

2013 FIELD REPORT
**WILDLIFE AND ARCHAEOLOGY
OF THE MONGOLIAN STEPPE**



LETTER FROM: GANA WINGARD



Dear Earthwatch volunteers,

We are writing on behalf of our Mongolian and American team members to express our gratitude for all of your hard work on behalf of Mongolian wildlife! Our 2013 fieldwork went exceedingly well in almost every aspect. We captured and radio tagged a large number of animals (15 argali lambs, four ibex kids, seven argali, eight ibex, nine hedgehogs, five snakes, and 131 bats); we monitored, wing tagged, and leg banded 28 cinereous vultures fledglings; we leg banded and measured 31 lesser kestrels, six common kestrel fledglings, two golden eagle fledglings, and two Eurasian eagle owls; monitored nests of four raptor species; collected data on more than 100 vegetation plots; conducted 11 small mammal, insect, and lizard surveys; and gathered telemetry data on argali, ibex, and hedgehogs. It was a lot of work, but also a lot of fun!

Many of you have decided to continue to help our work with donations of money, equipment, training materials, or other useful items. Thank you very much! Your hard work is already paying dividends. We have expanded Ikh Nart, and are working to enlarge it even further in the near future based on data you helped collect.

Finally, our data has been incorporated into a new management plan for the reserve. A new ecotourism operation is already raising funds to support park management. You should feel proud for having a hand in this. Many of you have kept in touch. I periodically send updates to volunteers who wish to be included in communications. For those who want to receive news, please send us an email (gwingard@denverzoo.org and rreading@denverzoo.org) to request that I add your name to our distribution list.

I want to conclude by reiterating my thanks. We were thrilled by the energy, hard work, and wonderful goodwill you provided. We hope that our many new friendships will last! We look forward to continuing our work with Earthwatch, and hope to see many of you in the future. Please keep in touch.

Best wishes,
Gana Wingard

OUTCOMES: WILDLIFE AND ARCHAEOLOGY OF THE MONGOLIAN STEPPE

1

The team expanded their understanding of wide number of wildlife species and archaeological sites within Ikh Nart Reserve, which contributed to a new management plan that was approved by both the local community and Mongolia's Ministry of Environment and Green Development (MEGD) in early 2013.

2

Researchers Rich Reading and Sukh Amgaalanbaatar, informed by the data collected through this project on argali sheep (*Ovis ammon*) and Siberian ibex (*Capra sibirica*), helped draft management guidelines for argali sheep throughout central Asia.

3

In October of 2013, a new Ikh Nart Nature Reserve administration building opened. Sezin Sinanoglu, Mongolia's United Nations Development Programme resident representative, spoke at the opening ceremony, saying that it was only possible to construct the Ikh Nart Nature Reserve administration building because of Earthwatch and the Denver Zoo's long-term commitment to developing a sustainable management plan for the reserve and its wildlife.

SECTION ONE: SCIENTIFIC RESEARCH ACHIEVEMENTS

TOP HIGHLIGHT FROM THE PAST SEASON

The Ikh Nart Nature Reserve administration building was established in October 2013 at Dalanjargalan sum (district), Mongolia. At the opening ceremony of the office, Sezin Sinanoglu, United Nations (UN) resident coordinator and United Nations Development Programme (UNDP) resident representative in Mongolia, sent her special appreciation to Denver Zoo and Earthwatch Institute for working to preserve and conserve the important habitats and wildlife found in Mongolia for many years, with a particular focus on Ikh Nart Nature Reserve. Sezin Sinanoglu emphasized that the Ikh Nart Nature Reserve administration building was only constructed because of Denver Zoo and Earthwatch Institute's long-term commitment to developing a model program to sustainably manage Ikh Nart Nature Reserve and its wildlife. A Denver Zoo and Earthwatch Institute-funded research project, "Ecology of Pallas' Coluber snakes in Ikh Nart," won the "Best Biology Student Researcher" award at the 2013 Biological and Medical Sciences Symposium in Ulaanbaatar, Mongolia.

REPORTING AGAINST RESEARCH OBJECTIVES

OBJECTIVE ONE: DEVELOPING LONG-TERM CONSERVATION MANAGEMENT PLANS

Our goal is to understand the ecology of target species well enough to develop long-term conservation management plans that ensure the health and enduring public support for the species and for the Ikh Nart Nature Reserve.

We continue collecting substantial data on a wide number of wildlife species and archaeological sites within Ikh Nart. As our knowledge and understanding grows, we have become better able to develop more effective management plans. A new management plan was approved by both the local community and by the Ministry of Environment and Green Development (MEGD) in the beginning of 2013. Also, as a result of our work on the argali sheep (*Ovis ammon*) and Siberian ibex (*Capra sibirica*) project, participants Rich Reading and Sukh Amgaalanbaatar, helped draft management guidelines for argali sheep throughout central Asia.

OBJECTIVE TWO: ANIMAL CAPTURE AND MARKING

Research goal one: Each year capture and radio collar five to 10 adult, and eight to 10 young argali sheep (*Ovis ammon*) and Siberian ibex (*Capra sibirica*). We hand-captured and radio collared 15 neonatal argali lambs (9 male:6 female) and four ibex kids (1 male:3 female) in 2013. We also captured seven adult argali (5 male: 2 female) and eight ibex (54 male:4 female) in drive nets in 2013. Three argali received drop-off satellite collars, two ibex received global positioning system (GPS) collars, and the rest received radio-collars.

We captured and radio tagged nine hedgehogs in 2013, including two Daurian hedgehogs (*Mesechinus dauuricus*) (2 male:2 female) and seven long-eared hedgehogs (*Hemiechinus auritus*) (3 male:4 female).

Research goal two: Permanently leg band and wing tag 10–20 cinereous vulture (*Aegypius monachus*) fledglings, and place satellite telemetry units on two adult cinereous vultures. We wing tagged and leg banded a record number of 28 Eurasian black vulture fledglings in Ikh Nart in 2013 (two of these were tagged in September). Unfortunately, we could not capture any adult vultures in 2013.

Research goal three: Permanently leg band five to 10 lesser kestrel (*Falco naumanni*) fledglings, and capture and place tail mounted telemetry units on five lesser kestrel adults. We leg banded 11 adults (6 male:5 female)) and 21 juveniles. We also leg banded and measured six common kestrel (*Falco tinnunculus*), two Eurasian eagle owl (*Bubo bubo*), and two golden eagle (*Aquila chrysaetos*) pre-fledging juveniles. In 2013, we applied two light-sensitive geolocators on one male and one female lesser kestrels (they were not a pair, and were not from the same nest).

Research goal four: Survey small mammals and invertebrates monthly using live traps for mammals. Ear tag all small mammals captured. We sampled small mammals at each of five habitats (11 surveys total), including sandy drainage, shrub, rocky, short grass, and long grass. For small mammals, we logged a total 180 captures of 111 individuals. All animals received ear tags.

Research goal five: Collect biological samples (blood, hair, parasites, etc.) as necessary and morphological measurements from captured animals for future genetic, disease, and other analysis. We collected blood samples from 26 fledgling cinereous vultures. We performed sera lead analysis (n=17), chemistries (n=14), blood gases (n=15), and physiologic measurements (temperature, heart rate, respiratory rate) in the field.



