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Title VIII Combined Research and Language Training Program

FINAL REPORT

Food Security, Anti-Poaching Enforcement,

and the Conservation of Farmland Birds in Siberia

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Research Abstract

The fate of the Great Bustard, the heaviest bird capable of flight, has been inextricably linked with Eurasia's agricultural development and regulation of hunting. Populations of Great Bustards in Eurasia crashed catastrophically during the 20th century, and perhaps 1000-1500 individuals remain in broader Central Asia today. As long-distance migrants, Great Bustards in Asia are exposed to threats in multiple countries. During my tenure as a Title VIII Combined Research & Language Training Fellow, I proposed field research at paired breeding sites on both sides of the Russia-Kazakhstan and Russia-Mongolia borders to detect the degree to which divergent agricultural and law enforcement activities have affected conservation of the species. However, my field activities in Russia were disapproved by my sponsoring institution. Given this constraint, I concentrated my efforts on morphological studies of the Great Bustard in the extensive natural history collections in Moscow and St Petersburg, to characterize distinct subpopulations and inform prioritization of conservation activities. I allocated my remaining

fellowship time to the field study of wintering Great Bustard populations in Kazakhstan and collaborated with colleagues in Kyrgyzstan, Uzbekistan and Turkmenistan to complete the first complete winter census of Great Bustards in Central Asia. I present recommendations to reduce poaching in the region, which continues to threaten Great Bustards and other endangered species.

Research Goals

Field Research:

In order to compare the impacts of varying law-enforcement practices and agricultural regimes on the status of Great Bustard populations across Eurasia, I planned to carry out research at bustard breeding sites in Siberia paired to my previous research sites in Kazakhstan and Mongolia. Specifically, I proposed travel to Orenburg Oblast', Omsk Oblast', and Republic of Tuva during my tenure as a Title VIII Fellow. At these sites, I planned to 1) census birds and make field observations; 2) learn the history of agricultural practices and hunting intensity at sites with Great Bustards; 3) assess current trends in poaching and agriculture; and 4) develop a better understanding of economic and social pressures affecting conservation issues through conversations with local people. These activities would allow me to develop policies to conserve farmland biodiversity and improve agricultural sustainability that are appropriate to local contexts. However, my sponsoring institution in Russia decided not to allow my travel outside of Moscow and St Petersburg due to heightened political sensitivities between the USA and Russia. This effectively precluded all the field work I had originally proposed for my program.

The only country in Central Asia holding Great Bustard populations in which field research by Title VIII Fellows was authorized was Kazakhstan, where I had previously completed investigations on Great Bustard breeding grounds. To avoid redundancy, I shifted the

focus of my field research during my fellowship term to southern Kazakhstan, where the major wintering spots for Great Bustards breeding in broader Central Asia are now located (A. E. Kessler & Smith, 2014). This would allow me to assess the status and threats to the regional population. I attempted to retain a paired-site research design by collaborating with researchers in adjacent countries. Unlike the breeding grounds of this species in Central Asia, which in my observations are now located primarily within crop fields, the sites at which I ultimately located Great Bustards this winter were predominately pasture. Therefore, the degree to which I was able to pursue the elements of my original proposal relating to cropland sustainability was limited. I also planned to request permission for the capture of a small number of Great Bustards for satellite-GPS monitoring. In the absence of field studies on breeding grounds, this would allow me to gather some high-resolution data on reproductive sites and success, as well as sites of mortality.

Research in Collections:

In order to inform conservation planning, specifically, to identify distinct Great Bustard subpopulations and aid the prioritization of conservation measures and suitable methods for supplementing critically small populations, I planned research in natural history collections of Moscow, St Petersburg, and Almaty. Taking measurements of preserved Great Bustard specimens allows me to investigate the degree of morphological differentiation



Photo 1. A Great Bustard specimen posed in a breeding display at the Museum of Biology of Moscow State University. Photo: A. Kessler.

between Great Bustards across their geographic range, and complements my earlier study of genetic differentiation of Great Bustards across Eurasia (A. E. Kessler et al., 2018).

