

SAIGA NEWS

Providing a six-language forum for exchange of ideas and information about saiga conservation and ecology

Photo by Eugeny Polonsky



Catastrophe and hope for saigas in 2015

As Saiga News 19 goes to press, we are reeling from the devastating mass die-off of saigas in the Betpakdala population, with the latest official statement from the Ministry of Agriculture (5th June) giving a death toll of 134,252, equivalent to 62% of the 2014 Betpakdala population estimate, and more than half of the global saiga population. The deaths were recorded in the birth aggregations, primarily affecting females and their new-born calves, and I can only imagine how awful a job it must have been for the people working to clear away the corpses and carry out postmortem examinations.

Photo by ACBK



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Saiga heroes

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There is more tragic news in this issue of *Saiga News*. We hear of the near-complete loss of the saigas in the breeding centre of the Centre for Wild Animals of the Republic of Kalmykia, and the Centre's ongoing struggle to continue in existence. Our friends at the CWA have been a beacon for research, conservation and public engagement over many years, and this news is a terrible blow for conservation in the north-west pre-Caspian region.

Other articles give grave news of the status of the north-west pre-Caspian and Ustyurt saiga populations, both of which have suffered substantial population decreases over the last 2 years, on top of an ongoing trend of decline. Elena Bykova *et al.*s article strongly suggests that Kazakhstan's border fence, erected in 2011-12, combined with ongoing poaching, has led to the Ustyurt saiga population being on the brink of extirpation. Vladimir Kalmykov's comparison of the number of saiga observations made by his team in 2014 with the numbers seen 10 years previously points to very large declines in the north-west pre-Caspian population. Forrest Hogg *et al.*'s article suggests why this might be: the authors estimate that 34% of the people interviewed in Kalmykia had eaten saiga meat in the preceding 12 months. Together, these findings suggest a strong demand for saiga meat in the region, fed by ongoing poaching which has substantially reduced the saiga population.

It is very hard to continue to be positive about the future of the saiga faced with these set-backs. However this issue of *Saiga News* also brings us hope. A new and scientifically robust population estimate for Mongolia suggests that this sub-species now consists of about 15,000 individuals. Although the estimate is not comparable to previous estimates made using different methods, it seems possible that the population is growing, and that rigorous conservation efforts are beginning to pay off. For the rest of our hope, we have to

turn to people. It is, as always, inspirational to read the several articles about the enthusiasm with which children are committing to conserving the saiga and its steppe habitat, and the dedication of their teachers and group leaders in helping them to learn about the species. Katie Mabbutt *et al.*'s work in the Ural population confirms previous studies showing that people are knowledgeable about saigas and their fate, and keen to volunteer to help them where they can. The worldwide media concern about the saiga deaths in Betpak-dala shows that people care about the fate of the saiga. And there are dedicated conservationists working hard to make a difference, such as Albert Salemgareev, one of a long line of saiga heroes recognised in *Saiga News*. Governments too are playing their part; Tatiana Bragina's update on ecological corridors shows the commitment of the Kazakhstan government to protecting the environment, Kalmykia has listed saigas on their Red Data Book, and Mongolia is strengthening law enforcement cooperation.

As we digest the latest news from Russia, Kazakhstan and Uzbekistan, we need to remember where we came from. In 2003, saiga populations were at a critically low level, and there was very little action being taken to conserve them. Starting with the signing of the Convention on Migratory Species' Memorandum of Understanding on saiga conservation in 2006, governments, NGOs, international organisations, researchers and local people in the saiga's range areas have come together to conserve the saiga. At meetings of the signatories

to the MOU in 2006 and 2010, we committed to implementing measures to fulfill an action plan, and in 2010 we demonstrated substantial progress. Although things are going very badly at the moment, the expertise, commitment and institutional frameworks are in place to support the conservation actions that saigas now need to bring them back from the brink again.

We know what needs to be done to save the north-west pre-Caspian and Ustyurt populations, but it will be difficult; poaching has to stop. In Betpak-dala, the population will hopefully still be large and resilient enough at the end of the mass mortality to withstand this blow and recover. This is thanks to a decade of conservation action by the government of Kazakhstan, supported by ACBK and many others. There are constructive actions we can take, as a community, to ensure that the saiga, spirit of the steppe, is still found throughout its range in 10 years time. As we look forward to our next meeting to review progress under the CMS saiga conservation MOU, let's keep hold of our hope, while recognising the urgency of the situation and the need to work together to safeguard the saiga's future.

Photo by Bivanbat Thiegnert



A herd of Mongolian saigas

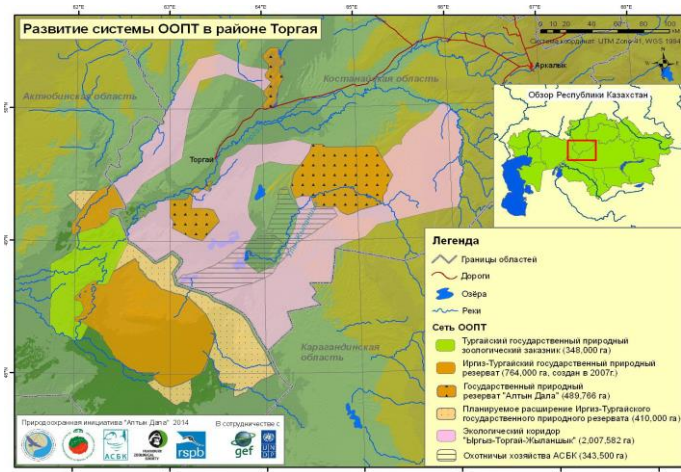
Updates

Prof. E.J. Milner-Gulland, Advisory Editor, Chair of the Saiga Conservation Alliance

Saiga migratory routes in Kazakhstan are taken under protection

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In 2004, the first ecological corridor in Kazakhstan was created in the Kostanai region, on the initiative of the Naurzum Public Ecological Organization, covering 31,253 hectares. The aim was to link the areas of Naurzum nature reserve used by saigas in summer, especially in dry years. The concept of an ecological network and its elements first entered into the legislation of the Republic of Kazakhstan as a result of a GEF/UNEP/WWF project ("Creation of the ecological network (ECONET) for the long-term conservation of biodiversity in ecoregions of Central Asia", 2003 – 2006). Amendments and additions to the "Law On Specially Protected Natural Areas" to facilitate the creation of ecological corridors were adopted in 2012. According to this law, ecological corridors should be created to ensure a spatial connection between specially protected natural areas and other elements of the ecological network, in order to preserve biological diversity and animal migration routes.



Map. Protected area network in Turgai, including the Irgyz-Turgai-Zhilanshik ecological corridor

In 2014, the Irgyz-Turgai-Zhilanshik ecological corridor was created in the Kustanai region, covering 2,007,582 hectares. It protects northern desert and desertified steppe ecosystems in the interfluvium of the Turgai, Irgyz and Ulyzhilanshik rivers as well as lake and river systems and the Tosynkum sand massifs. It connects the Altyn Dala and Irgyz-Turgai nature reserves and the Turgai State Zoological Sanctuary, which are crucially important for saigas and located on the Betpakdala population's migration route. According to law, the corridor was established by resolution of the akim (head of the administration) of the region.

The creation of the ecological corridor was preceded by extensive research and preparatory work under the GEF/UNDP/Kazakhstan government's project "Conservation and Sustainable Management of the Steppe Ecosystems". Its boundaries were defined based on a field survey by the Association for the

Conservation of Biodiversity of Kazakhstan, which provided additional data on the vegetation cover, wildlife, degree of human impact and saiga migration. Marxan software was used to define the corridor based on this information.

The law prohibits a range of activities in ecological corridors, including: discharge of pollutants and waste; introduction of alien species; haymaking during nesting of ground-nesting birds; large-scale earthworks (except in emergency); canalisation of rivers and streams; vegetation burning; use of dangerous chemicals including fuel, pesticides and fertilisers without taking precautions to avoid damage to wildlife and their habitats; placing obstacles on migration routes without mitigation, including fishing gear; clearance of vegetation for infrastructure during breeding seasons; using machinery which could endanger wildlife and their habitats; activities which could change the hydrological regime; irrigation and reclamation without mitigation; capture of wildlife outside the hunting seasons; hunting in certain areas during migration and calving periods; activities harmful to nature or ecological systems.

Additionally, in the Irgiz-Turgai-Zhilanshik corridor limitations are placed on visits to calving areas in the period from April 1 to June 1. Sustainable uses of natural resources within the ecological corridor are encouraged, including well-managed hunting, farming and recreation. The creation of the Irgyz-Turgai-Zhilanshik ecological corridor will facilitate saiga conservation, and the restoration of the region's natural ecosystems.



Photos by Pyotr Romanov

Saigas in Altyn Dala, July, 2014.

Public information helps to reduce illegal wildlife hunting in Mongolia

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WWF-Mongolia is cooperating with the General and Criminal Police Offices (Environmental Crime divisions) under a Memorandum of Understanding to eliminate illegal wildlife hunting. As a result of this effort, progress has been seen in revealing and stopping illegal hunting networks on the ground. Information from the public is important to combat poaching and trading of wildlife products. Information from local people recently helped policemen to detain offenders intending to sell saiga horns. Ten men aged 20-30 are under investigation for this crime, which took place in October 2014. Police reported that the offenders intended to transport horns illegally from Russia for sale in China. The case will soon come to court. In total 162 horns were seized, equivalent to 81 saigas. Wildlife crime is getting more complex and organized, which has a negative effect on wildlife conservation.



Photos WWF Mongolia

Seized saiga horns

The Steppe without the saiga is like Kalmyk tea without milk

Natalya Shivaldova, "Ekomaktab" Ecological Resource Center, nshivaldova@mail.ru



Photo by Alexander Esipov

Seminar participants visited the Centre for Wild Animals

In autumn 2014, an international seminar was held at the Centre for Wild Animals of the Republic of Kalmykia, entitled "Measures for saiga conservation in dialogue with the public". Participants included

leaders of the Steppe Wildlife Clubs (SWCs) from Uzbekistan, Kazakhstan, and Russia and representatives of the Saiga Conservation Alliance and the UK-based NGO People's Trust for Endangered Species, which partially funds the SCA's SWC programme, including this seminar. Steppe Wildlife Clubs are now well-established (see previous issues of Saiga News). They have made contact with environmental and law enforcement agencies, and are taking active steps to inform and shape public opinion towards saiga conservation. At this stage, it was felt important to discuss strategy and priorities for the near future, exchange experience and coordinate our efforts. The first two days of the seminar were allotted to introducing the activities that the SWCs have undertaken to date. A video greeting was shown from the children of the Akboken SWC in the village of Zhaslyk, Uzbekistan, in which they demonstrated their creative activities. The winners of the SCA's Young Conservation Leaders awards from Russia and Uzbekistan gave presentations on their work with SWCs in their countries. It was a very intensive workshop for sharing best practices, methods and

approaches to our work. The more so as every SWC has its own “zest” and unique traits. For example, SWCs in Kazakhstan have carried out ecological flash mobs, arranged puppet theatre performances and mobile photo and poster exhibitions.

The Saiga, an Illusory Beauty

Our minibus was speeding on a country road to the spacious open-air enclosures which were the site of the seminar participants' first meeting with saigas.