OBJECTIVE THREE: FECUNDITY, SURVIVORSHIP, DEVELOPMENT, AND MORTALITY PROGRESS

Research goal six: Gather data on fecundity of marked individuals and survivorship of their young. We gathered data on cinereous vulture and lesser kestrel nestlings and adults in 2013 (see below). We maintain data on survivorship of all animals we radio telemeter. We also noted which collared female argali and ibex had lambs and kids during each month that we sighted them. We are still collecting these data.

Research goal seven: Evaluate survival of 20–40 cinereous vulture fledglings and eight to 16 young argali and ibex. We monitored 85 active nests of cinereous vultures and marked 28 vulture fledglings in 2013, for a total of 293 wing tagged fledglings since 2005. We collared 15 argali neonatal lambs and four neonatal ibex. Of these, at least five animals died in 2013.

Research goal eight: Assess the influence of nest and nest site characteristics on nest failure for 50–70 nests. In 2013 we monitored 85 nesting pairs of cinereous vultures at Ikh Nart. We collected data on all nests and nest sites. Of these, 28 pairs successfully reared chicks to fledgling. We now have nest site characteristics on more than 500 nest sites, and are beginning to analyze these data to examine factors influencing site selection and nesting success. We monitored 51 lesser kestrel, two common kestrel (*Falco tinnunculus*), two Eurasian eagle owls (*Bubo bubo*), and three golden eagle (*Aquila chrysaetos*) nest sites in 2013, and also analyzed our data to examine factors influencing site selection and nesting success.

Research goal nine: Determine sources of mortality for as many marked and radio collared animals as possible. We recorded the deaths of the five neonatal lambs in 2013. A raptor killed two lambs, and three lambs died of starvation. Two radio-tagged, long-eared hedgehogs died from an unknown cause. Eurasian eagle owl predated one Daurian hedgehog this year.

OBJECTIVE FOUR: HABITAT USE AND MOVEMENT PATTERNS

Research goal 10: Collect data on habitat use for radio collared animals using location data. We collected 461 very high frequency (VHF) telemetry locations on argali sheep and 205 VHF telemetry locations on ibex through mid-December in 2013. So far in the study, we have collected 13,456 locations on argali and ibex in Ikh Nart since November 2000. We collected 1,159 VHF telemetry locations of two Daurian hedgehogs and seven long-eared hedgehogs during 2013, of which 120 passive locations (daytime) and 1,135 active locations (nighttime) were collated from radio-tagged animals during the past 98 days of surveys.

We followed hedgehogs for seven days. We also obtained GPS, satellite, and satellite/GPS location data for argali and cinereous vultures. In 2013, we have collected 3,479 location data for cinereous vultures and 13,594 for argali.

Research goal 11: Collect data on hedgehog foraging using fecal analysis. We continued collecting hedgehog scats in 2013 (n=20), which we hope to analyze next spring.

Research goal 12: Determine prey (small mammal, invertebrate, and lizard) and forage availability from spring through autumn. We ran 11 small mammal grids including sandy drainage, shrubby, rocky, short grass, and tall grass habitats during 2013. We logged a total of 180 captures of 111 individuals. We gathered vegetation data on 100, 10-square-foot (one-square-meter) circular plots from June through September, including data on species composition, biomass, and phenotypic stage of the plants.

Research goal 13: Evaluate characteristics of den sites and hibernacula for hedgehogs. We gathered data on one Daurian hedgehog den in 2013. During the study we confirmed that Daurian hedgehogs hibernate between September 20–29.

Research goal 14: Compare habitat use and forage plants of target animals to assess resource partitioning and overlap. Stefan Ekernas continued working on his Ph.D. dissertation entitled, “Competition with livestock, population dynamics, and conservation actions for argali sheep (*Ovis ammon*) in Mongolia’s desert steppe.” Hannah Davie completed and defended her thesis on wolf and livestock conflicts.

Research goal 15: With help from birders throughout Asia, gather data on cinereous vulture dispersal and foraging patterns. We recorded four resightings of four different vultures in 2013. Of these, three re-sightings occurred in South Korea and one in Mongolia.

Research goal 16: Gather data on movement patterns and dispersal for five to 15 radio collared individuals/species. We collected 461 locations on argali sheep and 205 locations on ibex through December in 2013. So far in the study, we have collected 13,456 locations on argali and ibex in Ikh Nart since November 2000. We collected 1,159 locations of two Daurian hedgehogs and seven long-eared hedgehogs during 2012.

OBJECTIVE FIVE: BEHAVIORAL AND SOCIAL ECOLOGY

Research goal 17: Determine activity patterns for five to 15 radio collars individuals/species. We continue collecting more data via satellite collars on four argali. We continued behavioral analysis of a Daurian hedgehog in 2013, collecting data every two minutes for seven nights.

Research goal 18: Collect data on group sizes and composition for appropriate species. We gathered data on 1,129 argali groups and 330 ibex groups through mid December 2013. We now have group size and composition data on 13,092 argali groups and 3,337 ibex groups in Ikh Nart.

Research goal 19: Determine social organization. We mentioned the number of argali and ibex groups we observed in 2013 and since our work began above. We have begun analyzing social organization data and population vital rates.

OBJECTIVE SIX: INITIATION OF AN ECOLOGICAL STUDY OF PALLAS' COLUBERS (ELAPHE DIONE) IN 2010

Our main goal to increase awareness and knowledge of reptile ecology in Ikh Nart.

Research goal 20: Capture and radio transmit three to eight Pallas' coluber snakes. We captured 25 Central Asian vipers (*Echis carinatus*) and 10 Pallas' colubers (*Elaphe dione*), and put radio transmitters in five colubers in 2013.

Research goal 21: Evaluate characteristics of den sites and hibernacula for coluber snakes. We found a snake hibernaculum in 2013 at southern Ikh Nart. This hibernaculum is 42.6 feet (13 meters) deep and both species of snakes were gathering by this location in the beginning of the October 2013. This finding marks the first time anyone found a snake hibernaculum in Mongolia.



SECTION TWO: IMPACTS

PARTNERSHIPS

Partnership with the Institute of Biology of Mongolian Academy of Sciences and with National University of Mongolia

In 2013, we established another partnership with National University of Mongolia. We hired Dr. Batsaikhan from National University of Mongolia as our Ikh Nart Research advisor. We also created Ikh Nart Research Advisory Group including eight Mongolian scientists from various universities and institutions.

Recently, our Ikh Nart researchers presented their research updates to the advisory group in Ulaanbaatar, Mongolia. We're continuing to work with biologists at the Institute of Biology of Mongolian Academy of Sciences as they started their biological research career in Ikh Nart Nature Reserve.

Partnership with Institute of Archaeology of Mongolian Academy of Sciences

In 2013, we continued to work with Dr. Y. Tserendagva of the Mongolian Academy of Science's Institute of Archaeology as our lead counterpart and with his graduate student, Dalantai, who also works for the Academy. Two other undergraduate students participated in Ikh Nart archaeology research in summer 2013. Dalantai traveled to the U.S. to visit local cultural resource sites and to attend an intensive six-week language training course.

