Herder Community-based Nature Conservation Project:

Wildlife Monitoring in Community-managed Areas

TRAINING PROCEEDINGS

Organized by the:

Wildlife Conservation Society (WCS) Mongolia Program

Eastern Mongolian Community Conservation Association (EMCCA)

26 June –30 June 2010

Chukh Eco-tur Camp, Dashbalbar, Dornod

Ulaanbaatar 2010

TABLE OF CONTENTS

Report Contributors:
S. Bolortsetseg, MS, Conservation Biologist, WCS Mongolia Program
G.Bat-Erdene, Manager of EMCCA, and WCS, Mongolia community specialist at field

Translation by *Tsolmon*

ACKNOWLEDGEMENTS

We thank those communities who are dedicated to sustainably using, monitoring and protecting wildlife and natural resources. This training will be our second field training of the numerous trainings that we have organized with the Eastern Mongolian Community Conservation Association. The herder communities participated in the trainings organized within the scopes of EMCCA operation which gives us the privilege to work together towards environmental protection.

We appreciate the offer and hospitality of the Chuck Eco-Tour as they provided the accommodations for the training and also we thank the generous herder families for providing horses for making possible to conduct line transect.

We thank Environmental and Tourism Agency for sending their rangers to the training and also the staff of Eastern Mongolian Protected Area Administration Office as we look forward to continued collaboration.

This report is made possible by the generous support of the American people through the United States Agency for International Development (USAID), under the terms of USAID/Global Conservation Partners Cooperative Agreement No. LAG-A-00-99-00047-00. The contents are the responsibility of the Wildlife Conservation Society and do not necessarily reflect the views of USAID or the United States Government.

EXECUTIVE SUMMARY

Communities were given the responsibility to monitor and manage the natural resources and wildlife in their respected areas under additions to the Environmental Protection Law made in 2005 and 2006. In order for communities to be able to sustainably manage wildlife in their community-managed areas, they first need to know the conditions of wildlife populations in those areas. This requires regular and systematic monitoring of wildlife using objective methods. Volunteer rangers can learn simple wildlife monitoring methods and collect data for wildlife management.

From 26th of June to 30th of June, 2010 the Wildlife Conservation Society Mongolia Program carried out training on "Wildlife Monitoring in Community-managed Areas." The goal of this training was ***for volunteer rangers to develop skills for recording wildlife monitoring data in their community-managed areas.*** This goal was accomplished by teaching participants 1) about the importance of wildlife and pertinent legislation, 2) techniques for making objective observations, 3) equipment use, 4) methods for monitoring wildlife, and 5) volunteer ranger roles and responsibilities.

A total of 20 (17 male, 3 female) participants attended the training, including 7 volunteer rangers and 2 leaders from herder community partnerships, protected area rangers, environmental protection officers and others. Organizations and agencies who participated in the training included the Eastern Mongolian Community Conservation Association (EMCCA), Eastern Mongolian Protected Areas Administration (EMPAA), Dornod aimag Specialized Inspection Agency (SIA) and the Dornod Environmental Protection and Tourism Agency.

Participants were given the opportunity to practice the skills they learned and operated equipments that were provided during wildlife monitoring field practice training as well as competited using GPS units. All participants completed pre and post-interviews (i.e. test) to track skill level improvement during the training, with a mean improvement of 20% when comparing pre and post-interview scores of 2009 ranger training. During the training, we handed out the mammal guidebook and Rare Pride Campaign materials. The participants were introduced to the White Gazelle Pride Campaign and met with the White Gazelle Mascot.

Participants improved their skills in and knowledge of wildlife monitoring during this training. In the future, the EMCCA and WCS Mongolia Program shall work to extend this training to the volunteer rangers who were not able to attend, and hold refresher trainings for participants in order to improve performance. These skills are critical to wildlife monitoring and management efforts in the Eastern Steppe, so trainings such as this one should be a priority in the future.

Recommendations

Immediate Action: 3-6 months

- Distribute collection of workshop materials to all herder community partnerships
- Distribute updated wildlife observation worksheets and charts to volunteer rangers
- Participate in wildlife monitoring work with volunteer rangers in selected 3 herder communities in the fall

Short-term Action: 6-12 months

- Organize workshops for the rest of the volunteer rangers using lessons learned from this seminar
- Provide equipment to volunteer rangers
- Compile all of wildlife monitoring information and copy it to the database

Long-term Action: 12-24 months

- Organize and start wildlife population count and management based on wildlife monitoring work

Training Participants

INTRODUCTION

Under Order #114 of the Environmental Protection Law, issued in 2006 by the Minister of Nature and Environment, community partnerships have the right to protect, own and use wildlife in areas they manage under contract with the local government. Since 2006, the Wildlife Conservation Society (WCS) Mongolia Program, in partnership with the Eastern Mongolian Community Conservation Association (EMCCA), has been working to build the capacity of herder communities to protect and manage wildlife and natural resources in community-managed areas under the new regulations.

In order for communities to be able to sustainably manage wildlife in their community-managed areas, they first need to know the condition of wildlife populations in those areas. This requires regular, systematic monitoring of wildlife using objective methods. Communities nominate volunteer rangers for their areas. These protectors can learn simple wildlife monitoring methods and collect data for wildlife management.

Through various workshops and meetings, the WCS Mongolia Program has been building the capacity of volunteer rangers to monitor impacts to wildlife and natural resources, and report this information to local law enforcement officers. Training on "Wildlife Monitoring in Community-managed Areas" was organized from 26 June – 30 June, 2010. This training was built on previous wildlife protection trainings to complete the skill set for volunteer rangers to protect and monitor wildlife in their areas. The goal of this training was ***for volunteer rangers to develop skills for recording wildlife monitoring data in their community-managed areas.*** This goal was accomplished through the following objectives:

Goal: For rangers to develop skills for <u>recording wildlife monitoring data</u>

Objectives:

1) Rangers learn about the importance of wildlife and pertinent legislation.
2) Rangers learn how to use equipment in the field for wildlife monitoring.
    - Binoculars
    - GPS units
    - Digital cameras
    - Map and compass
3) Rangers learn methods formonitoring wildlife.
    - Horseback Wildlife Transect
    - Marmot Monitoring Method
    - Proper use of wildlife monitoring forms
4) Review volunteer ranger roles and responsibilities (VR job description).
    - Discuss when to be aware of certain responsibilities and seasonal events (reporting to the soum and bag governments, be aware of times when there may be more poaching of wildlife, etc.).
    - Discuss how to quantify volunteer ranger effort.
    - Schedule for monitoring and Datasheet submission to EMCCA
    - Collaboration with law enforcement officers.

5) Assess participant aptitude of the above topics.

Outputs:

1) A good understanding of the importance of wildlife and pertinent laws.
2) Correct use of equipment for monitoring wildlife.
3) Correct use and good understanding of monitoring forms.
4) A **seasonal schedule** for community ranger work.
5) A means of measuring and reporting **ranger effort**.
6) Increased collaboration with law enforcement officers.
7) Assessment of participant aptitude for ranger work.

Duration: 3.5 days, *27th June- 1st July 2010*

Participants: 11 active community rangers – Khentii, Dornod, Sukhbaatar; Wildlife Conservation Society Mongolia Program (WCS)-4; Eastern Mongolian Community Conservation Association (EMCCA); Eastern Mongolia Protected Areas Administration (EMPAA)-5; Environmental Protection Agency (EPA)-10.

TRAINING PROCEEDINGS

Training Welcome and Opening *– D. Dagvasuren and Ann Winters*

Training Goal and Objectives *– L. Ochirkhuyag and S. Bolortsetseg*

"WILDLIFE MONITORING IN COMMUNITY-MANAGED AREAS"

May 30 – June 4, 2009

Dashbalbar soum, Dornod aimag

ORGANIZERS:

Wildlife Conservation Society (WCS) Mongolia Program,

Eastern Mongolian Community Conservation Association (EMCCA)

GOAL: For volunteer rangers to:

- Develop skills for recording wildlife monitoring data in their community-managed areas
- Learn wildlife monitoring methods
- Develop a monitoring schedule

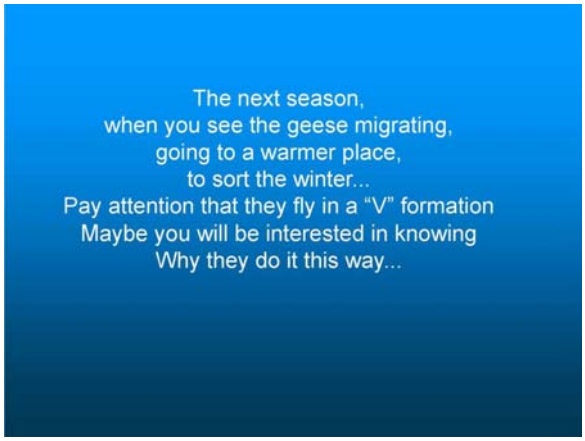
OBJECTIVES & OUTPUTS: (see those listed on pages 8-9)

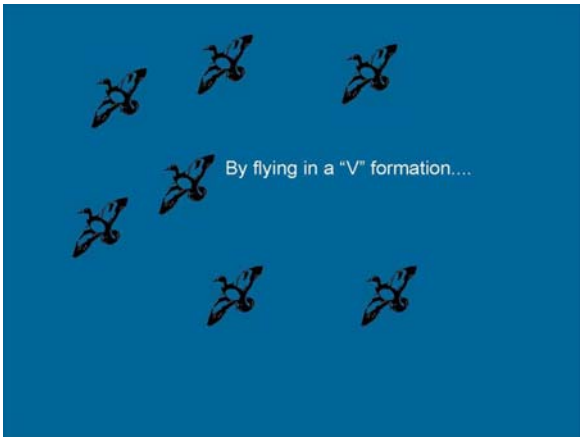
AGENDA: (see Appendix I for the detailed training agenda)

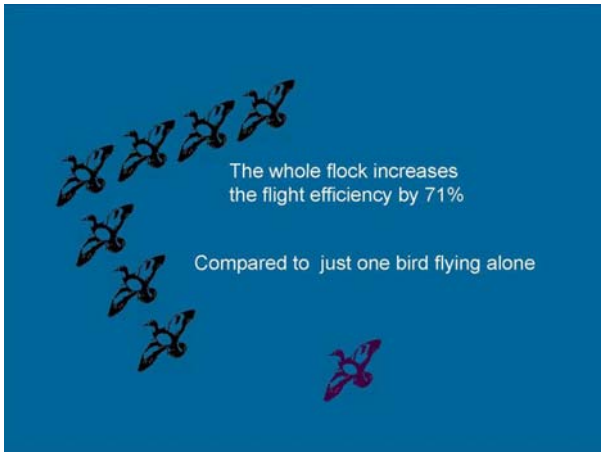
TRAINING RULES:

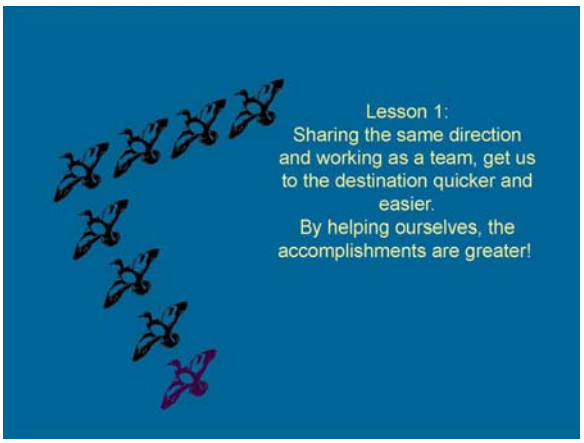
1) Be active
2) Turn off mobile phones
3) Be on time
4) No alcohol or drinking allowed
5) Listen to each other
6) Ask for clarification if you do not understand something
7) Do not litter (smoking)
8) Express your opinion
9) Be responsible for yourself of your personal things

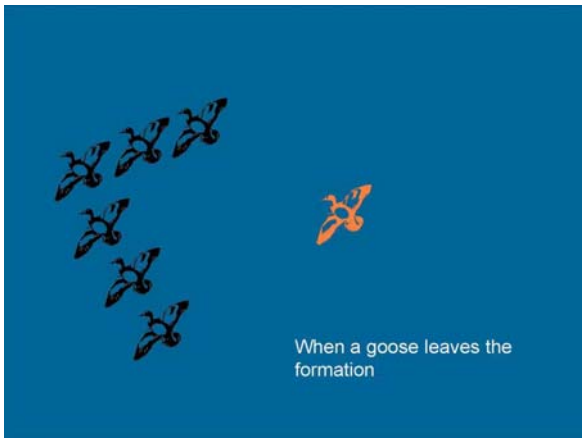
Team building lesson: *G. Bat-Erdene*, EMCCA

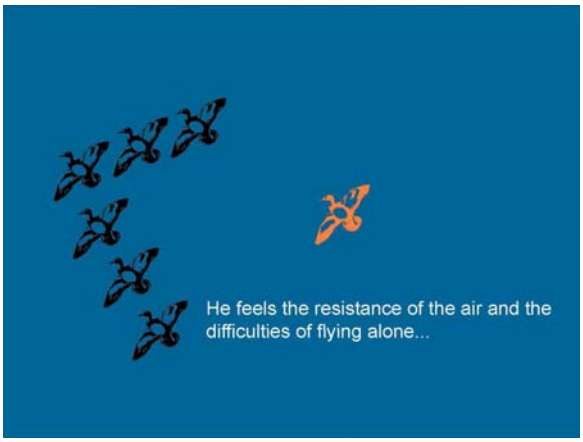


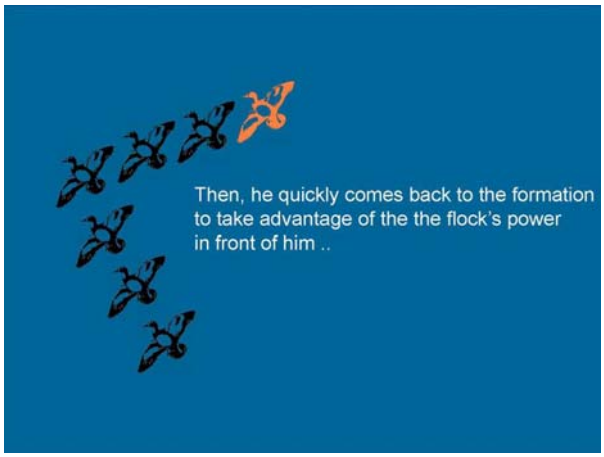


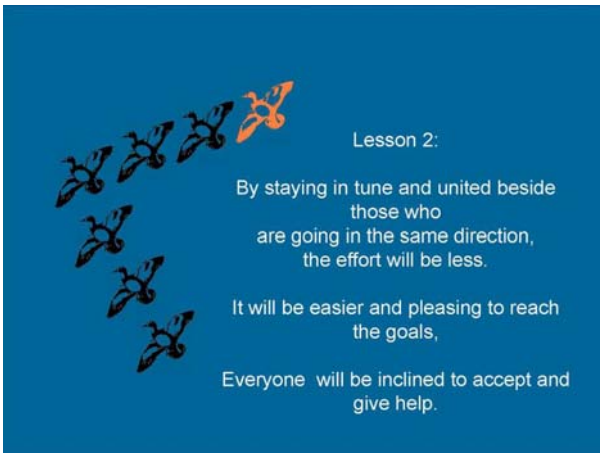




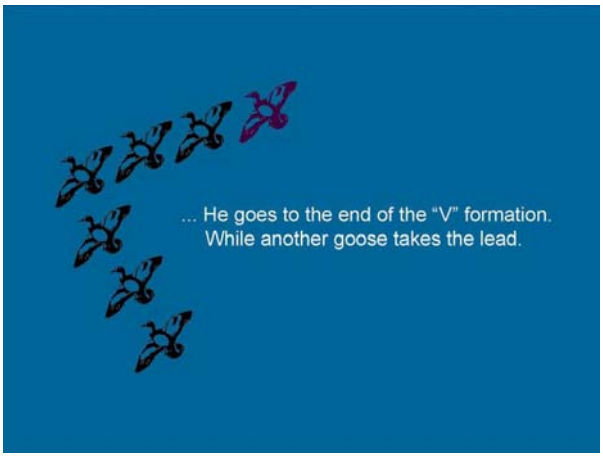


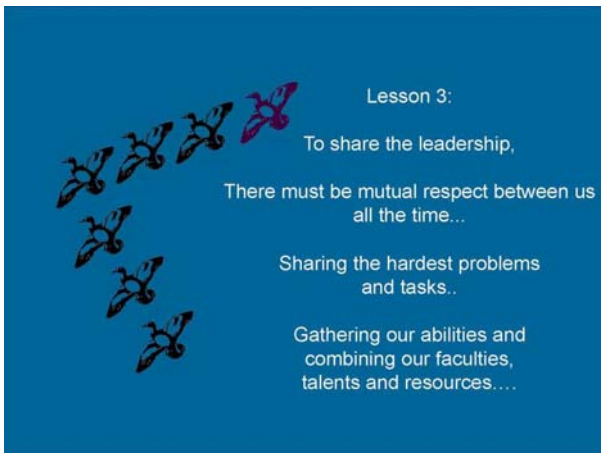


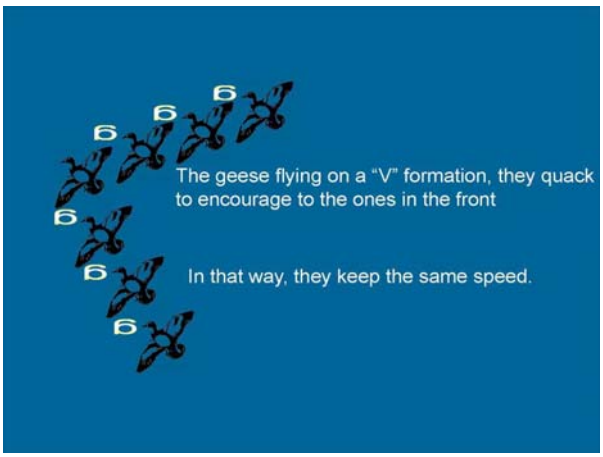

Then, he quickly comes back to the formation
to take advantage of the the flock's power
in front of him ..

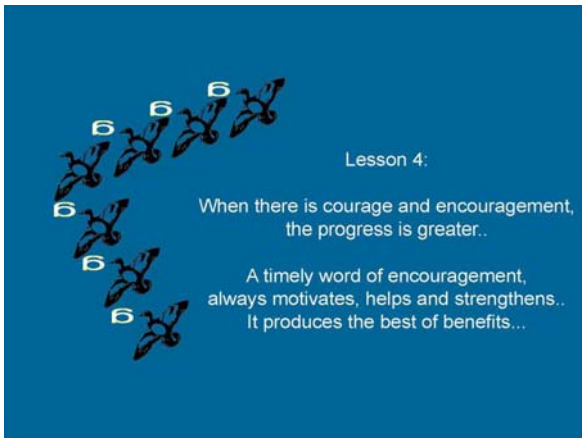

Lesson 2:
By staying in tune and united beside
those who
are going in the same direction,
the effort will be less.
It will be easier and pleasing to reach
the goals,
Everyone will be inclined to accept and
give help.


When the leader goose gets tired of flying...