Photo by Carlyn Samuel



Traditional welcoming ceremony

Enter Nature as a friend

The seminar's site visits began with a visit to the village of Yashkul'. There, the Living Heritage Steppe Club is active, based at the local school with the participation and support of the Centre for Wild Animals of the Republic of Kalmykia. Members of this club have approved their Charter, adopted a programme of actions and even acquired an emblem with an image of a lovely and defenceless saiga baby on it. A “younger brother” of the Living Heritage Steppe Club, the BambTsetsg Steppe Club, has recently been born. A noble image of Uldis Knakis, a biologist and hunting expert, who created the very first special saiga protection squad in Kalmykia and was killed in the steppe by poachers, was agreed as the basis for the Clubs' nature protection and outreach activities. Such an authoritative and heroic character serves as a strong foundation for education of the younger generation. In the Living Heritage and BambTsetsg Steppe Clubs, innovative teachers E.A. Samtanova and D.A.Byurchiyeva took a bold step by delegating many powers to the children. The children embarked on a study of the saiga's role in steppe ecosystems and in the life of the Kalmyk people, in their folklore and traditions. The activists of the Living Heritage Club have collected unique materials about the life and conservation activities of Uldis Knakis. Based on this research, a presentation was prepared and given to the seminar participants. Very popular with village residents are lectures on "The saiga is a contemporary of the mammoth" and "A proud symbol of the Kalmyk steppe".

Yashkul' Breeding Centre. Its vast territories and The timorous and cautious saigas moved away from the guests to the far end of the enclosure. We could only make immediate contact with Maslishka, a female saiga. Malishka is practically tame, she allowed us to stroke and photograph her. For many participants such close contact with a saiga was the first in their lives. Integrated activities are carried out at the Breeding Centre to address saiga conservation issues in the north-west pre-Caspian region; these include both scientific research and transfer of practical experience of captive saiga breeding to other Centres. On the following day we headed for

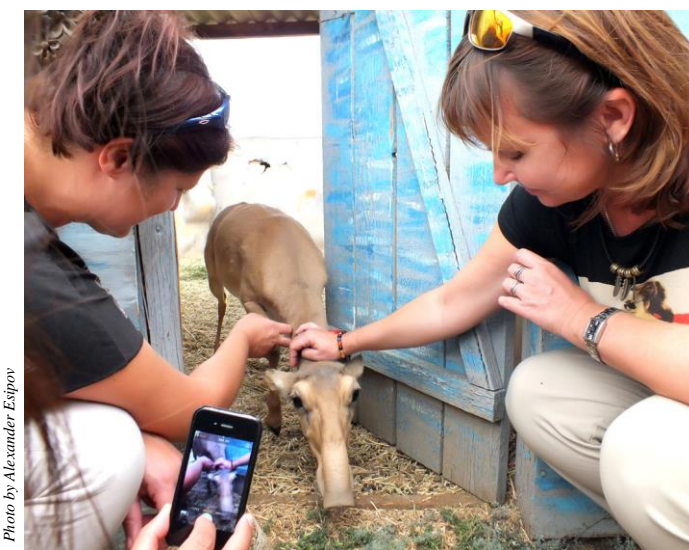


Photo by Alexander Esipov

Malishka, our favorite saiga

the heart of the Astrakhan steppes, the Stepnoi sanctuary. In anticipation of seeing saigas, we are staring into the distance with intense eagerness. Vladimir Kalmykov, director of the sanctuary,

meets us on the way and we go deeper into the territory of the nature reserve. Very soon we notice saigas rather close by. They are running graciously across the steppe, kicking up clouds of dust. According to the Stepnoi staff, in order to save this natural idyll, they have to wage real war on poachers. Inspectors do not have days off or holidays, at any moment they are ready to rise in defence of nature. We arrive at a mobile camp and have an opportunity to talk to the Stepnoi sanctuary's ranger team. These contacts were very important for the Uzbekistan delegation to give them tips for the running of the Saigachy sanctuary, which is

currently being designated. The head of the Living Heritage Steppe Club in Yashkul, Yevgeniya Samtanova, took the opportunity to establish contacts with the Stepnoi team, and discuss arrangements for the children in the club to visit their neighbours very soon.

Summing up the results of the seminar, I would like to quote the words of the Director of the Centre for Wildlife Animals of the Republic of Kalmykia, Yury Arylov: "Saiga conservation is an integrated problem of legislation, enforcement, education and awareness. The fate of this unique animal is in our hands".

Editor's Note: *Unfortunately the Yashkul' captive breeding centre has experienced severe difficulties since our seminar, see the Update below. We do not know whether our favourite, Malishka, is still alive.*

Saiga competition in Kazakhstan attracts over 2000 kids

Zhanna Aksartova and Alia Tonkobaeva, ACBK, zhanna.aksartova@acbk.kz

More than 2,000 creative and research works by children from all over Kazakhstan were entered into the first national competition "Saiga - a symbol of the Kazakh steppe". The competition was run by the Association for the Conservation of Biodiversity of Kazakhstan (ACBK) and the Ministry of Education and Science, with support of Fauna and Flora International and 'Haileybury Almaty' school, from November 1st to December 20th, 2014.

Kazakh children aged 6-15 submitted poems, drawings, research papers and videos about the saiga, promoting a caring and responsible attitude towards this unique antelope and its habitat.



Photo by ACBK

It's hard to pick the winning artwork



Photo by ACBK

Kids' artworks

We received works from 13 regions of Kazakhstan. Children from 50 districts, 23 cities and 180 towns took part in the competition. The largest number of works came from the North Kazakhstan and Atyrau

regions. The most popular category, with over 1200 applications, was 'Images of Saiga', and judges had a tough time choosing the winners from the high standard entries. The works of the winners will be used by ACBK in their new environmental education and awareness campaigns. ACBK will also compile and release a collection of the best poems and drawings and will organize an exhibition in 2015. The best 25 entries (overall winner and 24 awards) all received a prize and a further 100 were awarded runner-up prizes. Each entrant received a letter of thanks, comics and posters about the Saiga as well as saigabadges. ACBK would like to thank all the teachers and parents who supported the kids taking part in "Saiga - a symbol of the Kazakh steppe"!

The Day of Migratory Animals is one more reason to become closer to nature

Natalya Shivaldova, «Ekomaktab» Ecological Resource Centre, nshivaldova@mail.ru

A diversity of representatives of the animal world regularly embark on risky and exhausting travels just to survive as a species. So many dangers and obstacles are encountered by migratory animals on their way. And many of them have been created artificially, by human hands. The saiga is a champion long-distance migrant.

Until quite recently, the saigas of the Ustyurt Plateau would make one of the lengthiest of the saiga's seasonal migrations. In autumn the animals came from the steppes of Kazakhstan to the winter pastures of Uzbekistan, and in spring they returned north to the steppes of Kazakhstan. Snow leopards follow their prey, mountain goats, through the steep mountains, crossing the borders of Kyrgyzstan, Tajikistan, Uzbekistan and Kazakhstan. Bukhara deer travel from one bank of the Amu Darya River to another, from Uzbekistan to Turkmenistan and back. What makes these animals tick? What makes them start on such lengthy travels, often at risk of their lives? Animal migrations are caused by changes in their living conditions. Shortage of forage, low temperatures, a search for favourable breeding grounds and other reasons make animals cover many kilometres by air, land or water. An ecological festival dedicated to Migratory Animals Day was held in the schools of Nukus and Ustyurt in October 2014. The festival was preceded by preparatory work during which children from the Steppe Wildlife Clubs made informative posters showing the lengthy migrations undertaken by such champion animals as marine turtles, whales, monarch butterflies and of course, saigas, Bukhara deer and snow leopards. Children also chose their favourite characters from the kingdom of migratory



Photo by Elena Bykova

Painting the Saiga Queen

animals and made masks representing them. The young ecologists, assisted by educators and the club head, then found out about their characters and started rehearsing their mini-performance. Early in the morning the next day, everyone who entered the school saw a poster with pictures and interesting facts about the life of migratory animals. Senior students from the Steppe Wildlife Club, dressed as a Saiga King or Queen, came to visit small children from the primary school and gave them a short performance about migratory animals.



Photo by Olya Esipova

Wildlife club members at the Migratory Species day



Role play

Because you remember better when you teach others, we chose to use this "peer-to-peer" learning

Kalmykia pays tribute to the memory of Uldis Knakis

Aigul Aitbayeva, Center for Wildlife Animals of the Republic of Kalmykia, aigul-0889@mail.ru

We have already written about the fate of Uldis Knakis, a biologist and hunting expert who devoted his life to saiga conservation (see SN-12). We remind readers that Uldis Knakis was born in 1939, in the Tsestin district of the Latvian Soviet Socialist Republic. He graduated from Irkustsk Agricultural Institute with honours, majoring in biology and game husbandry; after that (in 1964) he was assigned to work at the Astrakhan State industrial farm as a chief in the ranger service protecting saigas in the Kalmyk Autonomous Soviet Socialist Republic (ASSR). In 1966, Uldis took up a position in the State Hunting Inspectorate under the Council of Ministers of the Kalmyk ASSR, and in 1969, he became head of the specially created saiga protection squad. For his selfless service to saiga protection, Knakis was repeatedly awarded government decorations. On September 26, 2014, 44 years had passed since the tragic death of Uldis Knakis, who was shot by poachers who were committing outrages in the Kalmyk steppes. It was only a week until his birthday on October 3, 1970, when Uldis would have turned 31. The loss of this still very young man roused society but, unfortunately, law-enforcement agencies failed ever to find his murderers. A monument was set up at the location of Uldis's tragic death in the Yustin district of the Republic of Kalmykia. On September 12, 2014, at Yashkul' high school, an open session of the Living Heritage Steppe Wildlife Club was held, with the topic "An heroic deed of man for the sake of nature". It was dedicated to the memory of this truly heroic person. Representatives of the Saiga Conservation Alliance, the People's Trust for Endangered Species, ACBK and Directors of Steppe

approach. After the visit of these unusual guests to the primary school, a second wave of curiosity arises, but now it is more conscious. Now a queue forms to look at the information poster. For a long time, children kept discussing this new information, which was presented in such an unusual way. They were astonished and delighted. They learned about the difficulties which these living beings had to overcome in their struggle for survival. It seemed that Nature itself came to visit them and became closer and more understandable.

Wildlife Clubs from Kazakhstan and Uzbekistan attended this session. On the day of remembrance for this hero, September 26 2014, a group of enthusiasts and people who were simply not indifferent, visited the scene of the tragic death of U. Knakis. These included the Director of the Centre for Wild Animals of the Republic of Kalmykia, Professor Yury Arylov; inspectors from the Hunting Department of the Kalmykian Ministry of Natural Resources B.L-G. Dordjiyev and V.G. Levashov; E.A. Samtanova, Honoured Teacher of Russia, biology teacher at Yashkul' school, and head of the Living Heritage Steppe Wildlife Club; and student members of the Living Heritage Steppe Wildlife Club. The monument was restored and the area around it was cleaned. During a small meeting, participants spoke about the deed of valour accomplished by Knakis and the current status of saiga conservation. The meeting ended with a minute's silence in tribute to the memory of U. Knakis. The memory of Uldis Knakis, of his honesty, vehement love of wildlife and nature, unswerving discharge of duty and unprecedented devotion to his profession will always be enshrined in our hearts.



At the monument to Uldis Knakis

Difficult times at the Centre for Wild Animals of the Republic of Kalmykia

Photo by CWA



The farmstead of CWA, winter time

From the very first issue of Saiga News (in 2006) we have been acquainting our readers with the work of the Centre for Wild Animals of the Republic of Kalmykia and its captive breeding centre, a pioneer in breeding and keeping the saiga in captivity. We have covered the organisation's achievements, both in scientific research and environmental education. In the course of its operation the Centre has not only become the pride of Kalmykia, but has also served as a foundation for a number of international projects and has carried out a lot of educational work with the younger generation.

Photo by CWA



Lots of excitement about new knowledge

Every year hundreds of people from various parts of the world visit the Yashkul' breeding centre near Elista, the capital of the republic of Kalmykia. Since the spring of 2014 the Centre has entered a streak of bad luck, suffering first a reduction in funding intended for food for the saigas, then the threat of

liquidation and finally, being struck by a series of deaths among the saigas, which inexplicably died right in their pens. In October 2014, the government of the Republic of Kalmykia decided to rationalize its budgetary expenditures, which made the threat of liquidation a reality.

