REPORT SERIES No. 2

AEWA
Lesser White-fronted Goose
International Working Group

AEWA
UNEP

Regulation of Spring and Autumn Hunting on Waterbirds in the Kumo-Manych Depression, Russian Federation March 2010 - February 2011

by Sonia Rozenfeld

Directorate for
Nature Management

РГГ

AEWA Lesser White-fronted Goose International Working Group

Regulation of Spring and Autumn Hunting on Waterbirds in the Kumo-Manych Depression, Russian Federation

March 2010 – February 2011

AEWA Lesser White-fronted Goose International Working Group Report Series No. 2

February 2011

Prepared with funding from the Norwegian Directorate for Nature Management

C**ompiled by:** Sonia Rozenfeld, Goose and Swans Study Group of Eastern Eurasia

Recommended citation: Rozenfeld, Sonia. 2011. Regulation of Spring and Autumn Hunting on Waterbirds in the Kumo-Manych Depression, Russian Federation, March 2010-February 2011. AEWA Lesser White-fronted Goose International Working Group Report Series No. 2. Bonn, Germany.

Picture on the cover: Lesser White-fronted Geese in the flock of White-fronted Geese and Red-breasted Geese in Manych © Sonia Rozenfeld

Picture on inner cover: Poster created as part of the project to raise awareness on Lesser White-fronted Geese and Red-breasted Geese

Contents

Introduction

Most goose populations in north-west Europe have in recent decades experienced population growth, due to the successful deployment of well-managed hunting regimes, habitat management in protected areas and the overcoming of conflicts with agriculture through use of economic incentives. Conversely, the inadequate development of such management in parts of Eastern Europe has led the two goose species which primarily use the Siberia – Black Sea flyway to become globally threatened.

Major conservation problems affect the stopover sites along this flyway. The most notable of these is unsustainable hunting of waterbirds, which is believed to be the driving force behind the population decline of threatened goose species. The negative impact of (illegal) hunting of the Lesser White-fronted Goose (*Anser erythropus*) and Red-breasted Goose (*Branta ruficollis*) is evident and the negative impacts from hunting along the flyway(s) and stopover sites in the Russian Federation are deemed to be especially high, resulting in a need for vigorous conservation efforts in those areas. It should be noted that the conservation of Red-breasted Geese (subsequently referred to as RbG) and Lesser White-fronted Geese (subsequently referred to as LWfG) is a priority for the Russian Federation, as both species are on the national Red List.

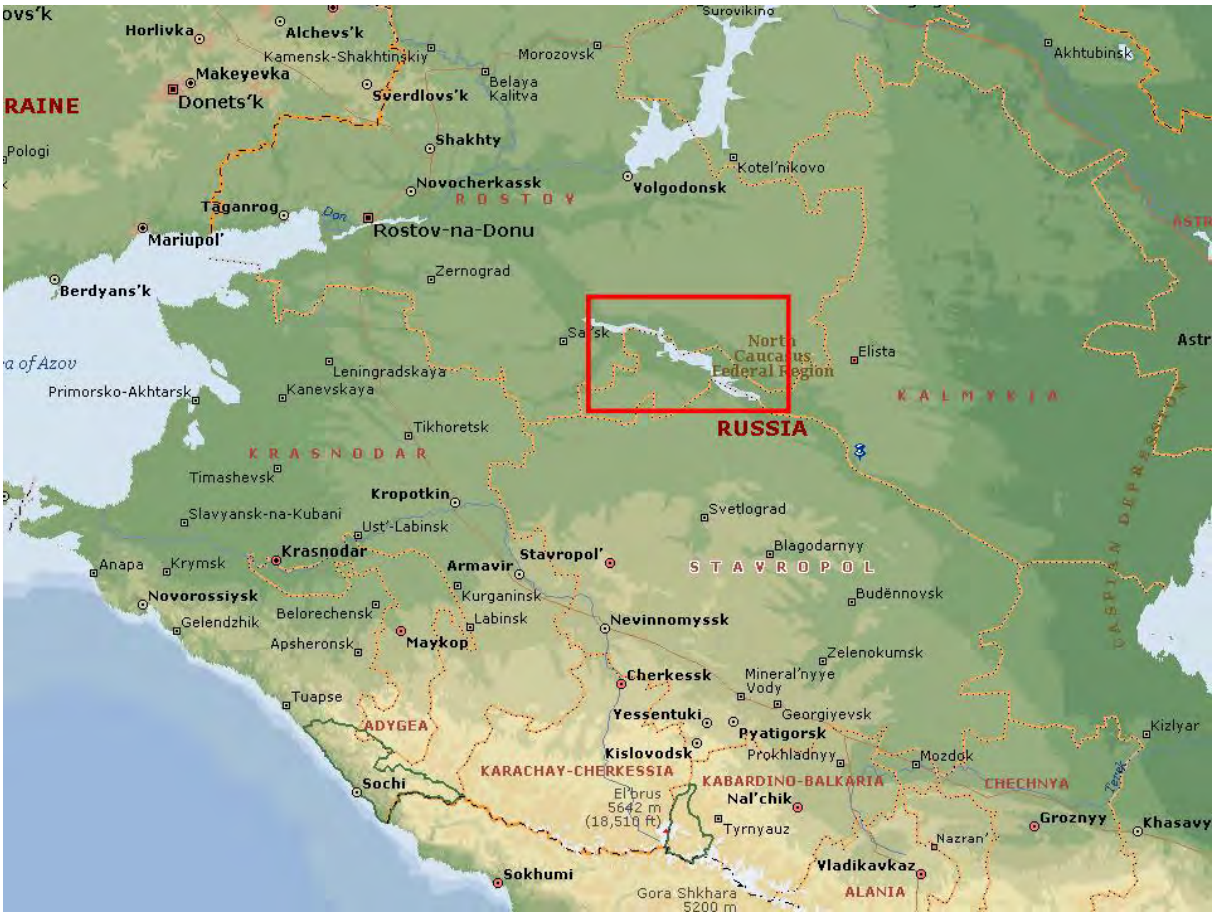
The project to regulate spring and autumn hunting in the key site of Kuma-Manych brought together for the first time new ideas generated in Russia on flyway management combined with approaches that have proven to be successful in (north-west) Europe. The main aim of the project was to close the spring hunt in the most important regions for rare species of geese and to develop a flexible scheme of hunting regulations based on the knowledge of the behavior and migration patterns of the geese. By developing a model for the management of key sites by cooperating with hunters and local land-users, the project is foreseen to benefit the conservation of migratory bird stopover sites in Russia in general. The project was based on the following:

- Elaboration of a scientific and sustainable approach to hunting;
- Elaboration of new hunting rules;
- Placing implementation of the strategy under the control of regional authorities;
- Organize regular regional (oblast level) meetings on hunting regulation and elaborate the mechanism of inter-regional consultations on that subject.

By implementing such measures, important wintering and stopover sites of globally threatened waterbird species will be protected and local authorities will be provided with instrumental advice for the long-term sustainable management of such sites.

The Importance of the Kumo-Manych Depression for the Lesser White-fronted Goose and other Endangered Waterbird Species

For a long time southern Russia (area between Taman and Astrakhan) was not considered an important area for globally threatened species of geese. This led to many important sites on the migration route south of Urals and in Western Siberia not being surveyed and subsequently left unprotected.



Location of the Kumo-Manych Depression

We now know that the Kumo-Manych Depression is a unique area in southern Russia. It is a critical junction on the migration routes of millions of birds nesting in the European part of Russia, Siberia and Kazakhstan (fig.1) and a key stop-over site supporting a major portion of the world's RbG population as well as other threatened waterbird species including the LWfG, and the White-Headed Duck (*Oxyura leucocephala, up to 50% of global population)*. Not surprisingly, it is also a key area for goose hunting. Numbers of RbG staging in the area during migration reach up to 44.000 birds, whilst LWfG occur in smaller numbers up to 700 individuals (table 1). Manych-Gudilo Lake has been declared a Ramsar site as well as an IBA (RU165 BirdLife International). There are also two State Biosphere Reserves (zapovednik) - Chernjye Zemli and Rostovsky - in the area.

The Kumo-Manych Depression can be described as a "bottleneck" site, where counts during migration and winter periods allow for good population estimates. As it also is one of the most important stopover sites for globally threatened species of geese, the area is well suited to serve as a testing ground for the development of waterfowl adaptive resource management, combining an effective game management and bird resource conservation with up-to-date scientific knowledge. The region is apt for the development of an effective strategy for sustainable resource exploitation, the development

of ornithological science in general and forming public opinion about waterfowl conservation and game management.

Fig.1. Migration route of Red-breasted Geese and Lesser White-fronted Geese

The Kumo-Manych Depression can thus serve as an example for conservation measures undertaken for globally threatened waterfowl species. In addition to the points mentioned above, the optimization of the resource management system for migratory birds in Russia needs to be targeted. These activities can also be relevant for other ongoing thematic programs in Russia, concerning topics such as ‘inland water biodiversity’ and ‘dry and sub-humid lands biodiversity’, and the cross-cutting issues of ‘ecosystem approach’, ‘sustainable use’ and ‘protected areas’.

Dolgonky Bay © Rozenfeld

Flock of White-headed Ducks on Manytch-Gudilo lake © Rozenfeld

Table 1. The dynamic of RBG and LWFG numbers (individuals) in Kumo-Manych

Season	**RbG**	**LWfG**
Autumn 2006	12.600	?
Winter 2007	5.300	?
Spring 2007	18.300	99
Autumn 2007	1.300	46
Spring 2008	40.830	224
Autumn 2008	23.200	260
Spring 2009	24.500	82
Autumn 2009	19.073	204
Winter 2010	1.800	4
Spring 2010	43.480	366
Autumn 2010	20.607	696

Geese Observations – Methodology and Results

Local migration of geese from the roosting place © Rozenfeld

Methodology

The surveys in the study area were conducted both in the form of aerial and ground surveys. The surveys were carried out according to the guidelines found in the "Monitoring Instructions for LWfG Surveys" (Tolvanen et. al. 1999). The flock sizes and species compositions of all flocks of geese present were counted and assessed. In addition, conditions permitting, the ratio of adults and juveniles in the survey area was also assessed. The biotopes used by the different goose species were also monitored and described.

