

# Ecology, Status, and Conservation

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Cranes constitute one of the world's most endangered families of birds. At the same time, their cultural value, high visibility, extraordinary beauty, dramatic migrations, and striking behavior have inspired widespread conservation efforts. Cranes often serve as "umbrella" and "flagship" species in conserving wetlands and grasslands around the world. As such, they draw attention to, and provide protection for, a broad array of species and ecosystems (Schoff 1991). Cranes have stimulated innovative conservation measures at the international level (Lewis 1991), while also providing a focus for local conservation programs (e.g., Harris 1994a, 1994b). Captive propagation and reintroduction programs have provided important experience in the conservation not only of cranes, but other endangered species as well. Cranes have also proven to be effective in focusing information for environmental education programs (e.g., Dietzman and Swengel 1994; Landfried et al. 1995).

In all of these areas, cranes present excellent opportunities to develop programs that combine varied conservation goals, activities, and techniques. Such integrated programs will become even more vital as cranes face growing challenges in a world of accelerating environmental change.

This chapter reviews the status of the fifteen species of cranes, assesses current conservation activities, and identifies future conservation needs. Table 13.1 provides a summary of population estimates and population trends. Our species accounts are derived from *The Cranes: Status Survey and Conservation Action Plan* (Meine and Archibald 1996), which was compiled in consultation with the Crane Specialist Group of the World Conservation Union (IUCN) and Birdlife International. We thank the many individuals around the world who contributed information, advice, and text for the species accounts.

## Black Crowned Crane

The Black-Crowned Crane (Fig. 1.1) inhabits the Sahel and Sudan Savanna region of Africa from the Atlantic coast to the upper Nile River basin (Fig. 13.1). Two subspecies are recognized. *B. p. pavonina* (the West African Crowned Crane), with an estimated population of 11,500-17,500, occupies the western part of this range and is divided into eight or more disjunct populations. *B. p. ceciliae* (the Sudan Crowned Crane), with an estimated population of 55,000-60,000, occurs in eastern Africa, with the largest concentrations in southern Sudan (Urban 1996). Historically, the Black Crowned Crane was more numerous and more evenly distributed than at present. In the eastern part of its range, the species remains relatively abundant. In the western portions of the range, however, both its numbers and its range have been reduced dramatically over the last two decades (Mustafa and Durbunde 1992 unpubl.). The species is classified as Vulnerable under the revised IUCN Red List criteria. *B. p. pavonina* is classified Endangered, and *B. p. ceciliae* Vulnerable.

Black Crowned Cranes use both wet and dry open habitats, but prefer a mixture of shallow wetlands and grasslands (especially flooded lowlands in the sub-Saharan savannas). They are both year-round residents and local migrants, flocking together during the dry (non-breeding) season and moving from large permanent wetlands to smaller temporary wetlands during the rainy season. Although they are non-migratory, daily and seasonal movements may, in some areas, range up to several dozen kilometers (Urban 1981).

The principal threat facing the Black Crowned Crane is the loss, transformation, and degradation of its habitat (Tréca 1996). Behind this threat lies a combination of causal factors: (1) extended drought in the Sahel and sub-Saharan savannas, (2) expanding

TABLE 13.1

Population estimates for crane taxa.<sup>1</sup>

SPECIES SUBSPECIES, POPULATION, OR WINTERING POPULATION	NUMBER	TREND
<b>Black Crowned Crane</b>		
<i>B. p. pavonina</i>	11,500-17,500	Declining. Extirpated (or nearly extirpated) in some range countries.
<i>B. p. ceciliae</i>	55,000-60,000	Unknown. Generally stable, but possibly declining locally. Still fairly abundant in Sudan.
Total	66,500-77,500	Declining
<b>Gray Crowned Crane</b>		
<i>B. r. gibbericeps</i>	85,000-90,000	Declining
<i>B. r. regulorum</i>	<10,000	Unknown
Total	85,000-95,000	Declining
<b>Wattled Crane</b>		
South African population	250-300	Declining
South-central African population	13,000-15,000	Declining
Ethiopian population	several hundred	Unknown
Total	13,000-15,000	Declining
<b>Blue Crane</b>		
Southern population	21,000	Declining
Namibia (Etosha Pan) population	<100	Stable
Total	21,000	Declining
<b>Demoiselle Crane</b>		
Atlas population (N Africa)	<50	Declining
Black Sea population	~500	Declining
Turkey population	<100	Unknown
Kalmykia population	30,000-35,000	Stable
Kazakhstan/Central Asia population	100,000	Stable to increasing
Eastern Asia population	70,000-100,000	Stable to declining
Total	200,000-240,000	Stable
<b>Siberian Crane</b>		
Eastern population	2,900-3,000	Unknown.
Central population	5?	Steadily declining. Not observed on the traditional wintering grounds in India since the winter of 1992-93.
Western population	10	Holding at 8-14 birds on the wintering grounds since mid-1980s. Highly vulnerable.
Total	2,900-3,000	

**TABLE 13.1 CONTINUED**

**Population estimates for crane taxa.<sup>1</sup>**

SPECIES SUBSPECIES, POPULATION, OR WINTERING POPULATION	NUMBER	TREND
<b>Sandhill Crane</b>		
<i>G. c. canadensis</i> and <i>G. c. rowani</i>	~450,000 <sup>2</sup>	Probably stable.
<i>G. c. tabida</i>	65,000-75,000	Unknown due to difficulty in distinguishing from Lesser Sandhill Cranes; probably stable.
<i>G. c. tabida</i>	65,000-75,000	Increasing rapidly in the eastern portion of its range. Generally stable elsewhere. Some western populations may be declining.
<i>G. c. pratensis</i>	4,000-6,000	Increasing rapidly in the eastern portion of its range. Generally stable elsewhere. Some western populations may be declining.
<i>G. c. pulla</i>	120	Generally stable, with local increases and declines. Includes the Okefenokee portion of the population (about 400 individuals).
<i>G. c. nesiotis</i>	300	Numbers in wild increasing through augmentation. Reproduction in the wild is below replacement level.
<i>G. c. nesiotis</i>	300	Generally stable. New populations recently discovered.
Total	520,000	Stable to increasing
<b>White-naped Crane (winter counts)</b>		
Japan (Izumi)	1,800-2,100	Increasing
Korean Peninsula	100-200	Decreasing
China (Poyang Lake)	~3,000	Unknown
Total	4,900-5,300	Stable to decreasing (based on loss of breeding habitat)
<b>Sarus Crane</b>		
<i>G. a. antigone</i>	8,000-10,000	Declining
<i>G. a. sharpii</i>	500-1,500	Unknown; likely declining
<i>G. a. gilli</i>	<5,000	Unknown
Total	13,500-15,500	Declining
<b>Brolga</b>		
Total	20,000-100,000	Stable through most of its range. Decreasing in southeastern Australia.
<b>Eurasian Crane</b>		
West European population	60,000-70,000	Stable to increasing
East European population	>60,000	Stable to increasing
European Russia population	~35,000	Decreasing
Turkish population (non-migratory)	200-500	Decreasing
West Siberia population	~55,000	Decreasing
C Siberia/NE China population	5,000	Decreasing
Tibetan Plateau population	1,000	Stable
Total	220,000-250,000	Increasing overall, but with local declines

TABLE 13.1 CONTINUED

Population estimates for crane taxa.<sup>1</sup>

SPECIES SUBSPECIES, POPULATION, OR WINTERING POPULATION	NUMBER	TREND
<b>Hooded Crane (winter counts)</b>		
Hubei (China)	up to 425	Unknown
Dongting Lake (China)	up to 200	Unknown
Poyang Lake (China)	up to 360	Unknown
Shengjin Lake (China)	300	Stable, but habitat declining
West Taegu (South Korea)	180-250	Unknown
Yashiro (Japan)	50	Declining
Izumi (Japan)	~8,000	Stable
Total	9,400-9,600	Stable
<b>Black-necked Crane (winter counts)</b>		
NE Yunnan/W Guizhou	1,300-1,600	Unknown
NW Yunnan	<100	Stable to declining
SC Tibet	3,900	Stable
E Tibet	<20	Declining
Bhutan	360	Stable
India-Arunachal Pradesh	<10	Declining
Total	5,600-6,000	Stable but vulnerable
<b>Red-crowned Crane (winter counts)</b>		
China	600-800	Unknown
North Korea	300-350	Increasing
South Korea	200-300	Unknown
Japan	594	Stable to increasing
Total	1,700-2,000	Stable to decreasing (based on loss of breeding habitat)
<b>Whooping Crane (as of August 1995)</b>		
Aransas-Wood Buffalo population	150	Increasing slowly.
Rocky Mountain population	4	Decreasing.
Florida population	24	Increasing through artificial augmentation.
Wild sub-total	178	
Patuxent	78	
ICF	44	
Calgary Zoo	19	
San Antonio Zoo	4	
Captive sub-total	145	
Total	324	Slowly increasing

<sup>1</sup> For details of proposed population status categories and criteria see IUCN (1994) and Meine and Archibald (1996).

<sup>2</sup> In mid-continental population estimates, Lesser and Canadian Sandhill Cranes are not distinguished. Also a relatively small number of Greater Sandhill Cranes are included in the total. Estimates are based on 3-year running averages of spring counts conducted on the Platte River during migration. The figure given here represents the 1995 survey results for the mid-continental populations (420,866) plus about 25,000 Lesser Sandhill Cranes from California.

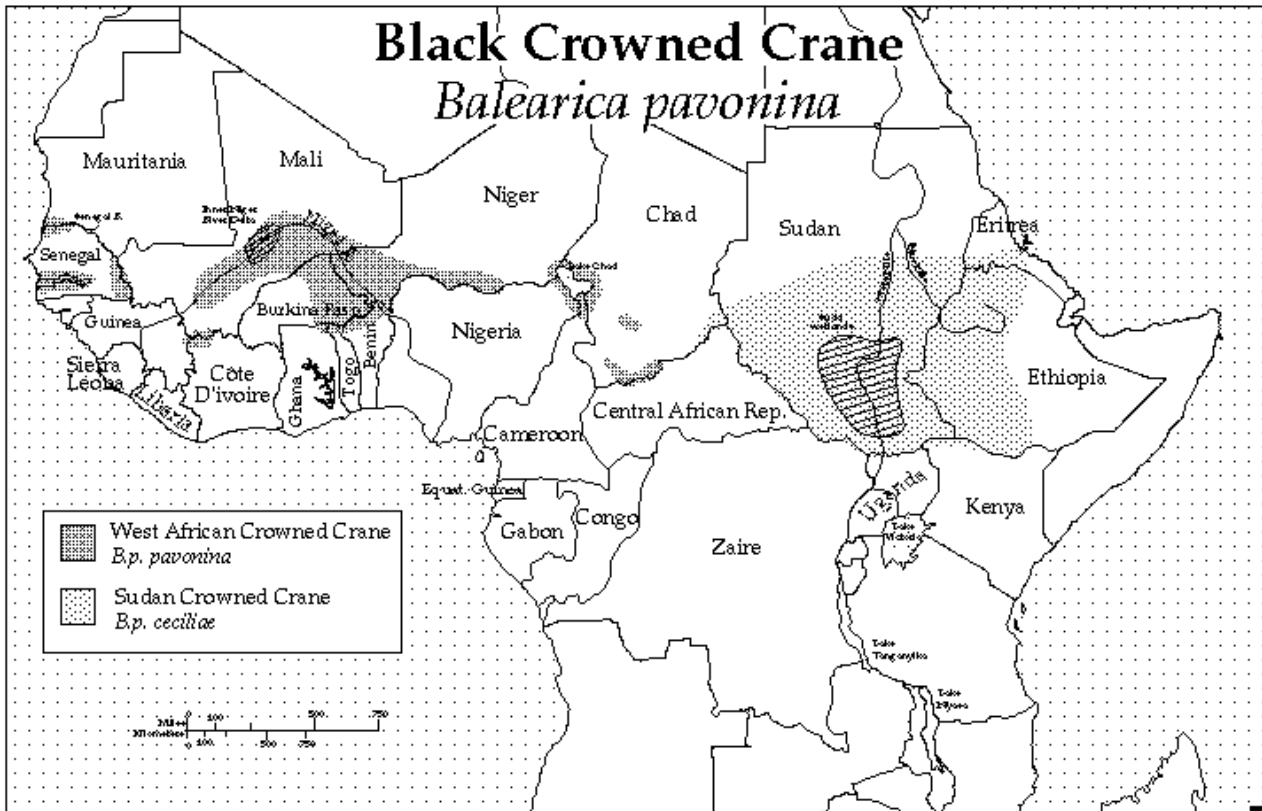


FIG. 13.1. Distribution of the Black Crowned Crane.

human populations, (3) intensive agricultural development and expansion, and (4) extensive changes in hydrological systems as a result of dams, drainage, and irrigation projects (Fry 1987; Daddy and Ayeni 1996). These factors are most pressing in West Africa, but also affect the species in the east. In some areas, these cranes are hunted for meat or captured and sold for trade. Ineffective law enforcement and the lack of long-term population monitoring leave the species in jeopardy.

The decline of the Black Crowned Crane in West Africa has begun to stimulate conservation efforts on behalf of the species. It is legally protected in most countries where it occurs, and many of the protected areas in these countries harbor cranes. Several local surveys have recently been undertaken. In 1992, Nigeria hosted an international conference on the Black Crowned Crane and its habitat. A Black Crowned Crane Coordinating Centre was established as a result. No reintroduction program has been undertaken for the species, but the potential for reintroduction of the West African subspecies is under discussion, and an experimental release took place in Nigeria in 1992 (Garba 1996).

