

SPECIES REVIEW:

EURASIAN CRANE (*Grus grus*)

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(with inputs from Ferdi Akarsu, Javier A. Alonso, Juan Carlos Alonso, Yuri Andryuschenko, Nicola Baccetti, Victor Belik, Eugeni Bragin, Damon Bridge, Olivier Combreau, Victor Degtyarev, Patrick Dulau, Petro Gorlov, Valentin Y. Ilyashenko, Antti Karlin, Anatoly Kovshar, Zev Labinger, Eugenia Lanovenko, Aivar Leito, Fengshan Li, Petr Lumpe, Sigvard Lundgren, Ming Ma, Yuri Markin, Sebastien Merle, Wolfgang Mewes, José Miguel, Iwona Mirowska-Ibron, Maxim Mitropolsky, Pekka Mustakallio, Gunter Nowald, Ivar Ojaste, Fawen Qian, Sasha Pekarsky, Polina Redchuk, Juhani Rinne, Eldar Rustamov, Sadegh Sadeghi Zadegan, Alain Salvi, Jostein Sandvik, Itai Shanni, Liying Su, K S Gopi Sundar, Marketa Tichackova, and Zsolt Végvári)

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Eurasian Crane family in Crane Motherland Wildlife Refuge in Russia (Photographer: Igor Bartashov)

Red List Category: Least Concern

Population Size: >700,000

**Population Trend: Increasing in western populations,
declining in the east**

Distribution: Eurasia



Mirande CM, Harris JT, editors. 2019. Crane Conservation Strategy. Baraboo, Wisconsin, USA: International Crane Foundation.

DISTRIBUTION AND STATUS OF KEY SITES

Subspecies/Populations

Four subspecies have been described. The Western Eurasian Crane (*G. g. grus*) and the Eastern Eurasian Crane (*G. g. lilfordi*) are separated by the Ural Mountains (Gill and Donsker 2017); two new subspecies have been proposed, including the Transcaucasian Eurasian Crane (*G. g. archibaldi*; Ilyashenko et al. 2008) and the Tibetan Eurasian Crane (*G. g. korelovi*; Ilyashenko and Belyalov 2011). Previously these two new subspecies were considered as isolated populations. They exhibit morphological and biological differences from Western and Eastern Eurasian Cranes (Ilyashenko 2013). The low phylogenetic relatedness and the small genetic distances within the Eurasian Crane suggest that the genetic diversity is fairly young. This further suggests that morphological differentiation, in particular of putative *G. g. archibaldi* and *G. g. korelovi*, has evolved rapidly. To demonstrate that these two new subspecies are truly monophyletic and qualify as evolutionarily significant units, more samples are necessary (Haase and Ilyashenko 2012). Western Europe is the only region where Eurasian Cranes with completely black tertiary feathers breed, and distribution and taxonomic status of this population require further research.

Overall Range and Subspecies Distribution

The Palearctic distribution area of the Eurasian Crane extends from the forest-tundra zone in the north to the sub-tropical zone in the south. Its breeding range extends across Eurasia from northern and western Europe to eastern Siberia and the Russian Far East and north-eastern China (0°W / N to 125–130°E longitude), as well as between northern Europe and Asia to Middle Europe, and the steppe zones of south-eastern Europe and Asia (67–69°N to 50–52°N latitude).

Western Eurasian Crane

The breeding grounds of the Western Eurasian Crane spread from North and West Europe to the Ural Mountains. This subspecies can be conditionally divided into three populations on the basis of their ecological features.

West European population

In the north, in Scandinavia the breeding range of the population extends far north of the Arctic Circle. The northernmost breeding place is at 70°39'N, which is not far from the Barents Sea and ca. 450 km north of the Arctic Circle (Svensson et al. 1999, Ottosson et al. 2012; Jostein Sandvik, personal comm. 2016). The population has the highest breeding density in the northern parts of Europe (Norway, Sweden, Finland, Baltic countries) and in the central ones (Poland, Germany). Denmark (Tofft 2013) and Czech Republic (Tichackova and Lumpe 2014) have small but increasing breeding populations. A slowly growing population inhabits Great Britain in different districts, most of them in Norfolk/east England (Bridge 2014). The distribution in West Europe has reached the Netherlands (about 10 pairs) and eastern France (15–20 pairs in 70–80 birds; Salvi 2013, 2014, 2015; Prange 2016). The Eurasian Crane is extinct as a breeding species in Ireland (D'Arcy 1999), southern France (Salvi et al. 1996), and Spain as well as in northern Italy (Brichetti and Fracasso 2004).

The West European flyway is used by cranes from northern Europe (Norway, Sweden, and partly from Finland) across the Baltic Sea and from the eastern Europe (Poland and partly from Baltic countries), through Germany, Netherlands, Belgium, and Luxembourg, to the wintering grounds in France (up to 160,000; Salvi 2015), Spain (up to 266,000; Roman et al. 2014), Portugal (near 8,000) and, in a marginal way, in Morocco (1,000–1,300) (Roman et al. 2014, Salvi 2016). During the last two decades, numbers of crane wintering in Germany have increased up to 20,000 birds, with large yearly differences depending on weather conditions (Prieta and Del Moral 2008; Onrubia et al. 2009; Prange 2010a, 2010b, 2012, 2015, 2016; Salvi 2012a,b). In Poland during the winter 2013–14, 122 observations

were documented of over 1,500 cranes with a flock size up to 350 birds (Nowald and Broniarek 2014). The relative numbers of Eurasian Cranes wintering in the south of the West European flyway (South Spain and Morocco) have decreased, while they have increased on northern wintering grounds in Spain, France, and Germany (Prange 2016).

