Feasibility Study on the Possible Restoration of the Caspian Tiger in Central Asia

by

Hartmut Jungius

2010
Contents

Executive Summary

I: Introduction

1. Study Methods

II: Species Distribution, Habitat and Biology

1. Former Distribution in Central Asia with Particular Reference to the Ily-Balkhash Basin
2. Decline of the Tiger in Central Asia with Particular Reference to the Ily-Balkhash Basin
3. Tiger Habitats in the Ily-Balkash Basin
4. Climate
5. Fauna with Particular Reverence to the Tiger
6. Human Use of the Ily-Balkash Basin
   6.1 Hydrology and Water Management
   6.2 Agriculture
   6.3 Hunting and Fishing
   6.4 Tourism
   6.5 Nature Conservation and Protected Area
7. The Biology of the Tiger
   7.1 Habitat Requirements

III: Discussion

IV: Conclusions

V: Recommendations

VI: Acknowledgements

VII: References

VIII: Annexes

Photos Ily Delta: WWF/Canon H. Jungius
Executive Summary:

The Caspian Tiger occurred in eastern Turkey, the southern Caucasus, in northern Iran, Iraq, and in isolated pockets throughout Central Asia until north-western China. In Central Asia the tiger was found along floodplains of rivers and in tall grass and reed beds along rivers and lakes. This type of riparian forest is called “Tugai” and used to be widespread throughout the region.

The tiger became extinct in the region about 40 year ago. The main reason for its disappearance was habitat destruction and hunting (even extermination as vermin during reclamation of new lands in 19-th century) and the decline of its prey base. Stimulated by recent findings that the Amur- or Siberian Tiger is the closest relative of the Caspian Tiger, discussions started if the Amur Tiger could be an appropriate substitute for reintroduction into a save place in Central Asia. The Amu Darya Delta and the South-Balkhash-Ily-Delta Regions were suggested as potential sites. A feasibility study was initiated to these areas with the objective to investigate if any of these 2 sites is suitable.

The project team analyzed the biological and ecological data of the species and its habitat. Factors for the species decline and extinction were assessed. A detailed review, on the tiger’s history in Central Asia revealed that the species disappeared not long ago from the region. Field visits were undertaken to the Amu Darya Delta in 2009 and the South-Balkhash-Ily-Delta in 2010 to analyze their suitability for the project.

The final conclusion of this assessment and a comparison between both regions is that a viable tiger population of about 100 animals would require at least 500.000 ha of contiguous habitat with rich prey populations. The relevant habitats are available; however several factors which led to the extinction of the species such as hunting and habitat deterioration are still prevailing in both regions. However, the implementation of the project might be possible, if these and other limiting factors could be overcome, together with significant financial and political support. The team realised that this can not be provided in the short term.

The Amu Darya Delta and the former coastline of the Aral Sea, embrace unique uninhabited wilderness areas with a great potential for restoring and preserving a vast system of wetlands, forest, steppe and desert habitats for a large variety of wildlife. The same applies to the South-Balkhash-Ily-Delta, where the tiger’s original habitat is still available in a fairly natural state, but occupied by people with their livestock. The area could become one of Central Asia’s prime wildlife conservation areas in the long term.
To provide suitable environment for the tiger in both areas, the following efforts have to be undertaken:

1. **Upgrade protection:**
   - Protected area status, including effective protection and management is given to Akpetki and Jiltyrbas Lake regions and the surrounding steppe and desert ecosystems of the former Amu Darya Delta, up to at least 500,000 ha.
   - Law enforcement in existing protected areas of the South-Balkhash-Ily-Delta is being significantly improved; consideration should be given to upgrade all potential tiger habitat (500,000 ha) to national park status under one management authority.
   - Well trained, competent and motivated staff in place

2. **Habitat Management:**
   - Regular and sufficient fresh water supply to both areas is a basic necessity for the ecological stability of both regions.
   - Habitat conservation (control of fires, stop overgrazing) and restoration, in particular Tugay forests.
   - Agriculture to be kept out from protected areas.
   - The Amu Darya Delta to remain free of livestock.
   - In the Ily Delta, livestock numbers to be stabilized and eventually gradually and completely withdrawn from critical habitats and/or those areas which are considered for national park status.
   - Oil, gas and other economic developments should follow strict environmental criteria.

3. **Wildlife conservation and restoration:**
   - Stop illegal hunting
   - Reinforcement of wild boar, gazelle and Saiga populations through good management.
   - Restoration of Bukhara deer and Kulan through reintroduction.
   - Regular wildlife monitoring by well trained scientists

4. Possibilities for returning the tiger to these regions should be re-examined when success or failure of restoration measures have been evaluated. Such a process might take up to 10 years.

5. In view of the more favourable habitat conditions in the South-Balkhash-Ily-Delta, a first assessment of restoration and management measures could be undertaken after 3 to 4 years. If habitat and wildlife restoration measures are successful, consideration could be given to identify a suitable site for a tiger reintroduction centre in the delta, and construction of the necessary facilities.
The first tigers might be brought to the centre while activities for habitat and wildlife restoration are ongoing.

6. It is further recommended that WWF’s Central Asia Programme submits these proposals to the relevant authorities in Uzbekistan and Kazakhstan for their consideration. The proposal to restore the tiger in Central Asia should also be introduced to the International Tiger Summit in September 2010, to which representatives from Uzbekistan and Kazakhstan should be invited.

I. Introduction

By the end of the last century, the range of the tiger, with several subspecies, extended from eastern Turkey and northern Iran to India and south-eastern Siberia. It was exterminated or became rare in most part of its range; the only relatively large populations survived in India, Nepal, and Malaysia. The total number of wild tigers is estimated at 4,000 to 5,000 individuals.

