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When The Hunt Is Over: Culture and Conservation in Kazakh Eagle Falconry

Nolan R. Ebner
SIT Study Abroad

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When The Hunt Is Over: Culture and Conservation in Kazakh Eagle Falconry

Nolan R. Ebner

Academic Director: Ulziijargal Sanjaasuren

Advisor: Nicole Schaefer-McDaniel, Ph.D.

Macalester College

Geology

Bayan-Ulgii, Mongolia

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Abstract

The last large scale practice of falconry that uses Golden Eagles takes place in Bayan-Ulgii, Mongolia. Recent media exposure allowed for the development of a tourism industry in the region that culminates in two annual festivals celebrating the cultural heritage. Modern eagle falconry practices have been shown to deviate from traditional hunting and training methods. While Golden Eagles are listed with a regional conservation status of Least Concern by the Mongolian Red List, these new practices place the health of Golden Eagle populations in the region at risk, especially as tourism continues to grow. Furthermore, a changing environmental climate and Mongolia's susceptibility to climate change and desertification put not only the eagles, but also their prey base at risk.

This research examined perspective of local environmental officials, tourism representatives, and local eagle hunters with respect to the status of Golden Eagles, their prey base, the health of the general ecosystem, and how tourism and modern eagle falconry practices have diverged from historical norms and the impact of such changes. Findings in literature were reviewed against the responses of Uglui officials as well as hunters from the countryside. The results show conflicting perceptions of the stability of eagle populations in the area and slight decreases in the prey base of golden eagles. In addition, data revealed that eagle hunters perceive the land of the countryside to be generally lessening in health. Falconers and officials cited growing numbers of livestock as the reason for decreasing pasturelands. Analysis of falconry methods also showed that eagle hunters are turning to trapping as the main source of attaining the raptors, and there is a growing base of people that only hold eagles for business and tourism purposes.

More research should be conducted into the absolute status of the prey base to confirm local observations. The market for eagles should be examined more thoroughly, and more quantitative data should be collected in regard to land type change and other major threats to Golden Eagle populations.

Key Words: Kazakh Eagle Falconry, Conservation, Bayan-Ulgii, Sustainability, Tourism

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Commonly Used Abbreviations

International Union for Conservation of Nature	IUCN
Altai Mountain Biodiversity Conservation Strategy	AMBCS

Persons

Ministry of Tourism and the Environment Official	ET
Tourism Representative	T
Land Management Official	LM
Altai Eagle Falconer	A
Altansugts Eagle Falconer	AS

1) Introduction and Literature Review

Conservation has never been easy, and it never will be. Everything is moving so fast, changing so quickly. In a rush to win the future, it seems as if often the past is forgotten. However, in Mongolia the past is still a very real part of life today. The country, still in the process of shedding its socialist history, is home to several traditions that cling to the passing of knowledge from the old to the young, the most famous of which is nomadism, herding livestock across the vast Asian steppe according to season. Mongolia is the last country in the world where such a life of wandering exists on such a large scale. And nomadism is not the only such tradition here that persists against time. Light, in fact a metaphoric floodlight, is now being cast upon the art Kazakh Golden Eagle falconry in Western Mongolia, a practice that has existed for generations upon generations. The internet and modern media have flashed this tradition to the world, and each year it stirs hundreds of people out of their seats, out of their homes, on a nomadic journey of their own, across the great mountains and oceans to see for themselves how humans are capable of forging such intimacy with the most wild of birds, the beasts of the sky.

A tradition in its own right, the Golden Eagle Festivals of Bayan-Ulgii, the westernmost province in Mongolia, have carried on, without fail, for the last 16 years. The festivals have become an annual celebration of traditional Kazakh Eagle Falconry. Falconers from across the province travel to its capital, Ulgii, and to Sagsai soum (town) to partake in a competition that encompasses two days and a range of events that test the skill and practice of those Eagle Hunters who choose to compete. Since the competition's conception in 1999, when newly created tourism agencies realized the potential attraction in the falconry, the Festival has seen a steady increase in both competitors and tourists.

The effects of a new booming tourism industry have shown to have lasting impacts on both the community of Bayan-Ulgii, however, not all of those impacts are positive. As tourism and expedition companies reap the unquestionable benefits of foreign visitors, the environment and general ecosystem of Bayan-Ulgii are silently succumbing to problems that much of Mongolia has already faced, which puts Golden Eagles and their prey at risk. How does modern eagle hunting fit into the current framework of today's society, especially the rapidly modernizing supply-and-demand of the new Mongolian market place? There is, of

course, no clear answer and no clear plan to solve the many challenges that eagle hunters and the environment of Bayan-Ulgii face; however, it has become necessary to take steps towards discovering and addressing current perceptions of modern eagle hunting and how the changing ecosystems and cultural environment surrounding it might jeopardize falconry as a sustainable practice.

The problems that Mongolia faces, relative to conservation and land change, can be looked at as a positive feedback cycle: land change, which stemmed from dramatic climate change, has led to rapid desertification of the vulnerable Mongolian landscape, which in turn has caused a major loss of biodiversity. This potent combination of climate and land change, coupled with the government's ongoing battle with debt, has placed Mongolia in an unenviable position in which economic interests outweigh environmental concerns. Southern Mongolia lies in the shadow of the great Himalayas, which, in a phenomenon known as a rain shadow, blocks clouds and therefore precipitation from passing over them. The result of the rain shadow is the expansive Gobi desert and the dry steppe north of it. This lack of precipitation makes the country especially prone to the effects of climate change with approximately 1,400 km² of pastureland lost to desertification each year. Desertification, the process by which land, in this case pastureland and forests, transitions to desert, has been estimated to impact 77% of Mongolian territory, (Zoljargal 2013), all of this while approximately 90% of the territory can be regarded as vulnerable to desertification (Batjargal 1998).

Climate change and the resulting desertification is a destructive and disturbing force. Human influence only serves to accelerate the process. According to The Ministry of Food and Agriculture, Mongolia's livestock population has sky rocketed to 73 million heads, an astonishingly high number, especially after considering that the suggested carrying capacity for the nation is close to 30 million animals (Sukhtulga 2016). In addition, the National Statistics Office of Mongolia reported that Mongolia's livestock population reached 56.0 million heads in 2015 before skyrocketing to an unprecedented 73 million heads in 2016 (Erdenesan, 2016). What makes this so significant, besides doubling the carrying capacity of the land, is that the number of goats is increasing relative to other animals. The percentage of goats in the overall livestock count of Mongolia has risen from 21% to 45% today, almost 24 million animals (Erdenesan 2016). Goats are more taxing on the arid ecosystem as they eat

not only the leafy greens of the plant, but also the roots, draining the ecosystem of energy and eventually allowing it to succumb to desertification and erosion.

The creation of dirt roads also impacts desertification. It is estimated that there are four times more vehicle tracks than are necessary to ensure access across the nation “causing degradation and denudation of 0.7 million ha of land” (Batjarga 1998, pg. 111). Roads and dirt tracks are problematic mainly because as more dirt and top soil are exposed, there is greater risk of being subjected to erosion by water and wind, which in turn can lead to forms of both water and air pollution from dust and other particulate matter. Deforestation carries the same risks for desertification as the creation of vehicle tracks in terms of soil erosion. Land is changing and not without consequences. Bayan-Ulgii is seeing the same sorts of alterations that the rest of Mongolia is, and there is a worry it might be impacting eagle falconry (Soma and Sukhee 2014).

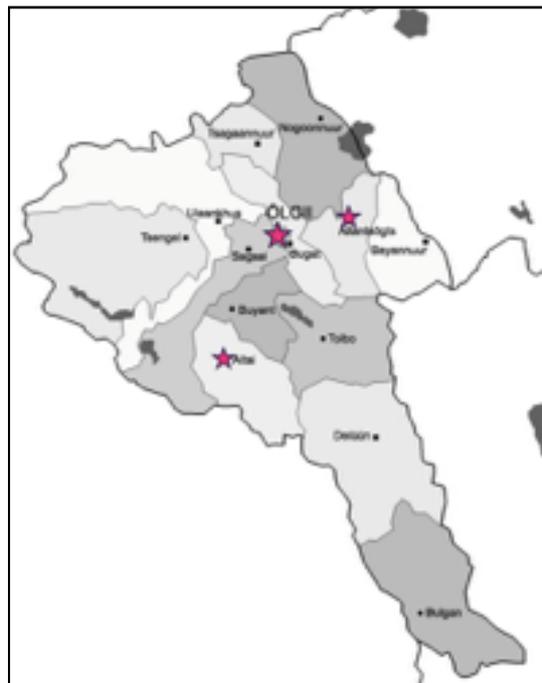


Figure 1. Bayan-Ulgii. The areas of focus in this research were Altai, Ulgii, and Altansugts and are highlighted with red stars.

