

Conservation Measures for the Siberian Crane



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Memorandum of Understanding concerning Conservation Measures for the Siberian Crane

including

Annotated Conservation Plan

Report of the Third Meeting of Siberian Crane Range States
(Ramsar, Islamic Republic of Iran, 8-13 December 1998)

Progress Reports



Seyed Amir Ayafat

The Third Meeting of Siberian Crane Range States was hosted by the Iranian Department of Environment and organized by the Secretariat of the Convention on Migratory Species, in collaboration with the International Crane Foundation, with the generous sponsorship of the United Nations Environment Programme, the Government of Germany, and Lufthansa German Airlines.

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Foreword

The Third Meeting of Range States of the endangered Siberian crane (*Grus leucogeranus*) took place in Ramsar, Islamic Republic of Iran, from 8-13 December 1998. The meeting was convened at the invitation of the Iranian Department of Environment, and was held under the aegis of the Convention on the Conservation of Migratory Species of Wild Animals (CMS), with the collaboration of the International Crane Foundation (ICF). About 40 delegates from all ten of the Range States concerned were in attendance.

The meeting reviewed the considerable progress that had been made to implement the Conservation Plan agreed at the previous meeting, held in India in November 1996. It was apparent that this detailed plan had served as a useful tool for guiding and assessing the activities that were undertaken in 1997 and 1998 to promote the conservation of Siberian cranes, and for setting new objectives for a further two years. Much of this discussion was conducted in small working groups which made an invaluable contribution to the success of the meeting. The product of this review can be found in the annotated Conservation Plan contained in Part I of this publication.

The meeting agreed a number of amendments to the original *Memorandum of Understanding concerning Conservation Measures for the Siberian Crane*, concluded under the auspices of CMS in 1993. Among other things, the MoU now provides for the formal participation of China. Representatives of seven of the Range States present (Azerbaijan, India, Islamic Republic of Iran, Kazakhstan, Pakistan, Turkmenistan, and Uzbekistan) formally signed the MoU on behalf of their agencies. Signatures on behalf of Afghanistan, China and the Russian Federation (a party to the original MoU) are still awaited.

The meeting also reviewed a first draft of a comprehensive project proposal, prepared by ICF and CMS, which aims to promote the conservation of Siberian cranes and other migratory waterbirds throughout their migration range. After incorporating further inputs of the Range States and receiving the necessary official endorsements, the proposal will be submitted, through the UNEP/GEF Co-ordination Unit, to the Global Environment Facility with a view to securing funding for future actions.

The Secretariat wishes to thank all of the individuals and organizations that have contributed to the contents of this document and to the concerted efforts to assure implementation of the Conservation Plan. Sincere appreciation is extended to the Iranian hosts for their hospitality, which included a visit to Fereidoonkenar to see some of the cranes on their wintering habitat, as well as to observe firsthand the traditional practice of duck trapping carried out there, which happens also to offer essential protection to the Siberian cranes. Finally, the Secretariat wishes to thank the United Nations Environment Programme, the Government of Germany, and Lufthansa German Airlines, all of which contributed generously to the sponsorship of this meeting.

Working together as partners, all of the Range States and Co-operating Organizations share a long-term commitment to seeing this ambitious recovery effort succeed. There are signs that these endeavours are starting to pay off: important new information about critical sites has been gathered, the flock numbers appear to have stabilised, and the recovery efforts are better co-ordinated than at any time in the past. There is every reason to believe that the next gathering of Range States will have an even brighter picture to consider.

Douglas Hykle
Deputy Executive Secretary
Secretariat, Convention on Migratory Species

Introduction

The present document consists of four sections containing: the text of the Memorandum of Understanding and the Annotated Conservation Plan, a summary report of the Range State meeting, copies of the reports submitted to the meeting by each delegation, and some useful reference materials.

Part I: Memorandum of Understanding and Annotated Conservation Plan

The Conservation Plans for the Western and Central Asian Siberian crane populations agreed in November 1996 are presented separately in tabular form. Each is structured according to three basic objectives, followed by a number of programmes and specific activities which recognize both the similarities and differences in the actions required to restore the Central and Western Populations. At their core, both plans aim to: (1) reduce mortality in the remaining populations; (2) increase numbers and genetic diversity; and (3) enhance co-operation among the Range States and other concerned agencies.

A Government or a Co-operating Organization has been identified as being primarily responsible for implementation of each activity. In many instances, one or more collaborators have been identified to assist in carrying out a particular activity. In some cases, the proposed activities are intended to be carried out in *all* of the Range States without mentioning any of them specifically by name. (For these generic activities, the column "Responsible Government or Co-operating Organization" shows "All Range States-CP" or "All Range States-WP", depending on whether the reference is to the Central or Western population. The last two columns of the table show the progress and results achieved in 1997-1999 and the specific follow-up activities identified by the meeting to be undertaken in 1999 and 2000.

For ease of reference, the activities listed in the last column of each table have also been extracted and reorganized in a separate table (found on pages 31-40), arranged in alphabetical order according to Range State and Co-operating Organization.

Part II: Summary Report of the Range State Meeting

This section consists of the report of the meeting, prepared by the Secretariat, together with the reports of each of the working groups formed to discuss issues of awareness/education, scientific knowledge and captive-breeding. Annexed to the main report are the opening statements made by representatives of the host country and the Secretariat of the Convention on Migratory Species, as well as the meeting agenda and the list of participants.

Part III: Progress reports

This section comprises the national reports submitted by each of the delegations, as well as the activity reports submitted by the International Crane Foundation. Apart from reformatting and some editing by the Secretariat, these are reproduced in the form in which they were received.

Part IV: Useful reference material

This section includes a useful bibliography provided by the International Crane Foundation and a copy of a recent journal article, reproduced with the permission of one of the authors.

Abbreviations used in the text

AF	Afghanistan
AZ	Azerbaijan
BLI	BirdLife International
CMS	Convention on the Conservation of Migratory Species of Wild Animals
CP	Central Asian population of Siberian cranes
GEF	Global Environment Facility
IBA	Important Bird Areas
ICF	International Crane Foundation
IN	India
Iran, IR	Islamic Republic of Iran
KNP	Keoladeo National Park (India)
KZ	Kazakhstan
MoE	Ministry of Environment
NGO	Non-governmental organisation
PK	Pakistan
PTT	Platform Terminal Transmitter
Russia, RU	Russian Federation
TM	Turkmenistan
UNEP	United Nations Environment Programme
USFWS	United States Fish and Wildlife Service
UZ	Uzbekistan
WBSJ	Wild Bird Society of Japan
WII	Wildlife Institute of India
WP	Western Asian population of Siberian cranes
WWF	World Wide Fund for Nature

Part I: Memorandum of Understanding and Annotated Conservation Plan

Memorandum of Understanding Concerning Conservation Measures for the Siberian Crane

among

The Chairman, State Committee on Ecology and Nature Utilization Control, Azerbaijan
The Director General, State Forestry Administration, China
The Secretary, Ministry of Environment and Forests, India
The Head of the Department of Environment, Islamic Republic of Iran
The Minister of Ecology and Natural Resources, Kazakstan
The Minister of Environment, Local Government and Rural Development, Pakistan
The Chairman, State Committee on Environmental Protection, Russian Federation
The Minister of Natural Resource Use and Environmental Protection, Turkmenistan
The Chairman, State Committee for Nature Protection, Uzbekistan
The appropriate authority (to be specified upon signature) of Afghanistan

The undersigned, acting on behalf of the respective authorities named above,

Aware that the western and central populations of the Siberian Crane, *Grus leucogeranus*, have been reduced to the brink of extinction, and that the status of the eastern population is threatened;

Recognizing that the Siberian Crane has the longest migration route of all crane species, ranging from breeding areas in the Arctic regions of Asia to wintering grounds in southern Asia, and that the species is highly dependent on the conservation of shallow wetlands for its survival;

Concerned that hunting and loss of wetlands, particularly in southern Asia, are thought to have been responsible for the decline in the numbers of Siberian Cranes;

Conscious that concerted, co-ordinated action must be taken immediately to prevent the disappearance of the remaining populations;

Acknowledging their shared responsibility for the conservation and wise management of the Siberian Crane and the wetland habitats on which the species depends, and the desirability of involving all Range States of the western, central and eastern populations of the species in common initiatives;

AGREE to work closely together to improve the conservation status of the Siberian Crane throughout its breeding, migrating and wintering range.

To that end, in a spirit of mutual understanding and co-operation, they shall:

1. Provide strict protection for Siberian Cranes and identify and conserve the wetland habitats essential for their survival;

2. Subject to availability of resources, implement in their respective countries the provisions of the Conservation Plan annexed to this memorandum as a basis for conserving the western, central and eastern populations of the species. The Conservation Plan shall aim to reduce mortality, increase numbers and genetic diversity, and enhance international co-operation, and shall include *inter alia*: measures to protect the traditional breeding, staging and wintering areas of the Siberian Crane; provisions for the identification of key sites for breeding, migrating and wintering Siberian Cranes and the preparation of national action plans; detailed proposals for monitoring, research and practical measures for the rehabilitation of Siberian Crane populations; and proposals for the establishment of a funding mechanism for these conservation measures. Implementation of the Memorandum, including the Conservation Plan, shall be assessed at regular meetings to be attended by representatives of each of the Governments concerned and persons or agencies technically qualified in the conservation of Siberian Cranes. Such meetings shall be convened by the Secretariat of the Convention on the Conservation of Migratory Species of Wild Animals (1979), and shall be hosted by and organized in collaboration with one of the Range States or Co-operating Organizations.

3. Facilitate the expeditious exchange of scientific, technical and legal information needed to co-ordinate conservation measures; and co-operate with recognized scientists of international organizations and other Range States in order to facilitate their work conducted in relation to the Conservation Plan;

4. Designate a competent authority to serve as a contact point for the other Parties and communicate without delay the name and contact details of this authority (and any changes thereto) to the Secretariat of the Convention on Migratory Species;

5. Provide to the Secretariat of the Convention on Migratory Species, by 31 March of each year, a report on implementation of this Memorandum of Understanding in each of the respective countries. The Secretariat shall transmit to each of the Range States all of the reports received, together with an overview report which it shall compile on the basis of information at its disposal.

Basic principles

1. This Memorandum of Understanding shall be considered an agreement under Article IV, paragraph 4, of the Convention on the Conservation of Migratory Species of Wild Animals. It supercedes the Memorandum of Understanding of the same name adopted at Kushiro in June 1993. The Memorandum shall take effect on 1 January 1999 for those two or more Range States that have signed it. It shall remain open for signature indefinitely, and shall become effective for all other signatory States on the first day of the first month following the date on which they sign. The Memorandum of Understanding shall remain in effect indefinitely subject to the right of any Party to terminate its participation by providing one year's written notice to all of the other Parties.

2. The Memorandum of Understanding, including the Conservation Plan, may be amended by a consensus of all of the signatory States.

3. The working language for all matters related to this Memorandum of Understanding shall be English.

Annotated¹ Conservation Plan for the Central Population of Siberian Cranes

¹ Reviews progress and results achieved in 1997-1998, and outlines further activities to be undertaken in 1999-2000

Conservation Plan for the Central Population of Siberian Cranes

Introduction

The Central Population contains perhaps just a single breeding pair and several non-breeding cranes. They breed on the basin of the Kunovat River and migrate across territories of the Russian Federation, Kazakhstan, Uzbekistan, Turkmenistan, Afghanistan, and Pakistan to spend the winter on the Gangetic Plains of northwest India. Siberian cranes have been reported on migration along a wide corridor that includes the Naurzum wetlands (Kazakhstan), Amu Darya river (Turkmenistan), Lake Ab-i-Estada (Afghanistan), and the juncture region of the Kurram River and the Indus River (Pakistan). In India they are known to winter at Keoladeo National Park. Other wintering areas in India have yet to be determined.

These cranes and their habitats are strictly protected at either end of their range: the Kunovat Nature Reserve (the breeding grounds) and Keoladeo National Park (the wintering grounds). Hunting of cranes and loss of wetlands in other areas, however, are perhaps the major limiting factors. A satellite telemetry unit (i.e. Platform Terminal Transmitter: PTT) placed on a wild Siberian crane chick at Kunovat in 1998, has helped to determine the autumn migration route of the remaining cranes between Kunovat and central Afghanistan. The signal continued to be sent from central Afghanistan for approximately one month and during this time a pair presumed to be the chick's parents arrived in India without the chick. Efforts to place a PTT on Siberian cranes on the wintering grounds in India have so far been unsuccessful. They should be continued to learn vital information on the location of summering areas of juveniles, and to determine spring migration routes. Additional PTTs placed on wild Siberian cranes at Kunovat may help to identify the migration route between central Afghanistan and India and alternate wintering areas in India.

There is a possibility that the relatively abundant Eurasian crane can be used to help restore the Central Population of Siberian cranes. Eurasian cranes breed among Siberian cranes on the Kunovat Basin, and it is probable that these Eurasian cranes spend the winter along the northern border of the Islamic Republic of Iran and Afghanistan. Flocks of other Eurasian cranes share the southern part of their migration route to India with Siberian cranes. The winter range of the Eurasian crane overlaps with that of the Siberian crane in India. Some Eurasian cranes in India may migrate along safer migration routes over the Himalayas. However, for populations that migrate across the Hindu Kush mountains, crane mortality must be reduced before restoration efforts for Siberian cranes can be successful.

During the 1991-1998 period several release experiments were conducted. Three costume-reared Siberian cranes migrated south with the Siberian cranes from the Kunovat area (Central Population) but were not observed with the wild Siberian cranes upon their arrival in India. Several were parent-reared by Eurasian cranes in the same area, and are suspected to have wintered with their foster parents along the Iran-Afghan border. Unfortunately, observations of cranes in winter have not been made in that area.

Several were parent-reared by Eurasian cranes on the breeding grounds of the Western Population, a population of Eurasian cranes that likely winters in India. However, Siberian cranes have not been observed with Eurasian cranes in India.

Seventeen costume-reared Siberian cranes released in Armizan (the staging areas of Eurasians on the migration corridor of both the Western and Central Populations of Siberian cranes) initiated migration. Eurasian cranes that migrate through this area winter in India, Afghanistan and Iran. Although fieldwork is incomplete, Siberian cranes have not been observed with Eurasian cranes in winter.

None of the birds released by the above methods have been observed to return to the release area. It is possible that juvenile Siberian cranes require supplemental food from parents during migration and, without such food, they may not be able to survive. Perhaps they

inadequately bond to the wild birds or are in inadequate physical condition to “keep up.” This problem might be overcome through the use of an ultra-light aircraft to lead the cranes south, and the provision of supplemental food along the way. However, due to the conflict in Afghanistan, the use of the ultra-light technique is not possible in the foreseeable future for the central population.

Several Siberian cranes were foster-reared by wild Eurasian cranes on the Kunovat Basin and these birds migrated south with their foster-parents. There is a possibility that these juveniles survived by feeding in the upland areas with Eurasian cranes and through food provided by the foster parents. However, the welfare of these juveniles has yet to be determined. Consequently, several experiments should be conducted to determine if Eurasian cranes could be used to enhance and increase the genetic variation in the central population of Siberian cranes. There is a high probability that Siberian cranes reared by Eurasian cranes will be sexually imprinted on Eurasian cranes, as happened with Whooping cranes reared by Sandhill cranes in the United States. However, the cross-fostered Whooping cranes did learn a new migration route from the Sandhills, and they learned to feed in upland habitats with the Sandhills. Likewise, there is a possibility that costume-reared Siberian cranes, released with the foster-reared Siberian cranes, will learn a migration route and foraging behaviour from the “guide” birds. Siberian cranes of the central population should pair with conspecifics and hopefully will breed on the Kunovat Basin. However, their migration route and wintering ground would be that of the Eurasian cranes that breed on the Kunovat Basin. A Eurasian crane fitted with a satellite transmitter (PTT) in 1990 on the Kunovat Basin spent the winter along the northern portion of the Iran-Afghanistan border, and there is a strong possibility that most Eurasian cranes from the Kunovat Basin spend the winter in that region far from India. It is important for scientists to visit the border areas between Iran, Afghanistan, and Turkmenistan to search for cross-fostered Siberian cranes.

Several years ago, PTTs were attached to two Eurasian cranes that wintered at Keoladeo National Park. They migrated northwest across the Hindu Kush mountains and on to a presumed breeding area between Omsk and Novosibirsk, Russian Federation. Their migration route overlaps with much of the presumed migration route of the Siberian crane. There is a little-known population of Eurasian cranes that migrates from Assam, India, northeast over the Himalayas. Perhaps these cranes migrate along a safer route.

Releases of parent-reared and costume-reared Siberian cranes and a hand-reared sub-adult Siberian crane on wintering areas in India and Iran were not successful. The cranes did not join the wild cranes and did not migrate. An experiment involving the release of juvenile, parent-reared, captive-produced cranes released with wild Siberian cranes in early winter to allow longer social bonding time has not been tested. However, winter release experiments with Sandhill cranes and results to date with Siberian cranes, have led to the consensus that release efforts are best focussed on staging or breeding grounds.

To promote public education and a strong interest in Siberian cranes in India, and to learn more about the biology and conservation of Siberian cranes in that country, efforts were made to establish a semi-wild population at Keoladeo National Park. These cranes did not contribute to the recovery of the remnant flock by bonding with wild cranes and migrating north with them in the spring. However, the Bombay Natural History Society, in collaboration with park staff, conducted valuable studies on the behaviour, ecology, and movements of 4 captive-produced Siberian cranes released in January 1997. The time budgets of the released cranes indicated that their use of food resources in the reserve paralleled that of the wild Siberian cranes. The release of captive-produced birds in wetland areas where wintering populations of wild Siberian cranes might be established is perhaps a valuable way to evaluate the suitability of such habitats for Siberian cranes. Two of the birds have died and two cannot be located in or around the park. In the future, two unreleasable, genetically well-represented Siberian cranes may be sent to a wetland exhibit at Keoladeo National Park for public education.

Objective	Programme	Activity	Range State / Organization	Collaborator	Progress / Results (1997-1998)	Further Specific Activities (1999-2000)
1) Reduce mortality	1) Increase public awareness	1) Broadcast and distribute the ICF/CMS video over the current and former winter range of Siberian cranes and monitor use.	All Range States-CP	ICF CMS	AF/PK: each received one copy and plan to collaborate on translation to Urdu and Pashto RU: copies received only at end of 1998 breeding season; work still to begin UZ: 4 TV broadcasts (in Russian, Uzbek) between Sep-Nov 98; and local TV (Bukhara, Nukus)	All Range States - CP: Translate ICF/CMS video into local languages; distribute and broadcast it widely along migration route (before autumn and spring migrations); obtain and distribute other suitable Siberian crane videos ICF: maintain central archive of all video material received from Range States and others
		2) Conduct education programmes for schools and hunters along the migration route (involve wildlife conservation staff and decision-makers).	All Range States-CP	ICF	AF: crane education material, videos, presentations; 7 environmental clubs for refugees in PK; BBC programmes IN: calendar, school programmes, crane booklet, Monsoon bird video, wetland week PK: school programme, teacher materials; 4 crane conservation clubs, lectures, slide show RU: crane information packet (booklet, slides, audio cassette) distributed to 50 schools; project "Sterkh" booklet; ongoing work in special school for ecology; Salekhar seminar for dozens of schools TM: lectures - 9 Ashkhabad schools in 1998 UZ: school/university lectures, radio, field excursions, traditional celebration - Korenian	All Range States - CP: translate and distribute curriculum packages for four age groups (provided by ICF); prepare posters and booklets; organize crane festivals, share info and samples on current methods and educational materials (especially Russian-speaking Range States) AF: develop conservation education programme for cranes and other species PK: develop education materials on wild cranes, and materials (for women) on captive breeding/training IN: develop puppet shows and other events in local languages RU: continue existing education programme UZ: extend Siberian crane education programme
		3) Publicize Siberian crane conservation efforts <i>in mass media</i> , distribute questionnaires, and ask that sightings be reported.	All Range States-CP	ICF	AF: BBC news, Ab-I-Estada signs/billboards IN: TV, newspaper reports; handbills PK: 2 questionnaires (limited response); WWF quarterly magazine, local paper TM: Uvat Siberian crane questionnaires to reserves, univ. students, local communities RU: 15 publications in newspapers (nesting areas/along migration routes); 2 questionnaires UZ: Siberian crane questionnaires to Samarkand, Bukhara, Nukus, reserves, universities	All Range States - CP: Continue questionnaire distribution within Important Bird Area (IBA) projects; ICF: Complete Robert Bateman Siberian crane print; copy and distribute it as a poster IN: produce a poster depicting Siberian cranes and their historic range PK: expand education programme to Zhob and Balochistan UZ: distribute booklets and questionnaires in areas of possible Siberian crane migration

Objective	Programme	Activity	Range State / Organization	Collaborator	Progress / Results (1997-1998)	Further Specific Activities (1999-2000)
1) Reduce mortality	1) Increase public awareness	4) Investigate all reported sightings.	All Range States-CP		AF: visited Ab-I-Estada & Dashte Nawar (March 1998); too late for 1998 PTT report IN: wetland surveys around KNP (BNHS, Forest Dept, WII); search for PTT signal from PK bird PK: 9 reports, none confirmed; Lakki Refuge (seasonal survey by NWFP and Punjab) RU: investigated 5 points along migration routes from breeding area to KZ border UZ: wetland surveys (about 40 in all), but not Siberian crane areas	All Range States - CP: Investigate all reported sightings of Siberian cranes as soon as possible
		5) Educate local people to protect cranes and their wetland habitats in areas where cranes are located.	All Range States-CP	ICF	AF: distributed educational materials among local Ab-I-Estada population (posted pamphlet) PK: 3 crane hunter associations formed; translated ICF captive breeding guidelines RU: regular TV programmes and films (11) and broadcasts (8); 100 lectures/excursions at Oka State Reserve; established "Sterkh" centre in Yamalo-Nenetsky autonomous region TM: Siberian/Demoiselle cranes added to Red Data Book (endangered/vulnerable) UZ: All cranes included new edition to be published, including photos, to increase public awareness	All Range States - CP: Continue educational activities to promote awareness; place signs about Siberian cranes at historic sites; conduct crane art exchanges between schools and countries
		6) Provide appropriate rewards and incentives for contributions to conservation made by local people.	All Range States-CP	ICF	IN: awards system at district, state, federal levels PK: WWF activities curtailed (no funds); NWFP wildlife club awards to children RU: modest items (books, clothes, compass, Siberian crane photos)	All Range States - CP: Initiate/continue reward and incentive schemes as far as possible (use Robert Bateman posters, when available) RU: Yamalo-Nenetsky autonomous region to send school children contest winners to Oka

Objective	Programme	Activity	Range State / Organization	Collaborator	Progress / Results (1997-1998)	Further Specific Activities (1999-2000)
1) Reduce mortality	2) Determine autumn migration routes, wintering areas and spring migration routes of the remaining flocks, as well as summering areas of juvenile Siberian cranes.	1) Place PTTs, mortality sensors and, if feasible, standard radios on a wild juvenile and/or a single wild adult Siberian crane in Kunovat. (Seek support from India for the cost of PTTs used in this flyway initiative.)	Russia-CP	[WBSJ-CP, India]	<i>Note: All PTT studies were carried out using Russian hardware thanks to improved technology and lower costs.</i> In 1997-98, 9 PTTs and 4 standard radios were placed on Siberian cranes and Eurasian cranes	Continue PTT and standard radio marking
		2) Place PTTs, mortality sensors and, if feasible, standard radios on a wild juvenile and/or a single wild adult Siberian crane in India.	India	[WBSJ-CP] Russia-CP	Unsuccessful attempts using noose, night-lighting, alphachlorose, sound & light trapping methods (possible disturbance to release birds, bonding with wild birds?)	Attempt to capture/mark a wild chick in India in December 1999; RU to bring a parent-reared bird; and attach a PTT if pair arrives with a chick
		3) Follow migration route of wild Siberian cranes fitted with PTTs by securing data from satellite.	Russia-CP [WBSJ-CP/ ICF-CP]		In 1997-98, migration of 3 Siberian cranes and 2 Eurasian cranes was tracked with PTT data. Ground surveys were limited	RU: continue migration studies
		4) Conduct ground surveys to locate Siberian cranes outside of Keoladeo National Park.	India		One survey conducted in area surrounding KNP (12/96, 12/97); one survey in historic wintering range (12/96-3/97 and 6/98).	Continue surveys (to be done by KNP around the park; and by WII in the historic range)
		5) Conduct ground surveys of known migration areas along the flyways or where PTT data indicate new migration or wintering areas.	All Range States-CP		RU: In 1997, investigated PTT data points in Tyumen; in 1998, investigated 4 PTT data points from Kunovat to Tyumen	All Range States - CP: survey areas where PTT signals indicate stopover sites; send description of areas to RU; coordinate network to exchange information about resting areas; RU: continue ground surveys as PTT data become available along flyways UZ: make spring expedition to known migration areas
		6) Conduct aircraft or helicopter surveys to locate both juvenile/adult Siberian cranes fitted with PTTs in India when they end their migration.	Russia-CP		Not done, because PTTs were not fitted on Siberian cranes in India	Place PTT on a wild chick (and possibly a released chick) in India; thereafter all Range States should monitor migration closely

Objective	Programme	Activity	Range State / Organization	Collaborator	Progress / Results (1997-1998)	Further Specific Activities (1999-2000)
1) Reduce mortality	3) Protect and manage breeding, migration and wintering areas.	1) Secure protection, through collaboration with local communities and/or legal measures, for inadequately protected or newly identified areas of importance for Siberian cranes.	All Range States-CP		<p>IN: some suitable sites identified, but no new areas protected</p> <p>PK: working with Lakki, Ghoriwala communities (voluntary protection, no hunting); hunting banned in Zhob for 2 years with help of local community</p> <p>RU: secured protection in Kunovat Basin by removing logging camp from nesting ground; expanded protection zone of Belozersky <i>zakarznik</i> (Armizok)</p>	<p>IN: bring satellite wetlands around Keoladeo National Park under protection</p> <p>KZ/UZ: increase network of seasonally protected wetlands (GEF project);</p> <p>KZ: develop IBA project through BirdLife International</p> <p>PK: continue work with communities and strengthen enforcement of legislation</p> <p>RU: Expand network of protected areas</p>
		2) Determine and monitor threats of all types to Siberian cranes (e.g. lead shot, pollutants, power lines, disturbance, nest predation, undesirable plant growth) in key areas, as appropriate.	All Range States-CP		<p>IN: documented other crane mortality from powerlines, contaminants, undesirable water levels, plant growth</p> <p>PK: factors identified: wild firing/stray bullets (from local community); habitat deterioration in Bannu (wetland drainage, eutrophication); water diversion from lakes for irrigation (Zangi Nower, Balochistan)</p> <p>RU: all limiting factors already determined</p>	<p>All Range States - CP: Continue monitoring work on threats to Siberian cranes</p> <p>IN: Undertake further contaminant studies on Sarus cranes</p>
1) Reduce mortality	4) Assess hunting pressure and other mortality factors along the migration route.	1) Determine hunting seasons and practices in areas used by Siberian cranes.	All Range States-CP		<p>PK: already known</p> <p>RU: has already been done</p>	<p>Wetlands International: Compile a separate list of hunting seasons in all Range States by mid-1999</p> <p>All Range States - CP: As necessary, adjust timing of hunting seasons along migration routes</p>
		2) Develop programmes to enlist hunters to support crane conservation.	All Range States-CP		<p>PK: hunters encouraged by WWF to self-regulate (3 hunter associations formed, have banned hunting, converted to conservation)</p> <p>RU: distributed questionnaire among hunting society (Yamalo-Nenetsky autonomic region and Tyumen Oblast); used local hunters in Kunovat and Tyumen fieldwork</p>	<p>All Range States - CP: provide printed information (e.g. postcards) about Siberian cranes to hunters, where licences are sold, before the beginning of each hunting season</p>

Objective	Programme	Activity	Range State / Organization	Collaborator	Progress / Results (1997-1998)	Further Specific Activities (1999-2000)
1) Reduce mortality	5) Develop and enforce effective rules and regulations for crane protection.	1) Review existing rules; create or modify them as necessary through consultative meetings/workshops, and enforce them accordingly.	All Range States-CP		<p>IN: Wetland policy drafted; Wildlife Protection Act being reviewed, strengthened</p> <p>PK: Wetland policy drafted; Wildlife Protection Act being reviewed, strengthened</p> <p>RU: work in progress on hunting laws for Tyumen region</p> <p>TM: 1998 new hunting regulations (Supreme Council), including Siberian crane protection</p> <p>UZ: new legislation (nature conservation - 1997, protected areas - 1998, hunting regulations - 1997); wetland policy drafted, review of country-wide wetland network</p>	<p>AF: attempt to enlist Taliban support for conservation laws (eg. local government support for former Ab-I-Estada sanctuary status)</p> <p>RU: realise a new hunting law at federal level and adapt it to regional level (Tyumen and Yamalo-Nenetsky autonomic region)</p>
2) Increase numbers and genetic diversity	1) Determine if captive-reared Sibe. juveniles can learn a new migration route by joining flocks of Eurasian cranes in late summer and autumn at staging areas of Eurasian cranes.	1) Costume-rear and parent-rear a group of Siberian cranes and include one or two costume-reared or parent-reared Eurasian cranes in the group.	Russia-CP	ICF	<p>In 1997: a total of 6 Siberian crane chicks were costume-reared at Oka State Reserve and released at Tyumen (4 migrated, 2 died)</p> <p>In 1998, a total of 6 Siberian crane chicks and 1 Eurasian crane chick were costume-reared at Oka and released at Tyumen (all migrated)</p> <p>No released birds have been observed during migration or on wintering grounds</p>	Continue releases of costume-reared and parent-reared chicks

Objective	Programme	Activity	Range State / Organization	Collaborator	Progress / Results (1997-1998)	Further Specific Activities (1999-2000)
2) Increase numbers and genetic diversity	1) Determine if captive-reared Sibe. juveniles can learn a new migration route by joining flocks of Eurasian cranes in late summer and autumn at staging areas of Eurasian cranes.	2) Place PTTs, mortality sensors and, if feasible, standard radios on all (costume-reared and/or parent-reared) Siberian cranes that are released with Eurasian cranes.	Russia-CP	[WBSJ-CP]	In 1998, 3 PTTs and 3 standard radios were fitted on the group of juvenile Siberian cranes mentioned above: 1 PTT stopped after 2 weeks; the second after 1 month; one continued to send signal in release area (probably fell off)	Continue fitting PTTs on Siberian cranes released with Eurasian cranes
		3) "Soft release" juvenile Siberian cranes into a flock of Eurasian cranes at a staging area near Tyumen (on migration route of the central flock of Siberian cranes) and other locations (number depending on production in breeding centres).	Russia-CP	[ICF-CP]	Soft releases were carried out at a staging area near Tyumen (on the migration route of the central and western flocks of Siberian cranes) in 1997 and 1998	Continue 'soft-releases' of juvenile Siberian cranes into a flock of Eurasian cranes
		4) Place PTTs on several Eurasian cranes in the flock that Siberian cranes join.	Russia-CP	WBSJ-CP	In 1997 a PTT was placed on one adult Eurasian crane from a flock that Siberian juveniles had joined in 1997. Its migration route is known from the staging area near Tyumen to the IN-PK border.	Continue to place PTTs on Eurasian cranes
		5) Study captive-reared Siberian cranes released into a flock of Eurasian cranes at a staging area near Tyumen (during migration, and on the wintering and summering grounds) to determine the efficacy of the release experiment.	All Range States-CP	ICF	RU: a total of 10 Siberian cranes joined flocks of Eurasian cranes (4 in 1997 and 6 in 1998) and have migrated together. Their fate is not known.	RU: send PTT data to ICF immediately by e-mail; coordinate data flow and field monitoring (alert other Range States one month in advance); develop network protocol for PTTs and leg bands; prepare standardized methodology/data forms Other Range States - CP: anticipate migration movements; pre-arrange resources for searches (staff, training, transport, communication, funds) in order to visit stopover sites as soon as possible

Objective	Programme	Activity	Range State / Organization	Collaborator	Progress / Results (1997-1998)	Further Specific Activities (1999-2000)
2) Increase numbers and genetic diversity	2) Determine if Siberian cranes reared by Eurasian cranes can survive in the habitat of Eurasian cranes during migration and on the wintering grounds.	1) Place up to 5 captive-produced Siberian crane eggs in the nests of wild Eurasian cranes on the Kunovat Basin.	Russia-CP	ICF-CP	ICF: sent eggs to RU in 1997 and 1998; RU: placed a total of 10 ICF and Oka captive-produced eggs in Eurasian crane nests at both Kunovat in 1997 (5 eggs) and 1998 (5 eggs)	Continue to place captive-produced Siberian crane eggs in the nests of wild Eurasian cranes
		2) In future years, place PTTs on Siberian cranes reared by Eurasian cranes on the Kunovat Basin. Determine their migration route and wintering area. (Seek support from India for the cost of PTTs used in this flyway initiative.)	Russia-CP	[WBSJ-CP/ ICF-CP, India]	RU: in 1998 a Russian PTT was placed on one Siberian crane chick reared by Eurasian cranes in Kunovat Basin; and the migration route was tracked as far as Uzbekistan as of Nov/Dec. 1998.	Continue to place PTTs on Siberian cranes reared by Eurasian cranes, and monitor their migration
		3) Study Siberian cranes reared by Eurasian cranes (during migration and on their wintering grounds) to evaluate their ability to survive in the habitat of Eurasian cranes.	All Range States-CP		Not done	AF/IR/TM: Search for cross-fostered Siberian crane chick in the transboundary area of Afghanistan, Iran, and Turkmenistan

Objective	Programme	Activity	Range State / Organization	Collaborator	Progress / Results (1997-1998)	Further Specific Activities (1999-2000)
2) Increase numbers and genetic diversity	3) If Siberian cranes foster-reared by Eurasian cranes in earlier years are located on the Kunovats Basin, determine if costume-reared Siberian cranes will migrate with these "guide" birds (and survive by feeding in upland areas where the foster-reared Siberian cranes were taught to feed by Eurasian cranes).	1) Through helicopter surveys over Kunovats Basin, search for colour-banded Siberian cranes that were reared by Eurasian cranes in that area since 1994.	Russia-CP		No released birds are known for sure to have returned to Kunovats, based on the 20 hours of helicopter surveys conducted in 1997-98. (A helicopter pilot might have seen 4 reddish-brown birds in late May). Insufficient resources did not allow for more flying time to determine whether there were any wild foster-reared Siberian cranes in the area	Continue helicopter surveys over Kunovats Basin
		2) Costume-rear and parent-rear Siberian cranes imprinted on Siberian cranes at Oka and then Kunovats, and release them with foster-reared wild Siberian crane "guide birds".	Russia-CP		Not done (see above)	In future years, extend the release programme once the efforts to foster-rear and reintroduce wild Siberian crane 'guide birds' are shown to be successful
		3) Place PTTs, mortality sensors and, if feasible, standard radios on all released Siberian cranes.	Russia-CP	WBSJ-CP	N/A (see above)	Carry out in connection with previous activity
		4) Monitor migration of costume-reared Siberian cranes released at Kunovats with Siberian cranes foster-reared by Eurasian cranes in earlier years, and determine wintering areas.	All Range States-CP		N/A (see above)	Carry out in connection with previous activity
		5) Conduct research in the wintering area to compare the behaviour of costume-reared Siberian cranes to that of foster-reared cranes to evaluate suitability of one or the other rearing techniques.	India		N/A (see above)	Carry out in connection with previous activity

Objective	Programme	Activity	Range State / Organization	Collaborator	Progress / Results (1997-1998)	Further Specific Activities (1999-2000)
2) Increase numbers and genetic diversity	4) Determine the migration route of various populations of Eurasian cranes wintering within the current and former range of the Siberian crane in India.	1) Place PTTs on several Eurasian cranes that spend the winter in India near areas with wetlands that might support Siberian cranes and where cranes are safe: two areas in historic range of Siberian cranes and two outside, currently used by Eurasian cranes.	India	WBSJ-CP	IN: not yet done; however, two appropriate sites have been identified 100km east of Bharatpur and in Brahmaputra Valley	Continue existing plan to place PTTs on several Eurasian cranes that spend the winter in India near areas with wetlands that might support Siberian cranes; develop research proposal with RU (instead of WBSJ) in 1999
		2) Monitor the migration route and breeding area of the Eurasian cranes wintering in India.	All Range States-CP		Not yet done (see above)	Continue according to plan
		3) Select a relatively safe population of Eurasian cranes) one that frequents ecologically suitable areas on the breeding grounds, along the migration route and on the wintering grounds) into which Siberian cranes could be reintroduced.	All Range States-CP		RU: Determined more than 10 suitable areas from Kunovat region to KZ border	Continue according to plan
		4) ... explore the possibility of releasing Siberian cranes in the Eurasian crane population, taking into account differences in migratory behaviour between the species.	All Range States-CP		Work in progress (see above)	Continue according to plan

Objective	Programme	Activity	Range State / Organization	Collaborator	Progress / Results (1997-1998)	Further Specific Activities (1999-2000)
2) Increase numbers and genetic diversity	5) Establish a flock of Siberian cranes at Keoladeo National Park for education and research purposes.	1) Parent-rear up to 4-6 Siberian cranes in captivity, using both Siberian and Eurasian cranes as "parents", and "soft-release" these captive-reared birds equipped with standard radios and mortality sensors	India	ICF-CP	ICF: 4 birds reared and sent to IN for release with standard radios in Jan 1997 IN: birds were released after quarantine; movements monitored to June 1998 (disappeared)	IN: continue to monitor possible return of the 2 birds released in January 1997; in 1999 construct with MoE funds a special compound in which to keep a pair of pinioned birds from ICF ICF: in 2000 send to KNP a genetically unrelated pair of birds for education purposes only (not expected to migrate)
		2) Capture released birds at predetermined intervals to test samples for environmental contaminants.	India		Capture attempted without success	
		3) Monitor the released cranes indefinitely to document their biology and their interactions with both wild Siberian cranes and Eurasian cranes.	India		Graduate student monitored birds (2 interim reports produced)	
		4) In late winter, if one of the released juveniles has formed strong social bonds with the wild cranes, place a PTT on the released crane.	India	WBSJ-CP, Russia-CP	Strongest bonding between released and wild Siberian cranes was in late February (roosting distance 50-500m); attempts to put PTT on wild bird failed (no attempt to place PTT on released crane due to weak bonding)	
		5) Monitor the migration route and summering area of the captive-reared cranes released at Keoladeo.	India	All Range States-CP	N/A	
		6) If the results are promising (i.e. as evidenced by migration with wild cranes; breeding in India), expand release programmes to other Range States.	India	All Range States-CP	Results not promising; use winter releases only for education purposes and document interaction with wild cranes	AF: identify suitable site to maintain captive Siberian cranes for education (develop expertise/ education materials first with Eurasian cranes) PK: consider sending captive birds to Lakki Refuge for education programme and decoy purposes (send info on facilities to ICF and Vogelpark Walsrode)

Objective	Programme	Activity	Range State / Organization	Collaborator	Progress / Results (1997-1998)	Further Specific Activities (1999-2000)
2) Increase numbers and genetic diversity	6) Once effective release techniques have been developed, manage the genetic diversity of the wild population.		Russia-CP	ICF-CP	Sex and blood line records are maintained to allow future management.	
3) Enhance inter-national co-operation	1) Improve exchange of information and technical expertise.	1) Designate national co-ordinators with responsibility for liaising with counterparts in other countries and with co-operating organizations.	All Range States-CP	CMS	Done for most Range States as of 12/98 (confirmation of some information pending from AZ, CN, TM)	CMS: include list of national co-ordinators as annex to report of the December 1998 meeting in Ramsar, Iran
		2) Provide central co-ordination of information exchange, subject to a strict protocol on use/ publication of data	ICF-CP	CMS	ICF: in progress CMS: compiled 1997-99 Conservation Plan, circulated to all Range States in August 1997 (attempted to secure Russian translation, but was not successful)	All Range States - CP: regularly forward current information on Siberian crane activities to ICF clearinghouse, without delay, for forwarding to others (by e-mail)
		3) Submit an annual report on implementation of the Siberian crane MoU to the UNEP/CMS Secretariat.	All Range States-CP, Co-operating Organizations	CMS	RU: 1997 report submitted, circulated to all Range States; working on a joint publication with ICF which will include 1998 activities All other Range States tabled reports at Ramsar meeting	CMS: annex all available texts of country reports to Ramsar meeting report CMS: remind Range States in January of each year of the new deadline set for receipt of reports: 31 March (starting in 2000)

Objective	Programme	Activity	Range State / Organization	Collaborator	Progress / Results (1997-1998)	Further Specific Activities (1999-2000)
3) Enhance international co-operation	1) Improve exchange of information and technical expertise.	4) Organize regular meetings of Siberian crane Range States; seek allocation for funding in the core CMS budget.	CMS		Organized meeting in Ramsar, Islamic Republic of Iran (main activities June-Dec 1998) with core CMS/UNEP funding	Compile/distribute revised Conservation Plan and meeting report (early 1999) Organize fourth Range State meeting in spring or autumn 2000 (CMS to solicit formal offers in 1999: PK , UZ , CN already expressed interest in hosting a meeting); consider inviting potential donors to observe sessions
		5) Invite the Government of China to participate as an observer in the MoU, and to participate in the next Range State meeting.	CMS		Done (Ramsar, Dec. 1998 - two participants)	CN : propose activities for inclusion in the new Conservation Plan
		6) Provide technical training at ICF for Oka veterinary staff; send ICF staff to Oka as part of reciprocal exchange.	ICF-CP	Russia-CP	Has been done	IN : Will to train local veterinarians near Bharatpur in 1999. PK : WWF-PK or USFWS to assist in training veterinarian from Pakistan Wildlife Department Other Range States - CP : requiring veterinarian training: attend 1999 training sessions in IN, if possible
3) Enhance international co-operation	2) Raise funds for a comprehensive conservation programme.	1) Develop comprehensive project proposal(s) to submit to appropriate agencies for possible funding support.	ICF	CMS	ICF/CMS/UNEP: GEF project proposal in progress	ICF/CMS: Complete GEF project proposal and submit in early 1999 (Range States comments and endorsements required no later than 8 January 1999 -- by fax to CMS)
		2) Seek/provide funding, to the extent possible, on an <i>ad hoc</i> basis for small-scale projects and tasks.	ICF	CMS	CMS: Financed Siberian crane video produced/distributed by ICF in 1998	All Range States - CP : Develop small scale project proposals and submit to CMS and ICF for their consideration; appeal also to governments for funding of programmes ICF : facilitate the organization of a fund-raising committee to improve effectiveness of fund-raising efforts

Conservation Plan for the Western Population of Siberian Cranes

Introduction

The Western Population of Siberian cranes breeds in a wilderness area of Tyumen District, Russian Federation. The breeding area may extend into Khanty Mansiysk District which borders northern areas of Tyumen District. Collaboration of authorities from both districts is important to conserve the entire wetland complex where Siberian cranes breed. The breeding area is so extensive and the numbers of cranes so low, that the local people are not familiar with Siberian cranes. The migration route extends from the breeding area in a southwest direction to the northern shore of the Caspian Sea. The cranes rest on migration at the Naurzum wetlands in Kazakhstan and the Astrakhan Nature Reserve in Russia at the mouth of the Volga River at the northwest corner of the Caspian Sea. Their migration continues south along the west side of the Caspian over Chechnya and Azerbaijan, then east along the south side of the Caspian to flooded rice fields used for duck trapping near the villages of Fereidoonkenar and Esbaran in the Islamic Republic of Iran. They usually arrive on the wintering grounds in October and remain until late February or early March.

Satellite telemetry units (i.e. Platform Terminal Transmitters: PTTs) placed on birds on both the wintering and breeding grounds have identified a route that overlaps significantly with the route of the Central Population. This suggests that genetic mixing between the two populations occurs. Unmated birds from one population (i.e. juveniles, divorced birds, or birds that lose a mate) might pair with birds from the other population during migration or on summering areas of juveniles and non-breeding birds. In North American cranes, males return to breed in natal areas. Females follow a male to these regions that might be a great distance from the area where the female was raised. If this pattern follows in Siberian cranes, a female from one population might follow a male from the other population to his natal area, leading to genetic mixing of the two populations. PTTs should be placed on a juvenile Siberian crane on the wintering grounds to help identify the unknown juvenile summering areas.

Counts of the Western Population of Siberian cranes at Fereidoonkenar and Esbaran in Iran have ranged between 9 and 11 individuals during the past decade. In November 1998, 14 Siberian cranes were reported at the waterfowl trapping station near Fereidoonkenar. Subsequently, three pairs were observed at that location. Only one colour-banded crane was among the three pairs, although in 1996 and 1997 Russian researchers colour-marked five Siberian cranes from this population. The other cranes likely winter at different location in Iran. Two pairs with colour-marked individuals were observed on the breeding grounds and these two pairs plus an additional unbanded pair were observed on the Volga Delta during autumn migration in 1998. One of the pairs with a banded member was observed in December at Fereidoonkenar. However, the other pair with a banded member was not observed. An additional unbanded pair was present at the duck trapping station, and the duck trappers reported a pair with a juvenile. Combining these data, a minimum of 11 cranes was accounted for among the 14 observed in November 1998.

Each of the three pairs resident at Fereidoonkenar during the winter of 1998-1999 is territorial and drives other cranes away from their feeding areas on flooded rice fields. Presumably, the duck trapping area is capable of supporting only three territorial pairs. The other cranes, including the majority of the color-marked cranes, are wintering elsewhere. Identifying these other locations and protecting the cranes and the wetlands in which they forage, is of top priority for the restoration of the Western Population.

Conservation of this population depends on reducing mortality during migration and on the wintering grounds, and enhancing the numbers and genetic diversity. Releases of parent-reared and costume-reared Siberian cranes and a hand-reared sub-adult Siberian crane on wintering areas in India and Iran have not been successful. The cranes did not join the wild cranes and did not migrate. An experiment involving the release of juvenile, parent-reared, captive-produced cranes with wild Siberian cranes in early winter to allow longer social bonding time has not been tested. However, winter release experiments with Sandhill cranes and results to date with Siberian cranes have led to the consensus that release efforts are best focussed on staging or breeding grounds. Efforts to bolster this population will focus on releases of costume-reared cranes on staging areas at Tyumen and Astrakhan. Human led migrations (i.e. using ultralight planes and trucks) with Sandhill and Whooping cranes in North America have resulted in over 50% of the birds that were led south returning to their release area the following spring. Consequently, Russian scientists will meet with North American researchers to explore possible application of the techniques to Siberian crane releases. This research is more feasible along the entire migration route of the Western Population, whereas it is difficult to conduct such research using the Central Population due to the present situation in Afghanistan.

There is a possibility that Siberian cranes, parent-reared by Eurasian cranes on the breeding ground of the Central Population of Siberian cranes, may spend the winter along the Iran-Afghanistan border. In addition, costume-reared Siberian cranes released at Armizan in Tyumen District, might join flocks of Eurasian cranes and winter in Iran. Because Siberian crane chicks probably require supplemental feeding during migration, it is important to monitor the released cranes to determine if they can survive without supplemental feeding from the adults.