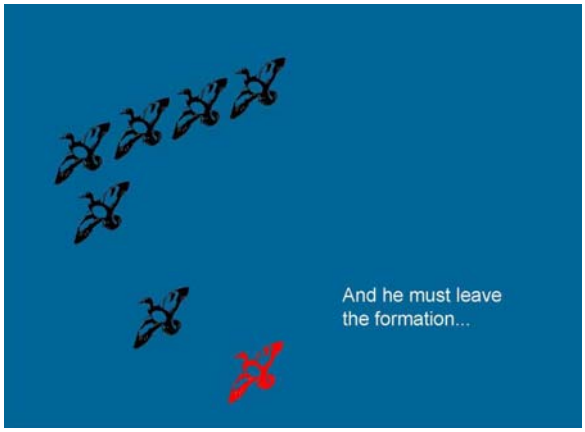

... He goes to the end of the "V" formation.
While another goose takes the lead.

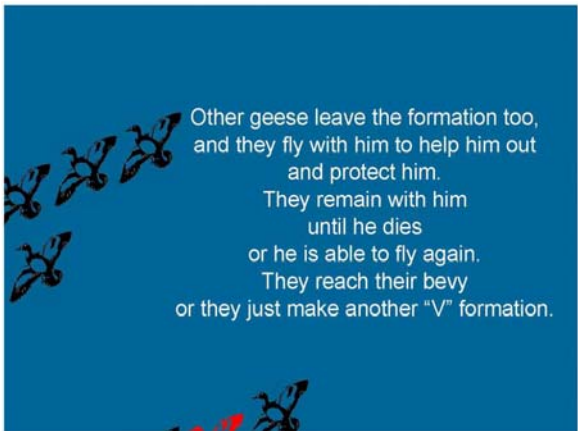

Lesson 3:
To share the leadership,
There must be mutual respect between us
all the time...
Sharing the hardest problems
and tasks..
Gathering our abilities and
combining our faculties,
talents and resources....

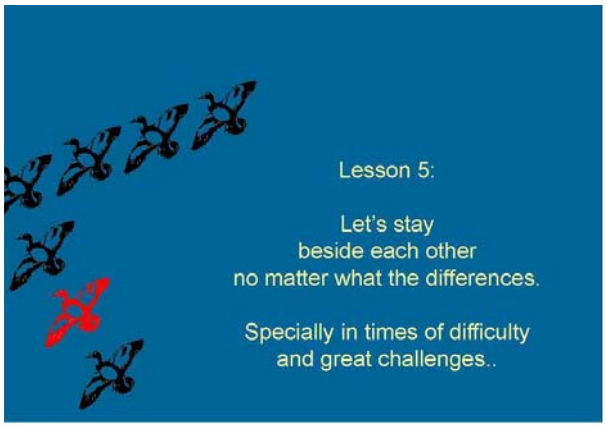

The geese flying on a "V" formation, they quack
to encourage to the ones in the front
In that way, they keep the same speed.

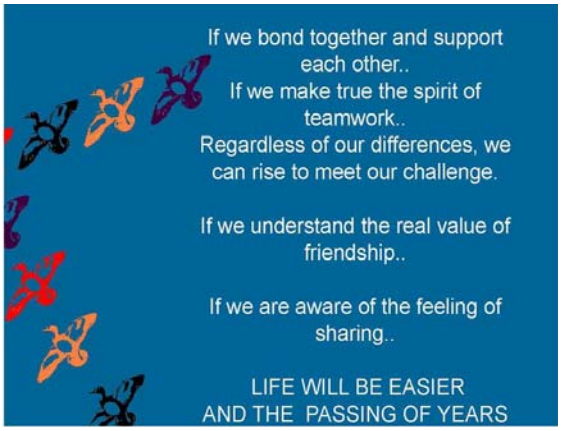

Lesson 4:
When there is courage and encouragement, the progress is greater..
A timely word of encouragement, always motivates, helps and strengthens.. It produces the best of benefits...


When a goose gets sick, is injured or gets tired ,


And he must leave the formation...

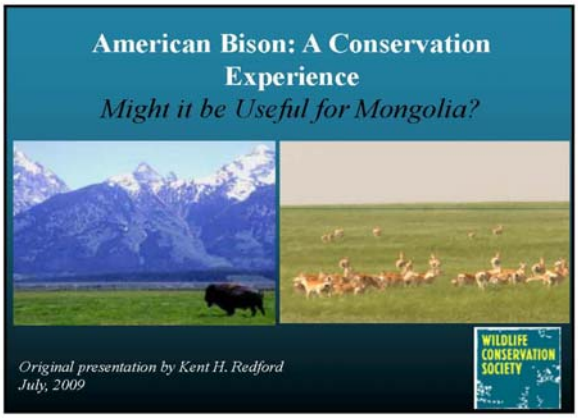

Other geese leave the formation too, and they fly with him to help him out and protect him.
They remain with him until he dies or he is able to fly again.
They reach their bevy or they just make another "V" formation.

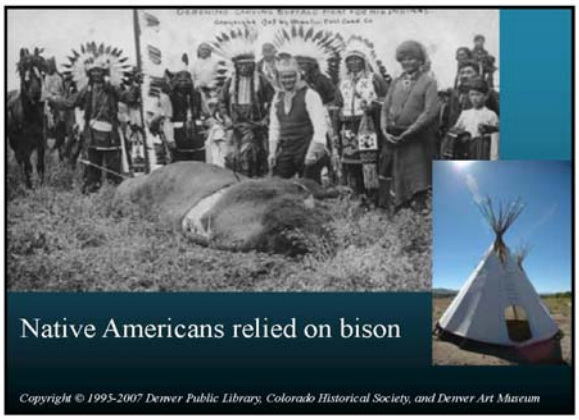

Lesson 5:
Let's stay beside each other no matter what the differences.
Specially in times of difficulty and great challenges..

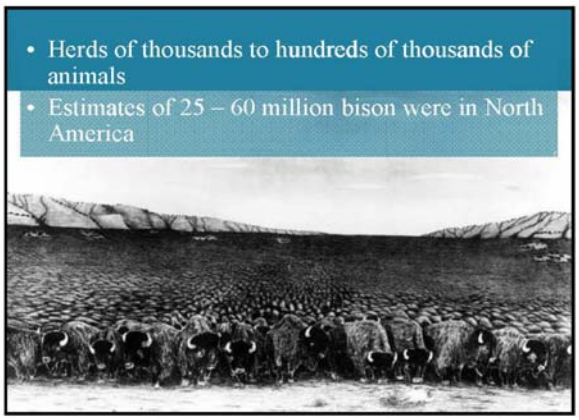

If we bond together and support each other..
If we make true the spirit of teamwork..
Regardless of our differences, we can rise to meet our challenge.
If we understand the real value of friendship..
If we are aware of the feeling of sharing..
LIFE WILL BE EASIER AND THE PASSING OF YEARS

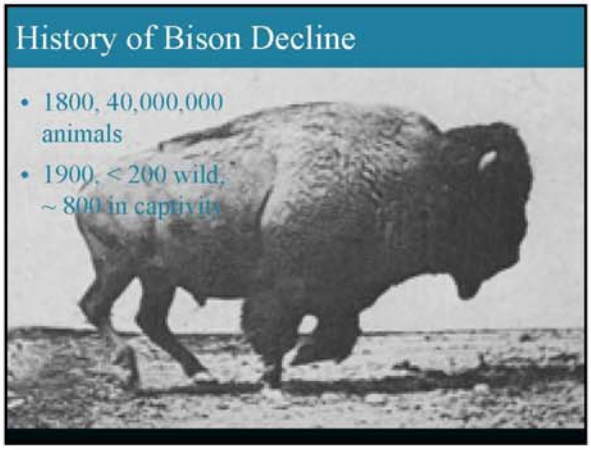
The Value of Wildlife in Community Areas *–S. Bolortsetseg*

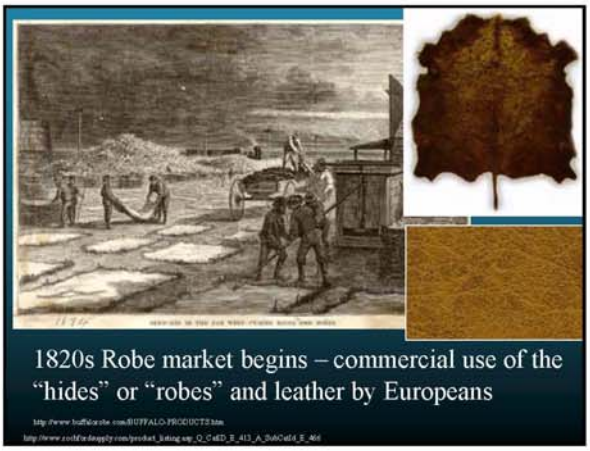
Prepared Presentation by Ann Winters

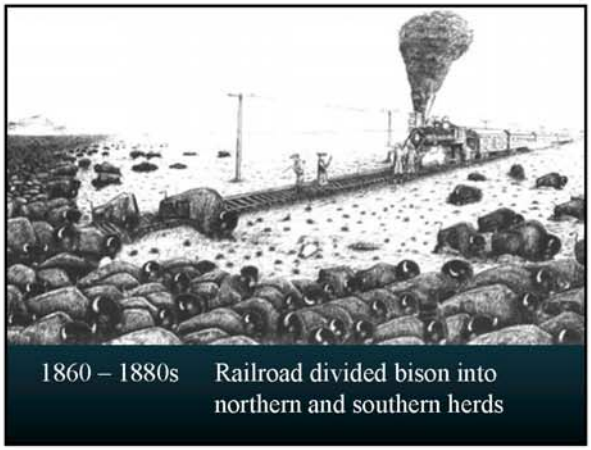




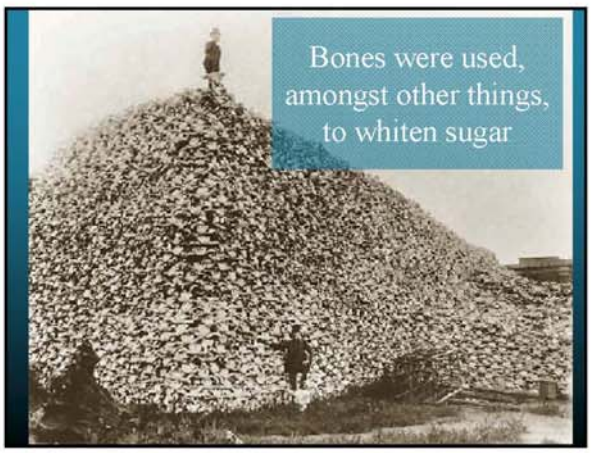



History of Bison Decline
• 1800, 40,000,000 animals
• 1900, < 200 wild, ~ 800 in captivity


1820s Robe market begins – commercial use of the "hides" or "robes" and leather by Europeans

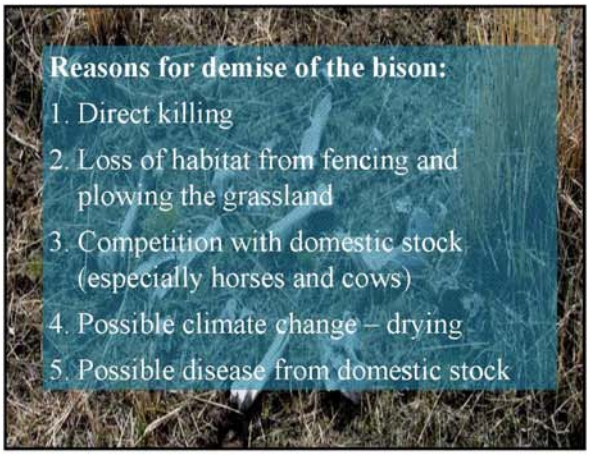

1860 – 1880s Railroad divided bison into northern and southern herds

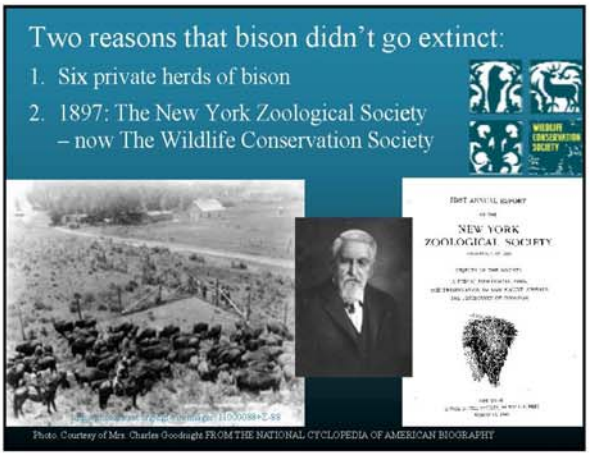

1871 Rapid appearance of hide market; new tanning technologies; hunting year-round

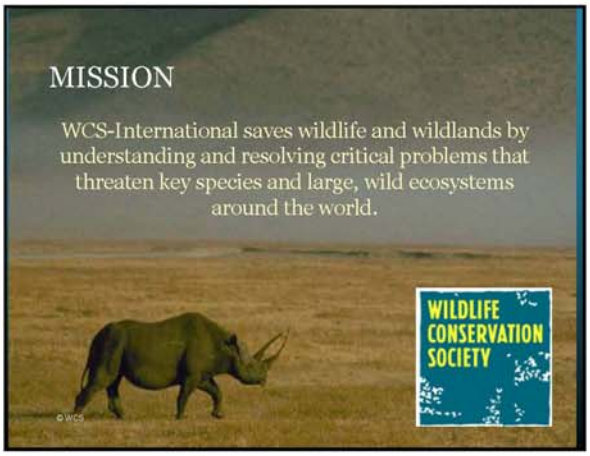

Bones were used, amongst other things, to whiten sugar

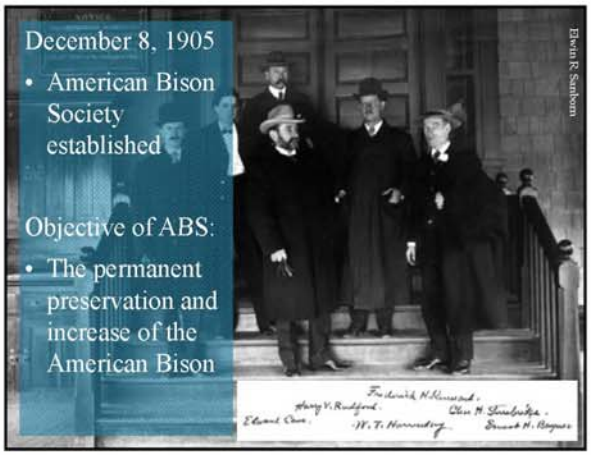

The Extermination of the American Bison to 1889
range as of 1870
range as of 1889


The North American bison, which once numbered in the tens of millions, had been reduced to ~ 1000 animals in less than 100 years by humans.
The grasslands were empty…


Reasons for demise of the bison:
1. Direct killing
2. Loss of habitat from fencing and plowing the grassland
3. Competition with domestic stock (especially horses and cows)
4. Possible climate change – drying
5. Possible disease from domestic stock


Two reasons that bison didn't go extinct:
1. Six private herds of bison
2. 1897: The New York Zoological Society – now The Wildlife Conservation Society
NEW YORK ZOOLOGICAL SOCIETY
Photo Courtesy of Mrs. Charles Goodnight FROM THE NATIONAL CYCLOPEDIA OF AMERICAN BIOGRAPHY


MISSION
WCS-International saves wildlife and wildlands by understanding and resolving critical problems that threaten key species and large, wild ecosystems around the world.
WILDLIFE CONSERVATION SOCIETY


December 8, 1905
• American Bison Society established
Objective of ABS:
• The permanent preservation and increase of the American Bison
Elwin R. Sanborn


• In one of the greatest, unappreciated conservation success stories of the U.S., the bison had been "saved" from extinction.
• 100 years later ~ 500,000 bison in North America
• Most in private herds, raised for meat.
• Only 20,000 wild

North American Gray Wolf

- Largest canine
- Weight = 22 – 59 kg
- Apex predator
- Pack size = 8
- Litter size = 4 – 7
- Lifespan = 7 – 8 years
- Historic global population ~ 2 million

Wolf extermination in the United States

- Bounty programs initiated in the 19th century continued as late as 1965, offering $20 to $50 per wolf.
- 1915 – 1940 about 4,000 wolves were killed in US

- In 1995, 31 wolves were re-introduced to Yellowstone National Park
- Now ~ 5,000 in lower US (+ 9,000 in Alaska)
- Now ~ 200,000 in the world – 57 countries

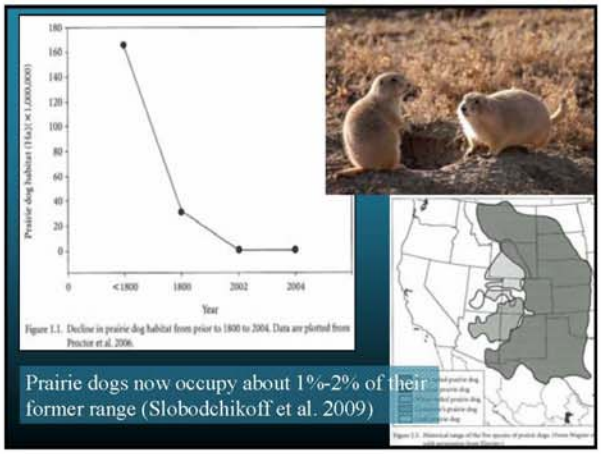


Figure 1.1. Decline in prairie dog habitat from prior to 1800 to 2004. Data are plotted from Proctor et al. 2006.