1.1 Climate and Land Change in Bayan-Ulgii with Focus on Kazakh Falconry

The previous review reveals ways in which climate change and human impacts have drastically affected the landscape and ecology of Mongolia, and Bayan-Ulgii is no exception. Bayan-Ulgii is the only majority Kazakh province in Mongolia and is the home of the Kazakh Eagle Hunters. It borders Russia to the North and is separated from China by the Altai Mountains to the South. The province is no exception to national environmental trends and shows similar, in some cases more dramatic, patterns. In fact, as a result of the described climate and land change there are several important ecological dynamics working against the Bayan-Ulgii ecosystem, which will be explored in the coming passage.

The land cover of Bayan-Ulgii aimag can be categorized as mixture of semi-arid and dry grassland, shrub land, meadows, sand and barren areas, with small amount of forested area (Dugarsuren, Lin and Tsogt 2011). The presence of the Altai Mountains creates great regions of mountainous and rocky areas along with some glaciation, such as the 14 km long Patonin Glacier, the longest glacier in Mongolia. In recent years, according to vegetation cover imagery, there has been a relative consistency in land cover from 2000 to 2009 with a slight decline in mixed forested areas and slight increases in meadow, sandy, and barren areas (Dugarsuren, Lin and Tsogt 2011). These results are counterintuitive to reports of rapid desertification, but further research reveals that there is moderate to extremely severe desertification in the central and eastern portions of the aimag (Mongolian Desertification Atlas, 2013).

Unpredictable fluctuations in temperature and precipitation are putting the landscape at risk. Increases in temperature, combined with a general decrease in precipitation over the last several years, prime the Bayan-Ulgii landscape for risks. Conversely, a recent surge in precipitation in the past two years can cause massive floods, such as the one that tore through portions of Ulgii on July 10th 2016, the capital of Bayan-Ulgii (Munkhbat 2016).

The aforementioned trends in livestock are also particularly troubling when the focus is narrowed to Bayan-Ulgii. Head counts of livestock reveal the same trends that were discovered on a national scale, but even moreso. In 1990 we see 299,884 sheep to 159,781 goats, these numbers out of a total 607,645 animals. Twenty years later, in 2010, those numbers increase to 457,245 and 552,730 respectively out of 1,122,835 animals (Bakhit 2014). Amazingly, the goats alone have gone from representing less than a third of the animal population of Bayan-Ulgii, to making up just under half of all animals in the entire aimag.

The Altai Mountains Biodiversity Conservation Strategy (hereafter referred to as the AMBCS), adopted by the aimag (provincial) Governments of Uvs, Khovd, Bayan Olgii and Gobi Altai, lists the three largest threats to the biodiversity of the region as Habitat Damage and Loss, Soil Erosion, and Over Harvesting, Hunting, and Fishing. According to the plan factors that contribute to these threats are Mining, Road Construction, Tourist Demand, Commercialization of Eagle Festival, Overgrazing, Ineffective Laws, Climate Change, and Increased Amounts of Livestock.

1.2 Female Golden Eagles

Female Golden Eagles are larger and more adept hunters, able to catch larger prey. As a result of these size and hunting differences, traditional Kazakh eagle falconry uses only female eagles.

Adult female Golden Eagles measure 66-90 cm in height, hold a 180-234 cm wingspan, and weigh approximately 5-7 kilograms weight (Gombobaatar and Usukhjargal). The Golden Eagles of Western Mongolia are said to be the largest Golden Eagles in the world, measuring up to 10% larger than other golden eagles across the world (Soma 2011).

Golden Eagles nest in high places, such as trees, cliffs, telephone polls, and other tall human built structures. Nests are constructed with sticks and usually expand up to 2m in diameter (Ferguson-Lees and Christie, 2001). The breeding season lasts from March to August (Ferguson-Lees and Christie, 2001), however, eagle falconers generally believe that young eagles leave the nest around July 20th, and so if they are taking an eaglet from its nest, will do so around that date (Soma 2011).

According to the Mongolian Redlist of Mammals, compiled by Clark and Javzansuren (2006), the diet of the Mongolian golden eagle consists of Brandt's Vole (*Lasiopodomys brandti*), Mongolian Gerbil (*Meriones unguiculatus*), Mongolian (or Siberian) Marmot (*Marmota sibirica*), Tolai Hare (*Lepus tolai*), Corsac Fox (*Vulpes corsac*), and Red Fox (*Vulpes vulpes*). A variety of birds, such as young Saker Falcon, Daurian Partridge, Rock Dove, Chukar, and young Demoiselle Crane, in addition to snakes also help comprise the diet of this raptor. There have been reports that this eagle hunts young Goitered Gazelle or Black-tailed Gazelle (*Gazelle subgutturoza*), and Saiga Antelope (*Saiga tatarica*). They are also known to attack White-tailed Gazelle and Mongolian Gazelle (*Procapra gutturoza*).

When held by hunters, the eagle's diet is mostly restricted to Red Fox, Corsac Fox, Tolai Hare, and Pallas's Cat. Supplemental meat is provided by the hunter and includes, dog, sheep, goat, yak, cow, and horse (Soma 2011, Soma and Sukhee 2014).

1.3 The Tradition of Eagle Falconry and the Golden Eagle Festival

In Mongolia, the practice of Eagle Falconry is estimated, from archeological remains, to have originated over 2,500 years ago and is thought to have stemmed from a desire for fur, rather than to acquire food or for the pleasure of sport, according to (Toma and Sukhee 2014). Eagle falconry has persisted through time as a tradition generally passed from father to son. While falconry is practiced on a global scale, falconry using golden eagles is unique to only a few areas in the world. The tradition mainly continues in the westernmost Mongolian province (aimag) of Bayan-Ulgii.

Golden Eagles, as a part of the ancient tradition, typically are stolen from their nests around the 20th of July by hunters in need a new bird, as soon after this is the time believed to be when they first leave their nest (Soma 2011). Recently eagles have been not only taken from their nest, but also captured as juveniles by falconers and non-falconers alike and bought and sold for prices ranging from 100,000 to 200,000 tugriks (Soma 2011, Soma and Sukhee 2014).

Eagle falconers historically hold and hunt with their eagles for five seasons before releasing them back into the wild (Soma 2011, Soma and Sukhee 2014). However, modern practices dictate that eagles aren't released until the ages of 7-10 years old (Soma and Sukhee 2014).

The Golden Eagle Festival was conceived as heritage tourism attraction in 1998 and the first festival was held in October of 2000 just outside the province capital, Ulgii. A second festival was created in 2002, and both have been reliable sources of tourism since then, attracting upwards of 300-400 tourists per festival per year. The festival relies on events that test how well the falconers have bonded with their respective eagles. In one of the most popular events, the falconer waits at the bottom of a mountain for his or her eagle to be released and then calls the bird to him. The event is scored for time and efficiency of the eagle in finding her master. In 2010, the practice of Golden Eagle Falconry was recognized by UNESCO under *The Representative List of the Intangible Cultural Heritage of Humanity*

(Soma and Sukhee 2014). The Golden Eagle Festivals are the largest tourist attraction in Bayan-Ulgii, and they are one of the biggest draws for tourists in Mongolia. This can largely be accredited to the release of features in BBC's *Human Planet*, and films like *The Eagle Huntress*, which entered theaters this past November and highlights a young girl's rise in the traditionally masculine sport.

1.4 Threats to Golden Eagles and Eagle Falconry

The International Union for Conservation of Nature (IUCN) places golden eagles under the conservation status of Least Concern (LC). This lowest risk categorization means that the taxa, in this case Golden Eagles, are globally widespread and abundant. Mongolia, which also provides a "Red List" to account for information on the conservation status of local fauna, also lists the golden eagle as Least Concern (2009).

The main threats to Golden Eagles in Bayan-Ulgii, Mongolia are derived from climate, the national and local implications of which pressure already strained breeding and range lands, in regard to Golden Eagles is for most the most part indirect and stems from impact on the aforementioned prey base of the raptor. Several studies have investigated ecological dynamics applicable to this setting.

