The relationship between distribution and protection of plants and animals with land and water management on two wetlands of Mongolian Plateau

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Preface:

I did my final thesis on two wetlands from February to July, 2011 in southeast of Mongolia plateau, China. I tried and found the relationship between distribution and protection (DAP) of plants and animals (PAA) with the land and water management (LWM) on wetlands. I wanted to strength the application level of the knowledge that I learned during Bachelor program in practical field, also improved the known and understanding of certain field topics related to my major (such as Wetland Ecology, Conservation biology, and Management by Politics).

The entry point of my thesis report was DAP of PAA and LWM. The basic data I collected from different places. Then I did deep and detailed analysis to answer my research questions and I got the final conclusion. The key was showing my research results and final opinion comprehensively, intuitively and precisely.

My thesis report was based on showing the internal relationship between PAA and LWM by using data precisely and effectively. Give rich argument and clear research way to readers who interested and working in the related fields.

In the end, thanks to Mr. Hans ven den Dool who was my internal tutor for his guide to my plan of approach and the suggestion and affirmation to my thesis process from different aspects. Also thanks to my program tutor Mr. Zhang Yan for his strong support to my data collection, field study and the investigation to related people.

Hope readers enjoyed reading my report and give me valuable criticism and correction at the same time.

Wang Hao

24th May, 2011

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Summary:

The research objects were the plants, animals, land and water on two wetlands in the southeast of Mongolian Plateau. With the observation method, investigate method, interdisciplinary method and data analysis method, the exploration and research were done to answer the research questions from different angles. The research was effectively supported by using measurement tools and equipment (such as telescope) and made the final conclusion clearly, principled and clarity. In this report, the background of this project, the problem analysis, research questions and what kind of methodology was used would be explained first. Then the situation of DAP of PAA and current LWM, main problems of DAP of PAA and current LWM, overview of common LWM plan and advises for future LWM would be introduced particularly, and also the relationship between DAP of PAA and LWM. After there was a clear understanding more or less of the relationship between DAP of PAA and LWM on two wetlands in the southeast of Mongolian Plateau in the conclusion. Two chosen places named H zone and B zone would be taken as the specific examples to do the analysis. During the analyzing progress, a lot of data were collected and all the data was used as a standard to judge if the relationship was clear, precise or not. And if still some problems were founded existing in the LWM plan, the corresponding recommendations and suggestions would be given. In the end of the report, there would be some appendix added to show detail information.

Key words:

Mongolian plateau, Lake Wetland, Distribution and Protection (DAP), Plant Resources, Animal Resources, Land and Water Management

1. Introduction:

-My Bachelor graduate thesis was aimed at to find the relationship between land and water management with the distribution and protection of plants and animals on two wetlands in southeast of Mongolian Plateau, which to give recommendations to improved the future LWM plan.

Wetland was the eco-system that formed by land and water, it had special hydrology, soil and biological characteristics. Wetlands, forest and ocean were three main eco-systems, and wetland was the eco-system with highest value all over the world. Wetland had strong relationship with living, multiply and development of human beings; it had very important functions about ecology and social service. Wetland had irreplaceable function in the field of flood and drought prevention, slowing runoff, conserving and purifying water, regulating climate, beautify the environment, maintenanced of biological diversity and regional ecological balance. Wetland was hailed as "lung of the earth", "species pool ", "bird paradise ", "climate regulator" and "source of carbon sinks". Many wetlands had unique natural environment and had beautiful landscape where was the ideal place to tourism and vacation (Fu, X., 2009)

According to national wide survey, the wetlands in Inner Mongolia autonomous region, China, and also the southeast part of Mongolian Plateau can be divided four types: river wetland, lake wetland, swamp wetland and artificial wetland. They were including 13 types: permanent rivers, seasonal or intermittent rivers, floodplains, permanent freshwater lake, seasonal of freshwater lakes, permanent lagoons, seasonal lagoons, moss swamps, marshes, shrub swamps, swamp forests, salt marshes and artificial wetlands (reservoirs and ponds) (Wetland center, C., 2009). The total area of wetlands was 424.50 × 104 hectares, ranked third behind Tibet and Heilongjiang province in China and occupyed 11.03% of the total area of wetlands in China. The authority study data from UNEP indicated that one hectare of wetland eco-system could create 14 thousand dollars economic value per year, it was more than 7 times to the tropical rain forest and more than 160 times to farmland ecosystem. On this basis, the wetland ecosystem could produce $ 59,430,000,000 economic property per year in Inner Mongolia autonomous (Yifan, B., 2007).

In recent years, with the population growth and rapid economy development, wetland resources in Inner Mongolia were faced with reclaiming land from lakes, swamp reclamation, pollution, water throttling, grassland degradation, human disturbance like predatory development. And with funding shortage, wetland management system was not perfect, all of these resulting shrinking wetlands, reduced biodiversity, ecosystem services declined, environmental degradation, and many other problems were harmful to sustainable development of wetlands.

Nowadays, the distribution and protection (DAP) of plants and animals (PAA) on wetland was a hot topic all over the world. At the same time, the land and water management (LWM) had a strong influence to the DAP and PAA. And the DAP of

PAA was also an important element that could decided the final land and water management plan on wetland because plants and animals were the important quality indicators of the wetland. And the relationship among land, water, plants and animals was becoming more and more complex and standing out in the modern age and the importance of wetland protection was increasing rapidly. So I chose Hesegenaoer nature protect zone (H zone) and Baiyinkulun nature protect zone (B zone) in southeast of Mongolian Plateau, China as my thesis places. And the research aimed at find the relationship between land and water management with the distribution and protection of plants and animals.

Problem Analysis:

In recent years, the environmental protection was focused by the national government and international organizations. And the wetland--'lung of earth' was necessary to be protected strongly in the age of serious pollution, increasing number of people and economy developing rapidly because the wetland contained numerous valuable plants and animals. The effective protection to the plants and animals on wetland was based on the good land and water management because the land and water on the wetland was the big home to the protect animals and valuable plants.

The two wetlands in southeast of Mongolian plateau were both developed for almost 10 years. Its original protect plan was lying above land and water management plan since the government decided to protect two wetlands. And an essential part of land and water management plan was based on the distribution of plants and animals and other elements like weather, soil characters, terrain and human activities.

Research questions

Main research question:

What was the relationship between land and water management and the distribution and protection of plants and animals on two wetlands in the southeast of Mongolia Plateau?

Sub-questions:

1: What was the land and water management plan for the two wetlands?
2: What was the situation of the distribution and protection of plants and animals on two wetlands?
3: How did distribution and protection of plants and animals influence the land and water management on two wetlands?
4: How did land and water management influence the distribution and protection of plants and animals on the two wetlands?

Methodology

Desk study:

Literature study

In order to provid theoretical basis for data analysis later on, I collected big amount of literature and materials. Like I borrowed the documents from Xilinhot Forestry Bureau and went to some universities where located in Hohhot to rich my answers to research questions.

Interview on the Internet

When I was in Netherlands from 1th February to 6th April, I had a lot of interviews with my program tutor to discuss the topics about the plan of approach, research questions and what I should do when I do the field study. On the other hand, I asked a lot about the wetland and I built an outline for my thesis from the communication with Mr. Zhang on the Internet.

Analysis method

I used analysis method for data analysis like compare method, calculation method, conclude method and so on. Through analysis the original data that I collected not only to answered my research questions but also got new idea to rich the answers.

Interdisciplinary method

The thesis topic related to plant, animal, land and water. So I must know the relationship among plant, animal, land and water management. I should know something about plant sciences, animal characteristics, land planning and hydrology. The thesis research was an interdisciplinary research and the research method should be interdisciplinary too.

Field study:

Observation

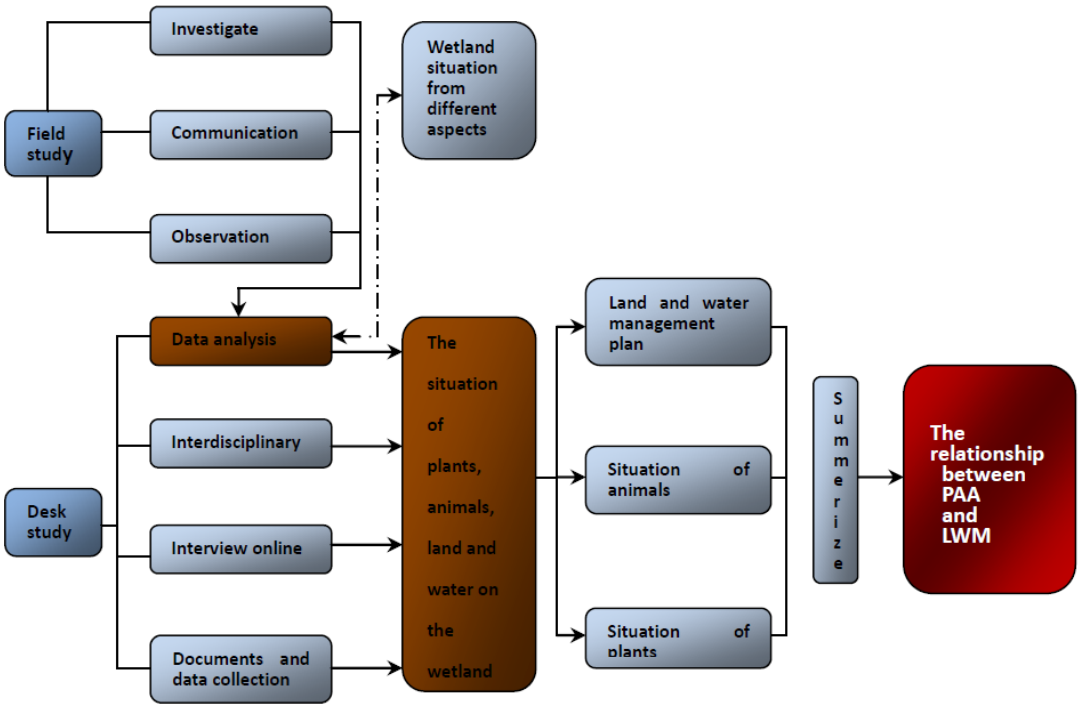
I got the first impression about situation of plants and animals and got the idea about land and water management on two wetlands through using observation method. The observation method including common observation, observation by telescope and supervision in computer room and so on. Through observation, I knew everything about wetlands. It was a long time and useful job that help me to find answers to research questions.

Interview with stakeholders

During the field study, interviews with local stakeholders were very important to help me to know the situation of wetland in passed time. And their ideas were also the direct evidence to help me to support my ideas about wetlands. I can get new ideas and way of thinking from the communication and discussion. The interviews could make my observation and research more effective.

Investigation method

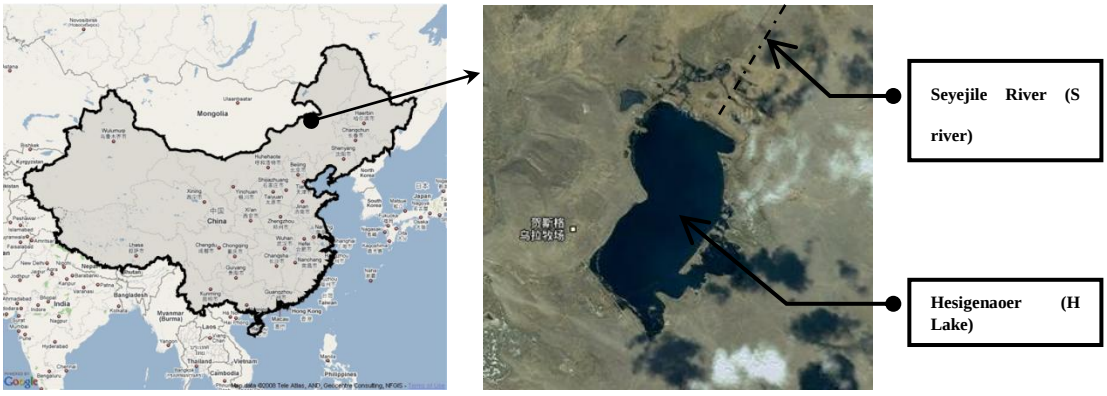
The investigation method like questionnaire survey could also make my interviews in a right way and the communication deeper. It was a good way to support discussion and improve my known level of two wetlands. On the other hand, I can get strong evidence to the answers to my research questions.



2. DAP situation of PAA and current LWM

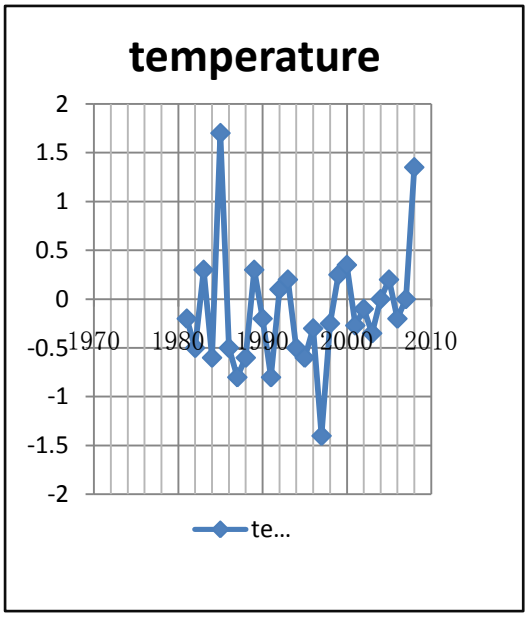
2.1. Introduction of H zone

H zone located in the southeast of Mongolian Plateau, China. The geographical coordinates were E: 119° 01′ --119° 20′ , N：46° 11′ --46° 26′ , the total area was 47200 hectares (see picture 2-1-1).



