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An assessment of the traffic disturbance to Tibetan Antelopes in Hoh-Xil National Nature Reserve

(Progress Report)

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INTRODUCTION

The Tibetan antelope (*Pantholops hodgsonii*), otherwise known as chiru is one of the world's most endangered species. They are virtually exclusive to the Tibetan Plateau, though they occasionally wander into India's Ladakh region (Wu & Feng, 1996, Schaller et al, 1998). The Tibetan Antelope is listed as Endangered animal by the World Conservation Union (IUCN) （EN 2d ver.3.1, 2001）and have been listed on Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) since 1979. The People's Republic of China gives them the highest level of legal protection under its Wildlife Protection Law (State Forestry Administration of China, 1998), prohibiting chiru hunting and trade in chiru parts without government permission.

The habitat of Tibetan Antelopes lies above 4,000 meters in elevation, but in parts of Xinjiang they formerly occured as low as 3,250 m. They prefer flat to rolling topography and alpine steppe or similar semiarid plant associations. The current range of Tibetan Antelopes can be divided into two large areas: A northern part of about 490,000 km2 and a central part of about 115,000 km2. The distribution was probably continuous previously and but is now fragmented (Schaller 1998).

There are no accurate estimates of Tibetan antelope numbers from the past (Schaller, 1998), although a few early explorers had made some occasional observations (Bonvalot, 1892; Wellby, 1898; Deasy, 1901 and Hedin, 1903, 1922). In 1900, the historical population of Tibetan Antelopes may have been a robust 1 million , estimates by Schaller based on the limited information available.(Schaller, 1998). Despite legal protection and trade bans, the burgeoning Western market for shahtoosh caused a dramatic increase in chiru poaching in the late 1980s and early 1990s—Schaller estimates in *Wildlife of the Tibetan Steppe* (1998) that "tens of thousands of animals must have been killed" to supply the trade during that time. In a report issued in December 1998, China's State Forestry Administration (SFA) cited Schaller's estimate that fewer than 75,000 chiru remained in the wild in 1995, which represents a population decline of greater than 85 percent.

Seasonal migration is one of the main characteristics of Tibetan Antelope ecology and reproduction. Each summer, female adults and their female offspring of last year will move about 300 kilometers between their winter mating grounds and summer calving grounds, while males tend to remain near their wintering grounds. In late June to July single calves are born . The grasslands surrounding *Zhuonai* and *Taiyang* lakes have been identified as major calving grounds of Tibetan antelopes, located in the northwest of Hoh-xil National Nature Reserve (Feng, 1991b), where the climate is moderate, and the water and grass are abundant. Schaller reported that there were at least four and possibly more major migratory populations on the Tibetan plateau (Schaller, 1998). Hoh Xil is one of the most important calving grounds

of the four populations mentioned above. Females of the subpopulation studied here migrates from Sanjiangyuan to Hoh Xil each summer, then return each fall.

Recent study on genetic variation among current population of chiru (Ruan, 2005) suggested high degrees of gene flow among all the sampled populations based on mitochondrial DNA control region sequences analysis. It was inferred that though the winter range of different population are seperated, but the populations do have gene exchanges through their calving ground, the migration of chiru may paly a significant role in the course of gene exchange.So the protection of migration route is quite important.

Among all migration populations of Tibetan Antelopes, the one we studied was the most seriously affected by human activities.Until recent years, this population and their migration route was affected by poachers, but the population now is one of the best protected in China. The newly built Qinghai-Tibet Railway parallels the existing Gumold-Lasha highway, and both cut across the study population's migration corridor on the boundary between Hoh Xil Nature Reserve and Sanjiangyuan Nature Reserve (Xia and Yang 2004a,b,c), about 130-150 kilometers from the calving ground. In order to ensure the Tibetan Antelopes and other species pass through the railway smoothly, 15 passages were designed in the reserve, but no corridors have been built across the highway (Yang and Xia, 2003). "passageways" -- trestle bridges, mostly -- have been incorporated into the railway's design at key points along the route where the antelopes are believed to cross during their seasonal migration to grazing grounds. At these locations, the antelopes could theoretically use underpasses to traverse the rail route without risking crossing over the tracks. But wildlife experts doubt that the antelope will actually use the underpasses, since their instincts may instead prompt them to climb up to the high ground of the rail bed and have a wary look around before proceeding. From 2004 a monitoring project was started to evaluate the efficiency of wildlife passages in migration season of Tibetan Antelopes. During the past two years we recorded the passes of chirus through their main migration corridors , covered about ten kilomiters from Chumaer River to Wudaoliang. Monitor the impacts of transportation infrastructure on this migratory herd of Tibetan Antelope and mitigating those impacts is extremely important.