Members of the Civic Chamber of the Russian Federation and ordinary people signed an appeal to Sergey Donskoy, the Minister of Natural Resources and Environment of the Russian Federation. The Secretariat of the Convention on Migratory Species (CMS) expressed concern about the fate of the Centre and its unique breeding centre and made an appeal to that effect. The Saiga Conservation Alliance did not stand aside either, and supported the Centre by sending a letter to the Ministry of Natural Resources and Environment of the Russian Federation, addressed to the person responsible for the implementation of the CMS Memorandum of Understanding concerning Conservation, Restoration and Sustainable Use of Saiga. So what will become of the captive breeding centre? Until a few months ago saiga were listed as a game species in Russia, which, despite the deep sadness of the fact, gave us hope that the Centre would acquire the status of a state experimental game husbandry unit, and the work the Centre had been carrying out for almost 15 years could be continued. However, recently the government of the Republic of Kalmykia made a crucial decision to include the saiga in the Red Data Book of the Republic of Kalmykia, which automatically prohibited saiga hunting. It was the best resolution from the government of the republic, which partly restored its reputation in the public eye after it had brought the Centre and its unique breeding centre to the brink of liquidation.

However, the Centre found itself in an uncertain situation. The long and difficult negotiations with the officials of the Ministry of Natural Resources and Environment gave us hope that the Centre with its complex of pens would not die, but would be turned into a visitor and scientific research centre under the jurisdiction of the Cherniye Zemli state national biosphere reserve. At least, this is the task Bataar Ubushayev, the recently appointed Director of the reserve, sets before his employees and himself.

In this connection we wish him every success in his difficult but noble cause of conserving the saiga and the whole biological diversity of the fragile ecosystems of the Cherniye Zemli ecological region. We also hope that in the nearest future all the

More information on the CWA can be found at:

<http://kalmsaiga.com/saiga.php>,
<http://www.drive2.ru/l/1237815/>.

For more information on the current situation visit:

<http://www.elista.org/>,
<https://www.ridus.ru/news/181705>,
<http://dni.ru/bloggers/2015/3/26/298952.html>.

For the position statement of the CMS see:

<http://www.cms.int/en/news/devastating-blow-captive-breeding-efforts-critically-endangered-saiga-antelope>

Media reports

Saigas listed in the Red Data Book of Kalmykia

Resolution number 86 of the Government of the Republic of Kalmykia on March 10, 2015, included saigas in the Red Data Book of the Republic. This was done on the initiative of the Ministry of Environment of Kalmykia because the north-west pre-Caspian population has decreased substantially in recent years. According to experts, only 4,000 animals were present during the rut in December 2014. Very few adult males have been observed.

Read more at: <http://kalmnpriroda.ru/n476.html>

formalities relating to the transfer of the Centre to the reserve will be executed and we will be happy to know that the Centre for Wild Animals is open again!



Photo by CWA

Impossible to make do without being fed during winter

Saiga deaths in Kazakhstan

The media has reported extensively on the mass mortality of saigas in the Betpak-dala population of Kazakhstan, both in Kazakhstan and internationally. The government of Kazakhstan has set up a commission to advise on the mass mortality, and has pledged a research fund for work into saiga disease, ecology and monitoring. The latest official figure of the number dead, reported to the World Organisation for Animal Health on 5th June 2015, was 134,252 saigas, but we expect this number to increase.



Photo by Evgeny Polonsky

Articles

Saiga Monitoring within the Stepnoi sanctuary, Astrakhan Region, reveals a substantial decline in saiga numbers over the last ten years

Vladimir Kalmykov, Stepnoi sanctuary, Astrakhan region, Russia, f6o7k8u9c0@rambler.ru

Over the last 20 years the saiga population inhabiting the north-west pre-Caspian region of Russia has been in a state of decline. In July 2013 the saiga was added to the list of particularly valued biological resources; illegal hunting, keeping, procurement, storage, transportation, shipping and selling of saigas and their products entail criminal liability pursuant to article 2581 of the Criminal Code of the Russian Federation.

In 2014, we were awarded a grant from the SCA's Small Grants programme, supported by the US Fish and Wildlife Service, to carry out year-round monitoring of the saigas inhabiting the sanctuary, analyse the data obtained, create a database with information about the distribution, number and sex-age structure of saiga herds within the sanctuary, and compare the present-day data with similar data collected 10 years ago. Thanks to this grant, we purchased a UAZ-Hunter vehicle that considerably facilitated the work. The monitoring operation was based on the monitoring protocol developed 10 years ago as part of the Darwin initiative project "Using saiga antelope conservation to improve rural livelihoods" led by Imperial College London. In 2014, we carried out observations over 168 days and filled out 182 report forms. We registered 926 encounters with saigas, averaging 119 saigas per encounter. The data suggest that saigas inhabit the Stepnoi sanctuary all year round.

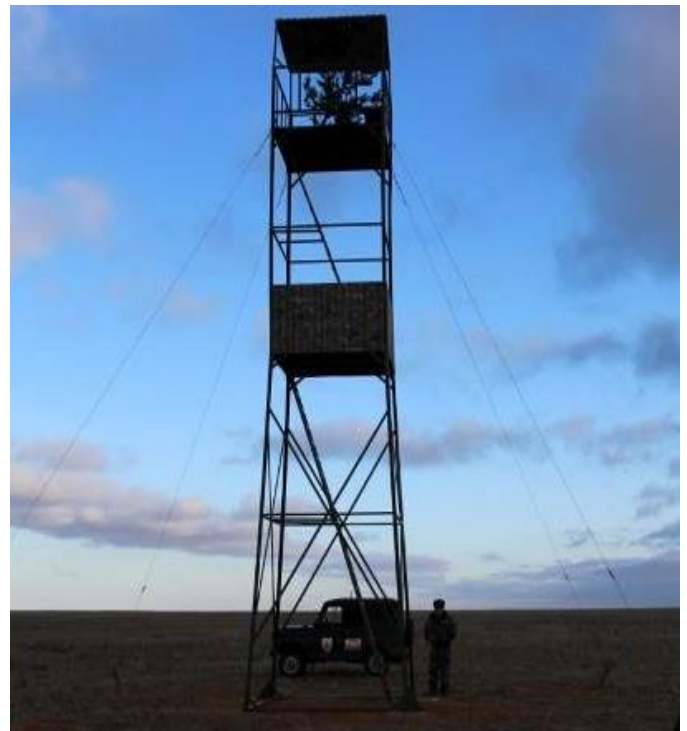


Photo by Galina Kalmykova

Stepnoy Reserve can be clearly observed from this tower

As would be expected, the largest saiga herds were encountered during the rutting (November-December) and calving (April-May) seasons. After calving, in the middle of summer, these aggregations break up into smaller herds and disperse both over the territory of the sanctuary and beyond its boundaries where the sanctuary staff have no authority.

In the summer months male animals were encountered extremely rarely (about 1.5%) and practically all of them were young animals, born in 2013. By the beginning of the rut the number of males had considerably reduced (to 0.1% of individuals encountered), arousing serious concern about the status of the pre-Caspian saiga population. Frequent evidence of poaching activities outside the borders of the sanctuary (sport motorcycle tracks, de-horned heads of animals etc) testify to continued poaching. A preliminary comparative analysis of the 2014 data with the 2003-2008 data shows that saiga numbers within the north-Western pre-Caspian



Photo by Galina Kalmykova

Specialists of the Stepnoi sanctuary making observations

region have reduced significantly. In 2007, about 15,000 saigas gathered for calving and about 20,000 saigas for rutting. In 2014 these numbers did not exceed 4,500 and 2,000 respectively. Over the last 10 years the geographic distribution of herds has not changed significantly, though the proportion of large herds encountered has reduced slightly. In 2003-2008, herds numbering up to 50 animals were seen 59% of the time, those numbering 51-500 animals 34% of the time and >500 animals 7% of the time. In 2014, these figures were 60%, 37% and 4%, respectively. One of the most likely causes for the reduction in numbers is the decline in the overall proportion of males; from 3.6% in 2003-2008 to 1.5% in 2014. During the rutting season, the proportion of males in 2003-2008 averaged 0.7%, compared to only 0.1% in 2014. Over the last 10 years, practically all the rutting and calving of this

population has occurred within the Stepnoi sanctuary. Over the entire observation period in 2014, 7 cases of saigas killed by wolves were noted; this is of insignificant impact on the saiga's survival in the region. Our activities are not limited to the protection and monitoring of saigas; they cover all the Stepnoi's inhabitants. In order to improve the protection of biodiversity in general, the sanctuary has attracted funding to build a 15-metre high watchtower in the Nikolsky area. The sanctuary staff also carry out fire-prevention measures consisting of ploughing and clearing tracks and laying out fire lines. We maintain the artesian wells where saigas and other species regularly come to drink; install artificial nests for birds of prey; and give talks explaining the illegality of poaching and other violations of the sanctuary's rules, to the people living nearby. In 2003-2008, saigas concentrated in



Photo by Evgeny Polonsky

A saiga herd coming up to a watering place in the Stepnoi sanctuary

the north-west of the sanctuary (Volga area), in 2014, they had moved to the centre (Nikolsky area). This shift is most likely accounted for by issues beyond the sanctuary boundaries, such as an increase in the number and size of livestock farms in adjacent areas, or fires, which are sometimes spread into the sanctuary by strong winds. Due to the well-coordinated teamwork of the sanctuary's inspectors, they are quickly put out. In conclusion, we would

Like to express our gratitude to the staff of the Institute of Ecology and Evolution of the Russian Academy of Science for their constant assistance and consultation while implementing the project, as well as to the U.S. Fish and Wildlife Service and the Saiga Conservation Alliance for their support of our most important and difficult work, especially today, when the saiga situation in Russia leaves much to be desired.

Population abundance and factors affecting the distribution of saiga antelopes in western Mongolia

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Introduction

The Mongolian saiga (*Saiga tatarica mongolica*) is categorized on the IUCN Red List as an endangered sub-species due to its small population size and threats from illegal hunting, harsh winters, and competition for resources with livestock. Estimates of population size are vital for understanding species ecology and for monitoring population trends to inform species management. Especially for threatened species, population estimates are crucial for developing conservation strategies and assessing their effectiveness. Methods used previously for estimating population sizes of the Mongolian saiga provided only a measure of relative abundance or were restricted to smaller geographic regions. Distance sampling methods are flexible, efficient, and cost-effective for monitoring sparse populations distributed over large regions. In addition, for the future conservation of the Mongolian saiga, a quantitative identification of human factors that influence or limit saiga movements and distribution within their current range is essential. The overall goal of this research was to estimate saiga abundance across its entire range in western Mongolia, and to use the data in spatial modelling to assess the human and environmental factors influencing saiga distribution. During 04-15 February and 15-27 August 2014, we surveyed 39 systematic line transects (10-km spacing) with a total survey effort of 1,505 km across a 14,713-km² area in western Mongolia. Each survey was conducted by three teams simultaneously. Distance sampling analysis using the software Distance 6.0 was used to estimate saiga densities from line transects (Thomas et al. 2010). To develop a habitat model, we split the survey transects into 3x3 km blocks (n = 519), and used the number of saiga groups calculated in each block to derive a response variable. We developed five predictor variables (NDVI [a measure of plant productivity], elevation, slope, distance to nearest



Photo by Bayanbat Thegmer

Mongolian saigas

settlement, distance to nearest surface water) and used Generalized Linear Models with a Poisson error structure to assess saiga distribution. Model selection was performed using the Akaike Information Criterion. Relative importance of variables explaining the distribution of saiga in relation to a suite of variables was evaluated using hierarchical variance partitioning in the R software.