Partnership with Foreign Universities

Both Mongolian students and foreign students participate in field research in Ikh Nart. In 2013, Hannah Davie (University of Vermont) finished her master's degree on "Wolves and livelihoods in the arid steppes of Mongolia: An integrated approach to understanding patterns of human-wolf conflict." Stefan Ekernas (Ph.D. student, University of Montana) continued to work in Ikh Nart on argali and ibex for a period of two months.

CONTRIBUTIONS TO CONVENTIONS, AGENDAS, POLICIES, MANAGEMENT PLANS

International

OBJECTIVE SEVEN: REGIONAL IUCN CONSERVATION ASSESSMENTS AND RECOMMENDATIONS

We aim to use the data collected from our research to conduct regional International Union for Conservation of Nature (IUCN) conservation assessments for focal species in Mongolia, and recommend changes in status where pertinent.

We continued to work with the IUCN's Caprinae Specialist Group to review and update the status for argali sheep and Siberian ibex in Mongolia.

National or Regional

In 2013, the Strengthening Protected Area Network (SPAN) project continued to use Ikh Nart as a model park, and worked to disseminate ideas and practices to other parks.

Local

OBJECTIVE 8: DEVELOP CONSERVATION MANAGEMENT PLAN FOR IKH NART WILDLIFE AND HABITAT

Our goal is to use the data collected from our research to develop a conservation management plan for wildlife and their habitat in Ikh Nart. This plan should ensure the persistence of all wildlife species; the maintenance of the health of the ecosystem; and work with local people to ensure their support of the plan and that their use of the reserve is sustainable.

In 2013, the UNDP/GEF and MEGD SPAN project helped to finalize the Ikh Nart Nature Reserve Management Plan. The plan was approved by the Ministry of Environment and Green Development at the beginning of 2013. We continued collecting data on cultural resources in 2013, and we added a cultural resources component to our management plan.

OBJECTIVE 9: CREATION OF CONSERVATION INFRASTRUCTURE

We aspired to assist in creating conservation infrastructure in Ikh Nart (and Mongolia in general) and increase long-term funding sources to better insure the persistence of long-term conservation activities.

Partnership with Anza-Borrego Desert State Park

In March 2013, Dr. Rich Reading and Gana Wingard visited Anza-Borrego Desert State Park for a week. During this time we met with Anza-Borrego State Park superintendent and staff members and talked about future collaborations and exchanges.

Finally, the UNDP/GEF SPAN project has begun to support park management activities in Ikh Nart and to implement various projects included in the business plan for new and sustainable income sources for Ikh Nart Nature Reserve.

DEVELOPING ENVIRONMENTAL LEADERS

OBJECTIVE 10: TRAINING OF MONGOLIAN COLLEAGUES

Our goal is to build capacity by training two to five Mongolian professionals and five to 15 Mongolian students in wildlife research, management, and conservation techniques. We ultimately aim to transfer specific research projects over to our Mongolian colleagues.

Partnerships with Universities in Mongolia

Every year we work with students to help build capacity within Mongolia and elsewhere, and train the next generation of conservationists. The Mongolian national "Biological and Medical Sciences Symposium" was held on November 20, 2013, in Ulaanbaatar, Mongolia. This symposium is a nation-wide gathering of students and an opportunity to share research results, exchange ideas, promote collaboration, and network with Mongolian students in a variety of disciplines.

More than 70 students from various Mongolian universities and colleges participated in this event, and the top 15 students presented their research results. Three of these students were from Ikh Nart (Denver Zoo and Earthwatch Institute funded): Ankhaa (Pallas's Coluber snakes), Odmaa (plants), and Byamba (bats). A research project, "Ecology of Pallas' Coluber snakes in Ikh Nart," (Ankhaa) won the "Best Biology Student Researcher" award.

The following Ikh Nart students are enrolled at various universities in Mongolia and elsewhere: Batdorj (Ph.D. on hedgehogs); Onoloo (Ph.D. on kestrels), Stefan Ekernas (University of Montana, argali sheep); Remo (master's degree on small mammals); Altangerel (master's degree on hedgehogs); Batzorig (master's degree on argali sheep and ibex); Ankhaa (undergraduate on snakes); Odmaa (undergraduate on plants); Byambaa (undergraduate on bats); Chimidee (undergraduate on kestrels); and Altangerel (undergraduate on insects). We provide tuition support to three doctorate (Batdorj, hedgehogs; Onoloo, kestrels; and Adiya, wild camels) and three master's degree students (Remo, small mammals; Altangerel, hedgehogs; Batzorig, argali/ibex). In 2013, we hired two master's degree students as our part-time biologists of Ikh Nart.

ACTIONS OR ACTIVITIES THAT ENHANCE NATURAL AND/OR SOCIAL CAPITAL

In 2013, we continued to conduct a few activities to enhance natural capital in our project area. We cleaned up trash around a water source in the park and Red Rock Valley. We fixed fences to maintain a clean, open water source for the camp as well for Red Rock Valley water source. Local people assisted with these activities.

CONSERVATION OF TAXA

1. Argali sheep (*Ovis ammon*)
2. Globally threatened, the argali sheep is listed as "Threatened" in the Mongolian Red List of Threatened and Endangered Species. The Convention on International Trade of Endangered Species of Wild Flora and Fauna includes argali in Appendix II.
3. IUCN Red List status: "Near Threatened"
4. Listed as "Near Threatened" because this species is believed to be in significant decline (most likely at a rate of less than 30 percent over three generations, taken at 24 years) due to poaching and competition with livestock, making the species close to qualifying for "Vulnerable" under criterion A2de.
5. We have radio collared 220 argali in Mongolia since 2000. The project analyzes the locations that the collared specimens inhabited to identify their home ranges. So far, the research has shown that the argali do not have seasonal movement patterns. Behavioral observations, genetic analysis, collection of biological samples, necropsies of animals that died, and fecal analysis have been conducted. Also, we believe that our long-term research efforts and presence helped increase the argali population in Ikh Nart due to less poaching, as the population has more than doubled since we began our work. The results of this work are helping us better conserve these magnificent animals.

1. Ibex (*Capra sibirica*)
2. The species is listed as “Near Threatened” in most recent Mongolian Red List of Threatened and Endangered Species, which represents an upgrade in status from the last two Red Lists, in which the species was listed as “Threatened.”
3. IUCN Red List status: “Least Concern”
4. This species is listed as “Least Concern” in view of its wide distribution and presumed large population. In addition, while some populations are likely to be in decline, overall this is most likely much less than the rate required to qualify for listing in a more threatened category.
5. Since 2003, researchers have captured and radio collared 68 ibex. In addition to tracking animals with radio collars, researchers have also made behavioral observations, collected fecal and tissue samples, and completed necropsies of animals that died. The preliminary results of this on-going research suggest that ibex are more restricted in the areas where they co-exist with the argali, and the ibex rely much more heavily on the more rugged terrain. Like argali, ibex numbers have more than doubled since we began our work.