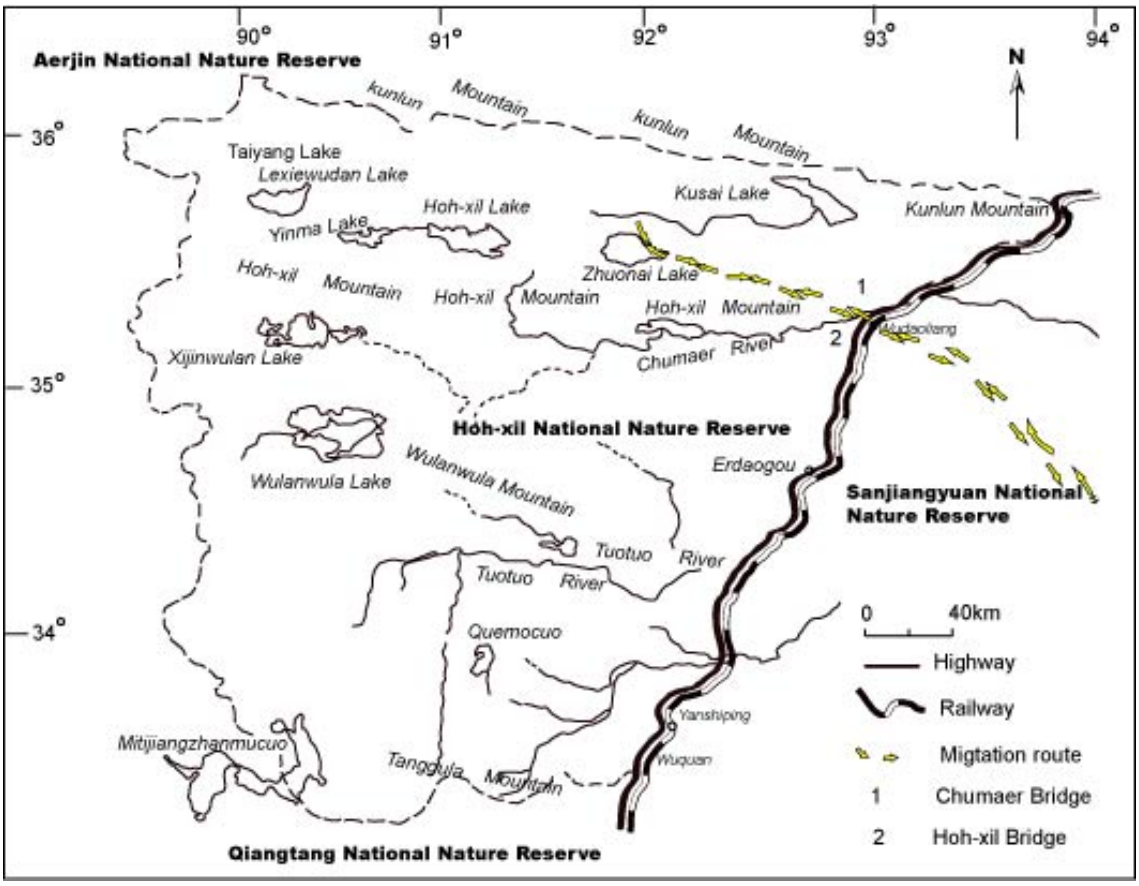

Fig 1. Hoh-xil National Nature Reserve, indicating the location of the study areas and the working sites

STUDY AREA

The Hoh-Xil National Nature Reserve is located in the territory of Qinghai Province; the altitude is on average 4,500 meters above sea level (Liu & Yin, 1993) . The topography is rolling hills and shallow gullies, habitat is high altitude steppe, alpine meadow and gravel-filled gullies, entirely without trees or shrubs.

