



**CHEN Xi General Chief Editor**

Series on "Ecosystem Assessment and Management of Arid Region in Central Asia"

# **ECOLOGICAL STATUS AND CONSERVATION OF WILDLIFE IN CENTRAL ASIA**

Compiled by David BLANK, YANG Weikang et al.



**China Meteorological Press**

# ECOLOGICAL STATUS AND CONSERVATION OF WILDLIFE IN CENTRAL ASIA

Compiled by David BLANK, YANG Weikang et al.



China Meteorological Press

## ABSTRACT

The book is a review of the information presently available on zoological research in the former Soviet Central Asia. Much of our data was collected and translated from scientific studies that were previously only reported in Russian. We tried to include all aspects of the current zoology in Central Asia: paleozoology, zoogeography, animal adaptations to different environments, biological distinctiveness of animal distributions in the plains and mountains, impacts from human activities, and the present status of various animal species, as well as conservation efforts of governmental and non-governmental organizations. In addition, we have included short descriptions, with maps of distribution, for some of the most important representatives of wildlife in this region: from numerous to rare and extinct species, animals for which there is a lack of information, and the biological sources of many diseases. In the appendixes, we have included a full list of vertebrate species for each Central Asia republic, along with a combined list of wildlife of the entire Central Asian ecosystem. We believe that this book will be interesting to teachers and university students, scientists, and all people everywhere who love nature.

### 图书在版编目(CIP)数据

中亚野生动物生态现状与保护管理:英文/(以)布兰克等编著.

—北京:气象出版社,2013.10

(亚洲中部干旱区生态系统评估与管理)

ISBN 978-7-5029-5826-8

I. ①中… II. ①布… III. ①野生动物—研究—中亚—英文 IV. ①Q958.536

中国版本图书馆 CIP 数据核字(2013)第 245906 号

## ECOLOGICAL STATUS AND CONSERVATION OF WILDLIFE IN CENTRAL ASIA

Original work by David BLANK, YANG Weikang et al.

Responsible Editors: LI Taiyu, WANG Yajun

Copyright 2013 by China Meteorological Press

All Rights Reserved

Published: China Meteorological Press

(46 Zhongguancun Nandajie, Haidian District, Beijing 100081, China)

(<http://www.cmp.cma.gov.cn> E-mail: [qxcbs@cma.gov.cn](mailto:qxcbs@cma.gov.cn))

First published in December 2013

First printed in December 2013

Price: ¥ 220.00

**Series: Assessment and Management of Ecosystems  
in Central Asia Arid Region  
Compiled Committee**

**General Chief Editor:** CHEN Xi

**Editors**

Jilil ABUDUWAILI

Salamat ALAMANOV

BAO Anmin

David BLANK

HU Ruji

Ramazan KUZIEV

LI Yan

LI Yaoming

LUO Geping

LUO Yi

Ernazar MAHMUDOV

Dyuxin MAMATKANOV

Ahmatkal MEDEU

Xavket RAHIMOV

Kadirkbek SAKIYEV

Abdulla SAPAROV

Gulnara SITPAYEVA

Rustam USMANOV

WANG Yajun

WU Miao

XIAO Wenjiao

XU Junrong

YANG Liao

YANG Weikang

YANG Degang

ZHANG Chi

ZHANG Jianming

ZHANG Yuanming

ZHOU Hongfei

ZHOU Kefa

## Preface One

Since industrial revolution, global climate changes such as global warming became serious environmental problems. Central Asia locates in the center of Eurasia Continent, far from oceans, having an arid climate. The interactive effects from the westerly, the arctic high latitude air mass, and the humid airflow from the Indian Oceans result in strong variation in temperature and humidity, frequent outbreak of climate extreme events in the region. The regional ecosystem is fragile and sensitive to global change. Researches showed that the surface temperature in Central Asia increased quickly in the last one hundred year. In average, the regional temperature increased by  $0.74^{\circ}\text{C}/\text{century}$ , much higher than the global mean warming rate. This caused steady shrinkage of the Tianshan and Altai mountain's glaciers, whose area have reduced by about 15%—30% in the recent 40 year, resulting in significant changes in the regional hydrological, agricultural and ecological systems.

