

Biodiversity Assessment for Turkmenistan

**Task Order under the
Biodiversity & Sustainable Forestry IQC (BIOFOR)**

USAID CONTRACT NUMBER: LAG-I-00-99-00014-00

SUBMITTED TO:

USAID CENTRAL ASIAN REPUBLICS MISSION,
ALMATY, KAZAKHSTAN

SUBMITTED BY:

CHEMONICS INTERNATIONAL INC.
WASHINGTON, D.C.

JUNE 2001

TABLE OF CONTENTS

Acronyms		i
SECTION I	INTRODUCTION	I-1
SECTION II	STATUS OF BIODIVERSITY	II-1
	A. Overview	II-1
	B. Major Ecoregions of Turkmenistan	II-1
	C. Species Diversity	II-5
	D. Agrobiodiversity	II-?
	E. Threats to Biodiversity	II-?
SECTION III	STATUS OF BIODIVERSITY CONSERVATION	III-1
	A. Protected Areas	III-1
	B. Land Use	III-1
	C. Caspian Sea	III-3
SECTION IV	STRATEGY AND POLICY FRAMEWORK	IV-1
	A. Policy Framework	IV-1
	B. Legislative Framework	IV-2
SECTION V	SUMMARY OF FINDINGS	V-1
SECTION VI	RECOMMENDATIONS FOR BIODIVERSITY CONSERVATION	VI-1
SECTION VII	USAID IN TURKMENISTAN	VII-1
	A. Impact of USAID Program on Biodiversity	VII-1
	B. Recommendations	VII-1
ANNEX A	SECTIONS 117 AND 119 OF THE FOREIGN ASSISTANCE ACT	A-1
ANNEX B	SCOPE OF WORK	B-1
ANNEX C	LIST OF PERSONS CONTACTED	C-1
ANNEX D	MAP OF ECOSYSTEMS AND PROTECTED AREAS OF TURKMENISTAN	D-1
ANNEX E	SCHEDULE OF TEAM VISITS	E-1
ANNEX F	CASPIAN ENVIRONMENTAL PROGRAM	F-1

ACRONYMS

BIOFOR	Biodiversity and Sustainable Forestry Initiative
BSAP	Biodiversity Strategy and Action Plan
CAR	Central Asian Republics
CEP	Caspian Environmental Program
CIC	National Commission on U.N. Environmental Conventions
CITES	Convention on International Trade in Endangered Species
EIA	Environmental Impact Assessment
GEF	Global Environmental Facility
I.A.	illustrative activity
NEAP	National Environment Action Plan
NEPT	National Environmental Programme for Turkmenistan
SD	sustainable development
TES	Turkmen Experimental Station of Plant Genetic Resources
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific, and Cultural Organization

SECTION I

Introduction

The biodiversity assessment for the Republic of Turkmenistan was funded by USAID's Regional Mission to the Central Asian Republics in Almaty under a contract to Chemonics International through the Biodiversity and Sustainable Forestry (BIOFOR) IQC (see Annex B, Scope of Work). A two-person team consisting of Raymond Carl Daviesson and Dr. Galina Fet visited Turkmenistan from June 7 to June 22, 2000. Mr. Daviesson and Dr. Fet collaborated with local biodiversity specialist Dr. Habibullah I. Atamuradov in researching and assessing biodiversity in Turkmenistan.

The approach used in the assessment was to collect and analyze information on biodiversity and related areas through documentation searches, interviews with key individuals and organizations concerned with biodiversity, both in Turkmenistan and in Washington D.C. (see Annex C, List of Persons Contacted), and field trips.

Rather than duplicating research already undertaken and presented in strategy and project documents, this assessment has borrowed freely from these documents and synthesized and adapted information where appropriate.

This assessment has three interlinked objectives:

- To summarize the status of biodiversity and its conservation in Turkmenistan; analyze threats, identify opportunities, and make recommendations for the improved conservation of biodiversity. This information will help USAID and other organizations and individuals, as appropriate, make decisions related to biodiversity conservation.
- To meet the requirements stipulated under Section 119 (d) of the Foreign Assistance Act (see Annex A, FAA Sections 117 and 119), required when USAID missions are developing new strategic programs. The assessment also prepares the Mission to address issues arising under Sections 117 and 119 of the FAA, by providing information on biodiversity and natural resources in Turkmenistan.
- To analyze the impacts of current and future USAID activities in Turkmenistan on biodiversity conservation, suggest actions that USAID could take to support biodiversity conservation in Turkmenistan that are consistent with current and future USAID programs, and identify special opportunities for the Mission in the area of biodiversity conservation.

SECTION II

Status of Biodiversity

A. Overview

The territory of landlocked Turkmenistan is 488,100 km² and spans 1,100 km from the west to the east and 650 km from the north to the south. In the north, Turkmenistan borders the Republic of Kazakhstan (379 km); in the east and northeast, Uzbekistan (1,621 km); in the south, Iran (992 km); and in the southeast, Afghanistan (744 km). The total length of the land border is 3,736 km. In the west, the waters of the Caspian Sea form the country's border (1,768 km).

The majority of the country (80 percent) is the sandy desert with dunes. In the south, low to medium mountains are located along the border with Iran (Kopetdagh) and Afghanistan (Kugitang). The elevation varies from -92 m (Akhchakaya depression) to 3,137 m (Mt. Ayrybaba in the Kugitang range). The river network in Turkmenistan is poorly developed, as no large rivers originate in the mountains. The lower parts of the Murghab and Tedjen Rivers are lost in the Karakum Desert. Only the large Amudarya River at times reaches its delta.

Turkmenistan's biodiversity is globally and regionally important as a result of its biogeographical location between the European, Mediterranean, Middle Eastern, and Asian floral and faunal regions. A broad range of natural ecosystems exists in the country covering deserts, riparian wetlands, lakes, mountain forests, and the Caspian Sea and its shores.

The territory of Turkmenistan falls under one of the Global 200 Ecoregions (palaeartic deserts and xeric shrublands) identified by the World Wide Fund for Nature and based on selection criteria including species richness, levels of endemism, taxonomic uniqueness, unusual evolutionary phenomena, and global rarity of major habitat types.

Turkmenistan lies in the Central Asian temperate desert zone. Average annual precipitation is less than 150 mm over most of the country, except the mountains of Kopetdagh and Kugitang. Turkmenistan's population is involved in nomadic cattle raising, intensive agriculture in irrigated oases, and exploration of large gas and oil resources.

The long and complicated geological history of Turkmenistan has provided a diverse arena for the formation of local biodiversity. The biogeographic border between the Mediterranean-type mountains of Kopetdagh and the lowland continental desert of Karakum is one of the best expressed ecological and biogeographic boundaries in existence. Transgressions of the proto-Caspian Sea periodically isolated these desert mountains promoting genetic differentiation of flora and fauna and effectively isolating European forest and meadow species in mountain valleys such as the Aidere Valley in Southwest Kopetdagh. Such processes have contributed to the current rich biodiversity of Turkmenistan.

B. Main Ecoregions of Turkmenistan

Desert territory, which occupies approximately 80 percent of Turkmenistan, can be subdivided into three subzones: tertiary plateaus (southern parts of Mangyshlak and Ustyurt); sand deserts; and submontane plains (northern foothills of Kopetdagh). Mountains cover less than 20 percent of the Turkmenistan territory, with the Kopetdagh range stretching along the southern border. The Greater and Lesser Balkans rise in isolation to the northwest of the Kopetdagh. Foothill spurs of Paropamiz mountains stretch from Afghanistan in the very south of Turkmenistan, forming the Badghyz and Karabil Plateaus. In the extreme east of Turkmenistan lie the Kugitangtau Mountains, part of the Gissar mountain system, shared with Uzbekistan and Tajikistan.

Based on geographic location, climate, soil, and vegetation, several ecological regions can be distinguished in the country:

- Lowland deserts and desert plateaus
- Kopetdagh Mountains
- Kugitang Mountains
- Caspian Sea



Mountain steppe habitats contain economically important species such as pistachio, which are increasingly threatened by deforestation and erosion.

B1. Lowland Deserts and Desert Plateaus

Landscape geographers distinguish up to ten types of deserts in Turkmenistan, based largely on soil type. Most prominently represented here are sand deserts, including the great sand desert of Karakum, which occupies a vast territory of 350,000 km². While sand dune of various types dominate Karakum, sand-gravel deserts are also found. Salt (*solonchak*) deserts occur throughout but are especially predominant in the Central Karakum and along the Caspian shores. The plant communities in the desert are dominated by the perennial *Chenopodiaceae*, large shrubs such as white and black saxaul (*Haloxylon persicum*, *H. alba*), sand acacia (*Ammodendron*), kandyum (*Calligonum*), ephedra (*Ephedra strobilacea*), and a large diversity of ephemeral plants.

Desert plateaus occupy only isolated areas in the west and south of Turkmenistan. Stony deserts occupy the major part of these plateaus. Relict plant species here include *Dendrostellera turkmenorum*, *Calligonum spp.*, and *Asparagus turkestanicus*. In the south, between the Tedjen and Murghab River valleys, the Badghyz rises up to 1,225 m and is covered with remnants of the savanna-like groves of wild pistachio (*Pistacia vera*) with herbaceous communities of *Carex pachystylis*, *Poa bulbosa*, and ephemerooids. Closed depressions with salt pans (*solonchaks*) are characteristic and support a number of endemic species of plants and animals. A very important element of the deserts is the *tugai* (desert riparian forest), a complex ecosystem found along the valleys and terraces of the large rivers such as Amudarya — the largest river of Central Asia. It is dominated by poplars (*Populus diversifolia*, *P. pruinosa*), jidda (*Elaeagnus oxycarpa*), willows (*Salix*), and tamarix (*Tamarix*) forming thick forests, sometimes mixed with reeds (*Phragmites communis*) and other wetland plants.

B2. Kopetdagh Mountains

These mountains are the northernmost range of the Iranian tableland. The biogeographical origins and development of the flora of Kopetdagh have resulted in an extremely diverse set of plant communities. The major communities are described below.

Wormwood (*Artemisia*) communities (300 to 800 m). Wormwoods (*A. badghysi*, *A. turcomanica*, *A. kulbadica*) occupy most of the foothills, combined with *Poa bulbosa* and desert sedge (*Carex pachystylis*). These communities include numerous ephemeral plant species. Under heavy grazing, wormwood cover declines, resulting in an increase in annual grass communities including such species as *Eremopyrum orientalis*, *Anisantha tectorum*, *Avena barbata*, and *Bromus japonicus*.

Semisavanna communities (800 to 1,000 m). These are dominated by a perennial grass *Elytrigia trichophora*. Common codominants are *Poa bulbosa*, *Helianthemum salicifolium*, *Convolvulus subhirsutus*, *Phlomis kopetdaghensis*, and *Perovskia abrotanoides* (an indicator of a disturbed habitat). Complexes of *E. trichophora* with *Festuca valesiaca* spread up to 1,700 m and include characteristic species of meadows and steppes.

Meadows (700 to 1,600 m) are dominated primarily by *Elytrigia repens* in the depressions of mountain plateaus or in the river valleys. Other dominants are *Trisetum flavescens*, *Dactylis glomerata*, *Alliaria alliacea*, *Nepeta sintenisii*, *Crucianela sintenisii*, *Anisantha sterilis*, *Galium verum*, and *G. aparine*. Derived communities are dominated by *Hordeum murinum* and *Eruca sativa*.

Mediterranean short-tree woodland (*shiblyak*) (800 to 2,500 m). Dominated by the Turkmen maple (*Acer tucomanicum*) and the Christ's thorn (*Paliurus spina-christi*). Codominant shrubs are *Cerasus microcarpa*, *Ephedra intermedia*, *E. equisetina*, *Cotoneaster nummularia*, *Colutea gracilis*, *Lonicera bracteolaris*, *Celtis caucasica*, *Jasminum fruticans*, and *Amygdalus communis*. The lower layer has such herbaceous dominants as *Anisantha sterilis*, *Trisetum flavescens*, *Fritillaria raddeanum*, *Allium paradoxum*, *Orthurus heterocarpus*, *Lamium turkestanicum*.

Juniper woodland (1,300 to 2,000 m). The only conifer tree in Turkmenistan, *Juniperus turkomanica*, forms forestlike stands mainly on inaccessible mountain ridges, and is heavily disturbed by logging and grazing. Steppe vegetation (1,000 to 2,200 m) develops on mountain plateaus; dominant grasses there include *Stipa spp.* and *Festuca valesiaca*. Common codominants are *Stipa turcomanica*, *S. hohenackeriana*, *Galium verum*, *Thymus transcaspicus*, *Elytrigia trichophora*, and some shrubs. Specific communities of mountain xerophytes are formed here by *Acanthophyllum*, *Acantholimon*, and *Tragacantha*.

Mountain riparian forest (1,000 to 1,500 m) is confined to a very narrow (50 to 100 m wide) strip along the mountain rivers. Walnut (*Juglans regia*) is accompanied by Syrian ash (*Fraxinus syriaca*), elm (*Ulmus carpinifolia*), *Thelycrania meyeri*, *Prunus divaricata*, *Lonicera floribunda*, *Rubus sanguinoides*, and *Rosa lacerans*. The herbaceous layer includes *Anisantha sterilis*, *Elytrigia repens*, *Cousinia umbrosa*, *Anthriscus longirostris*, *Physocaulis nodosus*, and *Allium paradoxum*. The relict Eastern plane tree (*Platanus orientalis*), included in the Red Data Book of

the former USSR, forms complexes with ash and walnut forests and meadow and wetland vegetation along large valleys.

B3. Kugitang Mountains

Located on the very southeast of Turkmenistan, this range is a part of Gissar Mountains extending further to Uzbekistan and Afghanistan. The structure of plant communities is similar to that of Kopetdagh. A number of species belonging to Gissar flora are found here but not present in Kopetdagh.

B4. Caspian Sea

The largest inland body of water in the world, the Caspian Sea has total surface area of 400,000 km². The southeastern sector of the sea, with 1,768 km of shoreline, is in the territory of Turkmenistan. The biodiversity of the Caspian aquatic environment is derived from the sea's long history and isolation, allowing ample time for speciation. It has been separated from other seas since the beginning of the post glacial period and has not only preserved the rich late-Tertiary, sea-originated flora and fauna but it also has been influenced by later invasions, particularly of freshwater origin.

