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BOUNDARY DELINEATION OF MACHIARA NATIONAL PARK



Boundary Demarcation and Renotification
of Protected Areas Project

May 2008

GIS Laboratory WWF - Pakistan

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List of Abbreviations/Acronyms

ASC	Area Specific Committee
AJK	Azad Jammu and Kashmir
BP	Blue Pine
CP	Chir Pine
DEM	Digital Elevation Model
ERDAS	Earth Resources Data Analysis System
FCC	False Colour Composites
GIS	Geographical Information System
GPS	Global Positioning System
GR	Game Reserve
Ha	Hectare
Km	Kilometer
Mm	Millimeter
MLC	Maximum Likelihood Classifier
MNP	Machiara National Park
MoE	Ministry of Environment
NP	National Park
PA	Protected Area
PPEPCA	Pakistan Petroleum Exploration & Production Companies Association
SPOT	Satellite pour l'Observation de la Terre
TIN	Triangulated Irregular Network
UC	Union Council
WS	Wildlife Sanctuary
WWF	World Wide Fund for Nature

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Urooj Saeed
GIS Coordinator

This study is funded by Pakistan Petroleum Exploration and Production Companies Association (PPEPCA) for the project "Boundary Demarcation and Renotification of Protected Areas". Report deals with GIS based boundary delineation of Machiara National Park. SPOT (2.5m) satellite image, DEM, TIN and bio-physical GIS layers such as roads, ridges, settlements, nullahs, forest etc were used for the boundary delineation. Field data collection and Area Specific Committee (ASC) meetings lead to delineate the boundary accurately.

As the boundary and draft notification is developed on scientific basis and finalized by incorporating ASC comments. It is therefore recommended to demarcate and re-notify the MNP boundary with geographic coordinates.

1 INTRODUCTION

1.1 Background

There are almost 230 Protected Areas (PAs) in Pakistan of different categories such as National Parks (NPs), Wildlife Sanctuaries (WSs) and Game Reserves (GRs), covering around 11% land (2,753,357 ha) of the country. These PAs represent almost every ecological, terrestrial and aquatic ecosystem and are considerably important for their ecological and socio-economic services.

In Pakistan currently available information about Protected Areas (PAs) boundaries is only in the form of notifications and sketch maps. Most of the notifications are without any reference whereas in some notifications localities, roads, water channel or any other landmark is considered as a reference. Such references are not reliable in the long run as the land conditions change with passage of time i.e. shift in water channel or migration of certain locality. These references are much generalized and hence cause inaccuracies in position as well as in areas.

On the other hand, GIS provides an opportunity to define boundary of certain region with geographic information. Hence a need of PA notifications with proper geo-information of boundaries was identified so that ambiguities and errors will be avoided.

Considering all these issues, WWF – Pakistan (WWF – P) in collaboration with the Federal Ministry of Environment (MoE) and with financial assistance of Pakistan Petroleum Exploration & Production Companies Association (PPEPCA) organized a three day Consultative National Workshop on "Boundary Demarcation and Renotification of Protected Areas". Participants of the workshop included government officials, representatives of relevant civil society organization, petroleum exploration and production companies and independent consultants.

As an outcome of this workshop, WWF – P and PPEPCA launched the second phase of the "Boundary Demarcation and Renotification of Protected Areas" Project. Under phase-II, WWF - P will be delineating boundaries of seven selected Protected Areas. In this report GIS based boundary delineation of Machiara National Park has been discussed.

1.2 Study Area

The Machiara National Park (MNP) lies at 34°-31' N latitude and 73°-37' E longitude, located on the right bank of the River Neelum at about 35 km from Muzaffarabad. Kaghan Valley (Mansehra, District) is on its western side, while on eastern side lies the Neelum Valley (Neelum, District).

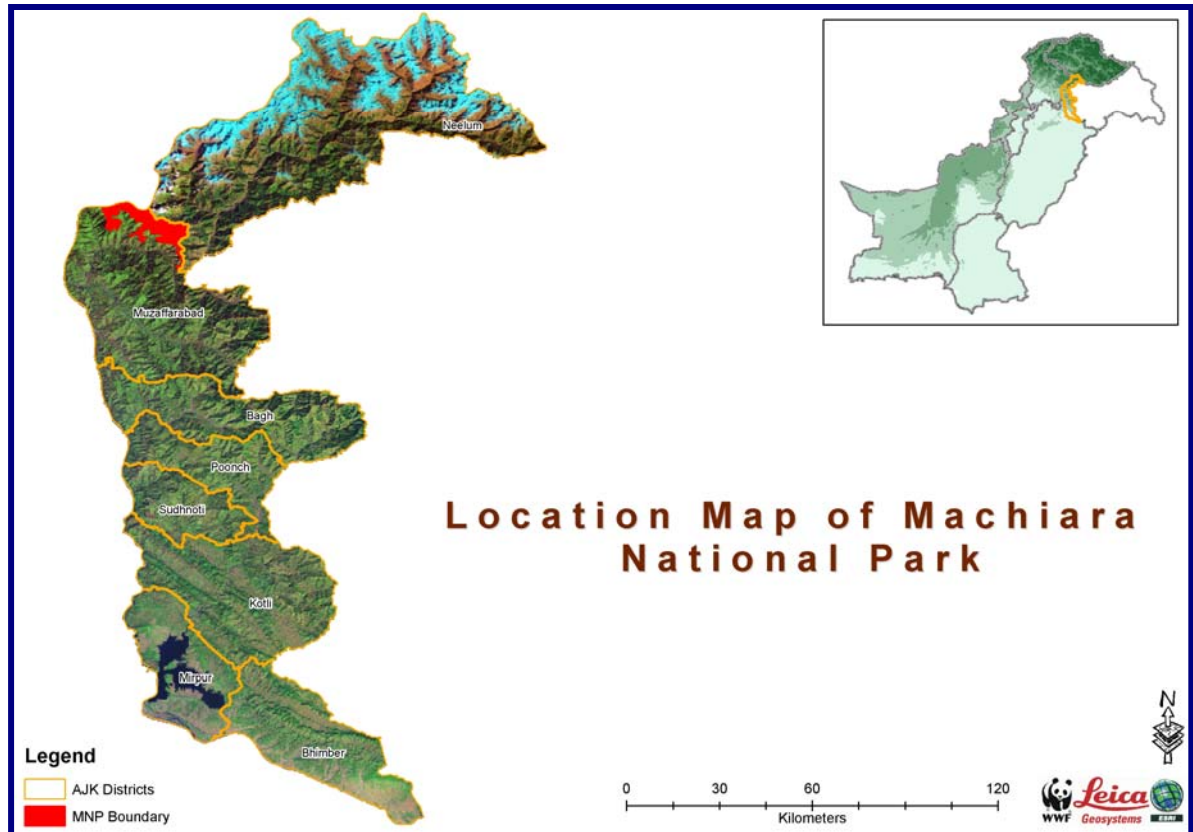


Figure 1. Location Map of Machiara National Park

Machiara National Park (MNP) covering 13,532 ha (33,437 acres) was given status of a National Park in 1982. It is situated in the Himalayan Highlands of AJK in the Muzaffarabad District. MNP is divided into three union councils i.e., Bagn, Machiara and Sarlisacha. Wildlife and Fisheries Department of AJK manages its field staff and different census data recording on the basis of UC's.

WWF has ranked the terrestrial Global 200 ecoregions by their conservation status. Machiara National Park is a part of Western Himalayan Broadleaf forest region. The Western Himalayan Ecoregion is one of the Global 200 Ecoregion. Two distinct forest types can be recognized in this ecoregion: evergreen broad-leaved forests and deciduous broad-leaved forest, are present in this part of the ecoregion.

MNP falls in the moist temperate zone with cold winters and deep snow. High peaks remain covered with snow till June or even longer, giving a splendid background to the lush green forest vegetation. The mean annual rainfall is 1526.7 mm, with 84.5 rainy days per year. The rainiest month is July with a mean rainfall of 327.6 mm, while the driest month is November receiving a mean rainfall of only 35.4 mm. It houses a broad range of ecological function from permanent snow fields and alpine pastures to variety of Himalayan forest types.

2 METHODOLOGY

Field data, Habitat mapping, topographic layers and Landcover maps were used to delineate the draft MNP boundary. ASC meetings lead to rectification of the draft GIS layer. Project workflow is shown in Figure. 2.

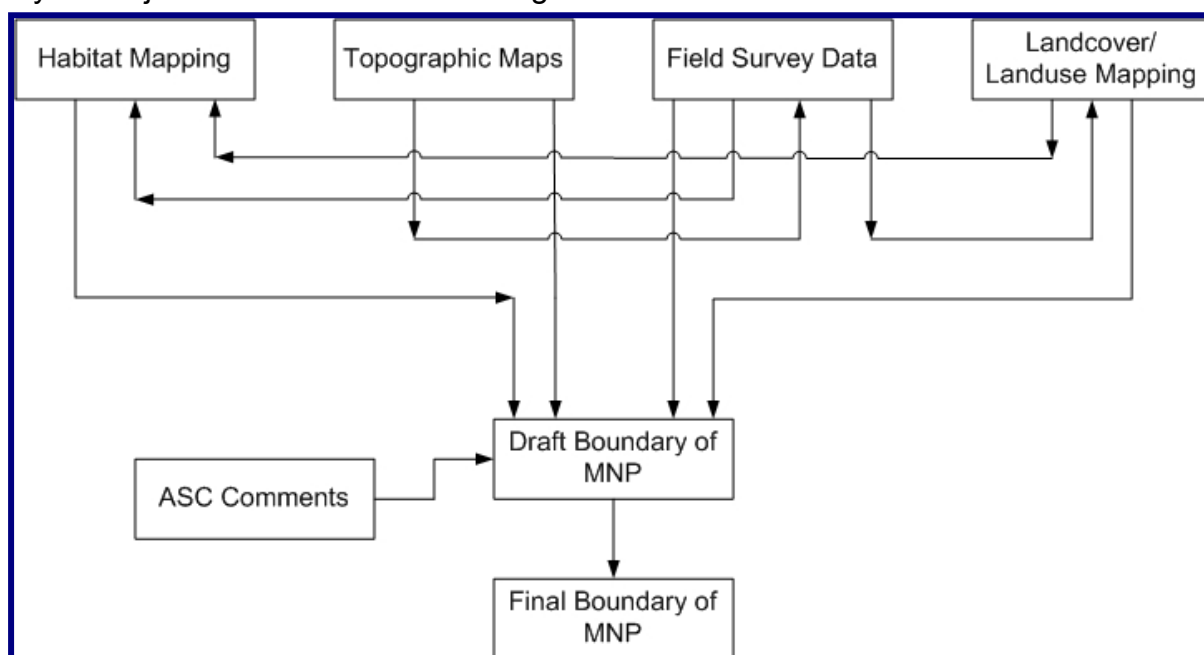


Figure 2. Flow Chart indicating project work

2.1 Preprocessing

SPOT – 5 image acquired on 20th October, 2005 was procured in multispectral (10m) as well as in panchromatic bands (2.5 m). The acquired image was in GeoTiff format. These files were imported into the image processing software ERDAS IMAGINE 8.7 by using the import utility.

SPOT multispectral imagery has lower spatial resolution (10 m) and four spectral bands as compared to its panchromatic layer that characterizes higher spatial resolution (2.4m) and a single spectral band. High-resolution merge with multiplicative and bilinear interpolation were used to improve the visual interpretability of the datasets. Output image (Plate 1) is a high-resolution (2.4m) multispectral image with greater details which was integrated with the GIS layers for the boundary delineation of the National Park.