One of these subspecies was the Caspian or Turanian Tiger (*Panthera tigris virgata*) which is extinct. Recent genetic investigations (Driscoll et. al. 2009) demonstrated that it is closely related to the Amur Tiger (*P.t.altaica*). Based on these findings, discussions started within the Central Asian conservation, scientific and to some extent also political communities, if the Amur Tiger could be an appropriate subspecies for reintroduction into a save place in Central Asia.

The first step for any reintroduction project is to find out (IUCN 1984; Jungius 1985):

- Is there a suitable habitat for the species?
- Are the factors which led to the extinction still prevailing?
- Will such a project receive support from the relevant decision makers?

The Amu Darya Delta and the Tugai forests along the Amu Darya River in Uzbekistan were one of the potential sites which were investigated in 2009. Jungius, Chikin, Tsaruk & Pereladova (2009) identified the Akpetki and Jiltyrbas Lake region in the delta as a unique wilderness of at least 1 million ha, with a great potential for restoring and preserving a vast system of wetlands, forest, steppe and desert for a large variety of wildlife. However, this region is not ready for the reintroduction of the tiger at this stage, but might be suitable to support a viable tiger population, if the following steps would be taken:

- Protected area status is given for Akpetki and Jiltyrbas Lake region and the surrounding steppe and desert ecosystems, up to 500,000 ha.
- The protected area is well managed and protected by well trained staff.
- Regular fresh water supply to the area for nature conservation is guaranteed.
- Agriculture and livestock are kept out from the protected area.
- Oil and gas developments follow strict environmental criteria.
• Habitat restoration, including forest and reed beds, re-establishment of prey species, in particular Bukhara deer and reinforcement of wild boar, gazelle and Saiga populations.
• Considerations for returning the tiger to this region should be re-examined when success or failure of restoration measures can be evaluated. Such a process might take up to 10 years or even more.

The team received information that the tiger might have existed much longer, in other parts of its former range, like the South Pribalkhash’e - Ili floodplain in Kazakhstan and recommended to investigate this closer. WWF’s Central Asia Programme with support from WWF-NL decided to follow up and established a team with the objective to:

• Verify these rumours.
• Find out if this region might even provide a more suitable ecological and political environment than the Amu Darya for the reintroduction of the tiger.

1. Study Methods

Desk top studies were carried out on the specie’s biology and former distribution in Central Asia (Annex 1). This was done by Y.Chikin and O.Tsaruk with a focus on the Amu Darya region (Jungius, Chikin, Tsaruk, and Pereladova 2009) and by E. Bragin (2010) for Kazakhstan with focus on the Ily-Balkhash Basin. Bragin compiled also information on the ecological situation, human aspects and land use of the Balkhash Basin.

Field visits were undertaken by Yuri Chikin, Hartmut Jungius and Oleg Tsaruk to potential habitats along the Amu Darya River and the Amu Darya Delta in June 2009 (Jungius et.al.2009). Two field missions were carried out to the South Balkhash - Ili floodplain in February 2010 by Lukarevski and Baidavletov (2010) and in Mai/June 2010 by Jungius and Baidavletov. The Mai/June visit included also an aerial survey of the potential project site (Annex 2).

Lukarevsky & Baidavletov (2010) gathered information on reasons for extinction and status of potential prey species during the winter survey. Jungius and Baidavletov analyzed the potential habitat and ecological situation under summer conditions. Jungius undertook a final assessment and analysis of data from both regions.
II. **Species Distribution, Habitat and Biology**

1. **Former Distribution in Central Asia with particular reference to the Ily-Balkash Basin (Annex 1).**

   The Caspian Tiger occurred in eastern Turkey, the southern Caucasus, northern Iran, Iraq, and in isolated pockets throughout Central Asia until north-western China. Tigers were also relatively well known in Old Russia. Geptner (1969), recorded it from the coast of the Sea of Azov, he stated also that tigers entered the southern Russian steppe and perhaps even the forest-steppe (the Chernigov Princedom). Tigers were also regularly seen on the territory of current Ukraine, in reed beds along the Terek and Kuban rivers, and in the Don River mouth.

   The Ily-Balkhash Basin was one of the four core areas of the tiger’s distribution in Central Asia, together with the South-Caspian region, the Amu Darya and Syr Darya river systems. The tiger lived in reed beds and flood plain forests along rivers and around lakes and adjacent dry lands with appropriate cover (Annex 1).

   Sludskii (1966), cited by Bragin (2010) provides the most detailed review on the tiger’s distribution in the Ily-Balkhash Basin. The data given below are extracts from Sludkii’s publication.

   During the first half of the 19th century tigers were common in the Balkash-Alakol depression. Karelin (1847), Nikolskii (1887) and Kostenko (1887) report tiger as a common species, from the riparian forests of the Ily valley, in particular along the lower reaches and the banks of Lake Balkhash, where it occurred in high densities (Alferaki, 1891). Schrenk (1845) registered tigers in the valleys between Ily and Tentek. Wlangali (1853) considered tiger to be common in the reed beds of the Lepsy valley. The situation changed by the end of 19th century. Tigers were still common in the lower reaches of Ily and in its valley upstream, till the settlement Ily’isk, but rare along valleys of other rivers in the Balkhash Basin, such as Karatal, Aksu and Ajguz.