C. Species Diversity

The ecology of Turkmenistan is characterized by both its high species and habitat diversity. An impressive body of information exists on the biodiversity of Turkmenistan, based on intensive studies by Soviet scientists. In the early 1990s, an international project was launched to document biodiversity of the region, which led to a publication titled *Biogeography and Ecology of Turkmenistan*, the first comprehensive ecological monograph published in English about former Soviet republics of Central Asia. A new edition of the Red Data Book of Turkmenistan, describing rare, threatened, or endangered plants and animals was published in 1999. This Red Data Book adopted global IUCN categories and criteria.

C1. Flora

The flora of Turkmenistan includes about 3,000 species of vascular plants belonging to 105 families. The main landscape of the Turkmenistan desert is defined by plant communities with dominant xerophytic low shrubs and halophytes, mixed with scattered saxaul (*Haloxylon spp*) communities, as well as sand-adapted shrubs and ephemerals. The flora of the Kopetdagh Mountains (1,942 species) has an unusually high endemism (332 species), which reflects its prolonged isolation from all other mountains of Central Asia, especially those to the east. Arid woodlands (*shiblyak*), formed in the lower belts during the early-middle Pliocene period, were later impoverished. During the Pliocene-Pleistocene, the Kopetdagh range was an important center of origin for mountain xerophyte flora. The mountain steppe communities (middle and upper mountain belts) played an important role in the evolution of endemic species.

C2. Fauna

The vertebrate fauna of Turkmenistan includes almost 700 species: 103 species of mammals, 397 birds, 82 reptiles, 5 amphibians, and 108 fish.

Group	Orders	Families	Genera	Species
Mammals	7	14	44	103
Birds	18	54	168	397
Reptiles	2	14	41	82
Amphibia	1	2	2	5
Fish	14	20	64	108
Total	41	104	319	695

Among the 101 vertebrate species listed in the Red Data Book of Turkmenistan (1985) are 27 mammals, 35 birds, 30 reptiles, one amphibian, and eight fish species. Turkmenistan is inhabited by about one-third of the animal species listed in the Red Data Book of the former USSR; within the territory of the former USSR, more than 11 percent of those species are found only in Turkmenistan.

The diverse and threatened large mammal fauna includes wild goats (bearded goat and markhor), wild sheep, wild ass, gazelles, leopard, hyena, jackal, and wild cats. The most common desert mammals are the long-eared hedgehog (*Erinaceus auritus*) and tolai hare (*Lepus tolai*); also common are long-quilled hedgehog (*Piracohinus hypomelas*), numerous rodents such as gerbils (*Rhombomys*, *Meriones*) and jerboas. Other characteristic desert mammals include honey badger (*Mellivora capensis*), an endemic sand shrew (*Diplomesodon*), ground squirrels (*Spermophilopsis*), and desert cat (*Felis margarita*).

The bird fauna includes many dry country specialists: including Pander's ground jay (*Podoces panderi*), houbara bustard (*Chlamydotis undulata*), sandgrouse (*Pterocles alcata*, *P. orientalis*), desert sparrow (*Passer simplex*), and several eagles and falcons, including the threatened imperial eagle (*Aquila heliaca*) and saker falcon (*Falco cherrug*). Turkmenistan is an important migratory and wintering area for aquatic birds, particularly along the eastern Caspian shore as well as artificial lakes such as Lake Sarykamysh.

In the deserts, reptiles are numerous, and the majority of species inhabiting these ecosystems are endemic to the Central Asian herpetofauna. These include Horsfield's tortoise (*Agrionemys horsfieldi*), lizards such as agamas (*Phrynocephalus*, *Trapelus*), and geckos (*Gymnodactylus*, *Alsophylax*, *Cyrtopodion*, *Crossobamon*, *Teratoscincus*). Snakes include sand boas (*Eryx miliaris*, *E. tataricus*), sand snakes (*Psammophis lineolatum*), gyurza viper (*Vipera lebetina*), and sand echis (*Echis carinatus*).

The Caspian Sea is noted for a great number of endemic fish species. Most of these endemics belong to the herring and bullhead families. Seven species and subspecies of sturgeon are of critical ecological and economic importance. There are 115 species of fish, of which a number are anadromous and migrate from the Caspian up the rivers to spawn. The Caspian is the only area to have maintained a significant sturgeon fishery, which represents up to 90 percent of the world catch.

Since the 1950s, the Turanian tiger, Asian cheetah, Syrian brown bear, and lynx have been extirpated in Turkmenistan. In 1990, the leopard (*Panthera pardus tullianus*) in Turkmenistan numbered between 130-150 individuals and the population seemed relatively stable. However, recent surveys reveal a critical situation.

Turkmenistan has surviving populations of wild sheep (*Ovis orientalis*) in Badkhyz and Kopetdagh, markhor (*Capra falconeri*) in Kugitangtau, and wild goat (*Capra aegagrus*) in Kopetdagh, but numbers are thought to be much reduced. The population of goitered gazelle (*Gazella subgutturosa*) is estimated as not more than 6,000. The Turkmen subspecies of wild ass (*Equus hemionus onager*) is currently found only in the Badkhyz Reserve. Onagers were recently introduced to the submontane plain of Central Kopetdagh and to the Kaplankyr Reserve (northern Turkmenistan).



Persian (goitered) gazelle, a threatened species throughout Central Asia. Numbers have plummeted through habitat loss, hunting and disturbance.

Populations of snakes that are harvested for venom — the Asian cobra (*Naja oxiana*), gyurza viper (*Vipera lebetina*) and echis (*Echis multisquamata*) are under constant pressure and threat of extirpation. The Caspian Sea supports the entire world population of the endemic Caspian seal (*Phoca caspica*), as well as many endemic fish species, including seven species of sturgeon.

D. Agrobiodiversity

Turkmenistan possesses a rich agricultural biodiversity, which is increasingly threatened. This includes many varieties and subspecies, some endemic to the region, that are close relatives of domestic food plants. This genetic diversity requires study and sustainable development under various regimes of protection. The shrubland communities of Kopetdagh and Kugitangtau mountains and foothills support many valuable fruit trees, shrubs, and vines. These include pomegranate (*Punica granatum*), wild grapes (*Vitis sylvestris*, *V. vinifera*), fig (*Ficus carica*), wild apple (*Malus turkmenorum*), wild pear (*Pyrus boissieri*), wild cherries (*Cerasus microcarpa*, *C. erythrocarpa*, *C. blinovskii*), wild prune (*Prunus divaricata*), almonds (*Amygdalus communis* and *A. scoparia*), and hawthorns (*Crataegus* spp.). Some of these species have been intensively studied. The wild almond that grows in the Kopetdag covers an area of more than 26,000 ha. Three species of the wild barberry also belong to the valuable food plants in Turkmenistan.

An outstanding repository of plant genetic diversity in Turkmenistan is the Turkmen Experimental Station of Plant Genetic Resources (TES) created by the famous scientist N. I. Vavilov in 1930 in the Southwest Kopetdagh (Garrygala). The TES contains the largest collection in the world of pomegranate and includes large collections of local wild varieties and cultivars of fig, grapes, apple, pear, almond, walnut, and pistachio.

Of the rich wild flora of Turkmenistan, about 400 species are considered economically important. In the mountainous areas of Turkmenistan many valuable species of medicinal and economically valuable plants are found: horsetail ephedra, Turkmen juniper, common St. John's wort, *Acanthophyllum*, ziziphora. The horsetail ephedra, which contains the alkaloid ephedrine, is an important medicinal plant and occurs widely in the mountain gorges of the Greater Balkhan and Kopetdag. Useful wild native plants include the Vavilov onion, fennel, thorny capers, Turkestan rhubarb, hawthorn, groomer, and madder. For a long time, roots and rootstocks of madder have been used to extract pigments used in carpet making. Significant plant resources are found in the valleys and river floodplains of Turkmenistan. The *tugai* plant communities are an important source of valuable and technical plants, especially in the Amudarya River valley, which covers over 30,000 ha. Among a great variety of valuable wild plants growing in the

THE BLACK LIST OF TURKMENISTAN

Throughout Turkmenistan, virtually every landscape today evidences clear ecosystem degradation. Not only are species disappearing; unique ecosystems like *tugai* forests, Caspian wetlands, and mountain steppe are also endangered. *Tugai* forests cover only 7,000 ha and are being replaced gradually by shrub, reed, and licorice (*Glycyrrhiza glabra*) communities. No virgin *tugai* remains in Turkmenistan. Mountain juniper forests cover only 42,020 ha today. Pistachio (*Pistacia vera*) groves are distributed sporadically and rarely constitute a natural ecosystem anymore. The largest pistachio groves are in Badkhyz and cover 76,000 ha. The last preserved black saxsaal (*Haloxylon aphyllum*) community is in the Repetek Nature Reserve and covers 2,000 ha. The scale of degradation in mountain pasture areas is so severe that the number of rare species is rising rapidly and now includes 61 percent of the flora of the Central Kopetdag. Turkmen juniper is the most important species for many mountain ecosystems in the Kopetdag. So, extensive logging of this slow growing species and the increasingly xeric climate put not only this species, but whole ecosystems at great risk.

Because of these environmental changes, the following species are on the verge of extinction:

- 1) Turkmen Mandrake (*Mandragora turcomanica*)
- 2) Greek Ash (*Sorbus graeca*)
- 3) Wild Pomegranate (*Punica granatum*)
- 4) White Saksaul (*Haloxylon persicum*)

Extirpated from Turkmenistan are, *inter alia*, the following species:

- 1) Medlar Flower (*Mespilus germanica*)
- 2) Kara-Kala Rod Rose (*Alcea karakalensis*)
- 3) Kossinski's Dionysis (*Dionysia kossinskyi*)

Over the past five years, road-building activities exempt from any environmental impact assessments have destroyed complete populations of *Astragalus* (*Astragalus chrysostachys*) and reduced populations of Kopetdag Warley Rose (*Aethionema kopetdaghi*) to critically low levels.

Almost extinct are local populations of spotted toad-headed agama (*Phrynocephalus maculatus*), lammergeier (*Gypaetus barbatus*), Near Eastern leopard (*Panthera pardus ciscaucasica*), goitred gazelle (*Gazella subgutturosa*), Tajik markhor (*Capra falconeri heptneri*), Bukhara deer (*Cervus elaphus*), Turkestan lynx (*Lynx lynx isabellinus*), and Amudarya shovelnose sturgeon (*Pseudoscaphirhynchus kaufmanni*). Over the past fifty years, scaly-bellied woodpecker (*Picus squamatus*), cheetah (*Acinonyx jubatus*), Syrian brown bear (*Ursus arctos siriacus*), and Turan tiger (*Panthera tigris virgata*) all disappeared. The existing network of nature reserves in Turkmenistan (eight reserves covering 894,856 ha, or slightly under 2 percent of the country) is sufficient to help ensure the survival of many species. However, corruption, low state salaries of wildlife inspectors, and hard currency hunts in reserves all work against the effectiveness of these reserves. Rather, those supposed to protect nature in Turkmenistan often are the ones causing the most damage. For example, partly due to lobbying by reserve staff, domestic livestock now graze in the Syunt-Khasardag Nature Reserve and in Southwest Kopetdag. Although Turkmenistan has signed and ratified a number of environmental treaties and published the Red Book of Turkmenistan in 1999, these treaties and such books mean little if there is no substantive protection or compliance with treaties or local laws. Without these latter two substantive events, there will be no hope for Turkmenistan biodiversity.

From Ecotan News 702 Dr. Galina Kamakhina, CATENA Ecological Club

Amudarya valley, licorice is of particular economic importance. The saponine-containing Turkestan soapwort, one of the most valuable plants an endemic plant of Central Asia, grows here. Reeds *Phragmites* are widely used as construction material.

E. Threats to Biodiversity

Threats to Turkmenistan's biodiversity, described in detail below, include the loss or degradation of habitat through direct and indirect anthropogenic changes to natural ecosystems, over-exploitation of individual species (hunting, fishing, persecution), and effects of non-native species.

1. Loss or degradation of habitat through direct conversion or exploitation of natural ecosystems.
 - *Unregulated deforestation.* Cutting of woodlands and forests for commercial and fuelwood needs, as well as the clearing of land for agriculture, is a major threat to biodiversity in Turkmenistan. Particularly affected have been the desert-adapted saxaul (*Haloxylon spp*) woodlands, the riparian *tugai* forests, and mountain forests. Mountain landscapes are under severe grazing pressure as well. Deforestation here is especially severe for juniper (*Juniperus turcomanica*) and pistachio (*Pistacia vera*) forests.
 - *Drainage of wetlands.* Rich water meadows have increasingly been drained, either directly or indirectly, resulting in loss of species diversity and wholesale reduction of important reedbed habitats. The quality of the pasture for grazing and hay production has consequently declined. Wetlands are mostly drained for irrigated agriculture. The number and diversity of breeding wildfowl has markedly decreased, including threatened species such as marbled teal (*Marmoretta anguirostris*) and white-headed duck (*Oxyura leucocephala*).
 - *Overgrazing by domestic livestock.* The fragile desert, semi-desert and wetlands zones have suffered severely from overgrazing, resulting in natural pastures being replaced by more weedy species unsuitable as forage, and by the appearance of desert moss *Tortula desertorum* that covers the soil surface and prevents natural regeneration of the vegetation. This concentrates domestic herds on fragile remaining pastures and around water points, which causes further degradation. The desert and foothill rangelands have been overgrazed by sheep due to unsustainable livestock practices. Domestic livestock are increasingly found in protected areas, competing with wild ungulates and impairing regeneration of natural vegetation.



Mountain plains are vulnerable to overgrazing and soil deterioration.