Priority conservation needs for the Black Crowned Crane include: (1) listing the species under CITES Appendix I; (2) ratification of the Ramsar Convention by countries within the species' range and adoption of stronger national wetland protection policies and legislation; (3) mandatory assessment for environmental impact of all large-scale land development schemes affecting Black Crowned Crane habitat; (4) increased support for existing protected areas and designation of new areas used by cranes; (5) ecological research on wetlands and crane habitat requirements; (6) a coordinated surveying and monitoring program for the species; (7) collaborative projects involving local communities in the conservation and sustainable use of wetlands; (8) establishment of a West African Crowned Crane Recovery Team; (9) development of educational programs involving Black Crowned Cranes and wetlands; and (10) expanded training opportunities for crane and wetland conservation specialists.

## Gray Crowned Crane

The Gray Crowned Crane (Fig. 1.2) is the most abundant of the resident African cranes. Although precise population numbers are not available, recent estimates place the total population at 85,000-95,000 (Urban 1996), down from more than 100,000 over the last decade. It no longer occurs in certain portions of its historical range, especially the drier areas (Fig. 13.2). Two subspecies are recognized. Most are *B. r. gibbericeps* (the East African Crowned Crane). This race occurs in East Africa from northern Uganda and Kenya south to Zimbabwe, Botswana, and Namibia. *B. r. regulorum* (the South African Crowned Crane) is found in Zimbabwe and South Africa. The species is classified as Vulnerable under the revised IUCN Red

List criteria. *B. r. regulorum* is classified Endangered, and *B. r. gibbericeps* Vulnerable.

Gray Crowned Cranes use mixed wetland-grassland habitats for nesting and foraging, and, along with Black Crowned Cranes, are the only cranes able to roost in trees. The species' feeding strategy (i.e., generalist) has allowed it to adjust to human settlement and activity; most populations in East Africa now live in human-modified habitats (Pomeroy 1987). Abundance and distribution of food and nest sites are the key ecological factors determining the size of the home range. These, in turn, are largely influenced by local rainfall. Gray Crowned Cranes are non-migratory, but undertake local and seasonal movements in response to changing water conditions and food availability (Gichuki and Gichuki 1991; Gichuki 1993).

Although Gray Crowned Cranes and people have long coexisted, population declines over the last decade

reflect widespread threats to the species' habitat due to rapid human population growth, drought-related changes in land use, and intensified agricultural practices (Archibald 1992a). Loss and deterioration of wetland breeding habitat constitute the most significant threats to the species. Other problems include increased use of agricultural pesticides, declines in the fallowing of croplands, high rates of wetland sedimentation due to deforestation, and altered flooding regimes due to dam construction. The capturing of Gray Crowned Cranes for domestication and for export is also a serious threat (Katondo 1996).

Many native people revere the Gray Crowned Crane as sacred and strictly protect it. No range-wide surveys of the species have been undertaken, but crane counts

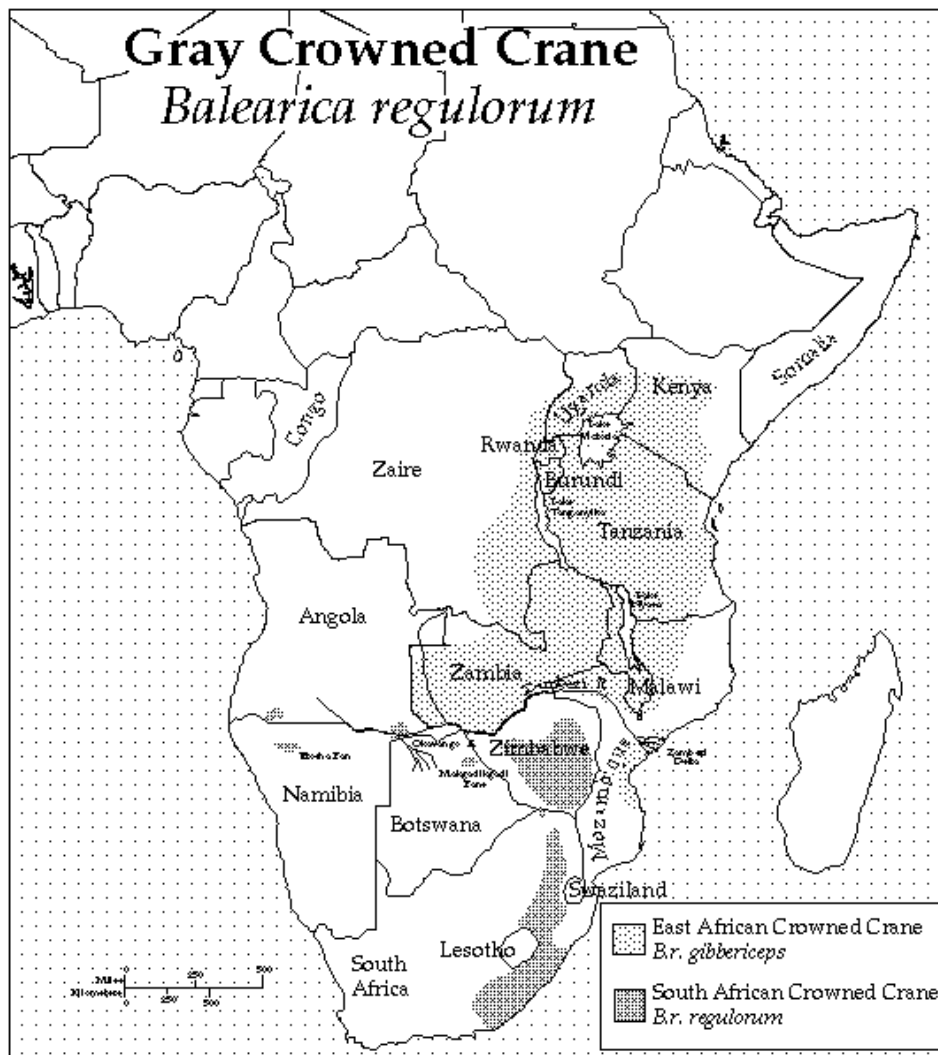


FIG. 13.2. Distribution of the Gray Crowned Crane.

and localized surveys have been undertaken intermittently in several countries. In recent years, field studies have begun to provide basic biological information, although our knowledge of this species remains relatively limited compared to other cranes. The increasing number and effectiveness of protected areas, especially in East Africa, has benefitted the species (Pomeroy 1987). However, most Gray Crowned Cranes nest and forage outside protected areas, so the overriding conservation challenge is to develop sustainable alternatives to the overexploitation of non-reserve wetlands. This goal has stimulated many community-based wetland conservation projects and several nationwide crane and wetland conservation plans (Wanjala 1996). Non-governmental organizations have often played a key role in these efforts.

Priority conservation measures for the species include: (1) listing of the species under CITES Appendix I; (2) strengthening laws to restrict trade and protect wild cranes; (3) expanding community-based wetland conservation programs; (4) designating additional reserves to protect key breeding areas; (5) developing and implementing national crane and wetland conservation plans and more specific management programs for key breeding habitats outside protected areas; (6) organizing national-level crane counts and long-term monitoring programs; (7) implementing research on the basic ecology of the species (e.g., critical habitat, local and regional movement patterns, and the extent of crop damage); and finally, (8) developing broad-based public awareness programs.

## *Wattled Crane*

CONTRIBUTED BY ANN BURKE

The Wattled Crane (Fig. 1.3) is the largest and rarest of the six African cranes. The three main populations are in south-central Africa, with smaller populations found in Ethiopia and South Africa (Fig. 13.3). Over the last several decades, the species has been declining over much of its range. The total population estimate of 13,000-15,000 has remained constant over the last decade, but this is due largely to the discovery of ca 2,500 birds in Mozambique in the early 1990s (Urban 1996). Historically, the species was more abundant and more widely distributed across southern Africa,

with the greatest losses occurring in South Africa (Brooke and Vernon 1988). The species as a whole is classified as Endangered under the revised IUCN Red List criteria. The South Africa population is Critically Endangered.

The Wattled Crane is the most wetland-dependent of Africa's cranes. The extensive riparian wetlands of southern Africa's large river basins (especially the Zambezi and Okavango) are their preferred habitat, but they also use smaller upland wetlands throughout their range (Konrad 1981). The Ethiopian birds may make greater use of drier habitats during the non-breeding season. Nesting pairs establish large (often >1 km<sup>2</sup>) territories, generally in shallow wetlands with minimal human disturbance. Their diet consists primarily of aquatic vegetation, but in drier habitats also includes seeds, insects, and waste grain. Wattled Cranes are non-migratory, but do undertake irregular local movements in response to water availability (Urban and Gichuki 1991).

Loss and degradation of wetlands constitute the most important threats to the species (Macdonald 1989; Allan 1994). Habitat loss in South Africa is due mainly to intensified agriculture, dam construction, industrialization, and other pressures. In other portions of the range, dams and other water development schemes have caused fundamental changes in the species' floodplain habitats (Beilfuss 1995). Human disturbance at or near breeding sites is also a major threat (Eksteen 1996); breeding success declines when human settlements are too close to wetlands. Because Wattled Cranes occasionally forage on agricultural fields alongside Blue and Gray Crowned Cranes, they are also vulnerable to poisoning (Allan 1994).

Conservation measures have been undertaken most extensively in South Africa, but are increasing in other range countries. These measures include: (1) strict legal protection; (2) establishment of protected areas in key wetlands, especially in Zambia, Namibia, and Botswana; (3) identification and communication of appropriate habitat conservation practices for farmers and other private landholders; (4) marking and relocation of electrical utility lines; (5) expanded counts and surveys (especially since the early 1980s); (6) expanded research, especially in South Africa, Zambia, and Namibia; (7) establishment, in 1982, of a Wattled Crane Steering Group in South Africa; and (8) development (mainly by non-governmental organizations) of education and public awareness programs. A limited release program for the species has been initiated in South Africa.

Priority conservation measures for the species include: (1) enforcing existing protective legislation; (2) strengthening key protected areas, especially in the Bangweulu Swamps and Kafue Flats in Zambia; (3) identifying additional areas of critical habitat for protection; (4) assessing large-scale habitat threats (mainly from water development schemes) in the Kafue Flats, Okavango Delta, Makgadikgadi Pans, and Zambezi Delta; (5) developing a coordinated program for the protection of breeding habitat on privately owned farmland; (6) organizing a range-wide census and local Wattled Crane counts; (7) expanding field research outside South Africa; and (8) developing education programs aimed at private landowners, farm laborers, and students.

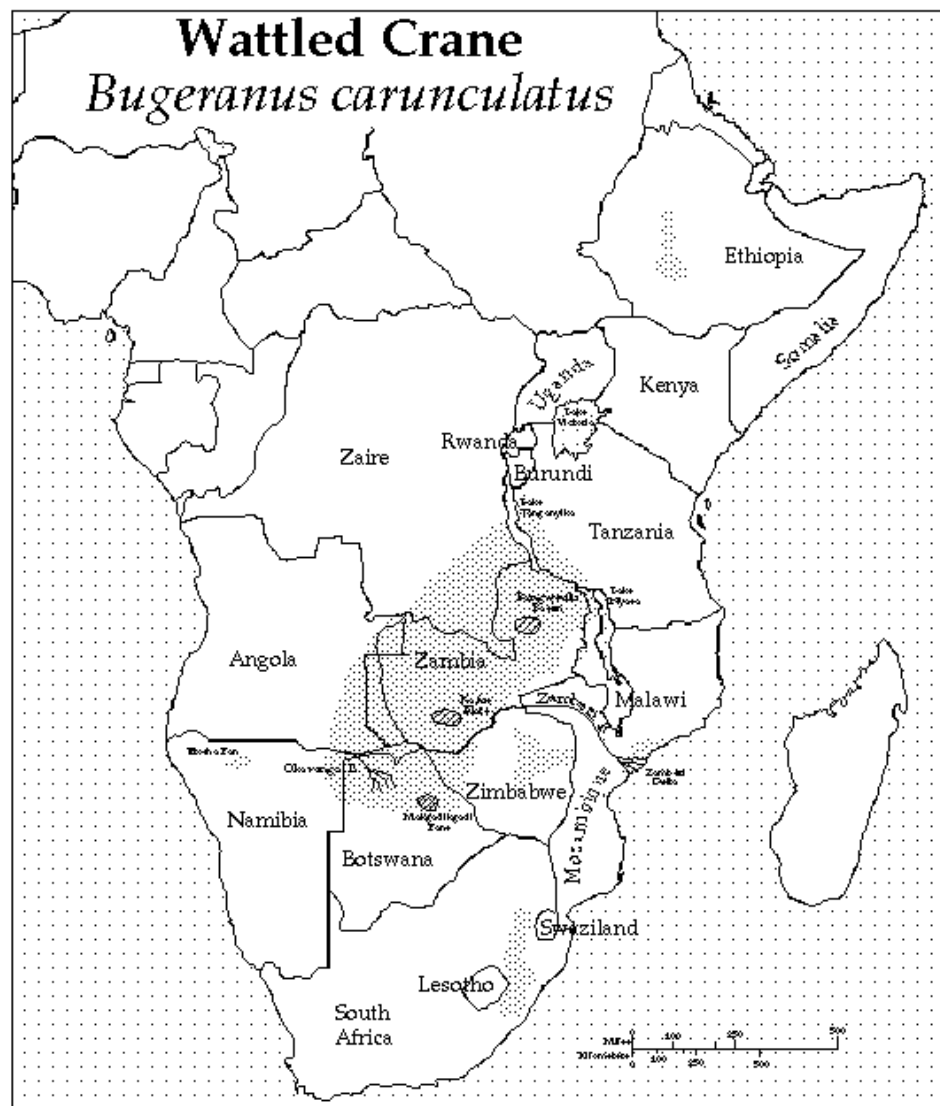


FIG. 13.3. Distribution of the Wattled Crane.