The most important staging areas and migration stopovers are located:

- In Finland, 9,000 in Söderfjärden and Waasa, 13,000 in Muhos, and 3,000 in Puurijärvi (Harry Seppälä, personal comm. 2016) and Tiira (BirdLife Finland, www.birdlife.fi 2016);
- In Sweden, up to 50,000 cranes simultaneously (all sites) at the southern lakes of Hornborga, Kvismaren, Takern, and on the Öland Island (Nilsson and Månsson 2012);
- In West Estonia, including Matsalu Bay, Haapsalu Bay, Hiiumaa Island, and Saaremaa Island with recently up to 30,000 cranes, according to state monitoring data of the Eurasian Crane in Estonia (Leito 2015);
- In Poland, about 100 sleeping sites with up to 80,000 cranes simultaneously were known in the years 2009–2013 (Iwona Mirowska-Ibron, personal comm. 2013; Sikora et al. 2015). In the last decade, the yearly increase of crane breeding and resting was about 7%. The biggest sleeping sites are located at Lower Odra Valley (15,000 max. in 2012, mainly feeding in northwestern Germany) (Jochen Haferland, personal comm. 2012) and on lowland at the mouth of the Warta River (17,800 max. in 2015 before leaving for Odra Valley) (Arkadiusz Broniarek, personal comm. 2015; Prange 2016).
- In Germany, with recently 250,000 resting cranes on average (in 2012, simultaneously 290,000; in 2015, 350,000) at about 100 resting areas with near 200 roosting sites, with maximum number of resting cranes changing from year to year (Prange 2015);
- The biggest concentrations in Germany are found in Darss-Zingster Boddenkette and Rügen (old name: Rügen-Bock area) regions with 55,000–75,000; Rhin-Havelluchs near Berlin with 60,000–125,000 cranes; Diepholz moor lowlands in the North West Germany with 60,000–120,000; as well as at the Helme and Unstrut Reservoirs in Thuringia with 30,000–45,000 cranes (Nowald et al. 2010a; Nowald 2012, 2015; Prange 2000–2009, 2010a, 2010b, 2013, 2016);
- In France, with the biggest resting sites in Lorraine (plain of Woëvre, up to 30,000 simultaneously), Champagne-Ardenne (Lac du Der Chantecoq and Lac du Temple, up to 200,000), and Aquitaine (military camp of Captieux and former coal mine of Arjuzanx, up to 50,000) (Salvi 2013); and
- In Spain, at the Extremadura Autonomous Community with up to 133,000; the Lagoon of Gallocanta with up to 60,000 cranes in autumn and up to 115,000 in spring (Alonso et al. 2014); as well as the lagoon of Sotonera with up to 70,000 in spring for only a few days before crossing the Pyrenean Mountains (Roman et al. 2014).

East European population

The breeding grounds of this population are located in Finland and in the eastern parts of the Baltic countries, in the north-west of European Russia, in Belarus, and Western Ukraine. The species became extinct as a breeding bird in the Balkan countries.

Recent research has confirmed the existence of a European-wide web of migration routes of Eurasian Cranes, which know and are able to use this web and take one of the routes on the basis of genetic and social memory and affected by weather and social connections on routes (Suorsa 2015, Leito et

al. 2015; Aivar Leito, personal comm. 2016). However, the majority of cranes of the East European population use the Baltic-Hungarian (Central European) flyway, although cranes from Finland, Estonia, and northwest of Russia may migrate along both the West European and Baltic-Hungarian flyways, in some cases performing loop migrations. The latter flyway goes from the northwestern part of Europe via Estonia to the south through Slovakia and Hungary. After the stopover in Hungary, this route divides into several branches running to the south-west and south. The southwestern course passes through the Balkan countries (former Yugoslavia), goes across the Adriatic Sea and southern tip of Italy (Mingozzi et al. 2013, Leito 2015), and ends in Tunisia, Libya, and Algeria (Houhamdi et al. 2008, Hafid et al. 2013, Saurola et al. 2013, Leito et al. 2015). Some cranes from Baltic-Hungarian flyway also reach Lake Tana in Ethiopia, flying over the Sahara Desert (Ivar Ojaste, person. comm. 2018). The West European and Baltic-Hungarian (Central European) flyways are partly mixing in the eastern areas of Finland, Estonia, in East Poland, and the northwest of European Russia (Sierakowski et al. 1969, Saurola et al. 2013, Leito et al. 2015).

The main staging areas and migration stopovers along the Baltic-Hungarian flyway are located in Estonia with about 80,000 migrating cranes. The biggest of numerous migration stopover areas is in the west of Estonia, including the Matsalu Bay, Haapsalu Bay, Saaremaa Island, Hiiumaa Island, and Lahemaa National Park in northern Estonia (Leito 2015). The situation in other Baltic countries and in Belarus is poorly known. Eastern Hungary is the most important resting area on this flyway. The Hortobágy National Park is a huge resting site with several roosts and 50,000–140,000 cranes resting in autumn and spring; the autumn average in the last decade was 75,700. Several other resting sites are in the southeast of Hungary (Kiskunság and Körös-Maros National Parks) with up to 45,000 cranes; the maximum numbers are reached two weeks later than in Hortobágy (Végyvári et al. 2010). Since the 1980s crane have begun wintering in Hungary, mainly in the south (Kiskunság and Körös-Maros National Parks) due to developed protection, plentiful maize (corn, *Zea mays*) cultivation, and warmer winters (Fintha 2003/04/05, Végyvári et al. 2010). Crane numbers vary from 10,000 to 20,000 birds (max. 27,900 individuals in January 2012), depending on weather conditions (Prange 2016).

Migration stopovers are known in several Balkan countries, for example, in the “Podpanj” Bird Sanctuary at the Hungarian-Croatian border at the Drava River near the city Donji Miholjac (<http://www.wdpa.org/podpanj-special-reserve>), as well as in the “Slano Kopovo” Nature Reserve, Serbia/Vojvodino, where up to 14,000 cranes stop for rest and around 20,000 for migration (Knezev 2013, Stumberger and Schneider-Jacoby 2013, Leito 2015, Prange 2016).

In the last decades, new wintering areas have been colonized in southeastern France in the Camargue near the mouth of the Rhone River, with up to 10,000 birds, outside the big traditional migration routes of cranes (Salvi 2016). Data and flight-corridor analysis shows that the Camargue has become a convergence area between the Western European and the Baltic-Hungarian (Central) flyways. The first flyway leads the birds from the north along the valleys of the Rhine and the Rhône and is supposed to drive the cranes toward Catalonia using a newly adopted route close to the Gulf of Lion, and only passing by the Camargue with a stopover or not. The second flyway leads the cranes by Austria along the Alps, crossing Italy to the south and Germany to the north to the Camargue, where they will spend the entire winter (Salvi 2016). Increasing numbers of these cranes are also crossing Switzerland in a southwest or northeastern direction in autumn and spring, respectively (Nowald and Schmid 2012). These increasing numbers of cranes wintering in the Camargue coincide with a simultaneous dramatic decrease in North Africa, particularly in Algeria, due to negative changes of habitat conditions there (Hafid et al. 2013). At the same time, numbers of wintering cranes are increasing in North Italy (Zenatello et al. 2014).