2. **Decline of the Tiger in Central Asia with Particular Reference to the Ily-Balkhash Basin**

   The main reason for the disappearance of the tiger in Central Asia was habitat destruction and extermination by military and professional hunters. Sludskii (1972) points out that the rising price for tiger skins was an important factor leading to the species decline throughout the region, as well as conflicts with livestock and the decline of prey species due to over hunting. The impact of agricultural developments, leading to habitat destruction, was less significant in Ily-Balkhash than in other regions of the tiger’s range, e.g. the Amu Darya valley (Jungius et al. 2010). The main cause for its disappearance was hunting.
The tiger became rare around 1900 along most river valleys of the Balkash basin. It survived longest in the Ily river system, in particular the Ily Delta, from where it disappeared completely in 1948 (Bragin, 2010). Rumours that tigers were seen in the delta in 2006 could not be verified (interviews of more than 50 local hunters and farmers by Lukarevski and Baidavletov). This is also underlined by the fact that traces of tigers were never registered by qualified specialists, who participate in regular wildlife surveys of the Ily-Balhash Basin.

Hunting:

Tiger hunting was of high commercial interest. In the 20th century tigers were considered vermin in the region and in Central Asia as a whole; bounties were paid up to 1929. Another major incentive for hunting was the high price for its skin, tiger bones and other body parts for use in Chinese and Korean traditional medicine (Heptner & Sludskii 1972; Prokhorov, 2002).

Economic development of the area in the 1920ies was accompanied by predator elimination strategies. Conflicts between livestock breeders and tigers led to well organized hunts with professional huntsmen and soldiers.

Prey species suffered also from intensive commercial hunting. About 1.5 million skins, of different game species, were recorded annually in the 40ies (Lukarevski & Baidavletov, 2010). The tiger’s main prey species, wild boar but also roe deer, Bukhara deer, goitered gazelle and Kulan suffered significantly.

It is of interest to note that the tiger disappeared from this region much earlier than elsewhere, e.g. in the Amu Darya Delta. Baidavletov and local hunters (pers.com) contribute this to professional hunters, which where stationed in the Ily Delta during the 40ies for Muskrat hunting. Other wildlife, including the tiger, was diminished by them at the same time.

Habitat destruction:

The impact of habitat changes was less severe in the South-Balkhash – Ily Delta than in other parts of the tiger’s range, e.g. the Amu Darya river system and around the former Aral Sea (Jungius et. al. 2010).

A dramatic impact on the habitat in the South-Balkhjash – Ily Delta were fires set to reed beds and riverine forests by farmers and hunters during the dry season. Huge parts of the area were burned, sometimes repeatedly in one season. These fires did not only kill wildlife (there are reports of tiger killed by fire, Bragin, 2010), but destroyed also their habitat. Expansion of livestock into the area started in the 40ies. As a consequence regular fires became a common feature throughout the Ily-Balkash Basin, leading to destruction of reed beds and tugay forest. (Annex 3).

Impact of agriculture on the habitat started later, at a time when the tiger was already rare or extinct in most parts of the Ily-Balkash Basin. It seems that this had no significant influence on the disappearance of the species.
3. Tiger Habitats in the Ily-Balkash Basin

The tiger’s prime habitats in Central Asia were forests, tall grass and reed beds along floodplains of rivers and along lakes and a variety of dry lands (with open fresh water) adjacent to these habitats. This type of riparian habitat with forest is called “Tugai”. It is recognized for its importance in global biodiversity and included into WWF’s globally important 200 Ecosystems. It is a unique habitat of woody-shrubby vegetation and high grasses, impenetrable thickets of trees with lianas, alternating with wetlands and patches of tall reeds and grasses up to several meters in height. For a detailed description refer to Krever, Pereladova, Williams, Jungius (1998).

The western parts of Lake Balkash (58% of its surface) are a rather shallow freshwater ecosystem. The eastern part is much deeper (up to 26 m) and saline. The southern shores, with the Ily River and its delta are the target of this study (Annex 2).

The southern shores are low and sandy. They are flooded regularly and covered by reed beds (Annex 4), in some places by semi-desert and halophytic vegetation. Trees and bushes are extremely rare. About 120,000 ha of this habitat are still available along the coast from the Ily Delta to the Karatal Delta (including the Karatal Delta). Most of the coastline is hardly accessible from land. We experienced this also during the spring 2010 survey. The high water level of the lake led to extensive flooding of the shallow shore line and expansion of reed beds.

The Ily enters the western part of the Balkhash Lake, where it creates a delta of 8,000 sq.km. It is economically important for livestock breeding and fishing. The Ily River and its delta are the live support system for the lake. They influence its chemical and biological processes.

For describing the extent of the delta we adopt the definition of the Institute of Geography, National Academy of Science, Republic of Kazakhstan, Almaty. Dostaj (2006) defines the area as a circle segment, starting downstream at the village of Bakanas and extending for about 200 km along the southern shore of Lake Balkhash from its most southern tip to Saryesik peninsular.

Definition of Delta by Dostaj (2006)
The delta is surrounded by deserts, the Taukum (Annex 5) in the south-west and the Saryesik-Atyrau (Annex 6) in the north-east. The bordering zones where the delta and the deserts meet are flooded during wet years and characterized by reed beds, dense stands of tugay like vegetation, Saksaul forest (*Haloxylon aphyllum* and *H. persicum*) and halophytic vegetation such as *Halostachys caspica*. Small lakes and wet depressions with rich vegetation can be found between sandy ridges and dunes. The extent of this transition zone between delta and desert varies each year, depending on the degree of annual floods.

It is important to note: The largest part of the delta is dry, in particular its former eastern part. Dostaj (2006) states that wetlands and grasslands represent about 40 % of the delta, the remainder are classified as semi-desert. He refers to data from 1984. We can assume that the situation has not improved since then and estimate that about 30% of this landscape type is left. If we add another 10% of transitional habitats, we will arrive at not more than 40% (320,000 ha) suitable habitat for the project in the delta.