Fieldwork was conducted from Chumaer Bridge to Wudaoliang, along the newly built Qinghai-Tibet Railway and the parallel highway on the boundary of Hoh-xil Reserve and the adjacent Sanjiangyuan Reserve. The monitoring area covered a ten kilometer stretch of concentrated migration, including *Chubei* Overpass corridor, *Chumaer* Underpass Passage (*Chumaer* Bridge), *Hoh-xil* Wildlife Passage (*Hoh-xil Bridge*) and some other crossing structures not specifically designed for wildlife (Figure 1).

Crossing structures

Chumaer Bridge – Main wildlife corridors in this area, used to be the main migration corridor. The main structure was finished in 2003 and put into use in 2004. The distance between highway and railway is about 800 meters. The surface of land under the bridge was destroyed by construction machinary, and was not restored Though the construction was halted, the workers were not removed from the working sites.

Chubei Passage -This overpass passage is about 2 km southwest of Chumaer Bridge, near Chumaer River, and the situation is similar to Chumaer Bridge. Unfinished construction and human activities are main impact factors.

Hoh-xil Bridge – An underpass bridge, which has become the main corridor for Tibetan Antelopes. The main construction completed in June 2004. Most of the workers were removed from the working sites, together with most of the machines, but still some machinery and debris left under the bridge. There is an open area between the highway and the railway.

Wudaoliang Railroad Bridge - North of Wubei Corridor. Although it was not designed for Tibetan Antelopes passage, but may be one corridor for migration. The structure is similar to Wubei Bridge and a bit far from the highway, with a large open area near the passage. Now the main construction sites located near the bridge, and part of the structure was still being built during this study.

Other small bridges and culverts – Most of these structure are about 1-2m in height, and 5-10m long. They are dark, narrow corridors, and the land surface under the bridge is not cleared of debris or restored.

METHODS

1) TRAINING (2 days)

Before the field survey starts, we conducted a training workshop in field monitoring techniques for the staff of the reserve and local residents involved in our project.

2) FIELD SURVEY (June- September,2005):

From early June to late August monitored 10 kilometres along the railway and highway, including two wildlife passages. We recorded the movement pattern of the migrating population along the rail line and highway, their population size, population structure and behavior when they pass through. We also recorded the traffic flow and disturbance by tourists, which will help to assess the impact of the infrastrure itself and of other human activites.

Two methods will be used.

Video Cameras**:** Using video cameras to record the passage of the chirus. It also could help to observe behaviours that may indicate hesitancy or stress in animals using the crossings.

Counters : We also counted the number of chirus which pass through the crossing structures and those acrossed the railway not using the passages. In some situation such as rainy or cloudy, the video camera could not work or keep on working continuously; we have to count the number of chirus by telescopes.

Dynamic monitoring: Driving vehicles along the rail line to inspect the whole research area.

Our fixed working site near Hoh-xil passage

PROGRESS

Some Monitoring results

From May 31st to July 30th, 1509 chiru individuals passes were detected at *Wubei Bridge* (*Hoh-xil Passage*, which is an under bridge corridor), chirus moved from *Sanjiangyuan* Reserve into HXNR to give birth, including females and sub-adult females and 8 new-born babies. In return migration till our fieldwork finished, 2182 individuals were recorded to crossed the Qihinghai-Tibet highway, 1977 passed were detected at Wubei Bridge.Among them 98% used wildlife corridors, only 2% over passed the railbed. The efficiency of wildlife passages increased thean past two years.