Results

In total, we observed 148 saiga groups and 1,934 individuals during the winter survey, and 243 groups and 1,738 individuals during the summer survey (Figure 1). The global estimate of detection probability was 0.44 (CV = 3.49) with an associated effective strip width of 489 m. The survey efforts in winter and summer were the same, but the encounter rate (number of groups/km) almost doubled in summer (i.e. 0.08 in winter vs. 0.15 in summer). However, because groups seen in the winter were sometimes large, the estimated densities of saiga individuals during winter and summer were not statistically different between seasons, at 1.20/km² (SE = 0.25) and 0.81/km² (SE = 0.22), respectively. Overall, the average estimate was 14,869 animals (CV = 15.00) across the saiga's entire range of 14,713 km² area, or a density of about 1 saiga/km².

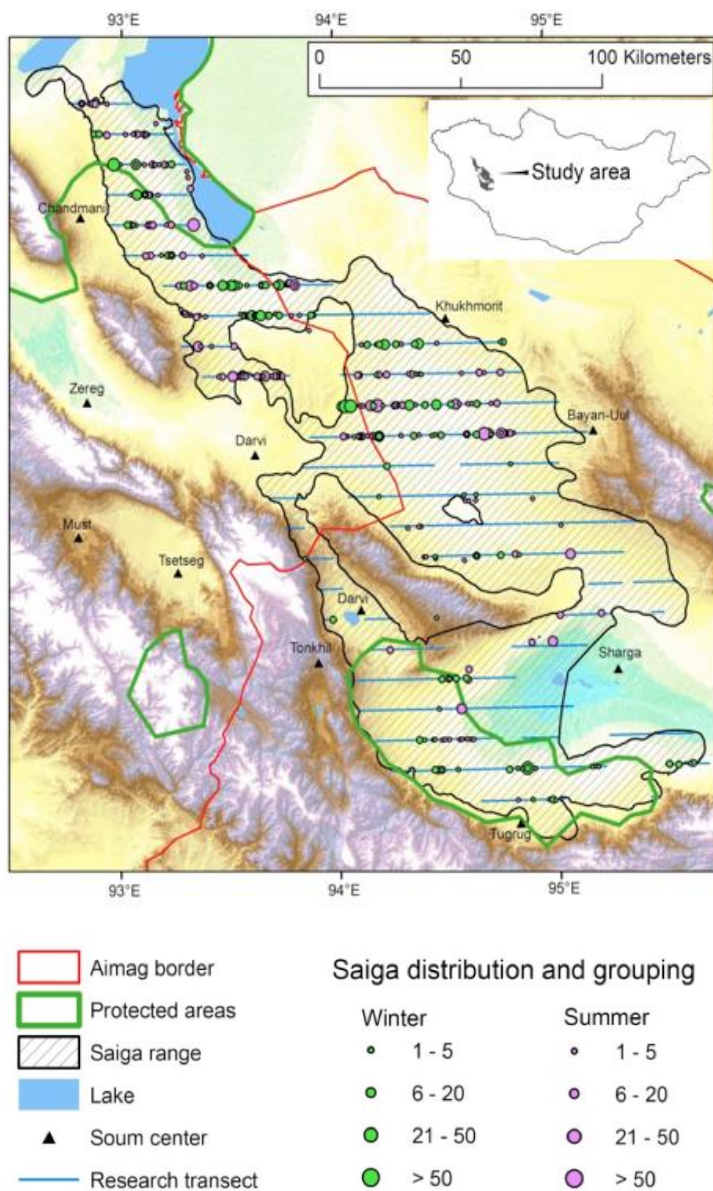


Figure 1. Spatial distribution and grouping patterns of Mongolian saiga observed along the line transects during winter and summer surveys in 2014, western Mongolia

The best model explaining the spatial distribution of saigas included the covariates of NDVI, elevation and distance to water, and explained 53% of the variance. Distance to water emerged as a more significant factor when modelled as a second-order polynomial, indicating the selection of intermediate values of this variable by saigas. Moreover, the reduced model suggests saigas tended to occur in areas with higher NDVI and avoided areas with higher elevation. According to the hierarchical variance partitioning approach, the relative importance of the variables for explaining the spatial distribution of saigas in Mongolia was: distance to water 36%, elevation 28%, NDVI 23%, distance to the nearest settlement 11% and slope 2%.

Discussion

This is the first survey for Mongolian saigas to utilize a statistically rigorous methodology, using line transect distance sampling to obtain population estimates across its entire range. Our population estimate for saigas in western Mongolia (11,000-20,000) is considerably larger than previous estimates (e.g. 5,000-7,000 individuals in 2006), based on minimum counts (Amgalan et al. 2008). It is difficult to draw firm inferences about trends in population size because of the change in monitoring method, which is likely to have increased the detectability of saigas and therefore led to a larger abundance estimate than would have been obtained from a repeat of the previous methods.

However, we suggest the saiga population in Mongolia has increased in the last decade, probably due to favourable weather and enhanced law enforcement. Improving the precision of population estimates is a prerequisite for evaluating the effectiveness of conservation measures, as wide confidence intervals complicate detection of any trends. Because it is difficult to detect changes in population abundance of small and widely distributed populations, an important next step in developing a standardized monitoring protocol is to identify methods that improve precision. We have shown that multiple factors affect the distribution of saiga antelopes in western Mongolia. Our model demonstrates that saigas are more prevalent in areas with higher plant productivity, lower elevation, and moderate distances to nearest surface water. Selection for greater values of NDVI (e.g. higher plant productivity) by Mongolian saiga did not come as a surprise in this extremely unproductive environment. Access to water is a critical factor for ungulates inhabiting arid environments for survival and reproduction, particularly during dry seasons. The saiga's preference for areas that were located in an intermediate distance from surface water might be explained as a trade-off between predation, disease, and water requirements.

Acknowledgements

This research was funded by the Saiga Conservation Alliance's USFWS-funded Small Grants Programme and the Gobi-Altai Environmental Protection Agency of Mongolia. We appreciate the support of Carlyn Samuel and E.J Milner-Gulland. Also, we would like to thank field team members and drivers for their hard work during the surveys.

Participatory monitoring of saiga distributions and poaching in Ustyurt, Uzbekistan

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The cross-border location of the Ustyurt saiga population brings difficulties for conservation despite the protection activities carried out in Kazakhstan and Uzbekistan and a number of international agreements signed by the countries (e.g. the CMS MoU on saiga conservation and the Bilateral Agreement between Kazakhstan and Uzbekistan for conservation of the saiga and its habitat). On top of existing threats, especially poaching, a border fence was erected between Kazakhstan and Uzbekistan between October 2011 and July 2012, which has had a serious impact on the Ustyurt population, cutting off traditional migration routes (see articles in SN15).

A narrow corridor with a width of about 12 km was left in the fence; however, the total length of the fence is more than 200 km and this corridor is inadequate to allow animals to migrate freely. Also roads and oil and gas infrastructure severely affect the Ustyurt ecosystem. In 2012, 2014 and 2015, robust participatory monitoring using motorbikes was conducted in the Uzbek part of Ustyurt to provide long-term data on saiga distribution and abundance, based on a transect design which was developed under our Whitley Fund for Nature project in 2012 (see S. Offord's article in SN14).



Photo by Dmitry Golovtsov

Monitoring team during transect census survey

We have also collected qualitative data about saiga poaching and illegal trade with support of the State Committee for Nature Protection of Uzbekistan.

Saiga transect censuses from motorcycles

The survey was conducted in the north-eastern part of Karakalpak Ustyurt (hereinafter, the project area), the area most frequently used by saigas. The area covered was 1.67 million hectares and limited to the north by the state border; to the east by the escarpment of the Ustyurt plateau and the Aral Sea, to the south at the latitude N44°15', to the south-west by the 10 km strip along the Kungrad - Beyneu road, and to the west by the longitude E56°45'. The project area covers almost all the area of the Saigachiy landscape reserve, which is in the process of being designated.

The transects had a total route length of 1143 km and covered 137,200 hectares, which is about 8.2% of the project area. In future, this line transect method can be used in the Saigachiy reserve to monitor their saiga population.

In 2012, 5 rounds of transects were carried out, in early April, late April-early May, late May, July and September. Due to the lack of funding in 2013 censuses were not conducted. Subsequently, surveys were conducted in May and October 2014 and February 2015.

The number of saigas encountered during the survey period in 2012 decreased from 525 in April to 12 in September. Since most animals have already migrated north by the time our survey starts in spring, and have not yet returned by September, the decline in numbers over this period could have been caused by poaching pressure.

A comparison of data from the same months in 2012 and 2014 suggests that saiga numbers have decreased a lot; from 244-317 individuals in May 2012 to 60 in May 2014; and from 12 individuals in September 2012 to zero in both September 2014 and February 2015 (Fig. 1). The lack of saigas in February 2015 is of particular concern, because this is before the saigas would be expected to have migrated to the north, and so they should still be present in the area in large numbers.

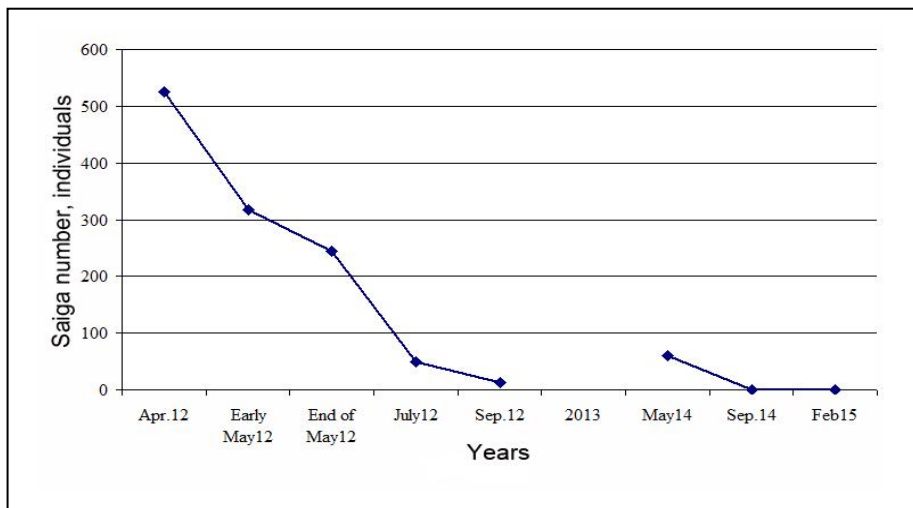


Figure 1. The number of saigas seen on the transects in 2012 and 2014-2015

Based on our census data we can say that the number of saigas in Uzbekistan has decreased substantially and that the Ustyurt population is in crisis. This is confirmed by the results of the annual aerial survey conducted in April 2014 in the Kazakh part of Ustyurt by the Kazakhstan Committee on Forestry and Hunting and ACBK. The number of saigas recorded was 1,700 individuals, which is 69% less than in 2013 (5,400 saigas). The population appears to be declining very rapidly over the last two years (Fig. 2), which is contrary to the overall trend for saiga populations in Kazakhstan (*see* SN18). We suppose that there are

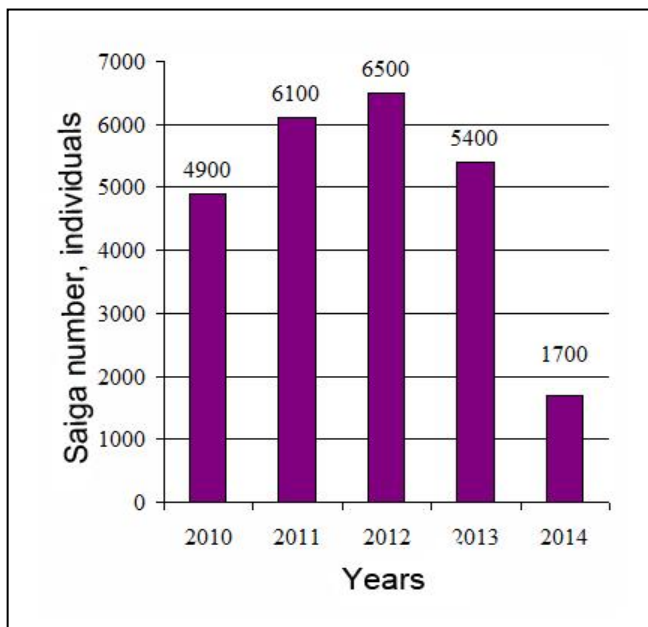


Figure 2. Ustyurt saiga population sizes, 2010-14, based on the aerial survey in Kazakhstan

around 500 saigas left in Uzbekistan, including those on the Vozrozhdenie peninsula, surviving animals in the northern part of Karakalpak Ustyurt and a few animals found in the more southern parts of the plateau. Poaching is still a serious threat but our

information suggests that it hasn't increased over the last two years, and the weather in 2013-2014 wasn't extreme. The only thing that changed which could have led to a further decline in the saiga population was the construction of the border fence.