The transitional zone includes interesting habitats for various wildlife species. Our own observations indicate that this zone is being used intensively by wild boar. Investigations need to clarify to which extend these habitats are of interest to other potential prey species such as Bukhara deer, Roe deer, Kulan, gazelle and perhaps even Saiga (Annex 7, 8).

The delta is fed by 3 main river branches: Zideli, Ili and Topar, all 100-150 km long. The eastern part of the delta is no longer supplied by water; it has become inactive and is now part of the Saryesik-Atyrau desert.

- The Topar-System covers the left side of the delta; water flow is being maintained by dredging the Suminka canal.
- The meandering side-arm of the Ily produces a small delta into the lake. This used to be the main channel of the delta, but covers only 7% of the total water supply to the lake now.
- The Zidlij-System in the east, represents the largest part of the delta, 90% of the water runs through this branch of the river, creating a vast wetland with lakes, ponds, swamps and watercourses (Dostaj 2006).

The delta is covered by a mosaic of different habitat types. These include riparian forest (tugay) dominated by oleaster (*Eleagnus sp.*), willows and in some places poplar (*Populus pruinosa*), tall grass and reed beds along watercourses, lakes and ponds but also sparsely vegetated dunes and patches with different types of desert and halophytic vegetation, where the delta meets with the deserts (Annex 9,10,11,12). The distribution of these habitat types changes frequently, depending on water availability and flooding. Tugay vegetation is most typical along river courses of the Topar, Ily and Zidlij systems, also outside the delta along the Ily flood plain between Bakanas and Araltobe. Woody vegetation disappears with increasing humidity in the delta towards the lake. The upper parts are entirely covered by lakes, ponds, swamps and tall reed beds, separated from each other by low ridges of dunes (Annex 10).
Within the limits of the Important Bird Area (574,300 ha) of the Ily Delta, (Annex 13) which covers most of the wetland areas, the following vegetation zones have been identified (Sklyarentko, Welch, Brombacher 2008).

- 60% wetlands (344,000 ha)
- 20% steppe
- 10% bushes (tamarisk and salt tree – Halimodendron)
- 5% (28,700 ha) riparian forest (Tugai)
- 5% (28,700 ha) grass and red beds, meadows, mires and different types of lakes and ponds.

These estimates indicate that the available habitat in the delta, with about 400,000 ha, might be larger, than the 320,000 ha estimated by us on the basis of data provided by Dostaj (2006).

The delta and the adjacent shore of the lake have been seriously degraded during the last 30 years due to a significant decrease of the water supply caused by the construction of the Katchagai water reservoir upstream and loss of water to irrigation in Kazakhstan and China.

The eastern part of the Ily-Delta was cut of from the water supply, through natural processes, several 100 years ago and became part of the Saryesik Atyrau desert (Annex 6). There are numerous small lakes and ponds in the desert, as well as occasional grasslands, which support a varied of wildlife, including about 150 Saiga.

**This implies there are about 500,000 ha of suitable habitat available for a potential tiger reintroduction programme in the Ily Delta and along the southern shore of Lake Balkhash, up to the delta of the Karatal River, (Annex 13).**

4. **Climate**

The climate is arid and extreme continental, characterized by significant daily and annual temperature fluctuations. The mean annual temperature is +2° to +5° C in the plains and -5° to -10°C in the foothills of the mountains. January is the coldest month, with an average temperature of -8°C near the lake and -5°C near the mountains. Maximum temperatures can reach -45°C. The expedition in February encountered daily temperatures between -10°C and -20°C at night and -10°C to +5°C during day time. Ice rains can cause a solid crust of ice during winter, which can impede feeding condition for large herbivores. The lake and the rivers freeze every year from November to the beginning of April. The hottest month is July with an average temperature of 24°C and maximum temperatures of +45°C.

The annual precipitation ranges between 200 – 250 mm in the foothills and around 150 mm close to the lake.
5. Fauna with Particular Reference to Tiger

The southern shore of Balkhash Lake, the valley of the Ily River and the adjacent dry lands used to be inhabited by a large diversity of species which used to be the major prey of the tiger.

The wild boar (*Sus scrofa*) is the most common species. Small groups, also with young were seen regularly during the aerial survey in the reed beds. It is common throughout the wetlands. We observed also that single animals and small groups with young enter regularly the fringes of the desert, where they dig for food around Karabarar (Halostachys caspica) shrubs (Annex 8). Lukarevski and Baidavletov (2010) estimate a population of at least 3,000 to 5,000 in the delta. The species used to be the tiger’s main prey throughout Central Asia. Human impact, in particular poaching, fire and livestock are changing its distribution. It seems that the depletion of tugai forests (see below) and hunting pressure pushed wild boar into the less accessible reeds and tall grass beds.

The Roe deer (*Capreolus capreolus*) is rare but occurs throughout the region. It suffers from habitat destruction (burning) and hunting. Tracks were seen and barking of deer was heard regularly during our surveys.

The dry lands adjacent to the river valley and the delta are inhabited by Goitered gazelle (*Gazella subgutturosa*), which still is fairly common (3,000).

The Bukhara deer (*Cervus elaphus bactrianus*) used to be another important prey for the tiger, but has become extinct in the region.

Excellent and extensive habitats are still available along the Ily flood plane and in the delta. The species could therefore be restored in many parts of the delta and along the shore of the lake.

Another characteristic species for the adjacent dry lands of the delta, and potential prey species in the transgression zone between delta and desert, is the Kulan (*Equus hemionus*). It is extinct, but the habitat is suitable for reintroduction.