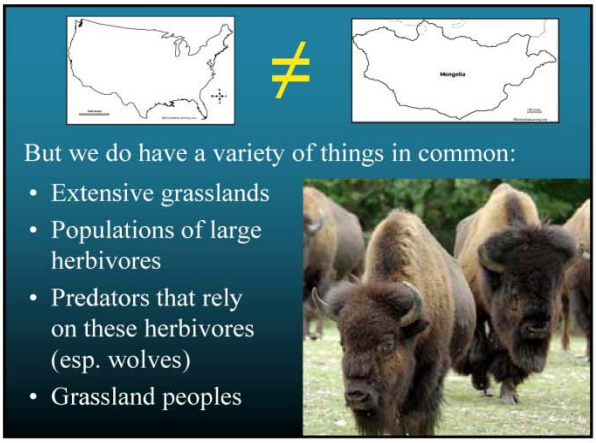
Prairie dogs now occupy about 1%-2% of their former range (Slobodchikoff et al. 2009)

We have found it very expensive to try to get back what we've lost …

Costs of Reintroduction (US $)

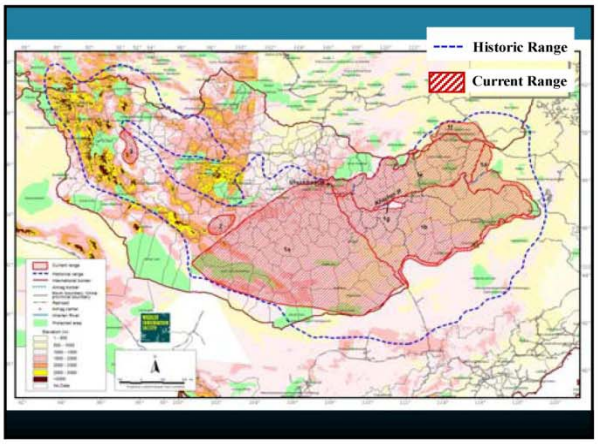
Wolf	$6.7 million	Two reintroduction Programs in U.S.
California Condor	$1 million	Annual for Program
Sea otter	$80,000	Cost/animal for rehabilitation and reintroduction
Golden lion tamarin	$22,000	Cost per animal for reintroduction

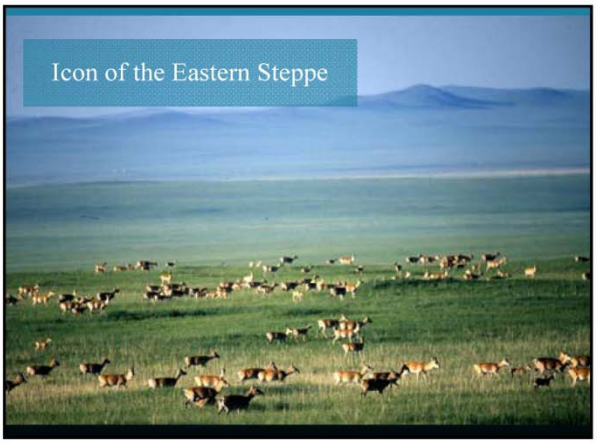
Fischer and Lindenmayer 2000

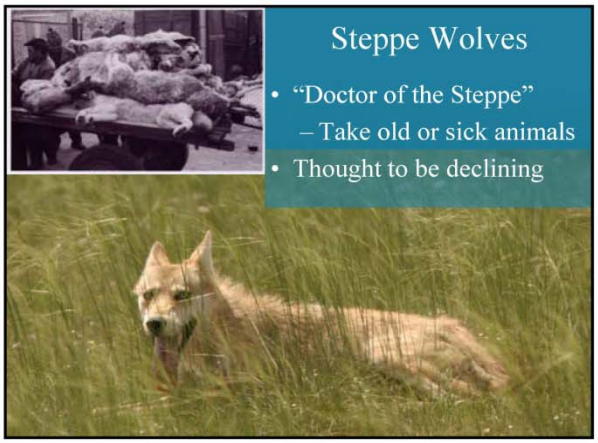

≠
But we do have a variety of things in common:
• Extensive grasslands
• Populations of large herbivores
• Predators that rely on these herbivores (esp. wolves)
• Grassland peoples


Gazelle on the Eastern Steppe
• One of the last great ungulate migrations in the world
– Rivals migrations of caribou in North America and wildebeest in Africa
– Are a food source for wolves and other predators (humans)

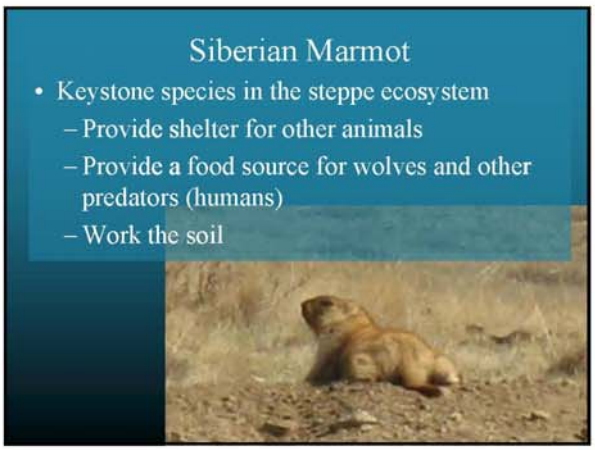

Gazelle on the Eastern Steppe
• In the past, numbered over 14 million
• In 1930's, 4.75 million
• In 2005, estimated at 1.2 million
• What is the decline from?
– Habitat loss
– Barriers
– Illegal hunting
• *May face the same fate as the American bison*


Historic Range
Current Range

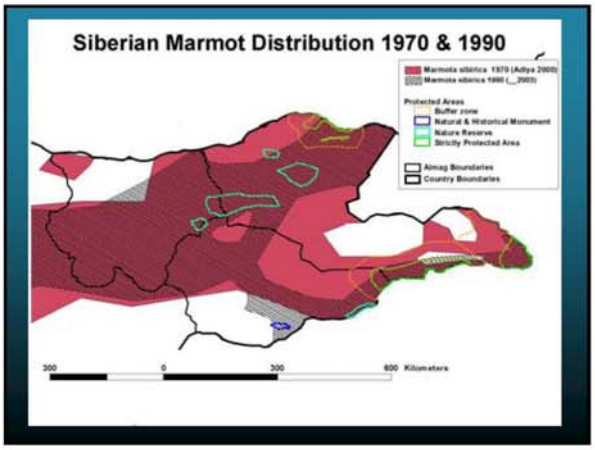

Icon of the Eastern Steppe

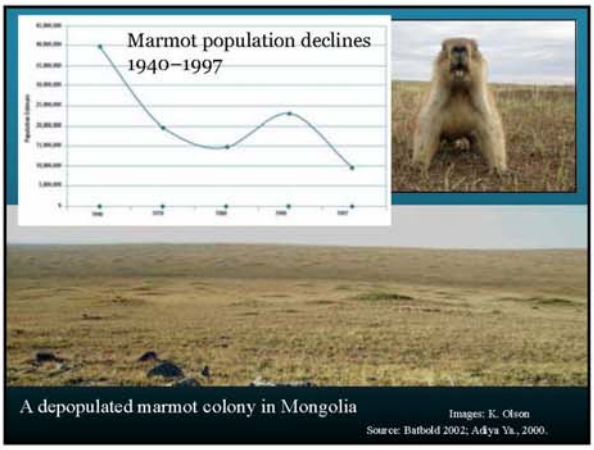

Steppe Wolves
• "Doctor of the Steppe"
– Take old or sick animals
• Thought to be declining


Official Wolf Skin Trade in Mongolia 1927–1985
Image: K. Olson
Source: Mongolian Academy of Sciences, Institute of Biology, Historical Trade Records, 1926–1984


Siberian Marmot
• Keystone species in the steppe ecosystem
– Provide shelter for other animals
– Provide a food source for wolves and other predators (humans)
– Work the soil


• In the past, numbered over 40 million
• By 1990, 20 million
• In 2002, only 5 million
• A decline of 75% in 12 years!!!
• Eastern Steppe
– 1990, 6 million
– 2002, 850,000
– 2005, >500,000
• Decline from trapping for the fur trade
Drastic decline of marmots

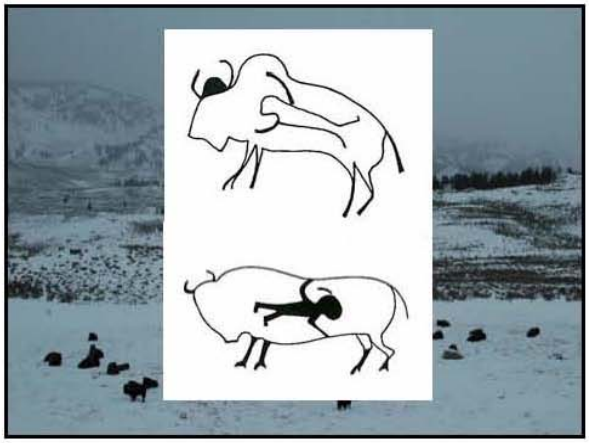

Siberian Marmot Distribution 1970 & 1990


Marmot population declines 1940–1997
A depopulated marmot colony in Mongolia
Images: K. Olson
Source: Batbold 2002; Adiya Ya., 2000.


Courtesy: Dan O'Brien

Eastern Steppe Wildlife

- Monitor, manage and sustainably use?



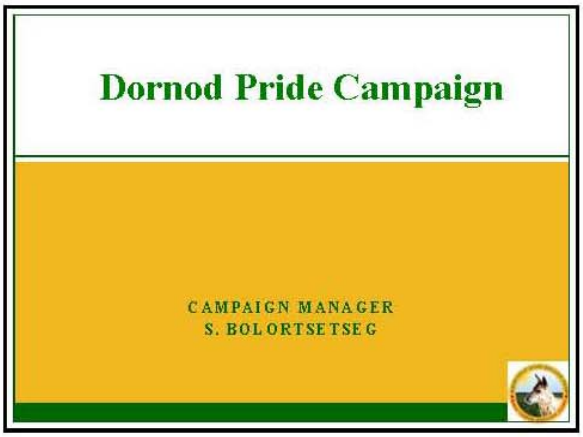
Why do you think wildlife are important?

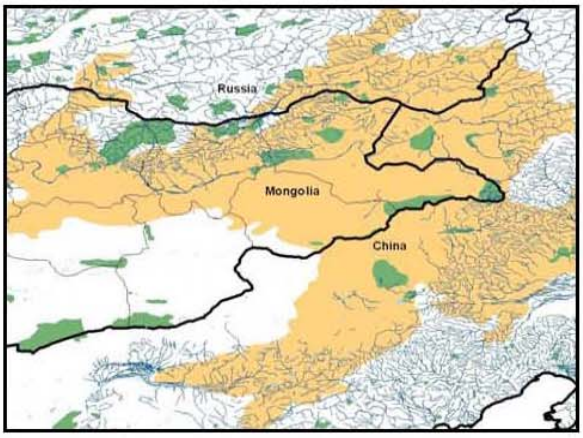
- Supplemental food source
- Warm clothing
- Ecosystem function
  - Wolves control gazelle population by taking diseased individuals
  - Marmots provide shelter for other small mammals
  - Raptors eat dead animals
- Inherent or aesthetic value

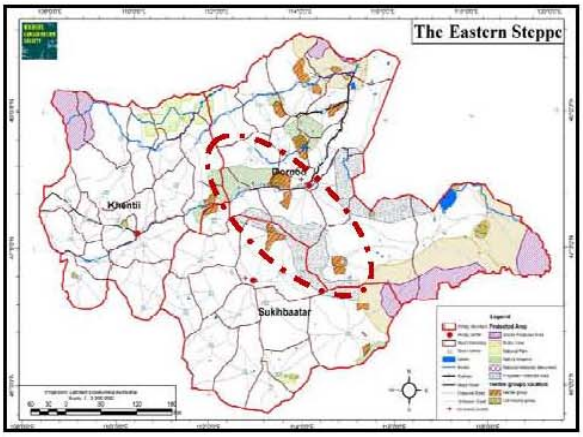
Where are wildlife commonly found in your areas?

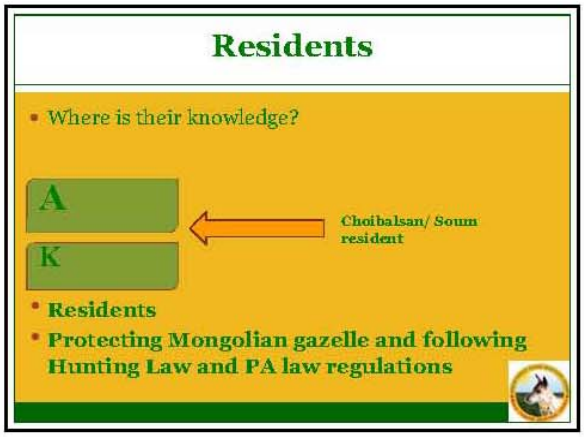
Dornod Pride Campaign,

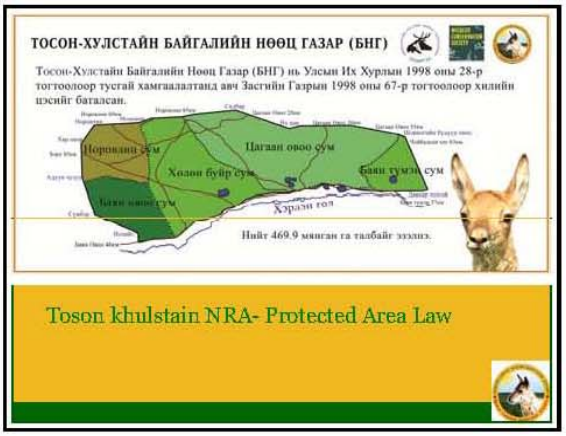
S. Bolortsetseg

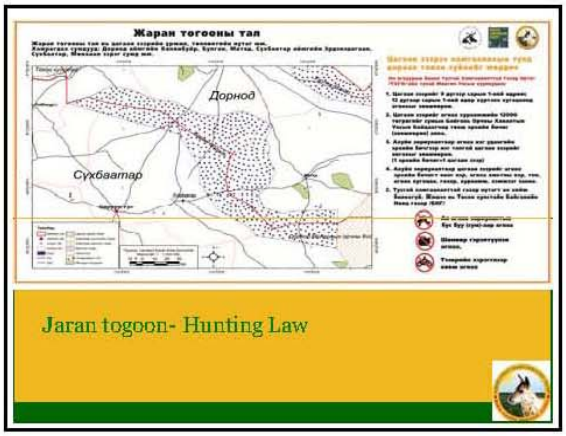




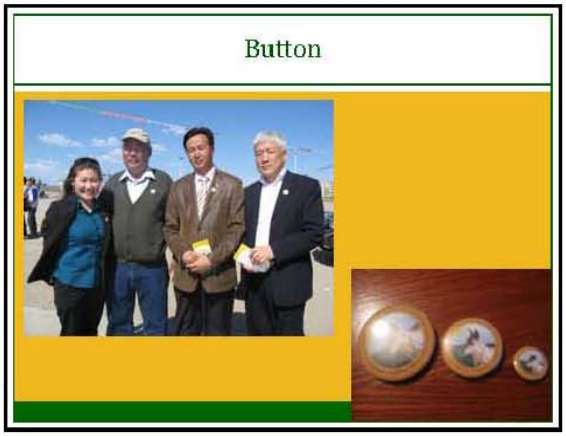




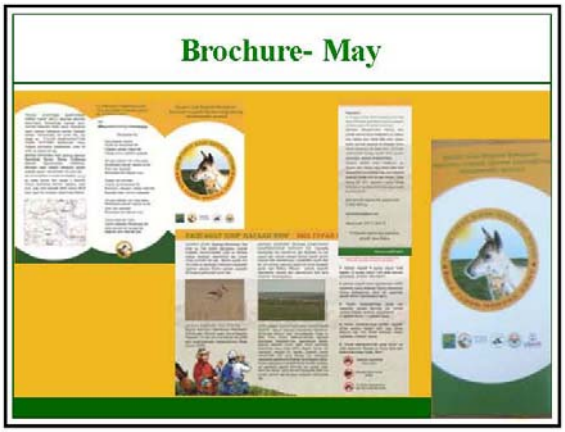

ТОСОН-ХУЛСТАЙН БАЙГАЛИЙН НӨӨЦ ГАЗАР (БНГ)
Тосон-Хулстайн Байгалийн Нөөц Газар (БНГ) нь Уласын Их Хурлын 1998 оны 28-р тогтоолоор тусгай хамгаалалтанд авч Засгийн Газрын 1998 оны 67-р тогтоолоор хилийн цэсийг батлсан.
Нийт 469.9 мянган га талбайг эзэлнэ.
Toson khulstain NRA- Protected Area Law


Жаран тогооны тал
Дорнод
Сүхбаатар
Jaran togoon- Hunting Law


Print Materials 4-6 Months
Stickers


Button

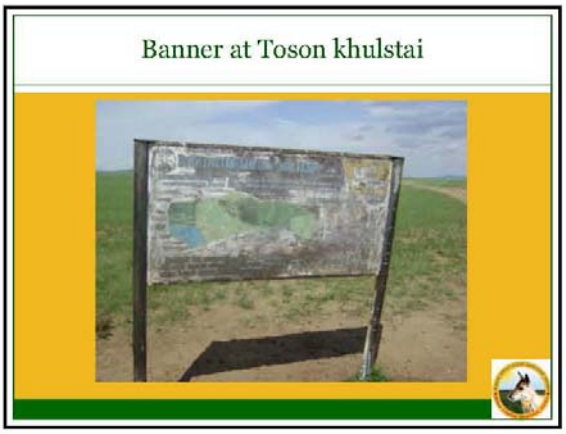

Bumper sticker
ХЯЛГАНАТ ХЭЭР
ЦАГААН ЗЭЭР
БИД ГУРАВ МӨНХӨД ХАМТ


Brochure- May

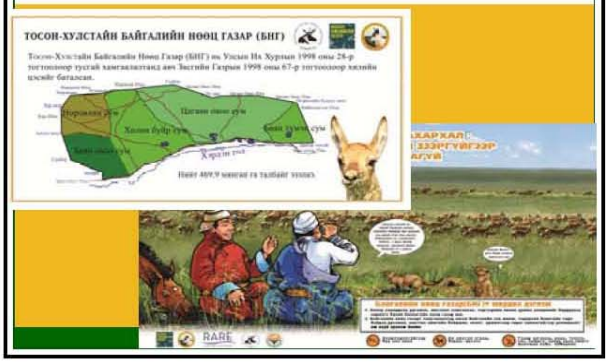

SMART WAY magazines: Eznis airways
SMART WAY


Хуанлитай өврийн дэвтэр
7 сар
• Гар зургийн болон шүлгийн бүтээлүүд
• БХ(ИБХ)-ийн мэдээллийн хуудсууд
• Тэмдэглэлийн хуудсууд
• Аяны холбогдолтой мэдээллүүд
• Хуанли 2010 оны 7 сараас 2011 оны 12 сар хүртэл

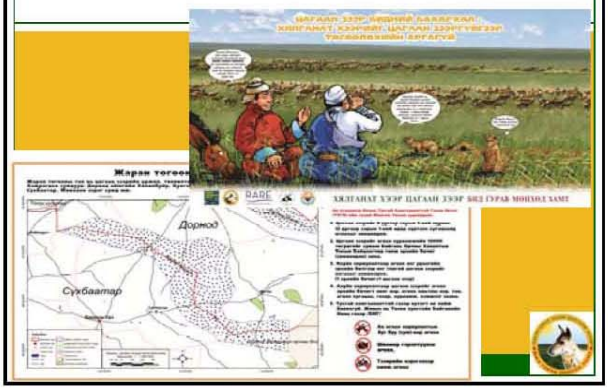

Banner- May


Banner at Toson khulstai

Banner at Toson khulstai



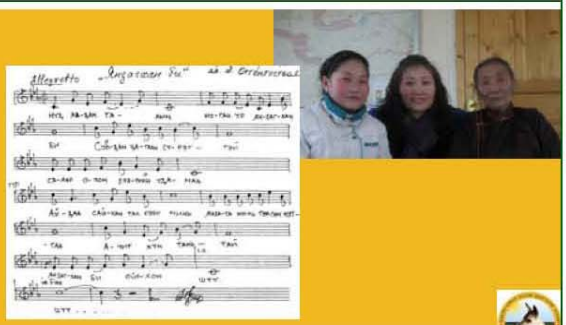
Banner at Jarantogoi



costume-Jan to March

- MNB Mazaahai kids program
- Visit schools
- Wildlife event
- Children & Mothers Day
- Visit Black market
- Visit Rangers
- Nadam Festival

"Calf Song



Hand pictures

Visit schools

Second of School visit work

Meeting with school teacher

Campaign site : meeting with teachers on 9

MNET

- SCAPES Project
  - Training Dornod Pride Campaign

- × Herder community
- × Locals
- × Organizations

Wildlife event

Visit International school of UB

Meeting with Rangers

SMS activity

MNB:mazaahai kids program

Mongolian National Radio channel

- Inspiring Messages

Local FM 107.5

Inspiring Messages

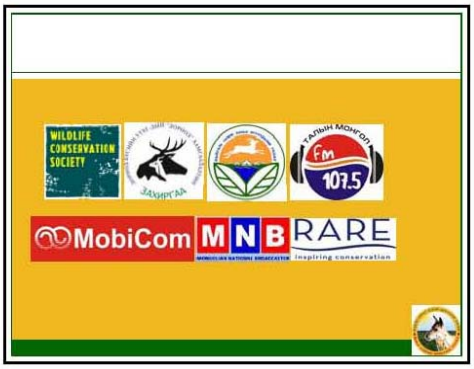
MNB: Voice Box interview April

- Interview on MNB TB

LocalTV: Hunting Law and Household Permit

- Hunting Law and Household permit meeting on Shine Channel Local TV
- Participants= 6


June first: Children& Mother's Day


WILDLIFE CONSERVATION SOCIETY
MobiCom
MNB
RARE
inspiring conservation


Thank you...