1.4.1 Indirect Human Impacts

Golden Eagles hunt medium-sized prey, animals that weigh 0.5-4.0 kg, preferably to small and large sized prey (less than 0.5 kg and greater than 4.0 kg respectively) (Watson 2010). The IUCN lists the Golden eagle's three main medium sized prey, Corsac Fox, Red Fox, and Pallas's Cat, all as Nearly Threatened (NT), likely to become endangered in the near future. Furthermore, local people of the Altai Mountain range identified fox, hare, and marmot as animals which have become rare in their respective soums (town) according to The Altai Mountains Biodiversity Conservation Strategy report (2009). And, while these prey are just several of a larger prey base, they are extremely important because, according to several studies, female golden eagles cannot carry prey items exceeding their weight, typically five to seven kilograms (Glutz von Blotzheim and Bauer 1971, Love and Watson 1990, Fischer 1995). Therefore, while the eagle hunts larger and smaller animals, those

within the defined medium weight range are of vital importance in being able to transport prey to their nest, or away from other predators or scavengers.

Furthermore, Corsac Fox and Red Fox have been shown to be reactive to land change. In her study, Myagmarjav Lkhagvasuren (2015) looked at the effects of land change on Corsac Foxes in Mongolia, and concluded that land change is a factor contributing to the the shrinking range and decreasing population of the fox. Unsustainable hunting for meat, skin, and medicines also contributes a major threat to these two species. In Mongolia approximately 1.1 million furs were sold to the Soviet Union from 1932 to 1972, the most equating 62,926 in 1947 (Wingard and Zahler 2006). Habitat loss from mining is also a significant threat to these species (Mongolia Red List of Mammals 2006). It can also be noted that just to the west of the Altai Mountains, in China, the prey base of golden eagles and other raptors has largely disappeared. Much of the natural habitat has been destroyed and nesting areas in mountainous regions have been largely impacted by desertification (Ma and Chen 2007, Ma 2011 cited in Ming Ma 2013). In addition, deforestation, long term changes in food supply, including reduced livestock carrion through changing management practices and climate change, may threaten the species in future (Watson, 2010). A decline in the threatened prey base, coupled with shifting range, does not bode well for golden eagles.

The current understanding of foraging, hunting or searching for food, is based on several main assumptions. One of the most basic of those assumptions of foraging theory is that individuals looking for prey will attempt to optimize their net energetic intake in order to maximize survival and breeding success. In other words, a golden eagle will attack a fox over a snake any day. That being said, predators are opportunists and will eat or hunt whatever is available to them. The second assumption of foraging theory predicts that, as the availability of optimal prey (in this case medium sized prey, such as Corsac or Red Fox) decreases, then the generalism of the individual will increase. In other words, as prey disappears or shifts its range, the eagles will hunt a wider, more general, range of prey.

Studies have been conducted specific to the golden eagle in Alaska (McIntyre and Schmidt 2012), Sweden (Moss et al. 2012), and Idaho (Steinhof and Kochert 1988), that show that as generalism in the species increases, the breeding success of the eagles decreases.

Top predators are of immeasurable value as they provide both economic and ecosystem services. The health of a top predator often reflects the health of an ecosystem. Studies have shown that landscape characteristics can affect prey availability which then affects both breeding and foraging success of golden eagles (Sulkava et al., 1999, Pedrini and Sergio 2001, Thirgood et al. 2003, Carrascal and Seoane 2009 cited in Schweiger et al. 2014). The environmental effects of climate change, paired with the land cover and land use change (as is the case in Mongolian and Bayan-Ulgii with current rates of desertification along side extraneous road cover), signifies the threat of decreasing range for both predator and prey. Consider range size as a circle. As the circle shrinks, the surface area (the range) of the circle decreases relative to size of the circle's edge (the range edge). At the same time, fragmentation, or the breaking up of an animal's habitat into many smaller portions is another problem identified by The Altai Mountains Biodiversity Conservation Strategy (AMBCS). Fragmentation is also caused by human presence and activities like mining. Roads also tend to contribute disturbances that divide habitats, such as noise pollution. Fragmentation further increases the amount of range edge. The creation of more range edge relative to range of Golden Eagles is particularly dangerous as Andreas Schweiger, Hans-Joachim Fünfstück, and Carl Beierkuhnlein (2014) found that, as eagles lived closer to the range edge, they observed a decrease in medium sized-prey species and decreasing breeding success of Golden Eagles. The impacts of climate change, along side land cover and use shifts, causes mismatches between current species of predator and prey (Schweiger et al. 2008). Foxes live in meadows and grasslands, if the land type shifts away from these, then the fox will move to another meadow or grasslands area leaving the eagle with a diminished prey base.

1.4.2 Direct Human Impacts

Previous studies of direct impact of humans on the ecology of Golden Eagles are less abundant in this context. In addition, there are often threats that are raised by the changing value of the cultural significance behind Golden Eagle falconry, as traditional falconry has been found to probably have little effect on other raptor populations (Su 1988, Millsap Allen 2006).

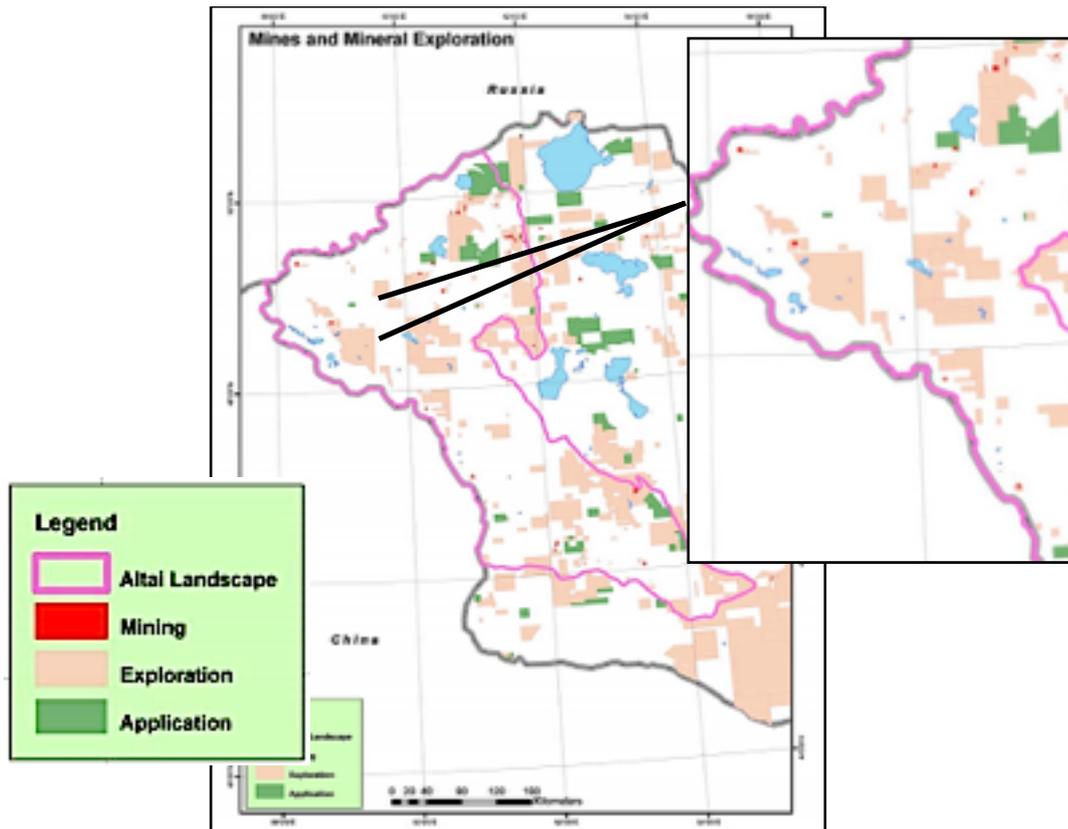


Figure 2. Mining exploration in the Altai region of Mongolia. The Bayan-Ulgii portion of the map is enhanced. Most of the active threats are exploration, however, mining and application exists in some areas as well.

Golden Eagles face the threat of changing cultural climate, in addition to the environmental changes. According to Soma (2011) non-eagle hunters will trap juvenile eagles or take eaglets from the nest and sell them to eagle hunters. This practice in Sagsai soum led to a market in which three eagles perished, four were captured, six were bought, and four were sold, all within the span of one year (Soma and Sukhee 2014). The aforementioned data, suggesting Golden Eagles are being held by falconers for two to five years upwards and often longer than tradition dictates, suggests decreased breeding and regeneration of the wild population.

Furthermore, as tourism increases, traditional falconry becomes de-contextualized for the sake of popularity. The swing from traditional falconry to modern Kazakh eagle falconry has shown a decline in how falconers handle their birds. As Toyuka Soma and Battulga Sukhee (2014) put it:

Many of the eagle hunters are not skilled breeders, just owners. In the local Kazakh's philosophy this destroys the traditional ideas about preserving the natural balance. One reason there are so many transactions is because the traditional, sustainable art of taming birds has been lost. This often results in the sickness or death of birds. In previous eras, the death of a captured eagle was regarded as an abomination.