A small Saiga population (*Saiga tatarica*) of about 150 animals exists in the Saryesik Atyrau desert, it needs to be investigated to which extent it enters the transition zone to the delta and if it could become a potential prey species.

This implies that three of the tiger’s prey species (wild boar, roe deer, and gazelle) are still available in the region; two other species (Bukhara deer and Kulan) are extinct but could be restored.

6. Human Use of of the Ily-Balkash Basin

Lake Balkhash and the waters from its tributary rivers, support 3 million people (Dostaj, 2006). Water is used for irrigated agriculture, municipalities and industries, including the Balkahsh Copper melting plant.

The entire area, with the exception of the southern lake shore, is occupied by small villages and family farms. The population number is low, but people are spread throughout the area. There are several permanent villages with 20 to 1000 inhabitants each within the delta and along the Ily River.
6.1 Hydrology and Water Management

Lake Balkhash is an extremely complex ecosystem, influenced by climatic trends and excessive use of water in its catchment area. The system is under additional ecological stress from pollution (mining and other industries) and excessive use of water from the contributing rivers for agriculture. It can not be excluded that this critical ecological situation will be further aggravated and that a scenario, comparable to the Aral Sea, could happen, unless serious counter measures are taken.

The Ily River provides 80% (15 km3) of the water to the lake. The river is shared between Kazakhstan and China, 815 km of its course (1,439 km) run through Kazakhstan. Its watershed is in the Tien Shan Mountains of China, from where 70% of its waters originate. The Ily starts at the confluence of Kash, Kunes and Teckes Rivers.

The waters of the Ily are of vital economic importance for Kazakhstan. Downstream the river is dammed for hydroelectric power at Kapchagay. Between 1970 and 1987 12 km3 were needed to fill the reservoir, at the same time irrigated agriculture was extended from 405.00 to 583.00 ha (Dostaj 2006). Further extension of irrigation aggravated the problem further. The construction of the Kapchagay Reservoir was the most dramatic impact on the Ily and the Balkhash Lake (Dostaj 2006), despite the decision to decrease the level of the reservoir by 10 m and to limit the total volume of water to 14 km3 instead of initially planned 28.1 km3 (Bragin 2010). These measures were based on the understanding that completion of the original plans for Kapchagay, would lead to a catastrophe for Lake Balkash and its entire ecosystem.

However, the situation is becoming worse due to water retention from the tributaries, in China, in particular the Teckes. These rivers loose large amounts of their run off to irrigation and hydropower (in China) before entering the Ily River. The same applies to tributaries entering the Ily in Kazakhstan from the west. Most of these rivers are fairly shallow, due to water retention for agriculture. The consequence of this is that the lower part of the Ily is rather unstable with dead channels, islands and sand bars. Water retention upstream for agriculture and filling of dams for irrigation and electricity (22 in China) has lead to dramatic fluctuations of water supply to the Ily river system and the lake. The consequence of this has been regular drying out of many wetlands along the shores of the lake and in the Ily-Delta. During the past 40 years, the delta suffered repeatedly great losses, with wetland disappearing and bare soil dominating the landscape where swamps and ponds used to exist.

The increasing water consumption in Kazakhstan for agriculture (3,6 Million m3) and the low standards of its irrigation schemes (loss of 1 million m3 by seepage and evaporation) and the increasing use of water in China for agriculture, hydropower, mining, processing industries, and the growing urban centres (Bragin 2010) is a major concern. This trend is aggravated by plans in China to transfer water from the Ily watershed to other basins e.g. to the Ebinoo Lake or south into the Tarim River. This would lead to a dramatic decline of the water supply to the Ily River and the Balkhash Lake.
All these factors might lead the Balkhash Lake region into a similar ecological catastrophe, parallel to the Aral Lake. Studies by CAREC (Central Asia Regional Environmental Centre) demonstrate that declining precipitation and increasing water use might cause the lake to split into 3 separate lakes. Annual water retention of 4 km³ in China would trigger further shrinking of these 3 separate lakes with catastrophic ecological impact on the densely populated region, which includes also Amalty with more than 1 million inhabitants. These concerns are shared by Dostaj, (2006) and Bazarbwev (2006). Dostaj, (2006) refers to 6 scenarios which were developed. He considers B2 as the "ecological" acceptable one but fears that B5 might become more realistic, it is the "economic" version. It is worth noting that the eastern part of the lake would suffer most, while the western part with the Ily-Delta might be able to maintain its viability to a some extent, which is of course vital for the project under consideration. (Annex 14).

First warnings that this process is under way were noticed by the changes of the Ily River Delta and along the southern banks of the lake between 1972 and 2001 (UNEP, 2004).
Measures are under way to prevent that this disaster happens. CAREC, with support from the EU, prepared a project "Development of Ili-Balkhash Basin Integrated Management Plan", which involves both countries. Establishment of the “Balkhash-Alakol River Basin Authority” is also under preparation by the Kazakh Government. CAREC prepared a draft agreement for the Governments of Kazakhstan and China on joint, integrated management of the water resources of the region. This is currently being negotiated by a joint Kazakh/Chinese Commission with support from UNEP. A first step to improve water use for irrigation has been recommended for Kazakhstan by installing modern irrigation tools e.g. drop-irrigation, which is already in use in China. This would reduce water loss for irrigation by 1 million m³!

The Government of Kazakhstan is aware that more action is needed to maintain and where possible restore the environment of Lake Balkhash and the rivers on which the lake depends. Three large Nature Reserves (1,061,100 ha) were established south of the lake (Annex 15, see below). For more detailed information refer to Bragin (2010).