(Picture 2-1-1)

Totally, H zone belonged to north temperate semi-humid, semi-arid continental climate zone. The characteristics were: long and cold winter; short and cool summer; the temperature increased sharply in spring; it was dry and windy here; temperature decreased rapidly in autumn and winter; and frost always came early. The annual average temperature in this area was –0.9℃ (see graph 2-1-2); extreme minimum temperature was -40.7 ℃; extreme maximum temperature was 38.5 ℃ (see graph 2-1-3); average annual rainfall was 342 mm and mainly concentrated in the June, July and August. The days of precipitation were 66.4 days every year, and including 40.8 days (see graph 2-1-4) from May to September. Temperature difference was high between day and night, the annual average evaporation was 1552mm. The frost-free period was 85—125 days, the annual change was large. Dominant wind direction was northwest wind throughout the year; the annual average wind speed was 3.8-4.4m / s and the speed always highest in May (Bureau, X. F., 2010).



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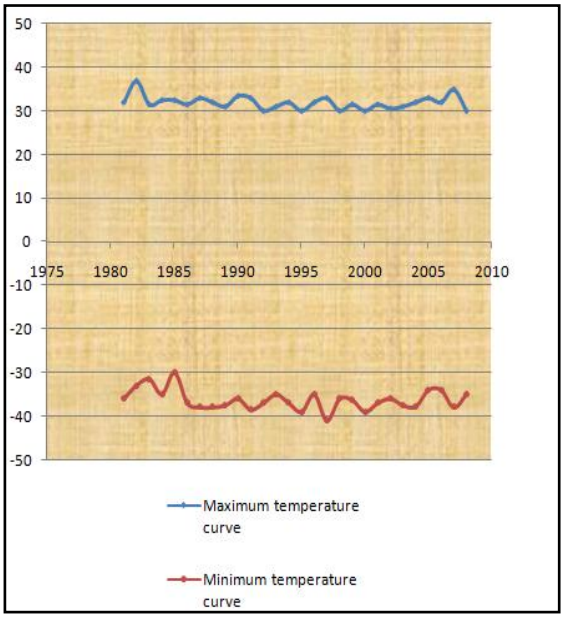

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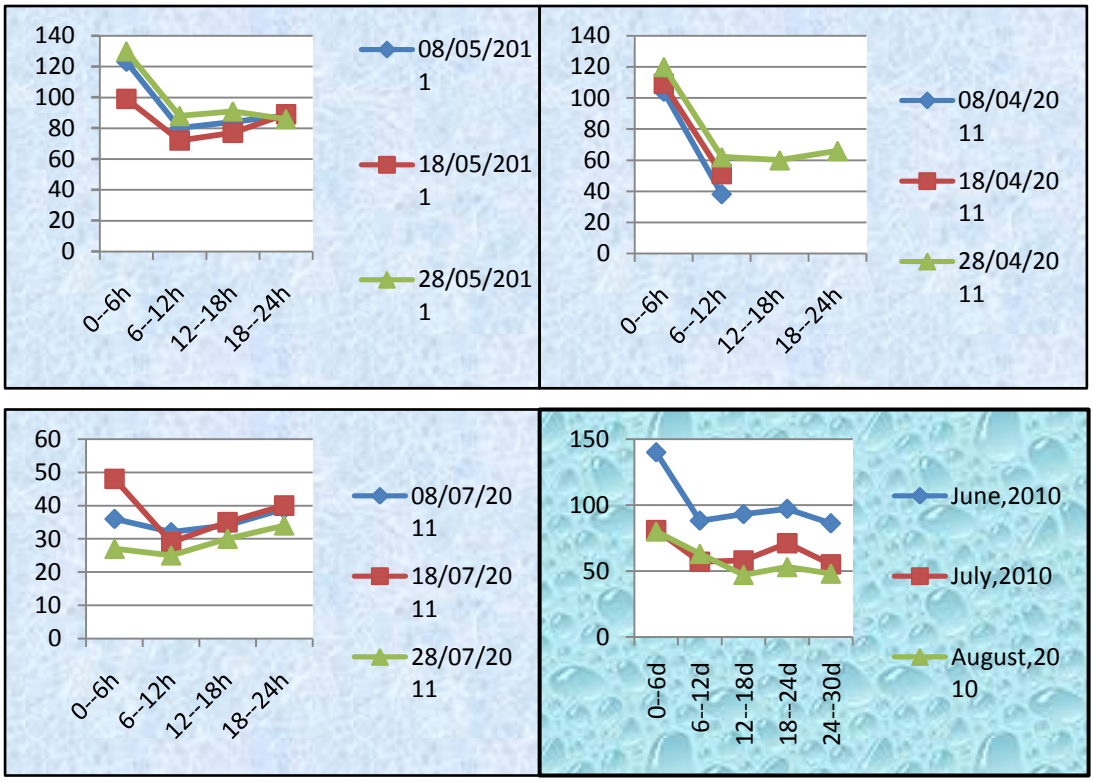

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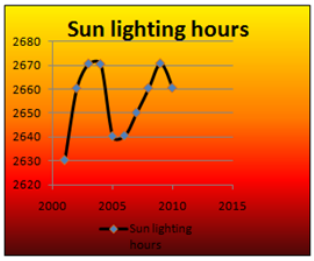
The sunshine hours were long in H zone, the year's average time was 2659.8 hours, and the percentage of sunshine was 61% which was one area have the largest sunshine in China (Bureau, X. F., 2010). Sunshine hours were very different every month, the highest in May, an average was 273.2 hours over the years; the shortest in November, an average was 171.5 hours over the years (Bureau, X. F., 2010). It was the growing season to vegetation when the sunshine hours were long and light condition was favorable.



2-1-5

Seyejile River (S river) flew from north to south in H zone, the length was 98km (Bureau, X. F., 2010). S river raised from the mountain area where in the northeast of H zone, the river was 4—5 meters wide. There were 84 lakes in H zone, the total area was about 886 hectares, among them, the Hesegenaoer Lake (H Lake) was the biggest one, and the water area was about 400 hectares. Lakes had year-round flow, the normal annual average water depth was 2.5 meters, and water quality was excellent. Good natural environment was a breeding ground and habitat for a variety of waterfowls on wetlands.

H zone was located in the transition area where chernozem soil to chestnut soil (Bureau, X. F., 2010). The soil formation was mainly affected by biological and climate conditions, also affected by region, topography and geochemical conditions at the same time. There were so many soil types in H zone, the soil thickness was different with terrain changes (Bureau, X. F., 2010).

H zone include zonal soil and some non-zonal soil, the zonal soil were chernozem soil and chestnut soil, non-zonal soils were meadow soil, swamp soil and sandy soil (Bureau, X. F., 2010). There were still some saline soil and rocky soil in some area. Most of them were distributed compositely and interlaced (Bureau, X. F., 2010).

Soil Type	subclasses	Soil Names	Characteristics and distribution
Chernozem	Chernozem	Coarse osseous chernozem soil	Black and deep humus layer, the thick of layer was generally 60cm. It's the water stable aggregate - granular structure and belonged to light loam; there had non-carbonate reaction on full-profile area; the PH value was 5.5—6.2; P and K was the high content in the soil, and distributed in the valley plains of H zone.
		Sandy - sandy loam parent material chernozem	
		Sandy loess parent material chernozem	
		Loess parent material chernozem	
		Residual of acidic volcanic rocks - slope sediments chernozem	
	Carbonate Chernozem	carbonate chernozem with sandy loam parent material	Dark and grey humus layer, the thickness was about 50 cm, most were aggregate, agglomerate structure and worse than the chernozem. The ratio of carbon to nitrogen was between 9—14; the calcium layer was under 60—70cm, carbonate calcium distribution in powder and form into a layer; carbon reaction gradually from the bottom to up strongly; distributed on sloping hills.
		carbonate chernozem with sandy loess parent material	
		carbonate chernozem with loess parent material	
		carbonate chernozem with residual acidic volcanic rocks of slope sediments	
		carbonate chernozem with proluvial—flooding parent material	
	Leaching Black Calcareous clay	leached chernozem with sandy loam parent material	Pale color of humus, it was dark grey and dark chestnut brown gray, the thickness was about 50cm. The organic matter contained by surface was 3—5%; total nitrogen content was 0.3—0.4%; PH value was between 9.5 to 11.0; the carbonate calcium was under 40—50cm of sediments; the whole section had neutral or weak alkaline reaction; parent materials were loess or sandy loess, mainly distributed in chernozem zone and low sloping hills on the west.
		leached chernozem with yellow sand to form - parent material	
		Residual acidic volcanic rocks - chernozem of slope sediments leached parent material	
		proluvial—the chernozem of flooding material with leached parent material	
	Black Meadow Calcareous clay	meadow chernozem with sand - loam parent material	The color of humus layer was grey or dark brown, the content was rich, the organic matter of surface was 5.5—7.0%; the carbonate reaction was increasing from up to down; the soil structure was granular or granular structure; it was a light loam and mainly distributed some dune valleys and hills.
		meadow chernozem with sandy loess parent material	
		meadow chernozem with loess parent material	
		meadow chernozem with Alluvial - alluvial parent material	
chestnut soil	Dark Chestnut Calcium Soil	Light dark calcium chestnut soil	Mainly distributed in valleys and low hill in the southeast of H zone. The color of humus was dark maroon or dark brown; the soil structure was loose granular structure; the valley surface was 30—40cm deep; the thick of slow sloping was about 20cm; the whole section had carbonate calcium reaction; the PH value was 6.5—7.5; the texture structure was loam and granular structure.
		Dark calcium chestnut soil	
		Deep dark chestnut calcium soil	
		dark chestnut soil with sandy loam parent material	
		Coarse osseous dark soil	
	Dark meadow Chestnut soil	meadow dark chestnut soil with flooding parent material	Mainly distributed in the flat area of chestnut zone, the humus layer was brown or gray brown, the thickness was above 50cm, typically granular or no structure. The whole section had carbonate calcium reaction, increasing from up to down; the calcium layer was in the middle; the whole section have alkali or alkaline reaction; the PH value was above 8.5—9.0 with saline or alkaline properties.
		meadow dark chestnut soil with alluvial parent material	
		meadow dark chestnut soil with slide rock of parent material	
		meadow dark chestnut soil with sandy loam parent material	

Soil zone	Soil Type	subclass	Soil Names	Characteristics
Chernozem Zone	meadow soil	Dark Meadow soil	dark meadow soil with sandy loam parent material	Humus layer was thick and generally above 50cm; the grass was densely on surface layer and it's about 10cm deep; the humus layer was black, dark grey and light grey; the soil structure was granular and pellet structure; The latent layer was under humus layer, it's grey or brown, the organic matter content was above 5%, and the PH value was between 3 to 7.
			dark meadow soil with loamy parent material	
			dark meadow soil with clayey parent material	
		Salinization Dark Meadow soil	dark meadow soil with alluvial salinization parent material	
			dark meadow soil with parent material of proluvial salinization	
Chestnut soil zone		Gray Meadow soil	Grey meadow soil with saline alluvial parent material	The humus layer was usually 20—40cm deep, light soil color and mainly was grey; it was crushed or block structure; multiple roots; gley was under humus layer and the color of soil was become light significantly; the organic matter content was between 2 to 4%; PH value was between 8.5 to 10 and high content of soluble salts and most is saline.
			Grey meadow soil with saline proluvial parent material	
		Salinization Meadow soil	Saline meadow soil with clayey parent material	
			Loamy meadow soil with saline parent material	
			Sandy meadow soil with saline parent material	
		White-gray slurry meadow soil	white gray slurry meadow soil with alluvial parent material	
			white gray slurry meadow soil with proluvial parent material	



The main part of H zone was the protection of wetland ecosystem and combined other kinds of protect functions. Wetlands and grasslands formed a staggered distribution and beautiful natural landscape. It was a pure land that well-preserved in Mongolian Plateau. H zone had protected birds in national primary level (the protect standard in the law of <List of National Key Protected Wild Animals> that promulgated by China government in 1992) like Red-crowned Crane *(Grus japonensis)* and Great Bustard *(Otis tarda)*; national secondary protected birds like Big Swan *(Cygnus cygnus)*, Crane *(Grus grus)* and so on. The reed marshes provided a hiding place and abundant food for Red-crowned Crane. The Red-crowned Crane migrated from south of China to H zone for their nesting and breeding every spring, and H zone became one of the main breeding places for Red-crowned Crane all over the world. There was a variety of wildlife in H zone, 17 species of plants and animals were belonging to national primary and secondary level. The Filitolium sibiricum steppe, Stipa baicalensis meadow steppe were belong to vegetation types of meadow steppe zone. There were various types of grassland plants constituted a gorgeous and varied landscape. The valuable plant and animal resources played a very important role for ensure species breeding, maintain ecological balance and biodiversity. H zone was the area had a typical eco-system that belonged to semi-humid, semi-arid continental climate zone. Though the eco-environment was good in H zone now, the eco-environment was deteriorating seriously with special geographical location and human activities. So, built natural protect zone was an effective and fundamental method to protected biodiversity, maintained ecological balance on wetlands. Through developing, H zone

could develop tourism based on beautiful landscape. Therefore, the built of H zone had great realistic significance and long historic significance to maintain ecosystem balance, develop scientific research of wetland, protect grassland and other natural resources, and the sustainable developing for using of wetland and grassland resource.

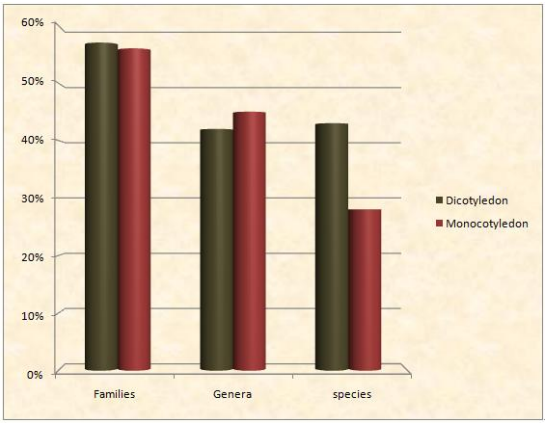
2.2. Plant Resources in H zone

2.2.1 Plant types

Meadow grassland was the main zonal vegetation in H zone, preserved Stipa baicalensis steppe and Filitolium sibiricum steppe were the representation vegetation types in H zone. Swamp vegetation, meadow vegetation were widely developed. Through collection, wild plants were known to the existing 62 families, 256 genera and 501 species. Among these, the Asteraceae was exiting mostly that own 94 species, and then followed by Ranunculaceae, Cyperaceae, Liliaceae, Chenopodiaceae, Cruciferae, Polygonaceae and so on (see graph 2-2-1 about growing environment) (Bureau, X. F., 2010).