In academic libraries, I intended to collect information that would help me to elucidate the relationship between threats to the Great Bustards and their population declines across Eurasia. Specifically, I planned to collect information on the previous extent of Great Bustard populations, shifts in agricultural practices including crop rotations, crop cover, use of irrigation and chemical inputs, and threats such as illegal hunting.

Language Study:

My Title VIII Fellowship proposal included plans to study Tuvan language. However, the prohibition on travel outside of Moscow and St Petersburg made this goal irrelevant to my research. Instead, I participated in advanced Russian language study during my time in Moscow, and advanced Russian language and elementary Kazakh language study in Almaty.

Research Activities

On 5 September 2018, I traveled to Moscow, Russia, where I began advanced Russian language study at Moscow International University. I tested and improved my morphological data collection protocol at the Biological Museum of Moscow State University, then completed measurements on the extensive collection of preserved bustard specimens (Photo 1). I gathered scientific literature in a private book collection and found access to additional rare materials, including several 19th century documents, at the Russian State Library (Photo 2). From 6-16 October, I visited the Department of Ornithology of the Institute of Zoology of the Russian Academy of Sciences in St Petersburg, Russia, where I measured specimens in the institution's collection.

I traveled to Kazakhstan on 31 October 2018. I was based at Al Farabi Kazakh National University in Almaty, where I studied advanced Russian language and introductory Kazakh language. I collected morphological data in the natural history collections of the Institute of Zoology of the Academy of Sciences of the Republic of Kazakhstan and the Museum of Biology of Al Farabi Kazakh National University. I carried out literature research at the Library of the Academy of Sciences of the Republic of Kazakhstan and the National Library of the Republic of Kazakhstan.

My partner for field research was the non-governmental organization Association for Conservation of Biodiversity of Kazakhstan (ACBK). I tentatively planned to carry out field investigations in three regions in the south and southeast of Kazakhstan which have served as the most important overwintering sites for the species in the 21st century (see review in Kessler and Smith 2014). As the timing of Great Bustard migration varies annually (Gubin, 2007), I communicated frequently with other field biologists and government employees (e.g. anti-poaching patrols and wildlife rangers at reserves) across southern Kazakhstan for updates on weather conditions and any observations of Great Bustards. With ACBK, I applied for and received permission to capture Great Bustards for the purposes of attaching satellite transmitters



Photo 2. Russian imperial-era hunting literature highlighting the Great Bustard as a game bird in present-day Kazakhstan. Photo: A. Kessler.

for conservation monitoring. The success of this application was notable, as no such permission had been granted for any wild species in Kazakhstan for over a year.

By mid-December, it had become clear that this winter was anomalously warm. Very few Great Bustard sightings were reported. I scheduled trips to the few sites where small numbers of these birds had been observed, as well as to sites where they had been sighted in past winters. Altogether, I personally carried out five trips to rural field sites, specifically: 1) Ili and Zhambyl Districts of Almaty Region; 2) Kordai, Merki and Shu Districts of Zhambyl Region; 3) Enbekshikazakh District of Almaty Region; 4) Eskel'di, Kerbulak, and Koxsu Districts of Almaty Region; and 5) again to Ili and Zhambyl Districts of Almaty Region. Routes to relevant sites in the Alakol' Depression on the border between Almaty and East Kazakhstan Regions were impassable due to snowy conditions, and snow cover also decreased the likelihood that Great Bustards would be spotted there. While since the early 21st century, large wintering gatherings of Great Bustards have been spotted in Turkistan Region (Gubin & Vagner, 2009), very few were reported there this winter. To make best use of my time, I cancelled my travel to Turkistan Region to focus on other sites, and enlisted collaborators in the region to carry out surveys and keep me abreast of their findings.

At my field sites, a colleague from ACBK and I carried out visual observations using binoculars and a spotting scope (Photo 3). I spoke to area residents, including farmers, herders and hunters about the birds they observe and factors



Photo 3. Searching for bustards with a spotting scope on the steppe in Kazakhstan. Photo: A. Kessler.

influencing Great Bustard populations. Unfortunately, conditions on the two occasions when I found Great Bustards were not suitable for capture.