The counting of geese and estimation of species ratio on the roosting islands of Manytch-Gudilo lake was done with a field scope with 15-100 magnification early in the morning and in the evening during the mass departure or arrival from/to the roosting area to/from the feeding grounds. The sites for these counts were selected to ensure that all flight departure/arrival sectors were covered. Data on species ratio was collected during the day in random samples of the flocks returning back from the feeding area to the roost or by surveying the feeding flocks. The location of the main point of counts of roosting and foraging birds permited the counts to be undertaken at a distance of 250-500 metres from the flocks, without causing any disturbance to the geese.

© Badmaev

© Markin

The total geese counts and the study of their biotope distribution in the project area was conducted in November (22.11- 11.2010) and in March (4.03-27.03.2010). For the first time at Manych small airplanes were also used for the counts. In order to be able to cover the whole area two planes (models СП-32 and СП -34) were used, each with a team of one pilot and one researcher conducting the count. Teams split up with one team covering the north side of the Kumo-Manych Depression and the second team conducting counts on the south side.

Plane used: СП-34 & flock of geese as seen from the plane © Ivanov

Results

Due to the extensive coverage of the territory it was possible to produce exact counts of the number of geese at the Kumo-Manych stopover site on the days of counting. The main part of geese used the winter wheat fields for feeding. Presently, a quite large coastal area of Manych-Gudilo Lake is no longer abandoned and the land is used by farmers to grow so called winter wheat or as pasture for their livestock. In 2010, due the very dry summer and autumn, the wheat plants were very small and didn't form a cover over the ground. Thus, also small goose species such as the RbG and the LWfG were able to use this resource.

It should be noted, that the data collected during the autumn 2010 counts does not correctly reflect the entire number of geese that migrated through the Kumo-Manych stopover site this particular year. The autumn of 2010 was unusually warm and the dates and the pattern of migration deviated from previous years. In 2010 the autumn migration took place during the last week of November (the peak of migration in the region normally occurs in the middle of November) and did not have the normal structure. It is supposed that a number of geese migrated to the wintering areas without stopping at Manych this year. For example, on the 23rd of November near the Malye Derbenty village (Volgogradskaya oblast), a flock of 1000 geese and an additional 140 RbG were sighted flying towards the south-west. For a more detailed understanding of the data collected during autumn 2010, it should be compared to data from wintering sites.

Table 2. Results of the spring 2010 geese counts

Date	Time	GPS data or place	Biotope	RbG	GWfG	GG	LWfG	Comments
4.03	7.30	Divnoe bridge 4599743/04342635	Manytch river	**0**	140	0	**0**	to the E
4.03	9.20	Divnoe bridge 4599743/04342635	winter wheat field	**0**	1700	0	**0**	in 2.5 км to the S.
5.03	6.00-8.00	Tzernie zemli 4626559\04286232	Islands near kordon	**3244**	1041	21	**2**	40 Bean goose in 2 flocks

Date	Time	GPS data or place	Biotope	RbG	GWfG	GG	LWfG	Comments
6.03	6.00-8.00	Tzernie zemli 4626559\04286232	Islands near Kordon	**4430**	506	50	**9**	Roosting place, GLG on the winter wheat field
8.03-24.03		Rostovskaya district, remontnensky region, Volotchaevka village	Winter wheat field	**1200**	12000	0	**0**	Data of State reserve "Rostovsky"
8.03	12.00	buffer zone near the border with Stavropol district	Winter wheat field	**8200**	1700	27	**293**	In the tree flock
9.03	6-8.00	Tzernie zemli 4626559\04286232	Islands near Kordon	**8500**	1775		**5**	
18.03	11.03	46178.97/04388294	lake	**0**	50	72	**0**	Near Manytch river
20.03	15.30	Priyutnoe bridge 4602834/04343953	Winter wheat field	**0**	200	28	**0**	Podmanok bay region
21.03	7.03	4616106/04281160	Winter wheat field	**4000**	31400	0	**81**	Near Oktyabrsky village
21.03	8.29	4620724/04286857	Dunda river	**30**	60	2	**0**	Along the river
21.03	12.00-17.50	Tzernie zemli 4626559\04286232	Shallow water and islands near Kordon	**9800**	21000	52	**44**	150 WFG feeding on the pasture
22.03	5.00-8.00	Tzernie zemli 4626559\04286232	Shallow water and islands near Kordon	**10690**	7900	10	**5**	Flights from the roosting places
23.03	5.00-8.00	Tzernie zemli 4626559\04286232	Shallow water and islands near Kordon	**7800**	0	0	**1**	Flights from the roosting places
23.03	11.30	4630076/04278616 (in 8 km to the N)	Pastures and shallow waters	**7000**	0	0	**0**	Sapojok semi island
23.03	13.45	4630076/04278616	Steppe after fire	**3000**	0	0	**0**	Roosting: islands near Kordon
23.03	17.30-18.50	Tzernie zemli 4626559\04286232	Shallow water and islands near Kordon	**11300**	0	0	**42**	Flights to the roosting places
24.03	5.30-8.00	Tzernie zemli 4626559\04286232	Shallow water and islands near Kordon	**5950**	69	4	**1**	Flights from the roosting places

Date	Time	GPS data or place	Biotope	RbG	GWfG	GG	LWfG	Comments
24.03	14.15	10 km from Divnoe bridge (4599743/04342635)	On the water	**0**	0	165	**0**	Manych river
27.03	07.00 – 08.00	Priyutnenskaya site of Manytch /46 16 101 43 00 802	Pasture	**6950**	270	0	**36**	In the several flocks
27.03	7.42	N-W part of Kirista hill 4616182/04259818	Hayed pasture	**6100**	200			Kirista bay
27.03	10.00	Kirista hill / 46 16 101 43 00 802	Hayed pasture	**850**	70		**36**	In the several flocks
27.03	14.00	46 18 219 / 42 57 837	Hayed pasture	**2**	105		**1**	Kirista bay
27.03	15.00-16.00	2.5 km to the N from Urojaynoe village 4618223/04257847	Winter wheat field	**8500**	17500	0	**0**	Kirista bay
27.03	16.20	2 km to the S-E from Urojaynoe village 4618223/04257847	Winter wheat field	**2200**	5000	0	**0**	Kirista bay
27.03	16.50	46 23 612 / 42 51 714	Hayed pasture	**15300**	3500	31	**0**	Between northern cost of Manych and Bobyshevsky pond

Table 3. Total number of geese on study area in March 2010

Region	RbG	GWfG*	GG*	LWfG
Rostov district	1200	10000	No data	No data
Priyutnensky	30980	8875	31	73
Yashaltinsky	11300	71000	301	293
Apanasenkovsky	0	1300	233	0
Total number (max)	**43480**	**91175**	**565**	**366**

***WfG = Greater White-fronted Goose, GG = Greylag Goose*

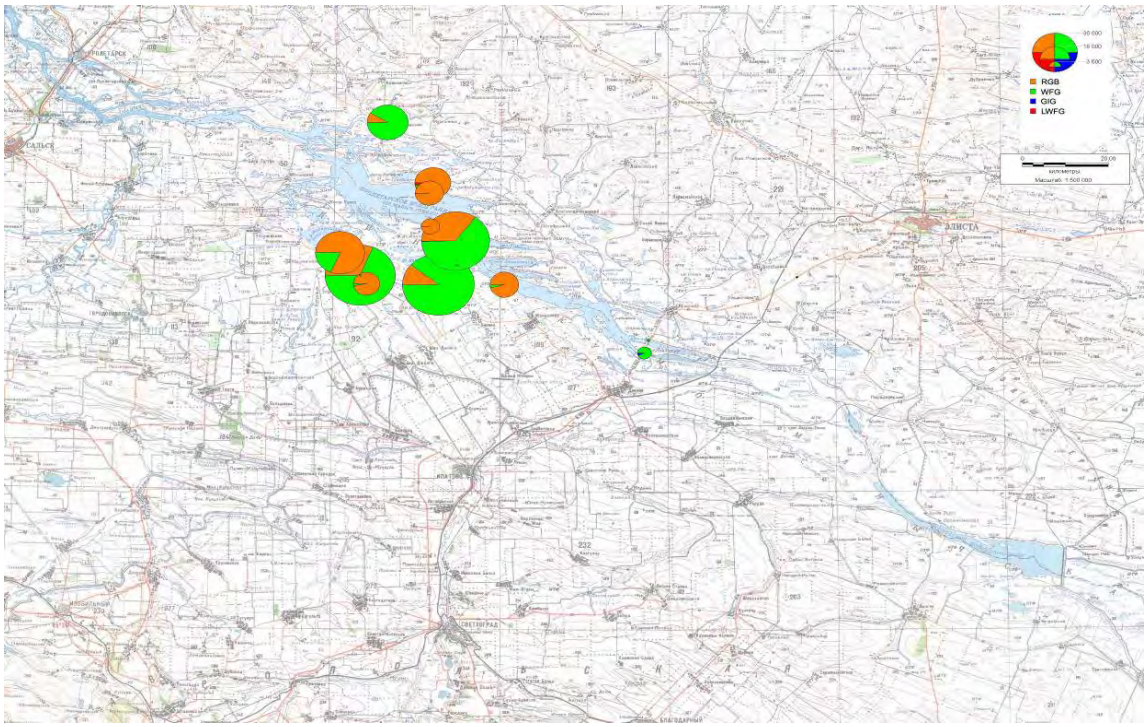


Fig.2. The distribution of the geese flocks in Kumo-Manych Depression, March 2010

