Individual Advanced Research Opportunities Program

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The Great Bustard (*Otis tarda*) in Kazakhstan: From Population Biology to Land-Use Planning

Topic of research

Over the course of the next decade, significant environmental policy decisions will be made concerning protected territories, environmental legislation, and the direction of development in Central Asia. As a vulnerable and charismatic bird unique to the steppes of Eurasia, the Great Bustard (*Otis tarda*) is of major interest as an indicator or flagship species for the formulation of sustainable development and land-use plans in the region. My dissertation research focuses on the conservation biology of the Great Bustard in Central Asia, specifically Kazakhstan and Mongolia. This research will lead to recommendations for environmental policy and species conservation in both countries.

Relevance and Contribution to Field

The Great Bustard, a large, steppe-dwelling bird, is listed as a globally vulnerable species by IUCN – The World Conservation Union due to ongoing rapid population declines. Its range, which once stretched from the grasslands of the Iberian Peninsula to the steppes of eastern Asia, has become increasingly fragmented over the past 150 years. Rapid population declines have been described in Kazakhstan and Mongolia in particular. The Great Bustard was listed in

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the Red Book of Endangered Species of the Kazakh SSR by 1978 and the Mongolian Red Book by 1987. Despite these concerns, very little research has been carried out on the Great Bustard in Central Asia over the intervening twenty to thirty years and even reliable population estimates are lacking. My research will describe habitat use, migration routes, and breeding behavior of the Great Bustard at the eastern end of its range.

Great Bustard populations are sensitive to habitat degradation, making this species an indicator of the health of steppe ecosystems and a potential choice to guide sustainable development and land-use planning in these rapidly developing countries. Particular threats to steppe ecosystems and populations of Great Bustards in Kazakhstan include agricultural and industrial development. In Mongolia, issues of land privatization, pasture management, mineral extraction and road construction are politically pressing and linked with Great Bustard conservation. Protecting Great Bustard populations not only conserves a distinctive species, but also results in the protection of important grassland resources. My research will provide local governments and international development organizations with an understanding of Great Bustard habitat requirements and threats to its populations which can serve as specific guidelines for environmental policies, including environmental regulations, land-use plans, sustainable development, and privatization programs.

Research Methodology

I began my term in Kazakhstan as an IREX IARO Fellow by conducting interviews with biologists in Almaty and a literature review of field sightings of the Great Bustard in Kazakhstan. I developed contacts with ornithologists and a partnership with a local environmental non-governmental organization.

From August through November 2006, I carried out five expeditions to clarify the current extent of Great Bustard populations in Kazakhstan. Expedition routes were located in rural Kostanai, West-Kazakhstan, South-Kazakhstan and Almaty *Oblast*'s. In each *oblast*', I interviewed local biologists, game wardens and representatives of the Hunters' Association whenever possible. We also interviewed local farmers, hunters, and herders extensively en route. When there was doubt, we used pictures of the Great Bustard to ensure that we were discussing the correct bird with local people. Questions involved residents' observations of Great Bustard flock size, habitat use, migration patterns and breeding activity. Surveys in the north provided information about nesting and summer habitat use; surveys in the south provided information about migration stopover and wintering sites. Because of low Great Bustard population levels, particularly at earlier survey sites, our team did not test capture methods or tag individual birds.

A minimum of three team members were present on each expedition. Members varied, but typically included a driver, local biologist and/or hunters. These team members provided expertise regarding local bird habits and ranges, contacts with informed residents, and extra pairs of eyes for thorough bird observations. In Kostanai *Oblast'*, two undergraduate biologists joined my research team to gain practical field experience in ornithological research.

We focused our time and attention on sites where there had been sightings of Great Bustards in recent times, as indicated in literature and interviews. We also surveyed locations where Great Bustards were common in the 1980s or 1950-1960s. We surveyed the most promising areas in the morning and evening, when Great Bustards are most active, and during appropriate weather conditions. At locations where Great Bustards had been recently or previously reported, and in potentially suitable habitat, we stopped at vantage points to survey the terrain with a spotting scope. When sightings were made, we noted habitat type, flock composition, and behavior. When possible, we unobtrusively collected dropped feathers for genetic analysis, measured footprints, and examined excrement.

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After completing field work in Kazakhstan, I finished my term as an IARO Fellow with one month in Moscow, where I reviewed Russian-language scientific literature related to Great Bustards at the Museum of Zoology and Moscow State University's Biology Department. These literature searches were focused primarily on historic literature regarding Great Bustard observations in Central Asia, including accounts of imperial expeditions and articles in 19th century hunting journals. I also examined preserved specimens at the Museum of Zoology.

Preliminary Research Findings

This research is a long-term undertaking and field work will take approximately three additional years (see "Future Research Plans," below). Though the most interesting and complex findings will be made in the years to come, some preliminary conclusions relevant to environmental policy can be made as a result of my pilot work as an IREX IARO Fellow in Kazakhstan and Russia in 2006. These results pertain to current Great Bustard population size, conservation issues, and use as a flagship and indicator species in Kazakhstan.