Topographic sheets were imported from TIFF to IMG format using ERDAS Imagine import option. Second order polynomial option was used to provide more accuracy in the geo-rectification process. Overall, nine control points were used for the georectification of each sheet. These points were laying on the extreme edges of the map and one in the centre. Output georectified maps were in Geographic projection system with Spheroid EVEREST and Datum were selected as Indian (Bangladesh)

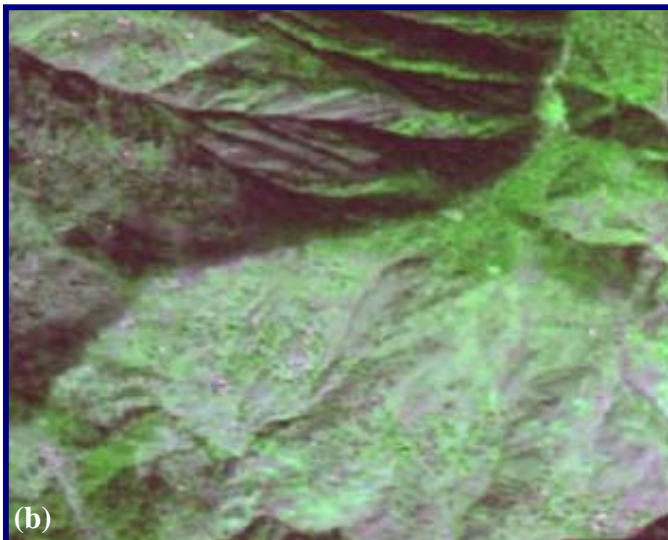


Plate 1. Quickbird (a) panchromatic, (b) multispectral and (c) high resolution merged imagery

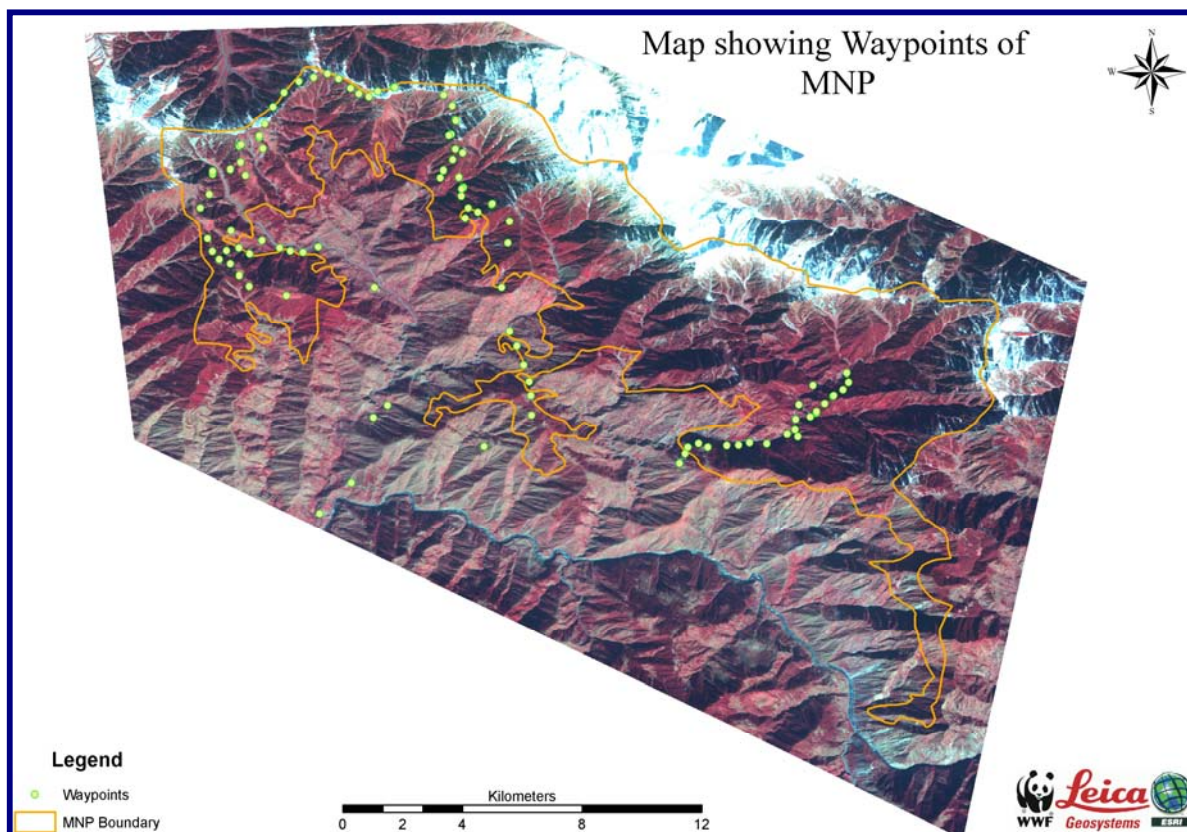


Figure 4. Field observation points in MNP

Some of the field observations are as follows;

1. October 8, 2005 earthquake destroyed MNP forest very badly. Affected trees were scattered everywhere.



Figure 5. Digital photographs of effected area

2. Different types of vegetation species were observed in MNP. In the Conifer forest Blue Pine, Fir, Chir Pine, and Deodar exists. In the National Park, blue pine and fir are the most dominant species of conifer forest (Figure 6). Both vegetation types

are present in different slopes and aspects. Blue Pine is present in the North East side where direct sunlight falls on the mountainous slope. While Fir is present in the North West side under the shadow of mountain ridge. Deodar does not cover a large area.

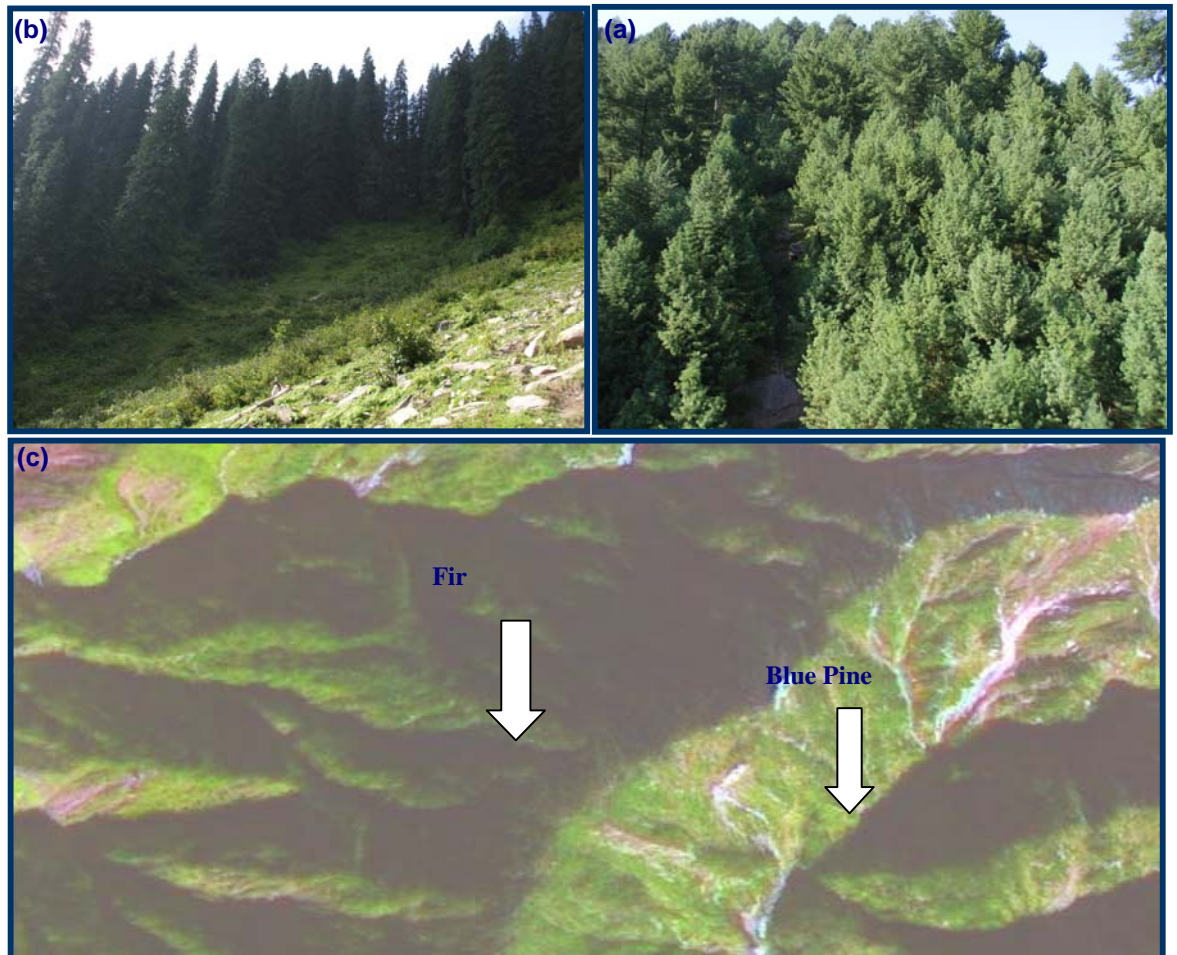


Figure 6. Digital photographs (a) Blue Pine (b) Fir and (c) Satellite Image of Blue Pine and Fir

3. Pastures and grasslands also cover large areas in MNP. Local communities spend their summer season on those pastures with their livestock due to the shortage of fodder in the villages. Digital photograph and satellite image of a water body in pasture land is shown in Figure 7.
4. In MNP relatively smaller area is covered with broadleaved forest mixed with conifer forest (Figure 8). Karkas Cinqana, Akhrot, Bankhor are the main broadleaved species in the area. Some patches of Karkas Cinqana mixed with Conifer forest was also observed while other broadleaved species were on very small area.

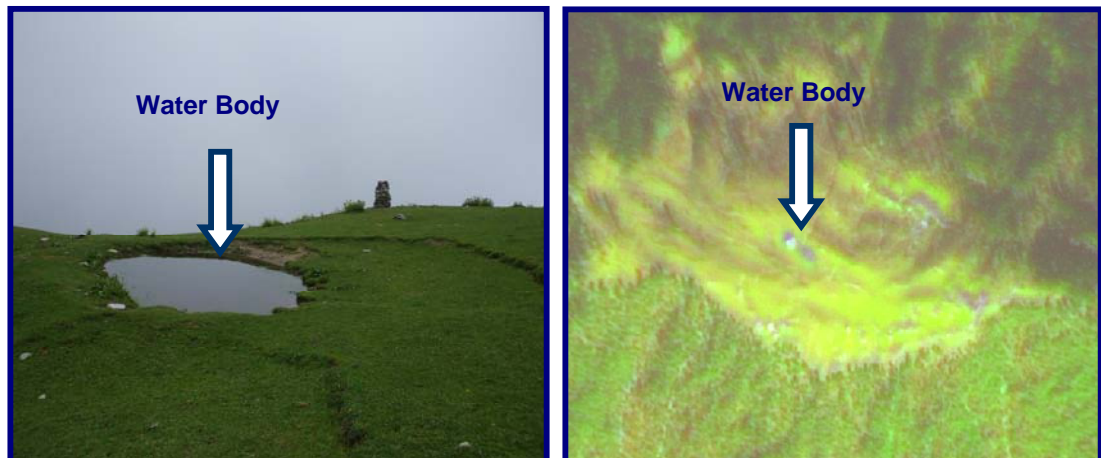


Figure 7. Pasture land (a) Digital photograph (b) Satellite data

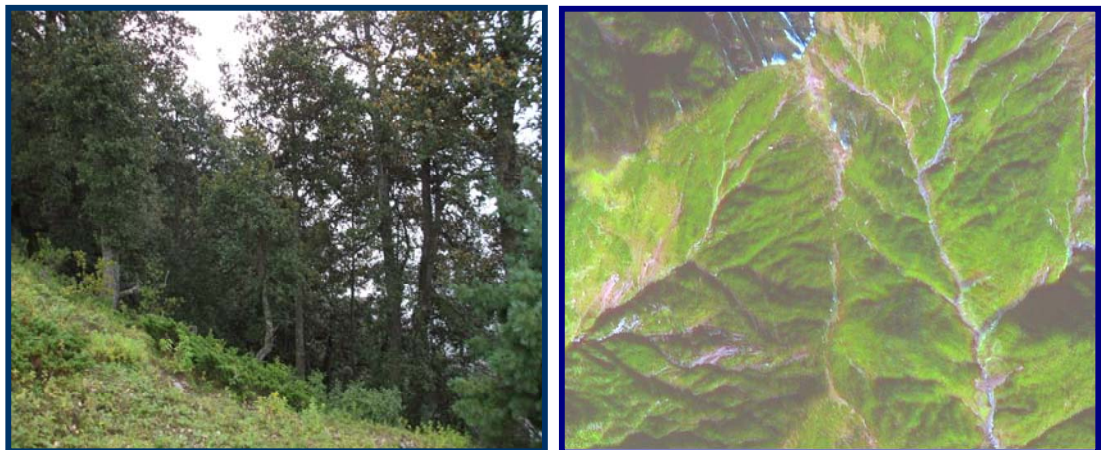


Figure 8. Broadleaved with mixing of conifer forest

5. On pasture lands home steds (huts) were also present. They are not identifiable through the satellite image due to the high spatial frequency.
6. Earthquake (2005) had a drastic impact over an extensive area of the forest cover. According to Qamar (Social Mobilizer, MNP) approximately 5000-6000 trees were damaged by earthquake in 8A compartment.

2.4 Landcover Mapping

Satellite sensor recorded electromagnetic radiation response by the earth features in digital format. The response of spectrum values of different features depends on internal characteristics of features. On the basis of pixels spectral values thematic layer is generated which is called classification or landcover/landuse mapping.

Supervised classification on multispectral imagery was adopted for thematic layer generation of MNP. In supervise classification training areas were identified on the bases of ground observations. The range of region growing in metric form was controlled through Euclidean distance. Spectral response curve, scatter plot and histogram helped to assign class name with specific colour. Sufficient and well


scattered training areas of each class were taken on the whole image. Forty seven training areas covering maximum diversity of spectral range were selected.