Fence building continued during our surveys in 2012, and at that time saigas could still cross the border relatively easy during the autumn and spring migrations.

In 2013 and 2014 migration routes were completely blocked except for the 12 km corridor. ACBK's satellite collar data confirms that saigas have crossed through this narrow corridor (*see* article by Albert Salemgareev, SN16). We still have no evidence on whether the fence causes saiga mortality during attempts to cross it, or whether it simply prevents them moving south. However, we can conclude from the surveys conducted in both Uzbekistan and Kazakhstan that the combined effect of poaching and the border fence have impacted very negatively on the Ustyurt saiga population overall.

Observations of saigas by local people

Information about saiga presence/absence collected in Jaslyk, Karakalpakiya and Kubla-Ustyurt villages in 2010-2014 corroborates our findings from the transect survey. In total 2190 saigas were spotted by local people between January 2010 and December 2014, including 185 males, 536 females, 168 calves and 1301 unrecognized saigas. The highest number of animals was observed in 2010 (1224 saigas), the lowest in 2012 (155 saigas). Comparison of the number of observations in January-August 2010 and the same period in 2014 showed a decrease from 1301 to 78 (Fig. 3). Females with calves have been reported in a number of locations, demonstrating that saigas breed in Uzbekistan, rather than just migrating south in the winter.

Poaching and illegal trade

Poaching continues to be a problem. Between 2010 and 2014, our informants reported that just one group of hunters killed 251 saigas including 104

males and 147 females. The highest level of poaching (168 saigas) was reported in 2010. Next year, around 32 animals were killed. In September 2014 to March 2015, saiga antelopes were not killed at all despite the attempts made by poachers (Fig. 3).

Our best guess is that there are about 20 active poachers in the 3 main saiga villages, a reduction from 10 years ago, when around 50 people were involved in illegal hunting in the village of Jaslyk alone (Bykova, Esipov, FFI report, 2004). Numbers

have decreased due to the lower profitability of illegal business because of declines in saiga numbers, government enforcement, finding new jobs and people moving to Kazakhstan to work. Thus our data suggest that there is an ongoing decline in saiga numbers in Uzbekistan. The most significant decrease was observed in 2013-2014. It is likely to have been due to the combined effect of several threats, first of all poaching and

construction of the border fence which blocked migratory routes in 2012. This confirms the negative prognosis made about the effect of the fence on the already extremely depleted Ustyurt population (see article by Milner-Gulland, SN15). To save the saiga from extinction it is necessary to strengthen controls on poaching by law enforcement agencies and to ensure protection of the saiga's range by accelerating the process of re-designation of the Saigachy landscape reserve in Uzbekistan. It is also vital to mitigate the impact of the border fence and facilitate saiga movements during their seasonal migrations.

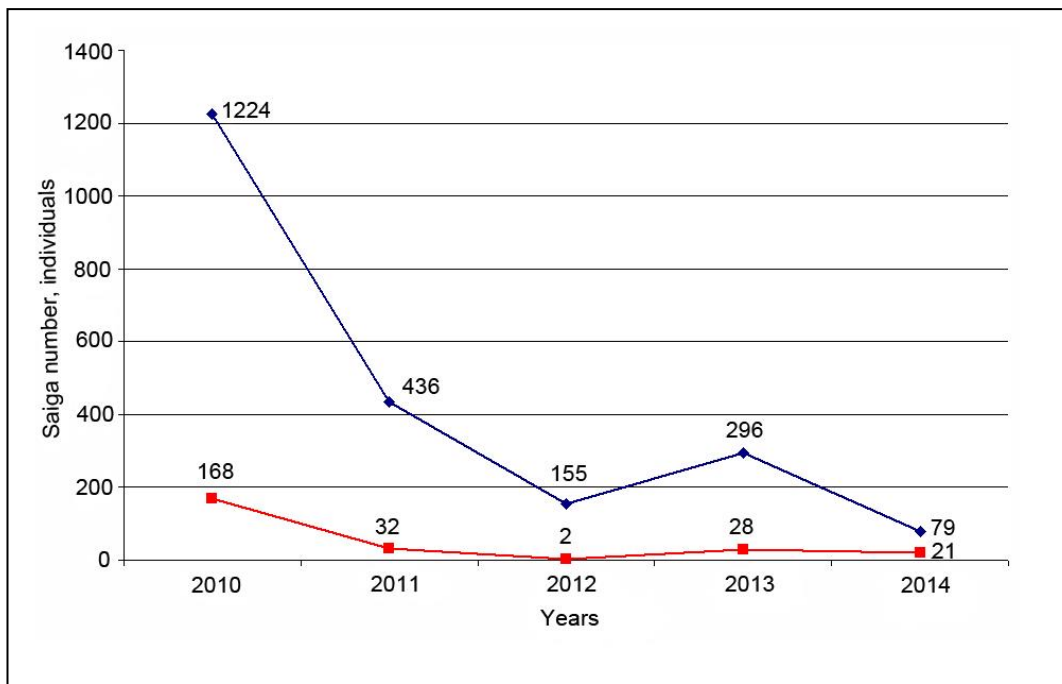


Figure 3. The number of saigas recorded by local people (blue line) and number of saigas reported killed in the same period (red line)

We tried to understand who poachers are and how many poachers are present in local villages. There are 4 categories of people involved in illegal saiga business:

1st category “hunters” – their main motivation is sport, they are happy to make money but this is not their main aim. Very often they hunt for meat. As a rule these people are over 40; they have work but get paid irregularly for economic reasons (3-4 months per year without salary).

2nd category “poachers & smugglers” – this is their main business or an important part of their business; they hunt only for money; they are jobless and involved in other criminal activities like smuggling and even stealing of cattle.

3rd category “traders” – former citizens of Uzbekistan who were involved in saiga business in the past; they moved to Kazakhstan and come back to their native villages to buy saiga horns; formerly they were jobless and are likely to be involved in illegal saiga activity in Kazakhstan as well.

4th category “middlemen” - both men and women are involved in this illegal trade; they collect horns and then sell them to the traders from Kazakhstan.



Photo by Alexander Esipov

Seized horns from the Ustyurt population

Usability of high-resolution satellite images for saiga antelope monitoring

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Estimation of animal abundance is one of the most important aspects of monitoring. Saiga surveys are carried out using different techniques, including aerial surveys from low-flying AN-2-type aeroplanes or helicopters and surveys from ground vehicles. These methods can track relative abundance over time but may incur a great deal of observation error, caused by the difficulty of counting fast-moving animals. In recent years, aerial photography from drones has started to be used for saiga surveys during calving, but these methods are still not well developed. All these methods also may have a negative impact both on the animals and their natural environments. High-resolution satellite images may provide an alternative approach to saiga population estimation. Remote-sensing earth observation methods are being rapidly developed which can be used to assess ecosystem status and identify small objects such as some species of mammal, including the saiga. The objective of this study was to determine whether high-resolution satellite images can be used for saiga identification and to develop the survey method. We used images from the GeoEye-1, EROS-B, and Pleiades satellites and analyzed the images using the ScanEX IMAGE Processor software. Statistical calculations were made using Statistica 8.0 software. Distances between groups of animal and between animals within the groups were calculated using MapInfo Professional 8.0 SCP software. We chose the Yashkul' breeding centre of the Centre for Wildlife Animals of the Republic of Kalmykia as a control site, because it contained a known number of saigas. We chose the Stepnoi sanctuary in the Astrakhan region as a field site, because regular ground-based observations by the sanctuary staff suggested that the chance of saiga presence at the time of the image was very high, and it was possible to verify the results of the image analysis using field observations. We decided on a set of identification features to distinguish saigas from other features such as livestock or physical objects:

contrast ratio of the object and its background; colour of animals in the image; their size [length, width and height]; proportions [length-width ratio]; structure and form of grazing herds. In order to make sure that the resolution of satellite images was sufficient to distinguish objects the size of saiga antelopes, we analyzed three images of the Breeding Centre enclosures with resolution from 0.5 to 0.8 m per pixel. In all three images we found the same number of objects as the actual number of saigas in the enclosure. Using a 0.5m pixel image from the Pleiades satellite we measured 154 saigas, and estimated: length 0.91 ± 0.18 m; width 0.54 ± 0.13 m; body length-width ratio 1.74 ± 0.37 m. These data were used as baselines for subsequent saiga identification in satellite images of the Stepnoi reserve.

Identification features allowing us to distinguish saigas from livestock included their colour, size and proportions as well as the form and structure of grazing herds. In terms of colour, we chose the season when saigas have their white winter coats, which contrast very well against the dark color of the snowless steppe. Herds of sheep have individuals of similar size to saigas, but never consist of animals of uniform colour. Saigas and sheep are shorter and more narrow than cows and horses. The saiga's length-width ratio is at least 1.0, usually about 1.5, while in sheep it does not exceed 1.0. In the satellite image, the height of an object is determined by the tangent of an angle of incidence of the sun's rays and the object's shadow length; saigas are smaller in height than camels, cows, and horses. We calculated the distances between animals in their aggregations, using the distance between a focal individual and the three nearest individuals as an estimate. Our analysis suggested that the mean distance between animals in saiga aggregations (2.84 ± 1.3 m) differs from that in sheep flocks (2.18 ± 1.51 m; t test, $t = 6.58$, $p < 0.005$). This approach of deciphering features allowed us to identify aggregations of ungulates in the steppe and to distinguish saigas from domestic

livestock. Our tests show that it is optimal to use the whole set of deciphering features and then to select the parameters which are most clear-cut in combination to determine the identify of each object. In the image of the Stepnoi sanctuary, we identified 14 aggregations of saigas and 3 groups of “non-saigas” (one flock of sheep and two mixed herds of sheep, cows and horses). We were able to identify animal aggregations over a wide area (266 km²), calculate distances between the aggregations and their coordinates, and count the number of saigas in them (from 16 to 1,657). Our suppositions concerning the species and locations of the herds we identified in the satellite images were confirmed by the field staff of the Stepnoi sanctuary. The image analysis also allowed us to link the images with particular types of behaviour in the aggregations; in the image grazing saigas look like rounded, tightly packed clusters, while saiga herds on the move form

narrow elongated aggregations. Thus, deciphering of high-resolution satellite images taken in the winter season made it possible to estimate the number of saigas in a defined area, analyze the distribution and structure of their groups, and the herds' activities. The method produces minimal errors and does not cause any damage to the animals.

The work was performed with financial support from the small grant programme of the Saiga Conservation Alliance and the US Fish and Wildlife Service. The authors are grateful to ScanEX, A.A.Lushchekina, A.A. Bobkov, the staff of the Stepnoi sanctuary and the Centre for Wild Animals of the Republic of Kalmykia. For more detail, see: V.V. Rozhnov, A.A. Yachmennikova, D.V. Dobrynin. On the possibility of identifying the saiga antelope (*Saiga tatarica*) on very-high resolution satellite images *Doklady Biological Sciences*, 459, 358-362.