Laws Regarding Wildlife Use, Monitoring and Management *– S. Bolortsetseg*

Wildlife conservation and status – *N. Odonchimeg*
www.wcs.org/Mongolia

BIODIVERSITY

- Mammals - 138
- Birds - 434
- Fish - 75
- Amphibians and reptiles - 28
- Insects - 13000

9.4% of the country's total area is forested

Plants:

- Vascular 2900
- Moss 495
- Lichen 930
- Algae 1574
- Mushrooms/fungi 838

LEGISLATION

Environmental laws: more than 30

- **General Environmental Conservation**
- **Hunting (** *hunting purpose & permission*)
- **Fauna (** very rare *and rare sp*)
- **CITES** (*international trade*)
- **Plants** (*plants conservation and permission*)
- **Environmental Impact Assessment** (*general and detailed assessment*)
- **Special Protected Areas** (*category*)
- **Buffer Zone** (*buffer zone consul*)
- **Land Use**
- **Ecotourism**
- **Water** (river basin management) etc.

CONVENTIONS

Joined around 8 International Conventions like;

- CBD (*convention on Biological diversity*)
- Ramsar (*wetland and water birds*)
- CMS (*migratory species conservation*)
- CITES (*regulation of endangered & rare species international trade*)

NATIONAL PROGRAM

Adopted by Parliament and Government

- Biodiversity Conservation
- Special Protected Areas
- Red deer(*Servus elaphus*)
- Argali (*Ovis ammon*)
- Saiga (*Saiga tatarica*)
- Taimen (*Huso Taimen*)
- Saker falcon (*Falco cherrug)*

CONSERVATION STATUS

By **Hunting** law, 2000

Hunting time of mammals, fish & birds

Wild boar - between 1 September – 1 December

By **Fauna** law 2004

Mammals - 13, like *Snow leopard ..*

Birds - 8 like *Dalmatian Pelican* ***…***

Fish - 4 like *Taimen ...*

Butterfly - 1 *listed under* ***Very rare species & Prohibited to hunt***

Rare *species are listed by Governments & 3 kind of hunting purpose like Argali, Ibex …*

- ***Mammals 13***
- ***Birds 28***
- ***Fish 3***

Can hunt for:

Research & scientific

Trophy hunting

Regulating number of wildlife and disease

Mongolian Red Data book 1997

Mammals-30 (13-very rare; 17-rare)

Birds-30 (6-very rare; 24-rare)

Fish-6 (4-very rare; 2-rare)

Amphibians-4 (4-rare)

Reptiles-5 (5-rare)

Agnathans -1 (1 rare)

Insects-19 (1-very rare; 18-rare)

Crustaceans -2 (2-rare)

Molluscs - 4 (4 rare)

Mongolian Red list (2006)

Sponsored by WB-Royal Netherlands embassy

Developed by MNE, NUM, Institute of Biology, ZSL and University of Education

Mammals

Fishes

Amphibians & Reptiles

Birds – in preparation

Insects- in preapration

Definition of category used in the Red list by IUCN

Extinct (EX)	**Vulnerable (VU)**
Extinct in the wild (EW)	**Near Threatened (NT)**
Regionally Extinct (RE)	**Least Concern (LC)**
Critically Endangered (CR)	**Data Deficient (DD)**
Endangered (EN)	**Not Applicable (NA)**

Mammals

Data Deficient DD 37%	**Regionally Extinct RE 1%**
Data Deficient CR 2%	**Endangered EN 11%**
Vulnerable VU 3%	**Near Threatened NT 6%**
Least Concern LC 40%	

Fishes

DD 46%	**CR 2%**

EN 13% **VU 8%**

NT 6% **LC 25%**

Amphibians & Reptiles

Amphibians: LC 33%, VU 67%

Reptiles: LC 55%, VU 11%, NT 28%, DD 6%

CITES I

Mammals 4

Birds 13

CITES II

Mammals 9

Birds 8

Fish 3

Plants 8

Insects 1

CONSERVATION STATUS: Special Protected Areas

PA system - since 1994 = 60 (13.7%)

- **SPA- 12**
- **NP - 21**
- **NR- 19**
- **Monuments - 8**

Managed by Park Administration under the MNE

Category of SPA

- **Strictly PA -12**
- **National park – 21**
- **National reserve -19**
  - **Natural complex**
  - **Biological**
  - **Geological**
  - **Historical**
  - **Water**
- **Monuments - 8**
  - **Natural**

- **Historical and cultural**

From those Special Protected Areas designated as:

MAB (Man and Biodiversity network) - 5

Ramsar site - 11

World heritage - 2

And around 40% of Mongolian biodiversity is protected under Mongolian Protested Areas

ECONOMICALLY IMPORTANT SPECIES

Marmot: 40 million (1940)
to 1-2 million (now & ban)

Red Deer: 130,000 (1986)
to 8-10,000 (2002)

Argali: 60,000 (1985)
to 15,000 (2001)

Saiga: 5,000 (1998)
to <800 (2004)

Saker Falcon: 3,000 (1999) to 2,000 (2004)

Map and Compass Use *– L. Ochirkhuya,* Presented *G. Bat-erdene,* EMCCA

A map is a representation of a landscape in two dimensions. It uses symbols to represent the features found on a piece of land. Different kinds of maps focus on different features. Some kinds of maps and their characteristics are;

1) Roadmaps. These maps illustrate the network of roads in an area or a region, usually along with settlements, airports, built-up areas and other human features that are connected via the road network.
2) Topographic maps. These feature terrain, rivers, vegetation and human features. Terrain is interpreted by contours – lines that join places of equal elevation above sea level. These maps show small areas in much detail so they are most useful for field conservation staff.
3) Political maps show man-made features, such as the boundaries between countries, or the locations of cities, villages and roads.
4) Satellite maps. These maps are based on information interpreted from photographs taken very high above the Earth's surface. They show large areas in small detail. They are useful for monitoring changes in vegetation and in landscape level planning.

Maps can indicate which parts of a reserve that are inaccessible, due to the presence of large rivers, wide swamps or high mountains, or which areas are far from roads, trails or waterways. Conversely, maps can show areas that are accessible and the access routes in and out of the reserve, and potentially used by poachers.

There is always something new to learn from a map. Refer to them often, especially when new information is brought in from the field. Check the date of any map you use and decide if it is still relevant. Aerial photographs and even satellite images are becoming increasingly available and can complement the information available from maps.

What features are important in a map?

All maps should clearly indicate orientation and scale. Furthermore, all symbols should be defined, and the map should be dated. Finally, the site of the map should be located within a larger known area.

Orientation

North, South, East, and West indicate direction throughout the world. On most maps, North is towards the top of the map, but this is not always the case. Therefore, any map should clearly indicate which way is North. A simple arrow pointing North with an "N" marked next to it is usually sufficient (Fig.1). Once North is defined, any other direction (East, West or South) is evident.

Figure 1. North arrow from a map

Scale

A map must include a scale in order for it to be useful as a source of spatial information. Scale refers to what a given distance on the map represents on the ground. Maps drawn in the same scale can be compared easily, because any given feature (e.g., a lake, road, or the bend of a river) is the same size on both maps. Scales are usually presented in two ways;

1. The scale of a map can be presented numerically, as a ratio between the distance on the map and the distance on the land. For example, on a map with a scale of 1:50,000 (read 1 to 50,000) 1 centimeter on the map represent 50,000 cm (or 500m) on the ground.
2. A scale can be presented graphically (see Fig.2). Graphic scales can be used to measure distances on the map itself. Place a piece of paper along the edge of the scale and mark on the paper each kilometer line (or other distance) with a pencil. Then move the marked paper to the area of the map you wish to measure. Alternatively, measure the scale with a ruler and calculate the distance that is equivalent to 1cm. Thereafter multiply the number of centimeters and millimeters measured with your ruler by the distance equivalent to 1cm. To measure the length of a meandering stream or road, lay a string on top of the curving line, then measure the length of the string using the scale or your ruler.
3. Note that if you magnify or reduce the map using a photocopier the graphic scale remains true (if copied with the rest of the map) but the numerical ratio written on the map will no longer be a true representation of map scale.

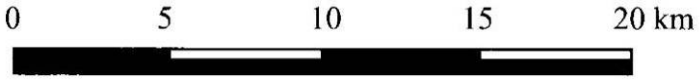


Figure 2. Scale bar from a map

Locate the Site

Any map should have a title, for example "Choibalsan", or "Ulaanbaatar". Even with a title, sometimes it is difficult to determine the location of the area represented in the map. Therefore, for any map that will be read by people unfamiliar with the area, the site of the map should be located relative to the surrounding region. This can be done in two different ways, though both can be used for the same map;

A picture of the focal map can be drawn in relation to a larger map, and placed in the legend (see Fig.3).

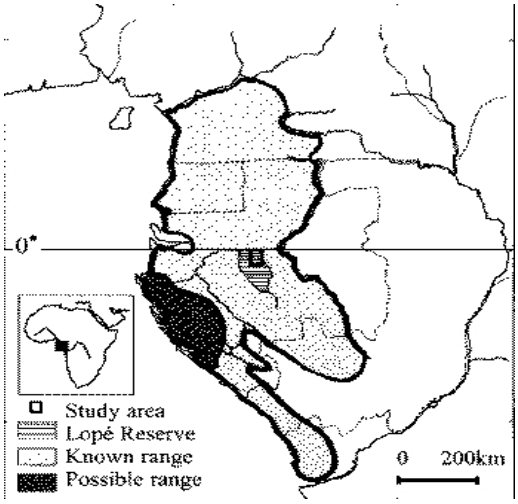


Figure 3. Locating a focal area within a larger area

1. Longitude and latitude lines can be included in the map (see Boxes 1 & 2). Longitude and latitude lines are recognized worldwide. Therefore, anyone, anywhere reading a map can know the location of the region pictured. Longitude and latitude lines should be marked on any map that is widely distributed. Lines of longitude and latitude that form the borders of a map are generally marked in the corners. Other longitude and latitude lines can be marked along the edges. If you look at a topographic map of the area where you work you will see longitude and latitude clearly labeled every 5' for maps at a scale of 1:50,000 or every 10' for maps at 1:200,000.

Symbols

Map features are defined using symbols. Both man-made and natural features can be defined using symbols. For example, villages, roads, railroad tracks, wells, streams, mountain tops and waterfalls can each have their own symbol. Different features can be defined using different colors, for example;

- Man-made features tend to be marked in black
- Water features tend to be marked in blue
- Vegetation features tend to be marked in green
- Terrain features tend to be marked in brown

Features may also be distinguished by widths of lines, or different pictures, such as a triangle for a tree. Any symbol used in the map should be defined in the map's legend. A legend is a box located near the edge of a map that has examples of each symbol, together with an explanation of what that symbol means. Sometimes a group of maps will have only one common legend, but these maps should always be found together, such as in an atlas.

Contour Lines

Contour lines are lines on a map that join all the places that have a common elevation. Contour lines define the presence of hills, valleys, streams and all the other vertical measurements of the land. Contour lines can indicate if an area is mountainous or flat, which way streams are flowing, or which way slopes are facing (see Box 3).

Contour lines (together with a scale) allow you to calculate the steepness of a slope or trail. The difference in elevation between one contour line and the next is called the "contour interval". Contour intervals remain the same throughout any one map. The contour interval can differ between maps and depends on the steepness of the area. In flat areas the contour interval may be only 10m, which means the elevation difference between one contour line and the next is 10m.

In mountainous areas, the contour interval may be 50m or 100m. Maps with contour lines are called "topographic maps" because they show the topography, or surface features, of the area. Topographic maps are widely used to navigate in natural areas where there are few roads or man-made features to act as landmarks.

What is a compass?

A compass is an instrument used to indicate direction. It is made of a magnetized needle that floats freely (often in a liquid). The needle always points north and is surrounded by a moveable dial on which the four "points of a compass" are written (**N**orth, **S**outh, **E**ast and **W**est). The dial is further divided into 360 equal sized parts, called degrees, the standard unit measure for directions and angles (Fig. 4).

Figure 4. Compass

How do you use a compass?

To use a compass, hold it level so the needle can swing freely. When it stops moving, align the "N" on the compass dial with the red or dark tip of the needle. When North (N) is properly in place you can accurately read the other compass directions (South, East and West) from the dial. If you have a compass which uses a freely rotating card with compass directions written on it (instead of just a needle) you can read the compass directions straight from the card without further adjustments. In addition to the four directions of North, South, East and West, compasses indicate direction using degrees. This allows for greater accuracy in defining a direction. There are 360° in a full circle. North always equals 0° (read zero degrees) or 360°, East equals 90°, South equals 180°, and West equals 270°. The circle can be further broken down into named sub-divisions: North East is exactly half way between North and East, at 45°; North East and East North East are exactly between North, North East, and East, at 22.5° and 67.5° respectively, etc. (Fig 5).

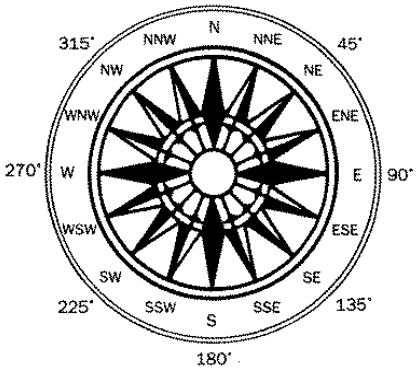


Figure 5. Compass directions

Other directions are usually referred to by a number (called a bearing), for example, 49°. To "take a compass bearing" means to align the compass with some distant object of interest and to read the "bearing" (for example, 86°) from the compass dial. Some compasses have sighting mechanisms or mirrors that allow you to look at the distant object and the bearing at the same

time. This allows you to take a more accurate reading. Because they depend on magnetism to work, compasses should not be used around large sources of iron or steel, or near electrical or magnetic currents. Therefore, compasses should not be used in or near a car, truck, or power lines. Even a nearby gun barrel carried by a ranger or guard can affect a compass reading. If you must use a compass near any of these things move the compass around the object to see what effect the object has on the compass.

Finding your way using a map and compass

To find your way in an unknown, road less area you will need a map and a compass. Before you start walking or riding, use the map to look for the easiest or desired route to your destination. The shortest distance between two points is a straight line. But if large rivers, swamps or steep slopes fall along that line, it might be easier and quicker to plan a route around them. Waterways and ridge tops are often good places to walk, as major animal trails tend to follow these features. Try to minimize the number of contour lines that you cross so that you minimize the number of hills you must climb.

The best way to walk in an unknown area without getting lost is to walk from one clearly identifiable landmark to another, such as from a large bend in the river, to a hilltop, and then to a recognizable clearing; or alternatively from summit to summit along a ridge. Mark your route on a map in pencil. Use straight lines where there are no paths to follow. Straight lines will allow you to use your compass to walk a compass bearing.

Calculating a bearing

You can use either a protractor or a compass to calculate the bearing you should follow to go from point A to point B on a map:

• First draw a faint pencil line joining points A and B;

• If you are using a compass, place the edge of the compass so that it lies between the points with the arrow pointing from A to B.

Without moving the compass from that point, rotate the compass dial until the north arrow on the compass is parallel with the north arrow on the map. Then read the number on the compass dial (Fig.6).

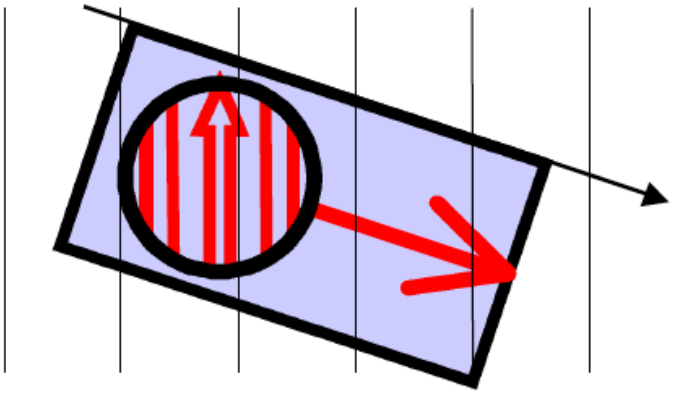


Figure 6. Using a compass to take a bearing on a map

• To use a compass, line the north on the scale of your compass along map north. Then rotate the body of the compass (holding the scale still) until its north is in line with the line you have drawn between A and B, and read the bearing off the scale.

Orienting a map

To use a map in the field first you must orient the map to either a compass or to visible

features in the landscape. You can orient the map to your compass by turning the map around until magnetic north on the map is lined up with north on your compass. You can orient the map to visible features in the landscape, such as mountaintops, by turning the map so that from where you are standing distant features line up with the map. From there the map can help you identify other distant features, and the compass can give you bearings towards them.

Walking a compass bearing

Usually during your normal duties your movements in the reserve will take you on non-linear paths of travel. On rare occasions, however, you may wish to walk or ride a compass bearing. For example, you may be asked to participate in a survey of Mongolian gazelle following line-transects. When you walk or ride a compass bearing you walk/ride a straight line in a single, pre-determined direction. First decide on the map where you are and where you want to go. Calculate the bearing between the two points as detailed above. Once you have calculated the bearing hold your compass in front of you and rotate the scale of the compass to the correct angle.

Hold the compass still and rotate your body around until the needle of the compass corresponds to the north on the scale, and your chosen bearing is pointing directly away from you. Look ahead and choose a clear landmark, such as the top of a hill or a rock (use the sight of the compass if there is one to help choose the best landmark). Walk to this landmark. You can deviate around small objects; ditches or crevices, as long as you get to the chosen landmark and are careful it is the right one. When you get there stop and repeat the same process, using a new landmark. For long distances, as you make your way towards your destination check that the features you pass correspond to those you expect from the map. If you will be walking long distances a compass with a strap worn as a watch is convenient as it keeps both your hands free.

Navigating around obstacles

If you are demarcating a park boundary or cutting a line transect on a compass bearing and you come to a big obstacle, such as a ravine, use the following procedure to maintain your compass bearing (see Fig.7).

Turn and walk exactly 90° or 270°from the direction you were traveling. When you have gone beyond the ravine, measure the distance you have deviated from your bearing or transect and proceed along your original compass bearing. When it is possible, turn 90° or 270° again, and walk the same distance back to your original line. Then turn one last time back on your original compass bearing to follow your original course. Alternatively, if you can see across the obstacle, send one of your colleagues to the far side and have him or her stand at the point which corresponds to the continuation of your line.