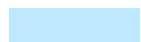
Maximum Likelihood Classification (MLC) algorithm was performed to develop thematic layer. For better interpretation, output thematic layer was recoded into seven landcover classes.


Table 1. Landcover classes along with class and percentage area of NP

No	Landcover Classes	Area (ha)	Percentage Area of NP
1	Conifer Forest	7718	56.6
2	Broadleaved and Conifer Forest	491	3.6
3	Conifer Forest , Shrub, Grasses	1112	8.16
4	Pasture Land, Grasses	2118	15.53
5	Settlement and Grasses	1431	10.49
6	Water / Rocks	208	1.53
7	Snow	557	4.08


Seven major classes were identified in MNP for landcover/landuse mapping (Fig. 9). The description of landcover/landuse classes is given below with their colours.


 “Conifer Forest” is dominating class in MNP. Blue pine, Fir Chir pine and Deodars are key species of conifer forest which cover more than 50 percent area of MNP.


 “Broadleaved and Conifer Forest” class covers dominating conifer with mixing of broad leaved forest. Broadleaved are present in selected area of MNP. This class covered 3.60 % area of total landcover/ landuse.

 “Conifer Forest, Shrubs, Grasses” is mixture of classes. Shrubs and grasses were present with very sparse conifer forest. In summer season the growth of shrubs and grasses increase comparatively in winter season. This class covered 8.16 % area of total landcover/ landuse of MNP.

Broadleaves and Conifer forest” and “Conifer Forest, Shrub, Grasses” both classes covers conifer forest as a dominant.

 “Pasture Land, Grasses” class is covering the area in MNP on which local people spend their summer season with their livestock. On pasture land they have built huts for themselves and livestock.

 “Settlement and Grasses” class is a mixture of settlement, soil and grass. The percentage area covered by this class is 10.49% of total area

 “Water and Rocks” class consist of water body and rocks. The mixing of water class with rocks is due to the naturally flow of water on rocks. In local language

this type of flow water is called "*Chashma*". At some places the reflectance of water was hindered by clouds and snow. The area covered by this class is 1.53 % of the total area of landcover/landuse of MNP.

■ "Snow" is a pure and individual class picked by the satellite image like conifer forest. The northern mountains of MNP are covered with snow throughout the year. The mountains covered with snow are called "*Ghanga Pahar*" by the locals.

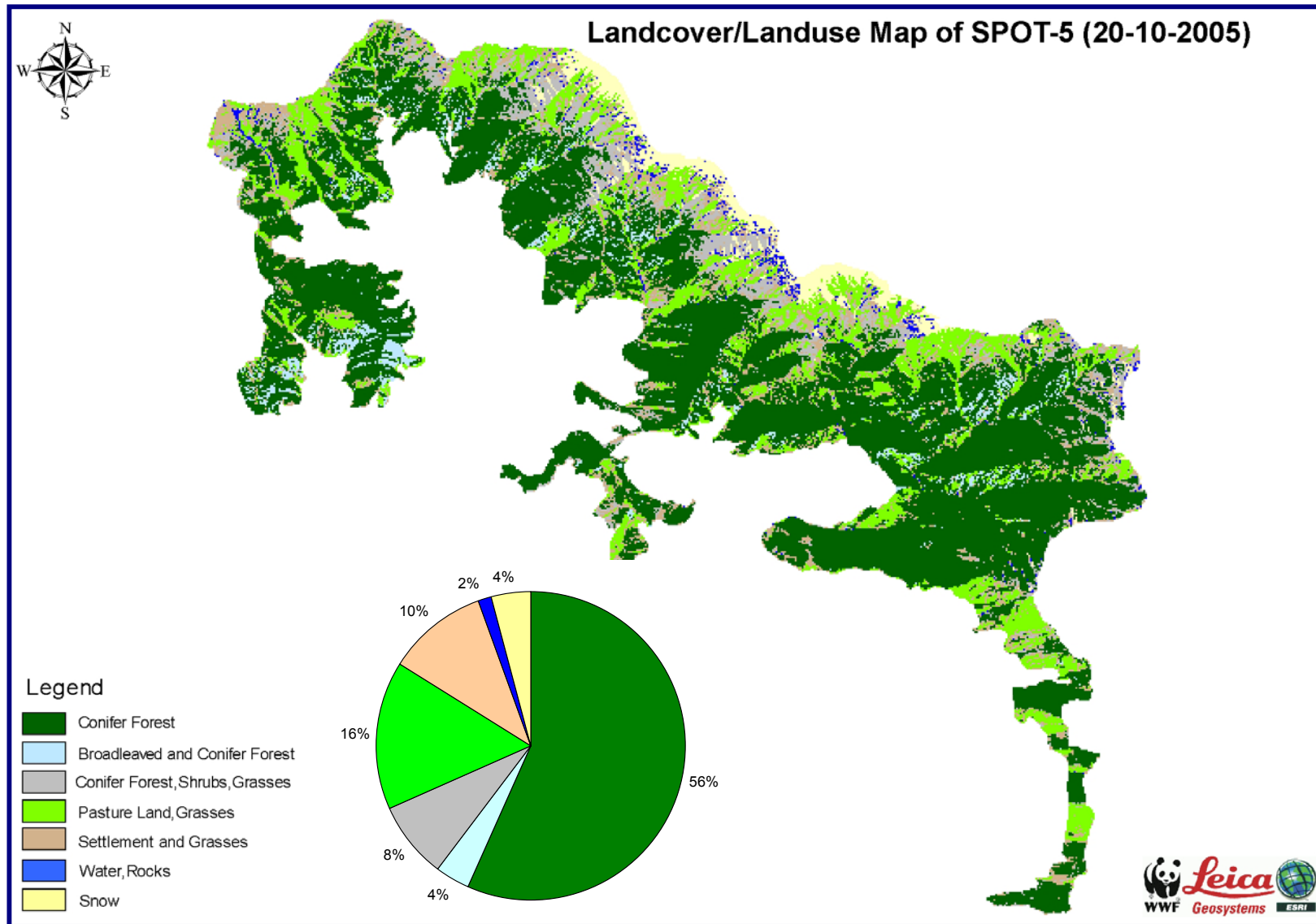


Figure 9. Landcover map of Machiara National Park

2.5 Habitat Mapping of Wildlife Species

Machiara National Park is very rich in biodiversity and is a habitat of hundreds of important animals, birds and plant species of economic importance, including rare and globally significant wildlife species of Snow leopard (*Uncia uncia*), Musk deer (*Moschus chrysogaster*), Western Horned-Tragopan (*Tragopan melanocephalus*), Cheer pheasant (*Catreus wallichii*), Lammergeier (*Gypaetus barbatus*) and the Himalayan Griffon Vulture (*Gyps himalayensis*). The park also harbors some flagship species of birds and mammals such as Western Horned Tragopan (*Tragopan melanocephalus*) and Musk Deer (*Moschus chrysogaster*) (Anwar *et al.* 2006).

In MNP there are 42 recorded mammal species (Baig, 2004) and more than 100 recorded bird species including both migratory and resident (Roberts, 1992 & Hassan, 2004) while few species of reptiles (n=25) and amphibians (n=7) have also been recorded (Baig, 2004). High species richness in MNP represents diversity in habitats, which is due to great variations in extreme altitudes and slopes of mountains of MNP.

A limited number of reports are available on species distribution in MNP but uptill now no proper maps based on the geographical distribution and habitats of these species have not been developed. Maps and attributed information on the geographical distribution of the wildlife species of MNP, collected through different reports including PAMP is discussed below.

Data and information on the occurrence and distribution of wildlife species was collected from different sources. Wildlife survey reports (compiled by different consultants) and data encoding forms (for birds, large and small mammals) were obtained from the Wildlife and Fisheries Department and WWF office in Muzaffarabd. The acquired reports did not specify vantage points of the species sightings instead the sighting records were mentioned with the name of localities. Therefore it was difficult to plot this data in a systematic way. To overcome this difficulty a field survey was conducted to gather vantage points of the locations mentioned in the reports. These geographical coordinates along with the localities of the distribution of wildlife species were entered into *MS Excel* for further processing. These geographic points helped in delineating habitat of species within the park.

For birds, reptiles and amphibians, vantage points (GPS coordinates) were mapped and their attribute information was established while for selected large and small mammals, their habitat was also visualised together with their vantage points.

2.5.1 Mammals Habitats Mapping

There are no concise and comprehensive data/maps available on the spatial distribution of the mammals within MNP region. Nonetheless, there are a number of wildlife ecologists and biologists who have studied and surveyed MNP with more or less account of the spatial distribution.

The data for mapping the spatial information of eight mammal species, out of the recorded mammals, were obtained from different data sources namely:

- “Compilation of baseline Data for Zoological and Wildlife Studies in MNP by Dr. Baig (2004)”.
- “Study on the Population of Selected Wildlife Species in MNP by Anwar *et al.* 2006.

The habitat extent of some key mammal species within the MNP region was also pointed out by the wildlife staff of MNP which was purely based on their field experience and knowledge. They identified different species habitat in MNP. These areas were manually delineated on the map and displayed for development and analysis. Developed maps indicate the known spatial distribution of wildlife habitats of the mammals within ANP.