Great Bustard populations in Kazakhstan dropped dramatically after the large-scale expansion of farming during the Soviet Union's Virgin Lands Campaign. A second decrease in population appears to have occurred after the collapse of the Soviet Union, probably due to increased poaching. An estimate of 300 breeding individuals in Kazakhstan is generally hazarded. My surveys in northern breeding grounds in Kazakhstan indicate that this is probably close to the truth. This low number is alarming, considering the large flocks which were once found in the region, the large geographic area of potentially suitable habitat and low human population density. Larger flocks are occasionally sighted on wintering grounds in the south of Kazakhstan, but the source of some of these birds is probably Russia.

Funding for anti-poaching enforcement declined after the collapse of the Soviet Union and illegal hunting on an individual scale appears to be the major threat to Great Bustards in all areas of Kazakhstan at this time. Indeed, while surveying areas of countryside near Great Bustard flocks, we sometimes heard gunshots, saw hunters patrolling fields in their cars, and found shells from shotguns. A large percentage of those who reported having seen a Great Bustard in recent times openly admitted that they tried to hunt it.

Though Great Bustard meat is eaten, it does not play an important role in local inhabitants' diets today. In most cases, poaching is pursued for the excitement, novelty, and triumph of killing a large, rare bird. In areas where Great Bustard flocks more commonly occur, the arrival of hunting parties composed of high-status individuals from out of town is a common occurrence. Local people are sometimes hired as hunting guides to these parties.

The Great Bustard is protected in Kazakhstan and there are hefty fines for poaching. However, there is widespread disregard for these laws and weak enforcement. Although most residents abstractly desire a healthy ecosystem and bird populations, this often does not translate into concrete action or personal responsibility.

The second major cause of Great Bustard population declines is probably chemically intensive agriculture. Though pesticides were rarely used in the period after the economic collapse, the practice of poisoning seeds to be sown is again growing. It is likely that use of insecticides in fields will also increase as economic conditions improve. Insecticides destroy the protein-rich insect food base important to Great Bustards, and especially their young, in the summer. During previous periods of intensive poisoning, residents report that Great Bustard and other bird populations shrank drastically.

Great Bustards often nest in wheat fields, where their eggs or chicks are crushed by farm machinery. As Kazakhstan's agricultural sector recovers from the economic collapse and discarded fields are reclaimed, it is likely that more cases of chicks and nests being crushed by agricultural machinery will be reported.

Further, it appears that the frequency of steppe fires has increased across much of Kazakhstan due to human activity, as well as the duration for which they are allowed to burn. This may be a problem for nesting Great Bustards.

Great Bustard populations are sensitive to habitat degradation, making the Great Bustard a potential indicator of the health of steppe ecosystems. My surveys in 2006 indicate that at this point, the Great Bustard is a good indicator of the quality of anti-poaching enforcement, in particular. Once poaching is under better control, surveys of Great Bustard populations can be used to guide sustainable development as well. This charismatic bird is also an appropriate flagship species for restoration of healthy steppe ecosystems, and is being used as such in a new conservation initiative put forward by a coalition of local and international non-governmental organizations.

Future Research Plans

A major goal of my pilot work in 2006 was to determine field sites for further, long-term investigations on particular populations of Great Bustards. I have identified sites in Kazakhstan which are appropriate for further research into breeding behavior, as well as sites which are appropriate for collection of genetic material in the form of dropped feathers. Great Bustard populations in Mongolia, where the level of poaching is substantially lower, will be used for studies involving satellite telemetry.

From May to October 2007, my research team will capture Great Bustards for attachment of patagial tags and satellite platform transmitter terminals. Satellite transmitters will provide data about habitat requirements, including breeding and wintering sites, migration patterns and range requirements. Visual observations of marked individuals in Mongolia and Kazakhstan from 2007-2009 will provide information about reproductive success and population demographics. Global Information Systems (GIS) analysis will be used to compare habitat use to current and projected land-use patterns. Information which concerns the spatial patterning and habitat requirements of Great Bustards will have implications for land-use planning in the region.

Recommendations for the US Policy Community:

Ultimately, the results of this research can help to inform development and land-use planning in Central Asia. At this early stage, some policy recommendations can be made concerning poaching, conservation education, and agricultural practices in Kazakhstan.

Poaching the Great Bustard for sport is a severe problem in Kazakhstan. Enforcement agencies are under funded, meaning that the extent of patrols is limited. Existing legislation is sufficient and fines are high, but there is little respect for these laws among many hunters and there is corruption in enforcement agencies. Hunting of a variety of species is a traditional activity for both Kazakhs and Russians, which provides enjoyment and supplements people's diets. However, without adequate enforcement of hunting limits and bans, Kazakhstan's wildlife resources have been dramatically depleted and some species are in danger of extinction. The US policy community should promote the reorganization of enforcement activities with an eye to more independent evaluation of agencies' performance. For conservation of the Great Bustard in particular, emphasis should be placed on the protection of display and wintering sites.

The level of public ignorance about the Great Bustard in Kazakhstan is striking, considering the large size and charismatic behaviour of this species. City residents are often completely uninformed about this bird, and unaware that it once existed in large numbers in their country. In the countryside, I observed a pervasive lack of a conservation ethic among those who were familiar with this bird. Public education campaigns should encourage people to take pride in their natural heritage and take responsibility for preserving this and other species for the next generation.

This research also touches on agricultural policy. Indiscriminant use of pesticides, which leads to declines in bird populations, should be discouraged. Small subsidies could be offered to farmers who implement environmentally-friendly policies such as minimal insecticide use, and who schedule use of farm machinery during non-nesting periods.

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