## Blue Crane

The Blue Crane (Fig. 1.4), the national bird of South Africa, is still abundant in parts of its historical range (Fig. 13.4), but has experienced significant declines in many areas over the last twenty years. Its distribution is the most restricted of the fifteen crane species. It is endemic to southern Africa, with the vast majority of the population occurring in eastern and southern South Africa (Allan 1993). A small disjunct population occurs in the Etosha Pan of northern Namibia, while breeding pairs are occasionally found in five other countries. As recently as 1980, there was little concern about the Blue Crane from a conservation standpoint.

Since then, however, the species has largely disappeared from the Transkei region, Lesotho, and Swaziland. In other areas, including eastern Cape Province, Natal, northern Orange Free State, and Transvaal, populations have declined by as much as 90% (Allan 1994; Urban 1996). The total population is estimated at 21,000 and is declining (Allan 1993). Due to its rapid decline, the species is classified as Critically Endangered under the revised IUCN Red List criteria. Both the main South African population and the Namibian population (because of its limited numbers) are Critically Endangered.

The Blue Crane is primarily a bird of dry, upland grasslands. In South Africa, the species occurs in the grassland, Karoo, and fynbos biomes. Blue Cranes use natural grass- and sedge-dominated habitats in these biomes for both



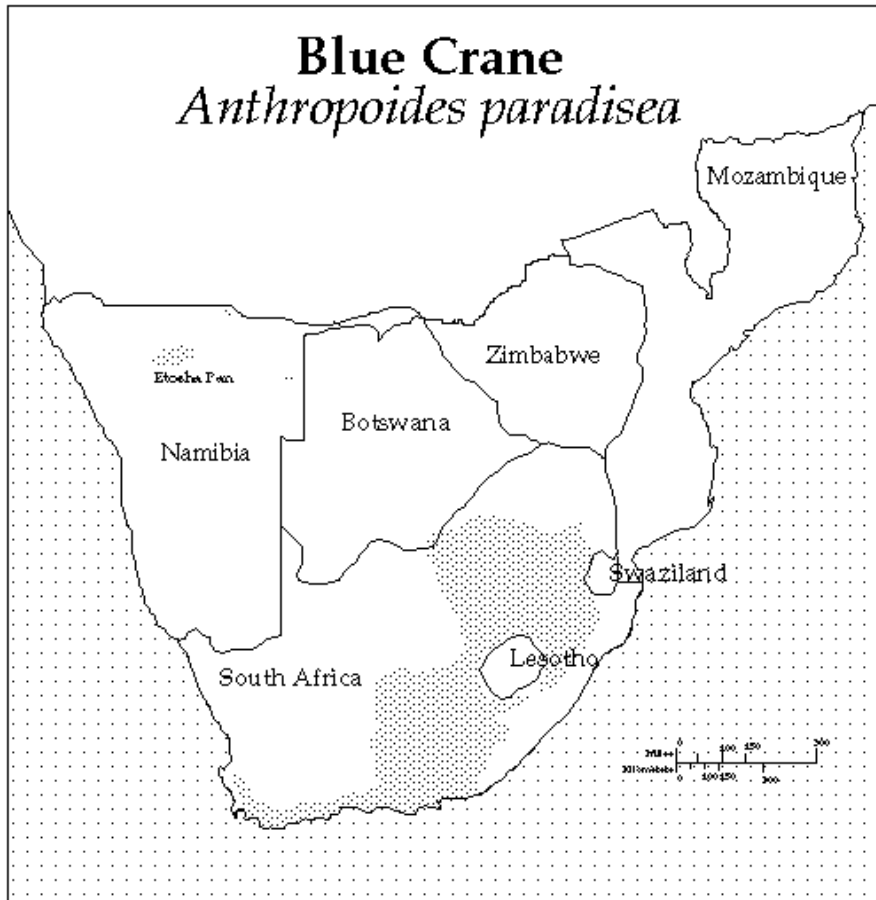


FIG. 13.4. Distribution of the Blue Crane.

nesting and feeding, but will roost in wetlands if available. Preferred nesting sites are secluded grasslands in higher elevations, although they also nest in wetlands. In agricultural areas (especially converted farms in the fynbos region), Blue Cranes nest in pastures, fallow fields, and crop fields (Allan 1993; Aucamp 1996). They migrate locally across elevation gradients, spending the breeding season in higher elevation grasslands and moving to lower elevations for the fall and winter (Vernon et al. 1992). Flocking occurs year-round, but intensifies in the winter (Vernon et al. 1992; Allan 1993).

Intentional and unintentional poisoning, afforestation of South Africa's grasslands, and growing human populations constitute the most significant threats to the Blue Crane (Johnson 1992; Tarboton 1992; Allan 1994). As these threats have taken their toll, conservation efforts have accelerated. These measures include: stricter legal protection for the species; local and national surveys of the population; expanded research on the species' biology, ecology, and conservation status; increased attention to habitat management,

especially on private lands; the emergence and active involvement of non-governmental organizations in Blue Crane conservation programs; and the development of new education programs focussing on the status and needs of the species.

Priority conservation measures include: (1) stronger enforcement of existing conservation laws; (2) listing of the species under CITES Appendix I; (3) development of a coordinated plan to halt the poisoning of cranes; (4) identification and protection of critical habitat, especially traditional wintering grounds; (5) adoption of habitat management programs on farms and other private lands; (6) implementation of requirements for environmental impact assessments preceding timber plantation projects; (7) expansion of surveys and monitoring programs

throughout the species' range; (8) extension of research on population dynamics, demographics, seasonal movements, breeding habitat requirements, and the threats posed by poisoning and commercial afforestation; and (9) development of educational programs specifically directed toward private landowners, farm laborers, and students.

## *Demoiselle Crane*

The Demoiselle Crane (Fig. 1.5) is the second most abundant of the world's cranes. Only the Sandhill Crane is more numerous. The total population is estimated at 200,000-240,000, but reliable surveys are available for only limited portions of its range. Six main populations are distinguishable. The three eastern populations (the eastern Asia, Kazakhstan/Central Asia, and Kalmykia) are abundant, each numbering in the tens of thousands. The Black Sea population consists of approximately 500 individuals. A disjunct

non-migratory population in the Atlas Plateau of northern Africa is believed to include no more than 50 birds, and a small breeding population (fewer than 100 cranes) exists in Turkey.

Historical records indicate that the species' range (Fig. 13.8) has contracted substantially (Sudilovskaya 1963; Kovshar 1987; Winter et al. 1995). The species is classified as Lower Risk (Near Threatened) under the revised IUCN Red List criteria. However, the Atlas and Turkey populations are classified Critically Endangered, the Black Sea population is Endangered, and the East Asia population is listed as Vulnerable.

Demoiselle Cranes breed in the Eurasian steppes from the Black Sea to northeastern China. The main wintering grounds are in India, Sudan, and other parts of eastern Africa to Chad. They are primarily grassland birds, but are usually found within a few hundred meters of rivers, shallow lakes, depressions, or other natural wetlands. If water is available, they will inhabit even true deserts. Their winter habitats in

east-central Africa include acacia savannas, grasslands, and riparian areas. In India, they feed in agricultural and stubble fields, and roost in shallow water or on sandbars and mudflats surrounded by water.

The future of the Demoiselle Crane is more secure than for most cranes because of its large total population, broad range, abundant breeding habitat, adaptability, and high rate of breeding success (even in areas inhabited by people). However, the species faces several serious threats. First, much of its breeding habitat in steppe areas is suitable for agricultural conversion. Although the species sometimes successfully adapts to agricultural fields (Winter et al. 1995; Bold et al. 1995), some population reduction is expected as a result of this trend. Its wintering grounds are subject to increased disturbance and agricultural development due to rising human populations. Other threats include sport hunting and persecution in response to occasional crop damage (Ahmad and Shah 1991; Khachar et al. 1991). These threats have brought about the species' decline in the

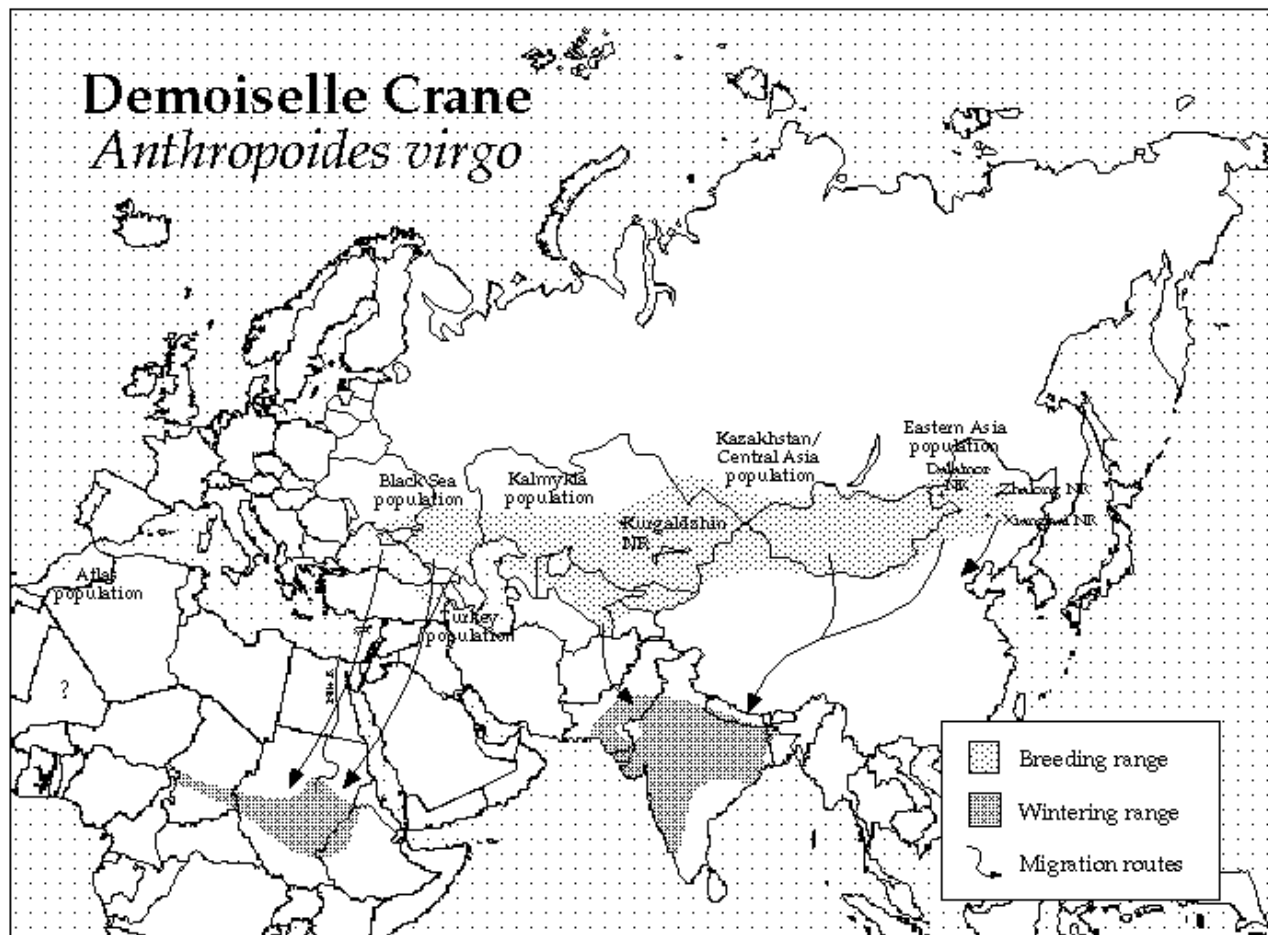


FIG. 13.5. Distribution of the Demoiselle Crane.

western part of its range, and have endangered local populations in other areas.

Conservation measures that have benefitted the Demoiselle Crane include: (1) protection, either through cultural traditions or formal legal restrictions, in many range countries; (2) establishment of numerous protected areas; (3) extensive local surveys and studies of several key migration routes; (4) development of a monitoring program for the threatened Black Sea population; (5) exchange of information on the species in several international forums; and (6) intensive crane education programs in India and Pakistan. No release or reintroduction programs are underway, but releases into areas where it has been severely reduced or extirpated have been considered.

Priority conservation measures for the species include: (1) expanded management programs for the Atlas, Turkey, and Black Sea populations and their habitats; (2) protection of key reserves and establishment of new protected areas in important habitats; (3) development and adoption of agricultural practices that minimize the conflict between cranes and farmers; (4) coordinated international surveys of the species; (5) studies of the migration routes, resting areas, and wintering grounds of the various populations; (6) public education programs in the species' breeding range and along its migration routes; and (7) development of a more specialized education program involving hunters in Pakistan and Afghanistan.

## *Siberian Crane*

The Siberian Crane (Fig. 1.6) is the third rarest species after the Whooping and Red-crowned Cranes. Until 1981, the species was believed to be more endangered than it is today. Then, in 1981, Chinese biologists discovered a wintering flock of 830-850 cranes at Poyang Lake along the middle Yangtze River in China (Zhou et al. 1981). Subsequent field surveys have revised the total population estimate upward to 2,900-3,000 (Gui 1995; Song et al. 1995). These numbers, although encouraging, do not negate the conservation challenges the Siberian Crane faces. Archibald (1992b) noted that "from the tundra to the subtropics, few endangered species involve so many complex problems in so many countries as does the Siberian Crane." The species is classified as Endangered under the revised

IUCN Red List criteria. The central and western populations, because of their extremely small numbers, are Critically Endangered.