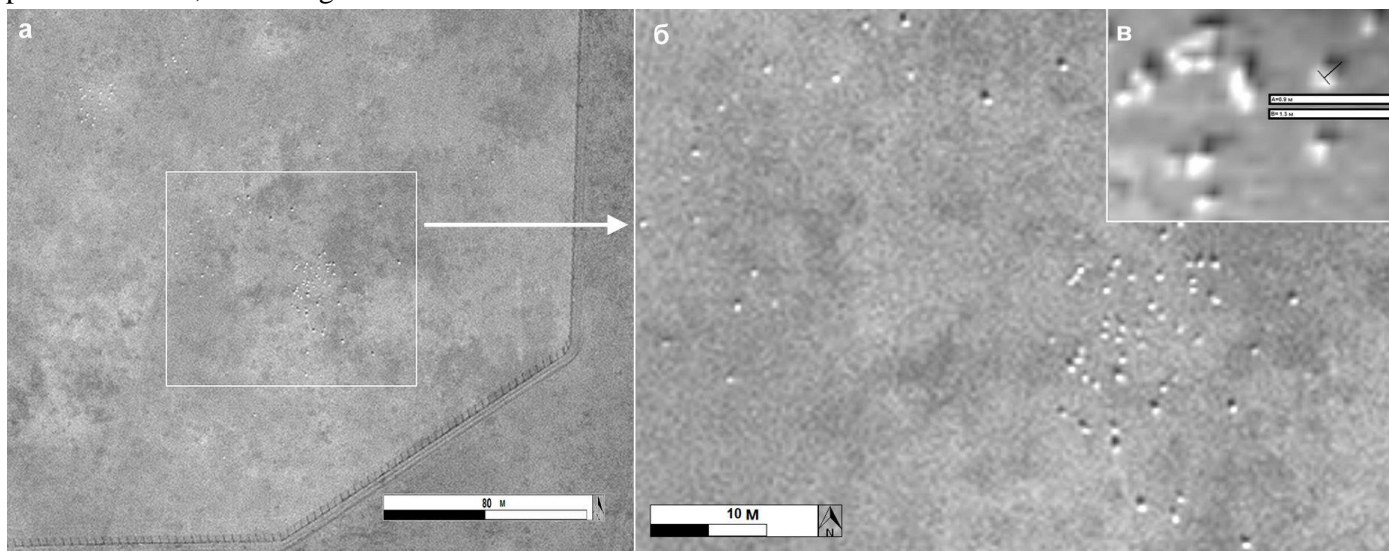


Figure. 1. The image of an open air enclosure of the Yashkulsky nursery with saigas taken from the Pléiades satellite: (a) saigas in the enclosure; (b) an enlarged fragment of (a); and (c) the method of measurement of animals and their shadows.

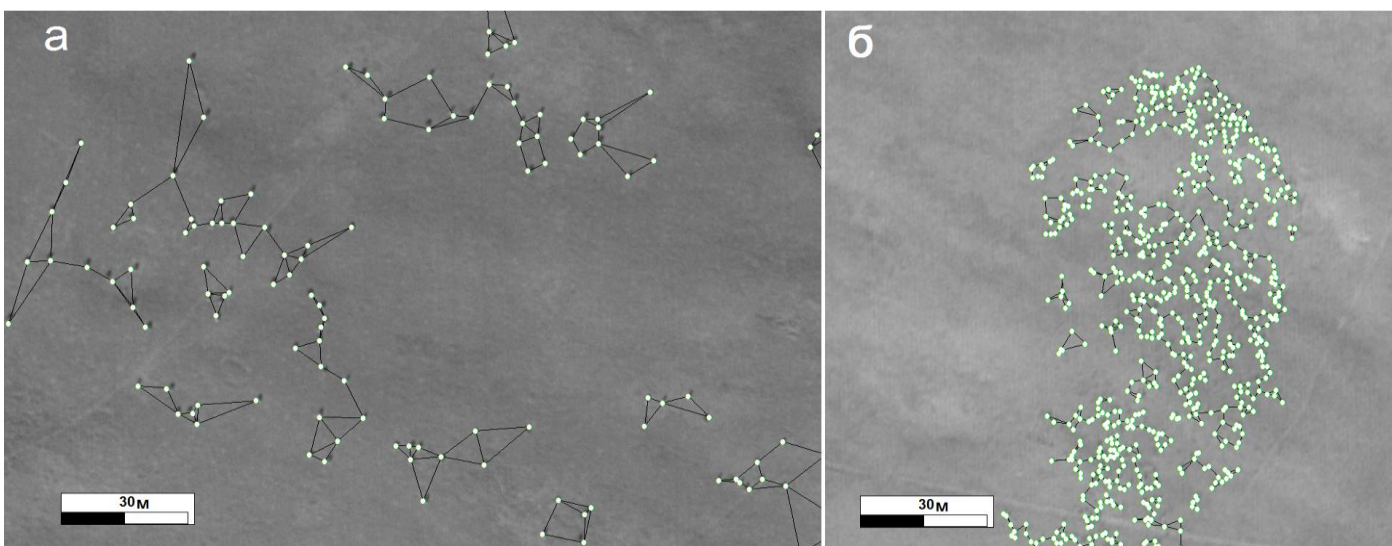


Figure.2 Distances between animals in a saiga aggregation (a), and in a flock of sheep (b) characterize the structure of these animals aggregations. While processing the image, animals are marked with color dots.

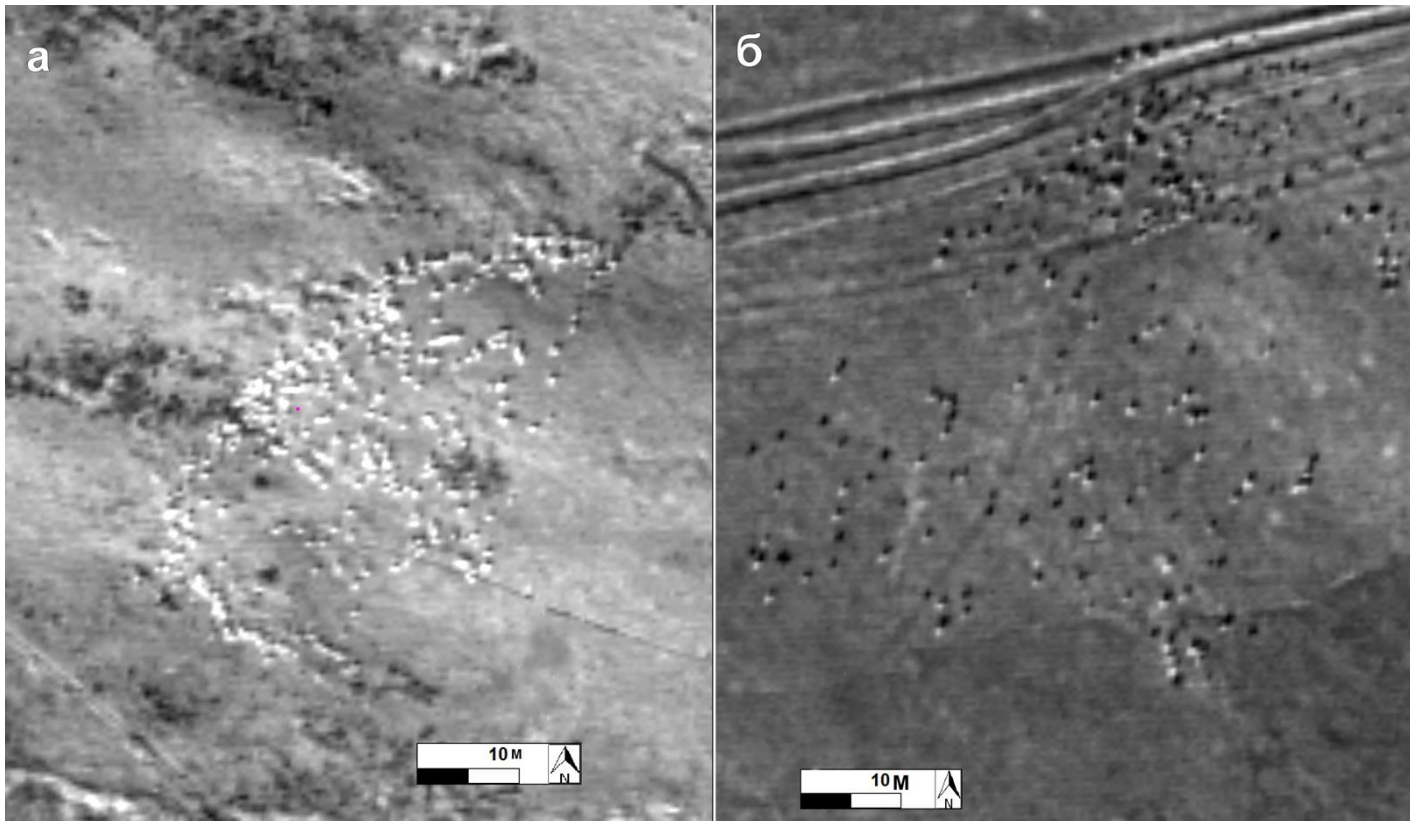


Figure 3. An image of the steppe in the Stepnoi sanctuary taken from the EROS-B satellite. Animals in the herds vary in colour: in (a) all the animals are white, allowing their identification as saigas; in (b) the animals are of different colours, helping to identify them as "non-saigas".

Tracking saiga horns to their population of origin using stable isotopes

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Similarly to poaching for saiga horn, African elephants are hunted for their valuable ivory, and poaching and smuggling of ivory is professionalized as never before. In order to increase the protection of elephant populations, the African Elephant Plan was developed in 2008. As part of this initiative, an isotope study was implemented that aimed to assign confiscated ivory to its origin, which will make it possible to distinguish legally from illegally sold ivory and to track ways of smuggling. The study achieved remarkable results. Findings showed that unknown ivory samples could be assigned to their origin with confidences up to 89%. Inspired by this and other related studies, the question arose whether

tracking the origin of animal tissue with stable isotopes could also be helpful for saiga antelopes. In a similar way to ivory, stable isotopes may help agencies to identify illegally traded saiga horns and to determine their origin even if the horns are found in crushed or powdered form. Isotopes are variations of atoms from the same element with slightly different weights. This diversity is due to differences in the number of neutrons in the atoms. The addendum “stable” means that the element is not subjected to radioactive decay. For investigations with isotopes the ratio of the two most abundant stable isotopes of an element is examined. Further, this ratio is related to an international standard

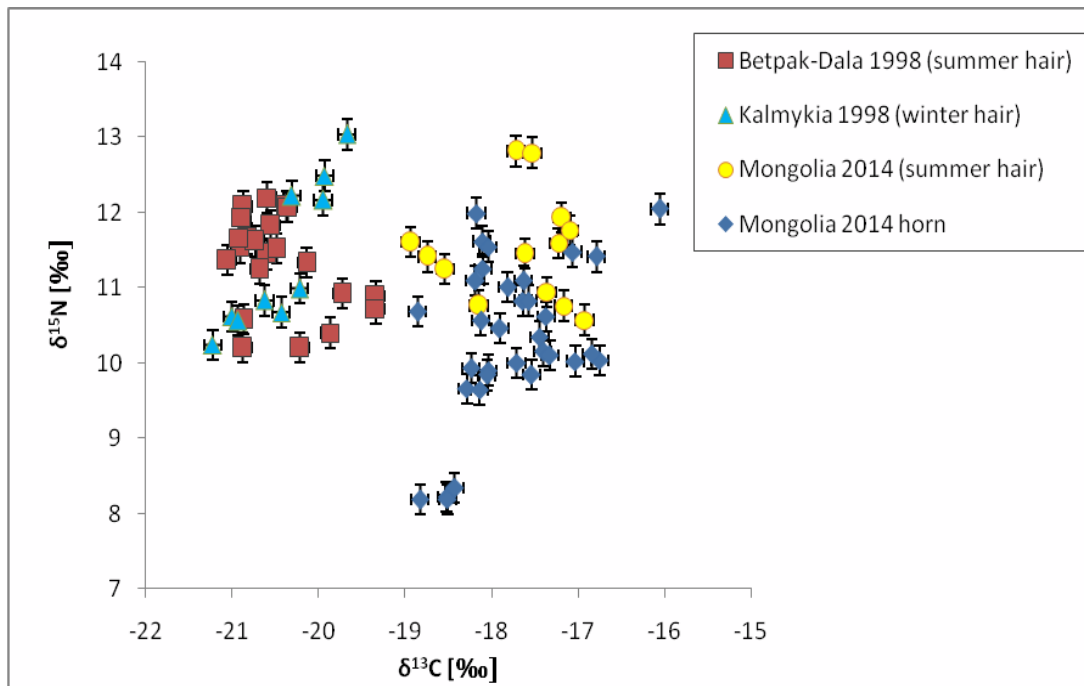


Figure 1: $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ values of saigas from Betpak-Dala, Kalmykia and Mongolia. The $\delta^{13}\text{C}$ range of the Mongolian samples does not overlap those of the Betpak-Dala and Kalmykia populations. (Reproducibility: $\delta^{13}\text{C}$: $\pm 0.1\%$, $\delta^{15}\text{N}$: $\pm 0.2\%$.)

expressed using the “ δ ”- notation, making comparisons more straight forward. Through ingested food and drinking water, the isotopes of a given element get incorporated and integrated into an animal’s body. Several factors can cause geographical differences in isotope ratios. For carbon, the type of plants that are consumed is the

main factor. For nitrogen, it is the local climate and for sulphur, the underlying bedrock. Hence, the different isotope ratios can provide geographical information, which is recorded in the animal tissue and therefore can be used to distinguish between different saiga populations.