Between field expeditions, I continued my language study and measurements in collections in Almaty. I also organized materials collected in the field, including GPS data, photographs, and notes from discussions with local people. In order to obtain more complete population counts and compare conditions on both sides of the international border, I coordinated surveys by colleagues in Uzbekistan and Kyrgyzstan in areas adjacent to survey sites in Kazakhstan. As winter deepened and our population count of Great Bustards continued to be well below that which was expected, I also coordinated surveys in Turkmenistan in an attempt to cover all bases in search of the “missing” birds. I returned to the US on 15 February 2019.

Important Research Findings

Field Research:

The Great Bustard is listed as Category I (highest level of threat of extinction) in Kazakhstan (Berezovikov & Gubin, 2010). My surveys as a Title VIII Fellow in winter 2018-2019, alongside the work of collaborators in other regions of Central Asia, represent the first attempt to systematically collect information about wintering Great Bustards across all of Central Asia. This work provides insights as to the species’ status, threats to its survival in the region, and policy measures which could improve anti-poaching enforcement. Here I will summarize my personal research findings. Ultimately, I plan to combine my data with those of collaborators from South Kazakhstan Region, Uzbekistan, Kyrgyzstan, and Turkmenistan.

There is no official estimate of the number of Great Bustards in Kazakhstan. A high count of 1000-1500 individuals was obtained over a decade ago during surveys of large flocks

concentrated at wintering grounds in Turkistan Region of Kazakhstan (Sklyarenko, 2006).

Because the number of Great Bustards at historical wintering sites in Azerbaijan, Turkmenistan, and Iran has dropped to near zero (Baghirov & Alieyev, 2013; Barati, Abdulkarimi, & Alonso, 2015; Saparmuradov, 2003), the estimate from southern Kazakhstan can be used as a minimum baseline of the number of Great Bustards in Central Asia as a whole at that time.



Photo 4. A small flock of overwintering Great Bustards, observed at 1 km distance. Photo: A. Kessler.

During my Title VIII Fellow fieldwork, I traveled more than 2000 miles by car on surveys that encompassed all major wintering sites of the Great Bustard in Kazakhstan, with the exception of Turkistan Region, which was surveyed by a colleague, and the Alakol' Depression, which was inaccessible due to snowy conditions, and thus also less likely to host overwintering bustards. I also

visited sites at which Great Bustards have been sighted only occasionally, and sites at which they have not been documented but which I or senior ornithologists evaluated as potential wintering sites given the ecology of the species. Despite this unprecedented level of effort, I located a potential maximum of just 75 individual Great Bustards, at only a single site (Photo 4). Though I am awaiting final reports from collaborators, the information I have received thus far indicates that the maximum number of Great Bustards we observed did not exceed 250 individuals in aggregate. In summary, our cumulative level of survey effort far exceeded historical surveys that located many more bustards.

In addition to observations in the field, I monitored weather phenomena and Great Bustard sightings over a larger area through phone conversations with representatives of

organizations tasked with monitoring wildlife and hunting over large territories of south and southeastern Kazakhstan (e.g. anti-poaching inspection agency, hunters' organizations, national parks). Only small numbers of Great Bustards were observed by these individuals.

The presence of patches of snow on the ground at all field sites provided additional information about the presence of Great Bustards in the landscape. Great Bustard footprints are large enough to be spotted from the car while driving (Photo 5). As bustards spend most of their time on the ground, if we did not observe footprints, we could be fairly certain that Great Bustards had not been at a site since snow had fallen.



Photo 5. A Great Bustard footprint in the snow.

Working with a native Kazakh-language colleague from ACBK, I spoke with 105 local residents over the course of my field surveys. Approximately half of these residents had either never seen a Great Bustard or did not know what it was. Roughly a quarter of those with whom I spoke had seen a Great Bustard over the course of the previous year. The largest group size described by a local observer was said to consist of about 100 individuals. These were reported to have been seen both temporally and geographically close to the spot where I counted a possible maximum of 75 Great Bustards, and could have consisted of the same individuals.