Siberian Cranes are divided into three populations. All but a few belong to the eastern population (Fig. 13.6). These birds breed in northeastern Siberia and winter along the middle Yangtze River in China. The central population (Fig. 13.7) breeds in the lower basin of the Kunovat River in western Siberia and winters in the Indian state of Rajasthan, most regularly at Keoladeo National Park. When this population was last observed on its wintering grounds in 1992-93, it included just five birds. Only four birds were observed in the Kunovat breeding grounds in 1995. The western population (Fig. 13.7), which has apparently held at 8-14 birds over the last 8-10 years, winters at a single site along the southern coast of the Caspian Sea in Iran. The exact location of the breeding grounds is still unknown, but recent reports indicate that they lie in the extreme northern portion of European Russia. This population remains extremely vulnerable.

The Siberian Crane is unique among the cranes in its morphology, vocalizations, and behavior (Sauey 1985). It is the most aquatic of the cranes, exclusively using wetlands for nesting, feeding, and roosting. It nests in bogs, marshes, and other wetlands of the lowland tundra, taiga/tundra transition zone, and taiga, preferring wide expanses of shallow fresh water with good visibility. Although its migration and wintering habitats are somewhat more varied, it still feeds and roosts only in shallow wetlands, including artificial water impoundments in India and Iran. Its preferred foods are the roots, tubers, sprouts, and stems of sedges and other aquatic plants, and it seldom forages above water line.

The three populations of Siberian Cranes face an array of threats. The traditional migratory and wintering habitats of the species (especially in China) are under constant pressure from the demands of the growing human population on wetland systems and resources (Harris 1992). Large portions of the eastern population's wintering grounds in China have been lost to drainage, reclamation, and agricultural development. These areas are also threatened by oil exploration and by construction of the Three Gorges Dam on the Yangtze River (Su 1992; Topping 1995). Oil exploration also poses a broad-scale threat to the known breeding grounds of the species. Hunting is believed to be the major cause of the rapid decline of the central population, and is of continuing concern

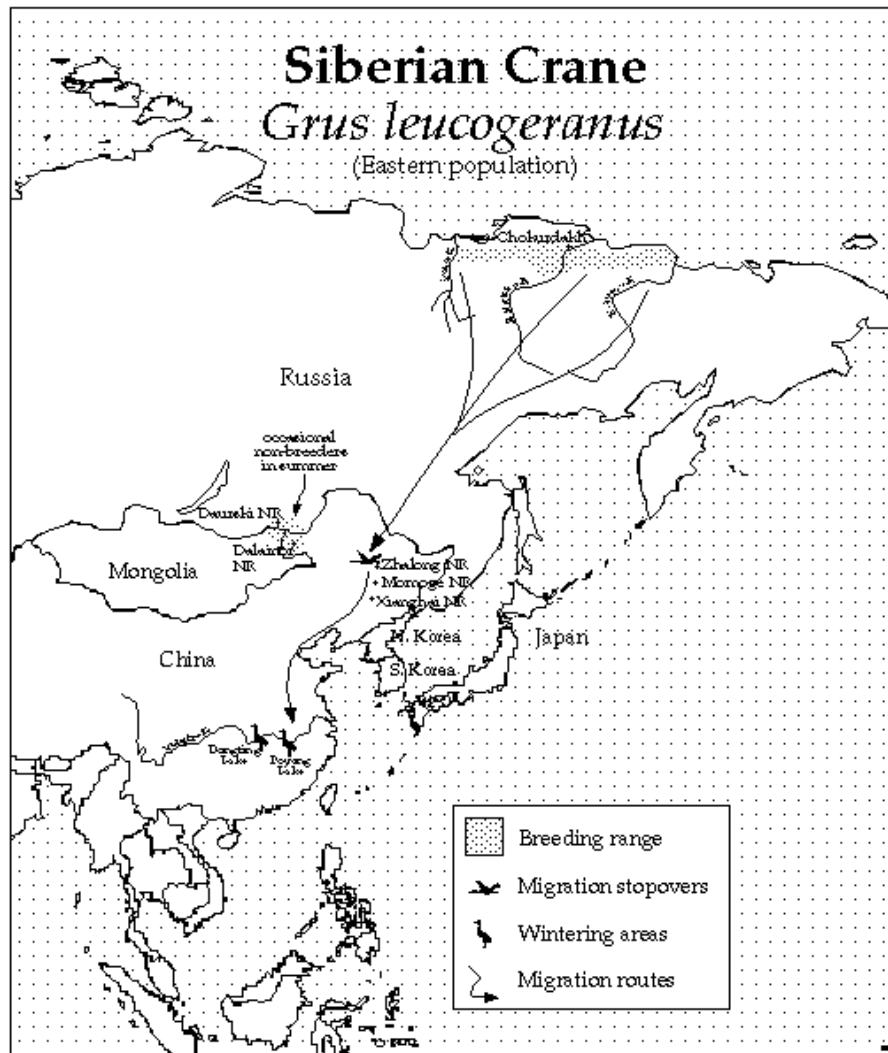


FIG. 13.6. Distribution of the eastern population of the Siberian Crane.

in Pakistan, Afghanistan, and other portions of the species' range (Landfried et al. 1995). The central and western populations are especially vulnerable because of their extremely low numbers.

Concerted conservation efforts on behalf of the Siberian Crane began in the early 1970s. Since then, extensive research has been conducted on the ecology, ethology, breeding and wintering grounds, and migration routes of the species. Annual censuses are available for all three wintering areas and on the breeding grounds of the eastern and central populations. Based on this data, a Population and Habitat Viability Assessment (PHVA) was prepared for the species in 1992 (Mirande et al. *In prep.*). Protected areas have been established at several migration stopover points in Russia, Pakistan, and China, and at the wintering grounds in China and India.

Information about the species has been shared at several international conferences and through expanded communications among biologists. Efforts are now underway to establish an international Siberian Crane Recovery Team and to develop a Recovery Plan. A Memorandum of Understanding Concerning Conservation Measures for the Siberian Crane has been developed. However, it has not yet been signed by all the range countries (UNEP/CMS 1995). An intensive captive propagation program, involving three separate facilities, was initiated in the mid-1970s. Captive-raised birds are now being released in an effort to maintain the central population, and releases are also planned for the western population.

Priority conservation measures for the species include: (1) active participation of all range countries in the Memorandum of

Understanding; (2) full development of the Recovery Team and Recovery Plan; (3) creation of protected areas on the breeding grounds and at key staging areas and stopover points; (4) upgrading habitat protection and management efforts at the wintering grounds in Iran and China; (5) continuation of annual winter counts; (6) identification of the western population's breeding grounds in European Russia; (7) identification of migration routes, important staging areas, stopover points, and alternative wintering grounds (including those used by Eurasian Cranes); (8) studies of breeding, migration, wintering, ecology, causes of mortality, and other crucial aspects of Siberian Crane biology; and (9) development of special educational programs involving hunters along the migration route of the central population and communities near the wintering areas in Iran, India, and China. Captive propagation and



FIG. 13.7. Distribution of the central and western populations of the Siberian Crane.

reintroduction efforts should focus on bolstering the western and central populations, maintaining a genetically diverse captive population, and perfecting rearing and release techniques.

### Sandhill Crane

With a total population estimated at more than 500,000, the Sandhill Crane (Fig. 1.7) is the most abundant of the world's cranes. It is widely (though intermittently) distributed throughout North America, with Cuba and northeastern Siberia at the range extremes (Fig. 13.8) (Tacha et al. 1992). Six subspecies have been described. The three migratory subspecies (the Lesser, Greater, and Canadian Sandhill

Cranes) are relatively abundant. They are distributed across a broad breeding range in northern North America and eastern Siberia, with wintering grounds in the southern United States and northern Mexico. The other three subspecies (the Mississippi, Florida, and Cuban Sandhill Cranes) exist as small, non-migratory populations with restricted ranges in the southern United States (southeastern Mississippi, Florida, and southern Georgia) and Cuba. Although some local populations may be declining, the total population is increasing. While the species is classified as Lower Risk under the revised IUCN Red List criteria, the Mississippi and Cuban subspecies are classified as Critically Endangered.

Prior to European settlement of North America, the Sandhill Crane was more widely distributed than at present (Walkinshaw 1949, 1973). While the remote arctic and subarctic breeding grounds of the Lesser and Canadian Sandhill Cranes have been relatively free from human disturbance, the wintering grounds of these subspecies have been extensively altered. Hunting, agricultural expansion, drainage of wetlands, and other habitat changes in the 18th and 19th centuries led to the extirpation of the Greater Sandhill Crane from many parts of its breeding range in the United States and Canada (Walkinshaw 1949). In recent decades, conservation efforts have allowed some of these populations to recover. The numbers and distribution of the two non-migratory races of the Sandhill Crane in the southern United States have diminished due to hunting, loss of wetlands, and other changes in its habitat. The Cuban Sandhill Crane was probably more widely distributed in the Cuban archipelago than at present.

Sandhill Cranes are primarily birds of open fresh-water wetlands and shallow marshes, but the different subspecies use a broad range of habitat types from bogs, sedge meadows, and fens to open grasslands, pine savannas, and cultivated lands (Tacha et al. 1992). During the breeding season, the three migratory subspecies are found in a wide variety of northern wetlands. Habitats along migration routes tend to be large, open palustrine and riparian wetlands near agricultural areas, while wintering habitats include riparian wetlands, wet meadows, playas, and pastures (Krapu et al. 1984; Iverson et al. 1987). The non-migratory subspecies use seasonally variable wetlands, grasslands, and palm and pine savannas (Smith and Valentine 1987; Nesbitt and Williams 1990; Galvez

and Perera 1995). Sandhill Cranes are omnivorous, feeding on a wide variety of plant materials (including waste grains) and small vertebrates and invertebrates, both on land and in shallow wetlands.

The leading threat to Sandhill Cranes is the loss and degradation of wetland habitats, especially ecological and hydrological changes in important staging areas. Of special concern are the spring staging areas along the central Platte River. The areas favored by the cranes have diminished due to anthropogenic effects on the river's flow. Current plans, if carried out, would result in more dams and excessive water withdrawals (Currier et al. 1985; Faanes and Bowman 1992). Continuing loss of roosting habitat has concentrated the migrating cranes, increasing the risks associated

with disease, disturbance, and other threats. Habitat loss continues on breeding grounds of the Greater Sandhill Crane and on the year-round habitats of the non-migratory subspecies. Overhunting poses a potential threat to certain segments of the mid-continental Sandhill Crane populations. Lead and mycotoxin poisoning, abnormal predation pressures, and collisions with fences, vehicles, and utility lines are of local concern.

Since the decline of the Sandhill Crane in the first half of the 1900s, extensive conservation measures have been undertaken on its behalf. These include: (1) legal protection under the Migratory Bird Treaty of 1916; (2) establishment of protected areas in key breeding, migration, and wintering habitats; (3) stronger national wetland protection policies and programs; (4) annual surveys and counts of many populations; (5) wide-ranging research on many aspects of the species' biology and ecology; (6) management guidelines and plans for mid-continental and Rocky Mountain populations; (7) development of a recovery plan, PHVA, and captive propagation and release program for the

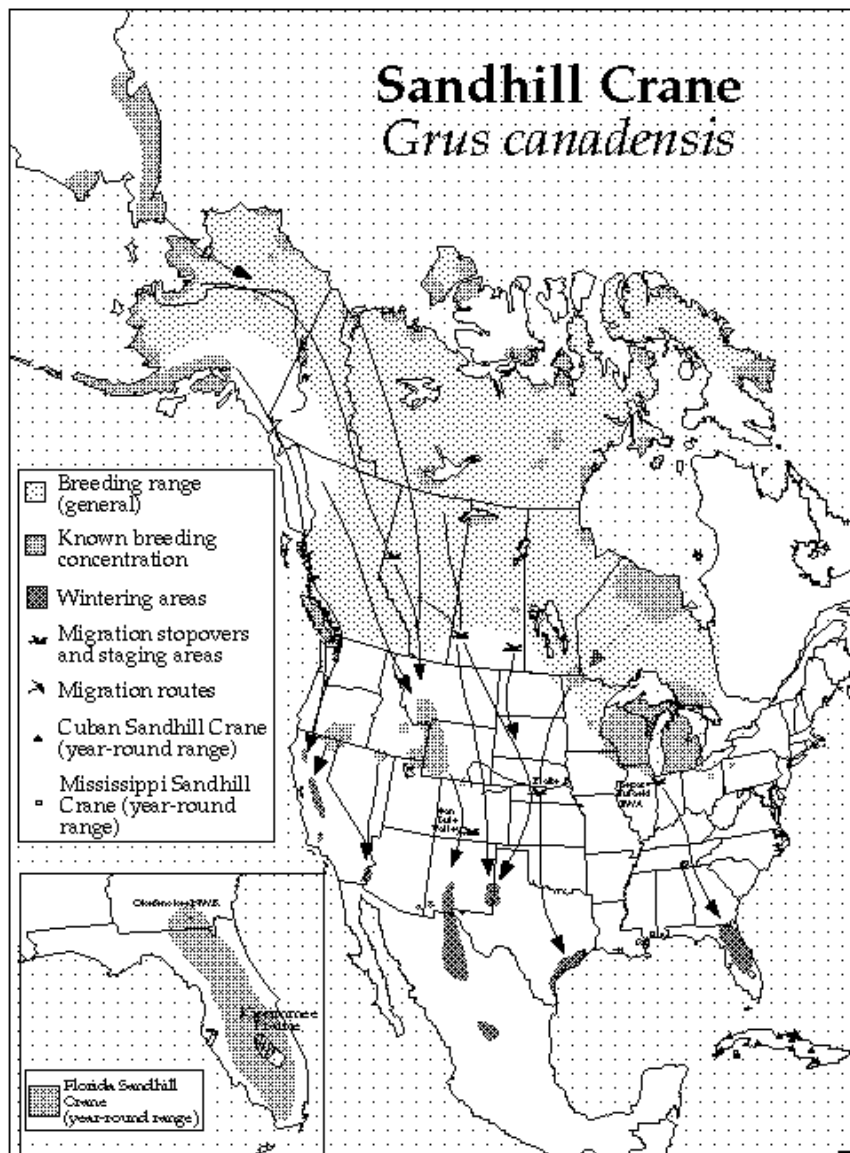


FIG. 13.8. Distribution of the Sandhill Crane.

