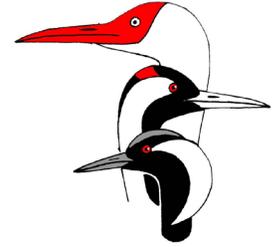


CENTRAL ASIA- MIDDLE EAST CRANE CONSERVATION GROUP



December 2024

AN UPDATE FROM THE CO-FOUNDER

By George Archibald, Ph.D.

Dear fellow conservationists,

I am pleased to share with you the second edition of our newsletter for the conservation of cranes in Central Asia and Middle East regions.

Last year, the International Crane Foundation and the Crane Working Group of Eurasia established the Middle East Crane Conservation Group (MECCG) and is now considering renaming it to Central Asia-Middle East Crane Conservation Group (CAMEC). This change is recommended by experts and colleagues because major flyways for Demoiselle and Eurasian Cranes cross Central Asia and the Middle East. Therefore, it is very important for us to expand our scope of work to include Central Asia alongside the Middle East. This name change reflects our commitment to expand our focus and enhance collaboration and efforts in both Central Asia and the Middle East.

As you know, cranes are not only symbols of natural beauty and biodiversity, but they also hold cultural significance across the Central Asia and Middle East region.

However, the populations of Demoiselle and Eurasian Cranes face increasing threats due to mass killing, capturing, habitat loss, climate change, and human activities in Central Asia and Middle East. We must act swiftly to protect these majestic birds and preserve their ecosystem for future generations.

Wali Modaqiq has been an advocate and leader in the field of conservation of nature in Afghanistan. His dedication for conservation of wildlife, particularly crane species, was necessary until the government change in Afghanistan in August 2021. In 2022, Wali, his wife and children moved to Mexico and after 15 months to Baraboo, Wisconsin-home of the

International Crane Foundation (ICF).

Today, Wali is employed at ICF to coordinate the Central Asia Programme and lead the Central Asia and Middle East Crane Conservation Group (CAMEC) initiative. His expertise, passion and experience for crane conservation will be helpful as we strive to tackle urgent issues such as the worrying practices of shooting the Demoiselle and Eurasian cranes. Together, we aim to implement effective strategies for the protection of crane habitats, and we aspire to advance the ambitious goal of reintroduction of Siberian cranes to their Western and Central Asia flyways.

Your engagement and support are crucial to our shared success as we engage in these important conservation efforts. Let us all work together to make a safer environment for these magnificent birds, ensure that they can flourish in their natural habitats.

We wish all a joyful and productive New Year filled with accomplishment and hope for the future of crane conservation.

Best regards,

George Archibald, Ph.D.

Co-Founder, International Crane Foundation



Photo by Andrew Holman

SITUATIONAL ANALYSIS OF HUNTING PRESSURE ON CRANES IN PAKISTAN (MARCH- APRIL 2024)

By Najam Ul Huda Khan¹

¹Deputy Project Director Wildlife, Upscaling of Green Pakistan Programme

Ministry of Climate Change & Environmental Coordination-Pakistan

Migratory cranes, including Demoiselle and Eurasian species, traverse Pakistan as part of their annual migration, utilizing critical wetlands and grasslands as stopover sites.

However, illegal hunting and habitat degradation severely threaten these populations.

This study investigates the scope and drivers of hunting pressure on cranes in Pakistan,

evaluates their population dynamics, and proposes participatory conservation

measures. Key findings reveal a high prevalence of hunting, with cultural practices and

economic incentives as major drivers. Recommendations focus on community

engagement, habitat restoration, strengthened legal frameworks, and leveraging

religious and educational platforms for awareness. The study underscores the need for

collaborative, data-driven conservation strategies to ensure the survival of these iconic

species.

1. Background and Introduction

Migratory cranes, particularly the Demoiselle and Eurasian species, are an integral part of Pakistan's biodiversity. These species traverse Pakistan's critical flyways, relying on wetlands and grasslands for rest and sustenance during their migrations. However, the

survival of these iconic species is increasingly at risk due to illegal hunting, habitat loss, and weak enforcement of conservation laws.

Historically, cranes have held significant cultural value in Pakistan, often associated with prestige and tradition. Unfortunately, these traditions have also fueled hunting practices, from live trapping in Khyber Pakhtunkhwa and Balochistan to recreational hunting in Punjab and Sindh. Alongside hunting, habitat degradation driven by urbanization, agricultural expansion, and refugee settlement has further endangered crane populations.

This research builds on a comprehensive situational analysis to examine the hunting pressures on cranes in Pakistan. The findings provide a basis for actionable strategies that emphasize participatory conservation, engaging local communities, religious leaders, and policymakers in efforts to protect these migratory birds. Pakistan's geographical location makes it a critical corridor for migratory cranes, hosting significant populations during their annual journeys. These birds play a vital ecological role and hold cultural significance. However, illegal hunting practices and habitat loss have led to alarming declines in crane populations. This research addresses the extent of hunting pressures, examines population trends, and highlights strategies for conservation through community participation.

2. Objectives

- 1.** To assess hunting practices and their drivers impacting crane populations.
- 2.** To analyze population data and identify critical habitats.
- 3.** To propose participatory strategies for sustainable crane conservation.

3. Methodology

The study utilized a multidisciplinary approach combining quantitative and qualitative methods to assess hunting pressures, population dynamics, and habitat conditions:

3.1 Field Surveys Population surveys were conducted during peak migratory seasons, employing direct sighting methods. Observers used telescopes, binoculars, and digital photography to collect data at key stopover sites such as Kashmore, Rojhan, and Wasta Lake. The surveys provided detailed counts of Demoiselle and Eurasian cranes, stratified by location and time of year.

3.2 Questionnaire Surveys Structured questionnaires targeted local hunters, community members, and market vendors. These surveys explored hunting practices, socio-economic drivers, and cultural traditions influencing crane hunting. Responses were cross-verified through interviews with conservation officials.

3.3 Habitat Analysis Satellite imagery and Geographic Information System (GIS) tools were employed to map critical habitats. Ground truthing was conducted to assess the extent of habitat degradation caused by urban encroachment, agricultural practices, and infrastructure development. The analysis included temporal changes to water bodies and vegetation coverage.

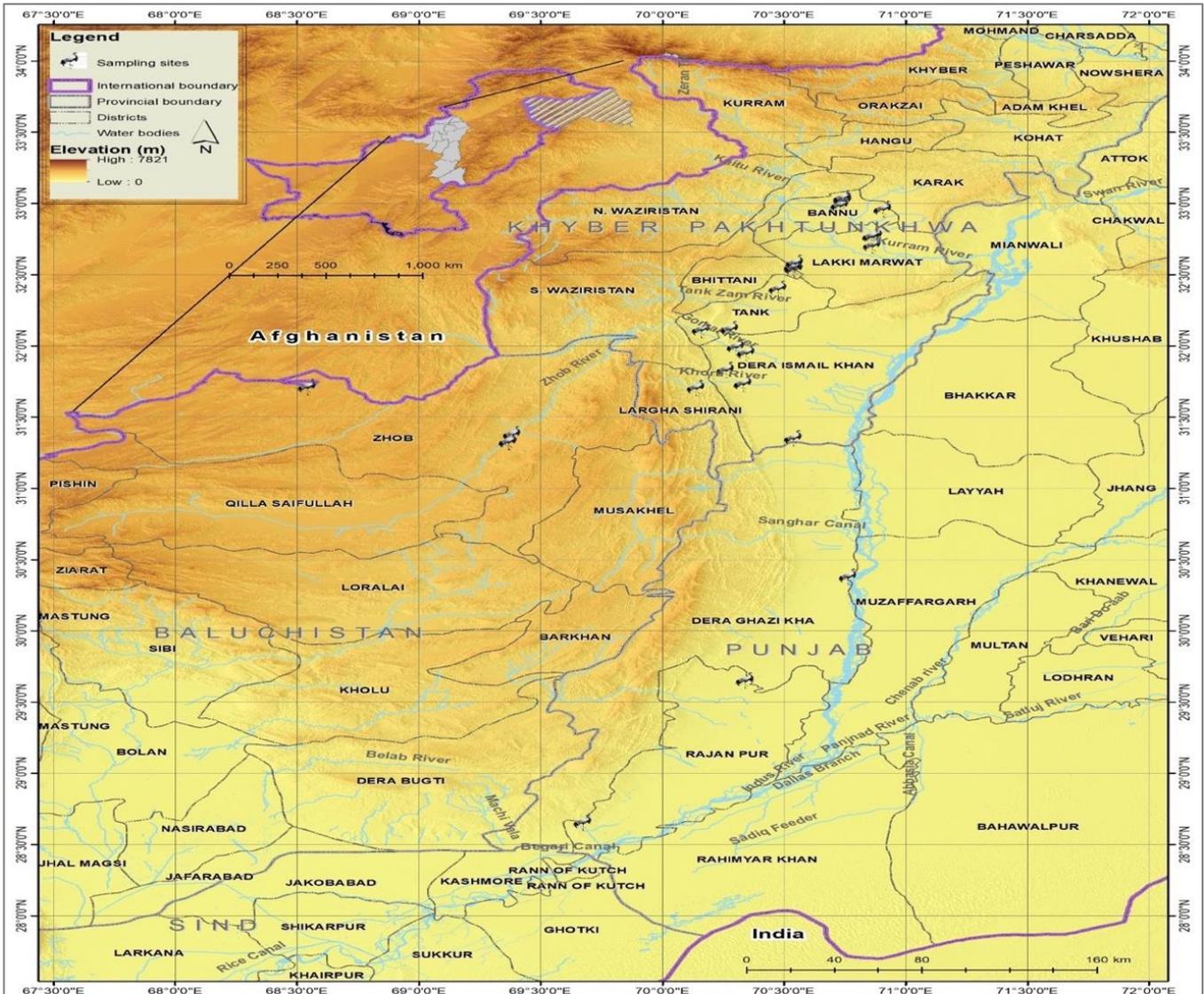


Fig. 1. The distribution of sampling sites in Pakistan.