Site	Filitolium sibiricum			Stipa baicalensis			leymus chinensis		
Depth (cm)	0-20	20-40	40-60	0-20	20-40	40-60	0-20	20-40	40-60
Sand (%)	39	16	46	40	41	48	34	30	42
Silt (%)	49	63	46	48	49	45	60	58	52
Clay (%)	12	21	8	12	10	7	6	12	6
Organic C (%)	2.28	0.4	0.31	3.14	0.9	0.27	3.39	1.61	0.44
Total N (%)	0.24	0.05	0.03	0.3	0.1	0.03	0.27	0.14	0.04
PH value	9.6	8.8	8.7	9.3	8.7	8.6	9.6	9.8	8.7
Soil C/N ratio	9.56	7.59	9.78	10.6	9.23	9.31	12.57	11.67	10.11

(2-2-1)



Stipa baicalensis, Leymus chinensis and Filitolium sibiricum steppe was main building group formation in H zone, also the excellent natural forage to animals. In addition, H zone had rich vegetation types with different uses and high economic value, especially the medicinal plants such as Licorice *(Glycyrrhiza uralensis)*, Bupleurum *(Stellaria dichotolata)*, Divaricate Saposhnikovia Root *(Saposhnikovia Schischk divaricata)*, Peony *(Paeonia lactiflora)*, Rhizome of Conic Gymnadenia (*Gymanadeniaconopsea)* and so on (Wang Daoshi, L. J., Li Ning, Guo Xueli, 2010).

2.2.2 Plant distribution

The natural vegetation was still preserved intact in H zone, the most basic community types were: Stipa baicalensis, Leymus chinensis and Filitolium sibiricum grassland.

Plant data	Filitolium sibiricum			Stipa baicalensis			leymus chinensis		
Biomass (g/㎡)		325.6			276.6			536.4	
Organic C (%)		42.4			45.1			44.3	
Total N (%)		0.93			0.73			0.36	
Total P (%)		0.17			0.128			0.14	
C/N		45.5			61.7			123.1	
Soil latter (cm)	0-20	20-40	40-60	0-20	20-40	40-60	0-20	20-40	40-60
Organic C (%)	2.83	0.91	0.28	3.29	0.7	0.25	3.39	1.58	0.33
Total N (%)	0.35	0.14	0.06	0.36	0.1	0.06	0.38	0.18	0.05
Soil C/N ratio	8.03	6.70	5.25	9.29	6.96	4.11	8.99	8.61	6.48

(The steppe characteristics in core area Ⅰ)

Plant data	Filitolium sibiricum	Stipa baicalensis	leymus chinensis
Biomass (g/㎡)	344.5	249.3	524.7
Organic C (%)	43.16	45.17	46.58
Total N (%)	0.69	0.54	0.36
Total P (%)	0.14	0.13	0.08
C/N	63	84	123
C/P	308	347	582

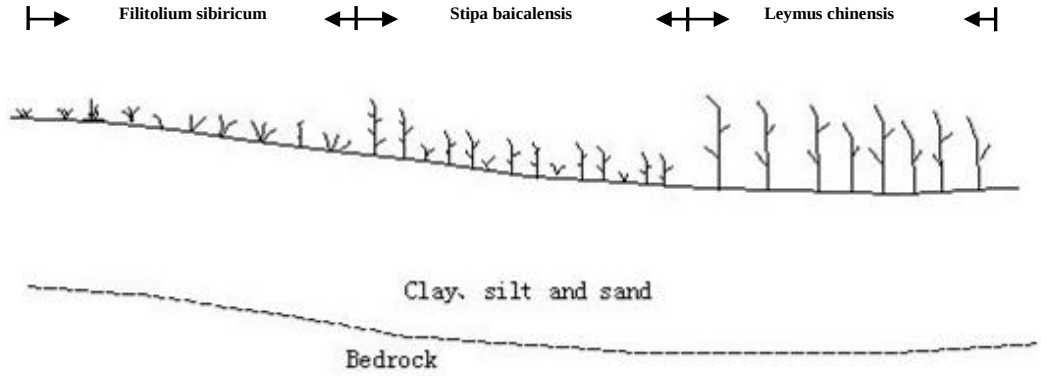
(The steppe characteristics in core area Ⅲ)

The plant distribution was different no matter based on zonal distribution or vertical belt distribution. To zonal distribution, H zone belonged to the transition zone from meadow steppe to typical steppe and familiar to the soil zonal distribution. So, the ecological type of vegetation not only had the mesophyte and mesoxerophytes that adapt grew on the meadow steppe such as Stipa baicalensis, Leymus chinensis, Filitolium sibiricum and clusters of Cares but also had the typical xerophytes that adapt grew on the typical steppe such as: Stipa grandis, Artemisia frigid, Thymus serpyllum and so on. The meadow steppe mainly contained bunch grass meadow steppe such as Stipa baicalensis; rhizome grass meadow steppe, such as L. chinensis steppe and miscellaneous meadow steppe, such as Filitolium sibiricum grassland. Typical steppe grassland mainly contained bunch grass meadow such as Stipa grandis and Stipa steppe. On the vertical distribute band, it was unlike the mountain range that occured typical, alternating and vertical distribution, but with different elevation appeared different vegetation formations. The Filitolium sibiricum steppe and small amount of leymus chinensis steppe appeared on high elevation of low hills and top of sloping hill. The big amount of leymus chinensis steppe appeared on the low part of sloping hills, the Stipa baicalensis steppe appeared in the middle part. The forb meadow steppe appeared in floodplain.

Stipa baicalensis steppe

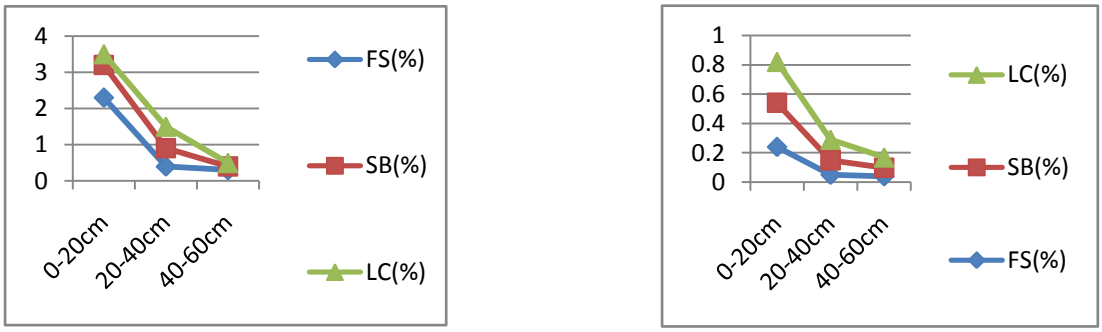
Stipa baicalensis had most representation of the meadow steppe in H zone. It had strong cold resistance and need high humid for its growing environment. It was also one kind of

Stipa type that had the most developed grass layer. It occupyed the middle part of sloping hills where well drained. The up part was Filitolium sibiricum grassland and the down part was the Leymus chinensis grassland.

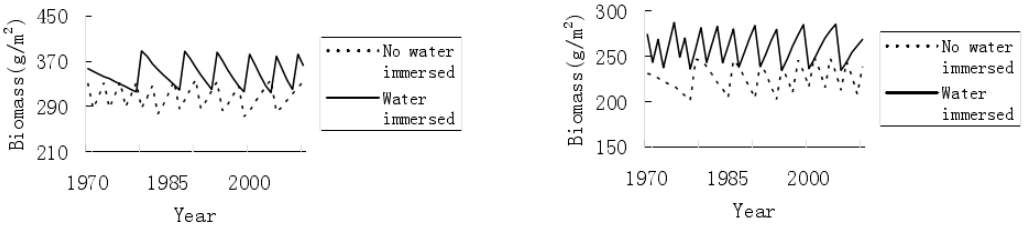


The common types were Stipa+ Filitolium sibiricum steppe, Stipa+ leymus chinensis+miscellaneous steppe. The vegetation was dense, it covered up 70%--80% of the ground, and the height of leaf layer was above 50cm generally. Stipa baicalensis was the dominant of the community composition, usually covered up to 45% and it was building a stable group.

Stipa baicalensis had abundant species composition and high species saturation. There were 15-20 species per square meter, up to 31 species and down to 17 species (See graph 2-2-2 about the soil characteristics of its growing environment).



（The change of organic matter with soil depth in different steppes）



(2-2-2) (Yali, W., 2010)

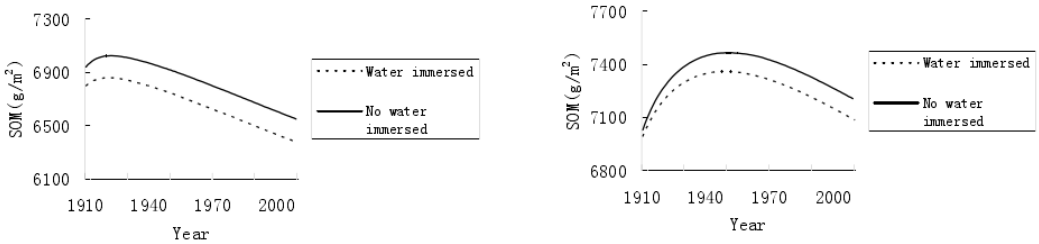
Filitolium sibiricum steppe

Filitolium sibiricum was also the basic formation in the meadow steppe. Filitolium sibiricum always distributed the up area of sloping hills and the edge of the high plateau where soil texture was rough, gravel or sand was more obvious, wind erosion was more serious and lack of snow in winter. It had the regular combination with hardwood shrub. The common type was Filitolium sibiricum + Leymus chinensis+rocky forbs prairie, Filitolium sibiricum + C.lanceolata+ miscellaneous class grass, Filitolium sibiricum +Leymus grassland and Filitolium sibiricum + feather grass steppe.

The coverage of Filitolium sibiricum was higher generally, reached 60—70%, the height of leaf was 20—30cm. The coverage of Filitolium sibiricum could reach 40—50% in H zone.

Leymus chinensis steppe

Leymus chinensis steppe zone was the most widely distributed grassland types in H zone. It occupyed the lower and foot part of sloping hills and wide valley. Because influenced by drainage more or less, so the soil moisture conditions was better. It did not appear in the flooding, stalinization, alkalization and low humidity area. Therefore, it had wide ecological amplitude and its growing environment was complex. The common types were leymus chinensis+Stipa capillata+ forbs grasslands (See 2-2-3 about the organic matter of its growing soil).



(2-2-3) (Yali, W., 2010)

Stipa grandis steppe

The Stipa grandis steppe was the main representative about the typical steppe of zonal vegetation in H zone. It had a large community and wide distributed on the hills where well-drained. The common type was Stipa grandis+leymus+ forb meadow. In addition to the dominant species of Stipa, the sub-dominant species had squarrosa, Carex, ice grass, leymus chinensis, Carex korshinskyi and so on. On the other hand, Kirschner wire grass was also the basic formation of grassland vegetation in H zone.

In addition, there were a lot coenotypes appeared in non-zonal growing environment and zonal vegetation types that interlace distributed. Mainly distributed in the flood plain, valley, dunes and the area of lower salinity.

2.2.3. Relation to land and water

According above words, plants distribution depends on soil properties and water supply conditions. Good quality soil and well-suited water supply played an irreplaceable role to plant growing and distribution. They ensured the species growing and stimulated the development of eco-system for the whole eco-system that based on plants. On the contrary, barren land and irregular water supply will bring great disaster to species on the wetland. The soil property was the postulate to plants exiting, and water supply was the prerequisite and decisive factor to plant growing. Therefore, the land and water decided the growing and distribution of plants on wetland.

2.3 Animals Resources in H zone

2.3.1 Environment and Fauna

H zone located in the southeast edge of Mongolian Plateau and on the side of upper middle of S river, the north part higher than south part of the terrian. The river wetland, swamp wetland and lake wetland were formed by rivers, lakes, waterweeds and reeds. H zone was located in the typical meadow steppe, it had well-preserved Filitolium sibiricum and Stipa baicalensis steppe. Steppe animals such as the Great Bustard (*Otis tarda),* Sandgrouse (*Syrrhaptes paradoxus),* Mongolian gazelle (*Procapra gittirpsa),* and Prairie tabby (*Felis silvestris)* were breeding in this grassland (Yali, W., 2010). Diversity of ecological environment, adequate food and good hidden conditions provided a breeding ground for many waterfowl and as an ‘Inn’ for the migratory birds and created good conditions for species diversity. The largest number are ducks, there were 53 Swan goose (*Anser cygnoides)* breeding groups recorded in 1998, more than 10 kinds of ducks with high economic value for

hunting like wigeon (*Anas Penelope)*, garganey (*Anas querquedula)* and shoveller (*Anas clypeata)* were breeding here (Wetland center, C., 2009). Not only the number and species of birds were very much, but also some of them were belongs to national primary and secondary protected birds.

The main element can decide fauna was the eco-environment in H zone. In my land and water management plan, H zone was divided by three parts: core area, buffer area and experimental area. The protect zone of rare animals was located in core area. The number of birds, fish, and animals were large in H zone. There were more than 20 kinds of animals were belongs to national primary and secondary protected level.

2.3.2 Birds and Ecological Distribution

The main part of H zone was wetland protection. H zone located in typical area of meadow steppe, there was well-preserved Filitolium sibiricum steppe and Stipa baicalensis steppe. Unique geographical location and diversify ecological environment created much good conditions for birds' diversity.

Water surface, shallow marsh birds

There were large number of birds on streams, lakes, marshes and other shallow water area. Main types were ducks, cranes, Etc swim, wading birds, such as Red-crowned crane, Crane, Coot (*Cygnus Cygnus*), Swan goose, Whooper Swan (*Anser cygnoides)*, Billed Duck (*Anas poecilorhyncha)* and Mallard duck (*Anas platyrhynchos)* and so on (Bureau, X. F., 2010).

