

PERSPECTIVE PLAN FOR DEVELOPMENT OF TAWANG RIVER BASIN

*Cumulative Impact Assessment of Proposed Hydel Power
Projects, Determination of Basin Carrying Capacity, and
Landscape Level Biodiversity Management Plan*

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VOLUME-II
APPENDICES

DEPARTMENT OF BOTANY
NORTH-EASTERN HILL UNIVERSITY
SHILLONG - 793022

In association with

Indian Institute of Technology, Guwahati
WWF India, Tezpur

Foundation for Revitalization of Local Health Traditions (FRLHT), Bangalore

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North-Eastern Hill University, Shillong

In association with



**Indian Institute of
Technology, Guwahati**



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**Foundation for revitalization of
Local Health Traditions (FRLHT),
Bangalore**

VOLUME-II
APPENDICES

Appendix II. 3.1: List of plant species recorded from Tsa chu-I HEP sites

Sl. No.	Species name	Family
TREES		
1	<i>Abies densa</i>	Pinaceae
2	<i>Acer</i> sp	Aceraceae
3	<i>Betula alnoides</i>	Betulaceae
4	<i>Junipers</i> sp	Cupressaceae
5	<i>Quercus</i> sp	Fagaceae
6	<i>Rhododendron</i> sp	Ericaceae
SHRUBS		
7	<i>Berberis</i> sp	Berberidaceae
8	<i>Daphne papyracea</i>	Thymelaeaceae
9	<i>Elaeagnus parviflora</i>	Elaeagnaceae
10	<i>Pogostemon</i> sp	Lamiaceae
11	<i>Rosa</i> sp	Rosaceae
12	<i>Rubus ellipticus</i>	Rosaceae
13	<i>Salix</i> sp	Salicaceae
HERBS		
14	<i>Aconogonum alpinum</i>	Polygonaceae
15	<i>Ainsliaea</i> sp	Asteraceae
16	<i>Arisaema nepenthoides</i>	Araceae
17	<i>Elsholtzia</i> sp	Lamiaceae
18	<i>Elsholtzia strobilifera</i>	Lamiaceae
19	<i>Fragaria</i> sp	Rosaceae
20	<i>Galinsoga parviflora</i>	Asteraceae
21	<i>Galium</i> sp	Rubiaceae
22	<i>Gentiana capitata</i>	Gentianaceae
23	<i>Geranium nepalense</i>	Geraniaceae
24	<i>Hemiphragma heterophyllum</i>	scrophulariaceae
25	<i>Impatiens</i> sp	Balsaminaceae
26	<i>Leontopodium stracheyi</i>	Asteraceae
27	<i>Meconopsis</i> sp	Papaveraceae
28	<i>Panax</i> sp	Araliaceae
29	<i>Persicaria</i> sp	Polygonaceae
30	<i>Pilea umbrosa</i>	Urticaceae
31	<i>Pogostemon</i> sp	Lamiaceae
32	<i>Polygonum hydropiper</i>	Polygonaceae
33	<i>Potentilla cuneata</i>	Rosaceae
34	<i>Pouzolzia</i> sp	Urticaceae
35	<i>Primula denticulata</i>	Primulaceae
36	<i>Primula</i> sp	Primulaceae
37	<i>Prunella vulgaris</i>	Lamiaceae
38	<i>Ranunculus</i> sp	Ranunculaceae
39	<i>Rumex nepalensis</i>	Polygonaceae
40	<i>Sambucus adnata</i>	Caprifoliaceae
41	<i>Senecio cappa</i>	Asteraceae
42	<i>Stellaria</i> sp	Caryophyllaceae
43	<i>Swertia</i> sp	Gentianaceae
44	<i>Viola sikkimensis</i>	Violaceae
CLIMBERS		
45	<i>Clematis montana</i>	Ranunculaceae
46	<i>Clematis</i> sp	Ranunculaceae
47	<i>Hedera nepalensis</i>	Araliaceae
ORCHIDS		
48	<i>Bulbophyllum</i> sp	Orchidaceae
PTERIDOPHYTES		
49	<i>Adiantum</i> sp	Adiantaceae
50	<i>Dryopteris serrato-dentata</i>	Dryopteridaceae

Appendices

Sl. No.	Species name	Family
51	<i>Equisetum diffusum</i>	Equisetaceae
52	<i>Equisetum</i> sp	Equisetaceae
53	<i>Lycopodium japonicum</i>	Lycopodiaceae
54	<i>Mecodium badium</i>	Hymenophyllaceae
55	<i>Selaginella tenuifolia</i>	Selaginellaceae
56	<i>Selaginella indica</i>	Selaginellaceae
57	<i>Vittaria flexuosa</i>	Vittariaceae
BRYOPHYTES		
58	<i>Brachymerium</i> sp	Bryaceae
59	<i>Bryum billardieri</i>	Bryaceae
60	<i>Funaria</i> sp	Funariaceae
61	<i>Marchantia</i> sp	Marchantiaceae
LICHENS		
62	<i>Aspicilia</i> sp	Megasporaceae
63	<i>Cladia aggregata</i>	Cladoniaceae
64	<i>Cladonia coccifera</i>	Cladoniaceae
65	<i>Stereocaulon</i> sp	Stereocaulaceae
66	<i>Usnea dasaea</i>	Parmeliaceae
FUNGI		
67	<i>Boletus reticulatus</i>	Boletaceae
68	<i>Clathrus rubra</i>	Phallaceae
69	<i>Daldinia concentrica</i>	Xylariaceae
70	<i>Gloeophyllum sepiarium</i>	Gloeophyllaceae
71	<i>Hericium erinaceus</i>	Hericiaceae
72	<i>Laccaria laccata</i>	Hydnangiaceae
73	<i>Lactarius rubidus</i>	Russulaceae
74	<i>Polyporus arcularius</i>	Polyporaceae
75	<i>Poria monticola</i>	Polyporaceae
76	<i>Pycnoporellus fibrillosus</i>	Formitopscidaceae
77	<i>Strobilomyces strobilaceus</i>	Boletaceae
78	<i>Thelephora penicillata</i>	Thelephoraceae
79	<i>Tremella mesenterica</i>	Tremellaceae
80	<i>Xylaria polymorpha</i>	Xylariaceae
81	<i>Coprinus disseminatus</i>	Agaricaceae
82	<i>Hydnum repandum</i>	Hydnaceae
83	<i>Schizophyllum commune</i>	Schizophyllaceae

Appendix II.3.2: Different groups of plant species present at Tsa chu- I HEP site

Sl. No.	Species name	Family	Sl. No.	Species name	Family
Barrage and Powerhouse			Catchment area		
CLIMBERS			CLIMBERS		
1	<i>Clematis montana</i>	Ranunculaceae	1	<i>Clematis montana</i>	Ranunculaceae
2	<i>Clematis</i> sp	Ranunculaceae	2	<i>Hedera nepalensis</i>	Araliaceae
3	<i>Hedera nepalensis</i>	Araliaceae	ORCHIDS		
ORCHIDS			1	<i>Bulbophyllum</i> sp	Orchidaceae
1	<i>Bulbophyllum</i> sp	Orchidaceae	PTERIDOPHYTES		
PTERIDOPHYTES			1	<i>Adiantum</i> sp	Adiantaceae
1	<i>Adiantum</i> sp	Adiantaceae	2	<i>Dryopteris serrato-dentata</i>	Dryopteridaceae
2	<i>Dryopteris serrato-dentata</i>	Dryopteridaceae	3	<i>Lycopodium japonicum</i>	Lycopodiaceae
3	<i>Equisetum diffusum</i>	Equisetaceae	4	<i>Selaginella indica</i>	Selaginellaceae
4	<i>Equisetum</i> sp	Equisetaceae	5	<i>Vittaria flexuosa</i>	Vittariaceae
5	<i>Lycopodium japonicum</i>	Lycopodiaceae	BRYOPHYTES		
6	<i>Mecodium badium</i>	Hymenophyllaceae	1	<i>Brachymerium</i> sp	Bryaceae
7	<i>Selaginella tenuifolia</i>	Selaginellaceae	2	<i>Bryum billardieri</i>	Bryaceae
8	<i>Selaginella indica</i>	Selaginellaceae	3	<i>Funaria</i> sp	Funariaceae

Sl. No.	Species name	Family	Sl. No.	Species name	Family
	Barrage and Powerhouse			Catchment area	
9	<i>Vittaria flexuosa</i>	Vittariaceae	4	<i>Marchantia</i> sp	Marchantiaceae
	BRYOPHYTES			LICHENS	
1	<i>Brachymenium</i> sp	Bryaceae	1	<i>Aspicilia</i> sp	Megasporaceae
2	<i>Bryum billardieri</i>	Bryaceae	2	<i>Cladia aggregata</i>	Cladoniaceae
3	<i>Funaria</i> sp	Funariaceae	3	<i>Stereocaulon</i> sp	Stereocaulaceae
4	<i>Marchantia</i> sp	Marchantiaceae	4	<i>Usnea dasaea</i>	Parmeliaceae
	LICHENS				
1	<i>Aspicilia</i> sp	Megasporaceae			
2	<i>Cladia aggregata</i>	Cladoniaceae			
3	<i>Cladonia coccifera</i>	Cladoniaceae			
4	<i>Stereocaulon</i> sp	Stereocaulaceae			
5	<i>Usnea dasaea</i>	Parmeliaceae			

Appendix II.3.3: Species list of macro-fungi recorded from barrage and powerhouse sites of Tsa chu-I

Species	Family	Species	Family
Barrage		Powerhouse	
<i>Boletus reticulatus</i>	Boletaceae	<i>Boletus reticulatus</i>	Boletaceae
<i>Clathrus rubra</i>	Phallaceae	<i>Clathrus rubra</i>	Phallaceae
<i>Daldinia concentrica</i>	Xylariaceae	<i>Coprinus disseminatus</i>	Agaricaceae
<i>Gloeophyllum sepiarium</i>	Gloeophyllaceae	<i>Gloeophyllum sepiarium</i>	Gloeophyllaceae
<i>Hericium erinaceus</i>	Hericiaceae	<i>Hydnum repandum</i>	Hydnaceae
<i>Laccaria laccata</i>	Hydnangiaceae	<i>Lactarius rubidus</i>	Russulaceae
<i>Lactarius rubidus</i>	Russulaceae	<i>Polyporus arcularius</i>	Polyporaceae
<i>Polyporus arcularius</i>	Polyporaceae	<i>Schizophyllum commune</i>	Schizophyllaceae
<i>Poria monticola</i>	Polyporaceae	<i>Strobilomyces strobilaceus</i>	Boletaceae
<i>Pycnoporellus fibrillosus</i>	Formitopscidaceae	<i>Tremella mesenterica</i>	Tremellaceae
<i>Strobilomyces strobilaceus</i>	Boletaceae		
<i>Thelephora penicillata</i>	Thelephoraceae		
<i>Tremella mesenterica</i>	Tremellaceae		
<i>Xylaria polymorpha</i>	Xylariaceae		
Catchment area			
Species	Family		
<i>Boletus reticulatus</i>	Boletaceae		
<i>Clathrus rubra</i>	Phallaceae		
<i>Coprinus disseminatus</i>	Agaricaceae		
<i>Daldinia concentrica</i>	Xylariaceae		
<i>Gloeophyllum sepiarium</i>	Gloeophyllaceae		
<i>Hericium erinaceus</i>	Hericiaceae		
<i>Hydnum repandum</i>	Hydnaceae		
<i>Laccaria laccata</i>	Hydnangiaceae		
<i>Lactarius rubidus</i>	Russulaceae		
<i>Polyporus arcularius</i>	Polyporaceae		
<i>Poria monticola</i>	Polyporaceae		
<i>Pycnoporellus fibrillosus</i>	Formitopscidaceae		
<i>Schizophyllum commune</i>	Schizophyllaceae		
<i>Strobilomyces strobilaceus</i>	Boletaceae		
<i>Tremella mesenterica</i>	Tremellaceae		
<i>Xylaria polymorpha</i>	Xylariaceae		

Appendix II.3.4: Frequency, density, basal area, and importance value index (IVI) for tree species in Tsa chu- I barrage site

Sl. No.	Name of species	Post-monsoon				Monsoon				Winter			
		Fr.	Dn.	BA	IVI	Fr.	Dn.	BA	IVI	Fr.	Dn.	BA	IVI
1	<i>Abies densa</i>	70	170	2.94	111.32	70	170	2.94	111.32	70	170	2.94	111.32
2	<i>Acer</i> sp.	30	60	1.10	42.70	30	60	1.10	42.70	30	60	1.10	42.70
3	<i>Betula alnoides</i>	40	80	1.32	54.89	40	80	1.32	54.89	40	80	1.32	54.89
4	<i>Junipers</i> sp.	20	40	0.35	22.95	20	40	0.35	22.95	20	40	0.35	22.95
5	<i>Quercus</i> sp.	20	50	0.57	28.24	20	50	0.57	28.24	20	50	0.57	28.24
6	<i>Rhododendron</i> sp.	30	70	0.76	39.94	30	70	0.76	39.94	30	70	0.76	39.94
Total		210	470	7.02	300	210	470	7.02	300	210	470	7.02	300

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), B A- Basal area ($\text{m}^2 \text{ha}^{-1}$), IVI- Importance value index

Appendix II.3.5: Frequency, density and IVI of shrubs in Tsa chu- I barrage site

Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
		Fr.	Dn.	IVI	Fr.	Dn.	IVI	Fr.	Dn.	IVI
1	<i>Berberis</i> sp.	12	112	20.49	12	112	20.49	12	112	20.49
2	<i>Daphne papyracea</i>	24	128	31.45	24	128	31.45	24	128	31.45
3	<i>Elaeagnus parviflora</i>	16	96	22.02	16	96	22.02	16	96	22.02
4	<i>Pogostemon</i> sp.	8	64	12.60	8	64	12.60	8	64	12.60
5	<i>Rosa</i> sp.	24	304	48.91	24	304	48.91	24	304	48.91
6	<i>Rubus ellipticus</i>	12	64	15.72	12	64	15.72	12	64	15.72
7	<i>Salix</i> sp.	32	240	48.81	32	240	48.81	32	240	48.81
Total		128	1008	200	128	1008	200	128	1008	200

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), IVI- Importance value index

Appendix II.3.6: Frequency, density and IVI of herbs in Tsa chu-I barrage site

Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
		Fr.	Dn.	IVI	Fr.	Dn.	IVI	Fr.	Dn.	IVI
1	<i>Aconogonum alpinum</i>				24	8400	7.57	20	4400	18.89
2	<i>Ainsliaea</i> sp.	28	11200	20.08	48	12400	12.77	44	9200	40.58
3	<i>Arisaema nepenthoides</i>				28	6000	6.79			
4	<i>Elsholtzia</i> sp.	32	8400	18.18	20	4400	4.91			
5	<i>Fragaria</i> sp.	28	9200	17.91	36	12800	11.46			
6	<i>Galinsoga parviflora</i>	20	4800	10.88	16	4400	4.40			
7	<i>Galium</i> sp.	24	5600	12.88	28	5200	6.36			
8	<i>Gentiana capitata</i>				20	4400	4.91	20	3200	16.42
9	<i>Geranium nepalensis</i>				28	6000	6.79			
10	<i>Hemiphragma heterophyllum</i>	24	5200	12.45	60	14800	15.59	48	18000	60.72
11	<i>Impatiens</i> sp.	24	4800	12.01	48	7600	10.20			
12	<i>Leontopodium stracheyi</i>	8	1600	4.00	16	3600	3.97	16	3600	15.28
13	<i>Meconopsis</i> sp.				12	2800	3.03			
14	<i>Panax</i> sp.				76	18800	19.78			
15	<i>Persicaria</i> sp.	16	2800	7.58	28	5200	6.36			
16	<i>Pilea umbrosa</i>	28	10800	19.64	28	10000	8.94			
17	<i>Pogostemon</i> sp.	12	2800	6.44	28	4800	6.15	24	3600	19.20
18	<i>Polygonum hydropiper</i>	16	3600	8.44	12	3600	3.46			
19	<i>Potentilla cuneata</i>	28	6400	14.88	8	2000	2.09			
20	<i>Pouzolzia</i> sp.				28	4800	6.15			
21	<i>Primula denticulata</i>				16	2800	3.54			
22	<i>Primula</i> sp.				8	2000	2.09	12	2800	11.67
23	<i>Prunella vulgaris</i>	16	4800	9.74	24	6000	6.28	20	3600	17.24
24	<i>Ranunculus</i> sp.	12	2800	6.44	20	5200	5.34			
25	<i>Rumex nepalensis</i>	24	4400	11.58	36	6400	8.03			

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Sl.	Name of species	Post-monsoon			Monsoon			Winter		
26	<i>Sambucus adnata</i>				24	4800	5.64			
27	<i>Senecio cappa</i>				12	2800	3.03			
28	<i>Stellaria</i> sp.				28	8400	8.08			
29	<i>Swertia</i> sp.				12	3200	3.25			
30	<i>Viola sikkimensis</i>	12	3200	6.87	12	2800	3.03			
Total		352	92400	200	784	186400	200	204	48400	200

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), IVI- Importance value index

Appendix II.3.7: Frequency, density, basal area, and importance value index (IVI) for tree species in Tsa chu- I Powerhouse site

Sl. No.	Name of species	Post-monsoon				Monsoon				Winter			
		Fr.	Dn.	BA	IVI	Fr.	Dn.	BA	IVI	Fr.	Dn.	BA	IVI
1	<i>Abies densa</i>	70	160	1.92	91.56	70	160	1.92	91.56	70	160	1.92	91.56
2	<i>Acer</i> sp.	50	90	1.52	62.62	50	90	1.52	62.62	50	90	1.52	62.62
3	<i>Betula alnoides</i>	30	40	1.11	37.72	30	40	1.11	37.72	30	40	1.11	37.72
4	<i>Junipers</i> sp.	50	80	0.49	44.04	50	80	0.49	44.04	50	80	0.49	44.04
5	<i>Quercus</i> sp.	20	30	0.23	17.81	20	30	0.23	17.81	20	30	0.23	17.81
6	<i>Rhododendron</i> sp.	40	70	1.01	46.33	40	70	1.01	46.33	40	70	1.01	46.33
Total		260	470	6.29	300	260	470	6.29	300	260	470	6.29	300

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), B A- Basal area ($\text{m}^2 \text{ha}^{-1}$), IVI- Importance value index

Appendix II.3.8: Frequency, density and IVI of shrubs in Tsa chu- I Power house site

Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
		Fr.	Dn.	IVI	Fr.	Dn.	IVI	Fr.	Dn.	IVI
1	<i>Berberis</i> sp.	16	112	23.11	16	112	23.11	16	112	23.11
2	<i>Daphne papyracea</i>	24	128	30.87	24	128	30.87	24	128	30.87
3	<i>Elaeagnus parviflora</i>	12	112	19.98	12	112	19.98	12	112	19.98
4	<i>Pogostemon</i> sp.	12	80	16.95	12	80	16.95	12	80	16.95
5	<i>Rosa</i> sp.	20	288	42.90	20	288	42.90	20	288	42.90
6	<i>Rubus ellipticus</i>	12	80	16.95	12	80	16.95	12	80	16.95
7	<i>Salix</i> sp.	32	256	49.24	32	256	49.24	32	256	49.24
Total		128	1056	200	128	1056	200	128	1056	200

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), IVI- Importance value index

Appendix II.3.9: Frequency, density and IVI of herbs in Tsa chu-I Power house site

Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
		Fr.	Dn.	IVI	Fr.	Dn.	IVI	Fr.	Dn.	IVI
1	<i>Aconogonum alpinum</i>							16	5200	17.62
2	<i>Ainsliaea</i> sp.	24	11200	23.17	44	12800	15.61	52	10800	45.46
3	<i>Arisaema nepenthoides</i>				24	6400	8.16			
4	<i>Elsholtzia strobilifera</i>	28	8400	21.28	16	4800	5.77			
5	<i>Fragaria</i> sp.	24	9200	20.71	32	13200	13.74			
6	<i>Galinsoga parviflora</i>	16	4800	12.16	12	4800	5.06			
7	<i>Galium</i> sp.	20	5600	14.71						
8	<i>Gentiana capitata</i>				16	4800	5.77	12	2000	9.54
9	<i>Geranium nepalensis</i>				24	6400	8.16			
10	<i>Hemiphragma heterophyllum</i>	20	5200	14.22	56	15200	19.20	56	19600	64.40
11	<i>Impatiens</i> sp.	20	4800	13.72	44	8000	12.66			
12	<i>Leontopodium stracheyi</i>	8	1600	5.10	12	4000	4.57	16	3600	14.52
13	<i>Meconopsis</i> sp.				8	3200	3.37			
14	<i>Panax</i> sp.				72	19200	24.47			
15	<i>Persicaria</i> sp.				24	5600	7.67			
16	<i>Pilea umbrosa</i>	24	10800	22.68	24	10000	10.37			
17	<i>Polygonum hydropiper</i>				8	3600	3.62			

Appendices

Sl.	Name of species	Post-monsoon			Monsoon			Winter		
18	<i>Pogostemon</i> sp.	8	2800	6.57				24	3600	18.30
19	<i>Potentilla cuneata</i>	24	6400	17.26	4	2000	1.93			
20	<i>Pouzolzia</i> sp.				24	4800	7.17			
21	<i>Primula denticulata</i>				12	2800	3.83			
22	<i>Primula</i> sp.							16	3200	13.75
23	<i>Prunella vulgaris</i>				20	6000	7.21	20	3600	16.41
24	<i>Ranunculus</i> sp.	8	2800	6.57	16	5200	6.01			
25	<i>Rumex nepalensis</i>	20	4400	13.23	32	6400	9.57			
26	<i>Sambucus adnata</i>				20	4800	6.47			
27	<i>Senecio cappa</i>				8	2800	3.13			
28	<i>Swertia</i> sp.				8	3200	3.37			
29	<i>Viola sikkimensis</i>	12	3200	8.63	8	2800	3.13			
Total		256	81200	200	568	162800	200	212	51600	200

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), IVI- Importance value index

Appendix II.3.10: Frequency, density, basal area, and importance value index (IVI) for tree species in Tsa chu- I catchment area

Sl. No.	Name of species	Post-monsoon				Monsoon				Winter			
		Fr.	Dn.	BA	IVI	Fr.	Dn.	BA	IVI	Fr.	Dn.	BA	IVI
1	<i>Abies densa</i>	70	210	3.33	96.06	70	210	3.33	96.06	70	210	3.33	96.06
2	<i>Acer</i> sp.	50	90	1.24	46.68	50	90	1.24	46.68	50	90	1.24	46.68
3	<i>Betula alnoides</i>	30	50	1.51	35.23	30	50	1.51	35.23	30	50	1.51	35.23
4	<i>Junipers</i> sp.	60	110	0.88	50.02	60	110	0.88	50.02	60	110	0.88	50.02
5	<i>Quercus</i> sp.	30	50	2.00	40.35	30	50	2.00	40.35	30	50	2.00	40.35
6	<i>Rhododendron</i> sp.	30	80	0.67	31.67	30	80	0.67	31.67	30	80	0.67	31.67
Total		270	590	9.63	300	270	590	9.63	300	270	590	9.63	300

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), B A- Basal area ($\text{m}^2 \text{ha}^{-1}$), IVI- Importance value index

Appendix II.3.11: Frequency, density and IVI of shrubs in Tsa chu- I catchment area

Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
		Fr.	Dn.	IVI	Fr.	Dn.	IVI	Fr.	Dn.	IVI
1	<i>Berberis</i> sp.	8	112	20.57	8	112	20.57	8	112	20.57
2	<i>Daphne papyracea</i>	20	128	35.84	20	128	35.84	20	128	35.84
3	<i>Elaeagnus parviflora</i>	8	112	20.57	8	112	20.57	8	112	20.57
4	<i>Rosa</i> sp.	16	304	49.33	16	304	49.33	16	304	49.33
5	<i>Rubus ellipticus</i>	8	80	17.29	8	80	17.29	8	80	17.29
6	<i>Salix</i> sp.	28	240	56.41	28	240	56.41	28	240	56.41
Total		88	976	200	88	976	200	88	976	200

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), IVI- Importance value index

Appendix II.3.12: Frequency, density and IVI of herbs in Tsa chu-I catchment area

Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
		Fr.	Dn.	IVI	Fr.	Dn.	IVI	Fr.	Dn.	IVI
1	<i>Aconogonum alpinum</i>				20	8800	7.34	28	4800	22.73
2	<i>Ainsliaea</i> sp.	32	11600	20.25	44	12800	12.85	44	9600	40.00
3	<i>Arisaema nepenthoides</i>				24	6400	6.71			
4	<i>Elsholtzia</i> sp.	36	8800	18.18	16	4800	4.74			
5	<i>Fragaria</i> sp.	32	9600	18.08	32	13200	11.30			
6	<i>Galinsoga parviflora</i>	24	5200	11.40	16	4800	4.74			
7	<i>Galium</i> sp.	28	6000	13.22	24	5600	6.31			
8	<i>Gentiana capitata</i>				16	4800	4.74	24	3600	18.41
9	<i>Geranium nepalensis</i>				24	6400	6.71			
10	<i>Hemiphragma heterophyllum</i>	28	5600	12.79	56	15200	15.80	48	16400	55.98

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Sl.	Name of species	Post-monsoon			Monsoon			Winter		
11	<i>Impatiens</i> sp.	28	5200	12.36	44	8000	10.43			
12	<i>Leontopodium stracheyi</i>	8	1200	3.22	12	4000	3.76	20	3600	16.59
13	<i>Meconopsis</i> sp.				8	3200	2.78			
14	<i>Panax</i> sp.				72	19200	20.14			
15	<i>Persicaria</i> sp.	20	2400	7.41	24	5600	6.31			
16	<i>Pilea umbrosa</i>	32	10400	18.95	24	10400	8.73			
17	<i>Pogostemon</i> sp.	16	2400	6.44	24	5200	6.11	24	3600	18.41
18	<i>Polygonum hydropiper</i>	20	3200	8.27	8	4000	3.18			
19	<i>Potentilla cuneata</i>	32	6000	14.19	12	2400	2.95			
20	<i>Pouzolzia</i> sp.				24	5200	6.11			
21	<i>Primula denticulata</i>				12	3200	3.36	16	2800	13.11
22	<i>Primula</i> sp.				8	2400	2.37	16	3600	14.77
23	<i>Prunella vulgaris</i>	20	4400	9.57	20	6400	6.13			
24	<i>Ranunculus</i> sp.	16	2800	6.88	16	5600	5.15			
25	<i>Rumex nepalensis</i>	28	4400	11.49	32	6800	8.08			
26	<i>Sambucus adnata</i>				20	5200	5.53			
27	<i>Senecio cappa</i>				8	3200	2.78			
28	<i>Stellaria</i> sp.				24	8800	7.92			
29	<i>Swertia</i> sp.				16	3600	4.14			
30	<i>Viola sikkimensis</i>	16	3200	7.31	8	3200	2.78			
Total		416	92400	200.00	688	198400	200.00	220	48000	200.00

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), IVI- Importance value index

Appendix II.3.13: Dominant and Co-dominant species determined on the basis of IVI/density values of species in the plant community at Tsa chu- I

Community components	Dam site	Powerhouse	Catchment area
Tree species: *			
Dominant	<i>Abies densa</i>	<i>Abies densa</i>	<i>Abies densa</i>
Co-Dominant	<i>Larix griffithiana</i>	<i>Acer</i> sp	<i>Junipers</i> sp
Shrub species: **			
Dominant	<i>Rosa</i> sp	<i>Rosa</i> sp	<i>Rosa</i> sp
Co-Dominant	<i>Salix</i> sp	<i>Salix</i> sp	<i>Salix</i> sp
Herb species: **			
i. Post monsoon season			
Dominant	<i>Ainsliaea</i> sp	<i>Hemiphragma heterophyllum</i>	<i>Hemiphragma heterophyllum</i>
Co-Dominant	<i>Hemiphragma heterophyllum</i>	<i>Ainsliaea</i> sp	<i>Ainsliaea</i> sp
ii. Monsoon season			
Dominant	<i>Hemiphragma heterophyllum</i>	<i>Panax bipinnatifidus</i>	<i>Panax bipinnatifidus</i>
Co-Dominant	<i>Panax bipinnatifidus</i>	<i>Hemiphragma heterophyllum</i>	<i>Hemiphragma heterophyllum</i>
iii. Winter season			
Dominant	<i>Ainsliaea</i> sp	<i>Ainsliaea</i> sp	<i>Ainsliaea</i> sp
Co-Dominant	<i>Pilea umbrosa</i>	<i>Pilea umbrosa</i>	<i>Pilea umbrosa</i>

* Dominance is based on density values

* Dominance based on IVI; ** Dominance based on density

Appendix II.3.14: List of plant species recorded from Tsa chu- I Lower sites

Sl. No.	Species name	Family
TREES		
1	<i>Abies densa</i>	Pinaceae
2	<i>Acer</i> sp	Aceraceae
3	<i>Betula utilis</i>	Betulaceae
4	<i>Junipers</i> sp	Cupressaceae
5	<i>Quercus</i> sp	Fagaceae
6	<i>Rhododendron</i> sp	Ericaceae
SHRUBS		
7	<i>Berberis</i> sp	Berberidaceae

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Sl. No.	Species name	Family
8	<i>Daphne papyracea</i>	Thymelaeaceae
9	<i>Eleagnus parviflora</i>	Elaeagnaceae
10	<i>Pogostemon</i> sp	Lamiaceae
11	<i>Rosa</i> sp	Rosaceae
12	<i>Rubus ellipticus</i>	Rosaceae
13	<i>Salix</i> sp	Salicaceae
	HERBS	
14	<i>Aconogonum alpinum</i>	Polygonaceae
15	<i>Aconitum ferox</i>	Ranunculaceae
16	<i>Aconitum heterophyllum</i>	Ranunculaceae
17	<i>Ainsliaea</i> sp	Asteraceae
18	<i>Arisaema nepenthoides</i>	Araceae
19	<i>Elsholtzia strobilifera</i>	Lamiaceae
20	<i>Fragaria</i> sp	Rosaceae
21	<i>Galinsoga parviflora</i>	Asteraceae
22	<i>Galium</i> sp	Rubiaceae
23	<i>Gentiana capitata</i>	Gentianaceae
24	<i>Geranium nepalensis</i>	Geraniaceae
25	<i>Hemiphragma heterophyllum</i>	Scrophulariaceae
26	<i>Impatiens</i> sp	Balsaminaceae
27	<i>Leontopodium stracheyi</i>	Asteraceae
28	<i>Meconopsis</i> sp	Papaveraceae
29	<i>Panax bipinnatifidus</i>	Araliaceae
30	<i>Paris polyphylla</i>	Trilliaceae
31	<i>Persicaria</i> sp	Polygonaceae
32	<i>Pilea umbrosa</i>	Urticaceae
33	<i>Pogostemon</i> sp	Lamiaceae
34	<i>Polygonum hydropiper</i>	Polygonaceae
35	<i>Potentilla cuneata</i>	Rosaceae
36	<i>Primula denticulata</i>	Primulaceae
37	<i>Primula</i> sp	Primulaceae
38	<i>Prunella vulgaris</i>	Lamiaceae
39	<i>Ranunculus</i> sp	Ranunculaceae
40	<i>Rumex nepalensis</i>	Polygonaceae
41	<i>Sambucus adnata</i>	Polygonaceae
42	<i>Senecio cappa</i>	Caprifoliaceae
43	<i>Stellaria</i> sp	Caryophyllaceae
44	<i>Swertia</i> sp	Gentianaceae
45	<i>Viola sikkimensis</i>	Violaceae
	CLIMBERS	
46	<i>Clematis montana</i>	Ranunculaceae
47	<i>Clematis</i> sp	Ranunculaceae
48	<i>Hedera nepalensis</i>	Araliaceae
	ORCHIDS	
49	<i>Bulbophyllum</i> sp	Orchidaceae
	PTERIDOPHYTES	
50	<i>Adiantum venustum</i>	Adiantaceae
51	<i>Dryopteris serrato-dentata</i>	Dryopteridaceae
52	<i>Equisetum diffusum</i>	Equisetaceae
53	<i>Equisetum ramosissimum</i>	Equisetaceae
54	<i>Lycopodium japonicum</i>	Lycopodiaceae
55	<i>Mecodium badium</i>	Hymenophyllaceae
56	<i>Selaginella indica</i>	Selaginellaceae
57	<i>Selaginella tenuifolia</i>	Selaginellaceae
58	<i>Vittaria flexuosa</i>	Vittariaceae
59	<i>Dryopteris wallichiana</i>	Dryopteridaceae
	BRYOPHYTES	

Sl. No.	Species name	Family
60	<i>Brachymerium</i> sp	Bryaceae
61	<i>Bryum billardieri</i>	Bryaceae
62	<i>Funaria</i> sp	Funariaceae
63	<i>Marchantia</i> sp	Marchantiaceae
LICHENS		
64	<i>Aspicilia</i> sp	Megasporaceae
65	<i>Cladia aggregata</i>	Cladoniaceae
66	<i>Cladonia coccifera</i>	Cladoniaceae
67	<i>Lobaria retigera</i>	Lobariaceae
68	<i>Stereocaulon</i> sp	Stereocaulaceae
69	<i>Usnea dasaea</i>	Parmeliaceae
FUNGI		
70	<i>Boletus reticulatus</i>	Boletaceae
71	<i>Clathrus rubra</i>	Phallaceae
72	<i>Coprinus disseminatus</i>	Agaricaceae
73	<i>Daldinia concentrica</i>	Xylariaceae
74	<i>Gloeophyllum sepiarium</i>	Gloeophyllaceae
75	<i>Hericium erinaceus</i>	Hericiaceae
76	<i>Hydnum repandum</i>	Hydnaceae
77	<i>Phellinus schweintzii</i>	Hymenochaetaceae
78	<i>Poria monticola</i>	Polyporaceae
79	<i>Pycnoporellus fibrillosus</i>	Formitopsidaceae
80	<i>Thelephora penicillata</i>	Thelephoraceae
81	<i>Hygrocybe miniata</i>	Hygrophoraceae

Appendix II.3.15: Different groups of plant species present at Tsa chu- I Lower HEP site

Sl. No.	Species name	Family	Sl. No.	Species name	Family
Barrage and Powerhouse			Catchment area		
CLIMBERS			CLIMBERS		
1	<i>Clematis montana</i>	Ranunculaceae	1	<i>Clematis montana</i>	Ranunculaceae
2	<i>Clematis</i> sp	Ranunculaceae	2	<i>Clematis</i> sp	Ranunculaceae
3	<i>Hedera nepalensis</i>	Araliaceae	3	<i>Hedera nepalensis</i>	Araliaceae
ORCHIDS			ORCHIDS		
1	<i>Bulbophyllum</i> sp	Orchidaceae	1	<i>Bulbophyllum</i> sp	Orchidaceae
PTERIDOPHYTES			PTERIDOPHYTES		
1	<i>Adiantum venustum</i>	Adiantaceae	1	<i>Adiantum venustum</i>	Adiantaceae
2	<i>Dryopteris serrato-dentata</i>	Dryopteridaceae	2	<i>Dryopteris serrato-dentata</i>	Dryopteridaceae
3	<i>Equisetum diffusum</i>	Equisetaceae	3	<i>Equisetum ramosissimum</i>	Equisetaceae
4	<i>Equisetum ramosissimum</i>	Equisetaceae	4	<i>Mecodium badium</i>	Hymenophyllaceae
5	<i>Lycopodium japonicum</i>	Lycopodiaceae	5	<i>Selaginella indica</i>	Selaginellaceae
6	<i>Mecodium badium</i>	Hymenophyllaceae	6	<i>Selaginella tenuifolia</i>	Selaginellaceae
7	<i>Selaginella indica</i>	Selaginellaceae	7	<i>Vittaria flexuosa</i>	Vittariaceae
8	<i>Selaginella tenuifolia</i>	Selaginellaceae	8	<i>Dryopteris wallichiana</i>	Dryopteridaceae
9	<i>Vittaria flexuosa</i>	Vittariaceae	BRYOPHYTES		
10	<i>Dryopteris wallichiana</i>	Dryopteridaceae	1	<i>Brachymerium</i> sp	Bryaceae
BRYOPHYTES			2	<i>Bryum billardieri</i>	Bryaceae
1	<i>Brachymerium</i> sp	Bryaceae	3	<i>Marchantia</i> sp	Marchantiaceae
2	<i>Bryum billardieri</i>	Bryaceae	LICHENS		
3	<i>Funaria</i> sp	Funariaceae	1	<i>Aspicilia</i> sp	Megasporaceae
4	<i>Marchantia</i> sp	Marchantiaceae	2	<i>Cladia aggregata</i>	Cladoniaceae
LICHENS			3	<i>Lobaria retigera</i>	Lobariaceae
1	<i>Aspicilia</i> sp	Megasporaceae	4	<i>Stereocaulon</i> sp	Stereocaulaceae
2	<i>Cladia aggregata</i>	Cladoniaceae	5	<i>Usnea dasaea</i>	Parmeliaceae
3	<i>Cladonia coccifera</i>	Cladoniaceae			
4	<i>Lobaria retigera</i>	Lobariaceae			
5	<i>Stereocaulon</i> sp	Stereocaulaceae			

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Sl. No.	Species name	Family	Sl. No.	Species name	Family
	Barrage and Powerhouse			Catchment area	
6	<i>Usnea dasaea</i>	Parmeliaceae			

Appendix II.3.16: Species list of macro-fungi recorded from barrage and powerhouse sites of Tsa chu-I Lower

Species	Family	Species	Family
Barrage		Powerhouse	
<i>Boletus reticulatus</i>	Boletaceae	<i>Boletus reticulatus</i>	Boletaceae
<i>Clathrus rubra</i>	Phallaceae	<i>Clathrus rubra</i>	Phallaceae
<i>Coprinus disseminatus</i>	Agaricaceae	<i>Coprinus disseminatus</i>	Agaricaceae
<i>Daldinia concentrica</i>	Xylariaceae	<i>Daldinia concentrica</i>	Xylariaceae
<i>Gloeophyllum sepiarium</i>	Gloeophyllaceae	<i>Hericium erinaceus</i>	Hericiaceae
<i>Hericium erinaceus</i>	Hericiaceae	<i>Hygrocybe miniata</i>	Hygrophoraceae
<i>Hydnum repandum</i>	Hydnaceae	<i>Phellinus schweintizii</i>	Hymenochaetaceae
<i>Phellinus schweintizii</i>	Hymenochaetaceae		
<i>Poria monticola</i>	Polyporaceae		
<i>Pycnoporellus fibrillosus</i>	Formitopscidaceae		
<i>Thelephora penicillata</i>	Thelephoraceae		
Catchment area			
Species	Family		
<i>Boletus reticulatus</i>	Boletaceae		
<i>Clathrus rubra</i>	Phallaceae		
<i>Coprinus disseminatus</i>	Agaricaceae		
<i>Daldinia concentrica</i>	Xylariaceae		
<i>Gloeophyllum sepiarium</i>	Gloeophyllaceae		
<i>Hericium erinaceus</i>	Hericiaceae		
<i>Hydnum repandum</i>	Hydnaceae		
<i>Hygrocybe miniata</i>	Hygrophoraceae		
<i>Phellinus schweintizii</i>	Hymenochaetaceae		
<i>Poria monticola</i>	Polyporaceae		
<i>Pycnoporellus fibrillosus</i>	Formitopscidaceae		
<i>Thelephora penicillata</i>	Thelephoraceae		

Appendix II.3.17: Frequency, density, basal area, and importance value index (IVI) for tree species in Tsa chu- I Lower barrage site