4. Findings and Results

4.1 Population Dynamics The study documented 169,772 Demoiselle Cranes and 12,426 Eurasian Cranes annually. Kashmir emerged as the most significant site for Demoiselle cranes, with the highest recorded counts, while Rojhan was a key site for Eurasian cranes. The findings indicate notable fluctuations in population dynamics influenced by environmental factors and anthropogenic pressures.

4.2 Hunting Practices and Trends Hunting activity peaked during spring, with tools such as “soya” and firearms being prevalent. A total of 2,460 cranes were hunted, and 250 were trapped within the study period. Hunting practices varied geographically: live trapping dominated in Khyber Pakhtunkhwa and Balochistan, whereas recreational and commercial hunting was prominent in Sindh and Punjab. Economic incentives, such as market prices ranging from PKR 8,000 to PKR 25,000 per bird, were a significant driver.

4.3 Habitat Degradation Key wetlands and grasslands, including Wasta Lake, suffered extensive degradation. Contributing factors included water resource mismanagement, agricultural encroachment, and refugee settlements. These changes forced cranes to alter traditional migration routes, leading to increased vulnerability.

4.4 Community Insights Interviews revealed a dual perspective among local communities. While some viewed crane hunting as a cultural tradition, others recognized its adverse impact on biodiversity. This dichotomy underscores the potential for community-driven conservation initiatives.

5. Discussion The findings underscore the urgent need to address illegal hunting and habitat loss through participatory conservation. While hunting is deeply ingrained in local traditions, economic incentives and lack of enforcement exacerbate the issue. A holistic approach involving local communities, religious leaders, and policymakers is essential.

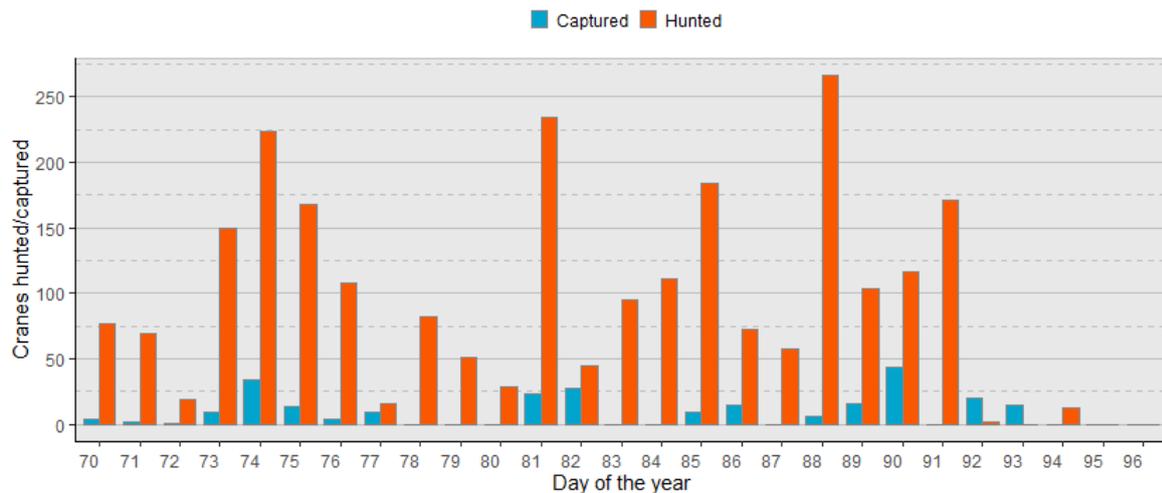


Fig. 2. Total Number of Cranes Captured or Hunted During the Study Period

6. Recommendations

Engaging local communities through participatory conservation initiatives can address illegal hunting while fostering sustainable livelihoods and preserving cultural values. Key strategies include:

6.1. Community-Based Conservation Committees

- Establish village- or valley-level committees to monitor and protect cranes and their habitats and there must be coordination meetings amongst the communities.
- Train local volunteers in habitat monitoring, enforcement and data collection.
- Promote ownership by integrating conservation with cultural practices and local traditions.

6.2. Alternative Livelihood Programs

- Introduce sustainable income-generating activities, such as ecotourism, birdwatching and wildlife photography and some skill development as per local craftsmanship.

- Support and register the captive breeding programs managed by local communities to reduce hunting pressure.

6.3. Awareness and Education Campaigns

- Conduct targeted awareness programs focusing on the ecological and economic value of cranes.
- Engage religious leaders to highlight conservation principles rooted in Islamic teachings. For example, workshops can focus on Islamic injunctions about the protection of nature and wildlife, emphasizing hunting only under strict ethical guidelines.
- Develop educational materials for schools and general public awareness and organize conservation-focused activities for children.

6.4. Social Media and Mainstream Media Engagement

- Leverage social media influencers to amplify conservation messages.
- Work with local journalists and local print and electronic media to highlight the impact of illegal hunting and successful community-led initiatives.

6.5. Strengthening Legal Frameworks

- Collaborate with local stakeholders, including political and religious leaders, to strengthen wildlife protection laws.
- Ensure laws are updated to address current challenges and include stricter penalties for illegal hunting.

6.6. Habitat Restoration Projects

- Rehabilitate key stopover sites, such as Wasta Lake by restoring water bodies and reducing habitat degradation.

- Promote sustainable land-use practices in areas surrounding crane habitats.

6.7. Transboundary Coordination

- Collaborate with neighboring countries to ensure safe migratory routes and synchronized conservation efforts.

7. A Call to Action

The conservation of migratory cranes in Pakistan hinges on active participation from local communities. By fostering awareness, offering sustainable alternatives, and strengthening collaborative frameworks, participatory conservation can mitigate illegal hunting and protect these iconic species. This approach not only benefits wildlife but also empowers communities to become stewards of their natural heritage, ensuring a harmonious coexistence between humans and nature.

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UNDERSTANDING THE MOVEMENTS OF DEMOISELLE CRANES DURING WINTER BETWEEN FORAGING AND ROOSTING AREAS IN KHICHAN, RAJASTHAN IS VITAL FOR EFFECTIVE CONSERVATION PLANNING

By Neelkanth Bora¹, Sevaram Mali², Pankaj Bishnoi¹ and Sujit Narwade¹

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Abstract

Ongoing monitoring at one of the most prominent congregation sites for Demoiselle Cranes, which hosts approximately 20,000 birds each winter in Khichan, Rajasthan, India, has highlighted the location's significance as a critical wintering ground along the Central Asian Flyway (CAF). This region is essential for these migratory birds. Recent efforts to capture and observe ringed or tagged Demoiselle Cranes have yielded valuable insights into their migration patterns and underscore the importance of Khichan as a wintering habitat. The data collected indicates that many of these cranes rely on this site for both roosting and feeding, highlighting the need for continued conservation efforts to protect this vital area. Through consistent monitoring and research initiatives, we can better understand the ecological needs of the Demoiselle Crane and enhance our efforts to ensure their survival in this critical region.

Introduction and background

Each year, as the monsoon rains begin to recede, an extraordinary event unfolds in the skies: migratory birds embark on epic journeys from their breeding grounds in regions such as Russia, Mongolia, and northeastern China to winter in the Indian subcontinent.

This fascinating phenomenon, referred to as winter migration, follows a well-defined route known as the Central Asian Flyway (CAF), which is recognized as one of the eight major avian migration corridors globally (<https://www.cms.int/en/legalinstrument/central-asian-flyway>). In autumn (black lines on the map), Demoiselles from the south of Central Siberia and North of Kazakhstan use the CAF in autumn and spring, the same route. Demoiselle, who breed more east (South-East Siberia in Russia, Mongolia, and North-East China), migrate to India from different directions, from north to northeast, using different flyways. In spring, all Demoiselles fly together through Pakistan and Afghanistan along the CAF, then reach the Western Tian-Shan and fly apart like a fan towards the north – north-north-east-east (red line on the map in Fig -1). Eastern Demoiselles use circle migration, while Demoiselles from North Kazakhstan use almost the same flyways in both seasons (Ilyashenko et al., 2022).

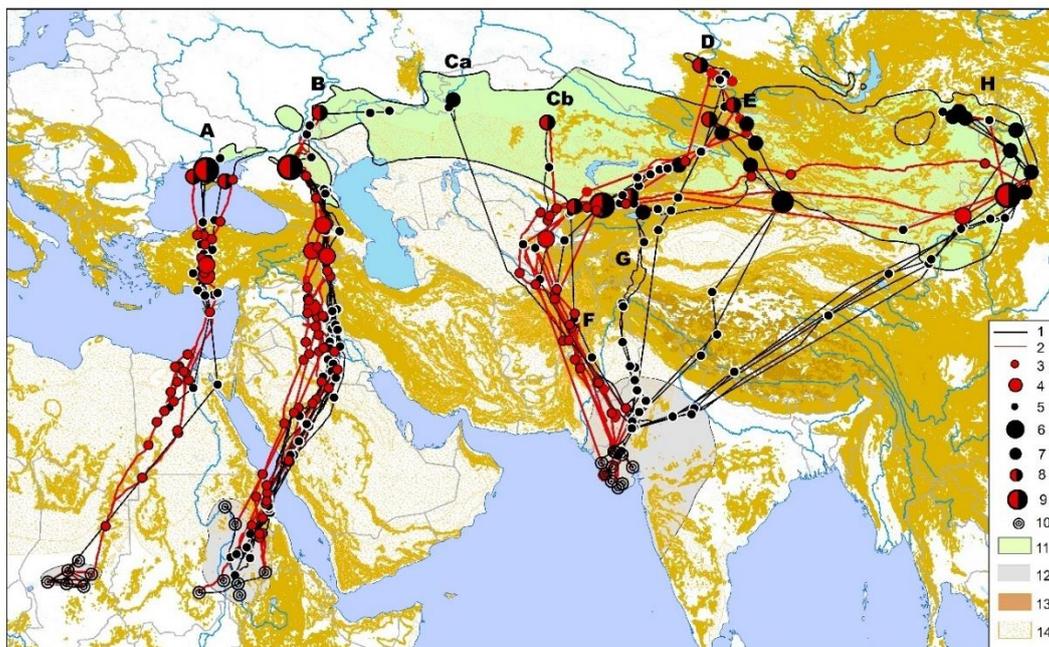


Fig 1. Map showing Flyway used by Demoiselle Crane visiting India (Sourced from - Ilyashenko et al., 2022)

The Central Asian and East Asian populations of the Demoiselle Crane migrate to their wintering grounds in Rajasthan and Gujarat provinces of the Indian Subcontinent (Kanai et al., 2000; Guo & He, 2017, Ilyashenko et al., 2022). Demoiselle Cranes of the East Asian population (Transbaikalia, Mongolia, and China) in autumn fly through the Himalayas and enter India through Nepal, stopping near Torey Lake in Russia, the Buyant River Valley in Mongolia, and Brakol Lake in China (Kanai et al., 2000; Goroshko, 2012; Guo & He, 2017; Ilyashenko et al., 2022). Some Demoiselle Cranes from Eastern Kazakhstan fly directly over the Himalayas, while others take a longer route around the Hindu Kush Mountains (Kanai et al., 2000). They cross the Dhaykagiri-Annapurna Mountain ranges via the Kali Gandaki River valley (Martens, 1981) and are often seen arriving early in the Kohat region of northwest Pakistan in late August (Ali & Ripley, 1969). Most of these birds avoid the formidable Himalayas, opting for the Hindu Kush Mountain ranges and the Great Indian Desert, known as the Thar Desert.