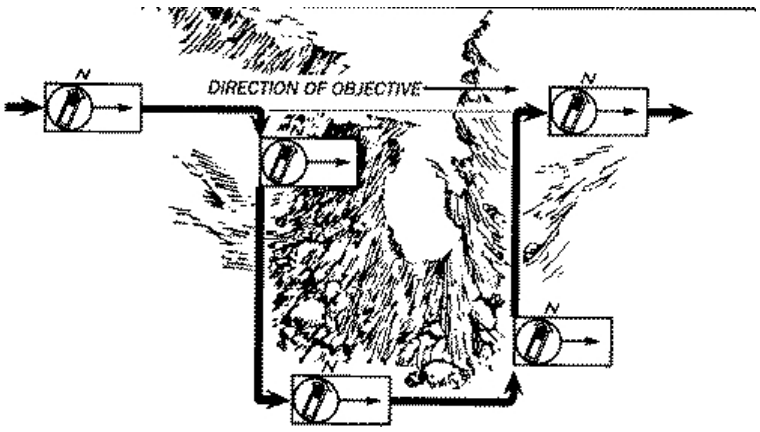


Figure 7. Navigating around an obstacle

GPS Use *– L. Ochirkhuyag*

Presented *G. Bat-Erdene*, EMCCA

Use of GPS for geo-referencing locations and for navigation/ orientation

Garmin Foretrex Receiver

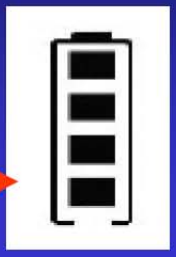
First steps - becoming familiar with the receiver

Equipment you need!

1. Garmin Foretrex receiver
2. Alkaline 'AAA' cells
3. Standard topographic map of area
4. Compass
5. Pencil, rule
6. You are going to the field. Please wear appropriate field clothing and footwear for the field exercise.

Powering up: please use only ALKALINE AAA cells

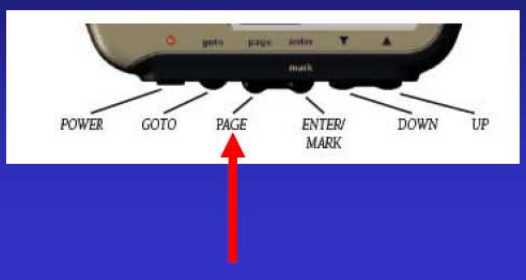
This is the battery level indicator in the top left hand corner of the screen. When it gets low, please change the batteries (see below)

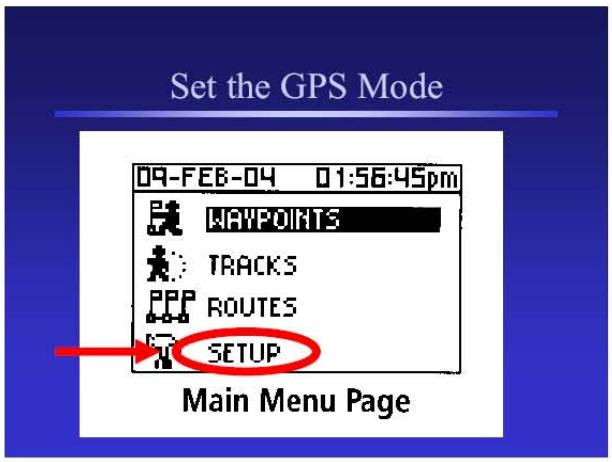


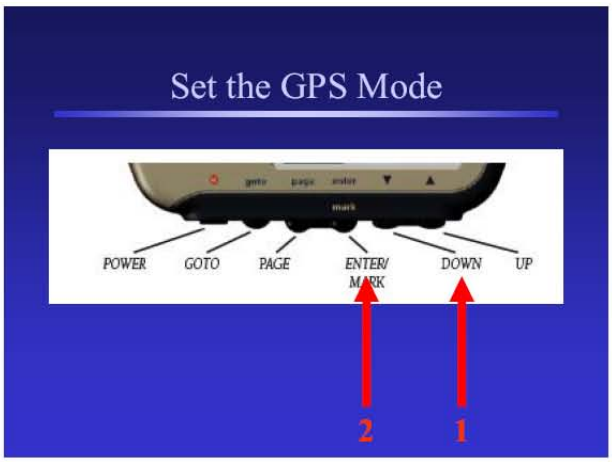
Turning the receiver on

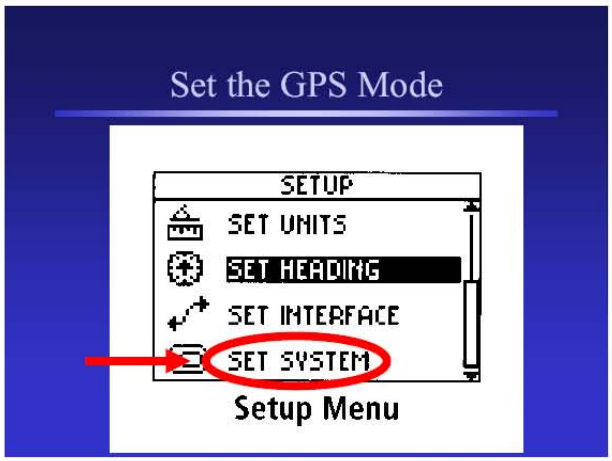
To turn the receiver ON, press this key and hold until the GARMIN screen appears

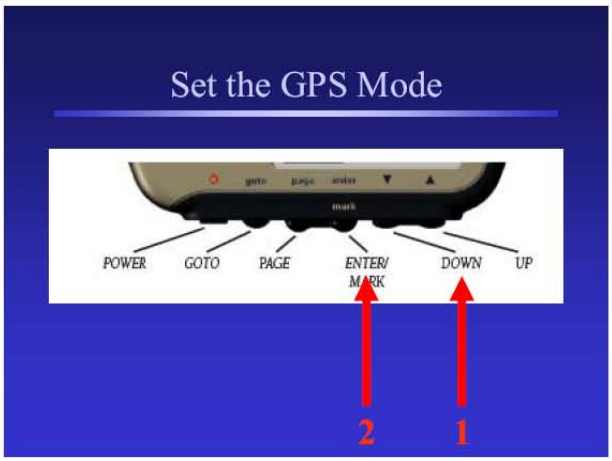
Set the GPS Mode

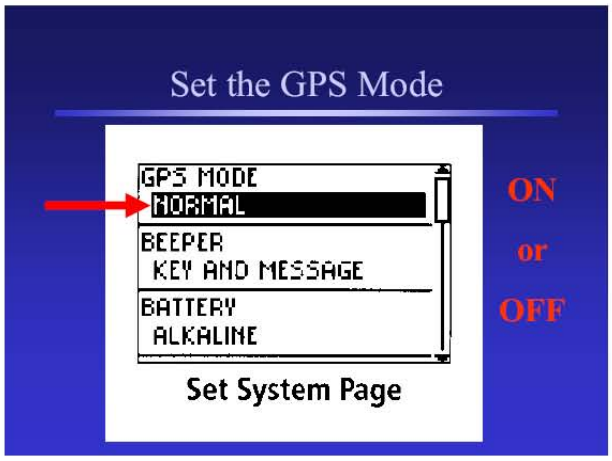


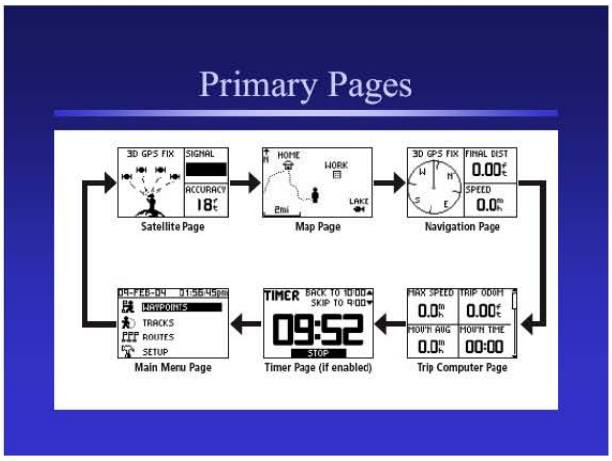

Set the GPS Mode
09-FEB-04 01:56:45pm
WAYPOINTS
TRACKS
ROUTES
SETUP
Main Menu Page


Set the GPS Mode
POWER
GOTO
PAGE
ENTER/ MARK
DOWN
UP
2
1

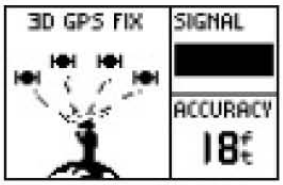

Set the GPS Mode
SETUP
SET UNITS
SET HEADING
SET INTERFACE
SET SYSTEM
Setup Menu


Set the GPS Mode
POWER
GOTO
PAGE
ENTER/ MARK
DOWN
UP
2
1


Set the GPS Mode
GPS MODE
NORMAL
BEEPER
KEY AND MESSAGE
BATTERY
ALKALINE
Set System Page
ON
or
OFF

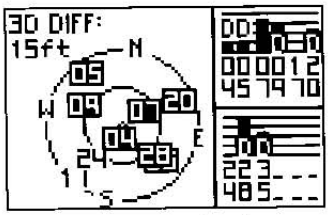

Primary Pages
Satellite Page
Map Page
Navigation Page
Main Menu Page
Timer Page (if enabled)
Trip Computer Page

Satellite Page



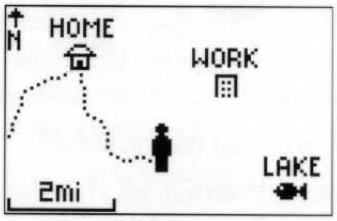
Satellite Page

Satellite Location



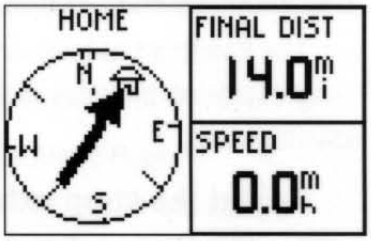
Advanced Skyview

Map Page



Map Page

Navigation Page



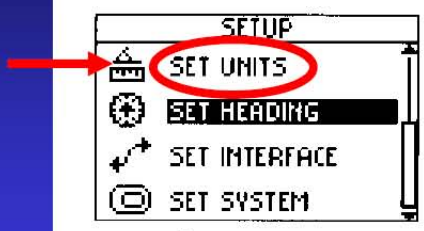
Navigation Page

Trip Computer Page

Main Menu

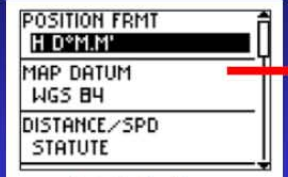
Main Menu Page

Setup Menu

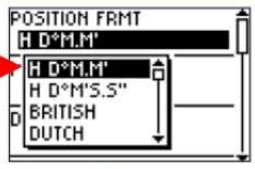


Setup Menu

Set Units



Set Units Page

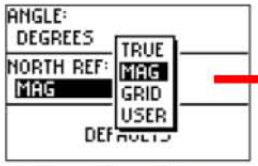


Selecting the Position Format

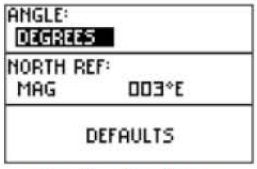
Set Time

Set Time Page

Set Heading



Selecting the angle setting



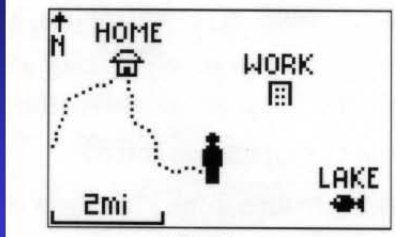
Set Heading Page

Now it's time to get some field practice, so let's move outside the classroom

Getting started - GARMIN exercises outside the classroom

Exercise 1: Using the Map Page

Watch the map page as you move around



Map Page

Exercise 2: Using tracks

Clear the track log

Main Menu Page

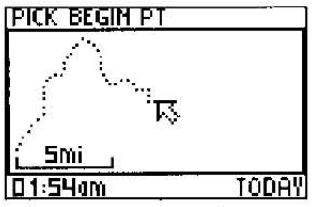
Clearing the Track Log

Tracks Menu Page

Clear the track log

Tracks Menu Page

Make a new track log



Saving a track

Saved Tracks

Saved Tracks List

Rename Tracks

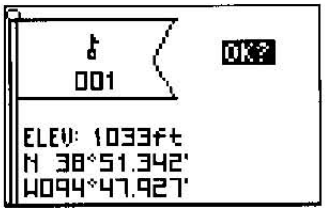
Saved Tracks Options

Edit Tracks

Edit Track Name Page

Exercise 3: Marking a waypoint

Marking current location

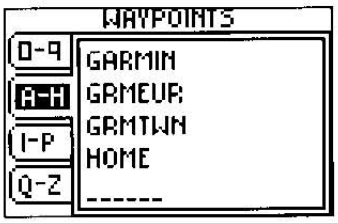


Mark Waypoint Page

Creating new waypoint

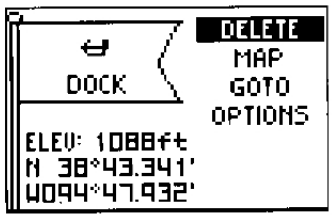
Waypoints Menu

Select a Waypoint



List All Waypoints Page

Editing a Waypoint



Review Waypoint Page

Exercise 4. Marking a waypoint on a map

Marking a Waypoint on a Map

Read the LATITUDE and LONGITUDE for a Waypoint called 'CLASS' from your GPS

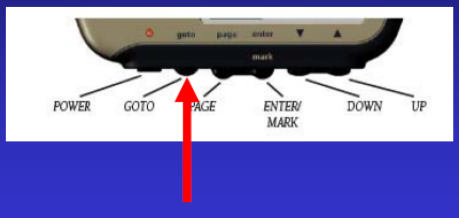
LATITUDE = DD…….. MM…… SS……

LONGITUDE = DD…….. MM…… SS……

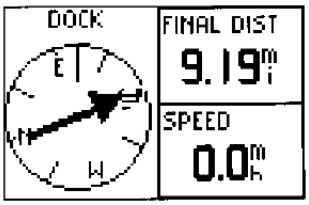
Now plot the position of 'CLASS' on your map

Exercise 4: Navigating to a location (using GPS)

Navigating to a Location



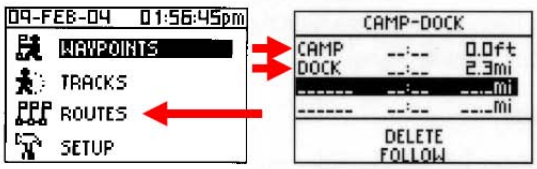
Navigating to a Location



Goto Waypoint:
Navigation Page displaying

Exercise 5: Using routes

Creating a Route



Main Menu Page Route Page

WILDLIFE MONITORING METHODS

Prepared Ann Winters,
Presented *S. Bolortsetseg,* WCS, Mongolia

Monitoring Marmots

Marmots are considered a keystone species in the steppe ecosystem, and likely affect community structure and function at a greater level than their numbers alone might suggest (Mills et al. 1993, Power et al. 1996). They influence the vegetation around their colonies, are themselves food for a number of raptors and mammalian predators, and provide ready-made shelter for a wide variety of wildlife; particularly for foxes, manul (Pallas') cats, hedgehogs and a variety of passerine birds (Murdoch et al. 2009, Adiya 2000, Schaller 1998).

Rampant marmot trapping for the fur trade has led to drastic declines in marmot numbers over the past decade. Marmots once numbered over 40 million in Mongolia, dropping to around 20 million by 1990 and were last tallied at around 5 million (~850,000 in the eastern steppe region) in 2002; a decline of 75% in only 12 years (Batbold et al. 2000). In response, the Mongolian government instituted a two-year ban on marmot trapping and hunting in 2006, which has been extended an additional two years, twice (2008 and 2009, 2010 and 2011).

Objective 1: Estimate the number of active and inactive colonies in community areas.

Objective 2: Monitor relative abundance of marmots over time.

Distance Sampling Assumptions

- Every object (i.e. animal or marmot colony) on the transect is detected
- Transects are randomly located in respect to objects (i.e. marmot colonies).
- Accurate measurements of distances to the observations. *Be especially careful to take care with those observations made close to the line. Do not record a zero distance unless the animal or target is exactly on the line (e.g., record 1.5m as such). Do not round distance measurements, i.e. record as 21.3m and not 20m, etc)*
- Animals must not move large distances before being detected (no movement prior to detection). *Try to detect animals before they move and record the distance from that position. If animals do move in response to the observer then try to look far enough ahead to detect them before they move.*
- Sightings of animals must represent independent events. *If animals occur in groups then record the distance to the center of the group and the size of the group (e.g. a marmot colony or a herd of gazelle). Establish a guideline to determine what constitutes a group, e.g. animals or burrows within 15m of each other, etc.*

Estimating Colony Densities Using Distance (Townsend 2006)

This method utilizes distance to objects detected and detection probabilities to estimate object densities. The marmot colony is the unit of observation. To get an estimate of the actual

number of active colonies we need information on the detection probability (*p*). The measured distances allow us to estimate *p* and, therefore, to accurately estimate the number of objects (i.e. marmot colonies).

1. When using this method, first identify your study area (name it and define its boundaries; i.e. the community area). Within this study area establish evenly-spaced, random transects over the entire community area. They should be between 2 and 3 kilometers long, and 3 to 5 kilometers apart (Fig. 1).

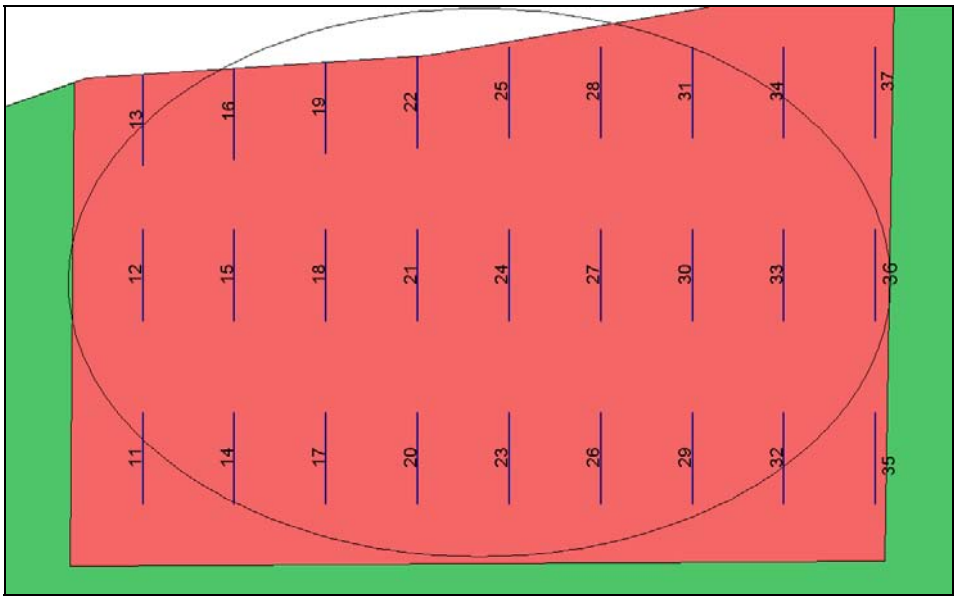


Figure 1. Example of a systematic parallel transects sampling scheme for collecting distance data in a 13,350 ha area (13.35 km2); with a spacing of 3-5 km apart.

2. On your data sheets, include beginning and ending times and locations, weather conditions, community (or site) name, date, transect number or ID, length of transect, compass bearing of your transect, general habitat description and mode of transportation (Fig. 2).

DATA SHEET: MARMOT COLONY DISTANCE SAMPLING

VR Name:	B. Monkhbaatar			**Date:**	2007 - 09 - 05 (yr mo day)
Start Time:	7:00			**End Time:**	12:00
Begin №:	829	**Lat:**	112.28030	**Long:**	47.88836
End №:	848	**Lat:**	112.28030	**Long:**	47.91836
Weather:	18C, wind 4-9 m/sec., clear sky, no rain, sunny				

(temperature, wind speed, cloud cover, preciptiation, sunshine, etc.)