Sl. No.	Name of species	Post-monsoon				Monsoon				Winter			
		Fr.	Dn.	BA	IVI	Fr.	Dn.	BA	IVI	Fr.	Dn.	BA	IVI
1	<i>Abies densa</i>	80	160	3.12	97.76	80	160	3.12	97.76	80	160	3.12	97.76
2	<i>Acer sp.</i>	50	80	1.24	48.37	50	80	1.24	48.37	50	80	1.24	48.37
3	<i>Betula utilis</i>	30	50	0.98	32.31	30	50	0.98	32.31	30	50	0.98	32.31
4	<i>Junipers sp.</i>	50	90	1.13	48.99	50	90	1.13	48.99	50	90	1.13	48.99
5	<i>Quercus sp.</i>	40	60	0.90	36.71	40	60	0.90	36.71	40	60	0.90	36.71
6	<i>Rhododendron sp.</i>	40	70	0.67	35.89	40	70	0.67	35.89	40	70	0.67	35.89
Total		290	510	8.05	300	290	510	8.05	300	290	510	8.05	300.00

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), B A- Basal area ($\text{m}^2 \text{ha}^{-1}$), IVI- Importance value index

Appendix II.3.18: Frequency, density and IVI of shrubs in Tsa chu- I Lower barrage site

Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
		Fr.	Dn.	IVI	Fr.	Dn.	IVI	Fr.	Dn.	IVI
1	<i>Berberis sp.</i>	8	64	13.81	8	64	13.81	8	64	13.81
2	<i>Daphne papyracea</i>	24	128	34.76	24	128	34.76	24	128	34.76
3	<i>Eleagnus parviflora</i>	12	96	20.71	12	96	20.71	12	96	20.71
4	<i>Pogostemon sp.</i>	8	80	15.48	8	80	15.48	8	80	15.48

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Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
		Fr.	Dn.	IVI	Fr.	Dn.	IVI	Fr.	Dn.	IVI
5	<i>Rosa</i> sp.	20	288	47.86	20	288	47.86	20	288	47.86
6	<i>Rubus ellipticus</i>	12	80	19.05	12	80	19.05	12	80	19.05
7	<i>Salix</i> sp.	28	224	48.33	28	224	48.33	28	224	48.33
		112	960	200	112	960	200	112	960	200

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), IVI- Importance value index

Appendix II.3.19: Frequency, density and IVI of herbs in Tsa chu- I Lower barrage site

Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
		Fr.	Dn.	IVI	Fr.	Dn.	IVI	Fr.	Dn.	IVI
1	<i>Ainsliaea</i> sp.	28	11600	23.83	24	8800	8.14	40	9200	52.87
2	<i>Aconitum Heterophyllum</i>				48	15600	15.21			
3	<i>Arisaema nepenthoides</i>				28	6400	7.42			
4	<i>Elsholtzia strobilifera</i>	32	8800	21.67	20	4800	5.42			
5	<i>Fragaria</i> sp.	28	10800	22.83	36	15200	13.29			
6	<i>Galinsoga parviflora</i>	20	5200	13.17	20	4800	5.42			
7	<i>Galium</i> sp.	24	6000	15.50	28	5600	6.99			
8	<i>Gentiana capitata</i>							20	3600	23.63
9	<i>Geranium nepalensis</i>				28	6400	7.42			
10	<i>Hemiphragma heterophyllum</i>	24	5600	15.00	60	15200	16.69	44	14000	69.06
11	<i>Impatiens</i> sp.				48	8000	11.12			
12	<i>Leontopodium stracheyi</i>	8	1600	4.67	16	4000	4.42	16	3200	19.80
13	<i>Panax bipinnatifidus</i>				76	19200	21.12			
14	<i>Persicaria</i> sp.	16	2400	8.33	28	5600	6.99			
15	<i>Pilea umbrosa</i>	32	9200	22.17	28	10400	9.57			
16	<i>Polygonum hydropiper</i>				12	4000	3.86			
17	<i>Potentilla cuneata</i>	32	6000	18.17	16	2400	3.56			
18	<i>Paris polyphylla</i>				24	5200	6.20			
19	<i>Primula denticulata</i>				12	3200	3.42			
20	<i>Primula</i> sp.				12	2800	3.21	12	2800	15.97
21	<i>Prunella vulgaris</i>	20	4400	12.17	20	6400	6.28	16	2800	18.68
22	<i>Rumex nepalensis</i>	16	4800	11.33	16	5600	5.28			
23	<i>Rumex nepalensis</i>				32	6800	8.20			
24	<i>Sambucus adnata</i>				16	4400	4.64			
25	<i>Stellaria</i> sp.				24	8800	8.14			
26	<i>Swertia</i> sp.				20	3600	4.78			
27	<i>Viola sikkimensis</i>	20	3600	11.17	12	2800	3.21			
Total		300	80000	200	704	186000	200	148	35600	200

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), IVI- Importance value index

Appendix II.3.20: Frequency, density, basal area, and importance value index (IVI) for tree species in Tsa chu- I Lower Power house site

Sl. No.	Name of species	Post-monsoon				Monsoon				Winter			
		Fr.	Dn.	BA	IVI	Fr.	Dn.	BA	IVI	Fr.	Dn.	BA	IVI
1	<i>Abies densa</i>	90	200	3.17	110.95	90	200	3.17	110.95	90	200	3.17	110.95
2	<i>Acer</i> sp.	60	80	1.12	40.89	60	80	1.12	40.89	60	80	1.12	40.89
3	<i>Betula utilis</i>	30	70	0.90	33.67	30	70	0.90	33.67	30	70	0.90	33.67
4	<i>Quercus</i> sp.	40	80	0.88	35.06	40	80	0.88	35.06	40	80	0.88	35.06
5	<i>Junipers</i> sp.	40	70	1.46	47.20	40	70	1.46	47.20	40	70	1.46	47.20
6	<i>Rhododendron</i> sp.	40	80	0.77	32.26	40	80	0.77	32.26	40	80	0.77	32.26
Total		300	580	8.29	300	300	580	8.29	300	300	580	8.29	300

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), B A- Basal area ($\text{m}^2 \text{ha}^{-1}$), IVI- Importance value index

Appendix II.3.21: Frequency, density and IVI of shrubs in Tsa chu- I Lower Power house site

Sl. No.	Name of species	Post-monsoon	Monsoon	Winter
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Appendices

Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
		Fr.	Dn.	IVI	Fr.	Dn.	IVI	Fr.	Dn.	IVI
1	<i>Berberis</i> sp.	8	80	16.50	8	80	16.50	8	80	16.50
2	<i>Daphne papyracea</i>	28	144	42.29	28	144	42.29	28	144	42.29
3	<i>Elaeagnus parviflora</i>	12	64	18.38	12	64	18.38	12	64	18.38
4	<i>Pogostemon</i> sp.	12	80	20.20	12	80	20.20	12	80	20.20
5	<i>Rosa</i> sp.	24	304	56.77	24	304	56.77	24	304	56.77
6	<i>Salix</i> sp.	24	208	45.86	24	208	45.86	24	208	45.86
Total		108	880	200	108	880	200	108	880	200

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), IVI- Importance value index

Appendix II.3.22: Frequency, density and IVI of herbs in Tsa chu- I Lower Power house site

Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
		Fr.	Dn.	IVI	Fr.	Dn.	IVI	Fr.	Dn.	IVI
1	<i>Aconogonum alpinum</i>				28	8400	8.81	12	2800	13.00
2	<i>Ainsliaea</i> sp.	24	11200	21.48	52	12400	14.47	44	9200	45.21
3	<i>Arisaema nepenthoides</i>				32	6000	7.93			
4	<i>Elsholtzia strobilifera</i>	28	8000	19.28	24	4400	5.89			
5	<i>Fragaria</i> sp.	24	9200	19.20	40	12800	13.07			
6	<i>Galinsoga parviflora</i>	16	4800	11.28	20	4400	5.35			
7	<i>Galium</i> sp.	20	5600	13.64	32	5200	7.46			
8	<i>Gentiana capitata</i>				24	4400	5.89	16	3200	16.10
9	<i>Geranium nepalensis</i>				32	6000	7.93			
10	<i>Hemiphragma heterophyllum</i>	20	6000	14.10	64	14800	17.53	48	18000	67.75
11	<i>Leontopodium stracheyi</i>	8	2400	5.64	20	3600	4.87			
12	<i>Meconopsis</i> sp.				12	2800	3.30			
13	<i>Panax bipinnatifidus</i>				76	18800	21.55			
14	<i>Pilea umbrosa</i>	28	11600	23.39	28	10000	9.76			
15	<i>Pogostemon</i> sp.	12	3600	8.46	28	4800	6.68	24	3600	21.38
16	<i>Polygonum hydropiper</i>	16	4400	10.82	12	3600	3.78			
17	<i>Potentilla cuneata</i>	28	7200	18.36	8	2000	2.28			
18	<i>Pouzolzia</i> sp.				28	4800	6.68			
19	<i>Primula denticulata</i>				16	2800	3.85			
20	<i>Primula</i> sp.							16	2800	15.18
21	<i>Prunella vulgaris</i>	16	6000	12.65	24	6000	6.84	24	3600	21.38
22	<i>Ranunculus</i> sp.				20	5200	5.82			
23	<i>Rumex nepalensis</i>	24	4400	13.72	36	6400	8.72			
24	<i>Sambucus adnata</i>				24	4800	6.13			
25	<i>Senecio cappa</i>				12	2800	3.30			
26	<i>Stellaria</i> sp.				28	8400	8.81			
27	<i>Viola sikkimensis</i>	12	3200	8.00	12	2800	3.30			
Total		276	87600	200	732	168400	200	184	43200	200

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), IVI- Importance value index

Appendix II.3.23: Frequency, density, basal area, and importance value index (IVI) for tree species in Tsa chu- I Lower catchment area

Sl. No.	Name of species	Post-monsoon				Monsoon				Winter			
		Fr.	Dn.	BA	IVI	Fr.	Dn.	BA	IVI	Fr.	Dn.	BA	IVI
1	<i>Abies densa</i>	70	210	3.54	97.74	70	210	3.54	97.74	70	210	3.54	97.74
2	<i>Acer</i> sp.	50	90	1.54	49.06	50	90	1.54	49.06	50	90	1.54	49.06
3	<i>Betula utilis</i>	30	50	0.79	27.27	30	50	0.79	27.27	30	50	0.79	27.27
4	<i>Junipers</i> sp.	80	140	1.24	64.11	80	140	1.24	64.11	80	140	1.24	64.11
5	<i>Quercus</i> sp.	30	50	1.11	30.85	30	50	1.11	30.85	30	50	1.11	30.85
6	<i>Rhododendron</i> sp.	30	80	0.69	30.98	30	80	0.69	30.98	30	80	0.69	30.98
Total		290	620	8.92	300	290	620	8.92	300	290	620	8.92	300

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), B A- Basal area ($\text{m}^2 \text{ha}^{-1}$), IVI- Importance value index

Appendix II.3.24: Frequency, density and IVI of shrubs in Tsa chu- I Lower catchment area

Appendices

Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
		Fr.	Dn.	IVI	Fr.	Dn.	IVI	Fr.	Dn.	IVI
1	<i>Daphne papyracea</i>	24	128	41.33	24	128	41.33	24	128	41.33
2	<i>Elaeagnus parviflora</i>	12	96	24.74	12	96	24.74	12	96	24.74
3	<i>Rosa</i> sp.	20	256	53.49	20	256	53.49	20	256	53.49
4	<i>Rubus ellipticus</i>	12	112	26.79	12	112	26.79	12	112	26.79
5	<i>Salix</i> sp.	28	192	53.66	28	192	53.66	28	192	53.66
Total		96	784	200	96	784	200	96	784	200

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), IVI- Importance value index

Appendix II.3.25: Frequency, density and IVI of herbs in Tsa chu- I Lower catchment area

Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
		Fr.	Dn.	IVI	Fr.	Dn.	IVI	Fr.	Dn.	IVI
1	<i>Aconogonum alpinum</i>				20	8800	8.21	24	4800	19.94
2	<i>Ainsliaea</i> sp.	20	11200	19.15	44	12400	13.78	48	10000	40.69
3	<i>Aconitum heterophyllum</i>				24	6400	7.29			
4	<i>Elsholtzia strobilifera</i>	24	8400	17.40	16	4400	4.94			
5	<i>Fragaria</i> sp.	20	9200	16.93	32	12800	12.35			
6	<i>Galinsoga parviflora</i>	12	4800	9.36	12	4800	4.63			
7	<i>Galium</i> sp.	16	5600	11.60	32	5200	7.67			
8	<i>Gentiana capitata</i>				24	4400	6.06	24	3600	17.54
9	<i>Geranium nepalensis</i>				32	5200	7.67			
10	<i>Hemiphragma heterophyllum</i>	16	5200	11.16	64	12800	16.82	48	18000	56.69
11	<i>Impatiens</i> sp.	16	4800	10.72	52	6400	11.20			
12	<i>Leontopodium stracheyi</i>	8	1600	4.47						
13	<i>Panax bipinnatifidus</i>				80	18800	22.75			
14	<i>Persicaria</i> sp.	16	2800	8.50	32	5200	7.67			
15	<i>Leontopodium stracheyi</i>							20	3600	15.82
16	<i>Pilea umbrosa</i>	28	9600	20.08	28	10000	10.07			
17	<i>Pogostemon</i> sp.	12	2000	6.27				28	3600	19.27
18	<i>Polygonum hydropiper</i>	16	2800	8.50	16	3600	4.45			
19	<i>Potentilla cuneata</i>	28	6400	16.54	12	1600	2.66			
20	<i>Primula denticulata</i>				20	2800	4.52			
21	<i>Primula</i> sp.				12	2400	3.15	16	2800	12.50
22	<i>Prunella vulgaris</i>	16	4800	10.72	28	6000	7.61	24	3600	17.54
23	<i>Ranunculus</i> sp.	12	3200	7.59						
24	<i>Rumex nepalensis</i>	24	4400	12.98	40	6400	9.53			
25	<i>Sambucus adnata</i>				28	4800	6.87			
26	<i>Senecio cappa</i>				16	2800	3.96			
27	<i>Stellaria</i> sp.				28	8400	9.08			
28	<i>Swertia</i> sp.				12	3200	3.65			
29	<i>Viola sikkimensis</i>	12	3600	8.04	12	2800	3.40			
Total		296	90400	200	716	162400	200	232	50000	200

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), IVI- Importance value index

Appendix II.3.26: Dominant and Co-dominant species in the plant communities at Tsa chu-I Lower determined on the basis of IVI/density values

Community components	Dam site	Powerhouse	Catchment area
Tree species: *			
Dominant	<i>Abies densa</i>	<i>Abies densa</i>	<i>Abies densa</i>
Co-Dominant	<i>Junipers</i> sp	<i>Junipers</i> sp	<i>Junipers</i> sp
Shrub species: **			
Dominant	<i>Salix</i> sp	<i>Rosa</i> sp	<i>Rosa</i> sp
Co-Dominant	<i>Rosa</i> sp	<i>Salix</i> sp	<i>Salix</i> sp
Herb species: **			
i. Post monsoon season			

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Community components	Dam site	Powerhouse	Catchment area
Dominant	<i>Panax bipinnatifidus</i>	<i>Panax bipinnatifidus</i>	<i>Panax bipinnatifidus</i>
Co-Dominant	<i>Hemiphragma heterophyllum</i>	<i>Hemiphragma heterophyllum</i>	<i>Hemiphragma heterophyllum</i>
ii. Monsoon season			
Dominant	<i>Ainsliaea</i> sp	<i>Pilea umbrosa</i>	<i>Pilea umbrosa</i>
Co-Dominant	<i>Fragaria</i> sp	<i>Ainsliaea</i> sp	<i>Ainsliaea</i> sp
iii. Winter season			
Dominant	<i>Hemiphragma heterophyllum</i>	<i>Hemiphragma heterophyllum</i>	<i>Hemiphragma heterophyllum</i>
Co-Dominant	<i>Ainsliaea</i> sp	<i>Ainsliaea</i> sp	<i>Ainsliaea</i> sp

* Dominance is based on density values

* Dominance based on IVI; ** Dominance based on density

Appendix II. 3.27: List of plant species recorded from Tsa chu-II HEP sites

Sl. No.	Species name	Family
TREES		
1	<i>Abies densa</i>	Pinaceae
2	<i>Acer</i> sp	Aceraceae
3	<i>Alnus nepalensis</i>	Betulaceae
4	<i>Betula utilis</i>	Betulaceae
5	<i>Junipers</i> sp	Cupressaceae
6	<i>Lyonia ovalifolia</i>	Ericaceae
7	<i>Quercus</i> sp	Fagaceae
8	<i>Rhododendron</i> sp	Ericaceae
9	<i>Tsuga dumosa</i>	Pinaceae
SHRUBS		
10	<i>Berberis</i> sp	Berberidaceae
11	<i>Daphnae papyracea</i>	Thymelaeaceae
12	<i>Eleagnus parviflora</i>	Elaeagnaceae
13	<i>Pogostemon</i> sp	Lamiaceae
14	<i>Rosa</i> sp	Rosaceae
15	<i>Rubus ellipticus</i>	Rosaceae
16	<i>Salix</i> sp	Salicaceae
HERBS		
17	<i>Aconogonum alpinum</i>	Polygonaceae
18	<i>Aconitum heterophyllum</i>	Ranunculaceae
19	<i>Ainsliaea</i> sp	Asteraceae
20	<i>Arisaema nepenthoides</i>	Araceae
21	<i>Elsholtzia strobilifera</i>	Lamiaceae
22	<i>Fragaria</i> sp	Rosaceae
23	<i>Galinsoga parviflora</i>	Asteraceae
24	<i>Galium</i> sp	Rubiaceae
25	<i>Gentiana capitata</i>	Gentianaceae
26	<i>Geranium nepalensis</i>	Geraniaceae
27	<i>Hemiphragma heterophyllum</i>	scrophulariaceae
28	<i>Impatiens</i> sp	Balsaminaceae
29	<i>Leontopodium Stracheyi</i>	Asteraceae
30	<i>Meconopsis</i> sp	Papaveraceae
31	<i>Oxalis corniculata</i>	Oxalidacea
32	<i>Panax bipinnatifidus</i>	Araliaceae
33	<i>Paris polyphylla</i>	
34	<i>Persicaria</i> sp	Polygonaceae
35	<i>Pilea umbrosa</i>	Urticaceae
36	<i>Pogostemon</i> sp	Lamiaceae
37	<i>Polygonum hydropiper</i>	Polygonaceae
38	<i>Potentilla cuneata</i>	Rosaceae
39	<i>Pouzolzia</i> sp	Urticaceae
40	<i>Primula denticulata</i>	Primulaceae

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Sl. No.	Species name	Family
41	<i>Primula</i> sp	Primulaceae
42	<i>Prunella vulgaris</i>	Lamiaceae
43	<i>Ranunculus</i> sp	Ranunculaceae
44	<i>Rumex nepalensis</i>	Polygonaceae
45	<i>Rumex</i> sp	Polygonaceae
46	<i>Sambacus adnata</i>	Caprifoliaceae
47	<i>Senecio cappa</i>	Asteraceae
48	<i>Stellaria</i> sp	Caryophyllaceae
49	<i>Swertia</i> sp	Gentianaceae
50	<i>Viola sikkimensis</i>	Violaceae
CLIMBERS		
51	<i>Clematis montana</i>	Ranunculaceae
52	<i>Clematis</i> sp	Ranunculaceae
53	<i>Hedera nepalensis</i>	Araliaceae
ORCHIDS		
54	<i>Bulbophyllum</i> sp	Orchidaceae
PTERIDOPHYTES		
55	<i>Adiantum venustum</i>	Adiantaceae
56	<i>Dryopteris serrato-dentata</i>	Dryopteridaceae
57	<i>Equisetum diffusum</i>	Equisetaceae
58	<i>Equisetum ramosissimum</i>	Equisetaceae
59	<i>Lycopodium japonicum</i>	Lycopodiaceae
60	<i>Mecodium badium</i>	Hymenophyllaceae
61	<i>Selaginella tenuifolia</i>	Selaginellaceae
62	<i>Selaginella indica</i>	Selaginellaceae
63	<i>Vittaria flexuosa</i>	Vittariaceae
BRYOPHYTES		
64	<i>Brachymerium</i> sp	Bryaceae
65	<i>Bryum billardieri</i>	Bryaceae
66	<i>Funaria</i> sp	Funariaceae
67	<i>Marchantia</i> sp	Marchantiaceae
LICHENS		
68	<i>Aspicilia</i> sp	Megasporaceae
69	<i>Cladia aggregata</i>	Cladoniaceae
70	<i>Cladonia coccifera</i>	Cladoniaceae
71	<i>Stereocaulon</i> sp	Stereocaulaceae
72	<i>Usnea dasaea</i>	Parmeliaceae
FUNGI		
73	<i>Laccaria laccata</i>	Hydnangiaceae
74	<i>Lactarius rubidus</i>	Russulaceae
75	<i>Phellinus schweintzii</i>	Hymenochaetaceae
76	<i>Polyporus arcularius</i>	Polyporaceae
77	<i>Poria monticola</i>	Polyporaceae
78	<i>Pycnoporellus fibrillosus</i>	Formitopscidaceae
79	<i>Schizophyllum commune</i>	Schizophyllaceae
80	<i>Strobilomyces strobilaceus</i>	Boletaceae
81	<i>Thelephora penicillata</i>	Thelephoraceae
82	<i>Tremella mesenterica</i>	Tremellaceae
83	<i>Boletus reticulatus</i>	Boletaceae
84	<i>Clathrus rubra</i>	Phallaceae

Appendix II.3.28: Different groups of plant species present at Tsa chu- II HEP site

Sl. No.	Species name	Family	Sl. No.	Species name	Family
	Barrage and Powerhouse			Catchment area	
	CLIMBERS			CLIMBERS	

Sl. No.	Species name	Family	Sl. No.	Species name	Family
	Barrage and Powerhouse			Catchment area	
1	<i>Clematis montana</i>	Ranunculaceae	1	<i>Clematis montana</i>	Ranunculaceae
2	<i>Clematis</i> sp	Ranunculaceae	2	<i>Hedera nepalensis</i>	Araliaceae
3	<i>Hedera nepalensis</i>	Araliaceae		ORCHIDS	
	ORCHIDS		1	<i>Bulbophyllum</i> sp	Orchidaceae
1	<i>Bulbophyllum</i> sp	Orchidaceae		PTERIDOPHYTES	
	PTERIDOPHYTES		1	<i>Adiantum</i> sp	Adiantaceae
1	<i>Adiantum venustum</i>	Adiantaceae	2	<i>Dryopteris serrato-dentata</i>	Dryopteridaceae
2	<i>Dryopteris serrato-dentata</i>	Dryopteridaceae	3	<i>Lycopodium japonicum</i>	Lycopodiaceae
3	<i>Equisetum diffusum</i>	Equisetaceae	4	<i>Selaginella indica</i>	Selaginellaceae
4	<i>Equisetum ramosissimum</i>	Equisetaceae	5	<i>Vittaria flexuosa</i>	Vittariaceae
5	<i>Lycopodium japonicum</i>	Lycopodiaceae		BRYOPHYTES	
6	<i>Mecodium badium</i>	Hymenophyllaceae	1	<i>Brachymerium</i> sp	Bryaceae
7	<i>Selaginella tenuifolia</i>	Selaginellaceae	2	<i>Funaria</i> sp	Funariaceae
8	<i>Selaginella indica</i>	Selaginellaceae	3	<i>Marchantia</i> sp	Marchantiaceae
9	<i>Vittaria flexuosa</i>	Vittariaceae		LICHENS	
	BRYOPHYTES		1	<i>Aspicilia</i> sp	Megasporaceae
1	<i>Brachymerium</i> sp	Bryaceae	2	<i>Cladia aggregata</i>	Cladoniaceae
2	<i>Bryum billardieri</i>	Bryaceae	3	<i>Stereocaulon</i> sp	Stereocaulaceae
3	<i>Funaria</i> sp	Funariaceae	4	<i>Usnea dasaea</i>	Parmeliaceae
4	<i>Marchantia</i> sp	Marchantiaceae			
	LICHENS				
1	<i>Aspicilia</i> sp	Megasporaceae			
2	<i>Cladia aggregata</i>	Cladoniaceae			
3	<i>Cladonia coccifera</i>	Cladoniaceae			
4	<i>Stereocaulon</i> sp	Stereocaulaceae			
5	<i>Usnea dasaea</i>	Parmeliaceae			

Appendix II.3.29: Species list of macro-fungi recorded from barrage and powerhouse sites of Tsa chu-II

Species	Family	Species	Family
Barrage		Barrage	
<i>Laccaria laccata</i>	Hydnangiaceae	<i>Boletus reticulatus</i>	Boletaceae
<i>Lactarius rubidus</i>	Russulaceae	<i>Clathrus rubra</i>	Phallaceae
<i>Phellinus schweintzii</i>	Hymenochaetaceae	<i>Lactarius rubidus</i>	Russulaceae
<i>Polyporus arcularius</i>	Polyporaceae	<i>Phellinus schweintzii</i>	Hymenochaetaceae
<i>Poria monticola</i>	Polyporaceae	<i>Polyporus arcularius</i>	Polyporaceae
<i>Pycnoporellus fibrillosus</i>	Formitopscidaceae	<i>Pycnoporellus fibrillosus</i>	Formitopscidaceae
<i>Schizophyllum commune</i>	Schizophyllaceae	<i>Schizophyllum commune</i>	Schizophyllaceae
<i>Strobilomyces strobilaceus</i>	Boletaceae		
<i>Thelephora penicillata</i>	Thelephoraceae		
<i>Tremella mesenterica</i>	Tremellaceae		
Catchment area			
Species	Family		
<i>Boletus reticulatus</i>	Boletaceae		
<i>Clathrus rubra</i>	Phallaceae		
<i>Laccaria laccata</i>	Hydnangiaceae		
<i>Lactarius rubidus</i>	Russulaceae		
<i>Phellinus schweintzii</i>	Hymenochaetaceae		
<i>Polyporus arcularius</i>	Polyporaceae		
<i>Poria monticola</i>	Polyporaceae		
<i>Pycnoporellus fibrillosus</i>	Formitopscidaceae		
<i>Schizophyllum commune</i>	Schizophyllaceae		
<i>Strobilomyces strobilaceus</i>	Boletaceae		
<i>Thelephora penicillata</i>	Thelephoraceae		
<i>Tremella mesenterica</i>	Tremellaceae		

Appendix II.3.30: Frequency, density, basal area, and importance value index (IVI) for tree species in Tsa chu- II barrage site

Sl. No.	Name of species	Post-monsoon				Monsoon				Winter			
		Fr.	Dn.	BA	IVI	Fr.	Dn.	BA	IVI	Fr.	Dn.	BA	IVI
1	<i>Abies densa</i>	70	160	1.92	67.3	70	160	1.92	67.3	70	160	1.92	67.3
2	<i>Alnus nepalensis</i>	50	90	1.52	45.8	50	90	1.52	45.8	50	90	1.52	45.8
3	<i>Betula utilis</i>	30	40	1.11	27.5	30	40	1.11	27.5	30	40	1.11	27.5
4	<i>Junipers</i> sp.	50	80	0.49	32.4	50	80	0.49	32.4	50	80	0.49	32.4
5	<i>Quercus</i> sp.	20	30	0.23	13.1	20	30	0.23	13.1	20	30	0.23	13.1
6	<i>Rhododendron</i> sp.	40	70	1.01	34.0	40	70	1.01	34.0	40	70	1.01	34.0
7	<i>Acer</i> sp.	70	110	1.79	57.6	70	110	1.79	57.6	70	110	1.79	57.6
8	<i>Lyonia ovalifolia</i>	30	40	0.66	22.3	30	40	0.66	22.3	30	40	0.66	22.3
Total		360	620	8.73	300	360	620	8.73	300	360	620	8.73	300

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), B A- Basal area ($\text{m}^2 \text{ha}^{-1}$), IVI- Importance value index

Appendix II.3.31: Frequency, density and IVI of shrubs in Tsa chu- II barrage site

Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
		Fr.	Dn.	IVI	Fr.	Dn.	IVI	Fr.	Dn.	IVI
1	<i>Berberis</i> sp.	16	80	21.12	16	80	21.12	16	80	21.12
2	<i>Daphnae papyracea</i>	28	144	37.39	28	144	37.39	28	144	37.39
3	<i>Pogostemon</i> sp.	16	80	21.12	16	80	21.12	16	80	21.12
4	<i>Rosa</i> sp.	16	288	43.53	16	288	43.53	16	288	43.53
5	<i>Rubus ellipticus</i>	20	112	27.69	20	112	27.69	20	112	27.69
6	<i>Salix</i> sp.	32	224	49.14	32	224	49.14	32	224	49.14
Total		128	928	200	128	928	200	128	928	200

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), IVI- Importance value index

Appendix II.3.32: Frequency, density and IVI of herbs in Tsa chu- II barrage site

Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
		Fr.	Dn.	IVI	Fr.	Dn.	IVI	Fr.	Dn.	IVI
1	<i>Aconogonum alpinum</i>	28	5600	18.23	32	8400	8.32			
2	<i>Ainsliaea</i> sp.	48	12400	35.57	56	14800	14.61	24	11200	19.05
3	<i>Aconitum heterophyllum</i>				36	6000	7.50			
4	<i>Elsholtzia strolifera</i>				28	4400	5.69	28	8400	17.19
5	<i>Fragaria</i> sp.				44	15200	13.40	24	9200	16.89
6	<i>Galinsoga parviflora</i>				24	5200	5.65	16	4800	9.82
7	<i>Galium</i> sp.				36	5200	7.07	20	5600	11.85
8	<i>Gentiana capitata</i>	12	2000	7.20	28	4800	5.90			
9	<i>Geranium nepalensis</i>				36	6000	7.50			
10	<i>Hemiphragma heterophyllum</i>	44	16800	40.99	68	14800	16.03	20	5200	11.42
11	<i>Impatiens</i> sp.				56	7600	10.73	20	4800	10.99
12	<i>Leontopodium Stracheyi</i>	20	3600	12.40	24	3600	4.78	8	2000	4.48
13	<i>Meconopsis</i> sp.				20	3200	4.09			
14	<i>Panax bipinnatifidus</i>				72	18400	18.44			
15	<i>Persicaria</i> sp.				24	5200	5.65	16	2800	7.67
16	<i>Pilea umbrosa</i>				24	10000	8.23	28	10800	19.78
17	<i>Pogostemon</i> sp.	20	3600	12.40	24	4800	5.43	20	3200	9.26
18	<i>Polygonum hydropiper</i>				8	3600	2.89	12	2800	6.51
19	<i>Potentilla cuneata</i>				12	2000	2.50	28	6400	15.04
20	<i>Paris polyphylla</i>				24	4800	5.43			
21	<i>Primula denticulata</i>				12	2800	2.93			
22	<i>Prunella vulgaris</i>	24	3600	13.77	20	6000	5.60	16	4800	9.82
23	<i>Rannunculus</i> sp.				16	5200	4.70	24	3600	10.86
24	<i>Rumex nepalensis</i>	36	6400	22.21	32	4400	6.16	24	4400	11.72
25	<i>Sambacus adnata</i>	24	4800	15.63	32	4800	6.38			
26	<i>Stellaria</i> sp.				20	8400	6.90			
27	<i>Swertia</i> sp.	20	3200	11.79	16	3200	3.62			

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Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
28	<i>Viola sikkimensis</i>	16	2800	9.80	20	2800	3.88	16	2800	7.67
Total		292	64800	200	844	185600	200	344	92800	200

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), IVI- Importance value index

Appendix II.3.33: Frequency, density, basal area, and importance value index (IVI) for tree species in Tsa chu- II Power house site

Sl. No.	Name of species	Post-monsoon				Monsoon				Winter			
		Fr.	Dn.	BA	IVI	Fr.	Dn.	BA	IVI	Fr.	Dn.	BA	IVI
1	<i>Abies densa</i>	70	160	1.9	54.4	70	160	1.9	54.4	70	160	1.9	54.4
2	<i>Acer sp.</i>	50	90	1.5	37.0	50	90	1.5	37.0	50	90	1.5	37.0
3	<i>Betula utilis</i>	30	40	1.1	22.1	30	40	1.1	22.1	30	40	1.1	22.1
4	<i>Junipers sp.</i>	50	80	0.5	26.3	50	80	0.5	26.3	50	80	0.5	26.3
5	<i>Quercus sp.</i>	20	30	0.2	10.6	20	30	0.2	10.6	20	30	0.2	10.6
6	<i>Rhododendron sp.</i>	40	70	1.0	27.4	40	70	1.0	27.4	40	70	1.0	27.4
7	<i>Alnus nepalensis</i>	60	120	2.0	47.4	60	120	2.0	47.4	60	120	2.0	47.4
8	<i>Lyonia ovalifolia</i>	50	60	0.8	26.4	50	60	0.8	26.4	50	60	0.8	26.4
9	<i>Tsuga dumosa</i>	70	110	2.0	48.4	70	110	2.0	48.4	70	110	2.0	48.4
Total		440	760	11.0	300	440	760	11.0	300	440	760	11.0	300

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), B A- Basal area ($\text{m}^2 \text{ha}^{-1}$), IVI- Importance value index

Appendix II.3.34: Frequency, density and IVI of shrubs in Tsa chu- II Power house site

Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
		Fr.	Dn.	IVI	Fr.	Dn.	IVI	Fr.	Dn.	IVI
1	<i>Berberis sp.</i>	8	64	14.2	8	64	14.2	8	64	14.2
2	<i>Daphnae papyracea</i>	32	240	55.0	32	240	55.0	32	240	55.0
3	<i>Pogostemon sp.</i>	20	112	29.9	20	112	29.9	20	112	29.9
4	<i>Rubus ellipticus</i>	36	224	56.4	36	224	56.4	36	224	56.4
5	<i>Salix sp.</i>	24	208	44.5	24	208	44.5	24	208	44.5
Total		120	848	200	120	848	200	120	848	200

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), IVI- Importance value index

Appendix II.3.35: Frequency, density and IVI of herbs in Tsa chu- II Power house site

Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
		Fr.	Dn.	IVI	Fr.	Dn.	IVI	Fr.	Dn.	IVI
1	<i>Aconogonum alpinum</i>	32	4800	17.1	36	9200	7.95			
2	<i>Ainsliaea sp.</i>	48	12400	33.0	60	15600	13.38	32	12400	23.03
3	<i>Arisaema nepenthoides</i>				40	6800	7.19			
4	<i>Elsholtzia strolifera</i>				32	5200	5.64	36	9600	21.06
5	<i>Fragaria sp.</i>				48	16000	12.40	32	10400	20.80
6	<i>Galinsoga parviflora</i>				28	6000	5.63			
7	<i>Galium sp.</i>				40	6000	6.81	28	6800	15.64
8	<i>Gentiana capitata</i>	16	2800	9.1	32	5600	5.83			
9	<i>Geranium nepalensis</i>				40	6800	7.19			
10	<i>Hemiphragma heterophyllum</i>	48	19200	42.7	72	15600	14.56	28	6400	15.19
11	<i>Impatiens sp.</i>				60	8400	9.92	28	6000	14.74
12	<i>Leontopodium Stracheyi</i>	20	4400	12.7	28	4400	4.86	16	3200	8.17
13	<i>Meconopsis sp.</i>				24	4000	4.28			
14	<i>Panax bipinnatifidus</i>				76	19200	16.68			
15	<i>Persicaria sp.</i>				36	6000	6.41	24	4000	11.36
16	<i>Pilea umbrosa</i>				36	10800	8.72	28	10800	20.10
17	<i>Pogostemon sp.</i>	20	4800	13.2	32	5600	5.83	20	3200	9.32
18	<i>Polygonum hydropiper</i>				16	4400	3.68			
19	<i>Potentilla cuneata</i>				20	2800	3.31	28	6400	15.19
20	<i>Paris polyphylla</i>				32	5600	5.83			
21	<i>Primula denticulata</i>				20	3600	3.69			
22	<i>Prunella vulgaris</i>	24	5200	15.1	28	6800	6.01	20	4400	10.66
23	<i>Ranunculus sp.</i>				24	6000	5.24			

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Sl.	Name of species	Post-monsoon			Monsoon			Winter		
24	<i>Rumex nepalensis</i>	36	6400	20.6	40	5200	6.42	16	3200	8.17
25	<i>Sambacus adnata</i>	28	4400	15.2	40	5600	6.61			
26	<i>Stellaria</i> sp.				28	9200	7.17			
27	<i>Swertia</i> sp.	24	3600	12.8	24	4000	4.28			
28	<i>Viola sikkimensis</i>	16	2400	8.5	28	3600	4.48	12	2800	6.57
Total		312	70400	200	1020	208000	200	348	89600	200

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), IVI- Importance value index

Appendix II.3.36: Frequency, density, basal area, and importance value index (IVI) for tree species in Tsa chu- II catchment area

Sl. No.	Name of species	Post-monsoon				Monsoon				Winter			
		Fr.	Dn.	BA	IVI	Fr.	Dn.	BA	IVI	Fr.	Dn.	BA	IVI
1	<i>Abies densa</i>	70	160	1.92	65.73	70	160	1.92	65.73	70	160	1.92	65.73
2	<i>Acer</i> sp.	50	90	1.52	44.84	50	90	1.52	44.84	50	90	1.52	44.84
3	<i>Betula utilis</i>	30	40	1.11	26.94	30	40	1.11	26.94	30	40	1.11	26.94
4	<i>Juniper</i> sp.	50	80	0.49	31.56	50	80	0.49	31.56	50	80	0.49	31.56
5	<i>Quercus</i> sp.	20	30	0.23	12.75	20	30	0.23	12.75	20	30	0.23	12.75
6	<i>Rhododendron</i> sp.	40	70	1.01	33.18	40	70	1.01	33.18	40	70	1.01	33.18
7	<i>Alnus nepalensis</i>	70	100	1.59	52.53	70	100	1.59	52.53	70	100	1.59	52.53
8	<i>Lyonia ovalifolia</i>	40	70	0.95	32.47	40	70	0.95	32.47	40	70	0.95	32.47
Total		370	640	8.82	300	370	640	8.82	300	370	640	8.82	300

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), B A- Basal area ($\text{m}^2 \text{ha}^{-1}$), IVI- Importance value index

Appendix II.3.37: Frequency, density and IVI of shrubs in Tsa chu- II catchment area

Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
		Fr.	Dn.	IVI	Fr.	Dn.	IVI	Fr.	Dn.	IVI
1	<i>Berberis</i> sp.	12	112	21.82	12	112	21.82	12	112	21.82
2	<i>Daphnae papyracea</i>	24	128	33.80	24	128	33.80	24	128	33.80
3	<i>Eleagnus parviflora</i>	12	96	20.18	12	96	20.18	12	96	20.18
4	<i>Pogostemon</i> sp.	8	64	13.45	8	64	13.45	8	64	13.45
5	<i>Rosa</i> sp.	20	288	46.75	20	288	46.75	20	288	46.75
6	<i>Rubus ellipticus</i>	12	64	16.90	12	64	16.90	12	64	16.90
7	<i>Salix</i> sp.	28	224	47.09	28	224	47.09	28	224	47.09
Total		116	976	200	116	976	200	116	976	200

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), IVI- Importance value index

Appendix II.3.38: Frequency, density and IVI of herbs in Tsa chu- II catchment area

Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
		Fr.	Dn.	IVI	Fr.	Dn.	IVI	Fr.	Dn.	IVI
1	<i>Aconogonum alpinum</i>	20	4800	17.72	24	8400	8.15			
2	<i>Ainsliaea</i> sp.	44	9600	37.27	48	12400	13.77	32	12400	18.05
3	<i>Arisaema nepenthoides</i>				28	6000	7.32			
4	<i>Elsholtzia strolifera</i>				20	4400	5.30	36	9600	16.50
5	<i>Fragaria</i> sp.				36	12800	12.35	32	10400	16.30
6	<i>Galinsoga parviflora</i>				16	4400	4.74	24	6800	11.35
7	<i>Galium</i> sp.				28	5200	6.86	28	6400	11.90
8	<i>Gentiana capitata</i>	20	3600	15.57	20	4400	5.30			
9	<i>Geranium nepalensis</i>				28	6000	7.32			
10	<i>Hemiphragma heterophyllum</i>	48	18400	54.91	60	14800	16.81	28	6000	11.55
11	<i>Impatiens</i> sp.				48	7600	11.01	28	5600	11.20
12	<i>Leontopodium Stracheyi</i>	16	4000	14.47	16	3600	4.28	12	2000	4.45
13	<i>Panax bipinnatifidus</i>				76	18800	21.33			
14	<i>Persicaria</i> sp.				28	5200	6.86	20	3200	7.30
15	<i>Pilea umbrosa</i>				28	10000	9.63	32	11200	17.00
16	<i>Pogostemon</i>	24	4000	18.10				16	3200	6.40
17	<i>Polygonum hydropiper</i>				12	3600	3.73			

Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
18	<i>Potentilla cuneata</i>				8	2000	2.26			
19	<i>Pouzolzia</i> sp.				28	4800	6.63	20	4000	8.00
20	<i>Primula denticulata</i>				16	2800	3.82	32	6800	13.15
21	<i>Primula</i> sp.	12	3200	11.21	8	2000	2.26	20	5200	9.05
22	<i>Prunella vulgaris</i>	20	4000	16.29	24	6000	6.77			
23	<i>Oxalis corniculata</i>	16	4000	14.47						
24	<i>Rumex</i> sp.							28	4800	10.50
25	<i>Rumex nepalensis</i>				36	6400	8.66	28	9200	14.35
26	<i>Sambacus adnata</i>				24	4800	6.08			
27	<i>Senecio cappa</i>				12	2800	3.27			
28	<i>Stellaria</i> sp.				28	8400	8.71			
29	<i>Swertia</i> sp.				12	3200	3.50			
30	<i>Viola sikkimensis</i>				12	2800	3.27	12	4000	6.20
31	<i>Viola</i> sp.							16	3600	6.75
Total		220	55600	200.00	724	173600	200.00	444	114400	200.00

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), IVI- Importance value index

Appendix II.3.39: Dominant and Co-dominant species determined on the basis of IVI/density values of species in the plant communities at Tsa chu- II

Community components	Barrage site	Powerhouse	Catchment area
Tree species: *			
Dominant	<i>Abies densa</i>	<i>Abies densa</i>	<i>Abies densa</i>
Co-Dominant	<i>Acer</i> sp	<i>Tsuga dumosa</i>	<i>Alnus nepalensis</i>
Shrub species: **			
Dominant	<i>Salix</i> sp	<i>Daphnae papyracea</i>	<i>Salix</i> sp
Co-Dominant	<i>Rosa</i> sp	<i>Rubus ellipticus</i>	<i>Rosa</i> sp
Herb species: **			
i. Post monsoon season			
Dominant	<i>Pilea umbrosa</i>	<i>Ainsliaea</i> sp	<i>Ainsliaea</i> sp
Co-Dominant	<i>Ainsliaea</i> sp	<i>Elsholtzia strolifera</i>	<i>Pilea umbrosa</i>
ii. Monsoon season			
Dominant	<i>Panax bipinnatifidus</i>	<i>Hemiphragma heterophyllum</i>	<i>Panax bipinnatifidus</i>
Co-Dominant	<i>Hemiphragma heterophyllum</i>	<i>Panax bipinnatifidus</i>	<i>Hemiphragma heterophyllum</i>
iii. Winter season			
Dominant	<i>Hemiphragma heterophyllum</i>	<i>Hemiphragma heterophyllum</i>	<i>Hemiphragma heterophyllum</i>
Co-Dominant	<i>Ainsliaea</i> sp	<i>Ainsliaea</i> sp	<i>Ainsliaea</i> sp

* Dominance is based on density values

* Dominance based on IVI; ** Dominance based on density

Appendix II.3.40: List of plant species recorded from Thingbu chu

Sl. No.	Species name	Family
TREES		
1	<i>Abies densa</i>	Pinaceae
2	<i>Acer sikkimensis</i>	Aceraceae
3	<i>Betula alnoides</i>	Betulaceae
4	<i>Corylus heterophylla</i>	Betulaceae
5	<i>Larix griffithii</i>	Pinaceae
6	<i>Leucosceptrum canum</i>	Lamiaceae
7	<i>Lindera neesiana</i>	Lauraceae
8	<i>Picea spinulosa</i>	Pinaceae
9	<i>Pinus wallichiana</i>	Pinaceae
10	<i>Taxus wallichiana</i>	Taxaceae
11	<i>Tsuga dumosa</i>	Pinaceae
SHRUBS		
12	<i>Aconogonum molle</i>	Poaceae
13	<i>Artemisia nilagirica</i>	Asteraceae
14	<i>Arundinaria maling</i>	Poaceae

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Sl. No.	Species name	Family
15	<i>Arundinaria</i> sp	Poaceae
16	<i>Berberis</i> sp.	Berberidaceae
17	<i>Coriaria nepalensis</i>	Coriariaceae
18	<i>Daphne papyracea</i>	Thymelaeaceae
19	<i>Eleagnus parviflora</i>	Elaeagnaceae
20	<i>Girardinia grandiflora</i>	Urticaceae
21	<i>Heracleum</i> sp	Apiaceae
22	<i>Hypericum choisianum</i>	Hypericaceae
23	<i>Ilex dipyrena</i>	Aquifoliaceae
24	<i>Neillia thyrsiflora</i>	Rosaceae
25	<i>Philadelphus tomentosus</i>	Hydrangeaceae
26	<i>Piptanthus nepalensis</i>	Papilionaceae
27	<i>Rosa</i> sp.	Rosaceae
28	<i>Rubus ellipticus</i>	Rosaceae
29	<i>Rubus niveus</i>	Rosaceae
30	<i>Sarcococca</i> sp	Buxaceae
31	<i>Seigesbeckia orientalis</i>	Asteraceae
32	<i>Spirea</i> sp.	Rosaceae
	HERBS	
33	<i>Aconitum elswii</i>	Ranunculaceae
34	<i>Aconitum ferox</i>	Ranunculaceae
35	<i>Ainsliaea</i> sp.	Asteraceae
36	<i>Anaphalis margaritacea</i>	Asteraceae
37	<i>Aster</i> sp.	Asteraceae
38	<i>Astilbe rivularis</i>	Saxifragaceae
39	<i>Cyathula capitata</i>	Amaranthaceae
40	<i>Dipsacus asper</i>	Dipsacaceae
41	<i>Dracocephalum</i> sp.	Lamiaceae
42	<i>Elatostemma sessile</i>	Urticaceae
43	<i>Elsholtzia strobilifera</i>	Lamiaceae
44	<i>Fragaria</i> sp	Rosaceae
45	<i>Galium</i> sp	Rubiaceae
46	<i>Geranium pretense</i>	Geraniaceae
47	<i>Halenia elliptica</i>	Gentianaceae
48	<i>Herpetospermum pedunculatum</i>	Cucurbitaceae
49	<i>Lecanthus peduncularis</i>	Urticaceae
50	<i>Nepeta</i> sp.	Lamiaceae
51	<i>Ophiopogon intermedius</i>	Liliaceae
52	<i>Oplismenus compositus</i>	Poaceae
53	<i>Parasenecio quinquelobus</i>	Asteraceae
54	<i>Panax bipinnatifidus</i>	Araliaceae
55	<i>Paris polyphylla</i>	Triliaceae
56	<i>Parochaetus communis</i>	Papilionaceae
57	<i>Persicaria ruminata</i>	Polygonaceae
58	<i>Phlomis</i> sp.	Lamiaceae
59	<i>Pilea umbrosa</i>	Urticaceae
60	<i>Pogostemon</i> sp.	Lamiaceae
61	<i>Potentilla cuneata</i>	Rosaceae
62	<i>Salvia</i> sp.	Lamiaceae
63	<i>Sambucus adnata</i>	Adoxaceae
64	<i>Senecio cappa</i>	Asteraceae
65	<i>Swertia paniculata</i>	Gentianaceae
66	<i>Swertia chirayita</i>	
67	<i>Thalictrum foliolosum</i>	Ranunculaceae
68	<i>Thladiantha cordifolia</i>	Cucurbitaceae
69	<i>Urtica dioica</i>	Urticaceae
70	<i>Viola sikkimensis</i>	Violaceae

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Sl. No.	Species name	Family
	CLIMBERS	
71	<i>Clematis Buchaniana</i>	Ranunculaceae
72	<i>Cissampelos</i> sp	Menispermaceae
73	<i>Clematis</i> sp	Ranunculaceae
74	<i>Ficus</i> sp	Dioscoreaceae
75	<i>Hedera nepalensis</i>	Araliaceae
76	<i>Herpetospermum pedunculatum</i>	Araliaceae
77	<i>Holboellia latifolia</i>	Lardizabalaceae
78	<i>Periploca</i> sp.	Periplocaceae
79	<i>Philadelphus tomentosus</i>	Hydrangeaceae
80	<i>Rubia cordifolia</i>	Rubiaceae
81	<i>Smilax aspera</i>	Smilacaceae
82	<i>Stephania glandulifera</i>	Menispermaceae
83	<i>Thladiantha cordifolia</i>	Cucubitaceae
	ORCHIDS	
84	<i>Bulbophyllum</i> sp	Orchidaceae
85	<i>Calanthe tricarinata</i>	Orchidaceae
86	<i>Coelogynae</i> sp.	Orchidaceae
87	<i>Cymbidium</i> sp	Orchidaceae
88	<i>Dendrobium</i> sp.	Orchidaceae
89	<i>Oberonia</i> sp	Orchidaceae
	PTERIDOPHYTES	
90	<i>Botrychium</i> sp	Ophioglossaceae
91	<i>Dicranopteris linearis</i>	Dicranopteridaceae
92	<i>Dryopteris wallichiana</i>	Dryopteridaceae
93	<i>Lepisorus</i> sp.	Polypodiaceae
94	<i>Polypodium</i> sp.	Polypodiaceae
95	<i>Pteris</i> sp.	Pteridiaceae
96	<i>Pteris vittata</i>	Pteridaceae
97	<i>Pyrrosia nuda</i>	Polypodiaceae
98	<i>Selaginella</i> sp.	Selaginellaceae
	BRYOPHYTES	
99	<i>Desmouthea</i> sp	Orthotrichaceae
100	<i>Diphyscium</i> sp	Buxbaumiaceae
101	<i>Funaria</i> sp	Funariaceae
102	<i>Lyellia</i> sp	Polytrichaceae
103	<i>Marchantia</i> sp	Marchantiaceae
104	<i>Plagiobryum</i> sp	Bryaceae
	LICHENS	
105	<i>Alectoria</i> sp	Alectoriaceae
106	<i>Cladonia</i> sp.	Cladoniaceae
107	<i>Graphis</i> sp.	Graphidaceae
108	<i>Lobaria</i> sp	Lobariaceae
109	<i>Parmelia</i> sp	Parmeliaceae
110	<i>Parmotrema</i> sp	Parmeliaceae
111	<i>Pseudocyphellaria</i> sp	Lobariaceae
112	<i>Stereocaulon</i> sp	Stereocaulaceae
113	<i>Sticta</i> sp	Lobariaceae
114	<i>Teloschistes</i> sp	Teloschistaceae
115	<i>Usnea</i> sp	Parmeliaceae
	FUNGI	
115	<i>Auricularia auriculiformis</i>	Auriculariaceae
116	<i>Clathrus rubra</i>	Phallaceae
117	<i>Coprinus disseminatus</i>	Agaricaceae
118	<i>Daldinia concentrica</i>	Xylariaceae
119	<i>Fomes pinicola</i>	Fomitopsidaceae
120	<i>Hygrocybe miniata</i>	Hygrophoraceae

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Sl. No.	Species name	Family
121	<i>Laccaria laccata</i>	Hydnangiaceae
122	<i>Lactarius rubidus</i>	Russulaceae
123	<i>Phellinus schweintzii</i>	Hymenochaetaceae
124	<i>Poria monticola</i>	Polyporaceae
125	<i>Schizophyllum commune</i>	Schizophyllaceae
126	<i>Tremella mesenterica</i>	Tremellaceae
127	<i>Xylaria polymorpha</i>	Xylariaceae
128	<i>Hericium erinaceus</i>	Hericiaceae

Appendix II.3.41: Species list of macro-fungi recorded from barrage and powerhouse sites of Thingbu chu

Species	Family	Species	Family
Barrage		Powerhouse	
<i>Auricularia auriculiformis</i>	Auriculariaceae	<i>Auricularia auriculiformis</i>	Auriculariaceae
<i>Clathrus rubra</i>	Phallaceae	<i>Clathrus rubra</i>	Phallaceae
<i>Coprinus disseminatus</i>	Agaricaceae	<i>Coprinus disseminatus</i>	Agaricaceae
<i>Daldinia concentrica</i>	Xylariaceae	<i>Fomes pinicola</i>	Fomitopsidaceae
<i>Fomes pinicola</i>	Fomitopsidaceae	<i>Hericium erinaceus</i>	Hericiaceae
<i>Hygrocybe miniata</i>	Hygrophoraceae	<i>Hygrocybe miniata</i>	Hygrophoraceae
<i>Laccaria laccata</i>	Hydnangiaceae	<i>Laccaria laccata</i>	Hydnangiaceae
<i>Lactarius rubidus</i>	Russulaceae	<i>Poria monticola</i>	Polyporaceae
<i>Phellinus schweintzii</i>	Hymenochaetaceae	<i>Tremella mesenterica</i>	Tremellaceae
<i>Poria monticola</i>	Polyporaceae	<i>Xylaria polymorpha</i>	Xylariaceae
<i>Schizophyllum commune</i>	Schizophyllaceae		
<i>Tremella mesenterica</i>	Tremellaceae		
<i>Xylaria polymorpha</i>	Xylariaceae		
Catchment area			
Species	Family		
<i>Auricularia auriculiformis</i>	Auriculariaceae		
<i>Clathrus rubra</i>	Phallaceae		
<i>Coprinus disseminatus</i>	Agaricaceae		
<i>Daldinia concentrica</i>	Xylariaceae		
<i>Fomes pinicola</i>	Fomitopsidaceae		
<i>Hericium erinaceus</i>	Hericiaceae		
<i>Hygrocybe miniata</i>	Hygrophoraceae		
<i>Laccaria laccata</i>	Hydnangiaceae		
<i>Lactarius rubidus</i>	Russulaceae		
<i>Phellinus schweintzii</i>	Hymenochaetaceae		
<i>Poria monticola</i>	Polyporaceae		
<i>Schizophyllum commune</i>	Schizophyllaceae		
<i>Tremella mesenterica</i>	Tremellaceae		
<i>Xylaria polymorpha</i>	Xylariaceae		

Appendix II.3.42: Frequency, density, basal area, and importance value index (IVI) for tree species in Thingbu chu barrage site

Sl. No.	Name of species	Post-monsoon				Monsoon				Winter			
		Fr.	Dn.	BA	IVI	Fr.	Dn.	BA	IVI	Fr.	Dn.	BA	IVI
1	<i>Abies densa</i>	30	30	1.08	16.69	30	30	1.08	16.69	30	30	1.08	16.69
2	<i>Acer sikkimensis</i>	50	90	1.37	33.47	50	90	1.37	33.47	50	90	1.37	33.47
3	<i>Betula alnoides</i>	30	40	1.90	20.84	30	40	1.90	20.84	30	40	1.90	20.84
4	<i>Corylus heterophylla</i>	30	40	0.65	17.16	30	40	0.65	17.16	30	40	0.65	17.16
5	<i>Leucosceptrum canum</i>	60	100	2.44	41.11	60	100	2.44	41.11	60	100	2.44	41.11
6	<i>Lindera neesiana</i>	20	30	0.14	11.15	20	30	0.14	11.15	20	30	0.14	11.15
7	<i>Picea spinulosa</i>	20	20	2.94	17.68	20	20	2.94	17.68	20	20	2.94	17.68
8	<i>Pinus wallichiana</i>	30	50	5.76	33.97	30	50	5.76	33.97	30	50	5.76	33.97
9	<i>Taxus wallichiana</i>	20	30	0.40	11.91	20	30	0.40	11.91	20	30	0.40	11.91

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Sl. No.	Name of species	Post-monsoon				Monsoon				Winter			
10	<i>Tsuga dumosa</i>	70	150	17.16	96.03	70	150	17.16	96.03	70	150	17.16	96.03
Total		360	580	33.83	300	360	580	33.83	300	360	580	33.83	300

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), B A- Basal area ($\text{m}^2 \text{ha}^{-1}$), IVI- Importance value index

Appendix II.3.43: Frequency, density and IVI of shrubs in Thingbu chu barrage site

Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
		Fr.	Dn.	IVI	Fr.	Dn.	IVI	Fr.	Dn.	IVI
1	<i>Arundinaria maling</i>	44	96	8.91	44	96	8.91	44	96	8.91
2	<i>Aconogonum molle</i>	28	224	7.55	28	224	7.55	28	224	7.55
3	<i>Artemesia nilagarica</i>	60	1568	28.75	60	1568	28.75	60	1568	28.75
4	<i>Berberis</i> sp.	44	720	16.12	44	720	16.12	44	720	16.12
5	<i>Coriaria nepalensis</i>	40	544	13.38	40	544	13.38	40	544	13.38
6	<i>Daphne papyracea</i>	64	1968	34.08	64	1968	34.08	64	1968	34.08
7	<i>Eleagnus parviflora</i>	28	128	6.44	28	128	6.44	28	128	6.44
8	<i>Girardinia grandiflora</i>	36	368	10.63	36	368	10.63	36	368	10.63
9	<i>Heracleum</i>	8	128	2.90	8	128	2.90	8	128	2.90
10	<i>Hypericum choisianum</i>	8	48	1.97	8	48	1.97	8	48	1.97
11	<i>Ilex dipyrrena</i>	12	144	3.79	12	144	3.79	12	144	3.79
12	<i>Neillia thyrsiflora</i>	8	80	2.34	8	80	2.34	8	80	2.34
13	<i>Philadelphus tomentosus</i>	8	48	1.97	8	48	1.97	8	48	1.97
14	<i>Piptanthus nepalensis</i>	56	464	15.29	56	464	15.29	56	464	15.29
15	<i>Rosa</i> sp.	12	128	3.61	12	128	3.61	12	128	3.61
16	<i>Rubus ellipticus</i>	24	208	6.66	24	208	6.66	24	208	6.66
17	<i>Rubus niveus</i>	8	48	1.97	8	48	1.97	8	48	1.97
18	<i>Sarcococca</i>	56	1568	28.04	56	1568	28.04	56	1568	28.04
19	<i>Seigesbeckia orientalis</i>	12	96	3.24	12	96	3.24	12	96	3.24
20	<i>Spirea</i> sp.	8	80	2.34	8	80	2.34	8	80	2.34
Total		564	8656	200	564	8656	200	564	8656	200

Appendix II.3.44: Frequency, density and IVI of herbs in Thingbu chu barrage site

Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
		Fr.	Dn.	IVI	Fr.	Dn.	IVI	Fr.	Dn.	IVI
1	<i>Aconitum elswii</i>				28	3600	4.11			
2	<i>Ainsliaea</i> sp.	20	3600	4.32	24	4800	3.94	16	3600	5.60
3	<i>Anaphalis margaritacea</i>	60	35600	22.01	60	49200	18.89	48	11200	17.01
4	<i>Aster</i> sp.	28	6800	6.70	16	3600	2.73			
5	<i>Astilbe rivularis</i>	24	7200	6.24	24	8400	4.82	20	5200	7.38
6	<i>Aconitum ferox</i>				28	6000	4.70	28	6000	9.63
7	<i>Cyathula capitata</i>	32	12800	9.48	36	13600	7.47	36	9600	13.41
8	<i>Dipsacus asper</i>	44	18000	13.19	20	9200	4.55			
9	<i>Dracocephalum</i> sp.	16	3600	3.72	16	3200	2.63			
10	<i>Elatostemma sessile</i>	32	9200	8.17	36	18000	8.54	44	18000	19.80
11	<i>Fragaria</i> sp.	60	44800	25.36	44	22400	10.53	40	22400	21.29
12	<i>Elsholtzia stobilifera</i>							48	35600	30.30
13	<i>Galium</i> sp.	20	9200	6.36	36	12800	7.27	32	12400	14.03
14	<i>Geranium pretense</i>	24	6800	6.09	16	3200	2.63	16	8400	8.21
15	<i>Herpetospermum pedunculatum</i>				20	3200	3.09			
16	<i>Leucanthus peduncularis</i>				48	55600	19.05			
17	<i>Nepeta</i> sp.	16	3200	3.58	16	3200	2.63			
18	<i>Ophiopogon intermedius</i>	24	4800	5.36	24	9200	5.01			
19	<i>Oplisminus compositus</i>	48	34800	19.91	56	49200	18.42	56	36400	32.55
20	<i>Parasenecio quinquelobus</i>				16	3600	2.73			
21	<i>Parochaetus communis</i>	36	13600	10.38						
22	<i>Persicaria ruminata</i>				28	9200	5.47			
23	<i>Paris polyphylla</i>	16	3200	3.58	16	3200	2.63			
24	<i>Pilea umbrosa</i>	36	15600	11.11	44	35600	13.73			
25	<i>Pogostemon</i> sp.	20	3200	4.18	16	3200	2.63	20	3200	6.29

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Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
26	<i>Potentilla cuneata</i>	32	7200	7.44	20	9200	4.55	24	6800	9.16
27	<i>Panax bipinnatifidus</i>				12	2800	2.07			
28	<i>Sambucus adnata</i>	36	17200	11.69	52	31200	13.59			
29	<i>Senecio cappa</i>	12	3200	2.97	16	3200	2.63			
30	<i>Swertia chiriyata</i>				40	18400	9.10			
31	<i>Thalictrum foliolosum</i>				16	4800	3.02			
32	<i>Thladiantha cordifolia</i>				12	3200	2.17			
33	<i>Urtica dioica</i>	28	10800	8.15	16	2800	2.53	12	4800	5.34
34	<i>Viola sikkimensis</i>				12	3200	2.17			
Total		664	274400	200.00	864	412000	200.00	440	183600	200.00

Appendix II.3.45: Frequency, density, basal area, and importance value index (IVI) for tree species in Thingbu chu Power house site

Sl. No.	Name of species	Post-monsoon				Monsoon				Winter			
		Fr.	Dn.	BA	IVI	Fr.	Dn.	BA	IVI	Fr.	Dn.	BA	IVI
1	<i>Abies densa</i>	30	50	3.33	36.02	30	50	3.33	36.02	30	50	3.33	36.02
2	<i>Acer sp.</i>	50	70	1.24	38.97	50	70	1.24	38.97	50	70	1.24	38.97
3	<i>Betula alnoides</i>	30	50	2.51	32.58	30	50	2.51	32.58	30	50	2.51	32.58
4	<i>Corylus heterophylla</i>	60	110	1.88	54.31	60	110	1.88	54.31	60	110	1.88	54.31
5	<i>Pinus wallichiana</i>	30	40	3.00	32.38	30	40	3.00	32.38	30	40	3.00	32.38
6	<i>Taxus wallichiana</i>	30	50	0.67	24.90	30	50	0.67	24.90	30	50	0.67	24.90
7	<i>Tsuga dumosa</i>	50	70	11.23	80.83	50	70	11.23	80.83	50	70	11.23	80.83
Total		280	440	23.87	300	280	440	23.87	300	280	440	23.87	300.00

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), B A- Basal area ($\text{m}^2 \text{ha}^{-1}$), IVI- Importance value index

Appendix II.3.46: Frequency, density and IVI of shrubs in Thingbu chu Power house site

Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
		Fr.	Dn.	IVI	Fr.	Dn.	IVI	Fr.	Dn.	IVI
1	<i>Arundinella sp.</i>	48	544	13.53	48	544	13.53	48	544	13.53
2	<i>Aconogonum molle</i>	60	368	13.27	60	368	13.27	60	368	13.27
3	<i>Artemesia nilagirica</i>	68	1248	24.73	68	1248	24.73	68	1248	24.73
4	<i>Berberis sp.</i>	72	896	21.23	72	896	21.23	72	896	21.23
5	<i>Coriaria nepalensis</i>	36	368	9.68	36	368	9.68	36	368	9.68
6	<i>Daphne paparacea</i>	72	1776	31.49	72	1776	31.49	72	1776	31.49
7	<i>Eleagnus parviflora</i>	36	272	8.56	36	272	8.56	36	272	8.56
8	<i>Girardinia grandiflora</i>	28	400	8.86	28	400	8.86	28	400	8.86
9	<i>Heracleum</i>	16	144	4.07	16	144	4.07	16	144	4.07
10	<i>Hypericum choisianum</i>	20	112	4.30	20	112	4.30	20	112	4.30
11	<i>Neillia thrysiflora</i>	12	96	2.92	12	96	2.92	12	96	2.92
12	<i>Philadelphus tomentosus</i>	12	64	2.54	12	64	2.54	12	64	2.54
13	<i>Piptanthus nepalensis</i>	48	768	16.14	48	768	16.14	48	768	16.14
14	<i>Rosa sp.</i>	32	80	5.72	32	80	5.72	32	80	5.72
15	<i>Rubus ellipticus</i>	36	288	8.75	36	288	8.75	36	288	8.75
16	<i>Rubus niveus</i>	8	64	1.94	8	64	1.94	8	64	1.94
17	<i>Sarcococca</i>	44	896	17.03	44	896	17.03	44	896	17.03
18	<i>Seigesbeckia orientalis</i>	20	192	5.23	20	192	5.23	20	192	5.23
Total		668	8576	200	668	8576	200	668	8576	200

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), IVI- Importance value index

Appendix II.3.47: Frequency, density and IVI of herbs in Thingbu chu Power house site

Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
		Fr.	Dn.	IVI	Fr.	Dn.	IVI	Fr.	Dn.	IVI
1	<i>Aconitum elswii</i>				20	3600	3.74			
2	<i>Ainsliaea sp.</i>	16	3600	3.91	20	4800	4.13	16	3600	5.37
3	<i>Anaphalis margaritacea</i>	48	42800	21.57	44	31200	15.76	20	7600	8.37
4	<i>Aster sp.</i>	16	3600	3.91	20	3600	3.74			

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Sl.	Name of species	Post-monsoon			Monsoon			Winter		
5	<i>Astilbe rivularis</i>	24	8400	6.78	24	6800	5.29	28	4800	8.60
6	<i>Aconitum ferox</i>				20	5200	4.26	32	5600	9.89
7	<i>Cyathula capitata</i>	28	11600	8.47	32	12400	8.13	36	8400	12.25
8	<i>Dipsacus asper</i>	24	9200	7.03	28	13600	8.01	36	8800	12.46
9	<i>Dracocephalum</i> sp.	12	2400	2.84	12	2000	2.19			
10	<i>Elatostemma sessile</i>				40	26800	13.82	28	20800	17.15
11	<i>Elsholtzia strobilifera</i>	44	35200	18.53	36	16800	10.07			
12	<i>Fragaria</i> sp.	36	18000	11.84	28	8400	6.32	40	25600	22.30
13	<i>Galium</i> sp.	36	22400	13.19	16	3200	3.10	32	12800	13.73
14	<i>Geranium pretense</i>	28	12800	8.84	16	3200	3.10	20	4800	6.87
15	<i>Herpetospermum pedunculatum</i>				12	2800	2.45			
16	<i>Leucanthus peduncularis</i>				20	3200	3.61	44	31200	26.15
17	<i>Nepeta</i> sp.	16	3200	3.78	28	9200	6.58			
18	<i>Ophiopogon intermedius</i>	16	3200	3.78	36	11200	8.26	52	36400	30.65
19	<i>Oplisminus compositus</i>	60	55600	27.61	56	44400	21.58			
20	<i>Parasenecio quinquelobus</i>				12	2800	2.45			
21	<i>Parochaetus communis</i>	16	3200	3.78						
22	<i>Persicaria ruminata</i>				36	26800	13.31			
23	<i>Panax bipinnatifidus</i>	20	9200	6.33	24	3200	4.13			
24	<i>Pilea umbrosa</i>	36	49200	21.44	40	26800	13.82			
25	<i>Pogostemon</i> sp.	12	3600	3.21	16	3600	3.23	20	3600	6.23
26	<i>Potentilla cuneata</i>	20	9200	6.33	16	3600	3.23	28	6400	9.45
27	<i>Paris polyphylla</i>				8	1600	1.55			
28	<i>Sambucus adnata</i>	20	9200	6.33	36	12400	8.65			
29	<i>Senecio cappa</i>	16	3200	3.78	12	2800	2.45			
30	<i>Thalictrum foliolosum</i>				28	4800	5.16			
31	<i>Thladiantha cordifolia</i>	16	3200	3.78	16	3200	3.10			
32	<i>Urtica dioica</i>	12	2800	2.96	12	2800	2.45	32	6800	10.53
33	<i>Viola sikkimensis</i>				12	2400	2.32			
Total		572	324800	200	776	309200	200	464	187200	200

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), IVI- Importance value index

Appendix II.3.48: Frequency, density, basal area, and importance value index (IVI) for tree species in Thingbu chu catchment area

Sl. No.	Name of species	Post-monsoon				Monsoon				Winter			
		Fr.	Dn.	BA	IVI	Fr.	Dn.	BA	IVI	Fr.	Dn.	BA	IVI
1	<i>Abies densa</i>	20	30	1.51	31.36	20	30	1.51	31.36	20	30	1.51	31.36
2	<i>Acer</i> sp.	50	90	1.52	61.36	50	90	1.52	61.36	50	90	1.52	61.36
3	<i>Betula alnoides</i>	20	40	2.14	39.98	20	40	2.14	39.98	20	40	2.14	39.98
4	<i>Corylus heterophylla</i>	30	70	0.23	34.74	30	70	0.23	34.74	30	70	0.23	34.74
5	<i>Larix griffithii</i>	10	20	0.09	10.77	10	20	0.09	10.77	10	20	0.09	10.77
6	<i>Picea spinulosa</i>	10	10	1.11	17.72	10	10	1.11	17.72	10	10	1.11	17.72
7	<i>Pinus wallichiana</i>	20	30	2.18	37.72	20	30	2.18	37.72	20	30	2.18	37.72
8	<i>Taxus wallichiana</i>	20	20	1.60	29.58	20	20	1.60	29.58	20	20	1.60	29.58
9	<i>Tsuga dumosa</i>	40	60	0.25	36.78	40	60	0.25	36.78	40	60	0.25	36.78
Total		220	370	10.64	300	220	370	10.64	300	220	370	10.64	300

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), B A- Basal area ($\text{m}^2 \text{ha}^{-1}$), IVI- Importance value index

Appendix II.3.49: Frequency, density and IVI of shrubs in Thingbu chu catchment area

Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
		Fr.	Dn.	IVI	Fr.	Dn.	IVI	Fr.	Dn.	IVI
1	<i>Arundinella malling</i>	28	368	8.97	28	368	8.97	28	368	8.97
2	<i>Aconogonum molle</i>	28	176	6.86	28	176	6.86	28	176	6.86
3	<i>Artemesia nilagirica</i>	60	1680	29.02	60	1680	29.02	60	1680	29.02
4	<i>Berberis</i> sp.	44	368	11.79	44	368	11.79	44	368	11.79
5	<i>Coriaria nepalensis</i>	40	448	11.96	40	448	11.96	40	448	11.96

Sl.	Name of species	Post-monsoon			Monsoon			Winter		
6	<i>Daphne papyracea</i>	56	1872	30.42	56	1872	30.42	56	1872	30.42
7	<i>Eleagnus parviflora</i>	16	128	4.22	16	128	4.22	16	128	4.22
8	<i>Girardinia grandiflora</i>	36	336	10.03	36	336	10.03	36	336	10.03
9	<i>Heracleum sp.</i>	8	48	1.94	8	48	1.94	8	48	1.94
10	<i>Hypericum choisianum</i>	8	64	2.11	8	64	2.11	8	64	2.11
11	<i>Ilex dipyrrena</i>	12	112	3.34	12	112	3.34	12	112	3.34
12	<i>Neillia thyrsiflora</i>	16	144	4.40	16	144	4.40	16	144	4.40
13	<i>Philadelphus tomentosus</i>	8	112	2.64	8	112	2.64	8	112	2.64
14	<i>Piptanthus nepalensis</i>	68	784	20.58	68	784	20.58	68	784	20.58
15	<i>Rosa sp.</i>	12	64	2.82	12	64	2.82	12	64	2.82
16	<i>Rubus ellipticus</i>	36	544	12.31	36	544	12.31	36	544	12.31
17	<i>Rubus niveus</i>	8	128	2.81	8	128	2.81	8	128	2.81
18	<i>Sarcococca</i>	56	1424	25.50	56	1424	25.50	56	1424	25.50
19	<i>Seigesbeckia orientalis</i>	20	240	6.16	20	240	6.16	20	240	6.16
20	<i>Spirea sp.</i>	8	64	2.11	8	64	2.11	8	64	2.11
Total		568	9104	200	568	9104	200	568	9104	200

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), IVI- Importance value index

Appendix II.3.50: Frequency, density and IVI of herbs in Thingbu chu catchment area

Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
		Fr.	Dn.	IVI	Fr.	Dn.	IVI	Fr.	Dn.	IVI
1	<i>Ainsliaea sp.</i>	16	3600	3.15	20	7600	4.91	20	4400	8.43
2	<i>Anaphalis margaritacea</i>	36	26800	11.82	60	44800	21.06	36	10400	16.82
3	<i>Aconitum ferox</i>	12	2800	2.39	16	3200	3.10			
4	<i>Astilbi rivularis</i>	16	3600	3.15	16	3600	3.21	12	3200	5.43
5	<i>Cyathula capitata</i>	40	31200	13.50	24	6800	5.22	28	4800	10.89
6	<i>Dipsacus aspera</i>	44	18000	10.71	36	23200	11.57	24	9200	12.73
7	<i>Elatostemma sessile</i>	28	12400	7.05	44	12400	9.55			
8	<i>Elsholtzia strobilifera</i>	48	13600	10.15				48	35600	36.92
9	<i>Fragaria sp.</i>	12	2000	2.18	36	13600	8.81	36	26400	27.49
10	<i>Galium sp.</i>	40	22400	11.27	28	10800	6.91	28	7600	12.76
11	<i>Geranium pretense</i>	24	8400	5.48	12	2800	2.44	20	4800	8.69
12	<i>Halenia elliptica</i>	32	22400	10.15						
13	<i>Leucanthus penduncularis</i>	56	54800	21.72	48	58000	23.23			
14	<i>Nepeta sp.</i>	20	3200	3.60	24	8400	5.68	12	2800	
15	<i>Ophiopogon intermedius</i>	32	12400	7.61	24	8400	5.68			5.16
16	<i>Oplismenus compositus</i>	52	49200	19.74	48	35200	16.66	56	31200	36.18
17	<i>Parochaetus communis</i>	36	22400	10.71						
18	<i>Parasenecio quinquelobus</i>				12	2800	2.44			
19	<i>Persicaria ruminata</i>				36	22400	11.34			
20	<i>Phlomis sp.</i>	12	2800	2.39	16	4400	3.44			
21	<i>Pilea umbrosa</i>	48	44400	17.96	28	11200	7.03			
22	<i>Pogostemon sp.</i>	12	2800	2.39	20	4400	3.98	12	3200	5.43
23	<i>Potentilla cuneata</i>	20	4800	4.01	28	9200	6.45	20	3600	7.89
24	<i>Paris polyphylla</i>				20	3200	3.64			
25	<i>Sambucus adnata</i>	40	22400	11.27	48	26800	14.24			
26	<i>Senecio cappa</i>	12	2800	2.39	16	3600	3.21			
27	<i>Thalictrum foliosum</i>				24	3600	4.30			
28	<i>Thladiantha cordifolia</i>	16	3600	3.15	8	1600	1.55			
29	<i>Urtica dioica</i>	12	1600	2.08	28	12400	7.38	12	2800	5.16
30	<i>Viola sikkimensis</i>				16	2800	2.98			
Total		716	394400	200.00	736	347200	200	364	150000	200

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), IVI- Importance value index

Appendix II.3.51: Dominant and co-dominant species determined on the basis of IVI/density values of species in the plant communities at Thingbu chu site

Community components	Barrage	Powerhouse	Catchment area
Tree species*			
Dominant	<i>Tsuga dumosa</i>	<i>Tsuga dumosa</i>	<i>Acer</i> sp.
Co-Dominant	<i>Leucosceptrum canum</i>	<i>Corylus heterophylla</i>	<i>Betula alnoides</i>
Shrub species*			
Dominant	<i>Daphne papyracea</i>	<i>Daphne papyracea</i>	<i>Daphne papyracea</i>
Co-Dominant	<i>Sarcococca</i> sp.	<i>Artemesia nilagarica</i>	<i>Artemesia nilagarica</i>
Herb species**			
i. Pre-monsoon season			
Dominant	<i>Fragaria</i> sp.	<i>Oplismenus compositus</i>	<i>Lecanthus penduncularis</i>
Co-Dominant	<i>Anaphalis margaritacea</i>	<i>Anaphalis margaritacea</i>	<i>Oplismenus compositus</i>
ii. Monsoon season			
Dominant	<i>Anaphalis margaritacea</i>	<i>Oplismenus compositus</i>	<i>Lecanthus penduncularis</i>
Co-Dominant	<i>Oplismenus compositus</i>	<i>Anaphalis margaritacea</i>	<i>Anaphalis margaritacea</i>
iii. Winter			
Dominant	<i>Oplismenus compositus</i>	<i>Oplismenus compositus</i>	<i>Elsholtzia strobilifera</i>
Co-Dominant	<i>Fragaria</i> sp.	<i>Elsholtzia strobilifera</i>	<i>Oplismenus compositus</i>

* Dominance based on IVI; ** Dominance based on density

Appendix II.3.52: List of plant species recorded from New Melling HEP sites

Sl. No.	Species name	Family
TREES		
1	<i>Acer</i> sp	<i>Aceraceae</i>
2	<i>Alnus nepalensis</i>	<i>Betulaceae</i>
3	<i>Betula alnoides</i>	<i>Betulaceae</i>
4	<i>Brassaiopsis glomerulata</i>	<i>Araliaceae</i>
5	<i>Corylus heterophylla</i>	<i>Betulaceae</i>
6	<i>Larix griffithiana</i>	<i>Pinaceae</i>
7	<i>Leucosceptrum canum</i>	<i>Lamiaceae</i>
8	<i>Persea</i> sp	<i>Lauraceae</i>
9	<i>Picea spinulosa</i>	<i>Pinaceae</i>
10	<i>Pinus wallichiana</i>	<i>Pinaceae</i>
11	<i>Populus ciliata</i>	<i>Salicaceae</i>
12	<i>Quercus semicarpifolia</i>	<i>Fagaceae</i>
13	<i>Rhododendron campanulatum</i>	<i>Ericaceae</i>
14	<i>Rhododendron</i> sp	<i>Ericaceae</i>
15	<i>Sorbus</i> sp	<i>Rosaceae</i>
16	<i>Taxus wallichiana</i>	<i>Taxaceae</i>
17	<i>Tsuga dumosa</i>	<i>Pinaceae</i>
SHRUBS		
18	<i>Aconogonum molle</i>	<i>Polygonaceae</i>
19	<i>Artemisia nilagirica</i>	<i>Asteraceae</i>
20	<i>Arundinaria maling</i>	<i>Poaceae</i>
21	<i>Berberis</i> sp	<i>Berberidaceae</i>
22	<i>Boenninghausenia albiflora</i>	<i>Rutaceae</i>
23	<i>Coriaria cylindrica</i>	<i>Coriariaceae</i>
24	<i>Coriaria nepalensis</i>	<i>Coriariaceae</i>
25	<i>Daphne papyracea</i>	<i>Thymelaeaceae</i>
26	<i>Elaeagnus parviflora</i>	<i>Elaeagnaceae</i>
27	<i>Girardinia diversifolia</i>	<i>Urticaceae</i>
28	<i>Hypericum choisianum</i>	<i>Hypericaceae</i>