1. Eurasian black vulture (*Aegypius monachus*)
2. The Convention on International Trade of Endangered Species of Wild Flora and Fauna and Bonn Conventions include Eurasian black vulture in Appendix II.
3. IUCN Red List status: “Near Threatened”
4. This species has a moderately small population that appears to be suffering an ongoing decline in its Asiatic strongholds, despite the fact that in parts of Europe numbers are now increasing. Consequently it qualifies as “Near Threatened.”
5. Our conservation efforts in Mongolia have primarily focused on better understanding the factors influencing raptor nesting success in Ikh Nart and using that information to guide conservation initiatives. More recently, we have begun research into movement patterns. We initially placed wing tags on juvenile birds to track survivorship, but we also gathered movement data and found that many young vultures traveled huge distances to Korea, China, Russia, and even Nepal. We have since expanded our vulture project to include telemetry and GPS tracking, and now gather information on adult and juvenile movement pattern and home range use, and have also expanded international collaboration with biologists from countries included within the vultures’ global range. Our analysis suggests that only juvenile birds migrate, and that this migration began in the late 1990s when the Korean government began provisioning birds with carrion. We are now collecting valuable data on vulture migration routes.

1. Siberian marmots (*Marmota sibirica*)
2. The species is listed as “Near Threatened” in most recent Mongolian Red List, which represents an upgrade in status from the last two Mongolian Red Lists, in which the species was listed as “Threatened.”
3. IUCN Red List status: “Endangered”
4. In Mongolia this species is experiencing an ongoing decline in population size, estimated at 70 percent over the past 10 years (Batbold, 2002) due to exploitation and disease. Generation length has been estimated as six years (Nowak, 1991). This species qualifies as “Endangered” under Criterion A2ad, based on observed declines of more than 50 percent over the past three generations due to exploitation. Most of the species’ global range is in Mongolia.
5. We’re implementing a project called “Do Siberian marmot colonies represent biodiversity hotspots? Evaluating the conservation importance of one of Mongolia’s most endangered mammals.” The Siberian marmot (*Marmota sibirica*) is endangered in Mongolia, and is a “keystone” species whose presence and burrowing activities may influence the number of variety of other species inhabiting steppe habitats (Murdoch, et al., 2009).

The Siberian marmot digs colonial burrow systems in solid and rocky areas. They stay in their burrow in 87.5 percent of their lifespan. The Siberian marmot is endangered, and is a “keystone” species, which is why their burrows appear to represent an important resource for a variety taxa including carnivores (Murdoch, et al., 2009). We observed six litters in active marmot sites by camera trap and direct observation. We documented 10 small rodent species during this study, and captured two rare species—Brandt’s vole (*Microtus brandti*) by Sherman and funnel traps, and particolored bat (*Vespertilio murinus*) by funnel trap. We captured 151 rodents total, including 145 on Sherman traps, six on pitfall traps. Of the total mammals caught, 21.9 percent (n=33) were captured on active marmot sites, 29.8 percent (n=45) on non-active marmot sites, and 48.3 percent (n=73) on off-colony sites.

OBJECTIVE 11: IDENTIFICATION OF MAJOR CONSERVATION THREATS TO EACH FOCAL SPECIES

We're continuing to identify conservation threats to the focal species in Ikh Nart, which include grazing competition and disturbance from livestock, illegal mining, and poaching (Mallon, et al., 1997; Clark, et al., 2006). Ibex is probably less affected than argali by poaching and competition with livestock because of the more precipitous, and therefore less accessible, terrain it occupies, nonetheless both most likely negatively impact the species. Early in our work we found that domestic guard dogs pose a threat to argali and ibex, and we helped initiate a program to mitigate this threat. Illegal and unsustainable hunting for meat, trophies, and skins remains a threat, although habitat degradation through grazing by increasing livestock numbers and competition for pasture and water may also constitute threats in some areas. In addition, we discovered that poaching of small carnivores for their fur and body parts (for trade with China) poses a serious threat to these species. We are developing anti-poaching and educational/outreach tactics to deal with this threat. Increasing resource extraction and mining activities also result in habitat loss and degradation, but have largely stopped illegal mining. Harsh winter weather conditions can also severely impact population sizes locally.

CONSERVATION OF HABITATS

In 2013, we helped Airag, Dalanjargalan, and Bayanjargalan sums create a local, protected area surrounding the southern portion of Ikh Nart to protect important habitat that falls outside Ikh Nart's boundaries. We also commented to the conservation management plan for Ikh Nart, which was approved in the beginning of 2013. We helped to pass a few local legislations on rerouting mining trucks. Park rangers and local people checked Ikh Nart boundary signs and added 15 more signs in summer 2013. We have been working with the local governments and mining companies to redress mining threats. In 2013, we arrested fewer illegal mine operators in Ikh Nart than in 2012, and we continue to decrease the incidence of this disturbance.

ECOSYSTEM SERVICES

We also continued our partnership with Ikh Nart Is Our Future, a local women's collective. We helped develop a promotional brochure and product hang-tags created with the assistance of Susan Fox. In the future we plan to continue working with the collective to help improve product designs, provide training workshops, develop website content, and start a market in the U.S. to sell their handicrafts.

CONSERVATION OF CULTURAL HERITAGE

Objective 12: Identification, Protection, and Preservation of Archaeological Resources in Ikh Nart Nature Reserve, Mongolia.

Archaeology goal one: Develop a project to record, assess the condition of, and map known cultural resources within Ikh Nart.

In 2013, we continued to expand our knowledge of the cultural landscape within Ikh Nart. First, we extended our field season by doubling its length. Second, we completed our random sample inventory strategy in the northern portion of Ikh Nart and made substantial progress in the southern portion of the reserve. Third, for the first time we incorporated Mongolian archaeological students into our work and did so with great success. By the end of the 2013 field season, we recorded and registered 92 archaeological sites in Ikh Nart with the Mongolian Academy of Sciences Institute of Archaeology.

Archaeology goal two: Develop a cultural resources monitoring/stewardship program for Ikh Nart.

In 2013, we successfully applied for a grant from the U.S. Ambassador's Fund for Cultural Preservation to provide a dedicated Mongolian cultural resources ranger for Ikh Nart and equip him/her with training and transportation for two years starting in spring 2014. This grant will also provide initial funding for the beginning of a interpretive signage project for Ikh Nart. We anticipate that the addition of these capabilities will result in greater protection of the cultural heritage sites within Ikh Nart.

Archaeology goal three: Identify a lead person or persons in Mongolia to receive training by American archaeologist specialists.

We continued to work with Dr. Y. Tserendagva of the Mongolian Academy of Science's Institute of Archaeology as our lead counterpart and with his graduate student, Dalantai, who also works for the Academy. With the assistance of the Trust for Mutual Understanding (TMU), one of our Mongolian archaeological colleagues who has continually worked with us at Ikh Nart completed a visit to California, learning first-hand the strategies and methods used in California state parks and national parks for cultural heritage resources management. During the trip, he also visited other American archaeologists, several museums and curatorial facilities, cultural resource management agencies, and Indian reservations. He has already used his experiences in California to inform his work in Mongolia.

Archaeology goal four: Establish an ongoing cultural resources protection program for Ikh Nart.