Khichan – classic example of bird-human coexistence

Rajasthan shares a lengthy international border of 1,070 km with Pakistan, and it is also bordered by the Indian states of Punjab, Haryana, Uttar Pradesh, Madhya Pradesh, and Gujarat. This strategic location facilitates a rich cultural exchange and fosters diverse influences from neighbouring areas (Reddy et al., 2011). The Thar Desert is a unique ecosystem at the intersection of three biogeographical regions: Palearctic, Oriental, and Saharan. This convergence of ecological influences produces various flora and fauna, contributing to the desert's ecological significance (Baqri & Kankane, 2002). The desert stretches from the fertile plains of Punjab to the saline expanses of the Rann of Kachchh. It is bordered to the east by the ancient Aravalli Mountain Ranges and to the

west by the Indus Valley, underscoring its geographical importance within the Indian subcontinent (Islam & Rahmani, 2011). Research has indicated that during their feeding times in breeding habitats, demoiselle cranes strongly prefer damp marshes and swamps, environments rich in food resources (Kozlova, 1975, in *Cranes of the World*). These wetland areas provide an abundance of vegetation and tiny aquatic organisms that are crucial for their diet during the breeding season. Moreover, the cranes favor alkali flat gravel grounds scattered throughout the region (Johnsgard, 1983), which serve as additional foraging sites. The Demoiselle Crane, referred to locally as Kurja, holds cultural significance, particularly in the Marwar region of Rajasthan. Each winter, these majestic birds make Khichan, a small village in the northwestern state of Rajasthan, home to an incredible number of around 20,000 birds (Mali et al., 2023). Rajasthan, known for its rich history and vibrant culture, is the largest state in India, covering an expansive area of 342,239 km², constituting approximately 10.4% of the country's total landmass. This region is strategically positioned in northwest India and falls within the Indomalaya ecozone, known for its diverse ecological zones, which include deserts and grasslands (Sharma et al., 2013).

The annual arrival of thousands of Demoiselle Cranes to Khichan is a sight to behold. The Salt Pan of Bap and Malar, referred to locally as *Rinn*, acts as a focal point for these cranes, attracting them in large numbers. These salt pans' shallow waters and open grounds offer a natural sanctuary for the cranes, protecting them as they roost for the night. In addition to these salt pans, the cranes also gravitate towards the catchment areas of various water bodies, such as Naadi's. To better understand the local movement patterns and habitat utilization of the Demoiselle Cranes during the migratory season, a team from the Bombay Natural History Society (BNHS) undertook a

comprehensive landscape-level survey of Khichan and its surrounding areas. During this survey on February 27, 2023, the team identified a water body in Rawra village, where two high-tension transmission lines intersect with the catchment area. This site is an important roosting area for the winter migratory Demoiselle Cranes. During the observation, the team estimated that over 500 cranes were present at the site, illustrating the significance of this habitat for the species. Unfortunately, during a follow-up visit on March 6, 2023, we discovered 12 Demoiselle Cranes that had tragically died due to injuries sustained while approaching the water body. The power line running north of the water source carries dual capacities of 132 kV and 33 kV and notably lacks Bird Flight Diverters, which have been proven effective in preventing bird collisions with such infrastructure. Under a threat assessment study, it was found that after food poisoning, the second highest number of incidences of bird mortality is due to collisions with power lines, followed by attacks from free-ranging stray dogs (See Fig. 1 - sourced from Mali et al. 2023). This highlights a critical need to implement protective measures to safeguard these migratory birds.

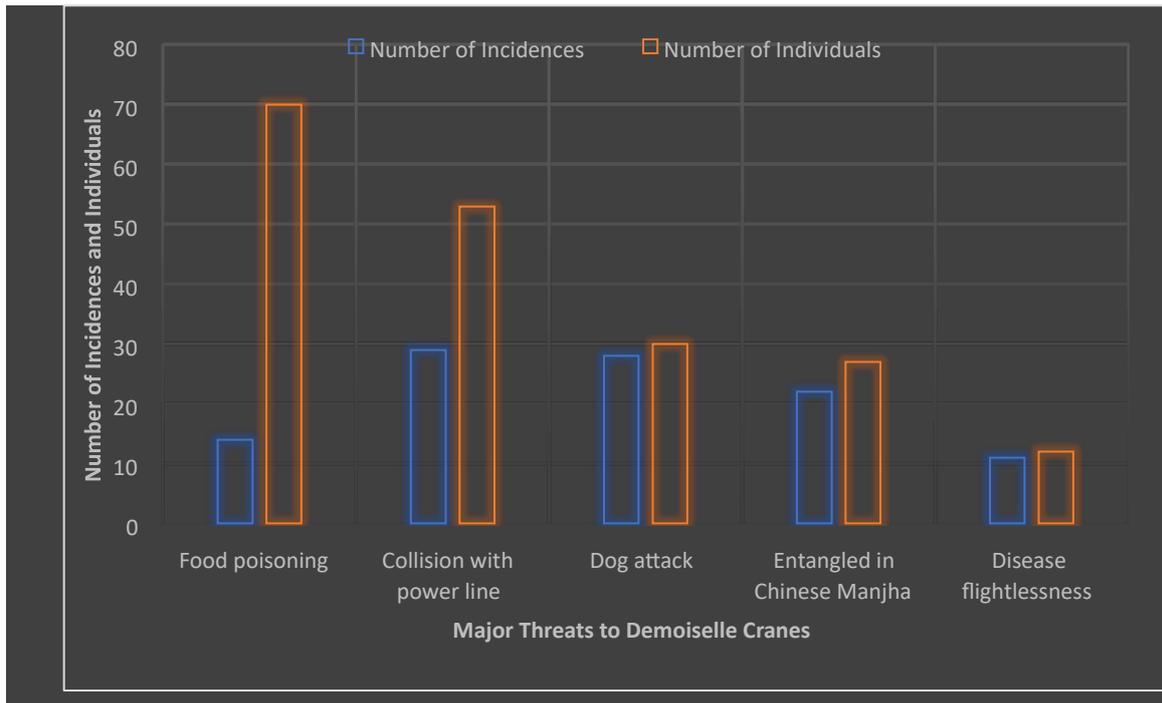


Fig. 2. Cranes are getting injured or killed due to the primary five reasons (Mali et al., 2023)

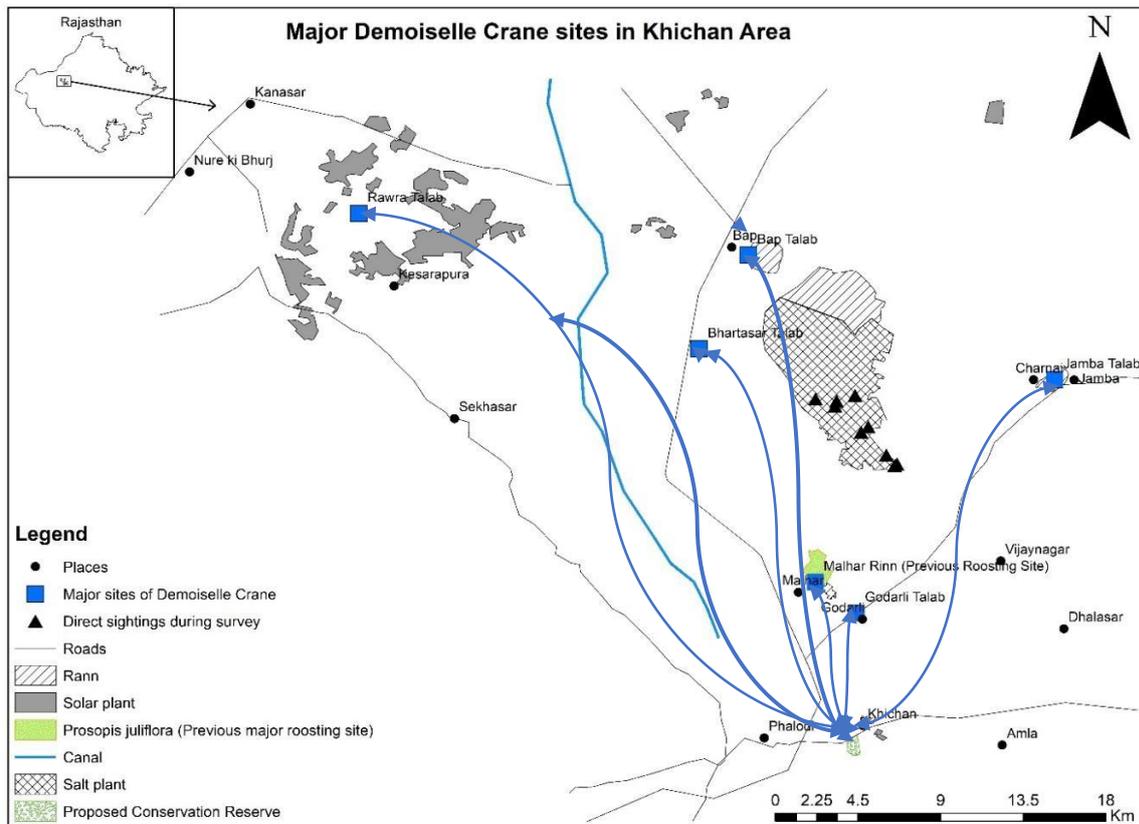


Fig. 3. The area intensively used by the demoiselle cranes in Khichan and its surroundings. Arrows indicate probable flight routes of the cranes to roosting areas from Khichan and back.