Ecological and Environmental problems are the all-time concerns to the governments of Central Asia countries. Ecological disasters in Central Asia—for example, the Aral Sea crisis further draws international attention. The United Nation, the Shanghai Cooperation Organization (SCO), and Chinese government all initiated counteracting projects to solve the problem. In the September of 2011, the SCO published a Joint Communiqué to Promote Ecological Conservation in Central Asia. Studying global change and its effects on Central Asia ecosystem and the solution is especially important for protecting the international ecological/economic security and development in the region of Central Asia and China. It also promotes technological cooperation against climate change among the SCO members.

The “Ecosystem Assessment and Management of Arid Region in Central Asia” book series compiled studying results of more than one hundred scientists from 40 institutes both in China and abroad. It is the product of the first large scale resource and environmental cooperation among the SCO members. The series assesses the fundamental patterns in climate, geography, and ecological changes in Central Asia. Being the first Chinese publications that address the



issue in scientific details, this series has important research and application value for understanding the responses and adaptations of Central Asia ecosystems to global change as well as ecological conservation in the region. It also provides reference value for the development of Silk Road Economic Belt.



(QIN Dahe)

December 4, 2013

## Preface Two

Xinjiang, China and the Central Asia make the main body of the Eurasia dryland. Being the largest temperate desert ecosystem, it accounts for 90% of global temperate desert. The unique mountain-oasis-desert ecosystem has global importance. Climate of the Eurasia dryland is mainly controlled by the westerly, the arctic high latitude air mass, and the humid airflow from Indian Ocean, showing a heat-water combination distinct from that of the Africa, America, and Australia, resulting in unique and complex ecological responses to global climate change. Meanwhile, evolution of the regional vegetation is influenced by the Central Asia flora system, the Tibet flora system, the Mongolia flora system, and the Tethys flora system, especially sensitive to changes in temperature and moisture.

The ecosystem in Central Asia is fragile. Climate change and human disturbances could easily induce significant changes in ecosystem or even cause severe ecological disasters. In addition, there are many cross-country rivers among Xinjiang and Central Asia countries, who share the same ecosystem. Any local ecological changes could readily result in international-level ecological issues. For example, the gradual diminishment of the Aral Sea in Central Asia has evolved into a world famous cross-nation ecological disaster in the region. Changes in temperature and precipitation in the recent years resulted in big uncertainties in the regional ecosystem's responses to global change, and more frequent climate extreme events. Therefore, make serious efforts on ecosystem change and ecological management researches under the context of global change is important to both regional ecosystem protection and socioeconomic sustainability in Central Asia.

In 2012, my team member and I investigated the Balkhash Lake basin and the Aral Sea basin, and were impressed by the eagerness of the Central Asia countries' in ecosystem protection and recovery. Findings from more than three-year's researches by more than one hundred scientists from Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, and Uzbekistan and from eighteen research institutes in China were agglomerated in the "Ecosystem Assessment

and Management of Arid Region in Central Asia”book series, which is the first systematic research report of the world on ecosystem assessment and management in this region. This series made comprehensive assessments on the changes in climate, flora, fauna, soil, and land cover in Central Asia, and proposed suggestions on ecosystem management in Central Asia. With authentic and detailed data and documents, clear conclusions, this series has important values in both scientific research and applications. It is especially important for biodiversity conservation and ecological security. It also promotes the ecological and environmental cooperation among the Shanghai Cooperation Organization member countries.

A handwritten signature in black ink, reading "Fu Bojie". The signature is stylized with a long horizontal stroke extending to the left and a vertical stroke extending downwards from the 'j'.

(FU Bojie)

December 5, 2013



## Series Foreword

With a typical continental arid climate, Central Asia is located in the hinterland of the Eurasian continent, accounting for 1/3 of the world's dryland area. In a broad sense, Central Asia lies in the Asian hinterland region and stretches from the Caspian Sea in the west, including the five Central Asian countries (Kazakhstan, Kyrgyzstan, Tajikistan, Uzbekistan and Turkmenistan) and western China, Mongolia, Russia, Afghanistan, and parts of Iran. More commonly, the term often refers to the five Central Asian countries that cover about 4 million km<sup>2</sup> land area and have a population size of 58.9 million.