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Sl. No.	Species name	Family
29	<i>Hypericum</i> sp	Hypericaceae
30	<i>Ilex dipyrena</i>	Aquifoliaceae
31	<i>Neillia thyrsoflora</i>	Rosaceae
32	<i>Piptanthus nepalensis</i>	Papilionaceae
33	<i>Plectranthus</i> sp	Lamiaceae
34	<i>Rosa</i> sp	Rosaceae
35	<i>Rubus ellipticus</i>	Rosaceae
36	<i>Rubus niveus</i>	Rosaceae
37	<i>Sarcococca</i> sp	Buxaceae
38	<i>Seigesbeckia orientalis</i>	Asteraceae
39	<i>Spirea</i> sp	Rosaceae
	HERBS	
40	<i>Ainsliaea</i> sp	Asteraceae
41	<i>Anaphalis margaritacea</i>	Asteraceae
42	<i>Aster</i> sp	Asteraceae
43	<i>Aster trinervius</i>	Asteraceae
44	<i>Astilbe rivularis</i>	Saxifragaceae
45	<i>Campanula</i> sp	Campanulaceae
46	<i>Cyathula capitata</i>	Amaranthaceae
47	<i>Cynoglossum</i>	Boraginaceae
48	<i>Dipsacus asper</i>	Dipsacaceae
49	<i>Dracocephalum</i> sp	Lamiaceae
50	<i>Drymaria cordata</i>	Caryophyllaceae
51	<i>Elatostemma sessile</i>	Urticaceae
52	<i>Elsholtzia strobilifera</i>	Lamiaceae
53	<i>Equisetum</i> sp	Equisetaceae
54	<i>Fragaria nubicola</i>	Rosaceae
55	<i>Fragaria</i> sp	Rosaceae
56	<i>Galium rotundifolium</i>	Rubiaceae
57	<i>Galium</i> sp	Rubiaceae
58	<i>Geranium pretense</i>	Geraniaceae
59	<i>Heracleum</i> sp	Apiaceae
60	<i>Herpetospermum pedunculatum</i>	Cucurbitaceae
61	<i>Lecanthus peduncularis</i>	Urticaceae
62	<i>Nepeta</i> sp	Lamiaceae
63	<i>Ophiopogon intermedius</i>	Liliaceae
64	<i>Oplisminus compositus</i>	Poaceae
65	<i>Panax bipinnatifidus</i>	Araliaceae
66	<i>Parasenecio quinquelobus</i>	Asteraceae
67	<i>Paris polyphylla</i>	Triliaceae
68	<i>Parochaetus communis</i>	Papilionaceae
69	<i>Persicaria runcinata</i>	Polygonaceae
70	<i>Phlomis</i> sp	Lamiaceae
71	<i>Pilea umbrosa</i>	Urticaceae
72	<i>Pogostemon</i> sp	Lamiaceae
73	<i>Potentilla cuneata</i>	Rosaceae
74	<i>Rumex acetosella</i>	Polygonaceae
75	<i>Rumex nepalensis</i>	Polygonaceae
76	<i>Salvia</i> sp	Lamiaceae
77	<i>Sambucus adnata</i>	Adoxaceae
78	<i>Senecio cappa</i>	Asteraceae
79	<i>Swertia chirayita</i>	
80	<i>Swertia paniculata</i>	Gentianaceae
81	<i>Thalictrum foliolosum</i>	Ranunculaceae
82	<i>Thladiantha cordifolia</i>	Ranunculaceae
83	<i>Urtica dioica</i>	Urticaceae
84	<i>Viola sikkimensis</i>	Violaceae

Sl. No.	Species name	Family
CLIMBERS		
85	<i>Aristolochia griffithii</i>	Aristolochiaceae
86	<i>Celastrus paniculata</i>	Celastraceae
87	<i>Cissampelos</i> sp	Menispermaceae
88	<i>Clematis</i> sp	Ranunculaceae
89	<i>Dioscorea</i> sp	Dioscoreaceae
90	<i>Ficus</i> sp	Moraceae
91	<i>Hedera nepalensis</i>	Araliaceae
92	<i>Herpetospermum pedunculatum</i>	Cucurbitaceae
93	<i>Holboellia latifolia</i>	Lardizabalaceae
94	<i>Periploca</i> sp.	Periplocaceae
95	<i>Philadelphus tomentosus</i>	Hydrangeaceae
96	<i>Rubia cordifolia</i>	Rubiaceae
97	<i>Smilax</i> sp	Smilacaceae
98	<i>Stephania glandulifera</i>	Menispermaceae
99	<i>Thladiantha cordifolia</i>	Cucurbitaceae
ORCHIDS		
100	<i>Bulbophyllum</i> sp	Orchidaceae
101	<i>Calanthe tricarinata</i>	Orchidaceae
102	<i>Coelogynae</i> sp.	Orchidaceae
103	<i>Cymbidium</i> sp	Orchidaceae
104	<i>Dendrobium</i> sp.	Orchidaceae
105	<i>Oberonia</i> sp	Orchidaceae
106	<i>Pleione praecox</i>	Orchidaceae
PTERIDOPHYTES		
107	<i>Adiantum</i> sp	Adiantaceae
108	<i>Athyrium</i> sp	Athyraceae
109	<i>Botrychium</i> sp	Ophioglossaceae
110	<i>Dicranopteris linearis</i>	Dicranopteridaceae
111	<i>Dryopteris wallichiana</i>	Dryopteridaceae
112	<i>Dynaria quercifolia</i>	Drynariaceae
113	<i>Lepisorus</i> sp.	Polypodiaceae
114	<i>Polypodium</i> sp.	Polypodiaceae
115	<i>Pteris</i> sp.	Pteridiaceae
116	<i>Pteris vittata</i>	Pteridaceae
117	<i>Pyrrosia nuda</i>	Crptogrammaceae
118	<i>Selaginella</i> sp.	Selaginellaceae
119	<i>Vittaria elongata</i>	Vittariaceae
BRYOPHYTES		
120	<i>Aerobryum</i> sp	Meteoriaceae
121	<i>Desmouthea</i> sp	Orthotrichaceae
122	<i>Diphyscium</i> sp	Buxbaumiaceae
123	<i>Funaria</i> sp	Funariaceae
124	<i>Lyellia</i> sp	Polytrichaceae
125	<i>Marchantia</i> sp	Marchantiaceae
126	<i>Plagiobryum</i> sp	Bryaceae
LICHENS		
127	<i>Alectoria</i> sp	Alectoriaceae
128	<i>Cladonia</i> sp.	Cladoniaceae
129	<i>Graphis</i> sp.	Graphidaceae
130	<i>Lobaria</i> sp	Lobariaceae
131	<i>Parmelia</i> sp	Parmeliaceae
132	<i>Parmotrema</i> sp	Parmeliaceae
133	<i>Pseudocyphellaria</i> sp	Lobariaceae
134	<i>Stereocaulon</i> sp	Stereocaulaceae
135	<i>Sticta</i> sp	Lobariaceae
136	<i>Teloschistes</i> sp	Teloschistaceae

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Sl. No.	Species name	Family
137	<i>Usnea</i> sp	Parmeliaceae
FUNGI		
138	<i>Auricularia auriculiformis</i>	Auriculariaceae
139	<i>Clathrus rubra</i>	Phallaceae
140	<i>Coprinus disseminatus</i>	Agaricaceae
141	<i>Daldinia concentrica</i>	Xylariaceae
142	<i>Fomes pinicola</i>	Fomitopsidaceae
143	<i>Hericium erinaceus</i>	Hericiaceae
144	<i>Hygrocybe miniata</i>	Hygrophoraceae
145	<i>Laccaria laccata</i>	Hydnangiaceae
146	<i>Lactarius rubidus</i>	Russulaceae
147	<i>Phellinus schweintzii</i>	Hymenochaetaceae
148	<i>Poria monticola</i>	Polyporaceae
149	<i>Pycnoporellus fibrillosus</i>	Formitopscidaceae
150	<i>Schizophyllum commune</i>	Schizophyllaceae
151	<i>Tremella mesenterica</i>	Tremellaceae
152	<i>Xylaria polymorpha</i>	Xylariaceae

Appendix II.3.53: Different groups of plant species present at New Melling HEP site

Sl. No.	Species name	Family	Sl. No.	Species name	Family
Barrage and Powerhouse			Catchment area		
CLIMBERS			CLIMBERS		
1	<i>Aristolochia griffithii</i>	Aristolochiaceae	1	<i>Aristolochia griffithii</i>	Aristolochiaceae
2	<i>Celastrus paniculata</i>	Celastraceae	2	<i>Celastrus paniculata</i>	Celastraceae
3	<i>Cissampelos</i> sp	Menispermaceae	3	<i>Hedera nepalensis</i>	Araliaceae
4	<i>Clematis</i> sp	Ranunculaceae	4	<i>Herpetospermum pedunculatum</i>	Cucurbitaceae
5	<i>Dioscorea</i> sp	Dioscoreaceae	5	<i>Holboellia latifolia</i>	Lardizabalaceae
6	<i>Ficus</i> sp	Moraceae	6	<i>Periploca</i> sp.	Periplocaceae
7	<i>Hedera nepalensis</i>	Araliaceae	7	<i>Philadelphus tomentosus</i>	Hydrangeaceae
8	<i>Herpetospermum pedunculatum</i>	Cucurbitaceae	8	<i>Rubia cordifolia</i>	Rubiaceae
9	<i>Holboellia latifolia</i>	Lardizabalaceae	9	<i>Stephania glandulifera</i>	Menispermaceae
10	<i>Periploca</i> sp.	Periplocaceae	10	<i>Thladiantha cordifolia</i>	Cucurbitaceae
11	<i>Philadelphus tomentosus</i>	Hydrangeaceae	ORCHIDS		
12	<i>Rubia cordifolia</i>	Rubiaceae	1	<i>Bulbophyllum</i> sp	Orchidaceae
13	<i>Smilax</i> sp	Smilacaceae	2	<i>Calanthe tricarinata</i>	Orchidaceae
14	<i>Stephania glandulifera</i>	Menispermaceae	3	<i>Cymbidium</i> sp	Orchidaceae
15	<i>Thladiantha cordifolia</i>	Cucurbitaceae	4	<i>Dendrobium</i> sp.	Orchidaceae
ORCHIDS			5	<i>Oberonia</i> sp	Orchidaceae
1	<i>Bulbophyllum</i> sp	Orchidaceae	PTERIDOPHYTES		
2	<i>Calanthe tricarinata</i>	Orchidaceae	1	<i>Adiantum</i> sp	Adiantaceae
3	<i>Coelogynae</i> sp.	Orchidaceae	2	<i>Dicranopteris linearis</i>	Dicranopteridaceae
4	<i>Cymbidium</i> sp	Orchidaceae	3	<i>Dryopteris wallichiana</i>	Dryopteridaceae
5	<i>Dendrobium</i> sp.	Orchidaceae	4	<i>Lepisorus</i> sp.	Polypodiaceae
6	<i>Oberonia</i> sp	Orchidaceae	5	<i>Polypodium</i> sp.	Polypodiaceae
7	<i>Pleione praecox</i>	Orchidaceae	6	<i>Pteris vittata</i>	Pteridaceae
PTERIDOPHYTES			7	<i>Pyrrosia nuda</i>	Crptogrammaceae
1	<i>Adiantum</i> sp	Adiantaceae	8	<i>Selaginella</i> sp.	Selaginellaceae
2	<i>Athyrium</i> sp	Athyraceae	9	<i>Vittaria elongata</i>	Vittariaceae
3	<i>Botrychium</i> sp	Ophioglossaceae	BRYOPHYTES		
4	<i>Dicranopteris linearis</i>	Dicranopteridaceae	1	<i>Aerobryum</i> sp	Meteoriaceae
5	<i>Dryopteris wallichiana</i>	Dryopteridaceae	2	<i>Desmotheca</i> sp	Orthotrichaceae
6	<i>Dynaria quercifolia</i>	Drynariaceae	3	<i>Funaria</i> sp	Funariaceae
7	<i>Lepisorus</i> sp.	Polypodiaceae	4	<i>Plagiobryum</i> sp	Bryaceae

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Sl. No.	Species name	Family	Sl. No.	Species name	Family
	Barrage and Powerhouse			Catchment area	
8	<i>Polypodium</i> sp.	Polypodiaceae		LICHENS	
9	<i>Pteris</i> sp.	Pteridiaceae	1	<i>Alectoria</i> sp	Alectoriaceae
10	<i>Pteris vittata</i>	Pteridaceae	2	<i>Cladonia</i> sp.	Cladoniaceae
11	<i>Pyrrosia nuda</i>	Crptogrammaceae	3	<i>Graphis</i> sp.	Graphidaceae
12	<i>Selaginella</i> sp.	Selaginellaceae	4	<i>Parmotrema</i> sp	Parmeliaceae
13	<i>Vittaria elongata</i>	Vittariaceae	5	<i>Pseudocyphellaria</i> sp	Lobariaceae
	BRYOPHYTES		6	<i>Stereocaulon</i> sp	Stereocaulaceae
1	<i>Aerobryum</i> sp	Meteoriaceae	7	<i>Usnea</i> sp	Parmeliaceae
2	<i>Desmotheca</i> sp	Orthotrichaceae			
3	<i>Diphyscium</i> sp	Buxbaumiaceae			
4	<i>Funaria</i> sp	Funariaceae			
5	<i>Lyellia</i> sp	Polytrichaceae			
6	<i>Marchantia</i> sp	Marchantiaceae			
7	<i>Plagiobryum</i> sp	Bryaceae			
	LICHENS				
1	<i>Alectoria</i> sp	Alectoriaceae			
2	<i>Cladonia</i> sp.	Cladoniaceae			
3	<i>Graphis</i> sp.	Graphidaceae			
4	<i>Lobaria</i> sp	Lobariaceae			
5	<i>Parmelia</i> sp	Parmeliaceae			
6	<i>Parmotrema</i> sp	Parmeliaceae			
7	<i>Pseudocyphellaria</i> sp	Lobariaceae			
8	<i>Stereocaulon</i> sp	Stereocaulaceae			
9	<i>Sticta</i> sp	Lobariaceae			
10	<i>Teloschistes</i> sp	Teloschistaceae			
11	<i>Usnea</i> sp	Parmeliaceae			

Appendix II.3.54: Species list of macro-fungi recorded from barrage and powerhouse sites of New Melling

Species	Family	Species	Family
Barrage		Powerhouse	
<i>Auricularia auriculiformis</i>	Auriculariaceae	<i>Auricularia auriculiformis</i>	Auriculariaceae
<i>Clathrus rubra</i>	Phallaceae	<i>Clathrus rubra</i>	Phallaceae
<i>Coprinus disseminatus</i>	Agaricaceae	<i>Coprinus disseminatus</i>	Agaricaceae
<i>Daldinia concentrica</i>	Xylariaceae	<i>Daldinia concentrica</i>	Xylariaceae
<i>Fomes pinicola</i>	Fomitopsidaceae	<i>Fomes pinicola</i>	Fomitopsidaceae
<i>Hericium erinaceus</i>	Hericiaceae	<i>Hericium erinaceus</i>	Hericiaceae
<i>Hygrocybe miniata</i>	Hygrophoraceae	<i>Hygrocybe miniata</i>	Hygrophoraceae
<i>Laccaria laccata</i>	Hydnangiaceae	<i>Laccaria laccata</i>	Hydnangiaceae
<i>Lactarius rubidus</i>	Russulaceae	<i>Poria monticola</i>	Polyporaceae
<i>Phellinus schweintzii</i>	Hymenochaetaceae	<i>Pycnoporellus fibrillosus</i>	Formitopscidaceae
<i>Poria monticola</i>	Polyporaceae	<i>Tremella mesenterica</i>	Tremellaceae
<i>Pycnoporellus fibrillosus</i>	Formitopscidaceae	<i>Xylaria polymorpha</i>	Xylariaceae
<i>Schizophyllum commune</i>	Schizophyllaceae		
<i>Tremella mesenterica</i>	Tremellaceae		
<i>Xylaria polymorpha</i>	Xylariaceae		
Catchment area			
Species	Family		
<i>Auricularia auriculiformis</i>	Auriculariaceae		
<i>Clathrus rubra</i>	Phallaceae		
<i>Coprinus disseminatus</i>	Agaricaceae		
<i>Daldinia concentrica</i>	Xylariaceae		
<i>Fomes pinicola</i>	Fomitopsidaceae		
<i>Hericium erinaceus</i>	Hericiaceae		
<i>Laccaria laccata</i>	Hydnangiaceae		

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Species	Family	Species	Family
<i>Lactarius rubidus</i>	Russulaceae		
<i>Poria monticola</i>	Polyporaceae		
<i>Pycnoporellus fibrillosus</i>	Formitopscidaceae		
<i>Schizophyllum commune</i>	Schizophyllaceae		
<i>Tremella mesenterica</i>	Tremellaceae		
<i>Xylaria polymorpha</i>	Xylariaceae		

Appendix II.3.55: Frequency, density, basal area, and importance value index (IVI) for tree species in New Melling barrage site

Sl. No.	Name of species	Post-monsoon				Monsoon				Winter			
		Fr.	Dn.	BA	IVI	Fr.	Dn.	BA	IVI	Fr.	Dn.	BA	IVI
1	<i>Acer</i> sp.	50	110	7.90	38.67	50	110	7.90	38.67	50	110	7.90	38.67
2	<i>Alnus nepalensis</i>	30	60	2.88	20.40	30	60	2.88	20.40	30	60	2.88	20.40
3	<i>Betula alnoides</i>	20	20	1.81	10.63	20	20	1.81	10.63	20	20	1.81	10.63
4	<i>Brassaiopsis glomerulata</i>	20	50	0.71	13.77	20	50	0.71	13.77	20	50	0.71	13.77
5	<i>Corylus heterophylla</i>	20	40	0.71	12.34	20	40	0.71	12.34	20	40	0.71	12.34
6	<i>Leucosceptrum canum</i>	30	70	0.96	19.82	30	70	0.96	19.82	30	70	0.96	19.82
7	<i>Picea spinulosa</i>	10	10	1.67	6.12	10	10	1.67	6.12	10	10	1.67	6.12
8	<i>Pinus wallichiana</i>	20	20	2.03	10.86	20	20	2.03	10.86	20	20	2.03	10.86
9	<i>Populus ciliata</i>	30	60	17.22	35.38	30	60	17.22	35.38	30	60	17.22	35.38
10	<i>Quercus semicarpifolia</i>	20	30	1.34	11.56	20	30	1.34	11.56	20	30	1.34	11.56
11	<i>Rhododendron campanulatum</i>	10	10	0.25	4.63	10	10	0.25	4.63	10	10	0.25	4.63
12	<i>Tsuga dumosa</i>	80	220	58.26	115.81	80	220	58.26	115.81	80	220	58.26	115.81
Total		340	700	95.75	300	340	700	95.7	300	340	700	96	300

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), B A- Basal area ($\text{m}^2 \text{ha}^{-1}$), IVI- Importance value index

Appendix II.3.56: Frequency, density and IVI of shrubs in New Melling barrage site

Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
		Fr.	Dn.	IVI	Fr.	Dn.	IVI	Fr.	Dn.	IVI
1	<i>Artemesia nilagirica</i>	36	1168	16.15	36	1168	16.15	36	1168	16.15
2	<i>Arundinella manii</i>	56	2784	33.46	56	2784	33.46	56	2784	33.46
3	<i>Aconogonum molle</i>	28	272	7.07	28	272	7.07	28	272	7.07
4	<i>Berberis</i> sp.	36	416	9.67	36	416	9.67	36	416	9.67
5	<i>Coriaria nepalensis</i>	32	416	8.99	32	416	8.99	32	416	8.99
6	<i>Daphne paparacea</i>	44	1968	24.40	44	1968	24.40	44	1968	24.40
7	<i>Elaeagnus parviflora</i>	48	272	10.45	48	272	10.45	48	272	10.45
8	<i>Girardinia diversifolia</i>	28	592	9.83	28	592	9.83	28	592	9.83
9	<i>Hypericum choisianum</i>	28	192	6.38	28	192	6.38	28	192	6.38
10	<i>Ilex dipyrrena</i>	32	272	7.75	32	272	7.75	32	272	7.75
11	<i>Neillia thyrsiflora</i>	28	288	7.21	28	288	7.21	28	288	7.21
12	<i>Piptanthus nepalensis</i>	48	736	14.45	48	736	14.45	48	736	14.45
13	<i>Rosa</i> sp.	24	144	5.30	24	144	5.30	24	144	5.30
14	<i>Rubus ellipticus</i>	28	448	8.59	28	448	8.59	28	448	8.59
15	<i>Rubus niveus</i>	24	128	5.16	24	128	5.16	24	128	5.16
16	<i>Sarcococca</i>	44	1248	18.19	44	1248	18.19	44	1248	18.19
17	<i>Seigesbeckia orientalis</i>	28	256	6.94	28	256	6.94	28	256	6.94
Total		592	11600	200	592	11600	200	592	11600	200

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), IVI- Importance value index

Appendix II.3.57: Frequency, density and IVI of herbs in New Melling barrage site

Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
		Fr.	Dn.	IVI	Fr.	Dn.	IVI	Fr.	Dn.	IVI
1	<i>Ainsliaea</i> sp.	24	5200	5.14	32	9200	5.05	20	1.51	5.08
2	<i>Anaphalis margaritacea</i>	48	26800	15.51	56	62400	18.05	44	7.06	14.92
3	<i>Aster</i> sp.	32	8400	7.33	32	9200	5.05			
4	<i>Aster trinervius</i>				28	6800	4.17			
5	<i>Astilbe rivularis</i>	28	6800	6.24	36	6800	4.97	28	2.35	7.35
6	<i>Campanula</i> sp.				32	4800	4.17			
7	<i>Cyathula capitata</i>	40	13600	10.15	52	26800	10.56	40	5.88	13.03

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Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
8	<i>Drymaria cordata</i>							56	14.96	24.96
9	<i>Dipsacus asper</i>	40	15200	10.65	44	13600	7.13			
10	<i>Dracocephalum</i> sp.	16	3200	3.34	28	4800	3.77			
11	<i>Elatostemma sessile</i>	40	26800	14.35	64	66800	19.73	52	9.41	18.70
12	<i>Elsholtzia strobilifera</i>	44	35600	17.73				60	15.97	26.68
13	<i>Equisetum</i>							24	3.36	7.65
14	<i>Fragaria</i> sp.							36	5.21	11.64
15	<i>Fragaria nubicola</i>	36	31200	15.17	28	22400	7.27			
16	<i>Galium</i> sp.	28	9200	7.00						
17	<i>Galium rotundifolium</i>				16	4800	2.56	24	3.36	7.65
18	<i>Geranium pretense</i>	16	6000	4.24	32	9200	5.05	28	3.03	8.03
19	<i>Leucanthus penduncularis</i>	24	7600	5.91	60	62400	18.45			
20	<i>Herachleum</i>				20	4800	2.96			
21	<i>Herpetospermum pedunculatum</i>				20	4800	2.96			
22	<i>Nepeta</i> sp.	20	3200	3.93	20	4400	2.88			
23	<i>Ophiopogon intermedius</i>	12	2800	2.64	12	12800	3.75			
24	<i>Oplisminus compositus</i>	44	53600	23.47	56	58000	17.18	48	17.31	25.88
25	<i>Panax bipinnatifidus</i>	24	3600	4.63	12	2000	1.60			
26	<i>Persicaria runcinata</i>				36	31200	9.83			
27	<i>Pilea umbrosa</i>	28	22400	11.20	92	30800	15.37			
28	<i>Pogostemon</i> sp.	20	3200	3.93	24	3200	3.05	20	1.18	4.75
29	<i>Potentilla cuneata</i>	40	5600	7.60	36	9200	5.45	24	2.35	6.64
30	<i>Rumex acetosella</i>							32	5.55	11.26
31	<i>Sambucus adnata</i>	44	14800	11.11						
32	<i>Senecio cappa</i>	20	3600	4.05	20	3200	2.65			
33	<i>Swertia chirayita</i>				16	3600	2.32			
34	<i>Thalictrum foliolosum</i>				32	9200	5.05			
35	<i>Thladiantha cordifolia</i>				16	3200	2.24			
36	<i>Urtica dioica</i>	20	5600	4.69	28	8400	4.48	24	1.51	5.80
37	<i>Viola sikkimensis</i>				16	3200	2.24			
Total		688	314000	200	996	502000	200	560	100.00	200

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), IVI- Importance value index

Appendix II.3.58: Frequency, density, basal area, and importance value index (IVI) for tree species in New Melling Power house site

Sl. No.	Name of species	Post-monsoon				Monsoon				Winter			
		Fr.	Dn.	BA	IVI	Fr.	Dn.	BA	IVI	Fr.	Dn.	BA	IVI
1	<i>Acer</i> sp.	20	20	0.71	24.40	20	20	0.71	24.40	20	20	0.71	24.40
2	<i>Alnus nepalensis</i>	20	30	0.67	27.35	20	30	0.67	27.35	20	30	0.67	27.35
3	<i>Brassaiopsis glomerulata</i>	40	60	0.74	47.63	40	60	0.74	47.63	40	60	0.74	47.63
4	<i>Persea</i> sp.	20	20	0.39	20.65	20	20	0.39	20.65	20	20	0.39	20.65
5	<i>Populus ciliata</i>	20	30	2.51	49.28	20	30	2.51	49.28	20	30	2.51	49.28
6	<i>Quercus semicarpifolia</i>	10	20	0.84	21.42	10	20	0.84	21.42	10	20	0.84	21.42
7	<i>Rhododendron</i> sp.	10	10	0.25	10.95	10	10	0.25	10.95	10	10	0.25	10.95
8	<i>Sorbus</i> sp.	10	10	0.04	8.49	10	10	0.04	8.49	10	10	0.04	8.49
9	<i>Tsuga dumosa</i>	20	20	1.44	33.09	20	20	1.44	33.09	20	20	1.44	33.09
10	<i>Corylus heterophylla</i>	20	20	0.31	19.64	20	20	0.31	19.64	20	20	0.31	19.64
11	<i>Leucoscepttrum canum</i>	30	50	0.52	37.09	30	50	0.52	37.09	30	50	0.52	37.09
Total		220	290	8.43	300	220	290	8.43	300	220	290	8.43	300.00

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), B A- Basal area ($\text{m}^2 \text{ha}^{-1}$), IVI- Importance value index

Appendix II.3.59: Frequency, density and IVI of shrubs in New Melling Power house site

Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
		Fr.	Dn.	IVI	Fr.	Dn.	IVI	Fr.	Dn.	IVI
1	<i>Artemesia nilagarica</i>	48	1424	21.01	48	1424	21.01	48	1424	21.01
2	<i>Arundinella manii</i>	36	2672	28.69	36	2672	28.69	36	2672	28.69
3	<i>Aconogonum molle</i>	24	368	7.73	24	368	7.73	24	368	7.73

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Sl.	Name of species	Post-monsoon			Monsoon			Winter		
4	<i>Berberis</i> sp.	28	368	8.52	28	368	8.52	28	368	8.52
5	<i>Coriaria cylindrica</i>	12	112	3.28	12	112	3.28	12	112	3.28
6	<i>Coriaria nepalensis</i>	36	528	11.40	36	528	11.40	36	528	11.40
7	<i>Daphne papyracea</i>	56	2496	31.24	56	2496	31.24	56	2496	31.24
8	<i>Elaeagnus parviflora</i>	24	272	6.96	24	272	6.96	24	272	6.96
9	<i>Girardinia diversifolia</i>	28	464	9.30	28	464	9.30	28	464	9.30
10	<i>Hypericum choisianum</i>	24	336	7.47	24	336	7.47	24	336	7.47
11	<i>Ilex dipyrrena</i>	32	416	9.70	32	416	9.70	32	416	9.70
12	<i>Piptanthus nepalensis</i>	44	864	15.70	44	864	15.70	44	864	15.70
13	<i>Rosa</i> sp.	16	112	4.08	16	112	4.08	16	112	4.08
14	<i>Rubus ellipticus</i>	32	368	9.32	32	368	9.32	32	368	9.32
15	<i>Rubus niveus</i>	12	112	3.28	12	112	3.28	12	112	3.28
16	<i>Sarcococca</i>	44	1424	20.21	44	1424	20.21	44	1424	20.21
17	<i>Spirea</i> sp.	8	64	2.10	8	64	2.10	8	64	2.10
Total		504	12400	200	504	12400	200	504	12400	200

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), IVI- Importance value index

Appendix II.3.60: Frequency, density and IVI of herbs in New Melling Power house site

Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
		Fr.	Dn.	IVI	Fr.	Dn.	IVI	Fr.	Dn.	IVI
1	<i>Ainsliaea</i> sp.	16	5200	4.01	32	9200	5.83			
2	<i>Anaphalis margaritacea</i>	36	21200	12.01	56	49200	17.80	16	4000	4.39
3	<i>Aster</i> sp.	16	8000	4.89	16	4400	2.87			
4	<i>Aster trinervius</i>				20	4800	3.43	20	3600	5.01
5	<i>Astilbe rivularis</i>	16	5200	4.01	16	3200	2.59	24	5200	6.31
6	<i>Campanula</i> sp.				32	13600	6.84			
7	<i>Cynoglossum</i>	20	16800	8.25	36	18000	8.31	28	11200	9.10
8	<i>Cyathula capitata</i>	36	12400	9.25	48	22000	10.63	36	15200	11.97
9	<i>Dipsacus asper</i>	44	14000	10.94	44	12800	8.05			
10	<i>Drymaria cordata</i>							44	29600	18.36
11	<i>Dracocephalum</i> sp.	12	1600	2.29	20	3200	3.06			
12	<i>Elatostemma sessile</i>	32	22400	11.79	48	30400	12.55	40	47600	23.70
13	<i>Elsholtzia strobilifera</i>	48	39200	19.44				44	60800	28.93
14	<i>Fragaria</i> sp.	40	30000	15.36	36	22400	9.32	28	12000	9.37
15	<i>Equisetum</i>							28	12000	9.37
16	<i>Galium</i> sp.	24	16800	8.84						
17	<i>Galium</i> sp.				20	9200	4.44	32	7600	8.64
18	<i>Geranium pretense</i>	28	7200	6.43	24	4800	3.89	16	5200	4.79
19	<i>Herachleum</i>				28	4800	4.36			
20	<i>Herpetospermum pedunculatum</i>				24	4800	3.89			
21	<i>Nepeta</i> sp.	16	2000	3.01	12	2800	2.04			
22	<i>Ophiopogon intermedius</i>	32	7200	7.02	28	12800	6.19			
23	<i>Leucanthus peduncularis</i>	56	50000	24.02	48	58000	18.88	40	42800	22.07
24	<i>Parochaetus communis</i>				36	31200	11.34			
25	<i>Persicaria ruminata</i>				16	6800	3.42			
26	<i>Phlomis</i> sp.	12	2000	2.41	44	30800	12.18			
27	<i>Pilea umbrosa</i>	44	30000	15.96	48	49200	16.87			
28	<i>Pogostemon</i> sp.	24	2800	4.45	20	5600	3.61	12	1600	2.81
29	<i>Potentilla cuneata</i>	32	5600	6.52	16	3600	2.69	32	5600	7.96
30	<i>Rumex nepalensis</i>							40	12000	11.64
31	<i>Sambucus adnata</i>	44	13600	10.81				28	14800	10.32
32	<i>Salvia</i> sp.				16	3200	2.59			
33	<i>Oplismenus compositus</i>	20	2000	3.60	20	3200	3.06			
34	<i>Thalictrum foliolosum</i>				16	3200	2.59			
35	<i>Thladiantha cordifolia</i>				16	2800	2.50			
36	<i>Urtica dioica</i>	24	3600	4.70	12	3200	2.13	20	4400	5.28

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Sl.	Name of species	Post-monsoon			Monsoon			Winter		
37	<i>Viola sikkimensis</i>				12	2800	2.04			
Total		672	318800	200	860	436000	200	528	295200	200

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), IVI- Importance value index

Appendix II.3.61: Frequency, density, basal area, and importance value index (IVI) for tree species in New Melling catchment area

Sl. No.	Name of species	Post-monsoon				Monsoon				Winter			
		Fr.	Dn.	BA	IVI	Fr.	Dn.	BA	IVI	Fr.	Dn.	BA	IVI
1	<i>Larix griffithiana</i>	20	30	1.04	14.43	20	30	1.04	14.43	20	30	1.04	14.43
2	<i>Acer sp.</i>	10	20	1.46	9.83	10	20	1.46	9.83	10	20	1.46	9.83
3	<i>Alnus nepalensis</i>	20	40	1.19	16.48	20	40	1.19	16.48	20	40	1.19	16.48
4	<i>Betula alnoides</i>	30	20	1.09	16.29	30	20	1.09	16.29	30	20	1.09	16.29
5	<i>Leucosceptrum canum</i>	20	20	0.25	11.18	20	20	0.25	11.18	20	20	0.25	11.18
6	<i>Pinus wallichiana</i>	10	10	0.83	6.88	10	10	0.83	6.88	10	10	0.83	6.88
7	<i>Populus ciliata</i>	80	250	22.68	115.05	80	250	22.68	115.05	80	250	22.68	115.05
8	<i>Rhododendron sp.</i>	10	20	0.25	7.61	10	20	0.25	7.61	10	20	0.25	7.61
9	<i>Taxus wallichiana</i>	10	20	0.39	7.87	10	20	0.39	7.87	10	20	0.39	7.87
10	<i>Tsuga dumosa</i>	70	130	25.03	94.37	70	130	25.03	94.37	70	130	25.03	94.37
Total		280	560	54.22	300	280	560	54.22	300	280	560	54.22	300

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), B A- Basal area ($\text{m}^2 \text{ha}^{-1}$), IVI- Importance value index

Appendix II.3.62: Frequency, density and IVI of shrubs in New Melling catchment area

Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
		Fr.	Dn.	IVI	Fr.	Dn.	IVI	Fr.	Dn.	IVI
1	<i>Artemesia nilagarica</i>	44	1152	16.96	44	1152	16.96	44	1152	16.96
2	<i>Arundinella manii</i>	56	2464	30.13	56	2464	30.13	56	2464	30.13
3	<i>Aconogonum molle</i>	28	368	7.67	28	368	7.67	28	368	7.67
4	<i>Berberis sp.</i>	36	608	11.01	36	608	11.01	36	608	11.01
5	<i>Coriaria nepalensis</i>	32	336	8.04	32	336	8.04	32	336	8.04
6	<i>Daphne papyracea</i>	52	2128	26.61	52	2128	26.61	52	2128	26.61
7	<i>Girardinia diversifolia</i>	36	304	8.41	36	304	8.41	36	304	8.41
8	<i>Hypericum sp.</i>	16	112	3.54	16	112	3.54	16	112	3.54
9	<i>Ilex dipyrrena</i>	28	368	7.67	28	368	7.67	28	368	7.67
10	<i>Neillia thyriflora</i>	20	208	5.01	20	208	5.01	20	208	5.01
11	<i>Piptanthus nepalensis</i>	36	720	11.97	36	720	11.97	36	720	11.97
12	<i>Plectranthus sp.</i>	16	112	3.54	16	112	3.54	16	112	3.54
13	<i>Rosa sp.</i>	44	272	9.43	44	272	9.43	44	272	9.43
14	<i>Rubus ellipticus</i>	44	544	11.75	44	544	11.75	44	544	11.75
15	<i>Rubus nivies</i>	28	208	6.30	28	208	6.30	28	208	6.30
16	<i>Sarcococca</i>	52	1392	20.30	52	1392	20.30	52	1392	20.30
17	<i>Seigesbeckia orientalis</i>	32	272	7.49	32	272	7.49	32	272	7.49
18	<i>Boenninghausenia albiflora</i>	20	112	4.18	20	112	4.18	20	112	4.18
Total		620	11680	200	620	11680	200	620	11680	200

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), IVI- Importance value index

Appendix II.3.63: Frequency, density and IVI of herbs in New Melling catchment area

Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
		Fr.	Dn.	IVI	Fr.	Dn.	IVI	Fr.	Dn.	IVI
1	<i>Ainsliaea sp.</i>	28	6400	5.82	28	7200	4.34	20	3600	5.31
2	<i>Anaphalis margaritacea</i>	44	34800	16.37	56	53600	16.58	44	12400	13.94
3	<i>Aster sp.</i>	20	4000	3.99	12	5600	2.37			
4	<i>Aster trinervius</i>				24	10000	4.49	36	8000	10.33
5	<i>Astilbe rivularis</i>	24	8400	5.84	28	4400	3.78	28	6000	7.92
6	<i>Campanula sp.</i>				36	9200	5.57			
7	<i>Cyathula capitata</i>	44	17200	11.23	52	30800	11.58	32	4800	8.01
8	<i>Drymaria cordata</i>							44	27200	21.40
9	<i>Dipsacus asper</i>	28	8400	6.41	44	19200	8.41			
10	<i>Dracocephalum sp.</i>	12	1600	2.16	16	2800	2.22			
11	<i>Elatostemma sessile</i>	32	18400	9.89	52	50800	15.61	36	18000	15.37

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Sl.	Name of species	Post-monsoon			Monsoon			Winter		
12	<i>Elsholtzia strobilifera</i>	48	50000	21.37				48	31600	24.32
13	<i>Equisetum</i>							24	9600	9.03
14	<i>Fragaria</i> sp.	32	21600	10.82	32	13600	6.05	44	18400	16.97
15	<i>Galium</i> sp.	28	12800	7.69	36	22400	8.23	36	14000	13.35
16	<i>Geranium pretense</i>	36	21600	11.39	44	18000	8.17	32	8400	9.83
17	<i>Heracleum</i>				32	9200	5.16			
18	<i>Herpetospermum pedunculatum</i>				12	2800	1.80			
19	<i>Ophiopogon intermedius</i>	48	17200	11.80	20	4400	2.95			
20	<i>Oplismenus compositus</i>	52	44000	20.18	56	52800	16.42	32	14000	12.65
21	<i>Parochaetus communis</i>	28	12800	7.69						
22	<i>Panax bipinnatifidus</i>				28	8400	4.58			
23	<i>Paris polyphylla</i>				20	5600	3.19			
24	<i>Parasenecio quinquelobus</i>				24	4800	3.45			
25	<i>Persicaria ruminata</i>				20	9200	3.92			
26	<i>Phlomis</i> sp.	24	3600	4.44	12	2800	1.80			
27	<i>Pilea umbrosa</i>	32	21600	10.82	36	31200	10.00			
28	<i>Pogostemon</i> sp.	20	4000	3.99	12	2400	1.72	16	2400	4.01
29	<i>Potentilla cuneata</i>	48	9200	9.46	44	13600	7.29	36	5200	8.91
30	<i>Rumex acetosella</i>							36	9600	11.13
31	<i>Salvia</i> sp.				20	4800	3.03			
32	<i>Sambucus adnata</i>	32	8400	6.97	52	53600	16.17			
33	<i>Senecio cappa</i>	24	4000	4.56	24	6400	3.77			
34	<i>Swertia paniculata</i>				36	20800	7.91			
35	<i>Thalictrum foliolosum</i>				20	4800	3.03			
36	<i>Thladiantha cordifolia</i>				12	2800	1.80			
37	<i>Urtica dioica</i>	24	12800	7.12	28	8400	4.58	28	5200	7.52
Total		708	342800	200	968	496400	200.00	572	198400	200.00

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), IVI- Importance value index

Appendix II.3.64: Dominant and Co-dominant species determined on the basis of IVI/density values of species in the plant communities at New Melling site