In 2013, our cultural resources interpretive and educational programs for Ikh Nart were enhanced by providing Mongolian-language translation of the cultural resources interpretive pamphlet we developed for visitors to Ikh Nart. We conducted an additional training session for research camp staff and rangers about the preservation and protection of cultural heritage sites

IMPACTING LOCAL LIVELIHOODS

Several of our activities help enhance local livelihoods. Our researchers, Earthwatch volunteers, and local people conduct argali sheep and ibex capture sessions to fit collars in September of each year. This year, 19 horsemen participated and received more than US\$824 (1.5 million Mongolian Tughrik) as compensation. By participation in these activities, local people start to understand our research and conservation methods of the endangered animals. The UNDP/GEF SPAN project organized training workshops for local people from Ikh Nart for organic gardening and ecotourism.

LOCAL COMMUNITY ACTIVITIES

Ikh Nart Education and Outreach Program: School-Pairing Program

We successfully developed a school exchange program between Dalanjargalan Secondary School in Dornogobi, Mongolia, and Kent Denver School in Denver, Colorado. In 2013, support from the TMU allowed one teacher and two students from Dalanjargalan Secondary School to travel to Denver. In Denver, they visited scientific and cultural organizations, participated in grassland field research, assisted with a service-learning project, and shadowed school activities at Kent Denver School, a local grade school partnering in the program. Kent Denver School—in conjunction with our program—established a Colorado-Mongolian conservation club called “Rockies to Mongolia” that has 17 students. Both the club in Denver and the club in Mongolia used curriculum from the Nomadic Nature Trunk (Ikh Nart version) that the TMU supported in the past to engage student in conservation education related activities.

In addition to providing the travel costs for one teacher and two students from Mongolia to the U.S., the TMU also covered the travel costs of a Denver Zoo staffer, Amy Lear. Lear, together with Erin Stotz and Matt Herbert from the Denver Zoo, traveled to Mongolia with ten Kent Denver School students who were part of the “Rockies to Mongolia” club. In Mongolia they engaged in scientific research at Ikh Nart Nature Reserve, and immersed themselves in the Mongolian culture, visiting Dalanjargalan and interacting with the community and students.

The second objective we accomplished in 2013 was the implementation of a service-learning project in both Mongolia and Denver. The service-learning project conducted in Denver involved the creation and distribution of kestrel boxes across the Kent Denver School’s campus. Together with the “Rockies to Mongolia” club, the visiting Mongolians were able to participate in the project. In June during the summer exchange, the Kent Denver School students visited the Dalanjargalan community and helped the Mongolian students generate ideas for their project. The students in Mongolia selected tree planting as their service-learning project, and had all the Mongolian club participants assist in the project, which was implemented in September.

Community Outreach Day

In 2013 we expanded and continued our community outreach efforts in the region by hosting a community outreach day. The event successfully connected the local community with our current research and conservation programs in and around Ikh Nart Nature Reserve. More than 60 local researchers, herders, and other members of the community attended the event. Researchers at Ikh Nart showcased their current research by creating visual interactive booths that demonstrated their work to the community.

In addition, the Kent Denver School and Mongolian students were able to participate in the event, working with local researchers to educate the community on conservation efforts at Ikh Nart, and highlighting their participation in the school-pairing program. We hope to make “Community Outreach Day” an annual event to foster awareness and appreciation of culture and ecology. In 2014 we plan to host two of these events, one at Ikh Nart and one at Dalanjargalan.

Nomadic Nature Trunk Program

Nomadic Nature Conservation (NNC) is a nonprofit organization established in March 2010, based in Ulaanbaatar, Mongolia. In 2013, NNC developed an evaluation component to the trunk program, and initiated a trunk survey with both teachers and students in Dalanjargalan. This information is currently being analyzed, and will contribute to the overall evaluation of the trunk program as a whole.

DISSEMINATION OF RESEARCH RESULTS

Scientific Peer-reviewed Publications

We continue to disseminate the results of our work in a variety of ways, including publications, formal and informal presentations, outreach efforts, and the media. We published a few papers in journals, an MS.c. thesis, and three bachelor's degree theses in 2013.

Davie, H. "Wolves and livelihoods in the arid steppes of Mongolia: An integrated approach to understanding patterns of human-wolf conflict." University of Vermont. 2013. Thesis.

Dondog, A. "Hedgehogs in Ikh Nart Nature Reserve." Mongolia National University. 2013. Thesis.

Kenny, D., Bickel C., and Richard P. "Veterinary assessment for free-ranging Eurasian black vulture (*Aegypius monachus*) chicks in south eastern Mongolia." *Topics in Companion Animal Medicine*. 2013. In press.

Munkhzul, T., Murdoch, J., Samjaa, R., and Reading, R.P. "Home range characteristics of corsac and red foxes of Mongolia." *Essforsh. biol. Ress. Mongolei (halle/Saale)* 2012 (12) 93-104. Print.

Murdoch J.D., Davie, H., Galbadrah, M., Donovan, T., and Reading, R.P. "Do Siberian marmots influence toad-headed agama occupancy? Examining the influence of marmot colonies and three steppe habitats in Mongolia." *Journal of Arid Environments* 92:76-90. 2013. Print.

Rentsen, O. "Morphological measurements and species richness of small mammals in Ikh Nart Nature Reserve." University of Mongolia. 2013. Thesis.

Batzorig, S. "Argali Resource Management of Gulzat area, Mongolia." Agricultural University of Mongolia. 2013. Thesis.

Grey Literature and Other Dissemination

We also gave several formal presentations about our work in 2013.

Amgalanbaatar, S., Reading, R.P. "Research and conservation program in Ikh Nart Nature Reserve." Nature Conservation and effort NGO's mini conference for Dornogovi aimag government office. 2013. Presentation.

Amgalanbaatar, S., Batdorj, S., and Otgonbayar, B. "Principle and methods argali conservation management in Galuut, Ulziit, Bogd, Jinst sums of Bayankhongor aimag." Meeting of Byankhongor aimag governors and Nature Conservation Agency officers, rangers. 2013. Presentation.

Amgalanbaatar, S. "Special management plan for argali population in Delgerxaan sum of Khentii aimag." Khentii aimag Governors office. 2013. Presentation.

Bickel, C. "Field Work on Eurasian black vultures (*Aegypius monachus*) in Mongolia's Ikh Nart Nature Reserve." Denver Zoo, Docent Appreciation Week. April and July 2013. Presentation.

Bickel, C. "Field Work on Eurasian black vultures (*Aegypius monachus*) in Mongolia's Ikh Nart Nature Reserve. Thirty Third Annual Proceedings for Association of Zoo Veterinary Technicians. 2013. Presentation.

Stotz, E., Reading, R., and Wingard, G. "Working with local stakeholders to develop a model protected area in Mongolia." Zoos and Aquariums Committed to Conservation conference in Des Moines, Iowa. July 8-13, 2013. Presentation.

Stotz, E., Herbert, M., and Masching A. "Helping People Help Animals: Denver Zoo Conservation Education and Outreach around the World." Zoos and Aquariums Committed to Conservation Conference in Des Moines, Iowa. July 8-13, 2013. Poster and Presentation.