Table 4. Results of autumn counting in Kumo-Manych stopover

Date	Time	GPS data or place	Biotope	RbG	GWfG	GG	LWfG	Comments
22.11	11.58	455501.3/0433248.4	Steppe near Divnoe village	**0**	0	150	**0**	Manych lake region
22.11	12.18	455124/0435546.9	Steppe	**0**	0	0	**10**	Manych lake region
22.11	13.32	454827.5/0440713.8	Winter wheat field	**1350**	2800	450	**45**	Thogray water reserve region
22.11	14.30	460654.7/0440621.6	Small lake on the steppe	**0**	90	60	**6**	Thogray water reserve region
22.11	15.24	4599743/04342635	Manych river	**0**	215	80	**0**	Manych lake region
22.11	16.00	4599743/04342635	Winter wheat field	**0**	1000	22	**5**	Manych lake region
22.11	14.57	45.9272/ 44.0257	Winter wheat field	**105**	1360	3760	**?**	Tzagan-Khag lake region
23.11	12.18	44.461232.0/0431058.5	Hayed pasture	**75**	115	0	**0**	
23.11	12.30	461232.0/9431058.5	Winter wheat field	**800**	200	100	**11**	Dolgonky bay region

Date	Time	GPS data or place	Biotope	RbG	GWfG	GG	LWfG	Comments
23.11	12.42	46.1021.5/0430325.9	Steppe	**0**	30	0	**15**	Between Lopiovskogo and Dolgonky bays
23.11	12.43	461335.6/0430401.9	Winter wheat field	**4500**	500	0	**25**	Manych bay
23.11	13.46	461357.6/0430046.9	Hayed pasture	**4150**	2000	0	**60**	Manych bay
23.11	13.41	461325.5/0425740.1	Winter wheat field	**1310**	1200	0	**44**	Manych bay
23.11	13.50	463215.9/0424407.7	Hayed pasture	**0**	80	4	**0**	Volochaevka region
23.11	13.57	462923.2/0423851.3	Winter wheat field	**0**	0	71	**0**	Volochaevka region
23.11	14.19	463355.5/0425757.7	Winter wheat field, on water	**18**	250	0	**0**	Volochaevka region
23.11	14.24	463426.7/0415921.4	On water	**4000**	450	0	**42**	Manych lake
23.11	14.34	463120.5/0421411.7	Steppe, Winter wheat field	**0**	797	0	**21**	Manych lake
23.11	15.01	462455.3/0422821.0	Steppe	**9**	70	0	**0**	Flying from the roosting place
23.11	15.12	462153.3/0423129.4	On the water	**30**	0	0	**0**	Flying from the roosting place
23.11	16.08	460125.7/0432153.4	On the water	**0**	54	0	**11**	Flying from the roosting place
23.11	12.47	46.1766/0429215	Winter wheat field	**660**	0	1800	**2**	Dunda river region
23.11	13.04	46.2536/042.8508	Winter wheat field	**0**	0	50	**52**	Sapojok peninsula region
23.11	13.27	46.4047/042.4673	Winter wheat field	**0**	20	0	**77**	Pyatisotka region
23.11	13.54	46.5396/042.0848	On the water	**3600**	3300	1800	**270**	Manych lake

Table 5. Total number of geese on study area in November 2010

Region of Kumo-Manych Depression	**RBG**	**GWfG**	**GG**	**LWfG**
Eastern part (Divnoe-Tchogray water reservoir, both coasts)	1455	9200	4135	Min 66
Western part (Divnoe-Egorlyk river mouth)	19152	9776	3825	630
Total number (max)	**20607**	**18976**	**7960**	**696**

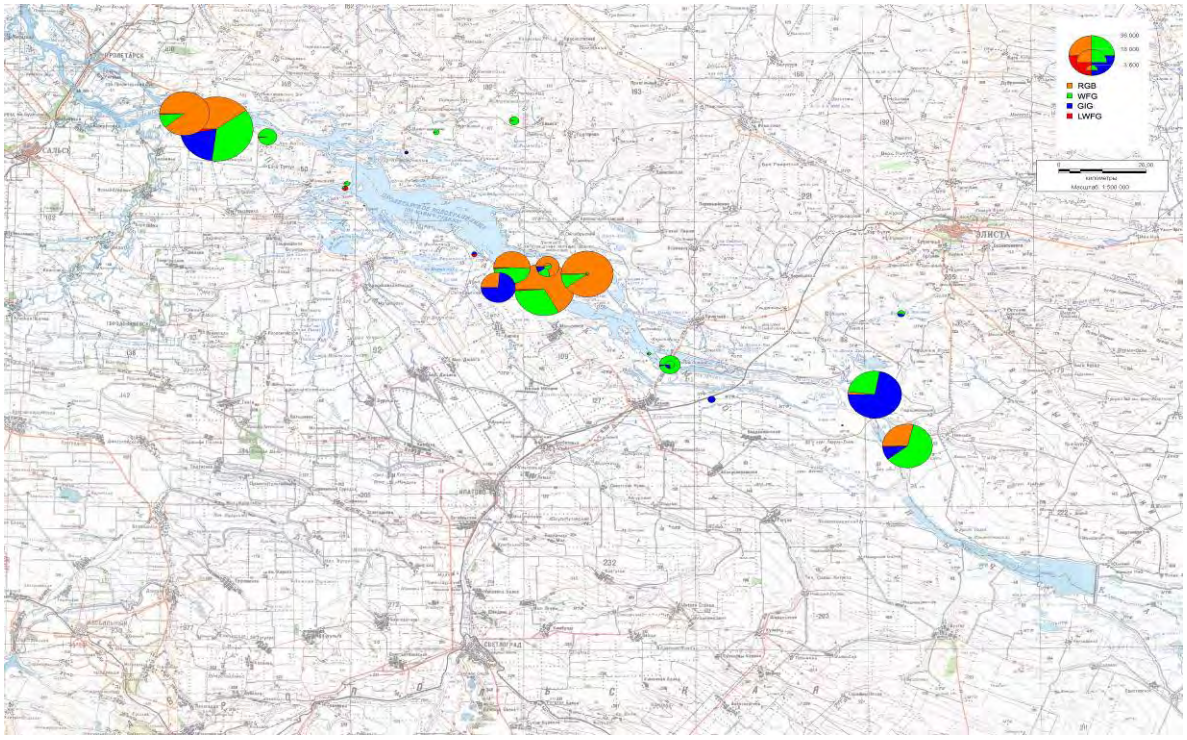


Fig.3. Distribution of the geese flocks in the Kumo-Manych Depression, November 2010

Study of Feeding Ecology and Biotope Distribution

The feeding patterns of four species were studied: RbG, LWfG, Greylag Goose (*Anser anser*) (GG) and Greater White-fronted Goose (*Anser albifrons*) (GWfG). The study was carried out by comparing cuticular coprologycal analysis results, visual observations and botanical descriptions of foraging sites with a special account of the biotope spectrum. RbG and LWfG demonstrate an especially pronounced feeding strategy with a preference for food which is rich in energy and easy to digest. In Manych this food consists of the salt marsh's galophyte complex of *Puccinellia distans* and *Aeroplus littoralis*. The RbG has its own feeding strategy, concentrating on food which is accessible only to the lower number of small species with a high level of dispersion in their distribution. The GWfG, on the other hand, is highly flexible in its preference of feeding habitats. During the stopover and wintering phases of migration the GWfG is more oriented and adapted to use the crops (winter wheat) and depends in its distribution on the presence of fresh water sources. The maximal diet diversity for both species can be observed during the autumn migration periods. The differences in the general feeding strategies of the small (rare) and large (hunting) species (fig.4) determined the different biotype use by these species in normal season (without deficit of the fresh water after dry period) and, thus, corresponded space distribution of rare and hunting species.

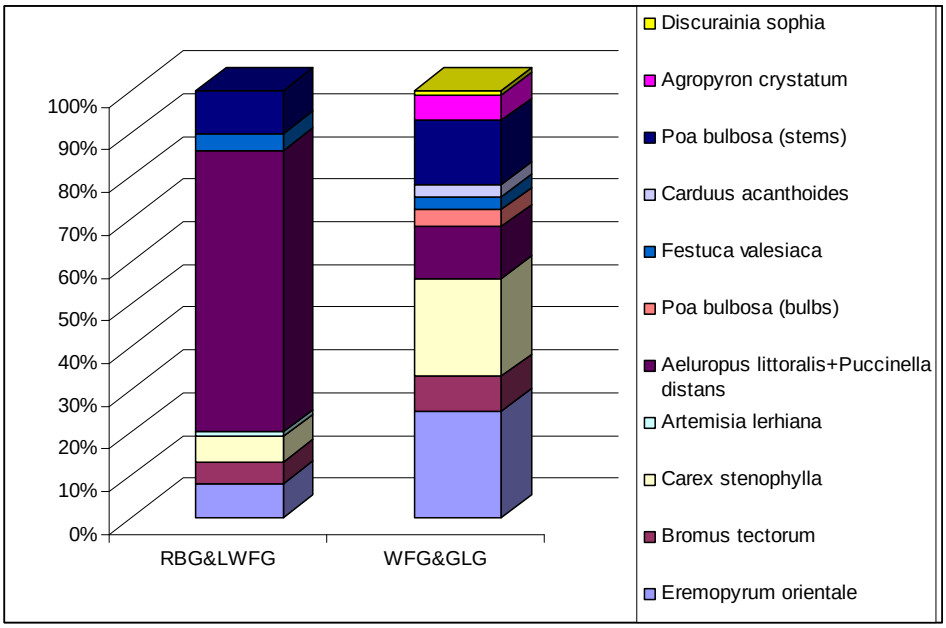


Fig.4. The diet of different geese species on the pasture's feeding area.