Shrub wetland, grassland birds

The shrub steppe landscape arounded the swamp area. The main species were Gramineae and Compositae. The main habitat species in this ecological environment were Ring-necked pheasant (Phasianus colchicus), Partridge (Perdix dauurica), Great Bustard, Mongolian Lark (Melanocorypha mongolica), Steppe Eagle (Aquila nipalensis), Goshawk (Accipiter gentilis) and so on (Bureau, X. F., 2010).

Rare birds




Red-crowned Crane Great Bustard Whooper Swan Common Crane

(1) Grus japonensis（Red-crowned Crane）

Big bird; most of the body was white; the bare skin on the head was red; had the secondary flight feathers; the three flight feathers and sides of neck was black; red-crowned crane habitated on wetland. Mainly distributed in eastern Asia and belonged to the omnivorous birds (Yifan, B., 2007).

(2) Otis tarda（Great Bustard）

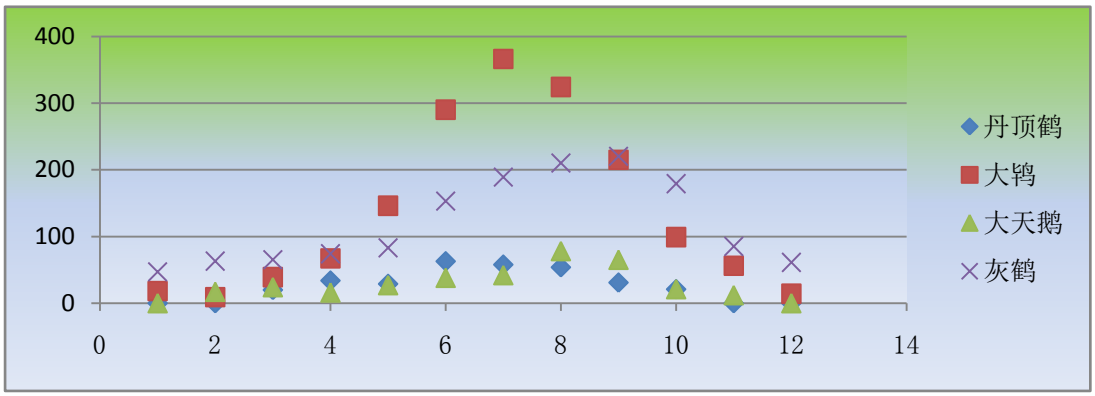
Big birds and good at fling, the color of body feathers was brownish black and the body color was different between male and female. They were summer visitors in H zone and habitat in vast grassland areas. The shoots, roots of plants and insects were their food (Yifan, B., 2007).

(3) Cygnus Cygnus（Whooper Swan）

Big swimming birds; body length was from 120 to 160cm; white body; the color of beak base was yellow and the color of mouth-side was black; the neck was long. They were like habitat the area where in open and food-rich shallow waters and always living in groups (Yifan, B., 2007).

(4) Grus grus（Common Crane）

Gray body, black head with red spots and black feet; lived in the reeds or on the bank; they were eating plants, berries and insects (Yifan, B., 2007).



(The number of birds in 2010) (Wetland center, C., 2009)

2.3.3 Fish

H zone located the area along in the upper middle of S river. The branches and ditches were criss-cross there. The different sizes of lakes scattered all over like stars in the sky, the water face area reached 886 hectares. The developing condition to fish was rich endowed by nature. The main fish were Carp (*Cyprinus carpio)*, Crucian *(Carassius auratus)*, Chub *(Hypophthalmichthys molitrix)*, Grass Carp *(Ctenopharyngodon idellus)* and other large species of fish; there were many rare species such as Liu Gen fish *(Phoxinus lagowskii Dybowski)*, Catfish *(Silurus asotus)*, Herring *(Mylopharyngodon piceus)* and Loach *(Misgurnus anguillicaudatus)* and so on (Bureau, X. F., 2010). In addition, many types of freshwater shrimps were living

here.

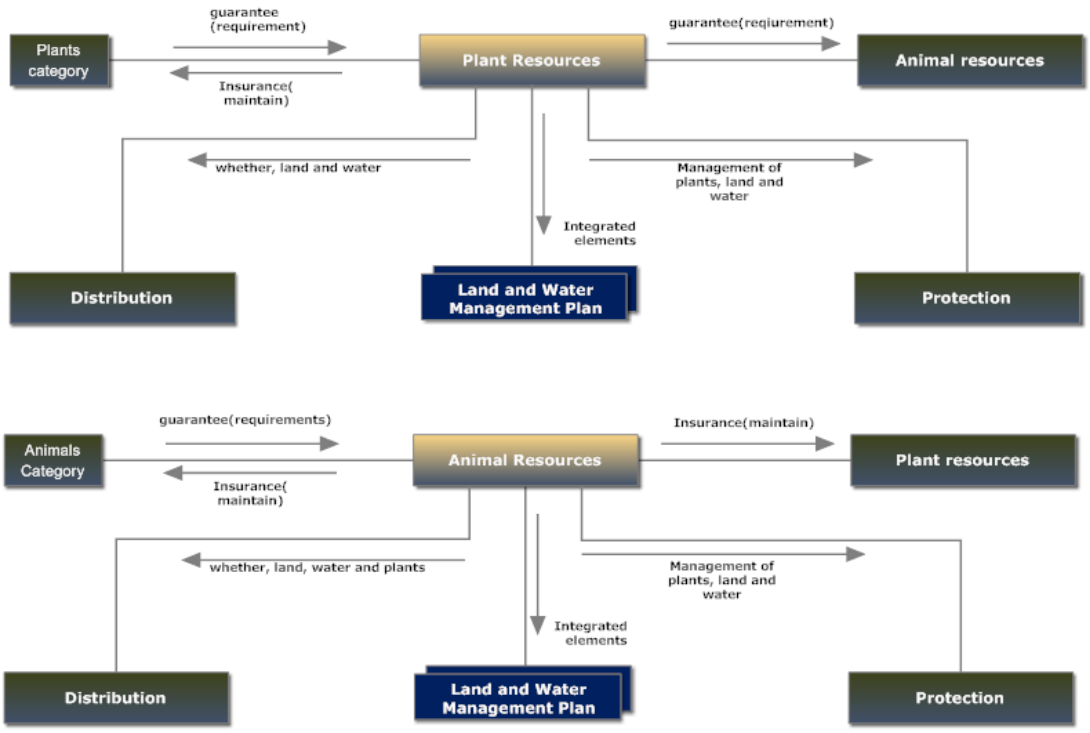
2.3.4 Mammals

The main body of H zone was wetland, but there was still large area of grassland and meadow that provided living and reproductive conditions to large amount of mammals. Now, many types of mammals lived in H zone, mainly plant-eating mammals were: Grass Rabbit *(Lepus capensis)*, Drought seto *(Marmota sibirica)*, Mongolian gazelle, Bielik *(Lepus timidus)*, Mus musculus etc; Meat eating mammals were Wolf *(Canis lupus)*, Corsac *(Vulpes corsac)*, Red fox *(Vulpes vulpes)* and Prairie tabby etc; Omnivorous mammals included Spermophilus dauricus *(Citellus dauricus)*, five-toed jerboa *(Allactaga sibirica)*, striped hamster *(Cricetulus barabensis)* etc (Bureau, X. F., 2010). These mammals played their own role to maintain the ecosystem balance. Mongolian gazelle and Drought seto were representative species of grassland and had a relative stable number. Although wolf and drought seto were harmful to livestock in some extent, or become the intermediate host of certain diseases to human, they still needed protection under the condition of control them in certain numbers.

2.3.5 Related to land and water

Animal distribution on wetland depends on the water supply and plant distribution, and plant distribution was influenced directly by land and water. Appropriate plants and animals lived with together and rely on each other, the relationship between each other were inseparable. Therefore, animals and plants on wetlands could be treated as a whole that also the reference for analysis land and water management. The regular distribution of plants corresponded to rule-based activities of animals. Over time, the distribution of plants and animals formed a relatively fixed pattern and had divide boundaries between different types of plants and animals, which was the significant base and form factor to improve the land and water management level.

The influence to Land and Water Management from Plant and Animal Resources



Integrated elements=Important basis + form factors + final goal

2.4 Introduction of B zone

B zone was located in 80km south of Xilin Gol city in Inner Mongolia and about 350 km in the southwest of H zone, it was located the border of Xilin Gol great grassland and Hunshandake sand. The geographic coordinates were N: 116 °07' - 116 °20', E: 43 °13' - 43 °17 ', the altitude was 1220—1400m, the total area was 10415 hectares. The climate of B zone belonged to north temperate semi-arid continental climate zone. There were many sandstorms in spring and autumn. The summer was cool and short, the winter was cold and long. The temperature difference was higher between day and night, the average annual temperature was 1.7 ℃ and the annual accumulated temperature was 2222.2 ℃ -2725.2 ℃ (Bureau, X. F., 2007). The average annual rainfall was 300mm. The annual average wind speed was 3.5m/s, the frost-free period were 123 days per year. The Baiyinkulun Lake (B Lake) located in the central location of B zone, and it was the main lake of B zone. The lake was 5km long from east to west, and 1.5km long from north to south. The perennial water area was 6.5 square kilometers, the average depth of water was 15cm deep, and the PH value was 10.0 (Bureau, X. F., 2007). It was a salt water lake. B Lake was a basin that formed during geological exercise and belonged to Tectonic lakes. The water mainly from the seepage of Hunshandake sand where in the south of B Lake and atmospheric precipitation. There was a big area of sedge grassland, Achnatherum saline meadow and shrub swamp. The formed area of wetland occupies 19% of B zone (Bureau, X. F.,

2007). The typical steppe zone was rounding the east, west and north part of big alluvial plain of B Lake. The south part was closed to the elm forest of Hunshandake sand.

2.5 Plant types and distribution in B zone

1. Typical steppe:

B zone was a typical steppe area belonged to temperate continental climate zone that had less rain. The xerophytic dense clump type grasses were mostly constructived species. The dominant plant communities were Stipa grandis, Stipa krylovii, Leymus chinensis and Agropyron cristatum. The level of difference was obviously: the first layer was formed by the L. chinensis and Stipa grandis, the second layer was constituted by Agropyron cristatum and the third layer was formed by Carex duriuscula. The typical steppe of Baiyinkulun has 22 families, 34 genera and 50 species (Wang Daoshi, L. J., Li Ning, Guo Xueli, 2010).

Dividing basis	Types	Number of Types	Percentage (%)
Living type	Perennial herb	31	62.00
	Annual and biennial herbs	16	32.00
	Shrubs and semi-shrub	3	6.00
Ecological type	mesophyte	25	50.00
	Xerophytes	25	50.00
	Aquatic and wetland plants	0	0

(The ratio of different types of species of typical steppe in B zone)

Distribution types	Family numbers	Occupy total families (%)	Families Names
World distribution	19	86	Urticaceae, Polygonaceae, Chenopodiaceae, Amaranthaceae, Ranunculaceae, Cruciferae, Rosaceae, Leguminosae, Euphorbiaceae, Thymelaeaceae, Umbelliferae, Convolvulaceae, Asteraceae, Boraginaceae, Labiatae Branch, the vehicle record, grass, linen Branch, Division teasel
Tropical distribution	1	5	Rubiaceae
North Temperate distribution	2	9	Zygophyllaceae, Liliaceae

(The distribution types of spermatophyte of typical steppe in B zone)

2. Carex meadow:

The carex meadow on the east of B Lake was one of the most important eco-environment formations in B zone. The soil was saline meadow soil. The research show that: Saxifragaceae was the key groups of branch during angiosperm evolution, another followed highly evolved Asteraceae, Poaceae, Orchidaceae and Equisetaceae belonged to the ferns that relative low level. Specimens collected from the field related to 23 families, 49 genera and 83 species (Wang Daoshi, L. J., Li Ning, Guo Xueli, 2010).

Distribution types	Family numbers	Occupy total families (%)	Families Names
World distribution	17	73.91	Leguminosae, Labiatae, Scrophulariaceae, car record, Alismataceae, Polygonaceae, Chenopodiaceae, Asteraceae, Ranunculaceae, Primulaceae, Cruciferae, Saxifragaceae, Rosaceae, Apiaceae, Gramineae, Cyperaceae, Orchidaceae
Tropical distribution	1	4.34	Rubiaceae
North Temperate distribution	5	21.74	Caryophyllaceae, Valerianaceae, water Radix Division, Liliaceae, Juncaceae

(The distribution types of spermatophyte of Carex meadow in B zone)

3. Sandy field:

Elm forest located 2km south of B zone and belonged to the Hunshandake sand. The mainly soil was sandy soil. Due to the prevailing westerly winds, fixed and semi-fixed ridge and honeycomb sand dune that generally arranged from northwest to southeast. It was occupied 98% of total sandy field. The height of sand ridge was 10—20m, the flow crescent sand dune and dune chains occupied 2%. The adretto covered by vegetation reached 30%--40%, the vegetation covered of Schattenseite could reach 60%--70% because growing arbors and shrubs. According to the survey, the plant species of Baiyinkulun belonged 27 families, 55 genera, 71 species (Wang Daoshi, L. J., Li Ning, Guo Xueli, 2010).

Distribution types	Families number	Occupy total families (%)	Families Names
World distribution	18	66.67	Leguminosae, Labiatae, Scrophulariaceae, car record, Polygonaceae, Ranunculaceae, Cruciferae, Saxifragaceae, Rosaceae, Gentianaceae, Chenopodiaceae, Asteraceae, freesia Apiaceae, Boraginaceae, Malvaceae, Poaceae, Sedum
Tropical distribution	2	7.40	Rubiaceae, Mang cattle Miao families, Liliaceae, Caryophyllaceae,
North Temperate distribution	7	25.93	Valerianaceae, Campanulaceae, Betulaceae, Salicaceae

(The distribution types of spermatophyte of Sandy field in B zone)

4. Artificial Populus:

The populus located in the northwest of B zone. The artificial populus was man-made ecological environment. Mainly soil was chernozem soil. Survey showed that forest plant species belonged to 20 families, 31 genera, 41 species (Wang Daoshi, L. J., Li Ning, Guo Xueli, 2010).