- Disturbance and degradation of fragile desert soils and ecosystems through poorly-planned infrastructure projects, including roads and increased mechanization. The vegetation of the sand deserts of Turkmenistan is the most vulnerable to these anthropogenic influences, and therefore the most disturbed. Areas occupied by the communities of saxaul (*Haloxylon album*, *H. persicum*) and psammophyte shrubs have been reduced by more than two thirds of their original area.
2. Loss or degradation of habitat through indirect effects of changing land use patterns.
- *Changing water balance through poor irrigation practices.* Widespread irrigation, using poor, water-wasting technologies, has had a disastrous effect on the country's ecology, leading to desiccation, salinization, erosion, and alteration of water balances. Natural vegetation communities adapted to desert and semi-desert ecosystems have been unable to adapt to these changing conditions.
 - *Diversion of water through irrigation schemes and artificial water bodies.* This is particularly evident in Turkmenistan through the Karakum canal and its many tributaries. This has resulted in significant changes in local hydrological regimes. *Tugai* forests that depended on natural cycles of flooding have been adversely affected, and shallow wetlands have dried up. Rare species, such as Dalmatian pelican (*Pelecanus crispus*), that depend on *tugai* and other wetland vegetation for breeding have declined considerably.
 - *Overuse of agricultural inputs.* Soviet agriculture was characterized by high levels of inputs (fertilizers, pesticides, herbicides), directly affecting biodiversity, especially native vegetation, concentrations of these inputs through the irrigation systems resulted in salinization of soils, further providing a hostile environment for plant and animal species.
 - *Effects of industrial pollution.* Effluents from industrial pollution can be especially toxic, and pollution control mechanisms are not generally in place. In addition to direct discharge into water bodies, pollutants are concentrated into shallow water bodies and seep into the aquifer. With the decline in industrial and agricultural output following the breakup of the former Soviet Union, pollution and agricultural input loads have decreased. The water ecosystems of the region are extremely vulnerable due to the fact that none of the river drainages are connected to the oceans.
3. Over-exploitation of individual species, through hunting, overfishing, and persecution. With the decline of the strict enforcement capacity of the former Soviet protected area and wildlife systems, citizens of the newly-independent republics took advantage to promote hunting, including unregulated trophy shooting. Human activity, including direct hunting, has significantly decreased the population of many wild ungulates in Turkmenistan, notably gazelles (*Gazella subgutturosa*), wild sheep (*Ovis ammon*), and wild goat (*Capra aegagrus*). Many wildlife species have been extirpated in the arid territories outside of natural reserves. Private interests in the caviar trade have promoted overfishing of sturgeon stocks in the Caspian. Collection of birds of prey for the falconry trade, particularly to the Arab states, has increased, as has collection of threatened reptiles, such as Horsfield's tortoise, for the pet trade.

4. Effects of introduced or non-native species. As fragile ecosystems have been degraded, primarily through overgrazing, invasive plant species, including non-native, introduced species have flourished, inhibiting return to the original condition, should other pressures be reduced. In the Caspian Sea, non-native species, such as the comb-jelly *Mnemiopsis leidyi*, recently discovered in the Caspian, have the potential to cause major ecological disruption. In the Black Sea, this species was responsible for a collapse in fisheries and a major decline in biodiversity, due to predation on fish eggs and other plankton, combined with an enormous capacity for reproduction.

SECTION III

Status of Biodiversity Conservation

A. Protected Areas

The eight natural preserves in the country cover an area in excess of 800,000 ha and include a broad range of coastal littoral, mountain, desert and riparian and floodplain ecosystems.

In addition to the reserves, natural monuments are located in mountain valleys with fragmented relict forests, gorges, and places of exceptional natural beauty. One such place in the Kugitang plateau has 500 fossilized footprints of the oldest dinosaurs, 140 million years old (Jurassic period).

Turkmenistan's protected areas comprise eight strict nature reserves (*zapovedniks*), 14 state conservation areas (*zakazniks*), and 11 state nurseries and natural monuments. The largest protected areas of desert ecosystems in Central Asia are located in Turkmenistan.

Nature reserves and other protected territories in Turkmenistan are critical in conserving the country's biodiversity. More than 80 percent of vertebrate species (such as wild ass and goitered gazelle) are represented. A flourishing population of wild ass in the Badkhyz reserve has actually caused problems as the animals damage agricultural crops outside the reserve. As a result wild asses (over 600) have been re-introduced to other protected areas in Meana-Chaacha, Kalininsk natural preserve, Sarykamysh natural preserve, and in the west of Turkmenistan.

The State of the Environment report for Turkmenistan (1998) makes several recommendations for improving the coverage and effectiveness of the protected area system in Turkmenistan:

- Territories of seven nature reserves (except for the Kaplankyr) should be increased by 3 to 10 times. The Amudarya, Kopetdag, and Syunt-Khasardag reserves are currently split each into three to four smaller parts that cannot function individually with surrounding anthropogenic pressures. That is why it is necessary to take special measures to maintain the integrity of their territories.
- Territories for the Kaplankyr, Kopetdag, and Syunt-Khasardag reserves were not chosen properly, do not satisfy requirements of preservation of species and community diversity (in Kaplankyr), and provide limited or no access for regular observations and reliable protection.
- The nature reserves and other protected territories are located unevenly over the territory of Turkmenistan. There are practically no full-value nature reserves in the Akhal Velayat (Greater Balkhan with Zauzboi, Predustyurt, and Central Karakum with the Murghab and Tedzhen deltas).

- It is necessary to create an integral, functional network of protected territories that incorporate an adequate number of nature reserves, conservation areas, and monuments of nature to form an effective network in the country.
- It is necessary to take measures to move all motor roads, stations, and the like outside the borders of the nature reserves.

Strict Nature Reserves	Description	Year Established	Area in Hectares
Amudarya	Amu-Darya flood plain and <i>tugai</i> forest	1982	48,506
Badkhyz	Foothills of the Paropamiz mountains	1941	87,680
Kaplankyr	Northern desert in the Kaplankyr highlands	1979	282,800
Kopetdag	3 Areas in the Kopetdag mountains	1976	49,793
Kugitang	Kugitangtau mountain range	1986	27,139
Repetek	South Eastern Karakum Desert	1912	340,002
Suyunt-Khasardag	Dry subtropical area, Kopetdag mountains	1978	26,461
Khazar	Marine wetlands of the Caspian Sea	1933, 1968	262,037
TOTAL			1,124,418

The Amudarya reserve includes the ecosystems of *tugai* forests in the Amudarya River valley and adjoining desert areas. This reserve provides habitats for 48 species and subspecies of mammals, and 203 species and subspecies of birds. More than 1,000 species of higher plants are represented. Among animals are rare species, such as the goitered gazelle, Bukhara deer, ratel, otter, marbled teal, and osprey. Greater and lesser Amudarya false shovelnose sturgeons and pike chub are representatives of the fish species.

The Amudarya nature reserve includes the Kelif natural preserve that incorporates lake ecosystems in South-East Turkmenistan and is a favorable place for the wintering of migratory and aquatic birds.

The Badkhyz reserve includes ecosystems of hilly plateaus in the foothills of the Paropamiz, the northernmost range of the Hindukush. The territory of the nature reserve supports 40 species of mammals, 250 species of birds, and 34 species of reptiles. Among them are the goitered gazelle, Turkmen mountain sheep, wild ass, striped hyena, caracal, leopard, short-toed eagle, and golden eagle.

The vegetation in Badkhyz includes 1,050 varieties of vascular plants (442 genera and 76 families), of which more than 75 species and subspecies are endemic. The nature reserve incorporates three natural preserves (all established in 1956):

- Chemenibit (floodplain-river, the summer drinking place for wild ass)
- Kyzyljar (foothills)
- Pulikhatum (foothills)

The larger territory of the Kaplankyr reserve is occupied by clay plateaus on the southern spur of the Ustyurt Plateau. The reserve lies at the junction of northern and southern deserts. Here are found 26 species of mammals, 147 species of birds, and 918 species of higher plants. Rare species of animals (the goitered gazelle, Ustyurt mountain sheep, ratel) are protected here.

Among higher plants, the Khiva thistle, Turkmen tulip, Antonia's gypsophila, Karelin sand acacia, and 55 other endemic species occur. In addition, populations of saiga antelopes migrate from Karakalpakstan in the winter and are protected in the reserve. The Kaplankyr nature reserve incorporates two natural preserves: Sarykamysh (established in 1980; lake-coastal ecosystems) and Shakhsemem (established in 1984; stony desert).

The Kopetdag reserve was set up for the conservation and integrated study of the mountain forest ecosystems. The protected territory covers the high and medium mountains of the Central Kopetdag. The nature reserve provides habitats for 68 species of mammals and 280 species of birds. More than 960 species of plants grow here. The nature reserve incorporates two natural preserves established in 1976: Kalininsk (mountains), and Meana-Chaacha (foothills).

The main objective of the Kugitang reserve is the conservation and restoration of the mountain ecosystems in the Southern Pamir-Alai. The Kugitangtau range, which forms the border between the montane Central Asian and Iranian biogeographic provinces, is characterized by distinctive physiographical conditions and an original flora and fauna. Twenty-two species of mammals and 80 species of birds have been recorded. About 1,000 species of higher plants, among which 40 are endemic, have been found in the nature reserve. The Kugitang nature reserve incorporates three natural preserves (all established in 1986):

- Karlyuk (karst; protection of unique subsurface caves, the world's only population of the Kugitang blind char)
- Khodjapil (mountain forest; conservation of Zarafshan juniper, "Dinosaurs Plateau", mountain goat, and others)
- Khodja-Burdji-Belend (mountain forest, pistachio woodlands)

The Karakum Desert occupies the area of about 35 million ha, or more than 80 percent of the whole territory of Turkmenistan. It incorporates the Repetek state biosphere reserve where 20 species of mammals and 23 species of birds live. The total flora of higher plants growing here includes 269 species belonging to 206 genera and 84 families. Of 132 species of aboriginal plants in the Repetek nature reserve 42 species (31.8 percent) are endemic for the Karakum and Kyzylkum deserts.

The Syunt-Khasardag reserve includes ecosystems of the Western Kopetdag mountains (dry subtropics) and neighboring plains. Here, 37 species of mammals and 217 species of birds are found. Flora of the Western Kopetdag includes 1,266 species of higher plants, which belong to 233 genera and 500 families; among these, 150 species are endemic. The nature reserve incorporates one mountain natural preserve, the Syunt-Khasardag (established in 1990).

The desert ecosystems, dry subtropics, and marine shallow bays in the southeastern coast of the Caspian are included into the Khazar reserve. It was set up in 1968 on an area of 192,300 hectares and is included as a Ramsar wetland of international importance. The Khazar nature reserve provides the habitat for 18 species of mammals and 372 species of birds. Of particular importance are the large populations of wintering and passage waterfowl and wetland birds.

B. Land Use

In Turkmenistan, as elsewhere in the Central Asian Republics, human modification has resulted in large-scale desertification and the decline in biodiversity. This combination of pressures has resulted in widespread degradation of lands, water resources, and habitats. Widespread soil and aquifer salination has taken place from the overuse of flood irrigation systems developed during the Soviet period to exploit Central Asia's vast natural resources. Diversion and damming rivers for vast agricultural schemes and the development of hydropower in the region have left their mark on the land and affected the environment and biodiversity.

Although well intentioned, attempts at afforestation (particularly around urban centers) have mostly involved species not adapted to fragile desert environments. They are often maintained by costly irrigation by tanker trucks using water-soluble fertilizers, but this is largely an unsustainable exercise, since these trees cannot survive in the long-term.

C. Caspian Sea

The Caspian Sea has suffered from the legacy of many years of unregulated environmental mismanagement during the Soviet era, during which time waste products from industries and pesticide and pollutant runoff led to high levels of toxic chemicals in the Sea, which is essentially a closed system. While levels of pollution have decreased with the decline of industrial and agricultural outputs since independence, high concentrations of certain toxins remain in the system, within both physical and biological components. Recent die-offs of the endemic Caspian Seal (*Phoca caspia*) in 2000, while proximately triggered by an infectious disease outbreak, were thought to be exacerbated by lowered immune resistance caused by buildup of pesticide residues and heavy metals within the tissues of the seals. Lowered fertility (with increasing percentages of barren females in the population), noted for several years and is linked to high contaminant levels in tissues. Seals do not breed in Turkmenistan but are mobile in search of migratory fish stocks and frequently enter Turkmen waters.

The sturgeon fishery, an important ecological and economic resource of the Caspian, is extremely threatened by pollution, overfishing, and loss of spawning grounds, to the point where a ban on future harvesting has been proposed, while a recovery plan is put in place. However, illegal exploitation, primarily by organized groups, is difficult to control given the profitable market for caviar. Turkmenistan is a member of the Caspian Environmental Program, which has proposed a number of activities to assess and improve the environment of the Caspian Sea. The Caspian shoreline in Turkmenistan is important for migratory birds, which are potentially at risk from oil spills resulting from the increasing oil and gas exploitation in the region.

SECTION IV

Strategy and Policy Framework

A. Policy Framework

Unlike most other countries in the region, Turkmenistan currently has no National Environmental Action Plan (NEAP) or Biodiversity Strategy Action Plan (BSAP), although both are currently being developed. No drafts were available for review by this assessment team.

With the technical and financial support of UNDP, the Government of Turkmenistan started the National Environmental Programme for Turkmenistan (NEPT) in July 1998. The NEPT is aimed at

- Strengthening the institutional capacity of the Ministry of Environment Protection
- Reviewing and improving environmental legislation
- Introducing Environmental Impact Assessment (EIA) procedures (as a requirement in public and private investments)
- Developing the Red Data Book of Turkmenistan (now published)
- Producing the State of the Environment Report (now published)
- Increasing public awareness and strengthening local technical capacity

One of the most important activities of the NEPT is intended to be the identification of key environmental problems that have significant negative impact on the economy and social welfare. Based on this analysis, the NEPT will propose a range of priority actions through a process of wide consultation and active participation of NGOs, academia, the private sector and governmental institutions. The output of this process will be an agreed NEAP that will serve as a tool for resource mobilization and proper natural resource planning.

Within the framework of the NEPT, and complementing it, UNDP is also supporting the development of a National Biodiversity Strategy and Action Plan. The BSAP will analyze the major issues affecting biological diversity and identify strategic priorities and actions to protect ecological systems and integrate conservation and sustainable management of biological diversity into development plans of Turkmenistan. The NEPT in general, and the NEAP in particular, will attempt to ensure that future economic development in Turkmenistan is guided by the principles of sustainable resource use. The NEPT and NEAP will also ensure that attention is paid, and national financial resources are directed, to solving the most pressing environmental problems of the country. On top of these baseline activities, the development and implementation of a BSAP tightly coordinated with the NEPT will promote the protection of biodiversity of global significance and its incorporation into local sustainable development strategies.