Central Asia is sensitive to the global climate change that has strong influence to the region's ecology and environment, which has always been one of the major concerns and hot research topic by Central Asian governments as manifested by the summit of the Shanghai Cooperation Organization. Research shows long-term temperature rise accompanied with steady glaciers retreat in the Tianshan and Altai mountains since the early 20th century in Central Asia. During the past 40 years, the glaciers have shrunk by 15% — 30%, which resulted in changes in the regional hydrological system, agricultural system and ecological system. Meanwhile, several anthropogenic environmental problems such as the Aral Sea ecological crisis caused by large-scaled land reclamation in the early 20th century have drastically worsen ecological conditions and resources in this region. Therefore, researches on the resources and environmental problems in Central Asia in the context of global climate change is important for the environmental protection and improvement as well as sustainable society and economy developments, and will provide scientific support for the ecological protection and resource exploitation of the Shanghai Cooperation Organization member states.

In 2010, the Ministry of Science and Technology, China established a national and international science and technology cooperation project—"A joint investigation and research for the ecological protection and resource management in Central Asia area in the context of climate change"; the State Administration of Foreign Experts Affairs, Chinese Academy of Sciences (CAS), initiate an innovation team project—"Transect Research on Central Asia's Ecosystem"; the United Nations Development Programme supported a new project "Enhancing Climate Change Adaptive Capacity via Strengthening Ecological

System Management in Central Asian Arid Area". All of these projects were organized by the Technology Department of Xinjiang Uygur Autonomous Region, leaded by Xinjiang Institute of Ecology and Geography Chinese Academy of Sciences, and leagued 17 domestic scientific research institutions, including Xinjiang University, Xinjiang Agricultural University, Xinjiang Normal University, Xinjiang Academy of Agricultural Sciences, Xinjiang Academy of Forestry Science, Animal Science Academy of Xinjiang Uygur Autonomous Region, Xinjiang Academy of Social Sciences, Central Asia Technology Economic Information Center, Xinjiang Institute of Desert, Xinjiang Remote Sensing Center, Science and Technology Information Center of Central Asia, Institute of Geographic Sciences and Natural Resources Research, CAS, Nanjing Institute of Geography Limnology, CAS, Cold and Arid Regions Environmental and Engineering Research Institute, CAS, Shenzhen Institute of Advanced Technology, CAS, The Institute of Remote Sensing and Digital Earth, CAS, Zhejiang University, and Lanzhou University. There are 26 institutions from the Central Asia countries participated in the project, including Kazakhstan Institute of Soil and Agricultural Chemistry, Kazakhstan Institute of Botany, Kazakhstan Institute of Zoology, Kazakhstan Institute of Geography, Kazakhstan Research Institute of Forestry, The National University of Kazakhstan, Kazakh National Agrarian University, Kyrgyzstan Institute of Geology, Kyrgyzstan Institute of Water Problems, Kyrgyzstan Osh State University, Kyrgyzstan National Agrarian University, The National University of Kyrgyzstan, Uzbekistan Institute of Genetics, Uzbekistan Institute of Soil Research, Uzbekistan Institute of Irrigation and Water Research, Uzbekistan Institute of Plant and Animal Research, National University of Uzbekistan, Tajikistan Institute of Geology, Tajikistan Institute of Botany, Tajikistan Animal Research Institute, National University of Tajikistan, Tajikistan Kasesart University, Tajikistan Academy of Agricultural Sciences, Tajikistan Institute of Water Problems, Turkmenistan Institute of Desert Flora and Fauna, and the National University of Turkmenistan.

After more than three years of cooperative research, with a responsibility system of general chief-editor, volume-editor, and chapter-writer, supervised by the principal investigator of the project, scientists from China and Central Asian countries worked together to complete 18 monographs (in Chinese,