None of the residents with whom I spoke reported an increase in the number of Great Bustards observed over time, but some did report a decrease or complete disappearance of the species from their region over the last decade. This comment was given in Kordai District of Zhambyl Region and Ili and Zhambyl Districts of Almaty Region.

Five percent of people volunteered information about their own poaching of Great Bustards. Reports of poaching were recorded at all field sites. Residents also complained about poaching by anti-poaching enforcement agents.

Most groups of Great Bustards were observed when they took flight upon sight of our approaching vehicle, before we had an opportunity to observe them through binoculars or spotting scopes. Only twice did a group of bustards not flee from us; on these occasions we located them during point observations through a spotting scope at a distance of 1-2 km. Overall, Great Bustards in southern Kazakhstan were more wary than I have observed during long-term fieldwork in Mongolia. After flushing, Great Bustards in southern Kazakhstan typically landed only at a distance of 4-6 km or further, beyond the field of view. These behaviors may be indicative of the poaching pressures experienced by Great Bustards in Kazakhstan. Hunted populations of Great Bustard in Germany, for example, were reported to flush at much greater distances from humans than bustards in areas with lower hunting pressure (Von Blotzheim, 1973).

My findings shed light on the variability of migratory behavior in Great Bustards in Central Asia. The eastern subspecies of Great Bustard, *Otis tarda dybowskii*, which I monitored over multiple years in Mongolia via satellite telemetry, regularly returned to the same general region each winter (A. E. Kessler, Batbayar, Natsagdorj, Batsuur', & Smith, 2013). Great Bustards in Central Asia (subspecies *Otis tarda tarda*) have not been monitored using telemetry, but in the 21st century have been observed in the same major wintering locations across southern Kazakhstan (see for example, the annual observations of N. Berezovikov and colleagues in the Alakol' Depression, e.g. Berezovikov & Filimonov, 2017). The almost complete absence of Great Bustards from all of their typical wintering sites this winter has been a departure from this

trend. This may be attributable to 1) a decrease in population size and/or 2) the birds' use of more dispersed overwintering sites due to anomalous winter weather or increased disturbance. It also suggests that Great Bustards in Central Asia, like more sedentary populations of *O. t. tarda* in Europe (e.g. Block 1996), make more radical changes in their year-to-year movement patterns in response to local weather patterns than *O. t. dybowskii*.

Research in Collections:

I took morphological measurements and notes on coloration of all preserved Great Bustard skins in four natural history collections, for a total of 103 specimens. There was good geographic diversity among the specimens, with 86 individuals of the western subspecies (*O. t. tarda*) including 41 of the deprecated Central Asian subspecies (*O. t. korejewi*), 16 individuals of the eastern subspecies (*O. t. dybowskii*), and one individual of unknown origin. The specimens had been collected from 1890 through 1985. Several specimens were collected from regions where the Great Bustard has since been extirpated, making them valuable records of gradation in physical characteristics of the species across Eurasia. I am carrying out statistical analysis of quantitative measurements of these specimens to characterize morphological variations between subpopulations. This information is valuable to conservation policy, and can be used in concert with genetic analyses to identify endangered subpopulations and the suitability of different population supplementation methods.

Policy Implications and Recommendations

My field research as a Title VIII Fellow has yielded information relevant to international policy for the conservation of the Great Bustard, a threatened species whose range spans Eurasia. The policy recommendations I describe below have the potential to decrease illegal hunting of

not only the Great Bustard, but a variety of threatened species in the region. These recommendations are also aimed at improving agricultural sustainability.

Conservation Prioritization:

My research suggests that it is unlikely that the population of Great Bustards in Central Asia has increased since the 2006 estimate of 1000-1500 Great Bustards, and that it is possible that the population has declined. Considering the previous extent of the species in Central Asia (Shnitnikov, 1949; Sushkin, 1908), and vast tracts of suitable habitat in the region, this finding warrants conservation action. As a signatory to the Convention on Migratory Species, which increased the level of protection for the Great Bustard globally in 2014 as a response to declines in Asia (A. E. Kessler & Batbayar, 2014), Kazakhstan is legally obligated to conserve this species.