Israel has important migratory and wintering sites. The biggest site is the well-managed Hula Valley in the very north of the country. Hula Valley may be a stopover and wintering site for cranes of both Eastern European and European Russia populations coming from northwest, north, and northeast, though the actual numbers and their exact origin are not known yet (Pekarsky et al. 2015). An estimated 60,000–80,000 migrating cranes use staging and wintering areas in Israel, including a growing wintering population of 35,000–42,000 cranes at Hula Valley and some 5,000–10,000 spread around other sites further south (Shanni et al. 2012; Rubin Inbar, personal comm. 2017).

European Russia population

The breeding grounds are located in Belarus, East Ukraine, and the European part of Russia, as well as smaller breeding sites in northwestern Kazakhstan. A possible transitional zone between the two subspecies—*G. g. grus* and *G. g. lilfordi*—is located in northwestern Kazakhstan and south from the Ural Mountains (Ilyashenko 2013).

This population uses the East European flyway with two branches: Baltic-Pontic and Russia-Pontic (Redchuk et al. 2015). Cranes from the northern and central parts of European Russia perform broad-front migration south (Russia-Pontic course) (Flint and Pancheshnikova 1985) to the wintering grounds in the Near East and North-East Africa. After reaching Ukraine, some of them proceed westerly around the Black Sea, cross the Mediterranean Sea to their wintering grounds in Turkey, Israel, and Ethiopia. A larger flock crosses the Black Sea over the Crimea Peninsula down to the same wintering grounds: Turkey, Israel, Saudi Arabia, Jordan, and Ethiopia. Cranes from Finland, part of the cranes from Baltic countries, Belarus, and the western part of Ukraine (Baltic-Pontic course) reach the Crimea Peninsula and then also cross the Black Sea to these wintering grounds (Redchuk et al. 2015).

In European Russia, there are 570 gathering sites with crane numbers varying between 30 and up to 3,000 individuals (Ilyashenko and Markin 2013). The biggest sites with numbers from 1,000 to 3,000, which served as both staging areas and migration stopovers, are located in Vologda, Kaliningrad, Kirov, Moscow, and Smolensk Regions.

The main migration stopovers where the Baltic-Pontic and Russian-Pontic routes of the East European flyways, as well as in part Baltic-Hungarian flyways, cross are located in Askania-Nova Nature Reserve (Kherson Region of the Ukraine), with crane numbers from 20,000 to 45,000, and at Sivash Bay in the Crimea Peninsula of the Black Sea with up to 60,000 (Gorlov 2012, Redchuk et al. 2015).

Cranes from central and eastern European Russia can also fly over the Caucasus Mountains through Georgia, Armenia, and Azerbaijan to wintering grounds located in Iran and Iraq, as well as in Israel, Jordan, and North East Africa (Caucasus flyway). This flyway became more significant at the end of the 20th century and the beginning of the 21st (Belik 2006, Sultanov et al. 2011, Markin 2013). The biggest migration stopover along this flyway is known in the Rostov and Stavropol Regions in Manych-Gudilo Lake Valley (up to 5,000–10,000 cranes simultaneously; Belik 2006).

At Manych-Gudilo Lake, cranes of the Caucasus Flyway can join with cranes from the trans-Volga Region, northwestern Kazakhstan, and South Ural region where the transition zone of two subspecies is located and use the Volga-Iranian Flyway (Flint and Pancheshnikova 1985, Flint 1987, Farhadpour 1987). Cranes following the Volga-Iranian route cross Manych-Gudilo Lake and then fly along the western Caspian Sea coast through Dagestan and Azerbaijan and reach wintering grounds in southwestern Iran, northeastern Iraq, and Jordan. However, these wintering grounds became insignificant during the last two decades due to long-term drought (Sadegh Sadeghi Zadegan, personal comm. 2016). This flyway crosses paths with the small branch of the West Siberian Flyway (*G. g. lilfordi*), which also goes along the western coast of the Caspian Sea.

Some authors combine Caucasus and Volga-Iranian Flyways into one Volga-Caucasus Flyway with the significant stopover at Manych-Gudilo Lake (Redchuk et al. 2015).

Eastern Eurasian Crane

West Siberian and Central Asian populations

Breeding grounds are located in Russia east of the Ural Mountain in West Siberia as well as in North and Central Kazakhstan. The majority of cranes migrate along the West Siberian Flyway, which extends from the north with biggest migration stopovers in Tyumen, Chelyabinsk, and Kurgan Regions of Russia (up to 10,000 simultaneously) (Ilyashenko and Markin 2013) and in the lake systems of Kostanai Region in North Kazakhstan (Bragin 2011). Then the cranes cross Central Asian countries (Turkmenistan, Kyrgyzstan, and Uzbekistan), Afghanistan, and Pakistan to the wintering grounds in eastern Iran and western and central India with the main wintering grounds in Gujarat Province. From the late 1990s to early 2000s, some of the migrating flocks began staying for winter in the Amudaria River Valley on the border between Afghanistan, Uzbekistan, Turkmenistan, and Tajikistan (Lanovenko et al. 2011, Rustamov et al. 2011, Toropova and Kulagin 2011).

Some cranes, after resting in Kazakhstan, can use the same flyway as the Siberian Crane and fly to the west, crossing the Volga Delta and then following the western Caspian Sea coast to wintering grounds in the southwest of Iran and eastern Iraq. However, this flyway is quite small (Sultanov et al. 2011). This route to Iran can merge with the Volga-Iranian Flyway of the West Eurasian Crane. Some cranes that cross Turkmenistan in a southwestern direction fly over the foothills of the Eastern Kopetdag Range Mountains through southern Turkmenistan to wintering grounds in Iran (Efimenko 2002, Rustamov et al. 2011). Thereby, both subspecies *G. g. grus* and *G. g. lilfordi* can be sighted at wintering grounds in Iran. At the end of the 20th century cranes began wintering in Tejen River Valley in southern Turkmenistan with their number increasing from up to 50 (Efimenko 2002) to near 1,300 birds (Rustamov et al. 2011).

