocal (Equiv). N/A indicates results that are not applicable.**

\* indicates samples that required re-testing due to lack of a control line on the test strip invalidating the initial round of testing.

No test results were clearly positive. It was necessary to repeat tests in two cases, both tracheal swabs in Whooper Swans, due to the absence of a control line during the first round of testing (Table 5). Test results where a faint pink/purple band was visible in place of the reaction line were considered equivocal. Equivocal test results were returned on nine sick and dead birds sampled at three sites (Table 5). In equivocal cases where paired samples were tested (N=8), seven cases returned equivocal results on both tracheal and cloacal samples.

#### **Section 4. Discussion**

No evidence of highly pathogenic subtypes of avian influenza was detected at any of the 42 lakes during the survey period. The prevalence rates of Influenza A detected using rRT-PCR among birds sampled individually (5:120) or as pooled environmental faecal samples (39:620) are similar to those found in previous studies (Stallknecht et al., 1990, Hanson et al., 2003, Wallensten et al., 2006, Krauss et al., 2004, Fouchier et al., 2005, Munster et al., 2006, Munster et al., 2005). The single H5 found using rRT-PCR in a faecal pool collected from congregations of live Red Crested Pochards is not to be unexpected, and although no virus could be isolated from this sample, there is no reason to suspect this virus was highly pathogenic.

High rates of mortality are a useful indicator that highly pathogenic subtypes of avian influenza are present in local wild bird populations. During the 2005 outbreak of H5N1 at Erhel Nuur, the State Veterinary Services reported 80 dead birds to the OIE ([http://www.oie.int/eng/info/hebdo/AIS\\_58.HTM#Sec4](http://www.oie.int/eng/info/hebdo/AIS_58.HTM#Sec4)). A further 41 dead birds were recorded by the collaborative team led by the WCS during their visit to the site (7-9 August 2005). This would have been equivalent to a mortality/morbidity index of 5.11 dead + sick birds km<sup>-1</sup> following the methods described in this study. During the 2006 surveys, comparable mortality/morbidity indices were only recorded at three sites: Khar Nuur, Dorgen Nuur, and a small lake Southeast of Boontsagaan Nuur (with mortality/morbidity indices of 5.81, 7.09 and 6.71 dead + sick birds km<sup>-1</sup> respectively). Considerably higher levels of mortality were recorded at a fourth site, the Tes Gol Delta region of Uvs Nuur where 30.05 dead + sick birds km<sup>-1</sup> were recorded.

Khar Nuur and Dorgen Nuur are neighbouring lakes representing a contiguous body of water in Hovd, Altai and Zavhan aimags. A total of 30 dead birds of at least 13 species were found along a 5.16 km section of western Khar Nuur, while 37 dead birds of at least two species, predominantly Great Cormorant (n = 33) were found along 5.22 km of Dorgen Nuur. Three dead birds at each site could not be identified to species. Decomposition of carcasses at both sites was too advanced to permit sampling, and faecal samples collected from 40 Great Cormorants at Khar Nuur were negative for Influenza A on rRT-PCR.

At a small lake Southeast of Boontsagaan Nuur, 31 dead birds of at least 12 species and one sick Great Cormorant were found along 4.77 km of shore transect (one carcass could not be identified to species level). Necropsy examinations were preformed on seven of these birds (five Great Cormorants, one Common Teal, and one Grey Heron). All samples from these birds were negative for Influenza A on rRt-PCR. All seven cases returned equivocal results when tested using symbiotic rapid tests on both tracheal (7:7) and cloacal (6:7) swabs. All of the cormorants examined were in poor body condition, with heavy burdens of gastrointestinal nematodes and trematodes. Autolysis was advanced in several cases obscuring a definitive diagnosis. Tissues collected from the Common Teal were found to have a gram-negative pneumonia (consistent with a *Salmonella* spp.).

The decision to survey the Tes Gol Delta region was made on the basis of news reports circulating in late June describing large numbers of wild birds dying along the shores of Uvs Nuur in Russia's Tuva republic (ProMED-mail. Avian Influenza (145) – Russia (Siberia). ProMED-mail 2006; 28 Jun: 20060628.1791. <<http://www.promedmail.org>>. Accessed 2 July 2006). Sources at the Russian Emergencies ministry reported that at least 1,622 birds had been found dead along the shores of Uvs Nuur from 15 – 27 June 2006, and that avian influenza subtype H5N1 had been isolated. However, this outbreak was never reported to the OIE, and conflicting media reports emerged suggesting that the deaths may have been related to poisoning, as the mortality event had been preceded by death of fish along the Tes-Khem River.

Uvs Nuur is Mongolia's largest lake, with its shoreline running through Mongolian and Russian territory. Permission and assistance in reaching this remote frontier area were obtained through State Border Defense Agency: Tes Soum Post, Tes Soum Agricultural Agency and the Tes Soum Environmental Inspection Office, and sections of lakeshore adjacent to the border were surveyed on 14 September.

Remains of at least 265 bird carcasses were located along 8.82 km of shoreline transect, clearly confirming that a significant mortality event had taken place. The majority of carcasses examined were in an advance state of decomposition, and none were in a condition conducive to sample collection. Carcasses representing at least 16 species were recovered including groups occupying a variety of ecological and tropic niches (fig. 2 and Appendix II). Many of the carcasses were in the process of moulting flight feathers suggesting that mortality continued into July when many species begin to moult.

In order to determine whether the mortality event had been localized further surveys targeted a section of lakeshore running north of the mouth of Narun Gol (approximately 37 km south of the Tes Gol transects). Despite recording high densities of waterfowl at this second site, numbers of sick and dead birds located were considerably lower (cf. 1.98 dead + sick birds  $\text{km}^{-1}$  at Narun Gol versus 30.05 dead + sick birds  $\text{km}^{-1}$  at Tes Gol). Thus we have reason to conclude that the mortality event was localized to the north eastern sections of lakeshore.

In the absence of further information we can only speculate as to the cause of the mortality event at Tes Gol. Mortality on such a large scale in multiple species groups from avian influenza subtype H5N1 has only been recorded at Qinghai Lake in 2005. Similar patterns of mortality would also be consistent with toxic incidents such as botulism. Given that avian influenza has been shown to recur annually in at least two areas in Mongolia, it is advised that surveillance focus on areas of north east Uvs Nuur in spring and summer 2007.

During 2006, nucleotide sequences from three isolates of avian influenza subtype H5N1 collected in Mongolia have been submitted to GenBank. The first of these ((A/whooper swan/Mongolia/2/06(H5N1))) was isolated from a sick Whooper Swan at Khunt Nuur, Saikhan soum in Bulgan aimag on 4 May 2006. Influenza A virus (OIE report: [http://www.oie.int/eng/info/hebdo/AIS\\_16.HTM#Sec8](http://www.oie.int/eng/info/hebdo/AIS_16.HTM#Sec8)). The second isolate came from a sample collected at by the State Veterinary Service at Erhel Nuur, and was submitted to GenBank on 30 November 2006 (Influenza A virus (A/common goldeneye/Mongolia/12/06(H5N1))). A third isolate was obtained from an unknown species of duck and reported as a low pathogenic avian influenza subtype H5N1 A/R (duck/Mongolia/54/01-duck/Mongolia/47/01). The location of this isolate was not reported.

Surveys at Khunt Nuur and Erhel Nuur were made on 29 August and 2-6 September 2006. The only evidence of mortality at Khunt Nuur was a single decomposed wing found along a 4.74 km shoreline transect. Signs of mortality are often evident many months after an outbreak (as observed at the Tes Gol Delta at Uvs Nuur), and so this finding was somewhat surprising at the site of a known H5N1 outbreak earlier in the year. However, there were signs that outbreak control measures had been in force at Khunt Nuur (including compulsory eviction of local herders and access restrictions), and it is possible that the local veterinary authorities had removed all carcasses from the site.

At Erhel Nuur, 59 dead birds and one sick Great Cormorant were recorded, which although lower than that reported during the 2005 outbreak still represented a higher mortality rate than was observed at most other sites (mortality/morbidity index of 2.53 dead + sick birds  $\text{km}^{-1}$ ). Notably these included 20 dead Whooper Swans, many of which showing signs of remigial moult, timing their death around late July or early August. Although it was not possible to determine the cause of death of such long-dead birds, the parallels to the 2005 outbreak (when at least 40 dead Whooper Swans were reported) are tantalizing, and in combination with the

H5N1 isolate obtained at Erhel in May 2006, suggest that the outbreak may have continued for a period of at least 2-3 months, or may alternatively represent a second 2006 outbreak.

The environmental persistence of AIVs is an important factor contributing to the potential for maintaining virus in wild bird populations. In general, persistence of AIVs is inversely proportional to temperature and salinity, and highest in slightly alkaline conditions (Brown et al., 2007). Water quality measurements were made at Erhel Nuur approximately 13 months after the outbreak in 2005. At this time, water salinity was found to be among the highest of those lakes surveyed with a salt content of 14.4 ppt ( $\pm$  0.4). Experimental trials using the H5N1 isolate obtained at Erhel in August 2005 (Brown et al., 2007), estimated a persistence of 28 days (for a starting viral concentration of 1 X 10<sup>6</sup> TCID<sub>50</sub>/ml water) and a 90% decline in infectivity after 5 days (1 log<sub>10</sub>) at 15 ppt, 17°C and pH 7.4. These temperatures are rather higher than those likely to be encountered in Erhel during July and August when the isolate was collected, so a marginally longer persistence might be expected during the time of the outbreak. The effect of the lower pH used in this experimental study is difficult to predict.

In conclusion no definitive evidence of outbreaks of highly pathogenic strains of avian influenza virus was found during the survey, suggesting that AIV subtype H5N1 is not widespread among populations of wild waterfowl in Mongolia. However, the isolates of highly pathogenic H5N1 obtained during May 2006 by the Central Veterinary Laboratory at Khunt Nuur and Erhel Nuur are significant. Influenza A viruses associated with sickness and mortality were found at both of these lakes during the previous summer (confirmed as highly pathogenic AIV subtype H5N1 at Erhel Nuur). Coupled with the lack of evidence for outbreaks at other sites this suggests that the general geographic area of central and northern Mongolia and perhaps these two lakes in particular may be the key in the occurrence of the virus. It is proposed that intensive surveillance efforts should focus on identifying and describing any future outbreaks at these sites, and attempts to identify wild carrier populations should be directed at the central and north of the country.

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## **Appendices**

- Appendix I: VTM Sample summary
- Appendix II. Species counts
- Appendix III. Water quality summary
- Appendix IV: Histopathology tissue list.
- Appendix V: Necropsy reports

**Appendix I: A summary of samples individual healthy, sick and dead birds sampled at each survey site. Samples collected included oropharangeal and cloacal swabs, or swabs of fresh faeces pooled in groups of five swabs per tube.**

Site	Common Name	Scientific Name	Healthy (Single)	Sick	Dead	Injured	Healthy (Pooled)
Site 1	Ruddy Shelduck	<i>Tadorna ferruginea</i>					15
Site 4	Eurasian Tree Sparrow	<i>Passer montanus</i>		1			
Site 6	Mongolian Gull	<i>Larus vagae mongolicus</i>					30
Site 7	Common Pochard	<i>Aythya ferina</i>					30
Site 8	Swan Goose	<i>Anser cygnoides</i>	29				
	Common Goldeneye	<i>Bucephala clangula</i>		1			
	Kentish Plover	<i>Charadrius alexandrinus</i>		2			
	Ruddy Shelduck	<i>Tadorna ferruginea</i>		1	1		
	Black-headed Gull	<i>Larus ridibundus</i>					30
Site 9	Common Pochard	<i>Aythya ferina</i>				1	
	Wood Sandpiper	<i>Tringa glareola</i>				1	
	Whooper Swan	<i>Cygnus Cygnus</i>		7			
	Whooper/Tundra Swan	<i>Cygnus Cygnus/columbianus</i>		1			
	Common Goldeneye	<i>Bucephala clangula</i>			1		
Site 10	Whooper Swan	<i>Cygnus Cygnus</i>	4				
	Northern Lapwing	<i>Vanellus vanellus</i>					5
Site 11	Common Shelduck	<i>Tadorna tadorna</i>					35
Site 12	Swan Goose	<i>Anser cygnoides</i>					30
	Great Cormorant	<i>Phalacrocorax carbo</i>					40
	Ruddy Shelduck	<i>Tadorna ferruginea</i>					110
Site 13	Demoiselle Crane	<i>Grus virgo</i>					20
Site 14	Swan Goose	<i>Anser cygnoides</i>					15
	Ruddy Shelduck	<i>Tadorna ferruginea</i>					5
Site 15	Ruddy Shelduck	<i>Tadorna ferruginea</i>					45
	Mongolian Gull	<i>Larus vagae mongolicus</i>					35
Site 16	Black-headed Gull	<i>Larus ridibundus</i>			2		
	Temminck's Stint	<i>Calidris temminckii</i>	3				

	Broad-billed Sandpiper	<i>Limicola falcinellus</i>	1	
	Common Tern	<i>Sterna hirundo</i>	1	
	Great Cormorant	<i>Phalacrocorax carbo</i>	1	30
Site 17	Common Teal	<i>Anas crecca</i>		100
	Ruddy Shelduck	<i>Tadorna ferruginea</i>		165
Site 18	Bar-headed Goose	<i>Anser indicus</i>		30
Site 19	Great Cormorant	<i>Phalacrocorax carbo</i>	1	20
	Bar-headed Goose	<i>Anser indicus</i>		60
	Whooper Swan	<i>Cygnus Cygnus</i>		30
Site 20	Ruddy Shelduck	<i>Tadorna ferruginea</i>	1	5
	Bar-headed Goose	<i>Anser indicus</i>		5
	Whooper Swan	<i>Cygnus Cygnus</i>		10
Site 21	Common Teal	<i>Anas crecca</i>	1	
	Tufted Duck	<i>Aythya fuligula</i>	1	
	Horned Lark	<i>Eremophila alpestris</i>	1	
	Mongolian Gull	<i>Larus vagae mongolicus</i>	2	100
	Ruff	<i>Philomachus pugnax</i>		
	Great Cormorant	<i>Phalacrocorax carbo</i>	1	
	Common Pochard	<i>Aythya ferina</i>		125
Site 22	Ruddy Shelduck	<i>Tadorna ferruginea</i>		80
	Great Cormorant	<i>Phalacrocorax carbo</i>	1	
	Upland Buzzard	<i>Buteo hemilasius</i>	1	
	Common Goldeneye	<i>Bucephala clangula</i>	1	
	Ruff	<i>Philomachus pugnax</i>		1
Site 23	Mongolian Gull	<i>Larus vagae mongolicus</i>		10
	Black Kite	<i>Milvus migrans</i>	1	
	Great Cormorant	<i>Phalacrocorax carbo</i>	2	20
	Ruddy Shelduck	<i>Tadorna ferruginea</i>		1
Site 24	Common Shelduck	<i>Tadorna tadorna</i>	1	
	Black-headed Gull	<i>Larus ridibundus</i>		160
	Ruddy Shelduck	<i>Tadorna ferruginea</i>		100
Site 25	Mongolian Gull	<i>Larus vagae mongolicus</i>	1	150

Site 26	Black-headed Gull	<i>Larus ridibundus</i>		80	
Site 27	Northern Lapwing	<i>Vanellus vanellus</i>	1	110	
Site 28	Great Cormorant	<i>Phalacrocorax carbo</i>	1		
	Little Stint	<i>Calidris minuta</i>	2		
	Temminck's Stint	<i>Calidris temminckii</i>	2		
	Common Snipe	<i>Gallinago gallinago</i>	1		
	Bluethroat	<i>Luscinia svecica</i>	4		
	Ruff	<i>Phylloscopus collybita</i>	4		
	Sand Martin	<i>Riparia riparia</i>	1		
	Small Whitethroat	<i>Sylvia minula</i>	2		
Site 30	Great Cormorant	<i>Phalacrocorax carbo</i>	2	1	200
Site 31	Northern Lapwing	<i>Vanellus vanellus</i>	1		
	Red Crested Pochard	<i>Rhodonessa rufina</i>		210	
Site 32	Tundra Swan	<i>Cygnus columbianus</i>	1		
	Great Cormorant	<i>Phalacrocorax carbo</i>	2	255	
	Black-headed Gull	<i>Larus ridibundus</i>	1	100	
	Mongolian Gull	<i>Larus vagae mongolicus</i>		40	
Site 35	Great Cormorant	<i>Phalacrocorax carbo</i>		40	
Site 37	Golden Eagle	<i>Aquila chrysatos</i>	1		
	Great Crested Grebe	<i>Podiceps cristatus</i>	1		
	Whooper Swan	<i>Cygnus cygnus</i>		15	
Site 38	Great Cormorant	<i>Phalacrocorax carbo</i>	1	125	
	Eurasian Wigeon	<i>Anas Penelope</i>	1		
	Common Teal	<i>Anas crecca</i>		100	
Site 39	Great Cormorant	<i>Phalacrocorax carbo</i>	1		
Site 40	Asian Short-toed Lark	<i>Calandrella cheleensis</i>	1		
	Mongolian Gull	<i>Larus vagae mongolicus</i>	1	15	
	Great Cormorant	<i>Phalacrocorax carbo</i>	2	60	
	Ruddy Shelduck	<i>Tadorna ferruginea</i>		40	
Site 41	Common Teal	<i>Anas crecca</i>	1		
	Grey Heron	<i>Ardea cinerea</i>	1		
	Great Cormorant	<i>Phalacrocorax carbo</i>	1	4	

Site 42	Black-winged Stilt	<i>Himantopus himantopus</i>	1	
	Swan spp.	<i>Cygnus spp.</i>		220
	Ruddy Shelduck	<i>Tadorna ferruginea</i>		40
	Common Shelduck	<i>Tadorna tadorna</i>		35
Non-Site	Great Cormorant	<i>Phalacrocorax carbo</i>	1	

**Appendix II. Detailed species counts made during 2006 surveys 22 July-6 October 2006. Nomenclature and taxonomy used conform to the checklist of the Oriental region (Inskipp et al., 2001), except for Mongolian Gull *Larus vegae mongolicus* considered distinct based on phenotypic and genotypic evidence (Үйсүү, 2005).**

<b>Site Name or ID</b>	Ikh Gun Nuur (Site 1)
<b>Longitude</b>	47.63357
<b>Latitude</b>	108.30150
<b>Start Date</b>	22-Jul-06
<b>Finish Date</b>	22-Jul-06
<b>Personnel</b>	Wildlife Conservation Society, Mongolian State Central Veterinary Laboratory

<b>Scientific name</b>	<b>English name</b>	<b>Mongolian name</b>	<b>Observed at Site</b>	<b>Counts</b>			<b>Comments</b>
				<b>Healthy Count</b>	<b>Sick Count</b>	<b>Dead Count</b>	
<i>Podiceps nigricollis</i>	Black-necked Grebe	Халтар шунгуур	Yes	4			
<i>Podiceps auritus</i>	Horned Grebe	Ухаа шунгуур	Yes	5			
<i>Cygnus Cygnus</i>	Whooper Swan	Гангар хүн	Yes	4			
<i>Tadorna ferruginea</i>	Ruddy Shelduck	Хондон ангир	Yes	51			
<i>Tadorna tadorna</i>	Common Shelduck	Анхидал ангир	Yes	24			
<i>Anas platyrhynchos</i>	Mallard	Зэрлэг нугас	Yes	4			
<i>Anas crecca</i>	Common Teal	Ногоохон нугас	Yes	1			
<i>Anas strepera</i>	Gadwall	Бор нугас	Yes	4			
<i>Anas clypeata</i>	Northern Shoveler	Халбага нугас	Yes	14			
<i>Aythya ferina</i>	Common Pochard	Улаанхүзүү шумбуур	Yes	16			
<i>Aythya fuligula</i>	Tufted Duck	Гээзэгт шумбуур	Yes	30			
<i>Aythya marila</i>	Greater Scaup	Тэнгисийн шумбуур	Yes	3			
<i>Bucephala clangula</i>	Common Goldeneye	Алаг шунгаач	Yes	157			
<i>Melanitta fusca</i>	White-winged Scoter	Тольт монхдой	Yes	12			
<i>Grus virgo</i>	Demoiselle Crane	Өвөгт тогируу	Yes	120			
<i>Charadrius dubius</i>	Little-ringed Plover	Нарийн хиазат	Yes	30			Estimated healthy count
<i>Tringa ochropus</i>	Green Sandpiper	Сүүлцагаан хөгчүү	Yes	1			
<i>Tringa glareola</i>	Wood Sandpiper	Шугуйн хөгчүү	Yes				
<i>Tringa nebularia</i>	Common Greenshank	Үхэр хөгчүү	Yes				
<i>Tringa erythropus</i>	Spotted Redshank	Хар хөгчүү	Yes				
<i>Tringa stagnatilis</i>	Marsh Sandpiper	Бүдний хөгчүү	Yes				
<i>Actitis hypoleucos</i>	Common Sandpiper	Эгэл хайргынхөгчүү	Yes	60			Estimated healthy count
<i>Phalaropus lobatus</i>	Red-necked Phalarope	Нарын сэлээхэй	Yes	3			
<i>Calidris ruficollis</i>	Red-necked Stint	Шартуруут элсэг	Yes				
<i>Calidris temminckii</i>	Temminck's Stint	Темиминскийн элсэг	Yes				

<i>Calidris ferruginea</i>	Curlew Sandpiper	Хадуур элсэг	Yes				
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	Сүүл элсэг	Yes				
<i>Limicola falcinellus</i>	Broad-billed Sandpiper	Сямби шалчиг	Yes	2			
<i>Larus ridibundus</i>	Black-headed Gull	Хүрэнтөлгөй цахтай	Yes	2			
<i>Larus vagae mongolicus</i>	Mongolian Gull	Монгол цахтай	Yes	75			
<i>Sterna hirundo</i>	Common Tern	Эгэл хараалай	Yes	31			
<i>Riparia riparia</i>	Sand Martin	Элсэг эргийнхараацай	Yes				
<i>Melanocorypha mongolica</i>	Mongolian Lark	Монгол Болжмор	Yes				
<i>Alauda arvensis</i>	Eurasian Skylark	Боролзой бодширго	Yes				
<i>Corvus corax</i>	Common Raven	Хон хэрээ	Yes	1			
<i>Oenanthe isabellina</i>	Isabelline Wheatear	Бужимч чогчиго	Yes				

**Site Name or ID** Guremiin Nuur (Site 2)  
**Longitude** 47.82013  
**Latitude** 112.17030  
**Start Date** 23-Jul-06  
**Finish Date** 23-Jul-06  
**Personnel** Wildlife Conservation Society, Mongolian State Central Veterinary Laboratory

<b>Scientific name</b>	<b>English name</b>	<b>Mongolian name</b>	<b>Observed at Site</b>	<b>Counts</b>			<b>Comments</b>
				<b>Healthy Count</b>	<b>Sick Count</b>	<b>Dead Count</b>	
<i>Podiceps nigricollis</i>	Black-necked Grebe	Халтар шунгуур	Yes	2			
<i>Podiceps cristatus</i>	Great Crested Grebe	Отгот шунгуур	Yes	1			
<i>Anser cygnoides</i>	Swan Goose	Хошуу галуу	Yes	603		1	
<i>Cygnus Cygnus</i>	Whooper Swan	Гангар хүн	Yes	38		1	
<i>Tadorna ferruginea</i>	Ruddy Shelduck	Хондон ангир	Yes	5			
<i>Tadorna tadorna</i>	Common Shelduck	Анхидал ангир	Yes	1			
<i>Anas strepera</i>	Gadwall	Бор нугас	Yes	4			
<i>Anas Penelope</i>	Eurasian Wigeon	Зээрд нугас	Yes	1			
<i>Anas clypeata</i>	Northern Shoveler	Халбага нугас	Yes	1			
<i>Aythya ferina</i>	Common Pochard	Улаанхүзүү шумбуур	Yes	18			
<i>Aythya fuligula</i>	Tufted Duck	Гээзэгт шумбуур	Yes	22			
<i>Aythya marila</i>	Greater Scaup	Тэнгисийн шумбуур	Yes	3			
<i>Bucephala clangula</i>	Common Goldeneye	Алаг шунгаач	Yes	220			
<i>Melanitta fusca</i>	White-winged Scoter	Тольт монхдой	Yes	2			
<i>Charadrius dubius</i>	Little-ringed Plover	Нарийн хиазат	Yes				
<i>Actitis hypoleucos</i>	Common Sandpiper	Эгэл хайргынхөгчүү	Yes				
<i>Calidris ruficollis</i>	Red-necked Stint	Шартуруүт элсэг	Yes	39			
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	Сүүл элсэг	Yes				
<i>Calidris alba</i>	Sanderling	Гурвалж элсэг	Yes	2			
<i>Larus vagae mongolicus</i>	Mongolian Gull	Монгол цахтай	Yes	1			
<i>Sterna caspia</i>	Caspian Tern	Морин шунгуулай	Yes	1			
<i>Sterna hirundo</i>	Common Tern	Эгэл хараалай	Yes	5			
<i>Hirundo rustica</i>	Barn Swallow	Асрын алтанхараацай	Yes				
<i>Melanocorypha mongolica</i>	Mongolian Lark	Монгол Болжмор	Yes				
<i>Alauda arvensis</i>	Eurasian Skylark	Боролзой богширго	Yes				
<i>Corvus corax</i>	Common Raven	Хон хэрээ	Yes	2			

**Site Name or ID** Small Pool near Khar Chuluut Uul (Site 3)  
**Longitude** 47.83630  
**Latitude** 112.36820  
**Start Date** 23-Jul-06  
**Finish Date** 23-Jul-06  
**Personnel** Wildlife Conservation Society, Mongolian State Central Veterinary Laboratory

<b>Scientific name</b>	<b>English name</b>	<b>Mongolian name</b>	<b>Observed at Site</b>	<b>Counts</b>			<b>Comments</b>
				<b>Healthy Count</b>	<b>Sick Count</b>	<b>Dead Count</b>	
<i>Tadorna ferruginea</i>	Ruddy Shelduck	Хондон ангир	Yes	9			
<i>Tadorna tadorna</i>	Common Shelduck	Анхидал ангир	Yes	47			
<i>Anas platyrhynchos</i>	Mallard	Зэрлэг нугас	Yes	6			
<i>Grus virgo</i>	Demoiselle Crane	Өвөгт тогируу	Yes	25			
<i>Motacilla citreola</i>	Citrine Wagtail	Шартуруүт цэгцийй	Yes	2			
<i>Corvus corax</i>	Common Raven	Хон хэрээ	Yes	4			

**Site Name or ID** Ereenii Burd Nuur (Site 4)  
**Longitude** 48.06940  
**Latitude** 113.25040  
**Start Date** 24-Jul-06  
**Finish Date** 24-Jul-06  
**Personnel** Wildlife Conservation Society, Mongolian State Central Veterinary Laboratory

<b>Scientific name</b>	<b>English name</b>	<b>Mongolian name</b>	<b>Observed at Site</b>	<b>Counts</b>			<b>Comments</b>
				<b>Healthy Count</b>	<b>Sick Count</b>	<b>Dead Count</b>	
<i>Tadorna ferruginea</i>	Ruddy Shelduck	Хондон ангир	Yes	1			
<i>Tadorna tadorna</i>	Common Shelduck	Анхидал ангир	Yes	201		1	
<i>Circus spilonotus</i>	Eastern Marsh Harrier	Дорны хулд	Yes	2			
<i>Grus vipio</i>	White-naped Crane	Цэн тогоруу	Yes	4			
<i>Grus virgo</i>	Demoiselle Crane	Өвөт тогируу	Yes	32			
<i>Charadrius dubius</i>	Little-ringed Plover	Нарийн хиазат	Yes				
<i>Charadrius alexandrinus</i>	Kentish Plover	Тэнгисийн хиазат	Yes				
<i>Vanellus vanellus</i>	Northern Lapwing	Умардын хавтгаалж	Yes	2			
<i>Recurvirostra avosetta</i>	Pied Avocet	Алаг эээтн	Yes	160			
<i>Tringa glareola</i>	Wood Sandpiper	Шугуйн хөгчүү	Yes				
<i>Tringa totanus</i>	Common Redshank	Улаанхөлт хөгчүү	Yes	10			
<i>Tringa erythropus</i>	Spotted Redshank	Хар хөгчүү	Yes	12			
<i>Actitis hypoleucos</i>	Common Sandpiper	Эгэл хайргынхөгчүү	Yes				
<i>Calidris ruficollis</i>	Red-necked Stint	Шартуруут элсэг	Yes				
<i>Calidris temminckii</i>	Temminck's Stint	Темиминскийн элсэг	Yes				
<i>Calidris ferruginea</i>	Curlew Sandpiper	Хадуур элсэг	Yes				
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	Сүүл элсэг	Yes				
<i>Larus vagae mongolicus</i>	Mongolian Gull	Монгол цахтай	Yes	1			
<i>Syrrhaptes paradoxus</i>	Pallas's Sandgrouse	Монгол ногтруу	Yes	4			
<i>Riperia riperia</i>	Sand Martin	Элсэг эргийнхараацай	Yes	2			
<i>Alauda arvensis</i>	Eurasian Skylark	Боролзой богширго	Yes				
<i>Anthus richardi</i>	Richard's Pipit	Хээрийн шийхүүнхэй	Yes				
<i>Motacilla flava</i>	Yellow Wagtail	Шар цэгций	Yes				
<i>Motacilla citreola</i>	Citrine Wagtail	Шартуруут цэгций	Yes	2			
<i>Oenanthe isabellina</i>	Isabelline Wheatear	Бужимч чогчиго	Yes				
<i>Passer montanus</i>	Eurasian Tree Sparrow	Хээрийн боршувуу	Yes	2			
<i>Gallinago spp.</i>	Snipe spp.	Хараалж	Yes	1			
<i>Emberiza sp.</i>	Bunting spp.	Хөмрөг	Yes				

**Site Name or ID** Khotongiin Nuur (Site 5)  
**Longitude** 48.11020  
**Latitude** 113.75790  
**Start Date** 24-Jul-06  
**Finish Date** 24-Jul-06  
**Personnel** Wildlife Conservation Society, Mongolian State Central Veterinary Laboratory

<b>Scientific name</b>	<b>English name</b>	<b>Mongolian name</b>	<b>Observed at Site</b>	<b>Counts</b>			<b>Comments</b>
				<b>Healthy Count</b>	<b>Sick Count</b>	<b>Dead Count</b>	
<i>Ardea cinerea</i>	Grey Heron	Хөх Дэглий	Yes	1			
<i>Tadorna ferruginea</i>	Ruddy Shelduck	Хондон ангир	Yes	2			
<i>Tadorna tadorna</i>	Common Shelduck	Анхидал ангир	Yes	10			
<i>Anas crecca</i>	Common Teal	Ногоохон нугас	Yes	5			
<i>Circus spilonotus</i>	Eastern Marsh Harrier	Дорны хулд	Yes	2			
<i>Grus vipio</i>	White-naped Crane	Цэн тогоруу	Yes	2			
<i>Grus virgo</i>	Demoiselle Crane	Өвөгт тогируу	Yes	2			
<i>Charadrius dubius</i>	Little-ringed Plover	Нарийн хиазат	Yes				
<i>Charadrius alexandrinus</i>	Kentish Plover	Тэнгисийн хиазат	Yes				
<i>Vanellus vanellus</i>	Northern Lapwing	Умардын хавтгаалж	Yes	8			
<i>Himantopus himantopus</i>	Black-winged Stilt	Эгэл хилэнжигүүр	Yes	1			
<i>Recurvirostra avosetta</i>	Pied Avocet	Алаг ээтэн	Yes	4			
<i>Tringa ochropus</i>	Green Sandpiper	Сүүлцагаан хөгчүү	Yes	1			
<i>Tringa nebularia</i>	Common Greenshank	Үхэр хөгчүү	Yes	1			
<i>Tringa stagnatilis</i>	Marsh Sandpiper	Бүдний хөгчүү	Yes	3			
<i>Xenus cinereus</i>	Terek Sandpiper	Матигар хөгчүүлэг	Yes	1			
<i>Calidris ruficollis</i>	Red-necked Stint	Шартгүүрүүт элсэг	Yes				
<i>Calidris temminckii</i>	Temminck's Stint	Темиминскийн элсэг	Yes	5			
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	Сүүл элсэг	Yes	30			Estimated healthy count
<i>Gallinago stenura</i>	Pintail Snipe	Замбын хараалж	Yes	1			
<i>Larus vagae mongolicus</i>	Mongolian Gull	Монгол цахтай	Yes	113			
<i>Riparia riparia</i>	Sand Martin	Элсэг эргийнхараацай	Yes	1			
<i>Alauda arvensis</i>	Eurasian Skylark	Боролзой богширго	Yes				
<i>Motacilla flava</i>	Yellow Wagtail	Шар цэгций	Yes	1			
<i>Duck spp.</i>	Duck spp.	Нугас	Yes			1	

**Site Name or ID** Shaazan Nuur (Site 6)  
**Longitude** 48.03810  
**Latitude** 114.16100  
**Start Date** 26-Jul-06  
**Finish Date** 26-Jul-06  
**Personnel** Wildlife Conservation Society, Mongolian State Central Veterinary Laboratory

<b>Scientific name</b>	<b>English name</b>	<b>Mongolian name</b>	<b>Observed at Site</b>	<b>Counts</b>			<b>Comments</b>
				<b>Healthy Count</b>	<b>Sick Count</b>	<b>Dead Count</b>	
<i>Podiceps cristatus</i>	Great Crested Grebe	Отгот шунгуур	Yes	8			
<i>Ardea cinerea</i>	Grey Heron	Хөх Дэглий	Yes	8			
<i>Anser cygnoides</i>	Swan Goose	Хошуу галуу	Yes	99			
<i>Cygnus cygnus</i>	Whooper Swan	Гангар хүн	Yes	3			
<i>Anas platyrhynchos</i>	Mallard	Зэрлэг нугас	Yes	26			
<i>Anas strepera</i>	Gadwall	Бор нугас	Yes	22			
<i>Aythya ferina</i>	Common Pochard	Улаанхузүү шумбуур	Yes	11			
<i>Aythya fuligula</i>	Tufted Duck	Гээзгэг шумбуур	Yes	12			
<i>Buteo hemilasius</i>	Upland Buzzard	Шилийн сар	Yes	1			
<i>Grus virgo</i>	Demoiselle Crane	Өвөгт тогируу	Yes	12			
<i>Tringa glareola</i>	Wood Sandpiper	Шугуйн хөгчүү	Yes				
<i>Actitis hypoleucos</i>	Common Sandpiper	Эгэл хайргынхөгчүү	Yes				
<i>Larus vagae mongolicus</i>	Mongolian Gull	Монгол цахтай	Yes	48			
<i>Sterna hirundo</i>	Common Tern	Эгэл хараалай	Yes	8			
<i>Upupa epops</i>	Common Hoopoe	Бөвөөлжин өвөөлж	Yes	2			
<i>Riparia riperia</i>	Sand Martin	Элсэг эргийнхараацай	Yes				
<i>Hirundo rustica</i>	Barn Swallow	Асырын алтанхараацай	Yes				
<i>Calandrella cinerea</i>	Greater Short-toed Lark	Талын жиргэмэл	Yes	1			
<i>Melanocorypha mongolica</i>	Mongolian Lark	Монгол Болжмор	Yes				
<i>Motacilla citreola</i>	Citrine Wagtail	Шартуруут цэгций	Yes				
<i>Oenanthe isabellina</i>	Isabelline Wheatear	Бужимч чогчиго	Yes				
<i>Passer montanus</i>	Eurasian Tree Sparrow	Хээрийн боршувуу	Yes				
<i>Bucanetes mongolicus</i>	Mongolian Finch	Монгол алтанжигүүр	Yes	30			Estimated healthy count
<i>Unknown</i>	Unknown	Мэдэхгүй	Yes			1	

**Site Name or ID** Chuhiin Nuur (Site 7)  
**Longitude** 49.53242  
**Latitude** 114.67550  
**Start Date** 27-Jul-06  
**Finish Date** 27-Jul-06  
**Personnel** Wildlife Conservation Society, Mongolian State Central Veterinary Laboratory

<b>Scientific name</b>	<b>English name</b>	<b>Mongolian name</b>	<b>Observed at Site</b>	<b>Counts</b>			<b>Comments</b>
				<b>Healthy Count</b>	<b>Sick Count</b>	<b>Dead Count</b>	
<i>Podiceps nigricollis</i>	Black-necked Grebe	Халтар шунгуур	Yes	8			
<i>Podiceps cristatus</i>	Great Crested Grebe	Отгот шунгуур	Yes	1			
<i>Anser cygnoides</i>	Swan Goose	Хошуу галуу	Yes	25			
<i>Cygnus cygnus</i>	Whooper Swan	Гангар хүн	Yes	4			
<i>Tadorna ferruginea</i>	Ruddy Shelduck	Хондон ангир	Yes	20			
<i>Anas falcata</i>	Falcated Duck	Гээзгт нугас	Yes	4			
<i>Anas strepera</i>	Gadwall	Бор нугас	Yes	13			
<i>Anas penelope</i>	Eurasian Wigeon	Зээрд нугас	Yes	3			
<i>Aythya ferina</i>	Common Pochard	Улаанхүзүү шумбуур	Yes	93			
<i>Aythya fuligula</i>	Tufted Duck	Гээзгт шумбуур	Yes	6			
<i>Bucephala clangula</i>	Common Goldeneye	Алаг шунгаач	Yes	74			
<i>Circus spilonotus</i>	Eastern Marsh Harrier	Дорны хулд	Yes	2			
<i>Haliaeetus albicilla</i>	White-tailed Eagle	Цагаансүүл нөмрөгбүргэд	Yes	1			
<i>Grus grus</i>	Common Crane	Хархираа тогоруу	Yes	2			
<i>Grus vipio</i>	White-naped Crane	Цэн тогоруу	Yes	1			
<i>Otis tarda</i>	Great Bustard	Хонин тоодог	Yes	1			
<i>Charadrius dubius</i>	Little-ringed Plover	Нарийн хиазат	Yes				
<i>Charadrius alexandrinus</i>	Kentish Plover	Тэнгисийн хиазат	Yes				
<i>Vanellus vanellus</i>	Northern Lapwing	Умардын хавтгаалж	Yes	75			Estimated healthy count
<i>Arenaria interpres</i>	Ruddy Turnstone	Алаг хайргач	Yes	1			
<i>Tringa glareola</i>	Wood Sandpiper	Шугуйн хөгчүү	Yes				
<i>Tringa totanus</i>	Common Redshank	Улаанхөлт хөгчүү	Yes				
<i>Tringa erythropus</i>	Spotted Redshank	Хар хөгчүү	Yes				
<i>Actitis hypoleucos</i>	Common Sandpiper	Эгэл хайргынхөгчүү	Yes				
<i>Calidris ruficollis</i>	Red-necked Stint	Шартруүт элсэг	Yes				
<i>Calidris temminckii</i>	Temminck's Stint	Темиминский элсэг	Yes				
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	Сүүл элсэг	Yes				
<i>Gallinago gallinago</i>	Common Snipe	Шөвгөн хараалж	Yes				

<i>Limosa limosa</i>	Black-tailed Godwit	Морин цууцал	Yes	1			
<i>Larus ridibundus</i>	Black-headed Gull	Хүрэнтэлгий цахтай	Yes	25			
<i>Larus vagae mongolicus</i>	Mongolian Gull	Монгол цахтай	Yes	1			
<i>Gelochelidon nilotica</i>	Gull-billed Tern	Бахим амуулай	Yes	2			
<i>Sterna hirundo</i>	Common Tern	Эгэл хараалай	Yes	4			
<i>Apus pacificus</i>	Fork-tailed Swift	Хондлойцагаан ураацай	Yes	3			
<i>Upupa epops</i>	Common Hoopoe	Бөвөөлжин өвөөлж	Yes				
<i>Riparia riparia</i>	Sand Martin	Элсэг эргийнхараацай	Yes	250			Estimated healthy count
<i>Hirundo rustica</i>	Barn Swallow	Асрын алтанхараацай	Yes				
<i>Melanocorypha mongolica</i>	Mongolian Lark	Монгол Болжмор	Yes				
<i>Alauda arvensis</i>	Eurasian Skylark	Боролзой богширго	Yes				
<i>Motacilla flava</i>	Yellow Wagtail	Шар цэгций	Yes				
<i>Motacilla citreola</i>	Citrine Wagtail	Шартуруүт цэгций	Yes				
<i>Motacilla alba</i>	White Wagtail	Хөх цэгций	Yes				
<i>Corvus corax</i>	Common Raven	Хон хэрээ	Yes				
<i>Oenanthe oenanthe</i>	Northern Wheatear	Адууч чогчиго	Yes				
<i>Passer montanus</i>	Eurasian Tree Sparrow	Хээрийн боршуувуу	Yes	2			
<i>Petronia petronia</i>	Rock Sparrow	Хадны боршуу	Yes				
<i>Gallinago spp.</i>	Snipe spp.	Хараалж	Yes	2			

**Site Name or ID** Khaichiin Tsagaan Nuur (Site 8)  
**Longitude** 49.67587  
**Latitude** 114.65780  
**Start Date** 28-Jul-06  
**Finish Date** 8-Aug-06  
**Personnel** Wildlife Conservation Society, Mongolian State Central Veterinary Laboratory, Mongolian Academy of Sciences

<b>Scientific name</b>	<b>English name</b>	<b>Mongolian name</b>	<b>Observed at Site</b>	<b>Counts</b>			<b>Comments</b>
				<b>Healthy Count</b>	<b>Sick Count</b>	<b>Dead Count</b>	
<i>Podiceps nigricollis</i>	Black-necked Grebe	Халтар шунгуур	Yes	2197			
<i>Phalacrocorax carbo</i>	Great Cormorant	Тураг голой	Yes	3			
<i>Ardea cinerea</i>	Grey Heron	Хөх Дэглий	Yes	1			
<i>Platalea leucorodia</i>	Eurasian Spoonbill	Цагаан халбагант	Yes	2			
<i>Anser cygnoides</i>	Swan Goose	Хошуу галуу	Yes	84		2	
<i>Tadorna ferruginea</i>	Ruddy Shelduck	Хондон ангир	Yes	632	1	1	
<i>Tadorna tadorna</i>	Common Shelduck	Анхидал ангир	Yes	884		2	
<i>Anas platyrhynchos</i>	Mallard	Зэрлэг нугас	Yes	1			
<i>Aythya ferina</i>	Common Pochard	Улаанхүзүү шумбуур	Yes	59			
<i>Aythya fuligula</i>	Tufted Duck	Гээгт шумбуур	Yes	44			
<i>Bucephala clangula</i>	Common Goldeneye	Алаг шунгаач	Yes	341			
<i>Melanitta fusca</i>	White-winged Scoter	Тольт монхдой	Yes	5			
<i>Grus virgo</i>	Demoiselle Crane	Өвөгт тогируу	Yes	9			
<i>Pluvialis squatarola</i>	Grey Plover	Буурал сүвээцагаан	Yes	1			
<i>Charadrius mongolus</i>	Mongolian Plover	Монгол хиазат	Yes	3			
<i>Charadrius veredus</i>	Oriental Plover	Дорнын хиазат	Yes	2			
<i>Charadrius alexandrinus</i>	Kentish Plover	Тэнгисийн хиазат	Yes				
<i>Arenaria interpres</i>	Ruddy Turnstone	Алаг хайргач	Yes	2			
<i>Recurvirostra avosetta</i>	Pied Avocet	Алаг ээтэн	Yes	13			
<i>Tringa glareola</i>	Wood Sandpiper	Шугуйн хөгчүү	Yes				
<i>Tringa nebularia</i>	Common Greenshank	Үхэр хөгчүү	Yes	1			
<i>Tringa stagnatilis</i>	Marsh Sandpiper	Будний хөгчүү	Yes				
<i>Heteroscelus brevipes</i>	Grey-tailed Tattler	Буурал хөгчүү	Yes	2			
<i>Calidris ruficollis</i>	Red-necked Stint	Шартуруүт элсэг	Yes				
<i>Calidris subminuta</i>	Long-toed Stint	Савар элсэг	Yes				
<i>Calidris temminckii</i>	Temminck's Stint	Темиминский элсэг	Yes				
<i>Calidris ferruginea</i>	Curlew Sandpiper	Хадуур элсэг	Yes	3			
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	Сүүл элсэг	Yes				

<i>Numenius minutus</i>	Little Curlew	Бичилхэн тутгалжин	Yes	32			
<i>Limosa limosa</i>	Black-tailed Godwit	Морин цууцал	Yes	31			
<i>Larus ridibundus</i>	Black-headed Gull	Хүрэнтэлгийн цахлай	Yes				
<i>Larus vagae mongolicus</i>	Mongolian Gull	Монгол цахлай	Yes				
<i>Larus canus</i>	Mew Gull	Үүлэн цахлай	Yes	106			
<i>Chlidonias niger</i>	Black Tern	Хилэн хараалзай	Yes	13			
<i>Gelochelidon nilotica</i>	Gull-billed Tern	Бахим амуулай	Yes	1			
<i>Sterna caspia</i>	Caspian Tern	Морин шунгуулай	Yes	2			
<i>Riparia riparia</i>	Sand Martin	Элсэг эргийнхараацай	Yes	1			
<i>Hirundo rustica</i>	Barn Swallow	Асрын алтанхараацай	Yes				
<i>Motacilla flava</i>	Yellow Wagtail	Шар цэгций	Yes				
<i>Motacilla citreola</i>	Citrine Wagtail	Шартүрүүт цэгций	Yes				
<i>Oenanthe isabellina</i>	Isabelline Wheatear	Бужимч чогчиго	Yes				
<i>Petronia petronia</i>	Rock Sparrow	Хадны боршуу	Yes	1			
<i>Unknown</i>	Unknown	Мэдэхгүй	Yes			3	
<i>Anser spp.</i>	Goose spp.	Галуу	Yes			1	