Components of National Environment Program of Turkmenistan

1. Creating Effective Environmental Legislation and Standards
 - Discussion Paper on the environmental legislation situation
 - Development of Environmental Quality Standards
 - Report to Government with recommendations
2. Capacity Building in the Ministry of the Environment
 - Review and report on the strong and weak points of the Ministry
 - Enhancements in staff and other resources
 - Strategy for Public Information and Environmental Awareness
 - Public education material through mass media
 - Environmental Studies curriculum development
 - Feasibility Study for a Center of Excellence at the State University of Turkmenistan
3. Strengthening the EIA Process
 - Report to Government on an improved EIA Process
 - Handbook for the EIA Process in Turkmenistan
 - National and other EIA Workshops
4. Land Use Planning and Management Process
 - Report on Land Use Planning and Management
 - Pilot Coastal Zone Management Plan for the Turkmen Caspian Coast
 - Publication of research results, advice and guidance on combating desertification
5. Management of Protected Areas
 - Rapid survey of ecological, geological and cultural resources in Turkmenistan
 - Advice to Government on Protected Areas Management Planning Procedures
 - Pilot management plan for Kopet-Dag Protected Area
 - Visitor Centre and equipment for Kopet-Dag Protected Area
 - Communication equipment for selected field stations
6. Framework for the Management of Species that Require Protection
 - Discussion paper on a protected species management framework
 - Updating of the Red Data Book of Turkmenistan
 - Pilot Recovery Plan for selected endangered plant species
 - Pilot Recovery Plan for selected endangered animal species
7. Environmental Information Management
 - Creating a relational database in CIS format
 - Publishing the Environmental Atlas of Turkmenistan
8. Control and Management of Industrial and Agricultural Impacts -Formulating a document on control and management of industrial and agricultural impacts in Turkmenistan

— from project document, UNDP

To support the Agenda 21 process, UNDP is also financing a two-year Capacity 21 initiative to help the Government mainstream environmental concerns (and eventually sustainable development (SD) principles) into national development programs and strategies. To achieve this, the project will adopt an implementation methodology that emphasizes the importance of multisectoral coordination and public participation within the decision making process. The project will target both national and local level initiatives. At the national level, it will build and strengthen the capacities of the newly established National Commission on U.N. Environmental Conventions (CIC) to make it fully functional and capable of implementing its current mandate. Second, the project will help the Commission acquire the skills and capacities to become the main sustainable development institution in Turkmenistan. Third, at the local level, in three selected districts, the project will support local community development and public participation in local decision making processes as well as strengthen the capacity of NGOs/CBOs to implement priority environment and SD projects. A feedback mechanism between national and local level initiatives is envisaged to assure that the lessons learnt and recommendations of the local pilot activities will be incorporated into the recommendations of the National Commission

for further policy reforms. Development of regional framework for cooperation on mutually agreed SD priorities component is also envisaged within the current project.

B. Legislative Framework

Most of the laws of Turkmenistan are based on the Civil and Criminal codes of the former Soviet Union. However, with independence most of them were reviewed, and re-ratified by parliament with minor changes. The major laws affecting the environment and biodiversity issues are:

The law ‘On Nature Protection’ 1991
 The law ‘On strengthening the responsibility for ecological disruption’ 1991
 The Turkmenistan Constitution 1992
 The law ‘On historic monuments and culture’ 1992
 The law ‘On State Particularly guarded Territories’ 1992
 The law ‘On Flora Preservation and its Usages’ 1993
 The law ‘On State Ecological Expertise’ 1995
 The law ‘On Atmosphere’ 1996
 The law ‘On Hydrocarbon Resources’ 1997
 The law ‘On Fauna Preservation’ 1997
 The law ‘On Hunting Management & Facilities’ 1999
 The Land Code 1991
 The Forestry Code 1993
 The Criminal Code 1961, 1993, 1994, 1996, 1997

Regulations Nature & Environmental Protection 1991
 Regulation on Conservation Zones 1995
 Decree (presidential) State Commissions to oversee compliance with country’s obligations under international conventions, on the environment 1999

In addition to these laws, codes, and regulations, there are articles that cover a wide range of related subjects. Many of the laws pertaining to natural resources, environment, and biodiversity conservation are more in the nature of presidential decrees subsequently made into laws, but without clear definition. There is a need to review these laws for consistency and coherence, but perhaps a more pressing issue relates to implementing regulations, to clarify how regulations can be implemented effectively in the field. Currently, decisions are made on an ad-hoc basis, often according to political expediency. An example is the turning over of parts of protected areas to local grazing and collection of economically valuable plant species. Protected species are regularly hunted, in many cases with licenses from relevant authorities. The relationship between central and local authorities is often unclear.

International Conventions

Turkmenistan has joined only a few international conventions, protocols, and agreements. These are:

1. The Vienna convention on protection of the ozone layer, 1993
2. The Montreal protocol on substances damaging the ozone layer, 1993

3. UN Convention global climate change, 1995
4. UN Convention on combating desertification, 1996
5. The Convention on biological diversity, 1996
6. The Aarhus Convention on access to information & community participation in decision making, 1999
7. The Ramsar Convention on the protection of wetlands of international significance, 1996

Support From Bilateral and Multilateral Donors

International donors have not participated in environmental and biodiversity conservation projects in Turkmenistan as much as they have in neighboring countries. The political environment has until now proved somewhat of a constraint. Of those who have funded projects, are the John D. & Catherine T. Mac Arthur Foundation, the International Science Foundation, The World Wildlife Fund for Nature, and ISAR.

WWF financed two projects in 1999: “status of the leopard in Kopetdag” and “supporting conservation of Bukhara deer populations in natural habitats.”

With the financial support of GRID/Arendal/UNEP, the information report “Biodiversity Conservation of Turkmenistan” was presented at the 4th meeting of the Convention on the Biological Diversity of Central and Eastern European Countries and at the Pan-European Strategy Meeting on the Biological and Landscape Biodiversity (Riga, March 20-23, 2000).

With the exception of the Caspian Environmental Program, for which UNDP is the principal support agency for the Turkmenistan component, Turkmenistan currently has no other environmental projects funded by international development agencies.

Government Institutions

Turkmenistan has its Parliament, Cabinet of Ministers, ministries, and a number of academic-research institutions, agencies, national commissions, committees, and regional and local authorities, heads of which are being appointed by the President.

The Ministry of Environment Protection has a mandate to promote the rational use of natural resources within the framework of government policy and targets and the management of biological resources. The Ministry includes different departments and agencies responsible for biological resources management (protected areas, endangered species), forestry, ecological monitoring, and pollution prevention. The Ministry has a number of scientific-research institutes that deal with the environmental issues in the country such as “National Institute of Deserts, Flora and Fauna.”

There are also other Ministries and NGOs in the country that share the responsibility of caring for the environment. Among these are the Ministry of Health and Medical Industry, Ministry of Water and Agricultural Resources, State Committee on Land Use and Land Reform, State Committee on Fisheries, Major Government Inspection on Standards, Mining and Occupational Safety, and the Turkmengeology State Corporation, as well as local municipal authorities.

Non-government Organizations

In contrast to other Central Asian republics, very few registered NGOs exist in Turkmenistan. There are only five environmental NGOs, and of these, four have government linkages. The fifth receives funding from a UN agency. Although these NGOs are quite active in environmental advocacy and communication, they have to operate in a difficult working environment. Recently, the internet service provider that environmental NGOs were using to communicate and disseminate messages was banned by the government. ISAR has supported NGOs in Turkmenistan, and currently these are involved in the Caspian partnership, where attention is being paid to aspects of ecological monitoring and developing partnerships with NGOs in other Caspian states. The lack of NGOs has probably limited the number of donor-funded projects in the country. USAID has not been very successful in its efforts to facilitate this key aspect of development. Counterpart Consortium has a poor reputation with non-government organizations and no new NGOs have become registered since the arrival of Counterpart Consortium

List of legally registered NGOs

The Turkmen Society of Nature Protection
 The Ecological fund of Turkmenistan
 EcoForest
 Ecological Club ‘Catena’
 Dashowuz Ecological Club

Academic Institutions

The traditional academic institutions concerned with biodiversity studies in Turkmenistan were Institute of Deserts, Institute of Botany, and Institute of Zoology of the former Academy of Sciences. Among these, the Institute of Deserts was an internationally acclaimed research and training center, with a sand desert field station at the Repetek Biosphere Reserve (East Karakum Desert) and represented one of the few specialized national-level ecological centers in the former Soviet Union. Recently, the Academy has been dissolved, and these three research bodies have been consolidated under the Institute of Deserts, Flora and Fauna. This academic institution, which belongs to the Ministry of Nature Protection, together with the State University constitutes the currently existing research expertise on biodiversity and conservation in Turkmenistan.

There is clearly an important role for these researchers to play in biodiversity conservation and environmental issues. However, while the State University and other schools seem to be getting sufficient budgets, the former Academy is run down and receives only occasional donor funding. In common with other former Soviet academies, staff have experienced sharp layoffs, decreased and irregular salaries and lack of equipment and facilities, including for computers and communications. Capacity and morale is very low; it will take a lot of investment to bring them up to and beyond their pre-1991 capability.

The Institute of Deserts, Flora and Fauna was put in charge of updating the Red Data book of Turkmenistan and a new edition was published in 1999. The institute is financed from the state budget and in need of updated computers. The majority of scientists with expertise in biodiversity work here. More than 50 specialists representing state, scientific and non-governmental structures are involved in developing proposals for funding (32 projects). The majority of them are unemployed.

There is very little international level scientific exchange experience on biodiversity conservation. One specialist received short-term training on development of the modern biotechnology of cultivation of pistachio (*Pistacia*) and almond (*Amygdalus*) in cooperation with Ben-Gurion University (Israel). There are some contacts with UC Davis (USA) on automated desert climate monitoring.

SECTION V

Summary of Findings

1. Turkmenistan's biodiversity is of global and regional importance, resulting from the unique confluence of Middle Eastern and Central Asian faunal and floral regions. The Kopetdagh mountain system in the southwest represents a unique mountain chain, with fauna and flora distinct from the Tien Shen and other mountain ranges. Central Asia desert ecosystems are widespread in Turkmenistan. The southern Caspian Sea also represents habitats and species of global importance.
2. The major direct threats to biodiversity include:
 - Loss or degradation of habitat through direct conversion or exploitation of natural ecosystems, particularly through deforestation (notably saxaul and juniper woodlands), overgrazing, and infrastructure development in fragile lands
 - Loss or degradation of habitat through indirect effects of changing land use patterns, principally irrigation to support cotton and cereal production. Riverine forests have been particularly affected
 - Over-exploitation of individual species, through hunting, overfishing, and persecution
 - Effects of introduced or non-native species, particularly important for fish species
3. The protected area system, while on paper providing coverage of many of the representative ecosystems, is largely ineffective, since regulations are rarely and arbitrarily enforced and boundaries are regularly violated to allow grazing of domestic livestock, collection of fuelwood and other plant products, road building, and semi-organized game hunting. There is no up-to-date monitoring system used in the management of the protected area system of the country. Without an inventoried assessment of these areas, and an efficient integrated monitoring system in-place, it is impossible to identify and address the effectiveness of protected areas, or the threats that they face.
4. Environmental institutions inherited from the Soviet system appear to have been increasingly centralized within government organizations, primarily the Ministry of Environmental Protection. Academic institutions have been subsumed within the Ministry and very few, if any, NGOs exist that are not linked to the government. Nevertheless, resource constraints and staff layoffs are widespread, leading to demoralization among the staff. Although the central ministries have old computers, working phones, and an occasional copier, the use of the Internet and other modern communication tools is restricted and monitored. With this type of censorship, the free access and flow of information between institutions and scientists is very limited.
5. Environmental policies and legislation are inherited from the Soviet era and have not been significantly modified since independence. Most of these are broad and directive and few of the current laws are implementable, given the lack of capacity and resources, particularly at

the field level. Progress on developing NEAP and NBSAP has been slow, and it is not clear to what extent the proposed mechanisms will involve different stakeholders.

6. Environmental awareness is still low in Turkmenistan, particularly among civil society. Environmental education initiatives are few, although there appears to have been an increase in environmental and biodiversity conservation concerns in school curricula.
7. The Caspian Environment Program provides the best opportunity for cooperation with neighboring countries and could provide the basis for cooperative monitoring programs, as well as exchange visits and information sharing.

SECTION VI

Recommendations for Biodiversity Conservation

1. The BSAP development process should result in prioritized, concrete activities, with clear roles and responsibilities for implementation. To maintain momentum, discrete activities should be planned to begin immediately upon BSAP completion. Often, BSAPs tend to the “laundry list” approach. Instead, a focus on one or two key protected areas, or specific issues, such as big game hunting, could more effectively catalyze future activities
2. Review environmental legislation affecting biodiversity (international conventions, agreements) to identify inconsistencies and gaps. This should also focus of the “implementability” of legislation, including the resources available at national and local levels. One example concerns the Aarhus Convention. Turkmenistan is one of the few countries to have ratified the treaty. During the review, special focus should be paid to how the commitments to participation and access to information are to be put into practice.
3. Review the status of protected areas to assess the effectiveness of different protected areas in conserving biodiversity. The review should look at the size, boundaries, and biogeographical and habitat distribution, as well as the status and functions of different protected areas (strict reserve, nature park). It may be that some areas should be degazetted, others proposed as new categories or grouped together as biosphere reserves. To develop basic management plans and monitoring systems, it should also review activities and threats (unregulated hunting and livestock incursions) and resources and capacities for management.
4. Develop participatory improved natural resource management initiatives for sustainable grazing systems, wetland management, and forest management.
5. Increase cooperation and information sharing with neighboring countries through such programs as the Caspian and Aral Sea programs. Explore linkages between research and management organizations in different countries as well as NGOs.
6. Improve environmental awareness at all levels, including building on promising school programs. Support NGOs to develop environmental education materials and programs.
7. Develop environmental impact guidelines for investment projects, both national and international. Many of the Government of Turkmenistan’s proposed development schemes have the potential for disastrous environmental impacts, particularly those for huge new water and irrigation projects. While it is not evident that the government pays more than lip service to environment when considering such schemes, any opportunities to build environmental awareness

among the very limited decision-making authorities (such as exposure to the effects of the Aral Sea disaster) and develop broad impact guidelines should be explored.

SECTION VII

USAID in Turkmenistan

A. Impact of USAID Program on Biodiversity

Although the program emphasizes natural resources, the focus is heavily oriented to water and energy, with “green” issues, such as forests, watershed protection, sustainable agriculture and biodiversity, conspicuously absent. This appears also to apply to models of “integrated” natural resources management.

USAID’s support to Turkmenistan has been limited by the Government of Turkmenistan’s lack of commitment to economic and democratic reforms and its strict control of activities, information, and freedom of expression. Support to NGO development, including environmental NGOs has been problematic. Opportunities for significantly improving biodiversity conservation in the country, even indirectly, have therefore been limited. The best opportunities probably lie in working with the private oil and gas companies and with the Caspian Environmental Program, one of the few donor-supported environmental initiatives that includes Turkmenistan.

B. Recommendations

The recommendations for the USAID program are separated by Strategic Objective.