Central/Eastern Siberia and North China population

The breeding grounds of this population are located in central and eastern Siberia, northern Mongolia, and northern China. Birds from central and East Siberia, Kazakhstan, and the Tibetan Plateau fly through Mongolia to central and western China and Myanmar (Chan 2003) (East Asian Flyway). Cranes from the northeast and southeast of Siberia use also the Far East–Chinese Flyway, which crosses Primoriye Region (Russia) and proceeds along the coast through Liaodong and Bohai Bays to wintering grounds of the Yangtze River valley in China, as well as to Myanmar and North Vietnam. Eurasian Cranes stop in Russia for roosting at Torey Lakes (Goroshko 2002) and Muraviovka Park, where some immature birds also spend summers (Sergei Smirenski, personal comm. 2016), and later at Zhalong and Shandong Huanghe Delta National Nature Reserves in China, where they join mixed flocks with other crane species.

Transcaucasian Eurasian Crane

Breeding grounds are located in the Anatolia and Armenia Uplands. They are restricted to Central and East Turkey and the border area of Armenia, Georgia and northern Iran. This proposed subspecies is isolated from the southern edge of the East Eurasian Crane's (*G. g. grus*) core range by a distance of more than 1,100–1,200 km (Ilyashenko et al. 2008). This subspecies is probably close to being resident; cranes have insignificant vertical migrations or regional movements, spending the winter in south Turkey (Nowald et al. 2014) and Georgia (Abuladze 2002). In recent years in Hula Valley (Israel), at the Eurasian Crane mass for wintering, some birds were showing features from the Transcaucasian Eurasian Crane (Itai Shanni, personal comm. 2010; Rozenfeld 2011).

Tibetan Eurasian Crane

Breeding grounds are wet valleys in high mountain regions at the border between the Eastern and Central Tien-Shan (Xinjiang–Uyghur Autonomous Region) and in frontier regions of three countries—Kazakhstan, Kyrgyzstan, and China (Ilyashenko 2011, Ma et al. 2011). Wintering grounds are unknown. Probably cranes spend the winter together with Black-necked Cranes (*G. nigricollis*) in the south part of Central Tibet and on the Yunnan–Guizhou Plateau in the southeast foothills of Tibet at altitudes from 2,000–3,400 m above sea level.

ECOLOGY

Eurasian Cranes breed in the northern tundra and boreal and temperate taiga, as well as in deciduous forest zones and the more southern forest-steppes and open steppes. Typical nest sites are found in wetlands dominated by alder (*Alnus*) and birch (*Betula*) trees, raised bogs, fens, and swamps, and at the reed borders of shallow lakes, fish ponds, and other water bodies. In Europe during the last three decades, the species has adapted to nesting in ponds in fields and wet meadows within agricultural lands, sometimes near roads and human settlements (Mewes 2010; Sigvard Lundgren, personal comm. 2010), and has colonized numerous abandoned gravel and sand quarries and small sea islets in the Baltic Sea (Leito et al. 2003, 2005, 2006).

The Tibetan and Transcaucasian Eurasian Cranes use aquatic habitats. Territorial cranes breed in seasonal wetlands at altitudes from 1,900 to 3,900 m above sea level. They build nests in completely open habitats (Ilyashenko et al. 2008, Ilyashenko and Belyalov 2011).

For hundreds of years Eurasian Cranes have adapted to foraging on agricultural fields during migration and wintering. Over the last 50 years, the extension of maize production and intensification of agriculture in West Europe have caused a rapid increase in crane numbers, and the problem of crane damage to crops has gained increasing attention (Leito et al 2008, Nowald et al 2010a, Prange 2010b, Nowald 2012).

NUMBERS AND TRENDS

The world population is estimated at over 700,000 cranes (Prange 2013, 2016).

Western Eurasian Crane

Presently, the Western Eurasian Crane population is estimated at 590,000 birds, of which around 350,000 migrate on the West-European Flyway, 150,000 on the Baltic-Hungarian (Central European) Flyway, (Prange 1999a, 1999b, 2010a, 2010b, 2013, 2014, 2016; Fintha 2003, Végvári et al. 2010, Nowald 2012), and up to 10,000 on the Austrian- Italian and Austrian-Bavarian Flyways (Salvi 2013, 2014, 2016; Prange 2016). The East European and Volga Caucasus Flyways are estimated to host approximately 80,000 cranes (Gorlov 2012, Ilyashenko and Markin 2013). The West Eurasian Crane population shows positive breeding trends during the last three decades. Overall, the population has been increasing for several decades, more in the west of Europe with 5–8% growth per year in the last three decades and to a lesser extent in the east (Mewes 2010, Prange 2016).

Eastern Eurasian Crane

The Eastern Eurasian Crane population is estimated at up to 110,000–112,000 birds. Nearly 100,000 cranes use the West Siberian Flyway according to censuses carried out on the wintering grounds of Amudaria River Valley with around 30,000 birds (Rustamov et al. 2011, Sorokin et al. 2011) and in India with about 70,000 cranes (Rahmani et al. 2016). The size of the Central/Eastern Siberian and North Chinese subpopulations are estimated at approximately 12,000, with several major wintering grounds such as Yunnan–Guizhou Plateau (1,500; Yang and Zhang 2014), Poyang Lake (~7,000; Jin

2015), Shanxi (2500; Liu et al 1989), and Shannxi (~1,000; Wu et al. 1998). Numbers at wintering grounds in Yellow River Delta, Beijing outskirts, and Myanmar are not stable. Yellow River Delta was a major wintering site, but the number of Eurasian Cranes there has declined to almost zero after year 2000 (Shan et al. 2005), while in Myanmar the numbers have been increasing during the past two decades.

Transcaucasian Eurasian Crane

At the turn of the 19th–20th centuries, Eurasian Cranes in Transcaucasia were quite common and hunted. However, until recently data on their biology, distribution, and numbers had been extremely scarce because a strict boundary regime has been set up in this area since the early 1920s.

The total number is now estimated at 250–300 individuals including 70–80 breeding pairs. In Iran, three or four pairs bred southwest of the Maku Village in 1997 (Ra'naghad and Ebrahimi 2007). Since that time there is no new information from northern Iran (Amir Mahdi Ebrahimi, personal comm. 2009). In Georgia, Eurasian Cranes breed near the border with Turkey and Armenia (Javakhishvili et al. 2013). During censuses in 1998, 1999, and 2008, from 11 to 17 breeding pairs were documented (Alexander Abuladze, personal comm. 2016). In Armenia in 2008, two to three pairs bred near the border with Georgia and Turkey (Ilyashenko et al. 2008). In Turkey, the number is estimated at 40–60 breeding pairs (Ferdi Akarsu, personal comm. 2017).