**Site Name or ID** Khorin Tsagaan Nuur (Site 9)  
**Longitude** 49.66777  
**Latitude** 114.62110  
**Start Date** 28-Jul-06  
**Finish Date** 28-Jul-06  
**Personnel** Wildlife Conservation Society, Mongolian State Central Veterinary Laboratory, Mongolian Academy of Sciences

<b>Scientific name</b>	<b>English name</b>	<b>Mongolian name</b>	<b>Observed at Site</b>	<b>Counts</b>			<b>Comments</b>
				<b>Healthy Count</b>	<b>Sick Count</b>	<b>Dead Count</b>	
<i>Podiceps nigricollis</i>	Black-necked Grebe	Халтар шунгуур	Yes	17			
<i>Anser cygnoides</i>	Swan Goose	Хошуу галуу	Yes	395			
<i>Cygnus cygnus</i>	Whooper Swan	Гангар хүн	Yes	668		1	
<i>Tadorna ferruginea</i>	Ruddy Shelduck	Хондон ангир	Yes	338			
<i>Tadorna tadorna</i>	Common Shelduck	Анхидал ангир	Yes	6			
<i>Anas strepera</i>	Gadwall	Бор нугас	Yes	30			
<i>Anas clypeata</i>	Northern Shoveler	Халбага нугас	Yes	2			
<i>Aythya ferina</i>	Common Pochard	Улаанхүзүү шумбуур	Yes	361		1	
<i>Aythya fuligula</i>	Tufted Duck	Гээзгт шумбуур	Yes	81			
<i>Bucephala clangula</i>	Common Goldeneye	Алаг шунгаач	Yes	564	1		
<i>Melanitta fusca</i>	White-winged Scoter	Тольт монхдой	Yes	4			
<i>Mergellus albellus</i>	Smew	Цахир бохио	Yes	2			
<i>Buteo hemilasius</i>	Upland Buzzard	Шилийн сар	Yes				
<i>Aquila nipalensis</i>	Steppe Eagle	Тарважи бургэд	Yes	4			
<i>Falco cherrug</i>	Saker Falcon	Идлэг шонхор	Yes	2			
<i>Charadrius dubius</i>	Little-ringed Plover	Нарийн хиазат	Yes				
<i>Charadrius alexandrinus</i>	Kentish Plover	Тэнгисийн хиазат	Yes				
<i>Tringa glareola</i>	Wood Sandpiper	Шугуйн хөгчүү	Yes			1	
<i>Tringa erythropus</i>	Spotted Redshank	Хар хөгчүү	Yes	1			
<i>Actitis hypoleucos</i>	Common Sandpiper	Эгэл хайрцынхөгчүү	Yes				
<i>Limosa limosa</i>	Black-tailed Godwit	Морин цууцал	Yes	2			
<i>Larus vagae mongolicus</i>	Mongolian Gull	Монгол цахтай	Yes	1			
<i>Sterna hirundo</i>	Common Tern	Эгэл хараалай	Yes				
<i>Bubo bubo</i>	Eurasian Eagle Owl	Эгэл шаршууу	Yes	2			
<i>Apus pacificus</i>	Fork-tailed Swift	Хондлойцагаан ураацай	Yes				
<i>Eremophila alpestris</i>	Horned Lark	Шоорон Эвэртболжмор	Yes				
<i>Motacilla citreola</i>	Citrine Wagtail	Шартуруут цэгций	Yes				
<i>Oenanthe isabellina</i>	Isabelline Wheatear	Бужимч чогчиго	Yes				

<i>Petronia petronia</i>	Rock Sparrow	Хадны боршуу	Yes				
<i>Unknown</i>	Unknown	Мэдэхгүй					2

**Site Name or ID** Delger Nuur (Site 10)  
**Longitude** 49.71370  
**Latitude** 114.59540  
**Start Date** 29-Jul-06  
**Finish Date** 29-Jul-06  
**Personnel** Wildlife Conservation Society, Mongolian State Central Veterinary Laboratory, Mongolian Academy of Sciences

<b>Scientific name</b>	<b>English name</b>	<b>Mongolian name</b>	<b>Observed at Site</b>	<b>Counts</b>			<b>Comments</b>
				<b>Healthy Count</b>	<b>Sick Count</b>	<b>Dead Count</b>	
<i>Podiceps nigricollis</i>	Black-necked Grebe	Халтар шунгуур	Yes	143			
<i>Anser cygnoides</i>	Swan Goose	Хошуу галуу	Yes	39			
<i>Cygnus cygnus</i>	Whooper Swan	Гангар хүн	Yes	31			
<i>Tadorna ferruginea</i>	Ruddy Shelduck	Хондон ангир	Yes	199			
<i>Tadorna tadorna</i>	Common Shelduck	Анхидал ангир	Yes	5		1	
<i>Aythya ferina</i>	Common Pochard	Улаанхүзүү шумбуур	Yes	78			
<i>Aythya fuligula</i>	Tufted Duck	Гээзэгт шумбуур	Yes	19			
<i>Bucephala clangula</i>	Common Goldeneye	Алаг шунгаач	Yes	935			
<i>Melanitta fusca</i>	White-winged Scoter	Тольт монхдой	Yes	8			
<i>Buteo hemilasius</i>	Upland Buzzard	Шилийн сар	Yes				
<i>Grus virgo</i>	Demoiselle Crane	Өвөгт тогируу	Yes				
<i>Charadrius dubius</i>	Little-ringed Plover	Нарийн хиазат	Yes				
<i>Vanellus vanellus</i>	Northern Lapwing	Умардын хавтгаалж	Yes	43			
<i>Tringa glareola</i>	Wood Sandpiper	Шугуйн хөгчүү	Yes				
<i>Tringa totanus</i>	Common Redshank	Улаанхөлт хөгчүү	Yes	1			
<i>Tringa erythropus</i>	Spotted Redshank	Хар хөгчүү	Yes	4			
<i>Tringa stagnatilis</i>	Marsh Sandpiper	Будний хөгчүү	Yes	1			
<i>Heteroscelus brevipes</i>	Grey-tailed Tattler	Буурал хөгчүү	Yes	1			
<i>Actitis hypoleucos</i>	Common Sandpiper	Эгэл хайрлынхөгчүү	Yes				
<i>Xenus cinereus</i>	Terek Sandpiper	Матигар хөгчүүлэг	Yes	1			
<i>Phalaropus lobatus</i>	Red-necked Phalarope	Нарын сэлээхэй	Yes	2			
<i>Calidris ruficollis</i>	Red-necked Stint	Шартруүт элсэг	Yes	7			
<i>Calidris temminckii</i>	Temminck's Stint	Темиминский элсэг	Yes				
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	Сүүл элсэг	Yes	2			
<i>Limicola falcinellus</i>	Broad-billed Sandpiper	Сямби шалчиг	Yes	1			
<i>Numenius minutus</i>	Little Curlew	Бичилхэн тутгалжин	Yes	3			
<i>Limosa limosa</i>	Black-tailed Godwit	Морин цууцал	Yes	5			
<i>Larus ridibundus</i>	Black-headed Gull	Хүрэнтлгой цахлай	Yes	2			

<i>Larus vagae mongolicus</i>	Mongolian Gull	Монгол цахлай	Yes	4		1	
<i>Gelochelidon nilotica</i>	Gull-billed Tern	Бахим амуулай	Yes	1			
<i>Sterna hirundo</i>	Common Tern	Эгэл хараалай	Yes	1			
<i>Eremophila alpestris</i>	Horned Lark	Шоорон Эвэртболжмор	Yes	1			
<i>Motacilla flava</i>	Yellow Wagtail	Шар цэгций	Yes				
<i>Motacilla citreola</i>	Citrine Wagtail	Шартруүүт цэгций	Yes				
<i>Corvus corax</i>	Common Raven	Хон хэрээ	Yes	1			
<i>Oenanthe isabellina</i>	Isabelline Wheatear	Бужимч чогчиго	Yes				
<i>Duck spp.</i>	Duck spp.	Нугас	Yes			1	

**Site Name or ID** Suujiin Tsagaan Nuur (Site 11)  
**Longitude** 49.75955  
**Latitude** 114.96180  
**Start Date** 2-Aug-06  
**Finish Date** 2-Aug-06  
**Personnel** Wildlife Conservation Society, Mongolian State Central Veterinary Laboratory

<b>Scientific name</b>	<b>English name</b>	<b>Mongolian name</b>	<b>Observed at Site</b>	<b>Counts</b>			<b>Comments</b>
				<b>Healthy Count</b>	<b>Sick Count</b>	<b>Dead Count</b>	
<i>Podiceps nigricollis</i>	Black-necked Grebe	Халтгар шунгуур	Yes	44			
<i>Anser cygnoides</i>	Swan Goose	Хошуу галуу	Yes	3			
<i>Cygnus cygnus</i>	Whooper Swan	Гангар хүн	Yes	2			
<i>Tadorna ferruginea</i>	Ruddy Shelduck	Хондон ангир	Yes	20			
<i>Tadorna tadorna</i>	Common Shelduck	Анхидал ангир	Yes	445			
<i>Anas clypeata</i>	Northern Shoveler	Халбага нугас	Yes	1			
<i>Aythya ferina</i>	Common Pochard	Улаанхузүү шумбуур	Yes			1	
<i>Bucephala clangula</i>	Common Goldeneye	Алаг шунгаач	Yes	83		1	
<i>Buteo hemilasius</i>	Upland Buzzard	Шилийн сар	Yes	1		1	
<i>Falco cherrug</i>	Saker Falcon	Идлэг шонхор	Yes	1			
<i>Grus virgo</i>	Demoiselle Crane	Өвөгт тогируу	Yes	4			
<i>Charadrius dubius</i>	Little-ringed Plover	Нарийн хиазат	Yes				
<i>Charadrius alexandrinus</i>	Kentish Plover	Тэнгисийн хиазат	Yes				
<i>Vanellus vanellus</i>	Northern Lapwing	Умардын хавтгаалж	Yes	35			
<i>Recurvirostra avosetta</i>	Pied Avocet	Алаг ээтэн	Yes	137		3	
<i>Tringa glareola</i>	Wood Sandpiper	Шугуйн хөгчүү	Yes	1			
<i>Tringa nebularia</i>	Common Greenshank	Үхэр хөгчүү	Yes	3			
<i>Tringa totanus</i>	Common Redshank	Улаанхөлт хөгчүү	Yes	2			
<i>Tringa erythropus</i>	Spotted Redshank	Хар хөгчүү	Yes	1			
<i>Tringa stagnatilis</i>	Marsh Sandpiper	Будний хөгчүү	Yes	10			Estimated healthy count
<i>Actitis hypoleucos</i>	Common Sandpiper	Эгэл хайргынхөгчүү	Yes				
<i>Xenus cinereus</i>	Terek Sandpiper	Матигар хөгчүүлэг	Yes	2			
<i>Calidris ruficollis</i>	Red-necked Stint	Шартүүрүүт элсэг	Yes	30			Estimated healthy count
<i>Calidris subminuta</i>	Long-toed Stint	Савар элсэг	Yes	1			
<i>Calidris temminckii</i>	Temminck's Stint	Темиминскийн элсэг	Yes				
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	Сүүл элсэг	Yes				
<i>Limicola falcinellus</i>	Broad-billed Sandpiper	Сямби шалчиг	Yes	23			
<i>Limosa limosa</i>	Black-tailed Godwit	Морин цууцал	Yes	5			

<i>Larus canus</i>	Mew Gull	Үүлэн цахтай	Yes	14		
<i>Gelochelidon nilotica</i>	Gull-billed Tern	Бахим амуулай	Yes	57		
<i>Melanocorypha mongolica</i>	Mongolian Lark	Монгол Болжмор	Yes			
<i>Duck spp.</i>	Duck spp.	Нугас	Yes		1	
<i>Unknown</i>	Unknown	Мэдэхгүй	Yes		3	

**Site Name or ID** Bus Nuur (Site 12)  
**Longitude** 49.73138  
**Latitude** 115.15780  
**Start Date** 9-Aug-06  
**Finish Date** 9-Aug-06  
**Personnel** Wildlife Conservation Society, Mongolian State Central Veterinary Laboratory

<b>Scientific name</b>	<b>English name</b>	<b>Mongolian name</b>	<b>Observed at Site</b>	<b>Counts</b>			<b>Comments</b>
				<b>Healthy Count</b>	<b>Sick Count</b>	<b>Dead Count</b>	
<i>Podiceps nigricollis</i>	Black-necked Grebe	Халтар шунгуур	Yes	956			
<i>Phalacrocorax carbo</i>	Great Cormorant	Тураг голой	Yes	230			
<i>Ardea cinerea</i>	Grey Heron	Хөх Дэглий	Yes	9			
<i>Anser cygnoides</i>	Swan Goose	Хошуу галуу	Yes	43		1	
<i>Cygnus cygnus</i>	Whooper Swan	Гангар хүн	Yes	6			
<i>Tadorna ferruginea</i>	Ruddy Shelduck	Хондон ангир	Yes	1549			
<i>Tadorna tadorna</i>	Common Shelduck	Анхидал ангир	Yes	5			
<i>Anas platyrhynchos</i>	Mallard	Зэрлэг нугас	Yes	48			
<i>Anas penelope</i>	Eurasian Wigeon	Зээрд нугас	Yes	9			
<i>Aythya ferina</i>	Common Pochard	Улаанхүү шумбуур	Yes	250			
<i>Aythya fuligula</i>	Tufted Duck	Гээзгт шумбуур	Yes	6			
<i>Aythya marila</i>	Greater Scaup	Тэнгисийн шумбуур	Yes	3			
<i>Bucephala clangula</i>	Common Goldeneye	Алаг шунгаач	Yes	258			
<i>Mergellus albellus</i>	Smew	Цахир бохио	Yes	18			
<i>Buteo hemilasius</i>	Upland Buzzard	Шилийн сар	Yes				
<i>Charadrius dubius</i>	Little-ringed Plover	Нарийн хиазат	Yes				
<i>Charadrius alexandrinus</i>	Kentish Plover	Тэнгисийн хиазат	Yes				
<i>Vanellus vanellus</i>	Northern Lapwing	Умардын хавтгаалж	Yes				
<i>Recurvirostra avosetta</i>	Pied Avocet	Алаг ээтэн	Yes				
<i>Tringa ochropus</i>	Green Sandpiper	Сүүлцагаан хөгчүү	Yes				
<i>Tringa glareola</i>	Wood Sandpiper	Шугуйн хөгчүү	Yes				
<i>Tringa erythropus</i>	Spotted Redshank	Хар хөгчүү	Yes	1			
<i>Tringa stagnatilis</i>	Marsh Sandpiper	Бүдний хөгчүү	Yes	1			
<i>Actitis hypoleucos</i>	Common Sandpiper	Эгэл хайргынхөгчүү	Yes				
<i>Calidris temminckii</i>	Temminck's Stint	Темминский элсэг	Yes				
<i>Larus vagae mongolicus</i>	Mongolian Gull	Монгол цахтай	Yes	123		5	
<i>Sterna hirundo</i>	Common Tern	Эгэл хараалай	Yes	1			
<i>Riparia riperia</i>	Sand Martin	Элсэг эргийнхараацай	Yes				

<i>Hirundo rustica</i>	Barn Swallow	Асрын алтанхараацай	Yes				
<i>Calandrella cinerea</i>	Greater Short-toed Lark	Талын жиргэмэл	Yes				
<i>Melanocorypha mongolica</i>	Mongolian Lark	Монгол Болжмор	Yes				
<i>Motacilla flava</i>	Yellow Wagtail	Шар цэгций	Yes				
<i>Motacilla citreola</i>	Citrine Wagtail	Шартуруут цэгций	Yes				
<i>Motacilla alba</i>	White Wagtail	Хөх цэгций	Yes				
<i>Gallinago spp.</i>	Snipe spp.	Хараалж	Yes				
<i>Unknown</i>	Unknown	Мэдэхгүй	Yes			3	

**Site Name or ID** Turgenii Ikh Nuur (Site 13)  
**Longitude** 49.39573  
**Latitude** 113.26040  
**Start Date** 10-Aug-06  
**Finish Date** 10-Aug-06  
**Personnel** Wildlife Conservation Society, Mongolian State Central Veterinary Laboratory

<b>Scientific name</b>	<b>English name</b>	<b>Mongolian name</b>	<b>Observed at Site</b>	<b>Counts</b>			<b>Comments</b>
				<b>Healthy Count</b>	<b>Sick Count</b>	<b>Dead Count</b>	
<i>Podiceps nigricollis</i>	Black-necked Grebe	Халтар шунгуур	Yes	17			
<i>Podiceps cristatus</i>	Great Crested Grebe	Отгот шунгуур	Yes	1			
<i>Phalacrocorax carbo</i>	Great Cormorant	Тураг голой	Yes	1			
<i>Ardea cinerea</i>	Grey Heron	Хөх Дэглий	Yes	3			
<i>Anser cygnoides</i>	Swan Goose	Хошуу галуу	Yes	16		1	
<i>Cygnus cygnus</i>	Whooper Swan	Гангар хүн	Yes	6			
<i>Tadorna ferruginea</i>	Ruddy Shelduck	Хондон ангир	Yes	22			
<i>Tadorna tadorna</i>	Common Shelduck	Анхидал ангир	Yes	21			
<i>Anas platyrhynchos</i>	Mallard	Зэрлэг нугас	Yes	7			
<i>Anas crecca</i>	Common Teal	Ногоохон нугас	Yes	5			
<i>Aythya ferina</i>	Common Pochard	Улаанхүзүү шумбуур	Yes	3			
<i>Aythya fuligula</i>	Tufted Duck	Гээзэгт шумбуур	Yes	11			
<i>Bucephala clangula</i>	Common Goldeneye	Алаг шунгаач	Yes	11			
<i>Melanitta fusca</i>	White-winged Scoter	Тольт монхдой	Yes	2			
<i>Milvus migrans</i>	Black Kite	Сохор элээ	Yes				
<i>Circus cyaneus</i>	Hen Harrier	Сарал хулд	Yes	1			
<i>Buteo hemilasius</i>	Upland Buzzard	Шилийн сар	Yes	1			
<i>Falco cherrug</i>	Saker Falcon	Идлэг шонхор	Yes	1			
<i>Grus virgo</i>	Demoiselle Crane	Өвөгт тогируу	Yes	77		1	
<i>Otis tarda</i>	Great Bustard	Хонин тоодог	Yes	1			
<i>Pluvialis squatarola</i>	Grey Plover	Буурал сувээцагаан	Yes	3			
<i>Pluvialis fulva</i>	Pacific Golden Plover	АЗийн сувээцагаан	Yes	1			
<i>Charadrius mongolus</i>	Mongolian Plover	Монгол хиазат	Yes				
<i>Vanellus vanellus</i>	Northern Lapwing	Умардын хавтгаалж	Yes	38			
<i>Arenaria interpres</i>	Ruddy Turnstone	Алаг хайргач	Yes	1			
<i>Recurvirostra avosetta</i>	Pied Avocet	Алаг ээтэн	Yes	2			
<i>Tringa ochropus</i>	Green Sandpiper	Сүүлцагаан хөгчүү	Yes	1			
<i>Tringa glareola</i>	Wood Sandpiper	Шугуйн хөгчүү	Yes				

<i>Tringa nebularia</i>	Common Greenshank	Үхэр хөгчүү	Yes				
<i>Tringa totanus</i>	Common Redshank	Улаанхөлт хөгчүү					
<i>Tringa stagnatilis</i>	Marsh Sandpiper	Будний хөгчүү	Yes	26			
<i>Actitis hypoleucos</i>	Common Sandpiper	Эгэл хайргынхөгчүү	Yes				
<i>Xenus cinereus</i>	Terek Sandpiper	Матигар хөгчүүлэг	Yes	13			
<i>Calidris ruficollis</i>	Red-necked Stint	Шартруүүт элсэг	Yes	12			Estimated healthy count
<i>Calidris temminckii</i>	Temminck's Stint	Темиминский элсэг	Yes				
<i>Calidris ferruginea</i>	Curlew Sandpiper	Хадуур элсэг	Yes	5			
<i>Calidris acuminata</i>	Sharp-tailed Sandpiper	Сүүл элсэг	Yes				
<i>Calidris alba</i>	Sanderling	Гурвалж элсэг	Yes				
<i>Numenius minutus</i>	Little Curlew	Бичилхэн тутгалжин	Yes	16			
<i>Numenius arquata</i>	Eurasian Curlew	Морин тутгалжин	Yes	3			
<i>Numenius madagascariensis</i>	Eastern Curlew	Мадгаскар тутгалжин	Yes	1			
<i>Limosa limosa</i>	Black-tailed Godwit	Морин цууцал	Yes	1			
<i>Larus ridibundus</i>	Black-headed Gull	Хүрэнтолгой цахтай	Yes	3			
<i>Sterna hirundo</i>	Common Tern	Эгэл хараалай	Yes	3			
<i>Motacilla citreola</i>	Citrine Wagtail	Шартруүүт цэгцийй	Yes	1			
<i>Corvus corone</i>	Carrion Crow	Хар хэрээ	Yes				
<i>Gallinago spp.</i>	Snipe spp.	Хараалж	Yes	1			
<i>Falco tinnunculus/F. naumannni</i>	Common/Lesser Kestrel	Начин шонхор/Зээрд шонхор	Yes	1			
<i>Lark sp.</i>	Lark spp.	Болжмор	Yes				

**Site Name or ID** Binder Tsagaan Nuur (Site 14)  
**Longitude** 48.59223  
**Latitude** 110.62120  
**Start Date** 11-Aug-06  
**Finish Date** 11-Aug-06  
**Personnel** Wildlife Conservation Society, Mongolian State Central Veterinary Laboratory

<b>Scientific name</b>	<b>English name</b>	<b>Mongolian name</b>	<b>Observed at Site</b>	<b>Counts</b>			<b>Comments</b>
				<b>Healthy Count</b>	<b>Sick Count</b>	<b>Dead Count</b>	
<i>Podiceps nigricollis</i>	Black-necked Grebe	Халтар шунгуур	Yes	6			
<i>Ardea cinerea</i>	Grey Heron	Хөх Дэглий	Yes	12			
<i>Anser cygnoides</i>	Swan Goose	Хошуу галуу	Yes	18			
<i>Cygnus cygnus</i>	Whooper Swan	Гангар хүн	Yes	7		3	
<i>Tadorna ferruginea</i>	Ruddy Shelduck	Хондон ангир	Yes	128		1	
<i>Tadorna tadorna</i>	Common Shelduck	Анхидал ангир	Yes	15			
<i>Anas platyrhynchos</i>	Mallard	Зэрлэг нугас	Yes	19			
<i>Anas crecca</i>	Common Teal	Ногоохон нугас	Yes	24			
<i>Anas querquedula</i>	Garganey	Цагаанхөмсөгт нугас	Yes	5			
<i>Aythya ferina</i>	Common Pochard	Улаанхузүү шумбуур	Yes	6			
<i>Aythya fuligula</i>	Tufted Duck	Гээзэгт шумбуур	Yes	3			
<i>Bucephala clangula</i>	Common Goldeneye	Алаг шунгаач	Yes	85			
<i>Milvus migrans</i>	Black Kite	Сохор элээ	Yes	2			
<i>Buteo hemilasius</i>	Upland Buzzard	Шилийн сар	Yes	1			
<i>Falco subbuteo</i>	Eurasian Hobby	Шууман шонхор	Yes	1			
<i>Pluvialis squatarola</i>	Grey Plover	Буурал сүвээцагаан	Yes	2			
<i>Charadrius dubius</i>	Little-ringed Plover	Нарийн хиазат	Yes				
<i>Vanellus vanellus</i>	Northern Lapwing	Умардын хавтгаалж	Yes	2			
<i>Recurvirostra avosetta</i>	Pied Avocet	Алаг ээтэн	Yes	15			Estimated healthy count
<i>Tringa glareola</i>	Wood Sandpiper	Шугуйн хөгчүү	Yes	40			Estimated healthy count
<i>Tringa erythropus</i>	Spotted Redshank	Хар хөгчүү	Yes	1			
<i>Tringa stagnatilis</i>	Marsh Sandpiper	Будний хөгчүү	Yes	30			Estimated healthy count
<i>Actitis hypoleucos</i>	Common Sandpiper	Эгэл хайргынхөгчүү	Yes				
<i>Xenus cinereus</i>	Terek Sandpiper	Матигар хөгчүүлэг	Yes	1			
<i>Calidris subminuta</i>	Long-toed Stint	Савар элсэг	Yes	3			
<i>Calidris temminckii</i>	Temminck's Stint	Теммининский элсэг	Yes	1			
<i>Calidris ferruginea</i>	Curlew Sandpiper	Хадуур элсэг	Yes	6			
<i>Gallinago gallinago</i>	Common Snipe	Шөвгөн хараалж	Yes				

<i>Numenius minutus</i>	Little Curlew	Бичилхэн тутгалжин	Yes	9			
<i>Limosa limosa</i>	Black-tailed Godwit	Морин цууцал	Yes	1			
<i>Larus ridibundus</i>	Black-headed Gull	Хүрэнтэлгийн цахтай	Yes	2			
<i>Larus vagae mongolicus</i>	Mongolian Gull	Монгол цахтай	Yes	2			
<i>Sterna hirundo</i>	Common Tern	Эгэл хараалай	Yes	1			
<i>Apus pacificus</i>	Fork-tailed Swift	Хондлойцагаан ураацай	Yes				
<i>Hirundo rustica</i>	Barn Swallow	Асрын алтанхараацай	Yes	1			
<i>Corvus corax</i>	Common Raven	Хон хэрээ	Yes	1			

**Site Name or ID** Dashinchilen Tsagaan Nuur (Site 15)  
**Longitude** 47.84835  
**Latitude** 104.30320  
**Start Date** 25-Aug-06  
**Finish Date** 26-Aug-06  
**Personnel** Wildlife Conservation Society, Mongolian State Central Veterinary Laboratory, Mongolian Academy of Sciences

<b>Scientific name</b>	<b>English name</b>	<b>Mongolian name</b>	<b>Observed at Site</b>	<b>Counts</b>			<b>Comments</b>
				<b>Healthy Count</b>	<b>Sick Count</b>	<b>Dead Count</b>	
<i>Anser cygnoides</i>	Swan Goose	Хошуу галуу	Yes	27			
<i>Cygnus cygnus</i>	Whooper Swan	Гангар хүн	Yes	1			
<i>Tadorna ferruginea</i>	Ruddy Shelduck	Хондон ангир	Yes	898			
<i>Tadorna tadorna</i>	Common Shelduck	Анхидал ангир	Yes	120			
<i>Anas platyrhynchos</i>	Mallard	Зэрлэг нугас	Yes	43			
<i>Anas crecca</i>	Common Teal	Ногоохон нугас	Yes	14			
<i>Anas strepera</i>	Gadwall	Бор нугас	Yes	13			Estimated healthy count
<i>Anas penelope</i>	Eurasian Wigeon	Зээрд нугас	Yes	103			
<i>Anas acuta</i>	Northern Pintail	Шовтгоралаг нугас	Yes	125			
<i>Anas clypeata</i>	Northern Shoveler	Халбага нугас	Yes	45			Estimated healthy count
<i>Aythya fuligula</i>	Tufted Duck	Гээзгт шумбуур	Yes	3			
<i>Milvus migrans</i>	Black Kite	Сохор элээ	Yes	1			
<i>Circus cyaneus</i>	Hen Harrier	Сарал хулд	Yes	1			
<i>Buteo hemilasius</i>	Upland Buzzard	Шилийн сар	Yes	1			
<i>Falco cherrug</i>	Saker Falcon	Идлэг шонхор	Yes	1			
<i>Pluvialis fulva</i>	Pacific Golden Plover	АЗийн сувээцагаан	Yes	500			Estimated healthy count
<i>Charadrius dubius</i>	Little-ringed Plover	Нарийн хиазат	Yes	1			
<i>Charadrius alexandrinus</i>	Kentish Plover	Тэнгисийн хиазат	Yes	120			Estimated healthy count
<i>Vanellus vanellus</i>	Northern Lapwing	Умардын хавтгаалж	Yes	80			Estimated healthy count
<i>Arenaria interpres</i>	Ruddy Turnstone	Алаг хайргач	Yes	28			Estimated healthy count
<i>Himantopus himantopus</i>	Black-winged Stilt	Эгэл хилэнжигүүр	Yes	14			
<i>Recurvirostra avosetta</i>	Pied Avocet	Алаг ээтэн	Yes	669			
<i>Tringa ochropus</i>	Green Sandpiper	Сүүлцагаан хөгчүү	Yes	1			
<i>Tringa glareola</i>	Wood Sandpiper	Шугуйн хөгчүү	Yes				
<i>Tringa nebularia</i>	Common Greenshank	Үхэр хөгчүү	Yes	7			Estimated healthy count
<i>Tringa totanus</i>	Common Redshank	Улаанхөлт хөгчүү	Yes				
<i>Tringa erythropus</i>	Spotted Redshank	Хар хөгчүү	Yes	1			
<i>Tringa stagnatilis</i>	Marsh Sandpiper	Будний хөгчүү	Yes	1			

<i>Xenus cinereus</i>	Terek Sandpiper	Матигар хөгчүүлэг	Yes	5			
<i>Phalaropus lobatus</i>	Red-necked Phalarope	Нарын сэлэхэй	Yes	8			
<i>Philomachus pugnax</i>	Ruff	Ноцоо ноололдой	Yes	50			Estimated healthy count
<i>Calidris minuta</i>	Little Stint	Одой элсэг	Yes	1			
<i>Calidris ruficollis</i>	Red-necked Stint	Шартуруут элсэг	Yes	7			
<i>Calidris temminckii</i>	Temminck's Stint	Темминский элсэг	Yes	1			
<i>Calidris ferruginea</i>	Curlew Sandpiper	Хадуур элсэг	Yes	12			Estimated healthy count
<i>Gallinago gallinago</i>	Common Snipe	Шөвгөн хараалж	Yes	1			
<i>Numenius arquata</i>	Eurasian Curlew	Морин тутгалжин	Yes	1			
<i>Numenius phaeopus</i>	Whimbrel	Бэсрэг тутгалжин	Yes	1			
<i>Limosa limosa</i>	Black-tailed Godwit	Морин цууцал	Yes	50			Estimated healthy count
<i>Stercorarius pomarinus</i>	Pomarine Jaeger	Бэсрэг хайлгана	Yes	1			
<i>Larus ridibundus</i>	Black-headed Gull	Хүрэнтлгой цахлай	Yes	9			
<i>Larus vagae mongolicus</i>	Mongolian Gull	Монгол цахлай	Yes	150			
<i>Larus canus</i>	Mew Gull	Үүлэн цахлай	Yes	1			
<i>Chlidonias leucopterus</i>	White-winged Tern	Буурал хараалзай	Yes	1			
<i>Syrrhaptes paradoxus</i>	Pallas's Sandgrouse	Монгол ногтруу	Yes	4			
<i>Riparia riparia</i>	Sand Martin	Элсэг эргийнхараацай	Yes				
<i>Hirundo rustica</i>	Barn Swallow	Асрын алтанхараацай	Yes				
<i>Motacilla flava</i>	Yellow Wagtail	Шар цэгций	Yes				
<i>Motacilla citreola</i>	Citrine Wagtail	Шартуруут цэгций	Yes				
<i>Corvus corax</i>	Common Raven	Хон хэрээ	Yes	1		1	
<i>Emberiza pallasi</i>	Pallas's Bunting	Цагаанхэвэлт хөмрөг	Yes	1			
<i>Gallinago spp.</i>	Snipe spp.	Хараалж	Yes	5			
<i>Falco tinnunculus/F. naumanni</i>	Common/Lesser Kestrel	Начин шонхор/Зээрд шонхор	Yes	1			

**Site Name or ID** Ogii Nuur (Site 16)  
**Longitude** 47.76325  
**Latitude** 102.81130  
**Start Date** 27-Aug-06  
**Finish Date** 27-Aug-06  
**Personnel** Wildlife Conservation Society, Mongolian State Central Veterinary Laboratory, Mongolian Academy of Sciences

Scientific name	English name	Mongolian name	Observed at Site	Counts			Comments
				Healthy Count	Sick Count	Dead Count	
<i>Gavia arctica</i>	Black-throated Loon	Хилэнгүээ гахууна	Yes	4			
<i>Podiceps nigricollis</i>	Black-necked Grebe	Халтар шунгуур	Yes	3			
<i>Podiceps auritus</i>	Horned Grebe	Ухаа шунгуур	Yes	2			
<i>Podiceps cristatus</i>	Great Crested Grebe	Отгот шунгуур	Yes	93			
<i>Phalacrocorax carbo</i>	Great Cormorant	Тураг голой	Yes	51	1		
<i>Ardea cinerea</i>	Grey Heron	Хөх Дэглий	Yes	1			
<i>Platalea leucorodia</i>	Eurasian Spoonbill	Цагаан халбагант	Yes	1			
<i>Anser anser</i>	Greylag Goose	Бор галуу	Yes	4			
<i>Anser indicus</i>	Bar-headed Goose	Хээрийн галуу	Yes	5			
<i>Anser cygnoides</i>	Swan Goose	Хошуу галуу	Yes	82			
<i>Cygnus cygnus</i>	Whooper Swan	Гангар хүн	Yes	2			
<i>Tadorna ferruginea</i>	Ruddy Shelduck	Хондон ангир	Yes	388		1	
<i>Anas platyrhynchos</i>	Mallard	Зэрлэг нугас	Yes	26			
<i>Anas crecca</i>	Common Teal	Ногоохон нугас	Yes	11			
<i>Anas falcata</i>	Falcated Duck	Гээзгт нугас	Yes	6			
<i>Anas strepera</i>	Gadwall	Бор нугас	Yes	19			
<i>Anas penelope</i>	Eurasian Wigeon	Зээрд нугас	Yes	9			
<i>Anas acuta</i>	Northern Pintail	Шовтгоралаг нугас	Yes	8			
<i>Anas querquedula</i>	Garganey	Цагаанхөмсөгт нугас	Yes	8			
<i>Anas clypeata</i>	Northern Shoveler	Халбага нугас	Yes	24			
<i>Aythya ferina</i>	Common Pochard	Улаанхүзүү шумбуур	Yes	1325			
<i>Bucephala clangula</i>	Common Goldeneye	Алаг шунгаач	Yes	411			
<i>Melanitta fusca</i>	White-winged Scoter	Тольт монхдой	Yes	4			
<i>Milvus migrans</i>	Black Kite	Сохор элээ	Yes	1			
<i>Aquila nipalensis</i>	Steppe Eagle	Тарважи бүргэд	Yes	1			
<i>Haliaeetus leucoryphus</i>	Pallas's Fish Eagle	Усны нөмрөгбүргэд	Yes	1			
<i>Haliaeetus albicilla</i>	White-tailed Eagle	Цагаансүүл нөмрөгбүргэд	Yes	1			
<i>Aegypius monachus</i>	Cinereous Vulture	Нөмрөг тас	Yes	11			

<i>Falco subbuteo</i>	Eurasian Hobby	Шууман шонхор	Yes	2			
<i>Pluvialis fulva</i>	Pacific Golden Plover	Азийн сүвээцагаан	Yes	117			
<i>Charadrius dubius</i>	Little-ringed Plover	Нарийн хиазат	Yes	9			
<i>Charadrius alexandrinus</i>	Kentish Plover	Тэнгисийн хиазат	Yes	7			
<i>Vanellus vanellus</i>	Northern Lapwing	Умардын хавтгаалж	Yes	100			Estimated healthy count
<i>Arenaria interpres</i>	Ruddy Turnstone	Алаг хайргач	Yes	16			
<i>Recurvirostra avosetta</i>	Pied Avocet	Алаг ээтэн	Yes	37			
<i>Tringa erythropus</i>	Spotted Redshank	Хар хөгчүү	Yes	4			
<i>Actitis hypoleucos</i>	Common Sandpiper	Эгэл хайргынхөгчүү	Yes	12			
<i>Xenus cinereus</i>	Terek Sandpiper	Матигар хөгчүүлэг	Yes	1			
<i>Phalaropus lobatus</i>	Red-necked Phalarope	Нарын сэлээхэй	Yes	4			
<i>Philomachus pugnax</i>	Ruff	Ноцоо ноололдой	Yes	7			
<i>Calidris alba</i>	Sanderling	Гурвалж элсэг	Yes	3			
<i>Larus ichthyaetus</i>	Pallas Gull	Итэлгэн цахлай	Yes	8			
<i>Larus ridibundus</i>	Black-headed Gull	Хүрэнтолгой цахлай	Yes	187		2	
<i>Larus vagae mongolicus</i>	Mongolian Gull	Монгол цахлай	Yes	88			
<i>Chlidonias niger</i>	Black Tern	Хилэн хараалзай	Yes	1			
<i>Chlidonias leucopterus</i>	White-winged Tern	Буурал хараалзай	Yes	1			
<i>Sterna hirundo</i>	Common Tern	Эгэл хараалдай	Yes	33			
<i>Riparia riparia</i>	Sand Martin	Элсэг эргийнхараацай	Yes				
<i>Motacilla cinerea</i>	Grey Wagtail	Уулын цэгций	Yes	1			
<i>Pyrhocorax pyrrhocorax</i>	Red-billed Chough	Улаанхушуут жунгаа	Yes	2			
<i>Corylus corax</i>	Common Raven	Хон хэрээ	Yes	4			
<i>Oenanthe isabellina</i>	Isabelline Wheatear	Бужимч чогчиго	Yes				
<i>Passer montanus</i>	Eurasian Tree Sparrow	Хээрийн боршуувуу	Yes	90			Estimated healthy count
<i>Petronia petronia</i>	Rock Sparrow	Хадны боршуу	Yes	1			

**Site Name or ID** Khunt Nuur (Site 17)  
**Longitude** 48.43007  
**Latitude** 102.57520  
**Start Date** 28-Aug-06  
**Finish Date** 29-Aug-06  
**Personnel** Wildlife Conservation Society, Mongolian State Central Veterinary Laboratory, Mongolian Academy of Sciences

Scientific name	English name	Mongolian name	Observed at Site	Counts			Comments
				Healthy Count	Sick Count	Dead Count	
<i>Podiceps nigricollis</i>	Black-necked Grebe	Халтар шунгуур	Yes	6			
<i>Podiceps auritus</i>	Horned Grebe	Ухаа шунгуур	Yes	2			
<i>Tachybaptus ruficollis</i>	Little Grebe	Хурган шунгуур	Yes	1			
<i>Ardea cinerea</i>	Grey Heron	Хөх Дэглий	Yes	1			
<i>Anser indicus</i>	Bar-headed Goose	Хээрийн галуу	Yes	3			
<i>Anser cygnoides</i>	Swan Goose	Хошуу галуу	Yes	9			
<i>Cygnus cygnus</i>	Whooper Swan	Гангар хүн	Yes	6			
<i>Tadorna ferruginea</i>	Ruddy Shelduck	Хондон ангир	Yes	866			
<i>Tadorna tadorna</i>	Common Shelduck	Анхидал ангир	Yes	9			
<i>Anas platyrhynchos</i>	Mallard	Зэрлэг нугас	Yes	13			
<i>Anas crecca</i>	Common Teal	Ногоохон нугас	Yes	508			
<i>Anas strepera</i>	Gadwall	Бор нугас	Yes	35			
<i>Anas penelope</i>	Eurasian Wigeon	Зээрд нугас	Yes	14			
<i>Anas acuta</i>	Northern Pintail	Шовтгоралаг нугас	Yes	10			
<i>Anas querquedula</i>	Garganey	Цагаанхөмсөгт нугас	Yes	22			
<i>Anas clypeata</i>	Northern Shoveler	Халбага нугас	Yes	2			
<i>Rhodonessa rufina</i>	Red-crested Pochard	Халбага нугас	Yes	7			
<i>Aythya ferina</i>	Common Pochard	Улаанхүзүү шумбуур	Yes	120			
<i>Aythya fuligula</i>	Tufted Duck	Гээзгэгт шумбуур	Yes	32			
<i>Aythya marila</i>	Greater Scaup	Тэнгисийн шумбуур	Yes	2			
<i>Bucephala clangula</i>	Common Goldeneye	Алаг шунгаач	Yes	87			
<i>Aquila nipalensis</i>	Steppe Eagle	Тарважи бургэд	Yes	2			
<i>Aegypius monachus</i>	Cinereous Vulture	Нөмрөг тас	Yes	5			
<i>Grus virgo</i>	Demoiselle Crane	Өвөгт тогириуу	Yes	20			Estimated healthy count
<i>Fulica atra</i>	Common Coot	Халzan түнжүү	Yes	39			
<i>Vanellus vanellus</i>	Northern Lapwing	Умардын хавтгаалж	Yes	6			
<i>Arenaria interpres</i>	Ruddy Turnstone	Алаг хайргач	Yes	2			
<i>Tringa glareola</i>	Wood Sandpiper	Шугуйн хөгчүү	Yes				

<i>Tringa totanus</i>	Common Redshank	Улаанхөлт хөгчүү	Yes	1			
<i>Tringa erythropus</i>	Spotted Redshank	Хар хөгчүү	Yes	1			
<i>Actitis hypoleucos</i>	Common Sandpiper	Эгэл хайргынхөгчүү	Yes	2			
<i>Phalaropus lobatus</i>	Red-necked Phalarope	Нарын сэлээхэй	Yes	23			
<i>Philomachus pugnax</i>	Ruff	Ноцоо ноололдой	Yes	38			
<i>Calidris temminckii</i>	Temminck's Stint	Темминскийн элсэг	Yes	2			
<i>Calidris ferruginea</i>	Curlew Sandpiper	Хадуур элсэг	Yes	6			
<i>Numenius phaeopus</i>	Whimbrel	Бэсрэг тутгалжин	Yes	1			
<i>Larus vagae mongolicus</i>	Mongolian Gull	Монгол цахлай	Yes	1			
<i>Pica pica</i>	Black-billed Magpie	Алаг шаазгай	Yes	1			
<i>Pyrrhocorax pyrrhocorax</i>	Red-billed Chough	Улаанхушуут жунгаа	Yes	1			
<i>Corvus corax</i>	Common Raven	Хон хэрээ	Yes	2			
<i>Unknown</i>	Unknown	Мэдэхгүй	Yes			1	

**Site Name or ID** Small lake in Khuljiin Khondii (Site 18)  
**Longitude** 48.79817  
**Latitude** 102.29680  
**Start Date** 29-Aug-06  
**Finish Date** 29-Aug-06  
**Personnel** Wildlife Conservation Society, Mongolian State Central Veterinary Laboratory, Mongolian Academy of Sciences

<b>Scientific name</b>	<b>English name</b>	<b>Mongolian name</b>	<b>Observed at Site</b>	<b>Counts</b>			<b>Comments</b>
				<b>Healthy Count</b>	<b>Sick Count</b>	<b>Dead Count</b>	
<i>Podiceps auritus</i>	Horned Grebe	Ухаа шунгуур	Yes	2			
<i>Anser indicus</i>	Bar-headed Goose	Хээрийн галуу	Yes	97			
<i>Anser cygnoides</i>	Swan Goose	Хошуу галуу	Yes	118			
<i>Tadorna ferruginea</i>	Ruddy Shelduck	Хондон ангир	Yes	10			
<i>Buteo hemilasius</i>	Upland Buzzard	Шилийн сар	Yes	1			
<i>Grus virgo</i>	Demoiselle Crane	Өвөгт тогируу	Yes	10			
<i>Tringa totanus</i>	Common Redshank	Улаанхөлт хөгчүү	Yes	1			
<i>Numenius arquata</i>	Eurasian Curlew	Морин тутгалжин	Yes	1			
<i>Pyrrhocorax pyrrhocorax</i>	Red-billed Chough	Улаанхушуут жунгаа	Yes				

**Site Name or ID** Sharga Nuur (Site 19)  
**Longitude** 48.94365  
**Latitude** 101.97030  
**Start Date** 30-Aug-06  
**Finish Date** 30-Aug-06  
**Personnel** Wildlife Conservation Society, Mongolian State Central Veterinary Laboratory, Mongolian Academy of Sciences

<b>Scientific name</b>	<b>English name</b>	<b>Mongolian name</b>	<b>Observed at Site</b>	<b>Counts</b>			<b>Comments</b>
				<b>Healthy Count</b>	<b>Sick Count</b>	<b>Dead Count</b>	
<i>Gavia arctica</i>	Black-throated Loon	Хилэнгүээ гахууна	Yes	1			
<i>Podiceps nigricollis</i>	Black-necked Grebe	Халтар шунгуур	Yes	432			
<i>Podiceps auritus</i>	Horned Grebe	Ухаа шунгуур	Yes	22			
<i>Phalacrocorax carbo</i>	Great Cormorant	Тураг голой	Yes	67		1	
<i>Ardea cinerea</i>	Grey Heron	Хөх Дэглий	Yes	3			
<i>Anser fabalis</i>	Bean Goose	Буурал галуу	Yes	8			
<i>Anser indicus</i>	Bar-headed Goose	Хээрийн галуу	Yes	109			
<i>Anser cygnoides</i>	Swan Goose	Хошуу галуу	Yes	24			
<i>Cygnus cygnus</i>	Whooper Swan	Гангар хүн	Yes	69		3	
<i>Tadorna ferruginea</i>	Ruddy Shelduck	Хондон ангир	Yes	51			
<i>Anas platyrhynchos</i>	Mallard	Зэрлэг нугас	Yes	34			
<i>Anas crecca</i>	Common Teal	Ногоохон нугас	Yes	319			
<i>Anas falcata</i>	Falcated Duck	Гээзгт нугас	Yes	8			
<i>Anas strepera</i>	Gadwall	Бор нугас	Yes	4			
<i>Anas penelope</i>	Eurasian Wigeon	Зээрд нугас	Yes	123			
<i>Anas acuta</i>	Northern Pintail	Шовтгоралаг нугас	Yes	76			
<i>Anas querquedula</i>	Garganey	Цагаанхөмсөтг нугас	Yes	19			
<i>Aythya ferina</i>	Common Pochard	Улаанхүзүү шумбуур	Yes	359			
<i>Aythya fuligula</i>	Tufted Duck	Гээзгт шумбуур	Yes	705			
<i>Bucephala clangula</i>	Common Goldeneye	Алаг шунгаач	Yes	2178			
<i>Melanitta fusca</i>	White-winged Scoter	Тольт монхдой	Yes	567			
<i>Mergus albellus</i>	Smew	Цахир бохио	Yes	5			
<i>Mergus merganser</i>	Common Merganser	Хумхин бохио	Yes	13			
<i>Milvus migrans</i>	Black Kite	Сохор элээ	Yes	1			
<i>Buteo hemilasius</i>	Upland Buzzard	Шилийн сар	Yes	1			
<i>Aquila nipalensis</i>	Steppe Eagle	Тарважи бүргэд	Yes	2			
<i>Aegypius monachus</i>	Cinereous Vulture	Нөмрөг тас	Yes	2			
<i>Grus virgo</i>	Demoiselle Crane	Өвөгт тогируу	Yes	48			