Objective	Programme	Activity	Range State / Organization	Collaborator	Progress / Results (1997-1998)	Further Specific Activities (1999-2000)
1)Reduce mortality	1)Increase public awareness	1) Broadcast and distribute the ICF/CMS video over the current and former winter range of Siberian cranes and monitor its use.	All Range States-WP	ICF CMS	IR: copy received in Aug 1998; dubbing work (into Farsi) to begin in early 1999 KZ/AZ: copies provided only in Dec.1998 RU: copies received only at end of breeding season; work yet to begin	All Range States - WP: Translate ICF/CMS video into local languages; distribute and broadcast it widely along migration route (before autumn and spring migrations); obtain/ distribute other suitable Siberian crane videos; ICF: maintain central archive of all video material received from Range States and others
		2) Conduct education programmes for schools and hunters along the migration route.	All Range States-WP		AZ/KZ/RU: basic materials still needed for programme to begin	All Range States - WP: continue educational activities to promote awareness RU: incorporate education information in school texts
		3) Publicize Siberian crane conservation efforts <i>in mass media</i> , distribute questionnaires, and ask that sightings be reported.	All Range States-WP	CMS	IR: published pictures, interviews in newspapers KZ: prepared draft questionnaire RU: published 10 articles in nesting areas, along migration routes	AZ: draft/distribute a questionnaire about Siberian cranes in 1999 IR: finalize brochure on Siberian cranes KZ: distribute questionnaire on Siberian cranes in 1999 All Range States - WP: Distribute Siberian crane postcards (to be printed in IN, with CMS financing?)
		4) Investigate all reported sightings.	All Range States-WP		KZ: investigated report at Narzum, but not north Caspian; RU: investigated Astrakhan rep't	Investigate all reported sightings of Siberian cranes as soon as possible
		5) Educate local people to protect cranes and their wetland habitats in areas where cranes are located.	All Range States-WP	ICF-WP Russia-WP	IR: spots on local radio station and news broadcasts; general brochure KZ: started education work in Narzum region in 1998 RU: regular TV programmes and films and broadcasts; lectures, excursions at Oka; "Sterkh" centre in Yamalo-Nenetsky admin. region	AZ: begin education not only near reserves but also along migration routes, especially among agricultural cooperative farmers and hunters IR: establish an education centre/bird garden with Babolsar municipality; RU (Oka) to provide a pair of Siberian cranes to IR; in 1999/2000, publish booklets in Farsi on the role of religious leaders in conserving migratory species, particularly Siberian cranes; translate it for other Range States as appropriate All other Range States - WP: Continue educational activities to promote awareness

Objective	Programme	Activity	Range State / Organization	Collaborator	Progress / Results (1997-1998)	Further Specific Activities (1999-2000)
1) Reduce mortality	1) Increase public awareness	6) Provide rewards and incentives for contributions of local people.	All Range States-WP	ICF	AZ/KZ: not operational RU: modest items (books, clothes, compass, Siberian crane photos)	Initiate/continue reward and incentive schemes, as far as possible
		7) Develop conservation incentive programmes for waterfowl hunters ... and provide awards to local people for contributions to conservation.	Iran		Reduced hunting fees, small gifts (boots, jackets) given in exchange for useful information	Establish new NGOs: (e.g. Mazandran Crane Conservation Association); organize a crane festival
1) Reduce mortality	2) Study cranes along the migration route.	1) Visit the site in west Caspian area where PTT data show one bird stopped in 1996. On the day migration begins, contact colleagues in Azerbaijan	Iran	Azerbaijan	AZ visited site on 7 April 1998, carried out education and conservation work; recorded single bird; IR: not done yet	IR: provide information by e-mail to Azerbaijan about <i>start</i> of spring migration in order to facilitate AZ planning for monitoring
		2) Notify colleagues in Russia and Kazakhstan immediately on the day migrating Siberian cranes leave Azerbaijan.	Azerbaijan	Russia-WP, KZ-WP	RU and KZ did not receive information about this report	RU/KZ/AZ: establish a communication network between Russia, Kazakhstan, and Azerbaijan to ensure early exchange of information on <i>all</i> bird movements
		3) Involve Drs. Pishvanov (Dagistan) and Rusanov (Astrakhan) to search for Siberian cranes and evaluate threats to them.	Russia-WP		Dr. Rusanov is involved and works actively in Siberian crane project. Dr. Pishvanov is not closely involved due to difficult political problems in Dagistan	Involve other Dagistan specialists if Dr. Pishvanov is unavailable to assist with Siberian crane monitoring
		4) Search for cranes in northwest Kazakhstan.	Kazakhstan -WP	Russia-WP TM-WP	Search was started in April 1998 in Narzum region	Continue the search for cranes and expand activities in northwest KZ near Caspian coast, especially in staging areas discovered by 1998 PTT data <i>*NEW:</i> Search for wetlands east of the Caspian Sea in KZ , RU and TM to evaluate possibility for a future flyway to Iranian coast of Caspian Sea

Objective	Programme	Activity	Range State / Organization	Collaborator	Progress / Results (1997-1998)	Further Specific Activities (1999-2000)
1) Reduce mortality	3) Establish a safer wintering area while promoting excellent relations with the waterfowl trappers at Fereidoonkenar. (Perhaps initiate in 1998.)	1) Obtain long-term leases in winter of a large section of rice fields with suitable crane habitat (i.e. with low pesticide levels) within their winter range, and cover the fields with shallow water from October - March. Possibly use Department of Environment forested land and adjacent fields near Fereidoonkenar.	Iran		Not yet done	Work towards the objective of obtaining long-term leases of suitable crane habitat
		2) Release captive-reared cranes into the area near Fereidoonkenar in order to decoy wild birds, including two birds released in 1996 (if they have not joined the wild cranes) or release 1-2 parent-reared birds from Oka Reserve.	Iran	Russia-WP TM-WP ICF	Not yet done. Of the two birds released in 1996, one disappeared, and the other remains at Pardisan Park: although not releasable, it could be used as a decoy.	Examine the possibility of releasing 1-2 pairs of Siberian cranes at Gomishan wetland (near TM border) Release 1-2 birds to establish a wild, non-migrating flock at Miankaleh with a view to luring wild birds there
		3) Hire guards to keep intruders away from the crane area.	Iran			Organize a guard system through NGOs (e.g. the newly formed Mazandran Crane Conservation Association) to keep intruders away from the cranes at Fereidoonkenar
		4) Build an education centre in the forest beside the field and with view of field. Invite local people to visit the education centre.	Iran		Not done	*NEW: Study possible construction of an observation tower at Fereidoonkenar in collaboration with NGOs and Finnish sponsors; study desirability of extending it to include an education centre

Objective	Programme	Activity	Range State / Organization	Collaborator	Progress / Results (1997-1998)	Further Specific Activities (1999-2000)
1) Reduce mortality	4) Locate and protect the region in which sub-adult cranes spend the summer.	1) Attach a PTT to one juvenile crane on the wintering ground and on a parent-reared bird (released in Iran) if the latter bonds with wild cranes and shows promise of migrating.	Iran	Russia-WP, [WBSJ-WP/ICF-WP]	Not done	Attach a PTT to a wild chick (Y.Markin: February 1999) – high priority
		2) Conduct aerial surveys over the region revealed by PTT data to be the probable summering area.	Russia-WP		Not done (PTTs were not fitted to any juvenile Siberian cranes in 1997 or 1998)	Carry out aerial surveys in future when PTT data becomes available
		3) Assess the threats to Siberian cranes and then act to protect crane habitats.	Russia-WP		Summering areas not yet identified (see above)	
		4) Educate local people about Siberian cranes and ask them to protect the birds.	Russia-WP		Summering areas not yet identified (see above)	Distribute educational materials, including postcards, in summering areas for sub-adult cranes
		5) If PTT monitoring of a juvenile is not successful in 1997, repeat the study in 1998.	Russia-WP			Repeat monitoring of a juvenile fitted with a PTT in the wintering ground in 1999 and/or 2000

Objective	Programme	Activity	Range State / Organization	Collaborator	Progress / Results (1997-1998)	Further Specific Activities (1999-2000)
1) Reduce mortality	5) Protect the breeding and staging areas.	1) Conduct helicopter surveys to locate all breeding pairs. Determine the distribution of possible crane breeding habitat adjacent to the known breeding habitat in order to accommodate at least 20 breeding pairs in the future. Protect this entire area as a nature reserve.	Russia-WP		In 1997: two nesting pairs located (10 flight hours); In 1998: these two pairs proven to be located in the nesting territory (20 flight hours); no new pairs were discovered. (Limited resources did not allow for full surveys needed to locate all breeding pairs.) Breeding territory which can support up to 20 breeding pairs has been determined.	Continue helicopter surveys (about 20 hours); and investigate funding possibilities to extend this work to West Siberia
		2) Attach PTTs to one or two pre-fledged Siberian cranes and to flightless single adults on the western breeding grounds to determine their migration route and staging areas in autumn.	Russia-WP	[WBSJ-WP] [ICF-WP]	In 1997: PTT was attached to one Siberian crane chick, also banded (at Uvat), showing migration route from breeding habitat to Astrakhan reserve. In 1998, a PTT was placed on an adult Siberian crane male (exchanged for the WBSJ PTT fitted in Iran in the winter of 1996), which proved the fall migration and staging areas	Continue to attach PTTs on Siberian crane <i>chicks</i> (rather than adults, for which the consequences of disturbance/loss are more acute)
		3) Assess conservation needs for the nesting and staging areas, and develop a conservation plan for each area.	Russia-WP Kazakhstan -WP		RU: conservation plan has been developed for nesting area and staging area	KZ: implement conservation plan in north Caspian region
		4) Educate the local people about the cranes and ask them to protect them in both breeding areas and at migration staging areas.	Russia-WP Kazakhstan -WP		Education work among local people in the breeding area has begun	Continue to develop education programmes among the local people

Objective	Programme	Activity	Range State / Organization	Collaborator	Progress / Results (1997-1998)	Further Specific Activities (1999-2000)
1) Reduce mortality	6) Assess hunting pressure and other mortality factors along the migration route.	1) Determine hunting seasons and practices in areas used by Siberian cranes.	All Range States-WP		Has been done	Wetlands International: Compile a separate list of hunting seasons in all Range States by mid-1999
		2) Determine threats to Siberian cranes at each wetland area they use.	All Range States-WP		KZ: Only partially done; investigated about 10 wetlands in 1998, including threats (some of these are refuges)	More work needed: important activity for GEF project
		3) Develop programmes to enlist hunters to support crane conservation.	All Range States-WP		Work in progress	All Range States - WP: Encourage hunters to join or establish conservation NGOs (especially in IR); provide printed information (e.g. postcards) about Siberian cranes to hunters, where licences are sold, before the beginning of each hunting season
2) Increase numbers and genetic diversity	1) Release costume-reared and parent-reared cranes with wild Siberian Cranes on breeding grounds after staff and facilities are available (in 1998 or 1999).	1) Transport costume-reared and parent-reared young Siberian crane chicks from the captive breeding centres to the breeding grounds of the western population for release with wild pairs.	Russia-WP	ICF-WP	Constructed camp for future releases at Uvat. In 1998, release was not possible on account of late spring/ absence of breeding	Carry out releases of young Siberian crane chicks into the western population in 1999
		2) Complete costume/ parent-rearing of Siberian crane chicks and place a PTT, mortality sensor and, if feasible, standard radio on each pre-fledged bird.	Russia-WP	[WBSJ-WP] ICF-WP	See above	The work is planned for 1999 (see above)

Objective	Programme	Activity	Range State / Organization	Collaborator	Progress / Results (1997-1998)	Further Specific Activities (1999-2000)
2) Increase numbers and genetic diversity	1) Release costume-reared parent-reared cranes with wild Siberian Cranes on breeding grounds after staff and facilities are available (in 1998 or 1999).	3) Monitor migration of costume-reared and parent-reared Siberian cranes released on breeding grounds, and visit resting areas and final winter destination. Promptly communicate PTT data to all western population Range States during the migration.	Russia-WP	All Range States-WP [WBSJ-WP] ICF-WP	See above	Communicate PTT data from the 1999 autumn migration of Siberian cranes released into the western population

Objective	Programme	Activity	Range State / Organization	Collaborator	Progress / Results (1997-1998)	Further Specific Activities (1999-2000)
2) Increase numbers and genetic diversity	2) Use Eurasian cranes to rear Siberian cranes in order to produce future "guide birds".	1) Bring eggs from Oka, ICF, and western European centres, to cross-foster in nests of wild Eurasian cranes on the western breeding ground.	Russia-WP	ICF-WP	In 1997: 3 Siberian crane eggs from ICF and Oka were put in 3 nests of Eurasian cranes; In 1998: 4 Siberian crane eggs were put in 4 nests of Eurasian cranes (no information on survival available)	Co-operate in ongoing programme to place eggs into nests of wild Eurasian cranes for cross-fostering, attach PTTs, monitor/communicate data from migration, and visit key sites
		2) Place PTTs on all pre-fledged Siberian cranes cross-fostered by wild Eurasian cranes on the western breeding grounds and on several pre-fledged Eurasian crane juveniles and moulting adults; and monitor the migration.	Russia-WP	[WBSJ-WP] ICF-WP	No PTTs were fitted since foster-reared wild Siberian crane chicks were not located. In 1998: a PTT was placed on a Eurasian crane chick, but the PTT failed. Chick was marked with color leg band.	Continue according to plan
		3) As PTT data from released cranes are received and communicated to the relevant Range State focal points, promptly visit the migration resting areas and wintering grounds which have been identified.	All Range States-WP		RU visited south Tyumen Oblast in 1997; KZ visited Caspian coast in the north (April/May 1997 - no Siberian cranes were observed). In 1998: RU extended visit to Astrakhan Reserve and KZ to Narzum	Continue according to plan

Objective	Programme	Activity	Range State / Organization	Collaborator	Progress / Results (1997-1998)	Further Specific Activities (1999-2000)
2) Increase numbers and genetic diversity	3) Use Siberian cranes released in Iran in 1996 to augment the wild flock.	1) If the free-ranging bird does not return to Fereidoonkenar, locate and capture it and release it with the wild cranes.	Iran	Russia-WP	Not done	No further action to be taken
		2) Health check the captive Siberian crane at Pardisan Park and release it with wild Siberian cranes.	Iran	Russia-WP ICF	Health checks carried out by Pardisan vet 4 times a year	ICF: arrange for ICF veterinarian to liaise with IR counterpart on care issues; consider moving the bird at Pardisan Park (Tehran) to Miankaleh to use as a decoy (continue to keep it a pen)
		3) Retrieve PTTs from both of the above birds (released in 1996) and send to WBSJ for refurbishing.	Iran	Russia-WP, WBSJ-WP	RU: WBSJ PTT was retrieved in nesting territory in 1998	No further action to be taken
3) Enhance inter-national co-operation	1) Improve exchange of information and technical expertise.	1) Designate national co-ordinators with responsibility for liaising with counterparts in other countries and with co-operating organizations.	All Range States-WP		Generally done, but some names to be added (see separate list compiled by CMS)	CMS: include list of national co-ordinators as annex to report of the December 1998 meeting in Ramsar, Iran
		2) Provide central co-ordination of information exchange, subject to a strict protocol on use and publication of data.	ICF-WP	CMS	ICF: in progress CMS: compiled 1997-99 Conservation Plan, circulated to all Range States in August 1997 (attempted to secure Russian translation, but was not successful)	All Range States - WP: regularly forward current information on Siberian crane activities to ICF clearinghouse, without delay, for forwarding to others (by e-mail)

Objective	Programme	Activity	Range State / Organization	Collaborator	Progress / Results (1997-1998)	Further Specific Activities (1999-2000)
3) Enhance inter-national co-operation	1) Improve exchange of information and technical expertise.	3) Submit an annual report on implementation of the Siberian crane Memorandum of Understanding to the UNEP/CMS Secretariat, for forwarding to all participating Range States and co-operating organizations.	All Range States-WP Co-operating Organizations	CMS	RU: 1997 report submitted, circulated to all Range States; working on a joint publication with ICF which will include 1998 activities All other Range States tabled reports at Ramsar meeting	CMS: annex all available texts of country reports to Ramsar meeting report; CMS: remind Range States in January of each year of the new deadline set for receipt of reports: 31 March (starting in 2000)
3) Enhance inter-national co-operation	1) Improve exchange of information and technical expertise.	4) Organize regular meetings of Siberian crane Range States; seek allocation for funding in the core CMS budget.	CMS		Organized meeting in Ramsar, Islamic Republic of Iran (main activities June-Dec 1998) with core CMS/UNEP funding	Compile/distribute revised Conservation Plan and meeting report (early 1999) Organize fourth Range State meeting in spring or autumn 2000 (CMS to solicit formal offers in 1999: PK, UZ, CN already expressed interest in hosting a meeting); consider inviting potential donors to observe sessions
3) Enhance inter-national co-operation	2) Raise funds for a comprehensive conservation programme.	1) Develop comprehensive project proposal(s) for submission to appropriate agencies for possible funding support.	ICF	CMS	ICF/CMS/UNEP: GEF project proposal in progress	ICF/CMS: Complete GEF project proposal and submit in early 1999 (Range States comments and endorsements required no later than 8 January 1999 -- by fax to CMS)
		2) Seek/provide funding, to the extent possible, on an <i>ad hoc</i> basis for small-scale projects and tasks (e.g. preparation of a GIS map).	ICF	CMS	CMS: Financed Siberian crane video produced/distributed by ICF in 1998	All Range States: Develop small scale project proposals and submit to CMS and ICF for their consideration; appeal also to governments for funding of programmes ICF: facilitate organization of a fund-raising committee to improve effectiveness of fund-raising efforts

Specific activities to be undertaken in 1999 - 2000 (drawn from the Annotated Conservation Plan)

Arranged as follows:

All Range States - Central Population

All Range States - Western Population

Individual Range States (in alphabetical order)

RANGE STATE / CO-OPERATING ORGANIZATION	SPECIFIC ACTIVITIES TO BE UNDERTAKEN IN THE PERIOD 1999-2000
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<p>All Range States</p> <p>Central Population</p> <p>(Afghanistan, India, Kazakhstan, Pakistan, Turkmenistan, Russian Federation, Uzbekistan)</p>	<p><i>Education / Awareness</i></p> <p>Translate ICF/CMS video into local languages; distribute and broadcast it widely along migration route (before autumn and spring migrations); obtain and distribute other suitable Siberian crane videos</p> <p>Translate, distribute curriculum packages for four age groups (provided by ICF)</p> <p>Prepare posters and booklets; organize crane festivals, share information and samples on current methods and educational materials (especially Russian-speaking Range States)</p> <p>Continue questionnaire distribution within Important Bird Area (IBA) projects</p> <p>Continue educational activities to promote awareness; place signs about Siberian cranes at historic sites; conduct crane art exchanges between schools and countries</p> <p>Initiate/continue incentive schemes as far as possible (use Robert Bateman posters, when available)</p> <p><i>Monitoring / Information exchange / Training</i></p> <p>Investigate all reported sightings of Siberian cranes as soon as possible</p> <p>Survey areas where PTT signals indicate stopover sites; send description of areas to Russian Federation; coordinate network information exchange about resting areas</p> <p>Continue monitoring work on threats to Siberian cranes</p> <p>As necessary, adjust timing of hunting seasons along migration routes</p> <p>Provide printed information (e.g. postcards) about Siberian cranes to hunters, where licences are sold, before the beginning of each hunting season</p> <p>Regularly forward current information on Siberian crane activities to ICF clearinghouse, without delay, for forwarding to others (by e-mail)</p> <p>Anticipate migration movements; pre-arrange resources for searches (staff, training, transport, communication, funds) in order to visit stopover sites as soon as possible</p> <p>Other Range States requiring veterinarian training: attend 1999 training sessions in India, if possible</p> <p>Develop further small scale project proposals and submit them to CMS and ICF for their consideration; appeal also to governments for funding of programmes</p>
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RANGE STATE / CO-OPERATING ORGANIZATION	SPECIFIC ACTIVITIES TO BE UNDERTAKEN IN THE PERIOD 1999-2000
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<p>All Range States-</p> <p>Western Population</p> <p>(Azerbaijan, Islamic Republic of Iran, Kazakhstan, Russian Federation)</p>	<p><i>Education / Awareness</i></p> <p>Translate ICF/CMS video into local languages; distribute and broadcast it widely along migration route (before autumn and spring migrations); obtain and distribute other suitable Siberian crane videos</p> <p>Continue educational programme activities to promote awareness</p> <p>Distribute Siberian crane postcards (to be printed in India, with financing from CMS?)</p> <p>Initiate/continue incentive schemes as far as possible (use Robert Bateman posters, when available)</p> <p>Provide printed information (e.g. postcards) about Siberian cranes to hunters, where licences are sold, before the beginning of each hunting season</p> <p>Encourage hunters to join or establish conservation NGOs (especially in Iran)</p> <p>Investigate all reported sightings of Siberian cranes as soon as possible</p> <p><i>Monitoring / Information exchange</i></p> <p>Co-operate in ongoing programme to place eggs into nests of wild Eurasian cranes for cross-fostering, attach PTTs, monitor/communicate data from migration, and visit key sites</p> <p>Investigate all reported sightings of Siberian cranes as soon as possible</p> <p>Regularly forward current information on Siberian crane activities to ICF clearinghouse, without delay, for forwarding to others (by e-mail)</p> <p>Develop further small scale project proposals and submit them to CMS and ICF for their consideration; appeal also to governments for funding of programmes</p>
<p>Afghanistan</p>	<p><i>See also activities listed under "All Range States - Central Population"</i></p> <p>Develop conservation education programme for cranes and other species</p> <p>Attempt to enlist Taliban support for conservation laws (eg. local government support for former Ab-I-Estada sanctuary status)</p> <p>Search for cross-fostered Siberian crane chick in the transboundary area of Afghanistan, Iran, and Turkmenistan</p> <p>Identify suitable site to maintain captive Siberian cranes for education (develop expertise/ education materials first with Eurasian cranes)</p>

RANGE STATE / CO-OPERATING ORGANIZATION	SPECIFIC ACTIVITIES TO BE UNDERTAKEN IN THE PERIOD 1999-2000
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Azerbaijan	<p><i>See also activities listed under "All Range States - Western Population"</i></p> <p>Draft/distribute a questionnaire about Siberian cranes in 1999</p> <p>Begin education not only near reserves but also along migration routes, especially among agricultural cooperative farmers and hunters</p> <p>Establish a communication network between Russia, Kazakhstan, and Azerbaijan to ensure early exchange of information on <i>all</i> bird movements</p>
China	<p>Propose activities for inclusion in the new Conservation Plan</p>
India	<p><i>See also activities listed under "All Range States - Central Population"</i></p> <p>Develop puppet shows and other events in local languages</p> <p>Produce a poster depicting Siberian cranes and their historic range</p> <p>Continue surveys (to be done by KNP around the park; and by WII in the historic range)</p> <p>Bring satellite wetlands around Keoladeo National Park under protection</p> <p>Undertake further contaminant studies on Sarus cranes</p> <p>Attempt to capture/mark a wild Siberian crane chick in India in Dec. 1999; RU to bring a parent-reared bird; and attach a PTT if pair arrives with a chick</p> <p>Continue existing plan to place PTTs on several Eurasian cranes that spend the winter in India near areas with wetlands that might support Siberian cranes; develop research proposal with Russian Federation (instead of WBSJ) in 1999</p> <p>Continue to monitor possible return of the 2 birds released in January 1997; in 1999 construct with MoE funds a special compound in which to keep a pair of pinioned birds from ICF</p> <p>Wildlife Institute of India to train local veterinarians near Bharatpur in 1999.</p>

RANGE STATE / CO-OPERATING ORGANIZATION	SPECIFIC ACTIVITIES TO BE UNDERTAKEN IN THE PERIOD 1999-2000
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Islamic Republic of Iran	<p><i>See also activities listed under "All Range States - Western Population"</i></p> <p>Search for cross-fostered Siberian crane chick in the transboundary area of Afghanistan, Iran, and Turkmenistan</p> <p>Finalize brochure on Siberian cranes</p> <p>Establish an education centre/bird garden with Babolsar municipality; Russian Federation (Oka) to provide a pair of Siberian cranes to Iran; in 1999/2000, publish booklets in Farsi on the role of religious leaders in conserving migratory species, particularly Siberian cranes; translate it for other Range States as appropriate</p> <p>Establish new NGOs: (e.g. Mazandran Crane Conservation Association); organize a crane festival</p> <p>Provide information by e-mail to Azerbaijan about <i>start</i> of spring migration in order to facilitate Azerbaijan planning for monitoring</p> <p>Organize a guard system through NGOs (e.g the newly formed Mazandran Crane Conservation Association) to keep intruders away from the cranes at Fereidoonkenar</p> <p>Work towards the objective of obtaining long-term leases of suitable crane habitat</p> <p>Study possible construction of an observation tower at Fereidoonkenar in collaboration with NGOs and Finnish sponsors; study desirability of extending it to include an education centre</p> <p>Attach a PTT to a wild chick (Y. Markin: February 1999) – high priority</p> <p>Examine the possibility of releasing 1-2 pairs of Siberian cranes at Gomishan wetland (near Turkmenistan border). Release 1-2 birds to establish a wild, non-migrating flock at Miankaleh with a view to luring wild birds there</p>
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RANGE STATE / CO-OPERATING ORGANIZATION	SPECIFIC ACTIVITIES TO BE UNDERTAKEN IN THE PERIOD 1999-2000
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Kazakhstan	<p><i>See also activities listed under "All Range States - Central Population"</i> <i>See also activities listed under "All Range States - Western Population"</i></p> <p>Continue to develop education programmes among the local people</p> <p>Increase network of seasonally protected wetlands (GEF project)</p> <p>Develop IBA project through BirdLife International</p> <p>Distribute questionnaire on Siberian cranes in 1999</p> <p>Establish a communication network between Russia, Kazakhstan, and Azerbaijan to ensure early exchange of information on <i>all</i> bird movements</p> <p>Continue the search for cranes and expand activities in northwest Kazakhstan near Caspian coast, especially in staging areas discovered by 1998 PTT data</p> <p>Search for wetlands east of the Caspian Sea in Kazakhstan, Russian Federation and Turkmenistan to evaluate possibility for a future flyway to Iranian coast of Caspian Sea</p> <p>Implement conservation plan in north Caspian region</p>
Pakistan	<p><i>See also activities listed under "All Range States - Central Population"</i></p> <p>Expand education programme to Zhob and Balochistan</p> <p>Develop education materials on wild cranes, and materials (for women) on captive breeding/training</p> <p>Continue work with communities and strengthen enforcement of legislation</p> <p>Consider sending captive birds to Lakki Refuge for education programme and decoy purposes (send information on facilities to ICF and Vogelpark Walsrode)</p> <p>WWF-Pakistan or USFWS to assist in training veterinarian from Pakistan Wildlife Department</p>

RANGE STATE / CO-OPERATING ORGANIZATION	SPECIFIC ACTIVITIES TO BE UNDERTAKEN IN THE PERIOD 1999-2000
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Russian Federation Central Population	<p><i>See also activities listed under "All Range States - Central Population"</i></p> <p>Continue existing education programme (Yamalo-Nenetsky autonomous region to send school children contest winners to Oka)</p> <p>Continue PTT and standard radio marking, migration studies, and ground surveys as PTT data become available along flyways</p> <p>Expand network of protected areas; realize a new hunting law at federal level and adapt it to regional level (Tyumen and Yamalo-Nenetsky autonomic region)</p> <p>Place PTT on a wild chick (and possibly a released chick) in India; thereafter all Range States monitor migration closely</p> <p>Continue releases of costume-reared and parent-reared chicks, the fitting of PTTs on Siberian cranes released with Eurasian cranes, 'soft-releases' of juvenile Siberian cranes into a flock of Eurasian cranes, and ground surveys as PTT data become available along flyways</p> <p>Continue to place PTTs on Eurasian cranes</p> <p>Send PTT data to ICF immediately by e-mail; coordinate data flow and field monitoring (alert other Range States one month in advance); develop network protocol for PTTs and leg bands; prepare standardized methodology/data forms</p> <p>Continue to place captive-produced Siberian crane eggs in the nests of wild Eurasian cranes</p> <p>Continue to place PTTs on Siberian cranes reared by Eurasian cranes, and monitor their migration</p> <p>Continue helicopter surveys over Kunovat Basin</p> <p>In future years, extend the release programme once the efforts to foster-rear and reintroduce wild Siberian crane 'guide birds' are shown to be successful</p>
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RANGE STATE / CO-OPERATING ORGANIZATION	SPECIFIC ACTIVITIES TO BE UNDERTAKEN IN THE PERIOD 1999-2000
Russian Federation Western Population	<p><i>See also activities listed under "All Range States - Western Population"</i></p> <p>Continue to develop education programmes among the local people, and incorporate education information in school texts</p> <p>Establish a communication network between Russia, Kazakhstan, and Azerbaijan to ensure early exchange of information on <i>all</i> bird movements</p> <p>Involve other Dagistan specialists if Dr. Pishvanov is unavailable to assist with Siberian crane monitoring</p> <p>Carry out aerial surveys in future when PTT data becomes available</p> <p>Distribute educational materials, including postcards, in summering areas for sub-adult cranes</p> <p>Repeat monitoring of a juvenile fitted with a PTT in the wintering ground in 1999 and/or 2000</p> <p>Continue helicopter surveys (about 20 hours); and investigate funding possibilities to extend this work to West Siberia</p> <p>Continue to attach PTTs on Siberian crane <i>chicks</i> (rather than adults, for which the consequences of disturbance/loss are more acute)</p> <p>Carry out releases of young Siberian crane chicks into the western population in 1999</p> <p>Communicate PTT data from the 1999 autumn migration of Siberian cranes released into the western population</p>
Turkmenistan	<p><i>See also activities listed under "All Range States - Western Population"</i></p> <p>Search for cross-fostered Siberian crane chick in the transboundary area of Afghanistan, Iran, and Turkmenistan</p>
Uzbekistan	<p><i>See also activities listed under "All Range States - Western Population"</i></p> <p>Extend Siberian crane education programme</p> <p>Distribute booklets and questionnaires in areas of possible Siberian crane migration</p> <p>Conduct spring expedition to known migration areas</p> <p>Increase network of seasonally protected wetlands (GEF project)</p>

RANGE STATE / CO-OPERATING ORGANIZATION	SPECIFIC ACTIVITIES TO BE UNDERTAKEN IN THE PERIOD 1999-2000
Secretariat, Convention on Migratory Species	<p>Complete (with ICF) GEF project proposal and submit in early 1999 (Range States comments and endorsements required no later than 8 January 1999 -- by fax to CMS)</p> <p>Include list of national co-ordinators as annex to report of the December 1998 meeting in Ramsar, Iran</p> <p>Annex all available texts of country reports to Ramsar meeting report</p> <p>Remind Range States in January of each year of the new deadline set for receipt of reports: 31 March (starting in 2000)</p> <p>Compile/distribute revised Conservation Plan and meeting report (early 1999)</p> <p>Organize fourth Range State meeting in spring or autumn 2000 (CMS to solicit formal offers in 1999: Pakistan, Uzbekistan, China already expressed interest in hosting a meeting); consider inviting potential donors to observe sessions</p>
International Crane Foundation	<p>Maintain central archive of all video material received from Range States and others</p> <p>Complete Robert Bateman Siberian crane print; copy and distribute it as a poster</p> <p>In 2000 send to Keoladeo National Park a genetically unrelated pair of birds for education purposes only (not expected to migrate)</p> <p>Arrange for ICF veterinarian to liaise with Iran counterpart on care issues; consider moving the bird kept at Pardisan Park (Tehran) to Miankaleh to use as a decoy (continue to keep it a pen)</p> <p>Complete (with CMS) GEF project proposal and submit in early 1999 (Range States comments and endorsements required no later than 8 January 1999 -- by fax to CMS)</p> <p>Facilitate organization of a fund-raising committee to improve effectiveness of fund-raising efforts</p>

Part II: Summary Report of the Range State Meeting

Report of the Third Meeting of Siberian Crane Range States Ramsar, Islamic Republic of Iran 8-13 December 1998

Agenda Item 1. Opening Remarks

Mr Seyed Amir Ayafat, Director General of International Affairs of the Iranian Department of Environment, opened the meeting and welcomed the delegates to the city of Ramsar, situated on the coast of the Caspian Sea.

In his opening remarks, Mr A. Najafi, the Deputy Head of Natural Environment and Biological Diversity, described the topography of the Islamic Republic of Iran, which covers 1.6 million km² and includes mountains, forests, deserts and coastal areas, with highly diverse climates and ecology. The different natural conditions give rise to different cultural traditions and support a wealth of fauna and flora on land and in Iranian rivers and coastal waters.

Twenty years ago it was feared that the Siberian crane had disappeared and would never be seen again, but in 1973 the species was again spotted in northern Iran and it has returned every year since. Russian and Dutch experts are welcomed yearly and they bring with them the latest satellite technology.

Mr Najafi noted that the Islamic Republic of Iran has over 200 wetland sites, 18 of them listed under the Ramsar Convention, one of the best being in the same province as Ramsar. These sites face the familiar problems of eutrophication, pollution, hunting and other demands on the land. The authorities are working on environmental education programmes and research to improve knowledge, and special efforts are being made to combat oil pollution. The Iranian authorities are grateful for the support received and are aware of the need to control industrial developments close to sensitive wetland sites. There was already a joint venture with UNDP to protect wetlands; with IUCN to protect the Asian cheetah and its habitat; and it was important also to achieve progress with birds and especially migratory species.

The Governor of Ramsar, Mr. Ghanbar Simiari, welcomed the delegates to Ramsar and recognised the importance of such meetings to reach common decisions on globally threatened species, such as the Siberian crane, one of the rarest birds in the world. Most of the 3,000 individuals of the species live in China and they migrate well over 4,000 km from northern Asia to their summer habitat. While Siberian cranes are considered to be a good omen in Iran, increasing the population is a difficult task. The birds lay two eggs per year, but only one chick is likely to survive except in particularly favourable seasons. The Governor concluded his remarks by noting that the Islamic Republic of Iran enjoys a good relationship with the International Crane Foundation. It is an honour to host the meeting and thanks were due to the Convention on Migratory Species for promoting the sacred aim of protecting this species.

The Deputy Executive Secretary of CMS, Mr Douglas Hykle, thanked the Iranian hosts for providing such a prestigious venue with strong historical connections to conservation. The meeting brought together specialists with many years of experience and knowledge of Siberian cranes. He had first become involved in the plight of the Siberian crane at a wetlands conference in Karachi in 1991. Since then, the Memorandum of Understanding had been signed under the auspices of CMS in Kushiro, Japan, in 1993, and further meetings of the Range States had been held in Moscow (1995) and Bharatpur (1996). The decisions of these meetings had translated into concrete actions, and the decline in the western and central

flocks appeared to have been arrested. The next three to five years should see the fruits of the work on cross-fostering, captive breeding and satellite telemetry. The activities for habitat protection and public awareness-raising needed to be continued, and the efforts extended to the eastern population by bringing China on board. Efforts were in hand to try to secure funding from the Global Environment Facility (GEF) for a multi-national project, which would help meet the challenge of rescuing the Siberian crane from the brink of extinction.

Mr Mohammad Roshanzamir, the Director General of the Province of Mazandaran, described the geography of the province, which stretches from the Turkmenistan border to the Caspian and includes the remaining parts of the Caspian jungle, a refuge for a range of wildlife. The region contains mountains, steppes and coastal plains, and the rice growing area has been recognized as an important habitat for birds for over 100 years. One of Iran's finest Ramsar sites is the key wintering area for Siberian cranes, with 14 individuals sighted this year (10 last year).

The Director of the International Crane Foundation, Dr George Archibald, expressed his pleasure to be back in the Islamic Republic of Iran after a long absence, having been involved in crane studies there back in the 1970s. The international co-operation to save the Siberian crane was an example of how things should be, with delegates from diverse countries sitting round the table working together towards a common goal.

Agenda Item 2. Adoption of the Agenda and Work Programme

Mr Asghar Mohammadi Fazel, Director General of the Natural History Museums, was elected chairman of the meeting by acclamation.

Mr Hykle introduced the agenda and the work programme, which was agreed without amendment, as was the suggestion that working groups be established to review progress and consider future priority actions for the Western and Central Populations.

Agenda Item 3. Reports of Range States and Co-operating Organizations

Delegates gave brief reports on activities undertaken the previous two years, including measures to increase the wild populations, research and monitoring activities, efforts to improve international co-operation and information exchange, and public awareness activities.

Russian Federation

Dr Sorokin reported that helicopter surveys had been continued and that 5 Siberian crane eggs (2 from ICF and 3 from Oka) had been placed in Common crane nests in the habitat of the Central Population. Ringing and PTT fitting had been undertaken in Kunovat in August 1998. Twenty hours of helicopter surveys in the western area had unfortunately not resulted in any sightings, so the location of the proposed captive releases was changed.

Ten Common crane nests had been found and four eggs left in the nests. Five individuals were marked and, on one of them, an old Japanese PTT was replaced with a new Russian model. One key site was about to be designated as a regional reserve with the possibility of national status later.

Six captive-bred chicks had been released near Common crane sites. All were fitted with PTTs and appeared to behave as a flock. Unfortunately, two birds from Vogelpark Walsrode

(Germany), due to be released there, arrived later than expected and the Common cranes had already left the area. These birds will be kept at the Oka breeding centre.

Three Russian PTT sets were still working as of December 1998 - one was sending strange signals from Afghanistan and it was feared that the chick may be in trouble or the set was in the possession of a nomadic herdsman (but the altitude and hilly landscape may be affecting the signal); one was attached to a cross-fostered chick and the third had a weak signal. The PTT sets seemed to have a life of 4-6 months (although technological improvements may lengthen this, and ICF knew of 10-month sets which can cover both migrations). PTT data had been useful in identifying key sites in Uzbekistan and Turkmenistan.

Dr Sorokin reported that contact with colleagues in Dagistan (Dr Pishvanov) had been difficult because of civil unrest there. He said the e-mail communication provided by ICF/CMS was very helpful, but that e-mail coverage in remote parts of Russia is still poor. Concerted efforts had been made to secure video coverage of Siberian crane conservation work.

There was no Russian report on the Eastern Population due to the unfortunate absence of Dr Germagenov, who had been unable to attend the meeting at the last moment.

India

Mr Choudhury described recent work in India and the structure of the various authorities playing a part in the conservation effort in that country. The PTT programme faced problems as some feared that the stress of having the sets fitted might frighten the birds and result in them not coming back to Keoladeo National Park again. When clearance was given, it had proved impossible to catch the birds. Two birds had arrived shortly after the meeting in Bharatpur in November 1996.

The Bombay Natural History Society was conducting research. One question was to find out where the birds go if they did not arrive at Keoladeo. PTTs were being fitted to other crane species to establish migration routes, with knock-on benefits for other crane species. The Common crane ringing exercise and subsequent monitoring (difficult with 70-90,000 in the flock) had unfortunately produced no sightings of Siberian cranes.

Records dating back over 60 years indicated that there had been sightings at 28 locations. Of these only one is now frequented, and only another four are suitable for possible reintroduction, the best candidate being in Uttar Pradesh. Staff turn-over in key offices and the small number of agencies actively involved in the conservation work had given rise to some administrative problems. There had been some TV coverage of the Siberian crane work, and leaflets had been produced in local languages as the birds tended to stray from the confines of Keoladeo National Park, and it was important to inform the local people about them.

Islamic Republic of Iran

The most significant site for Siberian cranes in the Islamic Republic of Iran was to be found at Fereidoonkenar. The site covers 200 hectares and is therefore not large enough to accommodate many more cranes, because of the territorial and aggressive nature of the birds. The land is privately owned and managed by farmers and wild duck trappers, and the local people were suspicious of officials taking an interest in their property. Ms. Mirande (ICF) noted that similar problems had been encountered elsewhere, for example in the United States, where local people often associated site designations with restrictions on the use of land. There was a possible role for NGOs in public awareness-raising and clearly a need to be sensitive to socio-economic concerns when promoting conservation issues.

There was increasing co-operation with international organisations, and a particularly constructive relationship with the ICF was developing. Training and developing veterinary expertise were also being improved through contact with outside bodies. A wetlands-related project was being elaborated for submission to the GEF.

It was intended to establish a centre of excellence which could benefit the crane conservation work. The former Shah's palace, currently used as a museum, had the potential to be used also as a research centre for wetlands and conservation issues.

Afghanistan

Mr. Adil (Society for Afghanistan Volunteer Environmentalists) explained that Afghanistan faced a difficult situation, having been in political turmoil and at war for so long. Institutions and infrastructure barely operated, but the United Nations was beginning to develop environmental programmes, which were however not a priority for the national authorities at the moment. Ten key sites (former royal hunting grounds) had been identified for possible designation.

Help of a practical and financial nature was required. WWF Pakistan was already helping monitor the site at Ab-i-Estada, and two other likely migration route sites Zarkol and Koul-e-Chaqmaqin near the Chinese/Pakistan border would be worth examining. The BBC had broadcast messages about the benefits of conservation and the possibility of eco-tourism.

A data exchange co-ordinated by ICF was suggested. Mr. van der Ven (Wetlands International) pointed out that his organisation already operated a database which was currently underused.

Azerbaijan

Sightings of Siberian Cranes in Azerbaijan during their migration to and from Siberia were very rare. Because of the very small numbers of this species, it had been included in the country's Red Data Book.

The State Committee on Ecology and the Control of Natural Resources had been participating in the international efforts co-ordinated by CMS and ICF since the second meeting of the Range States. Despite economic problems, the prospects for conserving two key lake sites seemed good.

Kazakhstan

Two field trips were made possible thanks to ICF funding. In the north, the lake appeared to be in excellent condition with many Common and Demoiselle cranes present. Following up reports of Siberian cranes was disappointing, as one sighting was actually a swan. There was a clear need to educate people so that they could identify the birds accurately. A second expedition to another larger habitat was undertaken in collaboration with Russian experts, and two possible Siberian crane sites were found. The summer of 1998 was very hot and the lakes were very dry. One pair of Siberian cranes which had not been fitted with PTT was sighted.

Pakistan

Some possible migration routes through Pakistan were identified, but the level of protection afforded to the sites was minimal. Hunting continues, but management and conservation plans aimed at habitat and other species are likely to benefit Siberian cranes.

The Siberian crane video had been received, but the English commentary made it unsuitable for wide use. The quality of the translation was not adequate and it would be done again.

The authorities were liaising with the Crane Hunters Association and the clubs were spreading the word to the local inhabitants. All reported sightings were being investigated, but no incentive scheme operated.

No sites for Siberian cranes had been positively identified. Consultation meetings were being held to consider more punitive legislation, but no decisions had yet been made.

Turkmenistan

The Siberian crane was a very rare migratory species in Turkmenistan with only ten sightings in the past hundred years. It had been seen on the eastern shore of the Caspian Sea at Sarykhmaysh Lake, along the Amudarya and Murgap River Valleys and in the foothills of Kopetdag. The most recent information dated from 10 March 1977 when five hybrid Siberian-Common cranes were said to have been observed in the central part of the Badkhyz reserve.

It was likely that the species continued to pass through the territory of Turkmenistan during migration. Other migratory cranes spend a little time in the southern oasis of Turkmenistan (especially in the autumn), but specialists had difficulty in determining exactly which species the high-flying birds were. Financial and logistical difficulties added to the complications for ornithologists to carry out regular surveys of the seasonal migration of cranes in different parts of the country.

Uzbekistan

Uzbekistan had signed the Memorandum of Understanding in India, and had made headway in protecting all cranes. There was a draft action plan, and projects were being elaborated, including analysis of migration routes for Common, Demoiselle and Siberian cranes. Promotional material was being produced regarding the protection of cranes. With ICF support, the State Committee, the Zoology Department and the Ecology Society were undertaking special projects.

Uzbekistan had produced a biodiversity strategy (now approved) which includes provisions for protected areas. CMS would be asked for help in providing material for environmental education.

The Uzbekistan National Crane Plan envisaged close relations with neighbouring countries and networking through the regional offices of the Zoology Society. An ICF-sponsored booklet in Uzbek and Russian, television and radio broadcasts had been the main media effort. Schools had been targeted with a "paper crane" project, but funds were scarce and the promotional programme was incomplete. Crane projects needed to be integrated to ensure best use of resources.

Hunting remained a problem in Uzbekistan. Although illegal, the economic situation was forcing people to hunt birds to eat or sell.

China

With 95% of the entire population of Siberian cranes being present on one site, the species was vulnerable to an ecological disaster. There were human pressures near Poyang Lake, and pesticide and fertilizer use were both issues of concern.

The Forestry Authority was taking the lead in monitoring crane population dynamics and habitat and the Government had recognised the need to participate in international organizations, and would consider positively signing the MoU and the Convention on Migratory Species.

Convention on Migratory Species

The CMS Secretariat had continued to organize meetings of the Range States and promote the MoU. The Secretariat would try in future to be more pro-active in soliciting the annual reports from Range States. The Secretariat was working with ICF to draw up the GEF proposal under consideration at the present meeting.

International Crane Foundation

Ms Mirande stressed that ICF was a non-profit organisation struggling to find its own resources and was not able to provide as much funding as it would like, being itself dependent on the generosity of external funders. She mentioned that the Brehm Fund in Germany had supported the work in Russia in 1998.

ICF had sent captive-bred eggs world-wide. It was also helping to provide veterinary expertise, and it was proposed to nominate a focal point for veterinary knowledge about mortality, injuries and diseases. Close contact was being maintained with European captive breeding programmes.

An e-mail network had been established and its use was encouraged. A bibliography service was also available and donations of articles, leaflets and pamphlets were welcome. Ms Mirande and Dr Sorokin (Russian Federation) were working on a new article on the status of the Siberian crane.

The revised ICF/CMS video with international footage would be distributed at the meeting, with commentaries in English, Russian or blank, with cassettes of VHS-PAL or commercial standard. The new versions of the film had cost \$3000 so no revision was likely for two years. T-shirts had also been produced suitable for international use since they had no writing on them.

Agenda Items 4. Detailed review of implementation of the Conservation Plan

The product of this detailed discussion, which took place in the working groups, can be found in the Annotated Conservation Plan, in the column "Progress/Results (1997-1998)".

Agenda Item 5. Work programme for 1999

The product of this detailed discussion, which took place in the working groups, can be found in the Annotated Conservation Plan, in the column "Further Specific Activities (1999-2000)".

The reports of the working groups on awareness/education, scientific knowledge and captive breeding are annexed to this report. A summary of the working groups' main findings is set out below:

Working Group on Awareness/Education (rapporteur: George Archibald)

Iran and China were particularly interested in the experience gained in India. Lessons for other Range States might be learnt from the solution used at Keoladeo National Park, where

there had been local hostility to the park being enclosed. A partnership approach had therefore been adopted, and the benefits to the local community from eco-tourism had been explained by the local NGO.

There were however no comparable NGOs in China or Iran, and George Archibald and others had been taking the initial steps in the margins of the meeting to set up the MCCA (Mazandaran Crane Conservation Association). Delegates were invited to join as founder members.

The possibility of representatives of the Chinese authorities visiting the Keoladeo National Park would be actively considered.

The representative of the USFWS offered funding to make duplicates of the Siberian crane video, and to produce posters for use in India.

Working Group on Scientific Knowledge (rapporteur: Abdul Aleem Chaudhry)

Inventories of populations and habitats were required, as little was known of the cranes' summer habits, breeding habits, population dynamics or the behaviour and habitat of pre-breeding birds. Studies using PTTs might help answer these questions.

Assessment of threats needed to be carried out, focussing on hunting, human pressures, and lead-poisoning as these were all likely factors.

Greater knowledge of the genetic make-up of both the Western and Central populations was required, to assist in possible breeding programmes, and the efficacy of PTT technology and possible improvements should be assessed.

Dieter Rinke (Brehm Fund) thought that incubation methods needed to be re-examined. In the three institutions, programmes were working well, but ICF had noted a significantly better success rate with surrogate incubation compared with artificial incubation. Robert Lacey's "Vortex" incubation software had proved to be a useful tool; the next Range State meeting should provide for a discussion of population viability analysis.

Working Group on Captive Breeding (rapporteur: Rob Belterman)

Important work was being done by a number of institutions and organisations, eg Chester Zoo and the Nordic Ark.

The Oka breeding centre was now being supported by a local food supplier, which had obvious logistical advantages over the previous practice of importing food from Belgium and the United States. It was expected that a breeding pair from Oka could be sent to Iran some time in 1999/2000 and the elderly Japanese female would be used for breeding.

Claire Mirande pointed out that the annual mortality rate tended to range from 22%-28%, and for the populations to survive, this needed to be reduced to 10%.

Summary

It was agreed that the working groups had made a very useful contribution to the meeting and that on future occasions they might be constituted earlier in the proceedings so that their deliberations could be readily integrated into the Conservation Plan.

To that end, facilitators were appointed as follows for the three existing working groups, and for a fourth new working group, on fund-raising, with a view to monitoring and progressing their activities inter-sessionally as well as organizing the work at the next meeting:

Awareness/Education:	David Ferguson
Scientific Knowledge	Abdul Aleem Chaudhry
Captive Breeding:	Rob Belterman
Fund Raising:	George Archibald

Agenda Item 6. Revision of the CMS Memorandum of Understanding

The Secretariat tabled a draft proposal for revision of the MoU for the meeting's consideration. Mr Hykle introduced the paper, explaining the rationale behind the proposed changes, which were:

- to provide for the inclusion of the Eastern population and the participation of China;
- to change outdated references to the former Action Plan to the new Conservation Plan;
- to modify the provision of the MoU limiting the duration of its validity

Mr Adil asked about the status within the United Nations of the current authorities in Afghanistan and the Secretariat undertook to look into this. After some discussion, it was agreed that the national annual reports should be submitted to the Secretariat by 31 March each year (starting in 2000). Another slight change of wording would enable organizations such as ICF to host meetings of the Range States. ICF expressed an interest in doing so in the future. There was a discussion about opening the MoU to organizations other than the Wild Bird Society of Japan and ICF (eg to the Brehm Fund, Cracids Conservation, and Wetlands International), but it was decided to retain the status quo.

The amendments proposed by the Secretariat and highlighted on the paper tabled were accepted. The amended Memorandum of Understanding appears in Part I of this document.

Agenda Item 7. Global Environment Facility (GEF) project proposal

Initial work had been undertaken by ICF and CMS in developing a draft proposal for review by the UNEP/GEF Co-ordination Unit. There had already been a number of changes in approach, as the original idea of submitting a project proposal for a medium-size GEF grant of \$750,000 had been superseded by a two stage approach with an initial grant of \$250,000-\$300,000 for the development of a much larger project.

The meeting was asked to give its views on the contents of the draft, as the endorsement of the participating countries was important, as well as additional details to complete the application. The deadline for submission was close and finalising the application was a priority. The draft contained a list of all the national GEF focal points (for those countries which had signed the Convention on Biological Diversity -- CBD) and these contacts needed to write in support of the application. A model letter had been drafted by CMS and was distributed to all delegates.

The following comments were forthcoming (arranged by country, organization):

Afghanistan

As Afghanistan was not a CBD country, it would not be eligible for GEF funding although UNDP was trying to obtain a Block A grant for another project. The importance of Afghanistan to the integrity of the project should be emphasized in the application.

Azerbaijan

The draft GEF proposal had been received too late for full discussions to take place internally. There were funding problems for the existing protected sites, so finding matching resources for the project might prove difficult in Azerbaijan.

China

In anticipation of closer co-operation with China, the Chinese sites should be a large component of the project. In that country, most experience with GEF had been with projects confined to China with no international or transboundary aspect.

India

There were already GEF projects operational at some nature reserves but none was relevant to cranes or Ramsar sites. The Ministry of Environment and Forests had funded some projects at the Ramsar sites. It would be necessary to consult with other relevant authorities to seek advice (Forestry Authority and Wetlands Committee). One problem being faced was conflict with the Agriculture authorities who wished to increase production, leading to excessive use of fertilizers and pesticides (particularly important in wetlands).

Islamic Republic of Iran

Iran already had a \$8-10 million project for wetlands in preparation, linked to its sustainable development strategy and consistent with its national biodiversity strategy. This separate proposal raised the question of overlapping funding which would count against the Siberian crane project.

Two sites lay near to national frontiers, so close co-operation between different national authorities was important. It was noted that Iran had benefited from a modest communication grant available from the CBD "clearing house mechanism" to help purchase e-mail equipment, which delegates of other countries might consider worthwhile looking into.

Kazakhstan

The government had prepared a GEF project (\$132,000), in collaboration with Wetlands International through the Ministry of Ecology, with the leading role held by the Ministry of Agriculture. Nine of the fifteen Ramsar sites in central Asia were in Kazakhstan. The objective was to integrate protection measures for all sites. The proposed inclusion in the Government project of the Naurzum site might lead to overlap problems.

Pakistan

Eleven wetlands were potential crane sites. There was no GEF programme, but one was in the pipeline covering four sites, but there was no likely overlap. Finding matching funding might be difficult, although at least some was likely to be made available.

Russian Federation

Russia had 3,000 km of migration route for the Western/Central population, with PTT data providing more and more information about the key wetland sites for Siberian cranes. Ten sites were already protected, but none of the wintering and staging areas received support from international funding except for that at Astrakhan. Some sites on the target list needed to be brought forward to secure adequate protection. It was not clear whether there were already GEF projects in Russia, but certainly none affected known Siberian Crane sites. WWF was active in Eastern Russia.

Turkmenistan

There were no conservation-related GEF projects in Turkmenistan. Unfortunately there had been insufficient time to discuss the papers with relevant colleagues before departure. There were three likely sites in Turkmenistan in the south of the country (one not far from Ramsar). Comments on the draft proposal could be communicated by the end of the year/early January.

Uzbekistan

Uzbekistan strongly supported the principle of the project, but had not received the documents before the meeting and therefore no inter-departmental discussion had been possible.

Uzbekistan was starting to work on a GEF funded project for wetlands, and would therefore need to ensure there was no overlap. The wetlands project was an evaluation study to elaborate proposals for candidate Ramsar sites. Some funds had been provided for this purpose by the Ramsar Convention (SFr 25,000). Uzbekistan was eager to participate in international initiatives and would send comments on the draft to CMS by the end of the year.

Convention on Migratory Species

There was a clear need to identify the scope of existing GEF projects and the Secretariat would collate information provided by national delegates.

International Crane Foundation

ICF noted that the more ambitious proposal meant that the scope of the project had to widen beyond Siberian cranes to other species and habitats and should relate to an issue of global concern. Tangible and measurable targets, inputs and expected outputs were required. As GEF was linked to CBD, non-CBD States would be ineligible for funding, but their contributions in the area of Siberian crane conservation could count towards the matching funding required by this project. There was a need to investigate other funding sources as well, in particular for urgent short-term measures.

ICF suggested that two types of meeting would be required to drive the project through. A small group of national representatives should meet and each participating country should convene local meetings with stakeholders to ensure support on the ground.

On the question of potential overlaps with other projects, ICF pointed out that existing GEF projects in China – although located in the key crane sites – dealt with staff training, rather than practical conservation work and therefore the potential overlap in subject matter might not arise.

It was pointed out that matching funding did not need to relate specifically to cranes, and that any wetland investment could count as matching funding. It was important though to have all the required information as soon as possible, so that ICF could collate the data and finalize the application with CMS.

United Nations Development Programme (UNDP)

Mr Frismark stressed the importance of ensuring that no part of the project was already receiving funding from other GEF sources, as the whole crane project would be endangered. He agreed that the Siberian crane could act as a flag-ship proposal with great knock-on benefits for other species. He was involved with the Iranian project and was aware that the GEF assessors were very sharp, and suggested that contact be established with the relevant GEF official to iron out problems. He suggested strong focus, as the Iranian project initially aimed at 18 wetlands this number would be pared down to five or six.

Wetlands International

Mr van der Ven had some experience with GEF in Asia, and was surprised that ICF/CMS had been advised to go for a large project first, since it was useful to learn how GEF works through the modest scooping programmes first (Block A grants of \$25,000 to hire a consultant). He also advised that contact be established with GEF, not least to keep abreast of changes of procedure.

He felt that the current draft was written too much from the point of view of crane conservation, and was insufficiently geared to GEF's requirements, and should be submitted informally to them as soon as possible. The inclusion of non-CBD states raised issues, and details of activities being undertaken in those countries needed to be clearly set out. He warned that GEF Block A and B funds were quite modest as they were aimed at scooping exercises. Only at Block C stage was there enough money for implementation.

Summary

Claire Mirande reiterated the information requirements for the GEF project proposal (in addition to the letters of endorsement to be sent to UNEP/GEF and CMS by early January 1999):

- a. Details of all relevant sites, including their national or international protection status;
2. Copies and scope of all other GEF projects affecting Range States, in order to ensure that there is no potential overlap/dual funding problem; and
3. Details needed to enable completion of the financial table, showing sources of other funding, existing complementary programmes, and financial requirements.

The meeting concluded that the ICF and CMS should take the proposal forward in conjunction with UNEP, and the following individuals agreed to act as focal points to stimulate follow-up of the project proposal in their respective countries:

Afghanistan	Abdul Wajid ADIL
Azerbaijan	Eldar SARIYEV
China	Qian FAWEN
India	B C CHOUDHURY
I.R. of Iran	Sadegh SADEGHI-ZADEGAN
Kazakhstan	Anatoly KOVSHAR

Pakistan	Ashiq Ahmed KHAN (nominated by A.A. Chaudhry)
Russian Federation	Alexander SOROKIN
Turkmenistan	Djumamurad SAPARMURADOV
Uzbekistan	Adiljan ATADJANOV

Agenda Item 8. Any other business

There was no other business.

Agenda Item 9. Closure of the meeting

On behalf of the delegates, Dr Archibald thanked the Convention on Migratory Species for providing the framework for international co-operation and bringing all the delegates together.

Mr Hykle commented that each successive Meeting of the Range States seemed to more productive than the last, thanks largely to the fact that the Conservation Plan agreed in India had provided a solid foundation on which to base the discussions. He thanked the Iranian hosts for their hospitality, and the working group facilitators and the CMS staff who had contributed to the meeting's success. Finally, he invited everyone to attend the signing ceremony for the revised Memorandum of Understanding.

Report of the Working Group on Awareness/Education

Participants:

Dr George Archibald (ICF - Facilitator)
 Mr Hamid A. Ebahrami (Iran, observer)
 Mr Qian Fa-wen (China, National Bird Banding Centre)
 Mr Asghar M. Fazel (Iran, DOE)
 Mr David Ferguson (US, FWS - Rapporteur)
 Mr Chen Jian-Wei (China, Dept Wild Fauna and Flora Conservation)
 Mr Ahmad Khan (Pakistan-WWF)
 Dr (Mrs) Elena Kreuzberg-Mukhina (Uzbekistan)
 Mr Paiwasta (Iran, land owner)
 Mr M. Roshanzamir (Iran, Mazandaran DOE)
 Ms Shruti Sharma (India, Rajasthan Forest Department)
 Ms Ellen V. Tavakoli (Iran, Observer)

Ahmad Khan represents an NGO in Pakistan working with crane hunters, the provincial wildlife authorities, nature clubs and schools. He depicted how they related to the crane hunters with pigeons, how many cranes came into his area, what pathways they followed, what the hunters did with their finds.