Distribution types	Family numbers	Occupy total families (%)	Families Names
World distribution	15	75	Leguminosae, Ranunculaceae, Lamiaceae, Polygonaceae, Chenopodiaceae, Cruciferae, Rosaceae, Apiaceae, Boraginaceae, Asteraceae, Convolvulaceae, Amaranthaceae, Solanaceae, white Danko, Gramineae
Tropical distribution	2	10	Sankoh, Mang ox seedlings Division
North Temperate distribution	3	15	Liliaceae, Caryophyllaceae, Salicaceae

(The distribution types of spermatophyte of Artificial Populus in B zone)

5. S.pentandra L swamps:

The S.pentandra L swamp located in the south of B Lake. It was one of ecological environment of B zone. Mainly soil was swamp meadow soil. Specimens obtained from the field related to 17 families, 40 genera, and 52 species (Wang Daoshi, L. J., Li Ning, Guo Xueli, 2010).

Distribution types	Family numbers	Occupy total families (%)	Families Names
World distribution	14	82.35	Leguminosae, Asteraceae, Rosaceae, Chenopodiaceae, Poaceae, Apiaceae, Orchidaceae, Lamiaceae, Ranunculaceae, Cyperaceae, Scrophulariaceae, car record, Alismataceae, Cruciferae
North Temperate distribution	3	17.65	Liliaceae, Caryophyllaceae, Salicaceae

(The distribution types of spermatophyte of S.pentandra L swamps in B zone)

6. Achnatherum meadow:

The Achnatherum meadow located in the south of H Lake, the soil was alkaline. Type analysis showed that the Achnatherum meadow was single species in B zone. The Achnatherum was the constructived specie and the Carex gmelinii was the dominant specie. Specimens obtained from the field related to 8 families, 15 genera and 15 species (Wang Daoshi, L. J., Li Ning, Guo Xueli, 2010).

Distribution types	Family numbers	Occupy total families (%)	Families Names
World distribution	7	87.50	Leguminosae, Compositae, Gramineae, Cyperaceae, freesia, Boraginaceae, Chenopodiaceae
North Temperate distribution	1	12.50	Liliaceae

(The distribution types of spermatophyte of Achnatherum steppe in B zone)

Types of growing Environment	Family numbers	Occupy total families (%)	Genera numbers	Occupy total generas (%)	Species numbers	Occupy total species (%)
Typical stepe	22	47.83	34	23.78	50	17.42
Carex meadow	23	50.00	49	34.27	83	28.92
Sandy field	27	58.70	55	38.46	71	24.74
Artificial populus	20	43.48	31	21.68	41	14.29
S.pentandra L Swamp	17	36.96	40	27.97	52	18.12
Achnatherum Meadow	8	17.39	15	10.49	15	5.23
Total amount	46		143		287	

(The occupation of different types of steppe in B zone)

2.6 Animal species and distribution in B zone

1: Pisces

There were mainly 6 kinds of fish were found in shallow water in the swamp. The water had high alkalinity, the PH value was about 10 and not suitable for fish survival. In 6 kinds of fish, the Watt's Leuciscus, Chinese prickly species of fish were belonging to salinity and Valsalva Leuciscus that most adaptable to the alkaline (Bureau, X. F., 2007). There were North Loach, flowers loach and loach distributed in the weak base environment of the swamp formed by the seepage water in the south of Hunshandake sand and the freshwater marsh formed by splendid achnatherum.

Head	Branch	species
Cypriniformes	Cyprinidae	*Phoxinus czekanowskii Dybowski*
		Leuciscus waleckii(Dybowski)
	Cobitidae	*Lefua costata (kessler)*
		Cobitis taenia Linnaeus
		Misgurnus anguillicaudatus (Cantor)
Gasterosteiformes	Gasterosteidae	*Pungitius sinensis* (Guichenot)

(The types of fish in B zone)

2: Amphibia

Amphibia mainly distributed in the grasslands arounded the lake and the surrounding marshes. The Bufo and rana amurensis were the dominant species here. Bufo general inhabited the low-lying sand land, and their activities were usually in high humidity sandy field at night. The Hyla arborea belonged to Hylidae that distributed in the reed swamp and Korshinky meadow, and their activities were on Polygonum, Cattail and reed leaves (Bureau, X. F., 2007). Rana amurensis, Rana nigromaculata and rana chensinensis were distributed in the Korshinky meadow where near the water face and S.pentandra L swamp.

Head	Branch	species
Anura	Bufonidae	*Bufo raddei*
	Hylidae	*Hyla arborea*
	Ranidae	*Rana amurensis*
		Rana nigromaculata
		Rana chensinensis

(The types of Amphibia in B zone)

3: Reptilia

Recorded reptile species were most of drought-resistant small species that especially adapted the sandy environment where the vegetation was sparse. The physiological characteristic of drought-resistant animals was very obvious because the sandy field was lack-of water. Among them, Phrynocephalus theobaldi and Eremias were the

dominant species of sandy field. The Phrynocephalus theobaldi can survive in the temperature of 48℃, the Eremias were usually living under the bush fallow, and their main food was insects. The snakes were widely distributed in H zone and it was the dominant specie on grassland. They were hiding in mouse hole and bush, their movement was agile and feed by insects and small vertebrates. The number of Elaphe rufodorsata was less than Elaphe dione like Coluber spinalis, most of them lived in Korshinky meadow surrounding B Lake and other wild area. They were feed by murine, batrachia and small fish.

Head	Branch	species
Lacertiformes	Agamidae	*Phrynocephalus frontalis*
		Phrynocephalus versicolor
	Lacertidae	*Eremias argus*
		Eremias multiocellata
Serpentiformes	Colubridae	*Coluber spinalis*
		Elaphe dione
		Elaphe rufodorsata
	Viperidae	*Gloydius intermedius*

(The types of Reptilia in B zone)

4. Birds

The unique topography in H zone formed typical wetlands. The complex, diverse wetlands and breeding grounds surrounded B Lake provided excellent habitat for waterfowls. The large area of reed and cattails in the south of B Lake created favorable breeding conditions for ducks, herons, cranes, and wading birds (Bureau, X. F., 2007). The large area of water, shallow water, swamp and meadow provided feeding environment for many kinds of birds that feed by plankton, aquatic plants and animals. Some birds such as silver gulls, brown-headed Gull, relict Gull, demoiselle crane often flied around the steppe wetlands for searching insects and seeds (Bureau, X. F., 2007). There were some Passeriformes birds like humid environment such as yellow head wagtail, yellow wagtail, grey wagtail and white wagtail except swimming birds and wading birds in H zone (Fu, X., 2009). They were inhabited on lake, wet meadow around river bank and reed swamp. They were feed by insects. Most of these birds were breeding birds and partly stop here for feeding during migration. Not only about variety of birds, but also the numbers were quite large especially in the migration season and the number would up to several thousands. So, B zone was not only the important breeding base for variety rare birds like Red-crowned Crane and Great Bustard, but also was the important "Inn" for many kinds of migrate birds.

Distribution types	Family Numbers	Occupy%
Millions type	57	50.4%
Whole north type	14	12.4%
Middle Asia type	12	10.6%
Northeast type	15	13.3%
Northeast and middle north type	2	1.8%
Highland type	1	0.9%
East ocean type	5	4.4%
Monsoon type	2	1.8%
Temperate to tropical type	5	4.4%
Total	113	100.0%

(The geographical distribution of birds in B zone)

5: Mammals

The mammals distributed in H zone include: Insectivora, Chiroptera, Lagomorpha, Carnivora, Artiodactyla. The largest was Cricetidae that have 16 species, occupied 34.78% of total subjects; murine had 6 species, occupyed 13.04% of total subjects; Mustelidae had 5 species, occupyed 10.87% of total subjects (Bureau, X. F., 2007). There were 2 families had 3 species which were bats and canine subjects; 4 families had 2 species which were hedgehog Branch, Division rabbits, squirrels Branch, deer and cattle families respectively. Most animals of Erinaceidae mostly distributed in the low land and sandy bush of the dry grassland in H zone. The desman of Talpidae were the underground habitant at night and distributed in sandy area; The Lagomorpha was typical animal on grassland, distributed on sandy field, grassland and splendid achnatherum grassland; the Spermophilus dauricus belonged to Sciuridae was one of the represent animals on grassland, mostly distributed on typical grassland and Spermophilus dauricus area where the soil quality was hard; The three feet jerboa and five feet jerboa belonged to Dipodidae were mostly distributed on sandy field and mainly inhabited in the sparse vegetation and the barbed nail bush environment; animals in Muridae were widely distributed and mainly inhabited on grassland and splendid achnatherum area; the habitat environment of Meriones meridianus Pallas and Meriones unguiculatus belonged to the Cricetidae was related to rock plant like sand binder; most wolf, red fox and sandy fox belonged to the Canidae were distributed in the wild area; the distribution of Talpidae animals were related to splendid achnatherum grassland, forest and other living environment; felid mainly distributed in grassland area and forest; roe deer of Cervidae distributed in forest; Mongolian gazelle of Bovidae was the represent animals of Ferungutates on grassland and distributed in all B zone.

Head	Branch	species
Insectvora	Erinaceidae	*Hemiechinus auritus*
		Hemiechinus dauricus
	Talpidae	*Scaptochirus moschatus*
Chiroptera	Vespertilionidae	*Myotis mystacinus*
		Myotis blythi
		Plecotus auritus
Lagomorpha	Ochotonidae	*Ochotona daurica*
		Ochotona pallasi
	Leporidae	*Lepus capensis*
Rodentia	Sciuridae	*Citellus dauricus*
	Dipodidae	*Dipus sagitta*
		Allactaga sibirica
	Muridae	*Micromys minutus*
		Apodemus draco
		Apodemus peninsulae
		Apodemus agrarius
		Rattus norvegicus
		Mus musculus
	Cricetidae	*Cricetulus eversmanni*
		Cricetulus barabensis
		Cricetulus migratorius
		Cricetulus longicaudatus
		Phodopus roborovskii
		Phodopus sungorus
		Meriones unguiculatus
		Meriones meridianus
		Myospalax fontanieri
		Myospalax aspalax
		Lagurus luteus
		Microtus fortis
		Microtus maximowiczii

		Microtus brandti
		Microtus mandarinus
		Microtus gregalis
Carnivora	**Canidae**	***Canis lupus***
		Vulpes vulpes
		Vulpes corsac
	Mustelidae	***Mustela sibirica***
		Mustela nivalis
		Mustela eversmanni
		Vormela peregusna
		Meles meles
	Felidae	***Felis manul***
		Felis lynx
Artiodactyla	**Cervidae**	***Capreolus capreolus***
	Bovidae	***Procapra gutturosa***

2.6 Current LWM

H zone:

The total area of H Lake and surrounded place was 2690 hectares as core area needed main protection in initial Land and Water Management Plan made by government. The buffer area was 1km extended outward of core area, it had scientific research, monitored and served as the buffer to core area.

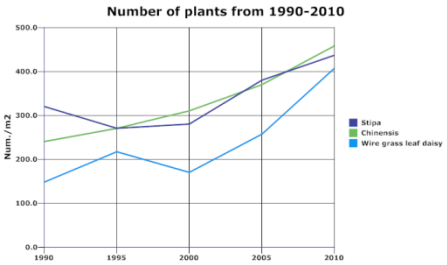
B zone:

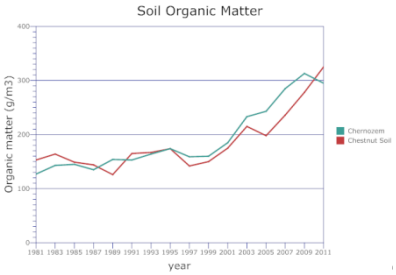
During the thesis, the protection of plants and animals was not associated with specific measures from local government. The land and Water Management planning was stayed in the discussion stage.

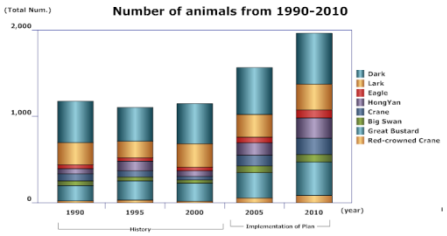
3. Main problems of DAP of PAA and Current LWM

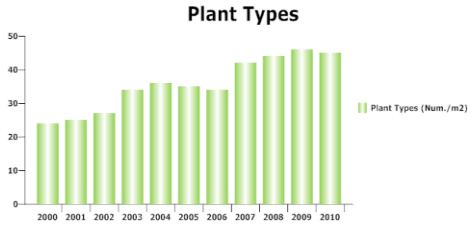
I thought two wetlands was a place that had beautiful ecological environment, a big number and species of plants and animals and mostly every management activity was done orderly and there was clear division of labor in the various institutions before I went there. But I also experienced negative aspects during my field study. At some places we found low soil fertility, relative small number of plants and animals, poor natural conditions, instable eco-system, and the distribution and protection of plants and animals in a disordered state (see four pictures below). This was the big problem to government for a long time. Though government devoted manpower, material resources and developed a preliminary land and water management plan for protect plants and animals in H zone, the plan was relative vague, inadequate implementation, monitoring system was not perfect and inefficient coordination of relevant departments were far away to “protected species diversity and constructed stable ecological wetland system”. To B zone, the protection of plants and animals was not associated with specific measures from local government. The land and Water

Management planning was stay in the discussion stage. During the thesis, I developed a set of land and water planning to H zone that I thought it was feasible through deep surveys and necessary study of almost all aspects. And I got final personal opinion to B zone through study the different aspects of plants, animals, land and water and joined the data collection for the discussion of LWMP in Xilinhot Forestry Bureau.