<i>Fulica atra</i>	Common Coot	Халзан түнжүү	Yes	4			
<i>Pluvialis fulva</i>	Pacific Golden Plover	Азиин сүвээцагаан	Yes	18			
<i>Charadrius dubius</i>	Little-ringed Plover	Нарийн хиазат	Yes	5			Estimated healthy count
<i>Arenaria interpres</i>	Ruddy Turnstone	Алаг хайргач	Yes	2			
<i>Recurvirostra avosetta</i>	Pied Avocet	Алаг ээтэн	Yes	4			
<i>Tringa ochropus</i>	Green Sandpiper	Сүүлцагаан хөгчүү	Yes	4			Estimated healthy count
<i>Tringa glareola</i>	Wood Sandpiper	Шугуйн хөгчүү	Yes	12			Estimated healthy count
<i>Tringa totanus</i>	Common Redshank	Улаанхөлт хөгчүү	Yes	1			
<i>Tringa erythropus</i>	Spotted Redshank	Хар хөгчүү	Yes	4			
<i>Actitis hypoleucos</i>	Common Sandpiper	Эгэл хайрлынхөгчүү	Yes	1			
<i>Xenus cinereus</i>	Terek Sandpiper	Матигар хөгчүүлэг	Yes	3			
<i>Phalaropus lobatus</i>	Red-necked Phalarope	Нарын сэлээхэй	Yes	7			
<i>Philomachus pugnax</i>	Ruff	Ноцоо ноололдой	Yes	1			
<i>Calidris minuta</i>	Little Stint	Одой элсэг	Yes	10			
<i>Calidris temminckii</i>	Temminck's Stint	Темиминский элсэг	Yes	7			
<i>Calidris ferruginea</i>	Curlew Sandpiper	Хадуур элсэг	Yes	3			
<i>Calidris alpina</i>	Dunlin	Хар элсэг	Yes	1			
<i>Limicola falcinellus</i>	Broad-billed Sandpiper	Сямби шалчиг	Yes	1			
<i>Larus ridibundus</i>	Black-headed Gull	Хүрэнтөлгөй цахтай	Yes	67			
<i>Larus vagae mongolicus</i>	Mongolian Gull	Монгол цахтай	Yes	68		1	
<i>Sterna hirundo</i>	Common Tern	Эгэл хараалай	Yes	2			
<i>Melanocorypha mongolica</i>	Mongolian Lark	Монгол Болжмор	Yes				
<i>Motacilla citreola</i>	Citrine Wagtail	Шартуруүт цэгций	Yes				
<i>Pyrrhocorax pyrrhocorax</i>	Red-billed Chough	Улаанхушуут жунгаа	Yes				
<i>Corvus corax</i>	Common Raven	Хон хэрээ	Yes	2			
<i>Duck spp.</i>	Duck spp.	Нугас	Yes			1	
<i>Falco tinnunculus/F. naumanni</i>	Common/Lesser Kestrel	Начин шонхор/Зээрд шонхор	Yes	1			
<i>Unknown</i>	Unknown	Мэдэхгүй	Yes			1	

**Site Name or ID** Achmagg Nuur (Site 20)  
**Longitude** 49.65760  
**Latitude** 100.49530  
**Start Date** 31-Aug-06  
**Finish Date** 31-Aug-06  
**Personnel** Wildlife Conservation Society, Mongolian State Central Veterinary Laboratory, Mongolian Academy of Sciences

Scientific name	English name	Mongolian name	Observed at Site	Counts			Comments
				Healthy Count	Sick Count	Dead Count	
<i>Podiceps nigricollis</i>	Black-necked Grebe	Халтар шунгуур	Yes	14			
<i>Phalacrocorax carbo</i>	Great Cormorant	Тураг голой	Yes	1			
<i>Anser indicus</i>	Bar-headed Goose	Хээрийн галуу	Yes	9			
<i>Cygnus cygnus</i>	Whooper Swan	Гангар хүн	Yes	3			
<i>Tadorna ferruginea</i>	Ruddy Shelduck	Хондон ангир	Yes	327		2	
<i>Anas crecca</i>	Common Teal	Ногоохон нугас	Yes	10			
<i>Anas penelope</i>	Eurasian Wigeon	Зээрд нугас	Yes	45			
<i>Anas acuta</i>	Northern Pintail	Шовтгоралаг нугас	Yes	67			
<i>Anas clypeata</i>	Northern Shoveler	Халбага нугас	Yes	28			
<i>Aythya ferina</i>	Common Pochard	Улаанхузүү шумбуур	Yes	5			
<i>Bucephala clangula</i>	Common Goldeneye	Алаг шунгаач	Yes	93			
<i>Haliaeetus albicilla</i>	White-tailed Eagle	Цагаансүүл нөмрөгбүргэд	Yes	1			
<i>Charadrius dubius</i>	Little-ringed Plover	Нарийн хиазат	Yes	1			
<i>Tringa glareola</i>	Wood Sandpiper	Шугуйн хөгчүү	Yes	15			Estimated healthy count
<i>Tringa nebularia</i>	Common Greenshank	Үхэр хөгчүү	Yes	1			
<i>Phalaropus lobatus</i>	Red-necked Phalarope	Нарын сэлээхэй	Yes	9			
<i>Philomachus pugnax</i>	Ruff	Ноцоо ноололдой	Yes	55			Estimated healthy count
<i>Calidris minuta</i>	Little Stint	Одой элсэг	Yes	3			
<i>Calidris temminckii</i>	Temminck's Stint	Темминскийн элсэг	Yes	4			
<i>Larus minutus</i>	Little Gull	Хурган цахтай	Yes	1			
<i>Larus ridibundus</i>	Black-headed Gull	Хүрэнтолгой цахтай	Yes	41			
<i>Larus vagae mongolicus</i>	Mongolian Gull	Монгол цахтай	Yes	15			
<i>Corvus corax</i>	Common Raven	Хон хэрээ	Yes	1			
<i>Motacilla sp.</i>	Wagtail spp.	Цэгций	Yes	1			

**Site Name or ID** Erhel Nuur (Site 21)  
**Longitude** 49.96677  
**Latitude** 99.90592  
**Start Date** 2-Sep-06  
**Finish Date** 2-Sep-06  
**Personnel** Wildlife Conservation Society, Mongolian State Central Veterinary Laboratory, Mongolian Academy of Sciences

<b>Scientific name</b>	<b>English name</b>	<b>Mongolian name</b>	<b>Observed at Site</b>	<b>Counts</b>			<b>Comments</b>
				<b>Healthy Count</b>	<b>Sick Count</b>	<b>Dead Count</b>	
<i>Podiceps nigricollis</i>	Black-necked Grebe	Халтар шунгуур	Yes	40			Estimated healthy count
<i>Phalacrocorax carbo</i>	Great Cormorant	Тураг голой	Yes	5	1		
<i>Ardea cinerea</i>	Grey Heron	Хөх Дэглий	Yes	2			
<i>Anser fabalis</i>	Bean Goose	Буурал галуу	Yes	3			
<i>Anser indicus</i>	Bar-headed Goose	Хээрийн галуу	Yes	9		3	
<i>Anser cygnoides</i>	Swan Goose	Хошуу галуу	Yes	1		1	
<i>Cygnus cygnus</i>	Whooper Swan	Гангар хүн	Yes	24		23	
<i>Tadorna ferruginea</i>	Ruddy Shelduck	Хондон ангир	Yes	1624		6	
<i>Tadorna tadorna</i>	Common Shelduck	Анхидал ангир	Yes	3			
<i>Anas platyrhynchos</i>	Mallard	Зэрлэг нугас	Yes	2			
<i>Anas crecca</i>	Common Teal	Ногоохон нугас	Yes	84		1	
<i>Anas penelope</i>	Eurasian Wigeon	Зээрд нугас	Yes	304			
<i>Anas acuta</i>	Northern Pintail	Шовтгоралаг нугас	Yes	141			
<i>Anas clypeata</i>	Northern Shoveler	Халбага нугас	Yes	96			
<i>Aythya ferina</i>	Common Pochard	Улаанхүзүү шумбуур	Yes	1278			
<i>Aythya fuligula</i>	Tufted Duck	Гээзгэш шумбуур	Yes	49		1	
<i>Bucephala clangula</i>	Common Goldeneye	Алаг шунгаач	Yes	867			
<i>Melanitta fusca</i>	White-winged Scoter	Тольт монхдой	Yes	3		2	
<i>Milvus migrans</i>	Black Kite	Сохор элээ	Yes	1			
<i>Circus cyaneus</i>	Hen Harrier	Сарал хулд	Yes	3			
<i>Accipiter gentilis</i>	Northern Goshawk	Үлэг харцага	Yes	1			
<i>Buteo hemilasius</i>	Upland Buzzard	Шилийн сар	Yes	5			Estimated healthy count
<i>Haliaeetus albicilla</i>	White-tailed Eagle	Цагаансүүл нөмрөгбүргэд	Yes	2			
<i>Hieraetus pennatus</i>	Booted Eagle	Бахим бүргэдэй	Yes	1			
<i>Aegypius monachus</i>	Cinereous Vulture	Нөмрөг тас	Yes	1			
<i>Falco peregrinus</i>	Peregrine Falcon	Эгэл шонхор	Yes	1			
<i>Falco subbuteo</i>	Eurasian Hobby	Шууман шонхор	Yes	2			
<i>Falco columbarius</i>	Merlin	Хайргууна шонхор	Yes	1			

<i>Falco naumanni</i>	Lesser Kestrel	Зээрд шонхор	Yes	1		
<i>Falco tinnunculus</i>	Common Kestrel	Начин шонхор	Yes	1		
<i>Grus virgo</i>	Demoiselle Crane	Өвөгт тогируу	Yes	3		
<i>Otis tarda</i>	Great Bustard	Хонин тоодог	Yes	12		
<i>Pluvialis fulva</i>	Pacific Golden Plover	Азийн сүвээцагаан	Yes	1		
<i>Charadrius dubius</i>	Little-ringed Plover	Нарийн хиазат	Yes	1		
<i>Vanellus vanellus</i>	Northern Lapwing	Умардын хавтгаалж	Yes	14	1	
<i>Arenaria interpres</i>	Ruddy Turnstone	Алаг хайргач	Yes	2		
<i>Actitis hypoleucos</i>	Common Sandpiper	Эгэл хайргынхөгчүү	Yes	1		
<i>Phalaropus lobatus</i>	Red-necked Phalarope	Нарын сэлээхий	Yes	53		
<i>Philomachus pugnax</i>	Ruff	Ноцоо ноололдой	Yes	80		
<i>Calidris minuta</i>	Little Stint	Одой элсэг	Yes	2		
<i>Calidris ferruginea</i>	Curlew Sandpiper	Хадуур элсэг	Yes	2		
<i>Gallinago gallinago</i>	Common Snipe	Шөвгөн хараалж	Yes	1		
<i>Larus ridibundus</i>	Black-headed Gull	Хүрэнтгой цахтай	Yes	50	1	
<i>Larus vagae mongolicus</i>	Mongolian Gull	Монгол цахтай	Yes	318	10	
<i>Larus canus</i>	Mew Gull	Үүлэн цахтай	Yes	1		
<i>Riparia riparia</i>	Sand Martin	Элсэг эргийнхараацай	Yes	50		Estimated healthy count
<i>Melanocorypha mongolica</i>	Mongolian Lark	Монгол Болжмор	Yes			
<i>Eremophila alpestris</i>	Horned Lark	Шоорон Эвэртболжмор	Yes		1	
<i>Alauda arvensis</i>	Eurasian Skylark	Боролзой богширго	Yes			
<i>Motacilla citreola</i>	Citrine Wagtail	Шартуруүт цэгций	Yes	1		
<i>Pyrhocorax pyrrhocorax</i>	Red-billed Chough	Улаанхушуут жунгаа	Yes	4		
<i>Corvus corax</i>	Common Raven	Хон хэрээ	Yes	1		
<i>Oenanthe oenanthe</i>	Northern Wheatear	Адууч чогчиго	Yes			
<i>Oenanthe pleschanka</i>	Pied Wheatear	Мяраан чогчиго	Yes	1		
<i>Duck spp.</i>	Duck spp.	Нугас	Yes		2	
<i>Lanius sp.</i>	Shrike spp.	Дунхай	Yes	1		
<i>Unknown</i>	Unknown	Мэдэхгүй	Yes		6	
<i>Anser spp.</i>	Goose spp.	Галуу	Yes		1	

**Site Name or ID** Ulaan Nuur (Site 22)  
**Longitude** 49.56397  
**Latitude** 98.72592  
**Start Date** 6-Sep-06  
**Finish Date** 6-Sep-06  
**Personnel** Wildlife Conservation Society, Mongolian State Central Veterinary Laboratory

Scientific name	English name	Mongolian name	Observed at Site	Counts			Comments
				Healthy Count	Sick Count	Dead Count	
<i>Podiceps nigricollis</i>	Black-necked Grebe	Халтар шунгуур	Yes	1			
<i>Tachybaptus ruficollis</i>	Little Grebe	Хурган шунгуур	Yes	20			
<i>Phalacrocorax carbo</i>	Great Cormorant	Тураг голой	Yes	3		1	
<i>Ardea cinerea</i>	Grey Heron	Хөх Дэглий	Yes	4			
<i>Cygnus cygnus</i>	Whooper Swan	Гангар хүн	Yes	4			
<i>Tadorna ferruginea</i>	Ruddy Shelduck	Хондон ангир	Yes	5			
<i>Anas platyrhynchos</i>	Mallard	Зэрлэг нугас	Yes	9			
<i>Anas crecca</i>	Common Teal	Ногоохон нугас	Yes	22			
<i>Anas penelope</i>	Eurasian Wigeon	Зээрд нугас	Yes	33			
<i>Anas acuta</i>	Northern Pintail	Шовтгоралаг нугас	Yes	60			
<i>Anas clypeata</i>	Northern Shoveler	Халбага нугас	Yes	16			
<i>Aythya ferina</i>	Common Pochard	Улаанхузүү шумбуур	Yes	65			
<i>Aythya fuligula</i>	Tufted Duck	Гээзгүүт шумбуур	Yes	560		1	
<i>Bucephala clangula</i>	Common Goldeneye	Алаг шунгаач	Yes	265	1		
<i>Melanitta fusca</i>	White-winged Scoter	Тольт монхдой	Yes	2			
<i>Milvus migrans</i>	Black Kite	Сохор элээ	Yes	1			
<i>Buteo hemilasius</i>	Upland Buzzard	Шилийн сар	Yes	1			
<i>Haliaeetus albicilla</i>	White-tailed Eagle	Цагаансүүл нөмрөгбүргэд	Yes	1			
<i>Aegypius monachus</i>	Cinereous Vulture	Нөмрөг тас	Yes	1			
<i>Falco tinnunculus</i>	Common Kestrel	Начин шонхор	Yes	1			
<i>Pluvialis squatarola</i>	Grey Plover	Буурал сувээцагаан	Yes	1			
<i>Pluvialis fulva</i>	Pacific Golden Plover	АЗийн сувээцагаан	Yes	4			
<i>Tringa ochropus</i>	Green Sandpiper	Сүүлцагаан хөгчүү	Yes	1			
<i>Tringa nebularia</i>	Common Greenshank	Үхэр хөгчүү	Yes	1			
<i>Tringa totanus</i>	Common Redshank	Улаанхөлт хөгчүү	Yes	3			
<i>Tringa erythropus</i>	Spotted Redshank	Хар хөгчүү	Yes	6			
<i>Philomachus pugnax</i>	Ruff	Ноцоо ноололдой	Yes	7			
<i>Calidris temminckii</i>	Temminck's Stint	Темминский элсэг	Yes	3			

<i>Calidris ferruginea</i>	Curlew Sandpiper	Хадуур элсэг	Yes	1			
<i>Calidris alba</i>	Sanderling	Гурвалж элсэг	Yes	2			
<i>Larus ridibundus</i>	Black-headed Gull	Хүрэнтогой цахтай	Yes	2		1	
<i>Larus vagae mongolicus</i>	Mongolian Gull	Монгол цахтай	Yes	48			
<i>Larus canus</i>	Mew Gull	Үүлэн цахтай	Yes	1			
<i>Eremophila alpestris</i>	Horned Lark	Шоорон Эвэртболжмор	Yes	1			
<i>Motacilla citreola</i>	Citrine Wagtail	Шартуруүт цэгций	Yes	1			
<i>Pyrrhocorax pyrrhocorax</i>	Red-billed Chough	Улаанхушуут жунгаа	Yes				
<i>Corvus corax</i>	Common Raven	Хон хэрээ	Yes	1			

**Site Name or ID** Tunamal Nuur (Site 23)  
**Longitude** 49.43660  
**Latitude** 98.58313  
**Start Date** 7-Sep-06  
**Finish Date** 7-Sep-06  
**Personnel** Wildlife Conservation Society, Mongolian State Central Veterinary Laboratory

Scientific name	English name	Mongolian name	Observed at Site	Counts			Comments
				Healthy Count	Sick Count	Dead Count	
<i>Phalacrocorax carbo</i>	Great Cormorant	Тураг голой	Yes	63		3	
<i>Ardea cinerea</i>	Grey Heron	Хөх Дэглий	Yes	7			
<i>Anser fabalis</i>	Bean Goose	Буурал галуу	Yes	1			
<i>Anser indicus</i>	Bar-headed Goose	Хээрийн галуу	Yes	1			
<i>Cygnus cygnus</i>	Whooper Swan	Гангар хүн	Yes	13			
<i>Tadorna ferruginea</i>	Ruddy Shelduck	Хондон ангир	Yes	36		1	
<i>Anas crecca</i>	Common Teal	Ногоохон нугас	Yes	4			
<i>Anas strepera</i>	Gadwall	Бор нугас	Yes	3			
<i>Anas penelope</i>	Eurasian Wigeon	Зээрд нугас	Yes	74			
<i>Anas acuta</i>	Northern Pintail	Шовтгоралаг нугас	Yes	24			
<i>Anas clypeata</i>	Northern Shoveler	Халбага нугас	Yes				
<i>Aythya ferina</i>	Common Pochard	Улаанхузүү шумбуур	Yes	8			
<i>Aythya fuligula</i>	Tufted Duck	Гээзгүүт шумбуур	Yes	5			
<i>Bucephala clangula</i>	Common Goldeneye	Алаг шунгаач	Yes	3			
<i>Mergus merganser</i>	Common Merganser	Хумхин бохио	Yes	19			
<i>Milvus migrans</i>	Black Kite	Сохор элээ	Yes	1		1	
<i>Circus cyaneus</i>	Hen Harrier	Сарал хулд	Yes	1			
<i>Aegypius monachus</i>	Cinereous Vulture	Нөмрөг тас	Yes	5			
<i>Falco cherrug</i>	Saker Falcon	Идлэг шонхор	Yes	1			
<i>Vanellus vanellus</i>	Northern Lapwing	Умардын хавтгаалж	Yes	80			Estimated healthy count
<i>Phalaropus lobatus</i>	Red-necked Phalarope	Нарын сэлээхий	Yes	6			
<i>Philomachus pugnax</i>	Ruff	Ноцоо ноололдой	Yes	8			
<i>Calidris temminckii</i>	Temminck's Stint	Темиминский элсэг	Yes	8			
<i>Numenius arquata</i>	Eurasian Curlew	Морин тутгалжин	Yes	1			
<i>Larus ridibundus</i>	Black-headed Gull	Хүрэнтогий цахтай	Yes	5		1	
<i>Larus vagae mongolicus</i>	Mongolian Gull	Монгол цахтай	Yes	35			
<i>Larus canus</i>	Mew Gull	Үүлэн цахтай	Yes	1			
<i>Sterna hirundo</i>	Common Tern	Эгэл хараалай	Yes	3			

<i>Melanocorypha mongolica</i>	Mongolian Lark	Монгол Болжмор	Yes	1			
<i>Eremophila alpestris</i>	Horned Lark	Шоорон Эвэртболжмор	Yes	1			
<i>Motacilla citreola</i>	Citrine Wagtail	Шартуруут цэгций	Yes	2			
<i>Motacilla alba</i>	White Wagtail	Хөх цэгций	Yes	1			
<i>Corvus corax</i>	Common Raven	Хон хэрээ	Yes	5			
<i>Oenanthe isabellina</i>	Isabelline Wheatear	Бүжимч чогчиго	Yes	1			
<i>Delichon sp</i>	House Martin spp.	Хараацай	Yes	1			
<i>Anser spp.</i>	Goose spp.	Галуу	Yes			1	

**Site Name or ID** Oygon Nuur (Site 24)  
**Longitude** 49.17490  
**Latitude** 96.65645  
**Start Date** 8-Sep-06  
**Finish Date** 8-Sep-06  
**Personnel** Wildlife Conservation Society, Mongolian State Central Veterinary Laboratory

<b>Scientific name</b>	<b>English name</b>	<b>Mongolian name</b>	<b>Observed at Site</b>	<b>Counts</b>			<b>Comments</b>
				<b>Healthy Count</b>	<b>Sick Count</b>	<b>Dead Count</b>	
<i>Cygnus cygnus</i>	Whooper Swan	Гангар хүн	Yes	30		1	Estimated healthy count
<i>Tadorna ferruginea</i>	Ruddy Shelduck	Хондон ангир	Yes	1500			
<i>Tadorna tadorna</i>	Common Shelduck	Анхидал ангир	Yes	100		1	
<i>Anas crecca</i>	Common Teal	Ногоохон нугас	Yes				
<i>Anas penelope</i>	Eurasian Wigeon	Зээрд нугас	Yes				
<i>Anas acuta</i>	Northern Pintail	Шовтгоралаг нугас	Yes				
<i>Anas clypeata</i>	Northern Shoveler	Халбага нугас	Yes				
<i>Circus cyaneus</i>	Hen Harrier	Сарал хулд	Yes	12			Estimated healthy count
<i>Circus macrourus</i>	Pallid Harrier	Хээрийн хулд	Yes	1			
<i>Buteo hemilasius</i>	Upland Buzzard	Шилийн сар	Yes	50			
<i>Falco cherrug</i>	Saker Falcon	Идлэг шонхор	Yes	10			
<i>Vanellus vanellus</i>	Northern Lapwing	Умардын хавтгаалж	Yes				
<i>Phalaropus lobatus</i>	Red-necked Phalarope	Нарын сэлээхэй	Yes	4			
<i>Philomachus pugnax</i>	Ruff	Ноцоо ноололдой	Yes	10			Estimated healthy count
<i>Calidris temminckii</i>	Temminck's Stint	Темиминский элсэг	Yes	2			
<i>Calidris alpina</i>	Dunlin	Хар элсэг	Yes	1			
<i>Larus ridibundus</i>	Black-headed Gull	Хүрэнтөлгөй цахлай	Yes	1200			Estimated healthy count
<i>Larus vagae mongolicus</i>	Mongolian Gull	Монгол цахлай	Yes				
<i>Melanocorypha mongolica</i>	Mongolian Lark	Монгол Болжмор	Yes				
<i>Eremophila alpestris</i>	Horned Lark	Шоорон Эвэртболжмор	Yes				
<i>Alauda arvensis</i>	Eurasian Skylark	Боролзой богширго	Yes				
<i>Motacilla citreola</i>	Citrine Wagtail	Шартуруүт цэгций	Yes				
<i>Motacilla alba</i>	White Wagtail	Хөх цэгций	Yes	1			
<i>Corvus corax</i>	Common Raven	Хон хэрээ	Yes				
<i>Locustella certhiola</i>	Rusty-rumped Warbler	Гүймхий шатансүүлт	Yes	1			
<i>Unknown</i>	Unknown	Мэдэхгүй	Yes			1	

**Site Name or ID** Shorbog Nuur (Site 25)  
**Longitude** 49.10017  
**Latitude** 96.48512  
**Start Date** 8-Sep-06  
**Finish Date** 8-Sep-06  
**Personnel** Wildlife Conservation Society, Mongolian State Central Veterinary Laboratory

Scientific name	English name	Mongolian name	Observed at Site	Counts			Comments
				Healthy Count	Sick Count	Dead Count	
<i>Podiceps cristatus</i>	Great Crested Grebe	Отгот шунгуур	Yes	1			
<i>Phalacrocorax carbo</i>	Great Cormorant	Тураг голой	Yes	22		3	
<i>Ardea cinerea</i>	Grey Heron	Хөх Дэглий	Yes	4			
<i>Platalea leucorodia</i>	Eurasian Spoonbill	Цагаан халбагант	Yes	32			
<i>Anser indicus</i>	Bar-headed Goose	Хээрийн галуу	Yes	7			
<i>Cygnus cygnus</i>	Whooper Swan	Гангар хүн	Yes	5			
<i>Tadorna ferruginea</i>	Ruddy Shelduck	Хондон ангир	Yes	98			
<i>Anas platyrhynchos</i>	Mallard	Зэрлэг нугас	Yes	14			
<i>Anas crecca</i>	Common Teal	Ногоохон нугас	Yes	4			
<i>Anas strepera</i>	Gadwall	Бор нугас	Yes	2			
<i>Anas penelope</i>	Eurasian Wigeon	Зээрд нугас	Yes	8			
<i>Anas acuta</i>	Northern Pintail	Шовторалаг нугас	Yes	39			
<i>Rhodonessa rufina</i>	Red-crested Pochard	Халбага нугас	Yes	10			
<i>Aythya ferina</i>	Common Pochard	Улаанхүзүү шумбуур	Yes	193			
<i>Aythya fuligula</i>	Tufted Duck	Гээзгт шумбуур	Yes	427			
<i>Bucephala clangula</i>	Common Goldeneye	Алаг шунгаач	Yes	327			
<i>Melanitta fusca</i>	White-winged Scoter	Тольт монхдой	Yes	3			
<i>Buteo hemilasius</i>	Upland Buzzard	Шилийн сар	Yes	6			Estimated healthy count
<i>Falco cherrug</i>	Saker Falcon	Идлэг шонхор	Yes	3			
<i>Vanellus vanellus</i>	Northern Lapwing	Умардын хавтгаалж	Yes	40			Estimated healthy count
<i>Larus ridibundus</i>	Black-headed Gull	Хүрэнтогий цахтай	Yes	1			
<i>Larus vagae mongolicus</i>	Mongolian Gull	Монгол цахтай	Yes	599		4	
<i>Larus canus</i>	Mew Gull	Үүлэн цахтай	Yes	1			
<i>Melanocorypha mongolica</i>	Mongolian Lark	Монгол Болжмор	Yes				
<i>Eremophila alpestris</i>	Horned Lark	Шоорон Эвэртболжмор	Yes				
<i>Motacilla alba</i>	White Wagtail	Хөх цэгций	Yes	1			
<i>Unknown</i>	Unknown	Мэдэхгүй	Yes			1	

**Site Name or ID** Nogoon Nuur (Site 26)  
**Longitude** 49.10253  
**Latitude** 96.54738  
**Start Date** 9-Sep-06  
**Finish Date** 9-Sep-06  
**Personnel** Wildlife Conservation Society, Mongolian State Central Veterinary Laboratory

<b>Scientific name</b>	<b>English name</b>	<b>Mongolian name</b>	<b>Observed at Site</b>	<b>Counts</b>			<b>Comments</b>
				<b>Healthy Count</b>	<b>Sick Count</b>	<b>Dead Count</b>	
<i>Gavia arctica</i>	Black-throated Loon	Хилэнгүээ гахууна	Yes	6			
<i>Podiceps nigricollis</i>	Black-necked Grebe	Халтар шунгуур	Yes	1			
<i>Phalacrocorax carbo</i>	Great Cormorant	Тураг голой	Yes	4			
<i>Ardea cinerea</i>	Grey Heron	Хөх Дэглий	Yes	1			
<i>Cygnus cygnus</i>	Whooper Swan	Гангар хүн	Yes	4			
<i>Tadorna ferruginea</i>	Ruddy Shelduck	Хондон ангир	Yes	2			
<i>Anas acuta</i>	Northern Pintail	Шовтгоралаг нугас	Yes	9			
<i>Aythya ferina</i>	Common Pochard	Улаанхүзүү шумбуур	Yes	36			
<i>Aythya fuligula</i>	Tufted Duck	Гээзэгт шумбуур	Yes	892			
<i>Bucephala clangula</i>	Common Goldeneye	Алаг шунгаач	Yes	256			
<i>Mergus merganser</i>	Common Merganser	Хумхин бохио	Yes	2			
<i>Buteo hemilasius</i>	Upland Buzzard	Шилийн сар	Yes	2			
<i>Falco cherrug</i>	Saker Falcon	Идлэг шонхор	Yes				
<i>Larus ridibundus</i>	Black-headed Gull	Хүрэнтогий цахтай	Yes	358			
<i>Larus vagae mongolicus</i>	Mongolian Gull	Монгол цахтай	Yes	8			
<i>Melanocorypha mongolica</i>	Mongolian Lark	Монгол Болжмор	Yes				
<i>Eremophila alpestris</i>	Horned Lark	Шоорон Эвэртболжмор	Yes				

**Site Name or ID** Sharbart Nuur (Site 27)  
**Longitude** 49.91568  
**Latitude** 93.71840  
**Start Date** 10-Sep-06  
**Finish Date** 10-Sep-06  
**Personnel** Wildlife Conservation Society, Mongolian State Central Veterinary Laboratory

<b>Scientific name</b>	<b>English name</b>	<b>Mongolian name</b>	<b>Observed at Site</b>	<b>Counts</b>			<b>Comments</b>
				<b>Healthy Count</b>	<b>Sick Count</b>	<b>Dead Count</b>	
<i>Podiceps nigricollis</i>	Black-necked Grebe	Халтар шунгуур	Yes	17			
<i>Podiceps auritus</i>	Horned Grebe	Ухаа шунгуур	Yes	3			
<i>Podiceps cristatus</i>	Great Crested Grebe	Отгот шунгуур	Yes	8			
<i>Tachybaptus ruficollis</i>	Little Grebe	Хурган шунгуур	Yes	1			
<i>Phalacrocorax carbo</i>	Great Cormorant	Тураг голой	Yes	2		1	
<i>Platalea leucorodia</i>	Eurasian Spoonbill	Цагаан халбагант	Yes			1	
<i>Anser indicus</i>	Bar-headed Goose	Хээрийн галуу	Yes	2			
<i>Cygnus cygnus</i>	Whooper Swan	Гангар хүн	Yes	2			
<i>Tadorna ferruginea</i>	Ruddy Shelduck	Хондон ангир	Yes	1			
<i>Anas platyrhynchos</i>	Mallard	Зэрлэг нугас	Yes	133			
<i>Anas crecca</i>	Common Teal	Ногоохон нугас	Yes	70			
<i>Anas strepera</i>	Gadwall	Бор нугас	Yes	11			
<i>Anas penelope</i>	Eurasian Wigeon	Зээрд нугас	Yes	196			
<i>Anas acuta</i>	Northern Pintail	Шовтгоралаг нугас	Yes	68			
<i>Anas querquedula</i>	Garganey	Цагаанхөмсөгт нугас	Yes	4			
<i>Anas clypeata</i>	Northern Shoveler	Халбага нугас	Yes	21			
<i>Aythya ferina</i>	Common Pochard	Улаанхүзүү шумбуур	Yes	106			
<i>Aythya fuligula</i>	Tufted Duck	Гээргэ шумбуур	Yes	227			
<i>Bucephala clangula</i>	Common Goldeneye	Алаг шунгаач	Yes	259			
<i>Oxyura leucocephala</i>	White-headed Duck	Цагаантолгой ямаансүүлт	Yes	4			
<i>Mergellus albellus</i>	Smew	Цахир бохио	Yes	1			
<i>Buteo hemilasius</i>	Upland Buzzard	Шилийн сар	Yes	1			
<i>Aegypius monachus</i>	Cinereous Vulture	Нөмрөг тас	Yes	14			
<i>Fulica atra</i>	Common Coot	Халзан түнжүү	Yes	5			
<i>Pluvialis fulva</i>	Pacific Golden Plover	АЗийн сувээнцагаан	Yes	30			Estimated healthy count
<i>Charadrius dubius</i>	Little-ringed Plover	Нарийн хиазат	Yes	1			
<i>Vanellus vanellus</i>	Northern Lapwing	Умардын хавтгаалж	Yes	1365		1	
<i>Tringa nebularia</i>	Common Greenshank	Үхэр хөгчүү	Yes	1			

<i>Phalaropus lobatus</i>	Red-necked Phalarope	Нарын сэлээхэй	Yes	44			
<i>Numenius arquata</i>	Eurasian Curlew	Морин тутгалижин	Yes				
<i>Larus ridibundus</i>	Black-headed Gull	Хүрэнтэлгий цахлай	Yes	16			
<i>Riparia riperia</i>	Sand Martin	Элсэг эргийнхараацай	Yes	40			Estimated healthy count
<i>Motacilla alba</i>	White Wagtail	Хөх цэгций	Yes	2			
<i>Sturnus vulgaris</i>	Common Starling	Хар тодол	Yes	50			Estimated healthy count
<i>Gallinago spp.</i>	Snipe spp.	Хараалж	Yes			1	
<i>Unknown</i>	Unknown	Мэдэхгүй	Yes			1	

**Site Name or ID** Baga Nuur (Site 28)  
**Longitude** 49.91815  
**Latitude** 93.81947  
**Start Date** 11-Sep-06  
**Finish Date** 11-Sep-06  
**Personnel** Wildlife Conservation Society, Mongolian State Central Veterinary Laboratory

<b>Scientific name</b>	<b>English name</b>	<b>Mongolian name</b>	<b>Observed at Site</b>	<b>Counts</b>			<b>Comments</b>
				<b>Healthy Count</b>	<b>Sick Count</b>	<b>Dead Count</b>	
<i>Gavia arctica</i>	Black-throated Loon	Хилэнгүээ гахууна	Yes	11			
<i>Podiceps cristatus</i>	Great Crested Grebe	Отгот шунгуур	Yes	70		2	
<i>Phalacrocorax carbo</i>	Great Cormorant	Тураг голой	Yes	3		2	
<i>Botaurus stellaris</i>	Great Bittern	Усны бухшуувуу	Yes	1			
<i>Casmerodus albus</i>	Great Egret	Цагаан дэвлээ	Yes	2			
<i>Ardea cinerea</i>	Grey Heron	Хөх Дэглий	Yes	12		1	
<i>Cygnus cygnus</i>	Whooper Swan	Гангар хун	Yes	7			
<i>Tadorna ferruginea</i>	Ruddy Shelduck	Хондон ангир	Yes	1			
<i>Anas platyrhynchos</i>	Mallard	Зэрлэг нугас	Yes	29		3	
<i>Anas crecca</i>	Common Teal	Ногоохон нугас	Yes	28			
<i>Anas strepera</i>	Gadwall	Бор нугас	Yes	10		1	
<i>Anas querquedula</i>	Garganey	Цагаанхөмсөгт нугас	Yes	2			
<i>Anas clypeata</i>	Northern Shoveler	Халбага нугас	Yes	7		1	
<i>Rhodonessa rufina</i>	Red-crested Pochard	Халбага нугас	Yes	7			
<i>Aythya ferina</i>	Common Pochard	Улаанхүзүү шумбуур	Yes	2			
<i>Aythya fuligula</i>	Tufted Duck	Гээргэ шумбуур	Yes	9			
<i>Bucephala clangula</i>	Common Goldeneye	Алаг шунгаач	Yes	5		1	
<i>Mergellus albellus</i>	Smew	Цахир бохио	Yes	3			
<i>Milvus migrans</i>	Black Kite	Сохор элээ	Yes	1			
<i>Circus cyaneus</i>	Hen Harrier	Сарал хулд	Yes	1			
<i>Accipiter gentilis</i>	Northern Goshawk	Үлэг харцага	Yes	1			
<i>Hieraetus pennatus</i>	Booted Eagle	Бахим бүргэдэй	Yes	1			
<i>Haliaeetus albicilla</i>	White-tailed Eagle	Цагаансүүл нөмрөгбүргэд	Yes	1			
<i>Aegypius monachus</i>	Cinereous Vulture	Нөмрөг тас	Yes	1			
<i>Falco peregrinus</i>	Peregrine Falcon	Эгэл шонхор	Yes	1			
<i>Fulica atra</i>	Common Coot	Халзан түнжүү	Yes	43		2	
<i>Charadrius dubius</i>	Little-ringed Plover	Нарийн хиазат	Yes	11			
<i>Vanellus vanellus</i>	Northern Lapwing	Умардын хавтгаалж	Yes	400			Estimated healthy count

<i>Tringa glareola</i>	Wood Sandpiper	Шугуйн хөгчүү	Yes	2			
<i>Tringa nebularia</i>	Common Greenshank	Үхэр хөгчүү	Yes	4			
<i>Tringa erythropus</i>	Spotted Redshank	Хар хөгчүү	Yes	1			
<i>Philomachus pugnax</i>	Ruff	Ноцоо ноололдой	Yes	1			
<i>Calidris minuta</i>	Little Stint	Одой элсэг	Yes	3			
<i>Calidris temminckii</i>	Temminck's Stint	Темминский элсэг	Yes	12			
<i>Limicola falcinellus</i>	Broad-billed Sandpiper	Сямби шалчиг	Yes	1			
<i>Gallinago gallinago</i>	Common Snipe	Шөвгөн хараалж	Yes	20			
<i>Larus minutus</i>	Little Gull	Хурган цахтай	Yes	3	1		
<i>Larus ridibundus</i>	Black-headed Gull	Хүрэнтгой цахтай	Yes	11			
<i>Larus vagae mongolicus</i>	Mongolian Gull	Монгол цахтай	Yes	7	3		
<i>Syrrhaptes paradoxus</i>	Pallas's Sandgrouse	Монгол ногтруу	Yes	50			Estimated healthy count
<i>Bubo bubo</i>	Eurasian Eagle Owl	Эгэл шаршуу	Yes	1			
<i>Upupa epops</i>	Common Hoopoe	Бөвөөлжин өвөөлж	Yes	1			
<i>Riparia riparia</i>	Sand Martin	Элсэг эргийнхараацай	Yes				
<i>Hirundo rustica</i>	Barn Swallow	Асрын алтанхараацай	Yes				
<i>Motacilla flava</i>	Yellow Wagtail	Шар цэгций	Yes				
<i>Motacilla citreola</i>	Citrine Wagtail	Шартүүрүүт цэгций	Yes				
<i>Motacilla alba</i>	White Wagtail	Хөх цэгций	Yes				
<i>Lanius isabellinus</i>	Rufous-tailed Shrike	Тольт дунхай	Yes	1			
<i>Sturnus vulgaris</i>	Common Starling	Хар тодол	Yes	50			Estimated healthy count
<i>Corvus corone</i>	Carriion Crow	Хар хэрээ	Yes	1			
<i>Corvus corax</i>	Common Raven	Хон хэрээ	Yes	5			Estimated healthy count
<i>Sylvia minula</i>	Small Whitethroat	Зэржигэнэ	Yes	4			
<i>Phylloscopus collybita</i>	Common Chiffchaff	Дуулгат ээрүүл бялзүүхай	Yes	20			Estimated healthy count
<i>Saxicola torquata</i>	Common Stonechat	Хар эрхт шулганаа	Yes	1			
<i>Luscinia svecica</i>	Bluethroat	Цэнхэр жижир	Yes	8			Estimated healthy count
<i>Passer montanus</i>	Eurasian Tree Sparrow	Хээрийн боршуу	Yes	15			Estimated healthy count
<i>Duck spp.</i>	Duck spp.	Нугас	Yes		2		
<i>Carpodacus sp.</i>	Rosefinch spp.	Бужмар	Yes	1			
<i>Emberiza sp.</i>	Bunting spp.	Хөмрөг	Yes	1			
<i>Unknown</i>	Unknown	Мэдэхгүй	Yes		2		

**Site Name or ID** Uvs Nuur - Tes Gol Delta (Site 29)  
**Longitude** 50.58763  
**Latitude** 93.04578  
**Start Date** 14-Sep-06  
**Finish Date** 14-Sep-06  
**Personnel** Wildlife Conservation Society, Mongolian State Central Veterinary Laboratory

<b>Scientific name</b>	<b>English name</b>	<b>Mongolian name</b>	<b>Observed at Site</b>	<b>Counts</b>			<b>Comments</b>
				<b>Healthy Count</b>	<b>Sick Count</b>	<b>Dead Count</b>	
<i>Podiceps nigricollis</i>	Black-necked Grebe	Халтар шунгуур	Yes	2			
<i>Podiceps auritus</i>	Horned Grebe	Ухаа шунгуур	Yes	1			
<i>Podiceps cristatus</i>	Great Crested Grebe	Отгот шунгуур	Yes	86		43	
<i>Phalacrocorax carbo</i>	Great Cormorant	Тураг голий	Yes	500		3	Estimated healthy count
<i>Casmerodius albus</i>	Great Egret	Цагаан дэвлээ	Yes	9			
<i>Ardea cinerea</i>	Grey Heron	Хөх Дэглий	Yes	8			Estimated healthy count
<i>Platalea leucorodia</i>	Eurasian Spoonbill	Цагаан халбагант	Yes	10		2	
<i>Anser anser</i>	Greylag Goose	Бор галуу	Yes	23			
<i>Anser cygnoides</i>	Swan Goose	Хошуу галуу	Yes			2	
<i>Cygnus cygnus</i>	Whooper Swan	Гангар хүн	Yes	8			
<i>Tadorna ferruginea</i>	Ruddy Shelduck	Хондон ангир	Yes	38			
<i>Tadorna tadorna</i>	Common Shelduck	Анхидал ангир	Yes	18		1	
<i>Anas platyrhynchos</i>	Mallard	Зэрлэг нугас	Yes	462		4	
<i>Anas crecca</i>	Common Teal	Ногоохон нугас	Yes	940		2	
<i>Anas strepera</i>	Gadwall	Бор нугас	Yes	16			
<i>Anas penelope</i>	Eurasian Wigeon	Зээрд нугас	Yes	847		2	
<i>Anas acuta</i>	Northern Pintail	Шовторалаг нугас	Yes	372			
<i>Anas clypeata</i>	Northern Shoveler	Халбага нугас	Yes	29			
<i>Rhodonessa rufina</i>	Red-crested Pochard	Халбага нугас	Yes	34			
<i>Aythya ferina</i>	Common Pochard	Улаанхүзүү шумбуур	Yes	129		3	
<i>Aythya fuligula</i>	Tufted Duck	Гээгт шумбуур	Yes	7			
<i>Bucephala clangula</i>	Common Goldeneye	Алаг шунгаач	Yes	69		2	
<i>Oxyura leucocephala</i>	White-headed Duck	Цагаантолгой ямаансүүлт	Yes	51			
<i>Mergellus albellus</i>	Smew	Цахир бохио	Yes	2			
<i>Mergus merganser</i>	Common Merganser	Хумхин бохио	Yes	1			
<i>Milvus migrans</i>	Black Kite	Сохор элээ	Yes	2			
<i>Circus cyaneus</i>	Hen Harrier	Сарал хулд	Yes	2			
<i>Circus aeruginosus</i>	Eurasian Marsh Harrier	Намгийн хулд	Yes	1			