SECTION THREE: PROJECT FUNDING

Our expenses exceeded our support from Earthwatch, but were covered by the Denver Zoological Foundation, the Trust for Mutual Understanding, the UNDP/GEF and MNET SPAN project, and a few other smaller sources of income (such as individual donations). We had planned for these expenses, so that our expenses and income roughly matched our overall project budget. Support from Earthwatch in the form of both financial and human resources continued to play a vital role in our ability to conduct our work, and realize the many successes we have achieved to date.

SECTION FOUR: FIGURES

FIGURE 1: COMPARISON OF MEAN (\pm SE) MORPHOMETRIC MEASUREMENTS (RIGHT) AND WEIGHTS (LEFT) OF LONG-EARED (*HEMIECHINUS AURITUS*) AND DAURIAN (*MESECHINUS DAURICUS*) HEDGEHOGS IN IKH NART NATURE RESERVE, MONGOLIA. ALL MEASUREMENTS IN CM, EXCEPT FOR WEIGHT, WHICH IS IN GRAMS. TBL = TOTAL BODY LENGTH.

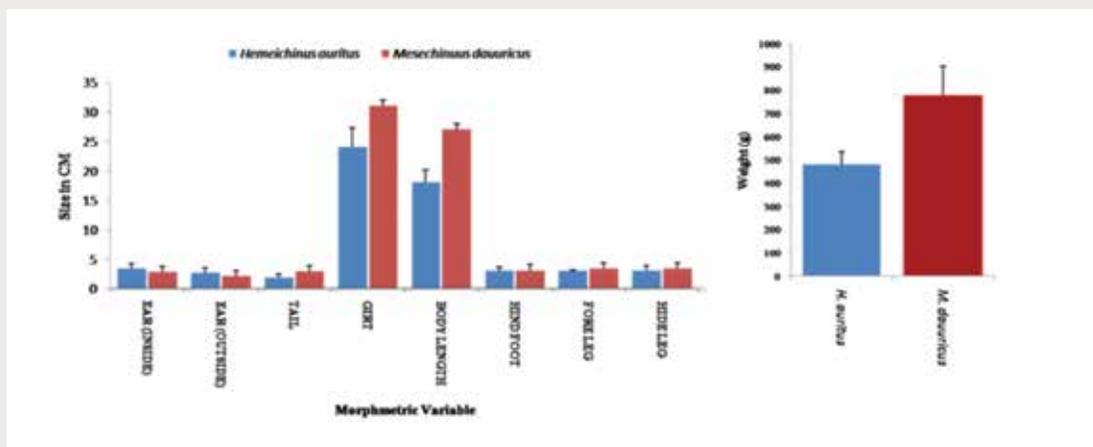


FIGURE 2. HOME RANGE OF DAURIAN HEDGEHOGS AT IKH NART NATURE RESERVE, MONGOLIA

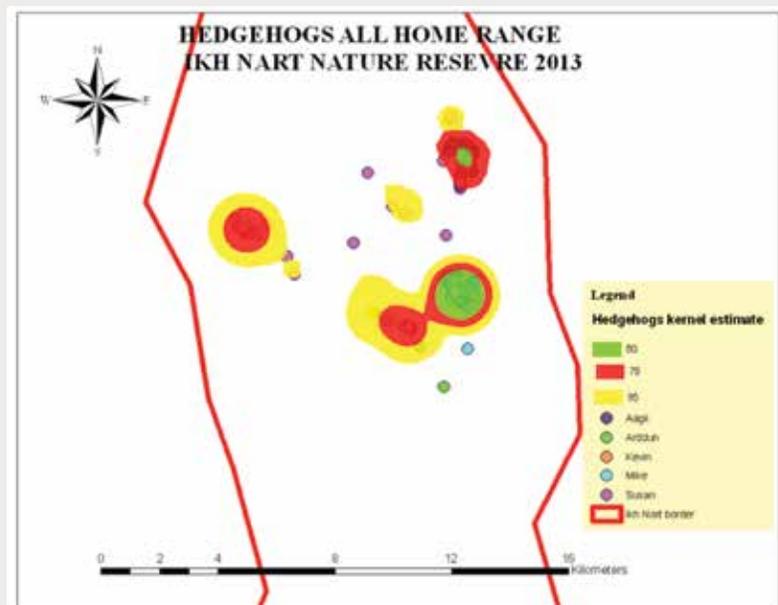


FIGURE 3. SEASONAL HOME RANGE OF DAURIAN HEDGEHOGS, IKH NART NATURE RESERVE, MONGOLIA

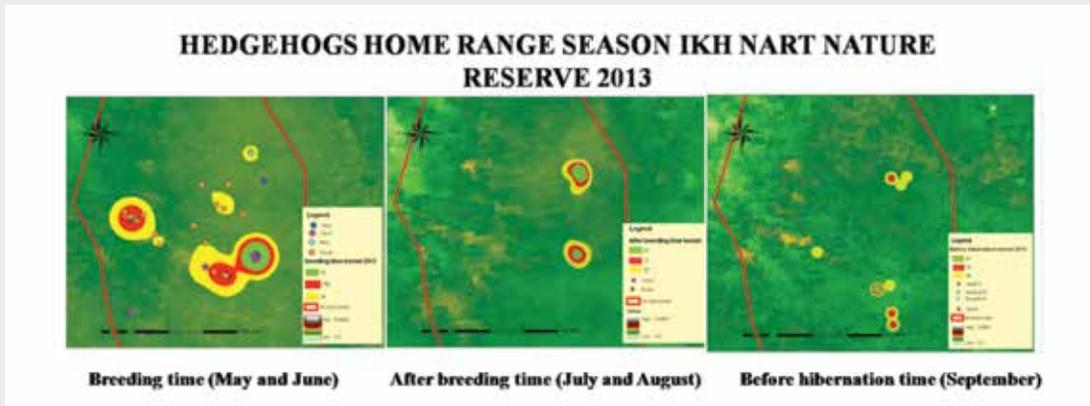


FIGURE 4. CORRELATION BETWEEN HOME RANGE OF DAURIAN HEDGEHOGS (BY MEAN OF SEASON AND YEAR), NDVI LEVEL (BY YEAR) AND AIR TEMPERATURE (BY MEAN OF DAY, MONTH AND YEAR)