Resulting out of these studies we can conclude, that biotope distribution depends not only on the quality of food but also on other key factors such as: the accessibility of vegetation, the distance from fresh water sources and roosting places, the level of disturbance and relief from disturbance. Further studies on the importance and influence of fresh water deficits should be undertaken in order to provide the best protection of rare and globally threatened species of geese.

The registration of the flocks in the feeding biotopes permitted the assembling of data about the geese distribution in the study area (fig.5). The biotope division of the species conditioned by the different types of their trophic strategies is quite evident during normal weather conditions. This short study of the feeding ecology of these four goose species can also explain the patterns of their use of feeding biotopes. According to the data gathered on geese distribution, the following can be concluded:

1. Coastal meadows with halophytes are used only by RbG and LWfG.
2. Pastures are used by RbG and LWfG together with GWfG and GG.

3. Winter wheat fields are predominately used by the large species (GWfG and GG).
4. RbG and LWfG also can use this biotope, but only do so in mixed flocks together with GWfG and GG.

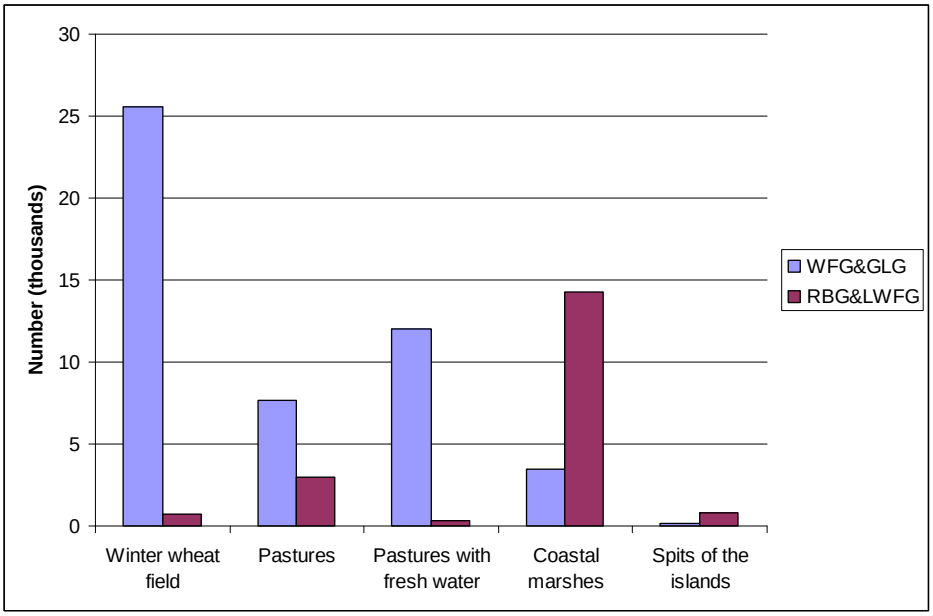


Fig.5. The pattern of the use of feeding biotopes by different species of geese

Thus, in a normal season without a deficit of fresh water, the smaller rare species mostly use the protected areas (fig.6). But the arid climate of the Kumo-Manych Depression causes frequent droughts and a subsequent instability of the hydrological regimes of the lakes and rivers. During the dry season all the geese, including the rare species, move from the protected areas to the huge artificial fresh water reservoirs frequently visited by hunters (fig. 7-8). For example, in the dry autumn of 2008 only 3.070 RbG stayed within the protected area. The major part of the flock (about 20.000 individuals) moved to areas open to hunting with high level of the poaching. This should take into account when planning the regional strategy on hunting regulations.

Red-breasted geese shot by poachers © Rozenfeld

Feeding area of geese: coastal meadows with halophytes © Rozenfeld

Feeding area of geese: pasture © Rozenfeld

Feeding area of large species of geese: winter wheat field © Rozenfeld

Feeding area of geese: winter wheat field © Rozenfeld.

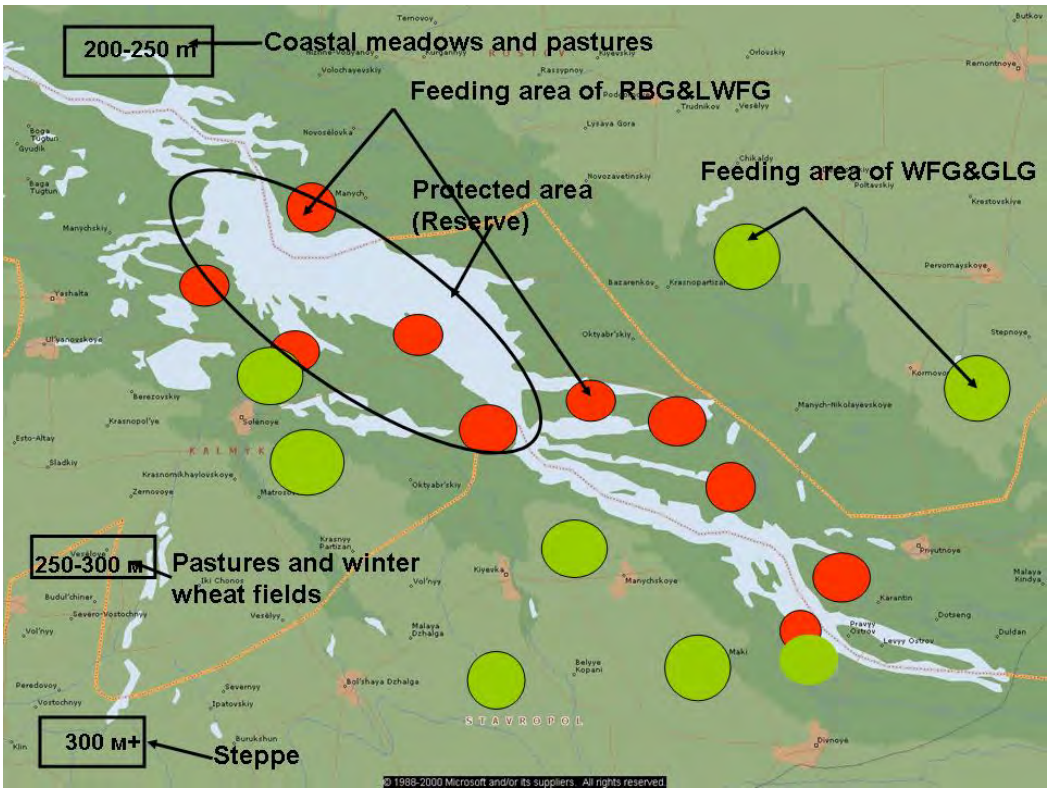


Fig.6. Biotope distribution of rare vs. huntable geese species in a normal season.

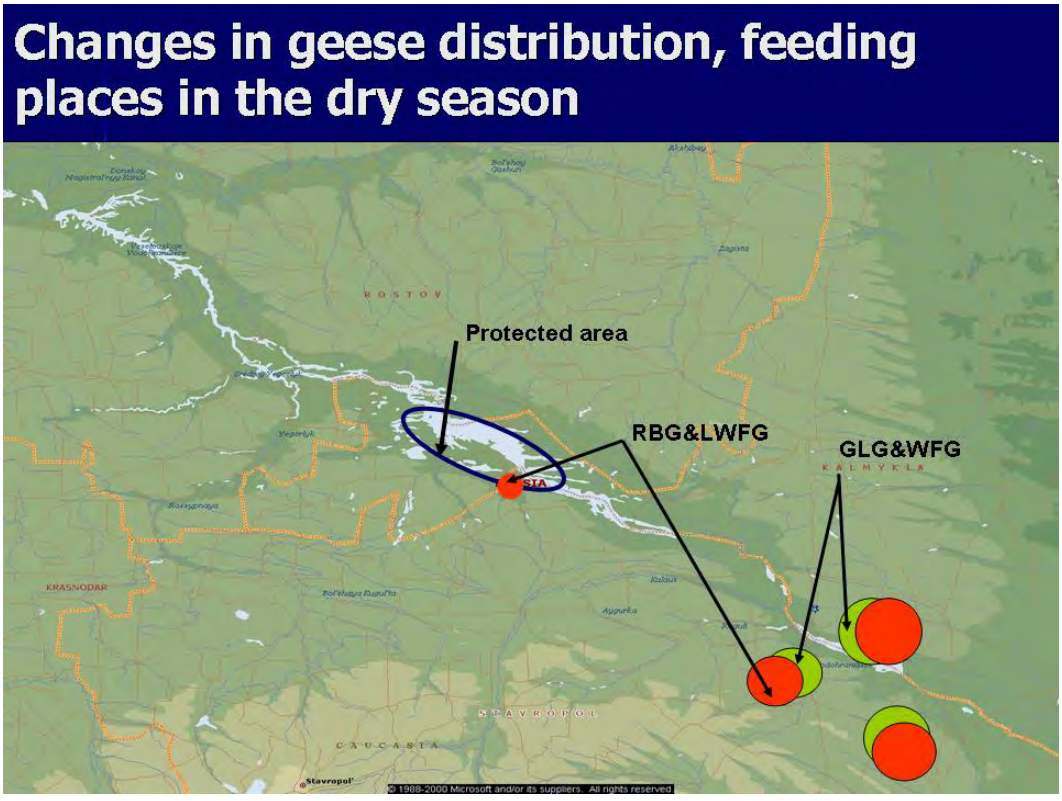


Fig.7. Changes in geese distribution in the dry season.