<i>Buteo hemilasius</i>	Upland Buzzard	Шилийн сар	Yes	1			
<i>Falco peregrinus</i>	Peregrine Falcon	Эгэл шонхор	Yes	1			
<i>Falco tinnunculus</i>	Common Kestrel	Начин шонхор	Yes	5			
<i>Grus virgo</i>	Demoiselle Crane	Өвөгт тогируу	Yes		1		
<i>Fulica atra</i>	Common Coot	Халзан түнжүү	Yes	1038			
<i>Pluvialis fulva</i>	Pacific Golden Plover	Азийн сувээцагаан	Yes	1			
<i>Vanellus vanellus</i>	Northern Lapwing	Умардын хавтгаалж	Yes	4	1	Estimated healthy count	
<i>Recurvirostra avosetta</i>	Pied Avocet	Алаг ээтэн	Yes		3		
<i>Calidris temminckii</i>	Temminck's Stint	Темиминскийн элсэг	Yes	3			
<i>Numenius arquata</i>	Eurasian Curlew	Морин тутгалжкин	Yes	1			
<i>Larus ridibundus</i>	Black-headed Gull	Хүрэнтлгой цахтай	Yes	3	22		
<i>Larus vagae mongolicus</i>	Mongolian Gull	Монгол цахтай	Yes	15	8	Estimated healthy count	
<i>Larus canus</i>	Mew Gull	Үүлэн цахтай	Yes	10			
<i>Sterna caspia</i>	Caspian Tern	Морин шунгуулай	Yes	19	1		
<i>Sterna hirundo</i>	Common Tern	Эгэл хараалай	Yes		4		
<i>Caprimulgus europaeus</i>	Eurasian Nightjar	Өрнийн эргүүбор	Yes	1			
<i>Riparia riparia</i>	Sand Martin	Элсэг эргийнхараацай	Yes				
<i>Alauda arvensis</i>	Eurasian Skylark	Боролзой богширго	Yes				
<i>Anthus spinolella</i>	Water Pipit	Харзны шийхүүнхэй	Yes				
<i>Motacilla citreola</i>	Citrine Wagtail	Шартгүүрт цэгций	Yes				
<i>Motacilla alba</i>	White Wagtail	Хөх цэгций	Yes				
<i>Pica pica</i>	Black-billed Magpie	Алаг шаазгай	Yes				
<i>Corvus corax</i>	Common Raven	Хон хэрээ	Yes				
<i>Oenanthe deserti</i>	Desert Wheatear	Цөлийн чогчиго	Yes				
<i>Panurus biarmicus</i>	Bearded Parrotbill	Сахалт шагшуургабялзуухай	Yes				
<i>Cygnus spp.</i>	Swan spp.	Хүн	Yes		1		
<i>Duck spp.</i>	Duck spp.	Нугас	Yes		31		
<i>Unknown</i>	Unknown	Мэдэхгүй	Yes		122		
<i>Anser spp.</i>	Goose spp.	Галуу	Yes		2		
<i>Larus spp.</i>	Gull spp.	Цахтай	Yes		5		

**Site Name or ID** Uvs Nuur - Mouth of Narun Gol (Site 30)  
**Longitude** 50.30428  
**Latitude** 93.30248  
**Start Date** 16-Sep-06  
**Finish Date** 16-Sep-06  
**Personnel** Wildlife Conservation Society, Mongolian State Central Veterinary Laboratory

<b>Scientific name</b>	<b>English name</b>	<b>Mongolian name</b>	<b>Observed at Site</b>	<b>Counts</b>			<b>Comments</b>
				<b>Healthy Count</b>	<b>Sick Count</b>	<b>Dead Count</b>	
<i>Podiceps cristatus</i>	Great Crested Grebe	Отгот шунгуур	Yes	789		2	
<i>Phalacrocorax carbo</i>	Great Cormorant	Тураг голой	Yes	2000		2	Estimated healthy count
<i>Casmerodius albus</i>	Great Egret	Цагаан дэвлээ	Yes	7			
<i>Ardea cinerea</i>	Grey Heron	Хөх Дэглий	Yes	12			
<i>Platalea leucorodia</i>	Eurasian Spoonbill	Цагаан халбагант	Yes	165		2	
<i>Anser anser</i>	Greylag Goose	Бор галуу	Yes	320			
<i>Anser cygnoides</i>	Swan Goose	Хошуу галуу	Yes	250			Estimated healthy count
<i>Cygnus cygnus</i>	Whooper Swan	Гангар хүн	Yes	130			
<i>Tadorna ferruginea</i>	Ruddy Shelduck	Хондон ангир	Yes	72			
<i>Tadorna tadorna</i>	Common Shelduck	Анхидал ангир	Yes	1		1	
<i>Anas platyrhynchos</i>	Mallard	Зэрлэг нугас	Yes	265			
<i>Anas crecca</i>	Common Teal	Ногоохон нугас	Yes	430			
<i>Anas strepera</i>	Gadwall	Бор нугас	Yes	786			
<i>Anas penelope</i>	Eurasian Wigeon	Зээрд нугас	Yes	305			
<i>Anas acuta</i>	Northern Pintail	Шовтгоралаг нугас	Yes	108			
<i>Anas clypeata</i>	Northern Shoveler	Халбага нугас	Yes	1			
<i>Aythya ferina</i>	Common Pochard	Улаанхүзүү шумбуур	Yes	10			
<i>Mergus merganser</i>	Common Merganser	Хумхин бохио	Yes	3			
<i>Milvus migrans</i>	Black Kite	Сохор элээ	Yes	1			
<i>Accipiter gentilis</i>	Northern Goshawk	Үлэг харцага	Yes	1			
<i>Buteo hemilasius</i>	Upland Buzzard	Шилийн сар	Yes	1			
<i>Haliaeetus albicilla</i>	White-tailed Eagle	Цагаансүүл нөмрөгбургэд	Yes	3			
<i>Falco peregrinus</i>	Peregrine Falcon	Эгэл шонхор	Yes	1			
<i>Grus grus</i>	Common Crane	Хархираа тогоруу	Yes	3			
<i>Pluvialis fulva</i>	Pacific Golden Plover	АЗийн сувээцагаан	Yes	11			
<i>Vanellus vanellus</i>	Northern Lapwing	Умардын хавтгаалж	Yes	700			Estimated healthy count
<i>Recurvirostra avosetta</i>	Pied Avocet	Алаг ээтэн	Yes	1			
<i>Philomachus pugnax</i>	Ruff	Ноцоо ноололдой	Yes	40			Estimated healthy count

<i>Calidris ferruginea</i>	Curlew Sandpiper	Хадуур элсэг	Yes	20			Estimated healthy count
<i>Numenius arquata</i>	Eurasian Curlew	Морин тутгалжин	Yes	1			
<i>Limosa limosa</i>	Black-tailed Godwit	Морин цууцал	Yes	51			
<i>Larus ridibundus</i>	Black-headed Gull	Хүрэнтэлгий цахлай	Yes	30		1	Estimated healthy count
<i>Larus vagae mongolicus</i>	Mongolian Gull	Монгол цахлай	Yes	15		8	Estimated healthy count
<i>Sterna caspia</i>	Caspian Tern	Морин шунгуулай	Yes	4			
<i>Alauda arvensis</i>	Eurasian Skylark	Боролзой богширго	Yes				
<i>Motacilla alba</i>	White Wagtail	Хөх цэгций	Yes	1			
<i>Corvus corax</i>	Common Raven	Хон хэрээ	Yes	2			
<i>Oenanthe isabellina</i>	Isabelline Wheatear	Бүжимч чогчиго	Yes	1			
<i>Unknown</i>	Unknown	Мэдэхгүй	Yes			13	

**Site Name or ID** Zost Nuur (Site 31)  
**Longitude** 48.88177  
**Latitude** 93.31348  
**Start Date** 18-Sep-06  
**Finish Date** 18-Sep-06  
**Personnel** Wildlife Conservation Society, Mongolian State Central Veterinary Laboratory

<b>Scientific name</b>	<b>English name</b>	<b>Mongolian name</b>	<b>Observed at Site</b>	<b>Counts</b>			<b>Comments</b>
				<b>Healthy Count</b>	<b>Sick Count</b>	<b>Dead Count</b>	
<i>Podiceps cristatus</i>	Great Crested Grebe	Отгот шунгуур	Yes	97			
<i>Pelecanus crispus</i>	Dalmatian Pelican	Борцгор хотон	Yes	2		1	
<i>Phalacrocorax carbo</i>	Great Cormorant	Тураг голой	Yes	7	3	13	
<i>Casmerodius albus</i>	Great Egret	Цагаан дэвлээ	Yes	18			
<i>Ardea cinerea</i>	Grey Heron	Хөх Дэглий	Yes	56		1	
<i>Platalea leucorodia</i>	Eurasian Spoonbill	Цагаан халбагант	Yes	345		1	
<i>Anser anser</i>	Greylag Goose	Бор галуу	Yes	10			
<i>Anser cygnoides</i>	Swan Goose	Хошуу галуу	Yes	7			
<i>Cygnus cygnus</i>	Whooper Swan	Гангар хүн	Yes	7			
<i>Anas platyrhynchos</i>	Mallard	Зэрлэг нугас	Yes	50			Estimated healthy count
<i>Anas crecca</i>	Common Teal	Ногоохон нугас	Yes	1327			
<i>Anas strepera</i>	Gadwall	Бор нугас	Yes	189			
<i>Anas penelope</i>	Eurasian Wigeon	Зээрд нугас	Yes	200			Estimated healthy count
<i>Anas acuta</i>	Northern Pintail	Шовтгоралаг нугас	Yes	40			Estimated healthy count
<i>Anas clypeata</i>	Northern Shoveler	Халбага нугас	Yes	42			
<i>Rhodonessa rufina</i>	Red-crested Pochard	Халбага нугас	Yes	598			
<i>Aythya ferina</i>	Common Pochard	Улаанхүзүү шумбуур	Yes	10			Estimated healthy count
<i>Aythya fuligula</i>	Tufted Duck	Гээргэ шумбуур	Yes	33	1		
<i>Mergellus albellus</i>	Smew	Цахир бохио	Yes	9			
<i>Mergus serrator</i>	Red-breasted Merganser	Сэвгэр бохио	Yes	38			
<i>Circus aeruginosus</i>	Eurasian Marsh Harrier	Намгийн хулд	Yes	1			
<i>Haliaeetus albicilla</i>	White-tailed Eagle	Цагаансүүл нөмрөгбургэд	Yes	3			
<i>Falco cherrug</i>	Saker Falcon	Идлэг шонхор	Yes	1			
<i>Falco peregrinus</i>	Peregrine Falcon	Эгэл шонхор	Yes	1			
<i>Fulica atra</i>	Common Coot	Халzan түнжүү	Yes	1263		1	
<i>Vanellus vanellus</i>	Northern Lapwing	Умардын хавтгаалж	Yes		1	1	
<i>Tringa glareola</i>	Wood Sandpiper	Шугуйн хөгчүү	Yes	1			
<i>Tringa erythropus</i>	Spotted Redshank	Хар хөгчүү	Yes	1			

<i>Gallinago gallinago</i>	Common Snipe	Шөвгөн хараалж	Yes	20			Estimated healthy count
<i>Larus ridibundus</i>	Black-headed Gull	Хүрэнтэлгий цахтай	Yes	20			Estimated healthy count
<i>Larus vagae mongolicus</i>	Mongolian Gull	Монгол цахтай	Yes	1			
<i>Syrrhaptes paradoxus</i>	Pallas's Sandgrouse	Монгол ногтруу	Yes	22			
<i>Riperia riperia</i>	Sand Martin	Элсэг эргийнхараацай	Yes	60			Estimated healthy count
<i>Eremophila alpestris</i>	Horned Lark	Шоорон Эвэртболжмор	Yes				
<i>Alauda arvensis</i>	Eurasian Skylark	Боролзой богширго	Yes				
<i>Motacilla citreola</i>	Citrine Wagtail	Шартуут цэгций	Yes	2			
<i>Corvus corone</i>	Carriion Crow	Хар хэрээ	Yes	2			
<i>Oenanthe pleschanka</i>	Pied Wheatear	Мяраан чогчиго	Yes	1			
<i>Panurus biarmicus</i>	Bearded Parrotbill	Сахалт шагшуургабялзуухай	Yes				
<i>Calidris spp.</i>	Stint spp.	Элсэг	Yes	1			
<i>Unknown</i>	Unknown	Мэдэхгүй	Yes			5	

**Site Name or ID** Airag Nuur (Site 32)  
**Longitude** 48.85717  
**Latitude** 93.34398  
**Start Date** 19-Sep-06  
**Finish Date** 19-Sep-06  
**Personnel** Wildlife Conservation Society, Mongolian State Central Veterinary Laboratory

<b>Scientific name</b>	<b>English name</b>	<b>Mongolian name</b>	<b>Observed at Site</b>	<b>Counts</b>			<b>Comments</b>
				<b>Healthy Count</b>	<b>Sick Count</b>	<b>Dead Count</b>	
<i>Podiceps cristatus</i>	Great Crested Grebe	Отгот шунгуур	Yes				
<i>Pelecanus crispus</i>	Dalmatian Pelican	Борцгор хотон	Yes	2			
<i>Phalacrocorax carbo</i>	Great Cormorant	Тураг голой	Yes	4150		4	
<i>Casmerodius albus</i>	Great Egret	Цагаан дэвлээ	Yes	7			
<i>Ardea cinerea</i>	Grey Heron	Хөх Дэглий	Yes	4			
<i>Platalea leucorodia</i>	Eurasian Spoonbill	Цагаан халбагант	Yes	235			
<i>Cygnus cygnus</i>	Whooper Swan	Гангар хүн	Yes	9			
<i>Cygnus columbianus</i>	Tundra Swan	Хүн	Yes			1	
<i>Tadorna ferruginea</i>	Ruddy Shelduck	Хондон ангир	Yes	11			
<i>Anas platyrhynchos</i>	Mallard	Зэрлэг нугас	Yes	457			
<i>Anas strepera</i>	Gadwall	Бор нугас	Yes	22			
<i>Anas penelope</i>	Eurasian Wigeon	Зээрд нугас	Yes	6			
<i>Anas acuta</i>	Northern Pintail	Шовтгоралаг нугас	Yes	2			
<i>Rhodonessa rufina</i>	Red-crested Pochard	Халбага нугас	Yes	200			Estimated healthy count
<i>Mergus serrator</i>	Red-breasted Merganser	Сэвгэр бохио	Yes	6			
<i>Mergus merganser</i>	Common Merganser	Хумхин бохио	Yes	152			
<i>Haliaeetus albicilla</i>	White-tailed Eagle	Цагаансүүл нөмрөгбургэд	Yes	2			
<i>Falco cherrug</i>	Saker Falcon	Идлэг шонхор	Yes	1			
<i>Falco peregrinus</i>	Peregrine Falcon	Эгэл шонхор	Yes	1			
<i>Falco columbarius</i>	Merlin	Хайргууна шонхор	Yes	1			
<i>Falco tinnunculus</i>	Common Kestrel	Начин шонхор	Yes	1			
<i>Grus grus</i>	Common Crane	Хархираа тогоруу	Yes	5			
<i>Grus vipio</i>	White-naped Crane	Цэн тогоруу	Yes	1			
<i>Charadrius dubius</i>	Little-ringed Plover	Нарийн хиазат	Yes				
<i>Vanellus vanellus</i>	Northern Lapwing	Умардын хавтгаалж	Yes				
<i>Tringa nebularia</i>	Common Greenshank	Үхэр хөгчүү	Yes	1			
<i>Tringa erythropus</i>	Spotted Redshank	Хар хөгчүү	Yes	1			
<i>Calidris ruficollis</i>	Red-necked Stint	Шартруүт элсэг	Yes	1			

<i>Calidris alba</i>	Sanderling	Гурвалж элсэг	Yes	13			
<i>Numenius arquata</i>	Eurasian Curlew	Морин тутгалжин	Yes	1			
<i>Larus ichthyaetus</i>	Pallas Gull	Итэлгэн цахлай	Yes	20			Estimated healthy count
<i>Larus ridibundus</i>	Black-headed Gull	Хүрэнтолгой цахлай	Yes	283	1		
<i>Larus vagae mongolicus</i>	Mongolian Gull	Монгол цахлай	Yes	217		2	
<i>Syrrhaptes paradoxus</i>	Pallas's Sandgrouse	Монгол ногтруу	Yes				
<i>Motacilla alba</i>	White Wagtail	Хөх цэгций	Yes	1			
<i>Duck spp.</i>	Duck spp.	Нугас	Yes	22500			Estimated healthy count
<i>Unknown</i>	Unknown	Мэдэхгүй	Yes			2	

**Site Name or ID** Dalay Nuur (Site 33)  
**Longitude** 48.31698  
**Latitude** 92.76508  
**Start Date** 21-Sep-06  
**Finish Date** 21-Sep-06  
**Personnel** Wildlife Conservation Society, Mongolian State Central Veterinary Laboratory

Scientific name	English name	Mongolian name	Observed at Site	Counts			Comments
				Healthy Count	Sick Count	Dead Count	
<i>Gavia arctica</i>	Black-throated Loon	Хилэнгүеэ гахууна	Yes	16			
<i>Podiceps cristatus</i>	Great Crested Grebe	Отгот шунгуур	Yes	15			
<i>Phalacrocorax carbo</i>	Great Cormorant	Тураг голой	Yes	2		2	
<i>Casmerodius albus</i>	Great Egret	Цагаан дэвлээ	Yes	5			
<i>Ardea cinerea</i>	Grey Heron	Хөх Дэглий	Yes	1			
<i>Platalea leucorodia</i>	Eurasian Spoonbill	Цагаан халбагант	Yes	4			
<i>Anser anser</i>	Greylag Goose	Бор галуу	Yes	11			
<i>Cygnus cygnus</i>	Whooper Swan	Гангар хун	Yes	3			
<i>Tadorna ferruginea</i>	Ruddy Shelduck	Хондон ангир	Yes	5			
<i>Anas platyrhynchos</i>	Mallard	Зэрлэг нугас	Yes	50			
<i>Anas crecca</i>	Common Teal	Ногоохон нугас	Yes	98			
<i>Anas strepera</i>	Gadwall	Бор нугас	Yes	41			
<i>Anas penelope</i>	Eurasian Wigeon	Зээрд нугас	Yes	92			
<i>Anas acuta</i>	Northern Pintail	Шовтгоралаг нугас	Yes	76			
<i>Anas querquedula</i>	Garganey	Цагаанхөмсөгт нугас	Yes	2			
<i>Anas clypeata</i>	Northern Shoveler	Халбага нугас	Yes	5			
<i>Aythya ferina</i>	Common Pochard	Улаанхүзүү шумбуур	Yes	8			
<i>Aythya fuligula</i>	Tufted Duck	Гээргэ шумбуур	Yes	15			
<i>Mergellus albellus</i>	Smew	Цахир бохио	Yes	2			
<i>Circus cyaneus</i>	Hen Harrier	Сарал хулд	Yes	2			
<i>Circus spilonotus</i>	Eastern Marsh Harrier	Дорны хулд	Yes	1			
<i>Falco tinnunculus</i>	Common Kestrel	Начин шонхор	Yes	1			
<i>Fulica atra</i>	Common Coot	Халзан түнжүү	Yes	121			
<i>Charadrius dubius</i>	Little-ringed Plover	Нарийн хиазат	Yes	2			
<i>Vanellus vanellus</i>	Northern Lapwing	Умардын хавтгаалж	Yes	60			Estimated healthy count
<i>Tringa erythropus</i>	Spotted Redshank	Хар хөгчүү	Yes	5			
<i>Numenius arquata</i>	Eurasian Curlew	Морин тутгалжин	Yes	4			
<i>Larus ridibundus</i>	Black-headed Gull	Хүрэнтолгой цахлай	Yes	3			

<i>Larus vagae mongolicus</i>	Mongolian Gull	Монгол цахлай	Yes	1		1	
<i>Syrrhaptes paradoxus</i>	Pallas's Sandgrouse	Монгол ногтруу	Yes	3		1	
<i>Eremophila alpestris</i>	Horned Lark	Шоорон Эвэртболжмор	Yes				
<i>Alauda arvensis</i>	Eurasian Skylark	Боролзой богширго	Yes				
<i>Sturnus vulgaris</i>	Common Starling	Хар тодол	Yes	35			Estimated healthy count
<i>Corvus corone</i>	Carriion Crow	Хар хэрээ	Yes	5			
<i>Corvus corax</i>	Common Raven	Хон хэрээ	Yes	3			
<i>Oenanthe pleschanka</i>	Pied Wheatear	Мяраан чогчиго	Yes				
<i>Oenanthe deserti</i>	Desert Wheatear	Цөлийн чогчиго	Yes				
<i>Panurus biarmicus</i>	Bearded Parrotbill	Сахалт шагшуургабялзуухай	Yes				
<i>Passer montanus</i>	Eurasian Tree Sparrow	Хээрийн боршувуу	Yes	3			Estimated healthy count
<i>Bucanetes mongolicus</i>	Mongolian Finch	Монгол алтанжигүүр	Yes	40			Estimated healthy count
<i>Duck spp.</i>	Duck spp.	Нугас	Yes	15			Estimated healthy count
<i>Gallinago spp.</i>	Snipe spp.	Хараалж	Yes	1			
<i>Unknown</i>	Unknown	Мэдэхгүй	Yes			1	

**Site Name or ID** Khar Us Nuur (Site 34)  
**Longitude** 47.93947  
**Latitude** 91.98840  
**Start Date** 22-Sep-06  
**Finish Date** 22-Sep-06  
**Personnel** Wildlife Conservation Society, Mongolian State Central Veterinary Laboratory

<b>Scientific name</b>	<b>English name</b>	<b>Mongolian name</b>	<b>Observed at Site</b>	<b>Counts</b>			<b>Comments</b>
				<b>Healthy Count</b>	<b>Sick Count</b>	<b>Dead Count</b>	
<i>Podiceps cristatus</i>	Great Crested Grebe	Отгот шунгуур	Yes	55			
<i>Pelecanus crispus</i>	Dalmatian Pelican	Борцгор хотон	Yes	8			
<i>Phalacrocorax carbo</i>	Great Cormorant	Тураг голой	Yes	5		1	
<i>Casmerodius albus</i>	Great Egret	Цагаан дэвлээ	Yes	8			Estimated healthy count
<i>Ardea cinerea</i>	Grey Heron	Хөх Дэглий	Yes	9			
<i>Anser anser</i>	Greylag Goose	Бор галуу	Yes	1			
<i>Cygnus cygnus</i>	Whooper Swan	Гангар хүн	Yes	11			
<i>Tadorna ferruginea</i>	Ruddy Shelduck	Хондон ангир	Yes	3			
<i>Anas platyrhynchos</i>	Mallard	Зэрлэг нугас	Yes	12			
<i>Anas penelope</i>	Eurasian Wigeon	Зээрд нугас	Yes	3			
<i>Anas clypeata</i>	Northern Shoveler	Халбага нугас	Yes	4			
<i>Rhodonessa rufina</i>	Red-crested Pochard	Халбага нугас	Yes	185			
<i>Aythya ferina</i>	Common Pochard	Улаанхүзүү шумбуур	Yes	128			
<i>Aythya fuligula</i>	Tufted Duck	Гээзгүүт шумбуур	Yes	2			
<i>Bucephala clangula</i>	Common Goldeneye	Алаг шунгаач	Yes	4			
<i>Oxyura leucocephala</i>	White-headed Duck	Цагаантолгой ямаансүүлт	Yes	138			
<i>Mergus serrator</i>	Red-breasted Merganser	Сэвгэр бохио	Yes	1			
<i>Mergus merganser</i>	Common Merganser	Хумхин бохио	Yes	2			
<i>Circus cyaneus</i>	Hen Harrier	Сарал хулд	Yes	1			
<i>Circus aeruginosus</i>	Eurasian Marsh Harrier	Намгийн хулд	Yes	1			
<i>Buteo hemilasius</i>	Upland Buzzard	Шилийн сар	Yes	1			
<i>Falco cherrug</i>	Saker Falcon	Идлэг шонхор	Yes	1			
<i>Fulica atra</i>	Common Coot	Халзан түнжүү	Yes	1080			
<i>Pluvialis fulva</i>	Pacific Golden Plover	Азийн сүвээцагаан	Yes	4			
<i>Vanellus vanellus</i>	Northern Lapwing	Умардын хавтгаалж	Yes	30			Estimated healthy count
<i>Calidris minuta</i>	Little Stint	Одой элсэг	Yes	1			
<i>Larus ichthyaetus</i>	Pallas Gull	Итэлгэн цахтай	Yes	4			
<i>Larus ridibundus</i>	Black-headed Gull	Хүрэнтогой цахтай	Yes	20		1	

<i>Larus vagae mongolicus</i>	Mongolian Gull	Монгол цахлай	Yes	4		1	
<i>Sterna hirundo</i>	Common Tern	Эгэл хараалай	Yes			1	
<i>Syrrhaptes paradoxus</i>	Pallas's Sandgrouse	Монгол ногтруу	Yes	60			Estimated healthy count
<i>Riperia riperia</i>	Sand Martin	Элсэг эргийнхараацай	Yes	1			
<i>Hirundo rustica</i>	Barn Swallow	Асрын алтанхараацай	Yes	1			
<i>Eremophila alpestris</i>	Horned Lark	Шоорон Эвэртболжмор	Yes				
<i>Alauda arvensis</i>	Eurasian Skylark	Боролзой богширго	Yes				
<i>Anthus spinosus</i>	Water Pipit	Харзны шийхүүнхэй	Yes				
<i>Corvus corone</i>	Carriion Crow	Хар хэрээ	Yes				
<i>Corvus corax</i>	Common Raven	Хон хэрээ	Yes	1			
<i>Podoces hendersoni</i>	Mongolian Ground-jay	Монгол хуланжороо	Yes	1			
<i>Acrocephalus dumetorum</i>	Blyth's Reed Warbler	Бутны охилбялзуухай	Yes				
<i>Phylloscopus collybita</i>	Common Chiffchaff	Дуулгат ээрүүл бялзуухай	Yes	1			
<i>Oenanthe pleschanka</i>	Pied Wheatear	Мяраан чогчиго	Yes				
<i>Oenanthe deserti</i>	Desert Wheatear	Цөлийн чогчиго	Yes				
<i>Panurus biarmicus</i>	Bearded Parrotbill	Сахалт шагшуургабялзуухай	Yes				
<i>Passer montanus</i>	Eurasian Tree Sparrow	Хээрийн боршувуу	Yes				
<i>Charadrius spp.</i>	Plover spp.	Хиазат	Yes	1			
<i>Gallinago spp.</i>	Snipe spp.	Хараалж	Yes	1			
<i>Unknown</i>	Unknown	Мэдэхгүй	Yes			1	

**Site Name or ID** Khar Nuur (Site 35)  
**Longitude** 48.02780  
**Latitude** 92.99908  
**Start Date** 24-Sep-06  
**Finish Date** 24-Sep-06  
**Personnel** Wildlife Conservation Society, Mongolian State Central Veterinary Laboratory

<b>Scientific name</b>	<b>English name</b>	<b>Mongolian name</b>	<b>Observed at Site</b>	<b>Counts</b>			<b>Comments</b>
				<b>Healthy Count</b>	<b>Sick Count</b>	<b>Dead Count</b>	
<i>Podiceps cristatus</i>	Great Crested Grebe	Отгот шунгуур	Yes	56		4	
<i>Phalacrocorax carbo</i>	Great Cormorant	Тураг голой	Yes	46		5	
<i>Casmerodius albus</i>	Great Egret	Цагаан дэвлээ	Yes	3			
<i>Ardea cinerea</i>	Grey Heron	Хөх Дэглий	Yes	1			
<i>Anser anser</i>	Greylag Goose	Бор галуу	Yes	5			
<i>Cygnus cygnus</i>	Whooper Swan	Гангар хүн	Yes			1	
<i>Anas platyrhynchos</i>	Mallard	Зэрлэг нугас	Yes	12			
<i>Anas crecca</i>	Common Teal	Ногоохон нугас	Yes	13			
<i>Anas penelope</i>	Eurasian Wigeon	Зээрд нугас	Yes	11		1	
<i>Anas clypeata</i>	Northern Shoveler	Халбага нугас	Yes	2			
<i>Rhodonessa rufina</i>	Red-crested Pochard	Халбага нугас	Yes	201			
<i>Aythya ferina</i>	Common Pochard	Улаанхүзүү шумбуур	Yes	104		3	
<i>Aythya fuligula</i>	Tufted Duck	Гээгт шумбуур	Yes	99			
<i>Bucephala clangula</i>	Common Goldeneye	Алаг шунгаач	Yes	34			
<i>Circus cyaneus</i>	Hen Harrier	Сарал хулд	Yes	1			
<i>Haliaeetus albicilla</i>	White-tailed Eagle	Цагаансүүл нөмрөгбүргэд	Yes	1			
<i>Fulica atra</i>	Common Coot	Халзан түнжүү	Yes	1876		1	
<i>Charadrius dubius</i>	Little-ringed Plover	Нарийн хиазат	Yes	1			
<i>Vanellus vanellus</i>	Northern Lapwing	Умардын хавтгаалж	Yes			3	
<i>Calidris temminckii</i>	Temminck's Stint	Темиминский элсэг	Yes	1			
<i>Larus ichthyaetus</i>	Pallas Gull	Итэлгэн цахтай	Yes			1	
<i>Larus ridibundus</i>	Black-headed Gull	Хүрэнтлгийн цахтай	Yes			2	
<i>Larus vagae mongolicus</i>	Mongolian Gull	Монгол цахтай	Yes			3	
<i>Sterna hirundo</i>	Common Tern	Эгэл хараалай	Yes			1	
<i>Riparia riparia</i>	Sand Martin	Элсэг эргийнхараацай	Yes	1			
<i>Lanius isabellinus</i>	Rufous-tailed Shrike	Тольт дунхай	Yes	1			
<i>Passer montanus</i>	Eurasian Tree Sparrow	Хээрийн боршувуу	Yes	7			
<i>Lark sp.</i>	Lark spp.	Болжмор	Yes			1	

<i>Unknown</i>	Unknown	Мэдэхгүй	Yes			3	
<i>Oenanthe sp.</i>	Wheatear spp.	Чогчиго	Yes			1	

**Site Name or ID** Dorgen Nuur (Site 36)  
**Longitude** 47.61107  
**Latitude** 93.40132  
**Start Date** 25-Sep-06  
**Finish Date** 25-Sep-06  
**Personnel** Wildlife Conservation Society, Mongolian State Central Veterinary Laboratory

<b>Scientific name</b>	<b>English name</b>	<b>Mongolian name</b>	<b>Observed at Site</b>	<b>Counts</b>			<b>Comments</b>
				<b>Healthy Count</b>	<b>Sick Count</b>	<b>Dead Count</b>	
<i>Podiceps auritus</i>	Horned Grebe	Үхaa шунгуур	Yes	3			
<i>Podiceps cristatus</i>	Great Crested Grebe	Отгот шунгуур	Yes	9			
<i>Phalacrocorax carbo</i>	Great Cormorant	Тураг голой	Yes	21		33	
<i>Ardea cinerea</i>	Grey Heron	Хөх Дэглий	Yes			1	
<i>Anser anser</i>	Greylag Goose	Бор галуу	Yes	1			
<i>Cygnus cygnus</i>	Whooper Swan	Гангар хүн	Yes	2			
<i>Cygnus columbianus</i>	Tundra Swan	Хүн	Yes	1			
<i>Tadorna ferruginea</i>	Ruddy Shelduck	Хондон ангир	Yes				
<i>Anas platyrhynchos</i>	Mallard	Зэрлэг нугас	Yes	5			
<i>Anas crecca</i>	Common Teal	Ногоохон нугас	Yes	19			
<i>Anas strepera</i>	Gadwall	Бор нугас	Yes	13			
<i>Anas penelope</i>	Eurasian Wigeon	Зээрд нугас	Yes	726			
<i>Anas acuta</i>	Northern Pintail	Шовтгоралаг нугас	Yes	2			
<i>Anas querquedula</i>	Garganey	Цагаанхөмсөтг нугас	Yes	8			
<i>Anas clypeata</i>	Northern Shoveler	Халбага нугас	Yes	1			
<i>Rhodonessa rufina</i>	Red-crested Pochard	Халбага нугас	Yes	19			
<i>Aythya ferina</i>	Common Pochard	Улаанхүзүү шумбуур	Yes	481			
<i>Aythya fuligula</i>	Tufted Duck	Гээзэгт шумбуур	Yes	26			
<i>Circus cyaneus</i>	Hen Harrier	Сарал хулд	Yes	1			
<i>Buteo hemilasius</i>	Upland Buzzard	Шилийн сар	Yes	3			
<i>Aegypius monachus</i>	Cinereous Vulture	Нөмрөг тас	Yes	1			
<i>Falco cherrug</i>	Saker Falcon	Идлэг шонхор	Yes	1			
<i>Fulica atra</i>	Common Coot	Халзан түнжүү	Yes	131			
<i>Vanellus vanellus</i>	Northern Lapwing	Умардын хавтгаалж	Yes				
<i>Larus ichthyaetus</i>	Pallas Gull	Итэлгэн цахлай	Yes	60			Estimated healthy count
<i>Larus ridibundus</i>	Black-headed Gull	Хүрэнтлгой цахлай	Yes	8			Estimated healthy count
<i>Larus vagae mongolicus</i>	Mongolian Gull	Монгол цахлай	Yes	40			Estimated healthy count
<i>Syrrhaptes paradoxus</i>	Pallas's Sandgrouse	Монгол ногтруу	Yes	8			

<i>Asio flammeus</i>	Short-eared Owl	Хулгар гүйванга	Yes	1			
<i>Calandrella cheleensis</i>	Asian Short-toed Lark	Дэрсний жиргэмэл	Yes				
<i>Eremophila alpestris</i>	Horned Lark	Шоорон Эвэртболжмор	Yes				
<i>Alauda arvensis</i>	Eurasian Skylark	Боролзой богширго	Yes				
<i>Motacilla alba</i>	White Wagtail	Хөх цэгций	Yes	1			
<i>Sturnus vulgaris</i>	Common Starling	Хар тодол	Yes	9			
<i>Corvus corone</i>	Carriion Crow	Хар хэрээ	Yes	2			
<i>Coryus corax</i>	Common Raven	Хон хэрээ	Yes				
<i>Phylloscopus collybita</i>	Common Chiffchaff	Дуулгат ээрүүл бялзуухай	Yes	5			
<i>Oenanthe deserti</i>	Desert Wheatear	Цөлийн чогчиго	Yes				
<i>Panurus biarmicus</i>	Bearded Parrotbill	Сахалт шагшуургабялзуухай	Yes				
<i>Emberiza schoeniclus</i>	Reed Bunting	Цагаанхүзүүт хөмрөг	Yes	1			
<i>Unknown</i>	Unknown	Мэдэхгүй	Yes			3	

**Site Name or ID** Eeren Nuur (Site 37)  
**Longitude** 47.34215  
**Latitude** 95.77928  
**Start Date** 27-Sep-06  
**Finish Date** 27-Sep-06  
**Personnel** Wildlife Conservation Society, Mongolian State Central Veterinary Laboratory

<b>Scientific name</b>	<b>English name</b>	<b>Mongolian name</b>	<b>Observed at Site</b>	<b>Counts</b>			<b>Comments</b>
				<b>Healthy Count</b>	<b>Sick Count</b>	<b>Dead Count</b>	
<i>Podiceps auritus</i>	Horned Grebe	Ухаа шунгуур	Yes	9			
<i>Podiceps cristatus</i>	Great Crested Grebe	Отгот шунгуур	Yes	49		1	
<i>Pelecanus crispus</i>	Dalmatian Pelican	Борцгор хотон	Yes	17			
<i>Phalacrocorax carbo</i>	Great Cormorant	Тураг голой	Yes	7			
<i>Ardea cinerea</i>	Grey Heron	Хөх Дэглий	Yes	2			
<i>Platalea leucorodia</i>	Eurasian Spoonbill	Цагаан халбагант	Yes	28			
<i>Anser cygnoides</i>	Swan Goose	Хошуу галуу	Yes	7			
<i>Cygnus cygnus</i>	Whooper Swan	Гангар хүн	Yes	25			
<i>Tadorna ferruginea</i>	Ruddy Shelduck	Хондон ангир	Yes	2			
<i>Anas crecca</i>	Common Teal	Ногоохон нугас	Yes	57		1	
<i>Anas strepera</i>	Gadwall	Бор нугас	Yes	47			
<i>Anas penelope</i>	Eurasian Wigeon	Зээрд нугас	Yes	350		1	
<i>Anas acuta</i>	Northern Pintail	Шовтгоралаг нугас	Yes	71			
<i>Anas clypeata</i>	Northern Shoveler	Халбага нугас	Yes	2			
<i>Rhodonessa rufina</i>	Red-crested Pochard	Халбага нугас	Yes	464			
<i>Aythya ferina</i>	Common Pochard	Улаанхүзүү шумбуур	Yes	81			
<i>Aythya fuligula</i>	Tufted Duck	Гээзгэгт шумбуур	Yes	56			
<i>Bucephala clangula</i>	Common Goldeneye	Алаг шунгаач	Yes	10			
<i>Mergus albellus</i>	Smew	Цахир бохио	Yes	7			
<i>Mergus merganser</i>	Common Merganser	Хумхин бохио	Yes	12			
<i>Circus cyaneus</i>	Hen Harrier	Сарал хулд	Yes	1			
<i>Buteo hemilasius</i>	Upland Buzzard	Шилийн сар	Yes	2			
<i>Aquila chrysaetos</i>	Golden Eagle	Цармын бүргэд	Yes			1	
<i>Aegypius monachus</i>	Cinereous Vulture	Нөмрөг тас	Yes	4			
<i>Falco cherrug</i>	Saker Falcon	Идлэг шонхор	Yes	1			
<i>Falco columbarius</i>	Merlin	Хайргууна шонхор	Yes	1			
<i>Falco naumanni</i>	Lesser Kestrel	Зээрд шонхор	Yes	1			
<i>Gallinula chloropus</i>	Common Moorhen	Хажилгат Түнжүүр	Yes	126			

<i>Pluvialis fulva</i>	Pacific Golden Plover	Азийн сүвээцагаан	Yes	40			Estimated healthy count
<i>Vanellus vanellus</i>	Northern Lapwing	Умардын хавтгаалж	Yes	300			Estimated healthy count
<i>Tringa glareola</i>	Wood Sandpiper	Шугуйн хөгчүү	Yes	1			
<i>Tringa erythropus</i>	Spotted Redshank	Хар хөгчүү	Yes	2			
<i>Xenus cinereus</i>	Terek Sandpiper	Матигар хөгчүүлэг	Yes	1			
<i>Calidris alpina</i>	Dunlin	Хар элсэг	Yes	2			
<i>Larus ichthyaetus</i>	Pallas Gull	Итэлгэн цахлай	Yes	2			
<i>Larus ridibundus</i>	Black-headed Gull	Хүрэнтогой цахлай	Yes	7	2		
<i>Larus vagae mongolicus</i>	Mongolian Gull	Монгол цахлай	Yes	1			
<i>Syrrhaptes paradoxus</i>	Pallas's Sandgrouse	Монгол ногтруу	Yes				
<i>Athene noctua</i>	Little Owl	Хотны бүгээхэй	Yes	1			
<i>Calandrella cheleensis</i>	Asian Short-toed Lark	Дэрсний жиргэмэл	Yes				
<i>Melanocorypha mongolica</i>	Mongolian Lark	Монгол Болжмор	Yes	1			
<i>Eremophila alpestris</i>	Horned Lark	Шоорон Эвэртболжмор	Yes				
<i>Anthus spinosus</i>	Water Pipit	Харзны шийхүүнхэй	Yes				
<i>Motacilla cinerea</i>	Grey Wagtail	Уулын цэгций	Yes	1			
<i>Motacilla alba</i>	White Wagtail	Хөх цэгций	Yes	1			
<i>Pica pica</i>	Black-billed Magpie	Алаг шаазгай	Yes	5			
<i>Corvus corax</i>	Common Raven	Хон хэрээ	Yes	1			
<i>Oenanthe pleschanka</i>	Pied Wheatear	Мяраан чогчиго	Yes	1			
<i>Unknown</i>	Unknown	Мэдэхгүй	Yes			3	

**Site Name or ID** Taigam Nuur (Site 38)  
**Longitude** 46.37497  
**Latitude** 97.37335  
**Start Date** 28-Sep-06  
**Finish Date** 29-Sep-06  
**Personnel** Wildlife Conservation Society, Mongolian State Central Veterinary Laboratory

Scientific name	English name	Mongolian name	Observed at Site	Counts			Comments
				Healthy Count	Sick Count	Dead Count	
<i>Podiceps nigricollis</i>	Black-necked Grebe	Халтгар шунгуур	Yes	1			
<i>Podiceps auritus</i>	Horned Grebe	Ухаа шунгуур	Yes	2			
<i>Podiceps cristatus</i>	Great Crested Grebe	Отгот шунгуур	Yes	3			
<i>Pelecanus crispus</i>	Dalmatian Pelican	Борцгор хотон	Yes	2			
<i>Phalacrocorax carbo</i>	Great Cormorant	Тураг голой	Yes	400		2	Estimated healthy count
<i>Ardea cinerea</i>	Grey Heron	Хөх Дэглий	Yes	3		1	
<i>Platalea leucorodia</i>	Eurasian Spoonbill	Цагаан халбагант	Yes	19			
<i>Ciconia nigra</i>	Black Stork	Хар өрөвтас	Yes	7			
<i>Anser anser</i>	Greylag Goose	Бор галуу	Yes	175			
<i>Anser cygnoides</i>	Swan Goose	Хошуу галуу	Yes	7		1	
<i>Cygnus cygnus</i>	Whooper Swan	Гангар хүн	Yes	82		2	
<i>Cygnus olor</i>	Mute Swan	Хуруут хүн	Yes	46			
<i>Cygnus columbianus</i>	Tundra Swan	Хүн	Yes	7			
<i>Tadorna ferruginea</i>	Ruddy Shelduck	Хондон ангир	Yes	61			
<i>Tadorna tadorna</i>	Common Shelduck	Анхидал ангир	Yes	19			
<i>Anas platyrhynchos</i>	Mallard	Зэрэлг нугас	Yes	9			
<i>Anas crecca</i>	Common Teal	Ногоохон нугас	Yes	269			Estimated healthy count
<i>Anas strepera</i>	Gadwall	Бор нугас	Yes	77			
<i>Anas penelope</i>	Eurasian Wigeon	Зээрд нугас	Yes	132	1		
<i>Anas acuta</i>	Northern Pintail	Шовтгоралаг нугас	Yes	31			
<i>Anas clypeata</i>	Northern Shoveler	Халбага нугас	Yes	32			
<i>Rhodonessa rufina</i>	Red-crested Pochard	Халбага нугас	Yes	89			
<i>Aythya ferina</i>	Common Pochard	Улаанхүзүү шумбуур	Yes	20			Estimated healthy count
<i>Aythya fuligula</i>	Tufted Duck	Гээзгт шумбуур	Yes	30			Estimated healthy count
<i>Bucephala clangula</i>	Common Goldeneye	Алаг шунгаач	Yes	100			Estimated healthy count
<i>Circus cyaneus</i>	Hen Harrier	Сарал хулд	Yes	1			
<i>Buteo hemilasius</i>	Upland Buzzard	Шилийн сар	Yes	2			
<i>Haliaeetus albicilla</i>	White-tailed Eagle	Цагаансүүл нөмрөгбургэд	Yes	1			

<i>Fulica atra</i>	Common Coot	Халзан түнжүү	Yes	9			
<i>Pluvialis fulva</i>	Pacific Golden Plover	Азийн сүвээцагаан	Yes	250			
<i>Charadrius dubius</i>	Little-ringed Plover	Нарийн хиазат	Yes	2			
<i>Charadrius alexandrinus</i>	Kentish Plover	Тэнгисийн хиазат	Yes	10			
<i>Tringa glareola</i>	Wood Sandpiper	Шугуйн хөгчүү	Yes	1			
<i>Tringa erythropus</i>	Spotted Redshank	Хар хөгчүү	Yes	1			
<i>Philomachus pugnax</i>	Ruff	Ноцоо нооллодой	Yes	2			
<i>Calidris alba</i>	Sanderling	Гурвалж элсэг	Yes	3			
<i>Larus ichthyaetus</i>	Pallas Gull	Итэлгэн цахтай	Yes	1			
<i>Larus ridibundus</i>	Black-headed Gull	Хүрэнтгой цахтай	Yes		2		
<i>Larus vagae mongolicus</i>	Mongolian Gull	Монгол цахтай	Yes	20	1	Estimated healthy count	
<i>Sterna caspia</i>	Caspian Tern	Морин шунгуулай	Yes	1			
<i>Syrrhaptes paradoxus</i>	Pallas's Sandgrouse	Монгол ногтруу	Yes	3			
<i>Eremophila alpestris</i>	Horned Lark	Шоорон Эвэртболжмор	Yes				
<i>Alauda arvensis</i>	Eurasian Skylark	Боролзой богширго	Yes				
<i>Anthus spinosus</i>	Water Pipit	Харзны шийхүүнхэй	Yes				
<i>Sturnus vulgaris</i>	Common Starling	Хар тодол	Yes	2			
<i>Corvus corone</i>	Carriion Crow	Хар хэрээ	Yes	6			
<i>Oenanthe isabellina</i>	Isabelline Wheatear	Бужимч чогчиго	Yes	1			
<i>Cygnus spp.</i>	Swan spp.	Хүн	Yes	4			
<i>Duck spp.</i>	Duck spp.	Нугас	Yes	6200	1		
<i>Gallinago spp.</i>	Snipe spp.	Хараалж	Yes				
<i>Carpodacus sp.</i>	Rosefinch spp.	Бужмар	Yes	1			
<i>Unknown</i>	Unknown	Мэдэхгүй	Yes		2		
<i>Larus spp.</i>	Gull spp.	Цахтай	Yes		1		

**Site Name or ID** Small lake near Bayan Undur Bag (Bupzuua) (Site 39)  
**Longitude** 46.05793  
**Latitude** 97.80922  
**Start Date** 29-Sep-06  
**Finish Date** 29-Sep-06  
**Personnel** Wildlife Conservation Society, Mongolian State Central Veterinary Laboratory