As Mr Paiwasta was a landowner in Iran where the Siberian cranes overwinter at Fereydoonkenar, it was felt that it might be helpful if the members of the group introduced themselves and related their position and role in working for Siberian crane conservation using education as a tool to achieve this.

The Chinese delegates made a presentation on their wildlife and wildlife reserve policies and practices. Their resources were quite meagre and it was found necessary to impose the rigid park management policy of a central core inviolate protected zone, a surrounding buffer zone and a yet larger economic zone .

India on the other hand, in the situation described by Shruti Sharma of the Keoladeo National Park, had developed a committee comprised of volunteers and headed by the District Commission to help the park in its efforts to educate the local communities to the values of the park and to raise revenue for development in the socio-ecological boundaries of the park. The Chinese were very interested in the Indian example and linked up with Ms Sharma to get more information on the specific examples of functions of the NGO supporting the park.

Mr Fazel from the Iranian DOE participated in the discussions, and several options for working on education and protective measures were explored. Mr Paiwasta was interested in approaches to getting local people, especially young people, interested in conserving the Siberian cranes in his "damgah" area. There was discussion of the merits of constructing a tower for use as a guard tower as well as for tourists to observe the cranes. The concept of a local Siberian crane NGO (e.g. the Mazandaran Crane Conservation Association) was introduced and elicited interest from Iranians. He was also interested in the potential of promoting ecotourism activities such as bringing in paying tourists to see the duck-catching operations.

Elena Kreuzberg-Mukhina brought a brochure produced in Uzbekistan showing the various crane species and their ranges, along with information on their status and ecology printed in Russian. It was planned to produce the brochure in a simpler form for use in schools and for the general public.

While the discussions were hampered by the need for numerous delays so that translations could be made from English to Farsi, Chinese and back, there was a high degree of participation and interest in the sharing of ideas for education.

Report of the Working Group on Scientific Knowledge on the Biology, Ecology, and Surveys of Siberian Cranes

The Group discussed the possibilities of collecting and collating information on various aspects of the ecology, biology, population dynamics and the movements of Siberian cranes. The following fields of study were highlighted:

I. Summer habitat

a. Inventories

It was considered of utmost importance that the wintering and summering populations be inventoried in both the habitats. The exact census of wintering birds in all three populations was especially emphasized. These numbers could be verified on the nesting grounds and if a discrepancy was found, efforts could be made to locate the missing birds. This could take us to new habitats both in the wintering and summering areas.

Inventories of the habitats were equally important both in summering and wintering areas to determine the suitability of habitat both in the short term and long term. This would be even more important to identify alternative habitats. Also important would be the determination of the cranes' diet and the feeding habitats.

b. Nesting Biology

Little information is available on nesting biology of the cranes. The important points to study would be the age at which the pairing starts. It might be different for females and males.

c. Juveniles' Habitat

A concern was expressed that the juveniles' whereabouts were not known, and it was important to find out where they passed their time until they joined the migrating cranes. PTT data would be helpful to obtain this information.

d. Time Budgeting

Another important area of study not only on summering and wintering areas but also for staging areas - how do the cranes distribute their time amongst various activities?

II. Migrating Cranes Data

It would be important to collect data for staging areas along the migration route. This could however be done with the help of agencies putting PTTs on migrating birds. On receiving information, the host country would arrange to locate the bird at the earliest and collect information on the following, besides relevant times/dates and climatic conditions:

- The detailed description of the wetland including the hydrology, flora, fauna, human factors, disturbance factors;

- The possible impacts of disturbance factors on the birds;
- Local influences;
- Home range of the bird and safe limits for disturbance;
- Inter-relationship with other birds/cranes/animals;
- Hunting practices not only on cranes but also on the species sharing the habitat;
- Socio-economic conditions/activities in the area which might effect the cranes; and
- Identification of similar habitats in the vicinity which might be used alternatively in case the original habitat stops being a suitable habitat or inclement weather or some other calamity hinders their use.

III. Wintering habitats

Besides recording the dates and times of arrival or departure and use of the wintering habitat data required to be collected are:

1. wetland characteristics not only of the wetland visited by the cranes, but also identical wetlands in the vicinity.
2. Any interventions in ecology of the wetland whether natural or artificial. This would also include:
 - i) the contamination of water with pesticides, herbicides or even with fertilizers and resulting eutrophication;
 - ii) hunting data/impacts not only on the cranes but also on the species sharing the habitat;
 - iii) local influences including socio-economic pressures on the habitat;
 - iv) climatological influences; and
 - v) identification of alternative sites which could be used in case the habitats becoming unsuitable temporarily or permanently

IV. General

1. Limiting factors may be determined for all the populations in their different areas. These might include the impact of hunting, predation, lead-poisoning, pollution, disturbance, inter-relationships.
2. Data on "genetic" make-up of 2 different populations should be collected.
3. Diet and feeding behaviours in all different areas should be studied.
4. Complementary studies on Common cranes especially with a view that they be used to lead Siberian chicks while migrating

V. Priorities identified by the working group

1. Exact inventory of numbers in the Iran western wintering population as it is not possible to locate all the birds in their summering habitat.
2. Juveniles' whereabouts until they reach nesting grounds and start to breed - this could be done by putting PTTs in wintering areas.
3. PTT technology should be studied thoroughly and further improved.
4. The technique should be standardized for all the study groups.
5. The incubation process should be studied, described and standardized for improved captive breeding.
6. The results may be shared with breeders.
7. Study of chicks from the day of hatching to fledgling stage in the wild.
8. All growth parameters to be recorded in the wild (special techniques might have to be developed).
9. Common crane migration pattern as it is to be used to lead to Siberian cranes

Report of the Working Group on Captive Breeding

Not all of the following was discussed within the working group, but this report integrates also the ideas and results of earlier and later discussions with members.

Overview of the captive population in cooperative breeding institutions and institutions who expressed their willingness to take part in the breeding program:

Location	Current Birds	Laying Females	Target Pairs
Oka	12.9.5	6	8
ICF	8.8	4	6
Walsrode	4.3	2	3
Cracids BCC	6.6	2	10-15
Parc Paradisio	3.3	2	5
Boston	2.2	2	2
Nordic Ark	--	--	5
Detroit	2.1	0	2
Cincinnati	1.1	0	1
Tama Zoo	2.2.1	1	2
Chester	--	--	1
Berlin TP	2.2	2	2
<i>Totals</i>	42.37.6	21	47-52

Chester Zoo offered to keep at least 1 pair of Siberian cranes and will provide financial support and send eggs and/or chicks for the release program in the future. Chester is ready to receive a pair of Siberians. Timing and selection of birds has to be discussed with the studbook keeper.

Rob Belterman will check at Nordic Ark when their facilities are ready.

Chinese zoos are not included in the list since they did not send their data to the studbook keeper. Rob Belterman will contact the Chinese Association of Zoological Gardens for their data. Exchange of birds between China and the other breeding institutions has to be considered of high importance to the captive populations in and outside China.

Oka made an arrangement with a German private breeder. Oka will send 2 pairs to Germany in exchange for financial help and, as the German breeder has a food agency in Moscow, it will be easy to supply Oka with Crane Food on a regular base. First delivery will be in January 1999. Rob Belterman will ask for analyses of this food and, if necessary, contact Julie Langenberg (ICF).

Chicks have to be raised for educational programs in India, Iran and Pakistan. This would be done with birds of no genetic value.

India: An architect will design a large moated wetland exhibit and India will receive a young pair from Boston Zoo in 1999 or 2000.

Pakistan: WWF will work with Lakki Refuge to build an enclosure and Pakistan will receive a pair in 2001 or 2002. Source of this pair has to be determined.

Iran is planning to establish a new safer wintering area in Iran. They told that Mian Koleh Wildlife Refuge would be an ideal place. The refuge is located at the eastern part of the Caspian Sea and there is no duck hunting. The area is about 60 km long and there is a peninsula of 30,000 ha, several islands and about 40,000 ha of shallow water. Iran offered to establish rice fields as a feeding place. One pair of semi-wild Sibes could be placed on one of the larger islands to attract wild Siberian Cranes. Yuri Markin will go there after the meeting and check if this area is suitable as a wintering area and Iran could get a pair from Oka in 1999 or 2000.

In Hirakawa Zoo there is still an 18 year old lonely female (Lazarus). This bird should be exchanged for a new breeding pair from Oka. Lazarus is an unrepresented founder and very important for the program so it is important to bring her to Oka and breed her.

In Oka there are still a few unrepresented founders and some founders who are represented in the released population but not in the captive population. Rob Belterman will make a list of these birds and discuss it with Dr. Panchenko (Oka) during his next visit to Russia.

Financial Support

For several years now Cracids Breeding & Conservation Center has supported the breeding and release program for Siberian Cranes. Food and materials were sent to Oka and money brought there, and all costs of travel made by Rob Belterman the last years to participate in the Siberian crane meetings were covered by the Cracids Breeding & Conservation Center.

Together with Parc Paradisio, the Cracids Breeding & Conservation Center offered to continue financial support for Oka. They will raise funds to support Oka on a yearly basis, so Oka can continue their important work for the breeding and release programme.

Oka will make a list of the money needed yearly for maintenance, crane diet, staff, and costs of survey and releases, and will present a yearly overview how the received funds were used.

Captive born, unreleasable birds should be placed within the managed programme. This is highly important to the credibility of the program and consequently ability to raise funds. So no Siberian cranes should be sold to private holders who do not make long-term commitments for financial and/or material support to the Oka Crane Breeding Centre.

Rob Belterman (European Studbook Keeper) has been recommended to coordinate the placement of surplus animals in Western Europe and will make long-term commitments with new holders for financial support to the breeding and release programme. Placing birds should be done after consultation with the Studbook Keeper and/or the Species Committee (still to be formed). ICF and Walsrode have recommended (and this was discussed with the Oka representatives) that the two birds, unfortunately not released in 1998 (from ICF eggs, hatched and isolation-reared in Walsrode) should be sent to CBCC for fundraising.

Another conservation project financially supported by CBCC (and one of the board members of this foundation) is the that for the eastern population of the Siberian cranes in China.

Rob Belterman
Cracids (& Crane) Breeding & Conservation Centre

Opening Statements

Mr. Ghanbar Simiari, Governor of Ramsar

Today we welcome you all who are taking part in this meeting. I hope that the fact that this meeting is taking place will assist the protection of the global environment and maintaining its vital balance. It is my pleasure to express many thanks to the authorities who have organised this useful meeting.

According to the available information regarding the Siberian Crane, please be informed that due to the limited numbers of these migratory birds, protection of them is very significant and essential. They number slightly more than 3,000. The habitat of 3,000 of them is in China. The remaining population migrates from Siberia to Iran, India and other countries of Asia, and Europe.

During the last year 10 Siberian Cranes, and during this year 14 of them, have migrated to Iran. Their habitat in Iran is Fereydoonkenar region in Mazandaran Province.

The people of the region, due to their religious beliefs, try to protect this species of bird. They believe that the appearance of the Siberian Cranes brings other birds to the region and this is to the advantage of the hunters. This belief, better than any law or regulation, leads the people of the region to try to protect the Siberian Crane species. Dear guests, you will have an interesting visit to the Fereydoonkenar region. In this visit you will see for yourselves evidence of the above-mentioned fact.

These birds lay two eggs each year. One of these eggs will produce a chick. In addition to the expressed reasons, storms, contact with electricity wires and also urban development will reduce the number of these migrant species.

The Islamic Republic of Iran works in close collaboration with International Crane Foundation (ICF). This conference is held in the member countries biennially. This year, Iran has the honour to be the host of this conference, in this beautiful Iranian city of Ramsar.

Once again, I bid you welcome and I express many thanks to all respected participants and the founder of this conference (CMS). I hope that the results of this conference can assist us to reach our sacred goals on this significant issue.

**Mr. Mohammad Roshanzamir, General Director,
Department of Environment, Mazandaran Province**

Mazandaran Province is located on the southern coast of the Caspian Sea which has a coastline of about 300km. It is important to mention that the Caspian Sea is the biggest lake on earth. The neighbours of this province are: Turkmenistan in the north; Tehran and Semnan Province in the south; Golestran Province in the east; and Gilan Province in the west.

Environmental features of this province include coastal plains and steppes, and mountains. The capital of this province is Sari. The most significant areas which are under the direct control and protection of Mazandaran Environmental Directorate are:

Miankaleh Wildlife Refuge: With the area of about 68 km², this region is one of the 9 most important places for the above-mentioned purpose. We have a joint program with the U.N. under the name of "MAB".

Miankaleh wetland: This is one of the 18 International wetlands designated under the Ramsar Convention. This region is the winter habitat of hundreds of thousands of waterbirds and also native and local birds like pheasant and a number of mammals.

Dasht-e-naz Wildlife Refuge: With an area of 55 hectares and with the ecosystem of Caspian forests, this is the habitat of Iranian yellow deer.

Semskandeh Wildlife Refuge: With an area of 937 hectares this refuge is located the 3km from Sari Center which is the remaining parts of the Caspian forests. This area is covered with trees and enjoys total protection as a genetic reservoir.

Dodangeh Wildlife Refuge: With an area of 1600 hectares, this includes rich communities of trees and biodiversity. As an example, we can mention some examples as follows: Goats, Leopards, Brown bear, Wolf, Pheasant, etc.

Northern Alborz protected area: With the area of 230,000 hectares, it is located at the west of province and boasts sights of great natural beauty, cascades, springs, forests, and a vast variety of wildlife, for instance, goats, leopards and brown deer.

Khoshkehdaran region: With the area of 264 hectares, this is the remaining part of steppe jungles with Tusca tree communities. The age of this jungle is about 100 years and the natural history museum is always open to the public.

Fereydoonkenar Wildlife Refuge: With an area of 200 hectares, the refuge includes vegetation, rice cultivation regions, strip-like jungles, and three rivers.

Each year, from 23rd of October to the beginning of February it hosts Siberian Cranes together with the hundreds of thousands of wild birds. Meanwhile, studies show more than 300,000 to 350,000 birds come to this habitat. In the current year, census shows that 14 Siberian Cranes are present. In the last ten years, 10 of them were seen. We hope that the International Crane Foundation (ICF) establishes a research centre for Siberian Cranes in this refuge to obtain further information, particularly regarding the habits and nutrition of Siberian Crane. We are also prevent detrimental effects of inappropriate, unsustainable development.

**Douglas Hykle, Deputy Executive Secretary,
Secretariat of the Convention on Migratory Species**

It's a pleasure to be back in Ramsar – it is my second visit in the space of about four months. I had the opportunity to go *through* the mountains on my first trip, which was quite memorable, and I have now been able to fly over them. Yesterday the view from the air of the snow-peaked mountains and the coastal lowlands was truly spectacular.

Ramsar, as many of you will know, is a historic city – the birthplace over 25 years ago of the Convention on Wetlands. Today, the name Ramsar is in common usage among all those individuals and organizations concerned with the conservation of wetlands around the world. We are honoured to have been invited to convene our meeting here, in this prestigious venue.

Many of you present today have been associated with the protection of Siberian cranes for a very long time – some have even devoted decades of their lives to the cause. My own involvement dates back about 7 years to a wetland conference in Karachi, Pakistan, where I was introduced to the problems facing these cranes. We all have something in common – a passion for ensuring that these magnificent birds not only survive during our lifetimes, but that they recover to sufficient numbers so that future generations may also enjoy their presence on earth.

As many of you will know, this is the third meeting organized by the Secretariat of the Convention on Migratory Species to bring together all of the countries directly concerned about Siberian cranes. Following the adoption of the Memorandum of Understanding in 1993, in Kushiro, Japan, the first such gathering was held in Russia in May 1995. I am pleased to see that many of our colleagues from Moscow and from the breeding centre at Oka have been able to join us here today.

This initial gathering was followed by a very successful meeting hosted by our Indian colleagues in Bharatpur already 2 years ago now – ample proof that it is not only Siberian cranes that fly -- time flies as well!

Looking back, I think we have made some real progress since 1993 -not only on paper, but where it counts -- in the field:

- The countries with populations of Siberian cranes have a common, co-ordinated framework within which to carry out their activities.
- The dramatic decline in numbers over recent decades appears to have stabilised, and there is good reason to believe that in the next 3-5 years, efforts in the field to reinvigorate the western and central populations will begin to pay off.
- Since our first meeting, important information on migration routes has been gathered thanks to satellite technology and the application of PTTs.
- Innovative Russian efforts to substitute eggs into nests of common cranes, and to release captive-reared birds are showing signs of progress. Hatchery success has greatly improved.
- Last, but not least, the birds keep coming back in consistent numbers -- to Bharatpur and Fereidoonkenar!

The work this week will look into the past, to what has been accomplished over the previous year or so, and will also consider what changes need to be made to the programme of work agreed at Bharatpur through to the end of 1999.

So, what is on the horizon? The field activities I have just mentioned need to continue, to be strengthened and expanded. Identification and protection of critical wetland habitats throughout the migration routes is a top priority. Our efforts to increase public awareness of the problems facing Siberian cranes, and of our work, need to be intensified.

We must also look at the *broader* picture, which means taking into account what is going on in the Eastern Population, and engaging conservationists there in our activities. In that regard, I would like to extend a special welcome to our colleagues from China, whose participation in this meeting was unanimously endorsed at our last gathering. I hope that the Government of China will be prepared to join us in our efforts as soon as possible.

The activities outlined in our ambitious Conservation Plan, will cost a lot of money -- money, which we all know, is very hard to come by. That is why another important task facing us will be to examine how we might tap into a substantial funding resource in the form of the Global Environment Facility. Colleagues at the International Crane Foundation and at UNEP have been working very hard with CMS over the past couple of months to prepare a first draft of a project proposal which now requires the input of everyone here.

Despite the magnitude of the challenge before us, it gives me great personal satisfaction to be associated with this initiative. I think all of us are motivated, not only by the challenge of bringing a population back from the brink of extinction, but also by the knowledge that the people we are working with all share a common passion and are inspired for the same reasons. It's a real honour to be part of this great adventure.

Before closing I would like to acknowledge our Iranian hosts, who have worked tirelessly in recent weeks to ensure that this meeting would take place. Although it is perhaps premature to be giving thanks, it must be said that our good friend, Mr. Seyed Amir Ayafat, and his colleagues in the Department of the Environment and Foreign Ministry, have been instrumental in getting us to this point.

Now the real work begins, and it is up to *all of us* to make this meeting a success. I couldn't help but think yesterday, as we flew along the coast, probably not far from where the Siberian cranes are currently wintering, that it is a miracle of nature that these birds are able to locate, with precision, the same tiny wetland year after year. We owe it to them, as custodians of nature, to fulfil our small part of the arrangement, and to protect the wetlands everywhere that are so vital to their survival.

Agenda of the Meeting

1. Opening remarks (Host Government and Secretariat)
2. Adoption of the agenda and work programme
3. Reports of Range States and Co-operating Organizations (brief overview)
 - a) Breeding area Range State: Russian Federation
 - b) Wintering area Range States: Islamic Republic of Iran, India
 - c) Range States along the migration routes: Afghanistan, Azerbaijan, Kazakhstan, Pakistan, Turkmenistan, Uzbekistan
 - d) Range States for the eastern population: China, Russian Federation
 - e) Co-operating organizations: UNEP/CMS, International Crane Foundation, Wild Bird Society of Japan
4. Detailed review of implementation of the Conservation Plan for 1997-1999

Main objectives:
 - 1) Reduce mortality
 - 2) Increase numbers and genetic diversity
 - 3) Enhance international co-operation
5. Work programme for 1999
 - a) Survey requirements
 - b) Releases
 - c) PTT monitoring
 - d) Related studies on common cranes
 - e) Education needs
 - e) Co-ordination of information exchange
6. Revision of the CMS Memorandum of Understanding
7. Global Environment Facility (GEF) project proposal
8. Any other business
9. Closure of the meeting

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Part III: Progress Reports

About Siberian Cranes (*Grus leucogeranus* Pallas 1773) in Azerbaijan

One seldom encounters Siberian cranes during their spring and autumn flight along Azerbaijan's Caspian coastline - Absheron peninsula, Shirvan and Kizil-Agach state reservations (Spannenberg, 1925; Vereschagin, 1946; Mustafaev, 1970, 1974; Mustafaev, Tuaeuv, 1979; Vorobiova, 1979; Babauev, 1992; Tuaeuv, 1996). Obviously, the birds are part of the population which flies in the autumn from the nesting sites in the north west of Siberia (the lower reaches of the river Ob) to wintering grounds in the north of Iran on the boggy lowlands of the east coast of the Caspian Sea before returning by the same route to the nesting grounds.

As a result of the near disappearance of the Siberian cranes, the species is currently protected in Azerbaijan and shooting is prohibited. The species will be included in the second issue of the "Red Book of Azerbaijan", currently being prepared for publication. It is protected in the Shirvan and Kizil-Agach state reservations.

Following the meeting on 2-9 November 1996 organized by the Secretariat of the Convention on the Conservation of Migratory Species of Wild Animals (CMS) and the International Crane Foundation, the State Committee on Ecology and the Control of Natural Resources of Azerbaijan issued an instruction for its local organizations to observe the migration of the Siberian crane across Azerbaijan, concentrating on those territories whose co-ordinates had been suggested.

One Siberian crane was observed by workers at the Shirvan reservation on 7 April 1998 at 12 o'clock near the lake in Bindovan district of the Salyan region of the Azerbaijan Republic.

In connection with all of the above, urgent investigation of the current numbers of the species, the habitats, migration routes and times should be carried out. However, achieving this work is difficult because of the lack of technical and financial resources.

Eldar Sariyev

Head of the Department of Protected Areas

Azerbaijan State Committee on Ecology and Control of Natural Resources Utilization

The Status of Conservation of the Siberian Crane in China

Chen Jian-Wei
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State Forestry Administration, P. R. China

Dear Chairman, Ladies and Gentlemen,

You may know it is the right time for the Siberian Crane to arrive at the wintering ground in China. I am so fortunate at this moment that I attend the Third Meeting of the Siberian Crane Range States, and have the opportunity to discuss the conservation of the Siberian Crane with representatives from other countries and international organizations. On behalf of the State Forestry Administration of P. R. China, I would like to give our sincere thanks to the kind invitation of the Secretariat of the Convention on the Conservation of Migratory Species of Wild Animals (CMS), and really appreciate the help from the Secretariat of CMS, the Department of the Environment of Islamic Republic of Iran, and the International Crane Foundation of USA.

China is the most important range country for the Siberian Crane. It is so magnificent that there are almost 3,000 Siberian Cranes wintering in Poyang Lake of Jiangxi Province in China, which possesses about 95% of the total population of Siberian Crane in the world. These wintering Siberian Cranes spend about 4 months in Poyang Lake. We have also found a few Siberian Cranes wintering in Yancheng of Jiangsu Province, Dongting Lake of Hunan Province and Shenjin Lake in Anhui Province. In addition, there are many important stopover sites for the Siberian Crane in China, such as Dalai Lake Nature Reserve in Inner Mongolia, Zhalong Nature Reserve of Heilongjiang Province, Momoge and Xianghai Nature Reserves of Jilin Province, Shuangtaihekou Nature Reserve of Liaoning Province, the coast of Beidaihe and the old riverbed of Yellow River of Henan Province.

The Chinese Government has paid much attention to the conservation of Siberian Crane. Since the discovery of Siberian Crane in 1980 in Poyang Lake, China has taken measures to protect the endangered species. In 1988, the Law of the Conservation of Wildlife was promulgated, and the Siberian Crane was listed as Class 1 in the list of the National Protected Species. Nature Reserves have been set up in several important sites for wintering or staging for the Siberian Crane, such as Poyang Lake National Nature Reserve, Yancheng National Nature Reserve, and Shenjin Lake Nature Reserve. Research projects have also been conducted for the Siberian Crane on population monitoring, distribution, wintering ecology, behaviour, etc. In addition to the efforts mentioned above, China has got good results in the conservation of the Siberian Crane. The population wintering in Poyang Lake has increased gradually, more important sites for Siberian Crane have also been discovered. These efforts and knowledge have set up good foundation for the conduct of conservation action plan for the Siberian Crane.

However, because of lack of fund, undeveloped techniques and few knowledgeable researchers, the conservation of Siberian Crane is facing some problems. The urgent one is how to deal with safe wintering of the Siberian Crane in Poyang Lake. We can imagine what will happen to 95% of the world's population of Siberian Crane in Poyang Lake if disaster should strike.

The other problem that the Siberian Crane is facing is the negative effect of dense human population to their behaviour and habitat. The use of fertilizer and pesticide usually do harm to Siberian Cranes and their habitat.

Moreover, some aspects of migration and artificial breeding of the Siberian Crane is still in secret. More research projects should be carried out on Siberian Crane.

In order to restore the population and effectively promote the conservation of Siberian Crane, the State Forestry Administration of China, which is the responsible organization for conservation of wildlife in China, will take steps to conduct the action plan of the conservation of Siberian Crane.

1. We have given special attention to the Siberian Crane during our National Wildlife Resources Survey and National Wetlands Survey. We hope that a clear view of the distribution, population, and habitat of the Siberian Crane would be obtained through this survey which will deliver the exact scientific data needed for the conservation of Siberian Crane.
2. We will organize a research group to carry out a project for the measures taken for the safety of Siberian Crane wintering in China, and securing the natural expense of population to new habitats.
3. Education projects will be conducted in order to raise the awareness of the conservation of the Siberian Crane in communities around the habitats. We encourage the local wildlife management service to take up close relation with local communities and conduct projects beneficial to both the conservation of Siberian Crane and the economic development of local communities. We also encourage local communities to take part in the conservative activities of Siberian Crane.
4. We will establish a monitoring system for the Siberian Crane in its wintering and stopover sites, which will enable us to monitor the changes of population, habitat, and various factors affecting the survival of Siberian Crane.
5. We will promote the study of ecology, biology and migration of the Siberian Crane, conduct research and take measures to prevent the epidemic diseases in the over-gathering flocks of Siberian Crane, encourage the artificial breeding of Siberian Crane, enforce staff training and raise the management and scientific quality of the staff of management services and nature reserves, and establish a mechanism for information exchange between persons and organizations concerning the conservation of Siberian Crane home and abroad.

Dear Chairman, the Chinese Government has a deep understanding of the role of international cooperation in the conservation of wildlife, and would like to fulfil the obligations of wildlife conservation in China. On the conservation of Siberian Crane, the State Forestry Administration of China had actively taken part in the North East Crane Sites Network in 1997, and introduced four national nature reserves as the sites in the network, one of which is the Poyang Lake National Nature Reserve. Seeing that the Convention on the Conservation of Migratory Species of Wild Animals plays an active role in the international wildlife conservation, we are considering taking part in CMS. We will take the priority to sign the Memorandum of Understanding Concerning Conservation Measures for the Siberian Crane after the Chinese Government takes part in the CMS. However, we will still take an active role in the conservation and international cooperation for the Siberian Crane. Any kind of financial or technological support from governmental organizations or non-governmental organizations will be welcomed. I believe what we do will give the Siberian Crane a bright future.

As the symbols of Purity, Elegance, Happiness and Longevity, cranes are loved by the Chinese people and merged harmoniously into traditional Chinese culture. At this very moment, I believe, through the efforts from the people all over the world, the Siberian Crane, together with other cranes, will fly over us in the sky happily and peacefully.

The Conservation and Research of Siberian Crane in China

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Siberian Crane *Grus leucogeranus*, also called Black-sleeved Crane for its black primaries, is one of the nine species of cranes ever recorded in China.

From breeding ground to wintering ground, Siberian Cranes migrate with the longest route (about 8,000 km) among the 15 species of cranes in the world.

From the view of the world, comparing the western and central populations of Siberian Crane wintering respectively in Iran and in India, the population wintering in China is called the eastern population of Siberian Crane.

The eastern population of Siberian Crane totals up to 3,000 individuals, which is about 95% of the world population (Harris et. Al., 1995).

The Measures Taken by China to Protect Siberian Crane

Cranes play an important role in Chinese traditional culture. Chinese people like cranes as the symbol of happiness and longevity.

In 1962, the Chinese Government issued *A Guide to the Active Protection and Wise Use of Wildlife Resources*, in which Siberian Crane was listed as Class I of National Protected Species, and urged to establish nature reserves for the protection of cranes at breeding and wintering sites. In 1988, the Law for the Conservation of Wildlife was issued by Chinese Government, which has greatly promoted the protection of cranes in China (The Department of Wild Fauna & Flora Conservation of the Ministry of Forestry of P. R. China).

In 1983, the local Government of Jiangxi Province gave permission to establish the Poyang Lake Nature Reserve mainly for the protection of Siberian Crane upon the discovery of Siberian Crane in 1980, which finally gave the world-important wintering site for Siberian Crane the status under the protection of law (The Management Office of the Department of Forestry of Jiangxi Province, 1987). In the following years, many nature reserves had been established for the Siberian Crane at the stopover sites, such as Dalai Lake Nature in Inner Mongolia, Zhalong Nature Reserve in Heilongjiang Province, Momoge Nature Reserve in Jilin Province, Shuangtaihekou Nature Reserve in Liaoning Province, and Yellow River Delta Nature Reserve in Shandong Province.

In 1984, the Chinese Crane Conservation Union was organized by the former Ministry of Forestry, which includes 19 crane range provinces and autonomous regions, for the conservation, management, and research of cranes in China.

Since 1981, the Chinese Government has been conducting an annual activity named "Birdloving Week" all over the country in order to raise the awareness of wildlife protection, as well as the laws and regulations concerning the wildlife conservation. The basic knowledge of wildlife and their conservation has also been contained in the schoolbooks of primary and middle schools.

The Research of Siberian Crane in China

Various aspects of Siberian Crane have been researched by Chinese specialists in order to promote the protection and management of Siberian Crane.

1. **The Distribution in China.** According to the recording in A SYNOPSIS OF THE AVIFAUNA OF CHINA (Cheng, 1987) for Siberian Crane, the crane migrates passing Dalai Lake in Inner Mongolia, upper reaches of Nenjiang, lower reaches of Wuyuer River and wetlands beside Qiqihar in Heilongjiang Province, Qinhuangdao in Hebei Province, and winters at lower reaches of Yangtze River.
2. **Population Monitoring.** Many reports of the population of Siberian Crane have been published; Mr. Zhao reported that there are about 300 individuals of Siberian Crane being observed in Jilin Province every year (Zhao *et.al.*, 1990), in spring of 1985, 435 individuals were counted; Mr. Wang surveyed the status of Siberian Crane in Anhui Province, and got the result that only about 10 individuals of Siberian Crane winter in Anhui, and the number will increase during migrating season (Wang, 1990); Mr. Ji had observed 3 individuals at the coast of Qingdao in the fall of 1984 (Ji *et.al.*, 1990); Mr. Gui observed 2 individuals in East Dongting Lake during wintering waterbird survey of 1985 (Gui, 1990); Poyang Lake Nature Reserve has a complete records for the Siberian Crane wintering in it, table 1 shows the results of annual maximum counts of Siberian Crane in the range of the Nature Reserve (Ji *et.al.*, 1998).

Table 1 Counts of Wintering Siberian Crane in Poyang Lake Nature Reserve

Year	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97
No.	91	148	189	457	840	1486	1609	1882	2653	2540	2486	2671	2709	725	2896	2367	2112	1917

3. **Wintering Ecology.** The Nature Reserve Management Office of Jiangxi Province had ever organized a research group, and conducted the research on the population, distribution, wintering behavior and time budget of wintering Siberian Crane in Poyang Lake Nature Reserve (The Nature Reserve Management Office of Jiangxi Province, 1987). Mr. Chen made a comparative research of Siberian Crane, White-naped Crane, Hooded Crane and Eurasian Crane on their ecological niches and wintering behaviors during December of 1983 to December of 1986(Chen *et.al.*, 1990). From 1981 to 1986, several aerial surveys were conducted in Poyang Lake, Dongting Lake and the surrounded wetlands, the wintering distribution, the food and the effect of human economic activities to Siberian Crane were studied (Ding *et.al.*, 1991). During 1992 and 1993, international cooperative researches for the Siberian Crane by Chinese, American and Russian scientists were carried out on the population, distribution and behavior in Poyang Lake(Harris *et.al.*, 1995).
4. **Migration Research.** According to the long-period monitoring of Siberian Crane wintering in Poyang Lake, Siberian Crane stays in Poyang Lake for about five months. The cranes usually arrive in Poyang Lake at the end of October or the early of November, and leave for north from the end of February to March of the next year (The Nature Reserve Management Office of Jiangxi Province, 1987). From 20th of March to 1st of April of 1985, 652 individuals of Siberian Crane were observed flying

northward and 192 individuals southward from 11th of October to 10th of November of 1986 at the coast of Beidaihe of Hebei Province (Martin, *et.al.*, 1990). Siberian Crane will stop over for one month during every spring and fall in Jilin Province, in spring from the end of March to the early of May, from the middle of September to the early of October in the fall (Zhao *et.al.*, 1990). A few Siberian Cranes were observed from the end of October to November at the coast of Qingdao in Shandong Province (Ji *et.al.*, 1990). During wintering survey of Siberian Crane by Chinese, American and Russian Scientists, eleven individuals of Siberian Crane banded at Yakut of Russia were observed at Poyang Lake, which proves that some of the wintering Siberian Crane are from the arctic region of eastern Russia (Harris *et.al.*, 1995).

REFERENCES CITED

- Chen Bin, Wang Zuo-Yi 1990 The Observation of Wintering Cranes at Poyang Lake. See: International Cranes' Conservation and Research. Beijing: Forestry Press. 31~33.
- Cheng Tso-hsin 1987 A Synopsis of the Avifauna of China. Beijing: Science Press. 178~179.
- Ding Wen-Ning, Zhou Fu-Zhang 1991 The Distribution Research of Wintering Siberian Crane. See: Chinese Ornithological Research. Beijing: Science Press. 1~4.
- Gui Xiao-Jie 1990 The Wintering Cranes at Dongting Lake. See: International Cranes' Conservation and Research. Beijing: Forestry Press. 34~35.
- Harris, J., O. Goroshko, Y. Labutin, A. Degtyarev, N. Germogenov, J. Zhao, N. Zeng, and H. Higuchi 1995 Results of Chinese-Russian-American Investigation of Cranes' Wintering at Poyang Lake Nature Reserve, China. See: Cranes and Storks of the Amur River. Moscow: Arts Literature Publishers. 57~72.
- Ji Jia-Yi, Yu Xin-Jian 1990 Cranes' Survey in Shandong Province. See: International Cranes' Conservation and Research. Beijing: Forestry Press. 25~26.
- Ji Wei-Tao, Zeng Nan-Jing 1998 An Introduction to the Poyang Lake National Nature Reserve. Unpublished
- Martin D. Williams, David N. Bakewell, Geoffrey J. Carey, Hsu Wei-Shu, and Jin Long-Rong 1990 Migration of Cranes at Beidaihe Beach, Hebei Province. See: International Cranes' Conservation and Research. Beijing: Forestry Press. 100~102.
- The Department of Wild Fauna & Flora Conservation 1994 A Collection of Official Documents Concerning the Wildlife Conservation and Management in China. Beijing: Forestry Press. 86~104.
- The Nature Reserve Management Office of the Department of Forestry of Jiangxi Province 1987 A Survey Report of the Endangered Waterbirds in Poyang Lake Nature Reserve. Nanchang: Science Press of Jiangxi. 47~56.
- Wang Qi-Shan 1990 Cranes and Conservation in Shenjin Lake of Anhui. See: International Cranes' Conservation and Research. Beijing: Forestry Press. 21~22.
- Zhao Zheng-Jie and Wu Zhi-Gang 1990 Cranes of Jilin Province. See: International Cranes' Conservation and Research. Beijing: Forestry Press. 13~14.

Siberian Crane Conservation Actions in India: 1997-1998

The breeding group of Siberian crane of the central population of the Kunovat river basin of Russia migrates to India for wintering. Their declining numbers from some 200+ individuals in the early 1960's to as low as four in the mid 1990's has been a cause of concern. Suspicions that other members of the population may be wintering in other wetland sites in India have not been conclusively proved, even though some 28 wetland sites in India have historical records of their occurrence.

A wild Siberian crane chick colour-banded at Kunovat in 1995 arrived at Keoladeo Ghana National Park in February 1996, conclusively proving that the Kunovat cranes are the ones which migrate to India in winter. The total number of the central population based on counts in Kunovat and Keoladeo Ghana is estimated to be only four individuals. Their migratory route across Kazakhstan, Uzbekistan, Turkmenistan, Afghanistan and Pakistan is considered to be the longest with stop-overs in Kazakhstan and Afghanistan. The last leg of their journey to North West India is believed to be across the Indus river basin, making this extremely small population highly vulnerable on its long migration route.

To supplement the central population of the Siberian cranes, captive reared Siberian cranes have been released both in Russia and India. None of the birds released so far migrated to the wintering and/or breeding grounds and this attempt still continues with the hope that the captive reared Siberian cranes will establish the traditional migratory path and a supplemented population.

While passive management actions for this transboundary migratory species included legal protection of Siberian cranes in the range countries through consensus agreement under the Convention on Migratory Species of Wild Animals (CMS), more active action by each Siberian crane range country has been initiated since the first range country meeting at Moscow in 1995. The second Siberian crane range country meeting held at Bharatpur, Rajasthan, India in November 1996, the following activities were assigned to India:

1. Placing of PTTs, mortality sensors and standard radios on wild juvenile and adult Siberian cranes in India.
2. Conduct ground survey to locate Siberian cranes outside Keoladeo National Park.
- 3a. Conduct research in the wintering area to compare the behaviour of costume-reared Siberian cranes with that of foster-reared cranes in order to evaluate suitability of one or other rearing technique.
- 3b. Capture released birds at predetermined intervals to test samples for environmental contaminants.
- 3c. Monitor the released cranes indefinitely to document their biology and their interactions with both wild Siberian cranes and Eurasian cranes.
- 3d. In late winter, if one of the released juveniles has formed strong social bonds with the wild cranes, place a PTT on the released crane.
- 3e. Monitor the migration route and summering area of the captive reared cranes released at Keoladeo.

- 3f. If the results are promising (i.e. as evidenced by migration with wild cranes; breeding in India), expand release programmes to other Range states.
4. PTT on several Eurasian cranes that spend the winter in India near areas with wetlands that might support Siberian cranes and two outside, currently used by Eurasian cranes.
5. Increase public awareness on Siberian cranes through education programmes, media use and rewards and incentives

Summarised here in brief are the results of the activities taken up during 1997-1998

1. Placing of PTTs, mortality sensors, standard radios on wild juvenile/adult Siberian cranes in India

On 16 November 1996, three adult wild Siberian cranes arrived at Keoladeo Ghana National Park. After considerable concern, the MoEF/GOI granted permission for putting PTT on the one single adult; this attempt was made during January 1997. Till this period the wild Siberian cranes had no interaction with captive-reared Siberian Cranes which arrived in late January. The wild Siberian cranes left Keoladeo on their return migration in early March without any PTT.

On 17 November 1997, two adult and one chick wild Siberian crane arrived at Keoladeo Ghana National Park and an attempt was made during 21 February to 12 March 1998 by Russian scientists and the Keoladeo Ghana National Park authorities to place PTTs on wild Siberian cranes without much success.

On 11 November 1998, only two adult wild Siberian cranes arrived at Keoladeo Ghana National park and plans are afoot to place PTT on wild Siberian cranes to determine their return migration route.

2. Conduct ground survey to locate Siberian cranes outside of Keoladeo Ghana National Park

The Keoladeo Ghana National Park authorities continued their effort to locate Siberian cranes in wetland sites within a radius of 50-80 kilometres of Keoladeo. However, none of these sites have resulted in any sightings though some of these wetlands have promising habitats.

The Wildlife Institute of India (WII) initiated a survey of Wetlands in the Indogangetic Plains in February 1998 and continued the summer survey till October 1998 in Gujarat, Rajasthan, Punjab, Haryana, Maharashtra, Uttar Pradesh, Madhya Pradesh and Bihar to assess the status of wetlands and cranes. The survey placed special emphasis on wetlands sites with historical reports of Siberian crane. The WII's ground survey will continue during the December 1998 to March 1999 migratory season with special attention to locate Siberian and other crane species.

The BNHS also carried out a survey in Saurashtra region of Gujarat and the Hadoti Natural History Society conducted a survey in Rajasthan and Madhya Pradesh during October 1997 to February 1998.

Results of these surveys are available as brief reports.

3. Conduct Research in the wintering area on Wild and Captive-reared Siberian Cranes

The MoEF/GOI funded a research project to Bombay Natural History Society and the Wildlife Institute of India to conduct research at Keoladeo Ghana National Park. The objective of this research was:

- a) monitoring of the captive reared Siberian cranes to document their biology and their interaction with other cranes
- b) conduct health surveillance and environmental contaminants in Siberian cranes
- c) study the social bonding of wild and captive reared cranes to fit PTT on the released cranes

The BNHS continues the first component and their findings are presented in a separate paper. The health, surveillance component covered the initial quarantine procedures. However, containment studies could not be conducted by the WII. Necropsy investigation of dead captive reared Siberian cranes were conducted in association with the WII-IWHC centre at Hissar. An elaborate proposal on health surveillance is now being considered by WII.

The PTT experiments as reported earlier has not been successful due to various constraints.

4. Place PTT on Wintering Eurasian cranes in India

The Keoladeo Ghana National Park management in collaboration with the Russian scientists have placed PTTs on wintering Eurasian cranes in early 1998. However, results of their return migration path based on this PTT are available with the Russian scientists.

The other two sites where PTT and colour-banding was proposed are Madhav National park, Shivpuri, 150-200 km east of Bharatpur and a flock of Eurasian cranes in Brahmaputra River islands in Assam. Due to lack of funding support, this work has not been taken up - though proposals have been developed.

5. Increase Public Awareness on Siberian Cranes

The MoEF/GOI has produced a video-film on the plights of Siberian cranes and has televised the film on the national network several times. Bombay Natural History Society and the KGNP management has produced posters in local language on Siberian cranes for awareness of villagers on the efforts to re-establish the Siberian crane in Bharatpur. The print media has been kept informed and kept the issue alive in the press.

*Report prepared by the Wildlife Institute of India in consultation with:
Ministry of Environment and Forests, Government of India;
Bombay Natural History Society, Bombay;
Keoladeo Ghana National Park, Bharatpur;
Hadoti natural History Society, Kota; and
Hissar Veterinary College, Hissar, December 1998*

Keoladeo National Park, Bharatpur, India

WWF-India did a "Participatory Rural Appraisal" for six villages adjoining the Park in 1995. It gave a set of recommendations.

I. Establishment of a Keoladeo National Development Society with membership of all stakeholders. The Society was established in September 1998 (registered with the Registrar, Societies Act). The members are:

1. District Magistrate - Chairman
2. Additional District Magistrate (Development)
3. Deputy Chief Wildlife Warden, Keoladeo National Park - membership secretary
4. Member of Parliament
5. Member of Legislative Assembly
6. Mayor of Bharatpur
7. Active NGOs - BNHS
8. LUPIN
9. ACCORD
10. WWF
11. Homeopathic Doctor
12. Animal Husbandry Director
13. Agricultural Director
14. District Tourism Officer
15. Irrigation Department
- 16.-20. Village Head men

The Society has a constitution and a bank account.

II Increased park fees will help to set up a development fund. The Park Fee was increased by 4 times:

Indian Tourist Entry Fee:	R5 to R20
Foreign Tourist Entry Fee	R25 to R100

This increase has been justified as an "eco-surcharge" which will go into the bank account of the Development Society with the help of which the Society will be able to do:

1. Habitat Improvement
2. Development of Tourism Infrastructure
3. Development in villages
4. Provide nature education
5. Provide employment to the local people during the lean period.

The sources of income to the park are:

1. Entry Fees
2. Boats
3. Electric vans/bicycles
4. Green book-shop
5. Rest houses
6. Canteens
7. Fines (for illegal felling)
8. Grass permit fee

75% of the revenue collected will go into the society's bank account. The Park has 108 rickshaw pullers and 50 naturalists trained by the Park in natural history, who provide interpretation services to the visitors.

An overview to the historical situation of the Siberian Crane and Common Crane in Iran

by Sadegh Sadeghi-Zadegan,
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The Common crane (*Grus grus*) is a migratory species that regularly visits Iran in winter. Only a few breeding pairs have been reported to date. Large numbers of wintering Common cranes annually occupy vast areas of southern and south western Iran. The first flocks of these birds usually arrive in mid-September and leave late in April.

There are about 40 wintering sites, with about half of these more important than the others. Additionally, there are seven or eight sites used primarily as staging areas and temporary rest places during migration. The wintering sites are mainly situated in the southern provinces of Fars, Khuzestan, Sistan-Baluchestan and Bushehr and the northern province of Khorasan. An excellent staging site - Megghan Lake, a hyper-saline water body located about 200 km south-west of Tehran has been identified by the author and has been proposed to BirdLife International for inclusion in the "Directory of Important Bird Areas in the Middle-East". This site annually supports between 3,000 and 8,000 Common cranes that stage at this area for about two months (Sadeghi-Zadegan, 1998).

Table 1 indicates the population of Common cranes counted and estimated during a nine-year period (1990-98) throughout the country. Additionally, counts were conducted in the province of Fars which is the most important region for wintering of this species in Iran over a twelve-year period (1986-98). These surveys show the crane population exceeded 17,000birds in 1997 (maximum) and not less than 6,300 in 1993 (minimum). In comparison to other Asian countries, Iran supports one of the most stable and numerous populations of the Common crane in this part of the world.

In recent years a small breeding colony of common cranes (two to four pairs) was discovered in the north-west corner of the country in West Azarbaijan province, near the border with Turkey. As it is known that there is a fairly large number of Common cranes on the Turkish side of the border, the small population on the Iranian side is no doubt part of the same group (Sadeghi-Zadegan, 1997).

Table 1: Number of Common cranes wintering in Iran:

Year/Province	Fars	Khuzestan	Sistan	Bushehr	Other	Total
1986	4626					
1987	3561					
1988	7502					
1989	7502					
1990	6952	162		17	54	8189
1991	7680	31	623	19		11578
1992	7922	348		162		8432
1993	4850	207	1414	395	3	6869

1994	7089		675		60	7824
1995	7298		26		14	7338
1996	11729	117	44	172		15960
1997	7140		778	65	9481	17481
1998	5705	726		11	1856	8298

Source: annual mid-winter waterfowl census reports (DOE)

Status of the Siberian Crane wintering in Iran:

The wintering area of the western population of Siberian crane (*Grus leucogeranus*) is located in the south east Caspian lowlands (23m below sea-level) in the Iranian province of Mazandaran near the town of Fereidoonkenar at 36 40N, 52 60E.

The first report of Siberian cranes was from the south-west Caspian littoral area in 1773 (C. Hablitzl) who reported their presence in Gila province. Subsequent reports date from the turn of the century and the 1920s when some birds were seen on the west side of the Caspian Sea in Gilan. The currently known population was first "officially discovered" in 1978 further east in Mazandaran. However, these cranes are reported to have been known to local farmers for at least 60 years, ie as far back as the oldest farmers can remember.

The number of this very small and endangered population of Siberian cranes has remained almost stable for the last decade, although each year two juveniles have been observed on the wintering grounds (three in 1988-89). This indicates a loss of birds from various mortality factors on the migration route to and from their breeding and wintering habitats (V Tavakoli 1989).

Table 2: The number of Siberian cranes wintering in Iran

Year	Number	Year	Number
1977-78	11-14	1991-92	10
1984-85	10	1992-93	11
1985-86	11	1993-94	10
1986-87	11	1994-95	8-10
1987-88	10-11	1995-96	9
1988-89	11-14	1996-97	7-8
1989-90	8-10	1997-98	7-9
1990-91	9	1998-99	14

Background to Reintroduction of the Siberian Crane in Iran

Prior to the "discovery" of the wintering population of Siberian cranes in Iran in 1978, the Iranian Department of the Environment, the former Soviet Ministry of Agriculture and the International Crane Foundation (ICF) embarked on an ambitious project to re-establish a west Asia population of Siberian cranes that might winter in Iran. The plan was to locate potential Siberian crane wintering habitat in an agricultural area which supported Common cranes.

Once a suitable area was located, Common cranes would be captured, marked and released to make possible the identification of the Iranian cranes on their breeding grounds in Russia. After the Common cranes were studied on both winter and nesting grounds, Siberian crane eggs were to be substituted into the nests of Common cranes for the latter to hatch the eggs, rear the chicks and migrate with them to Iran. By repeating the egg exchange practice for several years, it was hoped a self-sustaining population of Siberian cranes would be established.

In keeping with this plan, an area in south-western Iran, called Arjan National Park (Fars Province near the city of Shiraz) was identified as a potential Siberian crane wintering site. In early 1976 and 1977, 176 Common cranes were captured (using alfa-chlorose - a drug mixed with wheat for temporary immobilisation) and marked with coloured plastic wing tags. A national mass media campaign in the nesting grounds south-east of the Ural mountains by Russian biologists to encourage local people to look out for and report the location of marked common cranes resulted in the identification of several of the birds in the summers of 1976 and 1977. Efforts continued in Iran and Russia to better understand the biology of the Common crane. Vital information was needed before it was felt that Siberian cranes could be effectively managed and reintroduced into west Asia.

In 1978, Iran's Department of the Environment announced that during the annual mid-January waterfowl census, its ornithologists discovered a flock of at least nine Siberian cranes near the south east Caspian town of Fereydoonkenar. It was the first sighting after about 60 years. According to the local villagers, these cranes were yearly visitors to the flooded fields near the town and, like their conspecifics in India, spent their time wading in shallow water and digging for plant roots.

The news was a pleasant surprise to researchers involved in the plan to introduce the Siberian crane in Arjan National park. Discovery of the Siberian cranes at Fereydoonkenar led to cessation of the re-introduction programme in the south. Close co-operation between Russian and Iranian biologists has subsequently provided success in the tracking of this population between the nesting and wintering grounds and has provided information on their exact migratory routes. This has also led to the identification of the cranes' staging and stopping points which are crucial for effective management. Iran and Russia have joined an international effort with eight other countries through the Convention on Migratory Species of Wild Animals to help further protect and conserve this important endangered species. The time now seems appropriate for Iran to consider the implementation of other programmes to enhance the small population of Siberian cranes coming to Iran and to develop programmes for increased environmental awareness and enhanced wintering habitat protection.

Acknowledgments: Mr David Ferguson's review and comment on this paper are appreciated.

References: V Tavokoli, Ellen (1989). Some observation of Siberian cranes at Fereydoonkenar. First meeting of European Crane Working Group, Tallinn, Estonia

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Fereydoonkenar: Wintering Place for Siberian Cranes in Iran

FEREYDOONKENAR

The Fereydoonkenar refuge has an area of 200 hectares and is located to the south of the city.

At the beginning of autumn, after the rice harvest, the birds start to migrate to the south. Because of the long tradition of protecting wildlife, the area attracts a large number of species, the rarest of which is the Siberian crane, which has been migrating here for many years.

Because of the shape of its body, the harmony of its movement and its distinctive call, the Siberian crane is one of the local inhabitants' and native hunters' favourite birds.

Experts of the Department of Environment identified the species, ascertained their number and made a report to the IWRB. In 1995, their migration route was established by use of telemetry.

POPULATION

In the light of background reports, the arrival of cranes at the Fereydoonkenar refuge over the past two to three years and the likelihood of their continuing to arrive, the region was surveyed very carefully in liaison with the local hunters. Sightings of the cranes were recorded and reported. By 20 October a number of cranes had already arrived, followed by a group of three and another group of two on 31 October. By 25 November, a total of 14 cranes were observed.

Particular conditions prevailed at Fereydoonkenar, leading to the cranes not settling in their normal location within the reserve. Favourable climatic conditions resulted in migratory species not migrating and the reserve was not as peaceful as usual. A pair was observed at Hakerdekel, the male had a distinctive mark on its neck. The individuals identified in 1995 were again recorded in 1997.

This year, a new family of cranes has arrived, in place of previously sighted birds.

SUGGESTIONS

1. Establishment of a research base for the study of the Siberian crane in the Fereydoonkenar region funded by the GEF with a view to setting up a sanctuary for birds, particularly Siberian Cranes
2. Holding a seminar or workshop to present local hunters with information, based on the significance of the Siberian crane and the importance of maintaining the population, or setting up in the region an educational and treatment unit concerning Siberian cranes with a view to encouraging the collaboration of national and international crane experts.

Republic of Kazakhstan

National system of conservation of rare and endangered species of animal world

The extensiveness of the territory of Kazakhstan and the specific characteristics of its natural heritage determine a large diversity and complexity of internal interrelations of its components in the complexes of natural landscapes, their zonal and belt structure. Kazakhstan, according to the diversity of its biological resources, the amount of raw and useful stocks of flora and fauna, occupies the first place among the states of the Central Asia - the CIS Republics.