Fig. 4. Unplanned infrastructure development is leading to incidences of mortality of Demoiselle Cranes. An example is due to electrocution at Rawra, Bap Tehsil, Phalodi district © Neelkanth Bora.

Insights on migration through tagged birds

From 2014 to 2024, approximately 20 birds were recorded in Khichan with either identification rings or Platform Transmitter Terminals (PTTs), which are used for tracking their movements. According to the data, one of these sightings was a resighting of a previously identified bird. Among the 20 sightings, ten were reported to have originated from Mongolia, while nine were traced back to Russia (see Table 1) (Ilyashenko et al., 2023). A comprehensive crane migration study conducted collaboratively by the Severtsov Institute of Ecology and Evolution and the Vavilov Institute of General Genetics, both affiliated with the Russian Academy of Sciences, revealed significant insights into the migratory patterns of these birds. The study indicated that all 21 tagged cranes monitored in Russia predominantly traveled to and utilized areas in northwestern India, particularly the Thar Desert and Kutch Desert

(Ilyashenko et al., 2022). Observations in Khichan revealed that cranes typically arrived from the northern, eastern, and northeastern regions. However, these birds did not stay for extended wintering periods in other locations within India, suggesting a strong preference for the specific habitats provided by Khichan and its surrounding areas during their migratory stops (Ilyashenko et al., 2022). This information contributes valuable knowledge to understanding the region's crane migratory behavior and habitat preferences.

Table 1 - Tagged Demoiselle Crane (compiled by Sevaram Mali)

SN	Tag No.	Date	Name of the photographer	Information gathered by Sevaram from various sources
1	4Y9	2014	Seva ram Mali	By Tseveenmyadag Natsardorj in East Mongolia
2	1001	16-12-2018	Dr. Yuvraj Singh	Tagged by Dr. Nyambayar Batbayar, Michel Stunn, Wildlife Science and Conservation Center in east Mongolia
3	K6 and white ring from the transmitter	10-2-2019	Seva Ram Mali	Female, tagged by Elena Mudrik and her team, 10.07.2018, Altai Mountains, Russia
4	Solar PTT	7-2-2019	Seva ram Mali	Tagged by Dr Gaau in Russia 21-1-2016
5	T51	3-1-2020	Chirag Mali	Dr Nyambyar Batbayar and his team in 27-7-2019 in Mongolia
6	167 solar Tag	30-1-2020	Seva Ram Mali	Prof. Guo Yumin In Mongolia by Beijing College of Natural Conservation, China on 30-1-2020
7	S-05 (ES-05)	2021	Chirag Mali	Dr Nyambyar Batbayar in Mongolia at Surkh valley
8	A5		Seva Ram Mali	Female, tagged by Oleg Goroshko and his team, 02.08.2019, Transbaikalia, Russia
9	H-54	2023	Girdhari Lal (Rajasthan Forest Department)	Germany Mitchell Stubb in Mongolia
10	1177	23-12-2021	Seva Ram Mali	Alister in Mongolia, Germany, Prof. Mitchell Stubb
11	1907	19-9-2022	Seva Ram Mali	Alister in Mongolia, Germany, Prof. Mitchell Stubb, Martin Luther University

12	Solar ppt	25-11-2022	Seva Ram Mali	Solar PPT install on 21-1-2016 in Russia by Dr Gaauu revisited after 7-2-2019
13	125	5-12-2022	Seva Ram Msali	Ammer kun gunga in Mongolia
14	1916	7-12-2022	Seva Ram Mali and Girdhari Lal (Rajasthan Forest Department)	Michael Stubb from Germany
15	K1	4-01-2023	Seva Ram Mali	Male, tagged by Elena Mudrik and her team 19.07.2018, Altai Mountains, Russia
16	U4	17-01-2023	Chirag Mali	Female, tagged by Elena Ilyashenko and Elena Mudrik and their team, 18.07.2019, Khakasia, Russia, sibling of U3 (name Galdzha)
17	U3	11-10-2023	Seva Ram Mali and Dr Jeetu Solanki	Female, tagged by Elena Ilyashenko and Elena Mudrik and their team, 18.07.2019, Khakasia, Russia, sibling of U4 (name Shira)
18	2102	11-10-2023	Seva Ram Mali and Dr Jeetu Solanki	German scientist Erdia Sinera and Falakokrux Corbo on 13 July 2023 in Mongolia Usnoor
19	Yellow and blue color band	24-11-2024	Seva Ram Mali and Dr Jeetu Solanki	Male, by Elena Ilyashenko and Elena Mudrik and their team, 20.07.2024, Tyva, Russia (name Sukpak)
20	Green, yellow, and red band	03-12-2024	Pratik Desai, WWF, India	Male, by Elena Ilyashenko and Elena Mudrik and their team, 17.07.2024, Tyva, Russia (name Big Enisey)

Recommendation

Given this information, it is essential to closely monitor the Thar Desert, which serves as a significant congregation site for Demoiselle Cranes. This monitoring should be directly linked to their identified breeding areas. By examining the interactions between foraging behavior and movement patterns in breeding and wintering sites, researchers can develop a comprehensive strategy to conserve and protect these remarkable birds throughout their migratory ranges. Such strategic efforts will be vital for ensuring the sustainability of their populations in the face of habitat loss and environmental changes affecting their migratory grounds. Additionally, all power lines passing through the foraging and roosting sites of the Demoiselle Crane should be underground. Rescued individuals who have recovered and can live normal lives should be tagged with satellite trackers before release. Regular surveys should be conducted to monitor the species' distribution within their habitat. This information enriches our understanding of the species' migration patterns and habitat use. A long-term research project focused on the movement ecology of Demoiselle Cranes would yield valuable data on their migration paths, stopover locations, and foraging areas, which will aid in conserving this species.

Acknowledgment

We thank Rushikesh Pawar, BNHS, for assisting the authors in creating a map that illustrates the areas intensively used by the Demoiselle Cranes in Khichan and its surrounding regions, including probable flight routes to and from the roosting areas. E. I. Ilyashenko, Severtsov Institute of Ecology and Evolution, Russian Academy of Sciences, Moscow, Russia, and E. A. Mudrik, Vavilov Institute of General Genetics, Russian

Academy of Sciences, Moscow, Russia, for helping authors in literature review and cross-checking the information provided in the table in this manuscript.



Fig. 5. Roosting and resting habitats are becoming unsuitable for the cranes due to the infestation of exotic invasive plants *Prosopis juliflora* all over © Sujit Narwade

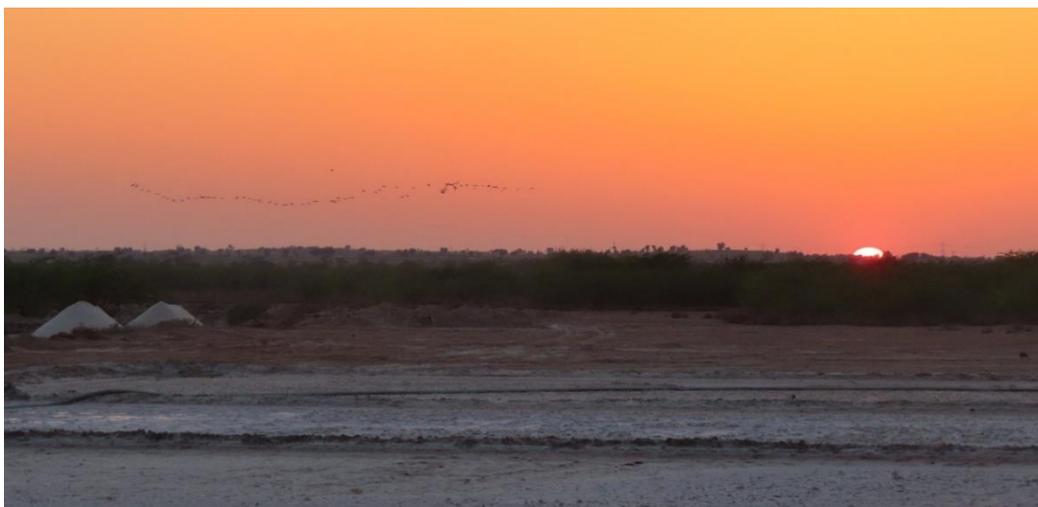


Fig. 6. Large flocks of Demoiselle Cranes fly to the open grounds, such as at Bap Rinn, searching for evening roosting sites © Neelkanth Bora.



Fig. 7. Cranes use surrounding areas such as Kanasar for foraging and Rawara as a roosting site, which is 4 km aerial distance from each other © Pankaj Bishnoi.



Fig. 8. Demoiselle Cranes at the site where people provide grains for them at Khichan © Sujit Narwade

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PUBLIC AWARENESS AND ECOLOGICAL EDUCATION AT DEMOISELLE CRANE BREEDING GROUNDS IN CISCAUCASIA, RUSSIA

By Elena Ilyashenko, Valentin Ilyashenko

V.E. Flint Crane Working Group of Eurasia

Numbers of the Demoiselle Crane in the European part of the range have rapidly decreased during last 5-3 years, even at the most optimal habitats in the Republic of Kalmykia and adjacent areas of the Rostov Region and Stavropol Territory (Fig. 1). Therefore, public awareness and ecological education are critically important there to support Demoiselle Crane in deteriorating habitat conditions, especially the reduction of water resources due to long-term drought.

Usually in Kalmykia steppe Demoiselle Cranes breed near livestock farms, where they can get water from free-flowing artesian springs or from livestock drinking bowls. Farmers are mostly Kalmyks, but also Dagestani and Chechens, and most of them are friendly to wild animals and love cranes.