<b>Scientific name</b>	<b>English name</b>	<b>Mongolian name</b>	<b>Observed at Site</b>	<b>Counts</b>			<b>Comments</b>
				<b>Healthy Count</b>	<b>Sick Count</b>	<b>Dead Count</b>	
<i>Phalacrocorax carbo</i>	Great Cormorant	Тураг голой	Yes			2	
<i>Casmerodus albus</i>	Great Egret	Цагаан дэвлээ	Yes	3			
<i>Tadorna ferruginea</i>	Ruddy Shelduck	Хондон ангир	Yes	25			
<i>Anas platyrhynchos</i>	Mallard	Зэрлэг нугас	Yes	8			
<i>Anas crecca</i>	Common Teal	Ногоохон нугас	Yes	13			
<i>Anas penelope</i>	Eurasian Wigeon	Зээрд нугас	Yes	28			
<i>Anas acuta</i>	Northern Pintail	Шовтгоралаг нугас	Yes	29			
<i>Anas clypeata</i>	Northern Shoveler	Халбага нугас	Yes	5			
<i>Pluvialis squatarola</i>	Grey Plover	Буурал сүвээцагаан	Yes	1			
<i>Pluvialis fulva</i>	Pacific Golden Plover	Азийн сүвээцагаан	Yes	7			
<i>Charadrius alexandrinus</i>	Kentish Plover	Тэнгисийн хиазат	Yes	3			
<i>Vanellus vanellus</i>	Northern Lapwing	Умардын хавтгаалж	Yes	14			
<i>Calidris alpina</i>	Dunlin	Хар элсэг	Yes	3			

**Site Name or ID** Boontsagaan Nuur (Site 40)  
**Longitude** 45.62630  
**Latitude** 99.09002  
**Start Date** 30-Sep-06  
**Finish Date** 30-Sep-06  
**Personnel** Wildlife Conservation Society, Mongolian State Central Veterinary Laboratory

<b>Scientific name</b>	<b>English name</b>	<b>Mongolian name</b>	<b>Observed at Site</b>	<b>Counts</b>			<b>Comments</b>
				<b>Healthy Count</b>	<b>Sick Count</b>	<b>Dead Count</b>	
<i>Podiceps nigricollis</i>	Black-necked Grebe	Халтар шунгуур	Yes	2			
<i>Podiceps auritus</i>	Horned Grebe	Ухаа шунгуур	Yes	49			
<i>Podiceps cristatus</i>	Great Crested Grebe	Отгот шунгуур	Yes	69			
<i>Phalacrocorax carbo</i>	Great Cormorant	Тураг голой	Yes	118		12	
<i>Casmerodius albus</i>	Great Egret	Цагаан дэвлээ	Yes	1			
<i>Ardea cinerea</i>	Grey Heron	Хөх Дэглий	Yes			1	
<i>Platalea leucorodia</i>	Eurasian Spoonbill	Цагаан халбагант	Yes	2		1	
<i>Anser anser</i>	Greylag Goose	Бор галуу	Yes	32			
<i>Tadorna ferruginea</i>	Ruddy Shelduck	Хондон ангир	Yes	127			
<i>Tadorna tadorna</i>	Common Shelduck	Анхидал ангир	Yes	5			
<i>Anas platyrhynchos</i>	Mallard	Зэрлэг нугас	Yes	1			
<i>Anas penelope</i>	Eurasian Wigeon	Зээрд нугас	Yes	147			
<i>Rhodonessa rufina</i>	Red-crested Pochard	Халбага нугас	Yes	66			
<i>Aythya ferina</i>	Common Pochard	Улаанхүзүү шумбуур	Yes	1			
<i>Aythya fuligula</i>	Tufted Duck	Гээгт шумбуур	Yes	5			
<i>Circus cyaneus</i>	Hen Harrier	Сарал хулд	Yes	1			
<i>Buteo hemilasius</i>	Upland Buzzard	Шилийн сар	Yes	1			
<i>Aegypius monachus</i>	Cinereous Vulture	Нөмрөг тас	Yes	15			
<i>Fulica atra</i>	Common Coot	Халzan түнжүү	Yes	129			
<i>Pluvialis fulva</i>	Pacific Golden Plover	АЗийн сувээцагаан	Yes	60			Estimated healthy count
<i>Charadrius mongolus</i>	Mongolian Plover	Монгол хиазат	Yes	1			
<i>Charadrius alexandrinus</i>	Kentish Plover	Тэнгисийн хиазат	Yes	2			
<i>Calidris alba</i>	Sanderling	Гурвалж элсэг	Yes	2			
<i>Larus relictus</i>	Relict Gull	Пеликт цахтай	Yes	2			
<i>Larus ridibundus</i>	Black-headed Gull	Хүрэнтэлгийн цахтай	Yes	35		2	
<i>Larus vagae mongolicus</i>	Mongolian Gull	Монгол цахтай	Yes	45		1	
<i>Sterna hirundo</i>	Common Tern	Эгэл хараалай	Yes			1	
<i>Syrrhaptes paradoxus</i>	Pallas's Sandgrouse	Монгол ногтруу	Yes				

<i>Calandrella cheleensis</i>	Asian Short-toed Lark	Дэрсний жиргэмэл	Yes			1	
<i>Alauda arvensis</i>	Eurasian Skylark	Боролзой богширго	Yes				
<i>Oenanthe deserti</i>	Desert Wheatear	Цөлийн чогчиго	Yes				
<i>Stercorarius skua</i>	Jaeger spp.	Хайлгана	Yes	1			
<i>Falco tinnunculus/F. naumannni</i>	Common/Lesser Kestrel	Начин шонхор/Зээрд шонхор	Yes	1			
<i>Larus spp.</i>	Gull spp.	Цахлай	Yes		1		
<i>Raptor sp.</i>	Raptor spp.	Махчин шувууны төрөл	Yes			1	

**Site Name or ID** Small lake Southeast of Boontsagaan Nuur (Site 41)  
**Longitude** 45.50915  
**Latitude** 99.24458  
**Start Date** 30-Sep-06  
**Finish Date** 30-Sep-06  
**Personnel** Wildlife Conservation Society, Mongolian State Central Veterinary Laboratory

<b>Scientific name</b>	<b>English name</b>	<b>Mongolian name</b>	<b>Observed at Site</b>	<b>Counts</b>			<b>Comments</b>
				<b>Healthy Count</b>	<b>Sick Count</b>	<b>Dead Count</b>	
<i>Phalacrocorax carbo</i>	Great Cormorant	Тураг голой	Yes	10	1	13	
<i>Casmerodius albus</i>	Great Egret	Цагаан дэвлээ	Yes	5		2	
<i>Ardea cinerea</i>	Grey Heron	Хөх Дэглий	Yes	29		4	
<i>Platalea leucorodia</i>	Eurasian Spoonbill	Цагаан халбагант	Yes	8		3	
<i>Ciconia nigra</i>	Black Stork	Хар өрөвтас	Yes	3			
<i>Anser anser</i>	Greylag Goose	Бор галуу	Yes	40			
<i>Cygnus cygnus</i>	Whooper Swan	Гангар хүн	Yes	5			
<i>Tadorna ferruginea</i>	Ruddy Shelduck	Хондон ангир	Yes	6		1	
<i>Anas platyrhynchos</i>	Mallard	Зэрлэг нугас	Yes	7		1	
<i>Anas crecca</i>	Common Teal	Ногоохон нугас	Yes	144		1	
<i>Anas strepera</i>	Gadwall	Бор нугас	Yes	1			
<i>Anas acuta</i>	Northern Pintail	Шовторалаг нугас	Yes	65			
<i>Anas querquedula</i>	Garganey	Цагаанхөмсөгт нугас	Yes	2			
<i>Anas clypeata</i>	Northern Shoveler	Халбага нугас	Yes	16			
<i>Aythya ferina</i>	Common Pochard	Улаанхүзүү шумбуур	Yes	2			
<i>Aythya fuligula</i>	Tufted Duck	Гээгт шумбуур	Yes	8			
<i>Mergellus albellus</i>	Smew	Цахир бохио	Yes	2			
<i>Circus cyaneus</i>	Hen Harrier	Сарал хулд	Yes	1			
<i>Falco cherrug</i>	Saker Falcon	Идлэг шонхор	Yes	3			
<i>Falco peregrinus</i>	Peregrine Falcon	Эгэл шонхор	Yes	1			
<i>Fulica atra</i>	Common Coot	Халзан тунжүү	Yes	1			
<i>Charadrius dubius</i>	Little-ringed Plover	Нарийн хиазат	Yes	1			
<i>Charadrius mongolus</i>	Mongolian Plover	Монгол хиазат	Yes	1			
<i>Charadrius alexandrinus</i>	Kentish Plover	Тэнгисийн хиазат	Yes	2			
<i>Vanellus vanellus</i>	Northern Lapwing	Умардын хавтгаалж	Yes	1		1	
<i>Tringa glareola</i>	Wood Sandpiper	Шугуйн хөгчүү	Yes	1			
<i>Gallinago gallinago</i>	Common Snipe	Шөвгөн хараалж	Yes	3			
<i>Lymnocryptes minimus</i>	Jack Snipe	Бичил салаалж	Yes			1	

<i>Larus relictus</i>	Relict Gull	Пеликт цахлай	Yes	1			
<i>Larus ridibundus</i>	Black-headed Gull	Хүрэнтөлгөй цахлай	Yes	1		1	
<i>Larus vagae mongolicus</i>	Mongolian Gull	Монгол цахлай	Yes			1	
<i>Syrrhaptes paradoxus</i>	Pallas's Sandgrouse	Монгол ногтруу	Yes	4			
<i>Eremophila alpestris</i>	Horned Lark	Шоорон Эвзартболжмор	Yes				
<i>Anthus spinoletta</i>	Water Pipit	Харзны шийхүүнхэй	Yes				
<i>Motacilla citreola</i>	Citrine Wagtail	Шартуруүт цэгций	Yes	2			
<i>Motacilla alba</i>	White Wagtail	Хөх цэгций	Yes	1			
<i>Sturnus vulgaris</i>	Common Starling	Хар тодол	Yes	23			
<i>Corvus corax</i>	Common Raven	Хон хэрээ	Yes	1			
<i>Luscinia svecica</i>	Bluethroat	Цэнхэр жижир	Yes	1			
<i>Zoothera sibirica</i>	Siberian Thrush	Шивэр хөөндэй	Yes	1			
<i>Panurus biarmicus</i>	Bearded Parrotbill	Сахалт шагшуургабялзуухай	Yes				
<i>Passer montanus</i>	Eurasian Tree Sparrow	Хээрийн боршувуу	Yes	25			Estimated healthy count
<i>Emberiza schoeniclus</i>	Reed Bunting	Цагаанхүзүүт хөмрөг	Yes	2			
<i>Calidris spp.</i>	Stint spp.	Элсэг	Yes			1	
<i>Unknown</i>	Unknown	Мэдэхгүй	Yes			1	

**Site Name or ID** Kholboolj Nuur (Laesan Lake) (Site 42)  
**Longitude** 45.32123  
**Latitude** 100.78590  
**Start Date** 4-Oct-06  
**Finish Date** 4-Oct-06  
**Personnel** Wildlife Conservation Society, Mongolian State Central Veterinary Laboratory

<b>Scientific name</b>	<b>English name</b>	<b>Mongolian name</b>	<b>Observed at Site</b>	<b>Counts</b>			<b>Comments</b>
				<b>Healthy Count</b>	<b>Sick Count</b>	<b>Dead Count</b>	
<i>Phalacrocorax carbo</i>	Great Cormorant	Тураг голой	Yes	5			
<i>Ardeola bacchus</i>	Chinese Pond-Heron	Цагаан дэвлээ	Yes	2			
<i>Ardea cinerea</i>	Grey Heron	Хөх Дэглий	Yes	2			
<i>Platalea leucorodia</i>	Eurasian Spoonbill	Цагаан халбагант	Yes	9			
<i>Anser anser</i>	Greylag Goose	Бор галуу	Yes	17			
<i>Anser cygnoides</i>	Swan Goose	Хошуу галуу	Yes	23			
<i>Cygnus cygnus</i>	Whooper Swan	Гангар хүн	Yes	217			
<i>Cygnus olor</i>	Mute Swan	Хуруут хүн	Yes	4			
<i>Cygnus columbianus</i>	Tundra Swan	Хүн	Yes	13			
<i>Tadorna ferruginea</i>	Ruddy Shelduck	Хондон ангир	Yes	139		1	
<i>Tadorna tadorna</i>	Common Shelduck	Анхидал ангир	Yes	321		1	
<i>Anas platyrhynchos</i>	Mallard	Зэрлэг нугас	Yes	162			
<i>Anas crecca</i>	Common Teal	Ногоохон нугас	Yes	232			
<i>Anas strepera</i>	Gadwall	Бор нугас	Yes	19			
<i>Anas penelope</i>	Eurasian Wigeon	Зээрд нугас	Yes	397			
<i>Anas acuta</i>	Northern Pintail	Шовтгоралаг нугас	Yes	119		1	
<i>Anas querquedula</i>	Garganey	Цагаанхөмсөгт нугас	Yes	2			
<i>Anas clypeata</i>	Northern Shoveler	Халбага нугас	Yes	270			
<i>Rhodonessa rufina</i>	Red-crested Pochard	Халбага нугас	Yes	2			
<i>Circus cyaneus</i>	Hen Harrier	Сарал хулд	Yes	1			
<i>Aquila chrysaetos</i>	Golden Eagle	Цармын бургэд	Yes	1			
<i>Falco cherrug</i>	Saker Falcon	Идлэг шонхор	Yes	1			
<i>Falco peregrinus</i>	Peregrine Falcon	Эгэл шонхор	Yes	2			
<i>Grus grus</i>	Common Crane	Хархираа тогоруу	Yes	7			
<i>Pluvialis fulva</i>	Pacific Golden Plover	АЗийн сувээцагаан	Yes	1			
<i>Charadrius dubius</i>	Little-ringed Plover	Нарийн хиазат	Yes	6			Estimated healthy count
<i>Charadrius alexandrinus</i>	Kentish Plover	Тэнгисийн хиазат	Yes	6			
<i>Vanellus vanellus</i>	Northern Lapwing	Умардын хавтгаалж	Yes	14			

<i>Himantopus himantopus</i>	Black-winged Stilt	Эгэл хилэнжигүүр	Yes	3	1		
<i>Tringa nebularia</i>	Common Greenshank	Үхэр хөгчүү	Yes	2			
<i>Tringa erythropus</i>	Spotted Redshank	Хар хөгчүү	Yes	9			
<i>Philomachus pugnax</i>	Ruff	Ноцоо ноололдой	Yes	2			
<i>Calidris temminckii</i>	Temminck's Stint	Темиминский элсэг	Yes				
<i>Limicola falcinellus</i>	Broad-billed Sandpiper	Сямби шалчиг	Yes	1			
<i>Gallinago gallinago</i>	Common Snipe	Шөвгөн хараалж	Yes	5			
<i>Numenius arquata</i>	Eurasian Curlew	Морин тутгалжин	Yes	3			
<i>Limosa limosa</i>	Black-tailed Godwit	Морин цууцал	Yes	1			
<i>Larus minutus</i>	Little Gull	Хурган цахлай	Yes	1			
<i>Larus ridibundus</i>	Black-headed Gull	Хүрэнтлгой цахлай	Yes	24			
<i>Larus vagae mongolicus</i>	Mongolian Gull	Монгол цахлай	Yes	1			
<i>Syrrhaptes paradoxus</i>	Pallas's Sandgrouse	Монгол ногтруу	Yes	100			Estimated healthy count
<i>Eremophila alpestris</i>	Horned Lark	Шоорон Эвэртболжмор	Yes				
<i>Alauda arvensis</i>	Eurasian Skylark	Боролзой богширго	Yes				
<i>Charadrius spp.</i>	Plover spp.	Хиазат	Yes	1			
<i>Falco tinnunculus/F. naumanni</i>	Common/Lesser Kestrel	Начин шонхор/Зээрд шонхор	Yes	1			
<i>Unknown</i>	Unknown	Мэдэхгүй	Yes			3	

**Appendix III. A summary of water quality readings made at survey sites in eastern, central and western Mongolia from 22 July – 6 October 2006.** Readings were taken at three locations at each survey site (except site 6 where three readings were taken at a single location).. The median reading for each parameter was taken from each location, and mean conductivity (recorded to the nearest 0.001 µS/cm compensated to 25°C), mean salinity (recorded to the nearest 0.1 ppt) and mean temperature (recorded to the nearest 0.1°C) taken across all three locations. Mean pH (recorded to the nearest 0.1) was taken by first converting median pH at each location to hydrogen ion activation (using activity =  $10^{-\text{pH}}$ ), calculating the mean activity across all three locations and then converting back to pH units (using  $\text{pH} = (-)(\log_{10})(\text{mean H}^+ \text{ activity})$ ). NR denotes values that were not recorded.

Site no.	pH				Conductivity		Salinity			
	Mean pH (Min:Max)	Min. Temp. (Celsius)	Max. Temp. (Celcius)	N	Mean Specific Conductivity, mS (SD)	N	Mean Salinity (SD)	Min. Temp. (Celsius)	Max. Temp. (Celcius)	N
1	8.95 (8.93:8.96)	19.5	20.2	9	1.738 ( $\pm 0.012$ )	9	0.9 ( $\pm 0.0$ )	19.5	20.2	9
2	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
3	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
4	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
5	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
6	7.76 (7.75:7.79)	23.4	23.4	3	NR	NR	0.1 ( $\pm 0.1$ )	23.4	23.4	3
7	9.56 (9.43:9.84)	24.4	26.1	9	2.068 ( $\pm 0.053$ )	9	1.1 ( $\pm 0.1$ )	24.4	26.1	9
8	9.11 (9.11:9.12)	23.4	25.1	9	11.371 ( $\pm 0.015$ )	9	6.5 ( $\pm 0.0$ )	23.4	25.1	9
9	9.00 (8.98:9.02)	21.1	22.8	9	5.056 ( $\pm 0.135$ )	9	2.7 ( $\pm 0.1$ )	21.1	22.6	9
10	8.86 (8.78:8.94)	23.1	23.7	9	11.424 ( $\pm 0.030$ )	9	6.5 ( $\pm 0.0$ )	23.1	23.6	9
11	9.15 (9.14:9.17)	26.3	27.6	9	35.796 ( $\pm 18.878$ )	9	21.9 ( $\pm 0.0$ )	26.3	27.6	9
12	9.14 (9.13:9.15)	19.1	20.7	9	15.044 ( $\pm 0.548$ )	9	8.8 ( $\pm 0.3$ )	19.2	20.7	9
13	8.66 (8.61:8.71)	17.7	19.4	9	0.869 ( $\pm 0.051$ )	9	0.4 ( $\pm 0.1$ )	17.7	19.4	9
14	9.64 (9.54:9.89)	17.0	19.0	9	3.477 ( $\pm 0.147$ )	9	1.8 ( $\pm 0.1$ )	17.0	18.9	9
15	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
16	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
17	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
18	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
19	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
20	9.43 (9.42:9.44)	12.5	13.2	9	27.366 ( $\pm 0.142$ )	9	16.9 ( $\pm 0.1$ )	12.5	13.2	9
21	9.10 (9.09:9.13)	8.5	9.7	9	24.022 ( $\pm 0.637$ )	9	14.4 ( $\pm 0.4$ )	8.5	9.7	9
22	8.84 (8.80:8.87)	10.4	13.1	9	1.108 ( $\pm 0.005$ )	9	0.6 ( $\pm 0.0$ )	10.4	12.8	9

23	8.92 (8.9:8.93)	9.2	11.2	9	5.929 ( $\pm$ 0.014)	9	3.2 ( $\pm$ 0.0)	9.2	11.2	9
24	9.02 (8.95:9.12)	8.1	13.1	9	29.156 ( $\pm$ 0.288)	9	18 ( $\pm$ 0.2)	8.1	13.1	9
25	8.86 (8.8:8.89)	7.5	8.8	9	7.311 ( $\pm$ 0.211)	9	4.0 ( $\pm$ 0.1)	7.5	8.8	9
26	9.20 (9.14:9.22)	9.1	9.7	9	2.764 ( $\pm$ 0.005)	9	1.4 ( $\pm$ 0.0)	9.1	9.8	9
27	8.54 (8.17:9.5)	16.1	19.6	9	1.240 ( $\pm$ 0.678)	9	0.6 ( $\pm$ 0.4)	16.0	19.6	9
28	8.88 (8.76:9.15)	18.0	21.5	9	0.873 ( $\pm$ 0.091)	9	0.5 ( $\pm$ 0.1)	18.0	21.5	9
29	8.70 (8.58:8.85)	18.6	20.9	9	18.794 ( $\pm$ 0.430)	9	11.2 ( $\pm$ 0.3)	18.6	20.9	9
30	8.98 (8.94:9.00)	17.1	17.3	9	18.772 ( $\pm$ 0.033)	9	11.2 ( $\pm$ 0.0)	17.0	17.3	9
31	8.51 (8.25:8.81)	12.0	13.6	9	0.352 ( $\pm$ 0.026)	9	0.2 ( $\pm$ 0.0)	12.0	13.6	9
32	9.32 (9.20:9.39)	14.2	15.1	9	4.127 ( $\pm$ 0.470)	9	2.2 ( $\pm$ 0.3)	14.1	15.1	9
33	8.99 (8.59:9.64)	13.6	17.4	9	0.472 ( $\pm$ 0.218)	9	0.2 ( $\pm$ 0.1)	13.6	17.4	9
34	7.63 (7.46:7.77)	13.4	14.2	9	0.300 ( $\pm$ 0.038)	9	0.1 ( $\pm$ 0.1)	13.4	14.2	9
35	8.51 (8.24:8.96)	11.4	15.9	9	0.282 ( $\pm$ 0.005)	9	0.1 ( $\pm$ 0.0)	11.4	16.0	9
36	9.20 (9.16:9.28)	10.1	10.5	9	6.589 ( $\pm$ 0.228)	9	3.6 ( $\pm$ 0.1)	10.1	10.6	9
37	9.99 (9.75:10.20)	9.6	16.0	9	0.201 ( $\pm$ 0.055)	9	0.1 ( $\pm$ 0.0)	9.6	16.0	9
38	8.92 (8.79:9.38)	9.2	15.9	9	13.974 ( $\pm$ 9.764)	9	8.3 ( $\pm$ 5.9)	9.2	15.9	9
39	9.57 (9.45:9.75)	13.4	14.2	9	60.756 ( $\pm$ 0.664)	9	40.7 ( $\pm$ 0.5)	13.4	14.2	9
40	9.01 (8.96:9.05)	12.4	17.4	9	7.724 ( $\pm$ 0.201)	9	4.3 ( $\pm$ 0.1)	12.4	17.4	9
41	9.25 (9.12:9.45)	15.5	16.6	9	0.965 ( $\pm$ 0.207)	9	0.5 ( $\pm$ 0.1)	15.5	16.6	9
42	8.79 (8.38:9.49)	10.1	17.9	9	4.578 ( $\pm$ 3.998)	9	2.5 ( $\pm$ 2.3)	10.1	17.9	9

**Appendix IV: List of tissue samples collected during necropsy examinations and fixed in 10% formalin for histopathology.**

<b>System</b>	<b>Tissue</b>
<b>Integument:</b>	Skin (feathered)
<b>Musculoskeletal System:</b>	Skeletal muscle Section of long bone (radius or tibia), including marrow.
<b>Hematopoietic System:</b>	Spleen
<b>Respiratory System:</b>	Trachea Lungs
<b>Cardiovascular System:</b>	Heart Aorta
<b>Gastrointestinal tract:</b>	Oesophagus Crop Proventriculus Ventriculus Duodenum Jejunum Ileum Ileocecocolic junction Ceca Large intestine Liver Gall bladder
<b>Urinary System:</b>	Kidney Ureter
<b>Genital System:</b>	Gonad (ovary, testes)
<b>Nervous System:</b>	Brain Vagus nerve
<b>Endocrine System:</b>	Pancreas Thyroid glands Parathyroid glands Adrenal glands
<b>Sensory System:</b>	Eye

## THE WILDLIFE CONSERVATION SOCIETY NECROPSY REPORT

<b>Common Name</b>	Swan Goose
<b>Species</b>	<i>Anser Cygnoides</i>
<b>Order/Family</b>	Anseriformes/Anatidae
<b>ISIS</b>	MN06-011
<b>Path#</b>	N2006-0817
<b>Sex</b>	M
<b>Age</b>	Adult
<b>Locale</b>	Khaichiin Tsagaan Nuur
<b>Park</b>	Field Vet
<b>DOB</b>	Unknown
<b>Time in Residence</b>	Not applicable
<b>DOD</b>	8/1/2006
<b>Type of Death</b>	Euth
<b>Submission</b>	
<b>Final Report</b>	3/21/2007

**History:** Band M07. Trapped for marking and satellite telemetry study. Found at longitude 49.67587 and latitude 114.6578. Khaichiin Tsagaan Nuur. Euthanized due to capture myopathy, but otherwise healthy.

**General Condition:** An adult, male swan goose is examined.

**Musculoskeletal System:**

**Body Cavities:**

**Hemolymphatics:**

**Respiratory System:**

**Cardiovascular System:**

**Digestive System:**

**Urinary System:**

**Reproductive System:**

**Endocrine System:**

**Nervous System:**

**Frozen:**

**Other:**

**Laboratory Studies:**

**Gross Findings:**

**Gross Prossector:**

**Special Stains:**

**Histo Prossector:**

DM

**Morphologic Diagnoses:**

- 1). Skeletal muscle: Rhabdomyolysis and myofiber degeneration, multifocal and regionally extensive, acute to subacute, severe
- 2). Skeletal muscle: Rhabdomyolysis, myofiber, multifocal, acute, and minimal
- 3). Heart: Degeneration and variable tinctorial staining, multifocal, mild with mild multifocal myocardiocyte vacuolization
- 4). Adipose tissue (epicardial): Atrophy, diffuse, moderate to severe
- 5). Lungs: Anthrasilicosis, multifocal, mild
- 6). Liver: Hemosiderosis, hepatocellular, diffuse, mild (presumptive)
- 7). Lungs: Congestion, multifocal, mild
- 8). Bone marrow: Moderate cellularity
- 9). Testis: Aspermatogenesis
- 10). Bone marrow: Bacteria, multifocal (post-mortem, presumptive)
- 11). Gall bladder: Autolysis, post-mortem, diffuse, severe

- 12). Large intestine: Autolysis, post-mortem, diffuse, moderate
- 13). Small intestine: Autolysis, post-mortem, diffuse, mild to moderate
- 14). Pancreas: Autolysis, post-mortem, focal, mild
- 15). Peripheral nerve: NHL
- 16). Spleen: NHL
- 17). Skeletal muscle: NHL
- 18). Elastic artery: NHL
- 19). Adrenal gland: NHL
- 20). Parathyroid gland: NHL
- 21). Thyroid gland: NHL
- 22). Kidney: NHL
- 23). Skin: NHL
- 24). Ventriculus: NHL
- 25). Trachea: NHL
- 26). Brain: NHL

**Comments:** The most significant lesion in the examined tissues was rhabdomyolysis. Exertional or “capture” myopathy and rhabdomyolysis has been reported in several species, including dogs, horses, birds and ruminants, following running, restraint and transportation. Lesions can develop in skeletal and/or cardiac muscles and were seen in skeletal muscle and possibly the cardiac muscle in this bird. The onset of clinical signs and death can develop within a few hours or up to one to two weeks. Death results from lactic acidosis and/or myoglobinuric nephrosis (with acute renal failure) that develops secondary to muscle necrosis. Fat atrophy suggests this was a lean/thin bird. Lack of spermatogenesis likely reflects a normal seasonal or age-related finding.

T-13000 M-50000 SKELETAL MUSCLE: DEGENERATION  
T-32000 M-50000 HEART: DEGENERATION  
T-1X010 M-58000 ADIPOSE TISSUE: ATROPHY  
T-28000 D-76100 LUNGS: ANTHRACOSIS  
T-28000 D-76210 LUNGS: SILICOSIS  
T-56000 M-57510 LIVER: HEMOSIDEROSIS  
T-28000 M-36100 LUNGS: CONGESTION  
T-00010 F-Y2770 BODY AS A WHOLE: EUTHANASIA

N2006-0817 1

## THE WILDLIFE CONSERVATION SOCIETY NECROPSY REPORT

**Common Name** Swan Goose  
**Species** *Anser Cygnoides*  
**Order/Family** Anseriformes/Anatidae  
**ISIS** MN06-006  
**Path#** N2006-0941  
**Sex** M  
**Age** Adult  
**Locale** Khaichiin Tsagaan Nuur  
**Park** Field Vet  
**DOB** Unknown  
**Time in Residence** Not applicable  
**DOD** 8/3/2006  
**Type of Death** Euth  
**Submission**  
**Final Report** 3/22/2007

**History:** Band M03. Trapped for marking and satellite telemetry study. Found at longitude 49.67587 and latitude 114.6578. Khaichiin Tsagaan Nuur Euthanized due to capture myopathy, but otherwise healthy

**General Condition:** An adult, male swan goose is examined.

**Musculoskeletal System:**

**Body Cavities:**

**Hemolymphatics:**

**Respiratory System:**

**Cardiovascular System:**

**Digestive System:**

**Urinary System:**

**Reproductive System:**

**Endocrine System:**

**Nervous System:**

**Frozen:**

**Other:**

**Laboratory Studies:**

**Gross Findings:**

**Gross Prossector:**

**Special Stains:**

**Histo Prossector:**

DM

**Morphologic Diagnoses:**

- 1). Skeletal muscle (lower and upper leg): Rhabdomyolysis (myonecrosis), subacute, multifocal to coalescing and regionally extensive, severe with multifocal myofiber regeneration, mineralization, and mild multifocal lymphoplasmacytic and histiocytic myositis
- 2). Heart: Degeneration, myocardiocyte, acute, multifocal, and mild (presumptive)
- 3). Lungs: Hemorrhage, intraparabronchial, acute, moderate and mild, diffuse edema
- 4). Kidney: Hemorrhage, perirenal, acute, multifocal, and mild
- 5). Brain: Rarefaction, neuropil (white matter), multifocal, mild (edema, presumptive; R/O autolysis)
- 6). Liver: Hemosiderosis, hepatocellular and Kupffer cell, diffuse, mild to moderate (presumptive)
- 7). Liver: Lymphoid aggregates, perivascular, multifocal, mild
- 8). Lungs: Congestion, diffuse, mild
- 9). Lungs: Anthrasilicosis, multifocal, mild
- 10). Testis: Aspermatogenesis
- 11). Gallbladder: Autolysis, post mortem, diffuse, moderate

- 12). Peripheral nerve: NHL
- 13). Thyroid gland: NHL
- 14). Skeletal muscle: NHL
- 15). Eye: NHL
- 16). Trachea: NHL
- 17). Skeletal muscle (ventriculus, presumptive): NHL
- 18). Crop: NHL
- 19). Hyaline cartilage and connective tissue: NHL
- 20). Eosphageal-provenricular junction (presumptive): NHL
- 21). Esophagus: NHL
- 22). Adrenal gland: NHL
- 23). Small intestine: NHL
- 24). Pancreas: NHL
- 25). Brain: NHL
- 26). Spleen: NHL

**Comments:** The most significant histologic finding was myonecrosis, which, based on the clinical history, was the result of excess exertion (exertional rhabdomyolysis). The remaining histologic findings considered secondary, agonal, or incidental findings.

T-00010 F-Y2770 BODY AS A WHOLE: EUTHANASIA  
T-13000 M-54000 SKELETAL MUSCLE: NECROSIS  
T-13000 M-79900 SKELETAL MUSCLE: REGENERATION  
T-13000 M-55400 SKELETAL MUSCLE: MINERALIZATION  
T-32000 M-50000 HEART: DEGENERATION  
T-28000 M-37001 LUNGS: HEMORRHAGE, ACUTE, FOCAL, MILD  
T-28000 M-36500 LUNGS: EDEMA  
T-71000 M-41004 KIDNEY: INFLAMMATION, ACUTE, M-F, MILD  
T-56000 M-57510 LIVER: HEMOSIDEROSIS  
N2006-0941 1

## THE WILDLIFE CONSERVATION SOCIETY NECROPSY REPORT

<b>Common Name</b>	Swan Goose
<b>Species</b>	<i>Anser Cygnoides</i>
<b>Order/Family</b>	Anseriformes/ Anatidae
<b>ISIS</b>	MN06-008
<b>Path#</b>	N2006-0942
<b>Sex</b>	M
<b>Age</b>	Adult
<b>Locale</b>	Khaichiin Tsagaan Nuur
<b>Park</b>	Field Vet
<b>DOB</b>	Unknown
<b>Time in Residence</b>	Not applicable
<b>DOD</b>	8/5/2006
<b>Type of Death</b>	Euth
<b>Submission</b>	
<b>Final Report</b>	3/22/2007

**History:** Longitude 49.67587 Latitude 114.6578. Khaichiin Tsagaan Nuur. Band M04  
Trapped for marking and satellite telemetry study. Euthanized due to capture myopathy, but otherwise healthy.

**General Condition:** An adult swan goose is examined.

**Musculoskeletal System:**

**Body Cavities:**

**Hemolymphatics:**

**Respiratory System:**

**Cardiovascular System:**

**Digestive System:**

**Urinary System:**

**Reproductive System:**

**Endocrine System:**

**Nervous System:**

**Frozen:**

**Other:**

**Laboratory Studies:**

**Gross Findings:**

**Gross Prossector:**

**Special Stains:**

**Histo Prossector:**

DM

**Morphologic Diagnoses:**

- 1). Skeletal muscle (upper and lower leg): Rhabdomyolysis (myonecrosis), subacute, multifocal to coalescing and regionally extensive, severe with multifocal myofiber regeneration, mineralization, and mild multifocal lymphoplasmacytic and histiocytic myositis
- 2). Skeletal muscle (upper and lower leg): Hemorrhage, acute, multifocal, and mild
- 3). Skeletal muscle (pectoral): Rhabdomyolysis, acute, to subacute, multifocal to coalescing and regionally extensive, moderate to severe
- 4). Heart: Myocarditis, acute to subacute, multifocal, mild with scattered myocardocyte necrosis and eosinophilic inflammation
- 5). Heart: Myocarditis, granulomatous, focal, and minimal with intralesional foreign material (R/O fungus)
- 6). Heart: Nematodes, encysted, multiple (two)
- 7). Epicardium: Atrophy (serous), fat, diffuse, moderate to severe with mild, multifocal mineralization
- 8). Liver: Pigment accumulation, hepatocellular, diffuse, mild (hemosiderosis, presumptive)

- 9). Spleen: Hyperplasia, reticuloendothelial cell, diffuse, mild
- 10). Kidney: Hemorrhage, perirenal, acute, multifocal, and mild to moderate
- 11). Lungs: Congestion and edema, multifocal, mild
- 12). Lungs: Anthrasicosis, multifocal, mild
- 13). Small intestine: Protozoa, intraepithelial, multifocal, mild (suggestive of coccidia)
- 14). Small intestine: Serositis, subacute to chronic, multifocal, and minimal to mild
- 15). Gallbladder: Autolysis, post mortem, diffuse, moderate
- 16). Bone marrow: Hypercellularity, diffuse, moderate
- 17). Testis: Aspermatogenesis
- 18). Kidney: NHL
- 19). Peripheral nerve: NHL
- 20). Skin: NHL
- 21). Eye: NHL
- 22). Proventriculus: NHL
- 23). Ventriculus: NHL
- 24). Trachea: NHL
- 25). Esophagus: NHL
- 26). Brain: NHL
- 27). Cartilage, connective tissue and mucosa (tongue base?): NHL

**Comments:** The most significant histologic finding was myonecrosis, which, based on the clinical history, was the result of excess exertion (exertional rhabdomyolysis). Several areas of inflammation and fibrosis were seen in the heart. A differential for the development of these changes is cardiac nematodiasis, as a few nematode parasites were seen in the myocardium. The remaining histologic findings considered secondary, agonal, or incidental findings.

T-00010 F-Y2770 BODY AS A WHOLE: EUTHANASIA  
T-13000 M-79900 SKELETAL MUSCLE: REGENERATION  
T-13000 M-45195 SKELETAL MUSCLE: INFLAMMATION, LYMPHOPLASMACYTIC  
T-13000 M-37004 SKELETAL MUSCLE: HEMORRHAGE, ACUTE, MULTI-FOC, MILD  
T-33010 M-41004 MYOCARDIUM: INFLAMMATION, ACUTE, M-F, MILD  
T-33010 M-45170 MYOCARDIUM: INFLAMMATION, EOSINOPHILIC  
T-33010 M-44001 MYOCARDIUM: INFLAMMATION, GRANULOM. FOCAL, MILD  
T-33010 E-40000 MYOCARDIUM: FUNGUS  
T-32000 E-45100 HEART: NEMATODE  
T-31010 M-58080 EPICARDIUM: ATROPHY, SEROUS  
T-31010 M-55400 EPICARDIUM: MINERALIZATION  
T-56000 M-57510 LIVER: HEMOSIDEROSIS  
T-07000 M-72003 SPLEEN: HYPERPLASIA, DIFFUSE  
T-71000 M-37004 KIDNEY: HEMORRHAGE, ACUTE, MULTI-FOC, MILD  
T-28000 M-36100 LUNGS: CONGESTION  
T-28000 M-36500 LUNGS: EDEMA  
T-28000 D-76100 LUNGS: ANTHRACOSIS  
T-13000 M-54000 SKELETAL MUSCLE: NECROSIS  
T-64000 E-43301 SMALL INTESTINE: COCCIDIA  
T-64000 M-41010 SMALL INTESTINE: INFLAMMATION, SUBACUTE  
T-64000 M-40004 SMALL INTESTINE: INFLAMMATION, MULTI-FOCAL, MILD

N2006-0942 1

## THE WILDLIFE CONSERVATION SOCIETY NECROPSY REPORT

<b>Common Name</b>	Swan Goose
<b>Species</b>	<i>Anser Cygnoides</i>
<b>Order/Family</b>	Anseriformes/Anatidae
<b>ISIS</b>	MN06-014
<b>Path#</b>	N2006-0816
<b>Sex</b>	F
<b>Age</b>	Adult
<b>Locale</b>	Khaichiin Tsagaan Nuur
<b>Park</b>	Field Vet
<b>DOB</b>	Unknown
<b>Time in Residence</b>	Not applicable
<b>DOD</b>	8/5/2006
<b>Type of Death</b>	Natural
<b>Submission</b>	
<b>Final Report</b>	3/20/2007

**History:** Band M10. Trapped for marking and satellite telemetry study. Found at longitude 49.67587 and latitude 114.6578. Khaichiin Tsagaan Nuur. Euthanized due to capture myopathy, but otherwise healthy.

**General Condition:** An adult, female swan goose is examined.

**Musculoskeletal System:**

**Body Cavities:**

**Hemolymphatics:**

**Respiratory System:**

**Cardiovascular System:**

**Digestive System:**

**Urinary System:**

**Reproductive System:**

**Endocrine System:**

**Nervous System:**

**Frozen:**

**Other:**

**Laboratory Studies:**

**Gross Findings:**

**Gross Prossector:**

**Special Stains:**

**Histo Prossector:**

DM

**Morphologic Diagnoses:**

- 1). Skeletal muscle: Rhabdomyolysis and myofiber degeneration, multifocal and regionally extensive, acute to subacute, severe
- 2). Lungs: Parasite, multifocal, few (arthropod, presumptive)
- 3). Heart: Protozoal cyst, focal, minimal
- 4). Lungs: Congestion, multifocal, mild
- 5). Connective tissue: Autolysis, post-mortem, diffuse, severe with multifocal bacteria and multifocal degenerate parasites (arthropods, presumptive)
- 6). Lungs: Autolysis, post-mortem, diffuse, severe with multifocal bacteria
- 7). Liver: Autolysis, post-mortem, diffuse, moderate to severe
- 8). Peripheral nerve: Autolysis, post-mortem, diffuse, moderate to severe with multifocal bacteria
- 9). Bone marrow: Autolysis, post-mortem, diffuse, moderate to severe
- 10). Thyroid gland: Autolysis, post-mortem, diffuse, moderate with multifocal bacteria
- 11). Elastic artery: Autolysis, post-mortem, diffuse, mild to moderate with multifocal bacteria

- 12). Lungs: Autolysis, post-mortem, diffuse, moderate with multifocal bacteria
- 13). Skeletal muscle: Autolysis, post-mortem, diffuse, mild with multifocal bacteria
- 14). Bone: NHL
- 15). Proventriculus: NHL

**Comments:** The most significant lesion in the examined tissues was rhabdomyolysis. Exertional or “capture” myopathy and rhabdomyolysis has been reported in several species, including dogs, horses, birds and ruminants, following running, restraint and transportation. Lesions can develop in skeletal and/or cardiac muscles and were seen in skeletal muscle in this bird. The onset of clinical signs and death can develop within a few hours or up to one to two weeks. Death results from lactic acidosis and/or myoglobinuric nephrosis (with acute renal failure) that develops secondary to muscle necrosis. A focal protozoal cyst was present in examined heart tissue. *Sarcocyst* sp. was a primary differential.

T-13000 M-50000 SKELETAL MUSCLE: DEGENERATION

T-28000 E-43000 LUNGS: PARASITE

T-28000 M-36100 LUNGS: CONGESTION

N2006-0816 1

## THE WILDLIFE CONSERVATION SOCIETY NECROPSY REPORT

**Common Name** Common Goldeneye  
**Species** *Bucephala clangula* (no Subsp)  
**Order/Family** Anseriformes/Anatidae  
**ISIS** MN06-049  
**Path#** N2006-0923  
**Sex** M  
**Age** Unknown  
**Locale** Khorin Tsagaan Nuur  
**Park** Field Vet  
**DOB** Unknown  
**Time in Residence** Not applicable  
**DOD** 8/8/2006  
**Type of Death** Euth  
**Submission**  
**Final Report** 3/23/2007

**History:** Found at 29.66777 longitude and 114.6211. Khorin Tsagaan Nuur. Caught by hand. Euthanized. Necropsy. Watery ocular discharge, no nasal discharge or fecal staining. All flight feathers in pin. Heavy deposits of SC fat. Good body condition. No other specific findings. Synbiotic negative on both tracheal and cloacal. Synbiotic test results negative, or gross pathology suggests cause of death unrelated to influenza

**General Condition:** Formalin-fixed tissues from an adult, male common goldeneye presents are received.

**Musculoskeletal System:** NGL

**Body Cavities:** NGL

**Hemolymphatics:** NGL

**Respiratory System:** NGL

**Cardiovascular System:** NGL

**Digestive System:** NGL

**Urinary System:** NGL

**Reproductive System:** NGL

**Endocrine System:** NGL

**Nervous System:** NGL

**Frozen:**

**Other:**

**Laboratory Studies:**

**Gross Findings:**

**Gross Prossector:**

**Special Stains:**

**Histo Prossector:**

JW

### **Morphologic Diagnoses:**

- 1). Lungs: Hemorrhage, intrabronchiolar and intraparabronchial, multifocal, moderate
- 2). Heart: Vacuolation, myocyte, multifocal, mild (R/O degenerative change vs. sectioning artifact)
- 3). Proventriculus: Perivascular infiltrates of lymphocytes and plasma cells, serosal and submucosal, multifocal, minimal to mild
- 4). Liver: Perivascular infiltrates of lymphocytes, plasma cells, and bile-laden macrophages, multifocal, minimal
- 5). Ureter: Adult trematode, luminal
- 6). Liver: Hydropic change, hepatocellular, diffuse, minimal to mild
- 7). Pancreas: Lymphoid follicle formation, multifocal, mild
- 8). Proventriculus: Submucosal lymphoid aggregates, multifocal, mild

- 9). Lungs: Black pigment, interstitial (surrounding parabronchi), diffuse, mild
- 10). Thyroid: Mineralization, colloidal, multifocal, and minimal
- 11). Testis: No spermatogenesis
- 12). Liver: Extramedullary hematopoiesis, multifocal, mild
- 13). Trachea: Ossification of tracheal rings
- 14). Lungs: Euthanasia artifact, mild to moderate
- 15). Skin: NHL
- 16). Skeletal muscle: NHL
- 17). Ventriculus: NHL
- 18). Eye: NHL
- 19). Brain: NHL
- 20). Spleen: NHL
- 21). Carotid artery: NHL
- 22). Air sac: NHL
- 23). Adrenal: NHL
- 24). Kidney: NHL
- 25). Esophagus: NHL
- 26). Intestines: NHL

**Comments:** This goldeneye was acting sick and was euthanized. A definitive cause of its clinical signs was not identified on gross or histologic examination. Hemorrhage was present within the small airways, but may have been an artifact of euthanasia or trauma associated with handling. Alternatively, this may represent acute trauma. Mild inflammatory changes were present in a few organs, along with small numbers of trematodes, but these were likely incidental findings in this case.

T-00010 F-Y2770 BODY AS A WHOLE: EUTHANASIA  
T-00010 M-09000 BODY AS A WHOLE: OPEN DIAGNOSIS  
T-28000 M-37005 LUNGS: HEMORRHAGE, ACUTE, MULTI-FOC, MOD.  
T-33010 M-66040 MYOCARDIUM: CYTOPLASMIC VACUOLIZATION  
T-63741 M-45195 PROVENTRICULUS: INFLAMMATION, LYMPHOPLASMACYTIC  
T-56000 M-45195 LIVER: INFLAMMATION, LYMPHOPLASMACYTIC  
T-73000 E-46500 URETER: TREMATODE  
T-56000 M-50070 LIVER: DEGENERATION, HYDROPIC  
T-59000 M-72200 PANCREAS: HYPERPLASIA, LYMPHOID  
T-63741 M-72200 PROVENTRICULUS: HYPERPLASIA, LYMPHOID  
T-28000 M-57000 LUNG: PIGMENTATION  
T-56000 M-73500 LIVER: HEMATOPOIESIS, EXTRAMEDULLARY  
T-25000 F-89340 TRACHEA: OSSIFICATION  
T-28000 F-Y2775 LUNGS: EUTHANASIA ARTIFACT  
N2006-0923 1

## THE WILDLIFE CONSERVATION SOCIETY NECROPSY REPORT

<b>Common Name</b>	Wood Sandpiper
<b>Species</b>	<i>Tringa glareola</i>
<b>Order/Family</b>	Charadriiformes/Scolopacidae
<b>ISIS</b>	MN06-050
<b>Path#</b>	N2006-0939
<b>Sex</b>	M
<b>Age</b>	Unknown
<b>Locale</b>	Khorin Tsagaan Nuur
<b>Park</b>	Field Vet
<b>DOB</b>	Unknown
<b>Time in Residence</b>	Not applicable
<b>DOD</b>	8/8/2006
<b>Type of Death</b>	Natural
<b>Submission</b>	
<b>Final Report</b>	

**History:** Found at 49.66777 longitude and 114.62111 latitude. Khorin Tsagaan Nuur. Found dead. Necropsy. No specific findings. Synbiotic negative (both tracheal and cloacal). Synbiotic test results negative, or gross pathology suggests cause of death unrelated to influenza.