Despite recognition from UNESCO as an Intangible Cultural Heritage of Humanity, the truth is that the traditional methods of Golden Eagle falconry are endangered by an aging population of hunters. In Altai soum, the most revered and respected practitioner of falconry passed away, leaving an unclear future for the soum (Soma and Battulgee 2014).

Humans have a direct impact on the environment as well. Concerns that stem from tourism are related to waste management, the development of more roads, and off-road driving (AMBCS 2009). The AMBCS also lists mining as a “severe and growing” threat to ecosystem stability, citing pollution and land degradation, potential conflicts with protected areas, current overlaps with important bird areas, and total lack of regulation of artisanal mining. There are two mines, both for tungsten, that are or have been operating in the Altai Tavan Bogd protected area. In the Munkh Kharikhan protected area there is at least one gold mine operating. Deforestation is also considered to be a severe threat to habitat, and has been proven to be impactful on stable Golden Eagle populations (Watson 2010). As a catalyst for land degradation the threat of mining becomes a major concern.

Hunting, which is illegal without a permit in Mongolia, is also a significant problem that challenges the Altai Mountain region. Both sport hunting and hunting by local people are considered severe threats by the AMBCS. To add to that, in Tolbo soum in Bayan Olgii hunting practices have changed to favor guns. Eagles have become supplementary to the Russian hunting rifles. Many hunters in this soum only employ the eagle if they have first missed with their rifle (Soma and Sukhee 2014). This is not a common practice, but perhaps an insight into how hunting practices continue to vary and evolve from traditional methods.

1.5 Existing Policy

Most existing legal infrastructure about hunting relies heavily on The Law on Hunting (1995 - revised in 2000), which allows individual aimags and soums to set hunting quotas, control hunting seasons, and limit commercial exploitation of certain species. The law also controls keeping animals in captivity and regulates certain hunting methods, such as the use of chemicals, smoking out dens, or using cars to chase animals. The Lawn Fauna (2000) defines and protects very rare species under similar measures. Furthermore, The Law on Regulation on International Trade in Endangered Species (2002) combined with the Mongolian Law on Environmental Protection (1995 - revised in 2008) “requires protection of natural resources, including wildlife, from adverse effects and ecological imbalance.” There are also a slew of laws protecting forested areas and plant species, such as The Law on Forests, and The Law on Natural Plants.

In Bayan Olgii there are 16 Environmental Inspectors and 44 Rangers that work towards conservation goals and protecting nature from poachers or other forms of malpractice. The budget for Rangers and Inspectors comes from local and national government funds. It may also be noted that “most protected areas do not have current management plans, and therefore even the objectives of the protected areas have not been elaborated clearly and used as targets for day to day management” (AMBCS 2009).

All in all, the Bayan-Ulgii ecosystem, though wild and diverse, is bending under the pressure of climate and land change that, though inevitable, is a result of direct human impacts as well as climate change on a global scale. These concerns threaten not only Golden Eagles, but the entire ecosystem around them. Much research has been done outside of Mongolia investigating the risks that Golden Eagle populations on a global scale. However, with the rise of Golden Eagle falconry as heritage tourism there are additional threats, threats that have been only lightly considered by researchers and concerned citizens alike who realize the possible impact of Golden Eagles coming into direct view the international public.

This research begins to ponder how a changing cultural tide might be striking an already threatened species at just the wrong time, and how the long standing tradition might be at risk as well. What are some of the environmental changes specific to Bayan-Ulgii? How are these changes perceived by local herders and government officials? What is the status of the local environment? What are the differences between the two perspectives? Do hunters

see their tradition as threatened? Are there existing policies to protect Golden Eagles, or other vital components of the ecosystem? How well are they followed and enforced? What are hunter's perspectives on the Golden Eagle festivals? How, if at all, is modern eagle falconry catering towards tourism? These questions have not been sufficiently answered by previous studies, and this research aims to address them, and to open up doors to newer and more in depth research.

2) Methodology

2.1 Setting

Bayan-Ulgii is the westernmost province in Mongolia and home to Mongolia's only majority population of Kazakh people. According to Bayan-Ulgii's government webpage, 93% of the approximately 90,404 inhabitants are Kazakh (as of 2013). The province borders Russia to the North and China to the South. Bayan-Ulgii is also Mongolia's highest elevation aimag due to the Altai Mountains running down the westernmost part of the province.

This study used interviews conducted in three different soums in the Bayan Olgii aimag (province). The areas of focus were: Altai soum (population 3,811), in which seven different eagle hunters were interviewed and one field observation session was held during a five-day span; Altansugts soum (population 3,080), in which four different eagle hunters were interviewed and one field observation session was held during a three-day span, and Ulgii soum (population 28,448) (the capital of Bayan-Ulgii), in which five different interviews were held during a three-day span with environment and tourism officials. Research was carried out over a 13-day span, from the 9th of November to the 21st of the same month.

Bayan-Ulgii was selected as the area of focus because it is the only location in Mongolia where Golden Eagle falconry is widely practiced. Ulgii was selected as it is the capital of the province and home to the government agencies and tourism companies. Altai and Altansugts were selected as a result of recommendations from guides and government officials as home to well respected eagle hunters.

The conversion rate for MNT to USD used for this paper is 2,450 MNT = 1 USD.

2.2 Participants

This study focuses on the interviews of three government officials, one tourism agency, and 11 eagle falconers. Participants were selected at the recommendation of guides and faculty at The School of International Training (SIT) Mongolia, as well as through contacts made in Ulgii. Government officials were interviewed to assess current policy measures, enforcement, and needs. Tourism agencies were interviewed to gain perspective

from a commercial standpoint, though this tourism agency, is not responsible for any part of the organization of the Golden Eagle Festivals. All officials and representatives live in Ulgii and are college educated. Eagle hunters were interviewed to gain invaluable information on their perceptions of climate change, land change, and eagle hunting traditions. This researcher was also able to conduct hunting observations on two separate occasions in the company of eagle hunters, and eagle care observations at each home where an eagle was present. Furthermore, the researcher stayed in the home of two eagle hunters for intervals of several days and was able to gather observations in this manner as well.

Falconers were interviewed in two parts of two separate communities, Altai and Altansugts. Seven interviews were done in the former and four in the latter. The average hunter age, and time as a hunter are recorded in the chart below (Chart 1) and more specific information regarding age and experience of hunting can be found in Appendix A.

Region	Age	Length Hunting	Eagle Age
Average Altai	48.5	18.33	2.67
Average Altansugts	56.5	25.5	4
Total Average	51.7	21.22	3.2

Chart 1. The average ages of hunters, how long they've been hunting for, and their eagle's age show that hunters in Altansugts are more senior than their counterparts in Altai.

Eagle falconers do not rely on their hunting for sustenance, but are commonly nomadic herders. Should an animal be caught the meat will go to the eagle, per tradition, and the pelt will be kept or sold. If the fur is kept it will be turned into a hat or coat, or will be hung from the wall as a trophy. Hunters, as herders, are often educated to a high school level, though some are taken out of school early if they decide to continue careers as herders. As Kazakh is the dominant ethnicity in Bayan Ulgii, all herders speak Kazakh, and most speak Mongolian (the official language of the aimag).

Living conditions vary from hunter to hunter. Herders, like elsewhere in Mongolia, live nomadic lifestyles, moving from home to home depending on the season. Elder falconers might live in the soum center and take care of grandchildren that go to school there. The economic status of a herder is based on the number of animals the herder has and varies from

herder to herder, but often hovers around or slightly above the global poverty line. Herding is a full time job that requires a variety of work depending on the season. Hunting is done for sport.

2.3 Measures and Procedure

Data was collected from participants using two main methods: interviews and observations. Each interview lasted 20 to 40 minutes and followed a set list of questions. Additional questions or clarifications arose during the course of the interview and may account for fluctuations in questioning and the amount of detail provided by the participants. Two translators were used during the course of the research period in Bayan-Ulgii, which also may account for some variation in answers and details provided through translation. Generally, two to three interviews were conducted each day during the interview period. Often eagle falconers would not be available for interview, because they were busy; the interviews happened to coincide with the animal slaughter season. In that way participants were not randomized or preselected, but were based on availability and by connections with the translator/guide. Interviews were conducted after first presenting the participants with a pre-prepared consent form detailing the participant's rights, which included the right to confidentiality, the right to withdraw any answers (or the whole interview) from the record, and notified the participants that they could ask the participant not to use a recording device. Furthermore, the researcher asked before the start of each interviewing session for permission to use a recording device and to take a photograph of the participant, in addition to the statement provided on the consent form. It may be noted that one participant declined to be recorded (A-5). In this case the researcher took handwritten notes during the interview. Otherwise, recordings were transcribed after the fact. Participants in the countryside (in Altai and Altansugts) were provided compensation for their time with 10,000 MNT. The compensation was provided after the completion of the interview. It may also be noted that one of the interview files was corrupted (A-2) and so responses were taken from the notes researcher's partner.