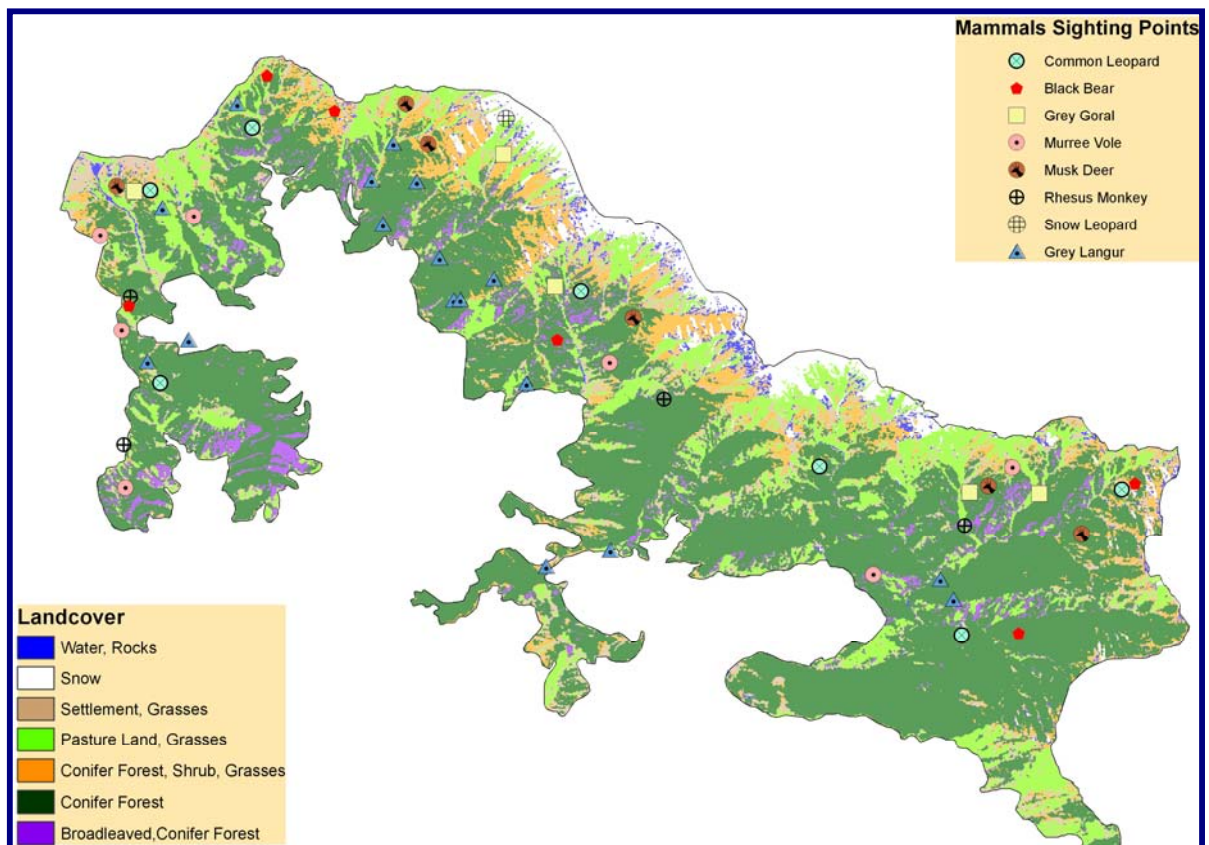


Figure 10. Mammals sighting points in MNP

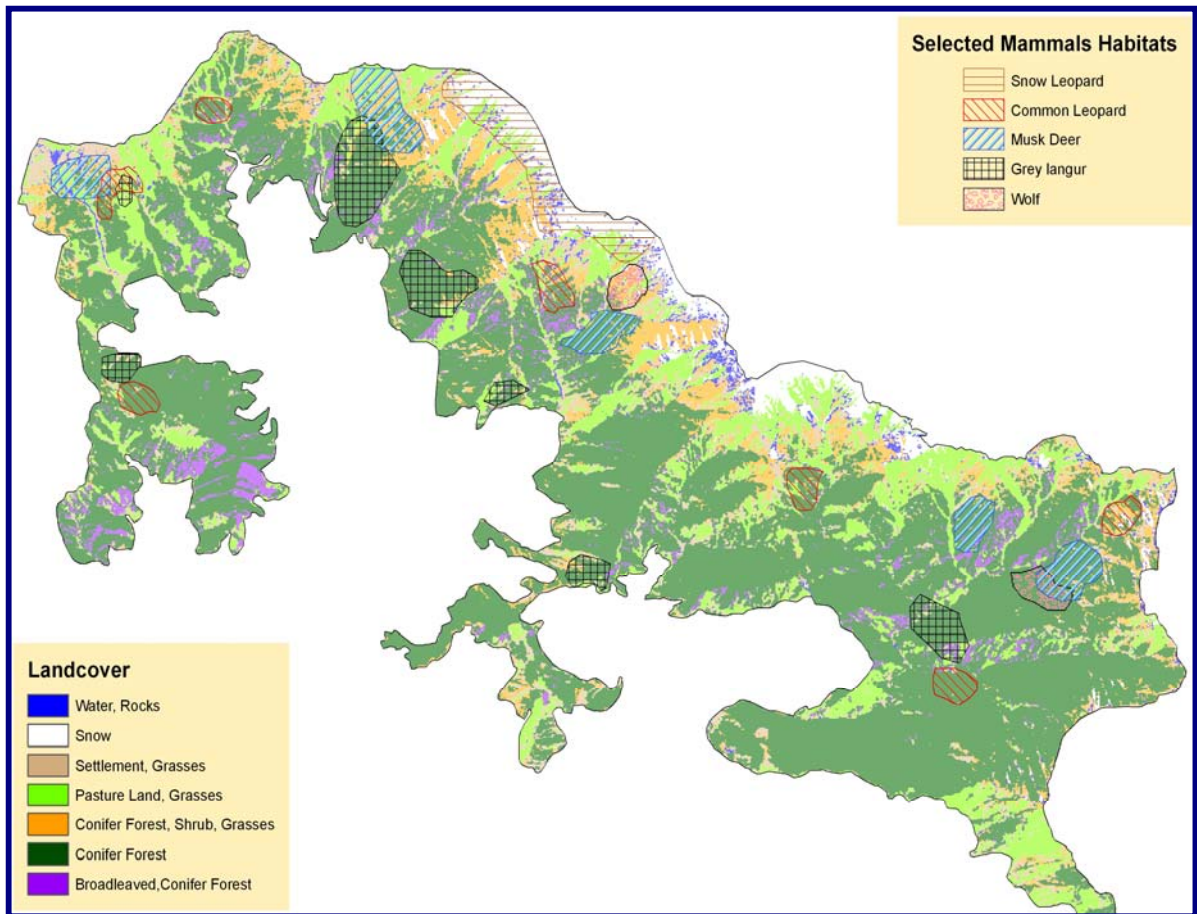


Figure 11. Selected mammals hot spots within MNP

2.5.2 Reptiles and Amphibians Mapping

Reptiles and amphibians of MNP have been surveyed and documented by Baig, 2004. In order to show the spatial distribution of the micro-habitats of reptiles and amphibians data were taken from the aforementioned report and from a checklist of amphibians provided by the MNP staff.

The report and checklist were reviewed and the species data having GPS readings were compiled. Only six species of reptiles and two of amphibians had GPS locations which were *converted into GIS format* (Figure. 12).

2.5.3 Birds Distribution Mapping

Bird's distribution map (Figure. 13) is based on the data collected by Hassan 2004, in the MNP. The data from report were extracted and transferred into *MS Excel* format and added as 'event theme' in Arc-View. The final shape file was saved as GIS layer for quick retrieval, visualisation and update in future.

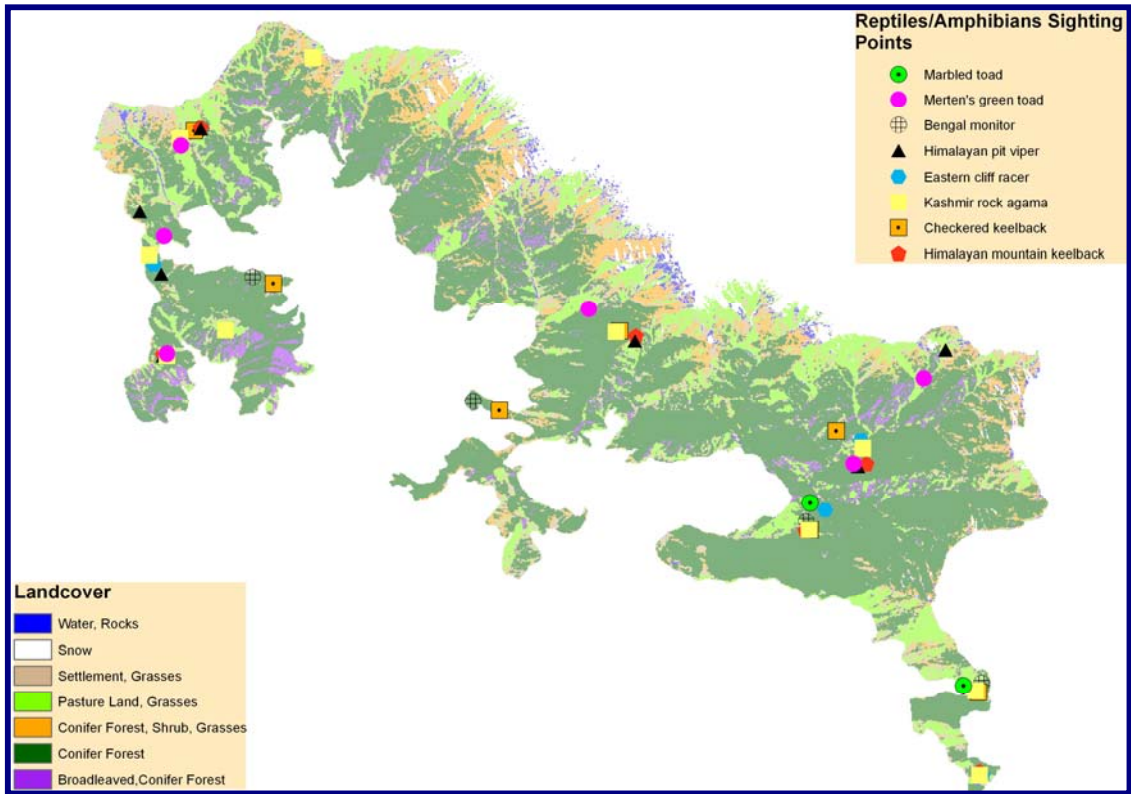


Figure 12. Reptiles/Amphibians distribution within MNP

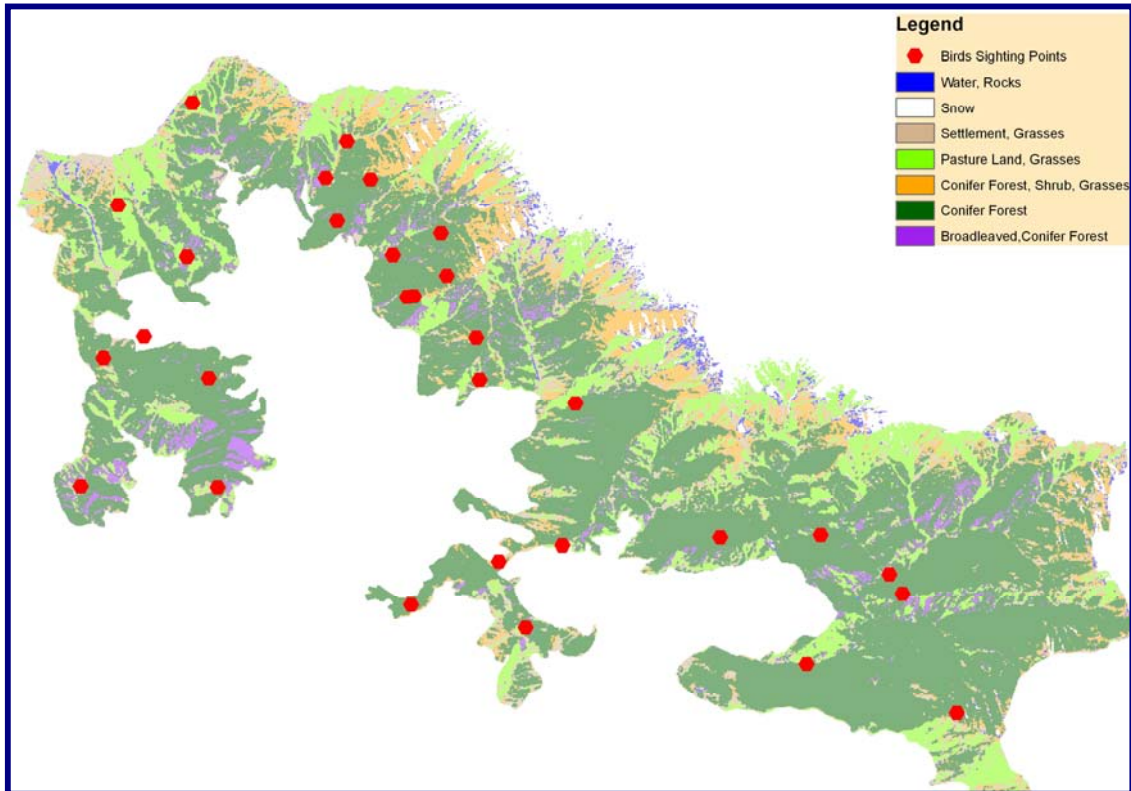


Figure 13. Birds distribution within MNP

2.6 Boundary Delineation

2.6.1 Legal Status and Customary Rights

Legally, the Park's land comprises of the Estate forest in the Kotla Forest Range of the Muzaffarabad Forest Division. Population of Bheri, Machiara and Serli Sacha Union Councils lies adjacent to the MNP boundary and is directly dependent upon the resources of the Park. According to 1998 census, approximately 33,000 people are living in the park periphery. In addition, an estimated 13,700 livestock population also live in and around the Park.

The Government of AJK declared area comprising of MNP as a Game Reserve in 1982. However, on the recommendation of WWF - P, its status was elevated to a National Park by the Government of AJK in 1996 (Annexure 2). Previously, compartment 7 - 15 falling in the MNP constituted part of the Kotla Range of the Muzaffarabad Forest Division.

2.6.2 Area and Boundaries

The Machiara National Park comprises of nine compartments of the Kotla Range in Muzaffarabad Forest Division. They are further subdivided into sub-compartments. MNP is bounded by the Kaghan Forest Division of NWFP towards North and Northeast, Keran Forest Division to its East and South East and Neelam River to its South. The total notified area of the Park is 33437 Acres (13532 ha). Forest compartment area within MNP is given below;

Table 2. Forest Compartments in MNP

S.No	Compartment No.	Area (Acres)
1	7	1463
2	8a	3100
3	8b	8396
4	9	900
5	10	3879
6	11	4857
7	12	3485
8	13a	1589
9	13b	681
10	13c	817
11	14	1681
12	15a	1076
13	15b	1500
Total		33424

Data collected with the help of field staff during the trip was very helpful in the boundary delineation process.

Team members involved in boundary delineation and field data collection include Mr. Zaman (game watcher), Mr. Muhammad Akram (Head watcher), Qamar uz Zaman (Social mobilizer) and Mr. Riaz Aziz (Social mobilizer) of Machiara National Park, Mr. Hassan Ali, Mr. Hammad Gillani, Ms. Urooj Saeed and Ms. Kaif Gill from the GIS Laboratory WWF Pakistan.

During the field survey GPS observations for all the land features necessary to delineate the boundary were recorded. Main objective of collecting the ground truth data was to verify various village points that exist along the boundary of the Machiara National Park. It was not possible to move along the whole boundary of MNP due to very difficult terrain and steep slopes. However an effort was made to cover maximum area.

GPS field observations were overlaid on the satellite images in the Arc GIS 9.0. SPOT satellite image, DEM, TIN and bio-physical GIS layers such as roads, ridges, settlements, nullahs, forest etc were used for the boundary delineation.