**General Condition:** An adult, male wood sandpiper is examined.

**Musculoskeletal System:**

**Body Cavities:**

**Hemolymphatics:**

**Respiratory System:**

**Cardiovascular System:**

**Digestive System:**

**Urinary System:**

**Reproductive System:**

**Endocrine System:**

**Nervous System:**

**Frozen:**

**Other:**

**Laboratory Studies:**

**Gross Findings:**

**Gross Prossector:**

**Special Stains:**

**Histo Prossector:**

DM

**Morphologic Diagnoses:**

- 1). Lungs: Hemorrhage, intraparabronchial, acute, mild
- 2). Lungs: Congestion, diffuse, moderate
- 3). Lungs: Anthrasilicosis, multifocal, mild
- 4). Spleen: Hyperplasia, reticuloendothelial cell, diffuse, mild
- 5). Liver: Lymphoid aggregates, perivascular, multifocal, minimal to mild
- 6). Testis: Aspermatogenesis
- 7). Pancreas: Autolysis, post mortem, multifocal, moderate to severe
- 8). Adrenal gland: NHL
- 9). Kidney: NHL
- 10). Ventriculus: NHL

- 11). Proventriculus: NHL
- 12). Skeletal muscle: NHL
- 13). Bone (leg, presumptive): NHL
- 14). Trachea: NHL
- 15). Eye: NHL
- 16). Heart: NHL
- 17). Small intestine: NHL
- 18). Elastic artery (great vessel): NHL
- 19). Large intestine: NHL
- 20). Cloaca: NHL
- 21). Bursa of Fabricius: NHL
- 22). Brain: NHL

**Comments:** A cause of death was not apparent on gross or histologic examination.  
Underlying infectious, inflammatory or other pathologic processes were not seen in examined tissue sections.

## THE WILDLIFE CONSERVATION SOCIETY NECROPSY REPORT

<b>Common Name</b>	Black-headed Gull
<b>Species</b>	<i>Larus ridibundus</i>
<b>Order/Family</b>	Charadriiformes/Laridae
<b>ISIS</b>	MN06-052
<b>Path#</b>	N2006-0928
<b>Sex</b>	Unknown
<b>Age</b>	Unknown
<b>Locale</b>	Ogii Nuur
<b>Park</b>	Field Vet
<b>DOB</b>	Unknown
<b>Time in Residence</b>	Not applicable
<b>DOD</b>	8/27/2006
<b>Type of Death</b>	Natural
<b>Submission</b>	
<b>Final Report</b>	3/22/2007

**History:** Found at 47.76325 longitude and 102.8113 latitude. Ogii Nuur. Formalin samples collected. Tracheal negative on Synbiotics RAPID. Synbiotic test results negative, or gross pathology suggests cause of death unrelated to influenza

**General Condition:** An adult black-headed gull is examined.

**Musculoskeletal System:**

**Body Cavities:**

**Hemolymphatics:**

**Respiratory System:**

**Cardiovascular System:**

**Digestive System:**

**Urinary System:**

**Reproductive System:**

**Endocrine System:**

**Nervous System:**

**Frozen:**

**Other:**

**Laboratory Studies:**

**Gross Findings:**

**Gross Prossector:**

**Special Stains:**

1 : Congo Red : Kidney : positive

1 : Trichrome : Kidney : positive (weakly)

**Gross Prossector:**

**Special Stains:**

**Histo Prossector:**

DM

**Morphologic Diagnoses:**

- 1). Kidney: Amyloidosis, basement membrane, periglomerular and vascular, diffuse, moderate and mild multifocal fibrosis
- 2). Lungs: Mineralization, interstitial, multifocal, and mild
- 3). Arterioles (heart): Amyloidosis, mural, multifocal, mild
- 4). Kidney: Granulomas and multinucleated giant cells, multifocal, mild with intralesional foreign material (R/O parasite fragments and/or gout tophus formation)
- 5). Nematode sections: Nematode sections
- 6). Liver: Autolysis, post-mortem, diffuse, moderate to severe
- 7). Heart: Autolysis, post-mortem, diffuse, moderate

- 8). Kidney: Autolysis, post-mortem, diffuse, moderate
- 9). Lungs: Autolysis, post-mortem, diffuse, moderate

**Comments:** The most significant finding in the examined tissue sections was extensive amyloidosis throughout the kidney. Amyloidosis was present in tubular basement membranes, Bowman's capsules and in vessel walls. Amyloidosis in animals usually develops secondary to other, often chronic, problems such as inflammation; physiologic processes such as stress have been implicated in some species (e.g. ducks) though this conclusion is controversial. A cause for its development was not identified in examined tissues.

T-71000 D-38900 KIDNEY: AMYLOIDOSIS  
T-28780 M-55400 LUNGS, INTERSTITIUM: MINERALIZATION  
T-41810 D-38900 ARTERIOLES: AMYLOIDOSIS  
T-71005 M-44004 KIDNEYS: INFLAMMATION, GRANULOM. M-F, MILD  
T-71005 M-55700 KIDNEYS: DEPOSITION OF FOREIGN MATERIAL  
1 : Congo Red : Kidney : positive  
1 : Trichrome : Kidney : positive (weakly)  
1 : von Kossa : Kidney : mild multifocal  
N2006-0928 1

## THE WILDLIFE CONSERVATION SOCIETY NECROPSY REPORT

<b>Common Name</b>	Great Cormorant
<b>Species</b>	<i>Phalacrocorax carbo</i> (no Subsp)
<b>Order/Family</b>	Pelecaniformes/Phalacrocoracidae
<b>ISIS</b>	MN06-051
<b>Path#</b>	N2006-0915
<b>Sex</b>	M
<b>Age</b>	Unspecified
<b>Locale</b>	Ogii Nuur
<b>Park</b>	Field Vet
<b>DOB</b>	Unknown
<b>Time in Residence</b>	Not applicable
<b>DOD</b>	8/27/2006
<b>Type of Death</b>	Natural
<b>Submission</b>	
<b>Final Report</b>	3/23/2007

**History:** Found at 47.76325 longitude and 102.8113 latitude. Ogii Nuur found sick on shore and died soon after sampling. Necropsy completed, formalin samples collected. Tracheal samples were negative on Synbiotics RAPID. Synbiotic test results were negative, or gross pathology suggests cause of death unrelated to influenza.

**General Condition:** Formalin-fixed tissues from a juvenile, male great cormorant are received.

**Musculoskeletal System:** NGL

**Body Cavities:** NGL

**Hemolymphatics:** NGL

**Respiratory System:** NGL

**Cardiovascular System:** NGL

**Digestive System:** NGL

**Urinary System:** NGL

**Reproductive System:** NGL

**Endocrine System:** NGL

**Nervous System:** NGL

**Frozen:**

**Other:**

**Laboratory Studies:**

**Gross Findings:**

**Gross Prosector:**

**Special Stains:**

**Histo Prosector:**

JW

### **Morphologic Diagnoses:**

- 1). Mesenteric adipose tissue: Serous atrophy, diffuse, moderate
- 2). Skeletal muscle: Myofiber degeneration, loss, and replacement with fibrous connective tissue, focal, minimal
- 3). Lungs: Congestion, acute, diffuse, and mild to moderate
- 4). Lungs: Black pigment, interstitial, multifocal mild
- 5). Liver: Fine granular green-brown cytoplasmic pigment, portal and sinusoidal Kupffer cells, multifocal, minimal
- 6). Gallbladder: Post mortem autolysis, moderate to marked
- 7). Kidney: NHL
- 8). Proventriculus: NHL
- 9). Heart: NHL

- 10). Intestines: NHL
- 11). Pancreas: NHL
- 12). Artery: NHL
- 13). Trachea: NHL
- 14). Skin: NHL
- 15). Adrenal: NHL
- 16). Bone: NHL
- 17). Eye: NHL
- 18). Spleen: NHL
- 19). Brain: NHL
- 20). Air sac: NHL
- 21). Skeletal muscle: NHL
- 22). Fibrovascular tissue: NHL

**Comments:** The cause of this wild cormorant's death was not determined on gross or histologic examination. The bird was in thin body condition with serous atrophy of fat, and this may have contributed to death. There was no evidence of an underlying disease process within the examined sections.

T-00010 M-09000 BODY AS A WHOLE: OPEN DIAGNOSIS  
T-1X010 M-58080 ADIPOSE TISSUE: ATROPHY, SEROUS  
T-13000 M-49001 SKELETAL MUSCLE: FIBROSIS, FOCAL, MILD  
T-28000 M-36101 LUNGS: CONGESTION, ACUTE  
T-28000 M-57000 LUNGS: PIGMENTATION N2006-0915 1  
T-00010 M-09000 BODY AS A WHOLE: OPEN DIAGNOSIS  
T-1X010 M-58080 ADIPOSE TISSUE: ATROPHY, SEROUS  
T-13000 M-49001 SKELETAL MUSCLE: FIBROSIS, FOCAL, MILD  
T-28000 M-36101 LUNGS: CONGESTION, ACUTE  
T-28000 M-57000 LUNGS: PIGMENTATION  
N2006-0915 1

## THE WILDLIFE CONSERVATION SOCIETY NECROPSY REPORT

<b>Common Name</b>	Tufted Duck
<b>Species</b>	<i>Aythya fuligula</i>
<b>Order/Family</b>	Anseriformes/Anatidae
<b>ISIS</b>	MN06-062
<b>Path#</b>	N2006-0932
<b>Sex</b>	M
<b>Age</b>	Unspecified
<b>Locale</b>	Erhel Nuur
<b>Park</b>	Field Vet
<b>DOB</b>	Unknown
<b>Time in Residence</b>	Not applicable
<b>DOD</b>	9/2/2006
<b>Type of Death</b>	Natural
<b>Submission</b>	
<b>Final Report</b>	3/22/2007

**History:** Found at 49.96677 longitude and 99.90592 latitude. Erhel Nuur. Found predated/scavenged on shore (estimated <24 hours post mortem). Necropsy exam. Head and neck missing. No significant findings. Tracheal samples were negative on Synbiotics RAPID.

**General Condition:** An adult, male tufted duck is examined.

**Musculoskeletal System:**

**Body Cavities:**

**Hemolymphatics:**

**Respiratory System:**

**Cardiovascular System:**

**Digestive System:**

**Urinary System:**

**Reproductive System:**

**Endocrine System:**

**Nervous System:**

**Frozen:**

**Other:**

**Laboratory Studies:**

**Gross Findings:**

**Gross Prossector:**

**Special Stains:**

3 : KAF : Small intestine : negative

**Histo Prossector:**

DM

**Morphologic Diagnoses:**

- 1). Bronchus: Hemorrhage, intraluminal, minimal to mild
- 2). Small intestine: Metazoan parasites (trematode larvae, presumptive), mucosal and multifocal multinucleated giant cells
- 3). Small intestine and ceca: Granulomas, mural, multifocal (few) with intralesional foreign material (probably parasite fragments)
- 4). Proventriculus: Nematode, intraglandular, multiple
- 5). Small intestine: Cestode, intraluminal
- 6). Small intestine and ceca: Protozoa, intraglandular, multifocal, and mild
- 7). Arterioles (small intestine and ceca): Hyperplasia, smooth muscle, multifocal
- 8). Ureter: Trematode, intraluminal (presumptive)
- 9). Liver: Hepatitis, subacute, multifocal random, mild
- 10). Liver: Lymphoid aggregates, periportal, diffuse, mild

- 11). Liver: Hemosiderosis, hepatocellular, diffuse, mild
- 12). Lungs: Leukocytosis, circulating (presumptive)
- 13). Lungs: Anthrasilicosis, multifocal, mild
- 14). Lungs: Congestion, diffuse, mild
- 15). Testis: Aspermatogenesis
- 16). Kidney: NHL
- 17). Pancreas: NHL
- 18). Elastic artery: NHL
- 19). Heart: NHL
- 20). Peripheral nerve and ganglion: NHL
- 21). Thyroid gland: NHL
- 22). Air sac: NHL
- 23). Adrenal gland: NHL
- 24). Spleen: NHL

**Comments:** A cause of death was not apparent in examined tissue sections, as significant inflammatory, infectious or other pathologic processes were not seen. The gross findings suggest trauma (predation) may have been a factor. Multiple different parasites were seen. Those in the small intestine were associated with small to moderate numbers of large, multinucleated giant cells. Parasites in this site appeared immature (possible larval stages of cestodes). The morphology (coelomyarian musculature, lateral cords, and lateral alae) and location of parasites in the proventriculus was consistent with spirurid nematodes. Differentials include *Dispharynx*, *Tetramereres* and *Cyrnea*. The walls of multifocal arterioles in the wall of the small intestine were hypertrophied. This is a non-specific finding but can be associated with schistosome infection (none were seen in histologic sections). It is unlikely that the number and type of parasites seen would have been consistent with clinical signs/debilitation.

T-26000 M-37000 BRONCHUS: HEMORRHAGE  
 T-64000 E-43020 SMALL INTESTINE: PARASITE, METAZOAN  
 T-64000 M-44000 SMALL INTESTINE: INFLAMMATION, GRANULOMATOUS  
 T-67100 M-44000 CECUM: INFLAMMATION, GRANULOMATOUS  
 T-64000 E-43000 SMALL INTESTINE: PARASITE  
 T-67100 E-43000 CECUM: PARASITE  
 T-63741 E-45100 PROVENTRICULUS: NEMATODE  
 T-64000 E-47100 SMALL INTESTINE: CESTODE  
 T-64000 E-43010 SMALL INTESTINE: PROTOZOA  
 T-67100 E-43010 CECUM: PROTOZOA  
 T-41810 M-72002 ARTERIOLES: HYPERPLASIA, MULTI-FOCAL  
 T-73000 E-46500 URETER: TREMATODE  
 T-56000 M-41010 LIVER: INFLAMMATION, SUBACUTE  
 T-56000 M-40004 LIVER: INFLAMMATION, MULTI-FOCAL, MILD  
 T-56000 M-57510 LIVER: HEMOSIDEROSIS  
 T-28000 M-77601 LUNGS: LEUKOCYTOSIS  
 T-28000 D-76100 LUNGS: ANTHRACOSIS  
 T-28000 D-76210 LUNGS: SILICOSIS  
 T-28000 M-36100 LUNGS: CONGESTION

N2006-0932 1

## THE WILDLIFE CONSERVATION SOCIETY NECROPSY REPORT

<b>Common Name</b>	Great Cormorant
<b>Species</b>	<i>Phalacrocorax carbo</i> (no Subsp)
<b>Order/Family</b>	Pelecaniformes/Phalacrocoracidae
<b>ISIS</b>	MN06-060
<b>Path#</b>	N2006-0916
<b>Sex</b>	F
<b>Age</b>	Juvenile
<b>Locale</b>	Erhel Nuur
<b>Park</b>	Field Vet
<b>DOB</b>	Unknown
<b>Time in Residence</b>	Not applicable
<b>DOD</b>	9/2/2006
<b>Type of Death</b>	Euthanized
<b>Submission</b>	
<b>Final Report</b>	3/23/2007

**History:** Found at 49.9667 longitude and 99.90592 latitude. Erhel Nuur. Bird found sick on shore. Euthanized and did necropsy. This tube was not tested using Synbiotic test strip.

**General Condition:** Formalin-fixed tissues from a juvenile, female great cormorant are received.

**Musculoskeletal System:** NGL

**Body Cavities:** NGL

**Hemolymphatics:** NGL

**Respiratory System:** NGL

**Cardiovascular System:** NGL

**Digestive System:** NGL

**Urinary System:** NGL

**Reproductive System:** NGL

**Endocrine System:** NGL

**Nervous System:** NGL

**Frozen:**

**Other:**

**Laboratory Studies:**

**Gross Findings:**

**Gross Prossector:**

**Special Stains:**

**Histo Prossector:**

JW

### **Morphologic Diagnoses:**

- 1). Proventriculus: Proventriculitis, granulomatous, multifocal, mild, with intralesional bacteria
- 2). Parasite: Nematode (morphology consistent with an ascarid)
- 3). Intestine: Luminal metazoan parasite, focal
- 4). Intestines: Congestion, villous, multifocal, and mild
- 5). Esophagus: Submucosal lymphoid aggregates, few
- 6). Lungs: Nodular lymphoid aggregates, focally extensive (perivascular), and mild
- 7). Kidney: Mineralization, tubular, multifocal, and minimal
- 8). Lungs: Black pigment, interstitial and vascular, multifocal, mild
- 9). Liver: Extramedullary hematopoiesis, multifocal, mild
- 10). Liver: Aggregates of lipofuscin-laden macrophages, periportal, multifocal, minimal to mild
- 11). Lung: Euthanasia artifact, mild
- 12). Gallbladder: Post mortem autolysis, moderate
- 13). Heart: NHL

- 14). Brain: NHL
- 15). Eye: NHL
- 16). Skin: NHL
- 17). Bone: NHL
- 18). Peripheral nerve: NHL
- 19). Skeletal muscle: NHL
- 20). Air sac: NHL
- 21). Duodenum: NHL
- 22). Pancreas: NHL
- 23). Trachea: NHL
- 24). Ovary: NHL
- 25). Adrenal: NHL
- 26). Air sac: NHL
- 27). Peripheral nerve: NHL
- 28). Skeletal muscle: NHL

**Comments:** The cause of this wild cormorant's death was not determined on gross or histologic examination. There was no evidence of a significant disease process within the examined sections.

T-00010 F-Y2770 BODY AS A WHOLE: EUTHANASIA  
T-00010 M-09000 BODY AS A WHOLE: OPEN DIAGNOSIS  
T-63741 M-44004 PROVENTRICULUS: INFLAMMATION, GRANULOM. M-F, MILD  
T-63741 M-40100 PROVENTRICULUS: INFLAMMATION, BACTERIAL  
T-50500 E-45100 INTESTINES: NEMATODE  
E-43040 E-45220 PARASITE, INTERNAL: ASCARIS  
T-50500 M-36101 INTESTINES: CONGESTION, ACUTE  
T-62000 M-72200 ESOPHAGUS: HYPERPLASIA, LYMPHOID  
T-28000 M-72200 LUNGS: HYPERPLASIA, LYMPHOID  
T-28000 M-57500 LUNGS: HEMOSIDERIN DEPOSITION  
T-56000 M-73500 LIVER: HEMATOPOIESIS, EXTRAMEDULLARY  
T-28000 F-Y2775 LUNG: EUTHANASIA ARTIFACT  
N2006-0916 1

## THE WILDLIFE CONSERVATION SOCIETY NECROPSY REPORT

**Common Name** Ruddy Shelduck  
**Species** *Tadorna ferruginea*  
**Order/Family** Anseriformes/Anatidae  
**ISIS** MN060966  
**Path#** N2006-0933  
**Sex** M  
**Age** Unspecified  
**Locale** Achmag Nuur  
**Park** Field Vet  
**DOB** Unknown  
**Time in Residence** Not applicable  
**DOD** 9/4/2006  
**Type of Death** Natural  
**Submission**  
**Final Report**

**History:** Longitude 49.66745; Latitude 100.4874. Found at Achmag Nuur. Found freshly dead. Necropsied. Pneumonia. Synbiotic negative on tube #114. Synbiotic test results negative or gross pathology suggests cause of death unrelated to influenza.

**General Condition:** An adult, male ruddy shelduck is examined.

**Musculoskeletal System:**

**Body Cavities:**

**Hemolymphatics:**

**Respiratory System:**

**Cardiovascular System:**

**Digestive System:**

**Urinary System:**

**Reproductive System:**

**Endocrine System:**

**Nervous System:**

**Frozen:**

**Other:**

**Laboratory Studies:**

**Gross Findings:**

**Gross Prossector:**

**Special Stains:**

**Histo Prossector:**

DM

**Morphologic Diagnoses:**

- 1). Brain: Encephalitis, lymphoplasmacytic and heterophilic, acute to subacute, multifocal, moderate with glial nodules, perivascular cuffs (lymphocytes, plasma cells, heterophils, mononuclear cells), and mild multifocal necrosis
- 2). Heart: Myocardial degeneration and fibrosis, subacute to chronic, multifocal, mild
- 3). Kidney: Lymphoid infiltrates, multifocal, mild
- 4). Liver: Lymphoid aggregates, periportal, diffuse, mild
- 5). Proventriculus: Lymphoid infiltrates, multifocal, mild
- 6). Ureter: Lymphoid infiltrates, periureteral, multifocal, mild
- 7). Ganglion (periadrenal): Lymphoid infiltrates, multifocal, mild
- 8). Heart: Hemochromatosis, multifocal, mild
- 9). Liver: Hemosiderosis, hepatocellular, diffuse, mild
- 10). Lungs: Anthrasilicosis, multifocal, mild
- 11). Proventriculus: Nematode, intraglandular, focal, and mild

- 12). Bone marrow: Moderate cellularity (approximately 30% cellularity)
- 13). Testis: Aspermatogenesis
- 14). Elastic arteries: NHL
- 15). Skeletal muscle: NHL
- 16). Thyroid gland: NHL
- 17). Adrenal gland: NHL
- 18). Pancreas: NHL
- 19). Esophagus: NHL
- 20). Peripheral nerve: NHL
- 21). Ventriculus: NHL
- 22). Eye: NHL
- 23). Skin: NHL

**Comments:** Death in this bird was likely related to encephalitis. The type (lymphocytes, plasma cells, heterophils, mononuclear cells) and pattern were consistent with an infectious etiology. Protozoal or viral infection may be more likely since fungal or bacterial organisms are generally seen in infections of the brain. Heterophils, in this case seen in perivascular cuffs and parenchymal inflammation, are not typical of most viral infections; eastern equine encephalitis is the exception to that general rule. All of that said all remaining differentials in this case as an underlying etiology were not identified. Multifocal lymphoid infiltrates were seen in several sites. This is a non-specific finding likely since fungal or bacterial organisms are generally seen in infections of the brain. Heterophils, in this case seen in perivascular cuffs and parenchymal inflammation, are not typical of most viral infections; eastern equine encephalitis is the exception to that general rule. All of that said all remaining differentials in this case as an underlying etiology were not identified. Multifocal lymphoid infiltrates were seen in several sites. This is a non-specific finding that may reflect a systemic response to antigenic exposure. Lack of spermatogenesis likely reflects a normal age-related or seasonal finding.

## THE WILDLIFE CONSERVATION SOCIETY NECROPSY REPORT

<b>Common Name</b>	Mongolian Gull
<b>Species</b>	<i>Larus vagae mongolicus</i>
<b>Order/Family</b>	Charadriiformes/Laridae
<b>ISIS</b>	MN06-067
<b>Path#</b>	N2006-0938
<b>Sex</b>	M
<b>Age</b>	Juvenile
<b>Locale</b>	Erhel Nuur
<b>Park</b>	Field Vet
<b>DOB</b>	Unknown
<b>Time in Residence</b>	Not applicable
<b>DOD</b>	9/5/2006
<b>Type of Death</b>	Natural
<b>Submission</b>	
<b>Final Report</b>	3/22/2007

**History:** Found at 49.96677 longitude and 99.90592 latitude. Erhel Nuur. Fresh dead (seen live evening 4 Sept.). Necropsy and minimal tissue sampling. Hemorrhage on neck and breast suggest predation. Angular deformity left tibiotarsal joint. Synbiotic test results negative, or gross pathology suggests cause of death unrelated to influenza.

**General Condition:** A juvenile Mongolian gull is examined.

**Musculoskeletal System:**

**Body Cavities:**

**Hemolymphatics:**

**Respiratory System:**

**Cardiovascular System:**

**Digestive System:**

**Urinary System:**

**Reproductive System:**

**Endocrine System:**

**Nervous System:**

**Frozen:**

**Other:**

**Laboratory Studies:**

**Gross Findings:**

**Gross Prossector:**

**Special Stains:**

**Histo Prossector:**

DM

**Morphologic Diagnoses:**

- 1). Skeletal muscle: Swelling and hypereosinophilia, myofiber, multifocal, mild
- 2). Esophagus: Esophagitis, lymphoplasmacytic, diffuse, mild
- 3). Esophagus: Swollen, basophilic superficial epithelial cells, multifocal, mils
- 4). Spleen: Hyperplasia, reticuloendothelial cell, diffuse, mild
- 5). Bone marrow: Mild to moderate cellularity and minimal adipose tissue
- 6). Liver: Congestion, diffuse, mild to moderate
- 7). Lungs: Congestion and edema, diffuse, mild
- 8). Testis: Aspermatogenesis
- 9). Kidney: NHL
- 10). Peripheral nerve: NHL
- 11). Thyroid gland: NHL
- 12). Thymus: NHL

- 13). Adrenal gland: NHL
- 14). Heart: NHL
- 15). Proventriculus: NHL
- 16). Pancreas: NHL
- 17). Small intestine: NHL

**Comments:** The gross findings were suggestive of predation as the cause of death. Angular limb deformity could have been a contributing factor. Mild inflammation was present in the esophagus. A cause was not apparent and it is unlikely that the changes were clinically significant.

T-00020 F-602Y0 MULTIPLE TOPOGRAPHIC SITES: PREDATION  
T-62000 M-45195 ESOPHAGUS: INFLAMMATION, LYMPHOPLASMACYTIC  
T-62000 M-40007 ESOPHAGUS: INFLAMMATION, DIFFUSE, MILD  
N2006-0938 1

## THE WILDLIFE CONSERVATION SOCIETY NECROPSY REPORT

**Common Name** Common Goldeneye  
**Species** *Bucephala clangula* (no Subsp)  
**Order/Family** Anseriformes/Anatidae  
**ISIS** MN06-072  
**Path#** N2006-0924  
**Sex** M  
**Age** Unspecified  
**Locale** Ulaan Nuur  
**Park** Field Vet  
**DOB** Unknown  
**Time in Residence** Not applicable  
**DOD** 9/6/2006  
**Type of Death** Natural  
**Submission**  
**Final Report** 3/26/2007

**History:** Found at 49.56397 longitude and 98.7259 latitude. Ulan Nuur Found resting on lakeshore, flushed into lake, but clearly compromised. Caught on water, exhausted, died soon after. Regurgitated copious yellow green fluid; aspirated. Necropsy exam: peritonitis. gas/fluid/ingesta-filled GIT. Synbiotic test results negative, or gross pathology suggests cause of death unrelated to influenza.

**General Condition:** Formalin-fixed tissues from an adult, male common goldeneye are received.

**Musculoskeletal System:** NGL

**Body Cavities:** NGL

**Hemolymphatics:** NGL

**Respiratory System:** NGL

**Cardiovascular System:** NGL

**Digestive System:** NGL

**Urinary System:** NGL

**Reproductive System:** NGL

**Endocrine System:** NGL

**Nervous System:** NGL

**Frozen:**

**Other:**

**Laboratory Studies:**

**Gross Findings:**

**Gross Prossector:**

**Special Stains:**

1 : Gram : Lungs : Negative for gram positive bacteria; inconclusive for gram negative bacteria

4 : Gram : Intestine : Negative for gram positive bacteria; inconclusive for gram negative bacteria

5 : Gram : Heart : Positive for short, gram-negative, rod-shaped bacteria; negative for gram positive bacteria

4 : PAS : Intestine : Negative for fungi

**Histo Prossector:**

JW

**Morphologic Diagnoses:**

1). Intestine: Enteritis, fibrinonecrotic, subacute, regionally extensive, severe, with intralesional bacteria

- 2). Intestines: Serositis, fibrinous, subacute, multifocally extensive, severe, with intralesional bacteria and granulation tissue formation
- 3). Lung: Bronchopneumonia, subacute, multifocal to coalescing, moderate to severe, with luminal accumulations of proteinaceous fluid, foreign material, bacteria, erythrocytes, and degenerate heterophils
- 4). Lungs: Edema, diffuse, mild to moderate
- 5). Air sac: Air sacculitis, subacute, diffuse, moderate to severe, with transmural edema and luminal accumulation of foreign material, bacteria, and degenerate heterophils
- 6). Heart, valve: Endocarditis, fibrinous, acute, focal, severe, with intralesional bacterial aggregates
- 7). Kidney: Capsulitis, acute, fibrinous, regionally extensive, moderate, with intralesional aggregates of bacteria and degenerate heterophils
- 8). Spleen: Capsulitis, acute, fibrinous, regionally extensive (area adjacent to air sac), moderate, with intralesional aggregates of bacteria and degenerate heterophils
- 9). Liver: Hepatitis, lymphoplasmacytic, multifocal (perivascular and sinusoidal), mild to moderate, with fibrosis and bile duct hyperplasia in more severely affected areas
- 10). Pancreas: Capsulitis, subacute, focal, mild
- 11). Kidney: Intravascular larval trematodes, several
- 12). Proventriculus: Intraglandular nematodes, focal (morphology consistent with Capillaria spp.), with moderate associated glandular ectasia
- 13). Lungs: Congestion, acute, multifocal, moderate
- 14). Kidney: Perivascular infiltrates of lymphocytes and plasma cells, multifocal, minimal to mild
- 15). Esophagus (near junction with proventriculus): Lymphoid hyperplasia, submucosal, focal, moderate
- 16). Spleen: Hemosiderosis, red pulp, multifocal, mild to moderate
- 17). Liver: Hemosiderosis, sinusoidal and periportal Kupffer cells, multifocal, mild
- 18). Lung: Black pigment, multifocal, mild to moderate
- 19). Testis: No active spermatogenesis
- 20). Trachea: Ossification of tracheal rings
- 21). Thyroid: NHL
- 22). Parathyroid: NHL
- 23). Gallbladder: NHL
- 24). Adrenal: NHL
- 25). Kidney: NHL
- 26). Esophagus: NHL
- 27). Brain: NHL
- 28). Skin: NHL
- 29). Eye: NHL
- 30). Skeletal muscle: NHL
- 31). Ventriculus: NHL
- 32). Duodenum: NHL

**Comments:** The likely cause of this goldeneye's death was sepsis/endotoxemia due to a multisystemic infection by gram negative bacteria. The probable originating infection was in the intestinal tract, with transmural necrosis and spread to other tissues. In addition to intestinal and coelomic inflammation, there was a severe bronchopneumonia, air sacculitis and endocarditis with similar-appearing intralesional bacteria. Likely differentials for the bacteria based on morphology and lesions are *E. coli* and *Salmonella* spp., among others.

T-00010 D-00800 BODY AS A WHOLE: SEPTICEMIA  
T-00020 E-10025 MULTIPLE TOPOGRAPHIC SITES: GRAM NEGATIVE BACILLUS  
T-00020 M-41010 MULTIPLE TOPOGRAPHIC SITES: INFLAMMATION, SUBACUTE  
T-00020 M-40500 MULTIPLE TOPOGRAPHIC SITES: INFLAMMATION, FIBRINOUS  
T-50500 M-44900 INTESTINES: INFLAMMATION, FIBRINOID NECROTIZING  
T-00020 M-40100 MULTIPLE TOPOGRAPHIC SITES: INFLAMMATION, BACTERIAL  
T-28000 M-36500 LUNGS: EDEMA  
T-56000 M-45195 LIVER: INFLAMMATION, LYMPHOPLASMACYTIC  
T-56000 M-49004 LIVER: FIBROSIS, MULTIFOCAL, MILD  
T-56110 M-72002 INTRAHEPATIC BILE DUCT: HYPERPLASIA, MULTI-FOCAL  
T-40000 E-46500 BLOOD VESSEL: TREMATODE  
T-25000 F-89340 TRACHEA: OSSIFICATION

T-63741 E-45300 PROVENTRICULUS: CAPILLARIA  
T-28000 M-36101 LUNG: CONGESTION, ACUTE  
T-62310 M-72200 ESOPHAGUS, LOWER THIRD: HYPERPLASIA, LYMPHOID  
T-07000 M-73500 SPLEEN: HEMATOPOIESIS, EXTRAMEDULLARY  
T-56000 M-73500 LIVER: HEMATOPOIESIS, EXTRAMEDULLARY  
T-28000 M-57000 LUNGS: PIGMENTATION  
N2006-0924 1

## THE WILDLIFE CONSERVATION SOCIETY NECROPSY REPORT

<b>Common Name</b>	Great Cormorant
<b>Species</b>	<i>Phalacrocorax carbo</i> (no Subsp)
<b>Order/Family</b>	Pelecaniformes/Phalacrocoracidae
<b>ISIS</b>	MN06-071
<b>Path#</b>	N2006-0918
<b>Sex</b>	F
<b>Age</b>	Unspecified
<b>Locale</b>	Ulaan Nuur
<b>Park</b>	Field Vet
<b>DOB</b>	Unknown
<b>Time in Residence</b>	Not applicable
<b>DOD</b>	9/6/2006
<b>Type of Death</b>	Natural
<b>Submission</b>	
<b>Final Report</b>	3/26/2007

**History:** Found at 49.56397 longitude and 98.7259 latitude. Ulan Nuur. Necropsy exam around 2 days post mortem. Very poor condition. Gastric nematodes. No body fat (subcutaneous, abdominal, heart). Watery intestines. Enteritis. Synbiotic test results negative, or gross pathology suggests cause of death unrelated to influenza.

**General Condition:** Formalin-fixed tissues from a juvenile, female great cormorant are received.

**Musculoskeletal System:** NGL

**Body Cavities:** NGL

**Hemolymphatics:** NGL

**Respiratory System:** NGL

**Cardiovascular System:** NGL

**Digestive System:** NGL

**Urinary System:** NGL

**Reproductive System:** NGL

**Endocrine System:** NGL

**Nervous System:** NGL

**Frozen:**

**Other:**

**Laboratory Studies:**

**Gross Findings:**

**Gross Prosector:**

**Special Stains:**

**Histo Prosector:**

MCz/JW

1 : Gram : Proventriculus, esophagus : Negative for gram positive bacteria; inconclusive for gram negative bacteria

1 : KAF : Proventriculus, esophagus : Negative for acid fast bacteria

1 : PAS : Proventriculus, esophagus : Negative for fungi

### **Morphologic Diagnoses:**

- 1). Esophagus: Esophagitis, ulcerative, neutrophilic and eosinophilic, multifocal, moderate, with intralesional parasite fragments and bacteria
- 2). Proventriculus: Proventriculitis, granulomatous, chronic, multifocal, mild, with numerous multinucleate giant cells
- 3). Esophagus: Esophagitis, granulomatous, multifocal, mild, with intralesional bacteria
- 4). Mesenteric adipose tissue: Serous atrophy, diffuse, moderate
- 5). Heart: Serous atrophy of fat, pericardial fat, diffuse

- 6). Small intestine with mesentery: Nematodiasis, mild
- 7). Small intestine with mesentery: Cestodiasis, mild
- 8). Ileum: Enteritis, chronic, lymphoplasmacytic and eosinophilic, diffuse, minimal to mild
- 9). Lung: Congestion, acute, diffuse, and marked
- 10). Air sac: Luminal proteinaceous fluid, mild
- 11). Esophageal-proventricular junction: Lymphoid follicular hyperplasia, locally extensive, moderate
- 12). Lungs: Black pigment, interstitial and vascular, multifocal, mild
- 13). Trachea and adjacent muscle: Ossification of tracheal cartilage with marrow formation and hematopoiesis
- 14). Ovary: Progressive folliculogenesis
- 15). Brain: Vacuolation of white matter, diffuse, cerebellar, mild (autolysis, presumptive)
- 16). Gall bladder: Autolysis, post mortem, severe
- 17). Tissue (uncertain): Autolysis, post mortem, severe
- 18). Liver: Post mortem autolysis, moderate to marked
- 19). Small intestine with mesentery: Autolysis, post mortem, moderate with bacterial overgrowth
- 20). Small intestine: Postmortem autolysis, moderate
- 21). Ileum: Postmortem autolysis, moderate
- 22). Pancreas: Postmortem autolysis, moderate
- 23). Cecae (base): NHL
- 24). Adrenal gland: NHL
- 25). Ganglia, para-adrenal: NHL
- 26). Thymus: NHL
- 27). Thyroid gland: NHL
- 28). Air sac, cervical: NHL
- 29). Kidney: NHL
- 30). Oviduct: NHL
- 31). Eye, conjunctiva and periocular tissues: NHL
- 32). Colon: NHL
- 33). Spleen: NHL
- 34). Aorta: NHL
- 35). Dura mater: NHL

**Comments:** The cause of this wild cormorant's death was not determined on gross or histologic examination. The degree of postmortem autolysis precluded thorough evaluation of many tissues. However, the bird was reported to be in poor body condition, and there was histologic evidence of serous atrophy of fat and parasitism by nematodes and cestodes. Additionally, foci of granulomatous inflammation associated with bacteria (likely gram negative) were present in the proximal gastrointestinal tract. Both of these factors may have contributed to this bird's death.

T-00010 M-09010 BODY AS A WHOLE: POST MORTEM AUTOLYSIS (PMA)  
T-00010 M-09000 BODY AS A WHOLE: OPEN DIAGNOSIS  
T-62000 M-40030 ESOPHAGUS: INFLAMMATION, ULCERATIVE  
T-62000 M-45170 ESOPHAGUS: INFLAMMATION, EOSINOPHILIC  
T-62000 M-41005 ESOPHAGUS: INFLAMMATION, ACUTE, M-F, MODERATE  
T-62000 M-40100 ESOPHAGUS: INFLAMMATION, BACTERIAL  
T-62000 M-44004 ESOPHAGUS: INFLAMMATION, GRANULOM. M-F, MILD  
T-62000 E-43020 ESOPHAGUS: PARASITE, METAZOAN  
T-63741 M-44004 PROVENTRICULUS: INFLAMMATION, GRANULOM. M-F, MILD  
T-1X010 M-58080 ADIPOSE TISSUE: ATROPHY, SEROUS  
T-64000 E-45100 SMALL INTESTINE: NEMATODE  
T-64000 E-47100 SMALL INTESTINE: CESTODE  
T-65200 M-45170 ILEUM: INFLAMMATION, EOSINOPHILIC  
T-65200 M-45195 ILEUM: INFLAMMATION, LYMPHOPLASMACYTIC  
T-28000 M-36101 LUNG: CONGESTION, ACUTE  
T-62310 M-72200 ESOPHAGUS, LOWER THIRD: HYPERPLASIA, LYMPHOID  
T-28000 M-57000 LUNGS: PIGMENTATION  
T-25000 F-89340 TRACHEA: OSSIFICATION

N2006-0918 1

## THE WILDLIFE CONSERVATION SOCIETY NECROPSY REPORT

<b>Common Name</b>	Northern Lapwing
<b>Species</b>	<i>Vanellus vanellus</i>
<b>Order/Family</b>	Charadriiformes/Charadriidae
<b>ISIS</b>	MN06-080
<b>Path#</b>	N2006-0930
<b>Sex</b>	F
<b>Age</b>	Natural
<b>Locale</b>	Sharbart Nuur
<b>Park</b>	Field Vet
<b>DOB</b>	Unknown
<b>Time in Residence</b>	Not applicable
<b>DOD</b>	9/10/2006
<b>Type of Death</b>	Natural
<b>Submission</b>	
<b>Final Report</b>	3/22/2007

**History:** Found at 49.91568 longitude and 93.7184 latitude. Sharbart Nuur. Found freshly dead. Necropsied. Massive internal hemorrhage, ruptured liver. Synbiotic negative. Synbiotic test results negative, or gross pathology suggests cause of death unrelated to influenza

**General Condition:** A juvenile, female northern lapwing is examined.

**Musculoskeletal System:**

**Body Cavities:**

**Hemolymphatics:**

**Respiratory System:**

**Cardiovascular System:**

**Digestive System:**

**Urinary System:**

**Reproductive System:**

**Endocrine System:**

**Nervous System:**

**Frozen:**

**Other:**

**Laboratory Studies:**

**Gross Prossector:**

**Special Stains:**

**Histo Prossector:**

DM

**Morphologic Diagnoses:**

- 1). Lungs: Hemorrhage, acute, multifocal, and mild
- 2). Skeletal muscle: Hemorrhage, interstitial, acute, multifocal, minimal and mild myofiber degeneration and necrosis
- 3). Liver: Hemorrhage, acute, multifocal, mild to moderate and tissue fracture
- 4). Liver: Dissociation, hepatocellular, multifocal, mild (presumptive)
- 5). Heart: Hemorrhage, epicardial, acute, multifocal, and mild
- 6). Small intestine: Hemorrhage, intraluminal, focal
- 7). Lymphoid tissue (perithyroidal): Lymphocytolysis, diffuse, mild
- 8). Small intestine: Trematode, intraluminal
- 9). Small intestine: Protozoa (flagellates, presumptive), intraglandular, few
- 10). Bone marrow: Moderate cellularity (approximately 80%)
- 11). Ovary: Folliculogenesis
- 12). Gall bladder: Autolysis, post-mortem, diffuse, severe
- 13). Pancreas: Autolysis, post-mortem, diffuse, severe

- 14). Ceca: Autolysis, post-mortem, diffuse, moderate
- 15). Pancreas: Autolysis, post-mortem, diffuse, mild to moderate
- 16). Small intestine: Autolysis, post-mortem, diffuse, mild
- 17). Proventriculus: NHL
- 18). Esophagus: NHL
- 19). Kidney: NHL
- 20). Spleen: NHL
- 21). Thyroid gland: NHL
- 22). Adrenal gland: NHL
- 23). Trachea: NHL
- 24). Eye: NHL
- 25). Ventriculus: NHL
- 26). Brain: NHL
- 27). Bone: NHL

**Comments:** The gross findings were consistent with trauma (possible predation) as the cause of death. Significant underlying pathologic processes that might have predisposed to the trauma were not seen.

T-00020 M-10000 MULTIPLE TOPOGRAPHIC SITES: TRAUMA  
T-28000 M-37004 LUNGS: HEMORRHAGE, ACUTE, MULTI-FOC, MILD  
T-13000 M-37004 SKELETAL MUSCLE: HEMORRHAGE, ACUTE, MULTI-FOC, MILD  
T-13000 M-50000 SKELETAL MUSCLE: DEGENERATION  
T-13000 M-54000 SKELETAL MUSCLE: NECROSIS  
T-56000 M-37004 LIVER: HEMORRHAGE, ACUTE, MULTI-FOC, MILD  
T-56000 M-12000 LIVER: FRACTURE  
T-31010 M-37004 EPICARDIUM: HEMORRHAGE, ACUTE, MULTI-FOC, MILD  
T-64000 M-37000 SMALL INTESTINE: HEMORRHAGE  
T-64000 E-46500 SMALL INTESTINE: TREMATODE  
T-64000 E-43010 SMALL INTESTINE: PROTOZOA

N2006-0930 1

## THE WILDLIFE CONSERVATION SOCIETY NECROPSY REPORT

**Common Name** Great Cormorant  
**Species** *Phalacrocorax carbo* (no Subsp)  
**Order/Family** Pelecaniformes/Phalacrocoracidae  
**ISIS** MN06-099  
**Path#** N2006-0919  
**Sex** M  
**Age** Unspecified  
**Locale** Zost Nuur  
**Park** Field Vet  
**DOB** Unknown  
**Time in Residence** Not applicable  
**DOD** 9/17/2006  
**Type of Death** Euth  
**Submission**  
**Final Report** 3/26/2007

**History:** Found at 48.88177 longitude and 93.31349 latitude. Zost Nuur. Picked up sick. Euthanized. Necropsy. Kidneys yellow tinged. Leeches in both eyes. Poor body condition. Heavy gastric nematode burden. Synbiotic negative. Synbiotic test results negative, or gross pathology suggests cause of death unrelated to influenza

**General Condition:** Formalin-fixed tissues from a great cormorant are received.

**Musculoskeletal System:** NGL

**Body Cavities:** NGL

**Hemolymphatics:** NGL

**Respiratory System:** NGL

**Cardiovascular System:** NGL

**Digestive System:** NGL

**Urinary System:** NGL

**Reproductive System:** NGL

**Endocrine System:** NGL

**Nervous System:** NGL

**Frozen:**

**Other:**

**Laboratory Studies:**

**Gross Findings:**

**Gross Prossector:**

**Special Stains:**

3 : Gram : Ileum : Positive for myriad stout, gram-positive, rod-shaped bacteria

**Histo Prossector:**

MCz/JW

### **Morphologic Diagnoses:**

- 1). Ileum: Enteritis, acute, multifocal to coalescing, heterophilic and ulcerative, moderate with intralesional stout, gram-positive, rod-shaped bacteria (morphology consistent with *Clostridium* spp.)
- 2). Proventriculus: Proventriculitis, chronic, diffuse, eosinophilic and lymphoplasmacytic, moderate with numerous intralesional nematodes
- 3). Jejunum: Enteritis, chronic, multifocal, eosinophilic, histiocystic and lymphoplasmacytic, mild with intralesional cestodes
- 4). Small intestine: Enteritis, chronic, segmental, lymphoplasmacytic and eosinophilic, minimal to mild with multifocal crypt abscesses and crypt drop-out
- 5). Duodenum: Enteritis, chronic, segmental, lymphoplasmacytic and eosinophilic, minimal to mild with multifocal crypt abscesses and crypt drop-out and many intralesional Cestodes
- 6). Small intestine: Cestodiasis and trematodiasis, segmental, moderate

- 7). Ileum: Luminal trematode ova, numerous
- 8). Adrenal gland: Intravascular trematode ovum
- 9). Heart: Luminal metazoan parasite
- 10). Esophagus: Serosal nematode, focal
- 11). Duodenal mesentery: Serous atrophy of mesenteric fat
- 12). Peritracheal adipose tissue: Serous atrophy of fat, diffuse, moderate
- 13). Meckel's diverticulum: Focal crypt abscess
- 14). Heart: Serous atrophy of fat, pericardial, diffuse, and moderate
- 15). Spleen: Extramedullary hematopoiesis, moderate
- 16). Liver: Extramedullary hematopoiesis, mild to moderate
- 17). Trachea: Luminal blood, moderate, with aggregates of black pigment
- 18). Liver: Pigment, Kupffer cells and portal macrophages, multifocal, mild ( hemosiderin, presumptive)
- 19). Lungs: Pigment accumulation, interstitial and intravascular, multifocal, mild to moderate
- 20). Lungs: Foreign material (trematode ova and particulate material), intraparabronchial (terminal aspiration, impression)
- 21). Cecum: Acid hematin accumulation, moderate (fixation artifact)
- 22). Liver: Acid hematin accumulation, mild (fixation artifact)
- 23). Lungs: Euthanasia artifact, mild
- 24). Ileum: Post mortem autolysis, moderate
- 25). Ileum: Post mortem autolysis, moderate
- 26). Cecum (base): Post mortem autolysis, moderate
- 27). Esophagus: NHL
- 28). Pancreas: NHL
- 29). Skin: NHL
- 30). Air sac: NHL
- 31). Skeletal muscle: NHL
- 32). Large coelomic artery: NHL
- 33). Peripheral nerves, coelom: NHL
- 34). Air sacs: NHL
- 35). Kidney: NHL
- 36). Eye: NHL
- 37). Brain: NHL
- 38). Bone: NHL

**Comments:** This wild cormorant was acting sick and was euthanized. There was histologic evidence of necrotizing clostridial enteritis that was the likely cause of this bird's clinical signs. Additionally, the bird was thin with serous atrophy of fat and had evidence of heavy parasitism by trematodes, cestodes, and nematodes, with associated inflammatory changes in the gastrointestinal tract.