Community components	Barrage	Powerhouse	Catchment area
Tree species*			
Dominant	<i>Tsuga dumosa</i>	<i>Populus ciliata</i>	<i>Populus ciliata</i>
Co-Dominant	<i>Acer</i> sp.	<i>Brassiopsis glomerulata</i>	<i>Tsuga dumosa</i>
Shrub species**			
Dominant	<i>Arundinaria maling</i>	<i>Daphne papyracea</i>	<i>Arundinaria maling</i>
Co-Dominant	<i>Daphne papyracea</i>	<i>Arundinaria maling</i>	<i>Daphne papyracea</i>
Herb species**			
i. Post monsoon season			
Dominant	<i>Oplismenus compositus</i>	<i>Lecanthus peduncularis</i>	<i>Elsholtzia strobilifera</i>
Co-Dominant	<i>Elsholtzia strobilifera</i>	<i>Elsholtzia strobilifera</i>	<i>Oplismenus compositus</i>
ii. Monsoon season			
Dominant	<i>Elatostemma sessile</i>	<i>Lecanthus peduncularis</i>	<i>Anaphalis margaritacea</i>
Co-Dominant	<i>Lecanthus penduncularis</i>	<i>Anaphalis margaritacea</i>	<i>Oplismenus compositus</i>
iii. Winter			
Dominant	<i>Elsholtzia strobilifera</i>	<i>Elsholtzia strobilifera</i>	<i>Elsholtzia strobilifera</i>
Co-Dominant	<i>Oplismenus compositus</i>	<i>Elatostemma sessile</i>	<i>Drymaria cordata</i>

* Dominance based on IVI; ** Dominance based on density

Appendix II.3.65: List of plant species recorded from Mago chu HEP sites

Sl. No.	Species name	Family
TREES		
1	<i>Acer hookerii</i>	Aceraceae
2	<i>Acer sikkimensis</i>	Aceraceae
3	<i>Acer</i> sp.	Aceraceae
4	<i>Alangium alpinum</i> .	Alangiaceae

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Sl. No.	Species name	Family
5	<i>Alnus nepalensis</i>	Betulaceae
6	<i>Brassaiopsis glomerulata</i>	Araliaceae
7	<i>Corylus heterophylla</i>	Betulaceae
8	<i>Leucoscepttrum canum</i>	Lamiaceae
9	<i>Lindera neesiana</i>	Lauraceae
10	<i>Pinus wallichiana</i>	Pinaceae
11	<i>Populus ciliata</i>	Salicaceae
12	<i>Quercus lamellosa</i>	Fagaceae
13	<i>Quercus semecarpifolia</i>	Fagaceae
14	<i>Rhododendron</i> sp.	Ericaceae
15	<i>Rhus chinensis</i>	Anacardiaceae
16	<i>Taxus wallichiana</i>	Taxaceae
17	<i>Tsuga dumosa</i>	Pinaceae
SHRUBS		
18	<i>Artemesia nilagirica</i>	Asteraceae
19	<i>Arundinaria maling</i>	Poaceae
20	<i>Berberis aristata</i>	Berberidaceae
21	<i>Coraria napalensis</i>	Coriariaceae
22	<i>Daphne papyracea</i>	Thymelaeaceae
23	<i>Elaeagnus parviflora</i>	Elaegnaceae
24	<i>Euphorbia sikkimensis</i>	Euphorbiaceae
25	<i>Girardinia diversifolia</i>	Urticaceae
26	<i>Hypericum choisianum</i>	Hypericaceae
27	<i>Ilex dipyrena</i>	Aquifoliaceae
28	<i>Neillia thyrsiflora</i>	Rosaceae
29	<i>Philadelphus tomentosus</i>	Hydrangeaceae
30	<i>Piptanthus nepalensis</i>	Papilionaceae
31	<i>Plectranthus</i> sp.	Lamiaceae
32	<i>Rosa</i> sp.	Rosaceae
33	<i>Rubus ellipticus</i>	Rosaceae
34	<i>Zanthoxylum armatum</i>	Rutaceae
35	<i>Zanthoxylum oxyphyllum</i>	Rutaceae
HERBS		
36	<i>Achyranthes aspera</i>	Amaranthaceae
37	<i>Ainsliaea</i> sp.	Asteraceae
38	<i>Anaphalis margaritacea</i>	Asteraceae
39	<i>Arisaema erubescens</i>	Araceae
40	<i>Arisaema nepenthoides</i>	Araceae
41	<i>Aster</i> sp.	Asteraceae
42	<i>Aster trinervius</i>	Asteraceae
43	<i>Astilbe rivularis</i>	Saxifragaceae
44	<i>Cirsium falconeri</i>	Asteraceae
45	<i>Crawfurdia speciosa</i>	Gentianaceae
46	<i>Cyathula capitata</i>	Amaranthaceae
47	<i>Didymocarpus</i> sp.	Gesneriaceae
48	<i>Dipsacus asper</i>	Dipsacaceae
49	<i>Dracocephalum</i> sp.	Lamiaceae
50	<i>Drymaria cordata</i>	Caryophyllaceae
51	<i>Elatostemma sessile</i>	Urticaceae
52	<i>Elsholtzia strobilifera</i>	Lamiaceae
53	<i>Fragaria nubicola</i>	Rosaceae
54	<i>Fragaria</i> sp.	Rosaceae
55	<i>Galinsoga parviflora</i>	Asteraceae
56	<i>Galium</i> sp.	Rubiaceae
57	<i>Gebbera</i> sp.	Asteraceae
58	<i>Geranium pretense</i>	Geraniaceae
59	<i>Goldfusia nutans</i>	Orchidaceae

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Sl. No.	Species name	Family
60	<i>Gonatanthus pumilus</i>	Araceae
61	<i>Hepetospermum pendunculatum</i>	Cucurbitaceae
62	<i>Imperata cylindrica</i>	Poaceae
63	<i>Iris lactea</i>	Iridaceae
64	<i>Nepata</i> sp.	Lamiaceae
65	<i>Ophiopogon intermedius</i>	Liliaceae
66	<i>Oplisminus compositus</i>	Poaceae
67	<i>Oxalis corniculata</i>	oxalidaceae
68	<i>Parasenecio quinquelobus</i>	Asteraceae
69	<i>Paspallum</i> sp.	Poaceae
70	<i>Persicaria runcinata</i>	Polygonaceae
71	<i>Panax bipinnatifidus</i>	Araliaceae
72	<i>Phlomis</i> sp.	Lamiaceae
73	<i>Pilea umbrosa</i>	Urticaceae
74	<i>Plantago major</i>	Plantaginaceae
75	<i>Pogostemon</i> sp.	Lamiaceae
76	<i>Polygonum capitata</i>	Polygonaceae
77	<i>Potentilla cuneata</i>	Rosaceae
78	<i>Roscoeia alpina</i>	Zingiberaceae
79	<i>Rumex acetosella</i>	Polygonaceae
80	<i>Swertia chirayita</i>	Gentianaceae
81	<i>Salvia</i> sp.	Lamiaceae
82	<i>Sambucus adnata</i>	Adoxaceae
83	<i>Senecio cappa</i>	Asteraceae
84	<i>Thaladiantha cordifolia</i>	Cucurbitaceae
85	<i>Thalictrum foliolosum</i>	Ranunculaceae
86	<i>Urtica dioica</i>	Urticaceae
87	<i>Viola sikkimensis</i>	Violaceae
	CLIMBERS	
88	<i>Celastrus paniculata</i>	Celastraceae
89	<i>Cissampelos</i> sp.	Menispermaceae
90	<i>Clematis</i> sp.	Ranunculaceae
91	<i>Dioscorea</i> sp.	Dioscoreaceae
92	<i>Ficus</i> sp.	Moraceae
93	<i>Hedera helix</i>	Araliaceae
94	<i>Hedera nepalensis</i>	Araliaceae
95	<i>Herpetospermum pedunculatum</i>	Cucurbitaceae
96	<i>Holboellia latifolia</i>	Lardizabalaceae
97	<i>Periploca</i> sp.	Periplocaceae
98	<i>Philadelphus tomentosus</i>	Hydrangeaceae
99	<i>Rubia cordifolia</i>	Rubiaceae
100	<i>Scziophgma</i> sp.	Hydrangeaceae
101	<i>Smilax</i> sp.	Smilacaceae
102	<i>Stephania glandulifera</i>	Menispermaceae
103	<i>Thladiantha cordifolia</i>	Cucurbitaceae
	ORCHIDS	
104	<i>Cymbidium</i> sp.	Orchidaceae
105	<i>Bulbophyllum</i> sp.	Orchidaceae
106	<i>Calanthe tricarinata</i>	Orchidaceae
107	<i>Coelogynae</i> sp.	Orchidaceae
108	<i>Dendrobium</i> sp.	Orchidaceae
109	<i>Oberonia</i> sp.	Orchidaceae
110	<i>Pleione praecox</i>	Orchidaceae
111	<i>Vanda</i>	Orchidaceae
	PTERIDOPHYTES	
112	<i>Botrychium</i> sp.	Ophioglossaceae
113	<i>Adiantum</i> sp.	Adiantaceae

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Sl. No.	Species name	Family
114	<i>Dryopteris wallichiana</i>	Dryopteridaceae
115	<i>Lepisorus</i> sp.	Polypodiaceae
116	<i>Polypodium</i> sp.	Polypodiaceae
117	<i>Pteris</i> sp.	Pteridiaceae
118	<i>Pteris vittata</i>	Pteridaceae
119	<i>Pyrrosia nuda</i>	Crptogrammaceae
120	<i>Selaginella</i> sp.	Selaginellaceae
121	<i>Vittaria elongata</i>	Vittariaceae
BRYOPHYTES		
122	<i>Aerobryum</i> sp	Meteoriaceae
123	<i>Desmotheca</i> sp	Orthotrichaceae
124	<i>Diphyscium</i> sp	Buxbaumiaceae
125	<i>Funaria</i> sp	Funariaceae
126	<i>Lyellia</i> sp	Polytrichaceae
127	<i>Marchantia</i> sp	Marchantiaceae
128	<i>Plagiobryum</i> sp	Bryaceae
LICHENS		
129	<i>Alectoria</i> sp	Alectoriaceae
130	<i>Cladonia</i> sp.	Cladoniaceae
131	<i>Graphis</i> sp.	Graphidaceae
132	<i>Lobaria</i> sp	Lobariaceae
133	<i>Parmelina</i> sp	Parmeliaceae
134	<i>Parmotrema</i> sp	Parmeliaceae
135	<i>Pseudocyphellaria</i> sp	Lobariaceae
136	<i>Stereocaulon</i> sp	Stereocaulaceae
137	<i>Sticta</i> sp	Lobariaceae
138	<i>Usnea</i> sp	Parmeliaceae
FUNGI		
139	<i>Auricularia auriculiformis</i>	Auriculariaceae
140	<i>Boletus reticulatus</i>	Boletaceae
141	<i>Clathrus rubra</i>	Phallaceae
142	<i>Coprinus disseminatus</i>	Agaricaceae
143	<i>Daldinia concentrica</i>	Xylariaceae
144	<i>Fomes pinicola</i>	Fomitopsidaceae
145	<i>Hericium erinaceus</i>	Hericiaceae
146	<i>Hydnum repandum</i>	Hydnaceae
147	<i>Hygrocybe miniata</i>	Hygrophoraceae
148	<i>Laccaria laccata</i>	Hydnangiaceae
149	<i>Phellinus schweintzii</i>	Hymenochaetaceae
150	<i>Polyporus arcularius</i>	Polyporaceae
151	<i>Poria monticola</i>	Polyporaceae
152	<i>Schizophyllum commune</i>	Schizophyllaceae
153	<i>Strobilomyces strobilaceus</i>	Boletaceae
154	<i>Thelephora penicillata</i>	Thelephoraceae
155	<i>Gloeophyllum sepiarium</i>	Gloeophyllaceae
156	<i>Lactarius rubidus</i>	Russulaceae
157	<i>Pycnoporellus fibrillosus</i>	Formitopscidaceae

Appendix II.3.66: Different groups of plant species present at Mago chu HEP site

Sl. No.	Species name	Family	Sl. No.	Species name	Family
CLIMBERS			CLIMBERS		
1	<i>Celastrus paniculata</i>	Celastraceae	1	<i>Celastrus paniculata</i>	Celastraceae
2	<i>Cissampelos</i> sp	Menispermaceae	2	<i>Hedera helix</i>	Araliaceae
3	<i>Clematis</i> sp	Ranunculaceae	3	<i>Hedera nepalensis</i>	Araliaceae
4	<i>Dioscorea</i> sp	Dioscoreaceae	4	<i>Herpetospermum pedunculatum</i>	Cucurbitaceae

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Sl. No.	Species name	Family	Sl. No.	Species name	Family
5	<i>Ficus</i> sp	Moraceae	5	<i>Holboellia latifolia</i>	Lardizabalaceae
6	<i>Hedera helix</i>	Araliaceae	6	<i>Periploca</i> sp.	Periplocaceae
7	<i>Hedera nepalensis</i>	Araliaceae	7	<i>Philadephus tomentosus</i>	Hydrangeaceae
8	<i>Herpetospermum pedunculatum</i>	Cucurbitaceae	8	<i>Rubia cordifolia</i>	Rubiaceae
9	<i>Holboellia latifolia</i>	Lardizabalaceae	9	<i>Smilax</i> sp	Smilacaceae
10	<i>Periploca</i> sp.	Periplocaceae	10	<i>Stephania glandulifera</i>	Menispermaceae
11	<i>Philadephus tomentosus</i>	Hydrangeaceae	11	<i>Thladiantha cordifolia</i>	Cucurbitaceae
12	<i>Rubia cordifolia</i>	Rubiaceae	ORCHIDS		
13	<i>Scziophgma</i> sp	Hydrangeaceae	1	<i>Cymbidium</i> sp	Orchidaceae
14	<i>Smilax</i> sp	Smilacaceae	2	<i>Bulbophyllum</i> sp	Orchidaceae
15	<i>Stephania glandulifera</i>	Menispermaceae	3	<i>Calanthe tricarinata</i>	Orchidaceae
16	<i>Thladiantha cordifolia</i>	Cucurbitaceae	4	<i>Oberonia</i> sp	Orchidaceae
ORCHIDS			5	<i>Pleione praecox</i>	Orchidaceae
1	<i>Cymbidium</i> sp	Orchidaceae	PTERIDOPHYTES		
2	<i>Bulbophyllum</i> sp	Orchidaceae	1	<i>Adiantum</i> sp	Adiantaceae
3	<i>Calanthe tricarinata</i>	Orchidaceae	2	<i>Dryopteris wallichiana</i>	Dryopteridaceae
4	<i>Coelogynae</i> sp.	Orchidaceae	3	<i>Lepisorus</i> sp.	Polypodiaceae
5	<i>Dendrobium</i> sp.	Orchidaceae	4	<i>Pteris vittata</i>	Pteridaceae
6	<i>Oberonia</i> sp	Orchidaceae	5	<i>Selaginella</i> sp.	Selaginellaceae
7	<i>Pleione praecox</i>	Orchidaceae	6	<i>Vittaria elongata</i>	Vittariaceae
8	<i>Vanda</i> sp.	Orchidaceae	BRYOPHYTES		
PTERIDOPHYTES			1	<i>Aerobryum</i> sp	Meteoriaceae
1	<i>Botrychium</i> sp	Ophioglossaceae	2	<i>Desmotheca</i> sp	Orthotrichaceae
2	<i>Adiantum</i> sp	Adiantaceae	3	<i>Lyellia</i> sp	Polytrichaceae
3	<i>Dryopteris wallichiana</i>	Dryopteridaceae	4	<i>Marchantia</i> sp	Marchantiaceae
4	<i>Lepisorus</i> sp.	Polypodiaceae	5	<i>Plagiobryum</i> sp	Bryaceae
5	<i>Polypodium</i> sp.	Polypodiaceae	LICHENS		
6	<i>Pteris</i> sp.	Pteridiaceae	1	<i>Alectoria</i> sp	Alectoriaceae
7	<i>Pteris vittata</i>	Pteridaceae	2	<i>Cladonia</i> sp.	Cladoniaceae
8	<i>Pyrrosia nuda</i>	Crptogrammaceae	3	<i>Graphis</i> sp.	Graphidaceae
9	<i>Selaginella</i> sp.	Selaginellaceae	4	<i>Parmotrema</i> sp	Parmeliaceae
10	<i>Vittaria elongata</i>	Vittariaceae	5	<i>Pseudocyphellaria</i> sp	Lobariaceae
BRYOPHYTES			6	<i>Stereocaulon</i> sp	Stereocaulaceae
1	<i>Aerobryum</i> sp	Meteoriaceae	7	<i>Usnea</i> sp	Parmeliaceae
2	<i>Desmotheca</i> sp	Orthotrichaceae			
3	<i>Diphyscium</i> sp	Buxbaumiaceae			
4	<i>Funaria</i> sp	Funariaceae			
5	<i>Lyellia</i> sp	Polytrichaceae			
6	<i>Marchantia</i> sp	Marchantiaceae			
7	<i>Plagiobryum</i> sp	Bryaceae			
LICHENS					
1	<i>Alectoria</i> sp	Alectoriaceae			
2	<i>Cladonia</i> sp.	Cladoniaceae			
3	<i>Graphis</i> sp.	Graphidaceae			
4	<i>Lobaria</i> sp	Lobariaceae			
5	<i>Parmelina</i> sp	Parmeliaceae			
6	<i>Parmotrema</i> sp	Parmeliaceae			
7	<i>Pseudocyphellaria</i> sp	Lobariaceae			
8	<i>Stereocaulon</i> sp	Stereocaulaceae			
9	<i>Sticta</i> sp	Lobariaceae			
10	<i>Usnea</i> sp	Parmeliaceae			

Appendix II.3.67: Species list of macro-fungi recorded from barrage and powerhouse sites of Mago chu

Species	Family	Species	Family
Barrage		Powerhouse	

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Species	Family	Species	Family
<i>Auricularia auriculiformis</i>	Auriculariaceae	<i>Auricularia auriculiformis</i>	Auriculariaceae
<i>Boletus reticulatus</i>	Boletaceae	<i>Boletus reticulatus</i>	Boletaceae
<i>Clathrus rubra</i>	Phallaceae	<i>Coprinus disseminatus</i>	Agaricaceae
<i>Coprinus disseminatus</i>	Agaricaceae	<i>Fomes pinicola</i>	Fomitopsidaceae
<i>Daldinia concentrica</i>	Xylariaceae	<i>Gloeophyllum sepiarium</i>	Gloeophyllaceae
<i>Fomes pinicola</i>	Fomitopsidaceae	<i>Hydnum repandum</i>	Hydnaceae
<i>Hericium erinaceus</i>	Hericiaceae	<i>Lactarius rubidus</i>	Russulaceae
<i>Hydnum repandum</i>	Hydnaceae	<i>Pycnoporellus fibrillosus</i>	Fomitopsidaceae
<i>Hygrocybe miniata</i>	Hygrophoraceae	<i>Schizophyllum commune</i>	Schizophyllaceae
<i>Laccaria laccata</i>	Hydnangiaceae	<i>Thelephora penicillata</i>	Thelephoraceae
<i>Phellinus schweintzii</i>	Hymenochaetaceae		
<i>Polyporus arcularius</i>	Polyporaceae		
<i>Poria monticola</i>	Polyporaceae		
<i>Schizophyllum commune</i>	Schizophyllaceae		
<i>Strobilomyces strobilaceus</i>	Boletaceae		
<i>Thelephora penicillata</i>	Thelephoraceae		
Catchment area			
Species	Family		
<i>Auricularia auriculiformis</i>	Auriculariaceae		
<i>Boletus reticulatus</i>	Boletaceae		
<i>Clathrus rubra</i>	Phallaceae		
<i>Coprinus disseminatus</i>	Agaricaceae		
<i>Daldinia concentrica</i>	Xylariaceae		
<i>Fomes pinicola</i>	Fomitopsidaceae		
<i>Gloeophyllum sepiarium</i>	Gloeophyllaceae		
<i>Hericium erinaceus</i>	Hericiaceae		
<i>Hydnum repandum</i>	Hydnaceae		
<i>Hygrocybe miniata</i>	Hygrophoraceae		
<i>Laccaria laccata</i>	Hydnangiaceae		
<i>Lactarius rubidus</i>	Russulaceae		
<i>Phellinus schweintzii</i>	Hymenochaetaceae		
<i>Polyporus arcularius</i>	Polyporaceae		
<i>Poria monticola</i>	Polyporaceae		
<i>Pycnoporellus fibrillosus</i>	Fomitopsidaceae		
<i>Schizophyllum commune</i>	Schizophyllaceae		
<i>Strobilomyces strobilaceus</i>	Boletaceae		
<i>Thelephora penicillata</i>	Thelephoraceae		

Appendix II.3.68: Frequency, density, basal area, and importance value index (IVI) for tree species in Mago chu barrage site

Sl. No.	Name of species	Post-monsoon				Monsoon				Winter			
		Fr.	Dn.	BA	IVI	Fr.	Dn.	BA	IVI	Fr.	Dn.	BA	IVI
1	<i>Acer hookeri</i>	40	70	2.63	33.10	40	70	2.63	33.10	40	70	2.63	33.10
2	<i>Acer sikkimensis</i>	20	40	0.96	16.17	20	40	0.96	16.17	20	40	0.96	16.17
3	<i>Alnus nepalensis</i>	40	80	2.33	33.78	40	80	2.33	33.78	40	80	2.33	33.78
4	<i>Brassaiopsis glomerulata</i>	20	50	0.65	16.79	20	50	0.65	16.79	20	50	0.65	16.79
5	<i>Leucosceptum canum</i>	20	40	0.48	14.47	20	40	0.48	14.47	20	40	0.48	14.47
6	<i>Pinus wallichiana</i>	20	40	3.76	26.04	20	40	3.76	26.04	20	40	3.76	26.04
7	<i>Populus ciliata</i>	40	60	6.11	43.67	40	60	6.11	43.67	40	60	6.11	43.67
8	<i>Quercus semicarpifolia</i>	30	40	1.76	21.93	30	40	1.76	21.93	30	40	1.76	21.93
9	<i>Rhododendron sp.</i>	10	20	0.39	7.78	10	20	0.39	7.78	10	20	0.39	7.78
10	<i>Taxus wallichiana</i>	20	30	0.33	12.22	20	30	0.33	12.22	20	30	0.33	12.22
11	<i>Tsuga dumosa</i>	60	90	8.46	63.02	60	90	8.46	63.02	60	90	8.46	63.02
12	<i>Corylus heterophylla</i>	20	20	0.48	11.03	20	20	0.48	11.03	20	20	0.48	11.03
Total		340	580	28.35	300	340	580	28.35	300	340	580	28.35	300

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), B A- Basal area ($\text{m}^2 \text{ha}^{-1}$), IVI- Importance value index

Appendix II.3.69: Frequency, density and IVI of shrubs in Mago chu barrage site

Sl. No.	Name of species	Post-monsoon	Monsoon	Winter
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Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
		Fr.	Dn.	IVI	Fr.	Dn.	IVI	Fr.	Dn.	IVI
1	<i>Artemesia nilagirica</i>	55	1072	20.24	55	1072	20.24	55	1072	20.24
2	<i>Arundinaria manii</i>	50	1792	27.76	50	1792	27.76	50	1792	27.76
3	<i>Berberis aristata</i>	60	720	16.94	60	720	16.94	60	720	16.94
4	<i>Coriaria nepalensis</i>	65	544	15.65	65	544	15.65	65	544	15.65
5	<i>Daphne papyracea</i>	60	1392	24.63	60	1392	24.63	60	1392	24.63
6	<i>Eleagnus parviflora</i>	20	144	4.55	20	144	4.55	20	144	4.55
7	<i>Euphorbia sikkimensis</i>	30	256	7.28	30	256	7.28	30	256	7.28
8	<i>Girardinia grandiflora</i>	35	336	8.92	35	336	8.92	35	336	8.92
9	<i>Hypericum choisianum</i>	40	192	7.99	40	192	7.99	40	192	7.99
10	<i>Ilex dipyrena</i>	45	416	11.28	45	416	11.28	45	416	11.28
11	<i>Neillia thyrsoflora</i>	25	128	5.09	25	128	5.09	25	128	5.09
12	<i>Philadelphus tomentosus</i>	25	96	4.72	25	96	4.72	25	96	4.72
13	<i>Piptanthus nepalensis</i>	55	688	15.85	55	688	15.85	55	688	15.85
14	<i>Rubus ellipticus</i>	50	608	14.21	50	608	14.21	50	608	14.21
15	<i>Zanthoxylum armatum</i>	35	192	7.27	35	192	7.27	35	192	7.27
16	<i>Zanthoxylum oxyphyllum</i>	40	160	7.63	40	160	7.63	40	160	7.63
	Total	690	8736	200	690	8736	200	690	8736	200

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), IVI- Importance value index

Appendix II.3.70: Frequency, density and IVI of herbs in Mago chu barrage site

Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
		Fr.	Dn.	IVI	Fr.	Dn.	IVI	Fr.	Dn.	IVI
1	<i>Achyranthes aspera</i>	20	3600	3.68	28	9200	3.84			
2	<i>Ainsliaea</i> sp.	44	10800	9.07	44	18000	6.70	16	4400	5.38
3	<i>Anaphalis margaritacea</i>	32	6800	6.24	52	26800	8.96			
4	<i>Arisaema erubescens</i>				32	12400	4.75			
5	<i>Arisaema nepenthoides</i>	24	6000	4.99	32	6800	3.69			
6	<i>Aster</i> sp.				44	13200	5.80			
7	<i>Aster trinervius</i>	20	3200	3.54	32	7600	3.84			
8	<i>Astilbe rivularis</i>	44	7200	7.84	56	8400	5.81			
9	<i>Berginia ciliata</i>				16	2800	1.73			
10	<i>Cirsium falconeri</i>				16	2800	1.73			
11	<i>Cyanoglossum</i> sp.				44	17200	6.55	16	3600	5.03
12	<i>Cyathula capitata</i>	12	2400	2.29	32	12800	4.82	24	8400	8.86
13	<i>Didymocarpus</i> sp.				16	2400	1.66			
14	<i>Dracocephalum</i> sp.	56	15200	12.05	12	2800	1.43			
15	<i>Drymaria cordata</i>	48	28800	15.74	40	35600	9.71	28	13200	11.83
16	<i>Elsholtzia strobilifera</i>	52	24400	14.72				36	25600	19.01
17	<i>Eupatorium adenophorum</i>	12	2400	2.29	32	5600	3.47			
18	<i>Euphorbia sikkimensis</i>				16	2800	1.73			
19	<i>Fragaria</i> sp.	52	24400	14.72	36	7600	4.15	24	12400	10.62
20	<i>Galeola lindleyana</i>				16	2800	1.73			
21	<i>Galinsoga parviflora</i>	48	10800	9.56	44	22000	7.46	28	16000	13.06
22	<i>Galium</i> sp.	16	2800	2.91	32	12800	4.82	12	5600	5.05
23	<i>Geranium pretense</i>	40	10400	8.45	24	6000	2.94	16	5200	5.73
24	<i>Gonatanthus pumilus</i>				16	3200	1.81			
25	<i>Herpetospermum pendulosum</i>				12	2800	1.43			
26	<i>Hypoestes roxburghii</i>	32	11200	7.75	28	12000	4.37			
27	<i>Imperata cylindrica</i>	28	15200	8.63	28	21600	6.17	24	24800	16.07
28	<i>Iris lactea</i>				24	4800	2.71			
29	<i>Oplisminus compositus</i>	44	28800	15.26				28	34400	21.15
30	<i>Nepeta</i> sp.	16	2400	2.78	16	2800	1.73			
31	<i>Ophiopogon intermedius</i>				32	7200	3.77			
32	<i>Oxalis corniculata</i>	4	800	0.76				20	8000	7.83
33	<i>Oplisminus</i> sp.				56	53200	14.22			
34	<i>Panax bipinnatifidus</i>	4	800	0.76	12	2800	1.43			

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Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
		Fr.	Dn.	IVI	Fr.	Dn.	IVI	Fr.	Dn.	IVI
35	<i>Paspallum</i> sp.	28	20000	10.28	32	17200	5.65	24	17200	12.73
36	<i>Persicaria runcinata</i>				32	18000	5.80	20	8000	7.83
37	<i>Pilea umbrosa</i>				32	30800	8.20			
38	<i>Plantago major</i>	44	24400	13.74	56	34800	10.77	32	11600	11.99
39	<i>Pleione praecox</i>				12	2800	1.43			
40	<i>Pogostemon</i> sp.	4	400	0.63	20	3600	2.19	20	4000	6.07
41	<i>Polygonum capitata</i>	24	6800	5.26	36	17600	6.02	28	5200	8.32
42	<i>Potentilla cuneata</i>	20	3200	3.54	36	6800	4.00	32	12400	12.34
43	<i>Rumex acetosella</i>	36	15600	9.75	48	26800	8.66			
44	<i>Sambucus adnata</i>	4	400	0.63						
45	<i>Swertia chirayita</i>				20	3600	2.19			
46	<i>Urtica dioica</i>	12	2000	2.15	36	9200	4.45	24	5200	7.46
47	<i>Valeriana hardwickii</i>				16	5200	2.19			
48	<i>Viola sikkimensis</i>				28	7200	3.47	12	2400	3.64
Total		820	291200	200	1324	532400	200	464	227600	200

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), IVI- Importance value index

Appendix II.3.71: Frequency, density, basal area, and importance value index (IVI) for tree species in Mago chu Power house site

Sl. No.	Name of species	Post-monsoon				Monsoon				Winter			
		Fr.	Dn.	BA	IVI	Fr.	Dn.	BA	IVI	Fr.	Dn.	BA	IVI
1	<i>Acer hookerii</i>	10	10	0.16	8.26	10	10	0.16	8.26	10	10	0.16	8.26
2	<i>Acer sikkimensis</i>	10	20	0.61	14.54	10	20	0.61	14.54	10	20	0.61	14.54
3	<i>Alangium alpinum.</i>	30	40	0.20	25.94	30	40	0.20	25.94	30	40	0.20	25.94
4	<i>Alnus nepalensis</i>	20	30	0.50	20.93	20	30	0.50	20.93	20	30	0.50	20.93
5	<i>Brassaiopsis glomerulata</i>	40	50	0.63	36.08	40	50	0.63	36.08	40	50	0.63	36.08
6	<i>Populus ciliata</i>	30	40	1.16	32.73	30	40	1.16	32.73	30	40	1.16	32.73
7	<i>Quercus lamellosa</i>	40	40	9.77	97.55	40	40	9.77	97.55	40	40	9.77	97.55
8	<i>Rhododendron</i> sp.	20	20	0.41	17.15	20	20	0.41	17.15	20	20	0.41	17.15
9	<i>Lindera neesiana</i>	20	20	0.13	15.20	20	20	0.13	15.20	20	20	0.13	15.20
10	<i>Rhus chinensis</i>	30	50	0.57	31.63	30	50	0.57	31.63	30	50	0.57	31.63
Total		250	320	14.15	300	250	320	14.15	300	250	320	14.15	300

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), B A- Basal area ($\text{m}^2 \text{ha}^{-1}$), IVI- Importance value index

Appendix II.3.72: Frequency, density and IVI of shrubs in Mago chu Power house site

Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
		Fr.	Dn.	IVI	Fr.	Dn.	IVI	Fr.	Dn.	IVI
1	<i>Artemesia nilagirica</i>	48	1248	21.48	48	1248	21.48	48	1248	21.48
2	<i>Arundinaria manii</i>	52	1568	25.69	52	1568	25.69	52	1568	25.69
3	<i>Berberis aristata</i>	56	512	14.48	56	512	14.48	56	512	14.48
4	<i>Coraria napalensis</i>	32	448	10.02	32	448	10.02	32	448	10.02
5	<i>Daphne papyracea</i>	44	1248	20.85	44	1248	20.85	44	1248	20.85
6	<i>Elaeagnus parviflora</i>	12	144	3.49	12	144	3.49	12	144	3.49
7	<i>Euphorbia sikkemensis</i>	20	224	5.63	20	224	5.63	20	224	5.63
8	<i>Girardinia grandiflora</i>	32	432	9.84	32	432	9.84	32	432	9.84
9	<i>Hypericum choisianum</i>	16	112	3.75	16	112	3.75	16	112	3.75
10	<i>Ilex dipyrena</i>	48	544	13.59	48	544	13.59	48	544	13.59
11	<i>Neillia thyrsiflora</i>	52	272	11.17	52	272	11.17	52	272	11.17
12	<i>Philadelphus tomentosus</i>	24	128	5.18	24	128	5.18	24	128	5.18
13	<i>Piptanthus nepalensis</i>	44	720	14.94	44	720	14.94	44	720	14.94
14	<i>Plectranthus</i> sp.	16	144	4.11	16	144	4.11	16	144	4.11
15	<i>Rosa</i> sp.	36	288	8.85	36	288	8.85	36	288	8.85
16	<i>Rubus ellipticus</i>	52	464	13.32	52	464	13.32	52	464	13.32
17	<i>Zanthoxylum armatum</i>	20	176	5.10	20	176	5.10	20	176	5.10
18	<i>Zanthoxylum oxyphyllum</i>	36	256	8.49	36	256	8.49	36	256	8.49
Total		640	8928	200	640	8928	200	640	8928	200

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), IVI- Importance value index

Appendix II.3.73: Frequency, density and IVI of herbs in Mago chu Power house site

Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
		Fr.	Dn.	IVI	Fr.	Dn.	IVI	Fr.	Dn.	IVI
1	<i>Achyranthes aspera</i>	8	1200	1.56	24	5600	3.31	16	2800	4.32
2	<i>Ainsliaea</i> sp.	20	6800	5.23	28	11200	4.87	16	3200	4.50
3	<i>Anaphalis margaritacea</i>	28	4400	5.53	48	23600	9.30			
4	<i>Arisaema erubescens</i>				16	5200	2.52			
5	<i>Arisaema nepenthoides</i>				20	6400	3.13			
6	<i>Aster</i> sp.	16	2800	3.26	32	8800	4.70			
7	<i>Aster trinervius</i>				36	11600	5.66			
8	<i>Astilbe rivularis</i>	4	800	0.85	28	11200	4.87			
9	<i>Cyanoglossum</i> sp.				44	22000	8.61	28	8400	9.15
10	<i>Cyathula capitata</i>				48	15200	7.49	32	8400	9.91
11	<i>Dracocephalum</i> sp.				20	3600	2.53			
12	<i>Drymaria cordata</i>	28	19200	10.69	44	26000	9.47	24	16800	12.19
13	<i>Elsholtzia strobilifera</i>	36	20000	12.12				52	34400	25.50
14	<i>Eupatorium adenophorum</i>	40	10800	9.48						
15	<i>Euphorbia sikkimensis</i>	12	2400	2.55	16	4400	2.35			
16	<i>Fragaria</i> sp.	40	22000	13.39	56	22400	9.74	36	16000	14.12
17	<i>Galinsoga parviflora</i>	28	6800	6.37	32	12800	5.57	20	8000	7.44
18	<i>Galium asperifolium</i>	24	6800	5.80						
19	<i>Galium</i> sp.				32	12800	5.57	28	6400	8.24
20	<i>Geranium pretense</i>				36	4800	4.19	8	2400	2.61
21	<i>Hypoestes roxburghii</i>	20	8400	5.79	36	19200	7.30			
22	<i>Imperata cylindrica</i>	32	24400	13.08	48	39200	12.68	36	23200	17.38
23	<i>Iris lactea</i>				20	3200	2.44			
24	<i>Nepeta</i> sp.	8	1600	1.70	28	3600	3.23			
25	<i>Ophiopogon intermedius</i>				32	6800	4.27			
26	<i>Oplisminus</i> sp.	32	24400	13.08						
27	<i>Oplisminus compositus</i>				48	26800	10.00	32	25600	17.70
28	<i>Oxalis corniculata</i>	36	12800	9.61				32	11600	11.36
29	<i>Persicaria runcinata</i>	28	14800	9.16	44	35600	11.55	20	6400	6.72
30	<i>Paspallum</i> sp.	36	24400	13.65	32	15600	6.17	24	15600	11.65
31	<i>Phlomis</i> sp.	4	1200	0.99	16	3600	2.18			
32	<i>Pilea umbrosa</i>				28	13200	5.30			
33	<i>Plantago major</i>	36	17600	11.28	36	22400	8.00			
34	<i>Pogostemon</i> sp.	4	800	0.85	24	4400	3.05	12	2400	3.38
35	<i>Polygonum capitatum</i>	48	22000	14.53	32	17600	6.61			
36	<i>Plantago cuneata</i>							24	10000	9.11
37	<i>Potentilla major</i>	4	800	0.85	44	9200	5.84	16	3600	4.68
38	<i>Sambucus adnata</i>	32	6800	6.94	28	13600	5.39			
39	<i>Senecio cappa</i>				28	4800	3.49			
40	<i>Rumex acetosella</i>	36	11200	9.05				44	10800	13.29
41	<i>Valeriana hardwickii</i>	20	3600	4.11						
42	<i>Urtica dioica</i>	24	6000	5.52	44	8400	5.66	16	3600	4.68
43	<i>Viola sikkimensis</i>	16	2000	2.98	16	7200	2.96	8	1200	2.07
Total		700	286800	200	1144	462000	200	524	220800	200

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), IVI- Importance value index

Appendix II.3.74: Frequency, density, basal area, and importance value index (IVI) for tree species in Mago chu catchment area

Sl. No.	Name of species	Post-monsoon				Monsoon				Winter			
		Fr.	Dn.	BA	IVI	Fr.	Dn.	BA	IVI	Fr.	Dn.	BA	IVI
1	<i>Acer sikkimensis</i>	90	170	15.22	88.12	90	170	15.22	88.12	90	170	15.22	88.12
2	<i>Alnus nepalensis</i>	10	20	0.59	8.49	10	20	0.59	8.49	10	20	0.59	8.49
3	<i>Brassaiopsis glomerulata</i>	20	30	0.40	13.68	20	30	0.40	13.68	20	30	0.40	13.68
4	<i>Pinus wallichiana</i>	20	20	1.11	12.46	20	20	1.11	12.46	20	20	1.11	12.46
5	<i>Populus ciliata</i>	40	50	13.21	42.51	40	50	13.21	42.51	40	50	13.21	42.51

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Sl.	Name of species	Post-monsoon				Monsoon				Winter			
		Fr.	Dn.	Fr.	Dn.	Fr.	Dn.	Fr.	Dn.	Fr.	Dn.	Fr.	Dn.
6	<i>Quercus semicarpifolia</i>	50	70	7.57	42.29	50	70	7.57	42.29	50	70	7.57	42.29
7	<i>Rhododendron sp.</i>	20	20	0.34	11.38	20	20	0.34	11.38	20	20	0.34	11.38
8	<i>Taxus wallichiana</i>	20	20	0.29	11.31	20	20	0.29	11.31	20	20	0.29	11.31
9	<i>Tsuga dumosa</i>	40	50	32.68	69.77	40	50	32.68	69.77	40	50	32.68	69.77
Total		310	450	71.42	300	310	450	71.42	300	310	450	71.42	300

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), B A- Basal area ($\text{m}^2 \text{ha}^{-1}$), IVI- Importance value index

Appendix II.3.75: Frequency, density and IVI of shrubs in Mago chu catchment area

Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
		Fr.	Dn.	IVI	Fr.	Dn.	IVI	Fr.	Dn.	IVI
1	<i>Artemesia nilagirica</i>	68	1216	23.98	68	1216	23.98	68	1216	23.98
2	<i>Arundinaria manii</i>	36	1248	19.43	36	1248	19.43	36	1248	19.43
3	<i>Berberis aristata</i>	48	512	13.07	48	512	13.07	48	512	13.07
4	<i>Coriaria napalensis</i>	52	368	12.08	52	368	12.08	52	368	12.08
5	<i>Daphne papyracea</i>	72	1568	28.51	72	1568	28.51	72	1568	28.51
6	<i>Eleagnus parviflora</i>	40	400	10.59	40	400	10.59	40	400	10.59
7	<i>Euphorbia sikkimensis</i>	20	368	7.17	20	368	7.17	20	368	7.17
8	<i>Girardinia diversifolia</i>	28	688	11.96	28	688	11.96	28	688	11.96
9	<i>Hypericum choisianum</i>	48	208	9.68	48	208	9.68	48	208	9.68
10	<i>Ilex dipyrena</i>	48	416	12.00	48	416	12.00	48	416	12.00
11	<i>Neillia thyrsoiflora</i>	20	144	4.67	20	144	4.67	20	144	4.67
12	<i>Piptanthus nepalensis</i>	52	688	15.64	52	688	15.64	52	688	15.64
13	<i>Rosa sp.</i>	28	272	7.32	28	272	7.32	28	272	7.32
14	<i>Rubus ellipticus</i>	32	416	9.54	32	416	9.54	32	416	9.54
15	<i>Philadelphus tomentosus</i>	20	128	4.49	20	128	4.49	20	128	4.49
16	<i>Zanthoxylum armatum</i>	16	144	4.06	16	144	4.06	16	144	4.06
17	<i>Zanthoxylum oxyphyllum</i>	24	192	5.82	24	192	5.82	24	192	5.82
Total		652	8976	200	652	8976	200	652	8976	200

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), IVI- Importance value index

Appendix II.3.76: Frequency, density and IVI of herbs in Mago chu catchment area

Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
		Fr.	Dn.	IVI	Fr.	Dn.	IVI	Fr.	Dn.	IVI
1	<i>Achyranthes aspera</i>	16	4000	3.08	24	9200	3.80	16	3600	5.07
2	<i>Ainsliaea sp.</i>	20	8400	4.84	20	7200	3.09	20	4400	6.30
3	<i>Anaphalis margaritacea</i>	28	15200	7.77	28	21600	6.40			
4	<i>Arisaema erubescens</i>				16	8800	3.02			
5	<i>Arisaema nepenthoides</i>				20	6800	3.01			
6	<i>Aster sp.</i>	16	4400	3.19	16	3200	2.01			
7	<i>Aster trinervius</i>	12	2800	2.25	36	14400	5.81			
8	<i>Astilbe rivularis</i>	16	2400	2.61	28	8000	3.94	16	5200	5.77
9	<i>Bergenia ciliata</i>				28	4400	3.29			
10	<i>Cirsium falconeri</i>				12	2800	1.58			
11	<i>Cyanoglossum sp.</i>				36	18000	6.46	20	6800	7.34
12	<i>Cyathula capitata</i>	36	8000	6.63	44	26000	8.62	16	6000	6.12
13	<i>Didymocarpus sp.</i>				16	2800	1.93			
14	<i>Dracocephalum sp.</i>	8	1600	1.42	20	3600	2.44			
15	<i>Drymaria cordata</i>	56	32400	16.13	20	19200	5.25	28	24400	16.75
16	<i>Elsholtzia strobilifera</i>	48	28000	13.89	32	10800	4.81			
17	<i>Eupatorium adenophorum</i>				36	8400	4.73			
18	<i>Euphorbia sikkimensis</i>	8	1600	1.42	12	3200	1.65			
19	<i>Fragaria sp.</i>	44	19200	10.85	48	26000	8.98	44	17600	17.30
20	<i>Galinsoga parviflora</i>	36	9200	6.98	44	21600	7.83	28	13600	12.05
21	<i>Galium sp.</i>	20	6000	4.14	28	12400	4.74	24	5600	7.70
22	<i>Geranium pretense</i>	12	4000	2.60	20	5200	2.72	12	2400	3.68
23	<i>Hypoestes roxburghii</i>	32	10400	6.85	8	1600	1.00			
24	<i>Imperata cylindrica</i>	52	28000	14.37	32	17600	6.03			

Sl.	Name of species	Post-monsoon			Monsoon			Winter		
25	<i>Imperata cylindrica</i>				48	34000	10.42	24	14000	11.35
26	<i>Iris lactea</i>				16	4400	2.22			
27	<i>Nepeta</i> sp.	4	400	0.59	12	3600	1.72			
28	<i>Ophiopogon intermedius</i>				20	6400	2.94			
29	<i>Oplisminus</i> sp.	28	19600	9.05	24	35600	8.57	28	24400	16.75
30	<i>Oxalis corniculata</i>	44	32800	14.81				24	17600	12.92
31	<i>Paspallum</i> sp.	24	15200	7.29	32	30800	8.42	16	16000	10.47
32	<i>Persicaria runcinata</i>	32	15200	8.25	20	17600	4.96			
33	<i>Phlomis</i> sp.	8	1600	1.42	12	2800	1.58			
34	<i>Pilea umbrosa</i>				28	22400	6.54			
35	<i>Plantago major</i>	32	12000	7.32	44	27600	8.91	32	18000	14.84
36	<i>Pogostemon</i> sp.	8	1600	1.42	16	3200	2.01			
37	<i>Polygonum capitatum</i>				40	19200	7.04			
38	<i>Potentilla cuneata</i>	28	3600	4.40	28	8400	4.02	20	6800	7.34
39	<i>Rumex acetosella</i>	84	20800	16.10	36	27200	8.12	52	34000	26.19
40	<i>Sambucus adnata</i>	52	27600	14.25	60	30800	10.92			
41	<i>Senecio cappa</i>	8	1200	1.31	12	3200	1.65			
42	<i>Urtica dioica</i>	24	6400	4.73	28	9200	4.16	28	8400	9.79
43					20	4800	2.65	8	1200	2.28
Total		836	343600	200.00	1120	554000	200.00	456	230000	200.00

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), IVI- Importance value index

Appendix II.3.77: Dominant and co-dominant species determined on the basis of IVI/density values of species in the plant community at Mago chu site

Community components	Barrage	Powerhouse	Catchment area
Tree species*			
Dominant	<i>Tsuga dumosa</i>	<i>Quercus lamellosa</i>	<i>Acer</i> sp.
Co-Dominant	<i>Populus ciliata</i>	<i>Brassiopsis glomerulata</i>	<i>Tsuga dumosa</i>
Shrub species*			
Dominant	<i>Arundinaria manii</i>	<i>Arundinaria manii</i>	<i>Daphnae papyracea</i>
Co-Dominant	<i>Daphnae papyracea</i>	<i>Artemesia nilagirica</i>	<i>Artemesia nilagirica</i>
Herb species**			
i. Pre-monsoon season			
Dominant	<i>Oplismenus compositus</i>	<i>Oplismenus compositus</i>	<i>Oplismenus compositus</i>
Co-Dominant	<i>Anaphalis margaritacea</i>	<i>Fragaria nubicola</i>	<i>Elsholtzia stobilifera</i>
ii. Monsoon season			
Dominant	<i>Sambucus adnata</i>	<i>Fragaria</i> sp.	<i>Sambucus adnata</i>
Co-Dominant	<i>Oplismenus compositus</i>	<i>Drymaria cordata</i>	<i>Oplismenus compositus</i>
iii. Winter			
Dominant	<i>Oplismenus compositus</i>	<i>Elsholtzia stobilifera</i>	<i>Elsholtzia stobilifera</i>
Co-Dominant	<i>Plantago major</i>	<i>Fragaria</i> sp.	<i>Fragaria</i> sp.

* Dominance based on IVI; ** Dominance based on density

Appendix II.3.78: List of plant species recorded from Nykcharong chu HEP sites

Sl. No.	Species name	Family
TREES		
1	<i>Acer campbellii</i>	Aceraceae
2	<i>Acer sikkimensis</i>	Aceraceae
3	<i>Alangium alpinum</i>	Alangiaceae
4	<i>Alnus nepalensis</i>	Betulaceae
5	<i>Betula alnoides</i>	Betulaceae
6	<i>Brassaiopsis glomerulata</i>	Araliaceae
7	<i>Eurya acuminata</i>	Theaceae

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Sl. No.	Species name	Family
8	<i>Fraxinus floribunda</i>	Oleaceae
9	<i>Leucosceptrum canum</i>	Lamiaceae
10	<i>Lindera neesiana</i>	Lauraceae
11	<i>Lyonia ovalifolia</i>	Ericaceae
12	<i>Magnolia campbellii</i>	Magnoliaceae
13	<i>Morus laevigata</i>	Moraceae
14	<i>Neolitsea</i> sp	Lauraceae
15	<i>Persea odoratissima</i>	Lauraceae
16	<i>Quercus lamellosa</i>	Fagaceae
17	<i>Quercus semecarpifolia</i>	Fagaceae
18	<i>Rhododendron arboreum</i>	Ericaceae
19	<i>Rhododendron campanulatum</i>	Ericaceae
20	<i>Rhododendron maddenii</i>	Ericaceae
21	<i>Rhododendron</i> sp	Ericaceae
22	<i>Rhus acuminata</i>	Anacardiaceae
SHRUBS		
23	<i>Artemisia nilagirica</i>	Asteraceae
24	<i>Berberis aristata</i>	Berberidaceae
25	<i>Berberis</i> sp	Berberidaceae
26	<i>Coraria napalensis</i>	Coriariaceae
27	<i>Daphne papyracea</i>	Thymelaeaceae
28	<i>Elaeagnus parviflora</i>	Elaeagnaceae
29	<i>Elsholtzia</i> sp	Lamiaceae
30	<i>Girardinia diversifolia</i>	Urticaceae
31	<i>Hypericum choisianum</i>	Hypericaceae
32	<i>Ilex dipyrrena</i>	Aquifoliaceae
33	<i>Neillia thyrsoiflora</i>	Rosaceae
34	<i>Philadelphus tomentosus</i>	Hydrangeaceae
35	<i>Piptanthus nepalensis</i>	Papilionaceae
36	<i>Rosa</i> sp	Rosaceae
37	<i>Rubus ellipticus</i>	Rosaceae
38	<i>Sarcococca</i> sp	Buxaceae
39	<i>Spirea</i> sp	Rosaceae
40	<i>Zanthoxylum oxyphyllum</i>	Rutaceae
HERBS		
41	<i>Ainsliaea</i> sp	Asteraceae
42	<i>Anaphalis margaritacea</i>	Asteraceae
43	<i>Arisaema erubescens</i>	Araceae
44	<i>Arisaema nepenthoides</i>	Araceae
45	<i>Aster</i> sp	Asteraceae
46	<i>Aster trinervius</i>	Asteraceae
47	<i>Astilbe rivularis</i>	Saxifragaceae
48	<i>Calanthe tricarinata</i>	Orchidaceae
49	<i>Codonopsis gracilis</i>	Campanulaceae
50	<i>Crawfordia speciosa</i>	Campanulaceae
51	<i>Cyanoglossum</i> sp	Boraginaceae
52	<i>Cyathula capitata</i>	Amaranthaceae
53	<i>Dipsacus asper</i>	Dipsacaceae
54	<i>Dracocephalum</i> sp	Lamiaceae
55	<i>Elatostemma sessile</i>	Lamiaceae
56	<i>Elsholtzia strobilifera</i>	Urticaceae
57	<i>Fragaria</i> sp	Rosaceae
58	<i>Galium rotundifolia</i>	Rubiaceae
59	<i>Galium</i> sp	Rubiaceae
60	<i>Gentiana capitata</i>	Gentianaceae
61	<i>Geranium pretense</i>	Geraniaceae
62	<i>Goldfusia nutans</i>	Orchidaceae

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Sl. No.	Species name	Family
63	<i>Imperata cylindrica</i>	Poaceae
64	<i>Nepeta</i> sp	Lamiaceae
65	<i>Ophiopogon intermedius</i>	Liliaceae
66	<i>Oplisminus compositus</i>	Poaceae
67	<i>Panax bipinnatifidus</i>	Araliaceae
68	<i>Parasenecio quinquelobus</i>	Asteraceae
69	<i>Paris polyphylla</i>	Triliaceae
70	<i>Persicaria runcinata</i>	Polygonaceae
71	<i>Phlomis</i> sp	Lamiaceae
72	<i>Pilea umbrosa</i>	Urticaceae
73	<i>Plantago major</i>	Plantaginaceae
74	<i>Pogonotherum</i> sp	Poaceae
75	<i>Pogostemon</i> sp	Lamiaceae
76	<i>Potentilla cuneata</i>	Rosaceae
77	<i>Roscoea alpine</i>	Zingiberaceae
78	<i>Rumex acetosella</i>	Polygonaceae
79	<i>Salvia</i> sp	Lamiaceae
80	<i>Sambucus adnata</i>	Adoxaceae
81	<i>Senecio cappa</i>	Asteraceae
82	<i>Thalictrum foliolosum</i>	Ranunculaceae
83	<i>Trifolium repens</i>	Ranunculaceae
84	<i>Urtica dioica</i>	Urticaceae
85	<i>Viola sikkimensis</i>	Violaceae
CLIMBERS		
86	<i>Aristolochia griffithii</i>	Aristolochiaceae
87	<i>Celastrus paniculata</i>	Celastraceae
88	<i>Cissampelos</i> sp	Menispermaceae
89	<i>Clematis</i> sp	Ranunculaceae
90	<i>Dioscorea</i> sp	Dioscoreaceae
91	<i>Ficus</i> sp	Moraceae
92	<i>Hedera helix</i>	Araliaceae
93	<i>Hedera nepalensis</i>	Araliaceae
94	<i>Herpetospermum pedunculatum</i>	Cucurbitaceae
95	<i>Holboellia latifolia</i>	Lardizabalaceae
96	<i>Periploca</i> sp.	Periplocaceae
97	<i>Philadelphus tomentosus</i>	Hydrangeaceae
98	<i>Rubia cordifolia</i>	Rubiaceae
99	<i>Scziophgma</i> sp	Hydrangeaceae
100	<i>Smilax</i> sp	Smilacaceae
101	<i>Stephania glandulifera</i>	Menispermaceae
102	<i>Thladiantha cordifolia</i>	Cucurbitaceae
ORCHIDS		
103	<i>Cymbidium</i> sp	Orchidaceae
104	<i>Bulbophyllum</i> sp	Orchidaceae
105	<i>Calanthe tricarinata</i>	Orchidaceae
106	<i>Coelogynae</i> sp.	Orchidaceae
107	<i>Cymbidium grandiflorum</i>	Orchidaceae
108	<i>Dendrobium</i> sp.	Orchidaceae
109	<i>Galeola lindleyana</i>	Orchidaceae
110	<i>Oberonia</i> sp	Orchidaceae
111	<i>Pleione praecox</i>	Orchidaceae
112	<i>Vanda</i> sp	Orchidaceae
PTERIDOPHYTES		
113	<i>Adiantum</i> sp	Adiantaceae
114	<i>Athyrium</i> sp	Athyraceae
115	<i>Dicranopteris linearis</i>	Dicranopteridaceae
116	<i>Dryopteris wallichiana</i>	Dryopteridaceae

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Sl. No.	Species name	Family
117	<i>Dynaria quercifolia</i>	Drynariaceae
118	<i>Lepisorus</i> sp.	Polypodiaceae
119	<i>Polypodium</i> sp.	Polypodiaceae
120	<i>Pteridium aquilinum</i>	Pteridaceae
121	<i>Pteris</i> sp.	Pteridiaceae
122	<i>Pteris vittata</i>	Pteridaceae
123	<i>Pyrrosia</i> sp	Polypodiaceae
124	<i>Selaginella</i> sp.	Selaginellaceae
125	<i>Vittaria elongata</i>	Vittariaceae
BRYOPHYTES		
126	<i>Aerobryum</i> sp	Meteoriaceae
127	<i>Desmotheca</i> sp	Orthotrichaceae
128	<i>Diphyscium</i> sp	Buxbaumiaceae
129	<i>Funaria</i> sp	Funariaceae
130	<i>Lyellia</i> sp	Polytrichaceae
131	<i>Marchantia</i> sp	Marchantiaceae
132	<i>Plagiobryum</i> sp	Bryaceae
LICHENS		
133	<i>Alectoria</i> sp	Alectoriaceae
134	<i>Cladonia</i> sp.	Cladoniaceae
135	<i>Graphis</i> sp.	Graphidaceae
136	<i>Lobaria</i> sp	Lobariaceae
137	<i>Parmelia</i> sp	Parmeliaceae
138	<i>Parmotrema</i> sp	Parmeliaceae
139	<i>Pseudocyphellaria</i> sp	Lobariaceae
140	<i>Stereocaulon</i> sp	Stereocaulaceae
141	<i>Sticta</i> sp	Lobariaceae
142	<i>Teloschistes</i> sp	Teloschistaceae
143	<i>Usnea</i> sp	Parmeliaceae
FUNGI		
144	<i>Auricularia auriculiformis</i>	Auriculariaceae
145	<i>Boletus reticulatus</i>	Boletaceae
146	<i>Clathrus rubra</i>	Phallaceae
147	<i>Coprinus disseminatus</i>	Agaricaceae
148	<i>Fomes pinicola</i>	Fomitopsidaceae
149	<i>Gloeophyllum sepiarium</i>	Gloeophyllaceae
150	<i>Hericium erinaceus</i>	Hericiaceae
151	<i>Hydnum repandum</i>	Hydnaceae
152	<i>Laccaria laccata</i>	Hydnangiaceae
153	<i>Lactarius rubidus</i>	Russulaceae
154	<i>Phellinus schweintzii</i>	Hymenochaetaceae
155	<i>Polyporus arcularius</i>	Polyporaceae
156	<i>Pycnoporellus fibrillosus</i>	Formitopscidaceae
157	<i>Schizophyllum commune</i>	Schizophyllaceae
158	<i>Thelephora penicillata</i>	Thelephoraceae
159	<i>Xylaria polymorpha</i>	Xylariaceae

Appendix II.3.79: Different groups of plant species present at Nykcharong chu HEP site

Sl. No.	Species name	Family	Sl. No.	Species name	Family
Barrage and Powerhouse			Catchment area		
CLIMBERS			CLIMBERS		
1	<i>Aristolochia griffithii</i>	Aristolochiaceae	1	<i>Aristolochia griffithii</i>	Aristolochiaceae
2	<i>Celastrus paniculata</i>	Celastraceae	2	<i>Celastrus paniculata</i>	Celastraceae
3	<i>Cissampelos</i> sp	Menispermaceae	3	<i>Clematis</i> sp	Ranunculaceae

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Sl. No.	Species name	Family	Sl. No.	Species name	Family
	Barrage and Powerhouse			Catchment area	
4	<i>Clematis</i> sp	Ranunculaceae	4	<i>Dioscorea</i> sp	Dioscoreaceae
5	<i>Dioscorea</i> sp	Dioscoreaceae	5	<i>Ficus</i> sp	Moraceae
6	<i>Ficus</i> sp	Moraceae	6	<i>Hedera nepalensis</i>	Araliaceae
7	<i>Hedera helix</i>	Araliaceae	7	<i>Herpetospermum pedunculatum</i>	Cucurbitaceae
8	<i>Hedera nepalensis</i>	Araliaceae	8	<i>Holboellia latifolia</i>	Lardizabalaceae
9	<i>Herpetospermum pedunculatum</i>	Cucurbitaceae	9	<i>Periploca</i> sp.	Periplocaceae
10	<i>Holboellia latifolia</i>	Lardizabalaceae	10	<i>Rubia cordifolia</i>	Rubiaceae
11	<i>Periploca</i> sp.	Periplocaceae	11	<i>Stephania glandulifera</i>	Menispermaceae
12	<i>Philadelphus tomentosus</i>	Hydrangeaceae	12	<i>Thladiantha cordifolia</i>	Cucurbitaceae
13	<i>Rubia cordifolia</i>	Rubiaceae		ORCHIDS	
14	<i>Scziophgma</i> sp	Hydrangeaceae	1	<i>Cymbidium</i> sp	Orchidaceae
15	<i>Smilax</i> sp	Smilacaceae	2	<i>Bulbophyllum</i> sp	Orchidaceae
16	<i>Stephania glandulifera</i>	Menispermaceae	3	<i>Calanthe tricarinata</i>	Orchidaceae
17	<i>Thladiantha cordifolia</i>	Cucurbitaceae	4	<i>Dendrobium</i> sp.	Orchidaceae
	ORCHIDS			PTERIDOPHYTES	
1	<i>Cymbidium</i> sp	Orchidaceae	1	<i>Adiantum</i> sp	Adiantaceae
2	<i>Bulbophyllum</i> sp	Orchidaceae	2	<i>Dicranopteris linearis</i>	Dicranopteridaceae
3	<i>Calanthe tricarinata</i>	Orchidaceae	3	<i>Dryopteris wallichiana</i>	Dryopteridaceae
4	<i>Coelogynae</i> sp.	Orchidaceae	4	<i>Dynaria quercifolia</i>	Drynariaceae
5	<i>Cymbidium grandiflorum</i>	Orchidaceae	5	<i>Lepisorus</i> sp.	Polypodiaceae
6	<i>Dendrobium</i> sp.	Orchidaceae	6	<i>Polypodium</i> sp.	Polypodiaceae
7	<i>Galeola lindleyana</i>	Orchidaceae	7	<i>Pteridium aquilinum</i>	Pteridaceae
8	<i>Oberonia</i> sp	Orchidaceae	8	<i>Pteris vittata</i>	Pteridaceae
9	<i>Pleione praecox</i>	Orchidaceae	9	<i>Selaginella</i> sp.	Selaginellaceae
10	<i>Vanda</i> sp	Orchidaceae	10	<i>Vittaria elongata</i>	Vittariaceae
	PTERIDOPHYTES			BRYOPHYTES	
1	<i>Adiantum</i> sp	Adiantaceae	1	<i>Aerobryum</i> sp	Meteoriaceae
2	<i>Athyrium</i> sp	Athyraceae	2	<i>Diphyscium</i> sp	Buxbaumiaceae
3	<i>Dicranopteris linearis</i>	Dicranopteridaceae	3	<i>Funaria</i> sp	Funariaceae
4	<i>Dryopteris wallichiana</i>	Dryopteridaceae	4	<i>Marchantia</i> sp	Marchantiaceae
5	<i>Dynaria quercifolia</i>	Drynariaceae		LICHENS	
6	<i>Lepisorus</i> sp.	Polypodiaceae	1	<i>Alectoria</i> sp	Alectoriaceae
7	<i>Polypodium</i> sp.	Polypodiaceae	2	<i>Graphis</i> sp.	Graphidaceae
8	<i>Pteridium aquilinum</i>	Pteridaceae	3	<i>Lobaria</i> sp	Lobariaceae
9	<i>Pteris</i> sp.	Pteridiaceae	4	<i>Parmelia</i> sp	Parmeliaceae
10	<i>Pteris vittata</i>	Pteridaceae	5	<i>Pseudocyphellaria</i> sp	Lobariaceae
11	<i>Pyrrosia</i> sp	Polypodiaceae	6	<i>Stereocaulon</i> sp	Stereocaulaceae
12	<i>Selaginella</i> sp.	Selaginellaceae	7	<i>Usnea</i> sp	Parmeliaceae
13	<i>Vittaria elongata</i>	Vittariaceae			
	BRYOPHYTES				
1	<i>Aerobryum</i> sp	Meteoriaceae			
2	<i>Desmotecha</i> sp	Orthotrichaceae			
3	<i>Diphyscium</i> sp	Buxbaumiaceae			
4	<i>Funaria</i> sp	Funariaceae			
5	<i>Lyellia</i> sp	Polytrichaceae			
6	<i>Marchantia</i> sp	Marchantiaceae			
7	<i>Plagiobryum</i> sp	Bryaceae			
	LICHENS				
1	<i>Alectoria</i> sp	Alectoriaceae			
2	<i>Cladonia</i> sp.	Cladoniaceae			
3	<i>Graphis</i> sp.	Graphidaceae			
4	<i>Lobaria</i> sp	Lobariaceae			
5	<i>Parmelia</i> sp	Parmeliaceae			
6	<i>Parmotrema</i> sp	Parmeliaceae			

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Sl. No.	Species name	Family	Sl. No.	Species name	Family
	Barrage and Powerhouse			Catchment area	
7	<i>Pseudocyphellaria</i> sp	Lobariaceae			
8	<i>Stereocaulon</i> sp	Stereocaulaceae			
9	<i>Sticta</i> sp	Lobariaceae			
10	<i>Teloschistes</i> sp	Teloschistaceae			
11	<i>Usnea</i> sp	Parmeliaceae			

Appendix II.3.80: Species list of macro-fungi recorded from barrage and powerhouse sites of Nykcharong chu

Species	Family	Species	Family
Barrage		Powerhouse	
<i>Auricularia auriculiformis</i>	Auriculariaceae	<i>Auricularia auriculiformis</i>	Auriculariaceae
<i>Boletus reticulatus</i>	Boletaceae	<i>Boletus reticulatus</i>	Boletaceae
<i>Clathrus rubra</i>	Phallaceae	<i>Coprinus disseminatus</i>	Agaricaceae
<i>Coprinus disseminatus</i>	Agaricaceae	<i>Fomes pinicola</i>	Fomitopsidaceae
<i>Fomes pinicola</i>	Fomitopsidaceae	<i>Gloeophyllum sepiarium</i>	Gloeophyllaceae
<i>Gloeophyllum sepiarium</i>	Gloeophyllaceae	<i>Hydnum repandum</i>	Hydnaceae
<i>Hericium erinaceus</i>	Hericiaceae	<i>Lactarius rubidus</i>	Russulaceae
<i>Hydnum repandum</i>	Hydnaceae	<i>Pycnoporellus fibrillosus</i>	Formitopsidaceae
<i>Laccaria laccata</i>	Hydnangiaceae	<i>Schizophyllum commune</i>	Schizophyllaceae
<i>Lactarius rubidus</i>	Russulaceae	<i>Thelephora penicillata</i>	Thelephoraceae
<i>Phellinus schweintzii</i>	Hymenochaetaceae		
<i>Polyporus arcularius</i>	Polyporaceae		
<i>Pycnoporellus fibrillosus</i>	Formitopsidaceae		
<i>Schizophyllum commune</i>	Schizophyllaceae		
<i>Thelephora penicillata</i>	Thelephoraceae		
<i>Xylaria polymorpha</i>	Xylariaceae		
Catchment area			
Species	Family		
<i>Auricularia auriculiformis</i>	Auriculariaceae		
<i>Boletus reticulatus</i>	Boletaceae		
<i>Clathrus rubra</i>	Phallaceae		
<i>Coprinus disseminatus</i>	Agaricaceae		
<i>Fomes pinicola</i>	Fomitopsidaceae		
<i>Hericium erinaceus</i>	Hericiaceae		
<i>Hydnum repandum</i>	Hydnaceae		
<i>Laccaria laccata</i>	Hydnangiaceae		
<i>Lactarius rubidus</i>	Russulaceae		
<i>Phellinus schweintzii</i>	Hymenochaetaceae		
<i>Polyporus arcularius</i>	Polyporaceae		
<i>Pycnoporellus fibrillosus</i>	Formitopsidaceae		
<i>Schizophyllum commune</i>	Schizophyllaceae		
<i>Thelephora penicillata</i>	Thelephoraceae		
<i>Xylaria polymorpha</i>	Xylariaceae		

Appendix II.3.81: Frequency, density, basal area, and importance value index (IVI) for tree species in Nykcharong chu barrage site

Sl. No.	Name of species	Post-monsoon				Monsoon				Winter			
		Fr.	Dn.	BA	IVI	Fr.	Dn.	BA	IVI	Fr.	Dn.	BA	IVI
1	<i>Acer campbellii</i>	20	40	5.30	19.57	20	40	5.30	19.57	20	40	5.30	19.57
2	<i>Alangium alpinum</i>	70	150	1.88	28.75	70	150	1.88	28.75	70	150	1.88	28.75
3	<i>Alnus nepalensis</i>	90	190	11.45	58.76	90	190	11.45	58.76	90	190	11.45	58.76
4	<i>Betula alnoides</i>	20	40	3.02	14.03	20	40	3.02	14.03	20	40	3.02	14.03
5	<i>Brassaiopsis glomerulata</i>	30	50	0.79	11.00	30	50	0.79	11.00	30	50	0.79	11.00
6	<i>Eurya acuminata</i>	20	40	0.30	7.37	20	40	0.30	7.37	20	40	0.30	7.37
7	<i>Lyonia ovalifolia</i>	70	90	3.39	27.09	70	90	3.39	27.09	70	90	3.39	27.09
8	<i>Neolitsea</i> sp.	20	20	0.61	6.34	20	20	0.61	6.34	20	20	0.61	6.34

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Sl. No.	Name of species	Post-monsoon				Monsoon				Winter			
9	<i>Persea odoratissima</i>	40	70	2.32	18.05	40	70	2.32	18.05	40	70	2.32	18.05
10	<i>Quercus semecarpifolia</i>	60	90	2.77	24.03	60	90	2.77	24.03	60	90	2.77	24.03
11	<i>Rhododendron campanulatum</i>	50	90	3.78	24.94	50	90	3.78	24.94	50	90	3.78	24.94
12	<i>Rhododendron maddenii</i>	20	40	1.21	9.59	20	40	1.21	9.59	20	40	1.21	9.59
13	<i>Rhus acuminata</i>	40	60	0.58	12.92	40	60	0.58	12.92	40	60	0.58	12.92
14	<i>Magnolia campbelli</i>	10	20	0.59	4.75	10	20	0.59	4.75	10	20	0.59	4.75
15	<i>Morus laevigata</i>	20	20	1.73	9.08	20	20	1.73	9.08	20	20	1.73	9.08
16	<i>Leucosceptrum canum</i>	30	50	0.87	11.21	30	50	0.87	11.21	30	50	0.87	11.21
17	<i>Lindera neesiana</i>	40	60	0.41	12.52	40	60	0.41	12.52	40	60	0.41	12.52
Total		650	1120	40.98	300	650	1120	40.98	300	650	1120	40.98	300

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), B A- Basal area ($\text{m}^2 \text{ha}^{-1}$), IVI- Importance value index

Appendix II.3.82: Frequency, density and IVI of shrubs in Nykcharong chu barrage site

Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
		Fr.	Dn.	IVI	Fr.	Dn.	IVI	Fr.	Dn.	IVI
1	<i>Artemesia nilagirica</i>	40	896	18.84	40	896	18.84	40	896	18.84
2	<i>Berberis</i> sp.	44	1424	25.86	44	1424	25.86	44	1424	25.86
3	<i>Daphne papyracea</i>	76	2144	40.97	76	2144	40.97	76	2144	40.97
4	<i>Eleagnus parviflora</i>	12	192	4.75	12	192	4.75	12	192	4.75
5	<i>Elsholtzia</i> sp.	16	128	4.83	16	128	4.83	16	128	4.83
6	<i>Girardinia diversiflora</i>	36	624	14.82	36	624	14.82	36	624	14.82
7	<i>Hypericum choisianum</i>	24	272	8.19	24	272	8.19	24	272	8.19
8	<i>Ilex dipyrena</i>	48	544	16.38	48	544	16.38	48	544	16.38
9	<i>Neillia thyrsoiflora</i>	28	384	10.34	28	384	10.34	28	384	10.34
10	<i>Rosa</i> sp.	12	112	3.81	12	112	3.81	12	112	3.81
11	<i>Rubus ellipticus</i>	28	192	8.08	28	192	8.08	28	192	8.08
12	<i>Sarcococca</i> sp.	36	1072	20.07	36	1072	20.07	36	1072	20.07
13	<i>Spirea</i> sp.	52	304	14.40	52	304	14.40	52	304	14.40
14	<i>Zanthoxylum oxyphyllum</i>	28	240	8.65	28	240	8.65	28	240	8.65
Total		480	8528	200	480	8528	200	480	8528	200

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), IVI- Importance value index

Appendix II.3.83: Frequency, density and IVI of herbs in Nykcharong chu barrage site

Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
		Fr.	Dn.	IVI	Fr.	Dn.	IVI	Fr.	Dn.	IVI
1	<i>Ainsliaea</i> sp.	32	10800	7.43	24	8000	3.65	16	3200	4.48
2	<i>Anaphalis margaritacea</i>	68	48400	24.47	60	67600	17.45	24	12400	10.30
3	<i>Aster</i> sp.	28	3600	4.51	20	6400	3.00			
4	<i>Aster trinervius</i>	48	6800	7.95	28	10800	4.52	12	3200	3.73
5	<i>Astilbe rivularis</i>	16	2000	2.56	20	5200	2.79			
6	<i>Calanthe tricarinata</i>				44	36400	10.49			
7	<i>Codonopsis gracilis</i>				16	3600	2.13			
8	<i>Crawfordia speciosa</i>				12	4000	1.83			
9	<i>Cyathula capitata</i>	52	33200	17.41	56	51600	14.28	32	12400	11.79
10	<i>Dipsacus asper</i>	44	12000	9.25	36	18800	6.67			
11	<i>Dracocephalum</i> sp.	24	3200	3.91	24	7200	3.51			
12	<i>Elatostemma sessile</i>	32	24400	12.07	32	23200	7.06	32	16800	13.87
13	<i>Elsholtzia strobilifera</i>	76	28800	18.73				48	34800	25.34
14	<i>Fragaria</i> sp.	64	12000	11.60	44	18800	7.42	56	26800	23.04
15	<i>Galium</i> sp.	72	12000	12.54	32	14800	5.59			
16	<i>Galium rotundifolia</i>							32	8000	9.71
17	<i>Gentiana capitata</i>	24	4400	4.32						
18	<i>Geranium pretense</i>	24	4400	4.32	28	10000	4.38	32	5200	8.38
19	<i>Goldfusia nutans</i>	16	2800	2.83	24	5200	3.16			
20	<i>Nepeta</i> sp.	12	2000	2.09	20	5600	2.86	24	4000	6.33
21	<i>Ophiopogon intermedius</i>	36	5200	6.00	44	9200	5.74	24	4800	6.71
22	<i>Oplisminus compositus</i>	48	37600	18.44	60	60400	16.19	44	39200	26.67
23	<i>Panax bipinnatifidus</i>				32	10000	4.75			

Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
24	<i>Paris polyphylla</i>				24	5600	3.23			
25	<i>Parasenecio quinquelobus</i>				12	3600	1.76			
26	<i>Persicaria runcinata</i>				24	18000	5.40			
27	<i>Phlomis</i> sp.				12	3200	1.69			
28	<i>Pilea umbrosa</i>	32	20800	10.84	32	22000	6.85	32	10000	10.65
29	<i>Pogonotherum</i> sp.	20	3600	3.57	24	5600	3.23			
30	<i>Pogostemon</i> sp.	16	3200	2.97	28	7600	3.96	20	3600	5.41
31	<i>Potentilla cuneata</i>	36	7600	6.81	36	10800	5.27	24	7200	7.85
32	<i>Rumex acetosella</i>				52	50400	13.69			
33	<i>Salvia</i> sp.				20	5600	2.86			
34	<i>Sambucus adnata</i>				44	27600	8.96	36	10000	11.39
35	<i>Senecio cappa</i>	12	1200	1.82	12	3600	1.76			
36	<i>Thalictrum foliosum</i>				28	9200	4.24	28	6400	8.21
37	<i>Urtica dioica</i>	8	1600	1.48	28	11200	4.59			
38	<i>Viola sikkimensis</i>	12	2000	2.09	32	11600	5.03	24	3600	6.15
Total		852	293600	200	1064	572400	200	540	211600	200

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), IVI- Importance value index

Appendix II.3.84: Frequency, density, basal area, and importance value index (IVI) for tree species in Nykcharong chu Power house site

Sl. No.	Name of species	Post-monsoon				Monsoon				Winter			
		Fr.	Dn.	BA	IVI	Fr.	Dn.	BA	IVI	Fr.	Dn.	BA	IVI
1	<i>Acer sikkimensis</i>	10	20	1.79	15.52	10	20	1.79	15.52	10	20	1.79	15.52
2	<i>Alangium alpinum</i>	60	100	1.42	48.76	60	100	1.42	48.76	60	100	1.42	48.76
3	<i>Alnus nepalensis</i>	60	80	4.09	55.61	60	80	4.09	55.61	60	80	4.09	55.61
4	<i>Fraxinus floribunda</i>	10	20	0.49	9.97	10	20	0.49	9.97	10	20	0.49	9.97
5	<i>Leucosceptrum canum</i>	20	30	0.44	15.37	20	30	0.44	15.37	20	30	0.44	15.37
6	<i>Lindera neesiana</i>	40	60	0.34	28.42	40	60	0.34	28.42	40	60	0.34	28.42
7	<i>Quercus lamellosa</i>	50	60	12.04	81.58	50	60	12.04	81.58	50	60	12.04	81.58
8	<i>Quercus semecarpifolia</i>	20	30	1.88	21.48	20	30	1.88	21.48	20	30	1.88	21.48
9	<i>Rhododendron</i> sp.	30	40	0.99	23.30	30	40	0.99	23.30	30	40	0.99	23.30
Total		300	440	23.48	300	300	440	23.48	300	300	440	23.48	300

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), B A- Basal area ($\text{m}^2 \text{ha}^{-1}$), IVI- Importance value index

Appendix II.3.85: Frequency, density and IVI of shrubs in Nykcharong chu Power house site

Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
		Fr.	Dn.	IVI	Fr.	Dn.	IVI	Fr.	Dn.	IVI
1	<i>Artemesia nilagirica</i>	68	1360	28.17	68	1360	28.17	68	1360	28.17
2	<i>Berberis</i> sp.	28	352	9.23	28	352	9.23	28	352	9.23
3	<i>Coraria napalensis</i>	32	432	10.89	32	432	10.89	32	432	10.89
4	<i>Daphne papyracea</i>	64	1872	33.25	64	1872	33.25	64	1872	33.25
5	<i>Elaeagnus parviflora</i>	12	112	3.51	12	112	3.51	12	112	3.51
6	<i>Girardinia diversiflora</i>	44	896	18.41	44	896	18.41	44	896	18.41
7	<i>Hypericum choisianum</i>	16	144	4.62	16	144	4.62	16	144	4.62
8	<i>Ilex dipyrena</i>	32	368	10.16	32	368	10.16	32	368	10.16
9	<i>Neillia thyrsiflora</i>	24	192	6.66	24	192	6.66	24	192	6.66
10	<i>Piptanthus nepalensis</i>	36	512	12.55	36	512	12.55	36	512	12.55
11	<i>Rosa</i> sp.	44	592	14.95	44	592	14.95	44	592	14.95
12	<i>Rubus ellipticus</i>	52	784	18.63	52	784	18.63	52	784	18.63
13	<i>Philadelphus tomentosus</i>	28	256	8.14	28	256	8.14	28	256	8.14
14	<i>Zanthoxylum oxyphyllum</i>	20	192	5.92	20	192	5.92	20	192	5.92
15	<i>Sarcococca</i> sp.	36	720	14.91	36	720	14.91	36	720	14.91
Total		536	8784	200	536	8784	200	536	8784	200

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), IVI- Importance value index

Appendix II.3.86: Frequency, density and IVI of herbs in Nykcharong chu Power house site