Community Name: Yuson Erdene

Tran. № / ID: 10 **Length:** 3 km **Bearing:** 180 °

Habitat: Hilly steppe grassland

Mode of Transportation: (horseback) | walking | motorcycle | vehicle

(circle one)

Figure 2. Example of the general information to record for collecting Marmot Colony Distance data.

3. Move along the transect keeping a heading of either north (0°) or south (180°). Search for burrows that fall on the transect, and within approximately 100 meters to either side of the transect. It is okay to collect data on burrows a bit further out than 100 meters, but just be aware of your time.
4. When a burrow (>10 cm in diameter) or cluster of burrows (i.e. colony = group of burrows within ~ 15 m of each other) are detected, stop and assign a number to the colony (Fig. 3). If you must leave the transect to collect data, leave a marker on the transect so you can find it later.

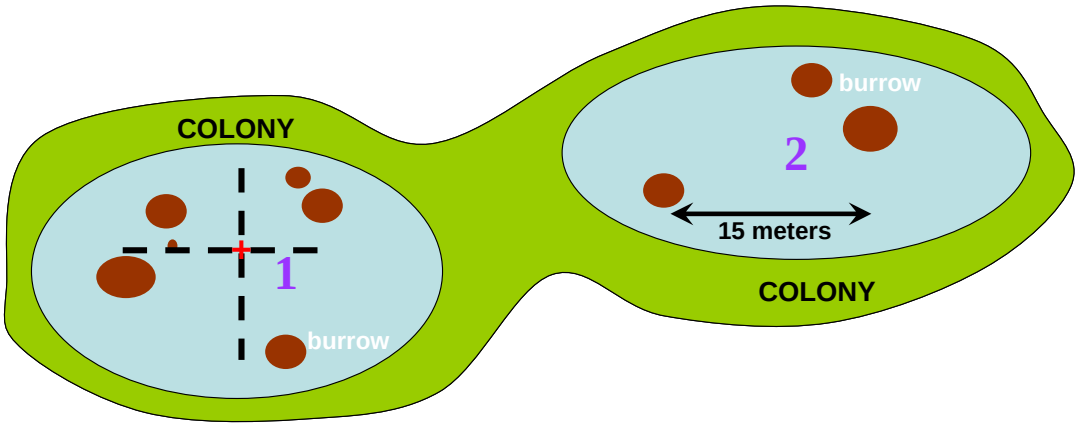


Figure 3. Example of a map of two colonies, 1and 2, with burrows within 15 meters of each other. The "+" pattern on the left shows colony area paces.

5. First, find the four burrows furthest from each other and pace off the colony using an "+" pattern – something similar to north to south and east to west. Multiplying the length of the two axes will give a rough estimate of the colony area.
6. Second, record the location of the colony at the middle of the colony (i.e. the "+" intersection) using a GPS unit, and write the location on your data sheet.
7. Third, observe all burrows in the colony and record how many there are in each of 3 size classes (10-20 cm, 21-30 cm and >31 cm). Record the total number of burrows (most important information; Table 2).
8. Fourth, record whether you heard a marmot alarm call (1 = yes, 0 = no) and/or actually observed a marmot at the colony (Table 2).

9. Fifth, observe all burrows and determine whether there is fresh digging, tracks and fresh (dark, green inside, smelly) or old scat (grey colored), recording the number of burrows this is true for, or a 0 if not present (Fig. 4).

Figure 4. Beginning from left: Fresh digging at a marmot burrow; fresh marmot scat; a clear marmot foot print.

10. Sixth, record the number of burrows without debris plugging them. Only if the burrow is mostly blocked by debris should a negative (0) be recorded. If there is debris near the hole, but it has been pushed out, you should record a positive (1). Also, if there is very little debris in burrows, record a positive (1).

11. Seventh, kneel down and smell each burrow. If a marmot is present, you will smell a musty odor. Record the number of burrows that have this smell.

12. Eighth, consider all of the burrows you have observed and decide whether you think the colony is active (1), inactive (0) or you are not sure (?), and record this information on the data sheet. Active colonies = marmots observed and/or fresh scat present, or when there is this combination "digging, old scat, tracks and no debris"; Inactive = if only one variable is noted (like old scat) with no other variables. "Debris in entrance" is considered a sign that marmots are likely absent. It is possible to have an active burrow or group of burrows that has "debris in entrance" checked as long as there are the other combination of variables as noted under "active" and "probable active." If you are not sure, record a "?".

13. Finally, record the number of paces it takes to walk back to your transect. This should be the perpendicular distance from the center of the colony (where the "+" falls) to your transect. If the center of the colony is close to the transect line then do not record this as zero (even for burrows straddling the line), but carefully measure and record the small distance. This distance can later be converted into meters.

***<u>NOTE</u>: Distances from the colony center to the transect are the most important data you will collect for this method, so take care to collect accurate data. Be sure to include your # of paces/meter on the data sheet.*

14. When you reach the end of the transect (you will know when the GPS tells you that you have arrived at your destination) make sure to record the time you completed the transect. It may also be useful to record your average moving speed and total distance covered. This will be different than the transect length since you were walking to burrows up to 100 meters away from the transect.

15. Understanding what areas have active, inactive or no colonies in the community-management area will help you detect re-colonization or range contraction of marmots over time.

Mongolian Marmot */ Marmota sibirica /*

Table 1. Example of a completed data sheet for Marmot Colony Distance data.

DATA SHEET: MARMOT COLONY DISTANCE SAMPLING

VR Name: B. Monkhbaatar **Date:** 2007 - 09 - 05 (yr mo day) **Community Name:** Yuson Erdene

Start Time: 7:00 **End Time:** 12:00 **Tran. № / ID:** 10 **Length:** 3 km **Bearing:** 180 °

Begin №: 829 **Lat:** 112.28030 **Long:** 47.88836 **Habitat:** Hilly steppe grassland

End №: 848 **Lat:** 112.28030 **Long:** 47.91836

Weather: 18C, wind 4-9 m/sec., clear sky, no rain, sunny (temperature, wind speed, cloud cover, precipitation, sunshine, etc.) **Mode of Transportation:** horseback | walking | motorcycle | vehicle (circle one)

Table 1. Example of a completed data sheet for Marmot Colony Distance data.

Colony №	Colony Area Paces +		Colony Location (Waypoint) Name	LAT	LONG	Burrow Sizes 10-17 см	18-25 см	26-33 см	Total # of Burrows	All Burrows Scoring (≥1 = yes, 0 = no) alarm call	marmot	digging	tracks	fresh scat	old scat	no debris	smell	Active? (1 = yes, 0 = no)	From Transect Distance (paces)	Distance (meters)	Notes:
1	16	10	830	48.1862	112.665	3	2	0	5	1	0	0	4	1	3	5	2	1	29	35.96	
2	1	1	832	48.1864	112.665	1	0	0	1	0	0	1	0	0	1	0	0	?	0	0.00	not sure if digging by marmot
3	1	1	833	48.1879	112.665	1	0	0	1	0	0	0	0	0	0	0	0	0	2	2.48	
4	12	1	835	48.1913	112.665	2	0	0	2	0	0	0	0	0	1	0	0	0	23	28.52	
5	1	1	837	48.193	112.665	1	0	0	1	0	0	0	0	0	0	0	0	0	14	17.36	
6	1	1	839	48.1932	112.665	1	0	0	1	0	0	0	0	0	0	0	0	0	3	3.72	
7	34	13	842	48.1961	112.665	9	3	0	12	0	1	0	5	0	5	10	0	1	39	48.36	
8	1	1	845	48.1997	112.664	1	0	0	1	0	1	0	0	0	0	1	1	1	52	64.48	
9	1	1	847	48.1996	112.665	1	0	0	1	0	0	0	0	0	0	1	0	1	6	7.44	

Estimating Mean Marmot Abundance at Colonies (Townsend 2006)

Objective: obtain 'maximum counts' for ACTIVE marmot colonies to track relative abundance over time.

Pre-sampling Data Collection:

1. Establish vantage points where a large portion of the area of interest can be viewed with binoculars. Obtain an accurate area size using the track log on your GPS (i.e. map the study area).

** *NOTE: Areas should be no larger than 800 x 800 meters (0.65 km^2 or 640 hectares).*

2. Colonies (i.e. burrow clusters) should be identified and marked prior to this survey, so you can record how many marmots you observe for each known colony (e.g. at site A, colonies 1, 2, 3…etc.; see note below).

3. After establishing the survey areas (i.e. GPS track log), systematically search each area for marmot colonies and record the locations of each.

4. Using the *DISTANCE Sampling for Active/Inactive Colonies* protocol (see above), record information about colony area size, location, burrow size classes, total number of burrows and score colony activity. Later, a map can be produced for each Scan Sampling site using these data.

5. At least 5 sites should be established in each community-managed area, from which no fewer than 15 marmot colonies can be observed. Sampling 25 colonies is ideal.

Scan Sampling Data Collection:

1. Visit the vantage point when marmots are mostly likely to be out; around sunrise and just before sunset during the hot summer months. Marmots are usually active at sunrise for a few hours, and then for a few hours before sunset. If it is overcast, marmots most likely will not be active, so postpone your survey until the weather improves.

2. Record time of day, location and weather at the start of the observation period onto a datasheet or into a notebook (Fig. 5).

Data Sheet: MARMOT SCAN SAMPLING

VR Name: R. Dulamkhand — Daguuriin shines (Community) **Date:** 2009 - 06 - 05 (yr mo day)

Area Name: Chuluun Khorot **Area ID:** C **Area size:** 8 ha

Waypoint №: 4 **Lat:** N 47° 55.777 **Long:** E 112° 17.731

Begin Time: 6:05 **End Time:** 6:50 **Habitat:** Steppe grassland

Weather: 18C, wind 4-9 m/sec., clear sky, no rain, sunny
(temperature, wind speed, cloud cover, preciptiation, sunshine, etc.)

Figure 5. Example of initial information to record for Marmot Scan Sampling, including Community name, date, area name, ID and size, location, begin and end times, habitat and general weather conditions.

3. Using binoculars scan the area from left to right and count the number of individual marmots you see. Record number of adult and young marmots associated with each previously marked colony, making sure to record the colony number (Table 3).

Table 3. Example of data collected for Marmot Scan Sampling, including start and stop times for scans and number of marmots observed at each burrow, recorded by age class.

Colony № / # burrows / Age Class

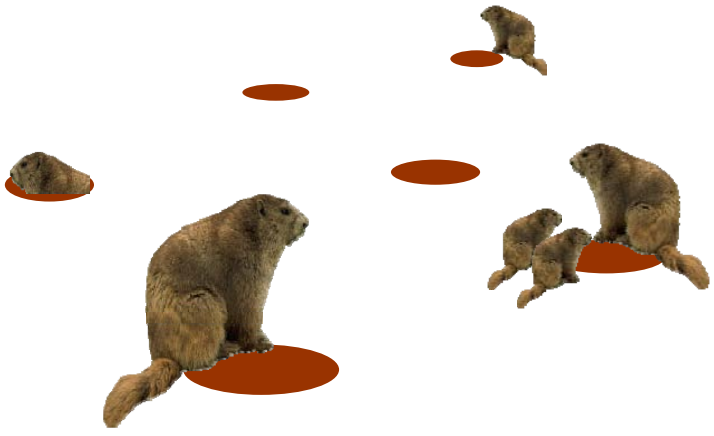
	TIME START/ STOP	1 /2		2 /3		3 /5		4 /1		5 /3						**Max Count**
		A	**Y**	**A**	**Y**	**A**	**Y**	**A**	**Y**	**A**	**Y**	**A**	**Y**	**A**	**Y**	
1	6:10 6:15	1	0	0	0	1	2	0	0	0	2					6
2	6:20 6:25	1	0	0	0	1	0	2	0	0	1					5
3	6:30 6:35	0	0	0	0	1	2	2	0	0	1					6
4	6:40 6:45	2	0	2	0	0	3	0	0	0	3					10
5																
6																
NOTES:														**MAX**		10

** A = Adult, Y = Young; ** If you observe marmots at more than 7 colonies, use another monitoring form.*

*****IMPORTANT***: Scan in one direction (e.g., begin at the left, and scan to the right), moving your binoculars slowly up and down to cover the entire area (Fig. 6). Make sure to only count individual marmots once during each scanning period.

Figure 6. Proper method for scanning for marmots: scan in one direction from left to right, moving your binoculars slowly up and down.

4. Rest for 10 minutes. Repeat this process at least 4 times or more. Record start and end times for each scan; begin subsequent scans 10 minuets after finishing a scan (Table 3).
5. After finishing (~ 80 minutes), record the maximum number of marmots observed for each scanning period. Total these figures for the 'max count' for this observation session.
6. Complete as many scans as you can during one sitting. The largest number of individuals in a particular scan is the "max count" for that observation period. Return to the vantage point several times over a few days. At some point, the "max count" should asymptote. This number would then be the maximum count for that area.
7. Scan sample at as many established sites in your area as you can. For meaningful data, establish at least 5 sites, observing no fewer than 15 marmot colonies; 25 is ideal. These sites should represent different marmot abundances in your area, so choose one site in an area with many marmots, one in an area with some marmots, and one in an area with few or no marmots. However, all sites should potentially have marmot colonies, whether they are active or inactive.



Monitoring Schedule

Several times during the year, important demographic information can be recorded. For example, in early June the number of young marmots can be recorded when they emerge from burrows (the number of juveniles at emergence can tell you something about the number of young that are being born) and in mid-July when marmots are active and feeding a good maximum count can be obtained. Marmots are less active as the summer wears on – and so maximum counts may not be as reliable during this time of the year. Knowing the number of individuals that go into hibernation would be a good number to have to compare to the number of marmots seen the following season in early spring (number that survived the winter).

Establish a scan sampling schedule for marmots. For example, scan sample each study area during 1) the last week in May, 2) the middle of July, and 3) the middle of September.

<u>Management</u>

1. Protect areas with marmot activity and monitor their presence and any increase or decrease.
2. As part of a community-wide effort, post signs warning against poaching, stating that the area is patrolled to discourage poachers. Include information about the cost of fines for poaching different animals.
3. If livestock normally use this area and co-exist with marmots, there is no need to exclude them.

How do we use monitoring information for management?

MARMOT POPULATION

- Increasing = protection efforts working; informed quota setting
- Decreasing = no sustainable use; need more protection / education

Wildlife Monitoring via Line-transect surveys on Horseback

Objective: to obtain data about relative abundance of certain wildlife species in your area.

- Which species are you most interested in monitoring?
  - Gazelle
  - Foxes
  - Rabbits
  - Cranes

It is important to monitor wildlife in your community-managed areas so you can determine whether your conservation and protection efforts are helping preserve or increase populations of certain species. This information is critical when reporting on the progress of your action plan to the *soum* government or outside funding organizations. It is important to monitor wildlife during the same time each year, with the same effort (i.e. completing the same number of routes). We suggest that you establish a 40 km route in your area (this will be broken up into 2 km segments for analysis). Make sure parallel sections of the route are at least 5 kilometers apart. Collect data along routes at least once per month – year round.

- To obtain useful data for management, collect data:
  - during the same times each year
  - with same effort each year (i.e. time spent)
  - along the same routes
  - along routes covering all important wildlife areas
  - year-round depending on your list of important species, and capacity

Horseback Line-transect Method

1. Using a map, determine the route that you will follow to survey wildlife. Determine how many kilometers long your route is.
2. At a certain time of day, preferably in the morning (e.g. it is best to begin ½ hour before sunrise), begin your route (i.e. transect; via horse or on foot is preferred because of minimal noise, but you must use the same method of transportation each time). Always begin the route around the same time of day and repeat the route monthly or bi-monthly, making sure to survey during the same months each year if you want to compare between years.
3. Move along at a steady pace that allows you to scan the area for wildlife and cover the whole route within a reasonable amount of time, i.e. not too fast or too slow.
4. When you see an animal, stop and record the time, species, number, location and habitat (Table 4).

Table 4. Example of data collected for a Wildlife Horseback Route, including general route information, species and number observed, location and habitat type.

DATA SHEET: WILDLIFE HORSEBACK ROUTE

VR Name: T. Uurdmonkh — Bayan khangai (Community) **Date:** 2009 - 07 - 05 (yr mo day)

Start Time: 7:00 **End Time:** 10:30 **Route Length:** 10 km

Route beginning & ending point names: Chuluut - Baruun bulag **Bearing:** 140°

Begin Waypoint №: 4 **Lat:** N 46° 54.86399' **Long:** E 115° 11.99727'

End Waypoint №: 5 **Lat:** N 46° 53.59971' **Long:** E 115° 15.89763'

Weather: 19C, wind 5 m/sec., cloud cover 50%, no rain
(temperature, wind speed, cloud cover, precipitation, sunshine, etc.)

TIME	Species	№	Sex (M,F)	Location		Distance	Angle	Habitat Type
				LAT	LONG			
7:20	Buzzard	2	?	46° 54.80259'	115° 12.56689'	100M	60°	steppe grass
7:42	Sib. Marmot	2	M,F	46° 54.76212'	115° 12.85023'	250M	45°	hill bottom
8:05	Tolai hare	2	?	46° 54.69455'	115° 12.99454'	50M	60°	steppe grass
8:15	Roe deer	1	F	46° 54.58426'	115° 13.00388'	300M	30°	shrub steppe
8:35	Buzzard	1	?	46° 54.50030'	115° 13.35833'	200M	40°	steppe grass
8:47	Tolai hare	1	?	46° 54.39224'	115° 13.45500'	100M	60°	shrub steppe
9:05	Steppe eagle	1	?	46° 54.35900'	115° 13.80050'	520M	90°	steppe grass
9:25	gazelle	1	F	46° 54.26990'	115° 14.42500'	350M	75°	steppe grass
9:40	Tolai hare	2	?	46° 54.26565'	115° 14.87721'	300M	34°	shrub steppe
9:52	Buzzard	2	?	46° 53.92000'	115° 14.92600'	250M	90°	steppe grass
10:10	gazelle	2	F	46° 53.74320'	115° 15.63345'	100M	15°	steppe grass
10:10	fox	1	?	46° 53.59971'	115° 15.74509'	100M	45°	steppe grass

5. Each time you observe an animal also take an angle bearing from your location on the transect to the spot where you initially saw the animal (Fig. 7).
6. Next, estimate the line-distance from the spot on the transect where you were when you saw the animal, to the spot where you originally saw the animal. This can be done by dismounting from your horse and pacing to the spot where you initially saw the animal, or by estimating the distance 'by eye' if you are comfortable with this type of estimate.

**NOTE:* It is important to collect this information accurately and thoroughly in order to have meaningful data analysis for abundance estimation of wildlife species in your area.

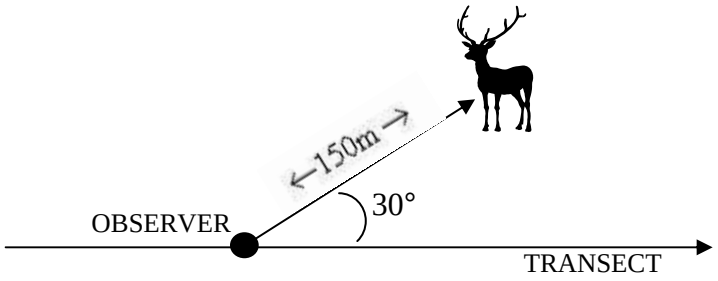


Figure 7. Example of DISTANCE measurements; meters from observer to animal and angle from transect to animal.