T-00010 F-Y2770 BODY AS A WHOLE: EUTHANASIA  
T-65200 M-41005 ILEUM: INFLAMMATION, ACUTE, M-F, MODERATE  
T-65200 M-40030 ILEUM: INFLAMMATION, ULCERATIVE  
T-65200 M-40100 ILEUM: INFLAMMATION, BACTERIAL  
T-65200 E-14300 ILEUM: CLOSTRIDIUM  
T-00020 M-43000 MULTIPLE TOPOGRAPHIC SITES: INFLAMMATION, CHRONIC  
T-00020 M-45170 MULTIPLE TOPOGRAPHIC SITES: INFLAMMATION, EOSINOPHILIC  
T-00020 M-45195 MULTIPLE TOPOGRAPHIC SITES: INFLAMMATION,  
LYMPHOPLASMACYTIC  
T-63741 E-45100 PROVENTRICULUS: NEMATODE  
T-00020 E-47100 MULTIPLE TOPOGRAPHIC SITES: CESTODE  
T-00020 E-46500 MULTIPLE TOPOGRAPHIC SITES: TREMATODE  
T-1X010 M-58080 ADIPOSE TISSUE: ATROPHY, SEROUS  
T-07000 M-73500 SPLEEN: HEMATOPOIESIS, EXTRAMEDULLARY  
T-56000 M-73500 LIVER: HEMATOPOIESIS, EXTRAMEDULLARY  
T-25000 T-0X000 TRACHEA: BLOOD  
T-00020 M-57000 MULTIPLE TOPOGRAPHIC SITES: PIGMENTATION  
T-56000 M-57510 LIVER: HEMOSIDEROSIS  
T-28000 F-Y2775 LUNGS: EUTHANASIA ARTIFACT

N2006-0919 1

## THE WILDLIFE CONSERVATION SOCIETY NECROPSY REPORT

<b>Common Name</b>	Bewick's Swan
<b>Species</b>	<i>Cygnus columbianus bewickii</i>
<b>Order/Family</b>	Anseriformes/Anatidae
<b>ISIS</b>	MN06-101
<b>Path#</b>	N2006-0935
<b>Sex</b>	Unspecified
<b>Age</b>	Unspecified
<b>Locale</b>	Airag Nuur
<b>Park</b>	Field Vet
<b>DOB</b>	Unknown
<b>Time in Residence</b>	Not applicable
<b>DOD</b>	9/18/2006
<b>Type of Death</b>	Natural
<b>Submission</b>	
<b>Final Report</b>	3/26/2007

**History:** Found at 48.85717 longitude and 93.34398 latitude. Airag Nuur. Found freshly dead. Necropsied. Old broken ribs, punctures to neck, thorax and pelvis. Lice, nematodes in glandular stomach. Heavy tapeworm burden. Puncture through spinal chord at pelvis and kidney hemorrhage. Probably eagle kill. Synbiotic negative. Synbiotic test results negative, or gross pathology suggests cause of death unrelated to influenza

**General Condition:** An adult Bewick's swan is examined.

**Musculoskeletal System:**

**Body Cavities:**

**Hemolymphatics:**

**Respiratory System:**

**Cardiovascular System:**

**Digestive System:**

**Urinary System:**

**Reproductive System:**

**Endocrine System:**

**Nervous System:**

**Frozen:**

**Other:**

**Laboratory Studies:**

**Gross Findings:**

**Gross Prossector:**

**Special Stains:**

**Gross Findings:**

**Gross Prossector:**

**Special Stains:**

8 : Gram : Connective tissue : Gram positive cocci

8 : KAF : Connective tissue : negative

**Histo Prossector:**

DM

**Morphologic Diagnoses:**

- 1). Connective tissue: Cellulitis, granulomatous, chronic, regionally extensive, and severe with intralesional granular brown black pigment and Gram positive cocci
- 2). Small intestine: Trematodes, intravascular, intraluminal and mucosal (various life stages) with multifocal multinucleated giant cells and granulomatous enteritis (Schistosome sp., presumptive)
- 3). Small intestine: Cestodes, intraluminal
- 4). Small intestine: Coccidia, mucosal (intraepithelial), multifocal moderate

- 5). Liver: Granulomas, chronic, rare, and minimal with intralesional finely granular brown or yellow pigment and intralesional parasite
- 6). Skeletal muscle (periocular): Myositis, granulomatous, focal, minimal with intralesional trematode egg (presumptive)
- 7). Ventriculus: Ventriculitis, subacute, mucosal and mural, multifocal, mild with multifocal intralesional finely granular brown pigment
- 8). Parasite: Cestodes, multiple and trematode
- 9). Skeletal muscle: Protozoal cyst, focal (Sarcocyst sp., presumptive)
- 10). Heart: Protozoal cyst, focal (Sarcocyst sp., presumptive)
- 11). Heart: Myocarditis, subacute, multifocal, minimal with intralesional larval parasites (nematodes, probable)
- 12). Heart: Myocarditis, subacute, multifocal, and mild
- 13). Elastic artery: Periarteritis, heterophilic, focally extensive, mild
- 14). Small intestine: Enteritis, mural, lymphoplasmacytic, subacute, multifocal, and mild
- 15). Kidney: Nephritis, interstitial, lymphoplasmacytic, multifocal, mild
- 16). Kidney: Tubular atrophy and regeneration, chronic, focally extensive, and mild with multinucleated giant cells and tubular atrophy and regeneration
- 17). Liver: Hepatitis, perivascular, subacute, diffuse, and mild to moderate
- 18). Liver: Hypertrophy and hyperplasia, Kupffer cell, diffuse, with fine intracellular granular light brown pigment
- 19). Brain: Encephalitis, granulomatous, multifocal, and minimal to mild with intralesional trematode eggs (presumptive)
- 21). Brain: Clear space and vacuolization, perinueronal, peri-Purkinje cell and neuropil, multifocal, mild
- 22). Eye: Cellulitis, heterophilic, periocular, acute, multifocal, and mild
- 23). Adrenal gland: Adrenitis, lymphocytic, multifocal, and mild
- 24). Lungs: Thrombus formation, vascular, focal, minimal (presumptive)
- 25). Pancreas: Dochitis, lymphoplasmacytic, focal, mild
- 26). Kidney: Atrophy and degeneration, tubular, acute, multifocal, and mild with mineralization
- 27). Kidney: Hemorrhage, acute, multifocal, and mild
- 28). Epicardial fat: Atrophy, diffuse, moderate
- 29). Small intestine: Autolysis, post-mortem, diffuse, moderate to severe with multiple (few) degenerate mucosal parasite
- 30). Gall bladder (presumptive): Autolysis, post-mortem, diffuse, severe
- 31). Parathyroid gland: NHL
- 32). Thyroid gland: NHL
- 33). Ovary: NHL
- 34). Spleen: NHL
- 35). Brain: NHL
- 36). Esophagus: NHL
- 37). Ventriculus: NHL
- 38). Trachea (mucosa): NHL
- 39). Proventriculus: NHL
- 40). Pancreas: NHL

**Comments:** The gross findings were suggestive of predation as the cause of death. However, underlying bacterial infection and parasitism with subsequent debilitation could have predisposed the bird to predation. Trematodes (*Schistosome* sp., presumptive) were seen in the lumen and vessels of intestinal tract and eggs were associated with inflammation in several other sites including the brain. Pigment, which could reflect trematode migration, was also seen in several sites, including in areas of granulomatous inflammation and bacterial infection in collagenous connective tissue. Cestodes were seen in relatively high numbers both grossly and histologically in the intestine and a few protozoal cysts were seen in the heart and skeletal muscle.

T-1X200 M-44003 CONNECTIVE TISSUE: INFLAMMATION, GRANULOM. FOCAL, SEV.

T-1X200 M-43000 CONNECTIVE TISSUE: INFLAMMATION, CHRONIC

T-1X200 E-10020 CONNECTIVE TISSUE: GRAM POSITIVE COCCUS

T-00020 E-46500 MULTIPLE TOPOGRAPHIC SITES: TREMATODE

T-64000 M-44000 SMALL INTESTINE: INFLAMMATION, GRANULOMATOUS

T-00020 E-47100 MULTIPLE TOPOGRAPHIC SITES: CESTODE

T-64000 E-43301 SMALL INTESTINE: COCCIDIA  
T-56000 M-44001 LIVER: INFLAMMATION, GRANULOM. FOCAL, MILD  
T-56000 E-43000 LIVER: PARASITE  
T-13000 M-44001 SKELETAL MUSCLE: INFLAMMATION, GRANULOM. FOCAL, MILD  
T-00020 M-41010 MULTIPLE TOPOGRAPHIC SITES: INFLAMMATION, SUBACUTE  
T-63742 M-40004 VENTRICULUS: INFLAMMATION, MULTI-FOCAL, MILD  
T-00020 E-43320 MULTIPLE TOPOGRAPHIC SITES: SARCOCYSTIS  
T-33010 M-40004 MYOCARDIUM: INFLAMMATION, MULTI-FOCAL, MILD  
T-33010 E-45100 MYOCARDIUM: NEMATODE  
T-41000 M-45165 ARTERY: INFLAMMATION, HETEROPHILIC  
T-41000 M-40001 ARTERY: INFLAMMATION, FOCAL, MILD  
T-00020 M-45195 MULTIPLE TOPOGRAPHIC SITES: INFLAMMATION,  
LYMPHOPLASMACYTIC  
T-64000 M-40004 SMALL INTESTINE: INFLAMMATION, MULTI-FOCAL, MILD  
T-71040 M-40004 KIDNEY, INTERSTITIUM: INFLAMMATION, MULTI-FOCAL, MILD  
T-71300 M-58000 RENAL TUBULE: ATROPHY  
T-71300 M-79900 RENAL TUBULE: REGENERATION  
T-56000 M-40007 LIVER: INFLAMMATION, DIFFUSE, MILD  
T-56000 M-72003 LIVER: HYPERPLASIA, DIFFUSE  
T-X2000 M-44004 BRAIN: INFLAMMATION, GRANULOM. M-F, MILD  
T-XX000 M-45165 EYE: INFLAMMATION, HETEROPHILIC  
T-XX000 M-41004 EYE: INFLAMMATION, ACUTE, M-F, MILD  
T-93000 M-40004 ADRENAL: INFLAMMATION, MULTI-FOCAL, MILD  
T-59000 M-40001 PANCREAS: INFLAMMATION, FOCAL, MILD  
T-71300 M-50000 RENAL TUBULE: DEGENERATION  
T-71300 M-55400 RENAL TUBULE: MINERALIZATION  
T-X2000 M-44004 BRAIN: INFLAMMATION, GRANULOM. M-F, MILD  
T-XX000 M-45165 EYE: INFLAMMATION, HETEROPHILIC  
T-XX000 M-41004 EYE: INFLAMMATION, ACUTE, M-F, MILD  
T-93000 M-40004 ADRENAL: INFLAMMATION, MULTI-FOCAL, MILD  
T-59000 M-40001 PANCREAS: INFLAMMATION, FOCAL, MILD  
T-71300 M-50000 RENAL TUBULE: DEGENERATION  
T-71300 M-55400 RENAL TUBULE: MINERALIZATION  
T-00020 F-602Y0 MULTIPLE TOPOGRAPHIC SITES: PREDATION

N2006-0935 1

## THE WILDLIFE CONSERVATION SOCIETY NECROPSY REPORT

**Common Name** Black-headed Gull  
**Species** *Larus ridibundus*  
**Order/Family** Charadriiformes/Laridae  
**ISIS** MN06-0100  
**Path#** N2006-0929  
**Sex** F  
**Age** Unspecified  
**Locale** Airag Nuur  
**Park** Field Vet  
**DOB** Unknown  
**Time in Residence** Not applicable  
**DOD** 9/18/2006  
**Type of Death** Natural  
**Submission**  
**Final Report** 3/26/2007

**History:** Found at 48.85717 longitude and 93.34398 latitude. Airag Nuur. Picked up sick and died soon after blood drawing. Necropsy. Good body condition, no specific findings. Synbiotic negative. Synbiotic test results were negative, or gross pathology suggests cause of death unrelated to influenza.

**General Condition:** An adult, female black-headed gull is examined.

**Musculoskeletal System:**

**Body Cavities:**

**Hemolymphatics:**

**Respiratory System:**

**Cardiovascular System:**

**Digestive System:**

**Urinary System:**

**Reproductive System:**

**Endocrine System:**

**Nervous System:**

**Frozen:**

**Other:**

**Laboratory Studies:**

**Gross Findings:**

**Gross Prossector:**

**Special Stains:**

6 : Congo Red : Kidney : positive (multifocal tubular and vascular)

6 : Congo Red : Pancreas : positive

6 : Trichrome : Kidney : positive (faintly)

6 : Trichrome : Pancreas : positive (faintly)

**Histo Prossector:**

DM

**Morphologic Diagnoses:**

- 1). Kidney: Nephritis, interstitial, lymphoplasmacytic, multifocal, moderate to severe
- 2). Kidney: Amyloidosis, tubular, glomerular, interstitial and vascular, multifocal mild and mild to moderate multifocal fibrosis
- 3). Spleen: Amyloidosis, multifocal, moderate
- 4). Heart: Amyloidosis, vascular, myocardial and valvular, multifocal, mild to moderate
- 5). Liver: Amyloidosis, vascular, mild to moderate (presumptive)
- 6). Pancreas: Amyloidosis, vascular and multifocal, mild
- 7). Thyroid gland: Amyloidosis, vascular and multifocal, mild to moderate (presumptive)

- 8). Proventriculus: Amyloidosis, glandular, multifocal, mild to moderate (presumptive)
- 9). Adrenal gland: Trematodes, intravascular, multiple
- 10). Small intestine and ceca: Trematodes, intraluminal and vascular, multifocal
- 11). Proventriculus: Trematodes, intravascular, multiple
- 12). Pancreas: Trematodes, intravascular, multifocal with multifocal acute pancreatic necrosis and amyloidosis
- 13). Connective tissue: Trematodes, intravascular, multifocal
- 14). Trematode: Trematode
- 15). Liver: Metazoan parasite, intravascular (trematode, probable), multifocal
- 16). Adrenal gland: Inclusions, intranuclear, eosinophilic, multifocal (presumptive; R/O prominent nucleoli)
- 17). Pancreas: Inclusions, intranuclear, eosinophilic, multifocal (presumptive; R/O prominent nucleoli)
- 18). Proventriculus: Proventriculitis, subacute, multifocal, and mild
- 19). Liver: Hemosiderosis, hepatocellular and Kupffer cell, diffuse, moderate
- 20). Bone marrow: Moderate cellularity (approximately 80%)
- 21). Lungs: Anthrasilicosis, multifocal, mild
- 22). Ovary: Folliculogenesis
- 23). Lung: Atelectasis and congestion, diffuse, mild
- 24). Gall bladder: Autolysis, post-mortem, diffuse, severe
- 25). Eye: NHL
- 26). Trachea: NHL
- 27). Ventriculus: NHL
- 28). Skin: NHL
- 29). Skeletal muscle: NHL
- 30). Oviduct: NHL
- 31). Peripheral nerve: NHL
- 32). Brain: NHL
- 33). Bone: NHL
- 34). Esophagus: NHL

**Comments:** This gull had severe chronic renal disease and multiorgan amyloidosis, which likely contributed to its clinical condition and death during handling. Amyloidosis was most severe in the spleen and pancreas; the kidney was less severely affected. The trigger for its development could have been primary renal inflammation. An association with parasitism is speculative since the parasites were not associated with tissue inflammation. Necrosis appeared to have been present in some portions of the pancreas and may have been related to the intravascular parasites (e.g. ischemia/anoxia). Moderate numbers of cells in the adrenal glands and pancreas contained an intranuclear eosinophilic structure. These could simply reflect prominent nucleoli. However, an alternate differential is that they were viral inclusions. If so, herpes virus would be the most likely differential. Other tissues that are often affected in herpes virus infections, such as the gastrointestinal tract and liver, did not contain similar structures and other findings seen with herpes virus such as necrosis were not seen.

T-71040 M-45195 KIDNEY, INTERSTITIUM: INFLAMMATION, LYMPHOPLASMACYTIC  
T-71040 M-40005 KIDNEY, INTERSTITIUM: INFLAMMATION, MULTI-FOCAL, MODERATE  
T-71300 D-38900 RENAL TUBULE: AMYLOIDOSIS  
T-71200 D-38900 GLOMERULUS: AMYLOIDOSIS  
T-71000 M-49004 KIDNEY: FIBROSIS, MULTIFOCAL, MILD  
T-07000 D-38900 SPLEEN: AMYLOIDOSIS  
T-32000 D-38900 HEART: AMYLOIDOSIS  
T-00020 D-38900 MULTIPLE TOPOGRAPHIC SITES: AMYLOIDOSIS  
T-00020 E-46500 MULTIPLE TOPOGRAPHIC SITES: TREMATODE  
T-56000 E-43020 LIVER: PARASITE, METAZOAN  
T-63741 M-41010 PROVENTRICULUS: INFLAMMATION, SUBACUTE  
T-63741 M-40004 PROVENTRICULUS: INFLAMMATION, MULTI-FOCAL, MILD  
T-56000 M-57510 LIVER: HEMOSIDEROSIS  
T-28000 D-76100 LUNGS: ANTHRACOSIS  
T-28000 M-36100 LUNGS: CONGESTION  
T-28000 M-34310 LUNGS: ATELECTASIS

## THE WILDLIFE CONSERVATION SOCIETY NECROPSY REPORT

<b>Common Name</b>	Great Cormorant
<b>Species</b>	<i>Phalacrocorax carbo</i> (no Subsp)
<b>Order/Family</b>	Pelecaniformes/Phalacrocoracidae
<b>ISIS</b>	MN06-102
<b>Path#</b>	N2006-0920
<b>Sex</b>	F
<b>Age</b>	Unspecified
<b>Locale</b>	Zost Nuur
<b>Park</b>	Field Vet
<b>DOB</b>	Unknown
<b>Time in Residence</b>	Not applicable
<b>DOD</b>	9/18/2006
<b>Type of Death</b>	Euth
<b>Submission</b>	
<b>Final Report</b>	2/23/2007

**History:** Found at 48.88177 longitude and 93.31348 latitude. Zost Nuur Picked up sick. Euthanized. Necropsy. Eyes half closed, globes protruding. Leech in one eye and mouth. Body condition, moderate, muscle cover fair, no fat. Liver yellow tinged, kidney yellow tinged. Heavy gastric nematode burden Synbiotic negative. Synbiotic test results negative, or gross pathology suggests cause of death unrelated to influenza

**General Condition:** Formalin-fixed tissues from a juvenile, female great cormorant are received.

**Musculoskeletal System:** NGL

**Body Cavities:** NGL

**Hemolymphatics:** NGL

**Respiratory System:** NGL

**Cardiovascular System:** NGL

**Digestive System:** NGL

**Urinary System:** NGL

**Reproductive System:** NGL

**Endocrine System:** NGL

**Nervous System:** NGL

**Frozen:**

**Other:**

**Laboratory Studies:**

**Gross Findings:**

**Gross Prossector:**

**Special Stains:**

**Histo Prossector:**

JW

**Morphologic Diagnoses:**

- 1). Esophagus (adjacent to junction with proventriculus): Esophagitis, lymphoplasmacytic, focal, moderate, with intralesional nematode parasites
- 2). Intestines: Luminal trematodes, many, with a minimal, multifocal lymphoplasmacytic and eosinophilic enteritis and villus tip congestion
- 3). Intestine: Granuloma, muscularis externa, focal, with intralesional bacteria
- 4). Proventriculus: Luminal nematodes, few
- 5). Colon: Luminal nematode
- 6). Heart: Serous atrophy of fat, pericardium, diffuse, moderate
- 7). Peripancreatic adipose tissue: Serous atrophy, diffuse, moderate
- 8). Mesenteric adipose tissue: Serous atrophy, diffuse, moderate

- 9). Intestine: Crypt ectasia, focal, moderate, with luminal proteinaceous material
- 10). Intestine: Crypt ectasia, focal, moderate, with luminal proteinaceous material
- 11). Lung: Congestion, acute, diffuse, and mild to moderate
- 12). Spleen: Extramedullary hematopoiesis, mild
- 13). Liver: Extramedullary hematopoiesis, minimal
- 14). Liver: Portal infiltrates of pigment-laden macrophages, multifocal, minimal (lipofuscin vs. hemosiderin)
- 15). Meckel's diverticulum: Focal accumulation of grey-green pigment (lipofuscin, presumptive)
- 16). Air sac: Black pigment, interstitial, multifocal, and moderate
- 17). Lungs: Black pigment, interstitial and intravascular, multifocal, mild
- 18). Gallbladder: Post mortem autolysis, moderate
- 19). Ovary: NHL (active folliculogenesis)
- 20). Pancreas: NHL
- 21). Cecum: NHL
- 22). Fibrovascular tissue: NHL
- 23). Adrenal: NHL
- 24). Thyroid: NHL
- 25). Thymus: NHL
- 26). Skeletal muscle: NHL
- 27). Kidney: NHL
- 28). Aorta: NHL
- 29). Skeletal muscle: NHL
- 30). Skin: NHL
- 31). Trachea: NHL
- 32). Eye: NHL
- 33). Brain: NHL
- 34). Bone: NHL

**Comments:** This wild cormorant appeared ill and was euthanized. There was histologic evidence of serous atrophy of fat due to chronic weight loss and moderate parasitism by nematodes and trematodes. Additionally, foci of granulomatous inflammation associated with bacteria were present in the intestinal tract. These factors likely contributed to this bird's poor health.

T-00010 F-Y2770 BODY AS A WHOLE: EUTHANASIA  
 T-62000 M-45195 ESOPHAGUS: INFLAMMATION, LYMPHOPLASMACYTIC  
 T-62000 E-45100 ESOPHAGUS: NEMATODE  
 T-50500 E-46500 INTESTINES: TREMATODE  
 T-50500 M-45195 INTESTINES: INFLAMMATION, LYMPHOPLASMACYTIC  
 T-50500 M-36101 INTESTINES: CONGESTION, ACUTE  
 T-50500 M-45170 INTESTINES: INFLAMMATION, EOSINOPHILIC  
 T-50500 M-44002 INTESTINES: INFLAMMATION, GRANULOM. FOCAL, MOD.  
 T-50500 M-40100 INTESTINES: INFLAMMATION, BACTERIAL  
 T-63741 D-07280 PROVENTRICULUS: NEMATODE INFECTION  
 T-67000 E-45100 COLON: NEMATODE  
 T-1X010 M-58080 ADIPOSE TISSUE: ATROPHY, SEROUS  
 T-28000 M-36101 LUNGS: CONGESTION, ACUTE  
 T-07000 M-73500 SPLEEN: HEMATOPOIESIS, EXTRAMEDULLARY  
 T-56000 M-73500 LIVER: HEMATOPOIESIS, EXTRAMEDULLARY  
 T-28850 M-57000 AIR SACS: PIGMENTATION  
 T-28000 M-57000 LUNGS: PIGMENTATION

N2006-0920 1

## THE WILDLIFE CONSERVATION SOCIETY NECROPSY REPORT

**Common Name** Northern Lapwing  
**Species** *Vanellus vanellus*  
**Order/Family** Charadriiformes/Charadriidae  
**ISIS** MN06-103  
**Path#** N2006-0931  
**Sex** M  
**Age** Unspecified  
**Locale** Zost Nuur  
**Park** Field Vet  
**DOB** Unknown  
**Time in Residence** Not applicable  
**DOD** 9/19/2006  
**Type of Death** Euthanized  
**Submission**  
**Final Report** 3/22/2007

**History:** Longitude 48.88177 Latitude 93.31348. Found at Zost Nuur. Caught by hand. Very weak and could barely fly. Emaciated. No parasites. No other specific findings. Synbiotic test results negative, or gross pathology suggests cause of death unrelated to influenza

**General Condition:** An adult male Northern lapwing is examined.

**Musculoskeletal System:**

**Body Cavities:**

**Hemolymphatics:**

**Respiratory System:**

**Cardiovascular System:**

**Digestive System:**

**Urinary System:**

**Reproductive System:**

**Endocrine System:**

**Nervous System:**

**Frozen:**

**Other:**

**Laboratory Studies:**

**Gross Findings:**

**Gross Prossector:**

**Special Stains:**

**Histo Prossector:**

DM

**Morphologic Diagnoses:**

- 1). Small intestine: Enteritis, lymphoplasmacytic and histiocytic, hyperplastic, diffuse, moderate with multifocal villous fusion (presumptive), scattered eosinophils and multifocal local lymphoplasmacytic and histiocytic airsacculitis
- 2). Small intestine: Granuloma, mucosal, focal, and minimal with intralesional trematode egg (presumptive)
- 3). Ceca: Granuloma, mural, focal, minimal
- 4). Air sac (perisplenic): Hyperplasia, lymphoid, regionally extensive, and moderate
- 5). Ventriculus: Nematodes, mucosal and intrakoilin, multifocal
- 6). Small intestine: Trematode, intraluminal
- 7). Lungs: Blood and edema, parabronchiolar, multifocal, mild
- 8). Lungs: Edema, diffuse, mild (presumptive)
- 9). Liver: Heterophilia, circulating (presumptive)
- 10). Spleen: Heterophilia, diffuse, mild

- 11). Liver: Granuloma, focal, minimal
- 12). Liver: Extramedullary hematopoiesis, perivascular, multifocal, minimal
- 13). Parasite: Metazoan parasite fragment (trematode, presumptive)
- 14). Testis: Aspermatogenesis
- 15). Gall bladder: Cholecystitis, heterophilic, acute, multifocal, and mild
- 16). Bone marrow: Nondiagnostic
- 17). Gall bladder: Autolysis, post-mortem, diffuse, moderate
- 18). Adrenal gland: NHL
- 19). Skin: NHL
- 20). Proventriculus: NHL
- 21). Elastic arteries: NHL
- 22). Trachea: NHL
- 23). Liver: NHL
- 24). Eye: NHL
- 25). Kidney: NHL
- 26). Ureter: NHL
- 27). Esophagus: NHL
- 28). Heart: NHL
- 29). Skeletal muscle: NHL
- 30). Bone: NHL

**Comments:** The most significant histologic lesion was the enteritis, characterized by thickening of the mucosal interstitium by a mixture of lymphocytes, plasma cells, histiocytic cells and scattered eosinophils. Villous fusion and epithelial cell hyperplasia were also seen; necrosis was not seen. The appearance was suggestive of a process in which the intestine was diffusely damaged (perhaps even still ongoing) and is now in the process of repair. A cause for these changes was not apparent, but an infectious etiology was suspected. Bacteria or inclusions typical of known viral agents were not seen with routine hematoxylin/eosin staining. Edema and hemorrhage in the lungs probably developed agonally.

T-64000 M-45195 SMALL INTESTINE: INFLAMMATION, LYMPHOPLASMACYTIC  
 T-64000 M-40008 SMALL INTESTINE: INFLAMMATION, DIFFUSE, MODERATE  
 T-64000 M-72000 SMALL INTESTINE: HYPERPLASIA  
 T-64000 M-44001 SMALL INTESTINE: INFLAMMATION, GRANULOM. FOCAL, MILD  
 T-64000 E-46500 SMALL INTESTINE: TREMATODE  
 T-67100 M-44001 CECUM: INFLAMMATION, GRANULOM. FOCAL, MILD  
 T-28850 M-72200 AIR SACS: HYPERPLASIA, LYMPHOID  
 T-63742 E-45100 VENTRICULUS: NEMATODE  
 T-28800 M-36500 LUNGS, BOTH: EDEMA  
 T-27000 M-36500 BRONCHIOLE: EDEMA  
 T-56000 M-44001 LIVER: INFLAMMATION, GRANULOM. FOCAL, MILD  
 T-56000 M-73500 LIVER: HEMATOPOIESIS, EXTRAMEDULLARY  
 T-57000 M-45165 GALLBLADDER: INFLAMMATION, HETEROPHILIC  
 T-57000 M-41004 GALLBLADDER: INFLAMMATION, ACUTE, M-F, MILD

N2006-0931 1

## THE WILDLIFE CONSERVATION SOCIETY NECROPSY REPORT

<b>Common Name</b>	Golden Eagle
<b>Species</b>	<i>Aquila chrysaetos</i>
<b>Order/Family</b>	Falconiformes/Accipitridae
<b>ISIS</b>	MN06-106
<b>Path#</b>	N2006-0926
<b>Sex</b>	F
<b>Age</b>	Unspecified
<b>Locale</b>	Ereen Nuur
<b>Park</b>	Field Vet
<b>DOB</b>	Unknown
<b>Time in Residence</b>	Not applicable
<b>DOD</b>	9/27/2006
<b>Type of Death</b>	Natural
<b>Submission</b>	
<b>Final Report</b>	3/23/2007

**History:** Found at 47.34215 longitude and 95.77928 latitude. Ereen Nuur Necropsy exam. Hepatomegaly, splenomegaly. Lesions on pancreas. Good body condition. Synbiotic test was negative on tracheal swab. Synbiotic test results negative, or gross pathology suggests cause of death unrelated to influenza

**General Condition:** Formalin-fixed tissues from an adult, male Manchurian golden eagle are received.

**Musculoskeletal System:** NGL

**Body Cavities:** NGL

**Hemolymphatics:** NGL

**Respiratory System:** NGL

**Cardiovascular System:** NGL

**Digestive System:** NGL

**Urinary System:** NGL

**Reproductive System:** NGL

**Endocrine System:** NGL

**Nervous System:** NGL

**Frozen:**

**Other:**

**Laboratory Studies:**

**Gross Findings:**

**Gross Prosector:**

**Special Stains:**

**Histo Prosector:**

JW

### **Morphologic Diagnoses:**

- 1). Esophagus: Esophagitis, ulcerative, acute, focal, moderate, with perivascular infiltrates of heterophils, lymphocytes, and plasma cells within the adjacent submucosa
- 2). Liver: Gout crystals, several, with mild associated infiltrates of lymphocytes and plasma cells
- 3). Pancreas: Mineralized adipose tissue, pericapsular, multifocal, mild
- 4). Brain: Microscopic ependymoma
- 5). Brain: Congestion, meningeal, multifocal, and moderate
- 6). Spleen: Congestion, red pulp, acute, diffuse, and moderate
- 7). Fibrovascular tissue: Granuloma with intralesional yellow, refractile, foreign material and mineral
- 8). Lung: Luminal accumulations of foreign material and keratin debris, multifocal, mild (consistent with terminal aspiration)

- 9). Spleen: Black pigment, sinusoidal, multifocal, and moderate
- 10). Lungs: Black pigment, interstitial and intravascular, multifocal, mild to moderate
- 11). Liver: Black pigment, sinusoidal and intravascular, multifocal, mild to moderate
- 12). Kidney: Black pigment, interstitial and intravascular, multifocal, mild
- 13). Ventriculus: Black pigment, intravascular, multifocal, and mild
- 14). Adrenal: Black pigment, intravascular, multifocal, and mild
- 15). Liver: Extramedullary hematopoiesis, mild
- 16). Testis: No sperm production
- 17). Lungs: Anthrasilicosis, multifocal, minimal
- 18). Pancreas: Post mortem autolysis, moderate to marked
- 19). Spleen: Post mortem autolysis, moderate to marked
- 20). Intestines: Post mortem autolysis, moderate to marked
- 21). Lungs: Post mortem autolysis, moderate to marked
- 22). Trachea: Post mortem autolysis, moderate to marked
- 23). Kidney: Post mortem autolysis, moderate
- 24). Esophagus: Post mortem autolysis, moderate
- 25). Ventriculus: Post mortem autolysis, moderate
- 26). Parathyroid: Post mortem autolysis, moderate
- 27). Thymus: NHL
- 28). Proventriculus: NHL
- 29). Skeletal muscle: NHL
- 30). Thyroid: NHL
- 31). Heart: NHL
- 32). Eye: NHL
- 33). Skin: NHL

**Comments:** The cause of this eagle's death was not determined on gross or histologic examination. The degree of postmortem autolysis hindered evaluation of many tissues. Ulcerative esophagitis was present focally, and acute gout was present in the liver. Both of these conditions may have been contributing factors, but a significant inflammatory response was not present within any of the examined tissues. The grossly-noted pancreatic lesions corresponded to areas of mineralization of fat. This can be seen with acute pancreatic necrosis, but no active pancreatitis or necrosis was present. Thus, the foci may be a sequela of an earlier event and not contributory to death. An interesting, albeit incidental finding in this case was a microscopic ependymoma in the brain.

T-00010 M-09010 BODY AS A WHOLE: POST MORTEM AUTOLYSIS (PMA)  
T-00010 M-09000 BODY AS A WHOLE: OPEN DIAGNOSIS  
T-62000 M-40030 ESOPHAGUS: INFLAMMATION, ULCERATIVE  
T-56000 D-12010 LIVER: GOUT  
T-1X010 M-55400 ADIPOSE TISSUE: MINERALIZATION  
T-X1610 M-80001 EPENDYMA: NEOPLASM  
T-X1110 M-36101 MENINGES: CONGESTION, ACUTE  
T-07040 M-36101 SPLENIC RED PULP: CONGESTION, ACUTE  
T-1X200 M-44001 CONNECTIVE TISSUE: INFLAMMATION, GRANULOM. FOCAL, MILD  
N2006-0926 1

## THE WILDLIFE CONSERVATION SOCIETY NECROPSY REPORT

<b>Common Name</b>	Eurasian Wigeon
<b>Species</b>	<i>Anas penelope</i>
<b>Order/Family</b>	Anseriformes/Anatidae
<b>ISIS</b>	MN06-107
<b>Path#</b>	N2006-0934
<b>Sex</b>	M
<b>Age</b>	Unspecified
<b>Locale</b>	Taigam Nuur
<b>Park</b>	Field Vet
<b>DOB</b>	Unknown
<b>Time in Residence</b>	Not applicable
<b>DOD</b>	9/29/2006
<b>Type of Death</b>	Euth
<b>Submission</b>	
<b>Final Report</b>	3/21/2007

**History:** Found at 46.37497 longitude and 97.37335 latitude. Taigam Nuur Found sick. Neural tremor, unresponsive. Euthanized. Synbiotic negative. Necropsy exam very good body condition (SC, cardiac, mesenteric fat). Vegetative endocarditis, right atrium and ventricle. Lead pellet embedded in pancreas (no tissue reaction). Synbiotic test results negative, or gross pathology suggests cause of death unrelated to influenza.

**General Condition:** An adult, male Eurasian wigeon in good body condition is examined.

**Musculoskeletal System:**

**Body Cavities:**

**Hemolymphatics:**

**Respiratory System:**

**Cardiovascular System:**

**Digestive System:**

**Urinary System:**

**Reproductive System:**

**Endocrine System:**

**Nervous System:**

**Frozen:**

**Other:**

**Laboratory Studies:**

**Gross Findings:**

- 1). Heart (right and left ventricle): Vegetative endocarditis
- 2). Pancreas: Lead pellet

**Gross Prossector:**

**Special Stains:**

**Histo Prossector:**

DM

**Morphologic Diagnoses:**

- 1). Heart (right and left ventricle): Vegetative endocarditis
- 2). Pancreas: Lead pellet
- 3). Brain: Meningoencephalitis, lymphoplasmacytic and granulocytic, multifocal, mild with micro abscess and granuloma formation, scattered intralesional bacteria, and scattered tissue and cell necrosis
- 4). Heart: Degeneration, myocardiocyte, regionally extensive, mild to moderate (presumptive)
- 5). Adrenal gland: Hyperplasia, smooth muscle, arteriolar, multifocal, and mild to moderate with focal intravascular metaxoan parasite
- 6). Small intestine: Hyperplasia, smooth muscle, arteriolar, multifocal, and mild

- 7). Adrenal gland: Adrenitis, lymphoplasmacytic, chronic, focally extensive with intralesional metazoan parasite (trematode, presumptive)
- 8). Adrenal gland: Adrenitis, lymphoplasmacytic, multifocal, mild
- 9). Artery (perirenal): Cellulitis, perivascular, chronic, multifocal, moderate with intralesional amyloid (presumptive; R/O fibrosis)
- 10). Liver: Lymphoid aggregates, perivascular, multifocal, mild
- 11). Pancreas: Lymphoid infiltrates, interstitial, multifocal, and minimal
- 12). Small intestine: Lymphoid infiltrates, perivascular, mural, multifocal, minimal to mild
- 13). Epicardial fat: Lymphoid aggregates, perivascular, multifocal, mild
- 14). Kidney: Nephritis, interstitial, lymphoplasmacytic, multifocal, minimal to mild
- 15). Ventriculus: Degeneration, koilin, multifocal, mild with degenerate cells
- 16). Lungs: Anthrasilicosis, multifocal, mild to moderate
- 17). Spleen: Hyaline degeneration, multifocal, minimal
- 18). Testis: Aspermatogenesis
- 19). Heart: Blood clot, intraluminal with euthanasia artifact
- 20). Gall bladder: Autolysis, post-mortem, diffuse, severe
- 21). Liver: Euthanasia artifact, regionally extensive, mild to moderate
- 22). Lungs: Euthanasia artifact, multifocal, mild
- 23). Elastic artery: NHL
- 24). Skeletal muscle: NHL
- 25). Thyroid gland: NHL
- 26). Proventriculus: NHL
- 27). Trachea: NHL

**Comments:** Elective euthanasia was performed due to clinically apparent neurologic signs, which were the result of bacterial meningoencephalitis. Inflammation was associated with mild tissue and cellular necrosis and several foci of inflammation contained small numbers of intracellular bacteria. Vegetative endocarditis was suspected grossly but was not apparent in examined tissue sections. If present, it could have been a source of spread to the brain if its cause was also bacterial. Degenerative changes appeared to be present in the cardiac muscle. It was acute and not associated with inflammation. Myocardial necrosis has been associated with lead toxicosis and lead shot was found (grossly) in the pancreas. However, whether lead toxicosis was a factor in the heart changes remains questionable, especially since other lesions seen in lead toxicosis, such as renal inclusions and/or necrosis or cortical laminar necrosis of the brain, were not seen. Alternate explanations for the heart changes include ischemia/anoxia (perhaps related to vegetative endocarditis) or an infectious etiology. Multifocal lymphoid infiltrates were seen in several sites. This is a non-specific finding that may reflect a systemic response to antigenic exposure (e.g. bacteremia). The walls of multiple adrenal and intestinal arterioles was hyperplastic; likely secondary to vascular nematodiasis (schistosomiasis, presumptive). Lack of spermatogenesis likely reflects a normal age-related or seasonal finding.

T-00010 F-Y2770 BODY AS A WHOLE: EUTHANASIA  
T-X0910 M-45195 BRAIN AND MENINGES: INFLAMMATION, LYMPHOPLASMACYTIC  
T-X0910 M-40004 BRAIN AND MENINGES: INFLAMMATION, MULTI-FOCAL, MILD  
T-X2000 M-41740 BRAIN ABSCESS  
T-X2000 D-01100 BRAIN: INFECTION, BACTERIAL  
T-32000 M-50000 HEART: DEGENERATION  
T-93000 M-72002 ADRENAL: HYPERPLASIA, MULTI-FOCAL  
T-64000 M-72002 SMALL INTESTINE: HYPERPLASIA, MULTI-FOCAL  
T-93000 M-45195 ADRENAL: INFLAMMATION, LYMPHOPLASMACYTIC  
T-93000 M-43000 ADRENAL: INFLAMMATION, CHRONIC  
T-93000 E-46500 ADRENAL: TREMATODE  
T-93000 M-43004 ADRENAL: INFLAMMATION, CHRONIC, M-F, MILD  
T-93000 M-55100 ADRENAL: AMYLOID DEPOSITION  
T-71040 M-45195 KIDNEY, INTERSTITIUM: INFLAMMATION, LYMPHOPLASMACYTIC  
T-71040 M-40004 KIDNEY, INTERSTITIUM: INFLAMMATION, MULTI-FOCAL, MILD  
T-28000 D-76100 LUNGS: ANTHRACOSIS  
T-28000 D-76210 LUNGS: SILICOSIS  
T-00020 M-47170 MULTIPLE TOPOGRAPHIC SITES: LYMPHOCYTIC INFILTRATE

## THE WILDLIFE CONSERVATION SOCIETY NECROPSY REPORT

<b>Common Name</b>	Grey Heron
<b>Species</b>	<i>Ardea cinerea</i> (no Subsp)
<b>Order/Family</b>	Ciconiiformes/Ardeidae
<b>ISIS</b>	MN06-114
<b>Path#</b>	N2006-0937
<b>Sex</b>	F
<b>Age</b>	Unspecified
<b>Locale</b>	Small Lake Southeast of Boontsagaan Nuur
<b>Park</b>	Field Vet
<b>DOB</b>	Unknown
<b>Time in Residence</b>	Not applicable
<b>DOD</b>	10/1/2006
<b>Type of Death</b>	Natural
<b>Submission</b>	
<b>Final Report</b>	3/22/2007

**History:** Found at 45.50915 longitude and 99.24458 latitude. Small lake SE Boontsaagan Necropsy 5. Synbiotic weak and positive both tracheal and cloacal. Necropsy. Synbiotic test results equivocal, avian influenza suspected.

**General Condition:** A juvenile, female grey heron is examined.

**Musculoskeletal System:**

**Body Cavities:**

**Hemolymphatics:**

**Respiratory System:**

**Cardiovascular System:**

**Digestive System:**

**Urinary System:**

**Reproductive System:**

**Endocrine System:**

**Nervous System:**

**Frozen:**

**Other:**

**Laboratory Studies:**

**Gross Prossector:**

**Special Stains:**

**Histo Prossector:**

DM

**Morphologic Diagnoses:**

- 1). Intestine: Parasites, degenerate, intraluminal, few
- 2). Unidentifiable tissue: Autolysis, post-mortem, diffuse, severe
- 3). Spleen (presumptive): Autolysis, post-mortem, diffuse, severe
- 4). Lungs: Autolysis, post-mortem, diffuse, moderate to severe
- 5). Intestine: Autolysis, post-mortem, diffuse, moderate to severe
- 6). Kidney: Autolysis, post-mortem, diffuse, moderate to severe
- 7). Liver: Autolysis, post-mortem, diffuse, moderate to severe
- 8). Heart: Autolysis, post-mortem, diffuse, moderate
- 9). Proventriculus: Autolysis, post-mortem, diffuse, moderate
- 10). Skeletal muscle: Autolysis, post-mortem, diffuse, moderate
- 11). Peripheral nerve: Autolysis, post-mortem, diffuse, moderate
- 12). Brain: Autolysis, post-mortem, diffuse, moderate
- 13). Brain: Autolysis, post-mortem, diffuse, moderate

**Comments:** A cause of death was not apparent in the examined tissue, all of which were moderately to severely autolyzed. A few intestinal parasites were seen. They did not appear to be associated with tissue necrosis or inflammation, were few in number and were likely an incidental finding.