Observations were completed through the course of the two home stays and many visits to the homes of eagle hunters and were recorded in a field journal throughout the

interviewing process. In addition, two hunting observation sessions were held, one in Altai and the other in Altansugts. The researcher accompanied two eagle hunters during each hunting session, and was accompanied by a translator and research partner. The sessions lasted three and five hours respectively.

Questioning and observations were supplemented with a literature review prior the start of the interviewing sessions. These two styles of data collection were decided on in part thanks to the research of Toyuka Soma (2011) and Soma and Battulga Sukhee (2014), both papers that provided in depth insights on issues relevant to this research and helped to provide a more accurate depiction of modern and traditional eagle hunting methods. Interviews and observations were chosen as data collection methods, rather than surveys, in order to provide for narrative responses from the participants, as well as clarification on complex questions and subjects at hand, which were often realized after several questions rather than just one.

2.4 Data Analysis

After interviews had been transcribed, all data was organized into a spreadsheet. Each falconer was assigned a code to replace his name. For example, A stands for Altai and AS represents Altansugts. A complete list of abbreviations can be found in List of Figures on page 5. Responses were recorded as shown in Chart 1. Questions that were avoided by the participant, such as “How frequently do you hunt per week?” or that the researcher did not obtain, are marked with a “-“. Complete data on eagle falconer interviews can be found in the Appendix A.

Analysis on interviews that took place in Ulgii were done separately from the eagle hunter interviews and can be seen in the Results section of the data. Observations to supplement the transcribed and coded data were organized in a field journal and added to the results whenever applicable.

Often participants would not respond to questions directly or did not give a sufficient answer. As a result, when citing responses in the results sections, the denominator will fluctuate. For example, seven people might have answered the question, “How often do you hunt?” while 11 people might have answered the question “How old is your eagle?”

Therefore, the answers to each question when cited in the text will be presented as x/7 and x/11, respectively.

2.5 Ethics

The research in discussion was not overtly ethically challenging; however, it did ask participants to give insights into their personal lives and perceptions of issues such as climate and land change and potential impacts of the very activity that they participated in, eagle falconry. Participants were made aware of the purpose and possible sensitivity of the issues at hand through a consent form and verbal explanation of the interview at hand, and the right to refuse to interview and withdraw information. Any ethical concerns that might have arisen were mollified in this manner.

3) Results

The results from this research will be separated in a similar fashion to the introduction and literature review. Data will be separated into three main groups: the festival, climate land change, and other indirect human threats to the local ecosystem, followed by an analysis of direct human threats on the environment of Bayan-Ulgii, according to the participants of this research.

3.1 The Golden Eagle Festivals

3.1.1 New Eagle Hunters, Tourism

The number of eagle falconers in Bayan-Ulgii has been increasing in recent years, according to 8/10 hunters that offered a response. One man responded by saying that the number of “real” hunters was going down (A-5), and another reported that the number of hunters has remained constant (A-1). One estimate puts 150-200 eagle falconers in Bayan-Ulgii. Tourism is also increasing in the region of late (all eagle hunters, T-1, ET-1, ET-2), much in part due to the Golden Eagle Festivals (T-1, ET-1, ET-2). There are some people who hold eagles and wish to exploit increasing tourism, to take pictures with eagles rather than hunting in a traditional fashion (ET-1). T-1 also mentions that, “It’s still too early to tell about things like that, especially in this area. Mostly people are focusing on hunting rather than the money they can get from tourism.” Other government officials are just as wary but are hesitant to draw conclusions: “Before tourism we knew only good hunters. As tourism increases, you see people holding eagles for tourists. There are, of course, these people, but not many.” (ET-2) The representative from the tourism company had a different view “Right now, if someone starts to go eagle hunting, it’s not for the tradition. It’s for the money part of it...The real hunters are far away from the festival [in places like Altai]. They don’t come [to the eagle festivals], they keep the tradition” (T-1).

Eagle falconers, when asked, didn’t believe that tourism eagle falconry was an issue in their soum (AS-1, AS-3, A-1, A-6, A-7), and one cited a specific soum, Sagsai, that might be more prone to “these people” (AS-1).

3.1.2 Socio-Economic Benefits

Profits from the Golden Eagle Festivals are gathered by the Mongolian Eagle Hunter's Association and are divided between the organizers, tourism companies, eagle hunters, and the local people (T-1). Eagle hunters are awarded monetary prizes based on how they finish. The award for performing well is around 150,000 MNT (AS-4). Another hunter was awarded six months to fly anywhere in the world he'd like, courtesy Turkish airlines, for winning the competition (AS-2). The Golden Eagle Festival has a positive effect on the local economy (ET-2) as "employment rises, and everyone is able to make money in some way." The Festival does, however, sometimes capture bad things on camera that bring negative attention to the community, such as "photos of children eating raw meat."

3.2 Golden Eagle Falconry and Treatment

3.2.1 Current Golden Eagle Populations

The current Golden Eagle population is thought to be strong and stable by both officials from the Ministry of Tourism and the Environment (ET-1, ET-2), but the representative from the tourism company believed that the eagles are decreasing in population and are threatened by the lack of regulations and increasing tourism (T-1). A government official in Altai was also concerned, "The number of eagles is decreasing. I no longer see eagles by themselves in the sky. Maybe because there are no rabbits left." Eagle hunters themselves believed that the tradition was such that there would be no impact on the populations of eagles, because they are released back into the wild to breed (A-4, A-6, AS-3), though one offered a different opinion: "There is a change in the eagles' population because we have more people hunting and so there is a tourism business and a trapping industry" (AS-4).

3.2.2 What do falconers hunt?

Eagle falconers listed Fox (10/10) and Hare (9/10) as the most common prey for their hunting, though not all responses clarified between the Corsac Fox and the Red Fox. Corsac

Fox were individually represented in 5 out of 10 responses by eagle hunters, the same frequency as the Mountain Cat (which is confirmed to be the Pallas's Cat, based on observations of hanging animals skins in the homes of eagle hunters). The Red Fox fur, when distinguished, is preferred to the Corsac Fox fur because of the larger size and color of the pelt (A-7, AS-2). Regardless, some hunters strongly prefer fox pelts to those of other animals (AS-2, AS-4). The pelt of the Pallas's Cat is considered too warm for hat making (A-7).

Other animals hanging on the hunters' walls as trophies included pheasant, owl (AS-4, A-1), and what looked to be a ferret or weasel (A-4). Two juvenile wolves were observed chained, to be used for eagle hunting when desired (Figure 3).



Figure 3. A falconer shows off his eagle. Pictured on the right is the glove that the raptor perches on when the pair is hunting.

3.2.3 Prey Availability

Interviews of both hunters and of government and tourist officials, provided conflicting data on how the prey base population has shifted. When asked about the number of prey species 4/9 responses stated that there are now lower populations than there have been in the past, 2/9 answered that there is the same amount, and the last 2/9 participants believed there to be more available prey species than there have been in the past. In Ulgii several sources said that the population of prey there was stable (ET-2, ET-1). One report is that there are fewer foxes, thanks to illicit hunting methods (T-1), while interviews in the Ministry of Tourism and the Environment suggested that when it comes to the impact of

hunting with Golden Eagles, that there are stable populations of prey, citing Kazakh falconry's sustainability and traditional practices as a safeguard (ET-1).

3.2.4 Capturing Eagles

Eagles are attained by falconers for hunting through two main methods, trapping juvenile birds or taking eaglets from the nest (from all eagle hunters and observations). Golden Eagles that are trapped are recognized in the hunting community as *juz khus* (жүз хус), and those that are take from the nest are *kohl bala* (хул бала) (A-7). Of the eagle hunters interviewed 5/10 bought their eagles, and the other 5/10 took the eagle from the nest either themselves or a relative of theirs completed the task for them, but there was no transaction that took place. All participants who gave a response to the question, "How do eagles differ that trapped versus take from the nets?," responded that trapped birds are better hunters. Many participants also distinguished those birds being taken from the nest as "able to catch anything" once they are grown, because they are raised by humans around animals aren't afraid of hunting livestock and even children (A-4, AS-1, AS-2, AS-3). One eagle falconer mentioned that eagles from the nest are better for competitions, such as the festivals, as they are easier to train (AS-2).