6.2 Agriculture

Economical activities in the Ily Delta and along the southern shore of Lake Balkhash focus on livestock breeding (20% of the area) and fishing (Annex 16). Some agriculture exists in the southern parts of the delta. Livestock breeding and agriculture declined significantly with the collapse of the Soviet system. The total number of livestock is currently about 120,000, during the Soviet time there were 200,000 alone in the district of Bakanas, and probable more that 500,000 throughout the region (Baidavletov pers. com.). Irrigated agriculture disappeared almost completely from the delta and the upper floodplain. Dry fields and eroded irrigation canals are the witnesses.

Large areas of government land have been leased for 50 years for livestock breeding; about 400 private farms are distributed throughout the area with a total of 80,000 to 100,000 cows and horses and 50,000 to 70,000 sheep (Lukarevski & Baidavlevot, 2010). Efforts are under way by the Forest Department to withdraw permits for grazing rights.

Livestock breeding is very damaging. Reed beds and forests are being burned regularly by herdiers to create fresh re-growth of grasses, herbs and shrubs for cattle and sheep, leading to the degradation and disappearance of the Tugai ecosystem (Annex 3). The lack of regular flooding of the delta (see above) impedes the situation further, lack of water accelerates the loss of willow and popular grows, with their rich undergrowth of grasses and herbs. Frequent fires promote the domination of oleaster (Elaeagnus angustifolia, E. orientalis) and salt tree (Halimodendron halodendron.), Tugai forests are loosing their high diversity; a dense, jungle like vegetation is being replaced by a savannah-type landscape which becomes more and more suitable for livestock grazing and less and less attractive for wildlife such as wild boar and roe deer, and less suitable for the potential reintroduction of the Bukhara deer. This development is unfortunately spreading throughout the delta.
6.3 **Hunting and Fishing**

Sport fishing, hunting and poaching have become very popular throughout the delta all year round, despite increasing control by wildlife authorities. More and more private hunting territories were authorized along the borders of the Zakazniks, during the last years.

Main game species are wild boar, roe deer, hare, pheasant and waterfowl. Hunting activities are increasing since mid 1990, including the use of helicopters for driving wild boar and hunting at night with flash lights from cross country vehicles. Lukarevski & Baidavletov (2010) estimate that up to 1,000 wild boars are taken illegally per year, which represents 30 to 40 % of the population and leading to overexploitation.

A fur trading company has permits to hunt musk rat in parts of the delta, outside the Zakazniks. This attracts hunters with their families and livestock.

Fishing is the main source of income for large parts of the local population. Sport fishing lodges are distributed throughout the delta. The delta is famous for its large cat fish (up to 100 kg) which attract local sport fisher and others from abroad. The delta has been closed for commercial fishing.

6.4 **Tourism**

This is expanding into the region; several tourist camps have been opened and are being frequented by local and foreign visitors. The main interests is fishing.

6.5 **Nature Conservation and Protected Areas**

**Nature Conservation:** The experience from the Aral Sea disaster led to Government to prepare a development plan for the conservation and restoration of the Ily-Balkhash Basin, this was approved by the parliament in 2001 and by the Ministry of Environment in 2002. This plan calls for:

- stabilization of the lakes water balance by increase of water flow to the lake,
- restoration of the delta ecosystem,
- restoration of the natural flooding dynamics, including restoration of 10 lake systems inside the delta (123.600 ha)
- reduction of pollution

Results of these measures are unknown.
Protected Areas (PA): The government established three protected areas, total 1,061,100 ha covering the southern shore of Lake Balkhash and the deserts adjacent to the delta and the Ily River floodplain (Annex 15):

Karoiskiy Zakaznik - 509.00ha
Pribalhashaskiy Zakaznik – 503.00 ha
Kukanskkii Zakaznik – 49.100 ha

All three PAs are complex Zakaniiks, established for wildlife and habitat conservation. Hunting and forestry are not allowed. Their international status corresponds to IUCN’s category III, or category VII criteria. Limitations are placed upon certain on-site economic activities, such as logging, mining and hunting, which are not always implemented according to the legal requirements. This applies in particular to grazing of livestock and hunting. Permitted is sport fishing based on permits, tourism and bee keeping.

Several governmental agencies are responsible for law enforcement:

- National Parks:
  - Pribalhashaskiy Zakaznik depends on Altyn Emel National Park
  - Karoiskiy Zakaznik depends on Ile-Alavsky National Park
  - Ohotzooprom is responsible for conservation of endangered species (Red Book) and enforcement of hunting regulations

- The regional Forest Divisions of Bakanas and Zheltoranga with a network of forest rangers controls enforcement of forest regulations

- Federal Fisheries inspection, ensures enforcement of fisheries legislation

- The Hunting and Forest Committee of the Ministry of Agriculture controls operations of the National Parks, Ohotzooprom and regional forest inspections.

The absence of a joint management plan under the responsibility of one agency impedes efficient law enforcement and management.

The forest authorities are responsible for wildlife monitoring, they provide population estimates to the Institute of Zoology; which verifies and publishes the information.

Karoiskiy and Pribalhashaskiy Zakazniks overlap partly with the Important Bird Area (IBA) “Ily-Delta”. IBAs are a network of protected areas developed by Birdlife International (BI) in more than 100 countries, to help protect habitats of globally threatened bird species. IBA’s are recommended by BI to governments for special conservation action for certain target species. Well trained volunteers from “Wildlife Conservation Clubs” and “Bird watching Clubs” undertake regular monitoring of the area. They cooperate with local conservation authorities, hunters and fishermen and assist in the preparation of management guidelines.
7. The Biology of the Caspian Tiger

7.1 Habitat Requirements

The tigers’ habitat requirements can be summarized as follows:

- Dense vegetation cover
- A sufficient prey base of large ungulates, at least 2 to 3 ungulates per sqkm (Bragin 1986)
- Access to fresh water

These conditions are provided by the Tugai ecosystem with reed beds and tall grass fields along rivers and wetlands (see above 3).