Strategic Objective 1.6 - Improved Management of Critical Natural Resources, Including Energy. This SO “reflects the important role of natural resources in the development of a broad-based, market-oriented economy” (USAID). Four specific intermediate results (IRs) are identified in the USAID Assistance Strategy as critical to achieving this particular objective.

Increased management capacity in natural resources sector

The assessment points out in its Summary of Findings that environmental institutions in Turkmenistan suffer from budgetary constraints, large staff layoffs, and inadequate office equipment (fax, phone, computer). The assessment should indicate specific activities that might be undertaken under this IR to help alleviate the problem.

Improved policy and regulatory framework for natural resources management

As the NEAP and BSAP are developed for Turkmenistan, opportunities may occur that allow specialized studies or technical assistance, such as a review of the coherence and consistency of the legal framework or a review of the adequacy of the current protected areas systems in effectively conserving representative biodiversity. Other examples include incorporating biodiversity into environmental guidelines and regulations for infrastructure and other investments. This could include mapping and describing threatened, fragile, and vulnerable areas, habitats and species that could be the basis of an “early-warning system” for proposed development activities.

Sustainable models developed for integrated natural resource management.

Multi-use protected areas may provide an opportunity to display the potential for balancing economic growth (through ecotourism, selective harvesting) and ecological conservation. An opportunity may exist to begin developing a model of sustainable development in reassessing the effectiveness of protected areas.

1. Providing technical advice through international research and conservation organizations on promoting sustainable soil and water conservation techniques (including improved irrigation), sustainable forestry, including the promotion of dry-country adapted tree species, improved grazing systems and protected area management. This could include some material support to the Institute of Deserts, Flora and Fauna, and environmental NGOs.
2. Bringing together local communities, local government authorities, and NGOs to develop management plans that lay out roles and responsibilities for improved management.

Public commitment established for natural resource management policies.

One way to increase commitment to natural resource policies, in addition to increasing awareness of such policies and their implications, is to work with and adapt such policies under local conditions by bringing stakeholders together in the development of management plans for areas of ecological importance, including protected areas.

The increasing petroleum activities in and around the Caspian Sea, an environmentally fragile area of high biodiversity importance, offer significant opportunities to incorporate environmental management and biodiversity conservation into economic development activities (getting involved early in the planning process) and ensure adequate monitoring. Opportunities also exist for increasing national and international awareness, developing site-specific management plans and species conservation planning (waterfowl in the Khazar reserve, sturgeon, Caspian seals). There are also opportunities to reinforce the awareness of, and commitment to, international and regional treaties and conventions.

The USAID CAR Environment and Energy project provides an excellent framework and opportunity for the integration of biodiversity conservation initiatives at low cost and potentially high impact and visibility. The existing high profile Caspian, transboundary, and GEF programs also present the opportunity to broaden the Mission's development program. The extent to which this can be achieved in Turkmenistan is open to question. However, examples include:

- Wetland and riparian vegetation management as part of local water initiatives
- Biodiversity in training and awareness programs
- Biodiversity in policy and legislative development and application (desirable but difficult in Turkmenistan)
- Biodiversity in monitoring and assessment in transboundary issues

- NGO development and civil society development (an urgent need but extremely difficult given the present political structures and the almost non-existence of NGOs in the country)
- Fill some of the monitoring gaps in existing international programs dealing with biodiversity conservation by providing the component through the Small Grant and Partnerships program
- Promote international cooperation, particularly with regard to transboundary issues through workshops, seminars, training sessions, participation in international congresses and meetings

The following include recommendations directly linked to the recent CAR Regional Environment and Energy project procurement (where applicable, activities are linked to the illustrative activities (I.A.) referred to in the RFP.

1. Increase awareness and understanding of policy makers and technical managers of the benefits of an integrated natural resource management approach that emphasizes linkages and sustainability. As part of the proposed training for increased management capacity (I.A.#1), incorporate ecological principles into technical approaches. For example, this could include the role and importance of catchment forests in maintaining water quality and supply, the importance of vegetation in maintaining hydrological regimes, and the role of biodiversity in maintaining soil fertility. Since many of these issues are transboundary in nature, regional training and cooperation will be advantageous.
2. Incorporate biodiversity into environmental impact policies and legislation, as part of the regulatory framework for investment (oil and gas exploration). Oil and gas provide perhaps the best opportunity to enter the policy dialogue arena, since international standards must be applied to foreign oil operations.
3. Develop integrated wetland management initiatives that promote the sustainability of ecological functions, including the continued provision of ecological goods and services and biodiversity conservation (I.A.#8). Community-based projects that promote sustainable management can provide opportunities to develop regional and local partnerships between communities, local government, and private sector interests. Specific activities could include improved management of riparian vegetation for pasture and haymaking, as well as reeds for local construction and water quality improvement, fisheries and hunting, and possibly ecotourism enterprises.
4. Promote the prevention and rehabilitation of salinized soil through improved vegetation management and conservation, improved irrigation practices, and better wetland conservation and management (I.A.#9). This provides another opportunity to develop local partnerships based on community-led initiatives.
5. Promote and support partnerships between oil and gas companies, local governments, and communities to improve monitoring of ecological conditions and biodiversity in the north Caspian region, including better understanding of the Caspian ecosystem and collection of baseline data. This activity could be linked to the development of EIA guidelines for the

industry and the region. It should also to serve to leverage the efforts of other donors under the Caspian Environmental Program.

Strategic Objective 2.1 - Strengthening Democratic Culture Among Citizens and Target Institutions. This SO states that there are “few indigenous democratic traditions” and that people have “little understanding of citizen participation.” An opportunity for establishing some “pockets” of citizen groups (where communities manage local resources) exists. Because common natural areas were formerly largely under government control, pilot projects that allocate lands to local and private groups, along with specified regulations for improved management, have the potential to empower these groups and set examples that could be replicated on a wider scale. A self-monitoring process probably needs to be put into place, perhaps through local committees, with some punctual independent evaluation to ensure that resources are managed effectively. Training and technical assistance to support groups, such as NGOs, or directly to communities, could facilitate this process.

More initiatives are needed to involve local citizens in the natural resource management process. Additionally, establishing citizen-managed lands matches the SO requirement calling for the need to concentrate democratization development efforts on “the basic components of a democratic polity at the grassroots level.” Community-based management could change people’s attitudes and values, emphasizing collaboration and increased communication among citizens (with respect to natural resources and biodiversity) and shift the way they relate to one another.

Strategic Objective 2.3 More Effective, Responsive and Accountable Local Government

This SO also has significant potential to assist in biodiversity issues. Activities under this SO might prove useful in assisting SO 1.6 in several ways. Two possibilities are discussed below.

One way in which this SO might assist SO 1.6 would be if a project helped local governments implement and enforce regulations for the protection of wildlife in parks. The focus of the activity would be to train staff to recognize the importance of enforcing these regulations. If effective and given moderate support (equipment, resources), the training could protect more animals living in and near these areas.

Another example would be the initiation of training of park managers in more up-to-date methods of park management. The training could provide information about the development of park management plans, including the importance of seeking advice of local populations and governments and even-handed enforcement of the park regulations. Developing relationships with park services in the region and with the U.S. National Park service could reinforce this development. This would likely meet the requirements of the SO and provide material assistance to implementing SO1.6.

Sections 117 and 119 of the Foreign Assistance Act

Sec. 117.⁶⁶ Assistance for Disadvantaged South Africans.—

* * * [Repealed—1993]

Sec. 117.⁶⁶ Environment and Natural Resources.—(a) The Congress finds that if current trends in the degradation of natural resources in developing countries continue, they will severely undermine the best efforts to meet basic human needs, to achieve sustained economic growth, and to prevent international tension and conflict. The Congress also finds that the world faces enormous, urgent, and complex problems, with respect to natural resources, which require new forms of cooperation between the United States and developing countries to prevent such problems from becoming unmanageable. It is, therefore, in the economic and security interests of the United States to provide leadership both in thoroughly reassessing policies relating to natural resources and the environment, and in cooperating extensively with developing countries in order to achieve environmentally sound development.

(b) In order to address the serious problems described in subsection (a), the President is authorized to furnish assistance under this part for developing and strengthening the capacity of developing countries to protect and manage their environment and natural resources. Special efforts shall be made to maintain and where possible to restore the land, vegetation, water, wildlife, and other resources upon which depend economic growth and human well-being, especially of the poor.

(c)(1) The President, in implementing programs and projects under this chapter and chapter 10 of this part, shall take fully

⁶⁶ Formerly at 22 U.S.C. 915c. Sec. 117 was repealed by sec. 4(x)(3)(D) of the South African Democracy and Transition Act of 1993 (Public Law 103-146; 107 Stat. 1606). It had been amended by sec. 201(b) of Public Law 99-440 (100 Stat. 1094). Sec. 117 provided assistance for disadvantaged South Africans through South African nongovernmental organizations, such as the Educational Opportunities Council, the South African Institute of Race Relations, REAID, professional teachers' unions, the Outreach Program of the Witwatersrand University Center (WFCU), the Funda Center in Soweto, SACHED, UPP Trust, OPCS, the Witwatersrand Fellowship Center (WFC), and civic and other organizations working at the community level which did not receive funds from the Government of South Africa.

⁶⁷ 22 U.S.C. 2151a. Sec. 117 was redesignated from being sec. 118 by sec. 30(11) of Public Law 99-529, resulting in the creation of two sections 117. Sec. 30(12) of Public Law 99-529 (100 Stat. 3014) further deleted subsec. (d) of that section, which dealt with "Tropical Forests". This section, as amended by sec. 402 of Public Law 99-529 (100 Stat. 3014) and amended by sec. 110 of Public Law 101-505 (104 Stat. 949) and sec. 122 of Public Law 99-53 (93 Stat. 249), was further amended and restated by sec. 307 of the International Security and Development Cooperation Act of 1981 (Public Law 97-113; 96 Stat. 1833). This section previously read as follows: "The President shall take fully into consideration the environmental and natural resources of the developing countries in the capacity of less developed countries to protect and where possible restore the land, vegetation, water, wildlife and other resources upon which depend economic growth and human well-being especially that of the poor. In carrying out programs under this chapter, the President shall take into consideration the environmental consequences of development actions."

See also sec. 834 of the Foreign Operations, Export Financing, and Related Programs Appropriations Act, 1990 (Public Law 101-167; 103 Stat. 1228), as amended, relating to "Global Warming Initiative"; sec. 801 of Public Law 101-513; 104 Stat. 2013), as amended, relating to "Global Warming"; sec. 832 of the Foreign Operations, Export Financing, and Related Programs Appropriations Act, 1993 (Public Law 102-391; 106 Stat. 1666), relating to "Environment Appropriations"; sec. 562 of the Foreign Operations, Export Financing, and Related Programs Appropriations Act, 1991 (Public Law 101-513; 104 Stat. 2026), added a new chapter 10 to part 1 of this Act.

into account the impact of such programs and projects upon the environment and natural resources of developing countries. Subject to such procedures as the President considers appropriate, the President shall require all agencies and officials responsible for programs or projects under this chapter—

(A) to prepare and take fully into account an environmental impact statement for any program or project under this chapter significantly affecting the environment of the global commons outside the jurisdiction of any country, the environment of the United States, or other aspects of the environment which the President may specify; and

(B) to prepare and take fully into account an environmental assessment of any proposed program or project under this chapter significantly affecting the environment of any foreign country.

Such agencies and officials should, where appropriate, use local technical resources in preparing environmental impact statements and environmental assessments pursuant to this subsection.

(2) The President may establish exceptions from the requirements of this subsection for emergency conditions and for cases in which compliance with those requirements would be seriously detrimental to the foreign policy interests of the United States.

Sec. 118.⁷¹ Tropical Forests.

(a) **IMPORTANCE OF FORESTS AND TREE COVER.**—In enacting section 103(b)(3) of this Act the Congress recognized the importance of forests and tree cover to the developing countries. The Congress is particularly concerned about the continuing and accelerating alteration, destruction, and loss of tropical forests in developing countries, which pose a serious threat to development and the environment. Tropical forest destruction and loss—

(1) result in shortages of wood, especially wood for fuel; loss of biologically productive wetlands; siltation of lakes, reservoirs, and irrigation systems; floods; destruction of indigenous peoples; extinction of plant and animal species; reduced capacity for food production; and loss of genetic resources; and

(2) can result in desertification and destabilization of the earth's climate.

Properly managed tropical forests provide a sustained flow of resources essential to the economic growth of developing countries, as well as genetic resources of value to developed and developing countries alike.

(b) **PRIORITIES.**—The concerns expressed in subsection (a) and the recommendations of the United States Interagency Task Force on Tropical Forests shall be given high priority by the President—

(1) in formulating and carrying out programs and policies with respect to developing countries, including those relating to bilateral and multilateral assistance and those relating to private sector activities; and

providing for long-term development in sub-Saharan Africa, and made a conforming amendment by inserting "and chapter 10 of this part" here. See also sec. 2151P-1. Sec. 118 was added by sec. 301(3) of Public Law 99-529 (100 Stat. 3014). See also footnote 66.

will prevent forest destruction, loss, or degradation, including research in agroforestry, sustainable management of natural forests, small-scale farms and gardens, small-scale animal husbandry, wider application of adopted traditional practices, and suitable crops and crop combinations.

(10) To the fullest extent feasible, conserve biological diversity in forest areas by—

(A) supporting and cooperating with United States Government agencies, other donors (both bilateral and multilateral), and other appropriate governmental, intergovernmental, and nongovernmental organizations in efforts to identify, establish, and maintain a representative network of protected tropical forest ecosystems on a worldwide basis;

(B) whenever appropriate, making the establishment of protected areas a condition of support for activities involving forest clearance of degradation; and

(C) helping developing countries identify tropical forest ecosystems and species in need of protection and establish and maintain appropriate protected areas.

(11) To the fullest extent feasible, engage in efforts to increase the awareness of United States Government agencies and other donors, both bilateral and multilateral, of the immediate and long-term value of tropical forests.

(12) To the fullest extent feasible, utilize the resources and abilities of all relevant United States Government agencies.

(13) Require that any program or project under this chapter significantly affecting tropical forests (including projects involving the planting of exotic plant species)—

(A) be based upon careful analysis of the alternatives available to achieve the best sustainable use of the land, and

(B) take full account of the environmental impacts of the proposed activities on biological diversity,

as provided for in the environmental procedures of the Agency for International Development.

(14) Deny assistance under this chapter for—

(A) the procurement or use of logging equipment, unless an environmental assessment indicates that all timber harvesting operations involved will be conducted in an environmentally sound manner which minimizes forest destruction and that the proposed activity will produce positive economic benefits and sustainable forest management systems; and

(B) actions which significantly degrade national parks or similar protected areas which contain tropical forests or introduce exotic plants or animals into such areas.