4. Overview of common LWM Plan

H zone:

4.1 Guiding ideology and Basic Principles

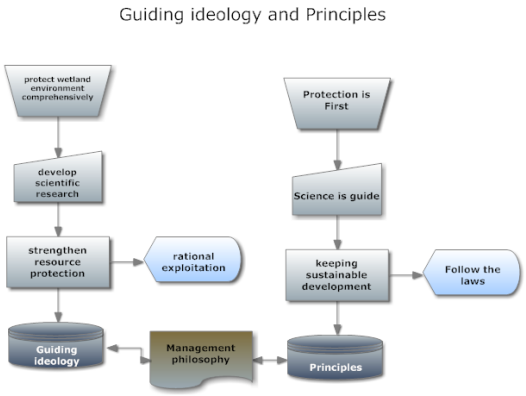
4.1.1 Guiding ideology

According to the actual situation and development potential of wetlands, I thought the land and water management in H zone should be guided by the general principle "protected wetland ecological environment comprehensively, carried out scientific research actively and enhanced resource protection, rational management and utilization". From the reality of H zone, followed the natural and economic laws, closely around the outstanding contradictions between human activities with eco-system and major problems (mentioned in "Chapter 2") that faced by H zone, and also based on the laws, policies and rules, it was necessary to adept effective measures to strengthen the management and protection. The center of land and water management was protecting plant and animal resources, expand populations of rare species, restored and improved the natural environment quality and maintained the balance of the wetland ecosystem. The key point was focused on scientific research,

publicity and education. At the same time to carry out eco-tourism actively because eco-tourism was an effective method to make publicity in a large range and also a good measure to get fund to develop H zone, combined the construction of H zone and economic development together and made H zone had a nice eco-environment.

4.1.2 Basic Principles

(1) Protection was first. The primary objective of land and water management in H zone should be protecting eco-system on wetland. All activities carried out in H zone must be based the protection of ecosystem, biological diversity and rare species. No impact or damage to the environment.
(2) Science was guide. The advanced scientific equipment and technological means can be used in the wetlands development and carried out environmental monitoring and scientific research. At the same time, the consciousness and awareness of love and protect nature should be educated and publicity to local students, farmers and sheepherders.
(3) Keeping sustainable development. Seek sustainable use of natural resources should following the natural and economic laws to combine the protection and utilization of natural resources, bring the ecological, social and economical benefits into play maximum.
(4) Keeping Principles. The land and water management and other activities in H zone must follow the related laws, policies regulations and policies in local and national level.



4.2 Management Objectives

4.2.1 General Objectives

Through the known of plants and animals in H zone, the analysis of faced problems and the evaluation of the develop potential, I thought the primary objective should be the protection ecological environment, rare and endangered plants and animals, and the integrity of the natural landscape. The biodiversity of wetlands, the virtuous cycle of wetland ecosystem and the function of wetland ecosystem should be stable and strength after finished land and water management. It should make the wetland became the natural laboratory for the monitoring and research to rare species and animals on meadow steppe after the developing and made the wetland become the basement of research, teaching and scientific propaganda to reaching the organic combination of protection and utilization of natural resources. After the developing, H zone should be developed to a demonstration area that had completed infrastructure facilities, effective management practices and the concentrated protection, scientific research, education, publicity and eco-tourism. Realize the cooperated development of

ecological environment protection and economic.

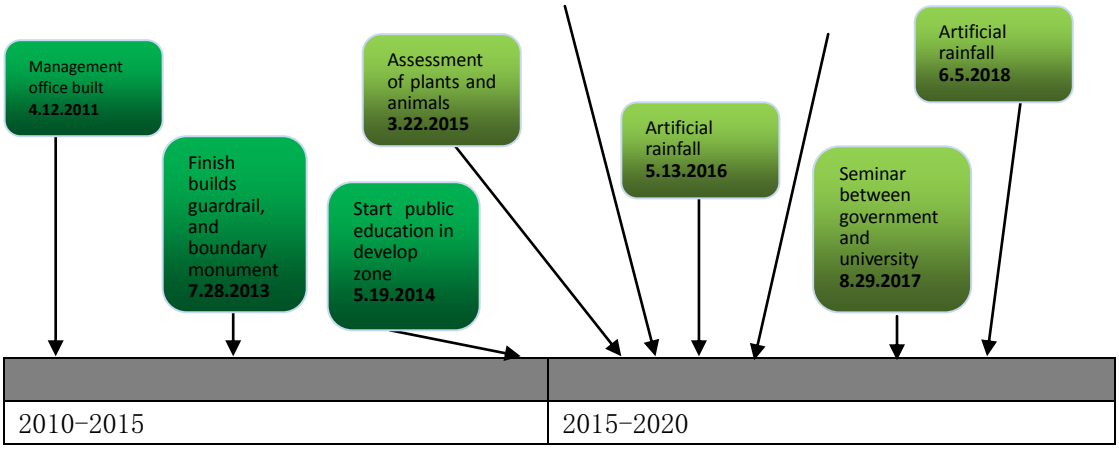
4.2.2 Management Period

The initial land and water management plan from the government had no explicited period about development and management about land and water. That leaded to lots of problems like low developing efficiency, uncleared labor division, capital investment was not in place, and the management institutions were not perfect and so on. The stricted time limit and cleared task division were necessary to have a steady, high effective and utility development and management of H zone. To this end, I made the land and water management plan in H zone from 2010 to 2020 and made related arrangements about large-scale activities that needed to implement.

I thought the implementation period of land and water plan was from 2010—2020 year. In accordance the principle—finished the plan comprehensively and implemented step by step, there were two phases to build H zone and develop different kinds of activities, the first phase was from 2010 to 2015, and the second phase was from 2015-2020. And the time of constructed infrastructure was in first 3 years.

Short term objective (2010-2015):
During this period, I thought the related institutions should finish land and water management comprehensively in H zone. Carried out the construction of supporting infrastructure step by step fellow the plan. Built high effective management institution in H zone and established a sound management system. Resource protection and management of construction projects should be in full swing. Carried out the initial monitoring system of ecological environment, did the scientific research in its power, made the publicity stronger and stronger for local people to know the importance deeper of building and developing H zone.

Long-term objective (2015-2020) :
In the late period of H zone development, I thought the wetland eco-system should be protected comprehensively and effectively, the wildlife resources should be restored and developed, and the type, quantity of wild plants and animals should be increased; the function of environmental protection in wetland eco-system should be effective play, self-regulation increased and the virtuous circle of eco-system should basically formed. The scientific research should be in full swing, research teams and the ecological environment monitoring system should be basically formed. At the same time to get significant ecological benefits, the social and economy benefits should be fully reflected too.



(The arranged important activities in the future)

4.3 Management Plan

The protected area was small, protected species was not comprehensive, the effect of Land and water management was not obvious in the government plan and would not achieve protect species diversity and stable the eco-system. To this end, in accordance the local and national laws with the actual situation of H zone, made the natural resources, natural environmental protection and scientific research as center, based on the actual situation of land and water, take into account of public education and tourism, I divided core area, buffer area and experimental area to H zone based on the principles of "focused key points, effective protection, clear boundaries and natural terrain as divided line as much as possible to maintain the natural landscape as the original type".

（Ⅰ）Core area

The core area was the places where concentrate obvious lakes, swamps, well-protected meadow steppe and the area where had clear characteristics. There were 4 core areas in H zone based on the actual situation of land and water management and the distribution of plants and animals

(1) **Lake core area**: The core was H Lake where have largest water area and richest plants along the river bank in H zone. The area reached 2690 hectares that occupied 47% of core area.

(2) **Swamp rare species core area**: The core was reed swamps that have largest reed area and most obvious wetland characteristics. The area was 2250 hectares that occupied 39% of H zone.

Rare species core area—the plants and national protected animals like red crowned crane, whooper swans, great bustards and other birds were protected. The area was 4940 hectares and occupied 86% of total core area. The radius of buffer area was 1km.

(3) **Stipa baicalensis core areas**: The endemic grassland type in the middle, west and east of Asia in the Eurasia—Stipa baicalensis should be protected. This core

area had 400 hectares and occupied 7% of total core area. The buffer radius was 1 km.

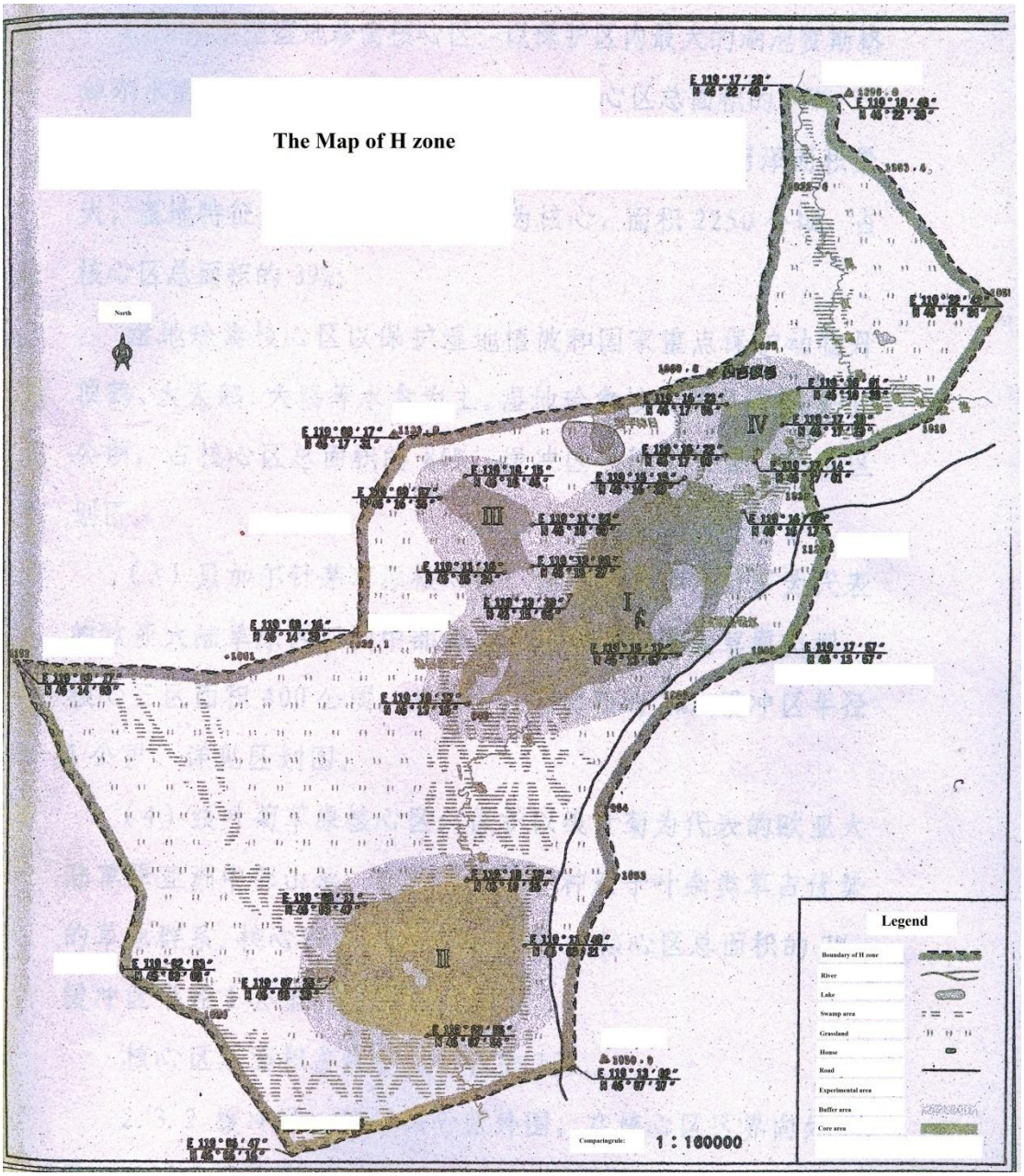
(4) **Filitolium sibiricum steppe core area**: Protected Filitolium sibiricum steppe was a dominated grassland formation that had unique dicotyledonous forbs in the mountain area of central Asia. This core area had 400 hectares area, occupied 7% of total core area. The buffer radius was 1km.

（Ⅱ）Buffer area

The buffer area was located in the region 1km outward expansion of the core area. The area was 5770 hectares and occupied 14% of H zone. The buffer area was the transition zone of core area and experimental area. It was the protective barrier of core area.

（Ⅲ）Experimental area

The experimental area was outside the buffer area. It was a function area used to scientific experiments, domestication, breeding, tourism, resource development and different kinds of utilization activities. The experimental area had 31190 hectares, occupied 73% of H zone.



(The map of LWM plan in H zone that made by me and guided by the technical institution of Xilinhot Forest Bureau)

B zone:

I got my final personal opinion through study the different aspects of plants, animals, land and water and joined the data collection for the discussion of LWMP in Xilinhot Forestry Bureau.

I thought the plan background, guiding ideology, management principles, objective, content and planning in B zone were all familiar with H zone. B zone can be divided to core area and buffer area. The boundary in B zone could use natural landscape like roads and elevation points. It should reflect the diversity, naturality, typicality of the

local environment and the diversity, rarity of species. The planning of core area should be planning based on the concentration of protected animals, less human disturbance and maintained the original natural landscape. The boundary of the core area should be mainly based on the natural landscape and elevation points, the area of core area occupied 47.8% of B zone. Because the flat terrain in B zone, the buffer area could extend 500m outward surrounding core area and played the buffer function.

5: Advises for future LWM

H zone

5.1 The protection planning of plants and animal resources

After the completion of land and water management planning, the problem was the strength was not enough to protect plants and animals and the problem became more prominent. In order to play the function of land and water management plan to role as soon as possible and produced positive effect to protection of plants and animals, I did a special investigation and got my personal opinion based on the combination of new land and water management plan and the protection of plants and animals in H zone.

5.1.1 Principles and content of protection

1: Protection Principles

The principles of the protection and management in H zone should based on management measures and engineering measures. It should follow the natural and economic laws strictly. Took the appropriate and effective measures according to the biological, ecological characteristics of different kinds of plant and animal resources and the influence from human activities to eco-system. And promoted the recovery of eco-system and wildlife populations multiply in H zone.