Mississippi Sandhill Crane; (8) initiation of a research and management program for the Cuban Sandhill Crane; and (9) a wide variety of public education programs.

Priority conservation measures for the Sandhill Crane include: (1) protection, restoration, and management of critical breeding, migration, and wintering habitat for the migratory subspecies (especially along the Platte River) and of the year-round use areas for the non-migratory subspecies; (2) implementation of conservation programs and incentives that involve private landowners; (3) research to improve understanding of the size, status, dynamics, distribution, and movements of populations; (4) continued implementation and updating of the recovery plan for the Mississippi Sandhill Crane; (5) development of a comprehensive Cuban Sandhill Crane conservation program; (6) greater attention to problems associated with crop depredation; (7) greater attention to the long-term effects of hunting; and (8) clarification of subspecies phylogeny.

## *White-naped Crane*

The total population of White-naped Cranes (Fig. 1.8) is estimated at 4,900–5,300. The species breeds in northeastern Mongolia, northeastern China, and adjacent areas of southeastern Russia (Fig. 13.9). Birds in the western portion of the breeding range (about 3,000 individuals) migrate south through China, resting along the Yellow River delta, and wintering in the middle Yangtze River valley (Harris et al. 1995). Approximately 2,000 birds in the eastern portion of the breeding range migrate south through the Korean peninsula (Chon et al. 1994; Ohsako 1994). Several hundred remain on wintering grounds in the Demilitarized Zone between North and South Korea; the remainder continue onto the Japanese island of Kyushu. In the past, the White-naped Crane was more numerous and more extensively distributed than at present (Flint 1978; Won 1981). The population reached its nadir in the years following World War I and the Korean War. Since then, it has increased in many parts of its range, although it may again be declining in parts of Russia and China. The species is classified as Vulnerable under the revised IUCN Red List criteria.

Typical White-naped Crane breeding habitat includes shallow wetlands and wet meadows in broad river valleys, along lake edges, and in lowland steppes

or mixed forest steppes (Su et al. 1991; Fujita et al. 1994). White-naped Cranes feed in their breeding habitat and in adjacent grasslands or farmlands. During migration and on their wintering grounds, they use rice paddies, mudflats, other wetlands, and agricultural fields, where they feed on waste grains, seeds, and tubers (Chen et al. 1987; Halvorson and Kaliher 1995).

The loss of wetlands to agricultural expansion, especially in the breeding grounds of the Amur River basin and other parts of northern China, is the most significant threat to the species. Its preferred habitats are especially prone to drainage and conversion to agriculture (Harris 1994a). The Korean Demilitarized Zone, which has served as a critical refuge for White-naped and Red-crowned Cranes, is highly vulnerable to armed conflict or to development should political tensions between North and South Korea be resolved (Halvorson and Kaliher 1995). Other threats include overexploitation of wetland resources, ineffective management of key protected areas, indiscriminate pesticide use, and the proposed dams on the Amur River and on the Yangtze River at Three Gorges. Wintering Hooded and White-naped Cranes at Izumi in Japan are highly concentrated and susceptible to disease outbreaks.

Current conservation measures for the species include: legal protection in all range countries; international cooperation to protect the species and to manage key reserves in the China-Russia-Mongolia border region; establishment of protected areas in important breeding and wintering habitats; regular surveys of the population at migration stopover points and on the main wintering grounds; expanded research on the species throughout its range; and the involvement of non-governmental organizations in research, habitat protection, and captive propagation programs. Limited releases of captive-reared birds have been carried out at the Zhalong Nature Reserve in China and the Khinganski Nature Reserve in Russia.

Priority conservation measures include: (1) expanded international cooperation in managing nature reserves and in research on migration patterns and timing; (2) expansion of existing reserves and establishment of new protected areas (especially in Mongolia, northeastern China, and the Korean Peninsula); (3) dispersion of the wintering crane populations at Izumi; (4) development of integrated land use and conservation programs in key watersheds; (5) assessment of the environmental impacts of large-scale dam and development projects; (6) continuing sur-

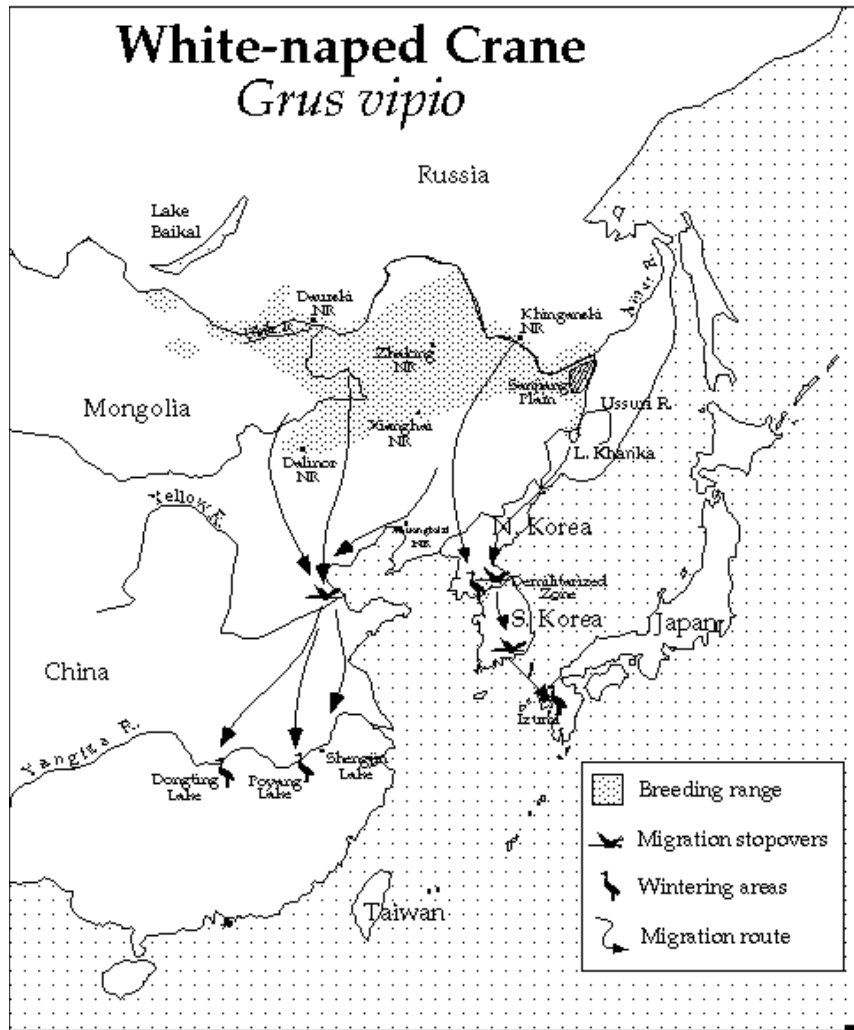


FIG. 13.9. Distribution of the White-naped Crane.

veys of the population; (7) more complete identification of the species' breeding grounds, especially in northeastern China; (8) professional training opportunities for reserve managers and conservation officials; (9) improved agricultural information services for farmers; and (10) community-based conservation education programs involving cranes and wetlands.

## Sarus Crane

At 1.8 m, the Sarus Crane (Fig. 1.9) is the world's tallest flying bird. It is also the only resident breeding crane in India and southeast Asia (Fig. 13.10). The total population for the three subspecies is between 13,500 and 15,500. The Indian Sarus Crane (*G. a. antigone*) is still common in northern India, but has

been extirpated from large portions of its historical range and continues to decline in areas where it still exists (Gole 1989, 1991). The Eastern Sarus Crane (*G. a. sharpii*) has been decimated throughout its historical range in southeast Asia. One known population, estimated at between 500 and 1,500, breeds in Cambodia and Laos (and possibly surrounding areas) and winters in Vietnam (Duc 1991; Barzen 1994). The Australian Sarus Crane (*G. a. gilli*) is limited to northeastern Australia, and probably numbers less than 5,000 (A. Haffenden, Australian Nature, Atlanta, Georgia, personal communication). Sarus Cranes, possibly of a distinct subspecies, formerly occurred in the Philippines. This population is now presumed extinct. The species is classified as Endangered under the revised IUCN Red List criteria. The Indian and Eastern subspecies are also classified as Endangered. We know too little about the Australian subspecies to classify it at this time.

The three subspecies use widely varying habitats. The Indian race is highly tolerant of human activity. These birds use even very small wetlands if they are not persecuted or heavily disturbed (Gole 1989, 1991). Breeding pairs and families with pre-fledged chicks are typically dispersed among scattered natural and artificial wetlands. Adult pairs will use drier habitats such as cultivated and fallow fields. Eastern Sarus Cranes are less tolerant of people and are almost completely dependent on natural wetlands in both wet and dry seasons. Australian Sarus Cranes nest in open wetlands during Australia's wet season and feed in upland agricultural fields and grasslands at other times of the year (Marchant and Higgins 1993).

Loss and degradation of wetlands (due to agricultural expansion, industrial development, river basin development, pollution, warfare, heavy use of pesticides, and other factors) are the most important



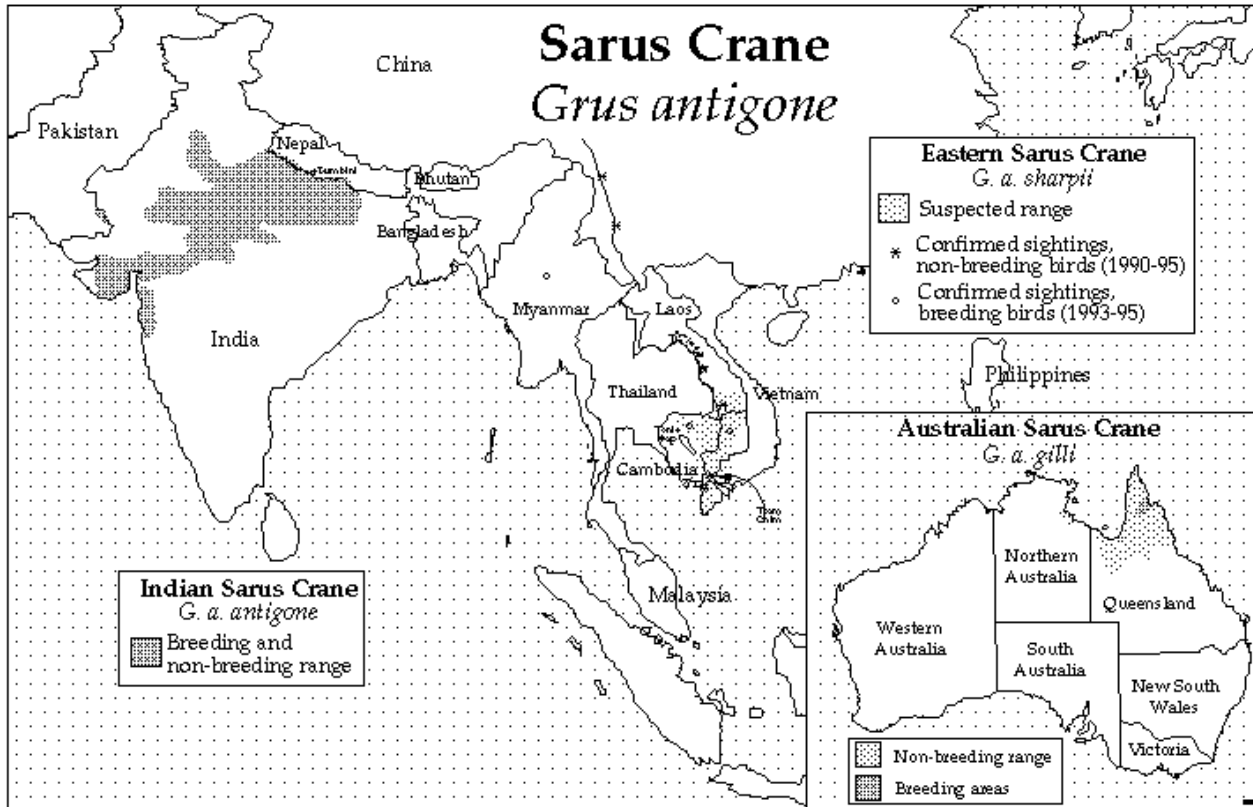


FIG. 13.10. Distribution of the Sarus Crane.

threats to the species, especially in India and southeast Asia. In many areas, high human population pressures compound these threats by increasing disturbance (Gole 1991; Suwal 1995). Human population growth and planned development projects on the Mekong River are acute threats to the Eastern Sarus Crane (Lohmann 1990). Hunting, egg stealing, and the capturing of chicks are also significant problems in some areas, and especially affect the Eastern Sarus Crane. Trading in adults and chicks has been reported in India, Cambodia, and Thailand.

Local traditions and religious beliefs have protected the Sarus Crane in many parts of its range, especially northern India, Nepal's western Terai, and Vietnam (Gole 1993). The species has been the focus of increased conservation activity in recent years, including: (1) international agreements and collaborative conservation projects in southeast Asia; (2) field studies of the species in India and Nepal; (3) intensive surveys of the Eastern Sarus Crane during the dry season in Vietnam and during the breeding season in Cambodia; (4) establishment of the Tram Chim National Reserve in Vietnam and efforts to restore the reserve's wetlands; (5) convening (in 1990)

an International Sarus Crane and Wetland Conservation Workshop; (6) development of a preliminary PHVA for the Eastern Sarus Crane; and (7) establishment of education programs in Nepal and Vietnam. Sarus Cranes are not currently being reintroduced, but plans for reintroduction are underway in Thailand and other portions of the species' historical range.