(15) Deny assistance under this chapter for the following activities unless an environmental assessment indicates that the proposed activity will contribute significantly and directly to improving the livelihood of the rural poor and will be conducted in an environmentally sound manner which supports sustainable development:

(2) In seeking opportunities to coordinate public and private development and investment activities which affect forests in developing countries.

(c) ASSISTANCE TO DEVELOPING COUNTRIES.—In providing assistance to developing countries, the President shall do the following:

(1) Place a high priority on conservation and sustainable management of tropical forests.

(2) To the fullest extent feasible, engage in dialogues and exchanges of information with recipient countries—

(A) which stress the importance of conserving and sustainably managing forest resources for the long-term economic benefit of those countries, as well as the irreversible losses associated with forest destruction, and

(B) which identify and focus on policies of those countries which directly or indirectly contribute to deforestation.

(3) To the fullest extent feasible, support projects and activities—

(A) which offer employment and income alternatives to those who otherwise would cause destruction and loss of forests, and

(B) which help developing countries identify and implement alternatives to colonizing forested areas.

(4) To the fullest extent feasible, support training programs, educational efforts, and the establishment or strengthening of institutions which increase the capacity of developing countries to formulate forest policies, engage in relevant land-use planning, and otherwise improve the management of their forests.

(5) To the fullest extent feasible, help end destructive slash-and-burn agriculture by supporting stable and productive farming practices in areas already cleared or degraded and on lands which inevitably will be settled, with special emphasis on demonstrating the feasibility of agroforestry and other techniques which use technologies and methods suited to the local environment and traditional agricultural techniques and feature close consultation with and involvement of local people.

(6) To the fullest extent feasible, help conserve forests which have not yet been degraded, by helping to increase production on lands already cleared or degraded through support of reforestation, fuelwood, and other sustainable forestry projects and practices, making sure that local people are involved at all stages of project design and implementation.

(7) To the fullest extent feasible, support projects and other activities to conserve forested watersheds and rehabilitate those which have been deforested, making sure that local people are involved at all stages of project design and implementation.

(8) To the fullest extent feasible, support training, research, and other actions which lead to sustainable and more environmentally sound practices for timber harvesting, removal, and processing, including reforestation, soil conservation, and other activities to rehabilitate degraded forest lands.

(9) To the fullest extent feasible, support research to expand knowledge of tropical forests and identify alternatives which

plant conservation programs. Special efforts should be made to establish and maintain wildlife sanctuaries, reserves, and parks; to enact and enforce anti-poaching measures; and to identify, study, and catalog animal and plant species, especially in tropical environments.

(c) ⁷⁶ FUNDING LEVEL.—For fiscal year 1987, not less than \$2,500,000 of the funds available to carry out this part (excluding funds made available to carry out section 104(c)(2), relating to the Child Survival Fund) shall be allocated for assistance pursuant to subsection (b) for activities which were not funded prior to fiscal year 1987. In addition, the Agency for International Development shall, to the fullest extent possible, continue and increase assistance pursuant to subsection (b) for activities for which assistance was provided in fiscal years prior to fiscal year 1987.

(d) ⁷⁶ COUNTRY ANALYSIS REQUIREMENTS.—Each country development strategy statement or other country plan prepared by the Agency for International Development shall include an analysis of—

(1) the actions necessary in that country to conserve biological diversity, and

(2) the extent to which the actions proposed for support by the Agency meet the needs thus identified.

(e) ⁷⁶ LOCAL INVOLVEMENT.—To the fullest extent possible, projects supported under this section shall include close consultation with and involvement of local people at all stages of design and implementation.

(f) ⁷⁶ PVOs AND OTHER NONGOVERNMENTAL ORGANIZATIONS.—Whenever feasible, the objectives of this section shall be accomplished through projects managed by appropriate private and voluntary organizations, or international, regional, or national nongovernmental organizations, which are active in the region or country where the project is located.

(g) ⁷⁶ ACTIONS BY AID.—The Administrator of the Agency for International Development shall—

(1) cooperate with appropriate international organizations, both governmental and nongovernmental;

(2) look to the World Conservation Strategy as an overall guide for actions to conserve biological diversity;

(3) engage in dialogues and exchanges of information with recipient countries which stress the importance of conserving biological diversity for the long-term economic benefit of those countries and which identify and focus on policies of those countries which directly or indirectly contribute to loss of biological diversity;

(4) support training and education efforts which improve the capacity of recipient countries to prevent loss of biological diversity;

(5) whenever possible, enter into long-term agreements in which the recipient country agrees to protect ecosystems or other wildlife habitats recommended for protection by relevant governmental or nongovernmental organizations or as a result of activities undertaken pursuant to paragraph (6), and the

⁷⁶ Para. (c) through (h) were added by sec. 302 of Public Law 99-529 (100 Stat. 3017).

(A) Activities which would result in the conversion of forest lands to the rearing of livestock.

(B) The construction, upgrading, or maintenance of roads (including temporary haul roads for logging or other extractive industries) which pass through relatively undegraded forest lands.

(C) The colonization of forest lands.

(D) The construction of dams or other water control structures which flood relatively undegraded forest lands.

(E) PVOs AND OTHER NONGOVERNMENTAL ORGANIZATIONS.—Whenever feasible, the President shall accomplish the objectives of this section through projects managed by private and voluntary organizations or international, regional, or national nongovernmental organizations which are active in the region or country where the project is located.

(f) ⁷⁶ COUNTRY ANALYSIS REQUIREMENTS.—Each country development strategy statement or other country plan prepared by the Agency for International Development shall include an analysis of—

(1) the actions necessary in that country to achieve conservation and sustainable management of tropical forests, and

(2) the extent to which the actions proposed for support by the Agency meet the needs thus identified.

(g) ANNUAL REPORT.—Each annual report required by section 634(a) of this Act shall include a report on the implementation of this section.

Sec. 119. ⁷⁵ Renewable and Unconventional Energy Technologies. * * * [Repealed—1980]

Sec. 119. ⁷⁵ Endangered Species.—(a) ⁷⁴ The Congress finds the survival of many animal and plant species is endangered by overhunting, by the presence of toxic chemicals in water, air and soil, and by the destruction of habitats. The Congress further finds that the extinction of animal and plant species is an irreparable loss with potentially serious environmental and economic consequences for developing and developed countries alike. Accordingly, the preservation of animal and plant species through the regulation of the hunting and trade in endangered species, through limitations on the pollution of natural ecosystems, and through the protection of wildlife habitats should be an important objective of the United States development assistance.

(b) ⁷⁴ In order to preserve biological diversity, the President is authorized to furnish assistance under this part, notwithstanding section 650. ⁷⁵ To assist countries in protecting and maintaining wildlife habitats and in developing sound wildlife management and

⁷⁵ Sec. 119, as added by Public Law 95-68 (91 Stat. 528), amended by sec. 111 of the International Development and Food Assistance Act of 1978 (92 Stat. 948), and by sec. 107 of the International Development and Food Assistance Act of 1976 (93 Stat. 362), was repealed by sec. 302 of the International Security and Development Cooperation Act of 1980 (Public Law 96-523, 94 Stat. 3147). See sec. 106 of this Act for text concerning energy technologies.

⁷⁴ 22 U.S.C. 2151(a) and (b) were added by sec. 702 of the International Environment Protection Act of 1983 (title VII of the Department of State Authorization Act, Fiscal Year 1984 and Public Law 98-164; 97 Stat. 1046).
⁷⁵ Sec. 119, as added by Public Law 95-68 (91 Stat. 528), amended by sec. 107 of the International Security and Development Cooperation Act of 1980 (Public Law 96-523, 94 Stat. 3147), was amended by sec. 103 of the Foreign Operations, Export Financing, and Related Programs Appropriations Act, 1990 (Public Law 101-167; 103 Stat. 1227), added "notwithstanding section 650" at this point.

United States agrees to provide, subject to obtaining the necessary appropriations, additional assistance necessary for the establishment and maintenance of such protected areas;

(6) support, as necessary and in cooperation with the appropriate governmental and nongovernmental organizations, efforts to identify and survey ecosystems in recipient countries worthy of protection;

(7) cooperate with and support the relevant efforts of other agencies of the United States Government, including the United States Fish and Wildlife Service, the National Park Service, the Forest Service, and the Peace Corps;

(8) review the Agency's environmental regulations and revise them as necessary to ensure that ongoing and proposed actions by the Agency do not inadvertently endanger wildlife species or their critical habitats, harm protected areas, or have other adverse impacts on biological diversity (and shall report to the Congress within a year after the date of enactment of this paragraph on the actions taken pursuant to this paragraph);

(9) ensure that environmental profiles sponsored by the Agency include information needed for conservation of biological diversity; and

(10) deny any direct or indirect assistance under this chapter for actions which significantly degrade national parks or similar protected areas or introduce exotic plants or animals into such areas.

(h) ⁷⁶ ANNUAL REPORTS.—Each annual report required by section 634(a) of this Act shall include, in a separate volume, a report on the implementation of this section.

ANNEX B

Scope of Work: Country Biodiversity Assessments Central Asia

I. Objective:

To conduct country-wide assessments of biodiversity resources and their status for the purposes of complying with sections 117 and 119 of the Foreign Assistance of 1961, Agency guidance on country strategy development, and USAID Environmental Procedures described in Title 22 CFR, Section 216.

II. Background

A. Policies governing Environmental Procedures

The Foreign Assistance Act (FAA) of 1961, Sec. 498C states that funds made available for assistance to the New Independent States (NIS) shall be subject to the provisions of Section 117 relating to Environment and Natural Resources (FAA Sec. 498C, footnote e). Section 117 requires that the President take fully into account the impact of foreign assistance programs and projects on environment and natural resources (Sec 117 (c)(1)). Current USAID Legislation which guides environmental impact and monitoring is Title 22 of the Code of Federal Regulations, Part 216 (“Reg. 216”). In complying with the law, USAID provides its Environmental Procedures under ADS 204.5 to ensure accordance with the requirements of Title 22 CFR 216.

Section 119 of the FAA relates to Endangered Species. It states that “the preservation of animal and plant species through the regulation of the hunting and trade in endangered species, through limitations on the pollution of natural ecosystems and through the protection of wildlife habits should be an important objective of the United States development assistance (FAA, Sec. 119 (a)).” Furthermore it states that “Each country development strategy statement or other country plan prepared by the Agency for International Development shall include an analysis of (1) the actions necessary in that country to conserve biological diversity and (2) the extent to which the actions proposed for support by the Agency meet the needs thus identified (FAA, Sec. 119(d)).”

For USAID Missions to be in compliance with the above, and for USAID Missions to effectively determine impact on natural resources and endangered species and incorporate mitigation measures in their programs, a biodiversity assessment is needed to inform Mission planning. The purpose of this Task Order is to provide the USAID/CAR Regional Mission in Central Asia with this critical information.

B. Overview on USAID programs in Central Asia

The USAID Regional Mission for Central Asia (USAID/CAR) manages U.S. assistance in five newly independent states of Kazakhstan, Turkmenistan, Kyrgyzstan, Tajikistan and Uzbekistan. USAID's assistance focuses on the economic, political, social, and environmental aspects of the transition process to more open, free market, democratic societies. Kazakhstan and Kyrgyzstan have full range of U.S. assistance. In Uzbekistan and Turkmenistan, the range of assistance is more limited by the pace of reform. In Tajikistan, USAID assistance primarily supports the reconciliation process after a civil war. Training, partnerships, and technical assistance are essential elements of all USAID/CAR programs. USAID/CAR provides considerable technical expertise through a network of specialized contractor and grantee partners.

Summary of Energy and Environmental Initiatives

The majority of USAID's work in the energy and environment sectors in Central Asia is regional rather than country-specific. This is because many of the energy and environmental challenges defy resolution at the national level — the associated problems cross national boundaries. Consider, for example, the relationship electricity and water: most of the major hydro-electric dams are in one country, the primary electricity dispatch center is in another, the power purchaser may be in third, agricultural irrigation takes place in a fourth and a fifth nation, and chief river routes thread through all five of the Central Asian countries of Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan. Energy, water and environmental officials throughout the region face many of the same problems as they look to market-based solutions for answers.

USAID's energy sector objective has been to establish a more economically sound and environmentally sustainable energy system as an engine of regional economic growth. Energy, covers oil and gas, as well as electricity. Patterns of energy sector investment and energy use in Central Asia will significantly influence the future political and economic independence of the region from Russia. If used strategically, these investment and use patterns could hasten Central Asia's emergence as a major petroleum producer in the 21st century — rivaling the Gulf region in its importance as an internal oil and gas market.

In the broader environment sector, USAID seeks to reduce regional economic and political tensions generated by transboundary environmental issues. These include the many aspects of sustainable water management in the Aral Sea Basin, environmental protection of the Caspian Sea, and reductions in pollution which contribute to global climate change.

Kazakhstan

Resource-rich Kazakhstan, with vast reserves of oil, gas and minerals, stretches from Mongolia to the Caspian Sea yet has a population of merely 16.5 million. Kazakhstan is the most politically and economically stable republic within Central Asia. Although traditionally a nomadic culture, Soviet policies led to a sedentary population that is more ethnically diverse and urban. Since gaining independence in 1991, President Nursultan Nazarbayev has been this constitutional republic's central political figure. Power is centralized within the presidency, although there is a Cabinet of Ministers and a Parliament. Nazarbayev recently relocated the capital to the northern

city of Astana (formerly known as Aqmola) even though Almaty remains the cultural and economic center of the country.

In Kazakhstan, USAID promotes the integrated development and economically efficient operation of regional electric power systems, assists the Ministry of Oil and Gas and the state energy companies in oil and gas investment issues, supports region-wide cooperation in sustainable water resource management, and works to improve the capability for environmental management in both pollution mitigation and global climate change areas.

Kyrgyzstan

The small mountainous Kyrgyz Republic situated just south of Kazakhstan hosts the alpine grandeur of the Tien Shan Mountains and the serenity of Issyl-Kul, an inland sea nested between two mountain ranges. Much of the country was closed to foreigners during Soviet times due to the top-secret mining and weapons development facilities located here. Since the declaration of independence in December 1991, Kyrgyzstan has been working closely with international donors and making steady progress in political, social and economic reforms.