The components of biodiversity differ by a level of their organization. Three levels are basically considered: species, cenotic and ecosystems, which objects are flora, fauna, vegetative communities and ecological systems. Complication of the structure and functioning of biota at each level, accordingly, increase the volume and character of information on biodiversity.

A long-term Strategy of Development up to 2030 "Ecology and natural resources of the Republic of Kazakhstan" has been developed and is being implemented. One of the priorities set, is the preservation of animal and vegetative world, which should be achieved by:

- < Creation of a databank "State cadastres of the objects of animal and vegetable world, key protected natural territories";
- < Monitoring, rational use, reproduction and preservation of animal and vegetable world;
- < Development of a network of key protected natural territories;
- < Creation of a network of civilized hunting and fishing;

The National system for the conservation of species of the animal world, including rare endangered species, is based on legislation, institutional framework and ecological education. The laws "On protection, reproduction and use of fauna", "On specially protected territories" and "Forest Code of the Republic of Kazakhstan" are closely related with the purpose of conservation of biological diversity in our state.

In accordance with the first one, protection and reproduction of animals being in exclusive ownership of the state is provided by the following:

- < establishment of appropriate regulations and standards;
- < establishment of prohibitions and restrictions in the use;
- < protection and conservation of habitation places, propagation conditions, migration ways and places of animals concentration;
- < protection and rearing of rare and endangered species in unnatural and half-natural conditions;
- < creation and segregation of specially protected territories;
- < prevention of fauna loss while effecting production processes;
- < protection of fauna while using the preparation of plant saving, mineral fertilizers and others;
- < limitation of withdrawal of animals for zoological collections;
- < propaganda of the ideas of animals protection through the mass media;
- < organization of researches targeted to substantiate the measures on protection and reproduction of animals;
- < cultivate in people the humane attitude to animals.

The law "On key protected natural territories" determines legal, economic, social and organizational basis of activity of key protected natural territories, which are the national property of the Republic of Kazakhstan, ensuring conservation and restoration measures of Biological Diversity. The state nature-reserved fund includes the objects: rare and endangered, valuable, typical, unique kinds of animals and plants.

Further in accordance with the stages of realization of "Strategy 2030" and plan of measures on the fulfillment of the Program of actions of the Republic of Kazakhstan on 1998 -2000" the preparation of documents on the connection of the Republic of Kazakhstan to the number of international ecological Conventions, including Bonn Convention on the preservation of migratory species of wild animals, is made. In this direction a complex of measures is taken. It includes the restriction of periods of hunting and fishing, establishment of quotas and restrictions of trade kinds, protection of places of rearing, rest and shedding of feathers of birds of passage, etc.

Special attention is paid to species of animals, under the threat of disappearance. Among them is Siberian White Crane of the Gruiformes, related by the status to the first category and included into the Red Book of Kazakhstan. For Kazakhstan, the Siberian Crane is a bird of passage, seen during migration primarily in the west from March to May and September to November. On flights it is met along the banks of reservoirs, most often it is seen in the Aral-Torgai depression in groups up to 11 individuals. The Siberian White Crane is protected in the Naursum, Kurgaldzhin and Torgai Reserves.

Suggestions on the conservation of migrating Siberian Crane in Kazakhstan first of all are seen in a more detailed study of the phenology of the Gruidae, especially of the Siberian Crane, which will give the opportunity to concentrate preservation measures on the period of its intensive flight.

Secondly, the best way of conserving of the crane is creation of an extensive network of protected natural territories. The conferment of the national designation on the Alackol water reserve has become a vivid example of the Kazakhstan Government's actions directed on the preservation of natural riches, including migrating kinds of wild animals.

However in this respect Kazakhstan is far behind the average world level. Protected territories - reserves and national parks occupy only 13595 sq. km or 0,5% of the area of the Republic together with territories with limited modes of protection - 2,6%. Reserves of Kazakhstan present 87,4% of a species diversity of birds nesting in Kazakhstan (including 39 "Red Book" species or 76,5% of their total number recorded in the Red Data Book).

From the above stated it is evident, that the available protected territories are not capable of fulfilling the tasks set for them completely, and in this connection, in Kazakhstan, the concept of development of the network of protected natural territories of the Republic of Kazakhstan providing expansion of the set of types of territories through formation of forest and soil genetic reserves and nature parks, has been developed and submitted for review to the Government. By increasing the number of reserves to 24, game reserves up to 117, national parks up to 8, the total area of protected territories should increase to 124,8 thousand sq. km. With the purpose of increasing the number of specially protected natural territories, optimization of their network and improvement of their management, prevention of privatization of valuable natural facilities subject to special protection, the following nature protective measures are being carried out:

- < Adjustment of the state "Schedules of development and accommodation of facilities of nature-reserve stock of Kazakhstan for the period till 2005" on the basis of a landscape-zonal and biogeographical zoning of Kazakhstan with the account for priority creation of specially protected territories in the centers of increased biodiversity, endemism and places of intensive economic development.
- < Reprinting the Red Data Book of Kazakhstan, volume 2 (invertebrate animals), volume 3 (plants) and publishing the Green book of Kazakhstan, volume 4 (vegetable communities).
- < Development of the Books of the genetic stock with definition of the status of each species and community, creation and introduction of cadastres of the vegetable and animal world of the Republic of Kazakhstan and separate administrative areas on their basis.
- < Development of unified scientifically substantiated programs and methods of maintenance of the cadastre of specially protected natural territories, their inventory and certification, including reserves, game reserves, natural and nature parks, monuments of nature, as well as reserved zones, zoological parks, botanical gardens and arboretums.
- < Development of the technique of economic estimation of how specially protected natural territories function in view of their nature protection, educational and enlightening role.
- < Development of new approaches to organization of reserved territories, including provision of economic incentives to landowners and land users, whose lands are taken for creation of a reserve core of a national park.
- < Transformation of national nature parks into important nature protection establishments, developing specifications for a rational use of nature in conditions of their region.
- < Development of specialized modes of protection, and if necessary, terms of functioning of game reserves for conservation and restoration of population of separate plant and animal species, which number is subject to significant fluctuations.
- < Development of the plan for creation of international regional reserves with the purpose of coordination of scientific researches conducted in them, related to conservation of Biological Diversity and their involvement into projects of international cooperation.

Pakistan - Country report

Siberian cranes have not been sighted in Pakistan for a long time or you can say, since the start of interest in their conservation by the ICF or by CMS. Steve Landfried was probably the first person to come to Pakistan and initiate conservation studies/efforts on the cranes in general and the Siberian crane in particular. There have been occasional reports made on the sighting of white cranes, or "*Safed Koonj*" the name by which they are known in Pakistan, but these have not been confirmed. All these reports except one however, pertain to the spring season i.e. on their return migration. The single report made in the autumn was by a hunter of Dalo Khe village (Lakki Marwat district Lakki in NWFP) sighting three Siberian cranes at 0600 hours on September 28, 1997 along Kurram River. But as I said, none of the reports have been confirmed.

There have been sighting reports from Afghanistan and their wintering records at Bharatpur (India), and obviously if they have to reach India, they would go through Pakistan but how? This is still a mystery

How to solve it? - The proper use of PTT data would be the answer.

As we have been told that there are two Siberian Cranes already at Bharatpur, and one is still hovering near Ab-i-Estada in Afghanistan, we simply hope that the PTT data would reveal the mode how the Siberians crossed or would cross Pakistan. At the moment it could be anybody's guess. At best we can associate the migration route of the Siberian cranes with the other two species of cranes migrating through Pakistan i.e. the demoiselle and the Eurasian. Looking at the map one would realise that they enter Pakistan in a broad front from NWFP to Baluchistan. Main entry routes are the Kurram-Gambeela valleys in NWFP, Koh-i-Safed range valleys leading to Suleiman range and Dera Ghazi Khan in the Punjab, and Zhob in Baluchistan; and Noshki areas along the border between southern Afghanistan and western Pakistan near Zangi Nawar lake. And within Pakistan again they traverse the country widely. They use the wetlands as staging areas but there are two to three locations along river Jhelum where they are known to stay for a period of more than four weeks. And in Cholistan and Thar areas their stay could also be prolonged especially along the border where they hop around between the two countries enjoying the food crops in India and the wilderness in Pakistan. Siberian cranes could possibly take any of these broad routes.

And they can also be hunted in the process. Crane trapping and hunting is a cultural activity along Kurram Gambella valleys (flyway). It is only for the community of these valleys, that the Government of NWFP has allowed hunting by traditional methods but in the recent years gun shooting has also started taking its toll. As a result the hunters have also started moving out of NWFP where the cranes are protected species. Each year many illegal hunters are caught/apprehended in the Punjab and an equal number move out with the booty. Sometimes the protection forces are successful and sometimes the other parties. This is a continuous race.

But there are some bright spots as well. Only a year back a village organization drove away the crane hunters from their village and the areas around in Zhob district of Baluchistan. NGOs, welfare organizations have started taking interest in the conservation of cranes, and in the Wildlife Departments especially NWFP, Punjab have increased their interest the protection of cranes. And whereas the government departments are busy working with the hunters,

WWF-Pakistan has started working with the communities, and the educational institutions. But have we been successful? This is a tough question to answer but I would say 'the ice has been broken' a step has been taken and now if the activities continue which I hope would continue, we shall make a headway.

Following shows the protected areas that are visited by the cranes during their migration through Pakistan:

Sl. #	Name of the wetland	Name of the province
1	Tanda Dam	NWFP
2	Baran Dam	NWFP
3	Malu Gul Dhand	NWFP
4	Thanedar Wala Game reserve	NWFP
5	Indus River reserve	NWFP
6	Chashma Barrage Wildlife Sanctuary	Punjab
7	Taunsa Barrage Wildlife Sanctuary	Punjab
8	Cholistan Game reserve	Punjab
9	Cholistan wildlife reserve	Punjab
10	Band Khushdil Khan	Baluchistan
11	Zangi Nawar Wildlife sanctuary	Baluchistan
12	Rann of Katch Game reserve	Sindh
13	Indus Dolphin reserve	Sindh

Amongst these management plans are under preparation for Chashma, Taunsa and Zangi Nawar Wildlife sanctuaries in collaboration with WWF-Pakistan. Management plans for Cholistan areas will be prepared in the second phase. Tanda Dam and Crane refuge at Lakki located in Tanedar Wala Game reserve and are being managed as wildlife parks/breeding exist the problem of conflict with local hunter community. Malogul Dhand located near Kurram Gambila junction is also being considered for rehabilitation and habitat improvement.

Pakistan has been an active member of Cranes Conservation organizations, and being a signatory to the MoU concerning conservation measures for the Siberian crane has been undertaking activities proposed by CMS. Following is a point by point report:

1. Reduce Mortality

- 1.1 The English version of video on Siberian cranes was translated into Urdu for wider circulation but the Urdu translation done by a professional journalist did not convey the essence of the message, and is now being re-translated by another translator. In the meantime, however, the English version of the video has been shown to the select gathering of policy makers.
- 1.2. The NWFP Wildlife Department has established a liaison with Crane Hunters Association that is based at Bannu and Lakki with a wider membership including hunters from D.I. Khan and tribal areas located in Bannu and D. I. Khan. There is a continuous dialogue between the department and the crane

hunters. The work with the communities has been undertaken by the Pakistan Forest Institute Peshawar, under a grant from the Oriental Bird Club, involving crane hunter camp surveys, through a set of questionnaires, and simultaneously spreading the conservation messages.

Simultaneously WWF-Pakistan have been working with the local communities and educational institution along the migration route in Bannu, Khan and districts to develop community based conservation program for cranes in the area.

1.3 The efforts to introduce Siberian Cranes to the interest groups have mainly been confined to the activities mentioned above while talking about the two crane species; Siberian Cranes would be automatically mentioned and reported on, with the request to report sightings.

1.4 All sightings reported are investigated but to confirm such a sighting is a difficult job. The appropriate PTT data would be the answer to this question.

1.5 Education programs have been described under (1.3). The wetland habitat is being looked after/managed by the respective land management departments. The awareness in the local population as well as in related departments is provided through an approach to the related agencies. The NWFP Wildlife department has established two refuges, a crane refuge in Lakki district on river Kurram and a waterfowl refuge in D.I. Khan on Indus river. Calls of captive cranes, kept in Lakki refuge attract the over-flying migrating cranes to take rest in the refuge for a day or two. The refuges provide safe resting ground to the wild cranes along the migration route.

Plans are being prepared by WWF-Pakistan and NWFP Wildlife department with support of local community, to undertake rehabilitation efforts at Malogul Dhand (lake), a previous Ramsar site. The lake was delisted because it had lost some of its habitat characteristics due to induced pressures. The ecological value of the lake can be restored through serious joint efforts

1.6 Incentives still to be worked out.

1.7 Surveys for the demoiselle and Eurasian cranes are being conducted regularly in the Punjab and occasionally in NWFP and Sindh provinces.

WWF-Pakistan has recently started survey of captive cranes in Lakki and Bannu districts. Also the organization is involved in identifying the role of women community in captive cranes care and conservation.

1.8 No identified area for Siberian crane.

1.9 Threats to Common and Demoiselle have been studied, and these would be equally applicable to Siberian cranes.

1.10 Hunting seasons and practices studied for common and demoiselle cranes, could be applicable to Siberian Cranes as well.

1.11 Crane hunters association being approached.

- 1.12 Consultative meetings with the local hunters have not so far yielded fruitful results because of their insistence to stick to their age-old practices. The existing legislation is being enforced as far as possible.

2. Increase numbers and genetic diversity

- 2.1 At present not relevant
- 2.2 At present not relevant
- 2.3 At present not relevant
- 2.4 Migration routes of Eurasian crane being monitored. No wintering areas in Pakistan.
- 2.5 Not relevant at present
- 2.6 Not relevant at present
- 2.7 Not relevant at present
- 2.8 Not relevant at present

3. Enhance International Co-operation

- 3.1 National counter part; The office of the Inspector General of Forests, Ministry of Environment, Local Government and Rural Development, Islamabad.
- 3.2 Annual Report-submitted.

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CRANES MIGRATION ROUTES IN PAKISTAN



Activities Undertaken in the Russian Federation in 1997 to Restore Siberian Crane Populations

Report prepared by the All-Russia Research
Institute of Nature Conservation

Translated to English from the original Russian text by A. Shilina,
with additional editing and formatting
by the Secretariat of the Convention on Migratory Species

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SUMMARY

Activities to restore the Siberian crane population are being carried out in four different localities: Oka State Biosphere Nature Reserve, the Kunovat River Basin, the Konda Region of Khanty-Mansi Autonomic Okrug, and the Uvat Region of Tumen Oblasts, South Tumen Oblasts (Armizon region) (il.1). Certain goals have been achieved in each area; all of them are included in the Siberian Crane Action Plan, developed under the Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention). This Plan was developed at the 1st International meeting of representatives of the Siberian Crane Range States, Moscow, May 1995. Further, at the 2nd meeting in India, November 1996, some amendments and additions were made to the Plan.

1. Oka State Biosphere Nature Reserve

The following activities were carried out in the Oka Crane Breeding Centre as part of the project.

1. collection of Siberian crane eggs
2. incubation of Siberian crane eggs
3. assigning Siberian crane eggs for introduction by cross-fostering techniques in Kunovat River Basin of Amalia-Nenetski Autonomic Okrug, in Konda region of Khanty-Mansi Autonomic Okrug and Uvat region of Tumen Oblast.
4. Chick rearing according to isolation rearing technique for introduction to South Tumen Oblast.

In 1997 22 Siberian crane eggs were produced in the Oka Crane Breeding Centre. One of them was infertile, another one was broken by the young inexperienced female. Three incubation types were employed: natural, artificial and mixed. The best results were obtained by natural or mixed incubation. Three Siberian crane eggs from the Oka Crane Breeding Centre were taken for «crossfostering» incubation. Twelve Siberian crane chicks hatched successfully. Four of them were raised by their parents, and the other eight were raised in isolation. Another chick hatched from an egg received from the International Crane Foundation. It also was raised in isolation. Six of the eight chicks reared in isolation were taken for release in Tumen Oblast.

2. Kunovat River Basin

The following activities were carried out in the Kunovat River Basin (KRB) as part of the Project:

1. Siberian crane population monitoring.
2. Common crane population monitoring.
3. Siberian and Common crane PTT-marking (Platform Terminal Transmitters) to clarify the autumn migration route and stopover locations.

In the Kunovat River Basin, Yamalo-Nenetski Autonomic Okrug, during an aerial survey in 1997 one pair of Siberian cranes was observed. This pair has been known as «Burovaya» since 1981. Also 4 pairs of Common crane and 1 single bird were founded during air and ground surveys. From 28 May till 6 June Siberian crane introduction by «crossfostering» method took place in KRB. Three eggs from the Oka Crane Breeding Centre and 2 eggs from the

International Crane Foundation were employed. It is certainly known that 3 Oka eggs had hatched successfully in Common crane nests. One of the ICF eggs perished, the other one's fate was unknown. Unfortunately the chick of Kunovat Siberian crane pair was not fitted with PTT. It was already fledged when an effort to catch it was made. The fates of 3 Siberian crane chicks being hatched in Common crane nests also were unknown because of limited fieldwork time.

3. Konda region of Khanty-Mansi Autonomic Okrug and Uvat Region of Tumen Oblast

The following activities were carried out in Konda region of Khanty-Mansi Autonomous Okrug and Uvat region of Tumen Oblast under the Project:

1. Siberian crane population monitoring.
2. Common crane population monitoring.
3. Siberian and Common crane PTT-marking to clarify the autumn migration route and stopover locations.
4. Protected area creation in Konda region of Khanty-Mansi Autonomic Okrug and frontier Uvat region of Tumen Oblast.

In January 1996 in Iran, where 9 Siberian cranes were spending the winter, one male from a pair with a chick was marked with PTT, provided by the Wild Bird Society of Japan and with a coloured plastic ring. It enabled us to follow the spring migration route and to clarify the nesting area. The nesting area is located in Uvat region of Tumen Oblast about 600 km to the South of Kunovat. In 1996 the marked pair was not observed during an aerial survey by helicopter. Another Siberian crane family with an unfledged chick was observed. According to PTT signals the marked pair was located nearby, but it was not found because of limited time. In 1997 both Siberian crane families were observed at a distance of about 10 km from each other. Both pairs had chicks. In August 1997, the chicks from these families were marked with coloured plastic rings.

The chick from the family found in 1996, was marked with PTT, produced by Russian Institute of Space Device Engineering. The PTT signals during the time limit were satisfactory. It enabled us to follow the autumn migration route and stopover location from the breeding area to the mouth of the Volga. Besides the chicks, a mate of the Siberian crane, marked in Iran, was also marked with a plastic coloured ring. Three Common crane nests were found near the Siberian crane territory first found in 1996. Siberian crane eggs from ICF were placed in these Common crane nests. In August Siberian crane chicks were not found because of limited time. Two Common crane chicks from a family, neighbour to the Siberian crane pair of '96 were marked with coloured plastic rings. It was impossible to mark them with PTT because of their young age.

4. South Tumen Oblast

The following activities were carried out in South Tumen Oblast under the Project:

1. Release of chicks reared in isolation into the wild.
2. Common crane population monitoring in autumn premigratory concentrations.
3. Siberian and Common crane PTT-marking to clarify autumn migratory routes and stopover locations.

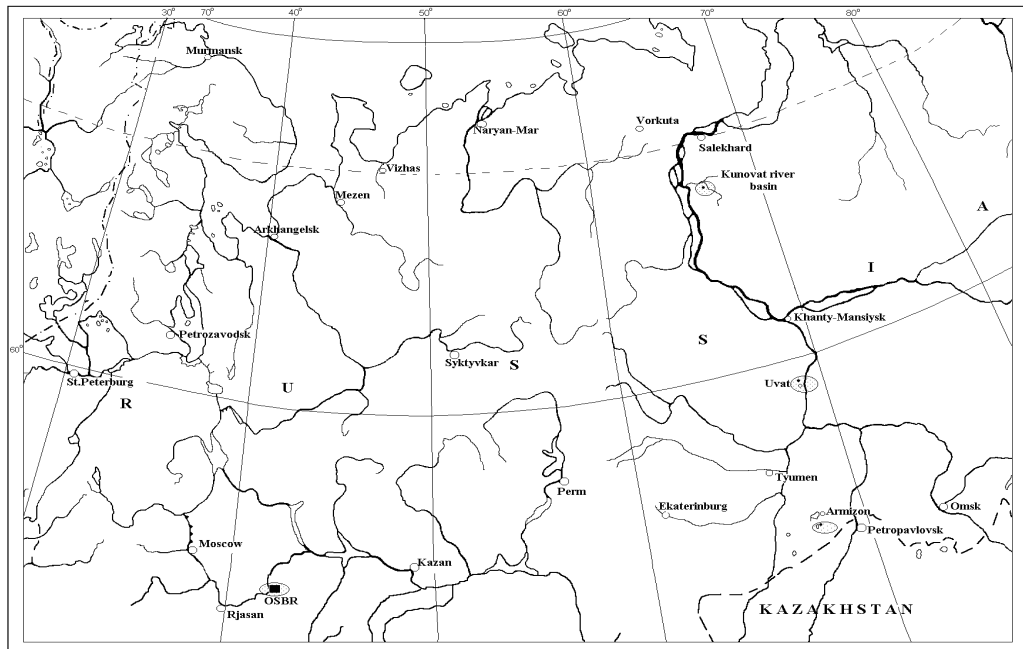
In South Tumen Oblast activities to release Siberian crane chicks were continued in autumn premigratory Common crane concentrations. Six isolation reared chicks from Oka Breeding Centre were used for this. The chicks were released in steppe island (Omelino Island) in Beloye lake (the lake is about 9 km in diameter). The island is often used by Common cranes as a stopover and roosting area. Several days after release one chick died because of a digestive disorder. The death was caused by trachea embolism with semi-digested artificial food. The chick was very aggressive to the others, so the accident could have happened because of a fight. During the period of three and a half weeks the remaining 5 chicks successfully adapted to the habitat, the natural food and the Common crane's daily routine. During this period of time the chicks had numerous contacts with wild Common cranes. The Siberian chicks soon fledged and started to fly above the island. Unfortunately, at the end of the fourth week after release, one of the youngest chicks was killed by a bird of prey, probably a White-tailed eagle. The details of the incident are unknown. On 31 August, the chicks flew away from the island to the fields, where Common cranes had their foraging area. Just at the time when Siberian crane chicks arrived in the fields, there were no Common cranes there, so the Siberian chicks left the release area and flew away to the West. The chicks were not marked with PTT, so the search for them was unsuccessful. According to local people, the chicks were observed near Cheornoye lake located in 40 km to the West of the release area. Daily counts of Common crane numbers were carried out during the fieldwork. In 1997, the maximum number of crane was more than 1000 birds. Activity for Common crane PTT-marking was continued. The PTT were produced by the Russian Institute of Space Device Engineering in 1996 and improved in 1997. One of the PTT enabled us to follow the Common crane migration from Armizon region to their wintering area at the mouth of the Ind in Pakistan, including all stopovers during the autumn migration. Three adult Common cranes and four young birds were marked with coloured plastic rings. One of the adult birds perished (it flew away under alfa-chlorolose influence and drowned in shallow lake water). Another adult crane suffered damage to its leg while being marked. After 4 days of treatment it disappeared into reed bush near the lake. Its fate is unknown.

INTRODUCTION

The number of cranes in the Central and the West Siberian populations is extremely low and continues to decrease. At the breeding area in the Kunovat River Basin only one pair is certainly known of. At the wintering area in Keoladeo National Park, India, 5 adult birds were observed in 1993. During the following two years Siberian cranes were not observed in the Indian wintering area. In the winter of 1995-96, 4 birds (a pair with a chick and a single bird) came for wintering very late - 1 February 1996. In the winter of 1996-97, 3 birds came on 16 November (a pair without a chick and a single bird). In November 1997, 3 birds came for wintering to Keoladeo National park: 2 adult birds and a chick. The single bird did not come for the first time. In February 1996 it was discovered for certain that Siberian cranes from KRB winter at the Keoladeo National Park, India. In Iran 9 birds (2 pairs with chicks, a pair without a chick, and a single bird) were observed during the winter seasons 1995-96 and 1996-97. In January 1996, in the Iranian wintering area, a male from a wild family was marked with PTT, provided by the Wild Bird Society of Japan. The PTT worked well, enabling us to follow the Siberian cranes' spring migration and to ascertain the location of the breeding area. The breeding area was located in Uvat region of Tumen Oblast. During the helicopter aerial survey in 1996, the marked pair was not observed. A nearby Siberian crane family with unfledged chick was found. One bird of this family (a moulting one) was marked with coloured plastic and standard metal rings. According to PTT signals, the radio marked bird was located not far away (about 10 km from observed pair). Siberian cranes were found in the open wet marsh. Its long and meandering ridges stretched for several km in latitude direction. The landscape looks similar to the Siberian crane breeding ground in KRB. Siberian and Common crane joint nesting is also typical for this area. In spite of comparatively short distance to the regional administrative centre, Uvat town (60 km) the newly discovered crane breeding area is practically unreachable. The river network is poorly developed, so in summer time it is only possible to get there by helicopter. There are no human settlements there, just some fishermen's cabins on big lakes (fishermen get this area by helicopter and go mainly for carps). At the same time, the territory is being prospected by the gas and oil industry. The possibility of its development threatens the Siberian crane breeding area. Only the creation of a specially protected area with a status not lower than a Federal refuge, can guarantee the safety of the breeding area. Described marshes stretch to the North to Konda region of Khanty-Mansi Autonomous Okrug, so it is possible that the Siberian crane also nest there. There is some information about Siberian crane observation in that region. It is necessary to coordinate the question about its territory with the two Federal states, where activities related to Federal refuge protection activities are concerned. It is possible to save the Siberian crane populations only through complex measures for species protection and restoration in the region. These measures should include both the creation of protected areas with a strict protection regime and Siberian crane releases into the wild. According to the previous year's research, the introduction can be carried out by two methods, ie «isolation rearing» and «crossfostering». The main idea behind the first method is raising chicks in the breeding centre without contact with people, developing in the chicks behaviour similar to wild birds and other conditions necessary to join wild cranes. The second method envisages that Siberian crane eggs from breeding centres should be located to Common crane nests in the wild. In such a case Siberian crane chicks are reared by Common crane parents. Introduction with isolation rearing technique has been carried out in KRB since 1991, and «crossfostering» since 1993. Both methods are considered as real instruments to restore the endangered Siberian crane population.

PROJECT STRUCTURE

1. Project sites (il.1)



1.1 Oka State Biosphere Nature Reserve (OSBNR)

The reserve is located 300 km southeast of Moscow, in the Meshcherski Lowland. It was established to preserve the plant communities of mixed forest sub-zone, large wetlands and meadow ecosystems of flood lands of the Oka and Pra rivers. Its well-preserved fauna is typical of the Central part of European Russia. The Reserve is also famous for its large number of Common cranes during the nesting season and the period of premigratory concentrations. Oka river flood land represents the important spring stopover of geese (White-fronted and Bean geese). One of the largest and the most productive crane breeding centres in the world was established and successfully operates in OSBNR.

The main goals of this Centre are to preserve the gene pool of rare crane species and to restore their population in the wild. Since 1979 a captive population of Siberian cranes has been maintained at OSBNR; at present this population is highly productive. Actually all the offspring employed by the Siberian Crane Project for release into the wild come from here.

1.2 Kunovat River Basin (KRB)

Right tributary of the Ob river, the Kunovat river, flows into the Big Ob (east channel of Dvuob'ye, or Two-Ob's) 200 km to the South of Salekhard - a city situated on the Arctic Circle. Kunovat is a typical northern taiga river with lowland flow pattern. Its well-developed northern taiga is famous for numerous river channels. Flood plain forest that occupies a riverain belt 3 to 5 km wide is represented by spruce stands with some birch and Siberian Pine trees on the drainage hillocks. Along the typical upper Kunovat flow elevations the percentage of larch trees in forest stands becomes larger. Flat and lowland shores are

occupied by vast marshes with numerous lakes and elevated islands of pine stands. Rolling marshes predominate here, with general inclination toward the river, so that the marshes located on the upper part of the slope are drier than those that are close to the river. In the lowest part of the flood plain open wet «floating» marshes with numerous deep channels are well developed. Such practically unreachable areas represent the most typical Siberian crane nesting habitats. Common cranes prefer to nest along the swampy periphery of forest «islands», in the midst of dead trees and bushes, although they can occupy more open marshes as well. The animal kingdom is represented by species typical of the northern taiga. Among mammals, moose, brown bear, sable, otter, muskrat, squirrel, chipmunk, red vole, and some other species are common. Among birds, waterfowl and other water species (river and diving ducks, waders, gulls) predominate. In the woods, Capercaillie (Wood grouse) and Hazel grouse are common. Birds of prey are represented by Goshawk, Merlin and White-tailed eagle; Golden eagle and Osprey are less common. Hooded crow are to be found everywhere.

In 1991, the Field Station of the Siberian Crane Project expedition was set up on a pine stand island near the Kunovat flood plain, on the territory of the Federal game refuge «Kunovatski». Located 3 km from the camp is a nesting territory of Siberian crane pair, known since 1981.

1.3. Konda Region of Khanty-Mansi Autonomous Okrug and Uvat Region of Tumen Oblast

Breeding grounds both of Siberian and Common cranes are located in the vast bogs and marshes massif in middle taiga subzone. Habitats of aapa type are predominate here. The majority of habitats are high wet ridge-depression and ridge-lake areas with oligotrophic vegetation on ridges and eutrophic vegetation in depressions. On better drained territories, ridges are covered with poor verdure of birches and pine-trees; in wetter area, trees are absent. In some places floating marsh is developed. Also there are some elevated islands, covered with forest, and a network of big lakes. The animal kingdom is represented by typical taiga species. Siberian and Common cranes were found on the open high wet ridge-depressed marsh. Its long and meandering ridges stretch for several km in latitude direction. Moss-grass ridges are 2-3 m wide and covered with low oppressed birches. Depressions between the ridges stretch for 100 m and more; they are covered with grass vegetation and have an unstable surface. Near the crane nesting site there is a big, long forest island, covered with aspen grove. Five km to the South there are the 2 big lakes of Chelbash and Krivoi Bor.

1.4 South Tumen Oblast (STO)

The Field station for releasing Siberian crane release into Common crane premigratory concentrations is located in lake-forest-steppe landscape in middle forest-steppe sub-zone in the Armizon region of Tumen Oblast, in the Federal game refuge «Belozerski», near the border with Kurgan Oblast. The refuge is located in the southwest Ishim Plain at medium altitude (up to 157 m above sea-level). The area represents a typical forest-steppe with birch and aspen groves and numerous shallow lakes with reed thickets. Steppe plants are rare. Open areas are developed into fields of wheat, barley, and other crops. Among large mammals, roe deer, wild boar, red fox, badger and raccoon dog are common. Birds are represented by waterfowl and wetland species, such as Greylag goose, ducks, Goot, Grey Heron, White Egret, Dalmayin Pelican, Great Cormorant, gulls and waders. Common crane breed in marshes. Among birds of prey there are White-tailed and Imperial eagles, Goshawk and Hobby. In August, after the crops ripen, local and migratory Common cranes form concentrations up to several hundred strong. They feed in the crop fields and roost on shallow lake islands till early October. The field station is set up in a birch grove on top of a high hill, enabling the cranes' diurnal activities to be monitored.

2. Project participants and time frames

All-Russia Research Institute of Nature Conservation

Sorokin A.G. - Head of Laboratory for rare animal species protection
Shilina A.P. - Junior Researcher of Laboratory for rare animal species protection

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Toyarov V.I. - Game Manager

State Refuge «Belozerski»

Drobyshevski VP. - Senior Game Manager
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Game Management Department of Tumen Region

Azarov V.I. - Head
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Participants	June 96	July 96	August 96	September 96
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3. Project sponsors

Terry Kohler (USA)
Environment Committee of Yamalo-Nenetski Autonomous Okrug (Russia)
Ecological Foundation of Khanty-Mansi Autonomous Okrug (Russia)
Tumen Environment Committee (Russia)

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Game Management Department of the Yamalo-Nenetski Autonomous Okrug Administration;
Executive Committee of Yamalo-Nenetski Region Department VOPD «Nash Dom Russia»
Game Management Department of Tumen Oblast Administration;
Federal Refuge «Kunovatski»;
Federal Refuge «Belozerski»;
Yamalo-Nenetski Environment Committee;
Tumen Oblast Environment Committee;
Administration of Uvat region, Tumen Oblast;
Other organizations and persons taking part in the Project promotion at its various stages.

METHODS AND ACTIVITIES DESCRIPTION

1. Oka State Biosphere Nature Reserve

In 1997 for Siberian crane releases into the wild, the eggs were taken from the Oka Breeding Centre, and also one of the eggs delivered by plane from the International Crane Foundation (U.S.) for the «crossfostering» method. That season 6 female and 5 male Siberian crane bred in Oka Breeding Centre (table 2, Appendix). Twenty two eggs were laid in total. One of them was destroyed by a young inexperienced female (the first breeding). Another one was infertile. The duration of the egg laying period was 95 days: from 30 March to 2 June.

1.1. Incubation

In Oka Breeding Centre 2 Grumbach incubators were used and 1 incubator of «New life» type was used as brooder. Three types of incubation were used, ie natural, artificial and mixed (table 3, Appendix). Five eggs throughout the entire incubation period were placed in crane nests (Siberian and White-naped); they were moved to the incubator just 1-2 days before hatching. All the eggs hatched, and the chicks were raised successfully. Four eggs got mixed incubation. The embryo in one of the eggs died. The cause of death is recorded in table 3 of the Appendix. Only one chick was raised out of 3 which hatched. From 8 artificially incubated eggs, 3 chicks hatched and were raised successfully. Embryos died in 5 eggs. The causes of death are recorded in table 3 of the Appendix. Despite the small sample size, the advantages of natural incubation are evident. This idea is supported also with data examined for many years (Panchenko. Kashentseva, 1995). One of the ICF eggs with early hatching time, transported for «crossfostering» introduction, was left in OSBNR for incubation. It hatched successfully. Later the chick was taken for release in STO. So, in the Oka Breeding Centre 6 females and 5 males have produced 22 eggs. Twenty of them were successfully incubated. The incubation mortality was 9 %. Fourteen chicks have hatched from 20 incubated eggs (3 chicks incubated in foster parents nests in KRB). The embryo mortality was 30% (25% is embryo mortality from artificial incubated eggs, and 5% is embryo mortality from the mixed incubation group). Eleven of 14 chicks hatched in OSBNR, were raised in Oka Breeding Centre. Together with those 11 chicks, 1 chick from an ICF egg was also raised at the Oka Breeding Centre. In total, 12 Siberian crane chicks were raised in Oka Breeding Centre in 1997. From 11 chicks hatched in Oka Breeding Centre, 7 were raised in isolation and 4 were raised under the parents. One chick reared in isolation died because of a heart problem. One of the parent- reared chicks died, as it was damaged by young unskilled parents. The chick mortality at this stage was 18%. In total, 9 chicks from 22 eggs were raised in the Oka Breeding Centre up to an age of 1.5 months. The total mortality rate from the time the egg was laid till 1.5 months of age was 46 %. The total mortality rate in previous seasons was:

1995 - 66%

1996 - 52%

1.2. Chick keeping

The chick accommodation in pen bloc for isolation raising in 1997

II.2.

0	0	0	0	0
Kvit**	Dustum*	Adult Siberian crane	Archi**	Shiro **
Khaku	Rob**	Adult Siberian crane	Trang	Chang**
0	0	0	0	0

* Outdoor pen

** Chicks for release in STO.

1.3. Chick feeding

The chicks' diet consisted of starter chick food and natural supplements: fresh fish, boiled eggs, milk curds (with addition of crushed burned bones, wheat sprout and vitamins), molluscs, insects, berry vegetation. The starter chick food of about 80 kg was provided by 3 countries: the USA, Belgium and Finland. In late May and June Belgian and U.S. food was given to the chicks. In July they were given Belgian and Finnish food. In both cases the chicks preferred the largest pieces, ie U.S. and Finnish food.

The feeding regime was the same as in previous years: 6 times a day every 3 hours (6.00 a.m., 9.00 a.m., 12.00, 3.00 p.m., 6.00 p.m., 9.00 p.m.). One chick (Chung) increased its weight too slowly, so it was fed 10 times a day, and later according to the ordinary regime. The feeding started from 1 day old. The chicks were taught to feed themselves by a puppet. The pen was always provided with water bowl, and a feeder with artificial food and pieces of burned bones.

Attached in the appendix, graphs of chick weight dynamics illustrate their good growth rates. For the majority of chicks the measures were higher than average or corresponded to maximum ones.

The chicks, released in 1997, hatched between 16 May and 13 June. The chicks released in 1996 hatched between 5 May and 2 June, ie they were 2 weeks older. At one month old chicks born in 1997 reached one and a half times the weight of the chicks born in 1996.

1.4. Chick rearing and raising

The isolation technique was used. The staff carried out all contacts with the chicks only in special «crane» costumes with taped crane vocalizations. Puppets, imitating crane head with bill and neck, were used for chick feeding. «Chick parents» started to take the chicks for a walk when they were 2-3 days old. First strolls were brief and the chicks stayed close to the pens. Starting from 1 week age the chicks had long walks on a small marsh near the river. While walking the chicks were fed with amounts of vegetation, berries, mollusks, small frogs, and insects. The chicks swallowed small stones as gastrolittes. When strange people were encountered, the «adult crane» took the chick away into the bush, demonstrating the necessity to avoid people. Later the chicks ran away from people themselves. From 23 July, when their aggression decreased significantly, the chicks walked in groups of 2-3. During the strolls the staff were supplied with puppets and tape-recorders with taped vocalizations of adult Siberian cranes. From hatching to the departure to Tumen Oblast all the chicks were able to watch adult Siberian cranes through a glass wall or a net. All the chicks stayed in pens close to a «parent» and contacted it. Taped crane vocalizations were used all the time when costumed «parents» made contact with the chicks. Thanks to this, and also to contacts with adult Siberian cranes, the chicks were more wild than in previous years.

1.5. Dealing with health problems

Orthopaedic problems

Two chicks (20%) had curled toes at 2 days of age. Toe misalignment was corrected with wooden splints fixed with paper plaster. Two chicks (20%) had splayed legs since hatching. It was corrected by hobbling the legs above and below the hocks for 2-3 days using

bandages. Three chicks (30%) had «angel» wings. The wings of the chicks were bandaged at 1 month old. The wings of 2 chicks were corrected in 3-5 days with this technique. The third chick had a wing bandage for 2 weeks with 1-2 days interruptions every 2-3 days.

Helminth parasites

To avoid syngamose, parent chicks got Panacur (once) orally through a tube and also Magatar (against pathogenic protozoa) was used in drinking water. The same treatment was given to an isolation-reared chick, which had a cough for 2 days.

Diarrhea

Siberian chick Mirande, reared by a crane pair (Svet-Aghidel) became sick at 2 months old simultaneously with parents. All the family had strong diarrhea. The chick refused to eat. It was removed from the parents and got the following treatment: Baytril (0.3 mg/kg twice a day during 5 days, activated charcoal 2 tablets a day, and laevomycetin 0.25 g/a day during 3 days. Also it got Megapter with drinking water during 5 days for prophylaxis. As the chick had a lot of plumage parasites, it got Ivomec (0.1 mg/kg) under the skin. The parents got the same treatment.

Weight loss

In case of strong weight lost during the first days of life and to prevent dehydration 3 Siberian chicks (30%) got Ringer's solution under the skin twice a day during 1-3 days. Another 2 chicks were tube fed with mixture of milk, yolk and baby food. As a whole chick health was satisfactory and did not cause a lot of problems, as in previous years. The main reason for this, in our opinion, was sufficient quality food and normal weight increase.

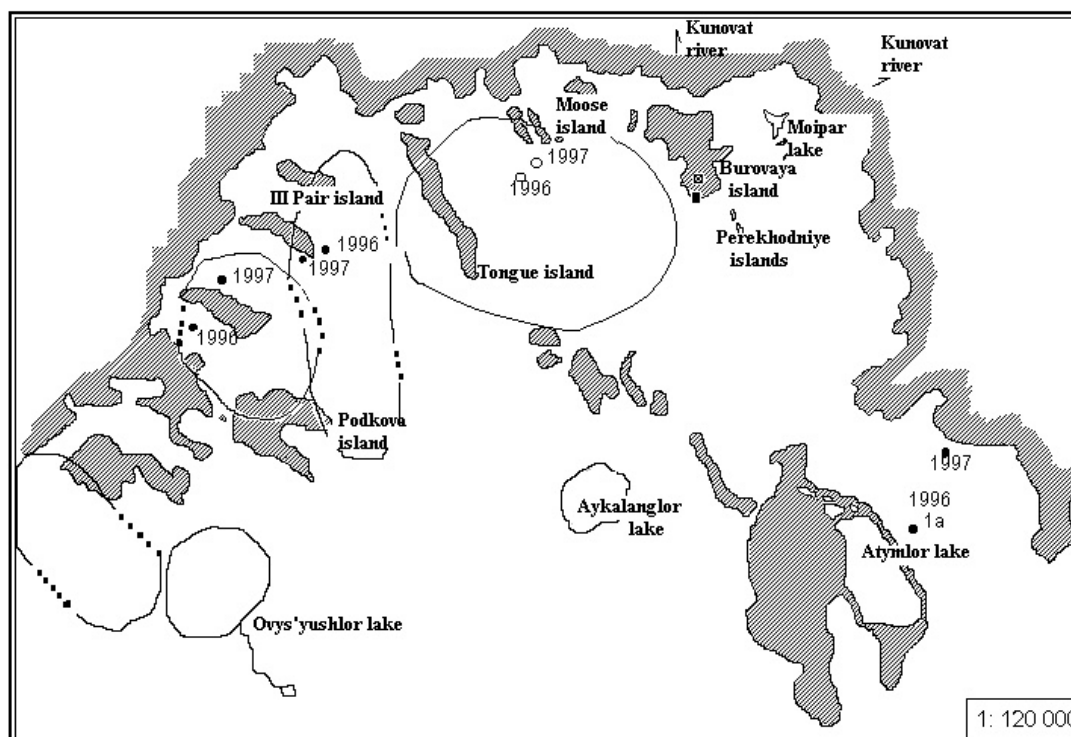
1.6. Transportation

1.6.1. Egg transportation

The transportation of Siberian crane eggs by the route ICF-Moscow-Tumen Oblast and OSBNR-Moscow-Tumen Oblast was carried out in portable incubators and in special containers, heated with rubber hot-water bottles. Cars, aircraft and helicopter were used.

1.6.2. Chick transportation

Six Siberian chicks between 46 to 74 days old were taken for release in STO (table Appendix). The weight of transported chicks ranged from 2.8 to 4.6 kg. During the transportation the chicks were kept in plywood boxes with tops, covered with sacking. They were drove by car from OSBNR to Domodedovo airport (350 km), then by Aeroflot plane to Tumen, and further in the car of the Game Management Department of Tumen Oblast to the release area in the Belozerski refuge (250 km).



2.1 Siberian crane population monitoring

In 1997 in KRB 1 Siberian crane pair was observed during an aerial survey. The survey was carried out on 19 May from a small AN-2 plane. All previously known Siberian crane breeding areas were examined, as were marshes near Muzhi village, where local people had come across Siberian cranes. Only one Siberian crane pair was found in the territory observed, near the field camp on Burovaya island (il. 3). This pair has been known since 1981. One of the birds had left the nest when the plane approached, the other one was feeding near the forest island to the east of the nest (il. 3). The pair's chick hatched on 9 June, the earliest hatching date for the whole observation period. Between 13-17 August, efforts were made to catch the chick to mark it with PTT, produced by Russian Research Institute. Unfortunately, on 13 August, when the chick was not yet fledged, we failed to catch it. On 15 August, during the second effort to catch it, the chick flew away, probably its first flight. The chick was 65 days old.

2.2 Common crane population monitoring

In KRB in 1997 4 Common crane pairs were founded. All of them were known from previous years. They are pairs NN Ia, III, IV and V. Pairs NN Ia, III and IV had nests. Siberian crane eggs were placed in those nests. Near nest Ia there were no other crane pairs unlike to previous years. The Common crane pair N V was not visible. It was possible only to hear the crane voices. The nest also was not founded, though we suppose that the pair did nest that year.

2.3 Introduction by «crossfostering» method

In Kunovatski Federal refuge the Siberian crane release in 1997 was carried out by the «crossfostering» method. The crane eggs from OSBNR and ICF were placed in Common crane nests. Searching for nests was started on 19 May during the aerial surveys. These surveys were carried out from the small AN-2 plane. In the area of field work the Common crane pairs NN III and IV were founded. One of the birds from the pair N III was sitting on the nest and did not leave it when the plane approach. The nest of pair IV was not observed from the plane. Only a single crane was observed from the plane on the territory of pair V. Another single crane was observed near the Atymlor lake; the mate and the nest were not found. From 21 May to 27 May, we were looking for Common crane nests by ground surveys. The nests of pairs III and IV were found in such a manner. We could hear the unison call from the territory of V pair. We were sure that the pair had bred that year. Unfortunately, we failed to find the nest because of limited time. The nest of pair Ia was found on 28 May, during the helicopter survey. Siberian crane eggs (table 3, Appendix) were placed in 3 Common crane nests (nests NN 1a, III and IV). No other Common crane nests were found. It was just a short time before hatching, and we had no incubation equipment, so we decided to place the second batch of Siberian crane eggs in Common nests NN III and IV. We knew that these birds were skilled parents, as they had raised 2 of their own and 1 Siberian chick in previous years. The eggs were placed in the nests on 29 May. On 5 June, the egg shell was found in nest 1a. We could hear the chick's voice from the bush nearby. Probably the chick hatched on 4 June. On 20 June, a chick of 2 days old was found 20 m from the nest of pair IV. The chick was named «Terry». An egg 6-30-6 was found in the nest. The Common crane pair was located nearby. In the nest of pair III, a shell of the egg 1-44(3) was found, but no sign of the egg 6-22-4. The Common cranes were located in the bush nearby. Their behaviour indicated that they had a chick. So 3 Siberian chicks had hatched from 5 eggs placed in Common crane nests (the eggs from the Oka Breeding Centre). One of the ICF eggs (6-22-4) had disappeared, the fate of the other one (6-30-6) was unknown, as the expedition had left KRB. The second step of «crossfostering» introduction took place from 13 to 17 August. Neither air surveys, nor ground searches produced any result: Common cranes were not founded. The fate of the Siberian crane chick, hatched in Common crane nests, was unknown.

3. Konda Region of Khanty-Mansi Autonomous Okrug and Uvat Region of Tumen Oblast

In 1996, a Siberian crane breeding ground, unknown before, was discovered thanks to PTT, provided by the Wild Bird Society of Japan. The nest of the marked bird was not found by ground surveys, but another Siberian crane pair was found; the female from the pair was marked with a coloured plastic ring. A Common crane pair was found in contiguous territory.

3.1 Siberian crane population monitoring

The activities had two stages: 26-27 May and 2-8 August. In May 1997, during the helicopter flight to place Siberian crane eggs in Common crane nests, an adult Siberian crane was observed. Probably, it was a bird from the family of the crane marked with PTT in Iran a year ago.

No Siberian crane nests were observed during the aerial survey. According to local people questioned, Siberian crane were observed in the Upper Katym river and near Vershinnoye lake (il. 4). On 2 August, a pair with a chick was noticed from the helicopter during a survey. The moulting female from this family had been marked with a coloured plastic ring in 1996.

Skilled pilots were lucky to bring the chick into the open and to cover it with wind shade. The chick «Slin» was marked with coloured plastic and standard metal rings (table 3, Appendix). It was also fitted with PTT, produced by Russian Research Institute of Space Device Engineering. On 5 August, during the helicopter survey, another Siberian crane pair with a chick was found 10 km from the first one. It was the family of the Siberian crane marked with PTT in Iran in 1996. Exactly the same coordinates were distinguished by PTT signals in 1996. However the pair was not found last year. As the helicopter approached, all three birds flew up, but the chick landed 20 m away and both the parents landed near it. The birds were covered with the wind shade of the helicopter. When people approached, the female tried to protect the chick, so both of them were caught and marked with coloured plastic and standard metal rings (table 6, 7, Appendix).

3.2. Common crane population monitoring

In May, 1997, four Common crane pairs were found in field work area. Three of them had nests, but we did not find a nest of the fourth one. Siberian crane eggs were placed into three Common crane nests. In August 1997, a pair of Common cranes with two unfledged chicks was found by helicopter near the first Siberian crane pair. Both the chicks were caught and marked with coloured plastic and standard metal rings (table 10, Appendix). The chicks were too young to be marked with PTT. Efforts to find at the same time 3 families of Common cranes with Siberian chicks were unsuccessful due to the limited time available for air surveys (3 hours) and ground activities (3 days).

3.3. Clarifying of Siberian crane migration routes and stopovers

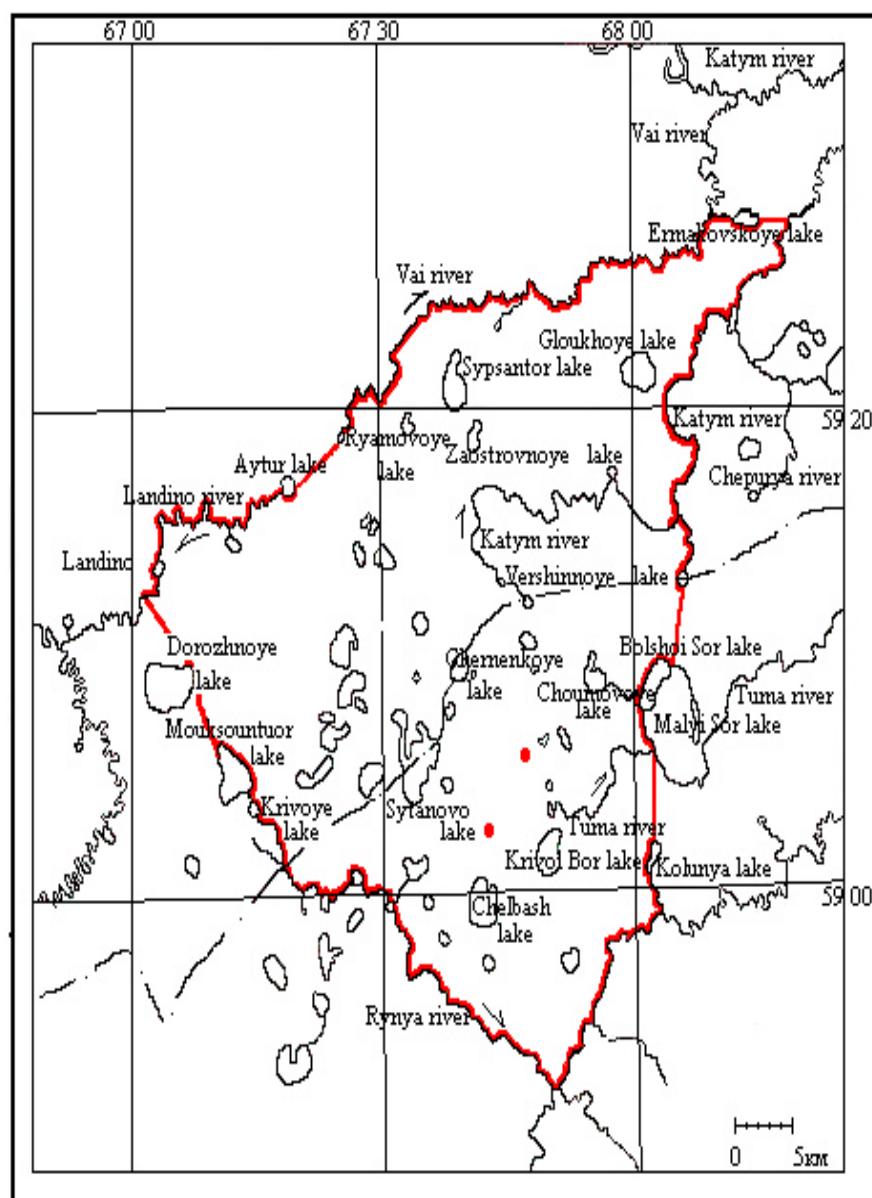
PTT, developed in Russian Research Institute of Space Device Engineering, attached to Siberian crane chicks, enabled us to follow migration routes and to clarify stopover locations and durations (il.5). The PTT worked for 453 hours and stopped when its power supply ran out. It allowed us to watch the whole migration route from the Uvat breeding ground in Tumen Oblast to the Volga Delta. While it was showing local bird movements in Astrakhan reserve, 10 (3, 3 and 4) Siberian cranes were observed in usual stopovers, according to information of the reserve Director, G. A. Krivonosov. However neither chicks nor ringed birds were observed among these Siberian cranes.