7. Summarize data by totaling the number of each species you observed, and dividing by the total kilometers of your route to obtain number of animals per kilometer sighted. Do this each time you complete a route. Compare these data between years for the same time period to see differences in relative sightings of certain species.

You don't need to do this, the following is for your information only:

1. Calculate the perpendicular distance for each observation (Table 5).

   ⊥ Distance = sin (θ) * sighted distance

Table 5. Example of line-distance calculations for angle and sight distance using the equation: ⊥ Distance = sin (θ) * sighted distance.

TIME	Species	Angle	Sighted Distance	Perpendicular Distance
7:20	*Buzzard*	*60°*	*100м*	*86.60 м*
7:42	*Sib. Marmot*	*45°*	*250м*	*176.78 м*

2. With distance sampling (Buckland et al. 2001), if the unit of observation is the group, then density of groups within the area surveyed (D_g) is estimated as:

$$\hat{D}_g = \frac{n\hat{f}(0)}{2L}$$

where L denotes the aggregate length of the transects, n is the number of groups observed, and $f(0)$ is the probability density function of observed perpendicular distances evaluated at $x = 0$ (Buckland *et al.*, 2001; see http://www.ruwpa.st-and.ac.uk/distance/). Thus, density estimates are obtained from estimates of $f(0)$ and encounter rate (n/L). Density of individuals (D) is obtained by multiplying the estimated group density by the estimated expected group size $\hat{E}(s)$. The density of individuals is multiplied by the surface area of the study area or survey stratum to obtain the corresponding abundance estimate (N).

Gazelle Management & Monitoring

Gazelle move across the steppe in search of suitable forage in a nomadic manner rather than in a predictable, migratory pattern. Mongolian gazelles are a much more important resource for rural families than previously estimated, and are the most commonly hunted animal on the steppe. Approximately 60% of herder households hunt an average of 8 gazelles per year (~100,000 per year). More intensive illegal hunting by residents from population centers is taking its toll, and there is anecdotal evidence that the overall level of hunting is not sustainable.

Management

1. Enforce hunting season and tagging laws. Make sure poaching and hunting out of season are punished accordingly.
2. Discourage outsiders from hunting in the HCG area.

Monitoring

1. When do gazelle come to your area and when do they go? Record date and time of the year when gazelle move into your area, and when they leave. Record the number of gazelle that are observed at certain times of the year, their sex ratio and number of calves, if present.

Saker Falcon & White-naped Crane Management & Monitoring

Saker Falcon

The saker falcon (*Falco cherrug*) is physically adapted to hunting close to the ground in open terrain, and is specialized to hunt for mid-sized diurnal rodents of open grassy landscapes such as desert edge, semi-desert, steppes and arid mountain areas. Population declines of this species are mainly due to off-take for falconry, although human persecution and pesticide use (notably in Mongolia in 2003) have also had an impact. The global population was estimated at 8,500-12,000 pairs in 1990 compared to 3,600-4,400 pairs for 2003, a decline of 48-70%. In Mongolia, the saker falcon population declined by 59% during this time period.

White-naped Crane

The white-naped crane (*Grus vipio*) is a bird of the crane family. It is a large bird, approximately 130 cm tall and weighs about 5.6 kg with pinkish legs, grey and white striped neck, and a red face patch. Its diet consists mainly of insects, seeds, roots, plants and small animals. The eggs are about 9 cm in length. The white-naped crane breeds in northeastern Mongolia, northeastern China, and adjacent areas of southeastern Russia. Different groups of birds migrate to winter near the Yangtze River, the DMZ in Korea and on Kyūshū in Japan. They also reach Kazakhstan and Taiwan. Only about 4,900 and 5,400 individuals remain in the wild. Due to ongoing habitat loss and overhunting in some areas, the white-naped crane is evaluated as Vulnerable on the IUCN Red List of Threatened Species. It is listed on Appendix I and II of CITES.

Management

1. Protect areas where saker falcons and white-naped cranes nest.
2. Post signs warning against poaching, stating that the area is patrolled to exclude poachers as part of a community-wide effort. Include the cost of fines for poaching different animals. Do not mention that there are saker falcon or white-naped crane nests in the area on this sign, since this may alert poachers.
3. Especially protect nests during brooding and fledging season, when females are sitting on their eggs, and when young birds are just beginning to fly.
4. Taking eggs from nests is very detrimental to the population and results in population decrease.

Monitoring

1. Record the number of active and inactive nests in the area each season (early summer). Without disturbing the birds, count the number of eggs that are in each nest without disturbing the nest (most importantly, do not disturb the female while she is laying on eggs, or touch the nest, since this may cause some of the eggs to not hatch).
2. Most importantly, for each nest, record whether young fledged, and the number of young that fledged. If possible, also record how many young hatched.
3. These data will give you information on the number of active nests present, relative breeding success, chick mortality, and fledging success for each year.

Wolf Management & Monitoring

Wolves are an important member of the steppe ecosystem. There are many discrepancies in information regarding the wolf population in Mongolia. Some people say the wolf population is increasing; some say it is decreasing. We can document wolf population numbers and changes to their population using simple monitoring methods. This information is very powerful when seeking government help for wolf management in areas used for livestock production.

Management

1. For your community group, record information about wolf depredation as accurately as possible (make sure to note time of year, type and number of livestock killed, and number of wolves, if seen).
2. Make sure to put your livestock in a fenced-in area at night, so they will not be easily preyed upon by wolves.
3. Restrain from randomly killing wolves, because if certain key individuals such as the alpha male or female are killed, this disrupts pack dynamics and may lead to other rogue wolves coming into the area and trying to gain a place in the pack.

Monitoring

1. Each month, record the number of wolf sightings in your area and the number of individuals in each group that is seen. If numerous people report wolf sightings, record their name and their location when they saw the wolf or group of wolves.

General Scan Sampling

1. Establish a vantage point from which observations will always be made. This is usually in a higher elevation area where you can see a great distance in all directions, and can observe many different habitat types.
2. Visit this point at a certain time of day, usually 1 hour before sunset or ½ before sunrise.
3. Complete several scans of the area, scanning 180° or more from left to right, and record all wildlife you see. Also, estimate and record the distance (in meters of kilometers) from you to the animals you observe. Rest for 10 minutes in-between scans – do not record wildlife you see during these rest periods. Repeat the scan samples 4 times (total time ~ 80 minutes). Record information such as time, species, habitat, age (adult, juvenile or young), sex (male or female), and behavior. Also record the time you begin and end each scan.

LITERATURE CITED

Adiya Y. 2000. Mongolian marmots: Biology, ecology, conservation, and use. *Ulaanbaatar: Mammalian Ecology Laboratory. Institute of Biological Sciences. Mongolian Academy of Sciences* (in Mongolian and English).

Batbold J., Demberel J., Todgerel T., Burnee M. and Batsaikhan B. 2000. Mongolian Marmot Range and Location Database Project Report. *Ulaanbaatar: Marmot Conservation Association.*

Mills L.S., Soule M.E. and Doak D.F. 1993. The keystone-species concept in ecology and conservation. *BioScience* 43: 1-8.

Murdoch J.D., Munkhzul T., Buyandelger S., Reading R.P. and Sillero-Zuberi C. 2009. The Siberian Marmot as a keystone species? Observations and implications of burrow use by corsac foxes in Mongolia. *Oryx* 43: 431-434.

Power M.E., Tilman D., Estes J.E., Menge B.A., Bond W.J., Mills L.S., Daily G., Castilla J.C., Lubchenco J.C. and Paine R.T. 1996. Challenges in the quest for keystones. *Bioscience* 26: 609-620.

Schaller G. 1998. Wildlife of the Tibetan Steppe. *London: University of Chicago Press.*

Townsend S.E. and Zahler P. 2006. Mongolian Marmot Crisis: Status of the Siberian Marmot in the Eastern Steppe. *Mongolian Journal of Biological Sciences* 4: 37-44.

Townsend S.E. 2006. Burrow Cluster as a Sampling Unit: An Approach to Estimate Marmot Activity in the Eastern Steppe of Mongolia. *Mongolian Journal of Biological Sciences* 4: 31-36.

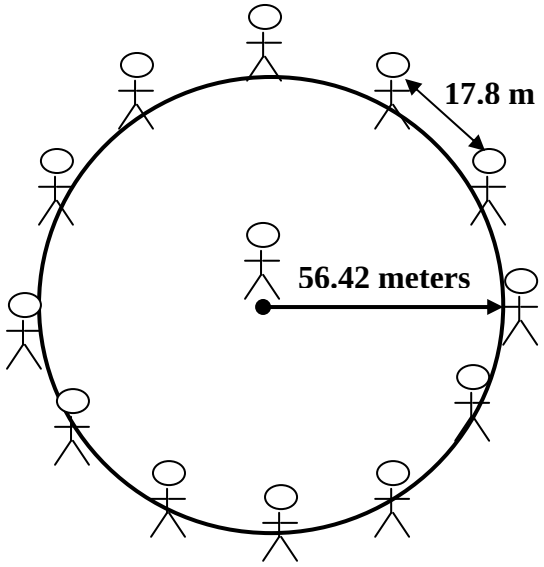
Townsend S.E. 2009. Estimating Siberian marmot (*Marmota sibirica*) densities in the Eastern Steppe of Mongolia. *Ethology Ecology and Evolution* 21: 325-338.

Area Size and Pace-Distance Estimation Exercise *– Prepared Ann Winters, Presented Bat-Erdene, EMCCA*

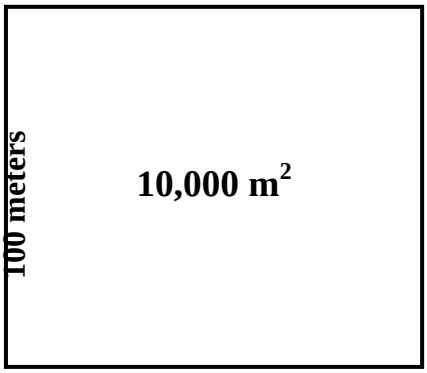
During this exercise, participants went outside and stood in a large circle that represented an area of 1 hectare. Then, participants stood in a square that also represented one hectare. The purpose of this exercise was to give participants a mental picture for estimating area size in the future during wildlife monitoring. Participants also had an opportunity to estimate their pace size after counting steps for 50 meters, 3 times.

Area Size

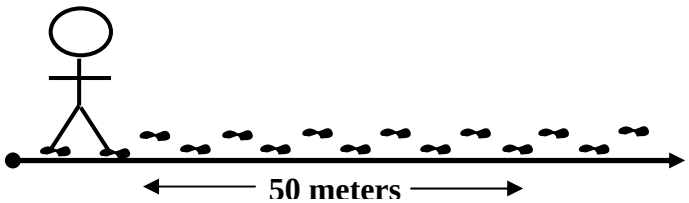
$1km^2 = 100$ ha
$1ha = 0.01km^2$



1 hectare



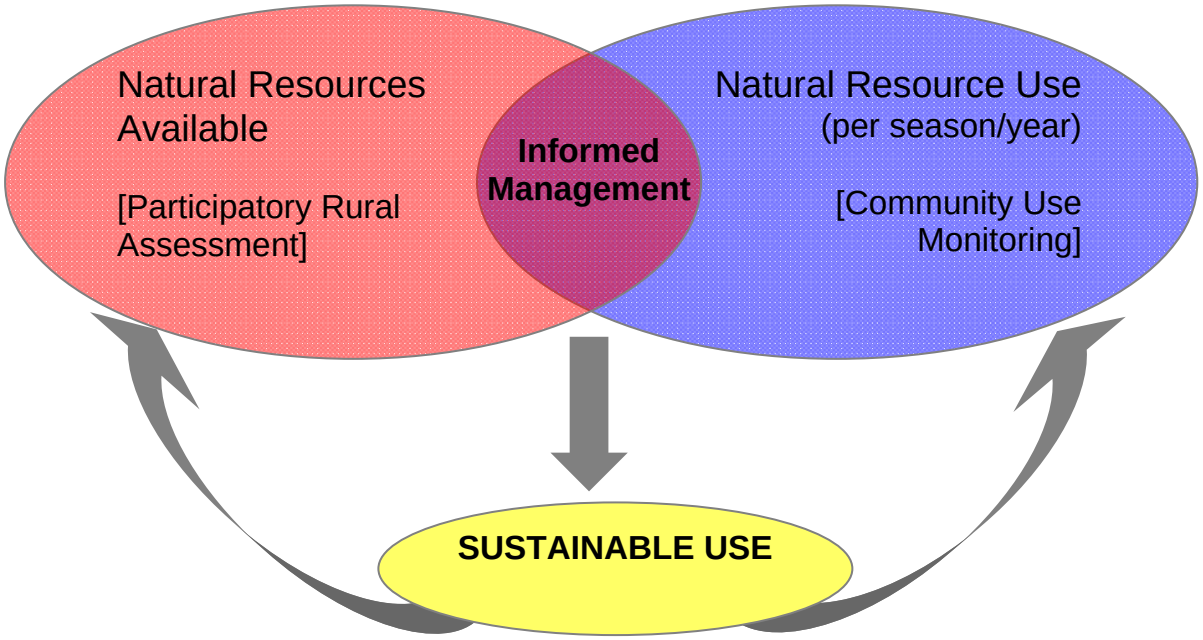
Pace Distance



- Walk 50 meters 3 times for an average number of paces per 50 meters
- Count each step

Monitoring, Management and Sustainable Use

– Ann Winters and S. Bolortsetseg



FIELD PRACTICE

Based on the lessons taught on 3 methods of wildlife monitoring on the second day of the workshop, volunteer rangers were divided into groups of 4 to executive what they learned in previously selected monitoring points surrounding the Chukh lake.Before noon, groups 1 and 2 completed line transect, and groups 3 and 4 monitored wildlife and learned how to complete the monitoring worksheet out on the field.Afternoon, the roles were switched as groups 3 and 4 completed line transect while groups 1 and 2 attended the field lesson on wildlife monitoring.

During peak marmot monitoring period, 16:30-19:00, groups 1,2 and 3 traveled to the southwest of Chukh lake to the south of Ulz lake to conduct marmot monitoring with binoculars. Throughout the session, over 20 marmots were spotted and rangers completed their worksheet based on what they saw. The monitoring results show an increase in marmot population and improvement in monitoring efforts.

During this time, group 4 conducted wildlife monitoring on horseback at 13 km/per from Chukh lake to Gurvan Hulst.

On the third morning of the workshop, groups 1, 3 and 4 traveled to three different monitoring points and conducted marmot monitoring at 4:00 am, while group 2 conducted wildlife monitoring. Groups 1,3 and 4 spotted 5 marmots throughout the session. All groups conducted marmot monitoring for 2 times and wildlife monitoring for 1 time each.

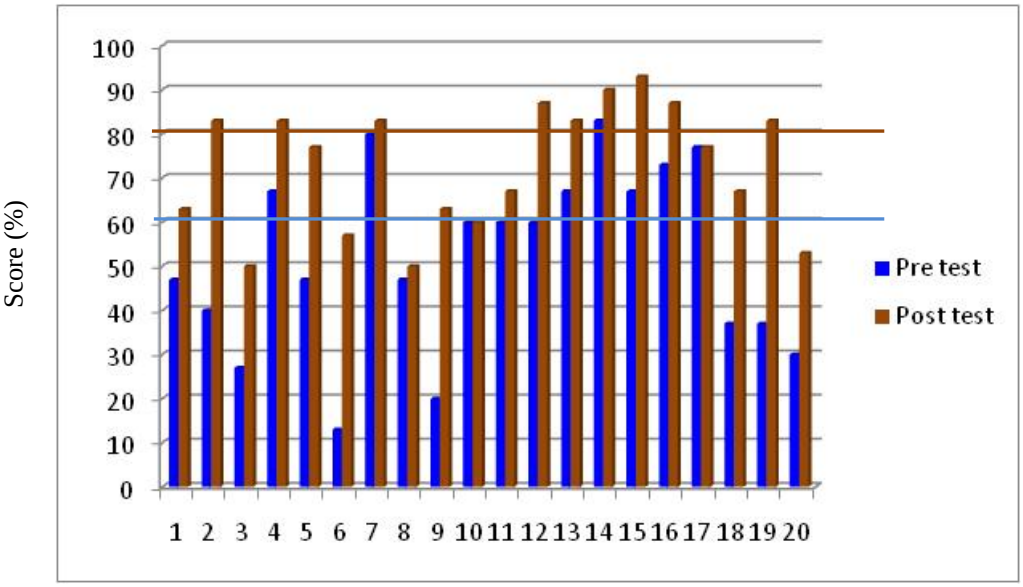
Participants on Field Practice for
Marmot distance method

Training Interviews (Pre- and Post-Tests) *–S. Bolortsetseg, G. Bat-Erdene*

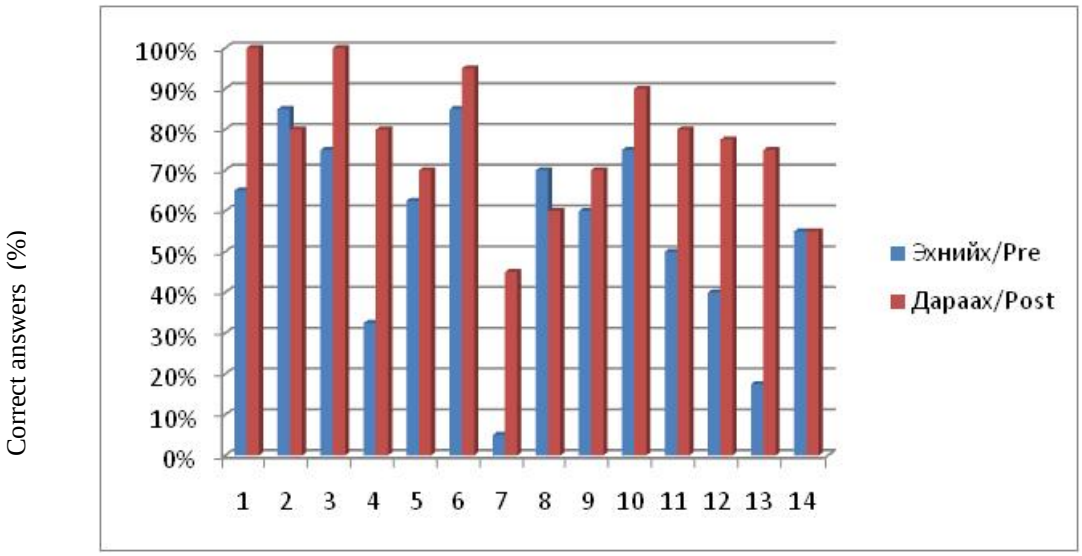
Before the training began, each participant was asked to undergo an 'interview' with the trainers. This included answering 10 questions about material that would be taught during the training and completing 4 practical exercises.

Overall, there was a 20% improvement in scores between pre- and post-training interviews. Compared to last year's similar ranger training which showed improvement of 10%, this year's results have significantly increased. For overall participants, 9 participants received scores within 80% to 93%. We rewarded 4 participants who received the highest scores: I. E.Urankhuu, II. B.Batkhuu, III. D. Bilguun, IV. M.Urtnasan.