The low Great Bustard population count I obtained may be due in part to the use of non-traditional wintering sites by Great Bustards. As I was in contact with wildlife rangers and anti-poaching patrols, any novel wintering sites are likely in locations that are not currently covered by these patrols. A few residents speculated that the birds may have moved to the “sands” which lie to the south of Lake Balkhash, an area that is difficult to access by car. Aerial surveys are carried out by government agencies to establish population size of some threatened ungulate species in Kazakhstan. These surveys should be expanded to encompass population counts of Great Bustards, which can also be sighted from the low-flying aircraft. This could help to identify currently unknown wintering sites and establish an accurate population estimate. If Central Asian populations of Great Bustard are indeed flexible in their migratory patterns, they may continue to shift the location and timing of their overwintering in coming years as climate changes, making continued monitoring necessary.

My analysis of the degree of morphological differentiation between European, Central Asian, and East Asian populations of Great Bustards (see “Plans for Future Research,” below), in combination with information about the degree of genetic differentiation (A. E. Kessler et al., 2018) and population size in each region, will inform the degree of prioritization that should be placed on conservation in various regions, and any attempts at population supplementation.

Agricultural Sustainability:

Though I have observed breeding Great Bustards in Kazakhstan to primarily use cereal agriculture, and previous accounts of overwintering Great Bustards have recorded use of soy fields (Berezovikov, 2016), the site at which I observed Great Bustard this winter was pastureland. At this site, the number of herders and dwellings has been increasing over the past decade, in sync with a general trend towards growth in smallholding agriculture across Kazakhstan (Lerman & Sedik, 2018). Increasing human disturbance, including reported poaching of Great Bustards as well as competition with livestock for forage, is likely making this field site less suitable for Great Bustards and may play a role in the lower number of bustards observed this winter. Promotion of sustainable stock levels, particularly in winter when forage is limited, could increase nutritional resources and decrease human disturbance for the endangered Great Bustard, and also reduce erosion, contributing to more sustainable livelihoods for local people. Two-thirds of Kazakhstan’s territory is currently at risk of desertification, with particularly high percentages in the primary regions where Great Bustards overwinter (Tokbergenova, Nyussupova, Arslan, Kairova, & Kiyassova, 2018).

Anti-poaching Enforcement:

Great Bustards gather in larger groups during migration and winter, and these larger flocks are easier targets for poachers (Berezovikov, 2016; Gubin & Vagner, 2005). Protection of

these gatherings is critical for the species' conservation. The comments of local residents, and wariness of the Great Bustards I observed, suggest that poaching remains a problem on these birds' Central Asian wintering grounds. The candid nature of comments about illegal poaching indicates a lack of fear of legal or social consequences. Poaching was self-reported by rural residents of middle incomes, and I overheard complaints about poaching by government officials including the anti-poaching authorities. Similar observations have been reported in written literature (e.g., Berezovikov and Levinskii 2010; Kessler and Smith 2014).

Fines for poaching the Great Bustard in Kazakhstan are already substantial (approximately US\$4500) but are rarely applied. Greater governmental attention and resources should be placed toward the enforcement of existing regulations. Efforts should include public information campaigns, funding for increased patrolling and improved salaries for anti-poaching enforcement, who risk their lives in the course of their work (see for example the murder of a ranger this winter by poachers, Abdurasulov 2019). The unpredictable use of wintering grounds suggested by my surveys presents challenges to anti-poaching enforcement. Flexibility in allocation of manpower and funding will be required to respond to the appearance of Great Bustards at novel migratory stopovers or wintering sites.

Social media has the potential to play a role in reducing poaching by officials and bureaucrats, as public outrage provoked by viral images and reports exposing the misdeeds of public servants can be sufficiently embarrassing to institutions to result in their firing. However, fear of retribution makes private citizens wary of using their own social media accounts to publish evidence of criminal behavior of powerful individuals. An anonymous portal for whistleblowers to share documentation of crimes, ideally with a mechanism for verification, could be useful to reduce poaching. As elite hunters poach not only Great Bustards, but also

threatened large mammals, a dedicated social media channel to bring these activities to the awareness of the public could make a significant contribution to the conservation of many species in Kazakhstan. Further, this approach could be used to test and model a means to combat corruption and promote accountable and fair practices in other spheres of government.