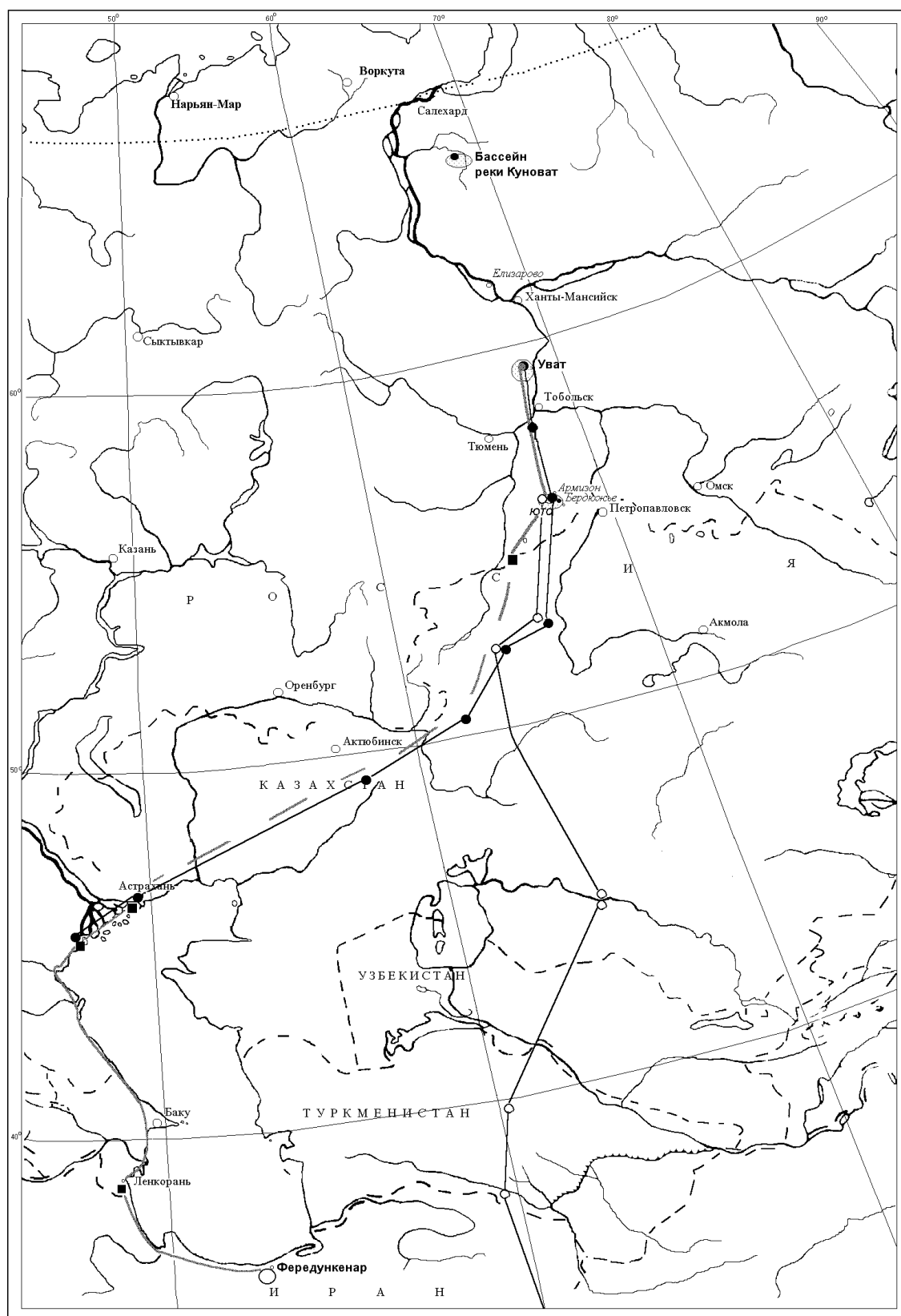
Along the migration route, 2 short and 2 long stopovers were recorded. The long ones took place in the vicinity of the Naurzum reserve and in the Volga Delta. One of the short stopovers was near Belaye lake, an area where young Siberian crane were released. It is interesting that 4 chicks released on Belaye Lake had left the release area on the very day that Uvat's migrating Siberian cranes made their stopover at the same territory.

3.4 Federal refuge creation at the territory of Konda region of Khanty-Mansi Autonomous Okrug and Uvat region of Tumen Oblast

A Federal refuge is going to be established at the territory of Konda region of Khanty-Mansi Autonomous Okrug and Uvat region of Tumen Oblast, at the areas where Siberian cranes breed and are observed. The boundaries of the planned refuge have been outlined (il.4). Now the administrative and conservation authorities are liaising. The boundaries of the planned refuge run from Aitour Lake along the Landina river to former Landino village, that is on a cross of a river and winter road; then on the ground to the southeast by the winter road along the river channel to Dorozhnoye lake; along to river channel to Muksuntour lake; along the east bank of Muksuntour lake and further to the south-east along the channel to Krivoye

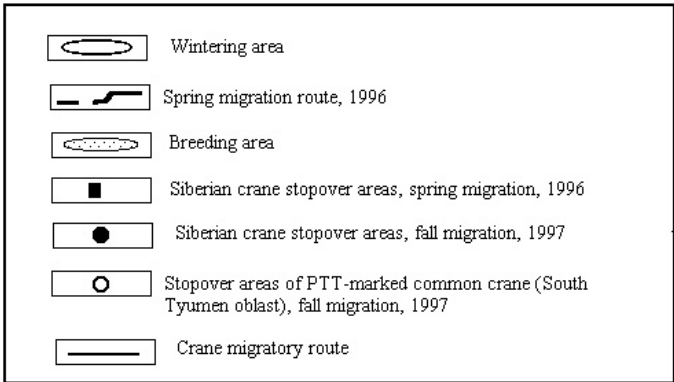
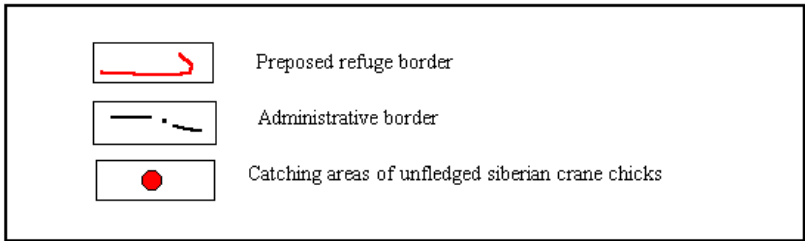
lake. Then the boundary runs along the east bank of Krivoye lake to the river-head Rynya, along the left bank of the Rynya to its mouth; down along the left bank of Alymka river up to the channel between Alymka and Kolunya lake; along the west bank of this channel to the north end of Kolunya lake; on the ground to the meeting point cross of Tuma river and a channel, running from Bolshoi Sor lake. Then the boundary runs up along the right bank of this channel to Bolshoi Sor lake; along west and northwest banks to the isthmus between Bolshoi Sor and Malyi Sor lakes; on the ground to the northeast up to an unnamed lake at the head of the river of the right tributary of Katym river, along the right bank of this tributary to its mouth, along the left bank of Katym river to Ermakovskoye lake traversing along the south bank of Ermakovskoye lake to the channel, running from the lake; down along this channel to Vai river; on the ground to southwest to Aitour lake. In such a way the refuge should cover the vast marsh massif on the frontier territory of the two Federal states, Tumen Oblast and Khanty-Mansi Autonomous Okrug.





See legend on next page.

Legend:



4. South Tumen Oblast

4.1 Siberian chicks release in South Tumen Oblast

In the Oka Breeding Centre 6 chicks were raised for release. On 29 July, the chicks were delivered to the Federal Refuge of Belozerski. It was the fourth season of Siberian crane chicks releases in the area of premigratory Common crane concentrations. The chicks were kept in a closed room without contact with people and then they were released in steppe island of Omelino in Belaye lake. This island is famous as one of Common crane roosting areas. People do not visit it.

At the release time the chicks were of 45, 46, 58, 60, 64, and 73 days old, that was 1-1.5 weeks younger than the chicks released in previous seasons. One of the chicks (Archi) was very aggressive, so temporary pens were built on the island. The pens kept the chicks apart, but allowed them to watch each other. The three oldest chicks were located in the big pen, as they did not demonstrate any aggression to each other. During the first several days costumed «parents» walked with the chicks 4-5 hours a day in accordance with isolation rearing techniques. All this time the chicks experienced aggressive contacts, initiated by the youngest ones. The oldest chicks formed a separate flock, and there was almost no conflict within it. All the youngest chicks were kept separately. In a week, when the chicks had got used to each other, the pens were removed. The walking time with costumed «parents» decreased to 1-2 hours a day. At this time chicks got artificial food, mixed with wheat, and caught insects in abundance. One of the chicks, which was late in its development and demonstrated the highest level of aggression, died at the age of 63 days. The details were not clear, but the autopsy showed that death was caused by trachea embolism with semi-digested artificial food. The accident could have happened because of a fight with the other chicks. During the second week, the staff walked with the chicks 1-2 hours in two days. The rest of the time the chicks were observed from the point on the bank of the lake 2 km from the island. The chicks got wheat, delivered to the island once every 2 days. By the middle of the second week, the chicks adapted completely to the habitat and started to investigate the island. At that time Common cranes premigratory concentration started to form. The cranes came to the island to roost. The Common crane roosting area was located 100 m from the chick release point, so they had contact all the time. During the following 2 weeks we visited the chicks on the island once in 3 days to bring them wheat, to take morphological measure (table 3, Appendix), and to carry out veterinarian control. By this time the chicks had completely adapted to the island, had every day contacts with Common cranes, flew around the island and formed a single flock of 5 chicks. The main flying, feeding and rest times coincided with those of the Common cranes. Each chick had its own social status in the flock. Dustum, a chick of middle age, had top status. It was the first of the chicks to investigate territory, to fly up; it always fed itself alone and did not allow other chicks to approach closer than 10m. Besides this during the last 2 weeks Dustum adopted threatened posture to people in crane costumes. This posture is characteristic of adult Siberian cranes. Once Dustum tried to attack a person in crane costume. It fledged at 65 days old, the same age as first wild Siberian crane chick to fly in KRB.

The oldest chick (Chang) was second in status. It would feed with the other chicks, but demonstrated threatened posture, when approaching people, as Dustum did. The youngest chick just before its death, had the lowest status in the flock; it stayed 20-25m from the other chicks, was always on the alert, fled just after the first sign of aggression from the other chicks. It was the only chick which did not fledge. In late August, at the age of 73-74 days it was killed and eaten probably by Golden eagle, which lived near Belaye lake. On 31 August, the chicks left the island themselves and flew to the main lake bank, the Common cranes' feeding habitat. At the time Common cranes were absent, so at some time the Siberian chicks left the release area and flew away to the west. The search for the chicks was

unsuccessful, but, according to local people questioned, they were observed 40 km to the west of the release area in another large premigratory Common crane concentration.

4.2. Monitoring of Common crane premigratory concentrations

Around Beloye lake 4-5 territorial concentrations of Common cranes were recorded. In 1997 premigratory concentration near Beloye lake started about 10 August. In August the crane numbers stayed about 450-550. The concentration consisted of three separate flocks. The biggest one (300 birds) was located on the south-east bank; a flock of 100 birds roosted on Omelino island (the released chicks had permanent contact with it); the third flock of about 100-150 birds was located on the south bank. In middle of September the maximum concentration number was recorded - 1000 birds. When roosting, they mainly stayed as a single flock.

4.3. Clarifying migrating routes of Common cranes from Beloye lake premigratory concentration

In 1997 investigation of migration routes of Common cranes were continued. Wheat seeds covered with alpha-chlorolose was used as a bait. Cranes were caught on their feeding grounds, a harvested wheat field. Four adult birds (table 10, Appendix) and 3 chicks (table 11, Appendix) were marked with coloured plastic and standard metal rings. Also one adult crane was provided with PTT, produced by Russian Research Institute of Space Device Engineering. The PTT allowed us to follow the crane migration route from the marking place to wintering area at the mouth of the Ind river in Pakistan (il.5). A part of a way Common and Siberian cranes migrate by the same route.

CONCLUSIONS

1. All activities, planned for 1997, have been carried out successfully. In Oka Breeding Centre a good group of chicks was raised for release. In the Kunovat River Basin monitoring activity for the Siberian crane population was continued and Siberian crane «crossfostering» releases were carried out. Also Siberian and Common crane population monitoring was continued on newly discovered (in 1996) Siberian crane breeding grounds. Eggs from the Oka Breeding Centre with early hatching time and from the ICF were successfully used in «crossfostering». In South Tumen Oblast Siberian crane release and monitoring of Common crane premigratory concentration were continued.
2. Documents were prepared for the creation of a Federal refuge on known and presumed Siberian crane breeding grounds in the Uvat region, Tumen Oblast and the Konda region of Khanty-Mansi Autonomous Okrug.
3. Using of PTT, produced by the Russian Research Institute of Space Devise Engineering allowed us to follow autumn migration routes of Siberian cranes from the Uvat breeding grounds and Common cranes from premigratory concentrations in Belozerski refuge. The results suppose new activities development on Siberian Crane Project.
4. Lack of PTT equipment meant that birds released in South Tumen Oblast were not marked.
5. Lack of funds limited the possibilities of aerial surveys in the fieldwork area, and also did not allow us to continue the research started in 1995 into presumed Siberian crane breeding grounds to the west from Ural (northwest of Arkhangelsk Oblast and Komi Republic).

RECOMMENDATIONS

1. Continue activities for Siberian crane introduction by «crossfostering» method in Kunovat River Basin and in the Uvat breeding grounds, Tumen Oblast, using eggs with early hatching time from ICF and Oka Breeding Centre.
2. Continue releasing Siberian cranes, using the chicks reared by the isolation technique in steppe island in Beloye lake, South Tumen Oblast.
3. Carry out wide air and ground investigations of Iranian population breeding grounds in frontier territory Uvat region of Tumen Oblast and Khanty-Mansi Autonomous Okrug, and also Siberian crane breeding grounds in Kunovat River Basin.
4. Prepare a sufficient amount (no less than 12) of PTT sets for activities on Siberian crane chick release and Siberian and Common crane population monitoring.
5. Establish a field station for «crossfostering» Siberian crane releases in the Uvat breeding grounds.

Appendix

Data on Siberian crane chicks released in KRB, Uvat region and STO

Table 1

Season	Birth year release area	C h i c k s		E g g s		Migration	
		Siberian	Common	Siberian	Common	Siberian	Common
1991	1991 KRB	3	-	-	-	-	-
1992	1992 KRB	2	2	-	-	1	2
1993	1993 KRB	4	-	-	-	-	-
1994	1994 KRB	10	1	1	-	4	-
1995	1994 KRB	4	-	-	-	4	-
	1995 KRB	4	-	1	-	1	-
	1995 STO	4	1	-	-	-	1
1996	1996 KRB	-	-	5	-	3	-
	1996 STO	4	-	-	-	4	-
1997	1997 KRB			3		?	
	1997 Uvat			3		?	
	1997 STO	4				4	
	Total	38	4	13	-	24	3

The chicks' origin

Table 2

mm	Egg number	Mother	Father	The egg and the chick fate
1	1-16(1)	Mark	Uchur	Archi, STO
2	1-16(2)	Mark	Uchur	KRB, nest 1a
3	1-16(3)	Mark	Uchur	Trang
4	1-16(4)	Mark	Uchur	Valey
5	1-18(1)	Julya	Kieng	*
6	1-18(2)	Julya	Kieng	*
7	1-18(3)	Julya	Kieng	Feer**
8	1-31(1)	Banyl	Sergei	*
9	1-31(2)	Banyl	Sergei	Valkonen
10	1-31(3)	Banyl	Sergei	Khaku
11	1-37(1)	Buguchen	Bakul	*
12	1-37(2)	Buguchen	Bakul	*
13	1-37(3)	Buguchen	Bakul	Chang, STO
14	1-44(1)	Agidel	Kolyma	Shiro, STO
15	1-44(2)	Agidel	Kolyma	KRB, nest IV
16	1-44(3)	Agidel	Kolyma	KRB, nest III
17	1-44(4)	Agidel	Kolyma	Rob, STO
18	1-44(5)	Agidel	Kolyma	Mirande***
19	1-59(1)	Bilipu		Egg broken by parents.
20	1-59(2)	Bilipu	Kolyma	*
21	1-59(3)	Bilipu	Kolyma	7vit, STO
22	1-59(4)	Bilipu	Kolyma	Unfertile egg.
23	6-30(3)	?k"	Dushenka	Dustum****, STO
24	6-18(2)			Uvat
25	6-22(3)			Uvat
26	6-22(4)			KRB, nest III
27	6-30(4)	?k"	Dushenka	Uvat
28	6-30(6)	?k"	Dushenka	KRB, nest IV

* Embryo death.

** The chick reared by female (Mark) till the age of 21 days, then by isolation technique.

*** The chick reared by Siberian crane pair (Svet - ! gidel) till the age of 57 days, then it was removed from the parents for treatment in isolation.

**** The egg delivered from ICF (U.S.) 25 May

STO chicks released in South Tumen Oblast (Belozerski refuge, Armizon region)

KRB Kunovat River Basin

Uvat breeding grounds in Uvat region, Tumen Oblast

Embryo mortality data

Table 3

m	m	Hatching date	Incubation	Incubation	Information on	
					Day	Death
1	1-16(1)	35551	A	30	?	
2	1-16(2)	35554	AG	?		
3	1-16(3)	35563	M	30	?	
4	1-16(4)	35574	M	28	?	
5	1-18(1)	35546	A		25	Infertile egg
6	1-18(2)	35556	A		28	Infection
7	1-18(3)	35566	N	30	?	
8	1-31(1)	35559	M		26	Unknown
9	1-31(2)	35569	M		?	
10	1-31(3)	35582	N	30	?	
11	1-37(1)	35518	A		28	Choked with amniotic
12	1-37(2)	35523	A		24	Unknown
13	1-37(3)	35539	A	26	?	
14	1-44(1)	35546	A	28	?	
15	1-44(2)	35554	AG	?		
16	1-44(3)	35558	AG	?		
17	1-44(4)	35565	N	28	?	
18	1-44(5)	35574	N	28	?	
19	1-59(1)	35545	*			
20	1-59(2)	35548	A		28	Unknown
21	1-59(3)	35562	N	30	?	
22	1-59(4)	35575	M**			
23	6-30(3)	35548	?	29	?	

* Broken by parents.

** Infertile egg.

N - natural incubation.

A - artificial incubation.

M - mixed incubation.

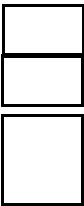
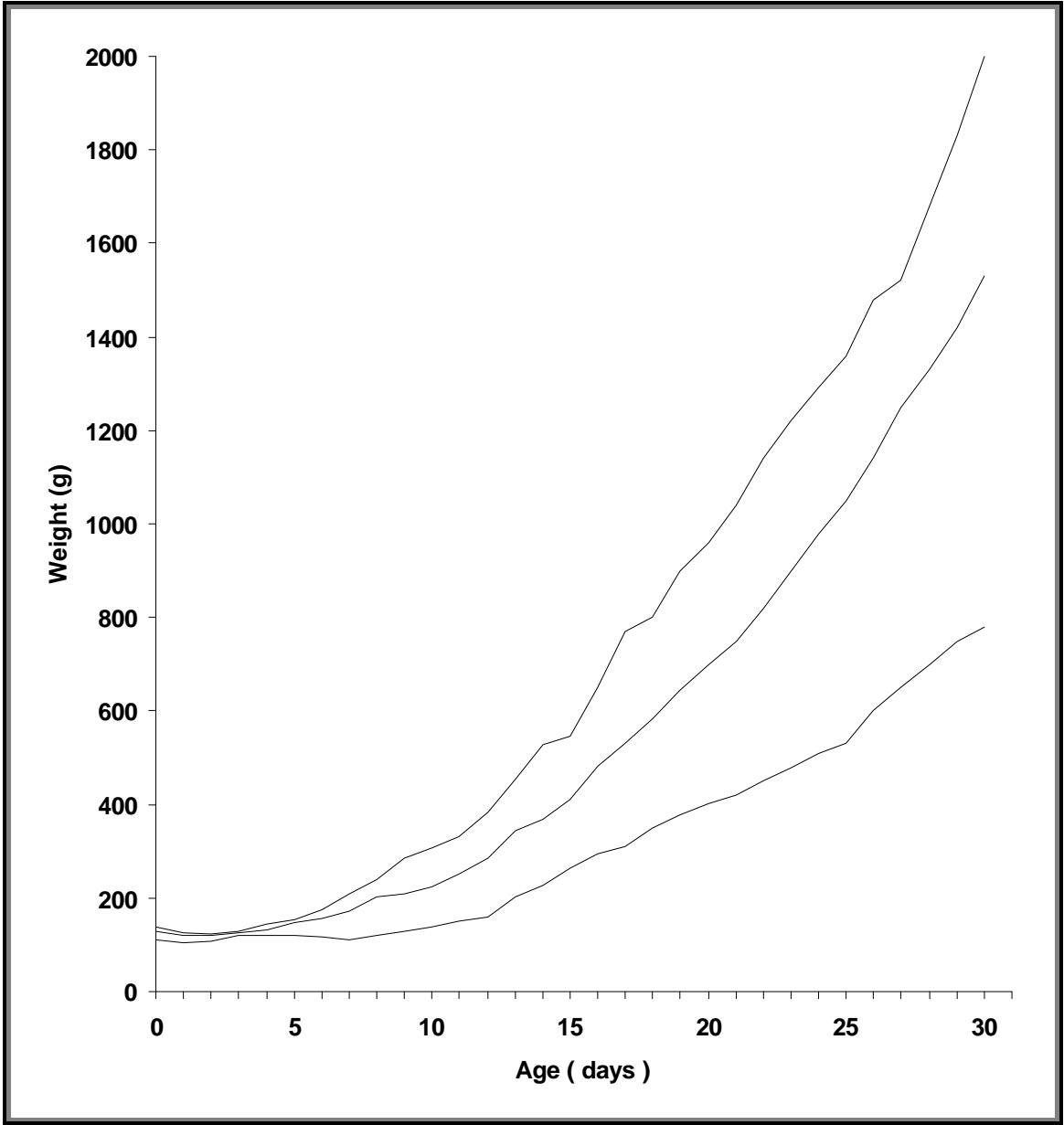
G - egg transportation to Tumen Oblast.

? - unknown hatching date (incubation type).

H - chick hatched successfully

mm	Chick name	Location	Age (days)	Cause
1	Valey	OSBNR	2	Damaged by unskilled parents
2	Valkonen	OSBNR	14	Heart problem
3	Archi	STO		Died
4	Rob	STO		Eaten by bird of prey

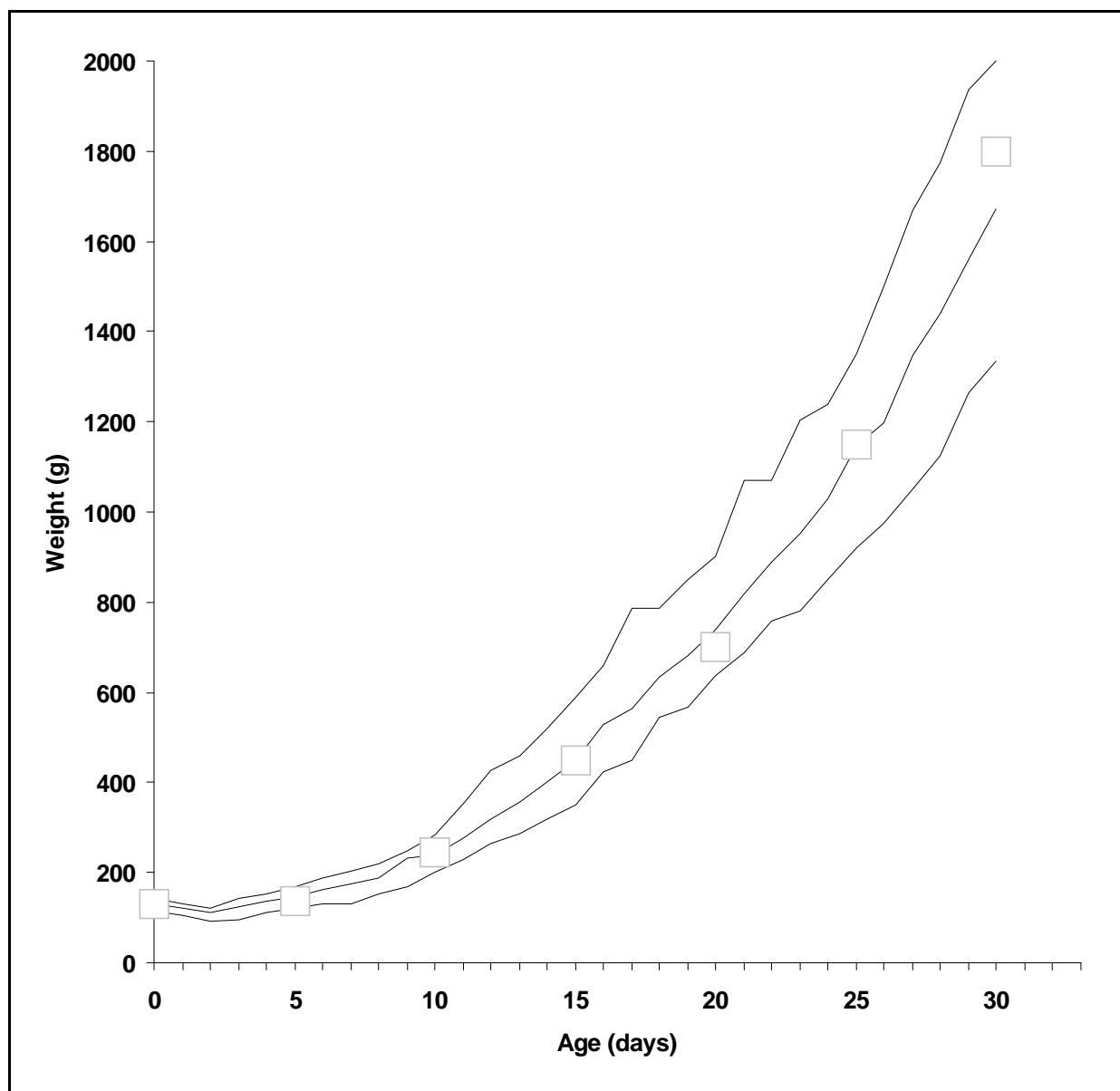
Siberian crane chicks weight dynamics in 1997 (n=8)



Minimum and maximum weight dynamics of the Siberian crane chicks.

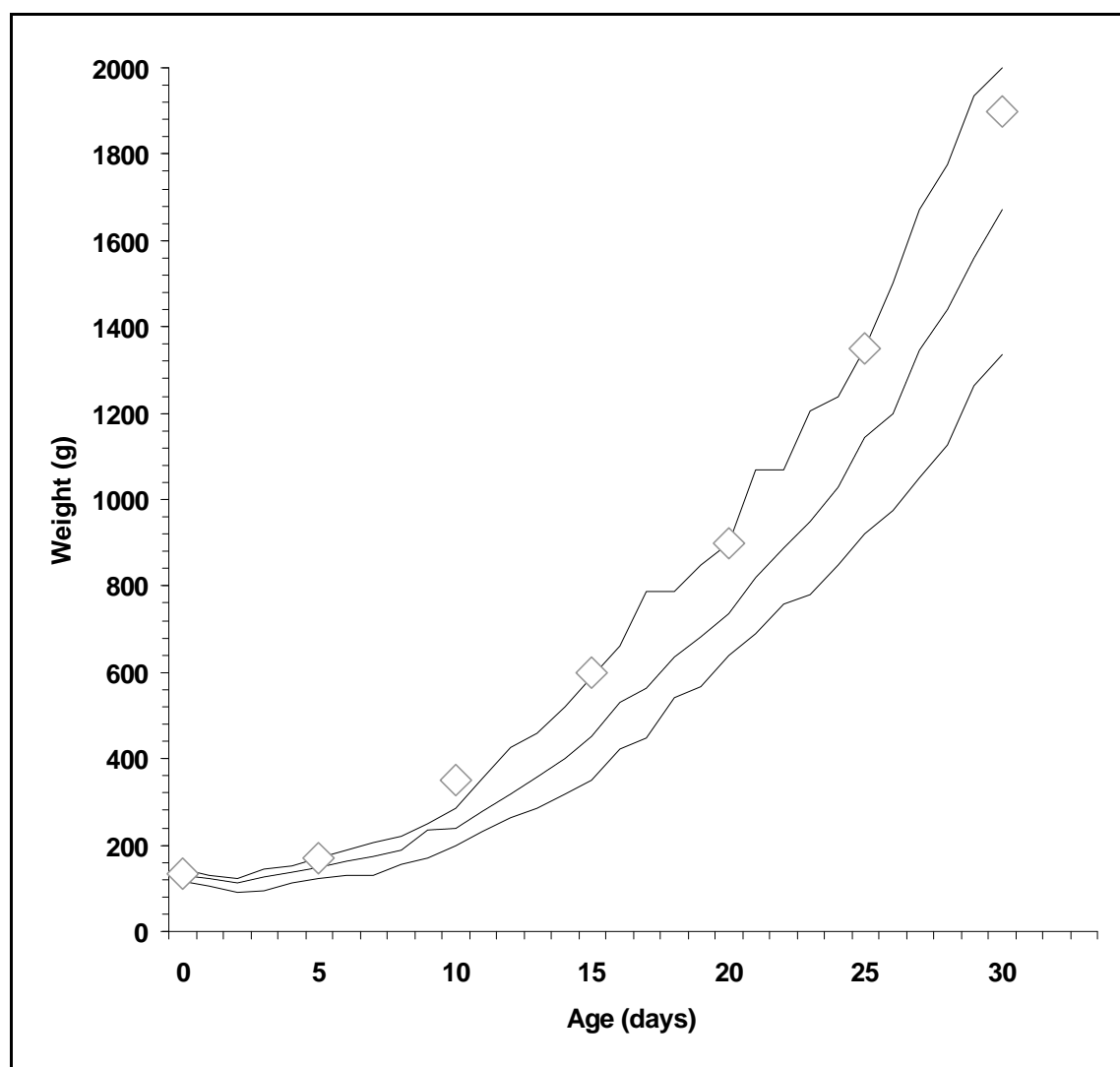
Average weight dynamics of the Siberian crane chicks.




Khaku weight dynamics (1997)



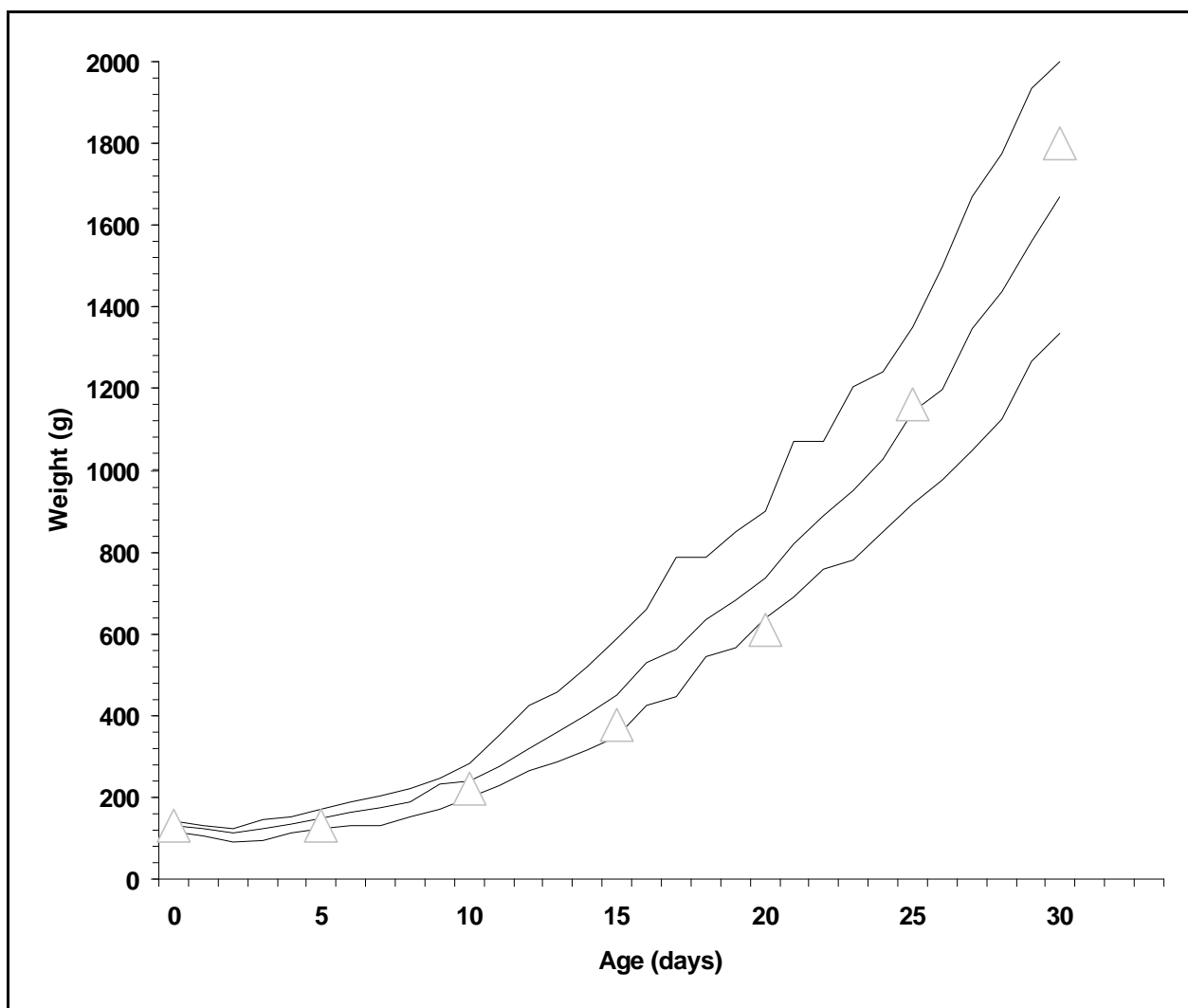
- ☐ Minimum and maximum weight dynamics of the Siberian crane chicks in 1980 in Oka Breeding Centre
- ☐ Average weight dynamics of the Siberian crane chicks in 1980 in Oka Breeding Centre.
- ☒ 9 Khaku weight dynamics.




Feer weight dynamics (1997)



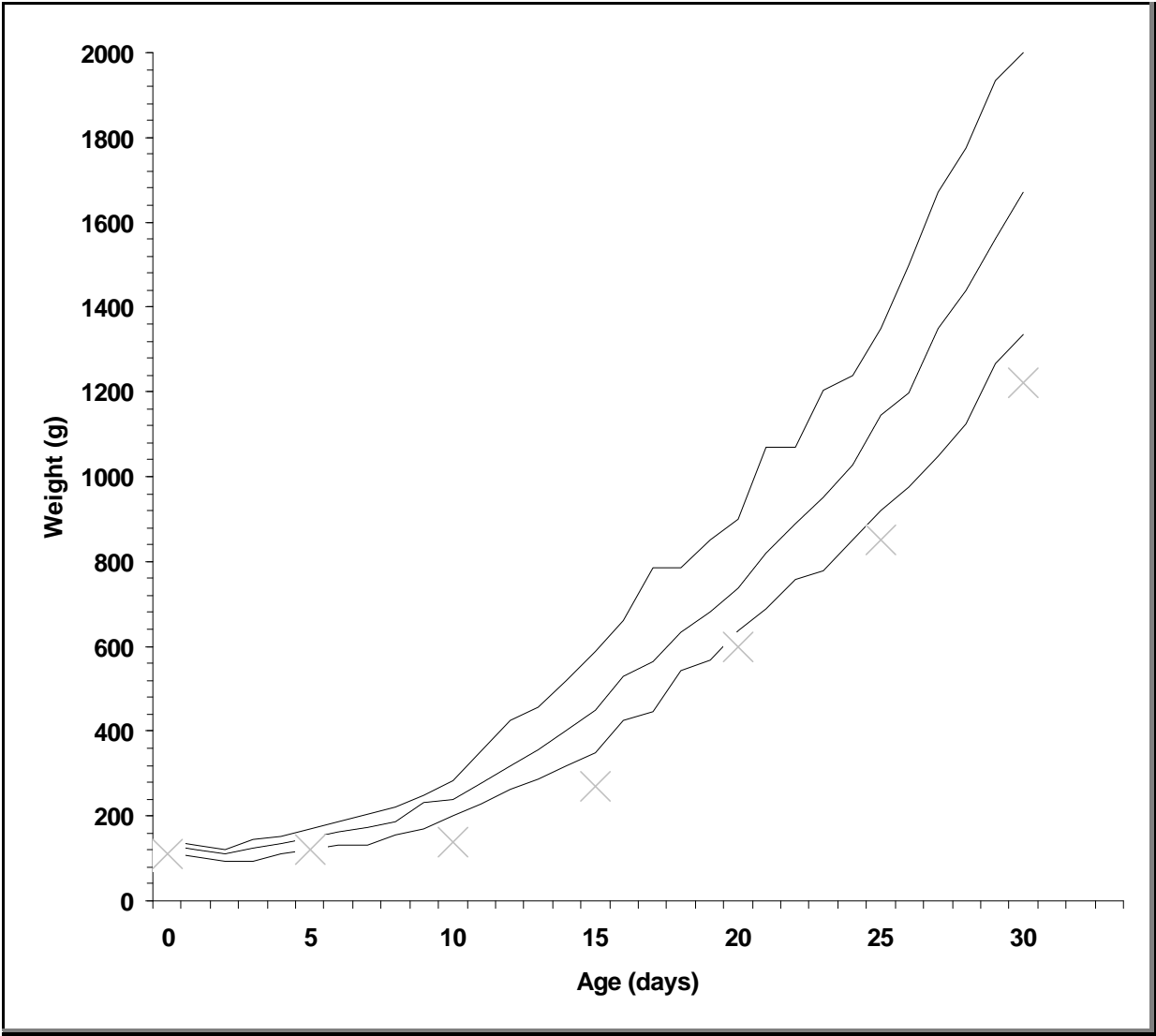
-  Minimum and maximum weight dynamics of the Siberian crane chicks in 1980 in Oka Breeding Centre
-  Average weight dynamics of the Siberian crane chicks in 1980 in Oka Breeding Centre.
-  Feer weight dynamics.



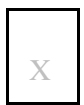
Trang weight dynamics (1997)



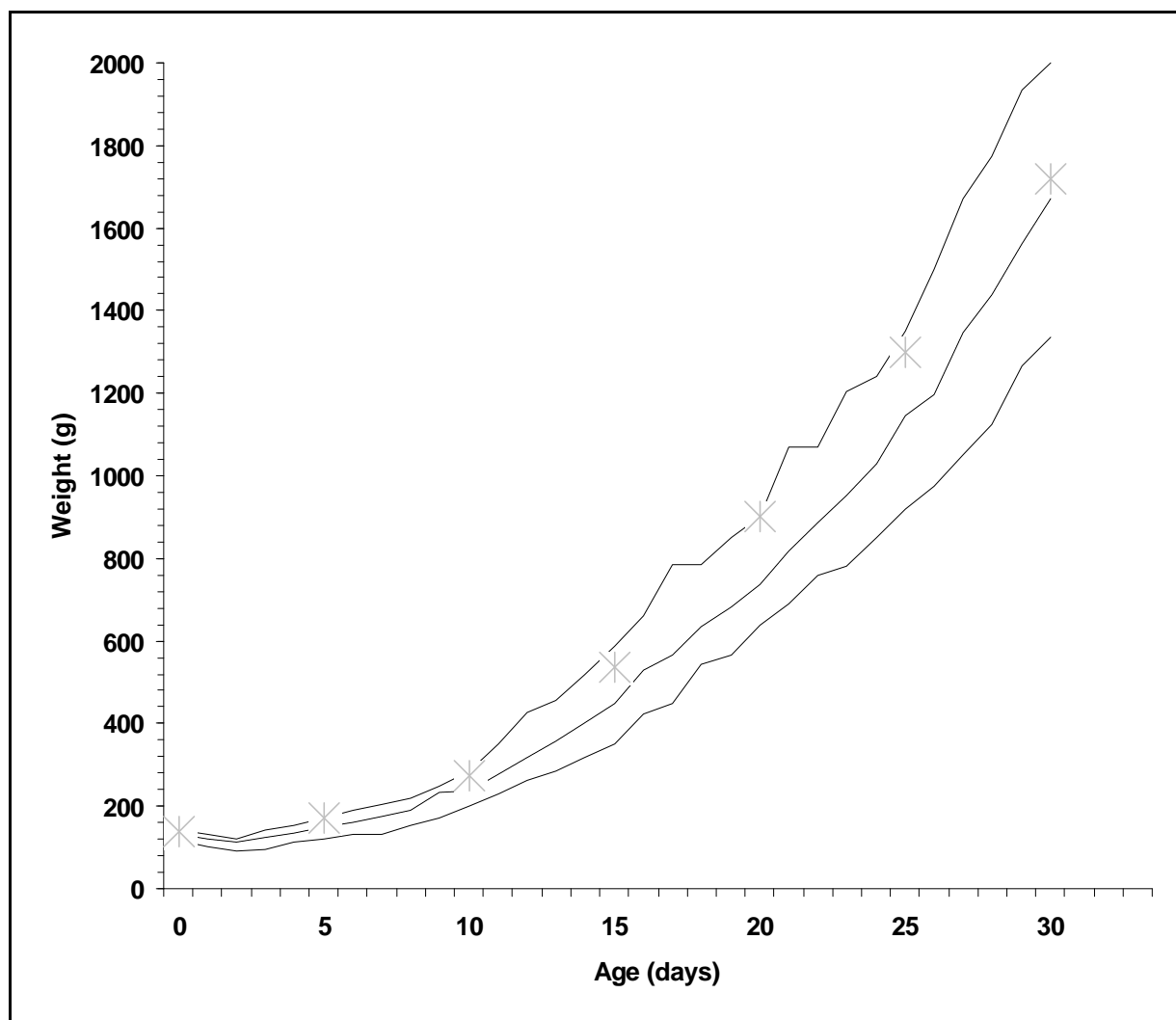
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-  Average weight dynamics of the Siberian crane chicks in 1980 in Oka Breeding Centre.
-  Trang weight dynamics.




Chang weight dynamics (1997)



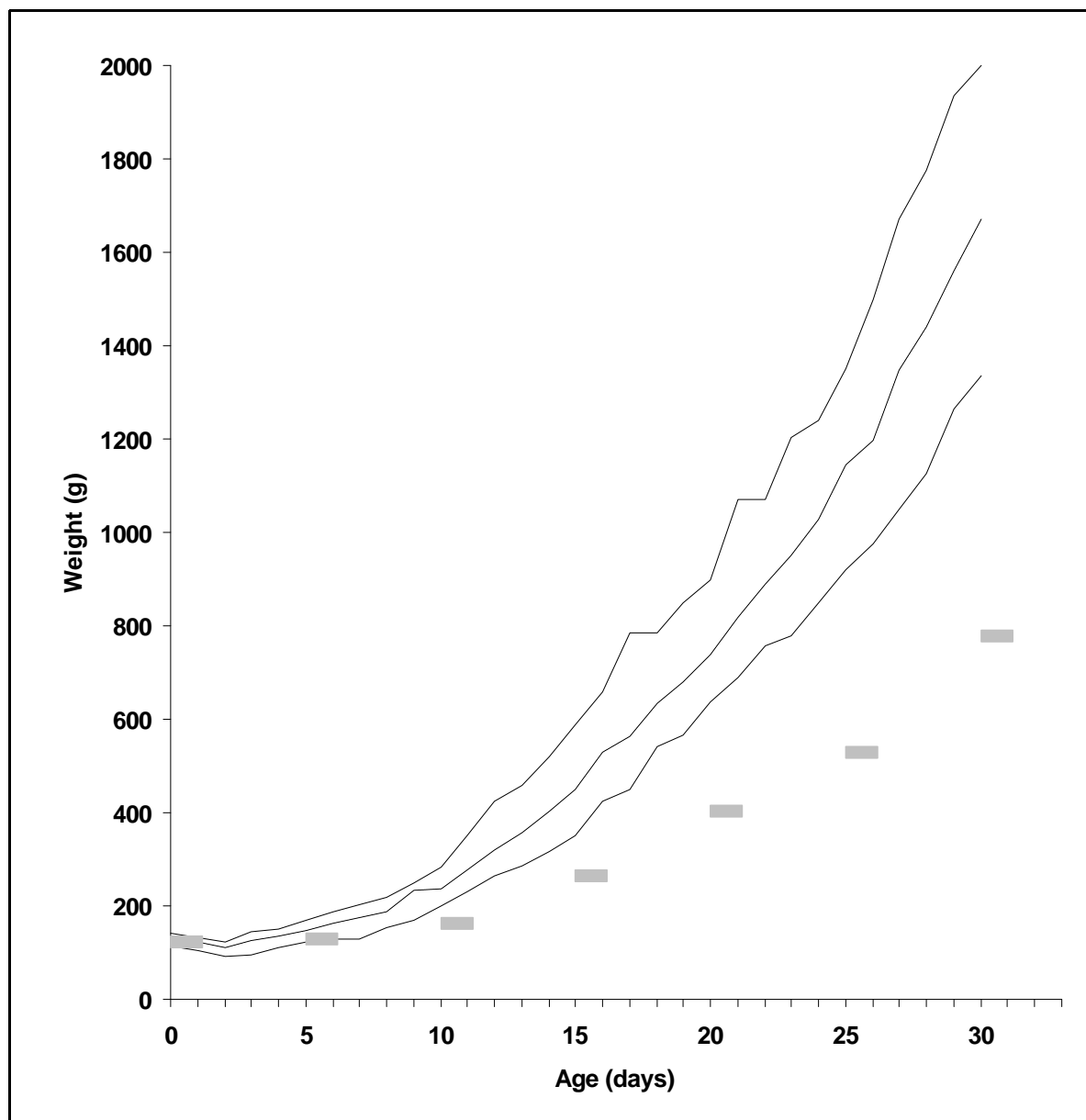
-  Minimum and maximum weight dynamics of the Siberian crane chicks in 1980 in Oka Breeding Centre.
-  Average weight dynamics of the Siberian crane chicks in 1980 in Oka Breeding Centre.
-  Chang weight dynamics.




Shiro weight dynamics (1997)



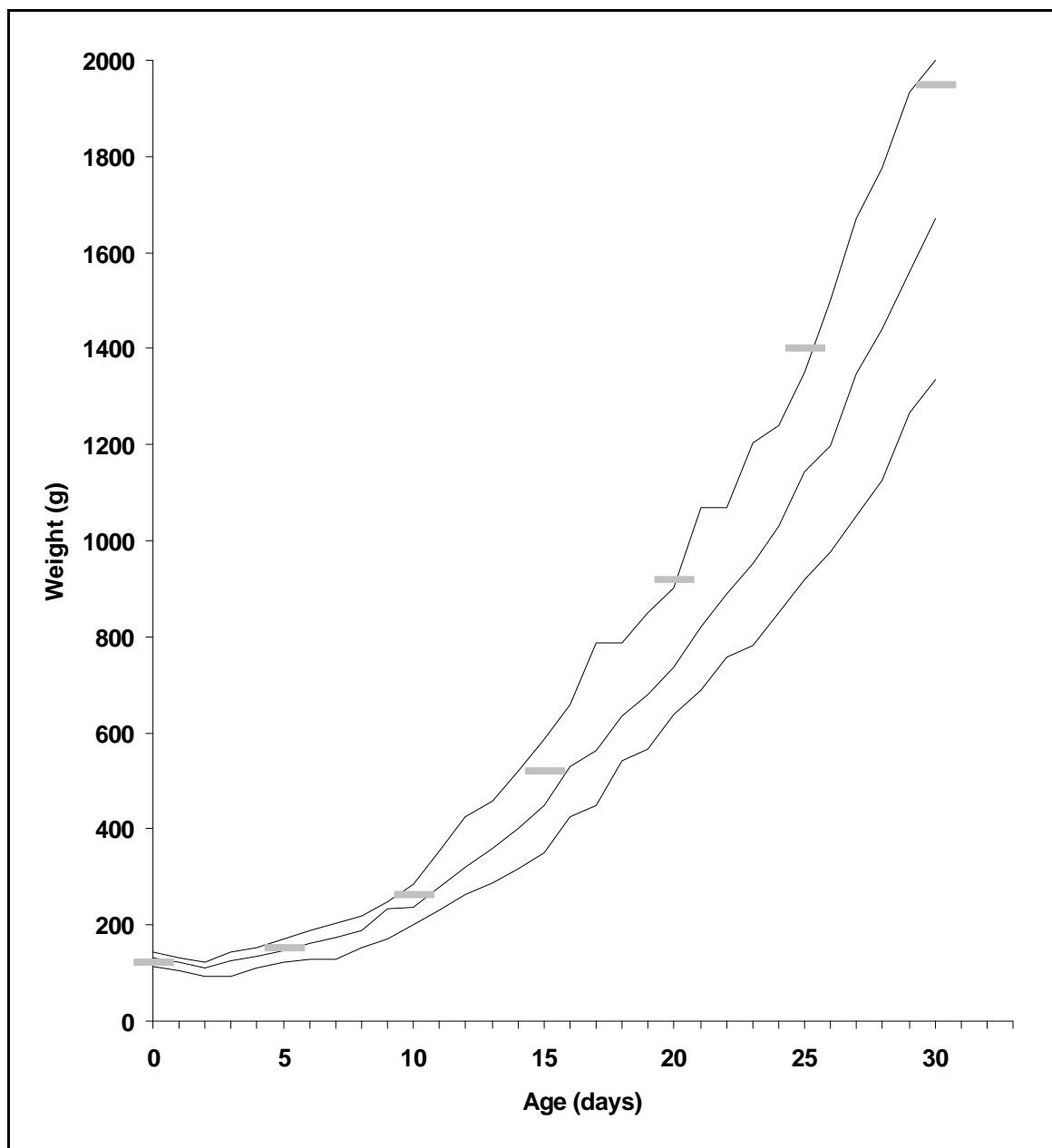
-  Minimum and maximum weight dynamics of the Siberian crane chicks in 1980 in Oka Breeding Centre.
-  Average weight dynamics of the Siberian crane chicks in 1980 in Oka Breeding Centre.
-  Shiro weight dynamics.




Archi weight dynamics (1997)



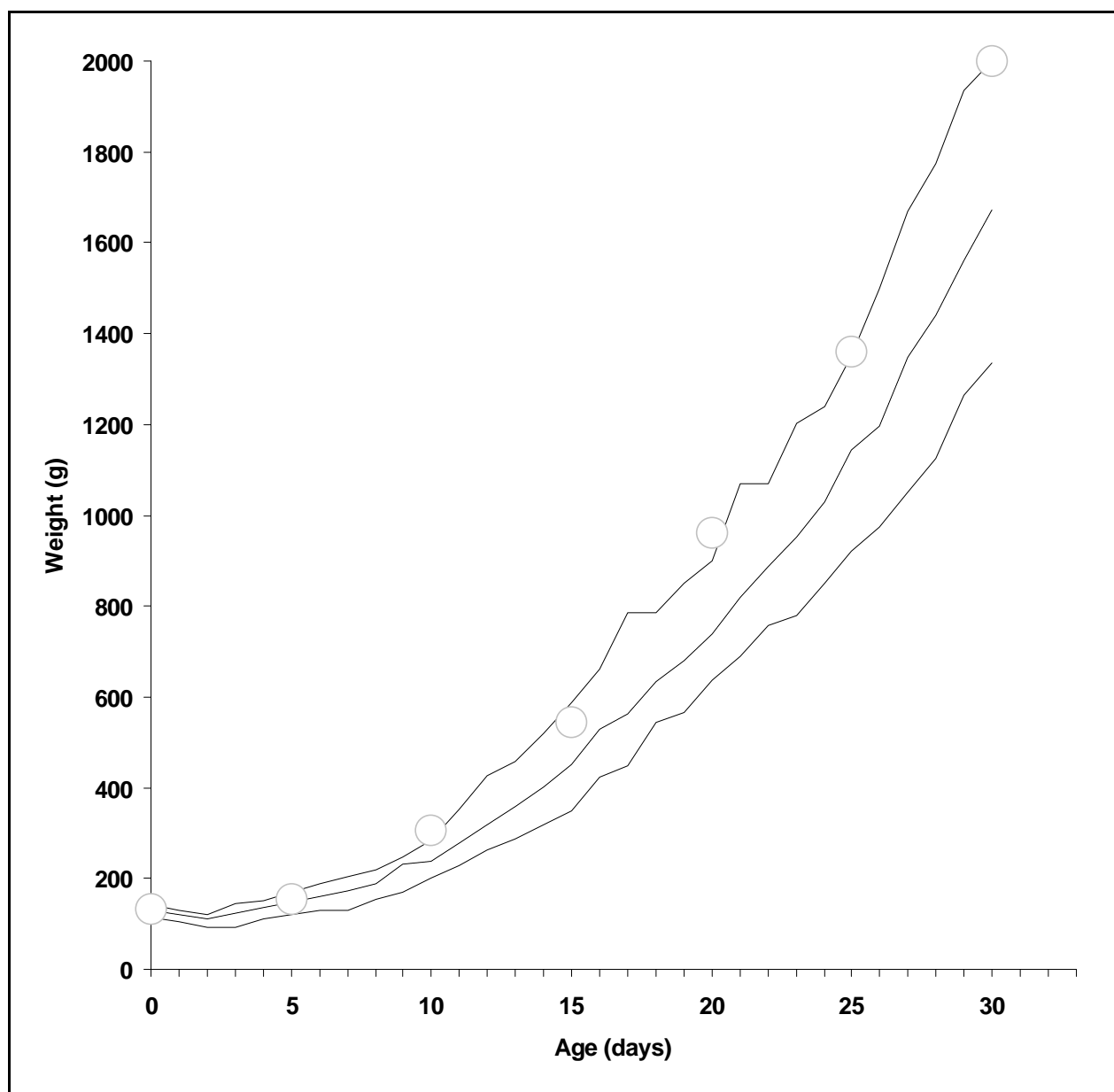
-  Minimum and maximum weight dynamics of the Siberian crane chicks in 1980 in Oka Breeding Centre.
-  Average weight dynamics of the Siberian crane chicks in 1980 in Oka Breeding Centre.
-  Archi weight dynamics.