English, and Russian languages), each with hundreds of thousands words: *Physical Geography of Central Asia*, *Geology and Geomorphology of Central Asia*, *Soil Geography of Central Asia*, *An Introduction to Environment of Central Asia*, *Plant Resources and Utilization in Central Asia*, *Ecological Status and Conservation of Wildlife in Central Asia* (in English), *Ecosystem Dynamics in Central Asia — Investigation and Data Mining* (in English), *Modeling Dryland Ecosystems' Response to Global Change in Central Asia* (in English), *An Outline of Economic Geography of Central Asia*, *Land Use and Land Cover Changes in Central Asia*, *Effects of Climate Change on Mountain Ecosystems* (in Chinese and Russian languages), *Physical Geography of Kirgizstan* (in Chinese and Russian languages), *Soil and Land Resources of Kazakhstan* (in Chinese and Russian languages), *Water Resources and Utilization in Uzbekistan* (in Chinese and Russian languages). This series of monographs reveals the changes in climate, plants, animals, soils and ecosystems in Central Asia, predicts the trend of ecosystem dynamics under different future scenarios, proposes solutions for ecosystem and natural resource managements in Central Asia in the context of climate change. While the research on resources and ecosystem of Central Asia arid region is a long-term work, the publication of this scientific research series provides the first systematical insights on ecological protection and resource management in Central Asia in the context of climate change. This effort provides scientific and technological support for sustainable development in Central Asia. This research received strong support from the National Ministry of Science and Technology, Chinese Academy of Sciences, and Xinjiang government. The project was well organized by the Xinjiang Science and Technology Department. It was the product from the cooperation between scientists from China and the Central Asia countries and the unremitting efforts of all involved researchers. The achievement is the fruit of group work from the above teams, acknowledged hereby. As the first systematic study on the resources and environmental problems in Central Asia, mistakes and limitations are unavoidable, and criticisms and advices are welcomed.



(CHEN Xi)

November 28, 2013

## Foreword

Central Asia has a unique natural environment through its combination of vast plains, deep depressions and high elevation mountains, as well as a variety of geographical zones, such as forest-steppes, steppes, semi-deserts and deserts. Here, the largest and longest rivers—the Amu-Darya and Syr-Darya—start from the Pamir and Tianshan mountains and penetrate through largest deserts—the Kara-Kum and Kyzyl-Kum—to form the Aral Sea, which was the second largest internal reservoir in Asia quite recently; other great lakes, such as the Caspian Sea and Balkhash Lake, are also quite prominent on the Asian continent. The highest peaks of Pamir at more than 5000–7000 m asl with the huge Fedchenko Glacier, and the Tianshan Mountains, especially the central and inner parts, with the largest glaciations in Asia, are situated in the eastern part of Middle Asia, while vast deserts and plateaus are located in its western part. Such a diverse ecosystem supports a very broad biodiversity over the entire spectrum of wildlife. Various ungulate species of high-elevated alpine mountains share various their parts differently: Siberian ibexes and markhors live on the cliffs of rocky slopes close to peaks, argali prefer gentle, rolling mountain areas, while maral deer choose to live in forested regions; and the bezoar goats and urials have established populations in very arid low-elevation mountains and along cliffs. On the plains, quite recently, numerous herds of saiga antelope were found migrating from the northern steppes to southern deserts to winter and then back to the steppes in spring to calve; and thousands of goitered gazelles and kulans inhabit the various deserts. Several decades ago, the Asian cheetah was common predator of the goitered gazelles in the Usturt Plateau, and the Caspian tiger was usual animal in the tugai jungles found along every large river. But unfortunately, people have all but exterminated the tigers and cheetahs and have hunted the saiga antelope, gazelles and kulans to the brink of extinction. Human activity has dried up the Aral Sea and transformed it from a once rich fish reservoir into region with severe ground salinization and environment degradation, and has made it a source of various diseases affecting humankind.

People are now able to penetrate into the most remote regions of the deserts and highest mountains, which previously had been inaccessible to human disturbance. As a result, the wildlife in these areas is losing its last refuges, and animal populations are experiencing sharp declines in number and density; habitat and populations are becoming fragmented and species continue to disappear without a trace. From the early 1990s until the present time, zoological investigations currently being done are very limited, leaving many extant processes in the nature of Middle Asia still unknown. Therefore to further our understanding of this region, the Xinjiang Institute of Ecology and Geography is planning to start systematic investigations of the wildlife of Middle Asia, beginning with the first step of summarizing what we already know about the ecosystems of Middle Asia. To that end, we collected many papers and books, mostly from Russian sources, that were published over the last few decades, and wrote this book to review and document our

knowledge so far on Central Asian wildlife.