Tibetan Eurasian Crane

The total number of the Tibetan Eurasian Crane is estimated at 1,000 individuals in China (Ma et al. 2011) and around 10 breeding pairs in Kazakhstan and Kyrgyzstan, showing decreasing trends (Ilyashenko and Belyalov 2011).

THREATS

- Loss and degradation of breeding and roosting habitats in southern Russia, Kazakhstan, Central Asia, Mongolia, and North China due to drainage, urbanization, agricultural expansion, crop alteration, and fires that were enhanced by drought during the previous decade. Ongoing drought followed wetland losses along the migration routes in the Middle East, in northeast Africa, India, and China (Ilyashenko et al. 2008, Goroshko 2011, Ilyashenko and Belyalov 2011, Hafid et al. 2013). Unstable water levels due to lack of cooperation on water control/diversions and due to climate change have impacted on crane habitats especially in forest-steppe, steppe, and mountain zones. Recent climate warming could threaten crane populations in the Mediterranean climate zone as well in northern and eastern Africa, particularly Ethiopia (Leito et al. 2015);
- Negative impacts on crane habitats due to afforestation and plowing of meadows and fallow fields for more intensive cultivation of rape (*Brassica napus*) and biogas-maize as biofuels to produce electric energy in Europe;
- Collisions with power lines regularly occur in Europe near roost sites as well as during migration on foggy days. Collisions in other regions are less well documented. Construction of power stations near staging areas and migration stopovers decreases the area for crane movement and foraging. Rapidly increasing construction of wind farms in Europe is an emerging and potentially significant threat (Danish Center for Environment and Energy 2015);
- In Afghanistan and Pakistan, crane poaching and capture with nets and nooses is still widespread (Khan 2004, Perveen and Khan 2010). Uncontrolled hunting and poaching increased in the Commonwealth of Independent States countries (11 out of the 15 former Soviet Republics—Azerbaijan, Armenia, Belarus, Kazakhstan, Kirgystan, Moldova, Russian Federation, Tajikistan,

Turkmenistan, Uzbekistan, and Ukraine—are member states) after the collapse of the USSR in 1991 because of the worsened living standards caused by the economic and agriculture crises (Bragin 2011, Degtyarev 2011, Mitropolskiy 2011, Toropova and Kulagin 2011; Oleg Goroshko, personal comm. 2016). On the other hand, following the economic recovery private hunting companies were created in Russia and Kazakhstan where the control over hunting is difficult (Eugeni Bragin, personal comm. 2016). Shooting of cranes is known from the Balkan region (Stumberger and Schneider-Jacoby 2013) and in Near East and North African countries (Nowald et al. 2010b);

- Poisoning causes occasional crane deaths in Mongolia, Russia, and European countries (Prange et al. 1999, Prange 2000–2009, Thiel 2003, Hohl 2004, Malovichko 2011) and is a growing problem in China, although Eurasian Crane numbers continue to increase there (Jim Harris, personal comm. 2016);
- Predators such as racoon dogs (*Nyctereutes procyonoides*) have become a serious threat in the Ukraine and other countries; foxes (*Vulpes*) are a danger everywhere for young birds and sometimes for the adults too, if they are roosting outside of water bodies; and
- Lack of knowledge, awareness, public support, and local conservation leadership are concerns for Transcaucasian and Tibetan Eurasian Cranes (Ilyashenko et al. 2008, Ilyashenko and Belyalov 2011).

CONSERVATION EFFORTS UNDERWAY

The increase in numbers of breeding cranes, as well as the recovery of breeding areas and their extension to the south, north, and west in the western parts of Europe, are results of progressive legislative actions for wetlands and species protection combined with an improved environmental awareness of the public.

Habitat protection has been strengthened in many countries. In Germany and France, nearly 80% of the roosting sites are officially protected; most of the others are supervised by members of administrations, national crane working groups, or local organizations. As a result, about 90% of migrating cranes are under relatively secure conditions. In Estonia, there are more than 36 crane breeding areas (total area 3,892 km²) and 17 roosting sites (3,400 km²) with protection status, according to the “Eurasian Crane Conservation Management Plan” (Leito et al. 2006). In Russia, Ukraine, China, and India, habitat management takes place mainly within strictly protected areas set up to protect other, endangered crane species but also beneficial for the Eurasian Crane. Human pressure on wetlands and crane habitats in China and India is being regulated by legislation and reduced by protection activities. Full or partial protection is provided for migrating cranes at key sites in Near East and Iran (Sadeghi Zadegan 2011), in Central Asia, China, and India.

Monitoring is underway every year in several European countries. Many honorary members of local groups supervise the breeding and resting sites.

In Great Britain, the “Great Crane Project” was founded by the Wildfowl & Wetlands Trust, the Royal Society for the Protection of Birds (RSPB), and Pensthorpe Conservation Trust to support the recovery of the breeding population of the Eurasian Crane through reintroduction, and help in the restoration of wetlands in Somerset, southwestern England. The project gathered 137 eggs from 84 nests in Brandenburg, Germany (Eberhard Henne and Beate Blahy, personal comm. 2012), and 122 viable eggs were transported to the UK. During 2010–2014 about 20 birds were released annually by the project partners on the RSPB’s West Sedgemoor Nature Reserve in Somerset. The first breeding of the 93 released birds (at three years old) was in 2013 without success, but in 2015 three breeding pairs fledged four chicks, and three pairs fledged a further three chicks in 2016 (Damon Bridge, personal comm. 2016).

Monitoring, conservation, education, and management planning were conducted at several wintering sites in Ethiopia through implementation of a project by Crane Protection Germany (NABU [Natural and Biodiversity Conservation Union], World Wildlife Fund, Lufthansa) in collaboration with the NABU Working Group for Africa, the University of Jimma, and the Ethiopian National Wildlife and History Society (Nowald et al. 2010b, Aynalem et al. 2013, Leito et al. 2015).

Effective crane-agricultural management has been implemented at larger crane migratory resting sites in Europe since the 1970s in Sweden, Estonia, East Germany, France, Israel, and Spain by the crane researchers of these countries (Mansfeld 1972; Alonso and Alonso 1987; Prange 1989, 1995; Swanberg and Bylin 1993; Dornbusch 1995; Bräse and Weiß 2005; Lundin 2005; Leito et al. 2006; Nowald et al. 2010a; Salvi 2012a). Farmers were occasionally subsidized for damage in France, Spain, Estonia, Latvia, Germany, Sweden, and other European countries. Instead of compensation, “diversion feeding” has been successfully undertaken near large resting sites as an alternate method to reduce damage and conflicts with farmers. The most intensive diversionary feeding for Eurasian Cranes is practiced in Hula Valley in northern Israel, where this technique is combined with education and tourism (Shanni et al. 2012).