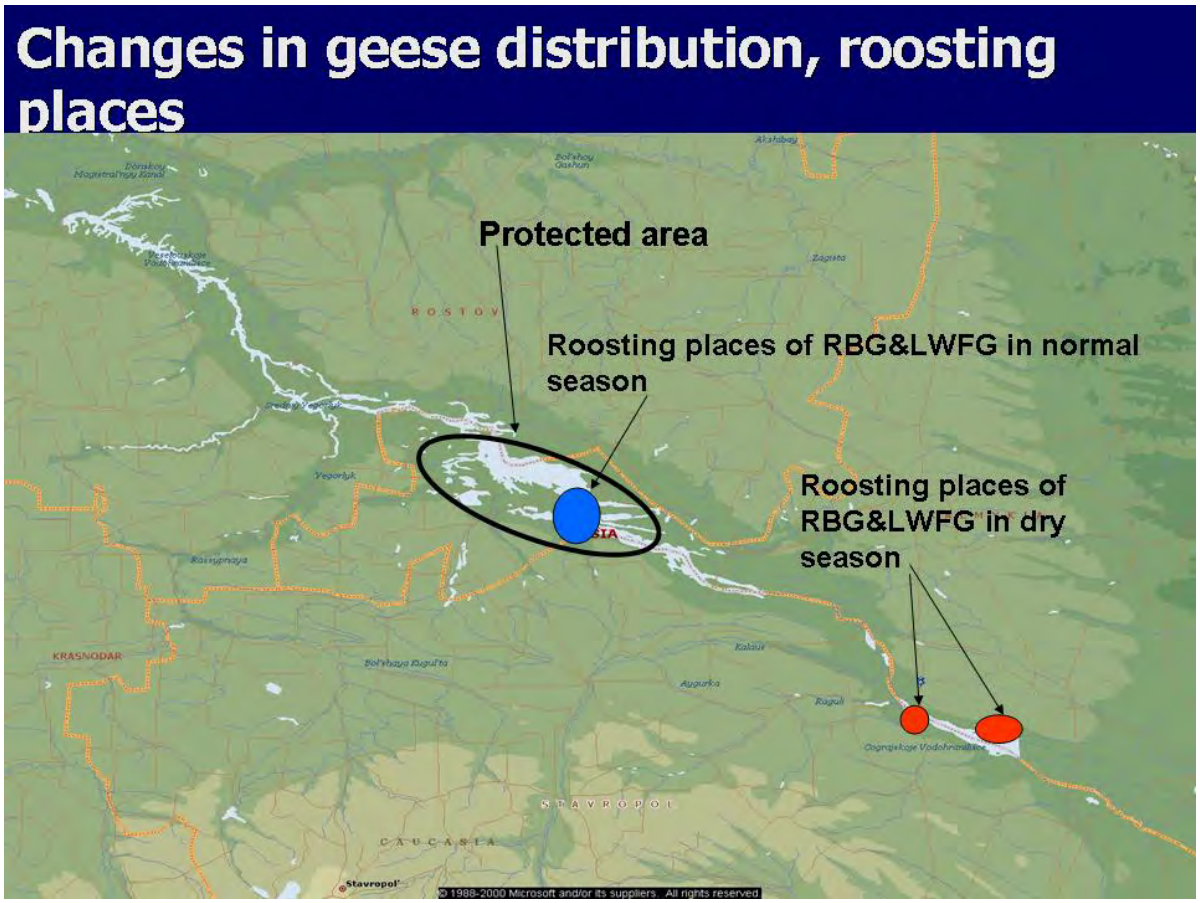


Fig.8. Changes in the pattern of the use of roosting places by geese.

Strategy for Hunting and Waterbird Resource Management

The negative influence of the hunting of waterbirds in Russia on the condition of globally threatened goose populations is evident. The strategy for the sustainable use of waterbirds in the Kumo-Manych Depression developed during the course of this project is proposed as a model for attempting to diminish the negative effects from overhunting. The strategy applies to key sites in three administrative entities of the Russian Federation: the Republic of Kalmykia, Stavropolsky Kray and Rostovskaya Oblast. The main goal of the strategy is that all hunting on geese should be closed during the migration of rare species in the areas which see mass concentrations of RbG and LWfG. This is a necessary step in order to prevent unintentional hunting of these rare species when migrating in mixed flocks. The hunting may again be opened when the migration of the threatened species is over. Taking this into account, the hunting period should be defined by the competent regional authority depending on seasonal conditions. The hunting period should be coordinated between all three administrative entities mentioned above and should take into account data made available by so-called coordinators from other countries along the RbG and LWfG flyways (Bulgaria, Romania, Kazakhstan and Ukraine).

On the base of the studies conducted on the ecology and other aspects of goose distribution in the region a proposal for a new Strategy for Hunting of Waterfowl was drafted encompassing the entire Kumo-Manych Depression. The proposed strategy is meant to be implemented by the three administrative entities of Republic of Kalmykia, Stavropolsky Kray, Rostovskaya Oblast and is based on the activities elaborated below.

1. Regulation of Hunting Periods and Quotas: Development and improvement of the regional measures regulating the waterfowl hunting – adaptive choice of hunting periods, quotas and activities for different game husbandries.

2. Regulation of Hunting Territories: Defining the rest-zones and season reserves, their maintenance and control coordinated with Reserves, IBA and protected areas system.

3. Providing Information for Decision-Making: Improved state controlled monitoring of the distribution of hunted species; elaborating special field guides for hunters.

4. Development of Goose Hunting License System for game husbandries: Introduction of goose hunting licenses in regional game husbandries with the future option for the expansion of this practice to the federal level.

Concrete measures through which these four key activities can be implemented are described below.

Regulation of Hunting Periods and Quotas

1.1. Restriction of spring goose hunting in those regions of the Kumo-Manych Depression, where RbG and LWfG are concentrated. The borders of such regions should be defined. There are numerous arguments in favor of such a restriction. The opening of spring hunting coincides with the beginning of the Graylag Goose (GG) and Dalmatian Pelican nesting period and may have strong negative influence on them. The migration of rare species which are red-listed in the Russian Federation - such as White-headed Duck, Eurasian Curlew *(Numenius arquata)*, Spoonbill *(Platalea leucorodia)*, LWfG, RbG - occurs at the same time. These species are inevitably caught in the crossfire from the hunters and are often killed. In addition hunting is a strong disturbance factor, which prevents the normal feeding of birds during the crucial spring migration and nesting periods and thus has a negative influence on the bird populations affected.

During the time of the Soviet Union spring hunting was closed in this region. This was a scientifically based decision by state control organizations.

1.2. Allow the spring hunting of male ducks using decoys in licensed game husbandries only and for a maximum of nine days. Define the maximum number of hunters according to the density norms for the coast line hides and the quality of bird habitat.

1.3. Allow the autumn hunting of waterbirds for the whole region from September the 1st until November the 30th. Specific territories and periods of hunting should be defined in each administrative entity in coordination with the migration of rare species over the Kumo-Manych Depression. The arrival of rare species can be monitored by Reserves, National Parks and universities. District administrations should make operative decisions on the opening and closing of goose hunting according to these monitoring results. In the absence of monitoring data the hunting period should depend on average arrival/departure dates of the migrating rare species.

1.4. Goose hunting during the autumn migration of rare species should be closed in the regions of mass concentration of RbG and LWfG. This is needed to prevent the unintentional killing of these rare species in mixed flocks. The hunting may be opened when the migration of the rare species is over. The autumn hunting period should be defined by the regional Ministry of Natural Resources (MPR) depending on seasonal conditions. The hunting period should be coordinated with all three administrative entities of the Russian Federation and take into account the coordinators' data from other countries along the RbG and LWfG flyways. This proposal should be discussed at a special meeting with the regional administrations.

1.5. Define the daily and overall hunting quotas for each species and specific season.

Regulation of Hunting Territories

2.1. Define the boundaries for where the strategy is to be applied in spring and autumn. Elaborate landscape-biotope distribution maps for every species in case of fresh water deficit/no deficit (with marked feeding and resting places in three districts). Use these maps to predict the situation per district in drought vs. normal years and, consequently, the regions where the goose hunting can be opened.

2.2. Create resting zones in the key areas, which rare migratory birds use to stop-over.

2.3. Put into practice the creation and strict control of resting zones in game husbandries.

Providing Information for Decision-Making

3.1. Develop the monitoring of waterbird migration by regional MPR, protected areas and reserves divisions and hunting societies. Organize the necessary research studies and consultations by the Geese and Swan Study Group of Eastern Europe and North Asia (RGG), relevant research institutions and international working groups on RbG and LWfG conservation. Such monitoring should be based, amongst other things, on the compulsory analysis of licenses returned by hunters.

3.2. Elaborate and publish a field guide for hunters, where rare birds forbidden for hunting will be highlighted.

Development of a License System for Goose Hunting

4.1 Goose hunting is not of mass-hunting type. The capacity of hunting territories is limited and, when exceeded, the hunting efficiency drops to a near zero level. So, the accommodation of as well as effective hunting is only possible when the following conditions are met:

- Prepared territory – hides, trenches, profiles;
- Resting zones near birds stop places (500 m from the shore);
- Resting zones near hunting places;
- No disturbing factors in hunting areas and nearby places (fields) during the hunting period and before it;
- Throughput capacity norm and choice of hunting sites – scientifically and practically founded.

Hunting satisfying the above conditions is not only more effective, but also less damaging for the birds being hunted, due to the mitigation of disturbance factors (critical in accumulation of energy reserves for further migration). So, the conditions above should be guidelines for granting the longtime hunting licenses.

4.2 Restrict goose hunting outside the specially licensed areas in all seasons.

4.3 Develop the throughput capacity norms for goose hunting based on distance between hides.

4.4 Develop a monitoring system and a complex of biotechnological measures (distracting feeding fields, cattle grazing, zinc phosphide ban enforcement, especially in Stavropolsky Kray and Rostovskaya Oblast).

4.5 Introduce the state licensing of goose hunting for the game husbandries – grant them the appropriate licenses and control their obedience of goose hunting rules. Restrict or close temporarily the hunting in game husbandries breaking the rules.