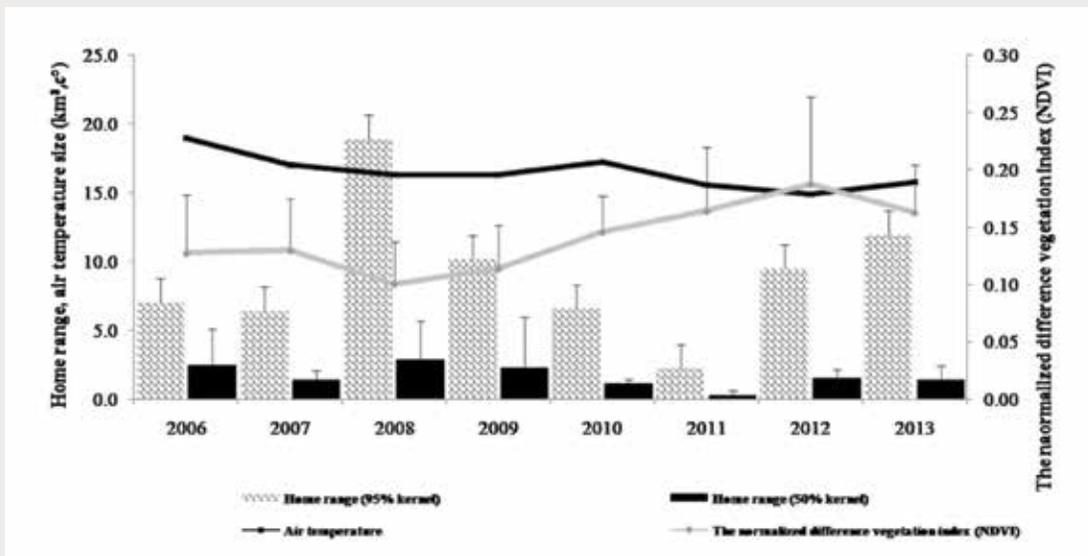


FIGURE 5. DAURIAN HEDGEHOG'S BEHAVIOR, I KH NART NATURE RESERVE, MONGOLIA

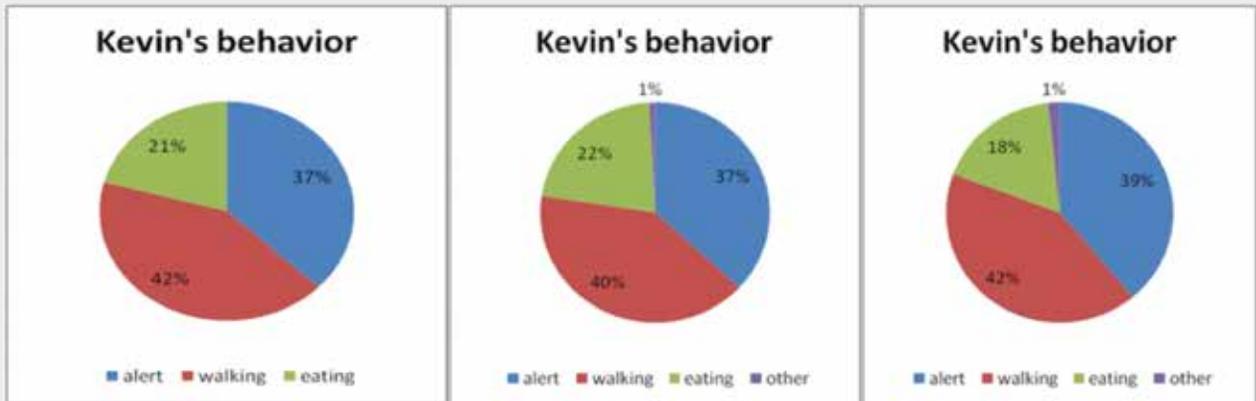


FIGURE 6. GROWTH MEAN (\pm SE) MORPHOMETRIC MEASUREMENTS OF LONG-EARED (*HEMIECHINUS AURITUS*) HEDGEHOG BABIES IN IKH NART NATURE RESERVE, MONGOLIA. ALL MEASUREMENTS IN MM, EXCEPT FOR BODY MASS, WHICH IS IN GRAMS

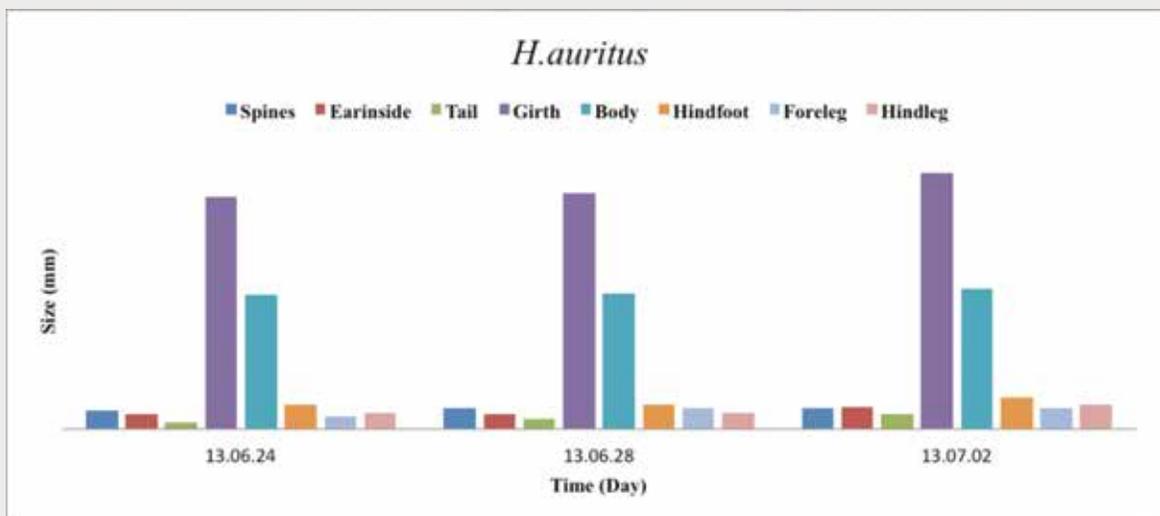


FIGURE 7. GROWTH MEAN (\pm SE) WEIGHT AND BODY LENGTH MEASUREMENTS OF LONG-EARED (HEMIECHINUS AURITUS) HEDGEHOG BABIES IN IKH NART NATURE RESERVE, MONGOLIA. ALL MEASUREMENTS IN MM, EXCEPT FOR BODY MASS, WHICH IS IN GRAMS.