Color-marking and radio-tracking of Eurasian Cranes were conducted successfully mainly in European countries and Israel, with the first ringing in Sweden where 90 cranes were marked from 1985 to 1991; the first satellite tracking began in Finland in 1991 and later expanded to various other countries (Alonso and Alonso 1990, 1999). The European Crane Banding Group (ECBG) was established in 1985 during the first European Crane Workshop in Hungary with members from six countries. Thanks to its active work, about 4,500 cranes were banded with national tri-color codes (left leg) and individual tri-color codes (right leg) as well as satellite or global-positioning-system (GPS) transmitters from 1988 to 2010 in Finland, Sweden, Norway, Estonia, Poland, Germany, and Spain (Alonso et al. 1995; Alonso and Alonso 1999, 2003; Leito et al. 2006; Donner and Nowald 2008; Nowald 2010; Saurola et al. 2013; Satelliittikurjet 2016), and more recently in Estonia (Leito 2015), as well as in Germany (Nowald and Broniarek 2014, Nowald et al. 2016). At the Hula Valley in Israel, marking with GPS transmitters has gathered valuable knowledge about Eurasian Crane flyways (Alon et al. 2003). A few cranes were also banded in Iran. ECBG organized training on crane capture and banding in Germany and Poland with participation of Russian, French, Ukrainian, Polish, Turkish, and Spanish ornithologists.

In Russia, nearly 200 cranes were color banded in the 1980s in Oka State Nature Reserve, and this activity was resumed there in 2016 with marking of cranes by GPS-GSM (geographic positioning system – global system for mobile communications) loggers under support of the Movement Ecology Laboratory in Israel. The Crane Working Group of Eurasia published Guidelines on Crane Capture and Banding with descriptions of different techniques used around the world (Markin and Ilyashenko 2010).

In Turkey from 2014 to 2016, 45 Transcaucasian Eurasian Cranes including 39 juveniles and 6 molting adults were color banded and/or marked with GPS-GSM loggers by an international team representing Turkey, Germany, Spain, and France with support by Crane Conservation Germany, Department of Wildlife Management Ministry of Forestry and Water Affairs (Turkey), Doğa Araştırmaları Derneği (Nature Research Society, Turkey), Lufthansa Group, and TR2011/0135.15 – Civil Society Dialogue Programme – Fourth Phase Grant Scheme – Project Ref No: CSD-IV/ENV/34.

Knowledge and research on the Eurasian Crane distribution, biology, ecology, and conservation status have expanded significantly over the last four decades, and international cooperation was strengthened

through organization of international conferences, workshops, meetings, training sessions, and publication of proceedings, as well as through cooperation in color-banding and transmitter-tagging of cranes among various countries and monitoring the sightings of these marked cranes through databases and websites. Joint fieldwork was conducted at crane breeding, migration, and wintering sites (Europe, Turkey, Ethiopia, Israel, Russia, Armenia, Uzbekistan, Kazakhstan, Turkmenistan, and other countries). As a result, the exchange of knowledge and information has also improved. Numerous articles in national and international workshop and conference proceedings, journals, newsletters, and yearly reports were published. A major contribution to this increase in knowledge was stimulated by the yearly monitoring in several European countries. A trial of comprehensively summarizing the knowledge of the Eurasian Crane was made by Hartwig Prange (2016).

A Western/Central Asian Site Network for the Siberian Crane and other Waterbirds was launched in 2007 under the Convention of Migratory Species with a goal of strengthening species and habitat protection at key sites along the Western/Central Asian Flyways used by Siberian, Eurasian, and Demoiselle Cranes as well as other waterbirds including endangered and vulnerable species. In 2010–2012, a project on hunting regulation and hunter education was conducted in Russia, Kazakhstan, Uzbekistan, Afghanistan, and Pakistan with support from the Mohammed bin Zayed Species Conservation Fund (Ilyashenko and Mirande 2014).

Transcaucasian and Tibetan Eurasian Cranes

Status of the subspecies was discussed at the 7th European Crane Conference (Stralsund, Germany, 2010) and the International Conference “Cranes of Palearctic: Biology, Conservation, Management (in memory of Academician P.S. Pallas)” organized by the Crane Working Group of Eurasia (Volgograd, Russia, 2011).

Field studies were conducted in Eastern Turkey in 2010 and in Central Tien-Shan, Kazakhstan, in 2010 and 2011 to determine the current status of cranes in these isolated populations of the Eurasian Crane and to assess subspecies status.

To assess possible subspecies status, Russian and German scientists conducted genetic research (Haase and Ilyashenko 2012).

CHANGES SINCE 1996

Most changes in crane populations have been caused by climate warming, agriculture changes, and wetland management.

The major increase of the European breeding populations has been caused by changes in agriculture and good water management, elevated protection, and possibly also by climate warming (Leito et al. 2006; Prange 2010a, 2010b; Nowald 2012; Salvi 2012a, 2012b; Mewes et al. 2013). Breeding grounds in Western Europe have expanded to the north, south, and west. In Sweden the breeding range expanded north- and southwards during the last two decades of the 20th century and now includes all counties (Lundgren and Lundin 2003). In Germany the breeding areas were doubled by expansion in the last three decades to the north (50 km), the south (60 km), and particularly to the west (240 km) (Mewes 2010). In the Czech Republic, the number of breeding pairs has increased to 40–50 pairs and is still increasing (Tichackova and Lumpe 2014); the breeding range continues spreading to the south and now there is also one breeding pair in Slovakia. In the UK at the end of the 1970s, a small breeding population began in the Norfolk Broads (Buxton 1987), slowly growing and spreading in the east of the UK over the next 30 years. With the additional 93 released birds, by 2016 there were around 160 birds in the UK with 38 breeding pairs, two of which were in Scotland (Damon Bridge, personal

comm. 2017). Over the decades up to the year 2000, the rearing success there was very low (average of 0.24 fledged juveniles per breeding pair 1980–2000), but since then it has increased to 0.51 per pair (2001–2006, not including the reintroduced population) (Damon Bridge, personal comm. 2017). In eastern France, the first breeding pair was discovered in 1995, and the population has grown to about 15–20 pairs by 2015 (Salvi 2015).