Cranes can drink water from artesian floods and puddles near farms (Fig. 2, 3). However free flowing artesian sources are located only in the quite small area in the center of Kalmykia, while in the greater part of Kalmykia farmers use water from wells or bring water by cars from the canals and reservoirs for livestock watering due to decreasing water resources (Fig. 4, 5). Water is supplied to the livestock drinking bowls by means of a pump, and in this case crane families with chicks do not always have access to water (Fig. 6, 7).

During the field research conducting at Demoiselle Crane breeding grounds, we constantly talk with farmers about the Demoiselle Crane, why its numbers are declining, what threatens it and how to help it. We ask farmers to pour water in small low drinkers specially for cranes with chicks and set up such drinkers next to livestock drinking bowls (Fig. 8). Most of them followed our request. Some farmers themselves pour water into livestock drinking bowls in the evening, so that cranes and other animals can drink water next early morning, before cows and sheep come to drink. certificates to those farmers near whose livestock farms cranes bring up chicks (Fig. 10).

Kalmyks are Buddhists, and they are very friendly to nature. We met with the Supreme Lama at the Central Buddhist Temple of Kalmykia and asked him to contact farmers through the Temple website with a request to help the cranes.

In August – September 2024 we did a huge project on education and public awareness among students in Kalmykia and adjacent territories of the Republic of Dagestan, Rostov Region and Stavropol Territory at 12 places, involving students and teachers from 27 schools.

We started in Dagestan schools during counting of migratory Demoiselle Cranes in the Caucasus Mountains. Education is important here as we learned about cases of migrating crane hunting when they cross mountains. We organized crane lessons and celebrations in four schools there (Fig. 11-13).

Then we continued in Kalmykia, Rostov Region and Stavropol Region where design of the crane education events were tailored to different audiences. Sometimes they were lessons with presentation about cranes, sometimes they were celebrations with master-classes, dances, poems, games, talks about cranes, excursion to fields to see cranes. In

Elista City, the capital of the Republic of Kalmykia, representatives of the Ministry of Science and Education and Ministry of Nature Protection of Kalmykia as well as representatives of Central Buddhist Temple, Kalmykia State University and State Nature Reserve of Cherny Zemli participated along with students and teacher (Fig. 14-18). Everywhere education materials were shared.

The art competition was organized in Kalmykia, nearly 300 best paintings of Demoiselle Crane were received, which were reviewed by professional artists. Authors of best pictures have got gifts (Fig. 19-22).

Such work on education and public awareness will be continued among people who live at the optimal Demoiselle Crane habitats and will spread to other areas of the European part of the range with suboptimal habitats.

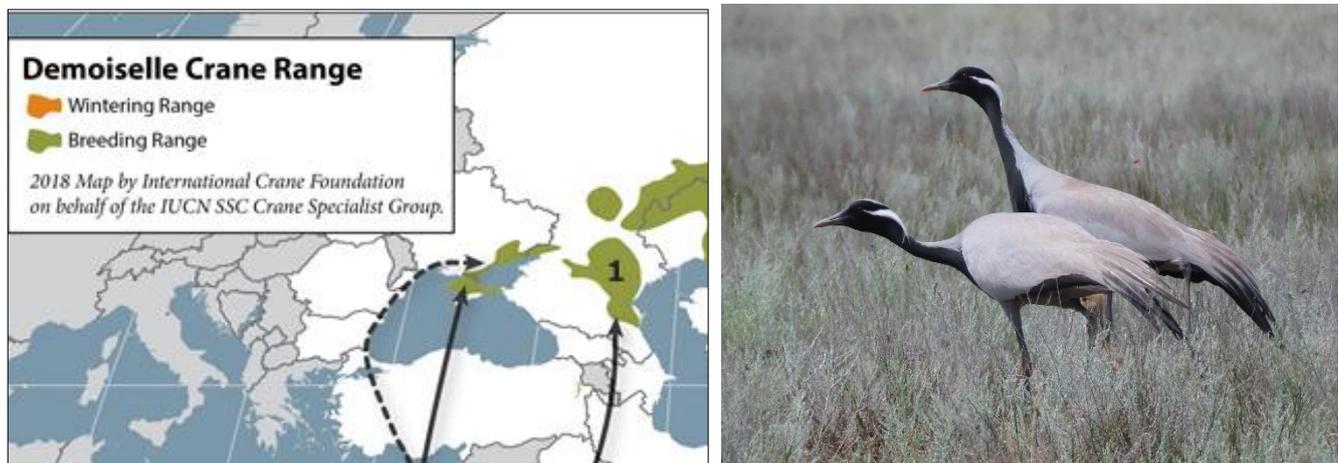


Fig. 1. European part of the range (1 – optimal habitats in Ciscaucasia) and Demoiselle Crane pair in Kalmykia steppe



Fig. 2. Free-flowing artesian springs near a farm



Fig. 3. A pair of Demoiselle Cranes at the flood of artesian spring



Fig. 4. Water well without flooding around



Fig. 5. Car with water for livestock drinking



Fig. 6. Lack of water for Demoiselle Cranes near a



Fig. 7. No access for cranes to livestock



Fig. 8. Low small drinkers suitable for lambs are also suitable for cranes with chicks



Fig. 9. Talks with farmers and sharing education materials among them



Fig. 10. Awarding of shepherds with certificates “Guard for Demoiselle Cranes”



Fig. 11-13. Crane celebration in Dagestan schools



Fig. 14-18. Different forms of "Crane Celebration" event in Kalmykia, Rostov Region and Stavropol



Fig. 19. Representative of the Ministry for Nature Protection of the Republic of Kalmykia at the Crane Celebration event



Fig.20. Supreme Lama of the Republic of Kalmykia at the Crane Celebration event in Elista City

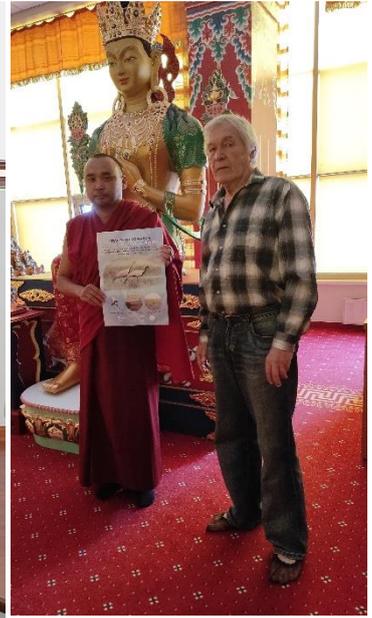


Fig.21. Supreme Lama of the Republic of Kalmykia and Valentin Ilyashenko in the Central Buddhist Temple



Fig. 22-23. Art competition in Dagestan and Kalmykia



Fig. 24-25. Art competition in the Stavropol Territory



Fig. 26. Crane count and art competition in Rostov Nature Reserve in Rostov Region

WASTA LAKE OF HAFIZ NOORUL HAQ – A CRANE’S PARADISE

By Ahmad Khan¹

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Cranes, magnificent and conspicuous but imperiled, are present in Pakistan, with four species of the living 15 species in the world: the migratory Eurasian, (*Grus grus*), the Demoiselle (*Anthropoides virgo*), and the Siberian (*Grus leucogeranus*) as well as the resident Sarus crane (*Grus antigone*). Among the migratory crane species, the last surviving pair of the Siberian crane’s central population migrated through Pakistan between their breeding ground in Russia and wintering ground in India. Tragically, these birds never showed up on their wintering grounds since 2003, and was confirmed extinct in Pakistan. The Sarus crane is sometimes observed in the Tharparkar area, and a small population of Sarus cranes is believed to survive there. The population estimates for the other two species, i.e. the Demoiselle and the Eurasian, are still unknown, though sighting records can be traced back to the early 20th century. A.A. Philips mentioned viewing of a ground-feeding flock of Demoiselle cranes, stretching as long as one and a half miles (Baker 1929); Whistler (1949) observed cranes like an army extending across the sky. Salim Ali and Dillon Ripley reported cranes migrating in enormous numbers through the Kurram Valley in 1960s (Ali and Ripley 1969).

The sky of the past is still the same, but no longer streaked grey with cranes during their migration. Their numbers are reduced by a significant proportion in most of their formerly known migration routes through Pakistan. In the early 1990s the estimated

population of Eurasian cranes migrating through Pakistan was around 50,000 with 20,000 migrating through the Zangi Nawar area (Ahmad et al. 1993; Jan and Ahmad 1995). Around 46,000 Demoiselle cranes were estimated to have migrated through the Zhob River (Khan 1997). However, Roberts and Landfried (1982) reported migration of an estimated 15,000 – 20,000 cranes (both Demoiselle and Eurasian) based on the hunters' bag of trapped cranes. In the spring of 2001, around 3,000 cranes (2,087 Demoiselle, and 866 Eurasian) migrated through the Kurram Valley (Khan 2004). Although cranes are observed through the length and breadth of the country, there are areas such as the Kurram Valley, Gomal river, Indus river and Baran dam in the Khyber Pakhtunkhwa, Zhob River valley, Rakhni, Musa Khel, Band Khushdil Khan, Zangi Nawar Lake, and Hamun-e-Mashkil in Balochistan, where large flocks of migrating cranes were reported as recent as the 1980s.

Cranes passing through the Kurram valley have reduced significantly with the onset of war in Afghanistan in the 1970s, resulting in the flow of arms and ammunition to the area and consequent increase in the shooting of cranes, as contrasted with the historic local tradition of trapping cranes for captivity and shooting a lower number of cranes for food in the trapper's camps along the Kurram, Kashew, Gambila, Gomal and Indus rivers. A recent trend of escalated crane hunting for trade, specifically due to lucrative prices in the Middle East as lawn birds, probably has an enormous impact on the cranes' population migrating through this region.

There could be various other drivers for the change in this population of cranes, yet some people's footsteps are vitally important to protect birds in general and cranes in particular. Among such people, Hafiz Noorul Haq (late) of Shighalu, Zhob was an imminent name. As owner of the Wasta Lake, he was instrumental in protecting birds

during their migration. In this article, I present some of my accounts of exploring Wasta lake as an important safe retreat for cranes, and the important role that Hafiz Haq played there.