Table 1. Summary of chiru passes at Wubei Passage in Westward migration (2004-2005)

Date		5.31	6.13	6.20	6.21	6.22	6.23	6.24	6.25	6.26	6.27	6.28	6.29	6.30	7.1	7.2	Total
Number of	2004	0	0	0	400	0	697	0	121	175	0	0	0	0	80	187	1660
individuals	2005	134	183	310	151	18	339	77	0	38	72	0	54	133	0	0	1509

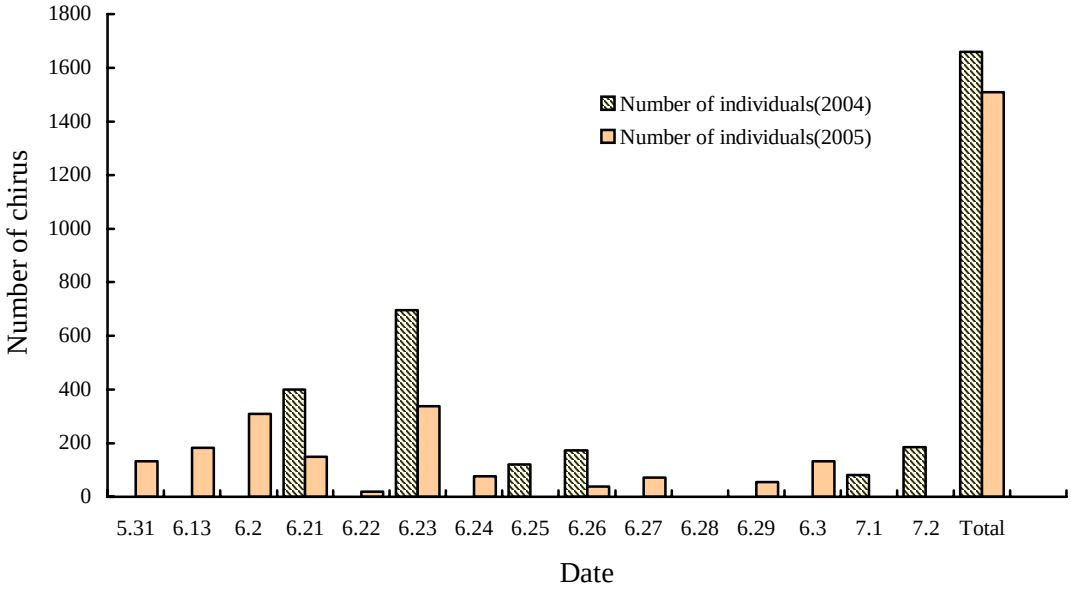

Fig 2. Summary of chirus passages at Hol-Xil Passage in Westward migration(2004-2005)

Table 2 . Summary of chiru passes in return migration at Qinghai-Tibet highway (2004-2005)

Date		8.3	8.7	8.8	8.9	8.10	8.11	8.12	8.13	8.14	8.15	8.16	8.17	8.18	8.19	8.20	8.21	8.22	8.23	8.25	Other	Total
Number	2004	0	0	48	9	36	0	121	633	54	272	298	274	143							415	2303
of Indiv.	2005	100	31	0	525	0	250	87	0	0	34	174	132	0	0	6	320	250	247	26	133	2315