Eagles trade is larger in some soums than in others. Tolbo, Deluun, and Altai were specified as soums that participate in capture and trade of eagles (A-2, A-5, AS-7). Eagles formerly used to be exchanged for a horse or a yak (AS-3), but now they are exchanged for tugriks, usually in the range of 150,000-300,000 MNT (A-7, AS-3).

3.2.5 Hunting Frequency

Many hunters declined to comment on the frequency of hunting or their monthly catch rate, stating that the answer is too variable based on the season and the weather (AS-4, AS-3, AS-2, AS-1, A-5). Hunting is preferred after fresh snow so that it is easy to see the fur of the animal against the white (AS-4, A-7). The general trend in hunting frequency is that falconers hunt less or the same amount now as they did in the past.

Falconer	Hunting Frequency (week)	Hunting Freq. Past	Catch Rate (month)	Available Prey
A-1	3-4	3	3-4	less
A-2	-	-	2-3	-
A-3	1-2	4-5	3-4	same
A-4	1	1	1	less
A-5	-	-	-	same
A-6	1-2	1	1	more
A-7	2-3	1-2	1-2	less
AS-1	-	-	-	less (depends)
AS-2	-	more	-	more
AS-3	less	3-5	-	-
AS-4	-	-	-	-

3.2.6 Release of Golden Eagles

The Mongolian Eagle Hunter’s Association recommends that hunters keep eagles for only seven years (ET-2); however, government officials state that eagles are typically kept for eight years, and, if it is a good hunter, then up to 10 years (ET-2, T-1). There is no definitive age when eagles are released: 7 out of the 9 participants gave ranges rather than exact years. Furthermore, depending on the hunting proficiency of the eagles, they may be kept longer, up to 10 years, or shorter, as few as two to three years (AS-4, A-4, A-7). In Altai, the average age at which falconers claim to release their eagles (based on the average of ranges given) is 7.66 years. In Altansugts, the average age is 8. It may be noted that the age cited that eagle hunters release their own eagles and the ages that they say others in the eagle hunting community release their eagles is different. Four out of six respondents said that the average age when eagles are released is at the upper limit, older than they themselves release eagles; while the other two respondents match the average age of release with their own, though one makes the claim that only “good” hunters release their eagles at the age of 7-8 (AS-4).

In Golden Eagle falconry families, the eagle is seen as part of the family. The releases are events that are often tearful. The release happens in the early summer months, to give time for the eagle to adjust back into the wild before winter. A ceremony is performed that involves inviting over friends, relatives, and other respected eagle falconers to slaughter an

animal, often a lamb or sheep, and bring the eagle and the carcass into the mountains where they leave them. The slaughtered animal feeds the eagle until it adjusts to the wild. Falconers often tie on a white string to the leg of the raptor as a sign of respect, and to mark it as an eagle that has already been used to hunt with (AS-4, A-7). Occasionally, an eagle that has been released will return to the home the hunter in the fall or winter. If this happens the hunter will take the bird back for the winter and release it again in the spring or summer (T-1, A-7). This is a very rare occurrence.

3.2.7 Eagle Treatment

Eagles were kept either in their own corner of the hunter's home (eight hunters kept their eagles this way) or were resigned to another building entirely, a shed kept outside the home, which was the case with only one of the 11 eagle falconers whom we interviewed. Two eagle falconers did not keep their eagles in their homes, but with a relative. When not hunting or feeding, the eagles wear a cap that acts as a blindfold. The cap acts as a calming method for the eagles, who are trained to believe that they are hunting when the cap is removed. When it was removed or knocked off by the eagle, which was common, the eagle would begin to chirp loudly and sharply.

In their room or shed, eagles rest on a tripod of deadwood. They are tied to the tripod and kept there indefinitely, fed every 1-3 days so that they stay fed and strong, but hungry enough to want to hunt.

3.3 Land Change

Interviews yielded a range of answers when it came to ecosystem health. In Ulgi, some participants cited deforestation, desertification, and livestock growth as current problems and major concerns for the future (T-1). Seven out of nine participants who responded to the question, "What changes have you seen in pastureland health in the past 10-20 years?" answered that they've seen it get worse" or some variation of that response, while the other two participants answered that the pastureland has stayed the same. However, when asked about the major concerns about the environment and their community all answered that there has recently been an increase in the number of livestock, and all

answered that this rise in animals was unsustainable or endangering the community. Many of the herders did not continue on to say why the number of animals was increasing, but some mentioned warmer weather patterns (A-6), and the representative from the tourist agency pointed to the declining value of one sheep, which has dropped from an average of 130,000 tugriks per animal, or the equivalent of \$52.70, to around 40,000 tugriks, or \$16.22, in today's market (T-1). Furthermore, several participant cited streams drying out, and decreases in precipitation in the recent past, though with increases in snow and rain fall in the past two years (A-6). There was little mention of climate change during interviews in Ulgii. The tourist representative stated that the land was getting drier and adding to the already impactful desertification (T-1).

3.4 Human Interaction and Impact

All eagle hunters that were questioned believed that the Golden Eagle Hunters were beneficial to the eagle hunting community. They believed the event to be important. The elder hunters look forward to teaching the younger ones, and the younger ones look forward to learning. While the Golden Eagle Festivals held in Sagsai and Ulgii have shown positive socio-economic benefits, as well as ways for eagle falconers to network and share information on hunting, some concerns were expressed about the festivals and their impact on the environment. These concerns include movements, or disruptions such as driving or other forms of noise pollutions (or even physical disturbance, like hiking off trails, or the lack of trails). Furthermore, waste and trash are seen as a possible disturbance, if not properly managed. Currently the ministry does not permit the building of hotels or ger camps in National Parks, but are considering letting tourism industries construct eco-gers in the parks that would be used only in the summers and monitored according to current standards in Mongolia for eco-gers (ET-1, ET-2).

3.4.1 Mining and Poaching

Results showed that mining was not assessed by locals as a severe threat in Bayan-Ulgii. One eagle falconer had previously been employed by a tungsten mine, but the mine only operated for two years (AS-2). Another said that the only thing resembling an organized

mining operation was brick production nearby; however, he also mentioned that artisanal “ninja miners” are a problem in the summertime (AS-1). He was wary of the potential environmental impacts of mining, “Gold is something that comes from the earth. That means it is part of the earth. If you dig it up you make dust, trash, and holes, which is not good.” There is currently no mining occurring in national parks (ET-1). There have historically only been three mining companies in the area, but none are currently in use (ET-1).

The Ministry of Environment of tourism is also aware of the risks that mining entails. The department is aimed at protecting the environment and allowing as little mining as possible by restricting permits (ET-2).

Hunting with guns is illegal in Mongolia (ET-2). Eagle falconers don’t see this type of hunting as part of their communities, according to five responses. One participant mentioned that local people liked to hunt wolves with guns, but that was it (A-1).

3.5 Policy

When constructing land management plans there are no accommodations made for eagle falconers, they can go wherever they want with no restrictions when hunting (Land Management Employee) (LM-1). There is no law in Mongolia preventing capturing and selling of eagles (LM-1). There are no laws protecting wild eagles (T-1). Regionally, as far as tourist management, there was no talk of a tourism ministry until 2006. The institution was not put in place until 2009. The Ministry of the Environment became the Ministry of Environment and Tourism. The goal of the department, the tourism sector, is to provide instructions to tourism agencies on protecting the environment, while also promoting tourism in the region. Most of the tourism is ecotourism. In order to continue to preserve and promote the environment as tourism, the department instructs “how to be mindful of nature” (ET-1, ET-2). The Mongolian Eagle Hunter’s Association exists to register eagle falconers.

4) Discussion

Results display conflicting perceptions of Golden Eagle and ecosystem health, and how tourism has impacted eagle falconry.

4.1 Tourism

There exists a gap between how eagle falconers and environmental officials in Ulgii understand how tourism is changing eagle hunting. Both parties are generally aware of how tourism and the boom of the Golden Eagle Festivals is changing global awareness around this piece of Kazakh culture, as all eagle hunters responded that they believed tourism to be increasing, and that they welcomed tourists and outsiders to come and watch the festival and learn about this ancient tradition. Government and tourist officials echoed this sentiment (T-1, ET-1, ET-2). However, when it comes to how tourism might be directly impacting or shifting the focus of some persons towards a more business minded form of keeping eagles, in which the owner either does not or rarely hunts, but rather hold the eagles for photographs and tourist attention, both eagle hunters, and government officials were hesitant to admit that these people might be infiltrating a proud and historic tradition. The lone tourist agency representative, however, told a different story, in which most, if not all, new hunters are entering the practice for the business side, rather than for tradition.