The first part of this book is devoted to the general geographical characteristics of the western part of Central Asia (Middle Asia) and the Xinjiang Uygur Autonomous Region of China. The second part describes the geological and paleontological history of this region, followed by zoogeographical characteristics and descriptions of ecological adaptations of animals to their environments. The current conservation status and protection system are presented in Chapter 5 and 6, and the last chapter is devoted to the most important representatives of Central Asian fauna. This final chapter detailed descriptions of each species and information on the animals' population status (endangered and extinct), numerous animals and species, which are used as natural recourses, animals for which we lack data, animals that are natural sources of diseases. In appendixes, we have listed the vertebrate fauna of Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan, Uzbekistan and Xinjiang of China, along with a list of the fauna for all of Central Asia.

This book was authored by visiting professor David BLANK and Prof. YANG Weikang, with assistance from Prof. ZHANG Yuanming, who participated in many discussions on its structure and design. Geographical maps and maps of animal distribution, as well as a number of graphs were prepared by assistant professors Dr. XIA Canjun and Dr. XU Wenxuan, and the list of Central Asian animals were prepared by Dr. XU Feng, Dr. XIA Canjun, Dr. XU Wenxuan, and MD student LIAO Haohong. Patricia JOHNSTON was our English language editor and also contributes ideas for content and style the book. Professor HU Ruji and Associate professor WANG Yajun participated in the whole edition process of this book.

The writing of this book and its preparation for publication was supported by the International Science and Technology Cooperation Program of China (2010DFA92720), the Chinese Academy of Sciences Visiting Professorships for Senior International Scientists (2011T1Z42), Innovative Research Group Program "Transect Research on Special Ecological Process in Arid Lands", the United Nations Development Programme supported a new project "Enhancing Climate Change Adaptive Capacity via Strengthening Ecological System Management in Central Asian Arid Area", which was financed by Chinese Academy of Sciences and State Administration of Foreign Experts Affairs, China, and program of Xinjiang & Central Asia Science Data Sharing Platform of Earth System Science, Data Sharing Platform of National Science & Technology Infrastructure.

Editors

June 20, 2013



# CONTENTS

## Preface One

## Preface Two

## Series Foreword

## Foreword

<b>1 NATURE-GEOGRAPHICAL CHARACTERISTICS OF CENTRAL ASIA</b> .....	( 1 )
1.1 Central Asia and/or Middle Asia .....	( 1 )
1.2 General characteristics of Central Asia .....	( 2 )
1.2.1 Semi-desert zone .....	( 3 )
1.2.2 Desert Zone of Central Asia .....	( 20 )
1.2.3 The Mountain Zone of Central Asia .....	( 65 )
<b>2 THE PALEO GEOGRAPHICAL HISTORY OF THE CENTRAL ASIAN FAUNA</b> .....	( 88 )
2.1 Amphibian and reptile fauna in the Paleozoic, Mesozoic, and Cenozoic eras .....	( 88 )
2.2 Ornithological fauna during Tertiary and Quaternary periods .....	( 94 )
2.3 Mammal fauna during the pre-glaciations period .....	( 94 )
2.4 Mammal fauna during the Great Glaciations period .....	( 98 )
2.5 The development of mammal fauna during the post-Pleistocene Epoch .....	( 99 )
<b>3 ZOO GEOGRAPHIC REGIONS OF CENTRAL ASIA AND THEIR CHARACTERISTICS</b> .....	( 102 )
3.1 General characteristics of fauna development .....	( 102 )
3.2 Zoogeographic regions of plains .....	( 105 )
3.2.1 The herpetological fauna .....	( 105 )
3.2.2 The mammalian and ornithological fauna .....	( 107 )
3.3 Most typical plain animals .....	( 111 )
3.4 Zoogeographic regions of mountains .....	( 134 )
3.4.1 Sub-oblast of the northern forests (Altay) .....	( 134 )
3.4.2 Zoogeographical regions of Tianshan, Pamir and Kopet-Dag .....	( 137 )
3.5 Most typical mountain animals .....	( 139 )
3.6 Wildlife of river valleys .....	( 151 )
3.7 Fauna of rivers and lakes .....	( 160 )
<b>4 PECULIARITIES OF ANIMAL DISTRIBUTION</b> .....	( 166 )
4.1 The Central Asia Plains .....	( 166 )
4.2 The Central Asia mountains .....	( 177 )
4.3 Vertical mountain zones .....	( 185 )
4.3.1 General characteristics .....	( 185 )
4.3.2 The mountain desert belt .....	( 187 )