To check whether different geographical origins can be tracked using stable isotopes, saiga hair and horn samples from Betpak-dala (Kazakhstan), Kalmykia (Russia) and Mongolia were analyzed with a mass spectrometer for carbon-, nitrogen- and sulphur- isotope ratios. The isotope ratios of hair and horn are directly comparable since they both consist of keratin. In total 78 samples were analyzed; 22 hair samples from Betpak-Dala, 10 hair samples from Kalmykia, 13 hair samples and 33 horn samples from Mongolia. The group of Mongolian samples was clearly separated from the two other tested groups by its higher $\delta^{13}\text{C}$ values (Fig. 1).

Statistical analysis showed that, when distinguishing the Mongolian samples from the other two tested populations, applying just carbon ($\delta^{13}\text{C}$) led to an accuracy of 100% correctly assigned samples (Table 1). Further, when distinguishing between all three populations, up to 98% of the samples were assigned correctly when all three isotopes were used. The

Table 1: The upper table shows the results of distinguishing between Mongolia, Betpak-Dala and Kalmykia using quadratic discriminant analysis. The lower table shows the results when distinguishing only between Mongolia and the other two populations. Results change when sulphur or sulphur and nitrogen are omitted from the quadratic discriminant analysis.

Betpak-Dala vs. Kalmykia vs. Mongolia			
	$\delta^{13}\text{C}, \delta^{15}\text{N}, \delta^{34}\text{S}$	$\delta^{13}\text{C}, \delta^{15}\text{N}$	$\delta^{13}\text{C}$
Number misclassified	1	8	13
Percent misclassified	1.37	10.26	16.67
-2LogLikelihood	6.709	27.74	45.58

Betpak-Dala and Kalmykia vs. Mongolia			
	$\delta^{13}\text{C}, \delta^{15}\text{N}, \delta^{34}\text{S}$	$\delta^{13}\text{C}, \delta^{15}\text{N}$	$\delta^{13}\text{C}$
Number misclassified	1	0	0
Percent misclassified	1.37	0	0
-2LogLikelihood	1.938	1.611	1.718

Mongolia vs the others indicates that, for some questions, it could be sufficient to use fewer isotopes to reduce the expenditure of time and money. However, when discriminating between three or more populations, using more isotopes increases the accuracy of the discrimination. The next step will be to collect and analyze samples from the other populations still missing from this research to see if this method is applicable for all five saiga

populations. Nevertheless, these preliminary results already confirm the possibility of discriminating between different saiga populations using stable isotopes. Thus, stable isotopes could be a useful tool in the future to help the fight against the illegal trade in saiga horns.

Photo by Matthias Schneider



Weighing hair samples before measurement

Recommendations for customs on sample preparation:

- Quantities of 2 mg and at least 5 samples per set are required.
- Sort and list the seized material (horn, hair, skin) using gloves.
- Get a picture of each piece of material.
- Transfer each piece of material in a separate re-sealable plastic bag.
- Write on the bag an identification code with the date of the seizure.
- Record the identification code with the corresponding picture.
- Send the bags and the information (picture, code identification) to the relevant laboratory.

For more information see:

<http://www.geo.uni-tuebingen.de/studium/studentische-projekte/wissenschaftliches-praesentieren-ss-2014-und-ws-201415/geowissenschaften/matthias-schneider.html>

Investigating the illegal consumption of the pre-Caspian saiga population

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Introduction

Illegal hunting continues to threaten the pre-Caspian saiga population in Russia. Though poorly documented, the trade and use of saiga horn is well recognised. There is much less focus on the nature and prevalence of saiga meat consumption.

Between May and July 2014, members of Imperial College London and the Centre for Wild Animals of the Republic of Kalmykia (CWA) conducted a socioeconomic survey and key informant interviews in six villages (known poaching centres) and 40 farms across eastern rural Kalmykia. The project aimed to determine the prevalence of household saiga meat consumption, and to understand the values, tastes and norms surrounding saiga meat and its consumption.

Given the expected sensitivity of speaking openly about illegal behaviour, prevalence estimates of saiga meat consumption were obtained using the Unmatched Count Technique (UCT) – an emerging indirect questioning technique in conservation research, which is thought to reduce the bias in answers. In UCT, people are shown a list of activities (or items) and asked to say how many they do, but not which ones. A randomly chosen half of the respondents are shown a list without the sensitive behaviour/item in it, and the other half are shown a list with the behaviour in it. The difference in the number of activities between the two groups is the estimate of the prevalence of the behaviour.

Prevalence of sensitive behaviours

In order to reduce bias in the UCT experiment, people were asked first about TV shows, then about legal game hunting. Then they were asked about sensitive behaviours - saiga meat consumption and poaching. Twenty-six percent ($\pm 8\%$) of households had someone who had hunted for game in the last 6 months, while 34% ($\pm 9\%$) had consumed saiga meat. The estimate of the proportion of households that had poached saigas in the previous 12 months was very low, but was likely to be between 0% and 12% (Fig. 1).

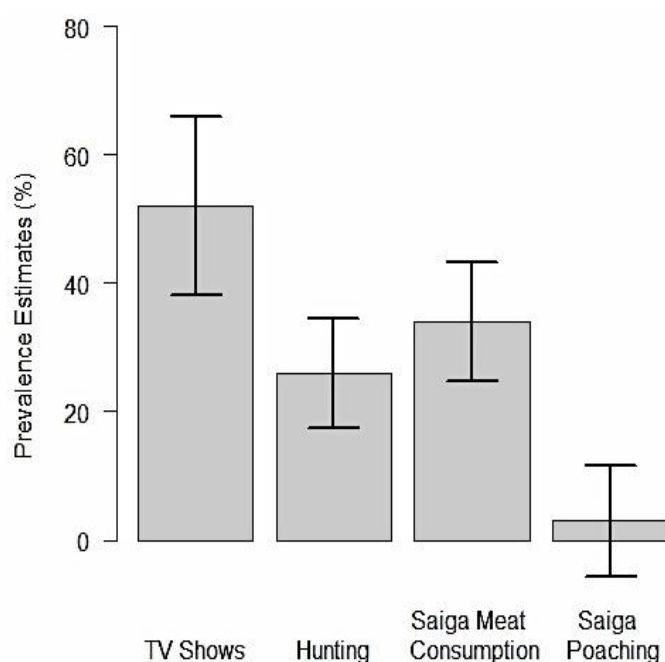


Figure 1. Household prevalence estimates for each target behaviour (for TV shows list - the UCT warm-up question - estimates reveal that 52% (± 13) of the study population had watched 'Let Them Talk' - a news programme - during the week prior to questioning)

Socioeconomic linkages

Wealthier households, headed by professionals and farm owners, were significantly less likely to have consumed saiga meat than relatively poorer households (headed by unskilled workers or the unemployed) over the previous six months. Although households that owned farms had consumed significantly more types of meat in general than households headed by skilled workers, unskilled workers and the unemployed, they had a significantly lower prevalence estimate

for saiga meat consumption. Households located in villages (<1000 people) had a significantly higher estimated prevalence of saiga meat consumption than both steppe (e.g. farms) and town (>5000 people) households. The villages of Erdniyevsky and Khulkhutta both had significantly higher estimates of saiga meat consumption than the larger town of Yashkul'. Ethnicity, household size and residency time had no significant effect on consumption.



Photo by Forrest Hogg

Fieldwork in Kalmykia - interviewing a farmer

Values, tastes and availability

The majority of respondents considered saiga meat as cheaper than other domestic meat – a perception that matched reported prices from key informants. However, saiga meat was sometimes referred to as a 'delicacy' and considered more expensive in towns than in smaller, more rural, villages. People tended to rank saiga meat as healthier than three other readily available meats; during the dissolution of the Soviet Union and other times of hardship, saiga meat was often seen as a viable source of protein and a remedy for ailments. To a degree these beliefs are still embedded in rural Kalmykia. Sentiments such as, 'if you are sick then you are permitted to eat saiga despite its illegality', were shared by some people.



A poster for the illegal saiga horn trade, found in a village

Informants suggested that whilst the availability of saiga meat is low, there are sufficient numbers of people willing to buy the meat if the supply were to increase. They also reported that prices of saiga meat have significantly increased over the last decade. Purchased by the carcass, saiga meat costs on average 67 RUB (1.5 USD) per kilo – a three-fold increase from 2004 estimates (20 RUB, 0.5 USD; Kuhl et al. 2009). Even allowing for inflation (in 2004–2013 the mean inflation rate for the Russian Federation was 9.35% per annum; www.inflation.eu), this represents a 50% increase in real terms. Despite this increase, saiga meat is still cheaper to buy than other common meats, such as beef and mutton, within the villages surveyed, suggesting poverty may play a role in driving consumption.

Social acceptability

There was a strong perception that society disapproved of hunting saigas, however the

responses to ‘most adults in my community believe that eating saiga meat is a bad thing to do’ were highly variable. Whilst 47% of respondents agreed with the statement, 20% were either neutral or not sure, and 27% disagreed. Interestingly, those people who agreed with the statement were less likely to have eaten saiga meat in the previous 6 months (based on the UCT results): 49% ($\pm 14\%$) of those who agreed with the statement had eaten saiga meat, compared to 15% ($\pm 12\%$) who disagreed with the statement.

Conclusions

This study reveals that the consumption of saiga meat in the rural districts of Kalmykia is widespread. Local perceptions of meat availability and reports given by key informants emphasize that the supply of saiga meat, through local trade, is irregular despite the continuing demand for it. Findings suggest that saiga meat consumption is associated with lower household socioeconomic status and limited protein access; however, people’s views of the different qualities of saiga meat are diverse, reflecting a range of values, tastes and pre-existing cultural norms. There is an association between people feeling that eating saiga meat is socially acceptable and them actually consuming it – public awareness events that aim to bring different sections of society together to discuss consumption may help re-align their divergent perceptions. The findings underline the importance of tackling meat consumption as well as the trade in horn in order to conserve saigas, and stress the need for a greater understanding of the human dimensions surrounding saiga poaching, trade and consumption.