Sl.	Name of species	Post-monsoon			Monsoon			Winter		
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No.		Fr.	Dn.	IVI	Fr.	Dn.	IVI	Fr.	Dn.	IVI
1	<i>Ainsliaea</i> sp.	16	3200	3.39	24	10800	5.22	28	8000	10.19
2	<i>Anaphalis margaritacea</i>	44	34000	17.70	56	58800	18.92	36	9200	12.52
3	<i>Arisaema erubescens</i>	24	5200	5.22	24	13200	5.71			
4	<i>Arisaema nepenthoides</i>	32	7600	7.18	28	10800	5.73	16	4400	5.73
5	<i>Aster trinervius</i>	20	3200	3.97	16	6400	3.32			
6	<i>Astilbe rivularis</i>	36	16400	10.68	20	8400	4.23			
7	<i>Cyanoglossum</i> sp.	56	29600	17.98	24	15200	6.11			
8	<i>Cyathula capitata</i>	20	3200	3.97	48	39200	13.98	32	6400	10.17
9	<i>Dicrosocephala</i> sp.	52	17200	13.28	16	6400	3.32			
10	<i>Dipsacus asper</i>	40	24400	13.93	44	16800	8.98	32	8400	11.25
11	<i>Elsholtzia strobilifera</i>							44	34800	27.99
12	<i>Fragaria</i> sp.	36	25200	13.61	32	10000	6.08	40	22400	20.47
13	<i>Galium rotundifolia</i>	32	7600	7.18						
14	<i>Geranium pretense</i>									
15	<i>Imperata cylindrica</i>	28	22800	3.97	40	24000	9.91	28	22400	17.95
16	<i>Galium</i> sp.	16	3200	3.39	36	12400	7.08	20	7200	8.08
17	<i>Nepeta</i> sp.	20	3200	11.65	28	10800	5.73	16	2800	4.87
18	<i>Ophiopogon intermedius</i>	12	2000	2.41	20	6000	3.75	20	4800	6.79
19	<i>Oplisminus compositus</i>	56	52000	25.43	56	64000	19.96	44	18000	18.94
20	<i>Parasenecio quinquelobus</i>				12	4400	2.41			
21	<i>Persicaria runcinata</i>				28	19600	7.50			
22	<i>Phlomis</i> sp.	8	1600	1.69	12	4000	2.33			
23	<i>Plantago major</i>	28	12000	8.06	24	15200	6.11	32	15200	14.91
24	<i>Pogostemon</i> sp.	16	2400	3.12	12	5200	2.57	16	2800	4.87
25	<i>Potentilla cuneata</i>	32	7600	7.18	24	6400	4.34	20	3200	5.93
26	<i>Roscoea alpine</i>				12	3600	2.25			
27	<i>Rumex acetosella</i>				44	46000	14.83			
28	<i>Sambucus adnata</i>	36	12000	9.22	56	59600	19.08	36	12800	14.46
29	<i>Senecio cappa</i>	12	1600	2.28	8	4400	1.90			
30	<i>Thalictrum foliolosum</i>				24	10000	5.06			
31	<i>Viola sikkimensis</i>	16	3600	3.52	16	7600	3.56	16	2800	4.87
Total		688	300800	200	784	499200	200	476	185600	200

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), IVI- Importance value index

Appendix II.3.87: Frequency, density, basal area, and importance value index (IVI) for tree species in Nykcharong chu catchment area

Sl. No.	Name of species	Post-monsoon				Monsoon				Winter			
		Fr.	Dn.	BA	IVI	Fr.	Dn.	BA	IVI	Fr.	Dn.	BA	IVI
1	<i>Acer campbellii</i>	30	40	2.52	21.34	30	40	2.52	21.34	30	40	2.52	21.34
2	<i>Alangium alpinum</i>	60	90	1.12	30.12	60	90	1.12	30.12	60	90	1.12	30.12
3	<i>Alnus nepalensis</i>	50	120	9.37	61.89	50	120	9.37	61.89	50	120	9.37	61.89
4	<i>Betula alnoides</i>	60	80	5.37	43.90	60	80	5.37	43.90	60	80	5.37	43.90
5	<i>Brassaiopsis glomerulata</i>	60	70	1.01	26.81	60	70	1.01	26.81	60	70	1.01	26.81
6	<i>Leucosceptrum canum</i>	30	40	0.64	14.62	30	40	0.64	14.62	30	40	0.64	14.62
7	<i>Lindera neesiana</i>	50	60	0.72	22.14	50	60	0.72	22.14	50	60	0.72	22.14
8	<i>Magnolia campbellii</i>	40	50	1.80	22.39	40	50	1.80	22.39	40	50	1.80	22.39
9	<i>Persea odoratissima</i>	40	60	3.00	28.17	40	60	3.00	28.17	40	60	3.00	28.17
10	<i>Rhododendron arboreum</i>	20	40	0.94	13.51	20	40	0.94	13.51	20	40	0.94	13.51
11	<i>Rhododendron campanulatum</i>	20	40	1.38	15.09	20	40	1.38	15.09	20	40	1.38	15.09
Total		460	690	27.86	300	460	690	27.86	300	460	690	27.86	300.00

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), B A- Basal area ($\text{m}^2 \text{ha}^{-1}$), IVI- Importance value index

Appendix II.3.88: Frequency, density and IVI of shrubs in Nykcharong chu catchment area

Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
		Fr.	Dn.	IVI	Fr.	Dn.	IVI	Fr.	Dn.	IVI
1	<i>Berberis aristata</i>	72	1488	35.99	72	1488	35.99	72	1488	35.99
2	<i>Daphne papyracea</i>	60	1248	30.10	60	1248	30.10	60	1248	30.10
3	<i>Elaeagnus parviflora</i>	24	192	7.66	24	192	7.66	24	192	7.66
4	<i>Girardinia diversifolia</i>	48	1056	24.90	48	1056	24.90	48	1056	24.90
5	<i>Hypericum choisianum</i>	32	224	9.75	32	224	9.75	32	224	9.75
6	<i>Ilex dipyrrena</i>	36	416	13.31	36	416	13.31	36	416	13.31
7	<i>Neillia thyrsoiflora</i>	28	256	9.39	28	256	9.39	28	256	9.39
8	<i>Rosa</i> sp.	32	272	10.44	32	272	10.44	32	272	10.44
9	<i>Rubus ellipticus</i>	44	368	14.27	44	368	14.27	44	368	14.27
10	<i>Philadelphus tomentosus</i>	16	112	4.88	16	112	4.88	16	112	4.88
11	<i>Spirea</i> sp.	28	192	8.48	28	192	8.48	28	192	8.48
12	<i>Zanthoxylum oxyphyllum</i>	28	288	9.85	28	288	9.85	28	288	9.85
13	<i>Sarcococca</i> sp.	40	896	20.98	40	896	20.98	40	896	20.98
Total		488	7008	200	488	7008	200	488	7008	200

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), IVI- Importance value index

Appendix II.3.89: Frequency, density and IVI of herbs in Nykcharong chu catchment area

Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
		Fr.	Dn.	IVI	Fr.	Dn.	IVI	Fr.	Dn.	IVI
1	<i>Ainsliaea</i> sp.	24	3600	4.46	24	14800	6.53	16	4400	4.87
2	<i>Anaphalis margaritacea</i>	48	47200	21.64	32	10400	6.51	20	19600	12.00
3	<i>Arisaema nepenthoides</i>	20	3600	3.91	32	8000	5.94			
4	<i>Aster trinervius</i>				28	8000	5.43	28	6400	7.98
5	<i>Astilbe rivularis</i>	24	4400	4.71	24	6000	4.46			
6	<i>Cyathula capitata</i>	52	29200	16.47	56	52000	19.34	44	13600	14.03
7	<i>Dipsacus asper</i>	44	12400	10.02	52	14800	10.08	56	12000	15.63
8	<i>Dracocephalum</i> sp.	20	3600	3.91	16	6000	3.44			
9	<i>Elatostemma sessile</i>	32	16800	9.76	56	36000	15.57	52	32800	23.58
10	<i>Elsholtzia strobilifera</i>	36	25600	13.11				44	28800	20.39
11	<i>Fragaria</i> sp.	40	22000	12.52				28	23200	15.02
12	<i>Galium</i> sp.				20	10400	4.98			
13	<i>Geranium pretense</i>	20	3600	3.91	36	14000	7.86			
14	<i>Nepeta</i> sp.	28	4400	5.27	20	6000	3.95	20	2000	4.63
15	<i>Ophiopogon intermedius</i>	24	5200	4.97	36	10400	7.01	16	3200	4.37
16	<i>Oplismenus compositus</i>	28	25600	12.01	52	59200	20.52	48	41600	26.51
17	<i>Panax bipinnatifidus</i>				24	9600	5.30			
18	<i>Panicum</i> sp.				16	6000	3.44			
19	<i>Parasenecio quinquelobus</i>				12	4000	2.46			
20	<i>Persicaria runcinata</i>				32	23600	9.61			
21	<i>Phlomis</i> sp.	48	8000	9.17	20	6000	3.95			
22	<i>Pilea umbrosa</i>	56	48000	23.00	36	32400	12.19	36	23200	16.53
23	<i>Pogostemon</i> sp.	20	8000	5.31	12	3200	2.28	16	3200	4.37
24	<i>Potentilla cuneata</i>	28	3600	5.01	12	4000	2.46	36	6400	9.50
25	<i>Sambucus adnata</i>	48	12400	10.57	52	36800	15.25	32	8800	9.75
26	<i>Senecio cappa</i>	16	1600	2.72	20	4400	3.57			
27	<i>Trifolium repens</i>	24	21200	10.06	20	22800	7.90			
28	<i>Urtica dioica</i>	16	2000	2.85	28	10400	6.00	24	6400	7.23
29	<i>Viola sikkimensis</i>	28	2400	4.63	20	6000	3.95	12	3200	3.61
Total		724	314400	200.00	788	425200	200.00	528	238800	200.00

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), IVI- Importance value index

Appendix II.3.90: Dominant and Co-dominant species determined on the basis of IVI/density values of species in the plant communities at Nykcharong chu site

Community components	Barrage	Powerhouse	Catchment area
Tree species*			

Community components	Barrage	Powerhouse	Catchment area
Dominant	<i>Alnus nepalensis</i>	<i>Quercus lamellosa</i>	<i>Alnus nepalensis</i>
Co-Dominant	<i>Alangium alpinum</i>	<i>Alnus nepalensis</i>	<i>Betula alnoides</i>
Shrub species*			
Dominant	<i>Daphnae papyracea</i>	<i>Daphnae papyracea</i>	<i>Berberis aristata</i>
Co-Dominant	<i>Berberis sp.</i>	<i>Artemesia nilagirica</i>	<i>Daphnae papyracea</i>
Herb species**			
i. Post-monsoon season			
Dominant	<i>Anaphalis margaritacea</i>	<i>Cyathula capitata</i>	<i>Pilea umbrosa</i>
Co-Dominant	<i>Elsholtzia strobilifera</i>	<i>Oplismenus compositus</i>	<i>Anaphalis margaritacea</i>
ii. Monsoon season			
Dominant	<i>Anaphalis margaritacea</i>	<i>Oplismenus compositus</i>	<i>Oplismenus compositus</i>
Co-Dominant	<i>Oplismenus compositus</i>	<i>Sambucus adnata</i>	<i>Elatostemma sessile</i>
iii. Winter			
Dominant	<i>Oplismenus compositus</i>	<i>Elsholtzia strobilifera</i>	<i>Oplismenus compositus</i>
Co-Dominant	<i>Elsholtzia strobilifera</i>	<i>Fragaria sp.</i>	<i>Elatostemma sessile</i>

* Dominance based on IVI; ** Dominance based on density

Appendix II.3.91: List of plant species recorded from Rho HEP sites

Sl. No.	Species name	Family
TREES		
1	<i>Acer campbellii</i>	Aceraceae
2	<i>Acer sikkimensis</i>	Aceraceae
3	<i>Alangium alpinum</i>	Alangiaceae
4	<i>Alnus nepalensis</i>	Betulaceae
5	<i>Brassaiopsis glomerulata</i>	Araliaceae
6	<i>Euvodia fraxinifolia</i>	Rutaceae
7	<i>Lindera neesiana</i>	Lauraceae
8	<i>Magnolia campbellii</i>	Magnoliaceae
9	<i>Photinia integrifolia</i>	Rosaceae
10	<i>Pinus wallichiana</i>	Pinaceae
11	<i>Populus ciliata</i>	Salicaceae
12	<i>Quercus griffithii</i>	Fagaceae
13	<i>Quercus lamellosa</i>	Fagaceae
14	<i>Quercus serrata</i>	Fagaceae
15	<i>Rhododendron arboreum</i>	Ericaceae
16	<i>Rhus chinensis</i>	Anacardiaceae
17	<i>Schima wallichii</i>	Theaceae
18	<i>Torreliella tiliifolia</i>	Torreliaceae
SHRUBS		
19	<i>Artemesia nilagirica</i>	Asteraceae
20	<i>Arundinaria maling</i>	Poaceae
21	<i>Berberis aristata</i>	Berberidaceae
22	<i>Boenninghausenia albiflora</i>	Rutaceae
23	<i>Coraria napalensis</i>	Coriariaceae
24	<i>Daphne papyracea</i>	Thymelaeaceae
25	<i>Elaeagnus parviflora</i>	Elaeagnaceae
26	<i>Euphorbia sikkimensis</i>	Euphorbiaceae
27	<i>Girardinia diversifolia</i>	Urticaceae
28	<i>Hypericum choisianum</i>	Hypericaceae
29	<i>Neillia thyrsoflora</i>	Rosaceae
30	<i>Piptanthus nepalensis</i>	Papilionaceae
31	<i>Rosa sp.</i>	Rosaceae
32	<i>Rubus ellipticus</i>	Rosaceae
33	<i>Sarcococca sp</i>	Buxaceae

Appendices

Sl. No.	Species name	Family
34	<i>Viburnum foetidum</i>	Adoxaceae
HERBS		
35	<i>Achyranthes aspera</i>	Amaranthaceae
36	<i>Ainsliaea</i> sp	Asteraceae
37	<i>Anaphalis margaritacea</i>	Asteraceae
38	<i>Arisaema erubescens</i>	Araceae
39	<i>Arisaema nepenthoides</i>	Araceae
40	<i>Aster</i> sp	Asteraceae
41	<i>Aster trinervius</i>	Asteraceae
42	<i>Astilbe rivularis</i>	Saxifragaceae
43	<i>Bergenia ciliata</i>	Saxifragaceae
44	<i>Cirsium falconeri</i>	Asteraceae
45	<i>Cyanoglossum</i> sp	Boraginaceae
46	<i>Cyathula capitata</i>	Amaranthaceae
47	<i>Didymocarpus</i> sp	Gesneriaceae
48	<i>Dracocephalum</i> sp	Lamiaceae
49	<i>Drymaria cordata</i>	Caryophyllaceae
50	<i>Elsholtzia strobilifera</i>	Lamiaceae
51	<i>Eupatorium adenophorum</i>	Asteraceae
52	<i>Euphorbia sikkimensis</i>	Euphorbiaceae
53	<i>Fragaria</i> sp	Rosaceae
54	<i>Galeola lindleyana</i>	Orchidaceae
55	<i>Galinsoga parviflora</i>	Asteraceae
56	<i>Galium asperifolium</i>	Rubiaceae
57	<i>Galium</i> sp	Rubiaceae
58	<i>Geranium pretense</i>	Geraniaceae
59	<i>Gonatanthus pumilus</i>	Araceae
60	<i>Herpetospermum pendulosum</i>	Cucurbitaceae
61	<i>Hypoestes roxburghii</i>	Acanthaceae
62	<i>Imperata cylindrica</i>	Poaceae
63	<i>Iris lactea</i>	Iridaceae
64	<i>Nepeta</i> sp	Lamiaceae
65	<i>Ophiopogon intermedius</i>	Liliaceae
66	<i>Oplismenus compositus</i>	Poaceae
67	<i>Oplismenus</i> sp	Poaceae
68	<i>Oxalis corniculata</i>	Oxalidaceae
69	<i>Paspallum</i> sp	Poaceae
70	<i>Persicaria runcinata</i>	Polygonaceae
71	<i>Phlomis</i> sp	Lamiaceae
72	<i>Pilea umbrosa</i>	Urticaceae
73	<i>Plantago major</i>	Plantaginaceae
74	<i>Pleione praecox</i>	Orchidaceae
75	<i>Pogostemon</i> sp	Lamiaceae
76	<i>Polygonum capitata</i>	Polygonaceae
77	<i>Potentilla cuneata</i>	Rosaceae
78	<i>Rumex acetosella</i>	Polygonaceae
79	<i>Sambucus adnata</i>	Adoxaceae
80	<i>Senecio cappa</i>	Asteraceae
81	<i>Urtica dioica</i>	Urticaceae
82	<i>Valeriana hardwickii</i>	Caprifoliaceae
83	<i>Viola sikkimensis</i>	Violaceae
CLIMBERS		
84	<i>Celastrus paniculata</i>	Celastraceae
85	<i>Cissampelos</i> sp	Menispermaceae
86	<i>Clematis</i> sp	Ranunculaceae
	<i>Dioscorea</i> sp	Dioscoreaceae
87	<i>Ficus</i> sp	Moraceae

Appendices

Sl. No.	Species name	Family
88	<i>Hedera helix</i>	Araliaceae
89	<i>Hedera nepalensis</i>	Araliaceae
90	<i>Herpetospermum pedunculatum</i>	Cucurbitaceae
91	<i>Holboellia latifolia</i>	Lardizabalaceae
92	<i>Periploca</i> sp.	Periplocaceae
93	<i>Philadelphus tomentosus</i>	Hydrangeaceae
94	<i>Rubia cordifolia</i>	Rubiaceae
95	<i>Scziophgma</i> sp	Hydrangeaceae
96	<i>Smilax</i> sp	Smilacaceae
97	<i>Stephania glandulifera</i>	Menispermaceae
98	<i>Thladiantha cordifolia</i>	Cucurbitaceae
ORCHIDS		
99	<i>Bulbophyllum</i> sp	Orchidaceae
100	<i>Calanthe tricarinata</i>	Orchidaceae
101	<i>Coelogynae</i> sp.	Orchidaceae
102	<i>Cymbidium grandiflorum</i>	Orchidaceae
103	<i>Cymbidium</i> sp	Orchidaceae
104	<i>Dendrobium</i> sp.	Orchidaceae
105	<i>Galeola lindleyana</i>	Orchidaceae
106	<i>Oberonia</i> sp	Orchidaceae
107	<i>Pleione praecox</i>	Orchidaceae
108	<i>Vanda</i> sp	Orchidaceae
PTERIDOPHYTES		
109	<i>Athyrium</i> sp	Athyraceae
110	<i>Adiantum</i> sp	Adiantaceae
111	<i>Dicranopteris linearis</i>	Dicranopteridaceae
112	<i>Dynaria quercifolia</i>	Drynariaceae
113	<i>Dryopteris wallichiana</i>	Dryopteridaceae
114	<i>Lepisorus</i> sp.	Polypodiaceae
115	<i>Polypodium</i> sp.	Polypodiaceae
116	<i>Pteridium aquilinum</i>	Pteridaceae
117	<i>Pteris</i> sp.	Pteridiaceae
118	<i>Pteris vittata</i>	Pteridaceae
119	<i>Pyrrosia nuda</i>	Polypodiaceae
120	<i>Selaginella</i> sp.	Selaginellaceae
121	<i>Vittaria elongata</i>	Vittariaceae
BRYOPHYTES		
122	<i>Aerobryum</i> sp	Meteoriaceae
123	<i>Desmotecha</i> sp	Orthotrichaceae
124	<i>Diphyscium</i> sp	Buxbaumiacae
125	<i>Funaria</i> sp	Funariaceae
126	<i>Lyellia</i> sp	Polytrichaceae
127	<i>Marchantia</i> sp	Marchantiaceae
128	<i>Plagiobryum</i> sp	Bryaceae
LICHENS		
129	<i>Alectoria</i> sp	Alectoriaceae
130	<i>Cladonia</i> sp.	Cladoniaceae
131	<i>Graphis</i> sp.	Graphidaceae
132	<i>Lobaria</i> sp	Lobariaceae
133	<i>Parmelia</i> sp	Parmeliaceae
134	<i>Parmotrema</i> sp	Parmeliaceae
135	<i>Pseudocyphellaria</i> sp	Lobariaceae
136	<i>Stereocaulon</i> sp	Stereocaulaceae
137	<i>Sticta</i> sp	Lobariaceae
138	<i>Teloschistes</i> sp	Teloschistaceae
FUNGI		
139	<i>Boletus reticulatus</i>	Boletaceae

Sl. No.	Species name	Family
140	<i>Clathrus rubra</i>	Phallaceae
141	<i>Coprinus disseminatus</i>	Agaricaceae
142	<i>Daldinia concentrica</i>	Xylariaceae
143	<i>Fomes pinicola</i>	Fomitopsidaceae
144	<i>Gloeophyllum sepiarium</i>	Gloeophyllaceae
145	<i>Hericium erinaceus</i>	Hericiaceae
146	<i>Hydnum repandum</i>	Hydnaceae
147	<i>Laccaria laccata</i>	Hydnangiaceae
148	<i>Lactarius rubidus</i>	Russulaceae
149	<i>Polyporus arcularius</i>	Polyporaceae
150	<i>Poria monticola</i>	Polyporaceae
151	<i>Pycnoporellus fibrillosus</i>	Formitopscidaceae
152	<i>Schizophyllum commune</i>	Schizophyllaceae
153	<i>Strobilomyces strobilaceus</i>	Boletaceae
154	<i>Tremella mesenterica</i>	Tremellaceae
155	<i>Xylaria polymorpha</i>	Xylariaceae

Appendix II.3.92: Different groups of plant species present at Rho HEP site

Sl. No.	Species name	Family	Sl. No.	Species name	Family
Barrage and Powerhouse			Catchment area		
CLIMBERS			CLIMBERS		
1	<i>Celastrus paniculata</i>	Celastraceae	1	<i>Celastrus paniculata</i>	Celastraceae
2	<i>Cissampelos</i> sp	Menispermaceae	2	<i>Clematis</i> sp	Ranunculaceae
3	<i>Clematis</i> sp	Ranunculaceae	3	<i>Ficus</i> sp	Moraceae
4	<i>Dioscorea</i> sp	Dioscoreaceae	4	<i>Hedera helix</i>	Araliaceae
5	<i>Ficus</i> sp	Moraceae	5	<i>Hedera nepalensis</i>	Araliaceae
6	<i>Hedera helix</i>	Araliaceae	6	<i>Herpetospermum pedunculatum</i>	Cucurbitaceae
7	<i>Hedera nepalensis</i>	Araliaceae	7	<i>Holboellia latifolia</i>	Lardizabalaceae
8	<i>Herpetospermum pedunculatum</i>	Cucurbitaceae	8	<i>Periploca</i> sp.	Periplocaceae
9	<i>Holboellia latifolia</i>	Lardizabalaceae	9	<i>Philadelphus tomentosus</i>	Hydrangeaceae
10	<i>Periploca</i> sp.	Periplocaceae	10	<i>Rubia cordifolia</i>	Rubiaceae
11	<i>Philadelphus tomentosus</i>	Hydrangeaceae	11	<i>Smilax</i> sp	Smilacaceae
12	<i>Rubia cordifolia</i>	Rubiaceae	12	<i>Stephania glandulifera</i>	Menispermaceae
13	<i>Scziophgma</i> sp	Hydrangeaceae	13	<i>Thladiantha cordifolia</i>	Cucurbitaceae
14	<i>Smilax</i> sp	Smilacaceae	ORCHIDS		
15	<i>Stephania glandulifera</i>	Menispermaceae	1	<i>Bulbophyllum</i> sp	Orchidaceae
16	<i>Thladiantha cordifolia</i>	Cucurbitaceae	2	<i>Calanthe tricarinata</i>	Orchidaceae
ORCHIDS			3	<i>Coelogynae</i> sp.	Orchidaceae
1	<i>Bulbophyllum</i> sp	Orchidaceae	4	<i>Cymbidium grandiflorum</i>	Orchidaceae
2	<i>Calanthe tricarinata</i>	Orchidaceae	5	<i>Cymbidium</i> sp	Orchidaceae
3	<i>Coelogynae</i> sp.	Orchidaceae	6	<i>Galeola lindleyana</i>	Orchidaceae
4	<i>Cymbidium grandiflorum</i>	Orchidaceae	7	<i>Oberonia</i> sp	Orchidaceae
5	<i>Cymbidium</i> sp	Orchidaceae	8	<i>Pleione praecox</i>	Orchidaceae
6	<i>Dendrobium</i> sp.	Orchidaceae	PTERIDOPHYTES		
7	<i>Galeola lindleyana</i>	Orchidaceae	1	<i>Athyrium</i> sp	Athyraceae
8	<i>Oberonia</i> sp	Orchidaceae	2	<i>Adiantum</i> sp	Adiantaceae
9	<i>Pleione praecox</i>	Orchidaceae	3	<i>Dicranopteris linearis</i>	Dicranopteridaceae
10	<i>Vanda</i> sp	Orchidaceae	4	<i>Dynaria quercifolia</i>	Drynariaceae
PTERIDOPHYTES			5	<i>Dryopteris wallichiana</i>	Dryopteridaceae
1	<i>Athyrium</i> sp	Athyraceae	6	<i>Polypodium</i> sp.	Polypodiaceae
2	<i>Adiantum</i> sp	Adiantaceae	7	<i>Pteridium aquilinum</i>	Pteridaceae
3	<i>Dicranopteris linearis</i>	Dicranopteridaceae	8	<i>Pteris</i> sp.	Pteridiaceae
4	<i>Dynaria quercifolia</i>	Drynariaceae	9	<i>Selaginella</i> sp.	Selaginellaceae
5	<i>Dryopteris wallichiana</i>	Dryopteridaceae	10	<i>Vittaria elongata</i>	Vittariaceae
6	<i>Lepisorus</i> sp.	Polypodiaceae	BRYOPHYTES		

Sl. No.	Species name	Family	Sl. No.	Species name	Family
	Barrage and Powerhouse			Catchment area	
7	<i>Polypodium</i> sp.	Polypodiaceae	1	<i>Aerobryum</i> sp	Meteoriaceae
8	<i>Pteridium aquilinum</i>	Pteridaceae	2	<i>Desmotheca</i> sp	Orthotrichaceae
9	<i>Pteris</i> sp.	Pteridiaceae	3	<i>Diphyscium</i> sp	Buxbaumiaceae
10	<i>Pteris vittata</i>	Pteridaceae	4	<i>Marchantia</i> sp	Marchantiaceae
11	<i>Pyrrosia nuda</i>	Polypodiaceae	5	<i>Plagiobryum</i> sp	Bryaceae
12	<i>Selaginella</i> sp.	Selaginellaceae		LICHENS	
13	<i>Vittaria elongata</i>	Vittariaceae	1	<i>Alectoria</i> sp	Alectoriaceae
	BRYOPHYTES		2	<i>Lobaria</i> sp	Lobariaceae
1	<i>Aerobryum</i> sp	Meteoriaceae	3	<i>Pseudocyphellaria</i> sp	Lobariaceae
2	<i>Desmotheca</i> sp	Orthotrichaceae	4	<i>Stereocaulon</i> sp	Stereocaulaceae
3	<i>Diphyscium</i> sp	Buxbaumiaceae	5	<i>Sticta</i> sp	Lobariaceae
4	<i>Funaria</i> sp	Funariaceae	6	<i>Teloschistes</i> sp	Teloschistaceae
5	<i>Lyellia</i> sp	Polytrichaceae	7	<i>Parmelia</i> sp	Parmeliaceae
6	<i>Marchantia</i> sp	Marchantiaceae	8	<i>Parmotrema</i> sp	Parmeliaceae
7	<i>Plagiobryum</i> sp	Bryaceae			
	LICHENS				
1	<i>Alectoria</i> sp	Alectoriaceae			
2	<i>Cladonia</i> sp.	Cladoniaceae			
3	<i>Graphis</i> sp.	Graphidaceae			
4	<i>Lobaria</i> sp	Lobariaceae			
5	<i>Parmelia</i> sp	Parmeliaceae			
6	<i>Parmotrema</i> sp	Parmeliaceae			
7	<i>Pseudocyphellaria</i> sp	Lobariaceae			
8	<i>Stereocaulon</i> sp	Stereocaulaceae			
9	<i>Sticta</i> sp	Lobariaceae			
10	<i>Teloschistes</i> sp	Teloschistaceae			

Appendix II.3.93: Species list of macro-fungi recorded from barrage and powerhouse sites of Rho

Species	Family	Species	Family
Barrage		Powerhouse	
<i>Boletus reticulatus</i>	Boletaceae	<i>Boletus reticulatus</i>	Boletaceae
<i>Clathrus rubra</i>	Phallaceae	<i>Clathrus rubra</i>	Phallaceae
<i>Coprinus disseminatus</i>	Agaricaceae	<i>Coprinus disseminatus</i>	Agaricaceae
<i>Daldinia concentrica</i>	Xylariaceae	<i>Daldinia concentrica</i>	Xylariaceae
<i>Fomes pinicola</i>	Fomitopsidaceae	<i>Gloeophyllum sepiarium</i>	Gloeophyllaceae
<i>Gloeophyllum sepiarium</i>	Gloeophyllaceae	<i>Hericium erinaceus</i>	Hericiaceae
<i>Hericium erinaceus</i>	Hericiaceae	<i>Hydnum repandum</i>	Hydnaceae
<i>Hydnum repandum</i>	Hydnaceae	<i>Lactarius rubidus</i>	Russulaceae
<i>Laccaria laccata</i>	Hydnangiaceae	<i>Polyporus arcularius</i>	Polyporaceae
<i>Lactarius rubidus</i>	Russulaceae	<i>Poria monticola</i>	Polyporaceae
<i>Polyporus arcularius</i>	Polyporaceae	<i>Schizophyllum commune</i>	Schizophyllaceae
<i>Poria monticola</i>	Polyporaceae	<i>Strobilomyces strobilaceus</i>	Boletaceae
<i>Pycnoporellus fibrillosus</i>	Fomitopsidaceae	<i>Tremella mesenterica</i>	Tremellaceae
<i>Schizophyllum commune</i>	Schizophyllaceae	<i>Xylaria polymorpha</i>	Xylariaceae
<i>Strobilomyces strobilaceus</i>	Boletaceae		
<i>Tremella mesenterica</i>	Tremellaceae		
<i>Xylaria polymorpha</i>	Xylariaceae		
Catchment area			
Species	Family		
<i>Boletus reticulatus</i>	Boletaceae		
<i>Clathrus rubra</i>	Phallaceae		
<i>Coprinus disseminatus</i>	Agaricaceae		
<i>Daldinia concentrica</i>	Xylariaceae		
<i>Fomes pinicola</i>	Fomitopsidaceae		
<i>Hericium erinaceus</i>	Hericiaceae		

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Species	Family	Species	Family
<i>Hydnum repandum</i>	Hydnaceae		
<i>Laccaria laccata</i>	Hydnangiaceae		
<i>Lactarius rubidus</i>	Russulaceae		
<i>Polyporus arcularius</i>	Polyporaceae		
<i>Poria monticola</i>	Polyporaceae		
<i>Pycnoporellus fibrillosus</i>	Formitopscidaceae		
<i>Schizophyllum commune</i>	Schizophyllaceae		
<i>Tremella mesenterica</i>	Tremellaceae		
<i>Xylaria polymorpha</i>	Xylariaceae		

Appendix II.3.94: Frequency, density, basal area and importance value index (IVI) for tree species in Rho barrage site

Sl. No.	Name of species	Post-monsoon				Monsoon				Winter			
		Fr.	Dn.	BA	IVI	Fr.	Dn.	BA	IVI	Fr.	Dn.	BA	IVI
1	<i>Acer sikkimensis</i>	20	20	0.84	11.10	20	20	0.84	11.10	20	20	0.84	11.10
2	<i>Alangium alpinum</i>	30	40	0.30	15.36	30	40	0.30	15.36	30	40	0.30	15.36
3	<i>Alnus nepalensis</i>	70	150	5.96	61.15	70	150	5.96	61.15	70	150	5.96	61.15
4	<i>Brassaiopsis glomerulata</i>	20	30	0.28	11.04	20	30	0.28	11.04	20	30	0.28	11.04
5	<i>Euvodia fraxinifolia</i>	10	10	0.23	4.98	10	10	0.23	4.98	10	10	0.23	4.98
6	<i>Quercus lamellosa</i>	60	100	15.69	79.96	60	100	15.69	79.96	60	100	15.69	79.96
7	<i>Rhododendron arboreum</i>	20	40	1.00	14.85	20	40	1.00	14.85	20	40	1.00	14.85
8	<i>Rhus chinensis</i>	40	50	1.05	21.92	40	50	1.05	21.92	40	50	1.05	21.92
9	<i>Schima wallichii</i>	40	60	5.41	36.83	40	60	5.41	36.83	40	60	5.41	36.83
10	<i>Acer sikkimensis</i>	10	20	1.06	9.13	10	20	1.06	9.13	10	20	1.06	9.13
11	<i>Lindera neesiana</i>	20	40	0.30	12.73	20	40	0.30	12.73	20	40	0.30	12.73
12	<i>Photinia integrifolia</i>	40	50	0.73	20.96	40	50	0.73	20.96	40	50	0.73	20.96
Total		380	610	32.84	300	380	610	32.84	300	380	610	32.84	300

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), B A- Basal area ($\text{m}^2 \text{ha}^{-1}$), IVI- Importance value index

Appendix II.3.95: Frequency, density and IVI of shrubs in Rho barrage site

Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
		Fr.	Dn.	IVI	Fr.	Dn.	IVI	Fr.	Dn.	IVI
1	<i>Artemesia nilagirica</i>	60	1424	29.33	60	1424	29.33	60	1424	29.33
2	<i>Arundinaria manii</i>	32	592	13.68	32	592	13.68	32	592	13.68
3	<i>Berberis aristata</i>	48	432	15.16	48	432	15.16	48	432	15.16
4	<i>Coriaria napalensis</i>	52	896	21.45	52	896	21.45	52	896	21.45
5	<i>Daphne papyracea</i>	48	1504	27.75	48	1504	27.75	48	1504	27.75
6	<i>Elaeagnus parviflora</i>	24	192	7.30	24	192	7.30	24	192	7.30
7	<i>Girardinia diversifolia</i>	32	912	17.44	32	912	17.44	32	912	17.44
8	<i>Hypericum choisianum</i>	16	144	5.05	16	144	5.05	16	144	5.05
9	<i>Neillia thyrsiflora</i>	24	256	8.05	24	256	8.05	24	256	8.05
10	<i>Piptanthus nepalensis</i>	36	512	13.58	36	512	13.58	36	512	13.58
11	<i>Rosa</i> sp.	28	368	10.21	28	368	10.21	28	368	10.21
12	<i>Rubus ellipticus</i>	40	432	13.48	40	432	13.48	40	432	13.48
13	<i>Sarcococca</i>	28	816	15.47	28	816	15.47	28	816	15.47
14	<i>Viburnum foetidum</i>	8	32	2.06	8	32	2.06	8	32	2.06
Total		476	8512	200	476	8512	200	476	8512	200

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), IVI- Importance value index

Appendix II.3.96: Frequency, density and IVI of herbs in Rho barrage site

Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
		Fr.	Dn.	IVI	Fr.	Dn.	IVI	Fr.	Dn.	IVI
1	<i>Achyranthes aspera</i>	20	3600	3.68	28	9200	3.84			
2	<i>Ainsliaea</i> sp.	44	10800	9.07	44	18000	6.70	16	4400	5.38
3	<i>Anaphalis margaritacea</i>	32	6800	6.24	52	26800	8.96			
4	<i>Arisaema erubescens</i>				32	12400	4.75			
5	<i>Arisaema nepenthoides</i>	24	6000	4.99	32	6800	3.69			

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Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
6	<i>Aster</i> sp.				44	13200	5.80			
7	<i>Aster trinervius</i>	20	3200	3.54	32	7600	3.84			
8	<i>Astilbe rivularis</i>	44	7200	7.84	56	8400	5.81			
9	<i>Berginia ciliata</i>				16	2800	1.73			
10	<i>Cirsium falconeri</i>				16	2800	1.73			
11	<i>Cyanoglossum</i> sp.				44	17200	6.55	16	3600	5.03
12	<i>Cyathula capitata</i>	12	2400	2.29	32	12800	4.82	24	8400	8.86
13	<i>Didymocarpus</i> sp.				16	2400	1.66			
14	<i>Dracocephalum</i> sp.	56	15200	12.05	12	2800	1.43			
15	<i>Drymaria cordata</i>	48	28800	15.74	40	35600	9.71	28	13200	11.83
16	<i>Elsholtzia strobilifera</i>	52	24400	14.72				36	25600	19.01
17	<i>Eupatorium adenophorum</i>	12	2400	2.29	32	5600	3.47			
18	<i>Euphorbia sikkemensis</i>				16	2800	1.73			
19	<i>Fragaria</i> sp.	52	24400	14.72	36	7600	4.15	24	12400	10.62
20	<i>Galeola lindleyana</i>				16	2800	1.73			
21	<i>Galinsoga parviflora</i>	48	10800	9.56	44	22000	7.46	28	16000	13.06
22	<i>Galium</i> sp.	16	2800	2.91	32	12800	4.82	12	5600	5.05
23	<i>Geranium pretense</i>	40	10400	8.45	24	6000	2.94	16	5200	5.73
24	<i>Gonatanthus pumilus</i>				16	3200	1.81			
25	<i>Herpetospermum pendulosum</i>				12	2800	1.43			
26	<i>Hypoestes roxburghii</i>	32	11200	7.75	28	12000	4.37			
27	<i>Imperata cylindrica</i>	28	15200	8.63	28	21600	6.17	24	24800	16.07
28	<i>Iris lactea</i>				24	4800	2.71			
29	<i>Oplisminus compositus</i>	44	28800	15.26				28	34400	21.15
30	<i>Nepeta</i> sp.	16	2400	2.78	16	2800	1.73			
31	<i>Ophiopogon intermedius</i>				32	7200	3.77			
32	<i>Oxalis corniculata</i>	4	800	0.76				20	8000	7.83
33	<i>Oplisminus</i> sp.				56	53200	14.22			
34	<i>Paspallum</i> sp.	28	20000	10.28	32	17200	5.65	24	17200	12.73
35	<i>Persicaria runcinata</i>				32	18000	5.80	20	8000	7.83
36	<i>Phlomis</i> sp.	4	800	0.76	12	2800	1.43			
37	<i>Pilea umbrosa</i>				32	30800	8.20			
38	<i>Plantago major</i>	44	24400	13.74	56	34800	10.77	32	11600	11.99
39	<i>Pleione praecox</i>				12	2800	1.43			
40	<i>Pogostemon</i> sp.	4	400	0.63	20	3600	2.19	20	4000	6.07
41	<i>Polygonum capitata</i>	24	6800	5.26	36	17600	6.02	28	5200	8.32
42	<i>Potentilla cuneata</i>	20	3200	3.54	36	6800	4.00	32	12400	12.34
43	<i>Rumex acetosella</i>	36	15600	9.75	48	26800	8.66			
44	<i>Sambucus adnata</i>	4	400	0.63						
45	<i>Senecio cappa</i>				20	3600	2.19			
46	<i>Urtica dioica</i>	12	2000	2.15	36	9200	4.45	24	5200	7.46
47	<i>Valeriana hardwickii</i>				16	5200	2.19			
48	<i>Viola sikkimensis</i>				28	7200	3.47	12	2400	3.64
Total		820	291200	200	1324	532400	200	464	227600	200

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), IVI- Importance value index

Appendix II.3.97: Frequency, density, basal area, and importance value index (IVI) for tree species in Rho Power house site

Sl. No.	Name of species	Post-monsoon				Monsoon				Winter			
		Fr.	Dn.	BA	IVI	Fr.	Dn.	BA	IVI	Fr.	Dn.	BA	IVI
1	<i>Alnus nepalensis</i>	80	180	6.98	92.33	80	180	6.98	92.33	80	180	6.98	92.33
2	<i>Brassaiopsis glomerulata</i>	20	20	0.31	10.90	20	20	0.31	10.90	20	20	0.31	10.90
3	<i>Photinia integrifolia</i>	40	60	0.89	26.80	40	60	0.89	26.80	40	60	0.89	26.80
4	<i>Quercus serrata</i>	20	30	0.84	15.53	20	30	0.84	15.53	20	30	0.84	15.53
5	<i>Rhododendron arboreum</i>	40	70	1.41	31.35	40	70	1.41	31.35	40	70	1.41	31.35
6	<i>Rhus chinensis</i>	20	40	0.92	17.73	20	40	0.92	17.73	20	40	0.92	17.73
7	<i>Schima wallichii</i>	30	40	2.46	28.95	30	40	2.46	28.95	30	40	2.46	28.95