4.3.3	The semi-desert vertical belt .....	(188)
4.3.4	The mountain dry steppes .....	(189)
4.3.5	The forest-meadow-steppe belt .....	(190)
4.3.6	Sub-Alpine belt .....	(194)
4.3.7	The Alpine belt .....	(196)
<b>5</b>	<b>HUMAN ACTIVITY AND ITS IMPACT ON FAUNA .....</b>	<b>(198)</b>
5.1	Impact on amphibians and reptiles .....	(199)
5.2	Impact on birds .....	(204)
5.3	Impact on mammals .....	(210)
5.4	Current status of animal conservation .....	(219)
5.5	National Red Data Books .....	(221)
<b>6</b>	<b>BIODIVERSITY CONSERVATION IN CENTRAL ASIA .....</b>	<b>(223)</b>
6.1	Conservation legislation .....	(223)
6.2	State Nature Reserves (Zapovedniki)—IUCN Category Ia .....	(226)
6.3	State National Parks (Natsionalniye Prirodniye Parky)—IUCN Category II .....	(231)
6.4	Wildlife Sanctuaries (Zakazniki) —IUCN Category IV .....	(233)
6.5	Natural Monuments (Prirodniye Pamyatniki) .....	(234)
6.6	International Protected Area Designations .....	(234)
6.7	UNESCO World Heritage Designation .....	(235)
6.8	Provincial Level Protected Areas .....	(235)
<b>7</b>	<b>MOST IMPORTANT REPRESENTATIVES OF FAUNA .....</b>	<b>(236)</b>
7.1	Rare and endangered species .....	(236)
7.1.1	Semirechensk (Central Asian) salamander ( <i>Ranodon sibiricus</i> Kessler, 1866) .....	(236)
7.1.2	Pewzov's toad ( <i>Bufo pewzowi</i> Bedriaga 1898) .....	(241)
7.1.3	Transcaspiian Desert Monitor ( <i>Varanus griseus</i> Daudin, 1803) .....	(244)
7.1.4	Black Francolin ( <i>Francolinus francolinus</i> Linnaeus, 1766) .....	(248)
7.1.5	Himalayan Snowcock ( <i>Tetraogallus himalayensis</i> Gray, 1842) .....	(251)
7.1.6	White Pelican ( <i>Pelecanus onocrotalus</i> Linnaeus, 1758) .....	(254)
7.1.7	Greater Flamingo ( <i>Phoenicopterus roseus</i> Pallas, 1811) .....	(257)
7.1.8	Ibisbill ( <i>Ibidorhyncha struthersii</i> Vigors, 1832) .....	(260)
7.1.9	Striped Hyena ( <i>Hyena hyena</i> Linnaeus, 1758) .....	(266)
7.1.10	Leopard ( <i>Panthera pardus</i> Linnaeus, 1758), Persian Leopard ( <i>P. pardus tullianus</i> Valenciennes, 1856) .....	(273)
7.1.11	Snow leopard ( <i>Uncia uncia</i> Schreber, 1775) .....	(279)
7.1.12	Bactrian (Bukhara) Deer ( <i>Cervus elaphus bactrianus</i> Lydekker, 1900) .....	(284)
7.1.13	Saiga ( <i>Saiga tatarica</i> Linnaeus, 1766) .....	(288)
7.1.14	Goitered gazelle ( <i>Gazella subgutturosa</i> Guld., 1780) .....	(298)
7.1.15	Bezoar (wild) goat ( <i>Capra aegagrus</i> Erxleben, 1777) .....	(303)