A draft GIS boundary was developed and shared with ASC, MNP field staff and the Wildlife and Fisheries Department of AJK for open discussion. The ASC comments were incorporated and a final boundary layer was developed (Figure. 15)

3 RESULTS AND DISCUSSION

3.1 MNP Boundary

Boundary delineated with assistance of MNP field staff, ecological baseline mapping, topographic mapping and field data was incorporated. It reveals that it covers the area of 13554 ha (33492 acres) whereas area mentioned in the notification of MNP is 13531 ha (33437 acres). The delineated boundary area is based on scientific steps followed by using GIS systems. For further discussion the boundary has been subclassified into six sections (Figure 15);

Section A

Western side of the MNP boundary extends in the southern direction covering the reserve forest of the Kutla range comprising of Compartment number 7 and 8. Drigan, Dhori Baik and Jabser settlements lie in the outer peripheries of the extreme south western part of the boundary.

Section B

Boundaries of 8a, 8b and 9 forest compartments and elevation values (ridge lines) were taken as reference for the boundary delineation. Nearby populated areas include Bheri, Lower Sokur, Shahkhori, Gali Kheter and Magri.

Section C

This area extends in the southern side forest of Compartment 10 and a portion of Compartment 9. Machiara, Mohri, Jabra and Miran di gali are the populated areas adjacent to the boundary.

Section D

This area lies near in Sarli Sachha Union Council and the boundary follows the forest compartment 11, 15a and 15b. Settlements adjacent to the boundary includes Lassi Danna, Kheter and Nakka.

Section E

This area is a tail like posture extending towards the southern side and comprise of a part of 15b forest compartment. Adjacent populated areas include Jargi, Chunj Parahri and Garatnar.

Section F

The Northern MNP boundary follows the forest compartments number 8b to 15 as well ridge line.

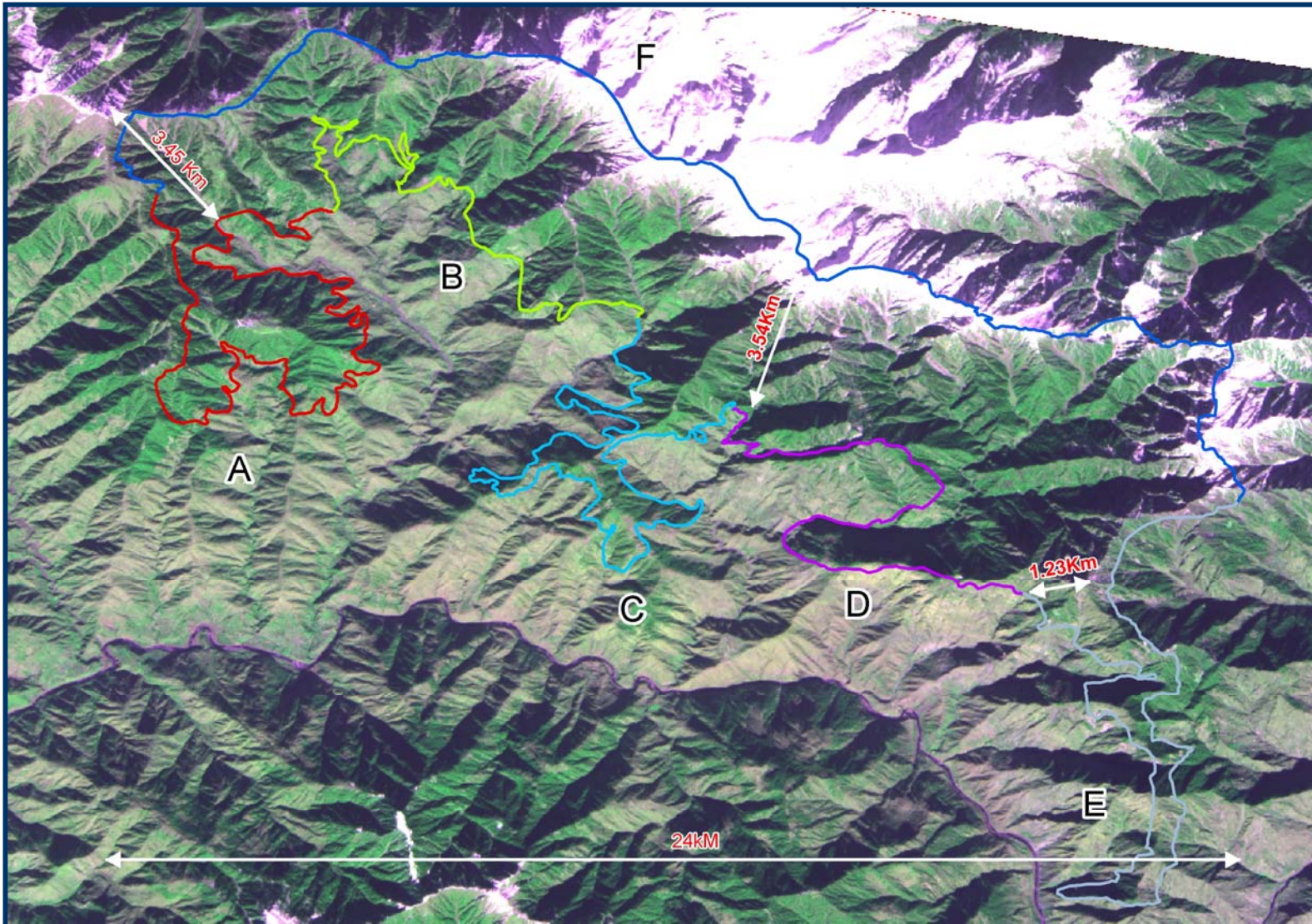


Figure 15. Length and width at various sections of MNP

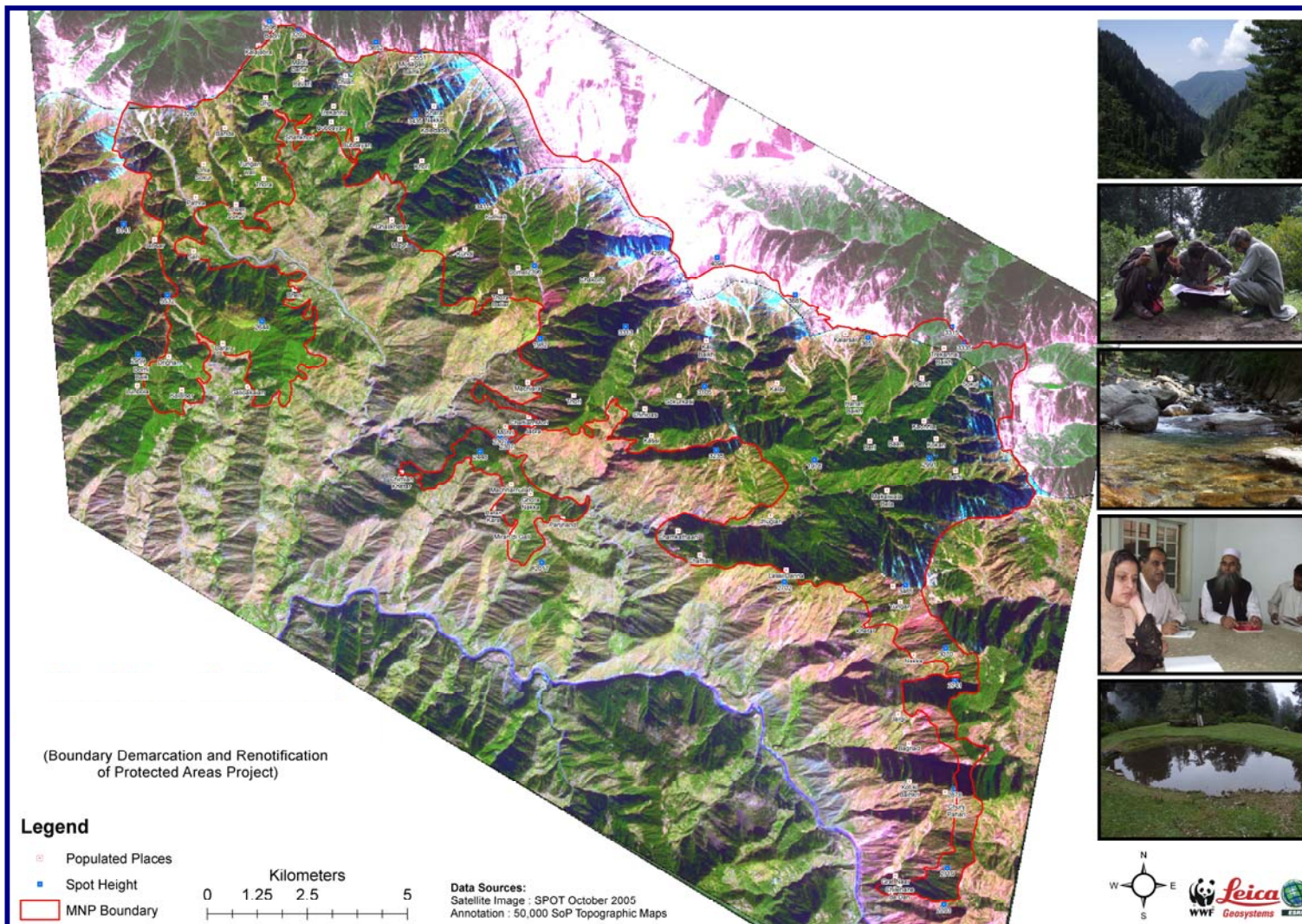


Figure 16. MNP Boundary Map

3.2 Draft Notification Format

On the basis of delineated boundary, a draft notification of MNP was developed. During the drafting process almost 30 notification formats of PA lying in different provinces of Pakistan were reviewed. In addition to that information about the PA notification available on the World Wide Web was also consulted. Recommended draft notification of ANP is given below;

GOVERNMENT OF AZAD JAMMU & KASHMIR FOREST, WILDLIFE & FISHERIES DEPARTMENT

Dated: 03-04-2008

NOTIFICATION

No. SOP (WL) 12.1/2008

In exercise of the powers conferred by section 32 (4) of the Azad Jammu & Kashmir Wildlife Act _1975, the Government of Azad Jammu & Kashmir is pleased to revise the boundaries of Machiara National Park specified in the schedule given below with immediate effect.

SCHEDULE

- | | | |
|----------------|---|--|
| 1) District(s) | : | Muzaffarabad |
| 2) Tehsil(s) | : | Muzaffarabad |
| 3) Locality | : | Machiara National Park |
| 4) Area | : | 23437 acres |
| 5) Coordinates | : | 73°30'45 to 73°45'55 E and 34°35'18 to 34°23'32 N |

REFERENCE

Satellite Image SPOT-5 (2.5 m)
1: 50,000 Surveys of Pakistan Maps
Projection: Geographic
Datum and Spheroid: World Geodetic System (WGS) 84

BOUNDARIES

North:

It starts from a grid reference point N1 (73°31'3.216"; 34°34'12.3") at the Mansehra/Muzaffarabad district boundary and follows the boundary line to grid reference point N2 (73°36'37.26"; 34°34'57.18") in eastern direction reaching grid

reference N3 (73°38'52.476"; 34°33'27.48") in south east direction. From here it moves further in southeast direction along the Neelam/Muzaffarabad districts boundary reaching grid reference N4 (73°42'35.352"; 34°31'18.18") and then travels in the eastern direction meeting grid reference N5 (73°45'43.704"; 34°31'5.58")

East:

From grid reference point E1 (73°45'43.704"; 34°31'5.58") it follows the Neelam/Muzaffarabad districts boundary towards southern direction ends up at grid reference point E2 (73°44'47.328"; 34°23'35.46").

South:

It starts from the grid reference point S1 (73°44'47.328"; 34°23'35.46") and runs along the extent of three union councils Sarli Sacha, Machiara and Bheri respectively ending at grid reference point S17 (73°31'35.868"; 34°30'1.86"). (Grid reference points between point S1 and S17 are: S2 (73°43'24.636"; 34°23'43.14"); S3 (73°43'47.964"; 34°26'30.12"); S4 (73°39'43.668"; 34°28'24.18"); S5 (73°41'53.16"; 34°29'9.78"); S6 (73°38'56.436"; 34°29'45.6"); S7 (73°38'38.508"; 34°28'56.7"); S8 (73°37'34.176"; 34°28'1.38") S9 (73°35'32.028"; 34°29'16.26") S10 (73°36'42.084"; 34°30'23.04"); S11 (73°37'51.276"; 34°31'33.06"); S12 (73°36'14.364"; 34°31'33.06"); S13 (73°33'27.432"; 34°34'7.02"); S14 (73°31'49.728"; 34°32'16.26"); S15 (73°33'57.564"; 34°31'55.08"); S16 (73°33'7.884"; 34°30'9.18"))

West:

Western boundary starts form grid reference point W1 (73°31'35.868"; 34°30'1.86") and runs toward the northern side ending at grid reference point W2 (73°31'3.216"; 34°34'12.3").

(Authority)
Government of
Azad Jammu & Kashmir

A copy is forwarded to the:-

1. Secretary to President of Azad Jammu and Kashmir.
2. Secretary to Prime Minister of Azad Jammu and Kashmir.
3. Private Secretary to Minister Tourism, Fisheries and Wildlife.