Priority conservation measures for the species include: (1) identification and protection of breeding areas in India, Cambodia, Myanmar, and Laos, and of non-breeding habitat in Vietnam, Laos, and Cambodia; (2) full implementation of the management plan for Vietnam's Tram Chim National Reserve; (3) protection, maintenance, and restoration of village ponds and other small wetlands in India; (4) improved pesticide management and regulation in agricultural areas used by cranes, especially in India and Nepal; (5) watershed-level conservation planning in the Mekong River basin; (6) expanded efforts to survey and monitor Eastern Sarus Cranes; (7) further research on distribution, ecology, movement, and habitat needs throughout the species range; (8) expanded surveys and basic ecological studies of the

Australian Sarus Crane; (9) development and implementation of national-level wetland conservation plans in range countries; (10) preparation of full PHVAs for both the Indian and Eastern Sarus Crane; and (11) assessments of existing habitat and the potential for natural recolonization in areas where the species is now rare or extinct.

## Brolga

The Brolga (Fig. 13.10) occurs throughout northern and eastern Australia and in limited areas of New Guinea (Fig. 13.11) (White 1987; Marchant and Higgins 1993). The Brolgas in northern and southern Australia can be regarded as discrete populations, but are no longer recognized as distinct subspecies. Because no systematic, range-wide survey of the species has been undertaken, no reliable population estimate is available and trends are poorly understood. The total population may range from 20,000 to 100,000 and is probably stable overall. This species still occupies much of its historical range. In recent decades, the Brolga has declined in southeastern

Australia, while apparently expanding (due to increasing use of croplands) in the Northern Territory, on the Kimberley Plateau, and elsewhere in western Australia (Blakers et al. 1984; White 1987). Little is known about the status of, or trends in, the New Guinea populations. The species is classified as Lower Risk (Least Concern) under the revised IUCN Red List criteria.

Brolgas are non-migratory, but do move in response to seasonal rains. Ecologically, they are perhaps the most opportunistic of the cranes, having evolved to cope with Australia's extreme climatic variations. Northern populations are concentrated during the dry season in coastal freshwater wetlands where they subsist on the tubers of the bulkuru sedge (*Eleocharis dulcis*). In the wet season, they disperse to breeding territories in freshwater and brackish marshes, wet meadows, and other seasonal wetlands (Lavery and Blackman 1969; Blackman 1977). Although the wet and dry seasons in southern Australia are less marked, southern Brolga populations also move between wet season breeding territories and traditional dry season flocking areas. They inhabit a similarly wide range of available wetland types, but generally use salt marshes far less than the northern Brolgas.

The most significant threat to the Brolga across its range is the loss and degradation of wetland habitat. In northern Australia (especially along the eastern coast), wetlands used by Brolgas have been extensively degraded by livestock grazing, disruption of hydrological processes, and changes in vegetation (A. Haffenden, Australian Nature, Atlanta, Georgia, personal communication). In the south, loss of wetlands to drainage and reclamation for agriculture is probably the main factor behind the dramatic decline in Brolgas there (Arnold et al. 1984). Other threats include the subdivision (and subsequent fencing) of large private land holdings, pre-

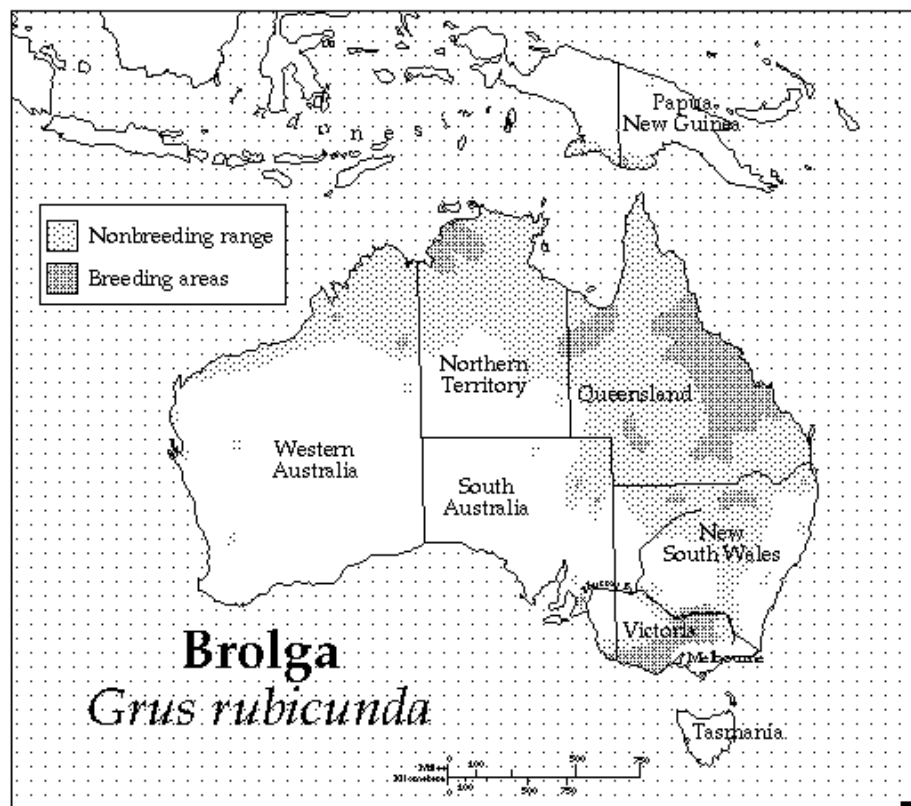


FIG. 13.11. Distribution of the Brolga.

dation by the introduced red fox (*Vulpes fulva*), incidental poisoning, and collisions with utility lines.

Most research and conservation activity involving the Brolga has taken place in the southeast, where the species is no longer as common as in the north. Conservation measures undertaken for the species include: (1) legal protection throughout Australia; (2) local surveys in South Australia, Victoria, and New South Wales; (3) preparation of an Action Statement for Brolgas under the Victorian Flora and Fauna Guarantee Act; (4) programs to protect and restore privately owned wetlands in Victoria; and (5) establishment of a private conservation organization, Friends of the Brolga. A captive propagation program was initiated in Victoria in 1964; surplus birds from this program are to be released in 1995 and 1996.

Priority conservation needs for the Brolga include: (1) adaption of strong watershed-level wetland conservation programs, (2) assessment of the status and conservation needs of the species in New Guinea; (3) enactment of stronger national wetland protection laws and policies; (4) development of incentive and extension programs to encourage and reward private landowners who conserve Brolga habitat; (5) development of a systematic censusing and monitoring program for the species, and inclusion of the species in routine aerial waterfowl counts; (6) expanded research on flocking sites, breeding biology, size and trends of each population, and identification of isolated populations; and (7) expanded education and extension programs.

## Eurasian Crane

The Eurasian Crane (Fig. 1.11) is the third most abundant species after the Sandhill and Demoiselle Cranes. The total population, estimated at 220,000-250,000, is probably increasing, although some populations are declining. However, no coordinated survey has been conducted throughout the species' range. The species is not globally threatened, but it is legally protected in many countries. The species is classified Lower Risk (Least Concern) under the revised IUCN Red List criteria. Breeding populations in European Russia and central Siberia are classified Vulnerable, while small populations in Turkey and the Tibetan Plateau are too poorly known to classify at present.

The species' breeding range extends from northern and western Europe across Eurasia to northern

Mongolia, northern China, and eastern Siberia, with isolated breeding populations in eastern Turkey and Tibet (Fig. 13.12). The winter range includes portions of France and the Iberian Peninsula, north and east Africa, the Middle East, India, and southern and eastern China. The species continues to occupy most of its historical range. However, during the last 200-400 years it has been extirpated as a breeding species in much of southern and western Europe, the Balkan Peninsula, and southern Ukraine (Prange 1989, 1995).

The Eurasian Crane nests primarily in bogs, sedge meadows, and other wetlands within Eurasia's boreal and temperate forest zones (Walkinshaw 1973; Johnsgard 1983). Under natural conditions, pairs prefer large, isolated nesting territories. However, in intensively cultivated areas they have adapted to smaller and less wild wetlands (Mewes 1994). During migration, they forage in agricultural fields, pastures, and meadows, and roost in shallow lakes, bogs, rivers, along the edges of reservoirs, and in other wetlands. The widely scattered wintering grounds include a wide spectrum of upland and wetland habitats, from open oak woodlands in the Iberian Peninsula to shallow lakes, agricultural fields, and delta wetlands in China (Alonso and Alonso 1990; Xu et al. 1991). Eurasian Cranes are omnivorous, foraging in wetlands, on dry land, and in agricultural fields for a wide variety of plant and animal foods.

Habitat loss and degradation are the principal threats to the species. Wetlands have been lost to drainage, dams, and other forms of development throughout the species' range, particularly in Europe, European Russia, and central Asia (Priklonski and Markin 1982; Harris 1992; Newton 1996). Although Eurasian Cranes have adapted to human settlement in many areas, continuing changes in land use and agricultural production methods (such as expanded irrigation and conversion of traditional pastures) have had negative impacts. Human disturbance and collision with utility lines are problems in Europe and other heavily developed areas. Hunting is a significant concern for the populations that migrate through Afghanistan and Pakistan (Landfried et al. 1995).

Conservation measures have been undertaken most intensively in the western portions of the species' range. In western and central Europe, the species has benefitted from legal protection, systematic research and monitoring programs, creation and restoration of wetlands, and protection of important staging areas, roosting sites, and wintering grounds. Information

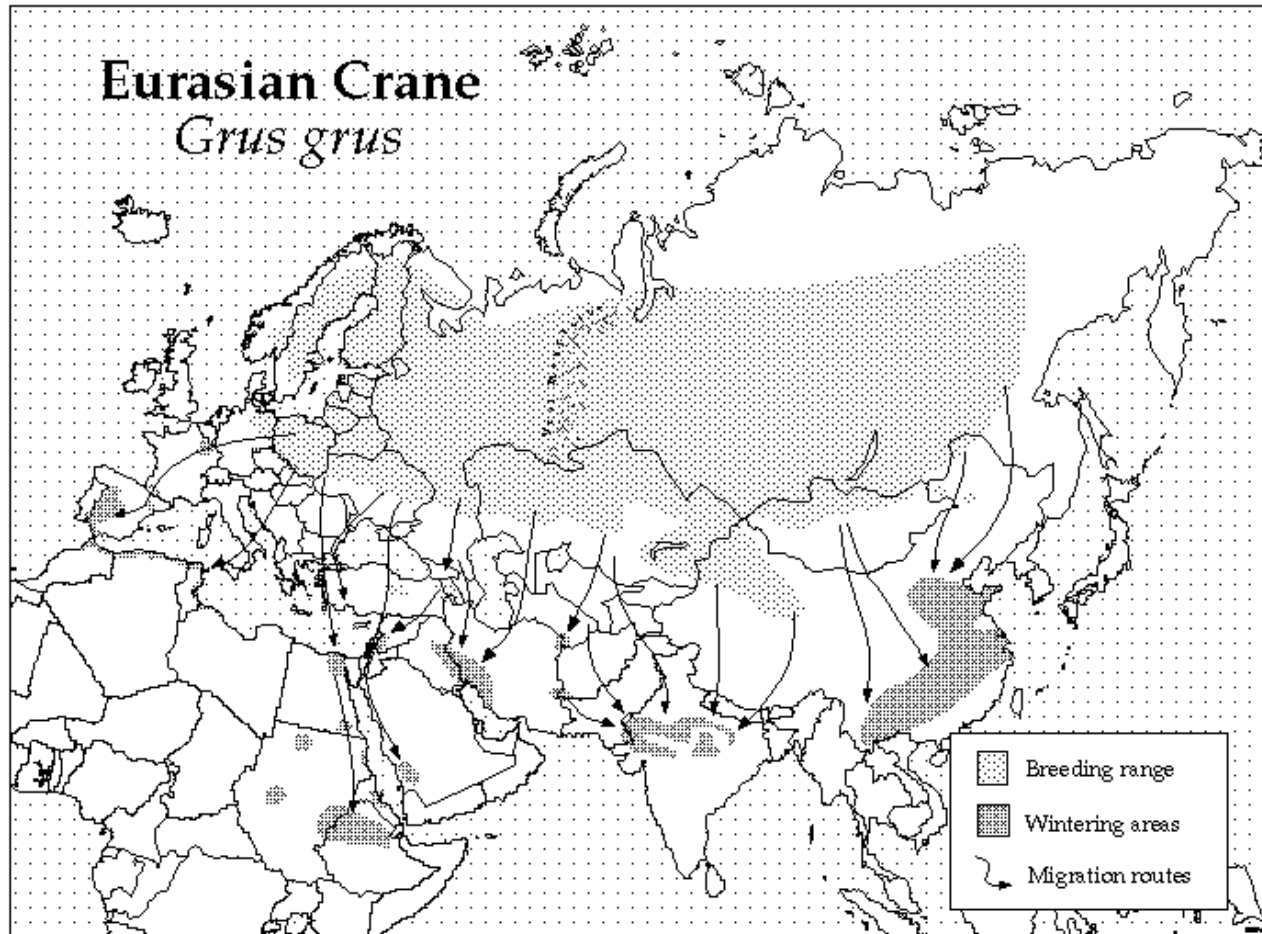


FIG. 13.12. Distribution of the Eurasian Crane.

about migration patterns is available due to color banding programs and regular observations along the migration routes (Prange 1989, 1995). International cooperation has played an important role in promoting these measures. In the last decade, such cooperation has expanded into Eastern Europe, where the species has been under greater threat due to recent economic changes. Conservation efforts have been less focused in eastern Russia, Africa, the Middle East, and Asia. In these areas, however, the Eurasian Crane often mixes with other cranes and thereby has benefitted from conservation actions undertaken on their behalf.