Dustum weight dynamics (1997)



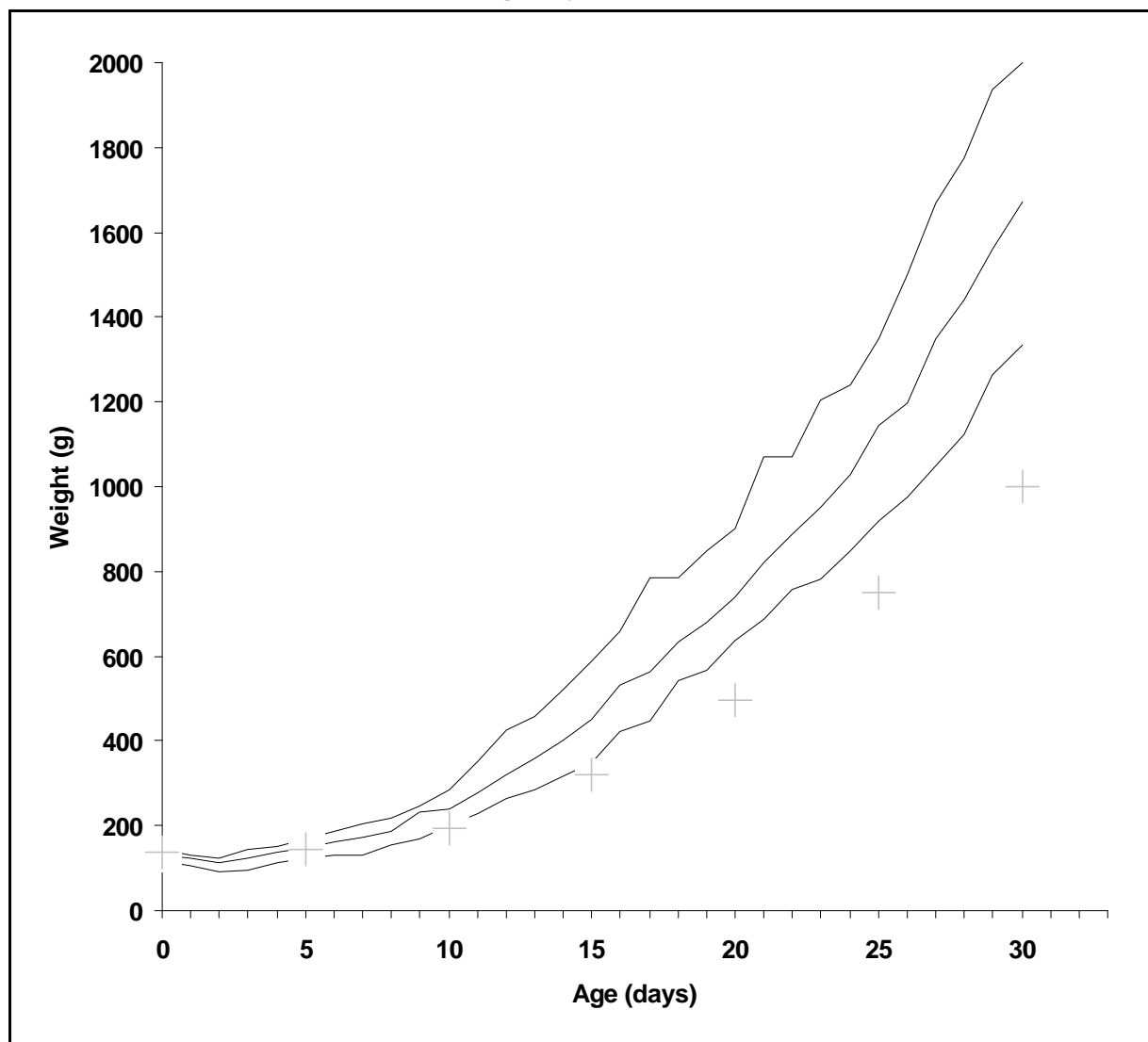
-  Minimum and maximum weight dynamics of the Siberian crane chicks in 1980 in Oka Breeding Centre.
-  Average weight dynamics of the Siberian crane chicks in 1980 in Oka Breeding Centre.
-  Dustum weight dynamics.

Kvint weight dynamics (1997)



-  Minimum and maximum weight dynamics of the Siberian crane chicks in 1980 in Oka Breeding Centre.
-  Average weight dynamics of the Siberian crane chicks in 1980 in Oka Breeding Centre.
-  Kvint weight dynamics.

Rob weight dynamics (1997)





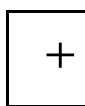
-  Minimum and maximum weight dynamics of the Siberian crane chicks in 1980 in Oka Breeding Centre.
-  Average weight dynamics of the Siberian crane chicks in 1980 in Oka Breeding Centre.
-  Rob weight dynamics.

Table 5

Siberian cranes morphology measures data

Adult Siberian cranes									
Date	Location	Name Sex Age (days)	Weight	Body condition.	Bill / bill from end to nostril	Wing/ alula	Tarsus	3 toe	Tail
35646	Uvat	female	5500	1	189/112	570/201	281	121	201
Siberian crane chicks									
35646	I & H	#7Q/ ! 22304 4 chickc	4400	1	121/71	490/198	265	114	188
35643		Slin [a] / ! 14594 0 chick	5100	-	121/71	480/202	276	121	166
35657	STO	Rob 63 days	3200	1	110/59	330/130	245	110	115
35657	STO	Kvit 64 days	3500	1	110/58	450/165	250	111	165
35657	STO	Dustum 78 days	4800	>1	144/71	545/165	285	112	200
35657	STO	Shiro 82 days	4900	>1	138/72	535/180	280	110	200
35657	STO	Chang 91 days	5000	>1	145/75	545/170	269	111	200

Table 6

Siberian crane marking (the birds involved in 1997 migration)

Chick name	Marking or release location	Left tarsus	Right tarsus
1997			
Slin PTT N2 CK	Uvat 2.08.1997	Plastic ring: Yellow Red Yellow	! 145940
	Uvat 5.08.1997	Plastic ring Black Red White	! 223044
Kvit	STO	Plastic white ring with number 2	! 16014
Dustum	STO	Plastic yellow ring	! 16015
Shiro	STO	Plastic blue ring	! 16017
Chang	STO	Plastic orange ring	! 16018

Table 7

Adult Siberian crane marking in wintering and breeding grounds

Name , sex	Catching location Date	Left tarsus	Right tarsus	PTT
1996				
femal e	Uvat 5.08.1997	! 223043	Plastic ring 8@: \P@ White Black White	-

Table 8

Common crane chicks marking in wintering grounds, migrating routes,
pre migratory concentrations, and breeding grounds

Name	Catching location Date	Left tarsus	Right tarsus	PTT
1997				
"Soviet Russia" adult	STO 16.09.1997	! 223048	Plastic ring: Yellow White Yellow	Caught by alfa-chloroloze. Failed to recover after being caught. Left on the island.
"NDR" adult	STO 16.09.1997	! 223073	Plastic ring: Blue Red Yellow	N3 gk
	STO 16.09.1997	! 223049	Plastic ring; Blue White Yellow	Founded drowned in the roosting place

**Common crane chicks marking in wintering grounds, migrating routes,
pre migratory concentrations, and breeding grounds.**

Name	Location Date	Left tarsus	Right tarsus
1997			
	Uvat 2.08.1997	Plastic ring Yellow Green Yellow	! 223040
	Uvat 2.08.1997	Plastic ring Yellow Black Yellow	! 223041
Oleg chick	STO .04.1997	Plastic ring Black White Yellow	! 223047
	STO 16.04.1997	Plastic ring Red Green Yellow	! 223047
	STO 16.04.1997	Plastic ring Green White Yellow	! 223083
	STO 16.04.1997	Plastic ring Blue Green Yellow	! 108181

Siberian Crane (*Grus leucogeranus, pallas, 1773*) studies and prospects in Turkmenistan

Djumamurad Saparmuradov

The Siberian crane is a very rare migratory species in Turkmenistan. Everyone is aware of how scarce this species is from numerous seminars and meetings. For over a hundred years beginning at the end of the nineteenth century, ornithological researchers have discovered this species no more than ten times in Turkmenistan. The peculiar flight of the Siberian crane was observed on the eastern shore of the Caspian Sea at Sarykhmaysh Lake, along the Amudarya and Murgap River Valleys and in the foot-hills of Kopetdag. The most recent information dates from 10 March 1977 when five hybrid Siberian-Grey Cranes were observed in the central part of the Badkhyz reserve.

Despite the lack of new reports over the last twenty years of sightings of Siberian cranes, it is still likely that the species continues to pass through the territory of Turkmenistan during migration. All migratory cranes spend a little time in the southern oasis of Turkmenistan (especially in the Autumn), but specialists have difficulty in determining exactly which species the high-flying birds belong to. Financial and logistical difficulties add to the complications for leading ornithologists to observe on a regular basis the seasonal migration of cranes in different parts of the country.

The material provided from the region of Uvata in western Siberia, Russia about the marking of cranes with leg rings received during the course of the year was duplicated and distributed among employees at the reserves, students and the local populace. To date, there have however been no recorded sightings of the birds.

The Siberian crane has been included in the Red Data book of Turkmenistan as a very rare species. Once location of a possible sighting and the main flight routes are protected as nature reserves in the country. The lot of the Siberian crane is a grave concern for the legislative assembly of Turkmenistan.

Scientists and the Government of Turkmenistan support all initiatives directed at preservation and reproduction, including the leading international research about Siberian crane conservation. Financial support would allow ornithologists to carry out regular, high level research to learn more about the current status of one of the bird species unique to the region.

National Action Plan for Crane Protection in the Republic of Uzbekistan 1999-2001

From 1971 to 1985 in the area of Uzbekistan, the Institute of Zoology, Academy of Sciences had provided the investigation on migration of birds within the Western Siberian-Central Asian programme. One of the broad migratory groups of birds which was observed during this research was the crane. Observations were provided in the different regions of the territory of the republic: north west of Fergana valley (spring 1971 and autumn 1972); vale of Leles river near Tashkent (spring 1972); south-western Kyzylkum, pre-mountain valleys of Kuldjuktai (spring 1973 and 1974 and autumn 1973); south-eastern Kyzylkum, northern bank of Aydar lake (spring and autumn 1974); basin of Surkhan river 15km to the north of Termez town (spring 1975); valley to the north of Nuratau range, Galla-Aral (spring 1976); Djisak pass of Malgusar range (spring 1977); southern banks (littoral) of Aydar lake (in different seasons from 1978 to 1998).

For the conducting of research standard methods were used (Yanushevich, 1974; Gavrilov, 1977), when censuses of all migratory birds were made in the definite point located on the prevalent altitude. Daily censuses were carried out in the early morning time (3 hours) and before sunset (3 hours) on the fixed stripe; besides that, one time within 5 days the census was carried out all day time. This method allowed to watch the phenology cranes migration, peculiarities of their ecology during migration on the areas of Uzbekistan, but it did not allow to make the real estimation of number for the migratory birds. Comparative data from different points (regions) defined of migration's intensity. The determination of migratory cranes (Common and Demoiselle) was difficult often owing to subjective and objective causes (long distance of flying birds; imperfect optics etc.)

On the territory of Uzbekistan the migration of three crane species is observed. Demoiselle Crane (*Anthropoides vigo L.*) is a more numerous migratory species; Common crane (*Grus grus L.*) is a usual visitor during migration, and Siberian Crane (*Grus leucogeranus Pall*) is extremely rare migrant. For the all period of cranes observation (from 1971 to 1985) there is only one published report about observation of Siberian crane in the flock of Common cranes near Tashkent, also there are several correspondent information about single finds of Siberian cranes in the region of Aydar lake and near Tashkent.

We have no clear quantitative estimation of migratory species. To provide of such data it is necessary to establish the special network on monitoring of migratory species and to make expeditions to survey areas of cranes migration to determine the number, places of feeding and rest etc. At present, there are the necessary specialists who could be included in the network for the providing of this research. It is possible on condition that the special working group will be financed for the providing of monitoring research within action plan on study and conservation of migratory bird species. Providing information on the current status of migratory species is especially important for the working out of programmes on their protection as in Republic of Uzbekistan as in the whole region. Receipt of data on the number and knowledge of current distribution of separate species can allow to prepare the basis for the conservation and protection of their habitats used for the feeding and resting.

ACTION PLAN ON MONITORING AND CONSERVATION OF CRANE SPECIES IN UZBEKISTAN

The main goal of this plan is establishing of monitoring for three species of migratory cranes -Siberian, Eurasian and Demoiselle Cranes - and organizing of their protection in Republic. Duration of action plan will be 3 next years: 1997, 1998 and 1999. During this period there will be provided the following measures:

1. Survey of migratory regions and establishment of seasonal observatory points for the counting of cranes.
2. Preparation of maps of migrations, analyses of migratory ways and environmental conditions;
3. Preparation and implementation of measures for territory conservation, control and popularization of crane protection.

Methodic base of this project includes the following topics:

- < preparation and distribution of special directions for state and community structures (organizations for nature protection and bodies using of nature) with purpose of organizing control and protection of cranes in the different regions;
- < organization of training workshops for the inspectors of nature protection in the different regions;
- < establishment of local informative-coordinate point for the concordance of measures and activity on conservation and study cranes with other countries of range area and within Republic;
- < organizing and development of correspondents network (questionnaire) through inquest provided by scientific specialists and hunting organizations;
- < establishment of data base, collection and analyses of primary information; treatment of received data and expansion of data base;
- < distribution of information (special issues, booklets) among local people for crane species protection;
- < preparation of video film about cranes in Uzbekistan for the propagation of their conservation and protection of their habitats (video: main habitats using by cranes during migration, behaviour during stopping, relation of local people to cranes in different regions of Republic, traditional legends and stories about cranes, etc.);
- < video-broadcast on TV with using of colorful information and video films (made in Uzbekistan and presented by CIF) about cultural, esthetic, ecological values of cranes; talking about experience of Siberian and other crane species protection in the range states;
- < establishment of seasonal observatory points in the regions of mass crane migration (stationary methods of survey);
- < investigation of territory in Republic (auto- and route survey) for the determination of resting and feeding areas of different crane species.

Final stage will be presented by determination of concrete measures for the crane protection and support for the working of crane monitoring network.

Main executors of Action Plan:

- < Gosbiocontrol of State Committee for the Nature Protection of Uzbekistan;
- < Uzbekistan Zoological Society (NGO)
- < Institute of Zoology: Academy of Sciences RUz,

Co-executors:

- < Uzbekistan Hunting and Fishing Union (NGO).

BUDGET:

1. Organization of training course for the staff of regional committee for the nature protection in Tashkent and in the different regions of Republic:

Responsible: Gosbiocontrol with participation of specialists from Institute of Zoology.

There will be provided the special educative workshops in Tashkent two times in the year for the specialists of Nature protection services from different regions of Uzbekistan who could be an intermediate points for the distribution of information about crane and collection of necessary data. Period of workshops providing - end of winter or beginning of spring; end of summer or beginning of autumn.

Besides that, two times in year there will be provided the special workshops in the regions where there will be invited the representatives from different state and community structures: regional committee for the nature protection, societies for the nature conservation, mass media, etc.

During these workshops there will be presented the information about crane species in Uzbekistan for the staff of regional inspections, there will be talked about difference of cranes, ways and period of their migration, about total methods of crane survey and given the questionnaires for the filling and distribution among wardens, hunters and other local people in the regions. For the distribution of this information there will be published the special popular brochure with data about three crane species in Uzbekistan. It would be preferently to show the video film about Siberian crane (which can be presented by ICF).

There will be invited one representative from each region of Uzbekistan where cranes are migrated and often are mass species:

- < Tashkent region
- < Sirdarya region
- < Djizak region
- < Navoi region
- < Bukhara region
- < Kashkadarya region
- < Surkhandarya region
- < Republic of Karakalpakstan

Travel expenses: 50\$ - average for 1 participator;

Daily allowance + hotel: 20\$ x 2 days = 40 \$ per 1 participator;

Thus: $(50 + 40) \times 8 \text{ participators} = 720\$ \times 2 \text{ times in year} = 1440\$$

Payment of 2 consultants: $15 \text{ per day} \times 2 \times 2 \text{ days} \times 2 \text{ times in year} = 120\$$;

Organizing of workshops in different regions with lectures of one specialist from the working group:

Travel expenses: 50 - average;

Daily allowance + hotel: $20\$ \times 2 \text{ days} = 40\$$;

7 regions $\times 2 \text{ times in year} = 14$

Payment for the lectures: $15 \times 2 \times 14 = 420\$$

Thus: $(90 \times 14) + 420 = 1260 + 420 = 1680\$$

Subtotal: $1440 + 120 + 1680 = 3240\$$ - per year

2. Communication: establishment of local point for co-ordination of activity on crane protection with international organizations, for the work on education and researches, for the collection and development of database;

Responsible: Uzbekistan zoological society.

Firstly, creation of co-ordination centre is necessary for the communication with ICF, secretariat of CMS and other range states that it would be possible to receive the data about exact ways and period of Siberian crane migration in Uzbekistan for the quick co-operation in conservation efforts. At the same time, on the base of this centre all information about cranes in Uzbekistan will be collected as database and distributed for the providing of special measures for their protection.

Computer, printer, modem, copy-machine - $1250 + 600 + 600 + 800 = 3250\$$

E-mail installation: 60\$

Post expenses: 240 \$ per year

Using of e-mail: 240\$ per year

Salary of operator: 600\$ per year

Subtotal: 4390\$ - first year; 1080\$ - next

3. Organizing of inquest

Responsible: Uzbekistan zoological society with Gosbiocontrol of State Committee and Uzbek Hunting & Fishing Union.

Preparation of questionnaires, their copy and sending to different divisions of zoological society, regional committees for the nature protection, field inspectors and hunters. There will be distributed 100 questionnaires per year and 2,000 special cards of crane counting. Paper, printing, copying, sending of questionnaires with envelopes for the answers, payment of constant correspondents:

500\$ - per year

Subtotal: 500\$ - per year

4. Establishment of monitoring research:

Responsible: Uzbekistan zoological society

The best points for the providing of stationary observation of crane migration in Uzbekistan can be the places near Tashkent, Samarkand, Bukhara and Sirdarya cities, where annually can be observed the spring and autumn crane migration and where there are specialists ornithologists. In every points there would be provided the daily observation of intensivity crane migration during two spring and two autumn months. It would be preferently to have two observers in one point. Besides that, it will be possible to attract for this observation of students from biological faculties of local Universities: learning of them by methods of counting, training of field experience, increasing of education level and distribution of information about crane protection with their help.

4 month x 8 specialists = 32 m/spec.

32 m/spec. x 200\$ = 6400\$ - per year

Subtotal: 6400\$ - per year.

5. Field research: study of territory during period of cranes migration.

Responsible: Uzbekistan zoological society, Institute of Zoology with participation of Gosbiocontrol.

On the constant contact with International Crane Foundation (ICF) there is expected to receive the information in time about ways and period of migration of Siberian and Eurasian cranes marked by PPT. Using of this data, there will be provided the special field research of territories where there are possible to find the places of these cranes resting and feeding in Uzbekistan, for the determination of ecological conditions in these regions and providing of necessary measures for their conservation. Besides that, it would be necessary to provide the special survey of cranes migratory areas in Kashkadarya and Surkhandarya regions where there is information about observation of Siberian Crane during migration. It is impossible to provide there the stationary observations owing absence of specialists. This survey can tee conducted by special working group from 1 Inspector of Gosbiocontrol, 3 ornithologists and 1 driver during one spring and one autumn months.

(1 inspector=3 specialists)x2 months=8 sp./mth.x200\$ = 1600\$

Salary of driver - 300\$ per two months;

Thus: 1600+300 = 1900\$

Field equipment necessary for the stationary and expeditional researches and making of video film:

Tents: 4 - 600\$

Sleeping bags + rucksacks - 8 - 700\$

Binoculars: 7 -490\$; Videocamera, VCR, TV - 2000\$

Transport: rents of car - 500\$

Fuel: petrol - 2 t - 1000\$

Thus: 5290\$ - first year; 1500\$ - next years

Subtotal: 7190 - first year; 3400\$ - next years.

6. Publication of informative and methodic data for the popularization of crane protection.

Responsible: Uzbekistan zoological society,

Gosbiocontrol of State Committee for the nature protection

There will be used the mass media: TV, radio - for the popularization of cranes protection (organizing of radio translation and show on TV in the circle of "Alive planet" with including of information about cranes through video films and special conversations).

There will be published the special issues, booklets, calendars about crane conservation, organized the special competition among school-children on subject of crane knowledge and protection with prizes for the best presentation.

Preparation, edition of texts, artistic designing works, publicity, publishing and distribution, prize fund - 5000\$.

Subtotal: 5000\$ - per year.

DISTRIBUTION OF BUDGET FOR THREE YEARS (in US\$)

	1997	1998	1999
Training	3240	3240	3240
Communication	4390	1080	1080
Questionnaire	500	500	500
Monitoring	6400	6400	6400
Field research	7190	3400	3400
Popularization	5000	5000	5000
Total	26720	19620	19620

Total sum for complete project in Uzbekistan is 65,960 US\$

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Report on the Activities of the International Crane Foundation

Funding Efforts

The International Crane Foundation (ICF) has been working closely with the Convention on Migratory Species (CMS) to prepare a proposal for the Global Environmental Facility. This proposal is being prepared to obtain long-term funding for the study, protection, and development and implementation of sound management plans for wetland ecosystems important to migratory Siberian Cranes. Only countries, which are signatories to the Convention on Biological Diversity, are eligible.

ICF has successfully raised the following funds to support the implementation of the Action Plan developed at the Second Meeting of the Range States in India (November 1996):

<u>Source</u>	<u>Purpose</u>	<u>Amount</u>
Brehm Fund for International Bird Conservation	Releases, surveys, and research	\$75,000
Chevron Oil Company	Surveys in Kazakhstan	20,000
Lufthansa Airlines	Flight donation for meeting	17,000
Amoco Oil Corporation	Field work and education	10,000
Cracid Breeding and Conservation Center	China field work	10,000
Windway Foundation (Terry and Mary Kohler)	Delivery of ICF Siberian Crane eggs and sight visits to Kunovat, Uvat, and Yakutia	15,000
US, European, and Japanese Zoos	Construction of base camp at Uvat	5,100
	Small grant funds	1,745
	Education in Uzbekistan	
	Hunter awareness in Pakistan	
	Video footage from Iran, t-shirts	
ICF In-kind Contributions	Education in Afghanistan	
	Staff time, communication	60,000
Total		\$313,845

Captive Breeding and Release

ICF sent six eggs in 1997 and 11 eggs in 1999 to Russia for release. Two aviculturists (Marianne Wellington in 1997 and Kelly Maquire in 1998) accompanied the eggs and met with Oka Rare Crane Breeding Center staff to discuss incubation, chick rearing, and release methods. George Archibald accompanied the first of two shipments in 1998. Terry and Mary Kohler generously donated flights in their personal plane to deliver the eggs and to visit all three breeding sites. Two eggs were sent to Vogelpark Walsrode to be costume-reared for release at Tyumen in Russia.

Four Siberian Cranes (2 chicks, 2 subadults) that were raised at ICF were sent to India in February 1997. They were accompanied by Julie Langenberg, ICF Veterinarian, who consulted with Indian colleagues on release methods and disease and health monitoring.

Russia has produced excellent annual reports on the release efforts. Kelly Maquire, an aviculturist at ICF, drafted a summary report to help look at the larger picture and progression

of the release program. The report was circulated to participants at the Iran meeting. The report will be finalized and circulated after corrections and additions are received from Russian colleagues.

ICF has met with European colleagues - Rob Belterman (Rotterdam Zoo, the Netherlands), Geer Scheres and Ernest Mourmands (Cracid Conservation and Breeding Center, Belgium), and Steffen Patzwahl (Parc Paradiseo, Belgium). The following issues were discussed: 1- expansion of captive breeding programs in Europe, 2 - review pairing and bird transfer strategies and provide genetic advice, and 3 - improve zoo support of field efforts. Christer Larson from the Nordic Ark in Sweden also visited ICF to explore possibilities for Nordic Ark to become significantly involved in captive breeding, release, and field support.

Communication

Claire Mirande at ICF has established an e-mail discussion group. Important news items and updates are circulated to colleagues worldwide interested in Siberian Crane conservation issues. Please send items you wish to share to <cmir.icf@baraboo.com>. Please note if something is confidential and it will not be sent to people on this list. The response to this information has been very positive. If you know of anyone on e-mail who should be on this list, please send their addresses to Claire. Let her know if you have an address change, or would like to be taken off the list. Important items are mailed or faxed to key people who are not on e-mail. We feel it is very important to get key representatives from each range country on e-mail. Some of the Brehm and Chevron funds have been used for this purpose.

ICF continues to serve as a central repository for literature on conservation of cranes and the wetlands and grasslands on which they depend. ICF produced and distributed a bibliography of literature in ICF's library on the Siberian Crane. Over 250 reports or publications are available. A copy of the bibliography is included in this CMS report on the Iran meeting. Copies of the articles are available on request. If anyone knows of literature that is not on this list, please send a copy to ICF.

A special request was made for colleagues to send ICF any education materials on cranes to ICF. Translation into English is desirable but not necessary.

ICF also continues to provide technical advice to colleagues. We have assisted in preparation and review of funding proposals and publications.

Sasha Sorokin and Claire Mirande are close to publishing a summary paper on the conservation of the central and western populations of Siberian Cranes. Sorokin presented this paper at the International Ornithological Congress in Durban, South Africa in 1998.

Training and Education

Natasha Sarapova, the staff Veterinarian at the Oka Rare Crane Breeding Center, trained for six weeks at ICF and other centers in the U.S. in the summer 1997. Two Indian Veterinarians, B. K. Mishra of the Hissar Veterinary College in Haryana and R.Jani of the Anand Vet College in Gujarat trained at ICF in October 1997 in collaboration with their training at the National Wildlife Health Center in Madison, Wisconsin.

Colleagues from Pakistan and Afghanistan visited ICF to discuss strategies to reduce mortality, conduct research, and improve public awareness. Trainees from Pakistan included Ahmad

Khan of WWF-Pakistan, Mohsin Farooque of the Forest Department of the Northwest Frontier Province (NWFP), and Sohrab Khan who is a hunter and local school headmaster in the NWFP. Abdul Wajid Adil, the Director of the Society for Afghanistan Volunteer Environmentalists, also attended.

The ICF training program included visits to the Necedah National Wildlife Refuge (Sandhill Crane breeding and staging area), Neenah Creek School crane program, Horicon Marsh (Canada Goose flyway and hunting management and subsequent recovery), Jasper Pulaski Refuge (major Sandhill Crane staging area), and ICF's mark & recapture study for Sandhill Cranes at Briggsville. Trainees also received training at ICF in captive breeding, education programs, wetland management, and health issues.

ICF also corresponded with the Human Rights and Wildlife Protection Organization of NWFP concerning crane hunting and captive breeding.

ICF completed the production of the Siberian Crane video and distributed both broadcast quality masters (BetacamSP) and home video versions (VHS) in appropriate formats and languages to each of the Range States. Blank master copies were provided to the Range States for translation. English copies of an earlier version were sent to Pakistan, Afghanistan, China, Iran, and India. Significant delays were encountered with completion of the Russian language translation that is now complete. Uzbekistan aired an earlier version of the Russian language video with minor translation errors. New footage from Iran and China was included in the final version.

An educational grant was provided to Uzbekistan through Dr. Elena Mukhina. English language education materials were sent for translation. Dr. Sergey Zagrebin of the Tashkent State University gave lectures to schools and ecological clubs, conducted hands-on activities with the Zoological Museum and the Tashkent City Zoo, led field observations on crane migration. Children assisted with translation of crane materials, and video footage was shot.

Educational grants were also provided to the System of Young Naturalists clubs (SNY) through Natalia Dervoed. SNY conducted a "Crane – Bird of Peace" project with emphasis to be placed on areas along the Siberian Crane migration route. Information was sent to 78 SYN clubs, two articles were written and published in newspapers and magazines, a questionnaire for crane observations was developed and Eurasian Crane counts were conducted in pre-migration gathering areas in the Moscow Region. They also conducted a children's art contest that ended with a show in the Duma with prizes given to winners including binoculars, t-shirts, and caps.

Iran was provided with 20 t-shirts to be used as rewards and incentives for local duck trappers at Fereydoon Kenar.

Research

ICF collaborated with staff of Poyang Lake Nature Reserve to initiate research on bird movements, water plants, and water levels at the reserve.

Project “Sterkh”: Summary of Siberian Crane Reintroduction Program 1983-1998

DRAFT

Prepared by Kelly Maguire, International Crane Foundation

30 November 1998

The following paper is a beginning draft of a detailed summary of all Siberian Crane eggs that entered project "Sterkh". The information attempts to track every egg and its outcome. The information was collect from the annual reports of Project "Sterkh" by All-Russia Research Institute of Nature Conservation as well as many smaller reports and faxes sent to various people.

During research of documents there were several inaccuracies. I cross referenced many documents to try and record the correct information. I would very much appreciate others input and knowledge of any inaccurate information. Because this is not the final form, do not site this information without confirmation from All-Russia Research Institute of Nature Conservation or author. If you have any questions or comment please feel free to contact me.

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INTRODUCTION

Siberian Cranes are considered the third rarest crane in the world (Meine and Archibald, 1996). Due to little historical information found on Siberian Cranes, it is thought that this species was never very abundant (Sauey 1985). Before 1983 there was thought to be approximately 100 birds in the wild. This number was raised in 1983 when a flock of 800 Siberians Crane was found on the wintering grounds at Poyang Lake, China. Because the habitat Siberian Cranes use is so vast, it is difficult for biologists to get an accurate count on the birds. Currently the population is estimated at approximately 2500-3000 birds (Meine and Archibald, 1996). With better technology and the opportunity to survey the wintering grounds where Siberian Cranes congregate into larger groups, the population looks as though it is increasing. Unfortunately this is not the case. Siberian crane numbers are barely holding their own. The populations are in serious trouble due to habitat destruction and hunting.

Siberian cranes are grouped into 3 distinct populations. The Eastern flock is the largest of the 3 populations. This flock consists of 2500-3000 Siberians which breed in Northeastern Yakutia, Russia and winters at Poyang Lake, China (Song et al. 1995, Gui 1995, J. Harris pers. obs.). This flock migrates along the Yana, Indigirka and Kolyma Rivers and holds 99 percent of the world's wild Siberian Cranes. The Central population was first discovered in 1981 on the lower reaches of the Ob River. These birds nest at Kunovat, Russia and migrate through Kazakstan, Uzbekistan, Turkmenistan, Afghanistan, and Pakistan until they reach their wintering grounds in India. The flock once numbered as many as 200 in 1965 (Archibald and Mirande 1996), but as of 1997 there are only 3 individual left in this flock, a pair with their chick (Mirande per. comm.). The Western population is estimated at 7 individuals, and has remained between 5-14 individuals for the last 20 years (Ashtiani 1983). This flock winters in Iran, migrates along the west side of the Caspian Sea to the breeding grounds near Uvat, Russia.

ESTABLISHING CAPTIVE BREEDING CENTERS

The purpose of this paper is to summarize the "Siberian Crane Project" annual reports and other information on captive propagation and reintroduction efforts implemented within the last 20 year. The goal of the reintroductions are to increase Central and Western populations of wild Siberian Crane in Russia.

Due to the extremely low number of birds in the wild and the constant threat to their wintering and migratory habitat, the Siberian Crane Project was added to the U.S.-U.S.S.R. Environmental Protection Agreement in 1977. The goal of Project Siberian Crane was "to create a captive group of Siberian Cranes whose offspring would be released into the wild" (Panchenko and Flint 1985). To reach this goal two things needed to occur. First it was essential to create a healthy captive population of Siberian Cranes. To do this second eggs were removed from the wild and sent to captive institutions around the world. The second goal was to develop a new captive rearing center in Russia. This would facilitate the ability to raise and release cranes back into the wild. In 1977 and 1978 things were set into motion, 12 Siberian Crane eggs were removed from wild nests in the Eastern flock. Of these 12 eggs, 7 were viable and sent to International Crane Foundation to establish a captive flock. Six of these eggs hatched successfully (Vladimir, Kyta, Aeroflot, Eduard, Bazov, Tanya). Several eggs also went to Vogelpark Walsrode, Germany.

Then in 1979 Oka Biosphere Reserve (Oka) became a breeding center for the Siberian Crane. It is located in Western Russia, just southeast of Moscow. The same year, 19 wild Siberian Crane eggs were collected from the Eastern population and taken to Oka. To help rear the Siberian Crane chicks, Oka used the techniques of cross-fostering these chicks with Eurasian Crane parents and isolation rearing. Ten years later the first Siberian Crane egg was laid at Oka. Meanwhile at ICF the first Siberian Crane chick hatched in 1981 (Dushenka).

BREEDING AND STAGING AREA RELEASES

1983. The circle was completed when ICF was able to send 4 eggs back to Russia for the first attempt at the release of captive bred Siberian Cranes. The oldest egg was placed in a nest of Eurasian Cranes on the Oka Nature Reserve. The egg was checked several days after being placed and was determined to be fertile. The other 3 Siberian Crane eggs were infertile and not placed in nests. The fate of this egg was unable to be found.

1985. This was next attempt at the transport of ICF eggs to Russia for release. This year 3 Siberian Crane eggs were taken to Oka Nature Reserve. Two of the 3 eggs were fertile but again the fate of these eggs are not known.

1991. It was determined that 2 ICF eggs would go to Oka to be hatched. Surviving chicks would then go to Kunovat and be isolation-reared. Both eggs hatched successfully (Bugle and Vodka) with 3 other eggs sent from Vogelpark Walsrode in Germany (Walsrode, Doinker, and Plastic). After the last of the eggs hatched at Oka, the chicks were transferred to Kunovat. Plastic was euthanized at 41 days due to severe leg problems. Doinker was pulled from the project at 57 days due to an injured toe. He later died at Moscow Zoo due to a handling injury. The remaining three birds (Walsrode, Bugle, and Vodka) were transferred to an area within Kunovat where a family of wild Siberian Cranes had established its territory. For the first days the 2 groups of birds slowly became used to each other and stayed in the same general area. On the third day the wild Siberian Crane family migrated but the isolation-reared chicks did not follow. It was thought that the chicks did not have enough time to bond with the wild bird and that their flight strength was inadequate. The chicks were recaptured and taken back to Oka. Two of the birds (Bugle and Vodka) were used as role models and re-released at Kunovat several times in the subsequent years.

1992. ICF sent 6 Siberian Crane eggs to Oka. Of the 6 eggs only 1 egg hatched successfully (Houp). Oka successfully hatched 1 of their Siberian Crane eggs and 2 Eurasian Crane eggs (Nadezdha, Hofnung, Espoir). All 4 chicks and 1 role model (Bugle) were transferred to Kunovat and isolation-reared. Houp was weak and was killed by a Golden Eagle. Late August the remaining 3 chicks left the area and were tracked by a satellite transmitter attached to one of the Eurasian Crane chicks (Espoir). The chicks migrated 300 km. south of the release site before the radio stopped transmitting. The birds were assumed to have migrated but never arrived on the wintering grounds. While Bugle did socialize with the chicks, he did not leave with them. He was recaptured and taken back to Oka.

1993. Again ICF sent Oka 6 eggs. Three of these eggs hatched with 2 others from Oka. One of the Oka chicks died but the remaining 4 chicks (Fatey, Shada, Stepan and Baltas) were isolation reared and fledged at Kunovat. Vodka, a 1991 isolation-reared Siberian Crane, was taken to Kunovat to serve as a role model. Two chicks (Stepan and Baltas) were recaptured to be released on the wintering grounds in India in 1994. The remaining 2 chicks (Fatey and Shada) at Kunovat were moved near the territory of the family of wild Siberian Cranes had their territory. The chicks joined the wild Siberian Cranes and moved with them 600 km south east of release site before the satellite signal on Shada was lost. Their movement could no longer be tracked and the birds were not seen again. Vodka was caught and sent back to Oka.

1994. ICF sent 10 Siberian Crane eggs to Oka. That year the hatchability rate was the highest it had ever been. Nine of 10 ICF eggs hatched successfully. The record for the 10th egg (6-14-5) was not found. The 9 ICF chicks were isolation-reared with one Oka Siberian Crane chick and 1 Eurasian Crane chick at Kunovat. Vodka again was taken to the release area to serve as the role model. Two Siberian Crane chicks and the Eurasian Crane chick died before fledging. It was thought that the remaining chicks would join with the wild Siberian Crane family that returned

to the same territory in Kunavot for the past several years. Unfortunately, the wild pair lost their chick that year and did not maintain their territory. A family of Eurasian Cranes took over the release area. On 1 September, 3 of the isolation-reared Siberian Crane (Delhi, Harsh, Bachue) that were banded but did not carry radiotelemetry units, joined the wild Eurasian Cranes and are assumed to have migrated. The remaining 5 Siberian Crane chicks (Arvinder, Balue, Glass, Blue, Mini) did not migrate and were recaptured along with the role model (Vodka). Vodka went back to Oka while the chicks were re-released in the staging area near Tyumen. It was hoped that the 5 chicks would join the wild Eurasian Cranes that migrate through the region. Due to numerous reasons, the chicks did not do this and were again recaptured and sent to Oka. Some of these birds were re-released at various sites the following year.

In addition to isolation-rearing Siberian Crane chick in 1994, Oka placed a captive-bred Siberian Crane egg in a wild Eurasian Crane nest. The chick successfully hatched and left on migration with its Eurasian Crane parents. This chick was banded but was not fitted with a transmitter.

1995. ICF sent more Siberian Crane eggs to Russia than it had in previous years. A total of 12 viable Siberian Crane eggs were transferred to Oka in 2 trips. Oka produced 21 Siberian Crane eggs. From ICF's and Oka's eggs, 21 hatched at Oka and 2 in nests of wild birds.

Four of the chicks (Liberty, Freiheit, Freedom, Svoboda) went to Kunovot with 1 adult role model from 1994 (Glass). All the chicks except Liberty died within several days of arrival due to various causes. They had been under a lot of stress due to a high population of gnats. Liberty was isolation-reared alone with Glass as his role model. Liberty was moved to the release site adjacent to the wild Siberian Cranes territory. There he would forage and was able to see the family of wild Siberian Cranes. On August 4th, Glass made his way to the release site. The next day Glass and Liberty foraged and spent time together. On August 28th the 2 birds left the area. They were not seen for several days and were assumed to have migrated. Neither bird was fitted with transmitters. On August 31st Glass returned to the release site without Liberty. Glass was captured and sent to Oka and later to Lanaken, Belgium for captive breeding. Liberty was not seen again.

Four other Siberian Crane chicks from the 1995 cohort (Amad, Rao, Kovshar, Azizi) and 1 Eurasian Crane (Peredelitas) were taken to Southern Tyumen and released. All 5 chicks were bonding well to the wild Eurasian Cranes and showing normal movements between feeding and roosting sites. Unfortunately, the 4 Siberian Cranes were killed by poachers while the Eurasian Crane migrated with other wild Eurasian Cranes.

Two of the 1995 chicks were kept in captivity at Oka (Nanki and Azar). The 11 remaining chicks died before fledging. There were 2 other chicks that were reared by wild birds at Kunovot. The first was Amoco II, he was a captive bred Siberian Crane egg that was hatched and reared by wild Eurasian Cranes. The other bird was Allene, a captive produced Siberian Crane egg that was hatched and reared by wild Siberian Cranes. Both chicks were last seen with their foster parents and are assumed to have migrated with them. Both were also banded.

In this same year, 3 - one year old birds from 1994 were re-released in the Kunovot area (Avindar, Blue and Mini). They were released at three different sites. All of the birds took flight when the helicopter which transferred them lifted off. All of the Siberian Cranes were banded. It is unknown what happened to them.

1996. Was a year that ICF did not send Siberian Crane eggs to Russia. Oka hatched 16 of their 25 Siberian Crane eggs. Seven of these chicks were reared and kept in captivity. Four Siberian Crane chicks were isolation reared that year. These chicks were released at Tyumen. The chicks were observed with wild Eurasian Crane flocks for several days. The chicks left the area a day after the wild Eurasian Cranes migrated. Although the chicks did have radio transmitters on, they could not be tracked because the radios failed. It is not known if the chicks actually migrated.

This seemed to be a year that cross-fostering Siberian Crane chicks with wild Eurasian Cranes took hold. Five captive-bred Siberian Crane eggs were transplanted into 3 wild Eurasian Crane nests and 1 wild Siberian Crane nest. Two eggs which were placed in the wild Siberian Crane nest and only 1 hatched. The remaining 3 eggs were placed in Eurasian Crane nests, 2 hatched, fledged and migrated with parents. One was picked by crows and died before hatching.

1997. ICF sent 6 Siberian Crane eggs to Oka. The plan was to put all of these eggs in the nests of wild Eurasian Cranes. But once the eggs arrived in Russia it was decided to leave the oldest egg(6-30-3) at Oka because it was about to hatch. This egg did hatch with 5 Oka eggs, which were isolation-reared and released at Tyumen. The Tyumen chicks spent time with wild Eurasian Cranes. Two of the chicks died; 1 was killed by a sibling and one by a White-tailed Sea Eagle. The remaining 4 chicks left the area on 31 August and were assumed to have migrated. Several days later they were observed with a flock of Eurasian Cranes 40km from the release site. The chicks were not radio tagged so further progress could not be monitored.

The other 5 Siberian Crane eggs from ICF and 3 from Oka were placed in wild Eurasian Crane nests. Three were placed in nests in the Uvat region and 5 at Kunovat. It is unknown if the eggs in the Uvat area hatched. It was observed that 3 eggs in the Kunovat area hatched but no juveniles were seen in late August. It is unknown whether the chicks did not survive or whether they were mobile and left the area.

A wild Siberian Crane chick in the Uvat region was fitted with a transmitter. This family was reported to have migrated through Tyumen, Kazakhstan then to the Astrakhan Nature Reserve, where the radio stopped transmitting.

1998. Eleven eggs hatched at Oka from the total of 21 (9 from ICF), and another 2 hatched at Walsrode, Germany from ICF eggs. Four eggs went into 4 different wild Eurasian Crane nests in Uvat. It is unknown if any of these eggs hatched. Another 3 Siberian Crane eggs were placed in Eurasian Crane nests of the Central Flock at Kunovat. One of the Kunovat eggs is known to have hatched. This chick was captured and fitted with a PTT.

Five Siberian Crane chicks were isolation reared at Oka and released at Tyumen. One bird had PTT on and began migration in mid-August. It flew 75 km to the north-east and the signal continued in this region until 25 October after departure of the wild Eurasian Cranes. No further signals were received. Another 2 chicks, isolation reared at Walrode, Germany were also released at Tyumen. The birds were returned to Oka since they were not sufficiently wild to release.

WINTERING SITE RELEASES

India

1993. A 1991 isolation-reared Siberian Crane (Bugle) was released in 1993 with another hand-reared Siberian Crane (White) on the wintering grounds of the Central flock at Keoladeo National Park (KNP) in India. The 2 birds did not migrate and were transported to Jaipur Zoo for holding.

1994. Bugle and White were re-released with 2 of the 1993 isolation-reared chicks (Stepan-renamed Bushy and Baltas-renamed Billy) and 2 captive parent-reared chicks (Boris and Gorby). None of these birds migrated. Bugle and White were left in the wild at KNP, while the other 4 birds were transported to Jaipur Zoo. Stepan died at the zoo. In July of this year White died and Bugle was pulled in to Jaipur Zoo.

In October Bugle, Gorby, Boris, Baltas were taken back to KNP and released in November. Boris was last seen 2 days after release. The last 3 birds became acclimated to the surroundings and

began to venture out of the park but would always return within a few days. Gorby and Bugle spent most of the time together.

1995. In October Gorby was last seen. Bugle returned to the park while Baltas stayed just outside its boundary. In February of 1996 4 wild Siberian Cranes returned to KNP. The wild male chased Bugle several times. Two weeks later Bugle was missing and never observed again. Baltas, the last captive bred Siberian Crane at KNP was last seen late February.

1997. Four captive bred Siberian Cranes from ICF were released in KNP in January (Alkonost, Annbur, Ayafat, Bahrami). Ayafat was found dead in August. Bahrami also died in July. In June of 1998 Alkonost and Annbur flew out of the park. Their whereabouts are not known.

Iran

1996. Two adult Siberian Cranes that were parent-reared in captivity, were released in Iran (Yertle and Arjan). One of the birds flew off and was not seen again. The other was captured and placed in captivity.

SUMMARY

Since 1991 ICF and Oka Biosphere Reserve have produced 127 Siberian Crane eggs for the Siberian Crane Project. Seventy-one eggs hatched successfully and 46 chicks were isolation reared and released. Another 20 eggs were placed in nests of wild Siberian Cranes and Eurasian Cranes. The number of eggs that hatched is unknown. To date, no birds have been resighted after they initiated migration. Satellite transmitters on 1998 released birds are providing valuable information.

REFERENCES

- Anzigitova, Natasha (Veterinarian at Oka Nature Reserve) 1993. *Siberian Crane Report project (west and central population recovery)*, Russia
- Ashtiani, Maohammad Ali, 1983. "Siberian Crane As A Wintering Bird in Iran". *Proceedings of the 1983 International Crane Workshop*, editors George W. Archibald, and R.F. Pasquier, 135-37 Baraboo, Wisconsin: International Crane Foundation.
- Archibald, George W. 1983. Siberian Crane Eggs Fly East. *The ICF Bugle*.
- Archibald, George W. and Mirande, Claire. 1996. "Status and Conservation of the Siberian Crane."
- Gui Xiao Jie. 1995. Protection and Habitat Plan for Wintering Cranes at Dongting Lake of the Yangtze River, China. *Cranes and storks of the Amur river: The proceedings of the international crane workshop*, eds Curtis H Halvorson, James T. Harris, and Sergei M. Smirenski, 163-67 Moscow: Arts Literature Publishers.
- Meine, Curt D. and Archibald, George W. (Eds) 1996. *The Cranes: Status Survey and Conservation Action Plan*. IUCN, Gland, Switzerland, and Cambridge, U.K. 294 pp
- Panchenko, V.G., and V.E. Flint. 1987. Five-year report (1979-1984) of the Crane Center at Oka Nature Preserve, USSR. *Proceedings 1985 Crane Workshop*, workshop co-chairman James C. Lewis, p. 371-76 Grand Island, Nebraska: Platte River Whooping Crane Habitat Maintenance Trust and U.S. Fish and Wildlife Service.
- Sauey, R. 1985. "The Range, Status, and Winter Ecology of the Siberian Crane (*Grus leucogeranus*).". Ph.D. diss. Cornell University, Ithaca, New York. 411pp
- 1991-1997. Annual Reports. *Restoration of the eastern and central populations of the Siberian crane (Sterkh)*. Social-Ecological Union, Ministry of Ecology All-Russia Research Institute of Nature Conservation, and A.G. Sorokin. Moscow.

Siberian Cranes Released in Russia

YEAR	#EGGS/ (ICF)	#HATCH/ (ICF)	#RELEASE	RE-RELEASE	# DIED	#UNKNOWN	PULLED- CAPTIVE
1983	(5)	?	-	-	-	-	-
	(3)	-	-	-	-	-	-
1991	6(2)	5(2)	5	-	2	0	3
1992	7(6)	1(1)	2	-	1	1	0
1993	10(6)	5(3)	4IR 1RM	1RM	-	2	2IR 1RM
1994	11(10)	10(9)	10IR 1RM	1RM	2	3IR	5IR 1RM
1995	33(12)	23(7)	8IR 1RM 3A	1RM 3A	7	1IR 1RM 3A	-
1996	25(0)	16(0)	4IR 5EGGS	-	3 EGG	4IR 2EGGS	-
1997	28(6)	-(-)	6IR 8EGGS	-	7	4IR 3EGGS	-
1998	23(9)	11(8)	7IR 7EGGS	-	-	7IR 7Eggs	-
TOTAL	127(51)	71(30)	46IR 3RM 3A 20EGGS	3RM 3A	22	38	12

Siberian Cranes Release in India

YEAR	RELEASED	DIED	UNKNOWN	DID NOT MIGRATE
1993	2A	-	-	2A
1994	2IR 2A 2PR	1A 1IR	1PR	1A 1IR 1PR
1995	-	-	1PR	1A 1IR
1996	-	-	1A 1IR	-

Siberian Cranes Released in Iran

YEAR	RELEASED	DIED	UNKNOWN	DID NOT MIGRATE
1996	2A	-	1A	1A

IR=ISOLATION REARED, PR=PARENT REARED, RM=ROLEMODEL, A=ADULT

SIBERIAN CRANE PROJECT 1983-1998

YEAR	ORIGIN	EGG # /FATE	CHICK NAME	STUD BOOK#	REARING	BANDS (Right/Left)	RELEASE	COMMENTS/CHICK FATE
1983	ICF	6-5-1						
	ICF	6-5-2						
	ICF	6-5-3						
	ICF	6-5-4						
1985	ICF	6-5-2						
	ICF	6-5-3						
	ICF	6-5-4						
1991	ICF	6-14-1/Hatched	Bugle	98	IR		K,O,K,I	91-Released, did not migrate. Pulled-Oka. 92-Role model in Kunovat, did not migrate. 93-Released at Keoladeo National Park(KNP), India with White. Did not migrate. Pulled into Jaipur Zoo. 94-Released KNP with White and 4 others. Pulled into Jaipur Zoo after White died. Re-released in November with the 3 younger birds. Did not migrate but left in KNP. 95-Observed in KNP. 96-Missing after wild Siberian Crane came.
	ICF	6-14-2/Hatched	Vodka	102	IR		K,O,K	91-Released, did not migrate. Pulled-Oka. 93-Role model in Kunovat, did not migrate. 94-Role model in Kunovat, did not migrate. 97-Tranfered to Reserve Zool. De Sauvage.
	Vogel	Hatched	Gorki	96				Died at 6 days.
	Vogel	Hatched	Walsrode	97	IR		K,O	91-Released, did not migrate. Pulled-Oka Feather damage-non releasable.
	Vogel	Hatched	Doinker	100	IR		K	Pulled into Moscow Zoo because of bad toes. Died there at 107 days
	Vogel	Hatched	Plastic	101	IR		K	Euthanized at 41 d. because of leg problem.
1992	ICF	6-5-5/EDE						
	ICF	6-5-6/EDE						
	ICF	6-14-4/Hatched	Houp	124	IR		K,	Died-weak and killed by Golden Eagle.
	ICF	6-14-5/LDE						Malpositioned
	ICF	6-18-3/LDE						Malpositioned

	ICF	6-18-4/LDE						
	Oka	Hatched	Nadezdha-2	200	IR		K	Left on migration. Did not arrive on wintering grounds.
	Oka	Eurasian Crane	Hofnung				K	Left on migration. Did not arrive on wintering ground.
	Oka	Eurasian Crane	Espoir			PTT	K	Left on migration. Did not arrive on wintering ground.
	Wild	Siberian Crane				PTT		Migrated with parents.
1993	ICF	6-5-4/Hatched	Fatey	133	IR	Rt;Metal, PTT white Lft;6LB30A	K	Released and joined wild Siberian Cranes. Migrated-last satellite signal, 600km away from release site.
	ICF	6-5-5/Hatched	Shada	139	IR	Rt:Red 3630 Lft:metal A145923	K	Released and joined wild Siberian Cranes. Migrated-last location recorded was 600km away from release site.
	ICF	6-5-6/LDE						Malposition
	ICF	6-14-5/Hatched	Stepan	138	IR	Rt: Blue Lft:A14592 6	K,O,I	Fledged at Kunovat. Pulled for holding at Oka. 94-Transported/released in Keoladeo National Park, India. Renamed "Bushy". Did not migrate-pulled to Jaipur Zoo. Died at Zoo due to heat exhaustion.
	ICF	6-22-5/Died						
	ICF	6-22-5/LDE						Malposition
	Oka	1/Hatched			IR			Died
	Oka	2/Hatched	Baltas	140	IR	Rt: Yellow Lft: A145925	K,O,I	Fledged at Kunovat. Pulled for holding at Oka. 94-Transported/released in Keoladeo National Park, India(KNP). Renamed "Billy". Did not migrate-pulled to Jaipur Zoo. Late 94-Re-released at KNP. Did not migrate. Left in park. 96-Not seen again.
	Oka	3/MDE						
	Oka	4/MDE						
	Oka	Sub-adult	White	90	Hand		O,I	93-Released at KNP with Bugle. Did not migrate. Pulled to Jaipur Zoo. 94-Released at KNP. Died of chronic infection.