2: Protection content

The natural resources protection was the core point in H zone, I thought the main content of H zone was protection of wetland eco-system and the all kinds of rare animals, Filitolium sibiricum, Stipa baicalensis grassland that the typical vegetation on meadow steppe.

5.1.2 Protective measures and means

1: Protection measures

(1) Established the whole management agencies and built management system in H zone.

The management agencies should be built speed up in the early developing period. And composed capable management team, made the construction and management organized. At the same time, the establishment of management system should be based on the laws, rules in national and local level.

(2) Strengthen the protection and management of the core area.

Core area was the most critical areas of protected areas; it was the essence of H zone. Therefore, good protection and perfect management was a top priority to H zone at all times. I thought any human interference must be prohibited in the core area, while strengthening the protection of the buffer area. The boundary markers, signs, management and protection post should be set up to responsible for the protection of buffer area, core area and ensured the normal play of functional areas.

Strengthen the development, utilization and management of resources

The development and utilization of resources in H zone must be done in experimental zone. The criterion should be sustainable use of natural resources and implemented scientific and standardized management. The rational development and utilization should be based on scientific proof and put approval and registration system into practice. The indiscriminate activities were strictly prohibited.

(3) Strengthen the protection, management and construction of experimental zone.

The experimental area was functional area that should carry out many activities, so in addition daily administration, the patrol, inspection work and infrastructure construction should be strengthen.

(4) Strengthen publicity and education

We should further strengthen the publicity of relevant legislation and policy advocacy. Increased the environmental awareness to local people. The final goal of publicity and education was made the environmental protection become the conscientious action of local people.

2: protect methods

In order to protected the rare animals, Filitolium sibiricum steppe, Stipa baicalensis and the whole eco-system in H zone. There were different approaches to different area in my land and water management plan.

(1) Any unit or individual was prohibited from entering except approved scientific research, ecological monitoring and investigation activities.

(2) Production and business activities were prohibited in buffer area.

(3) The production and management in experimental area would take the combination of administrative and legal methods. Such as strengthen patrol and supervision. All activities in experimental area must be follow relevant regulation.

(4) Minimize disturbance of human activities to H zone, residents in the core area and buffer area must be completely migrated.

(5) The projects that harmed to ecological quality were prohibited constructed in the outside of H zone.

(6) Strengthening the fire prevention on grassland, improved the forecasting and control work for pest.

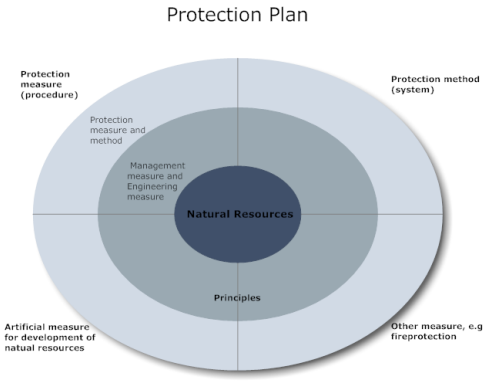
5.2 Recovery and development of animal and plant resources

The restoration and development of natural resources means promoted the recovery and reproduction of resources by artificial measures to achieve protection. In response to this situation, I had the following recommendations:

(1) Taking artificial measures to do the domestication and reproduction for wild life under the condition that had no influence or damage to rare species in experimental area.

(2) Establish breeding and rescue center for wild life especially to rare birds in experimental area. Reintroduction birds to nature step by step after the animal population reached a certain level for expanding the species population in natural conditions.

(3) The agriculture, husbandry and fishery production activities should be unified and planned in H zone. It should take production and operation measures to promote reproduction of vegetation, fish, and species by took holidays to grassland, rotational grazing, adjustment agriculture, and husbandry structure, improved breeding way and adjust industrial structure. In this way, the natural resources were rehabilitated and the goal of sustainable use of resources would be achieved.



B zone

According the actual situation of natural resources and human activities in B zone, the fundamental starting point about overall plan of land and water management should be protected and restored the virtuous circle of wetland ecosystem, and the starting point were types of vegetation, growing and habitat of rare animals in B zone. In order to decrease the disturbance of human activities, I made the following measures:

1: Combined the local conditions, sand control, ecological immigration and the large national ecological projects like the compensation of national forest, moved all 39 families to Xilinhot city and the pasture located in 51km northeast of B zone. The government gave property tax compensation and reproduction of capital subsidies to immigrated families. In this way, the ecological structure in B zone could be adjusted.

2: Strengthen the inspection and management in B zone. Built checkpoints on transport routes and in buffer zone. The checkpoints were responsible to people who accessed B zone, and had the duty of manage and protect of B zone. The checkpoints should send patrol officers in turning to had flow management and protection to B zone. Built fence surrounding the place where birds were mainly inhabited and

breeding to ensure the ecological environmental and inhabit in B zone. The breeding birds can't be disturbed and damaged in B zone.

3: Built rescue center for wild animals to ensure the timely rescue to injury and ill animals and the rescue center could be the base of scientific research, domestication and breeding for animals at the same time. The rescue center could be built on the wild grassland in 2.3km north of Hunshandake sand. This location not only closed to the concentrate area of plants and animals but also had no influence to the common habitat of plants and animals.

For land desertification, grassland degradation, reduction of wetland area, plant large area of forest in surrounding places and Hunshandake sand where the desertification was seriously was necessary in next few years. The residents should be all moved out from core area and buffer area of B zone, and in order to improve the ecological environment in B zone rapidly, the grazing should be prohibited comprehensively.

Names of Animals	Location and types in B zone
1:Black Stork	Marshes in the south of B Lake, rare species
2:White Spoonbill	wetland in the south of B Lake and eastern swamp, rare species
3:Whooper Swan	water area, breeding in the south of reed swamp of B Lake
4:Tundra Swan	water area and reed swamp, rare species
5:Swan Goose	water area of B Lake, dominant species
6:Eurasian Wigeon	water area and reed swamp of B Lake, common species
7:Green-winged Teal	water area and reed swamp of B Lake
8:Northern Pintail	water area and reed swamp, small numbers
9:Garganey	water area and reed swamp, small numbers
10:Northern Shoveler	water area and reed swamp, common species
11:Baer's Pochard	water area of lake, small numbers
12:Black Kite	wild grassland area
13:Western Marsh Harrier	Lake and surrounding wetlands, common species
14:Eastern Marsh Harrier	Lake and surrounding wetlands, small numbers
15:Hen Harrier	wild lake area, swamp area with more grass and sandy shrub, common species
16:Pied Harrier	wild grassland, small numbers
17:Japanese Sparrow Hawk	lake area and surrounding wetlands, small numbers
18:Eurasian Sparrow Hawk	lake area and surrounding wetlands, rare species
19:Common Buzzard	grassland in the east of B Lake, small numbers
20:Upland Buzzard	splendid achnatherum area in the north of the B Lake, and grassland in the east of the B Lake, rare species
21:Rough-legged Hawk	S.pentandra L swamp area in the south of B Lake in summer, rare species
22:Lesser Kestrel	wild sandy and open forest area, rare species
23:Common Kestrel	Grasslands, wetlands, sandy woodland area, common species
24:Eastern Red-footed Falcon	Grasslands, wetlands, sandy woodland area, common species
25:Hobby	Grasslands, wetlands, sandy woodland area, common species
26:Demoiselle Crane	wetlands and surrounding grassland, large numbers, common species
27:White-naped Crane	swamp in the south of the B Lake and the bank area with many reeds, common species
28:Red-crowned Crane	Swamp area in the south of the b Lake and the bank area with many reeds
29:Great Bustard	grassland in the north of B Lake, splendid achnatherum area
30:Asian Dowitcher	shallow swamp in the south of B Lake, rare species
31:Little Curlew	water area, swamp in the south of B Lake and splendid achnatherum area in the east, common species
32:Relict Gull	Lake and surrounding swamp, common species
33:Northern Eagle Owl	Artificial poplars, rare species
34:Little Owl	Wild grassland, common species
35:Long-eared Owl	Artificial poplars, rare species
36:Mongolian Lark	Wild grassland, common species
37:Pallas's Cat	Hilly grassland, shrub and sandy woodland
38:Eurasian Lynx	Shrub and sandy woodland near the B Lake
39:Mongolian Gazelle	Grassland area

6: Conclusion

According to the words above, the relationship between DAP of PAA and LWM on two wetlands was so closed that influenced each other, improved each other and completed each other. Mainly in following areas:

1: The influence from DAP of PAA to LWM:

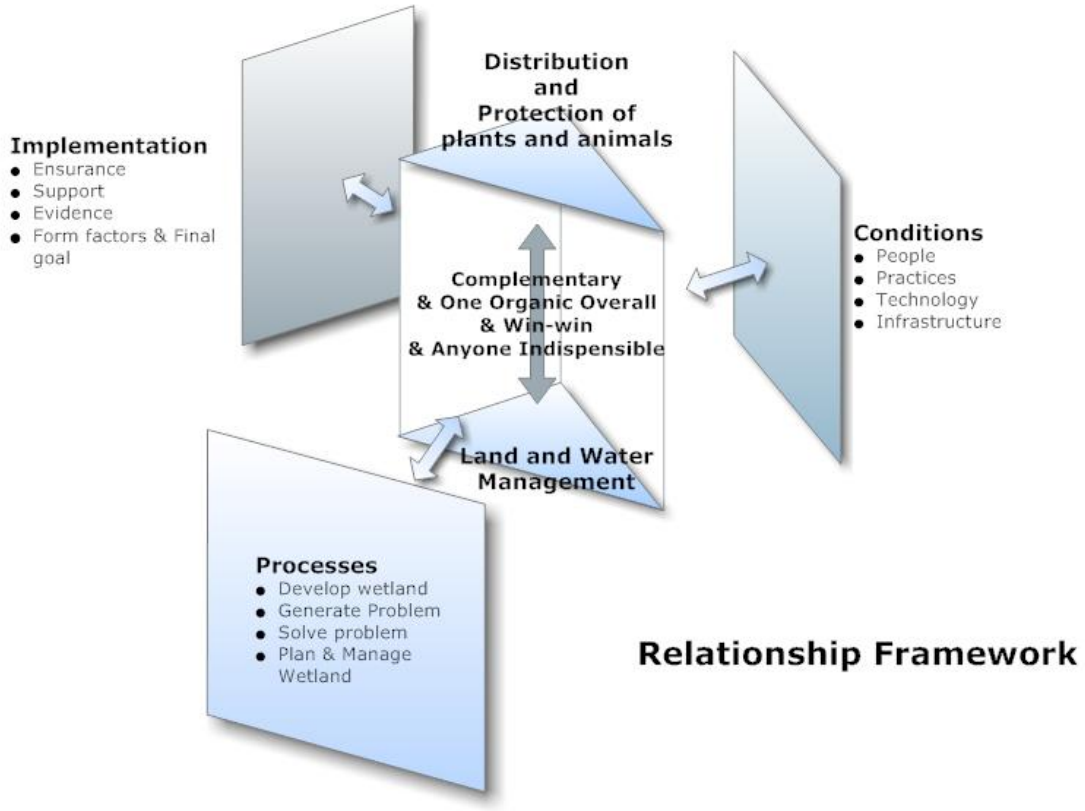
The overall design of LWM was all based on the vegetation types, distribution, living habitats of plants and animals and local climate, soil, hydrology. The LWM provided maximum feasibility protection and sustainable development for PAA on wetlands and the final goal was protected the diversity of PAA and the whole eco-system of wetland. The formed of LWM plan of two wetlands was all based the principle of maximum using natural terrain as boundaries and protected natural landscape. The concentration area of PAA was the core part of LWM plan.

2: The influence from LWM to PAD of PAA

The LWM plan provided reliable guarantee and effective support to DAP of PAA. LWM isolated the natural distribution of PAA and human disturbance, and different kinds of plants and animals had a basement of long-time exiting, breeding and developing. LWM reached the protection of numbers and diversity of PAA directly and effectively at the same time. LWM provided basic condition, development tendency, practical planning and support for the sustainable development of PAA.

3. The relationship between DAP of PAA and LWM

The DAP of PAA was the important base, form factor and final goal of LWM; The LWM was the effective measure, reliable guarantee and development tendency to PAD of PAA. Both complementary, like one organic overall, win-win each other and anyone was indispensible in the condition of enough human power, material resources, technology and infrastructure and also in the process of “develop wetland, treat problem and manage wetland”. They were all absolutely necessary parts of wetland eco-system.



7: Recommendations

In conclusion, the relationship between DAP of PAA and LWM was clear based on the situation of DAP of PAA and LWM plan. It can increase the level of LWM adaptation of H zone and B zone to a certain extent. For the further research and implementation, the LWM plan needs to be judged again by using all the criteria, including the rest aspects like policy influence and feedback from local stakeholders. It can be defined as a successful LWM plan when it shows effective improvements to DAP of PAA under all specified criteria.

On the other hand, after this report, if time was available, every step of working can be shown by maps that was visible and more convenience to do analysis by using Photoshop. That would be a more detailed process to help the research more completely.