Crane numbers have increased along the West-European Flyway (from 50,000–60,000 birds in the 1980s to about 350,000 in 2014) and the Baltic-Hungarian Flyway (from about 30,000–40,000 to 120,000–150,000) for the same period (Prange 1989, 2010a, 2010b, 2013, 2016; Fintha 2003/2004; Végvári et al. 2010; Alonso et al. 2014). This change is probably owing to manifold increase of breeding pairs over four decades in the northern and central parts of Europe as well as to the eastwards shift of the border between the two flyways with more intensive migration from the Baltic States, Finland, and northwestern parts of Russia. The cause of such alteration in migration routes seems to be the reduced food resources at the eastern resting areas due to the agricultural crises after the breakdown of the Soviet Union (Prange 2010a, 2010b; Ilyashenko and Markin 2013).

Due to increasing crane numbers in Western Europe, numerous small migration routes have appeared in the 2000s–2010s, most significantly the Austrian-Italian migratory path in the south and the Austrian-Bavarian migratory path in the north, both running along the Alps Mountains (Salvi 2013, 2014; Hansbauer et al. 2014; Salvi 2016; Prange 2016). Most of these cranes winter at the new site in the Camargue in the southeast of France (Salvi 2016).

An increase in the breeding population from 40,000 to 80,000 in European Russia (Ilyashenko and Markin 2013, Markin 2013) has probably occurred due to a decline of the breeding pair numbers in the south of the breeding range in Russia, Ukraine, and Kazakhstan. That decline was related to long-term drought, especially in the forest-steppe zone and likely was intensified by economic development (Ravkin et al. 2002, Kovshar 2010).

The decline of the breeding populations of Transcaucasian and Tibetan Eurasian Cranes is a result of landscape transformation and drying out of wet breeding habitats in mountainous regions as well as by increasing human disturbances, sometimes with shooting, and by lack of protection measures (Ilyashenko et al. 2008, Akarsu et al. 2013).

The wintering range has expanded to the north. In Europe, new wintering grounds of the Western Eurasian crane appeared across France and northwest Germany as well as in the south of Hungary due to increasing food availability, landscapes modifications, and global warming (Salvi et al. 1995; Alonso and Alonso 1996; Le Roy 2002; Alonso et al. 2003, 2008; Salvi 2003a, 2003b, 2012a, 2012b, 2013, 2014, 2015; Prange 2010a, 2010b; Végvári et al. 2010). As a result, between 1997 and 2007 the median migration distances of cranes breeding in northeast Germany decreased from 2,041 to 677 km on average (Donner and Nowald 2008, Nowald et al. 2013). New wintering grounds of the Eastern Eurasian Crane came to existence in Central Asia (in the Amudaria River Valley at the border among Uzbekistan, Afghanistan, Tajikistan, and Turkmenistan, as well as in the Tejen River Valley in south Turkmenistan) as a result of mild winters during the last two decades as well as changes in agriculture after the Soviet Union collapse. The most part of cotton (*Gossypium*) fields were replaced by cereal crops (wheat [*Triticum aestivum*] and rice [*Oryza sativa*]), creating favourable food conditions for cranes. A large portion of cranes (20,000–30,000) that formerly migrated to India and Iran started to spend winters in Central Asia (Rustamov et al. 2011, Sorokin et al. 2011, Ilyashenko and Markin 2013).

A growing wintering population from 5,000 to more than 42,000 birds has been reported from Hula Valley in northern Israel (Prange 1989, Shanni et al. 2012; Rubin Inbar, personal comm. 2017). Cranes are mostly concentrated here on a very small piece of land (200–400 ha), thus creating a very dense wintering population that is being fed throughout the winter in order to prevent damage to the surrounding 8,000 ha of agricultural fields.

Changes have occurred in the spring and fall migration in West Europe and European Russia associated with global warming, but the median migration date is nearly without change. The latest crane flocks depart in autumn about four weeks later and they arrive nearly 2–3 weeks earlier in Sweden and Finland and 4 weeks earlier in Germany (Lundgren et al. 2003; Leito et al. 2005, 2006, 2015; Mewes 2010; Prange 2010a, 2010b, 2015; Hermansson and Karlsson 2013; Markin 2013). In European Russia, cranes start autumn migration 2–3 weeks later than in the 1990s (Volkov et al. 2013; Olga Grinchenko, personal comm. 2016; Yuri Markin, personal comm. 2016). Changes in timetable for stopovers and wintering, as well as redistribution of staging areas and migration stopovers, were also connected with alteration in agriculture systems (Bautista et al. 1992, Alonso et al. 1994).

Staying several weeks longer than in the 1970s in the resting and wintering areas along the West European and Baltic-Hungarian Flyways (Central European Flyway) is closely correlated with the improved foraging and roosting possibilities, including intensive maize and grain cultivation, building of new reservoirs in Spain, France, and Germany, and wetland reconstructions of peat bog areas in northwest Germany and the Netherlands (Prange 2000–2009, 2012, 2013; Lundin 2005; Leito et al. 2006, 2015; Salvi 2013). For example, at the Rügen-Bock area in Germany in the 1970s with a maximum of 15,000 cranes, only 6% of the cranes visited fields that had cultivated maize, but in the 2000s with up to 60,000 resting cranes, 46% of the visited fields had maize stubble in autumn (Prange 2010b, 2016). The conversion of the traditional land-use system in the Iberian Peninsula, with open Holm oak (*Quercus ilex*) woodlands changing to intensive cereal crop fields, brought more energy-rich food for cranes, but destroyed in part a traditional rural culture (Sánchez Gusmán et al. 1993, Almeida 1995).

Redistribution of pre-migratory staging areas, their disappearance, and changes in their numbers as well as in crane numbers at staging areas in the Baltic countries, and Russia, came as a result of the agriculture crisis happening after the collapse of the Soviet Union in 1991 (Leito et al. 2008, Ilyashenko and Markin 2013). In European Russia, crane assemblages moved from the north to the west and the south (Ilyashenko and Markin 2012). Since 1999–2000 the crisis has been overcome and both agriculture and crane staging have bounced back, especially in the Baltic countries and in the South and the Volga regions of Russia (Rostov, Stavropol, Nizhny Novgorod, Kirov Regions, and Tatarstan; Ilyashenko and Markin 2013).