For more details on tiger habitat and biology in Central Asia, refer to Jungius et al. (2009).

III. Discussion

The tiger disappeared from the Ily Delta and the Balkhash region more than 60 years ago. The region used to be one of the species prime habitats in Central Asia. The latest confirmed records date back to 1948. The main reason for its extinction was hunting (even extermination as vermin during reclamation of new lands in 19th century), not habitat destruction as in other parts of its range, e.g. the Amu Darya Delta, where the tiger survived until 1972.

The Ily Balkhash region is under increasing pressure due to decreasing water supply, but it holds, despite of this with an area of about 500,000 ha, the largest fairly intact riparian forests, flood plains, reed beds and tall grass fields in the tiger’s former range. This provides an excellent habitat for wild boar, in some parts for roe deer and the Bukhara deer. The adjacent desert areas hold excellent habitats for Kulan, gazelle and Saiga. The Kulan is extinct in the region, plans for reintroduction into Saryesik-Atyrau have been prepared and are ready for implementation in 2011 (Baidavletov pers. com.) The area has a very low population density and no important industrial or other economically important projects. Some parts of the delta are used for livestock grazing. There is no agriculture in the delta and along the lake shore. All major irrigation projects are in the middle course of the river and closer to the foothills of the mountains and in the Chinese part of the watershed. Three large nature reserves cover more than 1 million ha (1,061,100 ha) of the delta and the lake shore, including an IBA which is under a special conservation regime.
IV. Conclusions

The review revealed that the tiger disappeared not long ago from Central Asia.

The Amu Darya Delta and the area around the former Aral Sea, and the South Pribalkhash-Ily River floodplain were prime habitats for the tiger until the middle 20th century. Tugai forests, different kind of wetlands, extensive grasslands and reed beds provided an excellent habitat and a rich prey base. The extinction of the tiger in this region happened about 40 years ago. The last confirmed record from South Pribalkhash-Ily River floodplain dates back to 1948 and to 1972 for the Amur Darya delta. Main reasons for the extinction were:

- Large scale habitat destruction for agriculture.
- Hunting; linked to agricultural developments, the military and professional hunters were ordered to clear the area of “vermin” for the colonists.
- Decline of prey species.
- Commercial hunting and poaching.

The research team investigated potential reintroduction sites in the former delta of the Amu Darya and in the South Pribalkhash-Ily River floodplain (Annex 2). The results of these investigations are as follows:

1. Tiger history: Both regions, in particular the Ily River Delta, with their rich Tugai forests, grasslands and reed beds, provided suitable habitats for the tiger.

2. The climate: In both regions similar.
   - The region of the Amu Darya Delta has become more severe with the disappearance of the Aral Sea, summers are dryer and hotter and winters colder.
   - The South Pribalkhash-Ily region climate is more continental and more extreme.

3. Status of habitat:
   - Amu Darya Region: Most of the former tiger habitat has been destroyed. The area is unpopulated; there is no livestock and no agriculture. At least 500,000 ha, or even more of unique wilderness areas remain, with great potential for restoring and preserving a vast system of wetlands, forests, steppe and desert habitats for a large variety of wildlife. There are no protected areas (PA), a planning process for PAs is under way.
   - South Pribalkhash-Ily River: About 500,000 ha of excellent tiger habitat are available. The area has a low human population density, and is used for livestock. Protected areas cover most of the potential habitats.
4. **Extinction:** Factors which lead to the extinction of the tiger are still prevailing in both regions.

   - Amu Darya Region: Habitat destruction, lack of regular and consistent supply of fresh water, poaching.
   - South Pribalkhash-Ily River: License hunting and poaching, decline and extinction of potential prey species. Threats of reduced water supply to the Ily system and Lake Balkhash, which might reduce the available habitat significantly.

5. **Other threats:**

   - Amu Darya: The most interesting area, Karabaily (Akpetki), has been licensed to a Chinese company for oil and gas exploration.
   - South Pribalkhash-Ily River: Regular fires accelerate habitat destruction. Further reduction of fresh water supply into the Ily Delta and Lake Balkhash would reduce available wildlife habitats and increase salinity along the coast line and in the delta and replace prime habitats by desert vegetation. There are concerns about another “Aral Sea Disaster”.

6. **Habitat requirements:** A viable tiger population of about 100 animals would require at least 500,000 ha of large tracts of contiguous habitat with rich prey populations.

   - Amu Darya: A large uninhabited wilderness area is available as potential habitat. Populations of prey species are low and effective protection is missing. The region is therefore unsuitable for the reintroduction, at least at this stage of developments.
   - South Pribalkhash-Ily River: Suitable habitat of up to 500,000 ha is available but prey populations are low or not existing. The area is used for livestock breeding. Illegal hunting is wide spread. It is therefore unsuitable for the reintroduction project at this stage.