These perspectives, as cited in the results section (3.1.1), suggest that, though a brand of eagle hunter who does not actually hunt, may be emerging, it is currently limited to a small group of people. Just as Mongolian democracy and free markets are relatively young institutions, Golden Eagle Festivals are even younger, only 16 years (Soma 2011). It would make sense from a business perspective to try and squeeze any money possible of tourists. However, in this context it does seem more doubtful that the tourist branch of eagle falconry would grow to overwhelm the actual tradition, after all the festivals are based on hunting and training competitions. Furthermore, the practice is so respected and engrained in Kazakh tradition that any such treatment of eagles as toys rather than wild beasts of the sky, would be looked down upon by the community (ET-1, ET-2, AS-1, AS-3, A-1, A-6). Reports are that in Sagsai almost half of the 30 some eagle hunters participate in hunting with a great deal of motivation coming from the chance to participate in festivals. A similar phenomenon is

reported to have taken place in Altai, where in 2014 a reported five eagle hunters attended the festivals, today there are 11 hunters in Altai that attend (Soma and Sukhee 2014, A-7). In addition, the average age of eagle falconers interviewed in Altai, the soum accused of being susceptible to 'new' eagle falconry, was 48.5 while the average age of those interviewed in Altansugts, a soum known for its strong grasp on tradition, is 56.5 years. These discrepancies may, of course, be the result of small sampling sizes.

Regardless, the fact that traditional eagle falconry has succumbed to this part of capitalism is still telling. It is a signal that eagle falconry is changing, perhaps not to the extreme, but some eagle hunters still fear that traditions are being lost and the younger eagle hunters have little interest in learning the "real" traditions of hunting (AS-4). The same eagle hunter that expressed this fear asked, "What will happen if all the experienced [hunters] pass away?" However, it appears that he was the only one who expressed this concern. Most hunters, when asked about the future of eagle falconry, were optimistic and had trained, were training, or would train in the future one of their sons or relatives (A-2, A-4, A-6, A-7, AS-1, AS-3, AS-4). It does not seem, according to these results, that eagle falconry is endangered by young people not wanting to become eagle hunters. All eagle hunters who were asked answered that they believed the festivals to be good things, ways of celebrating the tradition, and means of teaching younger eagle hunters, or learning from elder hunters. From these results, it can be discerned that young eagle hunters admit that they don't know everything there is to know about eagle hunting, and that they want to learn. Young and rising hunters are perhaps a more self aware group than Soma and Sukhee (2014) suggested in their research.

That being said, there are certainly some traditions being lost or altered, ones that might play a large role in the health and stability of Golden Eagle populations. Soma and Sukhee (2014) discussed a shifting dynamic in how hunters attain their Golden Eagles. Hunters had begun to buy juvenile eagles, captured by traps, from non-eagle hunters, rather than taking eaglets from the nest, as is traditional. This research produced similar findings. In Altai 5/7 eagle hunters had bought their current eagle. Out of these hunters only 3/7 had more than 20 years of experience (all of them bought their eagles). In Altansugts all of hunters, older and with a minimum of 20 years of experience, had taken their current eagles from the nest. This discrepancy goes along with the Soma and Sukhee narrative of younger and less

experienced eagle hunters. One of the main reasons that eagle hunters cited as why they chose to buy juvenile eagles rather than take eaglets directly from the nest boiled down to convenience. Falconers agreed unanimously that eagles caught in traps as juveniles were better hunters, as they had already learned how to hunt from their mother. Furthermore, as falconers are hunters when they can be and herders at all other times, the demands of nomadic life and keeping livestock impeded their ability to commit the time to steal eaglet and then train eaglets themselves. While eaglets can be trained more easily, taking the time to teach them how to hunt is all consuming and involved practice (AS-4 , Soma and Sukhee 2014). The issue with a market in which eagles are bought and sold stems from concerns over mistreatment and long term captivity. In Soma and Sukhee's study (2014) over a one-year period in Sagsai soum three eagles, one young and two adults, died, three more were captured, and six were bought. Sustainability in eagle falconry is based on the release of eagle back into the wild. If eagles die in captivity, then this peace between nature and the falconer is not realized. Of course, eagles also die in the wild due to injury and disease. Falconry hunting itself is a battle to the death between eagle and prey, and sometimes eagles are defeated and die (A-2). But if this is a practice that continues to increase, it could largely threaten golden eagle populations in the future.

Another potentially harmful practice of modern eagle hunters is how long they hold individual eagles for hunting. Traditionally in Kazakh eagle falconry the raptors are kept for five years (Soma 2011). Today the Mongolian Eagle Hunter's Association recommends that eagles be released at the age of seven. Eagle falconers themselves say that they hold onto eagles for an average of 7.66 years in Altai and eight years in Altansugts, depending on the skill of the eagle (A-4, A-7, AS-4 cited in results section 3.3.3), and that the average age for release in the eagle hunting community is closer to nine. The difference in self reported and community release ages suggests that the hunters interviewed are not representative of the community and are "good" hunters (AS-4) that release their eagle from the ages of seven to eight, that eagle hunters are aware of the appropriate age to release eagles and respond accordingly. Regardless, the age of release has increased significantly from the original age of five. Reports also suggested that eagle hunters sometimes keep eagles as long as 15 years, or until death (A-1). The life expectancy of a golden eagle is about 30 years (Clark 2006) and the breeding success of golden eagles is highly dependent on the availability of their prey

base (Watson 2010). As far as the treatment of eagles in the homes of eagle hunters, there were no observations in this research that would suggest they were being abused or mistreated in any way.

4.2 Climate and Land Change

Current estimates of Golden Eagle populations by locals mostly indicate stable numbers, but there is also some concern about the strength of the population (Results 3.2.1). Golden Eagles are given the conservation label of being Least Concern (LC) globally and regionally. Yet there is evidence that with changing climate and land cover, which threatens the eagles as well as their prey base, that there is reason for concern. Eagle hunters expressed concerns over certain phenomenons that are troubling for environment and tourist officials in the area (T-1, ET-1, ET-2), such as the disappearance of small streams, and the increase in number of livestock (all eagle hunters). The increase in the number of animals is particularly concerning as a human controlled impact. The most dramatic increase in animal type is goat (Bakhit 2013), following a national trend that stems desire for cashmere production. Today goats make up 47% of livestock in Bayan-Ulgii. In 1990 that number was 26%, and that's after an 85% increase in the total number of livestock in the province (Bakhit 2014). Land is also put at risk by several other human activities including road cover, traditional and artisanal mining (Figure 1), and deforestation, all of which can lead to land change and desertification.

Land change, especially desertification, is problematic for a host of reasons; however, in this context, these phenomena endanger the population of Golden Eagles, by endangering their prey base. As with results related to tourism-based eagle holding, hunters did not provide a clear picture for how the prey base of Golden Eagles is reacting to climate and land change, which they did recognize as being part of their lives. Seven out of nine participants answered that the pastureland was “not as strong” or in worse condition than in previously in their lives (A-4). However, their answers were more conflicted when talking about the health of the prey base, which was established as mainly Fox (Red and Corsac), Tolai Hare, Pallas's Cat (Results section 3.2.2). Falconers responded that for the most part the prey was less abundant (5/11) rather than more (1/11) or the same (2/11), and some thought it was too variable to give an answer (2/11) (AS-1, AS-2, AS-3, AS-4, A-5). A similar sentiment was

expressed in the amount of animals caught per month (and season), where 5/11 respondents did not want to give a specific number. It would seem, at first glance, safe to say that animals are decreasing in the area, but, just as it has been shown that breeding and hunting success of Golden Eagles is dependent on the health of medium sized prey (Schweiger et al 2014), several hunters observed that medium-sized prey are dependent on the small-sized prey that they feed on: “Where the mice go the foxes go. Sometimes they are here and other years they are not” (A-4). The same hunter stated that “if before the animals were at 100% [population], now they are at 30%.” Though there is a perceived decrease in prey species by hunters, the reason why is not especially clear to them. However, stating that mice and other small-sized prey move elsewhere and that foxes follow, implies that there is a reason small-sized prey are leaving the area. One explanation could certainly be land change.