Priority conservation measures for the species include: (1) adoption of the Ramsar Convention in all range countries; (2) stronger legal protection for cranes and crane habitats; (3) expanded international research, monitoring, and conservation programs; (4) establishment of protected areas at key breeding, staging, and wintering areas; (5) broad-scale wetland protection and restoration programs (especially in Europe); (6) expanded efforts to survey and census

populations; (7) research on the number, status, distribution, migration routes, and breeding and wintering areas of the main populations; (8) field studies of the isolated populations in the Tibetan Plateau and Turkey; (9) establishment of a central database to maintain information on the species; (10) coordinated efforts to address crop depredation problems; (11) training programs for volunteers working in protected areas established for cranes; and (12) expanded education programs for students and the general public.

### *Hooded Crane*

The total population of Hooded Cranes is estimated at 9,400-9,600. The breeding grounds of the species (Fig. 13.13) are in southeastern Russia and northern China, while non-breeding flocks occur in the Russia-Mongolia-China border region (Neufeldt 1981; Fujimaki et al. 1989; Li 1995; Bold et al. 1995). The

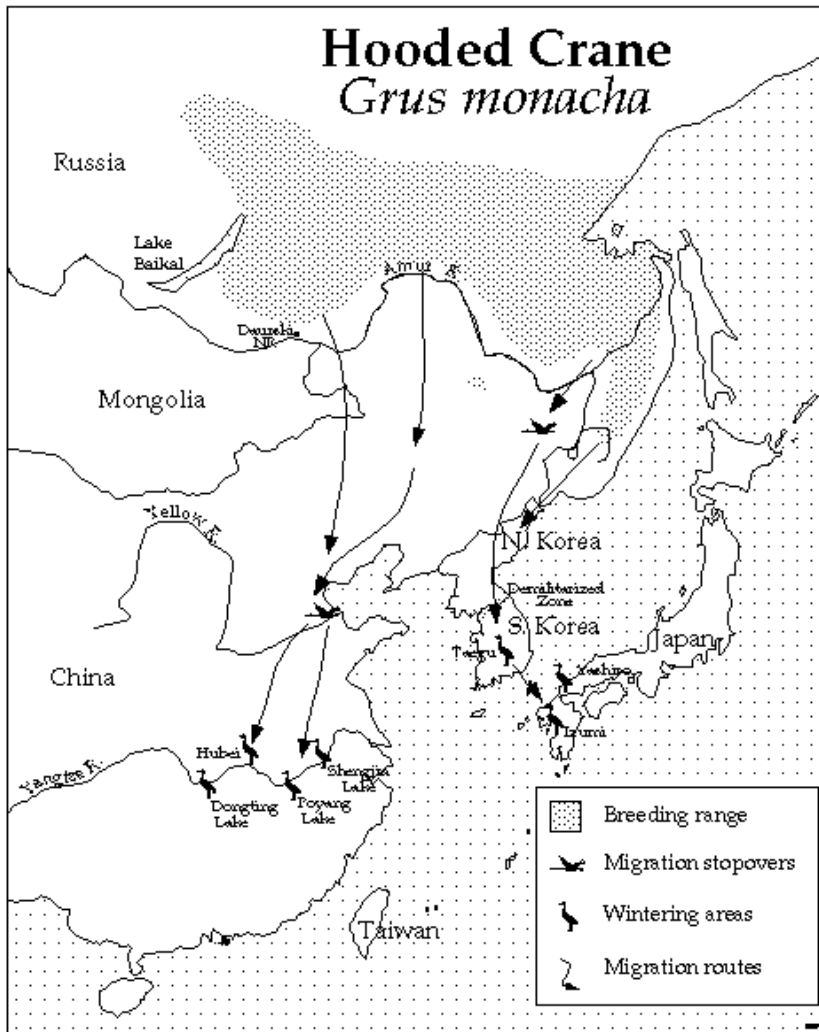


FIG. 13.13. Distribution of the Hooded Crane.

species is divided into several wintering subpopulations. More than 80% of the world's Hooded Cranes (about 8,000 birds) spend the winter at Izumi on the Japanese island of Kyushu, where they are sustained by artificial feeding (Ohsako 1994). Small subpopulations are found at Yashiro in southern Japan, near Taegu in South Korea, and at several sites along the middle Yangtze River in China. Although little is known about historical changes in the distribution of the species, its numbers are known to have fluctuated dramatically since the 1920s (Ohsako 1987). At present, the population is probably as large as at any point this century. The species is classified as Vulnerable under the revised IUCN Red List criteria.

Hooded Cranes (Fig. 1.12) nest in isolated, widely scattered bogs in the taiga and in other forested wetlands, preferring mossy areas with widely scattered larch trees (*Larix* sp.), and avoiding areas that are

either too open or too densely forested (Pukinski 1977). Non-breeding cranes are found in shallow open wetlands, natural grasslands, and agricultural fields in southern Siberia, northeastern Mongolia, and northern China. Wintering Hooded Cranes use a wide variety of habitats. In China, they tend to roost along the shores of rivers and shallow lakes, and to forage in the muddy edges of lakes and in nearby grasslands, grassy marshes, rice paddies, and agricultural fields (Chen and Wang 1991). In Korea and Japan they feed almost exclusively at feeding stations and in agricultural fields (Cho and Won 1990; Ohsako 1987).

Although the Hooded Crane is a threatened species, it is more secure than other threatened cranes of East Asia. This is due mainly to the relative absence of intensive human economic activity in their breeding grounds. Moreover, the species (unlike the other East Asian cranes) winters primarily in Japan rather than China and the Korean Peninsula, where threats are somewhat greater. However, the species does face several critical threats, including: drainage of wetlands and intensified logging in Russia's taiga

forests; reclamation of wintering grounds in China for agriculture and alterations in the hydrology of these areas; the planned Three Gorges dam on the Yangtze River; rapid development of the key wintering grounds in Korea, especially through the construction of greenhouses; and high risk of disease outbreak in the concentrated flocks at the winter feeding stations in Japan.

Conservation measures that have been undertaken include: (1) legal protection throughout the species' range; (2) international agreements to protect the species and key habitat throughout its range; (3) recently expanded research on breeding habitats, winter ecology, and migration routes; (4) annual surveys of populations on the wintering grounds; (5) establishment of protected areas, especially in the winter range; and (6) intensive management (including the artificial feeding programs) at the main wintering area in Japan.

The Hooded Crane has many of the same priority conservation needs as the White-naped, Red-crowned, and Siberian Cranes, including stronger enforcement of existing laws, adoption of an umbrella agreement on the migratory cranes of East Asia, adoption of the Ramsar Convention in all range countries, expanded international conservation programs, continued research on migration routes, and protection of key habitats in China and the Korean Peninsula.

Additional priorities specific to the species include: protection of potential alternative feeding and roosting sites for the wintering populations in southern Japan and Korea; studies of the West Taegu population in Korea and application of this information in creating an adequate protected area for the flock; agreements to bring greenhouse development under control in and near the Hooded Crane Protection Area in Korea; continued winter surveys of all Hooded Crane populations; and development of a program to monitor the status of the breeding grounds in Russia.

## *Black-necked Crane*

CONTRIBUTED BY MARY ANNE BISHOP

The world's Black-necked Crane population is estimated at 5,600–6,000. The species' breeding range (Fig. 13.14) includes much of the Qinghai-Tibetan Plateau in China, with a small breeding population occurring nearby in Ladakh, India (Lu et al. 1980). Six main wintering locations have been identified. These include lower elevations of the Qinghai-Tibet and Yunnan-Guizhou Plateaus in China, with some birds also occurring in Bhutan and Arunachal Pradesh, India (Bishop 1993). Published records and local reports indicate that the species has declined in many breeding and wintering areas over the last seventy years, although the population seems to have stabilized since the 1970s. The species is classified as Vulnerable under the revised IUCN Red List Criteria.

During the breeding season Black-necked Cranes (Fig. 1.13) use high altitude wetlands, nesting in grassy marshlands, sedge meadows, and marshes along the shores of lakes and streams, and foraging in shallow marshes, streams, and pastures (Li 1987). Their diet includes plant roots, tubers, snails, shrimp, small fish, and other small vertebrates and invertebrates. The

cranes winter in lower elevation, agricultural valleys, where they feed mainly on waste grains and other residue in fields and pastures. In both breeding and wintering areas, Black-necked Cranes are quite tolerant of human activity, and regularly feed near human settlements and domestic livestock.

Degradation and loss of habitat are the main threats facing the Black-necked Crane. These problems are most serious in the wintering areas, where wetlands have been extensively affected by irrigation projects, dam construction, drainage and conversion to agriculture, river channelization, heavy grazing pressure, sedimentation, and industrial pollution (Li and Li 1991; Wei et al. 1994; Bishop et al. *In prep.*). In Tibet, widespread changes in traditional agricultural practices have reduced the availability of waste barley and spring wheat, the main winter foods (Bishop 1991). Hunting has become an important threat in several wintering areas with the introduction of firearms and increased accessibility of formerly remote areas. Other factors, including egg collecting and predation by feral dogs, are significant threats in some locales.

Conservation measures for the species have greatly expanded since the late 1970s. These measures include: (1) implementation of an integrated program of conservation and development at Cao Hai Lake, a key wintering area in Guizhou Province, China; (2) establishment of additional protected areas in China and Bhutan; (3) regular population surveys in the main wintering areas; (4) expanded field studies of the species' distribution, habitat use, breeding biology, wintering ecology, and conservation status; (5) support for conservation programs from national and international non-governmental organizations; and (6) training programs for local conservation officials and reserve personnel. Local religious beliefs have also played a critical role in safeguarding the Black-necked Crane across much of its range.

Priority conservation measures for the species include: (1) stronger efforts to control poaching; (2) improved management of existing protected areas (especially Cao Hai Nature Reserve); (3) establishment of protected areas in Yunnan and India; (4) protection of wetlands (especially in wintering areas) against further deterioration and development; (5) establishment of agricultural management areas in key wintering and breeding areas; (6) regular, coordinated counts of the wintering populations; (7) banding and satellite radio studies of the main wintering populations; (8) studies of roosting habitats in Tibet,

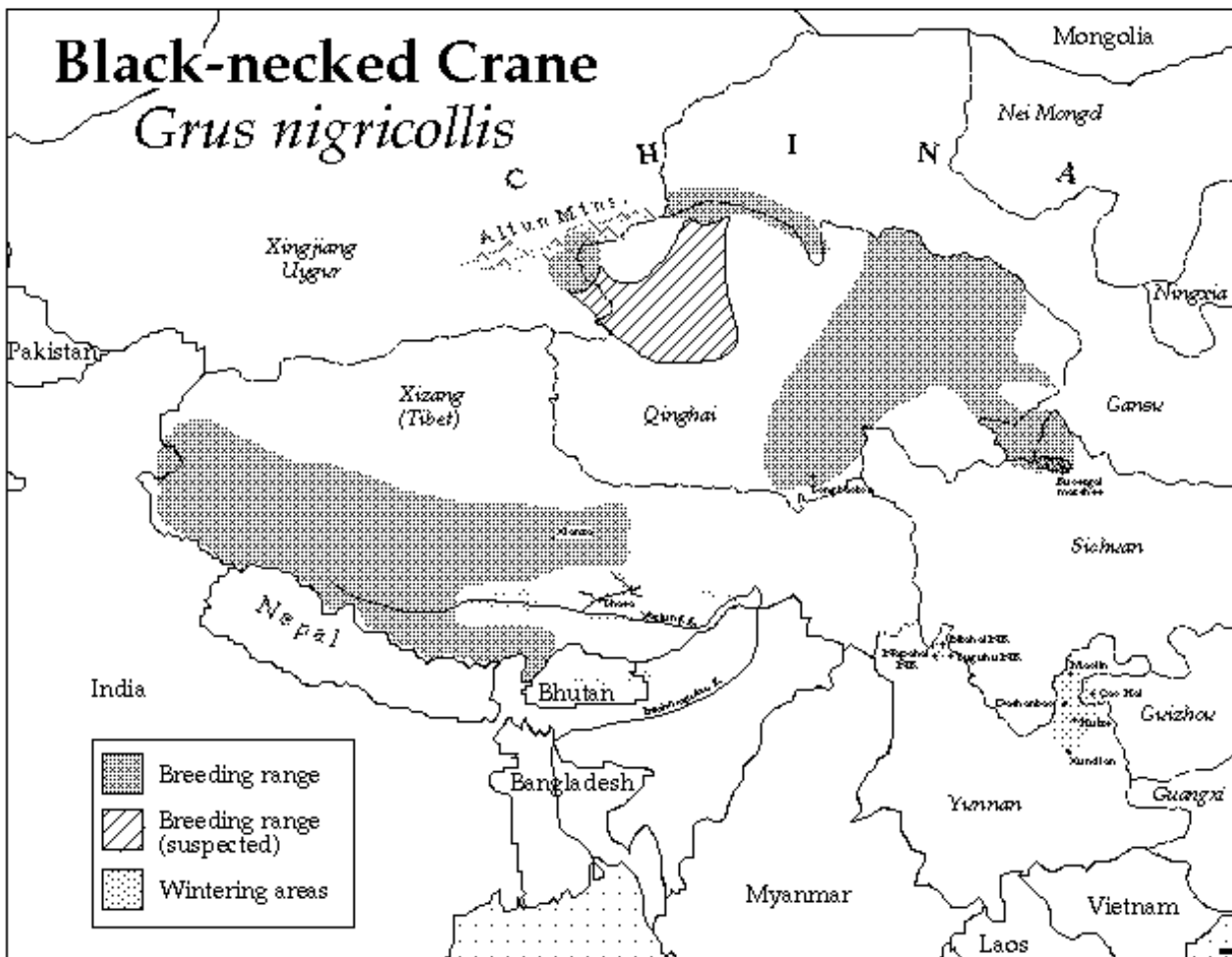


FIG. 13.14. Distribution of the Black-necked Crane.