Co-Curricular Activity

My experience as a Title VIII Fellow provided opportunities for me to develop and renew professional ties with scholars as well as biologists working in wildlife management in Russia and Kazakhstan. In Russia, I became acquainted with prominent taxonomists and ornithologists through extensive work at the Ornithology Sector of the Museum of Biology of Moscow State University, and Institute of Zoology of the Academy of Sciences in St Petersburg. I found fall to be a fortuitous time to be located in Moscow, as ornithologists were traveling through the city to attend conferences. This allowed me to meet and strengthen relationships with researchers from far-flung regions of the country despite my restriction to the city. I was invited to participate in a conference in Orenburg Oblast' but did not receive permission to attend from my sponsoring institution in time to arrange my travel. I devoted some of my time in the city to translating the ornithological treatise of a new colleague from Russian into English.

While in Almaty, Kazakhstan, I developed professional relationships with senior ornithologists through informal meetings and trips to the field. These individuals shared contacts and advice to help me locate wintering Great Bustards. I strengthened ties with biologists, NGOs, and a representative of a hunters' organization in Turkistan Region of Kazakhstan, Uzbekistan and Turkmenistan as I coordinated our surveys. My work with preserved specimens in Kazakhstan brought me into contact with the scientists responsible for management and

conservation of biological collections. I put one of these individuals into contact with an institution that may share expertise or funding to ensure continued care for the specimens.

I partnered with the non-governmental organization Association for Conservation of Biodiversity of Kazakhstan (ACBK) to develop outreach materials. Together we produced a desktop calendar and a wall poster to educate the public on the biology and conservation of bustard species (Photo 6). These materials were distributed to anti-poaching organizations, field biologists, and rural residents across seven regions of Kazakhstan. I provided an interview to the journal “Green World” and wrote a short piece for “Remez,” a publication of the Kazakhstan Association of Bird Lovers (M.



Photo 6. Educational poster about Great Bustards I produced with colleagues

Kessler, 2019; M. Kessler & Berezovikov, 2019).

I carried out my field work in collaboration with ACBK. In the countryside, I communicated and met with game wardens and protected area managers to discuss bustard observations, population status, and poaching.

Conclusions

Despite hurdles which necessitated a change in research focus and location, I was able to make valuable observations in the field and detailed measurements in natural history collections

during my term as a Title VIII Fellow. My field data from wintering grounds in Kazakhstan form a useful comparison to data I collected on breeding grounds in the country in 2017. Likewise, data I collected this winter concerning morphological variation across the range of this species provides a useful complement to my earlier genetic analyses. The opportunity for extensive conversations with local residents and improved understanding of conditions in rural Kazakhstan made possible by my fellowship term has yielded insights for improving the effectiveness of anti-poaching enforcement in the region. Merging of my data with that of collaborators (see “Plans for Future Research,” below, will enable further recommendations regarding prioritization of conservation actions.

Plans for Future Research Agenda/ Presentations and Publications

This winter, in addition to my own field research, I coordinated complementary field surveys by researchers in Turkestan Region of Kazakhstan, Kyrgyzstan, Uzbekistan and Turkmenistan in order to more thoroughly investigate the location and number of overwintering Great Bustards in Central Asia. I plan to combine observations from the final reports of all collaborators to produce a scientific manuscript. I will also incorporate relevant data and observations from this field season into the revision of the Action Plan for Conservation of the Great Bustard in Asia, for planned submission to the 2020 Conference of Parties of the Convention on Migratory Species.

I plan to merge the morphological data I collected from specimens in natural history collections in Russia and Kazakhstan with those of a colleague working in collections of western Europe. I will carry out statistical analyses to determine the degree of differentiation between

different subpopulations of Great Bustard, for comparison with previous genetic analyses, for publication in a scientific manuscript.

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