Strategy Realization and Control - Example of Work Plan for Southern Federal District

Within the framework of this project a subsequent strategy and work plan were developed for the Southern Federal District based on the general guidelines described above. The work plan includes two main activities: 1) the elaboration of new hunting rules and 2) placing the implementation of the strategy under the control of the competent regional authorities of the Federal Veterinary and Phyto-Sanitary Service.
In addition regular regional (oblast level) meetings on hunting regulation were to be organized and a mechanism of inter-regional consultations should be developed for dealing with this issue.

The first draft of this strategy was discussed on the 6th of April 2009 at the Geese Swan and Duck Study Group session № 72 and was reported on in the section “Ecology and monitoring of hunting species of birds, international cooperation” and approved by the International Congress of Game Biologists (Moscow 17-22 August 2009). For the implementation of this strategy the following framework was elaborated. It is based on RBG, being the easiest species to recognize in the field. But it is also valuable for LWFG as these two species use the same type of biotopes and migrate together.

A special international monitoring system for spring migration was set up in order to be able to implement the designed framework (fig. 9). In a first step the national RbG coordinators in Romania, Bulgaria, Ukraine and Azerbaijan provided information on when the RbG departed from their wintering sites. The regional coordinators in Kumo-Manych informed the local administrations about the necessity to close the hunting in the key sites (places of concentration depending on the seasonal

accessibility of the fresh water for birds). The regional coordinators monitored the situation in Manych and informed the local administrations when the RBG and LWFG started to migrate to the breeding areas. Following this, hunting could be re-opened. This practice both allows and requires collaborating with the Russian Hunters Association and Federal Game Management Department (Ministry of Agriculture) as well as the regional agencies responsible in order to develop cooperation and ultimately to limit/close spring hunting in key sites for rare waterbird species.

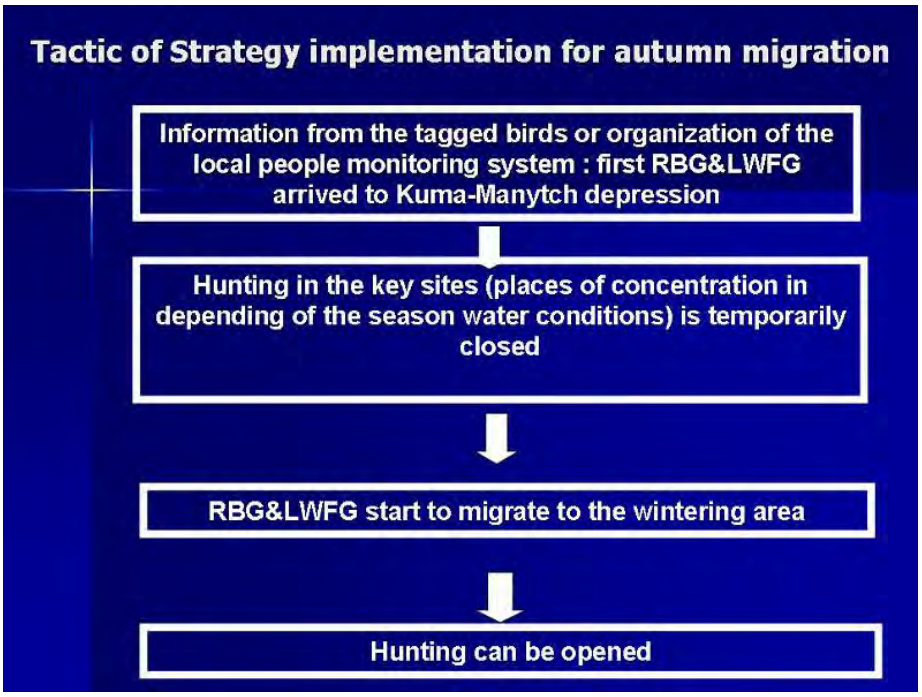
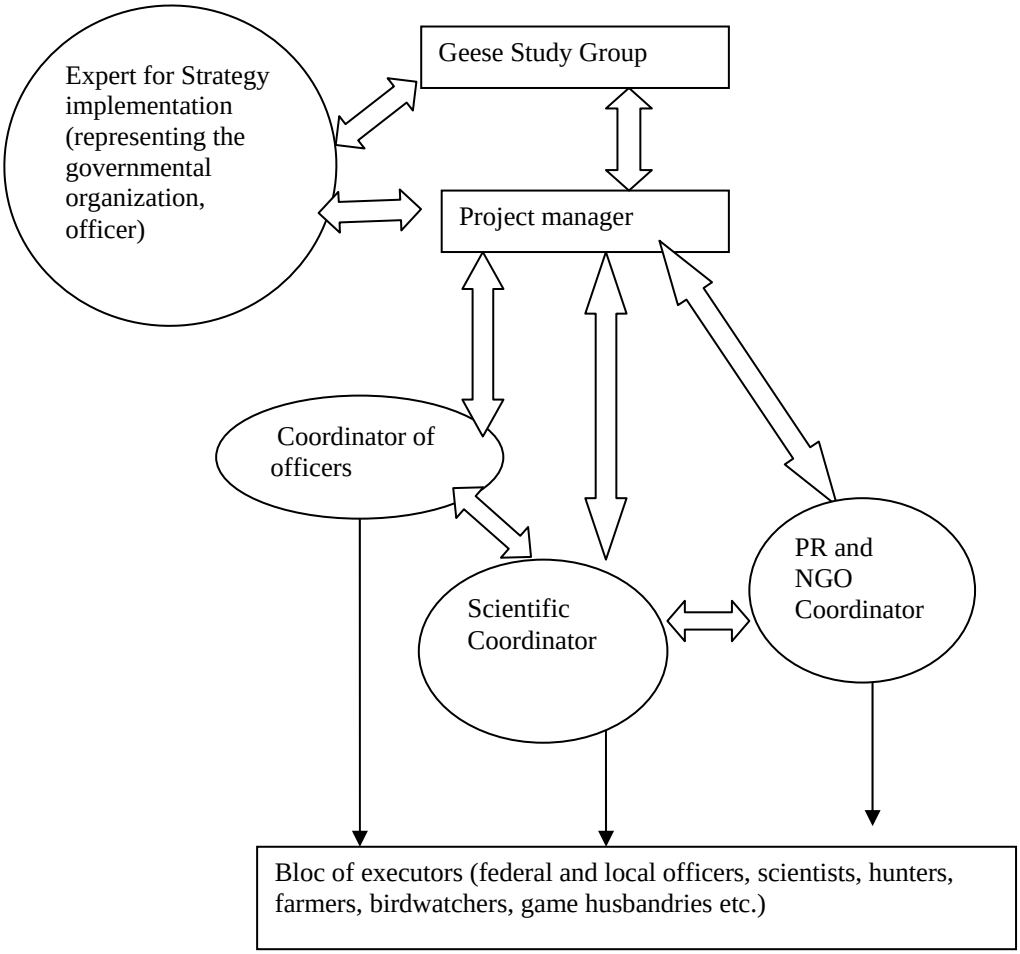


Fig.9. Tactic for Strategy implementation on the example of the autumn migration

The next critical period when the autumn-winter hunt is open for the rare geese species concentrate on the Kumo-Manytch stopover is 1 of November - 31 of December, so the main tusk is to elaborate the optimal dates for hunting in collaboration with local authorities, scientists, hunter clubs and game husbandries. Improvement of the dates of open hunting should be based on the "water pattern" (as the consequences of dry summer influent a lot on the geese distribution) of each season. Building relations with Russian Hunters Association and Federal Game Management Department (Ministry of Agriculture) and regional responsible agencies to develop cooperation and limit autumn hunting in key sites for rare waterbird species by our knowledge of autumn migration pattern (dates of presence of rare bird species within the key site areas) and distribution of rare species in each concrete season.

Thus, taking into account the results of our study, we propose to define the boundaries for the strategy application in spring and autumn – elaborate landscape-biotope distribution maps for every species in case of fresh water deficit/no deficit (with marked feeding and resting places in three districts). Use these maps to predict the situation per district in draught/normal years and, consequently, the regions where the goose hunting can be opened. Specific territories and periods of hunting should be defined in each administrative entity in coordination with rare species migration over Kumo-Manych depression. The arrival of rare species can be monitored by Reserves, National parks and universities. District administrations informed via Interregional working group should make operative decisions on goose hunting opening/closing according to the monitoring results. In the absence of monitoring data the hunting period should depend on mean arrival/departure dates of the migrating rare goose species.


Expert for Strategy implementation (representing the governmental organization, officer)
Geese Study Group
Project manager
Coordinator of officers
Scientific Coordinator
PR and NGO Coordinator
Bloc of executors (federal and local officers, scientists, hunters, farmers, birdwatchers, game husbandries etc.)

First Steps towards the Implementation of the Strategy in Russia – The Interregional Meeting about Optimization of Use of Waterfowl at the Kumo-Manytch Stopover

In 2010 special meetings were organized in each region with the local Ministries responsible for natural resources and nature conservation to discuss the possibility of closing or restricting the spring hunting on waterfowl. As a result of these activities the spring hunting was not opened in Rostovskaya oblast at all, in the Republic of Kalmykia the whole area of the Kumo-Manych Depression was declared a hunting free zone and in Stavropolsku kray the spring hunting on geese was permitted only in agriculture areas, thus creating hunting free zones in the wetlands.

During May 2010 the drafts of the documents for the "Interregional meeting about optimization of use of waterfowl of Kumo-Manytch stopover in Kalmykya Republic, Stavropolsky kray and Rostovskaya oblast" were prepared. On the 15th of June 2010 in Elista in the House of Government of the Republic of Kalmykia the "Interregional meeting about optimization of use of waterfowl of Kumo-Manytch stopover in Kalmykya Republic, Stavropolsky kray and Rostovskaya oblast" took place.