Another explanation for decreasing prey species is that hunting (or poaching) with a gun rather than an eagle has greatly increased in the region and represents a severe threat (AMBCS 2009). Hunting with guns, floodlights, or cars is illegal in Mongolia without special permissions (T-1, AMBCS 2009) but still is an issue. That being said, other Ulgii, Altai, and Atansugts locals were in disagreement with this assessment. No eagle hunters considered hunting with guns, cars, or floodlights (which cause the animals to freeze in panic), an issue in their communities. Furthermore, officials from the Ministry of Tourism and the Environment both believed anti-poaching measures, which includes 44 rangers and 16 environmental inspectors, to be effective (ET-1, ET-2, AMBCS 2009). Fines for poaching range from 10,800,000 MNT to 80,000,000 MNT (ET-2). Regional assessments contradicting the reports of locals leaves another unclear picture of illegal hunting in the region.

Mining also represents a very impactful and severe threat to the region, according to the Altai Mountain Biodiversity Conservation Strategy (2009). Water use and pollution, along with dust and their contributions to regional desertification are the largest concerns that come from mining. Though most eagle hunters did not believe mining to be a threat to their communities, they do understand the impacts as negative ones. A hunter talked about the negative impacts, from water consumption to dust and pollution, and considered it disruptive to nature (AS-1). Historically, there have been two tungsten mines and one gold mine in the Bayan-Ulgii aimag, a much lower number of mines than found in other provinces in Mongolia (ET-1, ET-2, T-1, AS-1, AS-2). Artisanal mining also occurs in Bayan-Ulgii in the

summertimes, but again the government is proud of how they have restricted the numbers of these so-called ninja miners (ET-2). The threat then mostly comes from the possibility of more mines in the future. Though the government is protective of its environment when it comes to mining (ET-2), the economic incentives of mining are always seductive, and Mongolia has shown little restraint thus far in its short democratic history. A large chunk of Bayan-Ulgii is currently being explored (Figure 2) for its mineral resources.

4.3 Limitations and Suggestions for Research

Time constraints did not allow for an all-encompassing study of Kazakh eagle falconry in the Bayan-Ulgii province. Research would have benefited from a complete analysis of interviews from each soum, rather than just two. Furthermore, two translators were used during interviews with differing abilities. The first translator, while sufficient, acts mostly as a tourist guide, while the second translator was more proficient in English. As a result, there may be discrepancies in the volume of details offered, and the translation of certain questions or complex topics and vocabulary. One interview was lost to a corrupted file, with no backup. This interview was with one of the brothers of another hunter and offered a different perspective.

Quantitative data, such as specific land imagery regarding land cover change, or surveys of specific prey species, would be invaluable to determining the health of the ecosystem against local perceptions. The Mongolian Eagle Hunter's Association should be included in other research projects, as they were unavailable for questioning during this study, and they have no online presence. Other research might focus on perceptions of authentic eagle falconry in the aimag to help fully contrast the differences between today's version of eagle falconry and previous traditions.

5) Conclusions

The results of this research create more questions than they answer; however, these findings do bring to light several issues surrounding current methods of eagle hunting and how they might affect species within the Bayan-Ulgii ecosystem, including Golden Eagles and their prey base.

Eagle falconry in its traditional form still exists, that being said the certain practices are shifting away from their past levels of sustainability. Capturing methods, such as trapping and holding eagles to sell rather than to hunt with, combined with longer periods of use per eagle, directly endanger Golden Eagle populations. More research should be done in order to examine the full extent of this change. Legislation should be passed in order to require hunters and those who sell eagles to register their eagles and transactions. Data should be collected annually and made accessible in a public database, especially on eagle vendors, who should be inspected for maltreatment of the raptors. Eagle population surveys should be completed and nest locations catalogued to track the stability of the population more thoroughly. Though the eagle festivals provide opportunities for younger hunters to learn from their elders, and young hunters can on their own initiative practice with the more experienced members of the hunting community, more opportunities should be created at the soum or aimag levels for knowledge to be shared between generations. Furthermore, a study could be done to consolidate traditional methods and knowledge regarding training and eagle keeping into a format that can be referenced by hunters and non-hunters alike, such as a book. This would also serve to help record the ancient tradition.

An ecosystem of any composition, is a dynamic setting for competition and change. Biotic and abiotic relationships shape an awesomely complex network of interactions that are, often times, untraceable and unrecordable. Human interactions with the environment and specific ecosystems, will always alter those existing dynamics, intentionally or not. Herders are well aware of the threats to the health of their land and community. In order to maintain a sustainable relationship with the ecosystem, animal numbers should be reduced, specifically the proportion of goats to other animals. Enforcement against illegal hunting and illegal hunting methods should be more strictly instituted. Bayan-Ulgii has historically done a good job protecting land from mining, but exploration should be heavily monitored to assess

potential threats to the environment. Artisanal mining should also be monitored. Miners should be given training or resources to make their practice less impactful on the environment. Roads should be either paved, or consolidated and mapped, it being noted that extreme weather conditions warp and make both of these objectives difficult.

A database should also be kept and made publicly available tracking hunting over the course of a year. Reports should include how many of what species has been caught, and assessments should be performed to track the health of these species.

Any measures that are taken should be done in a way that is the least impactful to traditional hunting practices and the culture surrounding Golden Eagles and does not dull or diminish the extent to which eagle hunting is part of the community of Kazakh herders. The author would like to stress the distinct need to focus on preserving and fostering the health of this hallowed practice. Falconry performed with Golden Eagles is done elsewhere in the world, but Bayan Ulgii remains the last area in which it is performed and celebrated on such a large scale. To lose this element of culture to negligence, lackluster hunting practices, or poor environmental practices and enforcement would be to lose a historical tradition unlike any other. Conservation must not start when an animal or tradition becomes threatened, but rather assume that there is a constant threat to the traditions of the past, and so monitor both old and new hazards, while keeping our eyes looking forward to future concerns.

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Appendix A

Falconer	Animals Hunted	Release Age (self)	Release Age (community)	Attained Eagle via	Cost (tugrik)	Better Hunter	# of Eagle Hunter Trend
A-1	Fox, Hare	5-10	<10	Bought	-	-	Same
A-2	-	-	-	Bought	-	-	-
A-3	Fox, Hare, Cat	6-10	10	Nest	-	Trap	Up
A-4	Fox, Corsac, Hare, Cat	7-8	10	Bought	-	-	Up
A-5	Fox, Hare	6-7		Bought	-	-	Down
A-6	Fox, Corsac, Hare, Cat	8	6-10	Nest	-	-	Up
A-7	Fox, Corsac, Hare, Cat	8-10	8-10	Bought	200,000	Trap	Up
AS-1	Foxes, Hare	9	-	Nest	-	Trap	Up
AS-2	Fox	-	-	-	-	Trap	Up (not in his region)
AS-3	Fox, Corsac, Hare, Cat	7-8	-	Nest	300,000-400,000	Trap	Up
AS-4	Fox, Corsac, Hare, Cat	7-8	7-8	Nest	-	-	Up

Falconer	Golden Eagle Festivals	General Tourism Impact	Tourism #s	Pasture Land Health	# Livestock in Community	Hunting/Poaching (Gun)
A-1	Yes	-	Up	Worse	Up	Only Wolves
A-2	Yes	-	-	-	-	-
A-3	Yes	Good	Up	Worse	Up	None
A-4	No	Good	-	Worse	Up	None
A-5	Yes	Good	Up	Same	Up	-
A-6	Yes	Good	-	Worse	Up	None
A-7	Yes	Good		Same	Up	None
AS-1	Yes	Good	Up	Worse (recently ok)	-	-
AS-2	Yes	Good	-	-	-	-
AS-3	No	Good	-	Worse (recently ok)	-	-
AS-4	Yes	Good	Up	Worse	Up	-

Falconer	Region	Age	Length Hunting	Eagle Age	Hunting Frequency (week)	Hunting Freq. Past	Catch Rate (month)	Available Prey
A-1	Altai	43	25	3	3-4	3	3-4	less
A-2	Altai	-	-	-	-	-	2-3	-
A-3	Altai	59	6	1	1-2	4-5	3-4	same
A-4	Altai	28	8	3	1	1	1	less
A-5	Altai	57	20	3	-	-	-	same
A-6	Altai	39	6	2	1-2	1	1	more
A-7	Altai	65	45	4	2-3	1-2	1-2	less
AS-1	Altans ugts	40	24	5	-	-	-	less (depends)
AS-2	Altans ugts	52	20	5	-	more	-	more
AS-3	Altans ugts	67	33	3	less	3-5	-	-
AS-4	Altans ugts	67	25	3	-	-	-	-
Average	Altai	48.5	18.33	2.67				
Average	Altans ugts	56.5	25.5	4				
Total Average		51.7	21.2	3.2				