List of boundary coordinates

No	Longitude	Latitude	No	Longitude	Latitude
1	73°33'51''	34°31'28''	230	73°31'33''	34°30'2''
2	73°34'7''	34°31'28''	231	73°31'24''	34°30'16''
3	73°34'5''	34°31'3''	232	73°31'22''	34°30'20''
4	73°34'4''	34°31'2''	233	73°31'26''	34°30'42''
5	73°34'2''	34°30'51''	234	73°31'44''	34°31'8''
6	73°34'18''	34°30'46''	235	73°31'47''	34°31'35''
7	73°34'18''	34°30'45''	236	73°31'34''	34°32'13''
8	73°34'5''	34°30'41''	237	73°31'36''	34°32'35''
9	73°34'4''	34°30'40''	238	73°31'35''	34°32'37''
10	73°33'51''	34°30'38''	239	73°31'32''	34°32'37''
11	73°34'0''	34°30'31''	240	73°31'15''	34°32'50''
12	73°33'59''	34°30'30''	241	73°31'16''	34°32'53''
13	73°33'58''	34°30'30''	242	73°31'25''	34°33'12''
14	73°33'47''	34°30'29''	243	73°31'23''	34°33'15''
15	73°33'46''	34°30'29''	244	73°31'2''	34°33'18''
16	73°33'45''	34°30'23''	245	73°30'59''	34°33'20''
17	73°33'37''	34°30'8''	246	73°30'57''	34°33'22''
18	73°33'36''	34°30'8''	247	73°30'46''	34°33'34''
19	73°33'26''	34°30'12''	248	73°30'46''	34°33'36''
20	73°33'8''	34°30'8''	249	73°30'47''	34°33'38''
21	73°33'4''	34°30'25''	250	73°30'48''	34°33'39''
22	73°33'3''	34°30'40''	251	73°30'59''	34°34'8''
23	73°32'43''	34°30'49''	252	73°31'18''	34°34'9''
24	73°32'37''	34°30'53''	253	73°31'45''	34°34'10''
25	73°32'29''	34°30'58''	254	73°32'10''	34°34'13''
26	73°32'23''	34°31'1''	255	73°32'12''	34°34'14''
27	73°32'11''	34°31'3''	256	73°32'38''	34°34'26''
28	73°32'25''	34°30'53''	257	73°32'38''	34°34'26''
29	73°32'24''	34°30'51''	258	73°32'38''	34°34'27''
30	73°32'20''	34°30'43''	259	73°32'39''	34°34'28''
31	73°32'25''	34°30'32''	260	73°32'41''	34°34'30''
32	73°32'25''	34°30'31''	261	73°33'6''	34°34'58''
33	73°32'19''	34°30'26''	262	73°33'21''	34°35'13''
34	73°32'19''	34°30'26''	263	73°33'23''	34°35'15''
35	73°32'20''	34°30'18''	264	73°33'36''	34°35'17''
36	73°32'14''	34°30'10''	265	73°33'39''	34°35'17''
37	73°32'12''	34°30'10''	266	73°33'41''	34°35'18''
38	73°32'0''	34°30'10''	267	73°33'58''	34°35'11''
39	73°31'51''	34°30'3''	268	73°34'1''	34°35'11''
40	73°31'37''	34°30'1''	269	73°34'18''	34°35'1''
41	73°34'27''	34°34'51''	270	73°41'23''	34°32'2''
42	73°34'29''	34°34'51''	271	73°41'42''	34°31'50''

43	73°34'42"	34°34'48"	272	73°41'43"	34°31'48"
44	73°34'42"	34°34'48"	273	73°41'43"	34°31'46"
45	73°34'43"	34°34'48"	274	73°42'8"	34°31'38"
46	73°34'44"	34°34'48"	275	73°42'12"	34°31'36"
47	73°34'45"	34°34'49"	276	73°42'37"	34°31'18"
48	73°34'46"	34°34'49"	277	73°42'40"	34°31'19"
49	73°35'9"	34°34'58"	278	73°42'40"	34°31'19"
50	73°35'12"	34°34'59"	279	73°43'3"	34°31'16"
51	73°35'43"	34°34'56"	280	73°43'5"	34°31'16"
52	73°35'44"	34°34'57"	281	73°43'6"	34°31'16"
53	73°35'45"	34°34'57"	282	73°43'32"	34°31'12"
54	73°35'45"	34°34'57"	283	73°44'3"	34°31'23"
55	73°35'47"	34°34'59"	284	73°44'27"	34°31'25"
56	73°36'22"	34°34'58"	285	73°44'40"	34°31'12"
57	73°36'49"	34°34'51"	286	73°44'41"	34°31'11"
58	73°37'1"	34°34'45"	287	73°44'41"	34°31'10"
59	73°37'31"	34°34'18"	288	73°44'43"	34°31'9"
60	73°37'32"	34°34'17"	289	73°44'44"	34°31'8"
61	73°37'45"	34°33'51"	290	73°44'45"	34°31'8"
62	73°38'10"	34°33'34"	291	73°44'46"	34°31'8"
63	73°38'39"	34°33'32"	292	73°45'9"	34°31'7"
64	73°38'44"	34°33'30"	293	73°45'29"	34°31'5"
65	73°39'4"	34°33'18"	294	73°45'31"	34°31'4"
66	73°39'24"	34°32'47"	295	73°45'41"	34°31'4"
67	73°39'34"	34°32'45"	296	73°45'42"	34°31'5"
68	73°39'37"	34°32'45"	297	73°45'44"	34°31'6"
69	73°39'57"	34°32'33"	298	73°45'44"	34°31'6"
70	73°39'57"	34°32'31"	299	73°45'44"	34°31'2"
71	73°39'55"	34°32'19"	300	73°45'45"	34°30'49"
72	73°39'57"	34°32'17"	301	73°45'43"	34°30'46"
73	73°40'1"	34°32'15"	302	73°45'43"	34°30'46"
74	73°40'11"	34°31'57"	303	73°45'32"	34°30'38"
75	73°40'12"	34°31'56"	304	73°45'31"	34°30'33"
76	73°40'13"	34°31'56"	305	73°45'32"	34°30'10"
77	73°40'15"	34°31'57"	306	73°45'32"	34°30'7"
78	73°40'15"	34°31'57"	307	73°45'31"	34°30'6"
79	73°40'37"	34°32'5"	308	73°45'29"	34°30'7"
80	73°41'21"	34°32'2"	309	73°45'18"	34°30'3"
81	73°45'19"	34°30'2"	310	73°45'2"	34°26'25"
82	73°45'19"	34°30'1"	311	73°44'44"	34°26'22"
83	73°45'18"	34°29'59"	312	73°44'42"	34°26'21"
84	73°45'21"	34°29'48"	313	73°44'42"	34°26'20"
85	73°45'22"	34°29'45"	314	73°44'40"	34°26'19"
86	73°45'22"	34°29'43"	315	73°44'38"	34°26'2"
87	73°45'35"	34°29'34"	316	73°44'39"	34°26'1"

88	73°45'35''	34°29'34''	317	73°44'41''	34°25'48''
89	73°45'36''	34°29'33''	318	73°44'41''	34°25'46''
90	73°45'37''	34°29'32''	319	73°44'41''	34°25'46''
91	73°45'47''	34°29'15''	320	73°44'41''	34°25'45''
92	73°45'53''	34°29'2''	321	73°44'52''	34°25'45''
93	73°45'52''	34°29'0''	322	73°44'55''	34°25'43''
94	73°45'50''	34°28'58''	323	73°45'6''	34°25'40''
95	73°45'50''	34°28'57''	324	73°45'9''	34°25'40''
96	73°45'48''	34°28'55''	325	73°44'58''	34°25'22''
97	73°45'19''	34°28'45''	326	73°44'58''	34°25'5''
98	73°45'12''	34°28'45''	327	73°44'59''	34°25'2''
99	73°44'44''	34°28'42''	328	73°44'59''	34°25'1''
100	73°44'20''	34°28'27''	329	73°44'59''	34°25'0''
101	73°44'19''	34°28'25''	330	73°45'8''	34°24'51''
102	73°44'18''	34°28'21''	331	73°45'8''	34°24'50''
103	73°44'10''	34°27'52''	332	73°45'8''	34°24'48''
104	73°44'13''	34°27'28''	333	73°45'0''	34°24'32''
105	73°44'13''	34°27'27''	334	73°45'0''	34°24'29''
106	73°44'15''	34°27'25''	335	73°45'0''	34°24'12''
107	73°44'16''	34°27'25''	336	73°45'0''	34°24'10''
108	73°44'38''	34°27'4''	337	73°44'46''	34°23'49''
109	73°44'40''	34°27'3''	338	73°44'44''	34°23'42''
110	73°44'40''	34°27'3''	339	73°44'46''	34°23'38''
111	73°44'40''	34°27'3''	340	73°44'47''	34°23'36''
112	73°44'41''	34°27'1''	341	73°44'26''	34°23'32''
113	73°44'55''	34°26'55''	342	73°44'22''	34°23'32''
114	73°44'56''	34°26'55''	343	73°44'2.292''	34°23'38''
115	73°44'58''	34°26'55''	344	73°43'56''	34°23'38''
116	73°44'58''	34°26'55''	345	73°43'29''	34°23'39''
117	73°45'0''	34°26'53''	346	73°43'30''	34°23'46''
118	73°45'3''	34°26'30''	347	73°43'34''	34°23'48''
119	73°45'3''	34°26'29''	348	73°44'1''	34°23'50''
120	73°45'2''	34°26'27''	349	73°44'7''	34°23'51''
121	73°44'15''	34°24'0''	350	73°43'20''	34°27'16''
122	73°44'31''	34°24'12''	351	73°43'19''	34°27'16''
123	73°44'33''	34°24'13''	352	73°43'13''	34°27'28''
124	73°44'37''	34°24'13''	353	73°42'55''	34°27'43''
125	73°44'42''	34°24'57''	354	73°42'53''	34°27'43''
126	73°44'42''	34°24'59''	355	73°42'52''	34°27'44''
127	73°44'42''	34°24'59''	356	73°42'51''	34°27'44''
128	73°44'42''	34°25'1''	357	73°42'50''	34°27'46''
129	73°44'40''	34°25'15''	358	73°42'5''	34°27'50''
130	73°44'40''	34°25'16''	359	73°42'5''	34°27'52''
131	73°44'40''	34°25'17''	360	73°42'4''	34°27'53''
132	73°44'43''	34°25'19''	361	73°42'2''	34°27'54''

133	73°44'39"	34°25'35"	362	73°41'40"	34°28'3"
134	73°44'37"	34°25'37"	363	73°41'4"	34°28'5"
135	73°44'35"	34°25'38"	364	73°41'2"	34°28'3"
136	73°44'23"	34°25'48"	365	73°41'0"	34°28'2"
137	73°44'3"	34°26'8"	366	73°40'33"	34°28'4"
138	73°43'49"	34°26'8"	367	73°40'15"	34°28'6"
139	73°43'49"	34°26'8"	368	73°40'12"	34°28'8"
140	73°43'47"	34°26'30"	369	73°40'9"	34°28'9"
141	73°44'4"	34°26'33"	370	73°39'47"	34°28'20"
142	73°44'8"	34°26'33"	371	73°39'45"	34°28'22"
143	73°44'27"	34°26'36"	372	73°39'54"	34°28'38"
144	73°44'30"	34°26'35"	373	73°40'27"	34°28'41"
145	73°44'31"	34°26'35"	374	73°41'1"	34°28'43"
146	73°44'31"	34°26'37"	375	73°41'2"	34°28'42"
147	73°44'30"	34°26'38"	376	73°41'2"	34°28'41"
148	73°44'27"	34°26'48"	377	73°41'3"	34°28'41"
149	73°44'24"	34°26'48"	378	73°41'5"	34°28'41"
150	73°44'5"	34°26'46"	379	73°41'31"	34°28'53"
151	73°44'3"	34°26'46"	380	73°41'34"	34°28'52"
152	73°44'2"	34°26'46"	381	73°41'52"	34°29'7"
153	73°44'1"	34°26'47"	382	73°41'52"	34°29'11"
154	73°43'48"	34°26'58"	383	73°41'26"	34°29'36"
155	73°43'44"	34°26'58"	384	73°41'24"	34°29'38"
156	73°43'39"	34°27'6"	385	73°41'21"	34°29'40"
157	73°43'38"	34°27'16"	386	73°40'43"	34°29'45"
158	73°43'36"	34°27'17"	387	73°39'54"	34°29'36"
159	73°43'33"	34°27'17"	388	73°39'16"	34°29'38"
160	73°43'22"	34°27'16"	389	73°39'17"	34°29'39"
161	73°39'17"	34°29'41"	390	73°36'53"	34°29'51"
162	73°39'20"	34°29'42"	391	73°36'54"	34°29'52"
163	73°39'3"	34°29'45"	392	73°37'15"	34°29'42"
164	73°38'58"	34°29'45"	393	73°37'29"	34°30'6"
165	73°38'59"	34°29'48"	394	73°36'59"	34°30'16"
166	73°39'5"	34°30'17"	395	73°36'41"	34°30'21"
167	73°39'4"	34°30'17"	396	73°36'52"	34°30'29"
168	73°39'3"	34°30'17"	397	73°37'9"	34°30'21"
169	73°38'29"	34°29'54"	398	73°37'31"	34°30'12"
170	73°38'28"	34°29'52"	399	73°37'47"	34°30'18"
171	73°38'28"	34°29'50"	400	73°37'49"	34°30'18"
172	73°38'26"	34°29'48"	401	73°37'37"	34°30'46"
173	73°37'54"	34°29'52"	402	73°37'44"	34°31'7"
174	73°37'49"	34°29'51"	403	73°37'45"	34°31'9"
175	73°37'21"	34°29'36"	404	73°37'50"	34°31'32"
176	73°37'24"	34°29'30"	405	73°37'48"	34°31'33"
177	73°37'27"	34°29'29"	406	73°37'29"	34°31'37"