Hafiz Noorul Haq – a leading hunter but a stubborn conservationist

In the summer of 2000, visiting Ab-e-Estada lake in the south of Ghazni province in Afghanistan was a challenging expedition, both due to the post war destroyed communication infrastructure and the political environment under the then-Taliban government. To fulfill requirements for my Master's degree in Conservation Biology and Sustainable Development from the Nelson Institute of Environmental Sciences, University of Wisconsin at Madison, I took the challenge with the facilitation and support of the International Crane Foundation, facilitation and assistance of my friends Naseer Ahmad Ahmadi, Abdul Wali Modaqiq, Abdul Ghani Ghuriani, Assadllah Khairzad, and Ghulam Muhammad Malikyar. I choose to take this arduous and protracted journey to determine the current status of Ab-e-Estada, a pre-war protected area in the country and where the last pair of the central population of the Siberian crane might have been resting during their thousands of miles migration route between the Kunovat Basin in Russia and Keoladeo National Park in India. During that time, Ab-e-Estada was bone-dry due to the years' long drought in the region, a first-time event in the life-history of the local residents. The question arose, where the migratory birds, and cranes in particular, would rest and feed to restore their energy to cover the thousands of miles journey ahead of them? I got answers from the local people, pointing to some wetland towards the border with Pakistan. On follow-up discussion with various people, I concluded the

cranes' resting site was across the border. Maps indicated it to be somewhere in the Zhob district of Balochistan within Pakistan.

With a mission to search for the cranes' rest area within Pakistan, I had no idea it would turn to exploring Wasta Zawar (Lake), a birds' hotspot and a sanctuary for the cranes migrating through the Zhob valley. I knew Zhob river was providing rest and feeding areas to the migrating cranes, but proposed to search for a more specific site where thousands of cranes should be found resting and feeding during their north – south migration. Baz Mir Khan, a close friend and a former colleague from Zhob, told me that Qamar Din Karez had areas where thousands of cranes were reported. These areas included the Abdul Wahab Dam and the Zari Daggar areas. I requested him to collect some details and planned to join him for expedition during the coming days

In late fall of 2000, I got a green light from Baz Mir that he had talked to Hafiz Noorul Haq, a Sardar "head of the Mardan Zai tribe", who owns the Wasta Lake and its surrounding lands near Qamar Din Karez, a town near the Pakistan-Afghanistan border. Hafiz Noorul Haq was more than happy that someone was coming to see his sanctuary, a birds' paradise. When we reached Wasta Lake, it was still very cold as it is a high-altitude cold desert steppe.

First visit to Wasta lake

It had turned warm in most of the country and was hot in the Indus plains. I took public transport to reach Zhob, where Baz Mir Khan received me and joined me for onward travel to Wasta lake. We opted for local transport, a Toyota pick-up truck, to take the ten-hour journey from Zhob to Qamar Din Karez. Riding the Toyota pick-up truck on a

rough dirt track with three men squeezed in the front seat and a number in the bed, was not comfortable at all. At Qamar Din Karez, we rented a local pick up to take us to Wasta lake, as there was no transport available towards Wasta.

It was still cold in this semi-arid high desert steppe of the Koh-e-Baba, an off-shoot of the Hindu Kush mountain range. We were received by Hafiz Noorul Haq and his nephews (Figure 1), who lived with him. The elders of his nephews were Abdul Bari, around 12 years old and Abdul Hadi about 8 years old. This was a cranes' land. When the dark started to take over the light of the day, cranes started pouring into the area. But this time, most of them flew high over our heads but a few landed, as, like at Ab-e-Estada, Wasta lake was also dry due to the prevalent drought in the region. Still, some birds were winding down to land in the western plains of the lake. Hafiz Haq had a one room mud hut "Brunj" on the lake (Figure 2), which was shelter for us all there. There was no other building in sight except a couple of tents of the Kochis (nomads, who migrate between their summer grounds in Afghanistan and winter grounds in Pakistan), posted at a distance in the Artemisia steppe to the east of the lake. When Hafiz Haq met me for the first time outside of his hut, he asked me to remind him about something he would tell me only on the day of our return journey. I thought it might be some advice regarding something.



Fig. 1. Hafiz Noorul Haq with his nephews; From left to right, Hafiz Noorul Haq, Nephew 1, Nephew 2 (Abdul Hadi), Nephew 3, Nephew 4 (Abdul Bari)

Hafiz Noorul Haq, an iconic tribal head in the area, was spending a month and a half each fall and a month and a half each spring at Wasta Lake. His love for that site was unprecedented. I asked him about this fealty to Wasta and he replied that he was born to his mother at the place where the hut was built. During that time, men of his tribe were fighting the British Indian army, and women and children of his tribe were sent to Wasta for their safety. He continued to come and spend time here was since his childhood. During his stays at Wasta, he wrote poetry in Pashto, mostly about nature. Of these, one poem is about cranes, appreciating their beauty, migration times, pairing and loyalty, and stress from various drivers. Hafiz Haq hunted at the lake, but only for food and then only infrequently. When he was there he protected the lake and its birds against

intruders, but during his absences, people would still take advantage to disturb the birds of the lake.



Fig. 2. Brunj (hut) of Hafiz Noorul Haq on Wasta lake from a visit in March 2003. Hafiz Noorup Haq, Baz Mir Khan, and nephews of Hafiz Noor Ul Haq in front of the Brunj.

The Wasta, a shallow saline lake was created by a six meters high and 150 meters long earthen dam, built around 450 years ago during the Nadir Shah Afshar, ruler of Afsharid dynasty of Iran (Figure 3), times. The plains around the lake provide retreat ground for thousands of Demoiselle and Eurasian cranes during their north – south migration, and might have been a rest area for the now extinct central population of Siberian crane. During our first night at Wasta, it rained. Next day, there was some moist land in the lake's bed. Hafiz Haq told us that it was the first time in three years that this land received some rain drops, and he attributed it to our visit as a good omen. For us, it was a blessing, as we could witness large flocks of Demoiselle and Eurasian cranes circling over the lake and

landing in the far western corner of the Artemisia steppe. Though, it was very far, still with magnification, we were able to watch a good gathering of a few thousand cranes, not in excess of three thousand on that day.



Fig. 3. Wasta lake in 2001, after years long drought

One of the gathered birds was an isolated crane on the lake's side. Hafiz Haq told us that this crane had been injured either by a "soya" or from a "gunshot". He proposed to hunt this bird, as it could not fly, and would not be able to continue on migration. That became a dinner for the residents of the hut that night. I was reluctant to eat this, as I told Hafiz Haq that I don't eat a hunt's meat. But as a tradition of the land, Hafiz Haq insisted that I eat with them, and ultimately, I had to take a few bites. I would admit, it was delicious meat, though. During our stay, that was the only bird hunted by Hafiz Noorul Haq, which reinforced his claim that he only hunted when there is a need.

After spending a few days at the Wasta lake with Hafiz Haq, and assessing the crane migration through the Wasta lake area, we were on the track back to Zhob. Before our departure, I reminded Hafiz Haq about what he said, that he would tell me something but only when we were ready to go back. Pointing to the hut, he said it is full of scorpions, but they don't bite, as he exorcises a Quranic spell on them. I asked him why he didn't tell this to me on the first day. He responded that "you couldn't have slept". During our stay, we slept on the floor of the hut, and we could see many scorpions wandering around, but none ever bit us, until a night at Wasta in 2010, when I was there with a Geo Television team to make a documentary about the Wasta lake. At around 03:00 am, a scorpion bit me on my left side around the kidney. All of a sudden, I was up with excruciating pain and burning in my affected area. Hafiz Haq was up for his mid-night supplication ('Tahajud'), and asked me, with shrug of his eyebrows, that what happened. I told him that today your spell didn't work. He had a valid excuse that he had been tired and couldn't perform his formal spell before sleeping. He asked me to come near him and started exorcising a spell on me. With the first recitation the pain and burning was half gone, with the second time, it was 90 percent fine, and with the third spell, it was like nothing had happened, and I was feeling even better than what I was before the scorpion bite.

Second visit to Wasta Lake

In March 2001, I along with Mir Qabaz and Rhamatullah Khan drove from Dera Ismail Khan to Zhob via the Drazinda Pass. The strip of road between Khyber Pakhtunkhwa and Balochistan, controlled by the tribal community of Suleman Khel, was generally considered unsecured. The local people would rob passing vehicles whenever they got

an opportunity. On this journey, we could have met such a gang, if I had not assessed something wrong a couple of turns before in the winding road through the mountains. The driver, Mir Qabaz was not aware of what was ahead of us. I asked him to turn on the siren and hit anything and anyone that might come and try to stop us. He wondered and asked why? I told him robbers are ahead of us and we have to get through it. The two persons blocking the road, when they heard the siren on the car, retreated and were scaling up the mountain like mountain goats. It was clear that Kalashnikov guns were heavy for them to carry during their escape. The timely decision to turn on the siren gave them the impression of a car of a security agency, like police or army. This left us to rush through the narrow pass between the logs blocking the road and the mountain.

We reached Zhob, where Baz Mir Khan joined us and the next day we were on the dirt track to Qamar Din Karez and onward to Wasta Lake, but this time in a comparatively comfortable car. When we arrived in Wasta, it was almost evening time. The small hut, built by Hafiz Noorul Haq, was locked and there was no sign of anyone in the nearby areas. After a while, two persons arrived on a motorbike, surely from some intelligence agency, to find out who we were and what was our agenda in this border area. We asked them about Hafiz Noorul Haq, and they told us that he was in the nearby village, Killi Abdullah, a few kilometers away. I requested one of them to go with Mir Qabaz to let Hafiz Noorul Haq about our arrival.

The plain was vast, and we could see the car's brake lights going west for more than 20 kilometers. On return, it was dark and we could see the car coming back as we anxiously waited for it outside of the hut. All of a sudden, we could see swirling movements of the lights, in no direction, but haphazard. We thought for a few moments that Mir Qabaz

probably lost track until the car stopped, and then we could clearly hear a gunshot. We became tense and worried. After the shot, once again the car started running haphazardly with no direction towards the Hafiz Haq's hut on the Wasta lake. I thought it had lost the track, but still had concerns about the gun shot.