V. **Recommendations**

1. The Amu Darya Delta and the surrounding areas of the former Aral Sea in particular the wilderness area of the Akpetki and Jiltyrbas Lake region, provide a great opportunity for restoring and preserving a vast system of wetlands, forest, steppe and desert habitats for a large variety of wildlife (Annex 17), including the tiger (Jungius et.al. 2009), provided that:

   - Sufficient fresh water is allowed to flow into the delta. This is not only important for the restoration of the vegetation, but for all wildlife, also in view of increasing extreme summer temperatures.
• Agriculture and livestock is not expanding into the area.
• Future oil and gas exploration and exploitation take ecological criteria into consideration and follow strict environmental guidelines.
• Protected areas status is given to the area.
• The protected area is well protected and managed by competent staff.

2. The South Pribalkhash-Ily River System provides excellent habitat conditions for the tiger and its prey, the main shortcomings are livestock raising, illegal hunting and the human population which is low, but spread throughout the region. Another shortcoming is the lack of sufficient prey and the long term threat of further reduction of water flow into the delta and the lake. However, the region provides, despite this, a great potential to establish one of Central Asia’s main wildlife conservation areas. The following steps would be required to have this realised:

• The remaining habitat is being conserved and restored (prevention of fire, distribution of water).
• Law enforcement in existing protected areas is being significantly upgraded; consideration should be given to upgrade all potential habitats to national park status.
• A common management plan is being established for all protected areas and implemented under the authority of one government agency.
• Existing ungulate populations are being restored (wild boar and roe deer).
• Extinct ungulates are being reintroduced (Bukhara deer, Kulan).
• Livestock numbers are not increasing and being decreased in key wildlife habitats.
• Comprehensive education and awareness programmes inform the population and mobilize their support for the project.
• A compensation programme for loss of livestock to predators should be introduced on the basis of WWF’s experience with large carnivores in Europe and Leopard in Turkmenistan.

3. Possibilities for returning the tiger to one of these regions should be re-examined when success or failure of restoration measures have been evaluated, such a process might take up to 10 years.

4. In view of the more favourable habitat conditions in the South-Balkhash-Ily-Delta, a first assessment of restoration and management measures could be undertaken after 3 to 4 years. If habitat and wildlife restoration measures are successful, or on a good way, consideration could be given to identify a suitable site for a tiger reintroduction centre in the delta, and construction of the necessary facilities. The first tigers might be brought to the centre while activities for habitat and wildlife restoration are ongoing.
5. WWF's Central Asia Programme should:
   a. Present these recommendations to the relevant authorities in Uzbekistan and Kazakhstan.
   b. Introduce this proposal to the International Tiger Summit in September 2010, to which representatives from Uzbekistan and Kazakhstan should be invited.
   c. Explore with WWF-International and WWF-China if the China Government would be interested in participating in a transboundary initiative to restore the tiger along the Ily River. This might have the advantage that problems on water management issues could be solved much quicker, and Siberian Tigers for reintroduction might be supplied from captive stocks in China. This would also allow China to respond positively to pressure from the international conservation community to reduce its captive stocks significantly.

V. Acknowledgements

Grateful acknowledgement is made to WWF-Netherlands for providing financial support for the study.
We thank the Academy of Science, Institute of Zoology, Republic of Uzbekistan for preparing the survey to the Amu Darya region, making available equipment and arranging meetings with representatives from Government at national and regional level, scientist and conservationists.
We are equally grateful to the Institute of Zoology, Republic of Kazakhstan for arranging the surveys to the South Balkhash area and to Dr. R. Baidavletov for making all arrangements for the field work and for preparing the maps on the Ily Delta. Particular thanks go to the Director of Ohotzooprom for enabling the helicopter survey of the Ily Delta.
We appreciate the support from Dr. Igor Chestin and Dr. Olga Pereladova for having initiated the study. Specific thanks are given to Dr. Pereladova for supplying important information, reviewing the report and providing translations of the Russian language reports and literature.
VI. References


Wlangali 1853. Reise nach der östlichen Kirgisen-Steppe. Mountain Magazine 4-7


UNEP, 2004. Sustainable resource use Lake Balkhash
VIII: Annexes

Annex 1: Former distribution of the Tiger in Central Asia
Annex 2: Field survey Ily Delta
Annex 3: Tugay and riverine habitats destroyed by fire

Annex 4: Lake Balkhash, reed beds along the southern shore
Annex 5: Transition zone between Taukum Desert and Ily Delta with poplar forest

Annex 6: Saryesik-Atyrau Desert
Annex 7: Transitional habitat between the delta and the Saryesik-Atyrau Desert

Annex 8: Habitat of wild boar (tracks) at the edge of the delta and the Saryesik-Atyrau Desert
Annex 9: Ily Delta with tugay, dunes and reed beds

Annex 10: Ily Delta with ponds, reed beds and dunes
Annex 11: Ily Delta wetlands with reed beds

Annex 12: Open Tugay forest with poplar
Annex 13: Potential Tiger habitats in the South Balkhash-Ily-Delta
Annex 14: Lake Balkhas and Ily-Delta; scenarios based on declining water supply

Szenario B2
Zufluß 13,0 km³
Ili 10,0 km³
Östliche Flüsse 3,0 km³
Seespiegel 340,5 m
Wasserfläche 15,280 km²
Volumen 79,6 km³

Szenario B5
Zufluß 10,0 km³
Ili 9,2 km³
Östliche Flüsse 0,8 km³
Seespiegel
Westteil 340,0 m
Ostteil 334,2 m
Wasserfläche 11,730 km²
Volumen 45,7 km³

Quelle: Ž. D. Dostaj 2006, S.76
Annex 15: Protected Areas in the South-Balkhash-Ily river region
Annex 16: Livestock in the Delta, wetlands, reed beds and some tugay

Annex 17: Amu Darya Delta, potential sites for habitat and wildlife restoration

The bright-green line marks areas covered by tugai and reed beds, the most suitable site for habitat and wildlife restoration.