178	73°37'28"	34°29'29"	407	73°36'58"	34°31'37"
179	73°37'30"	34°29'29"	408	73°36'43"	34°31'24"
180	73°38'1"	34°28'59"	409	73°36'43"	34°31'24"
181	73°38'18"	34°28'58"	410	73°36'36"	34°31'37"
182	73°38'21"	34°28'57"	411	73°36'12"	34°31'32"
183	73°38'11"	34°28'39"	412	73°36'13"	34°32'6"
184	73°38'9"	34°28'42"	413	73°36'4"	34°32'16"
185	73°37'22"	34°28'6"	414	73°35'40"	34°32'23"
186	73°37'20"	34°28'7"	415	73°35'30"	34°32'45"
187	73°37'15"	34°28'41"	416	73°35'34"	34°33'3"
188	73°36'51"	34°29'19"	417	73°35'19"	34°33'12"
189	73°36'27"	34°29'22"	418	73°35'18"	34°33'13"
190	73°36'1"	34°29'3"	419	73°35'1"	34°33'14"
191	73°35'50"	34°29'9"	420	73°34'35"	34°33'7"
192	73°35'50"	34°29'10"	421	73°34'35"	34°33'8"
193	73°35'51"	34°29'11"	422	73°34'35"	34°33'9"
194	73°35'51"	34°29'11"	423	73°34'39"	34°33'18"
195	73°35'51"	34°29'11"	424	73°34'40"	34°33'19"
196	73°35'40"	34°29'15"	425	73°34'40"	34°33'21"
197	73°35'39"	34°29'15"	426	73°34'43"	34°33'38"
198	73°35'41"	34°29'24"	427	73°34'41"	34°33'39"
199	73°36'15"	34°29'21"	428	73°34'41"	34°33'40"
200	73°36'34"	34°29'43"	429	73°34'37"	34°33'54"
201	73°34'37"	34°33'52"	430	73°31'50"	34°32'12"
202	73°34'35"	34°33'42"	431	73°31'51"	34°32'11"
203	73°34'44"	34°33'26"	432	73°31'52"	34°32'10"
204	73°34'42"	34°33'26"	433	73°32'4"	34°32'6"
205	73°34'39"	34°33'29"	434	73°32'22"	34°32'5"
206	73°34'39"	34°33'29"	435	73°32'22"	34°32'0"
207	73°34'38"	34°33'29"	436	73°32'22"	34°31'58"
208	73°34'28"	34°33'46"	437	73°32'44"	34°32'1"
209	73°34'6"	34°33'49"	438	73°33'26"	34°32'2"
210	73°33'46"	34°33'37"	439	73°33'29"	34°32'1"
211	73°33'45"	34°33'36"	440	73°33'37"	34°31'55"
212	73°33'45"	34°33'5"	441	73°33'53"	34°31'57"
213	73°33'39"	34°34'0"	442	73°33'43"	34°31'50"
214	73°33'35"	34°33'58"	443	73°33'46"	34°31'45"
215	73°33'26"	34°33'44"	444	73°33'47"	34°31'44"
216	73°33'30"	34°33'36"	445	73°33'43"	34°31'34"
217	73°33'29"	34°33'27"	446	73°33'41"	34°31'34"
218	73°33'35"	34°33'21"	447	73°33'40"	34°31'35"
219	73°33'36"	34°33'20"	448	73°32'41"	34°32'49"
220	73°33'43"	34°33'8"	449	73°32'37"	34°32'52"
221	73°33'39"	34°32'52"	450	73°32'24"	34°32'51"
222	73°33'25"	34°32'52"	451	73°32'7"	34°32'41"

223	73°33'11"	34°32'44"	452	73°32'17"	34°32'33"
224	73°33'11"	34°32'44"	453	73°32'19"	34°32'33"
225	73°33'9"	34°32'39"	454	73°32'17"	34°32'24"
226	73°33'21"	34°32'33"	455	73°32'18"	34°32'22"
227	73°33'21"	34°32'33"	456	73°32'9"	34°32'22"
228	73°33'7"	34°32'32"	457	73°31'53"	34°32'22"
229	73°32'57"	34°32'32"	458	73°31'50"	34°32'21"

4 CONCLUSIONS AND RECOMMENDATION

MNP boundary has been delineated by using topographic layers, landcover map, habitat maps and field data collected during the field visit of MNP. The boundary effectively describes extent of the National Park and incorporates GIS aspects of flora and fauna. This report is a useful document which provides information about the National Park boundary, topography, landcover and wildlife habitats.

There were extensive discussions sessions with wildlife officials and ASC members about the extent of the boundary, hence, the current boundary resolves major issues regarding NP boundary.

During the field visit it was noted that there were serious conflicts between local communities and the government authorities on utilization of the Park resources. According to Western *et al.* 1994 and Mascia, 2003, a policy on the use of Park by local people and outside visitors should be defined in the Park's management plan. As in MNP local communities have been traditionally using resources from the Protected Area, changing in such traditional dependences may lead to loss of subsistence. Additionally, this may exasperate the conflicts between communities and the Government. In these consequences it is suggested that in a consensus is developed to sustainable utilized the natural resources in defined areas of the Park. This is possible by zoning the Protected Area, which considers the overall management objectives for a park and set aside designated areas that permit or give priority to certain activities. As many localities are present adjacent to the NP boundary, it was recommended by ASC that core and buffer zones (if defined) within NP boundary can lead to the better management of the Park with community involvement.

Unprotected areas, including those immediately outside protected areas, are important to an overall conservation strategy. Developing strategies for unprotected areas is essential because more than 85% of the world's land will remain outside the protected areas, according to even the most optimistic predictions (Berkes and Folkes, 2000). Strategies should be made that encourage private land owners and government land managers to protect biological communities outside the park area.

MNP boundary is delineated on scientific basis and finalized by incorporating ASC comments. Draft notification format defines permanent reference i.e. geographic coordinates as compared to previous notifications in which land feature (which depend on season, temporal, social and environmental conditions) were used to define the boundary extent. It is therefore recommended to demarcate and re-notify the MNP boundary with geographic coordinates.

Annexure 1: Field Observation Points

ID	Longitude	Latitude	Height (m)	Description
1	34.53383333	73.55385	1890.674	Nala Bahire
2	34.53428333	73.55001667	1967.789	Kasi
3	34.53523333	73.54685	1979.371	Blue Pine
4	34.53751667	73.54153333	2190.598	BP
5	34.53341667	73.53778333	2328.062	FIR
6	34.53375	73.53626667	2353.056	FIR Dense
7	34.53523333	73.53461667	2360.981	FIR
8	34.53611667	73.53176667	2427.732	Shrubs & Agri (NE)&FIR (WS) FIR & blue
9	34.53696667	73.53111667	2454.554	FIR (SE)
10	34.53816667	73.5304	2491.435	(Kasi) Shrubs & Rocks
11	34.5385	73.53026667	2490.826	Chashma
12	34.53906667	73.53065	2535.022	Grasses Spurse FIR ,Kala Akhrot
13	34.54048333	73.53221667	2570.988	Shrubs / FIR (NW) Biburnum
14	34.53985	73.5336	2535.936	Lami dogi
15	34.53863333	73.53236667	2517.648	Shrubs / Grasses
16	34.5386	73.53151667	2520.086	Grasses
17	34.53793333	73.53023333	2507.894	Grasses,Shrubs,Akhrot (Snap taken)
18	34.53545	73.53078333	2526.792	Grasses (WS) FIR (NE)
19	34.53515	73.53068333	2534.717	Grasses/Shrubs
20	34.53443333	73.53086667	2556.967	Grass on point ,(SW) FIR
21	34.53415	73.53181667	2591.714	Dense FIR
22	34.53326667	73.5317	2623.414	Dense FIR
24	34.53205	73.53093333	2663.038	Dense FIR
25	34.53103333	73.53113333	2687.726	Nala,Shrubs & Grasses
26	34.53041667	73.53198333	2699.309	Grasses,Shrubs
27	34.53006667	73.53251667	2700.833	Pasture land
28	34.52898333	73.53376667	2721.864	Pasture land
29	34.52805	73.5339	2727.35	Pasture land ,Rocks SE
30	34.527	73.53466667	2747.162	Dense FIR (NE)
31	34.52558333	73.53556667	2743.81	Pasture land (Grasses)
32	34.52456667	73.5367	2744.419	Dense FIR up & Down
33	34.52381667	73.53771667	2733.751	FIR
34	34.52321667	73.53935	2723.693	(NE) Grasses and Pasture land
35	34.5221	73.54128333	2723.693	Pasture land
36	34.52141667	73.54281667	2711.196	Compartment no.7(NE)
37	34.52158333	73.54538333	2676.754	Pasture
38	34.52161667	73.54845	2673.706	Pasture land grasses
39	34.52095	73.54891667	2663.647	Kials and Shrubs (NW)
40	34.5229	73.54168333	2690.47	Pasture land (E)
41	34.52443333	73.537	2737.409	Bushes / FIR

42	34.5253	73.53585	2748.686	Bushes / FIR (Grasses)
43	34.53176667	73.5287	2821.229	Pure FIR
44	34.53298333	73.5266	2834.03	Pure FIR
45	34.5342	73.52658333	2842.26	Pure FIR (WS) Shrubs (ES)
46	34.53516667	73.52603333	2845.003	Grasses and Shrubs / some pieces of FIR
47	34.53671667	73.52536667	2851.404	Dense FIR
48	34.53775	73.52526667	2856.586	Dense FIR
49	34.53806667	73.52516667	2860.853	Pure FIR
50	34.5407	73.52441667	2873.045	Jupsar (pasture)(W) (E) Spurs FIR
51	34.54153333	73.52538333	2878.531	Spurs FIR
52	34.54361667	73.52526667	2884.932	Shrubs and Grasses & FIR (NE)
53	34.5444	73.52543333	2884.018	FIR (NE) Spurse (WS)
54	34.54596667	73.52398333	2827.934	FIR (WS) (Grasses + Shrubs)
55	34.54738333	73.52295	2791.358	Nala (abshar) ,Grasses (Daddar) Nala
56	34.549	73.52425	2801.112	Sparse FIR ,Grasse and Shrubs
57	34.54946667	73.52396667	2775.814	Grasses and Shrubs
58	34.5502	73.5239	2754.173	Nala (Rock)
59	34.55055	73.52415	2743.81	Grass Shrubs(E),& Sparse FIR (W)
60	34.55111667	73.52481667	2720.34	Nala (Rocks)
61	34.55153333	73.52563333	2724.302	Dense FIR
62	34.55223333	73.52623333	2713.634	FIR & Akhrot (pathra) BP mix
63	34.55335	73.52651667	2699.309	Grassses and Shrubs
64	34.5537	73.52686667	2698.394	FIR mix akhrot(NE) (WS)
65	34.55535	73.5262	2686.202	Shrubs and Grasses
66	34.55595	73.52673333	2666.695	Dense FIR
67	34.5576	73.52671667	2663.342	Sparse FIR
68	34.55836667	73.52671667	2644.75	Grass and Shrubs BP & Akhrot
69	34.55875	73.52688333	2626.462	FIR (NW)
70	34.55966667	73.52706667	2596.896	Nala (Rocks)Lowi Dandi
71	34.55716667	73.53653333	2776.118	Grass Land Pasture Land (Range Land)
72	34.55931667	73.5358	2806.598	Range land / Grasses (Near Sokar)
73	34.56101667	73.53508333	2845.613	E (Range Land) W (very Sparse FIR)
74	34.56156667	73.5351	2879.446	Grasses / Shrubs
75	34.5644	73.5346	2967.838	Very Sparse FIR
76	34.56595	73.53465	2981.858	Nala (Rocks)
77	34.56746667	73.5365	2991.307	Nala (Grasses & Sparse FIR)
78	34.56675	73.53805	2981.249	Range Land / Grasses Shrubs (SW) (EN)
79	34.56591667	73.54	3007.462	Unipurse (movie)(E)
80	34.56518333	73.54183333	3037.942	Banda (Pasture and Range Land)
81	34.56663333	73.54148333	3080.614	Very Sparse FIR and Grasses (WS)
82	34.56755	73.54123333	3102.864	Pasture Land /Grasses
83	34.56846667	73.54066667	3117.494	Range Land(Grasses)
84	34.56905	73.54073333	3132.43	Banda Jablian (Grasses)