We collected some dry straw and twigs from the plain full of bushes and plants, and lit them on fire. After a few moments, the lights straightened towards us and in a few minutes, Mir Qabaz arrived with Hafiz Noorul Haq. We were anxious about what happened, and Hafiz Noorul Haq showed us the hare that he had shot on his way. Out of my respect for my profession, I rarely eat a hunt's meat. So, told Hafiz Haq that I am not eating hunted meat in general and especially not a hare. Then I told him, there is another reason, too. I asked Hafiz Noorul Haq, if he knew that it was breeding season for most of the wildlife, and if he had checked the gender of the kill? If it was a female and had fetus in the womb, then that would count as cruelty. A thorough gentleman, Hafiz Noorul Haq immediately slapped his forehead as a sign of repentance that he never thought of it.

When checked, it was a female. When cleaned, there were fetuses in the womb, and Hafiz Haq was feeling very sorry for what he had done. That was the moment when Hafiz Noorul Haq asked what he can do as a compensation. My prompt answer was help conserve the wildlife in this area. After that we had a discussion on how to conserve wildlife, controlling hunting in this tribal belt and to be a leader of sustainable hunting. When you have sincerity with your cause, God creates opportunities to help and facilitate you. The hunting of the hare was such an opportunity that led us to a deeper understanding of each other, and to be friends for years to come.

This time, Wasta lake was half full, and there were many birds around. A variety of water birds were in the lake, white tailed lapwings, stilts, sandpipers, plovers, mallards, pintails, Northern shovelers, gadwalls, and a good number of Demoiselle and Eurasian cranes arriving and leaving. This felt like a paradise of birds, isolated from the world, difficult to access through a dirt track. I wished it could remain that way, as it is and be not touched by development. However, development was unavoidable and would happen in the next few years with plans for road construction between Qamar Din Karez and Zhob.

Hafiz Noorul Haq passed away last year in November, but before that the dam of Wasta lake couldn't sustain pressure from a flood in June 2023 (Figure 4). I hoped his nephews, particularly Abdul Bari, the elder of them, would continue spending spring and fall on the lake, as in the tradition of Hafiz Noorul Haq. In the Pushtun area, there is a folk saying that a dying person takes its beloved things before him, and so Hafiz Noorul Haq did with his beloved Wasta lake. Hafiz Noorul Haq, for his unsung stewardship of birds in general and cranes in particular, deserves a tribute, and the best would be to rebuild the Wasta dam and restore this habitat that may be lost in the years to come, and will have an enormous impact on cranes and all life at the Wasta lake.



Fig. 4. Google Earth time-series imagery of Wasta Lake 2003, 2013 and 2023

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TÜRKIYE CRANE PROJECT

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³Flint's Crane Working Group of Eurasia

In 2023 and 2024 the International Crane Foundation (ICF) supported scientific research on the distribution range of the Demoiselle Crane and the population size of the Eurasian Crane in Central Anatolia, including Tuz Lake Basin, and Eastern Anatolia in Türkiye.

As part of the Türkiye Crane Project, 22 days of fieldwork were conducted in 2023, and 19 days in 2024. During these studies, except for some wetlands (road and security conditions) all wetlands and steppes suitable for the Demoiselle Crane were surveyed across 30 cities (Bolu, Ankara, Kırşehir, Kırıkkale, Yozgat, Çorum, Amasya, Samsun, Konya, Aksaray, Kayseri, Sivas, Nevşehir, Tokat, Malatya, Adıyaman, Diyarbakır, Bingöl, Muş, Van, Bitlis, Van, Hakkari, Ağrı, Iğdır, Kars, Ardahan, Tunceli, Erzurum, Erzincan).

The Demoiselle Crane (*Anthropoides virgo*, L. 1758)

Historically the breeding population of the Demoiselle Crane in Türkiye was mostly concentrated in Eastern Anatolia, while in Central and Western parts of the Türkiye the species was recorded during migration (Van der Ven 1982, Van der Ven & Cheyselinck 1981, Kasperek 1988). The last known breeding record in Eastern Anatolia was in 2004 in Muş Province, Bulanık District, and the last sighting was in 2008 in Erçek Lake (Akarsu et al, 2013). Recent remote tracking study showed that there are two flyways of the

Demoiselle Crane in Türkiye (Ilyashenko et al, 2022). One of them goes from breeding grounds of Azov-Black Sea population through Central Turkey to wintering grounds in Chad Republic, while another goes from breeding grounds of Caspian/Volga-Ural population in European Russia and Western Kazakhstan through Eastern Turkey to wintering grounds in Nile Basin in Sudan.

Since 2004, breeding records were not known in Türkiye until 2021, when a pair was noted during the breeding season in Merzifon in Amasya Province. It was recorded that the pair successfully raised one chick (Akarsu et al, 2022). The same pair successfully raised one chick at the breeding seasons of 2022 and 2023 at the same place (Fig. 1) (Akarsu 2023; Akarsu et al, 2024). In 2023 three Demoiselle Cranes were sighted at this place by a professor from Ankara University. In 2024, one pair of Demoiselle Crane was noted at the same known site. It is worth noting that there are historical records of Demoiselle Crane breeding in Central Anatolia, and we propose that this new pair settled in the same region during migration.



Fig. 1. Demoiselle crane breeding pairs with their chick in Merzifon, Amasya Province, Türkiye, 29 May 2023. Photo by Engin Bıyıklıođlu

Considering that the offspring of this Demoiselle Crane pair can return and settle near the place of hatching, and also that individuals flying through Türkiye can also settle in the country, potential habitats along migration routes in Central Anatolia, Tuz Lake Basin and Eastern Anatolia were investigated in 2023 and 2024 to discover other breeding pairs and estimate suitability of habitats.

The study focused on natural steppes, rocky plains, animal enclosures within natural steppes, mixed agricultural and natural steppe areas, and wetlands. Based on remote tracking data, key migration stopovers and surrounding suitable habitats within Tuz Lake Basin, as well as an area in Sivas Altınyayla where a young crane tagged in Western Kazakhstan spent the summer in 2019 (Ilyashenko et al, 2022) were also included in the study. Interviews were conducted with local residents, primarily shepherds and farmers. The suitable habitats for the Demoiselle Crane should include open area with shallow water bodies with gentle banks allowing access to the water (Fig. 2). Areas with shepherd enclosures and watering troughs for livestock, which serve as key indicators of species presence, were particularly prioritized (Fig. 3).



Fig. 2. Example of suitable habitat for the Demoiselle Crane: Kazli Lake (Van Province) with shallow water and adjacent steppe territory is the historical location of Demoiselle Crane breeding



Fig. 3. Natural steppe and pastures with cattle watering are preferred habitats by Demoiselle Cranes

Despite these efforts, Demoiselle Cranes were not found in any of the surveyed areas, but a list of habitats suitable for their nesting has been compiled in order to take measures to restore the Turkish population through reintroduction (Fig. 4). Most of them were located in Sivas Province, in Tuz Lake Basin in its western part as well as in historical breeding areas in Eastern Anatolia.

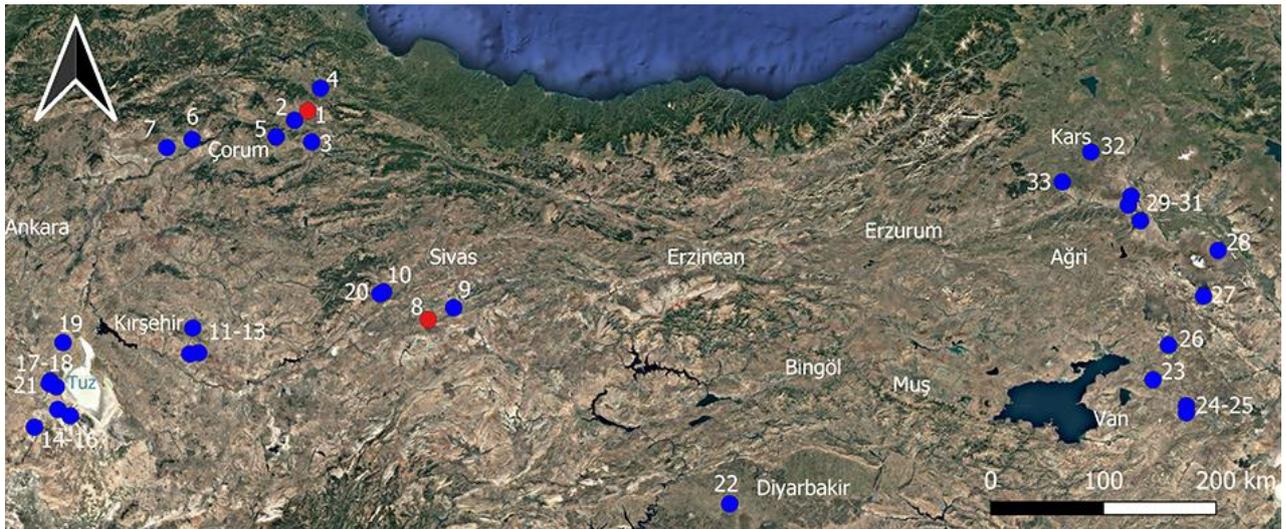


Fig. 4. Map of 33 suitable habitats for the Demoiselle Crane in Eastern Anatolia - 1 Numbers Red dot shows recent breeding and 8 numbers Red dots show summering area – Blue dots show suitable places for demoiselle breeding

During the field study the following threats to the Demoiselle Crane habitats were determined.

1. Dam constructions. Most of the natural wetlands suitable for nesting of Demoiselle Cranes have been converted into deep reservoirs with steep concrete banks (Fig. 5), and the number of such reservoirs is increasing every year to provide agriculture and villages with water.
2. Development of new construction. One of the important historical breeding sites, the Murat River floodplain within the boundaries of Yoncalı village in Muş, including its meander systems and islands, has suffered significant degradation due to dam, road, and bridge constructions (Fig. 6). Another site with confirmed breeding records, the Çaldıran Plain, has largely lost its natural structure due to extensive agricultural activities, irrigation systems, and construction.