7.1.16	Markhor ( <i>Capra falconeri</i> Wagner, 1839) .....	(307)
7.1.17	Urial ( <i>Ovis vignei</i> Blyth, 1840). .....	(310)
7.1.18	Argali ( <i>Ovis ammon</i> Linnaeus, 1758) .....	(317)
7.1.19	Kulan ( <i>Equus hemionus</i> Pallas, 1775). Persian onager ( <i>Equus hemionus onager</i> Boddaert, 1785) .....	(327)
7.2	Extinct species .....	(333)
7.2.1	Tiger ( <i>Panthera tigris</i> Linnaeus, 1758) Turan (Caspian) tiger ( <i>Panthera tigris virgata</i> Illiger, 1815) .....	(333)
7.2.2	Cheetah ( <i>Acinonyx jubatus</i> Shreber, 1775). Asiatic cheetah ( <i>Acinonyx jubatus ruddei</i> Hilzh, 1913) .....	(337)
7.2.3	Przewalski's horse ( <i>Equus przewalskii</i> Poljakov, 1881) .....	(339)
7.2.4	Wild ox or urus ( <i>Bos primigenius</i> Bojanus, 1827) .....	(342)
7.3	Animal resources and numerous species .....	(344)
7.3.1	Muskrat ( <i>Ondatra zibethicus</i> Linnaeus, 1776) .....	(344)
7.3.2	Caspian seal ( <i>Phoca caspica</i> Gmelin, 1788) .....	(349)
7.3.3	Grey wolf ( <i>Canis lupus</i> Linnaeus, 1758) .....	(357)
7.3.4	Wild boar ( <i>Sus scrofa</i> Linnaeus, 1758). Middle Asia wild boar ( <i>S. scrofa nigripes</i> Blanford, 1875) .....	(362)
7.3.5	European Red Deer ( <i>Cervus elaphus</i> Linnaeus, 1758). Maral ( <i>Cervus elaphus sibiricus</i> Sewertzow, 1873) .....	(368)
7.3.6	Siberian ibex ( <i>Capra sibirica</i> Pallas, 1776) .....	(376)
7.4	Introduced species .....	(384)
7.4.1	Russian desman ( <i>Desmana moschata</i> Linnaeus, 1758), Order Eulipotyphla .....	(385)
7.4.2	Eurasian red squirrel ( <i>Sciurus vulgaris</i> Linnaeus, 1758), Order Rodencia .....	(386)
7.4.3	Bobak marmot ( <i>Marmota bobak</i> Muller, 1776) .....	(386)
7.4.4	Large-toothed ground squirrel ( <i>Citellus fulvus</i> ) .....	(387)
7.4.5	Muskrat ( <i>Ondatra zibethicus</i> ) .....	(387)
7.4.6	Norway rat ( <i>Rattus norvegicus</i> Berkenhout, 1769) .....	(389)
7.4.7	Raccoon dog ( <i>Nyctereutes procyonoides</i> ) .....	(390)
7.4.8	Nutria ( <i>Myocastor coypus</i> ) .....	(391)
7.4.9	Striped skunk ( <i>Mephitis mephitis</i> Schreber, 1776) .....	(391)
7.4.10	American mink ( <i>Mustela vison</i> Schrebel, 1777) .....	(392)
7.5	Species with lack information .....	(393)
7.5.1	Selevinia or desert dormouse ( <i>Selevinia betpakdalaensis</i> Belosludov et Bashanov, 1938) .....	(393)
7.5.2	Honey badger or ratel ( <i>Mellivora capensis</i> Schreber, 1776) Turkmenian honey badger ( <i>Mellivora capensis buechneri</i> Baryshnikov, 2000) .....	(396)
7.5.3	Marbled Polecat ( <i>Vormela peregusna</i> Guldenstaedt, 1770) .....	(400)

7.5.4	Jungle cat or Chaus ( <i>Felis chaus</i> Guldenstaedt, 1776)	(402)
7.5.5	Sand Cat ( <i>Felis margarita</i> Loche, 1858)	(404)
7.6	Wild animals as a source of diseases and epizooty	(407)
7.6.1	Great gerbil ( <i>Rhombomys opimus</i> Lichtenstein, 1823)	(407)
<b>References</b>		(425)
<b>8</b>	<b>APPENDIX</b>	(447)
8.1	List of vertebrate animals of different countries of Central Asia	(447)
8.1.1	Kazakhstan fauna	(447)
8.1.2	Kyrgyzstan fauna	(474)
8.1.3	Tajikistan fauna	(494)
8.1.4	Turkmenistan fauna	(513)
8.1.5	Uzbekistan fauna	(536)
8.1.6	Xinjiang fauna	(558)
8.2	The United List of Vertebrate Animals of Central Asia	(579)
<b>References for Appendix</b>		(613)