Damage by cranes to agricultural fields has increased. In European countries, crop damage has grown due to the increase of crane numbers at staging areas and migration stopovers as well as to longer staging of cranes (Leito et al. 2008; Nowald et al. 2010a; Prange 2010a, 2010b; Fanke et al. 2013). In Russia, Kazakhstan, and Central Asian countries, crane damage coincided with the decline in crop growing during the economic crisis, and redistribution of crane flocks followed the changes in the agricultural system (Bragin 2011, Ilyashenko and Markin 2013).

PRIORITY RESEARCH AND CONSERVATION ACTIONS

Research and Monitoring

- Continue to conduct research on further increase/decrease of populations, pair formation, breeding success, life history, tolerance of disturbances, diseases and reasons for mortality, positive/negative

influences of climate change on the habitat, and population status across the whole range of the Eurasian Crane in relation to the environment conditions;

- Continue to conduct research along flyways at resting and wintering sites on migration behavior of different subpopulations using crane marking and other tools;
- Conduct genetic, morphological, and photographic identification research for differentiation of the Eurasian Crane subspecies and populations;
- Organize crane censuses at key sites in the European, Baltic, and Central Asian countries, in Russia, Ukraine, and Belarus as well as in China, Korea, and Japan (at breeding, migration, and wintering sites); involve hunters and other task groups in crane censuses, and use hunters as respondents for questionnaires on crane distribution in Turkey, the Caucasian countries, in Russia and Asia; and
- Continue to coordinate crane banding by the European Crane Banding Groups in Europe; involve other countries and crane working groups in crane banding; organize international trainings on crane capture and banding, and use central databases to share information on all banded and radio-tagged cranes among members of crane working groups, NGOs, and professional ornithologists. Furthermore, one day each in autumn and winter should be established for crane monitoring in all countries along the West-European flyway.

Species Protection

- Enforce existing hunting regulations or adopt new ones to prevent uncontrolled hunting, poaching and disturbances at crane breeding grounds and migration stopovers during the hunting season;
- Monitor incidents of crane poisoning, develop necessary regulations, and strengthen law enforcement in accordance with local situations; and
- Prevent crane collisions with power lines and wind power stations at crane resting areas. Power lines at key sites should be marked or otherwise modified to reduce the incidence of accidental collisions. Construction of wind power stations should be regulated in accordance with the national environmental legislation.

Habitat Protection and Management

- Cooperate between national governments and hunting organizations along the East Adriatic coast on providing and enforcing safe crane migration stopovers before and after the Adriatic Sea crossing, reducing illegal hunting, and strengthening protection at nature reserves and national parks to ensure that these areas are recognized and accepted by hunters;
- Cooperate between the International Crane and Agriculture Working Group, farmers, and other stakeholders to improve management at crane gathering sites to avoid damage by cranes and their poaching, poisoning, and chasing;
- Work with governmental and other public institutions involved in development and infrastructural projects to carry out detailed environmental impact assessments and modified cost-benefit analyses for projects that may affect cranes and/or their habitats;
- Undertake administrative measures and maintain a suitable water balance to protect breeding and roosting habitats in view of the substantial threats by wetland destruction; manage wetland recreation projects to increase the potential for crane breeding, resting, and wintering;
- Use international flyway program experience for establishing protection status for key sites; and

- Create internationally protected areas or ecological corridors along the West Siberian Flyway, that will include crane migration stopovers and wintering grounds in the Amudaria River Valley through cooperation among Kazakhstan, Afghanistan, Uzbekistan, Turkmenistan, and Tajikistan (due to Eurasian Cranes using the same migration route as Siberian Cranes); explore potential creation of a new wintering ground for the Siberian Crane in the Amudaria Valley.

Education and Public Awareness

- Increase education and public awareness for hunters, volunteers, children, and other members of the public in countries and regions with crane migration, resting, and wintering;
- Reduce crane disturbance by tourism, forestry, agriculture, and hunting activities through establishing buffer zones around roosting sites in Europe;
- Improve the relationship between crane protection and farming by addressing the reasons for crop damage and implementing prevention measures. This objective can be reached through the following activities:
 - Successful cooperation with land owners (farmers, foresters, hunters) and provision of incentives for those whose management practices benefit the cranes;
 - Adaptation of crane-agriculture management programs to local conditions;
 - Compensation for heavy crane damage or organization of diversionary feeding along the migration routes in special situations; and
 - Support traditional agricultural systems that benefit cranes (e.g., choice of crops, timing of plowing), especially in the southern wintering areas; and
- Continue to improve international cooperation through implementation of joint conservation programs and management strategies, organizing international workshops and trainings, publishing articles, and promoting information exchange.

Transcaucasian and Tibetan Eurasian Cranes

Research and Monitoring

- Advocate international efforts for the research and protection of the endangered Transcaucasian and Tibetan Eurasian Cranes by their range states;
- Demonstrate that these two newly described subspecies are truly monophyletic and qualify as evolutionarily significant units, by collecting and analysing more samples (Haase and Ilyashenko 2012);
- Conduct geographic information system analyses to determine potential breeding sites for these Eurasian Cranes subspecies in their Range States;
- Develop and conduct questionnaires for hunting societies about sightings of the Transcaucasian and Tibetan Eurasian Cranes;
- Continue to capture cranes and mark with transmitters and colour bands to investigate migration routes and wintering grounds;
- Cooperate with Israeli ornithologists to determine possible wintering grounds of the Transcaucasian Eurasian Cranes in Israel. Identify wintering individuals from Turkey, Armenia, and Georgia; and

- Cooperate with Chinese ornithologists to determine possible wintering grounds of Tibetan Eurasian Cranes in Tibet.

Species Protection

- Enforce measures to prevent illegal hunting in Armenia, Turkey, Kazakhstan, Kyrgyzstan, and other Middle Asia countries to ensure that poachers are identified and prosecuted; and
- Create captive breeding groups for both threatened populations of Eurasian Cranes on the basis of international collaboration among Armenia, Turkey, Georgia, and Iran (Transcaucasian Eurasian Crane), as well as among the Himalaya countries (Tibetan Eurasian Crane) on the basis of international collaboration among China, Kazakhstan, and Kyrgyzstan, and in cooperation with Walsrode Ornithological Park (Weltvogelpark Walsrode, Germany), and other interested zoos and breeding centers as well as related international agencies, to start a “genetic bank.”

Habitat Protection and Management

- Provide and enforce safe breeding sites for the threatened Transcaucasian and Tibetan Eurasian Cranes; and
- Establish a transboundary protected area in Turkey, Armenia, and Georgia.

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