Yunnan, and Bhutan; (9) further development of education programs; and (10) expanded training opportunities for nature reserve personnel.

## Red-crowned Crane

CONTRIBUTED BY SCOTT R. SWENDEL

The Red-crowned Crane (Fig. 1.14) is the second rarest species of crane, with a total population in the wild of 1,700-2,000 birds. The species breeds in large wetlands in temperate East Asia, and winters along rivers and in coastal and freshwater marshes in Japan, China, and the Korean Peninsula (Fig. 13.15). There are two main breeding populations, a migratory population on the East Asia mainland (northeastern China and Russia) and a resident population on the island of

Hokkaido in northern Japan (Masatomi 1981; Su 1993). In the winter, the mainland population divides into two or three wintering subpopulations. The total population has fluctuated over the last century, probably reaching its lowest point in the years following World War II (Masatomi 1981). Although the species has recovered in some areas, much habitat has been lost to agricultural development and other human economic activities. The species is classified as Endangered under the revised IUCN Red List criteria.

Red-crowned Cranes prefer to nest and feed in marshes with relatively deep water, building their nests in areas with standing dead vegetation (Smirenski 1988). They prefer wetter foraging sites, but will also forage on dikes and in croplands. On their wintering grounds, they feed on waste (or human-provided) grain and on aquatic plants and animals in coastal marshes and open watercourses (Andronov et al. 1988; Masatomi 1993).

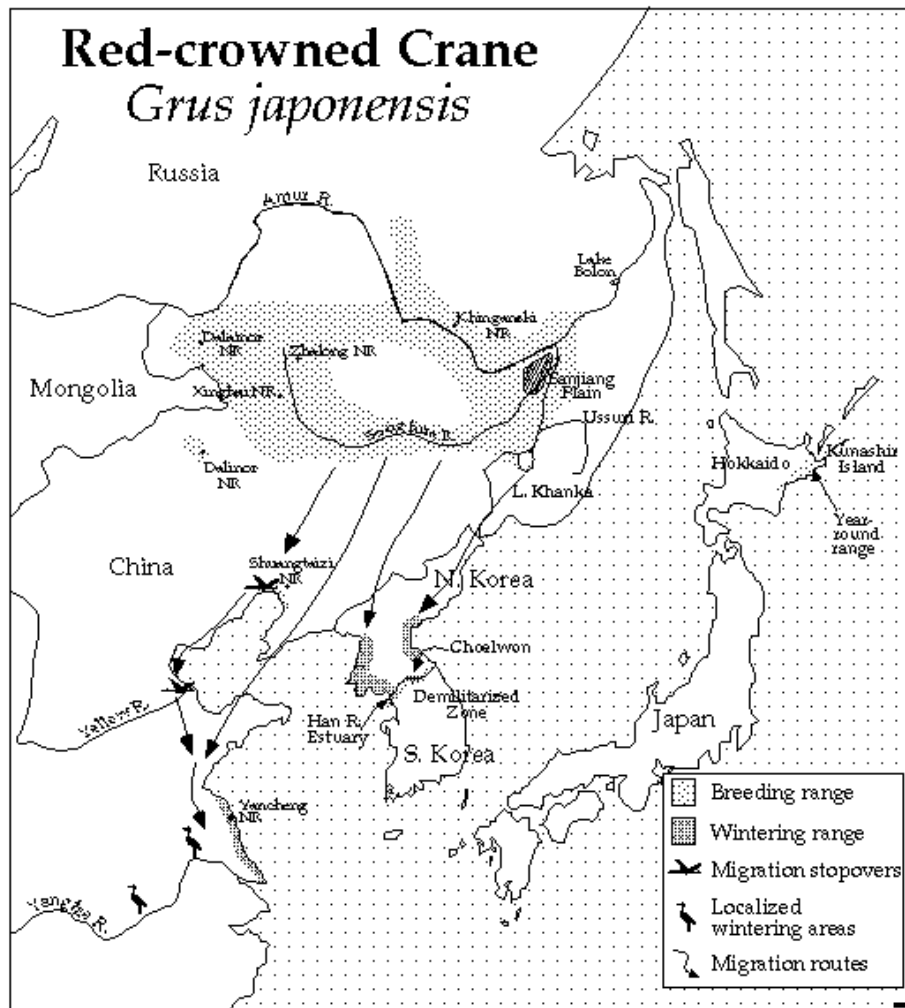


FIG. 13.15. Distribution of the Red-crowned Crane.

Habitat loss is the principal threat to the species. Continued agricultural and industrial development affects breeding areas in Hokkaido, the Sanjiang Plain in northeastern China, and the Amur River basin in Russia (Masatomi et al. 1990; Harris 1994a; Smirenski et al. 1995). Water control and diversion projects (including proposed dams on the Amur River and on the Yangtze River) and the potential for conflict or development in the Korean Demilitarized Zone pose large-scale threats to breeding, migration, and wintering habitat. Other anthropogenic threats include disturbance, intentional setting of fires, and overharvest of wetland resources in key breeding areas (Harris 1994a).

Current conservation measures include: (1) international agreements and cooperative research (especially involving migration); (2) establishment of reserves to protect habitat and minimize disturbance; (3) devel-

opment of winter feeding stations and the marking of nearby powerlines in Japan; (4) regular surveys on breeding and wintering grounds; (5) preparation of a PHVA for the species; (6) cooperative conservation and education programs focused on the species; and (7) several limited reintroduction efforts.

Priority conservation needs include: (1) adoption of an umbrella international agreement on the cranes of East Asia; (2) development of a comprehensive recovery plan for the species; (3) continued international cooperation in research on migration routes and patterns; (4) protection of key habitats on the Korean Peninsula; (5) adoption of improved methods of resource management (including both wetland resources and agricultural lands) in and around existing protected areas; (6) annual surveys of the main wintering populations; (7) research

on the impacts of human resource use on breeding habitats and breeding behavior; and (8) development of education programs to encourage farmers and other local residents to adopt sustainable resource use practices.

## Whooping Crane

The Whooping Crane (Fig. 1.15) is the rarest of the world's 15 crane species. The species' historical decline, near extinction, and gradual recovery is among the best known and documented cases in the annals of conservation (Allen 1952; McNulty 1966; Doughty 1989). Over the last 50 years, a combination of strict legal protection, habitat preservation, and continuous international cooperation between Canada and the



United States has allowed the only surviving wild population to increase steadily from a nadir of just 15 or 16 individuals in 1940-41 to about 150 today. Since the mid-1960s, captive propagation has become increasingly important and now provides security against extinction of the species while affording opportunities to initiate new populations. The species provides an important case study in the conservation of rare and endangered species, and serves as a symbol for international cooperation in conserving not only threatened cranes, but biodiversity in general. The species is classified as Endangered under the revised IUCN Red List criteria.

The Whooping Crane occurs exclusively in North America (Fig. 13.16). The historical mid-continental

breeding range stretched from Alberta across the northeastern portions of the mid-continental prairies nearly to the southern end of Lake Michigan (Allen 1952). The historical wintering grounds included the highlands of northern Mexico, the Texas Gulf coast, and parts of the Atlantic coast. Non-migratory populations occurred in Louisiana and possibly other areas in the southeastern United States. The species declined rapidly in the late 1800s and early 1900s as a result of hunting, collecting, and the conversion of its habitats to agriculture. By 1940, only one self-sustaining flock remained.

As of August 1995, the Whooping Crane numbered 178 in the wild and another 145 birds in captivity. In the wild, the species exists in three separate popula-

tions: the historical Aransas-Wood Buffalo population, an experimental cross-fostered population of only four surviving birds in the Rocky Mountains, and an experimental non-migratory population of released birds in central Florida. Whooping Cranes are maintained in captivity at four locations.

Historically, the species bred primarily in wetlands of the northern tall- and mixed-grass prairies and aspen parklands (Hjertaas 1994). The remnant wild population breeds at the northernmost extreme of the historical range in intermixed muskeg and boreal forest in Canada's Wood Buffalo National Park (Kuyt 1981). During migration, this population uses a variety of feeding and roosting habitats, including croplands, marshes, and submerged sandbars in rivers along the migration route (Lewis 1995). The birds winter in bays and coastal marshes within and near the Aransas National Wildlife Refuge on the Texas Gulf Coast. A population derived from 289 eggs placed in Sandhill Crane nests in the Rocky Mountains peaked at about 35 birds in 1985 but now consists of only four individuals (Ellis et al. 1992). The experimental non-migratory population of 24 captive-reared

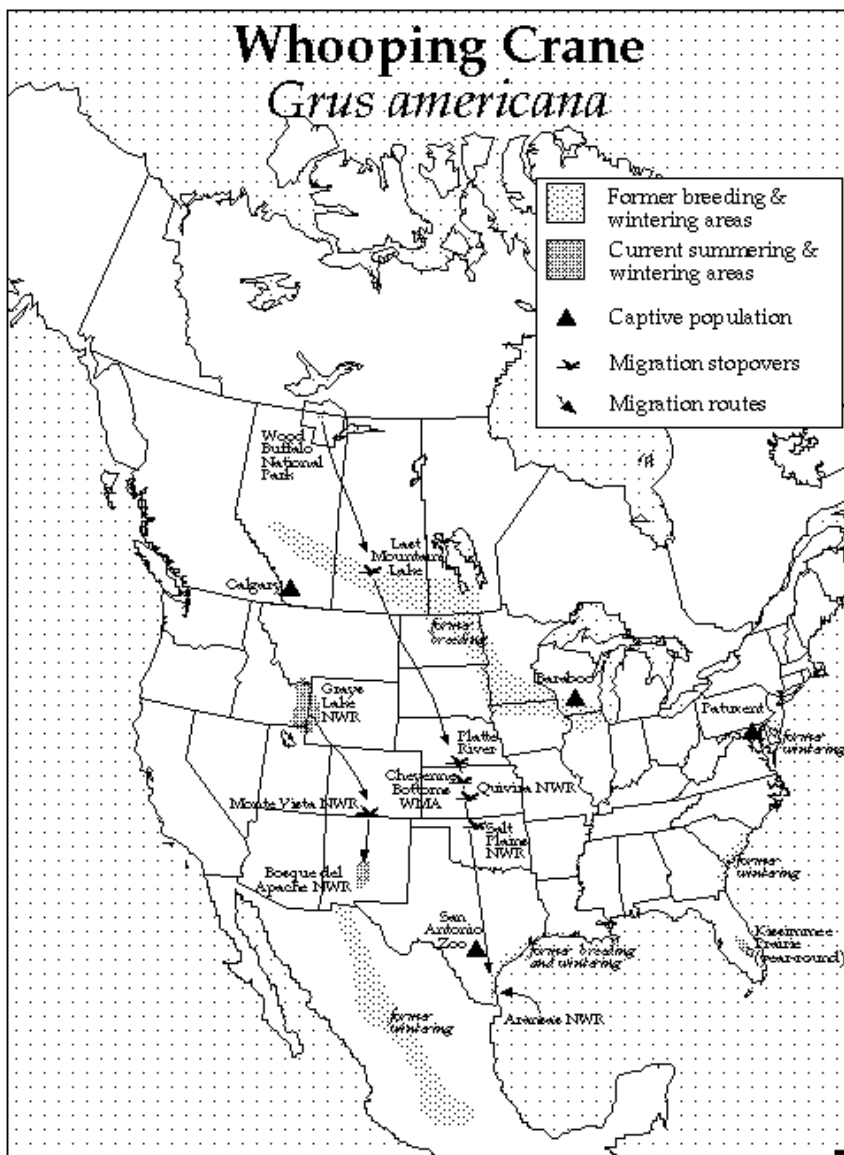


FIG. 13.16. Distribution of the Whooping Crane.

subadults (as of August 1995) results from recent releases in Florida's Kissimmee Prairie. Another 40 birds are due to be released in winter 1995-1996.

Whooping Cranes continue to face multiple threats including habitat loss and air and water pollution in their Texas wintering grounds, collision with utility lines, human disturbance, disease, predation, loss of genetic diversity within the population, and vulnerability to natural and human-caused catastrophes (USFWS 1994). Concern over the near extinction of the Whooping Crane has prompted a broad range of conservation actions including: (1) national and international legal protections; (2) comprehensive scientific research and monitoring programs; (3) protection of key habitats; (4) development of Whooping Crane recovery teams and comprehensive recovery plans in Canada (Edwards et al. 1994) and the United States (USFWS 1994); (5) and extensive public education campaigns.

Priority conservation measures for the future include: (1) full implementation of the U.S. and Canadian Whooping Crane Recovery Plans; (2) special attention to key problems within existing habitats, potential breeding areas, and potential reintroduction sites; (3) continued efforts to establish two additional self-sustaining wild populations and to maintain viable captive populations; and (4) research related to the above topics.

## Conclusions

These summary accounts provide only a hint of the tremendous challenges faced by the cranes and those who are working to protect them and the ecosystems that sustain them. Cranes, along with much of the world's biodiversity, will face difficult circumstances in the coming decades. Although their survival, and in some cases recovery, cannot be assured, the steps outlined above will greatly enhance their chances. However, these steps will only be effective if those who are most concerned about, and involved in, crane conservation effectively coordinate their efforts and share their knowledge. Local peoples, as well as the leaders of nations, must participate in these conservation efforts. Only through such shared commitment will cranes continue to grace the world's skies.

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