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Appendix 2: Photos of two wetlands

1: Photos taken from 11th April to 6th May in H zone

Outside of H zone

Outside of H zone

The spring located in outside of H zone

The spring located in outside of H zone

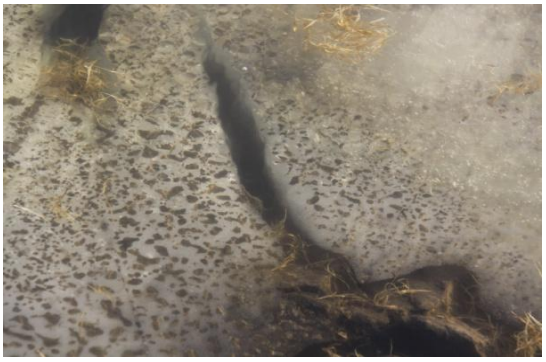
Full view of H zone

Full view of H zone

Water face of H Lake

Water face of H Lake

Water face of H Lake



Water face of H Lake

Accumulated snow in outside the H zone

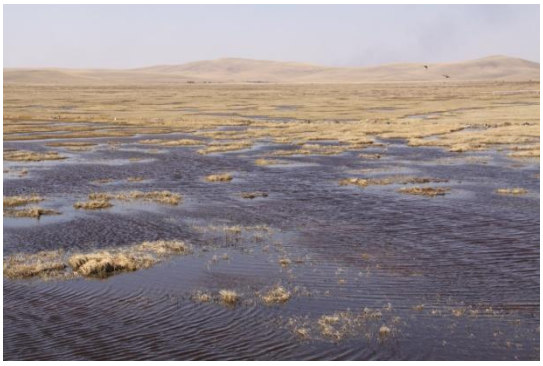
overlook of H zone

Other water area in H zone

Other water area in H zone

Other water area in H zone

Other water area in H zone



Other water area in H zone

Other water area in H zone

2. Photos taken from 9th May to 20th May in B zone

Main water area

Meadow surrounding the B Lake

Meadow surrounding the B Lake

Main water area

Birds

other water area

Birds

Birds

Soil of meadow

Soil of meadow

S.pentandra L

S.pentandra L

other water area

other water area

other water area

other water area

Birds

Birds

S.pentandra L

S.pentandra L

Other water area

Other water area

Other water area

Other water area

meadow

S.pentandra L

meadow

surrounding soil

Other water area

Other water area

Birds

Other water area

S.pentandra L

Other water area

Other water area

Other water area

Birds

Birds

3. Photos taken from 21th May to 23th May in H zone

H Lake

H Lake

H Lake

H Lake

Surrounding meadow

Animals in the meadow

Other water area

Other water area

Surrounding water area

Surrounding water area

Surrounding vegetation

Surrounding vegetation

Birds

Birds

Meadow

Meadow

Habitat of birds

Habitat of birds

Other water area

Other water area

Surrounding water area

Birds

Birds

Birds

Surrounding water area

Surrounding water area

Overlook of H zone

Appendix 3

Plan of approach

---- The relationship between land and water management with the distribution and protection of plants and animals on two wetland in southeast of Mongolian Plateau

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4/28/2011

Table of Content

Introduction:

Short description:

-My Bachelor graduate thesis will find the relationship between land and water management with the distribution and protection of plants and animals on two wetlands in the southeast of Mongolian Plateau.

Nowadays, the distribution and protection (DAP) of plants and animals (PAA) on wetland is a hot topic all over the world. At the same time, the land and water management (LWM) has a strong influence to the DAP and PAA. And the distribution and protection of PAA is also an important element that could decide the final land and water management plan on wetland because plants and animals are the main part of the wetland. And the relationship among land, water, plants and animals is becoming more and more complex and standing out in the modern age that importance of wetland protection is increasing rapidly. So I choose Hesegenaoer nature protect zone (H zone) and Baiyinkulun nature protect zone (B zone) in the middle of Inner Mongolia, China as my thesis place.

In order to reach the goal of my thesis, I will know different aspects of plants, animals, land and water management well on two wetlands. After that I will make a detailed comperation between two wetlands and make the research more persuasion.

Problem Analysis:

Nowadays, the environmental protection is focused by the national government and international organizations. And the wetland--'lung of earth' is necessary to be protected strongly in the age of serious pollution, increasing number of people and economy developing rapidly because the wetland contains numerous valuable plants and animals. The effective protection to the plants and animals on wetland is based on the good land and water management because the land and water on the wetland is the big home to the protected animals and valuable plants.

The two wetlands in the middle of Inner Mongolia are developed for almost 10 years. Its original protect plan is above land and water management plan since the government decide to protect two wetlands. And an essential part of land and water management plan is from the distribution of plants and animals and other elements like whether, soil characters, terrain and human activities.

Motivation

I'm very interested to know the knowledge of plants and animals which is core part on the wetland. At the same time, I can do the research based on land and water management that is my bachelor major. I can improve my knowledge level of land and water in practical way and know a lot about plants and animals. On the other hand, B zone is one of my internship places when I have an internship in 2010. I have a first-step known to B zone and it will make my thesis more effective and dedicated. And I have no language barrier during I do the thesis in China.

Research questions

Main research question:

What is the relationship between land and water management and the distribution and protection of plants and animals on two wetlands?

Sub-questions:

1: What is the land and water management plan on two wetlands?
2: What is the situation about the distribution and protection of plants and animals on two wetlands?
3: How land and water management influence the distribution and protection of plants and animals on two wetlands?
4: How distribution and protection of plants and animals influence the land and water management on two wetlands?

Plan of work

I will finish my thesis in 3 steps to answer the research questions logically and finish my report step by step.

1: Data collection
In order to answer my research question and do the research in a right direction, I will collect almost all data of every aspects related to my two thesis places. The data including whether, hydrology, soil, policy and human activates. After the data collection, I will make my research direction clearly and make the research work effective and useful in next step.

2: Data analysis
In this stage, I will select the useful data that could help me solve the research question. At the same time, I will get new data through compare, search and sift data.

These data could help me have a known to something that I'm not clear in the first stage. And I could have a comprehensive known to my two thesis places.

3: judgment
After the data analysis, I will have a good known about all aspects on my two thesis places. Then I will get my own judgment and conclusion to answer the research questions one by one. The answers are based on rationale and actual situation. It will have more persuasion.

Methodology

Desk study:

Literature study

I will do the literature study to collect data to provide theory province for the data analysis. I will borrow the documents from Xilinhot Forestry Bureau and go to some universities where located in Hohhot to rich my answers to research questions.

Interview on the Internet

I was in Netherlands from 1th February to 6th April. And I have a lot of interviews with my program tutor in China to discuss the plan of approach, research questions and what I should do when I do the field study. On the other hand, I asked a lot about the wetland and I build an outline for my thesis from the interviews with Mr. Zhang on the Internet.

Analysis method

I will use analysis method during I analysis data. I should analysis the original data that I collected to answer my research questions and get new idea to rich the answers.

Interdisciplinary method

My thesis topic related to plant, animal, land and water. I will know the relationship among plant, animals, land and water management, so I should know something about plant sciences, animal characteristics, land planning and hydrology. The thesis is an interdisciplinary research and the research method should be interdisciplinary too.

Field study:

Observation

I will get the first impression about situation of plants and animals and get the idea about land and water management on two wetlands from observation method. The

observation including common observation, observation by telescope and supervision in computer room to know everything about wetlands. It's a long time and useful job to help me to find answers to research questions.

Interview with stakeholders

During the field study, interviews with local stakeholders are very important to help me to know the situation of wetland in different time. And their ideas to themselves are also the direct province to help me to support my ideas about wetlands. I can get new ideas and way of thinking from the communication and discussion. The interviews could make my observation and research more effective.

Investigation method

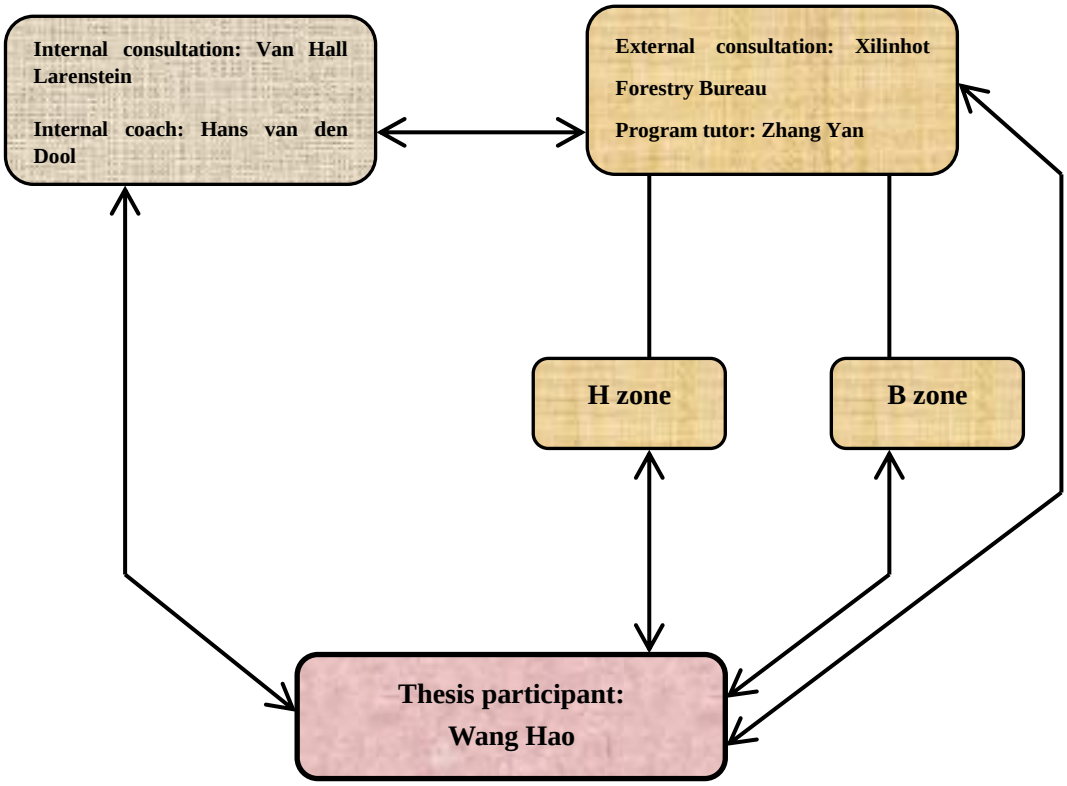
The investigation method could also make my interviews in a right way and make the communication deeper. It is a good way to support discussion and improve my knowledge level of two wetlands. On the other hand, I can get strong province to the answers to my research questions.

Results

My final thesis report wills approximately 40 pages. The big amount of data (such as pictures, numbers, graphs and maps) is contained. The structure will have cover page, title page, preface, table of content, summary, introduction, contents, conclusion, references and annexes.

The presentation will spend almost 30 minutes. I will show every aspects of my thesis in a simple and clear way. And the good interaction with audience is necessary.

Organization



Task division

The task division is essential to make the cooperation clear among my tutors and myself. And I can divide my task of my thesis in different time and in different places.

Team members:	Task:
Hans van den Dool (Internal tutor)	1: Help me to make the thesis topic in a right way 2: Provide effective guide that related to my thesis during the thesis time. 3: Provide feedback about my plan of approach and draft of my thesis report.
Zhang Yan (program tutor)	1: Help me to make the thesis topic in a right way 2: Provide literature, effective guide and arrange interviews with stakeholders and officers during all the thesis time.
Wang Hao	1: Make the thesis topic 2: Finisher to the thesis including report, PowerPoint and self-defence

Time schedule

	Monday	Tuesday	Wednesday	Thursday	Friday
1st week *(Feb.1~Feb.4)*		**Interview with Zhang Yan to discuss how to start the thesis**		Interview with Zhang Yan to talk about the wetland	
2nd week *(Feb.7~Feb.11)*	Search information about wetland		Interview with Zhang Yan to talk about post literature		**Prepare the plan of approach**
3rd week *(Feb.14~Feb.18)*	**Finish the draft of plan of approach**			Interview with Zhang Yan to talk about my thesis plan	
4th week *(Feb.21~Feb.25)*		Interview with Zhang Yan to talk about post literature		Literature study	
5th week *(Feb.28~Mar.4)*	Interview with Zhang Yan to talk about plants		Literature study		Interview with Zhang Yan to talk about plants and animals
6th week *(Mar.7~Mar.11)*	Literature study			Interview with Zhang Yan to talk about land and water management	
7th week *(Mar.14~Mar.18)*	**Writing my plan of approach**			**Interview with Hans van den Dool to talk about thesis plan**	**Hand my plan to Hans**
8th week *(Mar.21~Mar.25)*		Search information of animals on wetland on Internet			Interview with Zhang Yan
9th week *(Mar.28~Apr.1)*			Interview with Zhang Yan to talk about starting data of field study		
10th week *(Apr.4~Apr.8)*			**Go back to China**		
11st week	**Go to H zone**		**Start field study on**	Follow the introduction from	

(Apr.11~Apr.15)			**H zone**	local officers	
12st week *(Apr.18~Apr.22)*	Use telescope to observe plants and animals		Interview with stakeholders(sheepherders, officers and local residents)	**Start writing report in Chinese**	
13st week *(Apr.25~Apr.29)*		Literature study and collect data from the local forest Bureau			
14th week *(May.2~May.6)*	Analysis data and keep writing report			Use telescope to observe plants and animals	
15th week *(May.9~May.13)*	**Go to B zone**	Use telescope to observe plants and animals		Interview with manager from nature protect zone	
16th week *(May.16~May.20)*		Discussion with the problems from literature with manager		Literature study and data analysis	
17st week *(May.23~May.27)*	**Go back to Hohhot**	Finish Chinese report and translation to English		**Hand draft of my thesis report to Hans van den Dool**	
18st week *(May.30~Jun.3)*	Talk to Hans van den Dool about my thesis report			Regulate my thesis report follow the feedback from Hans van den Dool	
19st week *(Jun.6~Jun.10)*	Eliminate grammar mistakes		**Hand report**		
20th week *(Jun.13~Jun.17)*	Start to do the PowerPoint		Finish the word description of PowerPoint		
21th week *(Jun.20~Jun.24)*	Finish the design of PowerPoint				
22st week *(Jun.27~Jul.1)*	Holiday				
23st week *(Jul.4~Jul.8)*	**Go back to Netherlands**	Prepare self-defense			
24st week *(Jul.11~Jul.15)*	Prepare self-defense		**Graduation**		

Risk analysis and possible solutions

My thesis will be finished in two countries and the process will be arranged by me, so the evaluation of risks and solutions is necessary to improve the level of feasibility of my thesis.

Time: It is a precise job to hold the accurate time follow the time schedule because a lot of research and study should be done in different places. The traffic, whether and cooperate situation are hard to be sure sometimes. So the frequent communication and

hold information like whether forecast and asking are essential part during the thesis time.

Literature: Mr. Zhang Yan could provide me some common literature from the Xilinhot Forestry Bureau. But there are still a lot of data and details about the wetland I couldn’t get from the literature. So I should do something to collect data by myself like looking into the books in library, searching on the Internet and make good note from the interview and observation.