USAID support for economic transition initially focused on short-term and later stabilization measures designed to help bring government spending and inflation under control, shifted its focus to key structural reforms. This has included support for privatization of small- and medium-sized enterprises, establishment of financial markets, banking reform, fiscal reform, and development of an appropriate legal infrastructure for commercial activities. In 1998, with significant USAID technical assistance, Kyrgyzstan became the first Central Asian country to accede to the World Trade Organization.

In Kyrgyzstan, USAID promotes the integrated development and economically efficient operation of regional and national electric power systems, supports region-wide cooperation in sustainable water resource management, and works to improve capability for environmental management.

Tajikistan

Although Tajikistan achieved independence in 1991 with the break-up of the Soviet Union, independence brought widespread civil war to the nation. Tajikistan is the sole country among the five Central Asian states where underlying ethnic, regional, economic, and ideological strife led to civil conflict and caused major population displacements. Civil war broke out between rival clans in 1992 – 1993 and continued intermittently even after formal Peace Accords were signed in Moscow in June 1997.

Civil unrest by rival factions, however, continues to pose a challenge to continuing peace in the republic. Geographic isolation, dependence on food and industrial suppliers from beyond its borders, the elimination of most subsidies from Moscow, and the collapse of former trading relationships have all combined to create instability, with implications for other states in the region.

Currently U.S. government assistance in Tajikistan focuses primarily on humanitarian assistance and promotion of the peace process. Opportunities for longer-term impact are also made when appropriate. Much of the international assistance to Tajikistan has been carried out through U.N. humanitarian programs, other U.N. agencies, the International Red Cross and other international and American PVOs.

The ultimate challenge in Tajikistan for any development program is to resolve the current security situation. Until this issue is resolved, any progress towards the mission's objectives will be limited.

Turkmenistan

A primarily desert country, Turkmenistan borders the Caspian Sea and has substantial oil and gas reserves. However, getting the oil and gas to market remains a significant obstacle. President Saparmund Niyazov is the highly visible authoritarian leader of Turkmenistan. Even though the constitution provides for a balance of powers, the legislative and juridical branches are in effect powerless. Since gaining independence in 1991, the government has resisted introducing political and economic reforms. As Turkmenistan has not experienced a sharp decline in living standards, the government has had little incentive to undertake the economic reforms necessary to become a market economy.

The USAID portfolio in Turkmenistan focuses on mutually agreed upon activities, wherein the Mission can introduce and implement reforms as well as improve the investment environment for local and international businesses. Specific programs in budgetary reform, trade and investment are currently in operation, as is support for energy sector, with an emphasis on gas and oil. In health programs, USAID introduced modern clinical services, including reproductive health and disease surveillance, and facilitates a medical partnership program. USAID also supports fledging NGOs and community-based organizations in an effort to promote citizen involvement in civic life. Technical training is designed to support the specific activities in which USAID is involved.

Uzbekistan

Uzbekistan, which borders all four other Central Asian republics, boasts many of the historical and architectural highlights of the region. The country has the most diverse economic resources in the region, including agriculture, mining and industry. Officially, Uzbekistan is a secular, democratic presidential republic with a President, cabinet of Ministers and a legislative body.

The USAID portfolio in Uzbekistan focuses on economic, democratic, and social aspects of the transition process, as well as the environment and energy sectors. From a USAID perspective, the goal in Uzbekistan is to engage reform-minded elements in the government and assist as requested in the establishment of the basic building blocks of a market-oriented economic system. Assistance for the market transition involves support or tax reform, budget reform, bank reform, accounting conversion and development of a strong, open and transparent investment climate.

Energy and environment initiatives support specific programs in privatization and development of energy and water resource policies which foster international trade and investment, reduce regional tensions, and increase social stability and environmental sustainability.

III. Statement of Work

The Contractor shall perform the following activities:

A) Hold meetings with the Bureau Environmental Officer (BEO) of USAID's EE Bureau in Washington and the EE Desk Officer and other suggested by the Desk Officer to ensure full understanding of EE's program in Central Asia, USAID environmental procedures and purpose of this assignment. These discussion should include any policy decisions and approaches which the BEO and Agency Environmental Advisor are taking as per their authority under Reg. 216, which may not be explicit in general legal documentation. The Contractor should also meet with a representative of EE's energy division familiar with the CAR program as well as with a representative of the Bureau's democracy and governance office to cover to civil society-related issues. The Contractor should also include meetings with relevant World Bank officials and with appropriate international conversation NGOs .

B) The Contractor should review materials provided by USAID to become familiar with the internationally funded Caspian Environment Program and especially the activities of its regional thematic centers whose work affects bio-resources in Kazakhstan and Turkmenistan. These are existing host-country institutions, each of which have been provided funding to summarize current understanding of an important Caspian Sea environmental issue. These include sea-level rise (Almaty), desertification around the Caspian (Turkmenistan), biodiversity (Almaty), and commercial bio-resources (Astrakhan, Russia).

C) Field a team to conduct an overview and general analysis of each country's biodiversity and its current status. The documentation should include description of:

- Major ecosystem types highlighting important, unique aspects of the country's biodiversity, including important endemic species and their habitats.
- Natural areas of particular importance to biodiversity conservation, such as key wetlands, remaining old-growth or coastal areas critical for species reproduction, feeding or migration, if relevant.
- Plant and animal species which are endangered or threatened with extinction. Endangered species of particular social, economic or environmental importance (such as the Caspian seal) should be highlighted and described, as should their habitats. An updated list, such as the IUCN red list should be included as an annex.
- Current and potential future threats to biodiversity including a general assessment of overall health of ecosystems and major factors affecting ecosystem health such as land use, pests, and/or contamination, etc. or major institutional or policy failures or transboundary issues as appropriate. Special attention should be given to the potential

impacts from future oil and gas development, especially in the Caspian Sea region, and from changing patterns of transboundary water use.

- Conservation efforts including national policies and strategies, the status of financing for conservation, the status of country participation in major international treaties (with particular attention to the Convention on International Trade in Endangered Species – CITES), the country’s protected area system, and botanical gardens/gene banks (if relevant) and their status, and monitoring systems. This section should also include recent, current and planned activities by donor and multilateral lending organizations (IFIs), international conservation NGOs, and agencies of the USG that support biodiversity conservation, including sustainable forestry, soil conservation, and efforts to combat desertification and establishment of parks. Identify NGOs, universities and other local organizations involved in conservation, and a general description of responsible government agencies. A general assessment of the effectiveness of these policies, institutions and activities to achieve biodiversity conservation should be included. Priority conservation needs which lack donor or local support should be highlighted.
- USAID’s program in general and, if relevant, 1) any perceived potential areas of concern related to biodiversity impacts with current or planned program activities, or
- Any potential opportunities for USAID to support biodiversity conservation consistent with Mission program objectives.

D) For the CAR region prepare a report which incorporates the points above on the status of biodiversity and conservation efforts and implications for USAID programming and environmental monitoring to ensure compliance with 22 CFR 216.

IV. Methodology:

The Contractor shall field a two-person team of U.S. specialists for this assignment. One team member should be a natural resource management specialist with significant experience international, regional or Central Asia experience. The second team member should be a natural resources/institutional policy specialist with significant, relevant international, regional or Central Asia experience.

The Team Leader may have either of these specialties; however, he or she must have international experience with USAID and knowledge of USAID environmental regulations and programs. Additionally, the Team Leader must have proven leadership and communication skills (both oral and written), and preferably with relevant experience in USAID’s E&E Bureau. The Team Leader should be a senior-level professional with minimum qualifications of Ph.D. or equivalent education plus 7 years additional relevant experience, or Masters plus 9 years additional relevant experience, or Bachelors plus 11 years additional relevant experience.

The second team member should be mid-level or well-qualified junior level professional. This specialist must have proven technical, analytical, and written communication skills, and have demonstrated his or her ability to work successfully in a team. Minimum requirements for a

mid-level professional are Ph.D. or equivalent degree plus 3 years of relevant additional experience, or Masters plus 9 years additional relevant experience, or Bachelors plus 7 years additional relevant experience. Minimum qualifications for a Junior-level specialist are Ph.D. or equivalent degree or Masters, or Bachelors plus one year additional relevant experience or 5 years experience. Potential contractors are asked to supply USAID/CAR with the names of the proposed U.S. specialists, indicating the Team Leader along with at least one alternate candidate named for each of the two positions.

USAID/CAR strongly encourages the use of qualified local professionals with command of the English language as additional team members for this assignment. With a large and varied geographic region to cover, comprising several independent nations, the addition of knowledgeable local specialists would considerably strengthen the team. In selecting such specialists, the Contractor should consider previous experience working with international donor projects, as well as technical knowledge and English language skills, as a key qualification.

Prior to beginning actual field work in the region, the Contractor shall submit an outline of a model country-wide biodiversity assessment to USAID/CAR to ensure that USAID and the Contractor have a common understanding of the approach to be taken in the preparation of the assessment, the depth of coverage expected, and the treatment of sensitive issues.

V. Deliverables:

The primary deliverable under this task order is a report on the CAR region, with discrete sections for each of the five countries, addressing the points specified in the statement of work. The report will contain country-specific findings and recommendations and also provide a regional context and recommendations. The report will contain at a minimum one map per country that provides a broad picture of key ecosystems, habitats and projected areas, one annex containing IUCN lists for endangered and threatened species, and one annex containing Sections 117 and 119 of the Foreign Assistance Act.

The second sets of deliverables are in-country Mission exit briefings accompanied by two-page written summaries of key findings and recommendations. One electronic copy in Word format of this assessment shall be provided to the USAID/CAR Mission as well CTO (Environmental Officer).

VI. Reporting Requirements:

The Contractor shall report to the USAID/CAR Mission Environmental Officer in Almaty, Kazakhstan for this overall assignment.

Anticipated Level of Effort (LOE) and Schedule:

The LOE for this assignment is a total of 176 expatriate person-days, assuming 2.5 weeks per country for a two-person U.S. team as follows:

- Meetings in Washington with USAID, World Bank, NGOs and other as relevant – to cover all five countries (3 person – days)

- Field assessment, analysis and Mission debriefing (15 person-days in each country, except Tajikistan. For Tajikistan is allocated 5 person-days)
- Report preparation (including incorporating USAID comments (12 person-days)

Additional LOE is provided for local experts (120 days), drivers (65 days) and interpreters (65 days).

Schedule: Work under this task order may begin immediately after its signing. Upon signing this task order, the Contractor shall coordinate with USAID/CAR to establish the timing for the field assessments with the USAID Mission.* A final schedule shall be developed for this task order and delivered to the USAID/CAR Mission Environment Officer no later than 2 weeks after the signing of this task order.

Logistics: The Contractor will coordinate logistics with the USAID/CAR Mission (CTO) Environmental Officer or his designated Control Officer in each country. The Regional Mission and its Country Program Offices will assist the contractor by providing key references, documents and contacts available in country as well as advise on local transportation and interpretation services. In planning regional travel, the Contractor should consider that air travel in CAR during the winter months can be adversely affected by inclement weather, causing irregular flight schedules and unforeseen delays and reroutings. An additional logistical consideration is the frequent inability of U.S. personnel to physically visit Tajikistan. Travel to Tajikistan is, at the moment, prohibited due to security issues. The contractor will likely have to rely on a “desk-study” approach, strengthened by input from in-country expertise.

* See tentative itinerary on pages 9

Tentative Itinerary for the Biodiversity Assessment Team

Central Asia, March

Country, city	Amount of time (days)	Comments
II. Kazakhstan		
Almaty	4	
Kokshetau	3	4 flights a week from Almaty
Pavlodar (and/or other city)	3	train /flight from Kokshetau
Almaty	3	
Atyrau	3	4 flights a week from Almaty
Almaty	1	

Kyrgyzstan

Bishkek (and/or other city plus Tajikistani)

assessment)	17	by road
Almaty	2	
Uzbekistan		
Tashkent	7	everyday flights from Almaty
Nukus (and/or other city	4	everyday flights from Tashkent
Tashkent	6	
Turkmenistan		
Ashgabat	8	2 flights a week from Tashkent
Dashhowuz (and/or other city)	5	everyday flights from Ashgabat
Ashgabat	4	
Tashkent	2	
Almaty	1	everyday flights from Tashkent
	73 *	

ANNEX C

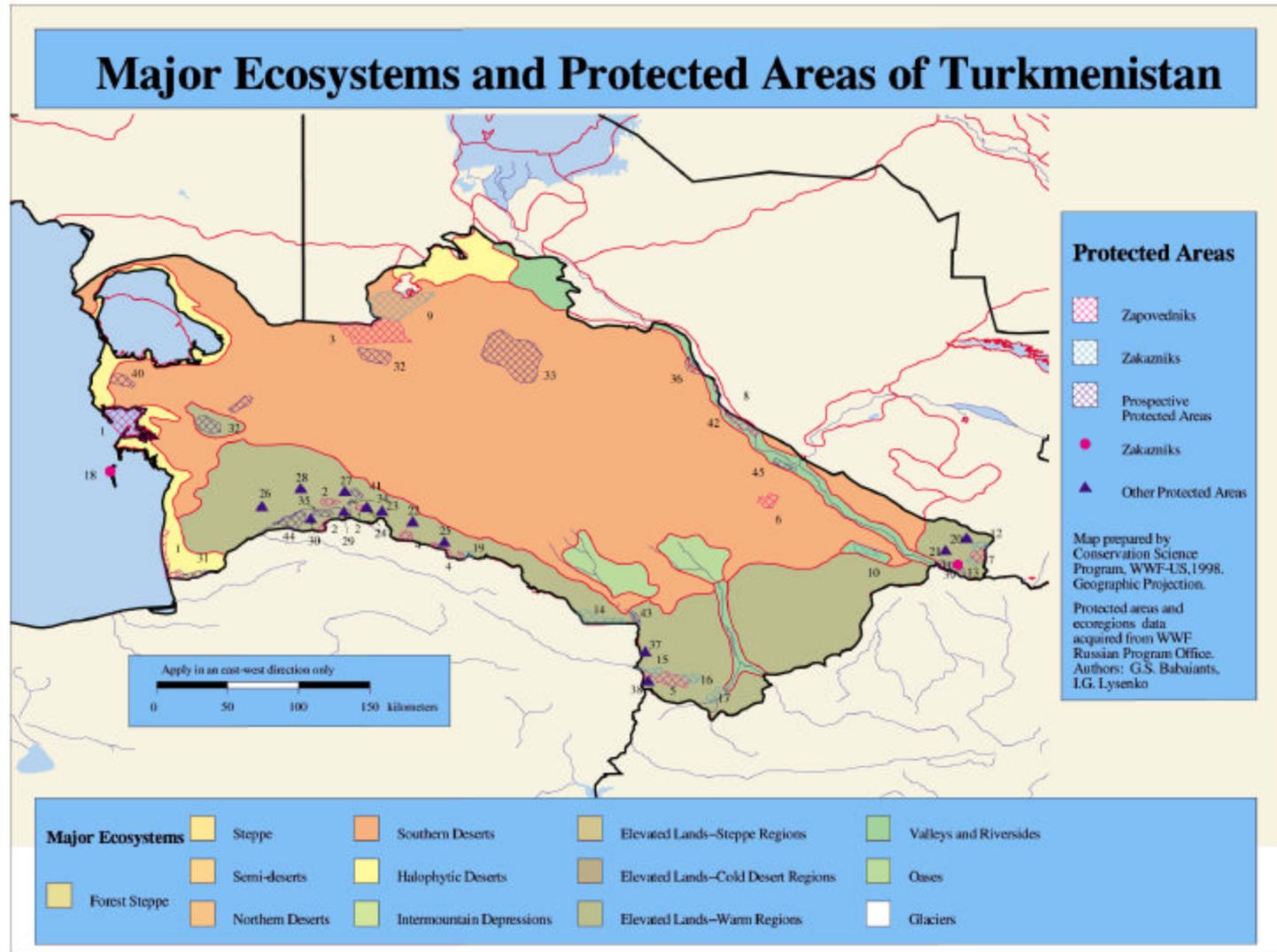
List of Persons Contacted

Name	Occupation	Email (or fax/phone)
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ANNEX D