Forrest Hogg carrying out a questionnaire survey

Factors affecting intention to volunteer to conserve the Ural saiga population

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Introduction

Understanding human behaviour is central to implementing effective conservation strategies. In this study, we aimed to understand what drives people's intention to volunteer for saiga conservation programmes. We conducted a survey of the residents of two villages in West Kazakhstan (Azhibay and Nursai). The villages were chosen as they have both had saiga awareness and education events operating in them for the same period of time. Saiga Days took place in 2010, 2013 and 2014 and a Steppe Wildlife Club has been running since 2013. The impact of attending these saiga awareness and education events was also assessed. We designed a questionnaire using Ajzen's (1991) Theory of Planned Behaviour, from social psychology, as a framework to assess willingness to volunteer for saiga conservation, by measuring attitudes towards volunteering, people's perceptions of the social norms around volunteering for saigas, perceived behavioural control (whether they feel able to volunteer), and their intention to volunteer (Fig. 1). We also collected data on people's knowledge about saiga status, and about conservation efforts and how to get involved, as this may affect people's intentions to volunteer.

Methods

The questionnaire contained four main sections: socio-demographic information; knowledge of the steppe; attitude towards the steppe; and willingness to volunteer. A shortened version of the questionnaire was developed for both children and adults at Saiga Day, to assess the impact of awareness events on knowledge, attitudes and willingness to volunteer. Door to door interviews were conducted between 4th and 7th May 2014 in Azhibay and between 10th and 13th May in Nursai, using opportunistic sampling. To reduce sampling bias the interviews were conducted on week days and weekends and at various times of day. Each interview lasted approximately 40 minutes. By the end of the research period the entire area of each village had been covered. The Saiga Day Quiz was distributed to all attendees of the Saiga Day event in each village.

Results

There were 239 respondents in total, including 113 from the door-to-door survey, and 34 adults and 92 children attending Saiga Day. Respondents generally had high levels of knowledge about saigas and the steppe. Residents of Nursai had slightly lower knowledge levels than residents of Azhibay. Those attending Saiga Day had the same level of knowledge as those who were not present.

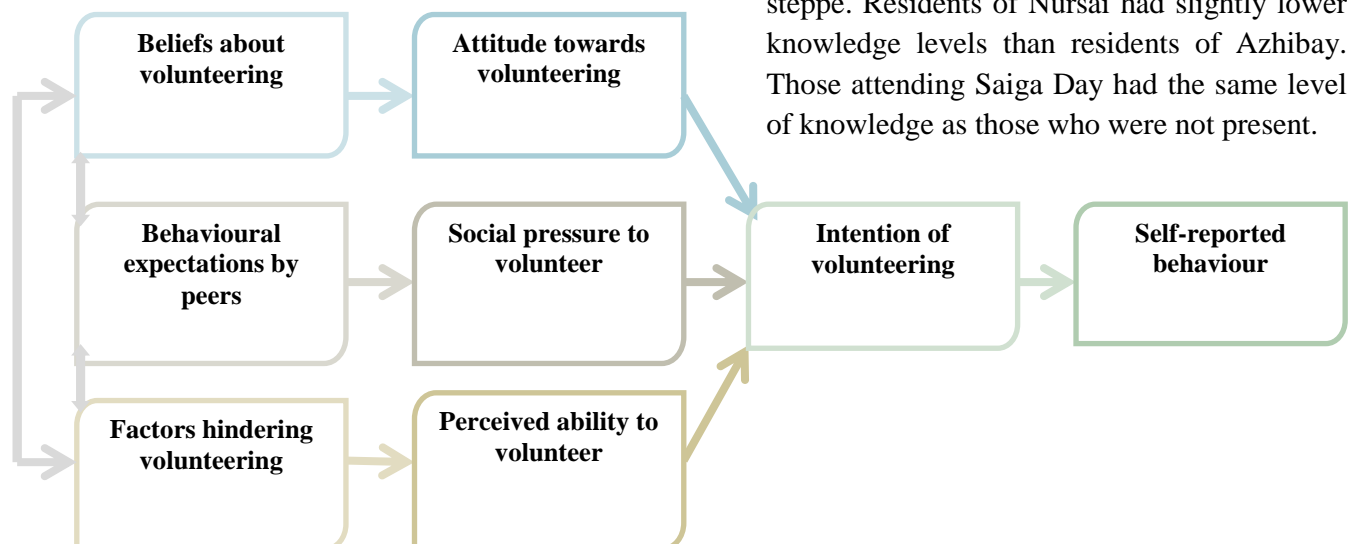


Figure 1. Ajzen's (1991) Theory of Planned Behaviour adapted for this study

This was unexpected but may be due to a transfer of knowledge between attendees and non-attendees, as Saiga Days have now been operating in these villages for three years. Women who looked after the home had lower levels of knowledge than other groups. Pensioners had higher levels of knowledge than other groups. Steppe Wildlife Club members had higher levels of knowledge than non-members. This was expected, as the children had been taught some of the information at the Steppe Wildlife Club. The majority of respondents, 70%, identified hunting by people as the main threat to saiga. 13% identified extreme weather. Other threats (e.g. predation, lack of grass or development and infrastructure) were much less often cited as the main threat. Respondents generally had positive attitudes towards the conservation of the steppe. Those with higher levels of knowledge and residents of Nursai had more positive attitudes, but those at Saiga Day had the same attitudes as other respondents. Subjective norms were the most significant factor in predicting willingness to volunteer for saigas. If respondents felt that there was social pressure to volunteer to conserve saigas, they were more likely to say that they were prepared to volunteer. This suggests that it may be possible to increase volunteering for saiga conservation by publicising how other people in the village are involved. Perceived behavioural control (i.e. whether they felt they were able to volunteer

if they wanted to) was not significant in predicting intention to volunteer. People with more positive attitudes to steppe conservation were more likely to be prepared to volunteer for saiga conservation.

We asked people whether or not they did actually volunteer to conserve saigas, and what they would like to do as a volunteer (Table 1). Those who said that they did currently volunteer were more likely to intend to volunteer in future. Pensioners were the least likely to intend to volunteer for saiga conservation. Over half of the respondents, adults and children, stated they would be prepared to attend saiga awareness events. This suggests that Saiga Day could be extended to include the whole village rather than being centred on particular schools. About half of adults were prepared to talk to their friends and families about saigas, but adults were much less willing to participate in activities that involve much higher levels of engagement, such as to helping collect ecological data or organising events. Children were keen to be involved in these types of activities, however, suggesting that there is potential for increasing their engagement in different types of saiga conservation. When respondents were asked to rate which conservation interventions would be the most effective, increased penalties and increased enforcement were in the top three (Table 1), but respondents rated direct public involvement in conservation as the second most important

Volunteer activity	Children %	Adults %
Participate in more saiga awareness events	62	57
Talk about the importance of saiga conservation to family / friends	18	48
Help with collecting ecological data on saiga populations	63	15
Lead / organise awareness events or clubs	52	16
Donate money	18	7

Table 1. Volunteer activities respondents would be prepared to do

Intervention:	1st	2nd	3rd	Total
Increase penalties for people who are caught	55	60	36	151
Increase direct public involvement in saiga conservation	17	39	61	117
Increase law enforcement effort	39	42	32	113
Improving incomes of local people from their current jobs	48	15	17	80
Change people's views on the value and importance of saigas	20	24	36	80
Help local people to get different jobs	21	25	14	60

Table 2 Ranked responses for most effective interventions to improve the status of saigas (number of responses shown, from children and adults combined)

intervention. There has already been a successful participatory monitoring scheme in the Ural region, so continuing this intervention could be potentially useful.

Recommendations

Based on this study, our recommendations for future saiga conservation in Ural and other regions are:

- Education and awareness campaigns such as Saiga Day should target the whole community and not just focus on schools.
- The Steppe Wildlife Clubs could start a young volunteers programme to instil volunteering behaviour at a young age, and could include more direct actions such as ecological monitoring and organising events.
- A formal volunteer programme, with an integrated monitoring and evaluation component, could be established to support

people willing to volunteer and to highlight to others that people in the community are volunteering, hopefully encouraging further people to join.

- Outreach to the region should continue to build upon people's willingness to help and increase local involvement in the organisation and running of Saiga Day and Steppe Wildlife Clubs
- Information provided to residents should be specific about what actions people can undertake to conserve saigas
- The possibility of reviving a participatory monitoring scheme should be explored further

Acknowledgements

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Saiga hero

To meet saigas was a great piece of luck and a good sign for me!



Photo by ACBK

Albert Salemgareyev is Technical Coordinator of the Altyn Dala Environmental Protection Initiative under the Association for the Conservation of Biodiversity of Kazakhstan (ACBK). He started to work with this organization as a project assistant in 2007 when he was a student. His research interests embrace ecology, ecological informatics, GIS, telemetry, biodiversity conservation. A childhood devotion to hiking, bird-watching, photography and video filming turned into his profession.

Editor: When did you first become interested in saigas?

Way back in my childhood, I knew about these animals from my parents, neighbours and teachers. I first happened to see saigas when I was a first-year student. It was in 2004 and then the saiga population was at critically low numbers. Therefore it was a great piece of luck and happiness for me and maybe a good sign!

Editor: When did you start to work in saiga research and conservation?

After my graduation from the Institute, I joined the ACBK team. At that point, a project to research and conserve the Betpakdala saiga population, the largest saiga population in Kazakhstan, had just been launched. Under this project, a lot of work was conducted including the study of migration routes, improvement of aerial census techniques, expansion of the State Protected Area network and many other things. This work is continuing.

Editor: What is your usual day like?

In my work no day is alike, so it is impossible to give a general description of my day. If we take my usual “field day”, then the major part is dedicated to research work: e.g. during aerial censuses you spend your time in the plane where you have to be very focussed to locate saiga groups looking through the window, manage to count them, and take photos to determine their sex-age structure. And during calving, we carry out transects when we count newborn saiga babies, determine their sex and weight and mark them; to do this we have to walk more than 10km every day. In winter, when rutting begins, we search for rutting aggregations in cars and snow mobiles to see how many males participate. Work in the office also keeps us from being bored because all the data we have collected need to be processed. Office work is also important for planning and arranging the subsequent field work.

Editor: What are the fundamental problems in your work?

I don't have any particular problems in my work, I love what I do. And if we speak about our work in general, it is worth mentioning a shortage of funding because there are many ideas for research into threatened species but there are not enough resources to implement everything.



Photo by Wendy Beauvais

Research in the birth areas of the Bekpak-dala saiga population

Editor: What can be done to remove barriers to your work?

Increase state funding for research and involve the industrial sector in the conservation of biological diversity in Kazakhstan.

Editor: What do you consider the best thing about your work?

One of the best things about my work is that I am doing my favourite work and contributing to a noble cause; it is the highest honour to make a contribution to the conservation and study of the ancient antelope that once walked the earth together with mammoths and woolly rhinoceroses! I consider one more important achievement in our work is our satellite marking of saigas and wolves. We are the first to be doing this in Central Asia, so we may be proud of the work we've done and will gladly share our experience.

Editor: What are the prospects for saiga conservation? What should be the top priority to help the species survive?

Nowadays, the saiga's situation in Kazakhstan is changing for the better, we can observe a more than 30% increase in numbers in two populations: Betpak-dala and Ural; only the Ustyurt population continues to decrease. The State spends enormous funds for protection and study of the saiga.



Attaching the satellite collar

Nonetheless, one of the major problems of today - poaching - is still unsolvable. Today poaching poses the main threat causing decreases in saiga numbers. I think we need to intensify our work on legislation to toughen punishments for poaching.

Editor: What has changed over the time you have been working on research and conservation of endangered species, and what are the current trends?

Unfortunately, I haven't worked in this sphere long enough to be able to make any comparisons. Yet I have no hesitation in saying that in our Republic, research and conservation of wild animals has changed for the better. This is exemplified by the fact that more and more young people are getting involved in the study of endangered species and take a great interest, with prospects for the future. In addition, many organisations, both national and international, are involved in the conservation of threatened species. If this continues into the future, we will hopefully solve the problem for some endangered species.

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