**Project Origin and Significance**

The Great Bustard (*Otis tarda*), a steppe-dwelling bird, is the heaviest bird capable of flight (Figure 1). Its range, once stretching from Manchuria to Portugal, has been highly fragmented by human activities and the species is considered globally Vulnerable due to projected population declines of 30% over the next 10 years. Less than 2200 individuals of the Asian subspecies of Great Bustard (*Otis tarda dybowskii*; henceforth "Asian Great Bustards") are estimated to remain. This subspecies is included on Red Lists across its range in Siberian Russia, Mongolia and China.

There is urgency for conservation action on these remnant Great Bustard populations. Further declines are expected to occur in Central Asia as a result of land-use change during the current politico-economic transitions from communist to free-market economies. However, this period of rapid transition also affords a window of opportunity for policy changes as these emerging countries debate environmental issues including land privatization, protected territories, agricultural policy, and the direction of development. A sensitive and wary animal, the Great Bustard serves as an indicator species for healthy steppe ecosystems and a flagship species for steppe conservation projects (e.g. the Altyn Dala Project in Kazakhstan, the Taimen Conservation Fund in Mongolia), yet little is known about Great Bustards in the region, hindering the effectiveness of these groups.

The Asian subspecies of Great Bustard differs substantially in aspects of its behavior and ecology from the better-known European subspecies (e.g. in migration patterns). Therefore conservation strategies based upon the existing understanding of European populations may not be applicable to Asian birds. Our conservation research and outreach program, founded in collaboration with N. Tseveenmyadag of the Mongolian Academy of Sciences and B. Nyambayar of the Wildlife Science and Conservation Center of Mongolia in 2006, is the largest effort focused on the Great Bustard in Central Asia thus far.

**Fig 1**. Asian Great Bustards (*Otis tarda dybowskii*). Photo: B. S. Chun.

**Project Goals and Research Questions**

Scientific Goals: Our research program is designed to provide the understanding of the ecology of remnant Great Bustard populations in Central Asia necessary for effective species management and, using the Great Bustard as an indicator species, for sustainable grassland development. Specifically, our research involves population surveys and determination of habitat use and movement patterns with an emphasis on their relationship to human land-use and nomadic movement patterns. We clarify principal causes of mortality to determine mechanisms behind population declines and collect materials for collaborative work on population genetic analyses to examine the effects of landscape fragmentation and isolation on inbreeding.

Outreach Goals: Without communication of important findings to policy-makers and the communities ultimately responsible for the preservation of vulnerable species, conservation research is an empty exercise. Thus, outreach activities, participation in workshops and conferences, meetings with conservation organizations, and reports to pertinent agencies are integral parts of our work. Further, we work to build scientific capacity so that a new generation of conservation professionals is prepared to tackle conservation issues in rapidly developing Mongolia.

**Preliminary Scientific Findings**

Though still in progress, our team's work has already produced findings with important implications for conservation planning. First, our ground surveys in 2006 brought attention to critically small and extremely isolated populations of Great Bustard in Central Asia. We have shared this information with the Mongolian government and conservation community to designate sites as Important Bird Areas of importance specifically for Great Bustards, and to produce population estimates for the poorly understood Asian subspecies of Great Bustard.

Second, we have identified agricultural fields as important resources for Central Asian Great Bustards. An example of our collected data can be seen in Figure 2; the near-exclusive use of agricultural mosaics as habitat is characteristic of all bustards we have tracked. The use of agricultural areas by these endangered populations presents an opportunity to promote conservation through agricultural policy.

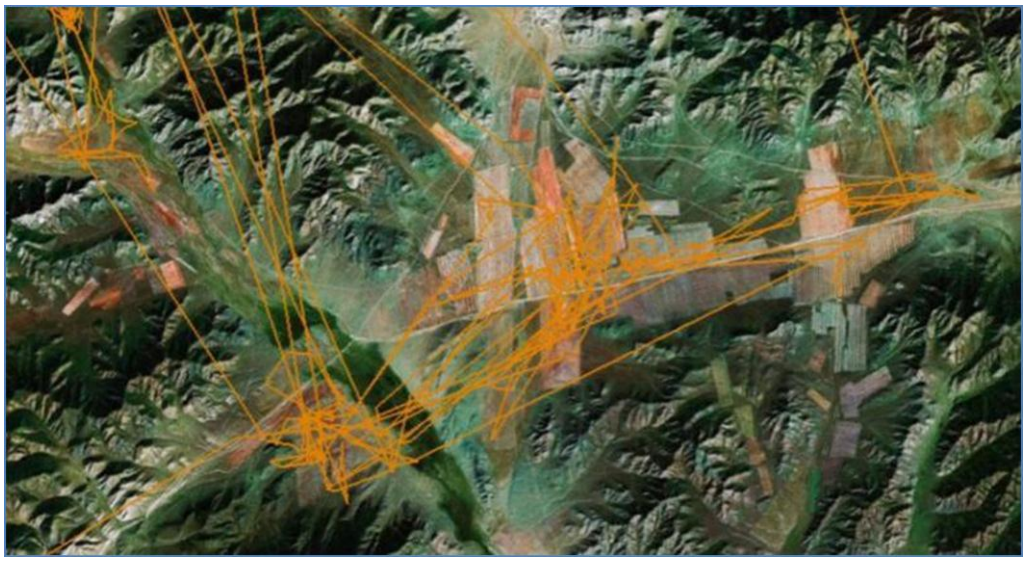

**Fig 2.** Movements of a male Great Bustard (orange line) over one summer as revealed through satellite telemetry. Rectangular shapes in this Google Earth image are agricultural fields.