Interregional meeting about optimization of use of waterfowl of Kumo-Manytch stopover in Kalmykya Republic, Stavropolsky kray and Rostovskaya oblast, Elista, House of Government of Kalmykya Republic. Photo © Garya Lidjiev

The representatives of the Government of Kalmykia Republic, Ministry of Natural Resources, Nature Protection and Energy Development of Kalmykia Republic, Ministry of Natural Resources of Stavropolsky kray, Department of Conservation and Use of the Objects of Animal World and Water Biological Resources of Rostovskaya oblast, Department of Control of Nature Use of Kalmykia Republic, Severtsov Institute of Ecology and Evolution RAS, State biosphere reserves "Tzernie zemli" and "Rostovsky", Stavropol state university, Stavropol society of hunters, Yashalta society of hunters, UNEP/GEF project "Conservation of biodiversity of wetlands in lower Volga", private game husbandry "Tzingis" and the Geese, Swans and Duck Study Group of Northern Eurasia (RGG) took part in this meeting. The meeting was saluted by the Government of Kalmykia Republic and Budha's lama.

Budha's lama salutes the Interregional meeting about optimization of use of waterfowl of Kumo-Manytch stopover in Elista. Photo © Garya Lidjiev

Letters of support addressing the meeting were sent from the following organizations: International Red-breasted Goose Conservation Working Group, UNEP/GEF, the UNEP/AEWA Secretariat, the IUCN International Goose Specialist Group, BirdLife International, Moscow State University, State Reserve "Taymirsky", Menzbir's Society of Bird Conservation, Association "Leaving Nature of steppe" and Southern State University.

The participants discussed the problem of regulating the hunting of waterbirds in the Kumo-Manych stopover with special attention to the problem of the conservation of rare goose species (RbG and LWfG) during spring and autumn-winter hunting. Rostovskaya oblast and Kalmykia Republic decided not to open spring hunting. The participants recognized the necessity of international cooperation in monitoring and protection of the rare goose species with NGOs of all the countries within the range of the RbG and LWfG. The necessity to apply for support from foreign NGOs for the implementation of urgent measures for the regulation of hunting was strictly noted.

The tabled draft on the creation of a working group named "The interregional working group for optimization of use of waterfowl of Kumo-Manych stopover" was approved. During the meeting the participants decided to update the proposed drafts of the Strategy and the Action plan for optimization of use of waterfowl of Kumo-Manych stopover in Kalmykia Republic, Stavropolsky kray and Rostovskaya oblast and indicated the responsible persons from each region to do it. During the next meeting of the interregional working group the drafts of these documents will be discussed and then the final versions will be approved. After this, the documents shall be presented to the Governments of Kalmykia Republic, Stavropolsky kray and Rostovskaya oblast for confirmation and implementation. The meeting strongly recommended that the administration of Rostov district extend the prohibition of hunting within the buffer zone of the Biosphere State Reserve "Rostovsky". During the meeting many participants indicated the necessity of the implementation in practice and the procedure of obligatory exams for hunters before giving them the license to hunt. It was also decided to organize a cycle of seminaries for hunters, and to include a special chapter about rare species in scholarship programs and to prepare lecture material for teachers. It was proposed to implement in practice the compensation of damage from the migrating bird's for farmers in Kalmykia. The role of the development of ecotourism as a compensatory activity instead of hunting was strictly marked.

(fig.6). The participants noted the high level of the organization of Meeting, actuality of discussed problems and constructivism of the proposed decisions. The participants also expressed their gratitude to the organizers of the meeting: the Ministry of Natural Resources, Nature Protection and Energy Development of Kalmykia Republic and the Severtsov Institute of Ecology and Evolution (RAS) and also thanked the UNEP/AEWA Secretariat and the Geese, Swans and Duck Study Group of Northern Eurasia (RGG) for sponsoring. The draft of the Action plan of urgent activities for implementation of the Strategy of optimization of use of waterfowl of Kumo-Manych stopover with drafts of the program of development of ecotourism in Kalmykia were signed by the Minister and sent to the Government of Kalmykia for harmonization of legislation. According the Action plan for Kalmykia the special proposal for cooperation with international nature protection foundations was made. On the base of the protocol of the Meeting the regional action plan about hunting regulation in Kalmykia was prepared and signed by Minister of Natural Resources of Kalmykia.

Seminars for Hunters

In order to decrease the hunting pressure on RbG and LWfG and increase the level of knowledge of the local hunters, the first phase of an education program for hunters was implemented in the form of a first cycle of seminars for hunters on the 27th to the 28th of November 2010 in Elista, Priyutnensky rayon and Yashaltinsky rayon – the three key sites for RbG and LWfG.

Conversations with hunters in the field © Dyluc

Conversations with hunters in the field © Dyluc

In the framework of these seminaries the following questions and problems were discussed:

1. The modern dynamic of the number, ecology and conservation problems of geese at the Kumo-Manych stopover;
2. The influence of spring and autumn hunting on rare species of geese;
3. Presentation of activities which urgently need to be implemented as part of the Strategy of optimization of use of waterfowl of Kumo-Manych stopover;
4. The perspectives of the private game husbandries;
5. The identification of the rare species which are red-listed in Russia in the field and during hunting;
6. The perspectives of cooperation with Russian and international scientific, conservation and hunting organizations
7. The perspectives of development of ecotourism and photo tourism in the territories of the game husbandries within Kumo-Manych stopover.

Roughly 100 hunters from regional hunting societies participated in these seminars including the owners of private game husbandries and employees of the Ministry of Natural Resources of Kalmykia. Two articles on the seminars were published in the local newspapers. These activities will hopefully lead to increasing of the hunters' awareness and sense of responsibility.

This was reflected in December when hundreds of geese perished because of foul weather in Kalmykia. In the middle of December in Priyutnensky region of Kalmykia on a large winter wheat field hunters registered thousands of dead geese and little bustards. Most of them were RbG, but there were also LWfG amongst them. The deaths were caused by the uncommon weather conditions – snow with rain in combination with a temperature of -10 degrees Celsius. Thus, the snow was immediately transformed into a thick ice layer, which covered the vegetation and trapped the birds in a shell of ice. The thickness of the ice covering the geese attained 15 cm and didn't permit them to move. Most of the injured/dead geese were juveniles. The hunters Povolozky Vladimir and Savtchenko Viktor saved 17 RbG.

Hunters saving Red-breasted geese covered in icy sleet © Cadre from the video of Povolozky Vladimir

They released the geese from the ice and transported them with their car to Priyutnoe village, where the geese were heated in a hen house. The hunters informed the Ministry of Natural Resources of Kalmykia about the disaster. During the next day when the snow melted, the RbG were released. Three birds couldn't fly and were transported to the center of wild animals of Kalmykia "Esmeli". Thus, it can be concluded that hunters are indeed starting to recognize the rare goose species and are keen to assist with conservation efforts aiming at their protection.

Additional Public Awareness Raising Measures

The following flyers for hunters about rare species of geese were officially distributed before the beginning of spring hunting via the local administrations to the hunters' clubs in the project area (Republic of Kalmykya, Stavropolsky kray and Rostovskaya oblast).

Example of flyer for hunters.

In addition, 18 posters with information about rare goose species were strategically installed for hunters at key sites in the 15 most popular game-husbandries of Kalmykya, Stavropolsky kray and Rostov district as well as in Elista, Stavropol and Rostov-on-Don.

Photo © Garya Lidjiev

Posters in the key game husbandries. Photo © Garya Lidjiev

Further Restrictions on Hunting

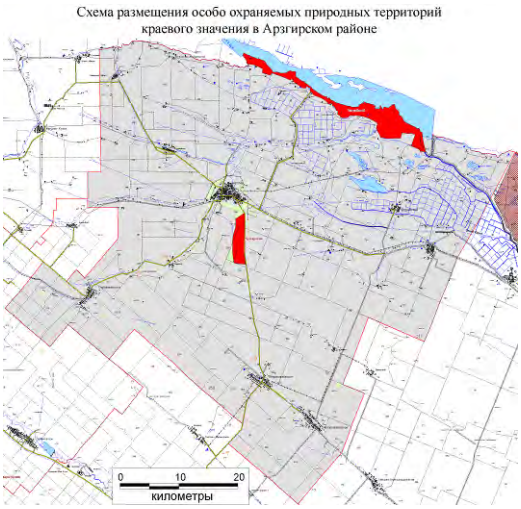
Prolongation of the hunting free status of the buffer zone of the State Reserve "Rostovsky"

In reply to the letters from RGG, SIEE and AEWA the Administration of the Rostovskaya oblast decided to close the hunt within the coastal key sites of the buffer zone of the State reserve "Rostovsky" since 15.11.2010 till 15.11.2013. (the resolution number 276 from 11.11.2010).

The creation of the new protected hunting free areas in Stavropol district

Despite the refuse of Stavropol district to close the spring geese hunt, 1 new protected area (zakaznik) was created on the key site of Kumo-Manytch depression: "Manytch-Gugilo reserve". With already existed "Burukshan" and "Thogray" reserves the protected area now covers about 30% of the Stavropol part of Kumo-Manytch depression. Here the hunt is forbidden, and the reserves are really protected by 3 teams of the rangers as they have the governmental financing and support. Also, the government of Stavropol district decided since 2011 to close the hunt on geese within the public hunting areas (20% of territory of each region). The location of the protected areas (the borders are marked by the orange color (left) and the red color (right)) is Stavropol district is presented on the map bellow.

Manytch-Gudilo reserve (zakaznik)



Thograysky reserve (zakaznik)

The obtained results show that the constant monitoring of the RBG and LWFG population condition in this area is necessary as well as the continuation of the work with hunters and officials for the implementation of the new conception of the hunt and wise use of the waterfowl resources not only in Kumo-Manytch depression but within the main stopovers and wintering sites of the rare geese species in Russia.