1994	ICF	6-22-6/Hatched	Arvinder	153	IR	Rt:WBW:Radio Lft:A15880 95-Blue cross added on back.	K,T,O	94-Released at Kunovat-did not migrate. Re-released at Tyumen-did not migrate-pulled to Oka. 95-Released at Kunovat-not seen again.
	ICF	6-22-7/Hatched	Sharma	156	IR		K	Died-broken leg.
	ICF	6-22-8/Hatched	Kassim	158	IR		K	Died-stomach problem
	ICF	6-22-9/Hatched	Blue	155	IR	Rt:Green Lft:158808	K,T,O,K	94-Released at Kunovat-did not migrate. Re-released at Tyumen-did not migrate-pulled to Oka. 95-Released at Kunovat-not seen again.
	ICF	6-14-4/Hatched	Bholu	152	IR	Rt:Y/R/Y Lft:A15880 4	K,T,O,K	94-Released at Kunovat-did not migrate. Re-released at Tyumen-did not migrate- Pulled to Oka. 95-Released at Kunovat-not seen again.
	ICF	6-14-5						
	ICF	6-14-6/Hatched	Bachu	160	IR	Rt:Y/B/Y Lft:A15881 0	K	94-Released-Left on migration
	ICF	6-14-7/Hatched	Delhi	161	IR	Rt:A15880 5 W/Y/W	K	94-Released-Left on migration
	ICF	6-30-5/Hatched	Glass	154	IR	Rt:A15880 1 Lft:Y/R/W PTT	K,T,O,K	94-Released at Kunovat-did not migrate. Re-released at Tyumen-did not migrate-pulled to Oka. 95-Role model at Kunovat. Did not migrate. Pulled into captivity.
	ICF	6-30-6/Hatched	Harsh	159	IR	Rt:Orange Lft:A15880 9	K	Released-Left on migration
	Oka	1-37-2/Hatched	Mini	162	IR	Rt:A15880 7 Lft:Y/BL/W Radio	K,T,O,K	94-Released at Kunovat-did not migrate. Re-released at Tyumen-did not migrate-pulled to Oka. 95-Released at Kunovat-not seen again.
	Oka	Wild Eurasian egg Hatched	Efim		PR by Siberians		K	Died due to stress.
	Wild	Captive Siberian egg. Hatched	Amoco		PR by wild Eurasians	Rt:Y/R/G Lft:A15880 2	K	Left on migration with Eurasian Crane foster parents.

1995	ICF	6-5-1/Hatched	Dzhan		IR			Died-heat exhaustion
	ICF	6-5-2/Hatched	Kovshar	191	IR		T	Killed by poachers
	ICF	6-14-3/Hatched	Freiheit	170	IR		K	Died-trauma
	ICF	6-14-4/EDE						
	ICF	6-14-5/Hatched	Lim	186	IR			Died
	ICF	6-22-3/LDE						
	ICF	6-22-4/Hatched	Volya	173	IR			Died
	ICF	6-22-7/EDE						
	ICF	6-22-9/Egg broken						
	ICF	6-30-5/EDE						
	ICF	6-30-6/Hatched	Ahmad	171	IR		T	Killed by poachers
	ICF	6-30-7/Hatched	Rao	172	IR		T	Killed by poachers
	Oka	1-37-4/Hatched	Liberty	176	IR	Rt:Y/G/Y-local radio Lft:A145917	K	Released- flew away and not seen again.
	Oka	1-37-5/EDE						
	Oka	1-37-6/Hatched	Azadi	177	IR			Died
	Oka	1-44-1/MDE						
	Oka	1-44-2/Hatched	Vrig	178	IR			Died
	Oka	1-44-3/Hatched	Svatan	174	IR			Died
	Oka	1-44-4/Hatched	Ayafat	187	IR			Died
	Oka	1-44-6/Hatched	Azar	190	IR		O	Captivity-Rambouilt
	Oka	1-16-1/Hatched	Bahrami	169	IR			Died
	Oka	1-16-2/LDE						
	Oka	1-16-3/EDE						
	Oka	1-16-4/Hatched	Rustam		IR			Unknown
	Oka	1-16-5/Hatched	Nanki		IR			Captivity
	Oka	1-18-2/Hatched	Azizi	189	PR			Killed by poachers
	Oka	1-18-3/Hatched	Douglas	192	IR			Died
	Oka	1-18-4/Hatched	Sher	195	IR			Died
	Oka	1-18-5/Hatched	Amocoll		PR by wild Eurasians	Rt: A145918 Lft:W/B/W	K	Left with Eurasian Crane foster parents.
	Oka	1-31-1/Hatched	Claire	196	IR			Died

	Oka	1-37-1/LDE						
	Oka	1-37-2/Hatched	Svoboda	174	IR		K	Died
	Oka	1-37-2/Hatched	Freedom	175	IR		K	Died of unknown causes
	Oka	Eurasian Chick	Peredelit sa			Rt:A59753 Lft:T/BL/R	T	Released with Siberian Crane chicks. Joined wild Eurasian Cranes.
	Wild	Siberian Crane Family	Allene		PR by wild Siberian Cranes	Rt:A145916 Lft:White with Blk #16	K	Migrated with wild Siberian Crane parents.
1996	Oka	1-16-1/EDE						
	Oka	1-16-3/Hatched	#10	212				Died
	Oka	1-16-4/Hatched	KRA		PR by wild Siberian Cranes			
	Oka	1-16-5/Died						Broken by adult cranes in captivity
	Oka	1-16-6/LDE	KRA		PR by wild Eurasian Cranes			Egg died due to predation by crows.
	Oka	1-16-7/Hatched			PR Captivity			
	Oka	1-16-8/Hatched			PR Captivity			
	Oka	1-18-1/Hatched	#7	209				Died
	Oka	1-18-2/LDE						
	Oka	1-18-3/LDE						
	Oka	1-18-4/Hatched	KRA #4		PR by wild Eurasian Cranes	Rt:A158803 Lft:W/R/Y	K	Fledged with parents
	Oka	1-31-1/Hatched	#4	206				Died
	Oka	1-31-2/Hatched	#6	208				Died
	Oka	1-37-3/LDE						
	Oka	1-37-4/Hatched	#1STR	220	IR	Rt: R/G/Y Lft: A145948	T?	
	Oka	1-37-5/Hatched	#2 STR	204	IR	Rt:W/R/Y Lft: A145949	T	
	Oka	1-37-6/Hatched	#3 STR	205	IR	Rt: W/G/Y Lft:A145950	T	
	Oka	1-37-8/Hatched	\$5	207				Died

	Oka	1-44-1/LDE						
	Oka	1-44-2/Hatched	#8	210				Died
	Oka	1-44-3/EDE						
	Oka	1-44-4/Hatched	#9 STR	211	IR	Rt: Y/G/Blk Lft:A145951	T	
	Oka	1-44-5/Hatched	KRA		PR by wild Siberian Cranes			
	Oka	1-44-6/Hatched	KRA 3#		PR by Eurasian Cranes			
	Oka	1-44-7/Hatched	Lili	214				
1997	ICF	6-18-2			Wild nest		Uvat	
	ICF	6-22-3			Wild nest		Uvat	
	ICF	6-30-4			Wild nest		Uvat	
	ICF	6-30-6	Nest IV		Wild nest		K	Egg found in nest
	ICF	6-22-4	Nest III		Wild nest		K	No sign in nest-Hatched?
	ICF	6-30-3/Hatched	Dustum		IR	Rt:A16015 Lf:Yellow	T	Released Tyumen (moved 40km away)
	Oka	1-37-3/Hatched	Chang		IR	Rt:A16018 Lf:Orange	T	Released Tyumen
	Oka	1-44-1/Hatched	Shiro		IR	Rt:A16017 Lf:Blue	T	Released Tyumen
	Oka	1-16-1/Hatched	Archie		IR		T	Released Tyumen-Died
	Oka	1-16-2/Hatched	Nest 1A		Wild nest		K	Hatched:chick heard, not seen
	Oka	1-16-3/Hatched	Trang					Captivity
	Oka	1-16-4/Hatched	Valey		PR			Died of neglect of parents
	Oka	1-18-1/LDE						
	Oka	1-18-2/LDE						
	Oka	1-18-3/Hatched	Feer		PR-IR			Captivity
	Oka	1-31-1/LDE						
	Oka	1-31-2/Hatched	Valkonen					Died-heart problems
	Oka	1-31-3/Hatched	Khaku					Captivity
	Oka	1-37-1/LDE						

	Oka	1-37-2/LDE						
	Oka	1-44-2	Nest IV				K	Hatched "Terry"
	Oka	1-44-3	Nest III				K	Egg found in nest
	Oka	1-44-4/Hatched	Rob		IR		T	Released Tyumen-Killed by eagle
	Oka	1-44-5/Hatched	Mirande		PR-IR			Captivity
	Oka	1-59-1/Died						Broken by adult cranes
	Oka	1-59-2/LDE						
	Oka	1-59-3/Hatched	Kvit		IR	Rt:A16014 Lf:White w/"2"	T	Released Tyumen
1998	ICF	6-18-3/Hatched						Died-curved neck
	ICF	6-18-4						
	ICF	6-22-3						
	ICF	6-22-4						
	ICF	6-22-5/Hatched						Died-bad leg
	ICF	6-30-4						
	ICF	6-30-5						
	ICF	6-30-6						
Misc.	ICF	Adult	Ayafat		Capt. PR	Orange/Yellow L8924	KNP	Died
	ICF	Adult	Annbur		Capt. PR	Red/green L8923	KNP	Flew out of park. Location unknown
	ICF	Sub-adult	Baharami		Capt. PR	Black/Yellow L8921	KNP	Died
	ICF	Sub-adult	Alkonost		Capt. PR	Green/Blue L8922	KNP	Flew out of park. Location unknown.
	ICF	Adult	Yertle		Capt. PR		Iran	Unknown if flew off or was captured and place in captivity.
	ICF	Adult	Arjan		Capt. PR		Iran	Unknown if flew off or was captured and place in captivity.

KNP=KEOLADEO NATIONAL PARK, INDIA
O or OKA=OKA BIOSPHERE RESERVE, RUSSIA

ICF=INTERNATIONAL CRANE FOUNDATION, U.S.
K=KUNAVOT

Capt. PR= Captive Parent Reared
IR= Isolation Reared

SIBERIAN CRANE PROJECT 1983-1998

YEAR	ORIGIN	EGG # /FATE	CHICK NAME	STUD BOOK#	REARING	BANDS (Right/Left)	RELEASE	COMMENTS/CHICK FATE
1983	ICF	6-5-1						
	ICF	6-5-2						
	ICF	6-5-3						
	ICF	6-5-4						
1985	ICF	6-5-2						
	ICF	6-5-3						
	ICF	6-5-4						
1991	ICF	6-14-1/Hatched	Bugle	98	IR		K,O,K,I	91-Released, did not migrate. Pulled-Oka. 92-Role model in Kunovat, did not migrate. 93-Released at Keoladeo National Park(KNP), India with White. Did not migrate. Pulled into Jaipur Zoo. 94-Released KNP with White and 4 others. Pulled into Jaipur Zoo after White died. Re-released in November with the 3 younger birds. Did not migrate but left in KNP. 95-Observed in KNP. 96-Missing after wild Siberian Crane came.
	ICF	6-14-2/Hatched	Vodka	102	IR		K,O,K	91-Released, did not migrate. Pulled-Oka. 93-Role model in Kunovat, did not migrate. 94-Role model in Kunovat, did not migrate. 97-Tranfered to Reserve Zool. De Sauvage.
	Vogel	Hatched	Gorki	96				Died at 6 days.
	Vogel	Hatched	Walsrode	97	IR		K,O	91-Released, did not migrate. Pulled-Oka Feather damage-non releasable.
	Vogel	Hatched	Doinker	100	IR		K	Pulled into Moscow Zoo because of bad toes. Died there at 107 days
	Vogel	Hatched	Plastic	101	IR		K	Euthanized at 41 d. because of leg problem.
1992	ICF	6-5-5/EDE						
	ICF	6-5-6/EDE						
	ICF	6-14-4/Hatched	Houp	124	IR		K,	Died-weak and killed by Golden Eagle.
	ICF	6-14-5/LDE						Malpositioned
	ICF	6-18-3/LDE						Malpositioned
	ICF	6-18-4/LDE						
	Oka	Hatched	Nadezdha-2	200	IR		K	Left on migration. Did not arrive on wintering grounds.

	Oka	Eurasian Crane	Hofnung				K	Left on migration. Did not arrive on wintering ground.
	Oka	Eurasian Crane	Espoir			PTT	K	Left on migration. Did not arrive on wintering ground.
	Wild	Siberian Crane				PTT		Migrated with parents.
1993	ICF	6-5-4/Hatched	Fatey	133	IR	Rt: Metal, PTT white Lft: 6LB30A	K	Released and joined wild Siberian Cranes. Migrated- last satellite signal, 600km away from release site.
	ICF	6-5-5/Hatched	Shada	139	IR	Rt: Red 3630 Lft: metal A145923	K	Released and joined wild Siberian Cranes. Migrated- last location recorded was 600km away from release site.
	ICF	6-5-6/LDE						Malposition
	ICF	6-14-5/Hatched	Stepan	138	IR	Rt: Blue Lft: A145926	K,O,I	Fledged at Kunovat. Pulled for holding at Oka. 94-Transported/released in Keoladeo National Park, India. Renamed "Bushy". Did not migrate-pulled to Jaipur Zoo. Died at Zoo due to heat exhaustion.
	ICF	6-22-5/Died						
	ICF	6-22-5/LDE						Malposition
	Oka	1/Hatched			IR			Died
	Oka	2/Hatched	Baltas	140	IR	Rt: Yellow Lft: A145925	K,O,I	Fledged at Kunovat. Pulled for holding at Oka. 94-Transported/released in Keoladeo National Park, India(KNP). Renamed "Billy". Did not migrate-pulled to Jaipur Zoo. Late 94-Re-released at KNP. Did not migrate. Left in park. 96-Not seen again.
	Oka	3/MDE						
	Oka	4/MDE						
	Oka	Sub-adult	White	90	Hand		O,I	93-Released at KNP with Bugle. Did not migrate. Pulled to Jaipur Zoo. 94-Released at KNP. Died of chronic infection.
1994	ICF	6-22-6/Hatched	Arvinder	153	IR	Rt: WBW: Radio Lft: A158806 95-Blue cross added on back.	K,T,O	94-Released at Kunovat-did not migrate. Re-released at Tyumen-did not migrate-pulled to Oka. 95-Released at Kunovat-not seen again.
	ICF	6-22-7/Hatched	Sharma	156	IR		K	Died-broken leg.
	ICF	6-22-8/Hatched	Kassim	158	IR		K	Died-stomach problem
	ICF	6-22-9/Hatched	Blue	155	IR	Rt: Green Lft: 158808	K,T,O,K	94-Released at Kunovat-did not migrate. Re-released at Tyumen-did not migrate-pulled to Oka. 95-Released at Kunovat-not seen again.
	ICF	6-14-4/Hatched	Bholu	152	IR	Rt: Y/R/Y Lft: A158804	K,T,O,K	94-Released at Kunovat-did not migrate. Re-released at Tyumen-did not migrate- Pulled to Oka. 95-Released at Kunovat-not seen again.

	ICF	6-14-5						
	ICF	6-14-6/Hatched	Bachu	160	IR	Rt:Y/B/Y Lft:A158810	K	94-Released-Left on migration
	ICF	6-14-7/Hatched	Delhi	161	IR	Rt:A158805 W/Y/W	K	94-Released-Left on migration
	ICF	6-30-5/Hatched	Glass	154	IR	Rt:A158801 Lft:Y/R/W PTT	K,T,O,K	94-Released at Kunovat-did not migrate. Re-released at Tyumen-did not migrate-pulled to Oka. 95-Role model at Kunovat. Did not migrate. Pulled into captivity.
	ICF	6-30-6/Hatched	Harsh	159	IR	Rt:Orange Lft:A158809	K	Released-Left on migration
	Oka	1-37-2/Hatched	Mini	162	IR	Rt:A158807 Lft:Y/BL/W Radio	K,T,O,K	94-Released at Kunovat-did not migrate. Re-released at Tyumen-did not migrate-pulled to Oka. 95-Released at Kunovat-not seen again.
	Oka	Wild Eurasian egg Hatched	Efim		PR by Siberians		K	Died due to stress.
	Wild	Captive Siberian egg. Hatched	Amoco		PR by wild Eurasians	Rt:Y/R/G Lft:A158802	K	Left on migration with Eurasian Crane foster parents.
1995	ICF	6-5-1/Hatched	Dzhan		IR			Died-heat exhaustion
	ICF	6-5-2/Hatched	Kovshar	191	IR		T	Killed by poachers
	ICF	6-14-3/Hatched	Freiheit	170	IR		K	Died-trauma
	ICF	6-14-4/EDE						
	ICF	6-14-5/Hatched	Lim	186	IR			Died
	ICF	6-22-3/LDE						
	ICF	6-22-4/Hatched	Volya	173	IR			Died
	ICF	6-22-7/EDE						
	ICF	6-22-9/Egg broken						
	ICF	6-30-5/EDE						
	ICF	6-30-6/Hatched	Ahmad	171	IR		T	Killed by poachers
	ICF	6-30-7/Hatched	Rao	172	IR		T	Killed by poachers
	Oka	1-37-4/Hatched	Liberty	176	IR	Rt:Y/G/Y-local radio Lft:A145917	K	Released- flew away and not seen again.
	Oka	1-37-5/EDE						
	Oka	1-37-6/Hatched	Azadi	177	IR			Died
	Oka	1-44-1/MDE						
	Oka	1-44-2/Hatched	Vrig	178	IR			Died
	Oka	1-44-3/Hatched	Svatan	174	IR			Died
	Oka	1-44-4/Hatched	Ayafat	187	IR			Died
	Oka	1-44-6/Hatched	Azar	190	IR		O	Captivity-Rambouilt

	Oka	1-16-1/Hatched	Bahrami	169	IR			Died
	Oka	1-16-2/LDE						
	Oka	1-16-3/EDE						
	Oka	1-16-4/Hatched	Rustam		IR			Unknown
	Oka	1-16-5/Hatched	Nanki		IR			Captivity
	Oka	1-18-2/Hatched	Azizi	189	PR			Killed by poachers
	Oka	1-18-3/Hatched	Douglas	192	IR			Died
	Oka	1-18-4/Hatched	Sher	195	IR			Died
	Oka	1-18-5/Hatched	Amocoll		PR by wild Eurasians	Rt: A145918 Lft:W/B/W	K	Left with Eurasian Crane foster parents.
	Oka	1-31-1/Hatched	Claire	196	IR			Died
	Oka	1-37-1/LDE						
	Oka	1-37-2/Hatched	Svoboda	174	IR		K	Died
	Oka	1-37-2/Hatched	Freedom	175	IR		K	Died of unknown causes
	Oka	Eurasian Chick	Peredelitsa			Rt:A59753 Lft:T/BL/R	T	Released with Siberian Crane chicks. Joined wild Eurasian Cranes.
	Wild	Siberian Crane Family	Allene		PR by wild Siberian Cranes	Rt:A145916 Lft:White with Blk #16	K	Migrated with wild Siberian Crane parents.
1996	Oka	1-16-1/EDE						
	Oka	1-16-3/Hatched	#10	212				Died
	Oka	1-16-4/Hatched	KRA		PR by wild Siberian Cranes			
	Oka	1-16-5/Died						Broken by adult cranes in captivity
	Oka	1-16-6/LDE	KRA		PR by wild Eurasian Cranes			Egg died due to predation by crows.
	Oka	1-16-7/Hatched			PR Captivity			
	Oka	1-16-8/Hatched			PR Captivity			
	Oka	1-18-1/Hatched	#7	209				Died
	Oka	1-18-2/LDE						
	Oka	1-18-3/LDE						
	Oka	1-18-4/Hatched	KRA #4		PR by wild Eurasian Cranes	Rt:A158803 Lft:W/R/Y	K	Fledged with parents
	Oka	1-31-1/Hatched	#4	206				Died
	Oka	1-31-2/Hatched	#6	208				Died
	Oka	1-37-3/LDE						

	Oka	1-37-4/Hatched	#1STR	220	IR	Rt: R/G/Y Lft: A145948	T?	
	Oka	1-37-5/Hatched	#2 STR	204	IR	Rt:W/R/Y Lft: A145949	T	
	Oka	1-37-6/Hatched	#3 STR	205	IR	Rt: W/G/Y Lft:A145950	T	
	Oka	1-37-8/Hatched	\$5	207				Died
	Oka	1-44-1/LDE						
	Oka	1-44-2/Hatched	#8	210				Died
	Oka	1-44-3/EDE						
	Oka	1-44-4/Hatched	#9 STR	211	IR	Rt: Y/G/Blk Lft:A145951	T	
	Oka	1-44-5/Hatched	KRA		PR by wild Siberian Cranes			
	Oka	1-44-6/Hatched	KRA 3#		PR by Eurasian Cranes			
	Oka	1-44-7/Hatched	Lili	214				
1997	ICF	6-18-2			Wild nest		Uvat	
	ICF	6-22-3			Wild nest		Uvat	
	ICF	6-30-4			Wild nest		Uvat	
	ICF	6-30-6	Nest IV		Wild nest		K	Egg found in nest
	ICF	6-22-4	Nest III		Wild nest		K	No sign in nest-Hatched?
	ICF	6-30-3/Hatched	Dustum		IR	Rt:A16015 Lf:Yellow	T	Released Tyumen (moved 40km away)
	Oka	1-37-3/Hatched	Chang		IR	Rt:A16018 Lf:Orange	T	Released Tyumen
	Oka	1-44-1/Hatched	Shiro		IR	Rt:A16017 Lf:Blue	T	Released Tyumen
	Oka	1-16-1/Hatched	Archie		IR		T	Released Tyumen-Died
	Oka	1-16-2/Hatched	Nest 1A		Wild nest		K	Hatched:chick heard, not seen
	Oka	1-16-3/Hatched	Trang					Captivity
	Oka	1-16-4/Hatched	Valey		PR			Died of neglect of parents
	Oka	1-18-1/LDE						
	Oka	1-18-2/LDE						
	Oka	1-18-3/Hatched	Feer		PR-IR			Captivity
	Oka	1-31-1/LDE						
	Oka	1-31-2/Hatched	Valkonen					Died-heart problems

	Oka	1-31-3/Hatched	Khaku					Captivity
	Oka	1-37-1/LDE						
	Oka	1-37-2/LDE						
	Oka	1-44-2	Nest IV				K	Hatched "Terry"
	Oka	1-44-3	Nest III				K	Egg found in nest
	Oka	1-44-4/Hatched	Rob		IR		T	Released Tyumen-Killed by eagle
	Oka	1-44-5/Hatched	Mirande		PR-IR			Captivity
	Oka	1-59-1/Died						Broken by adult cranes
	Oka	1-59-2/LDE						
	Oka	1-59-3/Hatched	Kvit		IR	Rt:A16014 Lf:White w/"2"	T	Released Tyumen
1998	ICF	6-18-3/Hatched						Died-curved neck
	ICF	6-18-4						
	ICF	6-22-3						
	ICF	6-22-4						
	ICF	6-22-5/Hatched						Died-bad leg
	ICF	6-30-4						
	ICF	6-30-5						
	ICF	6-30-6						
Misc.	ICF	Adult	Ayafat		Capt. PR	Orange/Yellow/L8924	KNP	Died
	ICF	Adult	Annbur		Capt. PR	Red/green L8923	KNP	Flew out of park. Location unknown
	ICF	Sub-adult	Baharami		Capt. PR	Black/Yellow L8921	KNP	Died
	ICF	Sub-adult	Alkonost		Capt. PR	Green/Blue L8922	KNP	Flew out of park. Location unknown.
	ICF	Adult	Yertle		Capt. PR		Iran	Unknown if flew off or was captured and place in captivity.
	ICF	Adult	Arjan		Capt. PR		Iran	Unknown if flew off or was captured and place in captivity.

KNP=KEOLADEO NATIONAL PARK, INDIA
O or OKA=OKA BIOSPHERE RESERVE, RUSSIA
ICF=INTERNATIONAL CRANE FOUNDATION, U.S.
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Capt. PR= Captive Parent Reared
IR= Isolation Reared

Part IV: Reference material

The Department of the Environment of the Islamic Republic of Iran

Mandate and Challenges for the 21st Century

In The Name of God

Article 50 of the Constitution of the Islamic Republic of Iran reads: "Protection of the environment, in which the present and future generations must lead an ever improving community life, is a general obligation. Therefore, all activities, economic or otherwise, which may cause irreversible damage to the environment, are forbidden."

Terrain and Character of the Land

Iran is a vast country, measuring 1,648,000 sq. km (or thrice the size of France) with a population of 60,000,000. The variety in the climatic conditions is striking. It features enormous deserts, several mountain ranges, a huge plateau, and large forests and on a daily basis, temperature variations of 40 degrees C are recorded within its borders.

The Department of the Environment (DOE) is responsible for 10 national parks with a total area of 1,274,585 hectares, five national natural monuments covering 1,798 sq. hectares, 25 wildlife reserves measuring 1,957,265 sq. hectares, 47 protected areas spread over 5,200,265 sq. hectares and including 17 wetlands. The sum total of these areas equals 84,374,372 sq. hectares or 5% of the entire land area.

The richness of Iran's natural and cultural heritage is a subject that first appears with the development of writing in ancient Sumeria in 3500 B.C. (present day Iraq). It is a history and heritage of global significance, as the country is situated on the crossroads between two of the four ancient river valley civilizations of the Indus and Euphrates/Tigris.

Iran's biodiversity and natural heritage is also richly endowed, as it sits at the junction of four major geoecological regions, namely the Iranian-Turanian, Euro-Siberian, Saharo-Arabian and Sudanian. Accordingly, Iran is in possession of the most diversified biological region amongst the southwestern Asian countries.

The country supports 7,000 plant species of which 20% are endemic, 500 species of birds and 148 species of mammals. Iran has been in the forefront of biodiversity conservation. The International Convention for Wetlands Protection was formulated at Ramsar in Iran and is accordingly named the Ramsar Convention.

The numerous wetlands are particularly important, as they are the resting grounds for several important migratory birds. These include the Siberian crane; flamingoes and pelicans, all listed as global heritage.

The country also borders the Persian Gulf, the Sea of Oman and the Caspian Sea. The Persian Gulf is already the transitway for 60% of the world's petroleum needs. Once the Caspian Sea energy resources are exploited, it is estimated that 75% of the world's hydrocarbon energy needs will pass through the littoral waters of Iran.

This energy configuration places Iran in the midst of an enormous international environmental protection zone. These waters are already facing pollution related to industry, retrograde agricultural practices, petroleum exploitation and shipping. Considered together with global warming associated with the burning of fossil fuels, this combination puts the country squarely in the middle of the global challenge of creating an economically and environmentally sustainable earthly habitat.

History of the DOE

The predecessor institution of the DOE was originally organized in 1956, to control rangeland hunting.

Under the title of the Game and Fish Organization, in 1967, it expanded in rapid order to take full responsibility for oversight and protection of wildlife and the country's wide variety of eco-systems.

The organization was restructured as the Department of the Environment in 1974. Its mandate was upgraded to insure the enhancement and promotion of establishing equilibrium between the needs of social development and environmental protection.

With the ratification of the 1979 Constitution of the Islamic Republic of Iran, new legislative ground was broken. Today, environmental protection is an important part of the country's legal framework.

Administrative Structure and Responsibilities

A Vice President of the Republic, who directs the daily operations of the institution, heads the DOE. The Organization has four deputies, three independent general directors and 20 other general directorates included on the central staff.

There are 28 provinces in Iran. Each has a DOE provincial directorate that monitors all aspects of environmental protection and the implementation of the department's programs.

The DOE is charged with defining and presenting the national rules, regulations and standards for preserving and enhancing the quality of the environment. A major part of this responsibility includes the provision of expert studies into human and industrial pollution, desertification, deforestation, soil erosion, rangeland degradation, improved water resource management and protection of the country's biodiversity. Considering the rapid development trends in the country the DOE is also responsible for monitoring the quality of air, water and soil.

The Department's legal division prepares comprehensive draft guidelines that detail regulations in accordance with the growing body of international environmental law, standards and conventions. This series of legislative measures is being incrementally introduced to parliament for ratification. Once approved, these mandates will inject legal powers into many new areas, where at present, the DOE is only able to make recommendations.

Public Awareness

Obviously public education plays a vital role in the success of the Department's agenda. To this end, the DOE has embarked on a major, long-term public environmental awareness campaign. This strategy will utilize available mass media, in addition to organizing international environmental culture festivals, gatherings and symposia.

National consultants are making inputs in data collection, economic, technical and legal research as part of the overall scheme to heighten public awareness on environmental protection and to establish a data bank and information network. In this effort, it has been recognized that youth and women play a vital role in the process. Consequently, the education of these two sectors of the general population is a major area of attention.

National Environmental Plan of Action

The DOE first introduced its National Environmental Plan of Action (NEPA) in 1997. It was presented as a report to the Cabinet, chaired by the President of the Islamic Republic of Iran. This initiative outlines the outstanding threats to the national environment and proposes concise measures needed for reversing ongoing negative trends.

It was decided that the DOE, with substantive inputs and in cooperation with other Government institutions, prepare an agenda for combating the serious dangers facing the natural habitat. Specific emphasis was placed on the basic infrastructural importance of environment protection.

The NEPA deals with danger zones including climate control; noise pollution; water resource preservation, protection and management; soil stabilisation and anti-erosion measures. Protection of forests and grasslands; desertification; safeguarding of biodiversity; and monitoring the anti-pollution measures being taken for the nation's littoral waterways are also subsumed. Environmental education and public participation have been emphasized in all these areas. The basic objectives and policies developed in this plan will be integrated within the third year economic social and cultural development plan.

College of the Environment

The DOE has its own College of the Environment, which was first established in 1972. At present it offers a variety of formal and informal courses with durations of between six months and two years. Its degree program offers a higher national diploma, in environmental sciences.

The college is dedicated to training a skilled workforce in the field of environment protection and research. Many of its graduates are absorbed as DOE staff.

Museum of Natural History

The National Museum of Natural History was inaugurated in Tehran, 1987, at Ghaem-Mahgarn Avenue. The complex houses a large and variegated collection of flora and fauna, fossils, minerals and other exhibits. There are also hundreds of paintings and dioramas on display. The museum is open to the public from Thursday-Saturday, 8:00 a.m.-2:00 p.m.

larger premises for the museum are in the planning stages. The new facility will be situated in the Pardisan Ecological Park, also in Tehran.

Some examples of natural environment in Iran

Golestan National Park

The Golestan National Park has covered an area of about 92000 hectares with a length of 52 Km in the east of the Alborz mountains. This national park is the largest protected forest in the country, hence covering different climatic zones, situated between the Caspian Sea and the arid zones.

The plant diversity of the park includes very rare species which are considered to be valuable treasures of biodiversity. Various wild mammals such as the large Iranian deer can be found in the forest areas. In the steppe zones we can see the ram, leopard, ewe, and boar, although we have different species of birds, there are more than 150 species of birds in this region such as pheasant, partridge, falcon, quail, starling and others.

This Park presents some of the magnificent landscapes especially in spring and autumn and many Iranian and international photographers praise the opportunity to spend some time in the most colorful natural landscapes. In order to take advantage and wise use from the natural resources of this park camping zones with modest facilities have been provided to host guests, The Park's sight seeing zones and picnic areas hosts thousands of tourists every year.

Lake Orumieh

An Outstanding World Biosphere situated between the two northwestern provinces of East and West Azerbaijan, Lake Orumieh has the second highest saline content recorded for lakes worldwide. The UNESCO's International Council registers this National Park as a primary world biosphere for Man and Biosphere Reserves.

Lake Orumieh covers an area of 5,125 sq. km, at an altitude of 1,200 m above sea level. This enormous waterway is dotted with 102 islands and has been recognized as one of the world's outstanding natural parks. The lake is also a biodiversity genetic bank of global significance.

It features vast marshlands, 14 permanently flowing rivers, numerous deltas and a variety of rare ecosystems. Its touristic attractions and facilities make Lake Orumieh a haven for nature lovers.

Anzali Protected Wetland

The Anzali wetland is one of the largest, most scenic and biologically diversified areas of its kind in the world. It is listed as a protected area under the Ramsar Convention. Located in the region of the city of Anzali, which borders the Caspian Sea in the north of Iran, the wetland is 35 km long and 12 km wide at its broadest point. It covers an area of 18,000 sq. hectares.

There are a large number of islands running throughout the area; the most important ones being Gholamgodeh Bozorgh, Gholamgodeh Kochek, Mian Poshteh and Torab Godeh. The Anzali wetland is a virtual flower garden, richly endowed with a diversity of animal and plant life.

The area is divided into eastern, western and central sectors. These divisions are based on specific environmental conditions, fishing reserves and social considerations.

The three sections are Siyah-Kashin, a protected wetland; Selkeh, a wildlife refuge and the no hunting zone of Sarkhankol. The Anzali wetland is also host to thousands of migratory birds. Bird watchers and nature lovers from across the globe visit Anzali to take a glimpse of the spectacular scenes.

The Rio Convention on Biodiversity

The Islamic Republic of Iran moved rapidly in following up on the resolutions taken at the 1992 Rio Conference. Consequently, the Convention for Biodiversity (CBD) in the Islamic Republic of Iran (CBIRI) was inked in the same year.

This led to the establishment of a sub-committee for biodiversity within the National Committee for Sustainable Development in 1994. The CBIRI was ratified by the national legislature and came into force in 1996.

Iran has also signed agreements enabling the country to prepare both a national strategy for biodiversity and a domestic plan that puts the country and the World Bank affiliated Global Environmental Facility (GEF) in partnership.

National Committee for Sustainable Development -1994-1997

The National Committee for Sustainable Development (NCSD), formulated in 1994, was one of the outcomes of the Rio Summit of 1992. The NCSD is mandated to work with counterpart international bodies, in addition to coordinating a number of domestic activities of global concern.

Among the measures it has taken to date is the establishment of sub committees for the Global Environment Facility, IPCC, CBD and the Forest Declaration.

Iran's membership to the IPCC and CBD was ratified in February 1995. In addition the NCSD has established sub-committees linking it to the Agenda 21, Biosafety Basel and Ramsar conventions. These sub-groupings are essential for coordinating the domestic implementation of these accords.

The NSCD publishes a bulletin and newsletter on the Committee for Sustainable Development, which includes a national list of environmental priorities with reference to sustainable development. Iran is also an active member of regional organisations. The Regional Organization for the Protection of Marine Environment ROPME (Persian Gulf States) and the (CEP) Caspian Sea Environmental Program are important regional organizations devoted to environmental issues.

The Supreme Council of the Environment

The Supreme Council of the Environment is a legislative body that enacts relevant regulations and the classification of protected areas. Headed by the president, Ministers of Agriculture, Industry, Jihad, Housing and the Interior are also members of the Council.

Siberian White Cranes in Volga delta¹

German M Russanov, Norbert Hölzel & Stefan Schleuning

Siberian White Crane *Grus leucogeranus* is one of the rarest and most endangered species of the world. It breeds in three separate populations in Siberia, Russia, from Yakutia in the east westwards to the West-Siberian lowlands just east of the Ural. About 99% of the world population of Siberian White Crane breed in northern Yakutia. Only in the 1980s, the wintering grounds of this population were discovered at Poyang Lake, China, near the Yangtze, where in 1993 up to 2915 birds were counted (del Hoyo et al 1996, Snow & Perrins 1998).

The breeding grounds of the population that winters in Bharatpur, India, were discovered in 1981 just east of the of the Ural in the basin of the river Kunovat, Russia, a tributary at the eastern side of the lower Ob (Potapov & Flint 1989). When the cranes did not return to Bharatpur in the winters of 1994/95 and 1995/96, it was feared that this population had gone extinct, but in autumn 1996 five birds reappeared (del Hoyo et al 1996).

In 1996, the breeding grounds of the westernmost wintering population, that winters on the south-eastern shores of the Caspian Sea near the village of Fereidoonkenar, Iran, were located by means of satellite tracking. They are situated in the West-Siberian lowlands north of Tyumen, Russia 250 km south of the confluence of the rivers Irtysh and Ob (Archibald pers comm; cf Archibald & Kanai 1998). In the same region, researchers located from a helicopter during summer a family of Siberian White Cranes with a chick. The breeding grounds of the population that winters in India are just 600 km to the north. Although they are geographically rather close, it is doubtful whether there is any exchange between the two western breeding populations, since their migration patterns are very different.

During the last 30 years, the western populations of Siberian White Crane have declined dramatically. During the 1960s up to 200 birds were observed in Bharatpur alone (Potapov & Flint 1989). Regarding the present numbers at the known wintering grounds, both western populations probably do not exceed 25 birds (del Hoyo et al 1996) and there is little hope that other yet undiscovered wintering sites may exist.

Siberian White Cranes / Siberische Witte Kraanvogels *Grus leucogeranus*, Volga delta, Russia, October 1996 (Alfred Kayser)



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Siberian White Cranes in Volga delta

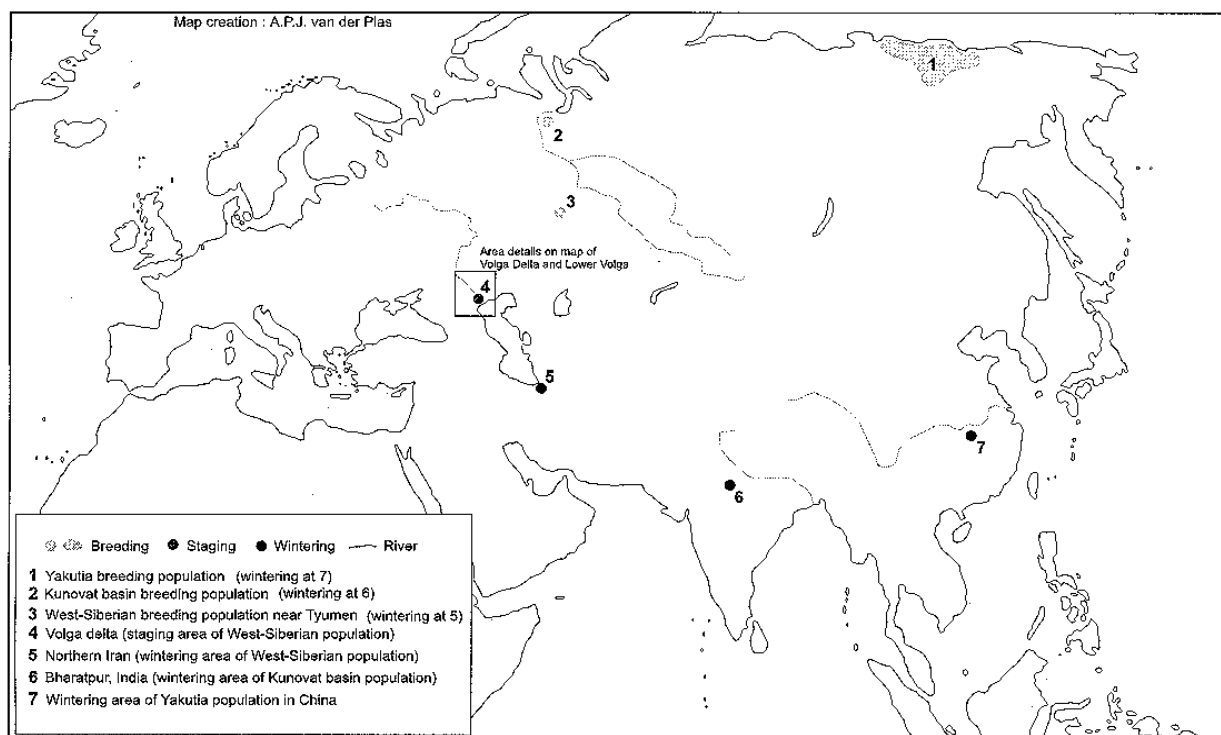


FIGURE 1 Distribution of Siberian White Crane / Siberische Witte Kraanvogel *Grus leucogeranus* in Eurasia

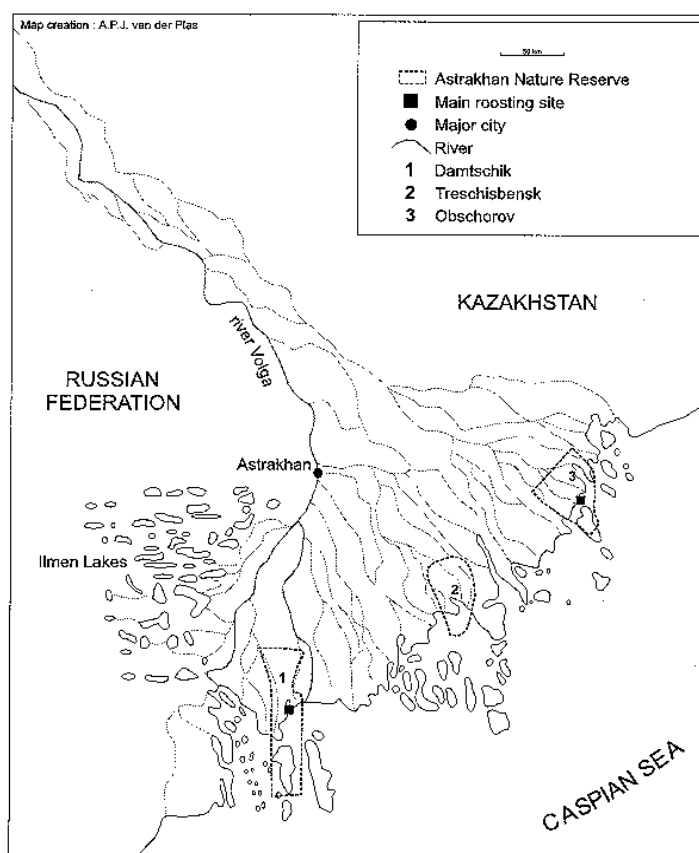


FIGURE 2 Detail of Volga delta, Russia, with Astrakhan Nature Reserve

TABLE 1 Spring migration of Siberian White crane / Siberische Witte Kraanvogel *Grus leucogeranus* in Volga delta

Year	First observation	Last	Number of observations	Maximum number	Area*	Year	First observation	Last	Number of observations	Maximum number	Area*
1928	8 April	-	1	?	O	1978	27 March	28 March	2	5	D
1935	6 April	-	2	3	O	1979	29 March	-	2	8	D
1942	22 April	-	1	4	D	1980	28 March	9 April	5	15	D
1952	10 April	-	1	1	D	1981	20 March	-	1	5	D
1953	8 April	-	1	3	O	1982	2 April	-	2	6	D
1956	2 April	-	1	1	T	1984	24 March	17 April	4	3	D
1957	25 March	12 April	5	5	T		29 March	-	1	3	O
1958	31 March	11 April	9	3	D	1985	25 April	-	1	1	T
1959	28 March	5 April	2	6	D	1987	9 May	-	1	1	O
1961	11 April	-	1	2	O	1988	29 March	3 April	2	2	O
1962	7 March	12 April	3	6	D	1989	23 March	-	1	3	D
1963	14 March	8 May	17	22	D	1990	20 March	-	2	2	O
1964	26 March	-	2	3	D		4 April	-	1	1	D
1965	19 March	18 April	9	7	D	1991	25 March	-	1	5	D
1966	11 March	29 March	2	7	D		27 March	13 April	-	9	O
1967	30 March	7 April	5	8	D	1992	25 March	12 April	-	4	O
1968	10 March	23 April	12	8	D	1993	28 March	-	1	2	O
1969	27 March	15 April	17	13	D		9 April	-	1	3	D
1970	13 March	11 April	22	12	D	1994	7 April*	-	1	1	O
1971	25 March	13 April	29	21	D	1995	4 March	-	1	2	D
1974	8 March	1 April	10	7	D	1996	5 April	-	1	3	O
1975	11 March	28 March	11	14	D		20 April	-	1	2	D
1976	25 March	27 April	6	2	D						

D = western part of reserve (Damtschik), T = central part of reserve (Treschisbensk), O = eastern part of reserve (Obschorov)

For the western population of Siberian White Crane that winters in Iran, the Volga delta is traditionally known as a staging area during migration. Especially after the foundation of the Astrakhan Nature Reserve, the frequency of bird observations increased, although these are not primarily focused on Siberian White Crane. So far, these observations have not been reported in the western literature. This paper presents a review of the migration, population size and ecology of the westernmost population of Siberian White Crane.

Historical records at Volga delta

Already Pallas, who first described the species and who travelled extensively in the northern Caspian area, remarked that 'in spring the Siberian White Crane could be encountered in pairs at the lower Volga and along the shores of the Caspian Sea' (cited in Deglan & Scherb 1915). Old archives revealed that in 1737 the tsars were supplied with Siberian White Cranes from Astrakhan (Kirikov 1966). The birds had been caught close to the city. At that time, other cranes were brought to a bird zoo in Astrakhan. It appeared that Siberian White Cranes were already not very common at that time ('we succeeded in catching 10 birds'). Other references to the cranes from the 19th century can be found but only Jakovlev (1872) mentioned their numbers: in spring, flocks of up to 300 migrating cranes were seen. This number has often been quoted subsequently. In information of the Astrakhan Nature Reserve, the species is first mentioned in 1927. These data have already partly been published (Vorobjov 1936, Lugovoj 1963, Russanov & Tschernjanskaja 1976).

Timing of migration

The climatological spring lasts between 36 and 64 days in the lower Volga. On average, it starts in the second decade of March, while summer already sets in late April/early May. In spring, Siberian White Cranes arrive in the nature reserve on average on 26 March (c 10 days; n=39), generally shortly after spring has started. They leave on average on 11 April (c 10 days; n=21). They thus stay around for c 17 days (cf table 1). As there are no daily observations in the reserve, these figures should be regarded as a minimum. In years with an early onset of spring, during which harsh weather conditions are characteristic and when cold spells set in often, Siberian White Cranes often stay much longer, for example 44 days in 1968 and even 55 days in 1963. The most regular spring observations took place in the period between 1957 and 1984.

TABLE 2 Autumn migration of Siberian White Crane / Siberische Witte Kraanvogel *Grus leucogeranus* in Volga delta

Year	First observation	Last observation	Maximum number	Area*	Year	First observation	Last observation	Maximum number	Area*
1927	16 October	12 November	7	O	1983	13 September	-	3	O
1935	14 August	15 August	2	O	1984	13 October	-	2	O
1939	12 September	-	8	D	1985	9 September	25 September	4	O
1940	30 July	6 August	1	O	1986	4 October	17 October	3	O
1942	22 June	-	4	D	1987	5 October	16 October	3	O
1953	18 October	-	3	O	1988	28 September	12 October	3	O
1956	22 October	-	1	O	1989	20 September	28 September	2	O
1970	15 October	26 October	3	O	1990	21 September	19 October	2	O
1971	11 December	-	3	O	1991	7 October	23 October	9	O
1974	14 October	27 October	3	O	1992	25 September	15 October	3	O
1978	12 October	13 October	3	O	1993	8 October	20 October	3	O
1979	18 October	26 October	2	O	1994	20 September	16 October	8	O
1980	13 October	-	3	O	1995	8 October	27 October	5	O
1981	7 October	18 October	3	O	1996	9 October	23 October	13	O

*D = western part of reserve (Damschik), O = eastern part of reserve (Obschorov)

In autumn, Siberian White Cranes arrive in the Volga delta on average on 4 October (c 12 days; n=24) and leave on 23 October (c 9 days; n= 6) (cf table 2). Therefore, the average staging time is 19 days. The observations in November and even December are clearly correlated with favourable weather, which is not rare in autumn and early winter. Interpretation of several summer records, made in the 1930s and 1940s, is difficult. Siberian White Cranes are only rarely observed in early autumn.

Numbers

Table 1 shows that the largest spring flocks of Siberian White Cranes were observed between 1963 and 1980 (up to 22 birds). Interestingly, in the winter of 1979/80 a wintering flock of 16 birds was observed in Iran (V Vinogradov pers comm). In most cases, five birds or less were observed in the Volga delta in spring. First-year birds were observed on 28 March 1980 and on 20 March 1981 (V Vinogradov pers comm).

Since 1970, autumn flocks often consisted of three birds, rarely more (cf table 2). On 26 October 1970, one young Siberian White Crane was observed in a flock of three (G Krivonossov pers comm). In subsequent years, families consisting of two adults and one young bird have been reliably observed on 12-13 October 1978, 13 October 1980, 25 October 1985, 28 September 1988 and 18 October 1990. In 1996, 13 Siberian White Cranes were observed in the eastern part of the reserve during 10-14 October, including three pairs with one young (Kayser 1996). However, A Kaschin mentioned in the 1996 internal report of the reserve a maximum of 10 birds on 11 October, consisting of three groups of three birds (without specifying their ages) and one single bird. Moreover, he mentioned an observation of two young in a group of seven birds on 17 October. During rare occurrences in early autumn, the largest number of birds observed was eight in September 1939.

Habitat choice

The long staging periods of Siberian White Cranes in the Volga delta, both in spring and in autumn, indicate that the right habitat is available for this species to gain reserves for its journey to the breeding and wintering grounds. In spring the majority of records of staging Siberian White Cranes come from the western part of the reserve (so-called Damschik). It is noteworthy that, after 1985, Siberian White Cranes ceased to occur regularly in the western part of the nature reserve. At the same time, observations in the eastern part of the reserve increased, after a long period of absence there. The birds are regularly observed in flocks of Whooper Swans *Cygnus cygnus* or Greylag\ Geese *Anser anser* searching for food in the lotus flower fields. Possibly, the cranes dig up roots of these plants with their massive bills, as well as other food. The cranes always rest in the low water lagoons at the southern edge of the



Siberian White Cranes / Siberische Witte Kraanvogels *Grus leucogeranus* with Swan Geese / Zwaanganzen *Anser cygnoides*, Lake Poyang, China, January 1997 (Jürgen Schneider)

delta (called 'Kultuks' by local people). In the western part of the reserve, a long-time favoured spot is the 'Sasan-Kultuk' which covers 400-500 ha. It is a shallow water habitat with rich plant and animal food supplies. In the north it is bordered by riverine forests, which in turn are surrounded by reed beds. During periods of low water levels, bare islands of mud are created in the mouth of the river, attracting swans, geese, herons and other birds. These are also frequently visited by the cranes. In March and April, before the start of high water levels, water levels at the southern edge of the delta are generally low (depth 30-40 cm), which creates a favourable ecological situation for the cranes. The rise of the water level of the Caspian Sea has had a huge impact on water depths in the region, although it has not led to major changes in the resting behaviour of the cranes yet.

In the eastern part of the reserve (so-called 'Obschorov'), Siberian White Cranes rest at the southern edge of the delta as well. Only in the central part of the reserve the cranes were observed at an enclosed water area during 1956-57. This area is located rather close to the southern edge of the delta. In 1985 one Siberian White Crane was observed here in flight. During autumn migration, Siberian White Cranes almost always rest in the eastern part of the reserve. Only in 1939 and 1942 cranes were observed in the western part.

Protection and the future

The records of family groups with young indicate that the western population of Siberian White Crane has not lost its potential of breeding. Although the observations of three young birds in 1996 gives some hope for the future, the western population of Siberian White Crane is still highly threatened due to human persecution and habitat destruction.

We know of two old records of Siberian White Cranes shot in the Volga delta, namely in March 1939 and on 8 April 1953. In both cases a female was killed. In recent years, the Volga delta has been visited during autumns by a large number of hunting tourists from several European countries. The disturbance caused by them, as well as by local hunters, is considerable, shown by the fact that the staging cranes are only found in the guarded Nature Reserve, where hunting is forbidden. From time to time the entire western population

of Siberian White Cranes is present in the area of the Astrakhan Nature Reserve for weeks, as in October 1996, therefore this reserve in the Volga delta is of the utmost importance for the continued survival of the western population of Siberian White Crane. It serves as a resting area free of disturbance, between the breeding and wintering areas. The survival of the reserve in its present form can hardly be called safe, in view of the political, social and economical transformation process in the former Sovjet

Union and the present deplorable financial state of the public nature protection in Russia. For future preservation of the reserve, it is necessary that western organizations for the protection of nature will get involved. For instance, they are already involved in supporting the monitoring and guarding programmes financially in name of the European Natural Heritage Fund (EURONATUR).

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We want to thank all ornithologists and other people who, for decades, contributed to our knowledge of the Astrakhan Nature Reserve.