3. Transformation of steppe into agricultural fields and planting of pistachio and olive trees (Fig. 7).
4. Pesticides. It can be the reason for the poor feeding base for the Demoiselle Crane which is mostly insectivorous, leading to this species extinction in Türkiye. During our trip we could not find any grasshoppers or beetles, even in natural steppe. This issue can be considered as a disadvantage for future efforts for this species restoration.



Fig. 5. Shallow waterbodies are transformed into big dams which are unsuitable for cranes due to deep water and inaccessible banks



Fig. 6. Previous historical breeding habitats of the Demoiselle Crane in Murat River Valley near Yoncali Village in Muş were destroyed by construction of new road and bridge



Fig. 7. Planting of pistachio trees in previously natural steppe near Diyarbakir

5. Overgrazing, especially in Tuz Lake Basin. Some areas became covered with plants which indicate overgrazing, such as *Eryngium* sp., *Acantholimon* sp., *Festuca* sp. and so on).
6. Disturbance due to growth of human population.
7. Uncontrolled hunting. We found many hunting cartridges, even near the current breeding site of the Demoiselle Crane despite military airdrome location nearby.

Regarding future efforts on species restoration, it is needed to take into consideration the illegal hunting in Saudi Arabia along the migration route to North Africa, where more than thousand Demoiselles are killed every migration season (Ilyashenko 2020).

The Transcaucasian Eurasian Crane (*Grus grus archibaldi*, Ilyashenko & Ghasabyan, 2008)

The Transcaucasian Eurasian Crane subspecies (*Grus grus archibaldi*) was scientifically described from Armenia in 2008 (Ilyashenko et al, 2008). It inhabits mainly Central and Eastern Türkiye, northwest Iran, western part of Armenia and southwestern part of Georgia. Since that time some studies were conducted including field surveys in a range countries and tagging of chicks with transmitters in Georgia and Turkey. According to the results all these studies, the number of the subspecies was estimated as nearly 70–80 breeding pairs including 40–60 pairs in Türkiye (Akarsu et al, 2013), 17–20 pairs in Georgia (Nowald et al, 2018), one pair in Armenia (M. Ghasabyan, pers. comm) and 5 pairs in Iran (Akarsu 2020).

In 2023 and 2024 the main goal for the Transcaucasian Eurasian Crane in Türkiye was to fill the knowledge gap about this subspecies across the entire country and obtain comprehensive data on their population tendency as well as to identify current threats.

As a result of the study, 44 breeding and territorial non-breeding pairs and near 20 chicks were recorded in 39 wetland areas in 2023. Additionally, 85 non-breeding young cranes in a few groups were recorded. In 2024, 39 breeding and territorial non-breeding pairs and at least 13 chicks were counted in 32 breeding sites. During the period of field work from 24 May to 7 June some pairs still have incubated and some pairs had small chicks at the age from 7 to 20 days old. Sometimes it was very difficult to see them in the grass. Additionally, 44 non-breeding cranes were seen in a few groups.

For two years, 83 breeding, probably breeding and non-breeding pairs were counted at 71 breeding sites, including 12 newly discovered sites. However, some previously known breeding sites have disappeared.

The density of breeding sites is higher in Eastern Anatolia because of a more humid climate, lesser human population, and less development in remote mountain habitats. In contrast, the Central Anatolia is a more developed area, very populated by humans, with a lot of construction, agricultural lands and dams. In Eastern Anatolia the high density of breeding pairs was recorded in Ardahan Province, in Central Anatolia in Sivas Province.

For breeding, the Eurasian Crane prefers wetland systems, particularly shallow wetlands with reed beds. Such shallow areas are greatly influenced by annual rainfall, especially winter precipitation. After some winters with good rainfall, certain wetlands become densely covered with reeds and can provide habitat for up to four pairs of cranes. In

contrast, in years with low rainfall, the same area may only support one pair, and in extremely dry years, there may be almost no reed cover, making breeding impossible. On the other hand, the increasing water level in some mountain lakes in some narrow hollows due to high precipitation during two-three years can lead to disappearing marsh areas around these lakes and disappearing crane pairs. However, sometimes wider river valleys became swampier and the density of breeding pairs there increased. Therefore, it is important to regularly monitor the crane's breeding sites to better understand the breeding population.

In Central Anatolia, three pairs of Eurasian cranes which were recorded at habitats at the altitude of less than 1,000 m above sea level, had red crowns (*Grus grus grus*), while all Eurasian cranes at habitats 1,000 m and higher had black crowns (*G. g. archibaldi*) (Fig. 8). Taking into consideration, that the migration route from breeding grounds in Eastern Europe and European Russia has gone through Türkiye to wintering grounds in the south of Türkiye (Adana province), Middle East and Northeast Africa, we can propose that recorded cranes with red crowns in former times could land in Türkiye for breeding, as they use the similar habitats covered with trees and bushes at low altitude as in the main breeding grounds in Eurasia. While cranes with black crowns, which use small open wetlands in high altitude, breed in Türkiye historically.



Fig. 8. Male with red crown from the pair in Kızılırmak Delta (on the left) and male with black crown from the pair at high mountain lake in vicinity of Suşehri (on the right)

The male of one breeding pair in Gulistan Valley in Ardahan Province was fitted with color rings read from up to down: white-white-red on the left tibia (national code) and white-yellow-green on the right tibia (individual code) (Fig. 9). This bird was tagged in Javakhetia National Park in Georgia on 5th June 2017 (Nowald et al, 2018) and was sighted as non-breeding at the same valley near Gulistan in 2023 (Barak Tatar, pers. com.) The place of breeding is located near 90 km from place of birth.



Fig. 9. Male in one of the breeding pair with color rings was tagged in Georgia in 90 km from this breeding site on 5 June 2017

During the field study the following threats to the Transcaucasian Eurasian Crane were determined.

1. Drainage of wetlands and their plowing for agricultural purpose. Lake Kuyucuk in Kars Province, where previously breeding of Eurasian Cranes was recorded, now dried up due to using water for agricultural fields in dry seasons. Some breeding sites in Sivas Province in Central Anatolia also disappeared due to plowing, for example around Tödürge Lake. Most mountain valleys in Eastern Anatolia also are plagued.
2. Dam construction which transformation of shallow water habitats to deep reservoirs which are unsuitable for cranes.

3. Construction of buildings and roads. Lake Putka in Ardahan Province, a known crane breeding site, has lost its status as a breeding area due to the construction of Ardahan University's campus right next to the wetland (Fig. 10). The Hürmetçi wetland in Kayseri Province, an important bird area and an important habitat for aquatic and shorebirds, is half built up with warehouses (Fig. 11).
4. Disturbance from high human population, especially in Central Anatolia.
5. Uncontrolled hunting.



Fig. 10. Disappearing of Eurasian Crane breeding pair in Putka Lake (Ardahan Province) due to disturbance of new construction



Fig. 11. Key ornithological area Hürmetçi, Kayseri Province, was transformed

Conclusion

The economy of Türkiye has been growing very fast, with transformation of natural lands for agriculture, drainage of wetlands, construction of dams for providing people and agriculture with water. Central Anatolia is one of the most developed regions in Türkiye, but economic development also is happening in Eastern Anatolia, where some high mountain natural areas still remain. But in this region intermountain valleys also are continued to be plowed, more and more new dams are built, and the human population is growing. Such fast-economic development is accompanied with low consideration of natural resource use, and uncontrolled hunting which lead to decreasing biodiversity and natural habitats.

Central Anatolia and Eastern Anatolia are among the regions in Türkiye where the steppe ecosystem is most prominent and agricultural activities are highly intensive. In Central Anatolia, especially with the introduction of powerful stone-crushing tools and tractors, natural steppes that were previously rocky and largely unsuitable for agriculture have been cleared of stones and transformed into agricultural lands, losing their natural character. Unfortunately, this process continues at full speed today, leading to the rapid destruction of natural steppes. This situation is critically important for bird species such as the Greater Sand Plover (*Anarhynchus leschenaultia*) and the Demoiselle Crane, which inhabit these natural steppes. The ongoing loss of these ecosystems poses a severe threat to their survival.

The future efforts on restoration of the isolated population of the Demoiselle Crane have many challenges such as continuation of transformation of existing suitable shallow water bodies into deep dams, or their drainage and plowing, use of pesticides

which led to absence of food, and uncontrolled hunting combined with population growth.

Despite a modest increase of Eurasian Cranes numbers since 2020s connected mostly with more precipitation in Eastern Anatolia during last 2–3 years, the larger outlook of the endangered subspecies is threatened. Area of suitable crane breeding habitats in Central Anatolia with drier climate is decreasing and some of them already disappeared.

Eurasian Cranes prefer wetlands for breeding. They can reproduce in various habitats such as reed beds surrounding lakes, seasonal wetlands, meadows with reeds, peatlands containing reeds, reed beds developing along water channels, reed sections formed by river meanders, and reed islands. Among these habitats, all but the reed beds around deep lakes are directly influenced by the rainfall patterns during the winter season. If there is insufficient rainfall throughout the year, the breeding habitats may lack adequate water and reeds, leading to potential issues in the species' reproductive success. Consequently, climate change driven by global warming can cause fluctuations in the breeding population size of the species. Monitoring this issue closely is crucial for the future of their breeding populations.

When examining the legal protection of crane habitats, only one area has been officially designated for the species in Türkiye. This site, located in Bulanık district Arakonak Village of Muş province, is known for consistently recording crane breeding activity every year. During the 2024 field study, the site was visited, and a total of five crane pairs were observed. Aside from this, there are no other officially designated protected areas specifically for this species. Despite these efforts, the need for additional legal protections is evident to ensure the survival and conservation of this species.

Türkiye is a developing country and is frequently subject to numerous and ongoing infrastructure, superstructure, and industrial investments, as well as agricultural activities. This situation consistently carries a high potential for exerting significant pressure on natural areas. In order to conserve Eurasian crane breeding wetlands, the application of internationally recognized scientific evaluation criteria and protocols in all investment and activity decisions, including wetlands inhabited by cranes, is of great importance.

Our crane project provides national nature conservation authorities with useful information which will allow them to approve control, conservation and monitoring on endangered Eurasian Crane subspecies and single breeding Demoiselle Crane pair.

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