Suggestions and Recommendations for the Monitoring and Conservation of Geese in Russia

After monitoring the situation in the study area we can conclude that the main threats for migrating rare geese species at Kumo-Manych are:

- Disturbance on the roosting places, absence of hunting free area
- High hunting pressure;
- Low culture of hunting, low control in some key game husbandries;
- Hunting on the rare species;
- Fluctuations in water levels lead to the accumulation of large concentrations of rare goose species within non-protected areas during dry seasons.

On the basis of these threats the following measures for the continuation of conservation efforts in the area and in particular the implementation of the activities started during this project are recommended

1. In order to minimize the pressure from hunting a total ban of spring hunting in the study area needs to be introduced and implemented by the local administrations and hunting societies. In addition habitat management activities such as buying or long-term leasing land for the creation protected feeding areas in the buffer zones of the National Reserves in Kalmykia should be considered. Data of color marking and satellite tracking should also be used.

2. The following Russian federal and regional authorities responsible for nature protection, game husbandries and the use of hunting territories, as well as the relevant governmental and public institutions in all the countries within the range of the RbG, LWfG and White-headed Duck (*Oxyura leucocephala*), the following: should be encouraged to take additional measures for the protection of these species at their key migration stopovers and wintering areas. The "Strategy for Waterfowl Resource Management in the Kumo-Manych Migration Stopover" can be used as a model for how additional conservation measures can be implemented.

3. 'Best practice' lessons learned at Manych should be disseminated to game managers and decision-makers at other identified key sites.

4. A network of protected areas with enforced no-hunting bans should be established.

5. Seasonal patrolling should be organized in the reserves during spring and autumn migration.

6. Awareness raising efforts must be continued. This includes the implementation of the substantial education program for local hunters, children and students, the distribution of booklets, flyers, posters and field guides as well as the popularization of LWFG and RBG conservation in literature for hunters, on TV, in mass media, and in the official structures of villages.

7. Monitoring of spring and autumn migration of geese this region need to be continued, including the regular counting of geese between October and March in the project area and neighboring regions. This should include morning and evening counts on the lake islands and special daily counts of the feeding flocks. The cooperation with the key game husbandries must also be continued. This should include the coordination with and supervision of the local rangers' work, the patrolling of protected areas for poachers from the nearby cities, the monitoring of geese movements and concentrations within the game husbandaries, the development of control activities against illegal hunting within the key areas as well as the development of a model of hunting activity (hunting plans) for each key region depending on the seasonal conditions and the migration patterns of threatened migratory waterbirds.

Summary

Conservation of many of the key stopover sites for threatened migratory waterbirds such as the LWfG and RbG is hindered by the simple fact that they or their importance have not yet been identified. However, the Kumo-Manych Depression is now known to be of immense importance, and pilot conservation work has already commenced there, making it the ideal demonstration site for developing conservation mechanisms.

New methods and ideas need to be tested at key sites in the Russian Federation in order to identify solutions to address unsustainable hunting. This has been done at the Kumo-Manych Depression, with a view to disseminating best practice to other sites in the future. The project will hopefully improve the conservation status of the Kumo-Manych Depression and its migratory waterbird populations in the long run by reducing hunting pressure, strengthening monitoring protocols, building local site management capacity and engaging the local community in these activities.

The hunting issue will be tackled by opening a dialogue between conservationists and hunters in order to develop mutually acceptable goals for sustainable use. The socio-economic background as well as the aims and aspirations of the hunters will be assessed to give a better understanding of appropriate solutions.

A further approach to site management still new to Russia will be the piloting of the concept of private, community managed protected and hunting areas. In addition data management systems will be developed and flyway level management will be facilitated by development of a national species action plans for RbG and LWfG, White-headed duck, Dalmatian Pelican, Eurasian Curlew *(Numenius arquata)* and Spoonbill *(Platalea leucorodia)*. Most importantly, lessons learned at the Kumo-Manych Depression will be disseminated to decision-makers at other sites, in order to create a cascade of improved management practice.

Acknowledgements

The implementation of this project was realized with funding from the Norwegian Directorate for Nature Management and with the assistance of Ms. Nina Mikander (UNEP/AEWA Secretariat). We especially wish to thank the following people for their help carrying out the monitoring work: Konstantin Litvin, Alexander Nikitin and the pilots of "Aero Trans Service", Viktor Badmaev, Yury Markin, Alexander Makarov, Sergey Dyluc, Igor, Elena and Oleg Golovtchenko, Alexander Matukhin, Vladimir Kazmin, Alexander Lipkovitch, Viktor Fedosov, Mikhail Ivanov, Batr Ubushiev, Anatoly Dordjiev and Vladimir Badmaev. The creation of this strategy would not have been possible without the help of Valentin Ilyashenko, Evgeny Syroetchkovsky and other colleagues from the Geese and Swans Study Group (RGG). We also thank the employees of the Ministries of Natural Resources of Kalmykia – especially in Sangy Ubushaev, Stavropolsky kray and Rostovskaya oblast - for their help in the implementation of some points of the strategy on regional level. We would also like to express our gratitude to the participants of the Interregional meeting and seminars for hunters – the members of Interregional working group for the wise use of geese within Kumo-Manych Depression. Last but not least we would also like to give a special thanks to photographer Garya Lidjiev for his help in the publishing of the flyers, banners and other awareness raising materials.

References

Badmaev, V.B., Burlutkin A.V., Rozenfeld S.B., Mathekhin A.V. 2007. Geese feeding ecology in ornithological part of Manytch-Gudilo and adjoin areas during spring migration // Problems of conservation of biodiversity of North-Western Caspian Sea region. Conference proceedings of international conference, Elista: 82-91. (*In Russian*)

Rozenfeld, S.B. 1997. The assessment of coprological cuticular method in the study of arctic geese diet composition in nesting period // Bulletin of Goose Study Group of Eastern Europe and Northern Asia "Casarca", 3: 38-52. (*In Russian*)

Rozenfeld, S.B., Volkov, S.V. 2001. Feeding ecology of red-breasted goose in Western Taimyr // Bulletin of MSNR (МОИП). Dep. Of biol. Vol.106 (3): 52-57.

Rozenfeld, S.B. 2002. Feeding ecology of Lesser white-fronted goose in tundra of South Yamal (in season of 1998) // Bulletin of Goose Study Group of Eastern Europe and Northern Asia "Casarca" 7: 116-130.

Rozenfeld, S.B., Badmaev, V.B. 2008. The pattern of feeding ecology of Red-breasted goose (*Branta ruficollis*) and White-fronted goose (*Anser albifrons*) during migration route and in Arctic // Bulletin of Southern Scientific Center, 4 (3): 87-96. (*In Russian*)

Rozenfeld, S.B. 2008. Some special features of Red-breasted goose (*Branta ruficollis*) and White-fronted goose (*Anser albifrons*) at the Manytch area of "Tzernie zemli" state reserve during migrations and winter time. // The conference proceedings of the conference "Actual problems of ecology and evolution in the researches of the yang scientists" SIEE RAS. KMK: 328-334. (*In Russian*)

Rozenfeld, S.B. 2009. The estimation of migrating waterbird population condition in the limits of Western Siberian crane migration route // The development of migration routes and wetlands for Siberian crane and other waterbirds in Asia. Analytic report of UNEP DGEF C/F 2712-03 GF-6030-03. Moscow: 67-98. (*In Russian*)

Rozenfeld, S.B. 2009. Geese feeding ecology in Russian Arctic. Moscow, KMK: 236 p. (*In Russian*)

Rozenfeld, S.B., Syroetchkovsky, E.E. 2009. Optimization and wiseuse of Anseriformes of Kumo-Manytch stopover (Ciscaucasia) // XXIX IUGB Moscow. Conference proceedings. Part 2: 98-102.

Rozenfeld, S.B. 2009. The strategy of wiseuse of Anseriformes of Kumo-Manytch stopover (Ciscaucasia) // Conference proceedings of international conference X zoological conference «The modern condition and perspective of the development of zoology, protection and wiseuse of animal resources » Part 2. Minsk: 152-155.

Rozenfeld, S.B. Number and distribution of migrant RBG and LWFG in Russia and Kazakhstan, 2006-2009. Strategy of the sustainable use of waterfowl: perspectives and preliminary experience. Conference proceedings of Goose Specialist Group, 12th meeting Holviken, Sweden: 35.

Rozenfeld, S.B., Badmaev, V.B. 2010. The results of geese counting on the Manytch part of the state reserve "Tzernie zemli" // Conference proceedings of "The resources of vertebrates of South-Eastern Europe. Conservation and wise use in the conditions of modern transformation of environment and social relationship", Odessa: 11-13. (*In Russian*)

Rozenfeld, S.B. Agriculture habitat management for conservation of globally threatened species of geese in Kalmykya with involvement of local communities Report to FWP-RF-2008-012, KNIP 08-012. 26p.
Rozenfeld, S.B. 2010. Steps to protect globally threatened goose species taken in South-West Russia // Casarca, 13 (1): in print.

Rozenfeld, S.B., Syroetchkovsky, E.E. 2011. Conservation and Planning the Strategy for wise use of Waterfowl Resource of Kumo-Manytch stopover (Ciscaucasia) // Vestnic ohotovedenia: in print

Tolvanen, P., Pynnönen, P., Markkola, J., Aarvak, T. & Oien, I.J. 1999. Monitoring instructions for Lesser White-fronted Goose surveys. In Tolvanen, P., Oien, I, J. & Ruokolainen, K. (eds.): Fennoscandian Lesser White-fronted Goose conservation project. Annual Report 1998. – WWF Finland Report 10 & Norwegian Ornithological Society, NOF Rapportserie Report no. 1-1999: 68-71.

UNEP/AEWA Secretariat
UN Campus
Hermann-Ehlers-Str. 10
53113 Bonn
Germany
Tel.: +49 (0) 228 815 2413
Fax: +49 (0) 228 815 2450
aewa@unep.de
www.unep-aewa.org