Samenvatting

SIBERISCHE WITTE KRAANVOGELS IN DE WOLGADELTA Siberische Witte Kraanvogel *Grus leucogeranus* is een van de zeldzaamste en meest bedreigde vogelsoorten van de wereld. De soort broedt in drie gescheiden populaties (figuur 1). De meest oostelijke populatie in Yakutia, Rusland (c 3000 vogels), overwintert in China; deze overwinteringsgebieden werden pas in de jaren 1980 ontdekt. Het broedgebied van de kleine populatie die vanouds overwintert in Bharatpur, India, werd ontdekt in 1981 en bevindt zich in het Kunovatbekken, Rusland, net ten oosten van de Oeral. Hoewel gevreesd werd dat deze populatie was uitgestorven, verscheener, er in het najaar van 1996 toch weer vijf vogels in Bharatpur.

De Wolgadelta, Rusland, was vanouds een doortreken pleistergebied voor Siberische Witte Kraanvogels. Dit artikel beschrijft de doortrek (in heden en verleden). De herkomst van deze vogels was echter lange tijd onduidelijk. Ze overwinteren in Noord-Iran, langs de zuidoostkust van de Kaspische Zee. De broedgebieden waren echter onbekend en meestal werd aangenomen dat ook deze vogels afkomstig waren uit het Kunovatbekken. In 1996 werd door middel van het per satelliet volgen van enkele in gevangenschap opgegroeide en in het overwinteringsgebied in Iran losgelaten en gezenderde vogels het broedgebied ontdekt van deze naar blijkt aparte populatie. Dit bevindt zich in het West-Siberische laagland ten noorden van de stad Tyumen, Rusland. Hoewel dit broedgebied slechts op 600 km afstand ligt van het Kunovatbekken, is er vermoedelijk geen enkel contact tussen beide populaties omdat het trekpatroon geheel verschillend is. Beide populaties zijn zeer klein, vermoedelijk niet meer dan 25 vogels.

References

- Archibald, G & Kanai, Y 1998. The mystery of the missing siberians. ICF-Bugle 24/1: 2-3.
- Deglan, S D & Scherb, S 1915. [European Ornithology or the systematic description of the observed birds of Europe.] St Petersburg. [In Russian.]
- del Hoyo, J, Elliott, A & Sargatal, J (editors) 1996. Handbook of the birds of the world 3. Barcelona.
- Jakovlev, V 1872. [List of birds of the Astrakhan government.] Bull Moscow Nat Soc 45 (4): 323-361. [In Russian.]
- Kayser, A 1996. Westliche Population des Schneekranichs *Grus leucogeranus* im Aufwind? Limicola 10:319.
- Kirikov, S V 1966. [Hunted animals, environment and man.] Moscow. [In Russian.]
- Lugovoj, A E 1963. [Birds of the Volga delta.] Astrakhan Nat Res Ser 8: 9-185. [In Russian.]
- Potapov, R L & Flint, V E 1989. Handbuch der Vögel der Sowjetunion 4. Wittenberg.
- Russanov, G M & Tschernjanskaja, S I 1976. [The Siberian White Crane in the Volga delta.] Oks Nat Res Ser 8: 101-107. [In Russian.]
- Snow, D W & Perrins, C M (editors) 1998. The birds of the Western Palearctic. Concise edition. Oxford.
- Vorobjov, K A 1936. [Information on the avifauna of the Volga delta and the surrounding steppes.] Astrakhan Nat Res Ser 1: 3-52. [In Russian.]

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Bibliography of published items compiled by the International Crane Foundation

- Ahmad, Ashiq, and Najam adapted by Tanya Shaykh Khurshid. "Observations of Migration and Migratory Routes of Cranes Through Baluchistan." article. Natura (1991): pp. 8-11.
- Ahmad, Ashiq, and S. Iqmail Hussain Shah. "The Future of Cranes in Pakistan With Special Reference to the Northwest Frontier Province." Proceedings 1987 International Crane Workshop: ed. James T. Harris. Baraboo, Wis.: International Crane Foundation, 1991. pp. 335-39.
- Alhainen, J., et al. "The Crane Work in Finland." Third European Crane Workshop: European Crane Working Group at "Projekt Kranichschutz Deutschland". Straslund: WWF/NABU, 1996. p.62.
- Anderson, Elizabeth C. "Four Case Studies in US-USSR Wildlife Conservation Cooperation." M.S. thesis. Cornell University, 1978.
- Archibald, George W. "Aerial Censusing As a Valuable Technique in Crane Conservation." typescript. Bokmakierie 33.3 (1981): 60-61.
- . "Conservation of Siberian Cranes in West Asia." Third European Crane Workshop: European Crane Working Group at "Projekt Kranichschutz Deutschland". Straslund: WWF/NABU, 1996. p.19.
- . "Crane Taxonomy As Revealed by the Unison Call." Proceedings of the International Crane Workshop: ed. James C. Lewis. [Stillwater, Okla.]: Oklahoma State University, 1976. pp. 225-51.
- . "The Fading Call of the Siberian Crane." article. National Geographic 185.5 (1994): 125-36.
- . "ICBP/SSC Crane Specialist Group: Cranes in Asia." article. Species .19 (1992): p. 67.
- . "Last Call for the Siberian Crane." article. Natural History (1981): p. 58-61.
- . "The Lily of Birds : the Elegant Siberian Crane." article. Surviving Together 11.4 (1993): pp. 14-15.
- . "Ron Sauey and the Siberian Cranes." article. Journal of Ecological Society 5 (1992): pp. 41-48.
- . "The Siberian Crane: a Status Report." article. CMS Bulletin .No. 4 (1993): unpaginated.
- . "Siberian Cranes for North America." Proceedings 1981 Crane Workshop: editor J. C. Lewis. Tavernier, Florida: National Audubon Society, 1982. 129-34.
- . "Siberian Success." article. Environmental Awareness 13.4 (1990): 115-17.
- Archibald, George W., and Steven Landfried. "Conservation Measures for the Siberian Crane." Wetland and Waterfowl Conservation in South and West Asia: eds Michael E. Moser and J. van Vesseem. Slimbridge, UK: IWRB, 1993. 85-87.
- Archibald, George W., and Debra L. Viess. "Captive Propagation at the International Crane Foundation 1973-78." Proceedings, 1978 Crane Workshop: ed. James C. Lewis. [Fort Morgan, Colo.]: Colorado State Univ and National Audubon Soc, 1979. pp. 51-73.
- Ashtiani, Mohammad Ali. "Distribution and Conservation of Cranes in I.R. Iran." Third European Crane Workshop: European Crane Working Group at "Projekt Kranichschutz Deutschland". Straslund: WWF/NABU, 1996. p.20.
- . "Distribution and Conservation of Cranes in the Islamic Republic of Iran." Pan-Asian Ornithological Congress & XIII BirdLife Asia Conference.
- . "Siberian Crane As a Wintering Bird in Iran." Proceedings of the 1983 International Crane Workshop: editors George W. Archibald and R. F. Pasquier. Baraboo, Wisconsin: International Crane Foundation, 1987. 135-37.
- Behrouzi-Rad, Behrouz. "The Current Status of Three Species of Cranes in Iran." Salim Ali Centenary Seminar on Conservation of Avifauna of Wetlands and Grasslands. Abstracts: Bombay Natural History Society, 1996.
- Bhatnagar, R. "A Case of Tumour in Siberian Crane." Newsletter for Birdwatchers 20:4:16 (1980).
- Bold, A. "Cranes of the Mongolian People's Republic." Crane Research Around the World: Proceedings of the International Crane Symposium at Sapporo, Japan in 1980 and Papers From the World Working Group on Cranes, International Council for Bird Preservation: editors James C. Lewis and Hiroyuki Masatomi. 1981. 49.
- Bold, A., N. Tseveenmyadag, and Boris M. Zvonov. "Cranes in Mongolia." Cranes and Storks of the Amur River: The Proceedings of the International Crane Workshop: eds Curtis H. Halvorson, James T. Harris, and Sergei M. Smirenski. Moscow: Arts Literature Publishers, 1995. 42-47.
- Bouffard, Steven H. "Human Impacts on Cranes in Northeast China." The Proceedings of the Second Annual International Crane Symposium: People, Water and Wildlife: Human Population Impacts on Cranes: editors Heather Whitaker and Cathy Schimmel. Boulder, Colorado: National Audubon Society, 1994. 23-29.
- Brar, A. S. "Distribution and Habitat Utilization by Captive Reared Siberian Crane *Grus leucogeranus* in Keoladeo National Park, Bharatpur." Salim Ali Centenary Seminar on Conservation of Avifauna of Wetlands and Grasslands. Abstracts: Bombay Natural History Society, 1996. 2.
- Brar, Arvinder S. "Management of Bio-Diversity of Keoladeo National Park." article. WII Newsletter 8.1-4 (1993): 3-4.
- Brar, Arvinder Singh. "Land of the Siberian Crane." article. Sanctuary 14.4 (1994): 14-21.
- Brazil, Mark A. "The Birds of Shuangtaizihekou National Nature Reserve, P.R. China." article. Forktail 7 (1992): 91-124.
- Breeden, S., and B. Breeden. "The Drought of 1979-1980 at the Keoladeo Ghana Sanctuary, Bharatpur, Rajasthan." article. J. Bombay Nat. Hist. Soc. 79.1 (1982): 1-34.
- Cao Jiangying. "Distribution and Protection of Cranes and Storks in Inner Mongolia, China." Cranes and Storks of the Amur River: The Proceedings of the International Crane Workshop: eds Curtis H. Halvorson, James T. Harris, and Sergei M. Smirenski. Moscow: Arts Literature Publishers, 1995. 48-49.
- Chang Jiachuan, and Li Pingjun. "A Comparison of the Structure and the Pectoral Girdle in Four Species of Crane." Proceedings 1987 International Crane Workshop: ed. James T. Harris. Baraboo, Wis.: International Crane Foundation, 1991. p. 193.
- Chaudhry, Inayat Ullah. "Crane Conservation in Pakistan." Asia Crane Congress: 1989.
- Chen Bin, and Wang Zuoyi. "Observations on Wintering Ecology of Cranes at Poyang Lake." Proceedings 1987 International Crane Workshop: ed. James T. Harris. Baraboo, Wis.: International Crane Foundation, 1991. pp. 105-07 (Chpt. 3).
- Cheng Meirong et al. "Endangered, Rare, and Vulnerable Birds in Asia." article. Chinese Wildlife 6 (1984): 29-32.

- Cheng Tso-hsin (=Zheng Zuo-xin). "Major Achievements of the Crane Research in China." article. Chinese Wildlife 2.14 (1987): p. 3-4.
- Cheng Tsohsin (=Zheng Zuoxin), and George W. Archibald. "Systematic Keys to the Cranes of the World." article. Acta Zoologica Sinica 32.2 (1986): p. 189-93.
- Cherrington, Mark. "All Quiet on the Mekong." article. Earthwatch (1990): pp. 16-23.
- Choudhury, Anwaruddin. "Status and Conservation of the Cranes in North-East India." Salim Ali Centenary Seminar on Conservation of Avifauna of Wetlands and Grasslands. Abstracts: Bombay Natural History Society, 1996. 5.
- Curro, Thomas G., Julie A. Langenberg, and Lynn Deakin. "Radiographic Analysis of the Development of the Pelvic Limb of Captive-Reared Cranes (*Grus* Spp.)." Zoo Biology 15 (1996): 143-57.
- Davidson, Neil. "A Possible Hybrid Common Crane (Gg) X Siberian White Crane (Gl) in Turkey." article. Bulletin Ornithological Society, Middle East 15.1 (1985): 3.
- Degtyaryev, A. G., and Y. V. Labutin. "Siberian Crane in Yakutia: Range, Migration, Numbers." Zoology Journal 70.1 (1991): 63-75.
- Dessauer, Herbert, George F. Gee, and James S. Rogers. "Allozyme Evidence for Crane Systematics and Polymorphisms Within Populations of Sandhill, Sarus, Siberian, and Whooping Cranes." article. Molecular Phylogenetics and Evolution 1.4 (1992): pp. 279-88.
- Dey, S. C. "Siberian Crane: Status Report and Indian Situation." article. Environ Magazine 11.1 (1994): 57-61.
- Drewien, Roderick C., and James Lewis. "Status and Distribution of Cranes in North America." Proceedings of the 1983 International Crane Workshop: editors George W. Archibald and R. F. Pasquier. Baraboo, Wisconsin: International Crane Foundation, 1987. 469-77.
- Dybowski, G., and A. Parrex. "Verzeichnis Der Vogel Von Darasum in Daurien." article. J. Ornith. 16 (1868): 336-37.
- Ellis, David H., and Uri Markin. "Satellite Monitors Cranes Migrating From Siberia." article. Journal of Ecological Society 4 (1991): 23-28.
- Engstrom, Henri. "Sibiriska Snötranan Spårade Med Satellit." Fauna Och Flora: Naturhistoriska Riksmuseet. No. 4 (1997): 28-36.
- Fearnside, P. M. "China's Three Gorges Dam: "Fatal" Project or Step Toward Modernization?" article. World Development 16.5 (1988): 615-30.
- Ferguson, David. "Making Crane Conservation Work in Southwest Asia." The Proceedings of the Second Annual International Crane Symposium: People, Water and Wildlife: Human Population Impacts on Cranes: editors Heather Whitaker and Cathy Schimmel. Boulder, Colorado: National Audubon Society, 1994. 33-37.
- Flint, Vladimir E., and A. A. Kistchinski. "The Siberian Crane in Yakutia." Crane Research Around the World: Proceedings of the International Crane Symposium at Sapporo, Japan in 1980 and Papers From the World Working Group on Cranes, International Council for Bird Preservation: editors James C. Lewis and Hiroyuki Masatomi. 1981. 136-45.
- Flint, Vladimir E., and V. G. Panchenko. "The Breeding Farm of Rare Crane Species: Results of Two-Years Investigations and Prospects." article. Cranes of East Asia (1982): 79-85.
- Flint, Vladimir E., and Alexander G. Sorokin. "The Biology of the Siberian Crane (Sterkh) in Yakutia." Crane Research Around the World: Proceedings of the International Crane Symposium at Sapporo, Japan in 1980 and Papers From the World Working Group on Cranes, International Council for Bird Preservation: editors James C. Lewis and Hiroyuki Masatomi. 1981. 146-49.
- . "The Modern Status of the Yakut Population of Siberian White Crane." article. Cranes of East Asia (1982): 60-65.
- Fomin, V. E., and A. Bold. "Rare Birds Conservation in Mongolia." abstract. XIX Congressus Internationalis Ornithologicus Abstracts 630 (1986).
- Forbes, W. A. "On the Convoluted Trachea of Two Species of Manucode; With Remarks on Similar Structures in Other Birds." Proc. Zool. Soc. of London (1882): 347-53.
- Futehally, Z. "Siberian Cranes Discovered in Iran & China." Newsletter for Birdwatchers 21:9-10:17 (1981).
- Futehally, Zafer. "The Siberian Crane." article. Newsletter for Birdwatchers 32.9&10 (1992): p. 2.
- Gole, Prakash. "Crane Conservation in India: Need to Reshape the Whole Effort." Salim Ali Centenary Seminar on Conservation of Avifauna of Wetlands and Grasslands. Abstracts: Bombay Natural History Society, 1996. 4.
- Gui Xiao Jie. "Protection and Habitat Management for Wintering Cranes at Dongting Lake of the Yangtze River, China." Cranes and Storks of the Amur River: The Proceedings of the International Crane Workshop: eds Curtis H. Halvorson, James T. Harris, and Sergei M. Smirenski. Moscow: Arts Literature Publishers, 1995. 163-67.
- Gui Xiaojie. "Cranes Wintering at East Dongting Lake." Proceedings 1987 International Crane Workshop: ed. James T. Harris. Baraboo, Wis.: International Crane Foundation, 1991. pp. 113-14 (Chpt. 3).
- Harris, James T. "Cranes, People and Nature: Preserving the Balance." The Future of Cranes and Wetlands: Proceedings of the International Symposium: editors Hiroyoshi Higuchi and Jason Minton. Tokyo, Japan: Wild Bird Society of Japan, 1994. 1-14.
- . "In Pursuit of Mongolia's Cranes." article. The ICF Bugle 18.4 (1992): 1, 4-5.
- . "International Conservation Activities for Migratory Cranes and Their Habitats." U.S.-Canada-China-Russia Migratory Bird Conference: 1992.
- Harris, James T., et al. "Results of Chinese—Russian—American Investigation of Cranes Wintering at Poyang Lake Nature Reserve, China." Cranes and Storks of the Amur River: The Proceedings of the International Crane Workshop: eds Curtis H. Halvorson, James T. Harris, and Sergei M. Smirenski. Moscow: Arts Literature Publishers, 1995. 57-72.
- Hartman, L., Duncan. S., and George W. Archibald. "The Hatching Process in Cranes, With Recommendations for Assisting Abnormal Chicks." 1985 Crane Workshop: J.C. Lewis. 1987. 387-97.
- Hartman, Lisa, Steve Duncan, and George W. Archibald. "The Hatching Process in Cranes With Recommendations for Assisting Abnormal Chicks." Proceedings 1985 Crane Workshop: workshop co-chairman James C. Lewis. Grand Island, Nebraska: Platte River Whooping Crane Habitat Maintenance Trust and U.S. Fish and Wildlife Service, 1987. p. 387-97.
- Hereford, Scott G. "Semen Volumes and Peak Production Periods for Cranes at the International Crane Foundation." Proceedings of the 1983 International Crane Workshop: editors George W. Archibald and R. F. Pasquier. Baraboo, Wisconsin: International Crane Foundation, 1987. 525-34.
- Higuchi, Hiroyoshi. "Tracking Cranes by Satellite in Eastern Asia." article. The ICF Bugle 19.4 (1993): 4-5.
- Higuchi, Hiroyoshi et al. "Satellite Tracking of the Migration Routes of Whistling Swans *Cygnus Columbianus*." article. Journal of the Yamashina Institute for Ornithology 23.1 (1991).
- Hildebrandt, Jörn. "Ornithologische Eindrücke Aus Dem Keoladeo-Nationalpark in Nordindien." article. (no date): 121-24.

- Hongxing, Hu. "Crane Information From Hubei Province." *China Crane News* 1, July 1997 (1997): 21.
- Horwich, Robert H. "Crane Rearing Techniques." article. *On the Edge* No. 28 (1985): pp. 6-7.
- Hunt, Michelle C. "Analysis of the Relationship Between Egg Order (1 - 15) and Egg Quality As Determined by Hatching and Fleging Rates in Siberian, Florida Sandhill, White-Naped and Red-Crowned Cranes." article. *Avicultural Magazine* 100.1 (1994): 29-34.
- Hykle, Douglas. "Bonn Convention Actions for the Siberian Crane." article. *IWRB News* 10 (1993): p. 13.
- Ingold, James L. "Systematics and Evolution of the Cranes (Aves: Gruidae)." Ph.D. thesis. Miami University, 1984.
- Ingold, James L., Sheldon I. Guttman, and David R. Osborne. "Biochemical Systematics and Evolution of the Cranes (Aves: Gruidae)." *Proceedings of the 1983 International Crane Workshop*: editors George W. Archibald and R. F. Pasquier. Baraboo, Wisconsin: International Crane Foundation, 1987. 577-84.
- Ingram, M. "Ronald Sauey (1949-1987)." *Earthwatch* (1987): 6.
- International Crane Foundation. "Mini Nagendran Arrives With Rare Chicks in Siberia." article. *Journal of Ecological Society* 5 (1992): pp. 55-57.
- Iqbal, Perwez. "Breeding Behaviour in Sarus Crane (*Grus Antigone Antigone*)." M.S. thesis. Muslim University, Aligarh, 1992.
- Proceedings of the Asian Wetland Symposium: Towards Wise Use of Asian Wetlands*: Hiroji Isozaki, Motokazu Ando, and Yoshihiro Natori. Japan: International Lake Environment Committee Foundation, 1993.
- IUCN. "China—the Largest Colony of Siberian Cranes." article. *IUCN Bulletin* 15.4-6 (1984).
- Jarvi, Susan I., et al. "Identification of Segregating Haplotypes of the Major Histocompatibility Complex in Cranes." *Proceedings of the Sixth North American Crane Workshop*: coord. ed. Dale W. Stahlecker. Grand Island, Neb.: North American Crane Working Group, 1992. p. 171.
- Ji Jiayi, and Yu Xinjian. "Cranes in Shandong Province." *Proceedings 1987 International Crane Workshop*: ed. James T. Harris. Baraboo, Wis.: International Crane Foundation, 1991. pp. 149-51.
- Johansen, Hans. "Die Vogelfauna Westsiberiens." *Journal Für Ornithologie* 102 (Section on cranes only) (1961): 240-45.
- John, D. E., and C. J. Issel. "Superpowers Unite to Save Siberian Crane." article. *Field Museum of Natural History Bull.* 51.2 (1980): 22-23.
- Kessel, B. "Migration of Sandhill Cranes in East-Central Alaska, With Routes Through Alaska and Western Canada." article. *Canadian Field-Naturalist* 98.3 (1984): 279-92.
- Koga, Tadamichi. "Studies on the Reproduction of Cranes, Especially on Their Artificial Incubation and Breeding." article. *Journal of Japanese Association of Zoological Gardens and Aquariums* 3.3 (1956): 51-68.
- Kohl, Steven G. "U.S.-Soviet Cooperation Yields 20 Years of Success." article. *Fish and Wildlife News* (1993): p. 20.
- Konrad, Paul M. "Requiem." article. *Wildbird* (1994): Editor's notebook.
- . "Status and Ecology of Wattled Crane in Africa." *Crane Research Around the World: Proceedings of the International Crane Symposium at Sapporo, Japan in 1980 and Papers From the World Working Group on Cranes, International Council for Bird Preservation*: editors James C. Lewis and Hiroyuki Masatomi. 1981. 220-37.
- Krajewski, Carey. "Phylogenetic Relationships Among Cranes (Aves: Gruidae) Based on DNA Hybridization." Ph.D. thesis. UW-Madison, 1988.
- Krajewski, Carey, and James W. Fetzner. "Phylogeny of Cranes (Gruiformes: Gruidae) Based on Cytochrome-b DNA Sequences." article. *The Auk* 111.2 (1994): 351-65.
- Kumar, P. "Vanishing Visitors: The Great White Siberian Crane." article. *Frontline* (1994): 63-74.
- . "Waiting for the Sibes: Avian Experiments at Bharatpur." *Frontline* (1995): 66-71.
- . "Where Have All the Cranes Gone?" *Span* (1994): 2-7, 10.
- . "Will the Wild Sibes Ever Come?" article. *the Hindu Magazine* (1994): 1, 10.
- Kumar, Sanjay. "Return of the Lost Cranes." *New Scientist* (1996).
- Kuyt, Ernie. "Management and Research of Whooping Cranes, 1965-1982." *Proceedings of the 1983 International Crane Workshop*: editors George W. Archibald and R. F. Pasquier. Baraboo, Wisconsin: International Crane Foundation, 1987. 365-69.
- Lall, Shalini, and Lata Raman. "Siberian Cranes: Last Indian Winter?" article. *WWF India Quarterly* 5.1 (1994): 22-23.
- . "The Siberian Cranes' Last Indian Winter." article. *Asian Wetland News* 7.2 (1994): 23.
- Landfried, S. "Calling for the Cranes." article. *ICF Quarterly Newsletter* 6.4 (1980).
- . "Saving the Siberian Crane." article. *Lawrence Today* (1984): 4-9.
- . "Saving the Siberian Crane: Another Step." article. *WWF-Pakistan Newsletter* 2.1 (1983).
- . "Siberian Cranes at Bharatpur." article. *World Wildlife Fund—India, Bombay, India, 4th Quarter* (1980): 7-9.
- . "Siberian Cranes: Going, Going...." article. *IUCN Bull., New Ser.* 11.9/10 (1980): 85.
- . "Siberian Cranes—Great Birds in Peril." article. *Nature Clubs of India, Bombay, India* (1980-1981): 2-3.
- . "Untitled." article. *WWF News* 42 (1986): 7.
- Landfried, Steven. "Western Flocks of Siberian Cranes at the Brink of Extinction." article. *Natura* (1991): 4-5, 7.
- Landfried, Steven E. "Integrating Education and Research for Cranes in Pakistan." *The Proceedings of the Third Annual International Crane Symposium: People, Water and Wildlife: Human Population Impacts on Cranes*: editor Cathy Schimmel. Boulder, Colorado: National Audubon Society, 1995. 63-69.
- Langenberg, Julie A. "Mycoplasma Pododermatitis (Bumblefoot) in a Siberian Crane (*Grus Leucogeranus*)." *Proceedings. American Association of Zoo Veterinarians, Wildlife Disease Association, American Association of Wildlife Veterinarians: Joint Conference*: eds Randall E. Junge. AAZV/WDA/AWV321-23.
- Levin, Julia. "Reports: Siberia for Sale: A Russian Timber Rush in a Regulatory Void." article. *Audubon* (1993): 20-24.
- Li Fangman, and Li Peixun. "The Spring Migration of Siberian Cranes at Lindian County, Heilongjiang Province, China." *Proceedings 1987 International Crane Workshop*: ed. James T. Harris. Baraboo, Wis.: International Crane Foundation, 1991. pp. 133-34.
- Li Jinlu, and Feng Kemin. "Overwintering of Red-Crowned and Siberian Cranes in China." *Proceedings 1987 International Crane Workshop*: ed. James T. Harris. Baraboo, Wis.: International Crane Foundation, 1991. p. 191.
- . "Overwintering of Red-Crowned Crane and Siberian Crane in China." article. *Journal of Northeast Forestry University* 13.3 (1985): pp. 135-42.
- Li Yongzeng. "The World's Largest Flock of White Cranes ." article. *Beijing Review* 17 (1984): 25-27.
- Linden, Eugene. "The Rape of Siberia: Earth's Great Northern Landscape Was Plundered and Polluted Under

- Communism. Can It Be Saved by Capitalism?" *Time* (1995): 45-53.
- Liu Zhiyong, and Chen Bin. "Wintering Ecology of the Siberian Crane." *Proceedings 1987 International Crane Workshop*: ed. James T. Harris. Baraboo, Wis.: International Crane Foundation, 1991. pp. 109-11 (Chpt. 3).
- Luthin, Charles S., et al. "Captive Breeding of Endangered Cranes, Storks, Ibises, and Spoonbills: a Summary." manuscript. *International Zoo Yearbook* 24 (1985).
- Müller, H. E. J. "Einige Beobachtungen Zum Herbstlichen Vogelzug in Der Mongolei." article. *Erforschung Biologischer Ressourcen Der Mongolischen Volksrepublik* 5 (1986): 95-98.
- Ma Guoen. "Cranes on the Middle and Lower Reaches of the Nenjiang River, The People's Republic of China." *Proceedings of the 1983 International Crane Workshop*: editors George W. Archibald and R. F. Pasquier. Baraboo, Wisconsin: International Crane Foundation, 1987. 61-62.
- Ma Yiqing. "Status and Conservation of Cranes in China." *Proceedings 1987 International Crane Workshop*: ed. James T. Harris. Baraboo, Wis.: International Crane Foundation, 1991. pp. 27-33.
- Ma Yiqing et al. "An Aerial Survey on Red-Crowned Cranes and Other Rare Waders of the Wuyuerhe River Basin of Heilongjiang Province." article. *Acta Zoologica Sinica* 33.2 (1987): 187-91.
- Malik, D. "The Siberian Crane in the Little Rann of Kutch." *Newsletter for Birdwatchers* 31:1-2: 13 (1991).
- Malik, Mohammed Mumtaz. "The Evolution of a Crane Refuge in the Northwest Frontier Province ." *The Proceedings of the Third Annual International Crane Symposium: People, Water and Wildlife: Human Population Impacts on Cranes*: editor Cathy Schimmel. Boulder, Colorado: National Audubon Society, 1995. 61-62.
- Maroldo, G. "Cranes in Asian Zoos, 1981." article. *Avic. Mag.* 88.2 (1982): 104-09.
- Masatomi, H. "Ornithology and Birds of Nepal." article. *Source Unknown (Japanese Periodical)* (1986): 5-22.
- Masatomi, Hiroyuki. "Ornithology and Birds of Nepal." article. *Source Unknown (Japanese Periodical)* (1986): 5-22.
- Mashallah, Bahrami Nasab. "Wintering Ground of the Siberian Crane in Iran." *Third European Crane Workshop: European Crane Working Group at "Projekt Kranichschutz Deutschland"*. Straslund: WWF/NABU, 1996. p.66.
- Matthiessen, Peter. "The Last Cranes of Siberia." article. *The New Yorker* (1993): pp. 76-86.
- McCleary, D. "75-Year-Old Crane Probable Papa." *Am. Pheasant and Waterfowl Soc. Mag.* 85.2 (1985): 10-11.
- Meadows, Robin. "A Haven Among the Reeds." *Zoogoer* 22.4 (1993): 18-26.
- Meine, Curt D. "The Calling of Cranes." article. *World Birdwatch* 15.4 (1993): p. 14-17.
- Melville, David S. "Management of Jiangxi Poyang Lake National Nature Reserve, China." *Mitt. Internat. Verein. Limnol.* 24 (1994): 237-42.
- Mian, Afsar. "Crane Migration Through Baluchistan: A Preliminary Report." article. *Bombay Natural Hist. Society* Vol. 86.No. 1 (1989): pp. 98-100.
- . "Crane Migration Through Western Baluchistan." *Asia Crane Congress*: 1989.
- Miller, Paul E., et al. "Pseudomonas Aeruginosa-Associated Corneal Ulcers in Captive Cranes." article. *Journal of Zoo and Wildlife Medicine* 25.3 (1994): 449-54.
- Miller, Paul E., Julie A. Langenberg, and Faye A. Hartmann. "The Normal Conjunctival Aerobic Bacterial Flora of Three Species of Captive Cranes." *Journal of Zoo and Wildlife Medicine* 26.4 (1995): 545-49.
- Mirande, Claire M. "The Role of Captive Breeding in the Conservation of Cranes." *Proceedings 1987 International Crane Workshop*: ed. James T. Harris. Baraboo, Wis.: International Crane Foundation, 1991. pp. 425-31.
- Mirande, Claire M., James W. Carpenter, and Ann M. Burke. "The Effect of Disturbance on the Reproduction and Management of Captive Cranes." *Proceedings of the Seventh North American Crane Workshop*: Richard P. Urbanek and Dale W. Stahlecker. North American Crane Working Group, 1997. p. 56-61.
- Mobley, D. L. "Siberian White-Necked Cranes (Megalorhis Leucauchen)." article. *Aviculture, Ser. 2* 5.2 (1933): pp. 18-20.
- Moore, Molly. "In India, Endangered Crane Is Running Out of Time." article. *Newsletter for Birdwatchers* 34.2 (1994): 36-37.
- Nagendran, Meenakshi. "Behavioral Ontogeny and Release of Costume-Reared Siberian and Sandhill Crane Chicks." Ph.D. thesis. North Dakota State University of Agriculture and Applied Science, 1995.
- . "Crane Conservation Efforts: Siberian, Sandhill and Whooping Cranes, With Emphasis on the Siberian Crane." *The Proceedings of the Fourth Annual International Crane Symposium: People, Water and Wildlife: Human Population Impacts on Cranes*: editor Tim Wohlgenant. Boulder, Colorado: National Audubon Society, 1996. 11-15.
- . "Satellite Tracking of a Greater Sandhill Crane." *Proceedings of the Sixth North American Crane Workshop*: coord. ed. Dale W. Stahlecker. Grand Island, Neb.: North American Crane Working Group, 1992. p. 173.
- Nagendran, Meenakshi, and Robert H. Horwich. "Isolation-Rearing of Siberian Crane Chicks at the International Crane Foundation." *Proceedings, 1988 North American Crane Workshop: Nongame Wildlife Program Technical Report*. Don A. Wood. [Tallahassee, Florida]: Florida Game and Fresh Water Fish Commission, 1992. p. 245-48.
- Nankinov, Dimitar. "Das Vorkommen Des Nonnenkranichs Grus Leucogeranus in Der West- Palaearktis. The Occurrence of the Siberian Crane Grus Leucogeranus in the Western Palearctic." *Orn. Verh.* 25 (1996): 233-37.
- Nawaz, Mohammad. "Migratory Cranes in Pakistan." article. *Tigerpaper* 11.4 (1984): 17-20.
- Neufeldt, I. "The Manchurian Crane." article. *Okhota i Okhotnich'e Khoziaistvo (Hunting and Game Management)* 11 (1973): 47-48.
- Neufeldt, Irene A. "The Hooded Crane in the USSR." *Crane Research Around the World: Proceedings of the International Crane Symposium at Sapporo, Japan in 1980 and Papers From the World Working Group on Cranes, International Council for Bird Preservation*: editors James C. Lewis and Hiroyuki Masatomi. 1981. 239-43.
- Nikiforov, Victor. "Kytalyk Resource Reserve: Combining Establishment of Protected Areas With Indigenous Communities' Needs." *WWF Arctic Bulletin* .4 (1996): 19-20.
- . "Kytalyk Resource Reserve: Combining Establishment of Protected Areas With Indigenous Communities' Needs." *WWF Arctic Bulletin* 4.96 (1997): 19-20.
- Nishida, Satoshi. "Wintering Life of Cranes in Kagoshima and Yamaguchi Prefectures, Japan." *Crane Research Around the World: Proceedings of the International Crane Symposium at Sapporo, Japan in 1980 and Papers From the World Working Group on Cranes, International Council for Bird Preservation*: editors James C. Lewis and Hiroyuki Masatomi. 1981. 52-56.
- Nogge, G., and J. Niethammer. "Die Vögel Auf Den Basaren Von Kabul Und Charikar." article. *Afghanistan Journal*

- Nogge, Gunther. "Beobachtungen an Den Flamingobrutplätzen Afghanistans." article. Journal Für Ornithologie 115.2 (1974): 142-51.
- Olsen, Glenn et al. "Mycotoxin-Induced Disease in Captive Whooping Cranes (*Grus Americana*) and Sandhill Cranes (*Grus Canadensis*)." Journal of Zoo and Wildlife Medicine 26.4 (1995): 569-76.
- Osipova, M. A. "The Siberian Crane in the Eastern Part of the Range." Third European Crane Workshop: European Crane Working Group at "Projekt Kranichschutz Deutschland". Straslund: WWF/NABU, 1996. p.42.
- Ostapenko, W. A., and N. Zewenmjadag. "Über Verbreitung, Anzahl Und Biologie Der Kraniche Im Ostteil Der Mongolischen Volksrepublik." Beitr. Vogelkd. 29 (1983): [001]-005.
- Oza, G. M. "Cranes in Crisis!" article. Environmental Awareness 13.4 (1990): 101-04.
- Pae, Seong-Hwan, et al. "Current Status of Wintering Cranes in Korea." Bulletin of Korea Institute of Ornithology v. 5.no. 1 (1996): 13-20.
- Panchenko, V. G., and Vladimir E. Flint. "Five-Year Report (1979-1984) of the Crane Center at Oka Nature Preserve, USSR." Proceedings 1985 Crane Workshop: workshop co-chairman James C. Lewis. Grand Island, Nebraska: Platte River Whooping Crane Habitat Maintenance Trust and U.S. Fish and Wildlife Service, 1987. p. 371-76.
- Parmasto, E. "Palearctic Crane Workshop." Palearctic Crane Workshop: 1989.
- Perfiliev, V. I. "New Data on the Ecology of the White Crane." article. Bulletin of the Moscow Society for Nature 68.1 (1963): 25-28.
- Phillips, J. L. "Wintering Cranes in New England." article. Avicultural Magazine 3 (3rd ser.).8 (1912): pp. 222-24.
- Potapov, Eugene. "The Trans-Siberian Runaway." article. BBC Wildlife 9.6 (1991): pp. 414-19.
- Poulsen, Holger. "Agonistic Behaviour of Two Species of Cranes." article. Dansk Orn Foren Tidsskr 69 (1975): 119-22.
- Preece, Annette. "Exploring India." article. Birds (Magazine of Royal Society for Protection of Birds) 11.2 (1986): pp. 29-34.
- Prynn, David. "Tigers in the Russian Far East Face Renewed Dangers." article. Oryx 27.3 (1993): p. 130-31.
- Putnam, Mike S., and George W. Archibald. "The Siberian Crane: Its History and Biology in Captivity." Proceedings of the 1983 International Crane Workshop: eds. George W. Archibald and Roger F. Pasquier. Baraboo, Wis.: International Crane Foundation, 1987. pp. 173-95.
- Qishan, W. "Lake Shengjin of Anhui Province, China." article. Asian Wetland News 1 (1988): 15-16.
- Quigley, Howard B. "Saving Siberian Tigers." article. National Geographic 184.1 (1993): pp. 38-47.
- Rainbow. "Life of a Nomad." article. Rainbow (1985): 10-11.
- Ripley, S. Dillon. "View From the Castle." Smithsonian August (1980): 6.
- Roberts, T. J., and S. E. Landfried. "Hunting Pressures on Cranes Migrating Through Pakistan." Proceedings of the 1983 International Crane Workshop: editors George W. Archibald and R. F. Pasquier. Baraboo, Wisconsin: International Crane Foundation, 1987. 139-45.
- Robiller, Franz, and K. Trogisch. "Schutzprojekte Und Zucht Der Kraniche Im Vogelpark, Walsrode: Species of Cranes and Their Shelters at Vogelpark, Walsrode, Germany." article. Die Gefiederte Welt 108.10 (1984): p.269-72.
- Robson, Craig. "Waterfowl Counts in China Record Valuable Data." article. Oriental Bird Club (1990): 12.
- Rogers, Susan. "Weight Loss and Egg Shell Thickness of Crane Eggs." Proceedings of the 1983 International Crane Workshop: editors George W. Archibald and R. F. Pasquier. Baraboo, Wisconsin: International Crane Foundation, 1987. 585-95.
- Sakovich, Igor. "Crane, the Bird of Peace." article. Russian Conservation News (1995): 17-18.
- Sauey, Ronald T. "The Behavior of Siberian Cranes Wintering in India." Proceedings of the International Crane Workshop: ed. James C. Lewis. [Stillwater, Okla.]: Oklahoma State University, 1976. pp. 326-42.
- . "The Cranes of Zhalong." article. Animals (1985): pp. 16-21.
- . "Disturbance Factors Affecting Siberian Cranes at Keoladeo National Park, India." Proceedings of the 1983 International Crane Workshop: editors George W. Archibald and R. F. Pasquier. Baraboo, Wisconsin: International Crane Foundation, 1987. 151-70.
- . "The Feeding Biology of Juvenile Siberian Cranes in India." Proceedings, 1978 Crane Workshop: ed. James C. Lewis. [Fort Morgan, Colo.]: Colorado State Univ and National Audubon Soc, 1979. pp. 205-10.
- . "The Range, Status, and Winter Ecology of the Siberian Crane (*Grus Leucogeranus*)." Ph.D. thesis. Cornell University, 1985.
- Sauey, Ronald T., P. Das, and V. Prakash. "A Recent Survey of 19th Century Wintering Sites for Siberian Cranes in the Gangetic Basin." Proceedings of the 1983 International Crane Workshop: editors George W. Archibald and R. F. Pasquier. Baraboo, Wisconsin: International Crane Foundation, 1987. 197-208.
- Sayer, Jeffrey A. "Afghanistan's Efforts to Manage Wildlife and Environment." article. Parks 4.4 (1980): pp. 5-7.
- Schaller, G. B. "Can China's Wildlife Survive?" article. National Wildlife Magazine, International Wildlife Magazine (1989): 20 p.
- . "Saving China's Wildlife." article. International Wildlife (1990): 30-41.
- Schneider, Tom. "Siberian Cranes." article. Habitat 5.9 (1994): 1,5.
- Schucker, Rachel. "Homeland of the Crane: the Making of a Nature Reserve." article. Surviving Together (a Quarterly on Grassroots Cooperation in Eurasia) 11.4 (1993): pp. 12-14.
- Scott, D. A. "Status and Distribution of Cranes in Iran and Some Observations in Iraq." Crane Research Around the World: Proceedings of the International Crane Symposium at Sapporo, Japan in 1980 and Papers From the World Working Group on Cranes, International Council for Bird Preservation: editors James C. Lewis and Hiroyuki Masatomi. 1981. 70-72.
- Sebastian, Sunny. "The Crane Saga - Experiments With Siberian Visitors." article. Conservation (1993).
- Sharma, Shantanu N. "A Paradigm for Environmental Protection: Siberian Cranes Rest in Dongibil of Lakhimpur District of Assam." the Eastern Newslite (1996): 46.
- Shibaev, Y. V. "Crane Migration in South Primor'e." article. Ornithological Studies in the Soviet Far East, Proceedings of the Institute of Biology & Pedology, New Series 29.132 (1975): 254-62.
- Singh, R., B. A. Khan, and H. Vardhan. "Alternate Wintering Grounds for Siberian Cranes." Proceedings of the 1983 International Crane Workshop: editors George W. Archibald and R. F. Pasquier. Baraboo, Wisconsin: International Crane Foundation, 1987. 147-50.
- [Smirenskaya, Elena M. "2nd All-Union Conference on Cranes." Zool. Zhur. 60 (1981): 1434-?
- Smirenski, Sergei M. "Adaptations of Cranes to Man-Made Habitats." XIX Congressus Internationalis Ornithologicus Abstracts 387 (1986).
- . "Crane Conservation in Russia." The Proceedings of the

- International Crane Symposium: People, Water and Wildlife: Human Population Impacts on Cranes: ed. Heather Whitaker. Lillian Annette Rowe Sanctuary: National Audubon Society's Sharing the Earth Project and the Rowe Sanctuary, 1992.
- Smirenski, Sergei M., D. Sumya, and C. Boldbaator. "Ornithological Investigations in Dornod, Allmak Mongolian People's Republic." article. OPHINTOJOTN(Reverse "R" for Last Letter in Russian Word) "Ornithology" 25 (1991): pp. 116-26.
- Song XianJin, Zhao Jinsheng, and Huang Xiangyu. "Crane and Stork Counts and Conservation Measures at Poyang Lake Nature Reserve." Cranes and Storks of the Amur River: The Proceedings of the International Crane Workshop: eds Curtis H. Halvorson, James T. Harris, and Sergei M. Smirenski. Moscow: Arts Literature Publishers, 1995. 73-80.
- Sorokin, Alexander G., and Yu. V. Kotyukov. "Discovery of the Nesting Ground of the Ob River Population of the Siberian Crane." Proceedings of the 1983 International Crane Workshop: editors George W. Archibald and R. F. Pasquier. Baraboo, Wis.: International Crane Foundation, 1987. 209-11.
- Sorokin, Alexander G., and Yuri M. Markin. "New Nesting Site of Siberian Cranes ." Newsletter of Russian Bird Conservation Union 2.5 (1996): 7.
- Spitzer, Paul R. "The Lily of Birds." Animal Kingdom Vol. 84, no. 5.October/November 1981 (1981): 25-30.
- . "The Siberian Crane at Bharatpur." Proceedings, 1978 Crane Workshop: ed. James C. Lewis. [Fort Morgan, Colo.]: Colorado State Univ and National Audubon Soc, 1979. pp. 249-53.
- Stewart, J. M. "The Lily of Birds: the Success Story of the Siberian White Crane." article. Oryx 21.1 (1987): 6-10.
- Stroemberg, Gunnar. "A Siberian White Crane Stay at Goeholm in March and April 1931." Faeglar I Blekinge 31.4 (1995): 131-37.
- Su Lying. "Human Impacts on Cranes in China." The Proceedings of the International Crane Symposium: People, Water and Wildlife: Human Population Impacts on Cranes: ed. Heather Whitaker. Lillian Annette Rowe Sanctuary: National Audubon Society's Sharing the Earth Project and the Rowe Sanctuary, 1992.
- Su, Lying, et al. "Preliminary Study on the Bird Fauna of Zhalong Nature Reserve." article. Journal of North-East Forestry University 15.2 (1987): 62-73.
- Swengel, Scott R. "Sexual Size Dimorphism and Size Indices of Six Species of Captive Cranes at the International Crane Foundation." Proceedings of the Sixth North American Crane Workshop: coord. ed. Dale W. Stahlecker. Grand Island, Neb.: North American Crane Working Group, 1992. pp. 151-58.
- Tavakoli, Ellen Viola. "[Siberian Cranes in Iran]." article. 2 (?).
- Tavakoli, Ellen Vuosalo. "Conservation Policy for Siberian Cranes in Iran." Asia Crane Congress: 1989.
- Tokarskaya, O., et al. "Analysis of Relatedness and Genetic Diversity in the Siberian Crane by DNA Fingerprinting." Third European Crane Workshop: European Crane Working Group at "Projekt Kranichschutz Deutschland". Straslund: WWF/NABU, 1996. p.52.
- Tokarskaya, Olga N., et al. "Genetic Differentiation in a Captive Population of the Endangered Siberian Crane (*Grus leucogeranus* Pall.)." article. Molecular & General Genetics 245 (1994): 658-60.
- Tong Yongchang, Guo Xiangcheng, and Wang Li. "Wetland Transition and Crane Protection in Momoge Nature Reserve of Zhenlai County, Jilin Province." Proceedings 1987 International Crane Workshop: ed. James T. Harris. Baraboo, Wis.: International Crane Foundation, 1991. p. 185.
- Tsujii, Tatsuichi. "Overview of Hokkaido Wetlands." Proceedings of the Asian Wetland Symposium: Towards Wise Use of Asian Wetlands: Hirojio Isozaki, Motokazu Ando, and Yoshihiro Natori. Japan: International Lake Environment Committee Foundation, 1993. pp. 174-76.
- UNEP, and CMS. "Siberian Crane Memorandum of Understanding." CMS Bulletin 5, 6 (1996): 5.
- unknown. "Cranes in Spring 1991." article. The China Flyway 2.11 (1992): p. 1-2.
- . "Poyang's Ups and Downs." article. The China Flyway — Bulletin of the Beidaihe Bird Society 2.11 (1992): p. 26.
- Uspenski, S. M. "Zur Verbreitung Und Biologie Des Nonnenkranichs in Nordost-Sibirien." article. Der Falke 10 (1961): 334-37.
- Vanderwalker, John G. "Preservation of Crane Habitat on the Platte River, Nebraska." Proceedings of the 1983 International Crane Workshop: editors George W. Archibald and R. F. Pasquier. Baraboo, Wisconsin: International Crane Foundation, 1987. 425-37.
- Vijayan, Lalitha. "Cranes of Bharatpur." Asia Crane Congress: Gujarat nature Conservation Society. Rajkot: Saurashtra University, 1989. 8-10.
- Vijayan, Lalitha, and V. S. Vijayan. "Ecology of the Siberian Crane in Keoladeo National Park, Bharatpur, India, During the Winter of 1992-93." Salim Ali Centenary Seminar on Conservation of Avifauna of Wetlands and Grasslands. Abstracts: Bombay Natural History Society, 1996.
- Vijayan, V. S. "Keoladeo National Park Ecology Study (1980-1990)." article. Asian Wetland News 4.1 (1991): pp. 12-13.
- Vuosalo-Tavakoli, E. "Migratory Behavior of the Siberian Crane in Iran." The Palearctic Crane Workshop: 1989.
- Vuosalo-Tavakoli, Ellen. "Conditions in Iran Related to Nature Awareness Education Programs in View of Enhancing Efforts to Protect Birds, Especially Siberian Cranes." Third European Crane Workshop: European Crane Working Group at "Projekt Kranichschutz Deutschland". Straslund: WWF/NABU, 1996. p. 86.
- . "The Siberian Crane in Iran." Proceedings 1987 International Crane Workshop: ed. James T. Harris. Baraboo, Wis.: International Crane Foundation, 1991. pp. 341-47.
- Wang Qishan. "The Conservation and Management of Cranes at Shengjin Lake in Anhui Province." Proceedings 1987 International Crane Workshop: ed. James T. Harris. Baraboo, Wis.: International Crane Foundation, 1991. pp. 97-99 (Chpt. 3).
- . "Lake Shengjin of Anhui Province, China." article. Asian Wetland News 1 (1988): 15-16.
- Wen Bo. "Cranes Find Shelter in Human Friends." China Environment News .81 (1996): 8.
- Wennrich, G. "Internationale Zusammenarbeit Im Vogelpark Walsrode Zur Rettung Des Vom Aussterben Bedrohten Nonnen- Oder "Schneekranichs"." Ornithologische Mitteilungen 12 (1980): 232.
- Williams, M. D. "Beidahe Birdwatching." article. Golden Dragon 2.1 (1988): 14-16.
- . "Birds of Passage on the North China Coast." article. Intrepid 12.2 (1987): 18-21.
- Williams, M. D., et al. "Migration of Cranes at Beidaihe Beach, Hebei Province, China." Proceedings 1987 International Crane Workshop: ed. James T. Harris. Baraboo, Wis.: International Crane Foundation, 1991. pp. 139-47.
- Williams, M. D., et al. "Autumn Bird Migration at Beidaihe, China, 1986-1990." Forktail 7 (1992): 3-56.
- Williams, Martin. "Autumn 1992 [Records of Birds Sighted at Various Locations]." article. China Flyway (1994): 4-5.

- . "Boom Town for Birds." article. Wildlife Conservation (1992): 38-43.
- . "Eco-Tourism at Beidaihe." article. Asian Wetland News 4.2 (1991): 3.
- Wong Chi-shan, and Ju Xiao-long. "Wintering Ecology of Hooded Cranes on the Lower Reaches of the Changjiang (Yangtze) River, China." International Crane Workshop: In press.
- Wood, D. Scott. "Phenetic Relationships Within the Family Gruidae." The Wilson Bulletin 91.3 (1979): 384-99.
- Workshop on Cranes and Wetland Research. "Workshop on Cranes and Wetland Research." , 1989.
- World Wildlife Fund. "Breakthrough for Siberian Cranes." World Wildlife Fund - India 3.3 (1982): 16.
- World Wildlife Fund for Nature. "Difficult Winter for Siberian Cranes." Oryx 23.3 (1989): 166.
- Wu Xianshong, Zhang Minghai, and Gao Zhongxin et al. "Siberian Tiger Distribution in Heilongjiang (China)." article. Chinese Wildlife 3 (1994): 17-20.
- Wu Zhigang, and Han Xiaodong. "Observations of Migratory Siberian Cranes at Momoge Nature Reserve." Proceedings 1987 International Crane Workshop: ed. James T. Harris. Baraboo, Wis.: International Crane Foundation, 1991. pp. 135-37.
- Xu Jie, and Jiang Zingzing. "Endangered Species—Siberian Crane." article. Chinese Wildlife 1985.3 (1985): pp. 30-40.
- Xu Weishu, and Martin Williams. "Study on Beidaihe Birds." article. Memoirs of Beijing Natural History Museum 47 (1990): 1-11.
- Xu Xingie, et al. "Cranes in the Place Where the Yellow River Flowed Long Ago in Henan Province." Proceedings 1987 International Crane Workshop: ed. James T. Harris. Baraboo, Wis.: International Crane Foundation, 1991. pp. 153-54.
- Xun, Yan. "Touristic and Environmental Use of Important Wetlands in China." Proceedings of the Asian Wetland Symposium: Towards Wise Use of Asian Wetlands: Hiroji Isozaki, Motokazu Ando, and Yoshihiro Natori. Japan: International Lake Environment Committee Foundation, 1993. pp. 128-31.
- Yan Li, and Ding Tieming. "A Survey of Grus Leucogeranus Overwintering in a Region Near Poyang Lake, Jiangsu Province." article. Chinese Journal of Zoology 23.4 (1988): pp. 34-36.
- Yin Ruixue. "Distribution of Cranes in Afforested Areas of the Da Hing'an Ling Mountains of Inner Mongolia." article. Yesheng Dongwu [Chinese Wildlife] .4 (1992): pp. 15-17.
- Zhang Fuyun. "Conservation of Wetlands and Cranes in China." The Future of Cranes and Wetlands: Proceedings of the International Symposium : editors Hiroyoshi Higuchi and Jason Minton. Tokyo, Japan: Wild Bird Society of Japan, 1994. 130-35.
- Zhao Zehngjie, and Wu Zhigang. "Cranes in Jilin Province." Proceedings 1987 International Crane Workshop: ed. James T. Harris. Baraboo, Wis.: International Crane Foundation, 1991. pp. 71-73.
- Zhou Fu-zhang, and Ding Wen-ning. "Wintering Habits of the White Crane, Grus Leucogeranus." article. Chinese J. Zool. 4 (1982): 19-21.
- Zhou Fuzhang, and Ding Wenning. "On the Wintering Habits of the White Crane, Grus Leucogeranus." article. Chinese Journal of Zoology 1984.4 (1984): pp. 19-21.
- . "Siberian Cranes Wintering in the Lower Yangtze in China." Proceedings of the 1983 International Crane Workshop: editors George W. Archibald and R. F. Pasquier. Baraboo, Wisconsin: International Crane Foundation, 1987. 171-72.
- Zhou Fuzhang, and Ding Wenning..Wang Ziyu. "A Large Flock of White Cranes (Grus Leucogeranus) Wintering in China." article (trans.). Acta Zoologica Sinica 27.2 (1981): p. 179.