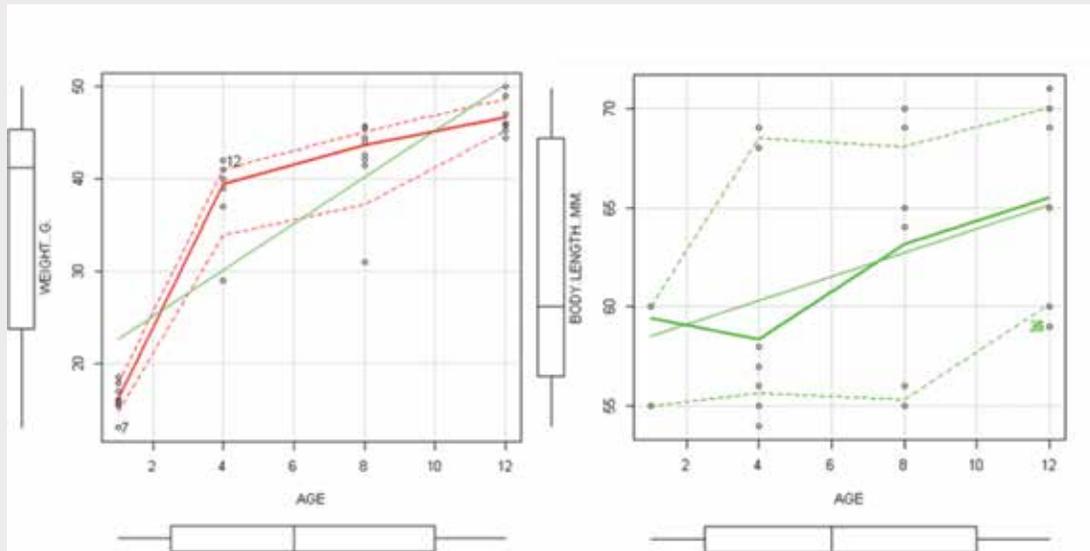


FIGURE 8. MORPHOMETRICS MEASUREMENTS FOR LESSER KESTRELS /MM/, IKH NART NATURE RESERVE, MONGOLIA

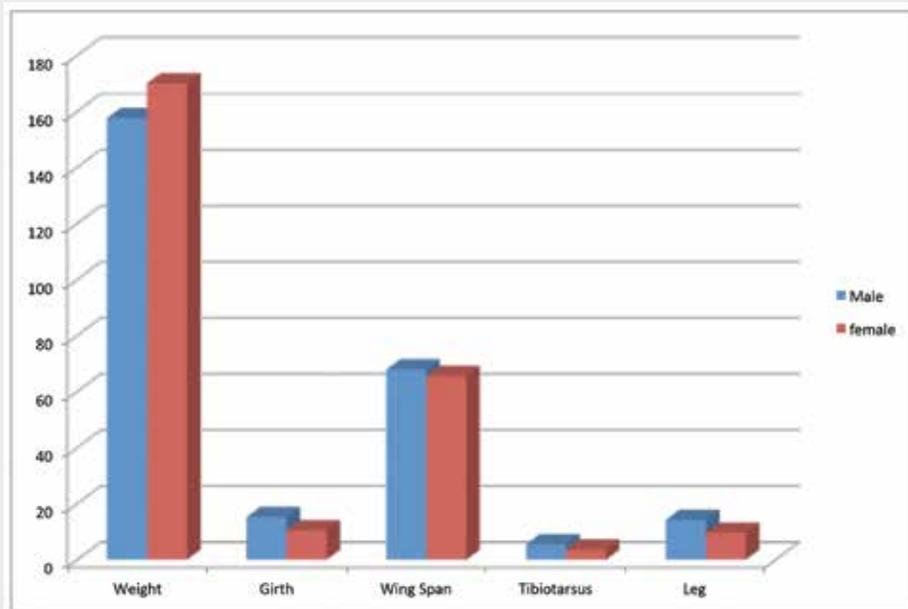


FIGURE 9. MORPHOMETRIC MEASUREMENTS OF CENTRAL ASIAN VIPERS (*GLOYDIUS HALYS*) FROM IKH NART NATURE RESERVE (SVL- SNOUT-VENT LENGTH, WT- WEIGHT, HEAD L- HEAD LENGTH, HEAD W- HEAD WIDTH □)

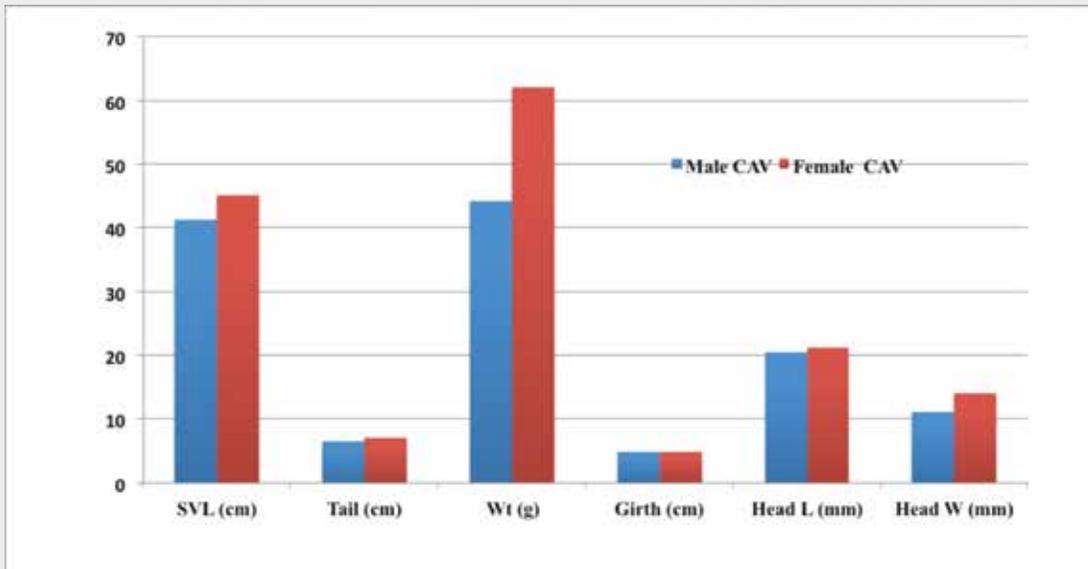
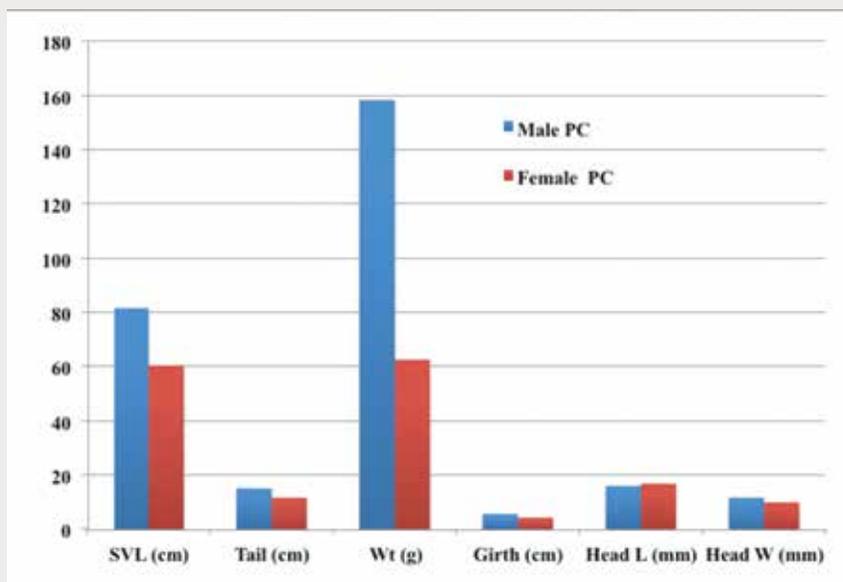


FIGURE 10. MORPHOMETRIC MEASUREMENTS OF PALLAS' COLUBER (*ELAPHE DIONE*), IKH NART NATURE RESERVE, MONGOLIA



Lead scientist: Ganchimeg "Gana" Wingard
Report completed by: Ganchimeg "Gana" Wingard

Period covered by this report: Summer 2013
Date report completed: December 12, 2013



Earthwatch Institute
114 Western Ave.
Boston, MA 02134
USA

-  Phone: **1-800-776-0188**
-  Email: info@earthwatch.org
-  Web: earthwatch.org
-  facebook.com/earthwatch
-  twitter.com/earthwatch.org