T-00010 M-09000 BODY AS A WHOLE: OPEN DIAGNOSIS

T-50500 E-43000 INTESTINES: PARASITE

N2006-0937 1

## THE WILDLIFE CONSERVATION SOCIETY NECROPSY REPORT

**Common Name** Great Cormorant  
**Species** *Phalacrocorax carbo* (no Subsp)  
**Order/Family** Pelecaniformes/Phalacrocoracidae  
**ISIS** MN06-113  
**Path#** N2006-0921  
**Sex** M  
**Age** Unspecified  
**Locale** Small Lake Southeast of Boontsagaan Nuur  
**Park** Field Vet  
**DOB** Unknown  
**Time in Residence** Not applicable  
**DOD** 10/1/2006  
**Type of Death** Euth  
**Submission**  
**Final Report** 3/23/2007

**History:** Found at 45.50915 longitude and 99.24458 latitude. Small Lake SE Boonstsagaan Necropsy 1. Weak, able to fly only short distances. Euthanized. necropsy. Synbiotic tracheal weak positive, cloacal negative. Poor body condition, no heart/SC fat. Dark hemorrhagic blotch on spleen. Gastric worms. Leech in mouth. Hemorrhage on muscle distal to both knees. Synbiotic test results equivocal, avian influenza suspected

**General Condition:** Formalin-fixed tissues from a juvenile, male great cormorant are received.

**Musculoskeletal System:** NGL

**Body Cavities:** NGL

**Hemolymphatics:** NGL

**Respiratory System:** NGL

**Cardiovascular System:** NGL

**Digestive System:** NGL

**Urinary System:** NGL

**Reproductive System:** NGL

**Endocrine System:** NGL

**Nervous System:** NGL

**Frozen:**

**Other:**

**Laboratory Studies:**

**Gross Findings:**

**Gross Prossector:**

**Special Stains:**

**Histo Prossector:**

JW

### **Morphologic Diagnoses:**

- 1). Intestines: Trematodiasis, moderate (*Schistosome* spp. presumptive), with mild multifocal lymphoplasmacytic and eosinophilic enteritis
- 2). Duodenum: Trematodiasis, moderate, with mild multifocal lymphoplasmacytic and eosinophilic enteritis
- 3). Ileum: Trematodiasis, moderate, with adults, larvae, and ova and a mild multifocal lymphoplasmacytic and eosinophilic enteritis
- 4). Jejunum: Cestodiasis and trematodiasis, moderate, with a mild multifocal lymphoplasmacytic and eosinophilic enteritis
- 5). Colon: Trematodiasis (adults, larvae, and ova), mild, with mild multifocal lymphoplasmacytic and eosinophilic colitis

- 6). Intestine: Trematodiasis, mild, with mild multifocal lymphoplasmacytic and eosinophilic enteritis
- 7). Cecum: Trematode ova and larvae, luminal, many
- 8). Proventriculus: Nematodiasis, glandular, multifocal, and mild
- 9). Trachea: Trematode ovum, mucosal, focal
- 10). Proventriculus: Proventriculitis, lymphoplasmacytic and eosinophilic, multifocal (superficial mucosa), minimal, with intralesional degenerate nematodes and bacteria
- 11). Intestines: Enteritis, lymphoplasmacytic and eosinophilic, multifocal, mild
- 12). Intestine: Crypt ectasia, focal, moderate, with luminal proteinaceous material and cellular debris
- 13). Ileum: Granuloma, focal (muscularis externa), with intralesional cellular debris, foreign material, and trematode pigment
- 14). Liver: Granulomas, few, with intralesional trematode ova
- 15). Heart: Epicarditis, lymphoplasmacytic, focally extensive, minimal to mild, with intralesional brown-black pigment (trematode pigment, presumptive)
- 16). Periadrenal connective tissue: Peritonitis, lymphoplasmacytic, multifocal, minimal, with rare brown-black pigment
- 17). Trachea: Ulceration, multifocal, mild, with few heterophils in the subjacent lamina propria
- 18). Mesenteric adipose tissue: Serous atrophy, diffuse, moderate
- 19). Bronchus: Luminal blood, mild
- 20). Liver: Brown-black cytoplasmic pigment, portal Kupffer cells, multifocal, minimal to mild (trematode pigment vs. hemosiderin, presumptive)
- 21). Liver: Black pigment, intravascular, multifocal, and mild
- 22). Lung: Brown-black pigment, interstitial and intravascular, multifocal, mild
- 23). Kidney: Black pigment, intravascular and interstitial, multifocal, mild
- 24). Spleen: Extramedullary hematopoiesis, mild
- 25). Liver: Extramedullary hematopoiesis, mild
- 26). Heart, greater vessel: Chondroid metaplasia and mineralization, focal (medial), moderate
- 27). Testis: No spermatogenesis (juvenile)
- 28). Lungs: Euthanasia artifact, mild
- 29). Kidney: Euthanasia artifact, mild
- 30). Gall bladder: Post mortem autolysis, marked
- 31). Pancreas: NHL
- 32). Skeletal muscle: NHL
- 33). Esophagus: NHL
- 34). Fibrovascular tissue: NHL
- 35). Carotid artery: NHL
- 36). Thyroid: NHL
- 37). Thymus: NHL
- 38). Skin: NHL
- 39). Heart: NHL
- 40). Adrenal: NHL
- 41). Eye: NHL
- 42). Brain: NHL
- 43). Bone: NHL

**Comments:** This wild cormorant appeared ill and was euthanized. There was histologic evidence of serous atrophy of fat due to chronic weight loss and moderate parasitism by nematodes, trematodes, and cestodes, with associated inflammatory changes. These factors likely contributed to this bird's poor health.

T-00010 F-Y2770 BODY AS A WHOLE: EUTHANASIA  
T-00020 D-07580 MULTIPLE TOPOGRAPHIC SITES: TREMATODE INFECTION  
T-00020 M-45170 MULTIPLE TOPOGRAPHIC SITES: INFLAMMATION, EOSINOPHILIC  
T-65100 E-47100 JEJUNUM: CESTODE  
T-65200 M-44001 ILEUM: INFLAMMATION, GRANULOM. FOCAL, MILD  
T-56000 M-44004 LIVER: INFLAMMATION, GRANULOM. M-F, MILD  
T-25000 M-40030 TRACHEA: INFLAMMATION, ULCERATIVE  
T-1X010 M-58080 ADIPOSE TISSUE: ATROPHY, SEROUS  
T-00020 M-57000 MULTIPLE TOPOGRAPHIC SITES: PIGMENTATION  
T-07000 M-73500 SPLEEN: HEMATOPOIESIS, EXTRAMEDULLARY  
T-56000 M-73500 LIVER: HEMATOPOIESIS, EXTRAMEDULLARY

T-40000 M-73320 BLOOD VESSEL: METAPLASIA, CHONDROID

T-40000 M-55400 BLOOD VESSEL: MINERALIZATION

T-28000 F-Y2775 LUNGS: EUTHANASIA ARTIFACT

T-71000 F-Y2775 KIDNEY: EUTHANASIA ARTIFACT

N2006-0921 1

## THE WILDLIFE CONSERVATION SOCIETY NECROPSY REPORT

<b>Common Name</b>	Great Cormorant
<b>Species</b>	<i>Phalacrocorax carbo</i> (no Subsp)
<b>Order/Family</b>	Pelecaniformes/Phalacrocoracidae
<b>ISIS</b>	MN06-115
<b>Path#</b>	N2006-0911
<b>Sex</b>	M
<b>Age</b>	Unspecified
<b>Locale</b>	Small Lake Southeast of Boontsagaan Nuur
<b>Park</b>	Field Vet
<b>DOB</b>	Unknown
<b>Time in Residence</b>	Not applicable
<b>DOD</b>	10/1/2006
<b>Type of Death</b>	Natural
<b>Submission</b>	
<b>Final Report</b>	3/22/2007

**History:** Found at 45.50916 longitude and 99.24458 latitude. Small Lake SE Boonstsagaan Necropsy 2. Synbiotic weak positive both tracheal and cloacal. Necropsy. Decomposition advanced. Poor condition. Gastric nematodes. Synbiotic test results equivocal, avian influenza suspected

**General Condition:** Formalin fixed tissues from a juvenile, male great cormorant are received.

**Musculoskeletal System:** NGL

**Body Cavities:** NGL

**Hemolymphatics:** NGL

**Respiratory System:** NGL

**Cardiovascular System:** NGL

**Digestive System:** NGL

**Urinary System:** NGL

**Reproductive System:** NGL

**Endocrine System:** NGL

**Nervous System:** NGL

**Frozen:**

**Other:**

**Laboratory Studies:**

**Gross Findings:**

**Gross Prossector:**

**Special Stains:**

**Histo Prossector:**

JW

### **Morphologic Diagnoses:**

- 1). Proventriculus: Proventriculitis, granulomatous, multifocal, moderate, with intralesional metazoan parasite fragments and bacteria
- 2). Intestines: Trematodiasis and cestodiasis, moderate
- 3). Intestines: Granulomas, mucosal, with intralesional bacteria
- 4). Trachea: Trematode ova, mucosal, few
- 5). GI parasite: Nematode (unknown genera)
- 6). Lungs: Congestion, acute, diffuse, moderate
- 7). Eye, periocular connective tissue: Protozoal cyst, focal (morphology consistent with Sarcocyst spp.)
- 8). Lungs: Parabronchial accumulation of foreign material, keratin debris, and bacterial aggregates, multifocal, mild to moderate (consistent with terminal aspiration)

- 9). Ureter: Luminal accumulations of bacteria, multifocal, moderate (postmortem overgrowth, impression)
- 10). Eye, periocular connective tissue: Intravascular aggregates of bacteria, multifocal, mild (postmortem overgrowth, impression)
- 11). Trachea: Intravascular aggregates of bacteria, multifocal, mild (postmortem overgrowth, impression)
- 12). Unidentifiable tissue (adrenal, presumptive): Intravascular aggregates of bacteria, multifocal, mild (postmortem overgrowth, impression)
- 13). Unidentifiable tissue (pancreas, presumptive): Intravascular aggregates of bacteria, multifocal, mild (postmortem overgrowth, impression)
- 14). Lung: Intravascular aggregates of bacteria, multifocal, mild (postmortem overgrowth, impression)
- 15). Kidney: Intravascular aggregates of bacteria, multifocal, mild (postmortem overgrowth, impression)
- 16). Liver: Sinusoidal aggregates of bacteria, multifocal, mild (postmortem overgrowth, impression)
- 17). Lungs: Acid hematin accumulation, multifocal, moderate (fixation artifact)
- 18). Heart: Acid hematin accumulation, multifocal, moderate (fixation artifact)
- 19). Spleen: Acid hematin accumulation, multifocal, moderate (fixation artifact)
- 20). Unidentifiable tissue (adrenal, presumptive): Acid hematin accumulation, multifocal, moderate (fixation artifact)
- 21). Unidentifiable tissue (pancreas, presumptive): Acid hematin accumulation, multifocal, moderate (fixation artifact)
- 22). Kidney: Acid hematin accumulation, multifocal, moderate (fixation artifact)
- 23). Trachea: Acid hematin accumulation, multifocal, moderate (fixation artifact)
- 24). Liver: Acid hematin accumulation, multifocal, mild (fixation artifact)
- 25). Liver: Postmortem autolysis, marked
- 26). Unidentifiable tissue (adrenal, presumptive): Postmortem autolysis, marked
- 27) Artery: Postmortem autolysis marked
- 28). Unidentifiable tissue (pancreas, presumptive): Postmortem autolysis, marked
- 29). Spleen: Postmortem autolysis, moderate to marked
- 30). Kidney: Postmortem autolysis, moderate to marked
- 31). Lungs: Postmortem autolysis, moderate to marked
- 32). Intestines: Postmortem autolysis, moderate to marked
- 33). Trachea: Postmortem autolysis, moderate
- 34). Testis: Postmortem autolysis, moderate
- 35). Esophagus: Postmortem autolysis, moderate
- 36). Esophagus: Postmortem autolysis, moderate
- 37). Proventriculus: Postmortem autolysis, moderate
- 38). Eye: Postmortem autolysis, moderate
- 39). Heart: Postmortem autolysis, moderate
- 40). Brain: NHL

**Comments:** The cause of this wild cormorant's death was not determined on gross or histologic examination. The degree of postmortem autolysis precluded thorough evaluation of most tissues. The bird was reported to be in poor body condition, and there was histologic evidence of moderate parasitism by nematodes, trematodes, and cestodes. Additionally, foci of granulomatous inflammation associated with bacteria were present in the gastrointestinal tract. Both of these factors may have contributed to this bird's death.

T-00010 M-09000 BODY AS A WHOLE: OPEN DIAGNOSIS  
T-00010 M-09010 BODY AS A WHOLE: POST MORTEM AUTOLYSIS (PMA)  
T-63741 M-44005 PROVENTRICULUS: INFLAMMATION, GRANULOM. M-F, MODER.  
T-63741 M-40100 PROVENTRICULUS: INFLAMMATION, BACTERIAL  
T-63741 E-45100 PROVENTRICULUS: NEMATODE  
T-50500 D-07580 INTESTINES: TREMATODE INFECTION  
T-50500 D-06640 INTESTINES: CESTODE INFECTION  
T-25000 E-46500 TRACHEA: TREMATODE  
T-28000 M-36101 LUNGS: CONGESTION, ACUTE  
T-1X200 E-43320 CONNECTIVE TISSUE: SARCOCYSTIS  
T-00020 D-01110 MULTIPLE TOPOGRAPHIC SITES: BACTERIAL OVERGROWTH

N2006-0911 1

## THE WILDLIFE CONSERVATION SOCIETY NECROPSY REPORT

**Common Name** Great Cormorant  
**Species** *Phalacrocorax carbo* (no Subsp)  
**Order/Family** Pelecaniformes/Phalacrocoracidae  
**ISIS** MN06-116  
**Path#** N2006-0912  
**Sex** M  
**Age** Unspecified  
**Locale** Small Lake Southeast of Boontsagaan Nuur  
**Park** Field Vet  
**DOB** Unknown  
**Time in Residence** Not applicable  
**DOD** 10/1/2006  
**Type of Death** Natural  
**Submission**  
**Final Report** 3/22/2007

**History:** Found at 45.50915 longitude and 99.24458 latitude. Small Lake SE Boonstsagaan Necropsy 3. Synbiotic weak positive both tracheal and cloacal. Necropsy. Decomposition advanced. Poor condition. Gastric nematodes. Synbiotic test results equivocal, avian influenza suspected.

**General Condition:** Formalin-fixed tissues from a juvenile, male great cormorant are received.

**Musculoskeletal System:** NGL

**Body Cavities:** NGL

**Hemolymphatics:** NGL

**Respiratory System:** NGL

**Cardiovascular System:** NGL

**Digestive System:** NGL

**Urinary System:** NGL

**Reproductive System:** NGL

**Endocrine System:** NGL

**Nervous System:** NGL

**Frozen:**

**Other:**

**Laboratory Studies:**

**Gross Findings:**

**Gross Prossector:**

**Special Stains:**

**Histo Prossector:**

JW

### **Morphologic Diagnoses:**

- 1). Esophagus: Esophagitis, lymphoplasmacytic and eosinophilic, multifocal, moderate, with intralesional nematode fragments and bacteria
- 2). Proventriculus: Proventriculitis, lymphoplasmacytic and eosinophilic, focal, moderate, with intralesional nematode fragment and bacteria
- 3). Intestine: Enteritis, granulomatous and necrotizing, multifocal (glandular), moderate, with intralesional bacteria
- 4). Intestine: Trematodiasis (larvae and ova), multifocal, moderate
- 5). Ventriculus: Nematodiasis, moderate (morphology consistent with an ascarid)
- 6). Lungs: Metaplastic bone formation, multifocal, mild
- 7). Liver: Intravascular and sinusoidal aggregates of bacteria, multifocal, mild to moderate (postmortem overgrowth, impression)

- 8). Esophagus: Intravascular aggregates of bacteria, multifocal, mild (postmortem overgrowth, impression)
- 9). Lung: Intravascular aggregates of bacteria, multifocal, mild (postmortem overgrowth, impression)
- 10). Trachea: Intravascular aggregates of bacteria, multifocal, mild (postmortem overgrowth, impression)
- 11). Intestines: Intravascular aggregates of bacteria, multifocal, mild (postmortem overgrowth, impression)
- 12). Unidentifiable tissue (pancreas, presumptive): Intravascular aggregates of bacteria, multifocal, mild (postmortem overgrowth, impression)
- 13). Heart: Intravascular aggregates of bacteria, multifocal, mild to moderate (postmortem overgrowth, impression)
- 14). Gallbladder: Acid hematin deposition, multifocal, moderate (fixation artifact)
- 15). Liver: Acid hematin deposition, multifocal, moderate (fixation artifact)
- 16). Spleen: Acid hematin deposition, multifocal, moderate (fixation artifact)
- 17). Lungs: Acid hematin deposition, multifocal, moderate (fixation artifact)
- 18). Unidentifiable tissue (liver, presumptive): Acid hematin deposition, multifocal, moderate (fixation artifact)
- 19). Trachea: Acid hematin deposition, multifocal, moderate (fixation artifact)
- 20). Unidentifiable tissue (pancreas, presumptive): Acid hematin deposition, multifocal, moderate (fixation artifact)
- 21). Heart: Acid hematin deposition, multifocal, moderate (fixation artifact)
- 22). Gallbladder: Postmortem autolysis, marked
- 23). Liver: Postmortem autolysis, marked
- 24). Unidentifiable tissue (liver, presumptive): Postmortem autolysis, marked
- 25). Unidentifiable tissue (pancreas, presumptive): Postmortem autolysis, marked
- 26). Intestines: Postmortem autolysis, moderate to marked
- 27). Trachea: Postmortem autolysis moderate to marked
- 28). Esophagus: Postmortem autolysis, moderate to marked
- 29). Proventriculus: Postmortem autolysis, moderate to marked
- 30). Lungs: Postmortem autolysis, moderate to marked
- 31). Spleen: Postmortem autolysis, moderate to marked
- 32). Eye: Postmortem autolysis, moderate
- 33). Ventriculus: Postmortem autolysis, moderate
- 34). Heart: Postmortem autolysis, moderate
- 35). Brain: NHL

**Comments:** The cause of this wild cormorant's death was not determined on gross or histologic examination. The degree of postmortem autolysis precluded thorough evaluation of most tissues. The bird was reported to be in poor body condition, and there was histologic evidence of moderate parasitism by nematodes and trematodes. Additionally, foci of granulomatous inflammation associated with bacteria were present in the gastrointestinal tract. Both of these factors may have contributed to this bird's death.

T-00010 M-09000 BODY AS A WHOLE: OPEN DIAGNOSIS  
T-00010 M-09010 BODY AS A WHOLE: POST MORTEM AUTOLYSIS (PMA)  
T-62000 M-45195 ESOPHAGUS: INFLAMMATION, LYMPHOPLASMACYTIC  
T-62000 M-45170 ESOPHAGUS: INFLAMMATION, EOSINOPHILIC  
T-62000 E-45100 ESOPHAGUS: NEMATODE  
T-62000 M-40100 ESOPHAGUS: INFLAMMATION, BACTERIAL  
T-63741 M-45195 PROVENTRICULUS: INFLAMMATION, LYMPHOPLASMACYTIC  
T-63741 M-45170 PROVENTRICULUS: INFLAMMATION, EOSINOPHILIC  
T-63741 E-45100 PROVENTRICULUS: NEMATODE  
T-63741 M-40100 PROVENTRICULUS: INFLAMMATION, BACTERIAL  
T-50500 M-44005 INTESTINES: INFLAMMATION, GRANULOM. M-F, MODER.  
T-50500 M-40100 INTESTINES: INFLAMMATION, BACTERIAL  
T-50500 D-07580 INTESTINES: TREMATODE INFECTION  
T-63742 E-45220 VENTRICULUS: ASCARIS  
T-28000 M-73400 LUNGS: METAPLASIA, OSSEOUS  
T-00020 D-01110 MULTIPLE TOPOGRAPHIC SITES: BACTERIAL OVERGROWTH

N2006-0912 1

## THE WILDLIFE CONSERVATION SOCIETY NECROPSY REPORT

<b>Common Name</b>	Great Cormorant
<b>Species</b>	<i>Phalacrocorax carbo</i> (no Subsp)
<b>Order/Family</b>	Pelecaniformes/Phalacrocoracidae
<b>ISIS</b>	MN06-117
<b>Path#</b>	N2006-0913
<b>Sex</b>	F
<b>Age</b>	Unspecified
<b>Locale</b>	Small Lake Southeast of Boontsagaan Nuur
<b>Park</b>	Field Vet
<b>DOB</b>	Unknown
<b>Time in Residence</b>	Not applicable
<b>DOD</b>	10/1/2006
<b>Type of Death</b>	Natural
<b>Submission</b>	
<b>Final Report</b>	3/22/2007

**History:** Found at 45.50915 longitude and 99.24458 latitude. Small Lake SE Boonstsagaan Necropsy 4. Synbiotic weak positive both tracheal and cloacal. necropsy. Decomposition moderate. Poor condition. Left pectoralis muscle dry and hard, although overlying skin apparently normal. Portions of lung appear in good condition, particularly cranial, other areas discolored. Gastric nematodes. Synbiotic test results equivocal, avian influenza suspected

**General Condition:** Formalin-fixed tissues from a juvenile, female great cormorant are received.

**Musculoskeletal System:** NGL

**Body Cavities:** NGL

**Hemolymphatics:** NGL

**Respiratory System:** NGL

**Cardiovascular System:** NGL

**Digestive System:** NGL

**Urinary System:** NGL

**Reproductive System:** NGL

**Endocrine System:** NGL

**Nervous System:** NGL

**Frozen:**

**Other:**

**Laboratory Studies:**

**Gross Findings:**

**Gross Prossector:**

**Special Stains:**

**Histo Prossector:**

JW

### **Morphologic Diagnoses:**

- 1). Proventriculus: Ectasia, glandular, multifocal, moderate, with luminal nematode fragments, trematode ova, bacteria, necrotic and proteinaceous debris
- 2). Intestines: Glandular ectasia, multifocal, mild to moderate, with luminal necrotic and debris and bacteria
- 3). Intestines: Luminal trematode ova, many and ascarid ova, few
- 4). Ventriculus: Trematode ova, multifocal (submucosal), few
- 5). Lungs: Congestion, acute diffuse, moderate
- 6). Trachea: Edema, submucosal, diffuse, and mild
- 7). Lungs: Parabronchial accumulations of particulate material and keratin debris, multifocal, mild to moderate (consistent with terminal aspiration)

- 8). Ureter: Luminal aggregates of bacteria (postmortem overgrowth, impression)
- 9). Intestines: Intravascular aggregates of bacteria, multifocal, mild to moderate (postmortem overgrowth, impression)
- 10). Heart: Intravascular aggregates of bacteria, multifocal, mild to moderate (postmortem overgrowth, impression)
- 11). Adrenal: Intravascular aggregates of bacteria, multifocal, mild to moderate (postmortem overgrowth, impression)
- 12). Liver: Intravascular and sinusoidal aggregates of bacteria, multifocal, mild to moderate (postmortem overgrowth, impression)
- 13). Fibrovascular tissue adjacent to parathyroid: Bacterial aggregates, multifocal, mild to moderate (postmortem overgrowth, impression)
- 14). Brain: Intravascular aggregates of bacteria, multifocal, mild to moderate (postmortem overgrowth, impression)
- 15). Eye: Acid hematin deposition, multifocal, moderate (fixation artifact)
- 16). Parathyroid and adjacent connective tissue: Acid hematin deposition, multifocal, moderate (fixation artifact)
- 17). Lungs: Acid hematin deposition, multifocal, moderate (fixation artifact)
- 18). Skeletal muscle: Acid hematin deposition, multifocal, moderate (fixation artifact)
- 19). Liver: Acid hematin deposition, multifocal, moderate (fixation artifact)
- 20). Kidney: Acid hematin deposition, multifocal, moderate (fixation artifact)
- 21). Trachea: Acid hematin deposition, multifocal, moderate (fixation artifact)
- 22). Adrenal: Acid hematin deposition, multifocal, moderate (fixation artifact)
- 23). Ovary: Acid hematin deposition, multifocal, moderate (fixation artifact)
- 24). Intestines: Acid hematin deposition, multifocal, moderate (fixation artifact)
- 25). Heart: Acid hematin deposition, multifocal, moderate (fixation artifact)
- 26). Spleen: Acid hematin deposition, multifocal, mild (fixation artifact)
- 25). Heart: Acid hematin deposition, multifocal, moderate (fixation artifact)
- 26). Spleen: Acid hematin deposition, multifocal, mild (fixation artifact)
- 27). Eye: Postmortem autolysis, marked
- 28). Liver: Postmortem autolysis, marked
- 29). Intestines: Postmortem autolysis, moderate to marked
- 30). Kidney: Postmortem autolysis, moderate to marked
- 31). Adrenal: Postmortem autolysis, moderate to marked
- 32). Parathyroid: Postmortem autolysis, moderate
- 33). Ventriculus: Postmortem autolysis, moderate
- 34). Trachea: Postmortem autolysis, moderate

**Comments:** The cause of this wild cormorant's death was not determined on gross or histologic examination. The degree of postmortem autolysis precluded thorough evaluation of most tissues. The bird was reported to be in poor body condition, and there was histologic evidence of moderate parasitism by nematodes and trematodes. Additionally, foci of granulomatous inflammation associated with bacteria were present in the gastrointestinal tract. Both of these factors may have contributed to this bird's death.

T-00010 M-09000 BODY AS A WHOLE: OPEN DIAGNOSIS  
T-00010 M-09010 BODY AS A WHOLE: POST MORTEM AUTOLYSIS (PMA)  
T-63741 M-40100 PROVENTRICULUS: INFLAMMATION, BACTERIAL  
T-63741 E-45100 PROVENTRICULUS: NEMATODE  
T-63741 E-46500 PROVENTRICULUS: TREMATODE  
T-50500 M-40100 INTESTINES: INFLAMMATION, BACTERIAL  
T-50500 E-46500 INTESTINES: TREMATODE  
T-28000 M-36101 LUNGS: CONGESTION, ACUTE  
T-25000 M-36500 TRACHEA: EDEMA  
T-63742 E-46500 VENTRICULUS: TREMATODE  
T-00020 D-01110 MULTIPLE TOPOGRAPHIC SITES: BACTERIAL OVERGROWTH  
N2006-0913 1

## THE WILDLIFE CONSERVATION SOCIETY NECROPSY REPORT

<b>Common Name</b>	Common Teal
<b>Species</b>	<i>Anas crecca</i> (no Subsp)
<b>Order/Family</b>	Anseriformes/Anatidae
<b>ISIS</b>	MN06-118
<b>Path#</b>	N2006-0922
<b>Sex</b>	F
<b>Age</b>	Unspecified
<b>Locale</b>	Small Lake Southeast of Boontsagaan Nuur
<b>Park</b>	Field Vet
<b>DOB</b>	Unknown
<b>Time in Residence</b>	Not applicable
<b>DOD</b>	10/2/2006
<b>Type of Death</b>	Natural
<b>Submission</b>	
<b>Final Report</b>	3/26/2007

**History:** Found at 45.50915 longitude and 99.24458 latitude. Small Lake SE Boonstsagaan Necropsy 6. Synbiotic weak positive cloacal, negative tracheal. Necropsy. Fresh, <24 hr.. Bloody fluid in abdominal air sac. Left and right lung lobes ventral borders green-white. Left lung lobe medial border, grey-white patch. remaining lung apparently normal. Body condition good. Small intramuscular hemorrhage caudal to cloaca. Synbiotic test results equivocal, avian influenza suspected

**General Condition:** Formalin-fixed tissues from a juvenile, female Common teal are received.

**Musculoskeletal System:** NGL

**Body Cavities:** NGL

**Hemolymphatics:** NGL

**Respiratory System:** NGL

**Cardiovascular System:** NGL

**Digestive System:** NGL

**Urinary System:** NGL

**Reproductive System:** NGL

**Endocrine System:** NGL

**Nervous System:** NGL

**Frozen:**

**Other:**

**Laboratory Studies:**

**Gross Findings:**

**Gross Prossector:**

**Special Stains:**

**Histo Prossector:**

JW

### **Morphologic Diagnoses:**

1 : Gram : Lung, Air sac : Negative for gram positive bacteria; inconclusive for gram negative bacteria

1 : KAF : Lung, Air sac : Negative for acid fast bacteria

1 : PAS : Lung, Air sac : Negative for fungi

1). Lungs: Pneumonia, parabronchial, heterophilic and histiocytic, multifocal to regionally extensive, moderate to severe, with intrahistiocytic and extracellular bacteria and parabronchial accumulations of bacteria, fibrin, and inflammatory cells

2). Thyroid and adjacent fibrovascular tissue: Capsulitis and cellulitis, heterophilic and histiocytic, diffuse, mild to moderate, with intrahistiocytic and

- extracellular bacteria and fibrin accumulation
- 3). Air sac: Air sacculitis, heterophilic and histiocytic, diffuse, mild, with intrahistiocytic and extracellular bacteria and edema
  - 4). Heart: Pericarditis, heterophilic and histiocytic, focally extensive, mild, with intrahistiocytic and extracellular bacteria and fibrin accumulation
  - 5). Air sac: Intravascular aggregates of bacteria (capillaries), multifocal, moderate
  - 6). Kidney: Coagulative necrosis (infarct), acute, regionally extensive, severe, with hemorrhage and an accumulation of fibrin
  - 7). Kidney: Fibrosis, interstitial, focally extensive, moderate to severe, with degeneration and loss of tubules, and hyaline degeneration of adjacent blood vessels
  - 8). Liver: Hepatitis, lymphoplasmacytic and heterophilic, perivascular, multifocal, minimal to mild, with associated hepatocellular degeneration and aggregates of lipofuscin-laden macrophages in the most severely affected focus
  - 9). Spleen: Lymphoid depletion, diffuse, moderate
  - 10). Spleen: Heterophilia, sinusoidal, diffuse, and moderate
  - 11). Air sac: Congestion, intramural, diffuse, and marked
  - 12). Ventriculus: Mineralization, glandular, focal, and minimal
  - 13). Air sac: Black pigment, interstitial, multifocal, and mild
  - 14). Lungs: Black pigment, interstitial, multifocal, and mild
  - 15). Trachea: Ossification of tracheal rings, diffuse
  - 16). Gallbladder: Post mortem autolysis, marked
  - 17). Intestines: Post mortem autolysis, moderate
  - 18). Carotid artery: NHL
  - 19). Parathyroid: NHL
  - 20). Eye: NHL
  - 21). Skeletal muscle: NHL
  - 22). Skin: NHL
  - 23). Peripheral nerve: NHL
  - 24). Ovary: NHL
  - 25). Adrenal: NHL
  - 26). Pancreas: NHL
  - 27). Proventriculus: NHL
  - 28). Brain: NHL
  - 29). Esophagus: NHL

**Comments:** The likely cause of this teal's death was sepsis/endotoxemia secondary to a gram negative bacterial pneumonia. The presence of short gram-negative, rod-shaped bacteria both within macrophages and extracellularly consistent with *Salmonella spp*. Additionally, this bird had evidence of chronic inflammatory changes within the kidney and acute infarction. An underlying cause of this was not determined, but a vascular change caused by endotoxemia is likely differential for the acute lesion. Foci of inflammation and hepatocellular degeneration were also present, and these may be seen with endotoxemia as well.

T-00010 D-00800 BODY AS A WHOLE: SEPTICEMIA  
 T-00020 M-41010 MULTIPLE TOPOGRAPHIC SITES: INFLAMMATION, SUBACUTE  
 T-00020 M-40100 MULTIPLE TOPOGRAPHIC SITES: INFLAMMATION, BACTERIAL  
 T-00020 E-10025 MULTIPLE TOPOGRAPHIC SITES: GRAM NEGATIVE BACILLUS  
 T-00020 M-55040 MULTIPLE TOPOGRAPHIC SITES: DEPOSITION, FIBRIN  
 T-71000 M-54720 KIDNEY: INFARCT, ACUTE  
 T-71040 M-49003 KIDNEY, INTERSTITIUM: FIBROSIS, FOCAL, SEVERE  
 T-07000 M-59020 SPLEEN: LYMPHOID DEPLETION  
 T-28850 M-36101 AIR SACS: CONGESTION, ACUTE  
 T-28000 M-57000 LUNGS: PIGMENTATION  
 T-28850 M-57000 AIR SACS: PIGMENTATION  
 T-25000 F-89340 TRACHEA: OSSIFICATION

N2006-0922 1

## THE WILDLIFE CONSERVATION SOCIETY NECROPSY REPORT

<b>Common Name</b>	Great Cormorant
<b>Species</b>	<i>Phalacrocorax carbo</i> (no Subsp)
<b>Order/Family</b>	Pelecaniformes/Phalacrocoracidae
<b>ISIS</b>	MN06-119
<b>Path#</b>	N2006-0914
<b>Sex</b>	F
<b>Age</b>	Unspecified
<b>Locale</b>	Small Lake Southeast of Boontsagaan Nuur
<b>Park</b>	Field Vet
<b>DOB</b>	Unknown
<b>Time in Residence</b>	Not applicable
<b>DOD</b>	10/2/2006
<b>Type of Death</b>	Natural
<b>Submission</b>	
<b>Final Report</b>	3/23/2007

**History:** Found at 45.50915 longitude and 99.24458 latitude. Small Lake SE Boonstsagaan Necropsy 7. Synbiotic weak positive, cloacal and tracheal. Necropsy. Decomposition moderately advanced. Green-brown discoloration to caudal left lung lobe. Remaining lung apparently normal. Poor body condition and gastric nematodes. Synbiotic test results equivocal, avian influenza suspected

**General Condition:** Formalin-fixed tissues from a juvenile, female great cormorant are received.

**Musculoskeletal System:** NGL

**Body Cavities:** NGL

**Hemolymphatics:** NGL

**Respiratory System:** NGL

**Cardiovascular System:** NGL

**Digestive System:** NGL

**Urinary System:** NGL

**Reproductive System:** NGL

**Endocrine System:** NGL

**Nervous System:** NGL

**Frozen:**

**Other:**

**Laboratory Studies:**

**Gross Findings:**

**Gross Prossector:**

**Special Stains:**

**Histo Prossector:**

JW

### **Morphologic Diagnoses:**

- 1). Mesenteric adipose tissue: Serous atrophy, diffuse, moderate
- 2). Intestines: Luminal metazoan parasites (degree of postmortem autolysis precludes further identification)
- 3). Intestines: Luminal trematode larvae and ova, moderate
- 4). Proventriculus: Luminal and glandular nematodes, few
- 5). Proventriculus: Nematode fragment, luminal, with associated bacteria and minimal infiltrate of lymphocytes, plasma cells, and eosinophils
- 6). Thyroid: Colloid depletion, diffuse, moderate
- 7). Lungs: Congestion, diffuse, severe
- 8). Heart: Congestion, myocardial, diffuse, and moderate

- 9). Kidney: Intravascular bacterial aggregates (postmortem overgrowth, impression)
- 10). All examined tissues: Acid hematin accumulation, multifocal, mild to moderate (fixation artifact)
- 11). Pancreas: Postmortem autolysis, marked
- 12). Gallbladder: Postmortem autolysis, marked
- 13). Ventriculus: Postmortem autolysis, moderate to marked
- 14). Thyroid: Postmortem autolysis, moderate to marked
- 15). Parathyroid: Postmortem autolysis, moderate to marked
- 16). Thymus: Postmortem autolysis, moderate to marked
- 17). Liver: Postmortem autolysis, moderate to marked
- 18). Lungs: Postmortem autolysis, moderate to marked
- 19). Trachea: Postmortem autolysis, moderate to marked
- 20). Intestines: Postmortem autolysis, moderate to marked
- 21). Brain: Postmortem autolysis, moderate
- 22). Adrenal: Postmortem autolysis, moderate
- 23). Kidney: Postmortem autolysis, moderate
- 24). Spleen: Postmortem autolysis, moderate
- 25). Proventriculus: Postmortem autolysis, moderate
- 26). Ovary, oviduct: NHL
- 27). Carotid artery: NHL
- 28). Eye: NHL

**Comments:** The cause of this wild cormorant's death was not determined on gross or histologic examination. The degree of postmortem autolysis precluded thorough evaluation of most tissues. The bird was reported to be in poor body condition, and there was histologic evidence serous atrophy of fat, as well as moderate parasitism by nematodes and trematodes. Both of these factors may have contributed to this bird's death.

T-00010 M-09000 BODY AS A WHOLE: OPEN DIAGNOSIS  
T-00010 M-09010 BODY AS A WHOLE: POST MORTEM AUTOLYSIS (PMA)  
T-1X010 M-58080 ADIPOSE TISSUE: ATROPHY, SEROUS  
T-50500 E-43020 INTESTINES: PARASITE, METAZOAN  
T-50500 E-46500 INTESTINES: TREMATODE  
T-63741 E-45100 PROVENTRICULUS: NEMATODE  
T-96000 M-59000 THYROID: DEPLETION  
T-28000 M-36101 LUNGS: CONGESTION, ACUTE  
T-33010 M-36101 MYOCARDIUM: CONGESTION, ACUTE  
T-71000 D-01110 KIDNEY: BACTERIAL OVERGROWTH  
N2006-0914 1

## THE WILDLIFE CONSERVATION SOCIETY NECROPSY REPORT

<b>Common Name</b>	Asian Short-toed Lark
<b>Species</b>	<i>Calandrella cheleensis</i>
<b>Order/Family</b>	Passeriformes/Alaudidae
<b>ISIS</b>	MN06-120
<b>Path#</b>	N2006-0936
<b>Sex</b>	F
<b>Age</b>	Unspecified
<b>Locale</b>	Boontsagaan Nuur
<b>Park</b>	Field Vet
<b>DOB</b>	Unknown
<b>Time in Residence</b>	Not applicable
<b>DOD</b>	10/3/2006
<b>Type of Death</b>	Natural
<b>Submission</b>	
<b>Final Report</b>	3/22/2007

**History:** Found at 45.6263 longitude and 99.09002 latitude. Boonstsagaan Nuur. Dead on beach. Synbiotic test results negative, or gross pathology suggests cause of death unrelated to influenza.

**General Condition:** An adult, female karakoram short-toed lark is examined.

**Musculoskeletal System:**

**Body Cavities:**

**Hemolymphatics:**

**Respiratory System:**

**Cardiovascular System:**

**Digestive System:**

**Urinary System:**

**Reproductive System:**

**Endocrine System:**

**Nervous System:**

**Frozen:**

**Other:**

**Laboratory Studies:**

**Gross Findings:**

**Gross Prossector:**

**Special Stains:**

**Histo Prossector:**

DM

**Morphologic Diagnoses:**

- 1). Kidney: Hemorrhage, perirenal, moderate to severe (presumptive)
- 2). Small intestine: Metazoan parasite, intraluminal, degenerate
- 3). Liver: Autolysis, post-mortem, diffuse, moderate to severe
- 4). Pancreas: Autolysis, post-mortem, diffuse, moderate to severe
- 5). Small intestine: Autolysis, post-mortem, diffuse, moderate to severe
- 6). Bone marrow: Autolysis, post-mortem, diffuse, moderate to severe
- 7). Eye: Autolysis, post-mortem, diffuse, moderate
- 8). Trachea: Autolysis, post-mortem, diffuse, moderate
- 9). Bursa of Fabricius: Autolysis, post-mortem, diffuse, moderate
- 10). Kidney: Autolysis, post-mortem, diffuse, moderate
- 11). Kidney: Autolysis, post-mortem, diffuse, moderate
- 12). Cloaca: Autolysis, post-mortem, diffuse, moderate

- 13). Lungs: Autolysis, post-mortem, diffuse, moderate
- 14). Ventriculus: Autolysis, post-mortem, diffuse, mild to moderate
- 15). Brain: Autolysis, post-mortem, diffuse, mild to moderate
- 16). Esophagus: Autolysis, post-mortem, diffuse, mild to moderate
- 17). Heart: Autolysis, post-mortem, diffuse, mild
- 18). Proventriculus: Autolysis, post-mortem, diffuse, mild
- 19). Skin: NHL
- 20). Bone: NHL
- 21). Skin: NHL
- 22). Skeletal muscle NHL

**Comments:** A cause of death was not apparent in examined tissue sections. However, a large area of blood accumulation lay adjacent to one section of kidney. This could reflect trauma. An alternative conclusion is that the area is a large, intact perirenal blood vessel. Confirmation of either of these conclusions was complicated by autolysis, which was mild to severe in most of the examined tissues. That said, obvious inflammation did not appear to be present in tissues with recognizable architecture.

T-00010 M-09000 BODY AS A WHOLE: OPEN DIAGNOSIS  
T-71000 M-37002 KIDNEY: HEMORRHAGE, ACUTE, FOCAL, MODERATE  
T-64000 E-43020 SMALL INTESTINE: PARASITE, METAZOAN  
T-00010 M-09000 BODY AS A WHOLE: OPEN DIAGNOSIS  
T-71000 M-37002 KIDNEY: HEMORRHAGE, ACUTE, FOCAL, MODERATE  
T-64000 E-43020 SMALL INTESTINE: PARASITE, METAZOAN  
N2006-0936 1

## THE WILDLIFE CONSERVATION SOCIETY NECROPSY REPORT

<b>Common Name</b>	Black-winged Stilt
<b>Species</b>	<i>Himantopus himantopus</i> (no Subsp)
<b>Order/Family</b>	Charadriiformes/Recurvirostridae
<b>ISIS</b>	MN06-121
<b>Path#</b>	N2006-0940
<b>Sex</b>	M
<b>Age</b>	Unspecified
<b>Locale</b>	Kholboolj Nuur
<b>Park</b>	Field Vet
<b>DOB</b>	Unknown
<b>Time in Residence</b>	Not applicable
<b>DOD</b>	10/4/2006
<b>Type of Death</b>	Euth
<b>Submission</b>	
<b>Final Report</b>	3/22/2007

**History:** Found at 45.32123 longitude and 100.7859 latitude. Kholboolj Nuur Found unable to fly. Synbiotic weak positive tracheal, more strongly on cloacal samples. Euthanized. Necropsy exam. Body condition very good, with extensive deposits of subcutaneous, abdominal and cardiac fat. Grey flecks visible in cross-section of both lung lobes, but appeared grossly normal on uncut surfaces. Testes uneven in size. Synbiotic test results equivocal, avian influenza suspected.

**General Condition:** An adult, male black-winged stilt is examined.

**Musculoskeletal System:**

**Body Cavities:**

**Hemolymphatics:**

**Respiratory System:**

**Cardiovascular System:**

**Digestive System:**

**Urinary System:**

**Reproductive System:**

**Endocrine System:**

**Nervous System:**

**Frozen:**

**Other:**

**Laboratory Studies:**

**Gross Findings:**

**Gross Prossector:**

**Special Stains:**

**Histo Prossector:**

DM

**Morphologic Diagnoses:**

- 1). Lungs: Hemorrhage, intraparabronchiolar, acute, multifocal, and mild
- 2). Adrenal gland: Hemorrhage, periglandular, acute, multifocal, and mild to moderate
- 3). Proventriculus: Nematodes, intraglandular, multifocal
- 4). Small intestine: Cestode parasites, luminal, multifocal
- 5). Ureter: Trematodes, intraluminal and minimal, multifocal, eosinophilic periureteritis
- 6). Ureter: Lymphoid aggregates, perireteral, diffuse, mild to moderate
- 7). Liver: Inflammatory cell aggregates, perivasicular and multifocal random, mild
- 8). Kidney: Lymphoid aggregates, subcapsular, multifocal, minimal to mild
- 9). Skeletal muscle: Fatty infiltration, interstitial, multifocal, and mild
- 10). Liver: Fatty change (lipidosis), diffuse, mild

- 11). Lungs, air sac: Anthrasilicosis, multifocal, mild with minimal to mild, histiocytic inflammation
- 12). Liver: Pigment accumulation (hemosiderosis), Kupffer cell and hepatocellular, multifocal, mild (presumptive)
- 13). Spleen: Hyperplasia, lymphofollicular, multifocal, mild
- 14). Lungs: Edema, diffuse, mild
- 15). Kidney: Mineralization, tubular, multifocal, and minimal
- 16). Testis: Aspermatogenesis
- 17). Heart: Euthanasia artifact, intravascular, moderate
- 18). Lungs: Euthanasia artifact, intravascular, multifocal, and mild to moderate
- 19). Liver: Euthanasia artifact, intravascular, multifocal, mild (presumptive)
- 20). Pancreas: NHL
- 21). Peripheral nerve: NHL
- 22). Gallbladder: NHL
- 23). Trachea: NHL
- 24). Esophagus: NHL
- 25). Eye: NHL
- 26). Ventriculus: NHL
- 27). Tongue: NHL
- 28). Brain: NHL

**Comments:** A cause of death was not apparent in the examined tissue sections. Hemorrhage was seen in the connective tissues surrounding the adrenal glands and in the lungs. This could have been related to tissue collection during the post-mortem procedure if this was a freshly dead bird. Alternatively, it could reflect antemortem trauma. Examined testis was inactive (possible seasonal variation or subadult). Multiple different types of parasites were seen in several sites in this bird. They were not associated with inflammation or other tissue damage and were not likely to have been the cause of clinical disease; however, their presence could reflect increased susceptibility to infection if this bird had been debilitated for other reasons. The morphology (coelomyerian musculature, lateral cords, lateral alae) and location of parasites in the proventriculus was consistent with spirurid nematodes. Differentials include *Dispharynx*, *Tetrameres* and *Cyrnea*. Changes in several blood vessels were consistent with euthanasia artifact.

T-00010 F-Y2770 BODY AS A WHOLE: EUTHANASIA  
T-00010 M-09000 BODY AS A WHOLE: OPEN DIAGNOSIS  
T-28000 M-37004 LUNGS: HEMORRHAGE, ACUTE, MULTI-FOC, MILD  
T-93000 M-37004 ADRENAL: HEMORRHAGE, ACUTE, MULTI-FOC, MILD  
T-63741 E-45100 PROVENTRICULUS: NEMATODE  
T-64000 E-47100 SMALL INTESTINE: CESTODE  
T-73000 E-46500 URETER: TREMATODE  
T-56000 M-50085 LIVER: LIPIDOSIS  
T-28000 D-76100 LUNGS: ANTHRACOSIS  
T-28850 D-76100 AIR SACS: ANTHRACOSIS  
T-28850 D-76210 AIR SACS: SILICOSIS  
T-56000 M-57510 LIVER: HEMOSIDEROSIS  
T-07000 M-72200 SPLEEN: HYPERPLASIA, LYMPHOID  
T-28000 M-36500 LUNGS: EDEMA

N2006-0940 1