85	34.5709	73.54045	3147.06	Grasses and Shrubs
86	34.57135	73.54083333	3158.338	Kial and Uniperse Mix (NE)
87	34.57191667	73.54135	3164.738	BP And Uniperse mix
88	34.57201667	73.54178333	3172.968	Mix Zone of BP and Uniperse
89	34.57268333	73.54235	3180.588	BP,Uniperse (NW),FIR (ES)+F107
90	34.57375	73.54283333	3186.379	FIR , Juniperse Mix BP Grasses
91	34.57458333	73.54223333	3202.229	Mix zone of BP.FIR ,Junipers(SW)
92	34.57493333	73.542	3215.335	Mix Zone (Rat Snap)
93	34.57568333	73.54236667	3232.709	Mix zone FIR ,BP
94	34.57601667	73.54276667	3224.479	Pakistan and AJK Boundary
95	34.57786667	73.54488333	3231.185	BPJunipers ,Grass(S)
96	34.5791	73.5452	3208.63	Grass, BP, Junipers(top ES)
97	34.58216667	73.54816667	3219.907	Junipers /Grasses BP, Kala Jablian
98	34.58336667	73.5488	3235.757	Junipres/Grasses (NW)
99	34.58566667	73.5526	3245.206	Nala
100	34.58601667	73.55438333	3238.805	FIR ,BP mix
101	34.58608333	73.5551	3241.548	Dense BP
102	34.58683333	73.55713333	3213.202	Dense BP (ES)(NW)
103	34.58755	73.55951667	3220.212	FIR Dense
104	34.588	73.56125	3214.116	Bathr Gali (NS)
105	34.5868	73.56323333	3244.901	BP (W) Side
106	34.58643333	73.56458333	3290.011	Pasture Mali Start
107	34.58613333	73.56516667	3301.898	Top of Mali Pasture
108	34.58556667	73.56635	3303.422	Pasture and Juniper
109	34.5836	73.56823333	3340.303	Very Big PastureLand Marka
110	34.58188333	73.57065	3356.153	Mali (SW)
111	34.58083333	73.57161667	3400.044	Junipers & Grasses some Trees
112	34.58105	73.57325	3476.854	Junipers and Grasses
113	34.58098333	73.5737	3500.628	Junipers and Grasses
114	34.5826	73.57635	3531.108	Junipers and Grasses
115	34.58383333	73.58111667	3548.786	Rocks
116	34.58143333	73.59618333	3384.499	Musa Ghali Pasture Land
117	34.58035	73.59911667	3318.053	Junipers and Nala
118	34.57921667	73.59956667	3280.258	Snow and Rocks
119	34.57818333	73.59883333	3302.203	Very Sparse FIR Trees (W)
120	34.57775	73.59916667	3301.289	Mix Zone FIR ,BP& Shrubs
121	34.57715	73.59998333	3238.195	Grasses and Shrubs
122	34.57555	73.59983333	3228.442	Bago Wali Tari MD Habitat
123	34.57505	73.59966667	3204.667	Grasses ,Shrubs some Trees
124	34.57391667	73.59975	3185.465	Nala ,Grasses some Trees (E)
125	34.5736	73.59978333	3209.544	Habitat of MP& MD along the Nala
126	34.5728	73.59991667	3255.264	MP and MD Grasses
127	34.5717	73.60028333	3297.631	Grass ,Shrubs down (MD)

128	34.57051667	73.5995	3388.157	End of 8B, Shrubs ,MD.BP Habitat
129	34.56988333	73.59883333	3400.349	Shrubs ES
130	34.56943333	73.59848333	3396.691	MixZone BP, Shrubs
131	34.56911667	73.59778333	3399.434	Mix zone BP, Shrubs
132	34.56846667	73.59795	3390.9	Grass Land
133	34.56778333	73.5983	3372.917	Mix Zone BP Bushes
134	34.56651667	73.59818333	3340.303	BP (NW)
135	34.56606667	73.59841667	3330.55	Bata Wali Gali ,MD,BP Shrubs(S) (NE) Shr
136	34.56496667	73.59973333	3294.583	Shrubs Grasses Dense side BP
137	34.56408333	73.60105	3242.767	Shrubs ,Rocks,Grass
138	34.56383333	73.60188333	3207.41	BP Dense (ES)(NW)
139	34.56336667	73.60231667	3167.482	Pure BP
140	34.56291667	73.60186667	3145.536	Pure BP
141	34.56255	73.60161667	3128.772	Pure BP
142	34.56233333	73.60136667	3116.275	Barth wali (grasses)
143	34.56211667	73.60128333	3102.864	Grasses and Shrubs (MP)
144	34.56206667	73.5995	3044.952	Dense BP
145	34.56175	73.59895	3037.942	Dense BP (EW)
146	34.56055	73.59786667	2999.537	Mix BP and FIR
147	34.56025	73.5975	2990.393	Mix Bp and Sharp Reein
148	34.56006667	73.59733333	2974.848	Mix Bp and Sharp Reein
149	34.55951667	73.5966	2933.7	Mix Zone FIR ,Reein BP
150	34.55886667	73.59648333	2902.61	Dense FIR
151	34.55861667	73.59605	2880.665	Mix Zone BP,FIR
152	34.5581	73.59585	2855.671	Mix Zone BP,FIR
153	34.55773333	73.59586667	2836.164	Dense BP
154	34.55655	73.59711667	2695.042	Dense BP,Monkey
155	34.55686667	73.59828333	2678.278	Dense BP,Monkey
156	34.5567	73.60071667	2615.794	BP and Akhrot
157	34.55531667	73.60151667	2511.857	Nala Water, RocksBarmi (WS)
158	34.55365	73.6021	2554.224	Berniwala Nakes
159	34.55348333	73.60206667	2560.625	Shrubs Mix
160	34.5532	73.6016	2583.18	Shrubs and Trees mix
161	34.553	73.60135	2613.66	Shrubs andBarmi
162	34.55268333	73.60061667	2626.766	Mix Barmi ,BP
163	34.55181667	73.60098333	2640.178	Mix BP.Barmi
164	34.55093333	73.60148333	2619.146	Shrubs, BP, Barmi
165	34.55038333	73.60181667	2623.414	Shrubs, BP, Barmi (W)
166	34.55011667	73.6021	2642.921	Shrubs, BP, Barmi (W)
167	34.54981667	73.60251667	2673.401	Shrubs
168	34.54975	73.60363333	2717.902	Grey Langoor, Shrubs Mix
169	34.54853333	73.60435	2797.454	MP,Fly and Shrubs
170	34.54796667	73.60398333	2843.784	Shrubs MD Zone,

171	34.54738333	73.60358333	2895.905	very Sparse FIR
172	34.54493333	73.60428333	3024.53	Zayaraf ,Karkoos+FIR
173	34.54615	73.60645	3097.378	Karkoos + FIR min (ES)
174	34.54665	73.60776667	3145.841	Karkos+FIR Mixture
175	34.54733333	73.60896667	3204.058	Dense Karkos Broad Leaves (SW)
176	34.5478	73.60938333	3236.062	Dense Karkos Broad Leaves (SW)
177	34.5484	73.61061667	3301.898	Karkoos Dense (SW)
178	34.54871667	73.61083333	3317.138	Pasture Land on the Top of Ridge (SE) Shr while NW Karkoos
179	34.50768333	73.61515	1759.915	CP (SW)
180	34.50565	73.6182	1865.681	CP (W)
181	34.50055	73.62085	2134.819	Very Sparse Trees of BP and Fruit
182	34.4998	73.62025	2181.454	Very Sparse Trees of BP and Fruit
183	34.49495	73.62193333	2281.428	Panjoor Gali (9-B,10,11A)
184	34.49278333	73.62133333	2271.37	Akhrot + corn Area
185	34.49181667	73.62163333	2273.503	Start Bopine
186	34.49075	73.62246667	2264.969	Dense Blue Pine Up/Down
187	34.48923333	73.62181667	2276.551	Dense BP
188	34.4876	73.62281667	2298.497	BP + Shrubs
189	34.48683333	73.62261667	2314.042	BP
190	34.47001667	73.66713333	1887.017	BP
191	34.47295	73.66886667	1899.514	BP Up/Down
192	34.47495	73.6696	1928.165	Deodar + BP Dense Mix
193	34.47608333	73.67283333	1941.881	BP Deodar
194	34.47496667	73.67565	1900.733	Bankhor
195	34.47543333	73.68135	1832.762	D BP
196	34.47555	73.68485	1796.796	Up / Down BP Barmi
197	34.47625	73.68818333	1792.834	Chugian Ended
198	34.47593333	73.6934	1824.838	Dense BP Both Sides
199	34.47886667	73.69948333	1856.232	Nala Jhasian ,Deodar,BP
200	34.47816667	73.70273333	1909.572	Deodar +BP both Sides
201	34.48026667	73.7019	1939.747	Water Nala
202	34.48246667	73.7011	1965.35	Entry ...Deodar+BP
203	34.48341667	73.70208333	1976.933	Deodar Mix +BP
204	34.48511667	73.70628333	2019.605	Bari Bhakar 11,13c,14+ top FIR
205	34.48416667	73.7065	2054.657	Deodar Max+BP+Tang,DryTemperate
206	34.48443333	73.70726667	2073.554	Dense Deodar
207	34.54168333	73.61608333	2980.334	Karkas Barmi
208	34.53671667	73.61551667	3140.354	Karkas
209	34.54335	73.61603333	3089.148	Karas Barmi
210	34.47516667	73.60831667	3116.885	Karkas
211	34.51015	73.61598333	3086.71	Karkas
212	34.4491	73.54885	3183.941	Karkas

213	34.54428333	73.60261667	1861.414	Konkan
214	34.54615	73.60386667	1755.953	Machara
215	34.5244	73.61481667	852.8304	Pateka

Annexure 2: MNP Notification, 1982

آزاد حکومت ریاست جموں و کشمیر مظفر آباد -
جنگلات سیکرٹریٹ -

جناب صدر آزاد جموں و کشمیر وائٹڈ لائنز ایجنٹ
مجریہ ۱۷۵، لاہور، رقبہ ۳۲ ٹری نمبر (۳) - کنج تحت حاصل شدہ اعتبارات کو پرہیزگار
لانے ہوئے سدرجہ اول رقبہ جات جنگلی موقع پر نشاندہی کر دی گئی ہے، کنج جنگلی
جانبوں کے تحفظ و ترقی کیلئے یہ رقبہ

سیرنمبر	نام رقبہ	کمپارٹمنٹ نمبر	رقبہ (ایکڑوں میں)	تحصیل
۱	تاندی گاؤں	۱۰۹، ۱۱، ۱۲، ۱۳	۱۱۹۳۵	مٹیان
۲	موجن	۱۰، ۱۱، ۱۲، ۱۳	۶۵۳۷	مٹیان
۳	مچھیارہ	۸، ۹، ۱۰، ۱۱، ۱۲، ۱۳	۳۳۳۷	مظفر آباد
۴	سہہ پالہ	۳۵	۲۰۰۰	مظفر آباد
۵	مچھو	۱۶ و ۱۷	۶۷۳۸۸	مظفر آباد
۶	مچھری سید گاؤں	۲۹ و ۳۰	۲۰۰	مچھری
۷	پھالہ	۳۲ و ۳۷	۲۰۰	مچھری
۸	مٹیان	۳۳	۱۰۳۳	مچھری
۹	مٹیان		۱۱۱۱	مچھری

اندر حکم ۱۲ تاریخ فروری ۱۹۸۲ء -

دستخط /
رکن (مشاور اعلیٰ جموں و کشمیر)
ایئر سہیہ جنگلات

من ج/ای - ۹ - ۱۲/۳۰۷۶-۸۲/۳۰۸۰ مورثہ ۲۸-۷-۱۹۸۲

۱- سیکرٹری صحت، جناب صدر و منتظم اطلاع -
۲- پرائیمری سیکرٹری، چیف سیکرٹری برائے اطلاع جناب چیف سیکرٹری -
۳- قائم اطلاع صحت، جنگلات بحوالہ ایسے مکتوب نمبر ۳۰۸۲/سی-۱۷۸ مورثہ ۲۰-۷-۱۹۸۲
۴- جناب سیکرٹری صحت، ان حکومت -

ذیل مطابق اول نمبر -
وائٹڈ لائنز وارڈن

Annexure 3: References

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