"Wildlife Protection training" participants score by % for Pre and Post test



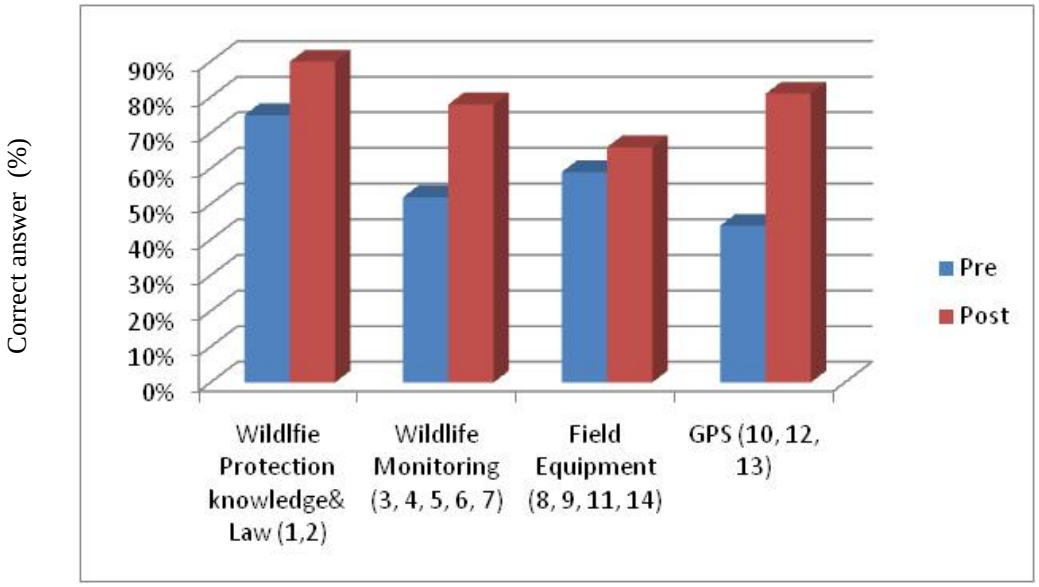
"Wildlife ProtectionTraining" Interview Questions



According to the chart, it can be analyzed that participants correctly answered more than 50% of the questions and percentage of questions that were answered right have increased. The questions that were answered have increased respectfully from 10-58%.

Participants found questions about wildlife protection and ranger responsibilities the most difficult. There was a significant increase in participant knowledge of GPS use (36%) and wildlife monitoring (22%). Participant knowledge of general equipment use also improved slightly (11%).

"Wildlife Protection Training" Interview results by Topic



The chart above shows the overall results of the questions that were answered correctly in five categories. Overall, the knowledge of the participants was over 50%. The chart shows that after the training the knowledge of participants increased significantly. Before the training, participants truthfully stated that they had forgotten how to operate a GPS whereas after the workshop participants had no question as to how to operate and utilize GPS. Only 3 participants stated that they did not understand GPS before the training.

DISCUSSION & CONCLUSIONS

Discussion – Wildlife Monitoring Methods

- **Scan Sampling**
  - Few marmots – difficult to get information
  - Count the number of mundul (baby marmots) , get information from each site
  - Place worth many marmots
  - Total (compare at community level , early)
  - By eyes
  - 5 min, count how many are out at the same time (largest number)
  - 10 min – rest
  - 1 hour, 4 times /can be overlap /
  - Use binoculars
  - From left to right, < 180 degrees (120 degrees is good)
  - No overlapping numbers
  - Monitor: Mid May, end of July, beginning of September

- **Marmot method 2 (Presence/Absence)**
  - Each burrow should be some one's responsibility
  - Hibernation burrow
  - Monitoring time: 4 month duration, once every 2 months
    - 20 days of July
    - Numbering of burrows
    - Draw a map of burrows in each colony and number them
    - At active burrows, urine (wet/ not wet)
    - Estimate No of marmots/ha. Use for estimating no's in other areas
    - Smell hole
    - Need to go earlier –just at sun rise
  - For 'Yes or No' can write + or –
  - New scat, trap, nesting

- **Horseback Transect**
  - Everyone understands this method well

Discussion – Monitoring, Management and Sustainable Use

- Attention:
  - Determine site

  - Prepare equipment
    - GPS
    - Compass
    - Map
    - pen and pencil
    - patrol form
    - binoculars
    - ruler
    - camera
  - Weather

- Why need monitoring?
  - Systematic information
  - Wildlife populations (marmot, gazelle) increasing, decreasing or staying the same?
  - Partly monitoring
    - Database
    - several times 40-50 years information

    Order 114 gives ownership

Interview- RARE Pride Campaign in Dornod

- Implement in soums that are located near the railway
- Place campaign materials in the train
- Educate border patrols on how to inspect
- Travel with White Gazelle mascot to soums
  - schools, administration, soum clubs

After the interview, we handed out campaign information and materials as well as introduced basic legal instructions on what they can and cannot do in terms of hunting and or getting in contact with a white gazelle. Participants received more campaign materials as they wanted to pass it out to their local citizens.

Conclusions

This training gave volunteer rangers and other wildlife protectors the opportunity to learn valuable skills for monitoring wildlife populations in their community managed areas. The participants from this training now have the skills to scan sample for marmots, score presence/absence of marmots at burrows and record the various wildlife they encounter along horseback transects. They also have a basic understanding of how to use map and compasses and GPS units for recording this information. In addition, participants have a mental picture of how large a one hectare area is, and the average steps they take per meter, allowing them to estimate distance to objects.

The Wildlife Monitoring Training was designed to complete the skill set of volunteer rangers for protecting and monitoring wildlife in community-managed areas. Since many representatives from herder communities had previous training in the subject matter, participants scored relatively high in the pre-interview questions (i.e. 60% or greater; *see* Training Interviews). There was some improvement in participant performance when comparing pre and post-interview scores with a mean improvement of 20% and all 20 participants attained passing scores on the final evaluation.

Participants improved their skills in and knowledge of wildlife monitoring as well as learned how to effectively work together, which is due to the value of team work presentation. In the future, the EMCCA and WCS Mongolia Program shall work to extend this training to the volunteer rangers who were not able to attend, and hold refresher trainings for participants in order to improve performance. These skills are critical to wildlife monitoring and management efforts in the Eastern Steppe and Mongolia as a whole, so trainings such as this one should be a priority in the future.

Appendix I: Training Agenda

AGENDA

Time	Lecture/Activity	Presenter/Facilitator
Pre-Training		
13:00 – 17:00	*Travel to Chuck Eco-tur*	
17:00 – 18:30	Concurrent Registration	G. Baterdene
18:00 – 19:30	*Dinner*	
19:30 – 20:00	Introduction of participants	G. Baterdene
20:00 – 20:30	Icebreaker	
21:00	*Rest*	
Day 1: The Importance of Wildlife, Pertinent Legislation and Equipment Use		
07:30 – 08:30	*Breakfast*	
08:30 – 09:00	Opening	G. Bat-Erdene, S. Bolortsetseg
09:00 – 09:30	Agenda, Goal and Objectives of training	G. Bat-Erdene, S. Bolortsetseg
09:30 – 11:30	Pre-test of training	ALL facilitators
11:00 – 11:30	*Tea break (concurrent)*	
11:30 – 12:00	American Bison: A Conservation Experience	S. Bolortsetseg
12:00 – 12:15	Questions / Discussion	
12:15 – 12:45	Laws and Regulations pertinent to wildlife protectors	S. Bolortsetseg
12:45 – 13:00	Discussion	all
13:00 – 14:00	*Lunch*	
14:00 – 14:20	Team Building	G. Bat-Erdene
14:00 – 14:40	Map and Compass Use	G. Bat-Erdene
14:40- 15:40	Exercise – Map and compass	G. Bat-Erdene
15:40 – 16:00	*Tea break*	
16:00 – 16:40	Introduction to GPS	G. Bat-Erdene
16:40 – 18:00	Exercise – GPS	G. Bat-Erdene
18:00 – 19:00	*Dinner*	
19:00 – 21:00	Movie	
21:00	*Rest*	
Day 2: Wildlife Monitoring		
07:00 – 08:00	*Breakfast*	
08:00 – 08:20	RARE Pride Campaign	S. Bolortsetseg
08:20 – 08:30	Monitoring, Management and Sustainable Use	S. Bolortsetseg
08:30 – 09:10	Scan Sampling for Marmots	S. Bolortsetseg/G. Baterdene
09:10 – 09:20	Questions / Discussion	
09:20 – 09:30	*Tea break*	
09:30 – 09:50	Area Size Estimation	G. Bat-Erdene/Tsolmon

09:50 – 10:30	Horseback Transects w/Location Data DISTANCE data collection for Marmots	S. Bolortsetseg/ G. Baterdene
10:30 – 10:50	Exercise: Paces per 50 meters	G. Bat-Erdene
10:50 – 11:10	How to use Data Sheets	G. Bat-Erdene
11:00 – 13:00	Exercise – DISTANCE Data Collection for Marmots Team 1 – walking transect Team 2– walking transect	G. Bat-Erdene, S. Bolortsetseg,
11:00 – 13:00	Exercise – Horseback Wildlife Transects Team 3 – transect #1 Team 4 – transect #2	G. Bat-Erdene, S. Bolortsetseg,
13:00– 14:00	*Lunch time/ preparation for field work*	
14:00-16:30	Exercise – DISTANCE Data Collection for Marmots Team 3 – walking transect Team 4– walking transect	*All*
14:00-16:30	Exercise – Horseback Wildlife Transects Team 1 – transect #1 Team 2 – transect #2	*All*
16:50 – 19:00	Field monitoring – Scan sampling for Marmots Team 1 – observation point Team 2 – observation point Team 3 – observation point Team 4 – observation point	All
19:00 – 20:00	*Dinner*	
20:00 – 20:30	Questions / Discussion / Briefing on the next day's plan	S. Bolortsetseg
20:30 – 21:00	Short Movie	
21:00	*Rest*	

Day 3: Wildlife Monitoring

04:00	*Bag breakfast*	
04:30 – 12:00	Field monitoring: Scan sampling for marmots Team 1 (sub group)– 2 observation points Team 2 (sub group)– 2 observation points Horseback and DISTANCE Data Collection Team 3 (sub group)– 2 horseback transects Team 4 (sub group)– 2 walking transects	All
12:00 – 13:30	*Lunch*	
12:30 – 14:30	Discussion	All
14:30 – 15:30	*Field Practice / Rest*	
16:30 – 19:00	Field Monitoring: Scan sampling for	All

	marmots Team 3 (Sub group) – 2 observation points Team 4 (Sub group) – 2 observation points Horseback and DISTANCE Data Collection Team 1(Sub group) – 2 horseback transects Team 2 (Sub group) – 2 walking transects	
19:00 – 20:00	*Dinner*	
20:00 – 20:30	Experience exchange, Review of Agenda	G. Bat-Erdene
21:00	*Rest*	

Day 4: Wildlife Monitoring

06:00-09:00	Field Monitoring: Team 1, 3 (Sub group) – 2 walking transects Team 2, 4 (Sub group) – 2 horseback transects	All
09:00 – 10:00	*Breakfast*	
10:00 – 11:00	Discussion about methods	S. Bolortsetseg
11:00 – 11:10	Seasonal Schedule for Rangers	G. Bat-Erdene, S. Bolortsetseg
11:10 – 13:00	*Tea break (concurrent)*	
13:00-14:00	Post-test of training	G. Bat-Erdene, S. Bolortsetseg
14:00 – 14:20	Active Human Life	G. Bat-Erdene
14:20 – 15:00	Awards for: ➢ 3 highest test scores ➢ most improved ➢ best ranger (voted for by all participants)	G. Bat-Erdene, S. Bolortsetseg,
15:00 – 15:30	*Pack and return to Choibalsan*	

- Might want to make time to talk about data sheets submission: what we received last fall, collect anything they have this time. Making sure to collect data, otherwise we have no results, etc.
- Schedule: July visits and DISTANCE data collection on marmot burrow clusters.

Appendix II: Training Participants

№	Name	Title	Aimag, Soum	Favorite/ conservation species	Contact Info.
1	N. Nanzaddorj	Baynuhaa, volunteer ranger	Dornod, Bayandun	Roe deer	99956470
2	B. Damdindorj	Daguuriin shines, leader	Dornod, Dashbalbar	Siberian marmot	99918944
3	R. Dulamhand	Daguuriin shines, VR	Dornod, Dashbalbar	Siberian marmot	99984638
4	Ch. Urjinhand	Chukh, leader	Dornod, Dashbalbar		95860906
5	D. Monkhbold	Chukh, VR	Dornod, Dashbalbar	Swan sp	95585014
6	T. Uurdmonkh	Bayankhangai, VR	Dornod, Matad	Roe deer	88588324
7	Sh. Chuluunbat	Bayanburd VR	Dornod, Matad		99579070
8	D. Ganzorig	Hotont, VR	Dornod, Bayantumen		88125920 99125920
9	J. Erdene	Moilt, VR	Sukhbaatar, Erdenetsagaan	Roe deer, foxes,	95181404
10	Yo. Uugankhuu	Dashbalabar ,Ranger	Dornod, Dashbalbar		91586706 91183332
11	D. Bilguun	Dashbalabar ,Ranger	Dornod, Dashbalbar	Mongolian gazelle	99087167
12	B. Batkhuu	EMPAA, ranger	Dornod, Dashbalbar	Mongolian gazelle	99037345
13	Yo. Baljinnyam	Gurvanzagal soum ranger	Dornod, Gurvanzagal		88574301
14	TS. Erdenebayar	Sergelen soum ranger	Dornod, Sergelen		81586684
15	Ch. Ganbold	Chuluunhoroot Soum ranger	Dornod, Chuluunhoroot		95587766
16	Ch. Ganholog	Bayandun soum ranger	Dornod, Bayandun		99026718
17	S. Batsaihan	EMPAA ranger	Dornod, Chuluunhoroot		99059089
18	B. Gantomor	EMPAA ranger	Dornod, Bayandun		99932588
19	M. Urtnasan	EMPAA specialist	Dornod Choibalsan		93013416
20	Z. Tserenbaltav	EPTA wildlife specialist	Dornod Choibalsan		98621839

Total = 20 **17 male**
3Female

Training teachers

21	S. Bolortsetseg	WCS, Mongolia Conservation biologist	Ulaanbaatar	Gazelle, Marmot, wolf	95146626
22	G. Bat-Erdene	EMCCA manager	Dornod, Choibalsan	Mongolian marmot	99588170

Drivers

23	O. Chuluunbaatar	Driver	Dornod, Choibalsan		88586607
24	Ts. Monkhoo	Driver	Dornod, Choibalsan		99588515

Appendix II: Training Pre and Post tests

Pre- and Post-Test Questions

Answers:, 1c, 2b, 3c, 4b, 5d, 6a, 7a, 8b, 9c, 10d

Participant Name: _____

Participant HC, Soum, Aimag: _____

Score: _____ (15 pts. Total)

Interview questions. Please select the **MOST correct** ONE answer.

1. A PERSON who is to take permit for hunt/or catch wildlife and which kind of permit need from SOUM INSPECTOR to him/her? (to must be follow hunting season depends species)
   a. Hunting agreement
   b. Trophy hunting permit, hunting agreement
   c. Household permit
   d. Trophy hunting permit, Weapon permission for own

2. If you see 2 people in the steppe 3 marmots with motorbike during you herding horses on 5th Aug morning and what to do first?
   a. To meet with them and take marmots
   b. To write down all information and telling to SOUM INSPECTOR or RANGER
   c. Just tell to Bag governor
   d. Just tell to herder community leader
   e.

3. If you are walking on a heading of 120 degrees and see a roe deer on your left, and sight with your compass and record a bearing of 180 degrees, what angle from the transect to the animal will you record?
   a. 200 degrees
   b. 40 degrees
   c. 60 degrees
   d. 90 degrees

4. 800 x 800 meters size is how many hectare area ?
   a. 400 ha
   b. 64ha
   c. 8 ha
   d. 10,000 ha

5. When SCAN SAMPLING for marmots it is important to:
   a. Record the number of adults and young that I see during each scan
   b. Record the total number of marmots that I think are present in the area.
   c. Number each colony and record number of marmots I see at each.
   d. Both a and c.

6. When evaluating the DISTANCE SAMPLING (presence/absence) of marmots in a colony's the burrow is considered ACTIVE if the following is present:

a. Digging, new scat and tracks
b. Old scat
c. Debris and old scat
d. Digging and tracks

7. When measuring distances from marmot colonies to transects, you should:
    a. Record a distance of "0" for all colonies within 2 meters of the transect.
    b. Estimate the distance by "eye."
    c. Use paces, to the ½ pace, to record an accurate distance.
    d. Be careful to record accurate distances from colony centers, especially when the center is close to the transect.
    e. Both c and d.

8. MAPS are useful for your work as a community ranger because;
    a. They show the distribution of endangered species.
    b. They help you plan where patrols and surveys can be done.
    c. Maps are not important because I already know the terrain in the area where I patrol.
    d. They help monitor wildlife numbers

9. What does SCALE mean on a map?
    a. It is says map's boundary
    b. It is says Map's bottom between leg's size
    c. The scale can be presented numerically, as a ratio between the distance on the map and the distance on the land.
    d. It is between 2 things size at map

10. A Global Positioning System (GPS) device is;
    a. An expensive piece of equipment that should only be used on special occasions.
    b. A tool for determining where you will patrol.
    c. A tool for approximately measuring location and roughly measuring direction and distance traveled.
    d. A tool for accurately measuring location, direction and distance traveled.

Practicum: **Need compass, GPS, map**

11. Measure a bearing to an object using a compass. (1)

12. Turn on the GPS and write down the latitude and longitude. (1)

13. Plot the location on a map. (2)

14. Measure a certain distance on a map. (1)

TOTAL 15 SCORES

Appendix IV:Participants Pace fro three times (CM)

№	Name	Title	Soum	Community	Pace-Distance Estimation for 3 times (cm)
1	Nanzaddorj	Volunteer Ranger	Bayandun	Bayan uhaa	67
2	Erdene	Volunteer Ranger	Erdenetsagaan	Moilt	68
3	Uurdmonkh	Volunteer Ranger	Matad	Bayankhangai	69
4	B. Damdindorj	Volunteer Ranger	Dashbalbar	Daguuriin shines	
5	D. Ganzorig	Volunteer Ranger	Bayantumen	Khotont	67
6	Sh. Chuluunbat	Volunteer Ranger	Matad	Bayanburd	58
7	Ch. Ganbold	Ranger	Chuluunkhoroot	Soum	69
8	Ch. Ganholog	Ranger	Bayandun	Soum	67
9	E. Baljinnyam	Ranger	Gurvanzagal	Soum	62
10	B.Gantomor	Ranger	Bayandun	Ugtam NRA	67
11	Ts.Erdenebayar	Ranger	Sergelen	Soum	75
12	D. Bilguun	Ranger	Dashbalbar	Soum	69
13	S. Batsaihan	Ranger	Chuluunkhoroot	Mongol Daguur PA	89
14	B. Bathuu	Ranger	Chuluunkhoroot	Mongol Daguur PA	79
15	Yo. Uuganhuu	Ranger	Dashbalbar	Mardai's Ranger	72
16	M. Urtnasan	Training specialist	Choibalasan	EMPAA	79
17	Z. Tserenbaltav	Wildlife specialist	Choibalasan	EPTA	59
18	Urjinhand	Community leader	Dashbalbar	Chukh	59
19	Monkhbold	Volunteer Ranger	Dashbalbar	Chukh	76

Ulaanbaatar
2010