Map of Ecosystems and Protected Areas of Turkmenistan



ANNEX E

Schedule of Team Visits

2000 BIOFOR C.A.R. Regional Biodiversity Assessment

Day, Date	Location	Schedule	Appointments	Notes	
April					
TU	4	Washington DC	Early AM flight for D.C. PM arrival at Dulles International.	Booking at Wyndham City Center Hotel.	
WD	5	Washington DC	AM appointment with Spike Millington, Nicole Beaumont.		
TH	6	Washington DC	AM meeting with Chemonics. PM briefing by project managers.		
FR	7	Washington DC			
SA	8	Washington DC			
SU	9	Frankfurt	Day in Frankfurt enroute to Almaty, Kazakhstan.	Flight delay.	
MO	10	Almaty	Calls, mail. 4:30 PM USAID meeting.	Net connections.	
TU	11	Almaty	USAID documents. Meeting with facilitator.	Info from documents.	
WD	12	Almaty	Travel planing. Appointments, NGO.	Local contact info and phone. Tickets & travel arrangements	
TH	13	Almaty	10:00 Bekenov Amankul Bekenovich (Ministry of Sciences). 11:30 Aitjanov Aian, chief ecologist EPD (local EPA) UNDP programs, water resources issues, pollution. Kryldakova R.(national coordinator) Yushenko K. (monitoring) 11:00 Institute of zoology, Kovshar'A.F, Erokhov, Levin (crane). 15:30 Dnyshpanov, Regional Forestry Zoological Society (Red Book).	(requested info) 10 days Thesis of the conference 1999. Get e-info 5 days (e-request sent). Get e-info 5 days. Electronic proposal in print. Get report @info. Get more info.	10-12:00 PM email: 1.Chinara (Kyrgyz) 2. Firuza (Tadjik, desk) 3. Elena (Uzbek) 4. Turkmen inquiry

FR	14	Almaty	<p>9:00 – 10:00 Turkmenistan calls.</p> <p>10:00 Envirc and Terra, both NGOs working in environmental and trans-border issues. Envirc produced two books on Methodologies of Stony Lands Sustainable Development and Desert Management.</p> <p>11:00 Forestry committee.</p> <p>14:00 Rushan Karyldakova, small grants GEF-UNDP.</p> <p>Zharas Tokenov, UNDP Sustainable Development Policy Specialist (Program officer, ? Regional Environmental Representative).</p>	Calls and electronic responses from local facilitators.	Travel arrangements for trip to Pavlodar etc.
SAT	15	Pavlodar	<p>Full day of interviews, Almaty Regional Director Forestry, Academy of Sciences. (See appendix for people met.)</p> <p>Travel to Pavlodar PM.</p>	Discussed wide range of environmental and natural resource development impacts.	Hotel check out. Flight 3113; 19:15-21:35.
SUN	16	Pavlodar, Almaata park tour.	<p>Dr. Prof. Vice Dean of Pavlodar State University, Fungi expert.</p> <p>Park Director, Regional Forestry Director (cards in Russian, will photo copy).</p> <p>Director-Xamula Oleg Nik., Galina Vishnevskaya Dr. Prof. V. Dean Pavlodar State University), rangers, local officials.</p> <p>Visit to Nature Museum. (5 hrs. each way driving.)</p>	Park hit by fungal infestation, causing large-scale forest loss.	
MO	17	Almaty	<p>Vice Minister of Forestry.</p> <p>Director of the protected areas.</p>		Flight 3114; 15:00-17:30.
TU	18	Almaty – Kokchetav	<p>Prof. Kim Yelki, Forestry Law/Legislation. AM.</p> <p>Vice Minister of Environmental Affairs, Reg. Director of Forests, Hunting & Fishing.</p> <p>Kokchetav. Met director & staff of Caspian Ecological Program.</p>		Flight 4477; 15:00-18:30.
WD	19	Astana	<p>Minister of Forestry early AM.</p> <p>Director Protected Areas & Wetlands.</p> <p>Dr. L. Shabanova, Chr Caspian Sea Project, UNDP-funded.</p> <p>Visiting protected areas enroute.</p>	By road to Astana.	
TH	20	Astana	<p>Committees, NGOs & Caspian Sea project leaders.</p> <p>PM Bayan Aul National Park.</p> <p>Astana late PM.</p>	Dir. Tengis Biosphere, Minister, Forestry.	

FR	21	Astana	Mr. Alexander Amanbaev Minister of Forestry early AM, Director Protected Areas, & Wetlands. Visiting Ministries, Forestry, Protected Areas. Talgat S. Kerteshev Chief Min. Forestry, and Ustemirov Koiron, Forestry Department Chief.	People: Ministry of Forestry, Protected Areas (see card appendix).	
SAT	22	Astana, wetlands AM, Almaty PM	Kurgaljinsky Zapovednik & Murat National Park, also called Tengis Wetlands (3 hrs. each way driving). Dir. (forestry) Dr. T. Sidorova Assistant Director (field scientist). The park is being supported by NABU, and they are funding its preparation for being declared a Biosphere site.		Traveled with Head of Protected Areas & Wetlands, Biosphere. Return flight to Almaty.
SUN	23	Almaty	Paper work.		Forms to Chemonics.
MO	24	Almaty	Appointment USAID 9:30. TETHYS Tethys group NGO Dr. K. Pachikin Soils Sci Dept Head, Dr. B. Arnov V. Pres., Dr. Roman Jashenko (UNDP TERRA (GIS) NGS, KSG Ibrashev. 534-050 (070) 534-082	Some of these may not be able to see us due to big meetings re: inauguration of wells.	Petroleum people not available.
TU	25	Almaty	Aliya Satubaldina. European Union (not available). Met Tethys (NGO) and Kazakh Zoological Society people (cards on list) Ministry of Science Institute Dir. Dr. Prof. Science Laureate, Amankul Bekenov.	Excellent NGO with every capability, with Acad. of Science experts. Funded projects with IUCN, WWF and German orgs. 'Nature-shchutz-Bund'	
WD	26	Almaty	World Bank? Nat. Info & Analytical Center for Statistical Info in PM.	Visited NGO, Mapping Office, Dostyk for mail.	Revisited Terra NGO.
TH	27	Almaty	Michael Bailly, principal regional man. Jmb@hb.almaty.kz , USAID oil contacts.		Will complete interviews when able, and contacts made by USAID.
FR	28	Almaty	Report.		
SAT	29	Almaty	Report.		
SUN	30	Almaty	Day off.		
May					
MO	1	Almaty	Report. Meeting with Chinara. Igor and Tadjik people at hotel while they are on stopover between flights from Peking. AM report writing.		Arrange to meet them at Airport with Dostyk vehicle. Igor to email flights, times. Last minute flight changes, had to pay for vehicle sent to airport for pickup.
TU	2	Almaty – Bishkek Note*** Revised itinerary Kyrgyz	By road to Bishkek, 07:00. Appointment at USAID Mission at 16:30, approx. Minister has agreed to see us after his official meetings with the President.	Met Chinara PM and went over our program in Kyrgyzstan. Have an appointment with Minister of Environ. Affairs in PM. Overnight hotel.	Confirmed hotel reservations, and program with Chinara and travel plans. Met Vice Minister. Met Nina from Almaty Mission at USAID/Bishkek.

June				
SAT	24	Tashkent – Almaty	Travel to Almaty.	
SUN	25	Almaty – Aktau	Travel to Aktau.	
MO	26	Aktau	AM meeting with Regional Hunting & Fishing Protection Department. Met director and staff. Manage Karagia Protected Area of 147,500 hectares.	
TU	27	Aktau	AM Ministry of Ecology, Minister unavailable due to President's visit next two days.	
WD	28	Aktau	Met with Marat G. Abdrakmanov, head of Regional Environmental Protection Agency.	
TH	29	Atyrau	Met head of Oblast Fisheries Protection Agency, northern Caspian area to discuss seal die off. PM flight to Atyrau.	Has no monitoring system that is linked with other Regional Caspian Project offices. Did not hear of die off until end of May. Also needed to test sedimentary plugs for DDT and other agrochemicals.
FR	30	Atyrau		
July				
SAT	1	Atyrau		
SUN	2	Almaty		
MO	3	Almaty	Mission debriefing on Caspian Seal die off PM.	
TU	4	Almaty	Holiday	
WD	5	Enroute to USA	Early AM flight to Frankfurt.	
TH	6	Enroute	No bookings made by UA to Lufthansa, standby for two flights. Ended up spending day 06:30 – 19:30 in Frankfurt. Baggage was left in Almaty.	
FR	7	Washington DC	Arrived Washington without bags.	
SAT	8	Washington DC	Bags delivered in late PM.	
SUN	9	Washington DC	Day off.	
MO	10	Washington DC	Project expense report.	
TU	11	Washington DC	Report writing/expenses.	
WD	12	Washington DC	Financial report.	
TH	13	Washington DC	Financial report.	
FR	14	Washington/SFO	Travel.	

ANNEX F

Caspian Environmental Program

Assessment of Transboundary Biodiversity Priorities (led by GEF) will assess and record living resources, environmental characteristics, and human uses on a comprehensive, regional basis, according to agreed, consistent and compatible procedures. This effort centers on establishment and operation of a Caspian Bioresources Network as the primary tool for bioresources protection. Below, excerpts are given from the CEP project description.

Activities	Responsible Parties	Associated International Partners
Assessment of capacities of Caspian Regional Thematic Centres, nominated by the governments and their technical cooperation needs, including training, equipment, expert consultation	PCU CEP Advisor	UNDP, EU/TACIS The World Bank
Establish a well-functioning system of communications and data transfer within the region using internet	UNOPS PCU	EU/TACIS GRID/Geneva
Country committees, consultants, and thematic centres to evaluate existing data sets, needs and data gaps, monitoring programmes and monitoring capabilities in each country and identify and prioritize needs for SAP and NCAP actions (e.g., baseline monitoring, compliance monitoring, transboundary impacts)	Contaminant CRTC Contaminant Consultant Contaminant NPPP PCU	EU/TACIS, The World Bank, FAO, IOC, UNEP, WMO, WHO, IAEA
Limited regional assessments of contaminants to fill key gaps in transboundary diagnostic analysis (TDA) needed to formulate strategies and action plans	Contaminant CRTC PCU Contaminant Consultant PCU	EU/TACIS
Collaborate with oil and gas industry on their contribution to the regional assessment to the TDA process	Contaminant CRTC Contaminant NPPP NFPs PCU	
Establish or strengthen links between monitoring facilities throughout the region	Contaminant CRTC Contaminant NPPP PCU	
Support the Caspian Bioresources Network to stress transboundary issues	Biodiversity CRTC PCU	The World Bank
Undertake an initial, rapid ecological survey of the coastal and marine species and habitats, their uses, values, and threats, for each of the five Caspian states. The survey will result in an Inventory of Caspian Ecological Resources, their priority transboundary implications and will be part of the final TDA	Biodiversity CRTC Biodiversity Consultant PCU	The World Bank
Collate a Caspian Red Data Book based on existing and revised national Red Data Books, identifying and describing rare, threatened and endangered species that require attention from a regional perspective and that will be included as a priority within the TDA process	Biodiversity CRTC Biodiversity Consultant UNOPS PCU	The World Bank
Evaluate existing Protected Areas and habitats protection status, particularly those with transboundary borders and/or those used by migratory species. Identify and facilitate adoption of SAP and NCAP commitments related to protected areas	Biodiversity CRTC Biodiversity Consultant PCU	

Activities	Responsible Parties	Associated International Partners
Prepare national reports on the State of Caspian Biodiversity according to an agreed scope and prescription; meld the five national reports into a Regional Overview on the State of Caspian Biodiversity with transboundary priorities to support the TDA and SAP preparation	Biodiversity CRTC Biodiversity Consultant Biodiversity NPPP UNOPS, PCU	
Prepare comprehensive Caspian Bibliography, including science, management, and economics	Info/Data Mgmt NPPP CRTCs PCU	UNESCO
Develop Caspian Information System including data on institutional capacities, scientists, environmental projects	CRTCs PCU	EU/TACIS, WHG, GRID/Geneva
Develop Caspian Geographic Information System and hold stakeholders training workshop in the use of GIS/IP applications	Info/Data Mgmt NPPP CRTCs PCU	EU/TACIS GRID/Geneva
Upgrade and maintain CEP Home Page on Internet, prepared by The World Bank in 1998; publish TDA, SAP, NCAPs	PCU	EU/TACIS
Develop Regional Environmental Internet Node, including relevant environmental databases	CRTCs PCU	The World Bank GRID/Geneva
Prepare and hold a Caspian regional workshop for country Intersectoral Coordination Committees relating to environmental information networking (EIN), including standards, tools and techniques for data and information management	Info/Data Mgmt NPPP PCU	EU/TACIS GRID/Geneva
Collation of data by country committees with assistance, where necessary, from consultants in order to contribute to regional transboundary assessment	Info/Data Mgmt NPPP PCU	GRID/Geneva
Prepare State of the Caspian Environment Report	NFPs CRTCs, PCU	EU/TACIS, WHG IOC, UNEP, IAEA, WMO