Third, we have found migratory routes twice as long as has previously been identified for this species (Figure 3), many European populations of which are sedentary. As we have found that bustards breeding in Mongolia overwinter in China, it has become clear that international cooperation in conservation efforts will be required to protect these populations of birds - conservation of birds on their breeding grounds is limited in effectiveness if habitat on wintering grounds is destroyed.

This migration route may change as effects of climate change are felt in Eurasia. Our analyses of the relationship between migration dates, weather patterns, and vegetation condition will lead to a better understanding of the potential responses of this species to climate change and thus lead to more effective long-term conservation planning.

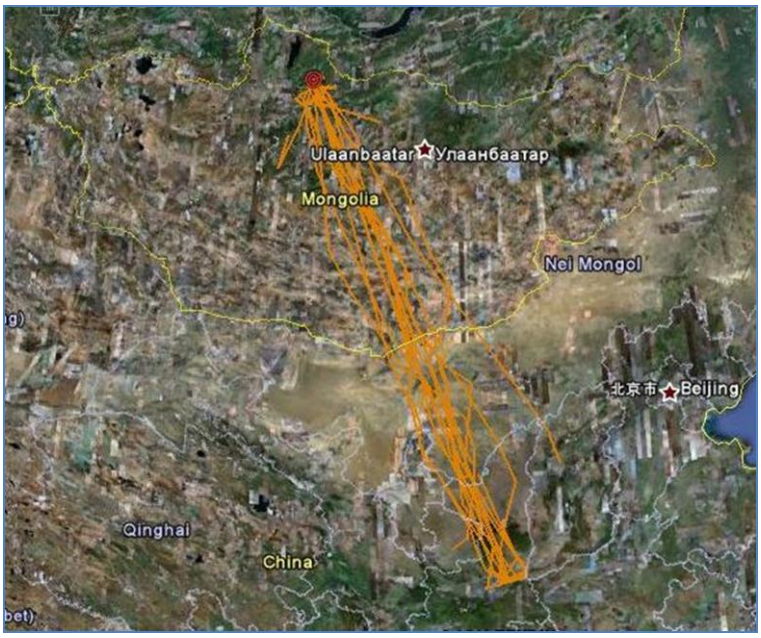


**Fig 3**. The migration routes of all Great Bustards tagged with satellite transmitters thus far (orange lines), superimposed on Google Earth satellite imagery.

Fourth, we have identified high rates of adult mortality and poaching. In our sample to date, 50-70% of deaths have been due to illegal hunting. Deaths have occurred an average of one year after monitoring has begun. This high rate of adult mortality is especially concerning considering the long maturation time of Great Bustards and their low reproductive success (due to high rates of egg loss and chick mortality). The results of our mortality investigations and interviews with local people have revealed that poaching is carried out at a variety of socioeconomic strata, across many regions, indicating that conservation education efforts must be broad in scope.

**Preliminary Outreach Impacts**

As described above, our project places a strong emphasis on developing scientific capacity within Mongolia and raising public awareness about the plight of the Great Bustard.

Our project has trained four undergraduates and supports the work of two master's students. We are proud to announce that our first master's student, B. Dashnyam, defended his thesis on Great Bustard diet and habitat in July 2011. Dashnyam now works at the Mongolian Academy of Sciences, as one of only a handful of professional ornithologists in Mongolia.

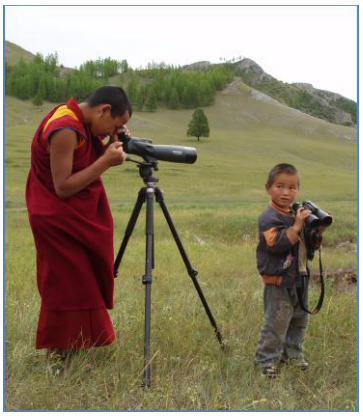

**Fig 4**. Our team's educational activities with local children at a summer camp emphasizing the conservation values inherent in Buddhism. Photo: A. Kessler.

We also carry out popular conservation education programs with rural youths (Figure 4). A dozen rural schoolchildren who have participated in these programs have since gone on to enter the biology departments of Mongolian universities.

We also work with media sources to share information about the charismatic Great Bustard with communities beyond our research sites. In 2011 we produced a short documentary on Great Bustards for national television. The goal of this documentary is to encourage national pride in this charismatic species and reduce the rate of poaching.

We have also authored curricula on bird identification and conservation which have been distributed to public schools across northern Mongolia, and participated in national radio and print interviews.

**Immediate Budgetary Needs**
We appreciate the interest of the Great Bustard Group in supporting our team's activities. We currently have the following urgent budgetary needs:

1) $2620 for 12 months of satellite transmissions from transmitters currently attached to wild Great Bustards. We use these data to determine habitat use patterns, migratory routes and cause of mortality. This is our most urgent requirement as we currently have funds remaining for only one month of transmissions.

2) An additional $1080 would allow us to collect a year of transmissions from a newly harnessed bustard. (We have two transmitters ready for attachment to bustards.)

3) $1400 for tuition of our team's second master's student, G. Natsag, as he pursues a thesis on Great Bustards.

4) $3800 for distribution of our documentary on Great Bustards to schools and organizations within Mongolia.

5) $1500 for chemicals and analyses to begin population genetic analyses using mitochondrial DNA.