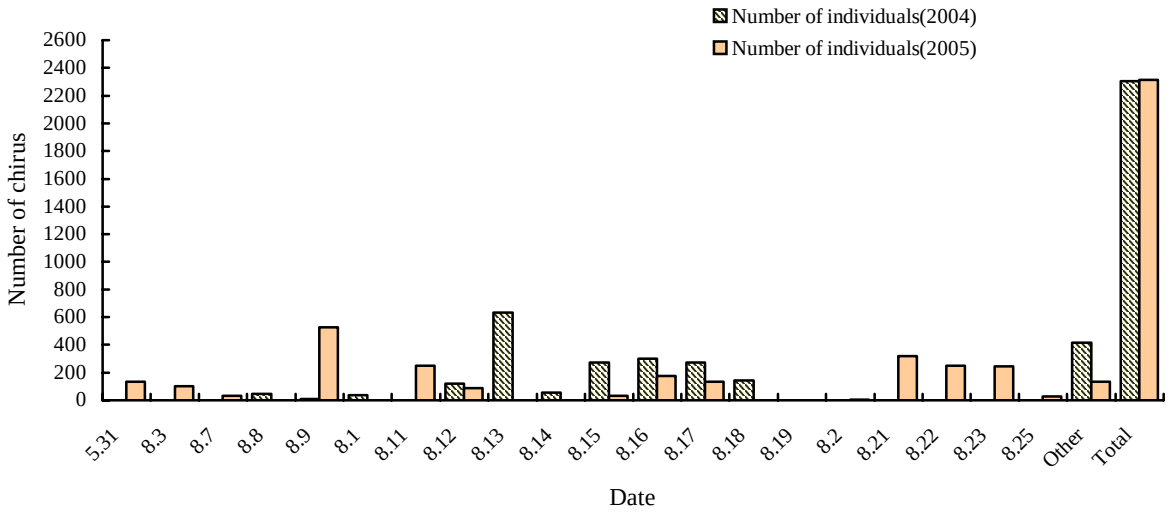

Fig3 . Summary of chiru passes in return migration at Qinghai-Tibet highway (2004-2005)

Table3. Summary of chiru passes in return migration at railway and highway, 2005

Date		8.3	8.7	8.8	8.9	8.10	8.11	8.12	8.13	8.14	8.15	8.16	8.17	8.18	8.19	8.20	8.21	8.22	8.23	8.25	8.27	Total
Number of individuals	Highway	100	31	0	525	0	250	87	0	0	34	174	132	0	0	6	320	250	247	26		2182
	Railway	100	0	0	499	0	250	50	0	0	31	83	173	0	0	6	208	127	290	10	150	1977

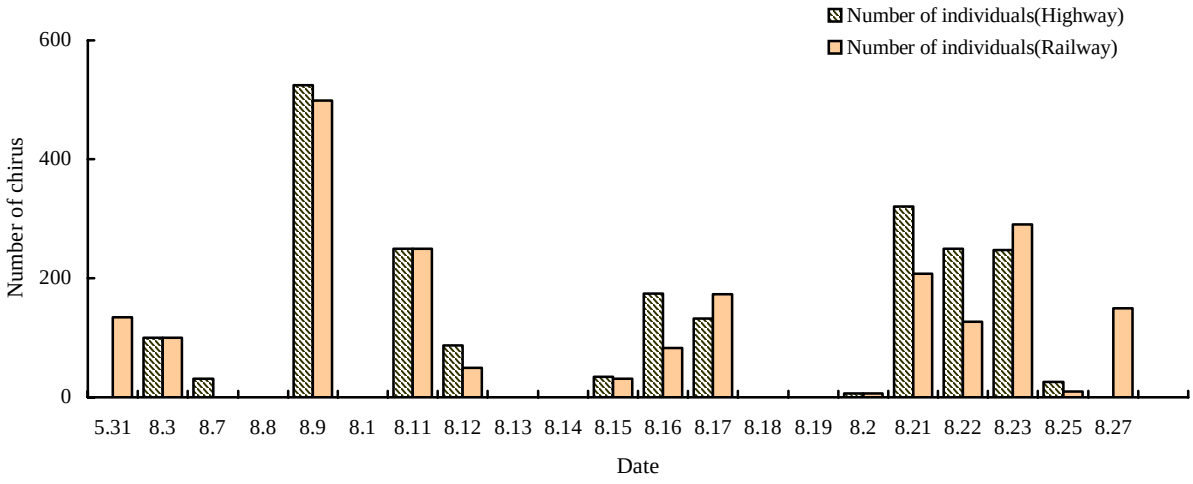

Fig4. Summary of chiru passes in return migration at railway and highway, 2005

(More data will be submitted in final Report).

PHOTO

Chirus in migration:

Across the highway:

Chiru passes at Wubei wildlife corridor

Our dream- a "second nature"-

Improving transportation without putting nature second

I found this word in an surface transportation policy project, I really love this. It means:

" The development of our modern society has caused immense destruction to the natural environment native to our earth ('first nature'). However, we can establish a new world -- a 'second nature', where humans and animals can live in harmony. We can achieve this through a series of effective measures, including setting up wildlife passages."

Rufford help us to enhance the development of this undertaking. It is really a valuable and exciting opportunityfor us!