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Sl.	Name of species	Post-monsoon				Monsoon				Winter			
8	<i>Torricellia tiliifolia</i>	30	50	1.27	24.23	30	50	1.27	24.23	30	50	1.27	24.23
9	<i>Quercus griffithi</i>	70	80	3.34	52.18	70	80	3.34	52.18	70	80	3.34	52.18
Total		350	570	18.41	300	350	570	18.41	300	350	570	18.41	300

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), B A- Basal area ($\text{m}^2 \text{ha}^{-1}$), IVI- Importance value index

Appendix II.3.98: Frequency, density and IVI of shrubs in Rho Power house site

Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
		Fr.	Dn.	IVI	Fr.	Dn.	IVI	Fr.	Dn.	IVI
1	<i>Artemesia nilagirica</i>	64	2544	45.16	64	2544	45.16	64	2544	45.16
2	<i>Arundinaria manii</i>	28	544	12.85	28	544	12.85	28	544	12.85
3	<i>Berberis aristata</i>	16	272	6.87	16	272	6.87	16	272	6.87
4	<i>Coriaria nepalensis</i>	28	1072	19.26	28	1072	19.26	28	1072	19.26
5	<i>Daphne papyracea</i>	28	544	12.85	28	544	12.85	28	544	12.85
6	<i>Elaeagnus parviflora</i>	36	208	10.56	36	208	10.56	36	208	10.56
7	<i>Girardinia diversifolia</i>	28	512	12.46	28	512	12.46	28	512	12.46
8	<i>Neillia thyrsoiflora</i>	16	144	5.32	16	144	5.32	16	144	5.32
9	<i>Piptanthus nepalensis</i>	44	368	14.29	44	368	14.29	44	368	14.29
10	<i>Rosa</i> sp.	24	272	8.66	24	272	8.66	24	272	8.66
11	<i>Rubus ellipticus</i>	44	720	18.56	44	720	18.56	44	720	18.56
12	<i>Sarcococca</i>	36	656	16.00	36	656	16.00	36	656	16.00
13	<i>Viburnum foetidum</i>	32	176	9.28	32	176	9.28	32	176	9.28
14	<i>Boenninghausenia albiflora</i>	24	208	7.88	24	208	7.88	24	208	7.88
Total		448	8240	200	448	8240	200	448	8240	200

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), IVI- Importance value index

Appendix II.3.99: Frequency, density and IVI of herbs in Rho Power house site

Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
		Fr.	Dn.	IVI	Fr.	Dn.	IVI	Fr.	Dn.	IVI
1	<i>Achyranthes aspera</i>	8	1200	1.56	24	5600	3.31	16	2800	4.32
2	<i>Ainsliaea</i> sp.	20	6800	5.23	28	11200	4.87	16	3200	4.50
3	<i>Anaphalis margaritacea</i>	28	4400	5.53	48	23600	9.30			
4	<i>Arisaema erubescens</i>				16	5200	2.52			
5	<i>Arisaema nepenthoides</i>				20	6400	3.13			
6	<i>Aster</i> sp.	16	2800	3.26	32	8800	4.70			
7	<i>Aster trinervius</i>				36	11600	5.66			
8	<i>Astilbe rivularis</i>	4	800	0.85	28	11200	4.87			
9	<i>Cyanoglossum</i> sp.				44	22000	8.61	28	8400	9.15
10	<i>Cyathula capitata</i>				48	15200	7.49	32	8400	9.91
11	<i>Dracocephalum</i> sp.				20	3600	2.53			
12	<i>Drymaria cordata</i>	28	19200	10.69	44	26000	9.47	24	16800	12.19
13	<i>Elsholtzia strobilifera</i>	36	20000	12.12				52	34400	25.50
14	<i>Eupatorium adenophorum</i>	40	10800	9.48						
15	<i>Euphorbia sikkimensis</i>	12	2400	2.55	16	4400	2.35			
16	<i>Fragaria</i> sp.	40	22000	13.39	56	22400	9.74	36	16000	14.12
17	<i>Galinsoga parviflora</i>	28	6800	6.37	32	12800	5.57	20	8000	7.44
18	<i>Galium asperifolium</i>	24	6800	5.80						
19	<i>Galium</i> sp.				32	12800	5.57	28	6400	8.24
20	<i>Geranium pretense</i>				36	4800	4.19	8	2400	2.61
21	<i>Hypoestes roxburghii</i>	20	8400	5.79	36	19200	7.30			
22	<i>Imperata cylindrica</i>	32	24400	13.08	48	39200	12.68	36	23200	17.38
23	<i>Iris lactea</i>				20	3200	2.44			
24	<i>Nepeta</i> sp.	8	1600	1.70	28	3600	3.23			
25	<i>Ophiopogon intermedius</i>				32	6800	4.27			
26	<i>Oplismenus</i> sp.	32	24400	13.08						
27	<i>Oplismenus compositus</i>				48	26800	10.00	32	25600	17.70
28	<i>Oxalis corniculata</i>	36	12800	9.61				32	11600	11.36
29	<i>Persicaria runcinata</i>	28	14800	9.16	44	35600	11.55	20	6400	6.72

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Sl.	Name of species	Post-monsoon			Monsoon			Winter		
30	<i>Paspallum</i> sp.	36	24400	13.65	32	15600	6.17	24	15600	11.65
31	<i>Phlomis</i> sp.	4	1200	0.99	16	3600	2.18			
32	<i>Pilea umbrosa</i>				28	13200	5.30			
33	<i>Plantago major</i>	36	17600	11.28	36	22400	8.00			
34	<i>Pogostemon</i> sp.	4	800	0.85	24	4400	3.05	12	2400	3.38
35	<i>Polygonum capitatum</i>	48	22000	14.53	32	17600	6.61			
36	<i>Plantago major</i>							24	10000	9.11
37	<i>Potentilla cuneata</i>	4	800	0.85	44	9200	5.84	16	3600	4.68
38	<i>Sambucus adnata</i>	32	6800	6.94	28	13600	5.39			
39	<i>Senecio cappa</i>				28	4800	3.49			
40	<i>Rumex acetosella</i>	36	11200	9.05				44	10800	13.29
41	<i>Valeriana hardwickii</i>	20	3600	4.11						
42	<i>Urtica dioica</i>	24	6000	5.52	44	8400	5.66	16	3600	4.68
43	<i>Viola sikkimensis</i>	16	2000	2.98	16	7200	2.96	8	1200	2.07
Total		700	286800	200	1144	462000	200	524	220800	200

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), IVI- Importance value index

Appendix II.3.100: Frequency, density, basal area, and importance value index (IVI) for tree species in Rho catchment area

Sl. No.	Name of species	Post-monsoon				Monsoon				Winter			
		Fr.	Dn.	BA	IVI	Fr.	Dn.	BA	IVI	Fr.	Dn.	BA	IVI
1	<i>Acer campbellii</i>	20	30.00	1.85	14.20	20	30.00	1.85	14.20	20	30.00	1.85	14.20
2	<i>Alangium alpinum</i>	60	80.00	0.68	28.23	60	80.00	0.68	28.23	60	80.00	0.68	28.23
3	<i>Alnus nepalensis</i>	70	140.00	7.87	58.42	70	140.00	7.87	58.42	70	140.00	7.87	58.42
4	<i>Brassaiopsis glomerulata</i>	30	70.00	0.56	18.99	30	70.00	0.56	18.99	30	70.00	0.56	18.99
5	<i>Quercus lamellosa</i>	60	120.00	17.42	78.47	60	120.00	17.42	78.47	60	120.00	17.42	78.47
6	<i>Rhododendron arboreum</i>	30	60.00	1.28	19.48	30	60.00	1.28	19.48	30	60.00	1.28	19.48
7	<i>Populus ciliata</i>	20	20.00	1.63	12.19	20	20.00	1.63	12.19	20	20.00	1.63	12.19
8	<i>Rhus chinensis</i>	30	50.00	0.93	17.12	30	50.00	0.93	17.12	30	50.00	0.93	17.12
9	<i>Magnolia campbellii</i>	10	20.00	0.57	6.88	10	20.00	0.57	6.88	10	20.00	0.57	6.88
10	<i>Schima wallichii</i>	40	70.00	4.27	31.37	40	70.00	4.27	31.37	40	70.00	4.27	31.37
11	<i>Lindera neesiana</i>	30	40.00	0.54	14.66	30	40.00	0.54	14.66	30	40.00	0.54	14.66
Total		400	700	38	300	400	700	38	300	400	700	38	300

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), BA- Basal area ($\text{m}^2 \text{ha}^{-1}$), IVI- Importance value index

Appendix II.3.101: Frequency, density and IVI of shrubs in Rho catchment area

Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
		Fr.	Dn.	IVI	Fr.	Dn.	IVI	Fr.	Dn.	IVI
1	<i>Artemesia nilagirica</i>	64	2368	41.25	64	2368	41.25	64	2368	41.25
2	<i>Arundinaria manii</i>	28	272	9.00	28	272	9.00	28	272	9.00
3	<i>Berberis aristata</i>	24	256	7.99	24	256	7.99	24	256	7.99
4	<i>Coraria napalensis</i>	52	720	19.27	52	720	19.27	52	720	19.27
5	<i>Daphne papyracea</i>	56	1248	26.34	56	1248	26.34	56	1248	26.34
6	<i>Elaeagnus parviflora</i>	32	272	9.83	32	272	9.83	32	272	9.83
7	<i>Euphorbia sikkemensis</i>	32	576	13.43	32	576	13.43	32	576	13.43
8	<i>Girardinia diversifolia</i>	36	624	14.82	36	624	14.82	36	624	14.82
9	<i>Hypericum choisianum</i>	16	96	4.44	16	96	4.44	16	96	4.44
10	<i>Neillia thyrsoiflora</i>	28	208	8.25	28	208	8.25	28	208	8.25
11	<i>Piptanthus nepalensis</i>	44	720	17.61	44	720	17.61	44	720	17.61
12	<i>Rosa</i> sp.	20	208	6.59	20	208	6.59	20	208	6.59
13	<i>Rubus ellipticus</i>	36	784	16.72	36	784	16.72	36	784	16.72
14	<i>Viburnum foetidum</i>	16	96	4.44	16	96	4.44	16	96	4.44
Total		484	8448	200	484	8448	200	484	8448	200

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), IVI- Importance value index

Appendix II.3.102: Frequency, density and IVI of herbs in Rho catchment area

Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
		Fr.	Dn.	IVI	Fr.	Dn.	IVI	Fr.	Dn.	IVI
1	<i>Achyranthes aspera</i>	16	4000	3.08	24	9200	3.80	16	3600	5.07
2	<i>Ainsliaea</i> sp.	20	8400	4.84	20	7200	3.09	20	4400	6.30

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Sl.	Name of species	Post-monsoon			Monsoon			Winter		
3	<i>Anaphalis margaritacea</i>	28	15200	7.77	28	21600	6.40			
4	<i>Arisaema erubescens</i>				16	8800	3.02			
5	<i>Arisaema nepenthoides</i>				20	6800	3.01			
6	<i>Aster</i> sp.	16	4400	3.19	16	3200	2.01			
7	<i>Aster trinervius</i>	12	2800	2.25	36	14400	5.81			
8	<i>Astilbe rivularis</i>	16	2400	2.61	28	8000	3.94	16	5200	5.77
9	<i>Bergenia ciliata</i>				28	4400	3.29			
10	<i>Cirsium falconeri</i>				12	2800	1.58			
11	<i>Cyanoglossum</i> sp.				36	18000	6.46	20	6800	7.34
12	<i>Cyathula capitata</i>	36	8000	6.63	44	26000	8.62	16	6000	6.12
13	<i>Didymocarpus</i> sp.				16	2800	1.93			
14	<i>Dracocephalum</i> sp.	8	1600	1.42	20	3600	2.44			
15	<i>Drymaria cordata</i>	56	32400	16.13	20	19200	5.25	28	24400	16.75
16	<i>Elsholtzia strobilifera</i>	48	28000	13.89	32	10800	4.81			
17	<i>Eupatorium adenophorum</i>				36	8400	4.73			
18	<i>Euphorbia sikkimensis</i>	8	1600	1.42	12	3200	1.65			
19	<i>Fragaria</i> sp.	44	19200	10.85	48	26000	8.98	44	17600	17.30
20	<i>Galinsoga parviflora</i>	36	9200	6.98	44	21600	7.83	28	13600	12.05
21	<i>Galium</i> sp.	20	6000	4.14	28	12400	4.74	24	5600	7.70
22	<i>Geranium pretense</i>	12	4000	2.60	20	5200	2.72	12	2400	3.68
23	<i>Hypoestes roxburghii</i>	32	10400	6.85	8	1600	1.00			
24	<i>Imperata cylindrica</i>	52	28000	14.37	32	17600	6.03			
25	<i>Imperata cylindrica</i>				48	34000	10.42	24	14000	11.35
26	<i>Iris lactea</i>				16	4400	2.22			
27	<i>Nepeta</i> sp.	4	400	0.59	12	3600	1.72			
28	<i>Ophiopogon intermedius</i>				20	6400	2.94			
29	<i>Oplismenus</i> sp.	28	19600	9.05	24	35600	8.57	28	24400	16.75
30	<i>Oxalis corniculata</i>	44	32800	14.81				24	17600	12.92
31	<i>Paspallum</i> sp.	24	15200	7.29	32	30800	8.42	16	16000	10.47
32	<i>Persicaria runcinata</i>	32	15200	8.25	20	17600	4.96			
33	<i>Phlomis</i> sp.	8	1600	1.42	12	2800	1.58			
34	<i>Pilea umbrosa</i>				28	22400	6.54			
35	<i>Plantago major</i>	32	12000	7.32	44	27600	8.91	32	18000	14.84
36	<i>Pogostemon</i> sp.	8	1600	1.42	16	3200	2.01			
37	<i>Polygonum capitatum</i>				40	19200	7.04			
38	<i>Potentilla cuneata</i>	28	3600	4.40	28	8400	4.02	20	6800	7.34
39	<i>Rumex acetosella</i>	84	20800	16.10	36	27200	8.12	52	34000	26.19
40	<i>Sambucus adnata</i>	52	27600	14.25	60	30800	10.92			
41	<i>Senecio cappa</i>	8	1200	1.31	12	3200	1.65			
42	<i>Urtica dioica</i>	24	6400	4.73	28	9200	4.16	28	8400	9.79
43	<i>Viola sikkimensis</i>				20	4800	2.65	8	1200	2.28
Total		836	343600	200.00	1120	554000	200.00	456	230000	200.00

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), IVI- Importance value index

Appendix II.3.103: Dominant and co-dominant species determined on the basis of IVI/density values of species in the plant communities at Rho village

Community components	Barrage	Powerhouse	Catchment areas
Tree species*			
Dominant	<i>Alnus nepalensis</i>	<i>Alnus nepalensis</i>	<i>Alnus nepalensis</i>
Co-Dominant	<i>Quercus lamellosa</i>	<i>Quercus griffithi</i>	<i>Quercus lamellosa</i>
Shrub species**			
Dominant	<i>Artemesia nilagirica</i>	<i>Artemesia nilagirica</i>	<i>Artemesia nilagirica</i>
Co-Dominant	<i>Daphnae papyracea</i>	<i>Coraria napalensis</i>	<i>Daphnae papyracea</i>
Herb species**			
i. Post-monsoon season			
Dominant	<i>Drymaria cordata</i>	<i>Polygonum capitata</i>	<i>Drymaria cordata</i>

Appendices

Community components	Barrage	Powerhouse	Catchment areas
Co-Dominant	<i>Oplismenus compositus</i>	<i>Paspallum</i> sp.	<i>Rumex acetosella</i>
ii. Monsoon season			
Dominant	<i>Oplismenus compositus</i>	<i>Imperata cylindrica</i>	<i>Sambucus adnata</i>
Co-Dominant	<i>Plantago major</i>	<i>Persicaria runcinata</i>	<i>Imperata cylindrica</i>
iii. Winter			
Dominant	<i>Oplismenus</i> sp.	<i>Elsholtzia stobilifera</i>	<i>Rumex acetosella</i>
Co-Dominant	<i>Elsholtzia stobilifera</i>	<i>Oplismenus compositus</i>	<i>Fragaria</i> sp.

* Dominance based on IVI; ** Dominance based on density

Appendix II.3.104: List of plant species recorded from Tawang-1 HEP sites

Sl. No.	Species name	Family
TREES		
1	<i>Alangium chinensis</i>	Alangiaceae
2	<i>Albizia arunachalensis</i>	Mimosaceae
3	<i>Alnus nepalensis</i>	Betulaceae
4	<i>Brassaiopsis glomerulata</i>	Araliaceae
5	<i>Brassaiopsis mitis</i>	Araliaceae
6	<i>Erythrina arborescens</i>	Papilionaceae
7	<i>Eurya acuminata</i>	Theaceae
8	<i>Ficus auriculata</i>	Moraceae
9	<i>Ilex</i> sp	Aquifoliaceae
10	<i>Leucosceptum canum</i>	Lamiaceae
11	<i>Litsea citrata</i>	Lauraceae
12	<i>Macaranga denticulata</i>	Euphorbiaceae
13	<i>Merrilliopanax alpinus</i>	Araliaceae
14	<i>Myrica</i> sp	Myricaceae
15	<i>Photinia integrifolia</i>	Rosaceae
16	<i>Pinus wallichiana</i>	Pinaceae
17	<i>Prunus cerasoides</i>	Rosaceae
18	<i>Quercus griffithii</i>	Fagaceae
19	<i>Quercus serrata</i>	Fagaceae
20	<i>Quercus semecarpifolia</i>	Fagaceae
21	<i>Rhododendron arboreum</i>	Ericaceae
22	<i>Rhus chinensis</i>	Anacardiaceae
23	<i>Rhus javanica</i>	Anacardiaceae
24	<i>Salix wallichiana</i>	Salicaceae
25	<i>Saurauia punduana</i>	Actinidiaceae
26	<i>Schima wallichii</i>	Theaceae
27	<i>Torricellia tiliifolia</i>	Torricelliaceae
SHRUBS		
28	<i>Aconogonum molle</i>	Polygonaceae
29	<i>Ardesia crenata</i>	Myrsinaceae
30	<i>Artemisia nilagirica</i>	Asteraceae
31	<i>Arundinaria maling</i>	Poaceae
32	<i>Boehmeria macrophylla</i>	Urticaceae
33	<i>Buddleja asiatica</i>	Buddlejaceae
34	<i>Butea buteiformis</i>	Papilionaceae
35	<i>Coriaria nepalensis</i>	Coriariaceae
36	<i>Cyathula tomentosa</i>	Amaranthaceae
37	<i>Debregeasia longifolia</i>	Urticaceae
38	<i>Dicranopteis</i> sp	Gleicheniaceae
39	<i>Dobinia vulgaris</i>	Anacardiaceae
40	<i>Elaeagnus parvifolia</i>	Elaeagnaceae
41	<i>Flemingia macrophylla</i>	Papilionaceae
42	<i>Girardiana diversifolia</i>	Urticaceae
43	<i>Hydrangea</i> sp	Hydrangiaceae
44	<i>Hypericum</i> sp	Hypericaceae

Appendices

Sl. No.	Species name	Family
45	<i>Indigofera</i> sp	Papilionaceae
46	<i>Maesa indica</i>	Myrsinaceae
47	<i>Morus rubra</i>	Moraceae
48	<i>Mussaenda</i> sp	Rubiaceae
49	<i>Neillia thyrsiflora</i>	Rosaceae
50	<i>Rubus ellipticus</i>	Rosaceae
51	<i>Rubus rugosus</i>	Rosaceae
52	<i>Senecio</i> sp	Asteraceae
53	<i>Solanum khasianum</i>	Solanaceae
54	<i>Spirea</i> sp	Rosaceae
55	<i>Strobilanthes</i> sp	Acanthaceae
56	<i>Triumfetta rhomboidea</i>	Malvaceae
57	<i>Urena lobata</i>	Malvaceae
58	<i>Viburnum foetidum</i>	adoxaceae
59	<i>Woodfordia fruticosa</i>	Lythraceae
60	<i>Yushania hirsuta</i>	Poaceae
HERBS		
61	<i>Ageratum conyzoides</i>	Asteraceae
62	<i>Agrimonia pilosa</i>	Rosaceae
63	<i>Anaphalis margaritacea</i>	Asteraceae
64	<i>Anemone rivularis</i>	Ranunculaceae
65	<i>Ariesaema</i> sp	Araceae
66	<i>Bidens pilosa</i>	Asteraceae
67	<i>Campanula pallida</i>	Campanulaceae
68	<i>Cannabis sativa</i>	Cannabaceae
69	<i>Centella asiatica</i>	Apiaceae
70	<i>Cirsium</i> sp	Asteraceae
71	<i>Cissampelos pareira</i>	Menispermaceae
72	<i>Crassocephalum crepidioides</i>	Asteraceae
73	<i>Cyathula tomentosus</i>	Amaranthaceae
74	<i>Cymbopogon citratus</i>	Poaceae
75	<i>Cynoglossum</i> sp	Boraginaceae
76	<i>Cyperus</i> sp	Cyperaceae
77	<i>Delphenium</i> sp	Ranunculaceae
78	<i>Drymaria cordata</i>	Caryophyllaceae
79	<i>Eleusine coracana</i>	Poaceae
80	<i>Equisetum diffusum</i>	Equisetaceae
81	<i>Eupatorium adenophorum</i>	Asteraceae
82	<i>Euphorbia hirta</i>	Euphorbiaceae
83	<i>Fagopyrum esculentum</i>	Polygonaceae
84	<i>Fragaria nubicola</i>	Rosaceae
85	<i>Galinsoga parviflora</i>	Asteraceae
86	<i>Galium asperifolium</i>	Rubiaceae
87	<i>Galium rotundifolium</i>	Rubiaceae
88	<i>Galium</i> sp	Rubiaceae
89	<i>Geranium nepalense</i>	Geraniaceae
90	<i>Geranium</i> sp	Geraniaceae
91	<i>Houttuynia cordata</i>	Saururaceae
92	<i>Hydrocotyle nepalensis</i>	Araliaceae
93	<i>Hypoestes</i> sp	Acanthaceae
94	<i>Impatiens</i> sp	Balsaminaceae
95	<i>Ipomea</i> sp	Convolvulaceae
96	<i>Juncus</i> sp	Juncaceae
97	<i>Lecanthus peduncularis</i>	Urticaceae
98	<i>Lindenbergia</i> sp	Scrophulariaceae
99	<i>Lysionotus</i> sp	Gesneriaceae
100	<i>Melastoma</i> sp	Melastomaceae

Appendices

Sl. No.	Species name	Family
101	<i>Musa</i> sp	Musaceae
102	<i>Oxalis corniculata</i>	Oxalidaceae
103	<i>Oxalis</i> sp	Oxalidaceae
104	<i>Pedicularis</i> sp	Orobanchaceae
105	<i>Pedicularis</i> sp1	Orobanchaceae
106	<i>Peperomia tetraphylla</i>	Piperaceae
107	<i>Persicaria capitata</i>	Polygonaceae
108	<i>Persicaria chinensis</i>	Polygonaceae
109	<i>Pimpinella diversifolia</i>	Apiaceae
110	<i>Piper pedicellatum</i>	Piperaceae
111	<i>Plantago erosa</i>	Plantaginaceae
112	<i>Plantago major</i>	Plantaginaceae
113	<i>Pogostemon</i> sp	Lamiaceae
114	<i>Pteridium aequilinum</i>	Dennstaedtiaceae
115	<i>Ranunculus diffusus</i>	Ranunculaceae
116	<i>Roscoea</i> sp	Zingiberaceae
117	<i>Rumex nepalensis</i>	Polygonaceae
118	<i>Seigesbeckia orientalis</i>	Asteraceae
119	<i>Selinum</i> sp	Apiaceae
120	<i>Urtica dioica</i>	Urticaceae
121	<i>Verbasacum thapsus</i>	Scrophulariaceae
122	<i>Vernonia</i> sp	Asteraceae
123	<i>Viola pilosa</i>	Violaceae
124	<i>Viola sikkimensis</i>	Violaceae
125	<i>Xanthium strumarium</i>	Asteraceae
CLIMBERS		
126	<i>Cissampelos</i> sp	Menispermaceae
127	<i>Clematis acuminata</i>	Ranunculaceae
128	<i>Clematis Bucchianiana</i>	Ranunculaceae
129	<i>Clematis</i> sp	Ranunculaceae
130	<i>Cuscuta reflexa</i>	Cuscutaceae
131	<i>Dioscorea</i> sp	Dioscoreaceae
132	<i>Ficus</i> sp	Moraceae
133	<i>Hedera helix</i>	Araliaceae
134	<i>Hedera nepalensis</i>	Araliaceae
135	<i>Holboellia latifolia</i>	Lardizabalaceae
136	<i>Periploca</i> sp.	Periplocaceae
137	<i>Rubia cordifolia</i>	Rubiaceae
138	<i>Smilax aspera</i>	Smilacaceae
139	<i>Stephania glandulifera</i>	Menispermaceae
ORCHIDS		
140	<i>Cymbidium</i> sp	Orchidaceae
141	<i>Dendrobium</i> sp.	Orchidaceae
142	<i>Coelogynae</i> sp.	Orchidaceae
143	<i>Bulbophyllum</i> sp	Orchidaceae
PTERIDOPHYTES		
144	<i>Blechnum</i> sp.	Blechnaceae
145	<i>Dicranopteris linearis</i>	Dicranopteridaceae
146	<i>Drynaria</i> sp	Drynariaceae
147	<i>Dryopteris sparsa</i>	Dryopteridaceae
148	<i>Dryopteris wallichiana</i>	Dryopteridaceae
149	<i>Dynaria quercifolia</i>	Drynariaceae
150	<i>Lepisorus nudus</i>	Polypodiaceae
151	<i>Lycopodium clavatum</i>	Lycopodiaceae
152	<i>Polypodium</i> sp.	Polypodiaceae
153	<i>Pteridium aquilinum</i>	Pteridaceae
154	<i>Nephrolepis cordifolia</i>	Dryopteridaceae

Sl. No.	Species name	Family
155	<i>Pteris</i> sp.	Pteridiaceae
156	<i>Pteris vittata</i>	Pteridaceae
157	<i>Pyrossia rupestris</i>	Polypodiaceae
158	<i>Pyrrosia lanceolata</i>	Polypodiaceae
159	<i>Pyrrosia</i> sp.	Polypodiaceae
160	<i>Selaginella</i> sp.	Selaginellaceae
161	<i>Vittaria elongata</i>	Vittariaceae
BRYOPHYTES		
162	<i>Aerobryum</i> sp.	Meteoriaceae
163	<i>Desmouthea</i> sp.	Orthotrichaceae
164	<i>Diphyscium</i> sp.	Buxbaumiaceae
165	<i>Lyellia</i> sp.	Polytrichaceae
166	<i>Plagiobryum</i> sp.	Bryaceae
LICHENS		
167	<i>Alectoria</i> sp.	Alectoriaceae
168	<i>Bulbothrix</i> sp.	Parmeliaceae
169	<i>Cladonia</i> sp.	Cladoniaceae
170	<i>Everniastrum nepalense</i>	Parmeliaceae
171	<i>Graphis</i> sp.	Graphidaceae
172	<i>Heterodermia</i> sp.	Physciaceae
173	<i>Lecanora perplexa</i>	Lecanoraceae
174	<i>Lobaria</i> sp.	Lobariaceae
175	<i>Parmelinella</i> sp.	Parmeliaceae
176	<i>Parmotrema</i> sp.	Parmeliaceae
177	<i>Pseudocyphellaria</i> sp.	Lobariaceae
178	<i>Stereocaulon</i> sp.	Stereocaulaceae
179	<i>Sticta</i> sp.	Lobariaceae
180	<i>Teloschistes</i> sp.	Teloschistaceae
181	<i>Usnea</i> sp.	Parmeliaceae
FUNGI		
182	<i>Boletus reticulatus</i>	Boletaceae
183	<i>Clathrus rubra</i>	Phallaceae
184	<i>Coprinus disseminatus</i>	Agaricaceae
185	<i>Daldinia concentrica</i>	Xylariaceae
186	<i>Fomes pinicola</i>	Fomitopsidaceae
187	<i>Gloeophyllum sepiarium</i>	Gloeophyllaceae
188	<i>Hericium erinaceus</i>	Hericiaceae
189	<i>Hygrocybe miniata</i>	Hygrophoraceae
190	<i>Lactarius rubidus</i>	Russulaceae
191	<i>Phellinus schweintzii</i>	Hymenochaetaceae
192	<i>Polyporus arcularius</i>	Polyporaceae
193	<i>Poria monticola</i>	Polyporaceae
194	<i>Schizophyllum commune</i>	Schizophyllaceae
195	<i>Strobilomyces strobilaceus</i>	Boletaceae
196	<i>Thelephora penicillata</i>	Thelephoraceae
197	<i>Tremella mesenterica</i>	Tremellaceae
198	<i>Xylaria polymorpha</i>	Xylariaceae

Appendix II.3.105: Different groups of plant species present at Tawang-I HEP site

Sl. No.	Species name	Family	Sl. No.	Species name	Family
	Barrage and Powerhouse			Catchment area	
CLIMBERS			CLIMBERS		
1	<i>Cissampelos</i> sp.	Menispermaceae	1	<i>Clematis acuminata</i>	Ranunculaceae
2	<i>Clematis acuminata</i>	Ranunculaceae	2	<i>Clematis Buchaniana</i>	Ranunculaceae
3	<i>Clematis Buchaniana</i>	Ranunculaceae	3	<i>Cuscuta reflexa</i>	Cuscutaceae
4	<i>Clematis</i> sp.	Ranunculaceae	4	<i>Ficus</i> sp.	Moraceae

Appendices

Sl. No.	Species name	Family	Sl. No.	Species name	Family
	Barrage and Powerhouse			Catchment area	
5	<i>Cuscuta reflexa</i>	Cuscutaceae	5	<i>Hedera helix</i>	Araliaceae
6	<i>Dioscorea</i> sp	Dioscoreaceae	6	<i>Hedera nepalensis</i>	Araliaceae
7	<i>Ficus</i> sp	Moraceae	7	<i>Periploca</i> sp.	Periplocaceae
8	<i>Hedera helix</i>	Araliaceae	8	<i>Rubia cordifolia</i>	Rubiaceae
9	<i>Hedera nepalensis</i>	Araliaceae	9	<i>Stephania glandulifera</i>	Menispermaceae
10	<i>Holboellia latifolia</i>	Lardizabalaceae		ORCHIDS	
11	<i>Periploca</i> sp.	Periplocaceae	1	<i>Cymbidium</i> sp	Orchidaceae
12	<i>Rubia cordifolia</i>	Rubiaceae	2	<i>Coelogynae</i> sp.	Orchidaceae
13	<i>Smilax aspera</i>	Smilacaceae	3	<i>Bulbophyllum</i> sp	Orchidaceae
14	<i>Stephania glandulifera</i>	Menispermaceae		PTERIDOPHYTES	
	ORCHIDS		1	<i>Blechnum</i> sp.	Blechnaceae
1	<i>Cymbidium</i> sp	Orchidaceae	2	<i>Dicranopteris linearis</i>	Dicranopteridaceae
2	<i>Dendrobium</i> sp.	Orchidaceae	3	<i>Drynaria</i> sp	Drynariaceae
3	<i>Coelogynae</i> sp.	Orchidaceae	4	<i>Dryopteris wallichiana</i>	Dryopteridaceae
4	<i>Bulbophyllum</i> sp	Orchidaceae	5	<i>Dynaria quercifolia</i>	Drynariaceae
	PTERIDOPHYTES		6	<i>Lepisorus nudus</i>	Polypodiaceae
1	<i>Blechnum</i> sp.	Blechnaceae	7	<i>Lycopodium clavatum</i>	Lycopodiaceae
2	<i>Dicranopteris linearis</i>	Dicranopteridaceae	8	<i>Pteridium aquilinum</i>	Pteridaceae
3	<i>Drynaria</i> sp	Drynariaceae	9	<i>Nephrolepis cordifolia</i>	Dryopteridaceae
4	<i>Dryopteris sparsa</i>	Dryopteridaceae	10	<i>Pteris</i> sp.	Pteridiaceae
5	<i>Dryopteris wallichiana</i>	Dryopteridaceae	11	<i>Pteris vittata</i>	Pteridaceae
6	<i>Dynaria quercifolia</i>	Drynariaceae	12	<i>Pyrrosia</i> sp	Polypodiaceae
7	<i>Lepisorus nudus</i>	Polypodiaceae	13	<i>Selaginella</i> sp.	Selaginellaceae
8	<i>Lycopodium clavatum</i>	Lycopodiaceae		BRYOPHYTES	
9	<i>Polypodium</i> sp.	Polypodiaceae	1	<i>Aerobryum</i> sp	Meteoriaceae
10	<i>Pteridium aquilinum</i>	Pteridaceae	2	<i>Desmouthea</i> sp	Orthotrichaceae
11	<i>Nephrolepis cordifolia</i>	Dryopteridaceae	3	<i>Diphyscium</i> sp	Buxbaumiaceae
12	<i>Pteris</i> sp.	Pteridiaceae	4	<i>Plagiobryum</i> sp	Bryaceae
13	<i>Pteris vittata</i>	Pteridaceae		LICHENS	
14	<i>Pyrossia rupestris</i>	Polypodiaceae	1	<i>Alectoria</i> sp	Alectoriaceae
15	<i>Pyrrosia lanceolata</i>	Polypodiaceae	2	<i>Bulbothrix</i> sp.	Parmeliaceae
16	<i>Pyrrosia</i> sp	Polypodiaceae	3	<i>Cladonia</i> sp.	Cladoniaceae
17	<i>Selaginella</i> sp.	Selaginellaceae	4	<i>Everniastrum nepalense</i>	Parmeliaceae
18	<i>Vittaria elongata</i>	Vittariaceae	5	<i>Graphis</i> sp.	Graphidaceae
	BRYOPHYTES		6	<i>Parmelinella</i> sp.	Parmeliaceae
1	<i>Aerobryum</i> sp	Meteoriaceae	7	<i>Pseudocyphellaria</i> sp	Lobariaceae
2	<i>Desmouthea</i> sp	Orthotrichaceae	8	<i>Stereocaulon</i> sp.	Stereocaulaceae
3	<i>Diphyscium</i> sp	Buxbaumiaceae	9	<i>Sticta</i> sp	Lobariaceae
4	<i>Lyellia</i> sp	Polytrichaceae	10	<i>Usnea</i> sp	Parmeliaceae
5	<i>Plagiobryum</i> sp	Bryaceae			
	LICHENS				
1	<i>Alectoria</i> sp	Alectoriaceae			
2	<i>Bulbothrix</i> sp.	Parmeliaceae			
3	<i>Cladonia</i> sp.	Cladoniaceae			
4	<i>Everniastrum nepalense</i>	Parmeliaceae			
5	<i>Graphis</i> sp.	Graphidaceae			
6	<i>Heterodermia</i> sp.	Physciaceae			
7	<i>Lecanora perplexa</i>	Lecanoraceae			
8	<i>Lobaria</i> sp	Lobariaceae			
9	<i>Parmelinella</i> sp.	Parmeliaceae			
10	<i>Parmotrema</i> sp	Parmeliaceae			
11	<i>Pseudocyphellaria</i> sp	Lobariaceae			
12	<i>Stereocaulon</i> sp.	Stereocaulaceae			
13	<i>Sticta</i> sp	Lobariaceae			
14	<i>Teloschistes</i> sp	Teloschistaceae			

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Sl. No.	Species name	Family	Sl. No.	Species name	Family
	Barrage and Powerhouse			Catchment area	
15	<i>Usnea</i> sp	Parmeliaceae			

Appendix II.3.106: Species list of macro-fungi recorded from barrage and powerhouse sites of Tawang-I

Species	Family	Species	Family
Barrage site		Powerhouse site	
<i>Boletus reticulatus</i>	Boletaceae	<i>Boletus reticulatus</i>	Boletaceae
<i>Clathrus rubra</i>	Phallaceae	<i>Coprinus disseminatus</i>	Agaricaceae
<i>Coprinus disseminatus</i>	Agaricaceae	<i>Daldinia concentrica</i>	Xylariaceae
<i>Daldinia concentrica</i>	Xylariaceae	<i>Fomes pinicola</i>	Fomitopsidaceae
<i>Fomes pinicola</i>	Fomitopsidaceae	<i>Gloeophyllum sepiarium</i>	Gloeophyllaceae
<i>Gloeophyllum sepiarium</i>	Gloeophyllaceae	<i>Hygrocybe miniata</i>	Hygrophoraceae
<i>Hericius erinaceus</i>	Hericiaceae	<i>Lactarius rubidus</i>	Russulaceae
<i>Hygrocybe miniata</i>	Hygrophoraceae	<i>Poria monticola</i>	Polyporaceae
<i>Lactarius rubidus</i>	Russulaceae	<i>Tremella mesenterica</i>	Tremellaceae
<i>Phellinus schweintzii</i>	Hymenochaetaceae		
<i>Polyporus arcularius</i>	Polyporaceae		
<i>Poria monticola</i>	Polyporaceae		
<i>Schizophyllum commune</i>	Schizophyllaceae		
<i>Strobilomyces strobilaceus</i>	Boletaceae		
<i>Thelephora penicillata</i>	Thelephoraceae		
<i>Tremella mesenterica</i>	Tremellaceae		
<i>Xylaria polymorpha</i>	Xylariaceae		
Catchment area			
Species	Family		
<i>Boletus reticulatus</i>	Boletaceae		
<i>Clathrus rubra</i>	Phallaceae		
<i>Coprinus disseminatus</i>	Agaricaceae		
<i>Daldinia concentrica</i>	Xylariaceae		
<i>Fomes pinicola</i>	Fomitopsidaceae		
<i>Gloeophyllum sepiarium</i>	Gloeophyllaceae		
<i>Hericius erinaceus</i>	Hericiaceae		
<i>Hygrocybe miniata</i>	Hygrophoraceae		
<i>Lactarius rubidus</i>	Russulaceae		
<i>Phellinus schweintzii</i>	Hymenochaetaceae		
<i>Polyporus arcularius</i>	Polyporaceae		
<i>Poria monticola</i>	Polyporaceae		
<i>Schizophyllum commune</i>	Schizophyllaceae		
<i>Strobilomyces strobilaceus</i>	Boletaceae		
<i>Thelephora penicillata</i>	Thelephoraceae		
<i>Tremella mesenterica</i>	Tremellaceae		
<i>Xylaria polymorpha</i>	Xylariaceae		

Appendix II.3.107: Frequency, density, basal area, and importance value index (IVI) for tree species in Tawang- I barrage site

Sl. No.	Name of species	Post-monsoon				Monsoon				Winter			
		Fr.	Dn.	BA	IVI	Fr.	Dn.	BA	IVI	Fr.	Dn.	BA	IVI
1	<i>Alangium chinensis</i>	12	20	0.21	4.29	12	20	0.21	4.29	12	20	0.21	4.29
2	<i>Alnus nepalensis</i>	72	692	16.79	94.90	72	692	16.79	94.90	72	692	16.79	94.90
3	<i>Brassaiopsis glomerulata</i>	32	72	0.69	12.76	32	72	0.69	12.76	32	72	0.69	12.76
4	<i>Eurya acuminata</i>	12	20	0.13	4.08	12	20	0.13	4.08	12	20	0.13	4.08
5	<i>Leucocephalum canum</i>	36	40	0.79	12.14	36	40	0.79	12.14	36	40	0.79	12.14
6	<i>Photinia integrifolia</i>	36	36	0.55	11.33	36	36	0.55	11.33	36	36	0.55	11.33
7	<i>Pinus wallichiana</i>	40	92	3.66	22.91	40	92	3.66	22.91	40	92	3.66	22.91
8	<i>Prunus cerasoides</i>	8	12	0.21	2.94	8	12	0.21	2.94	8	12	0.21	2.94

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Sl.	Name of species	Post-monsoon				Monsoon				Winter			
9	<i>Quercus griffithi</i>	64	492	10.14	65.93	64	492	10.14	65.93	64	492	10.14	65.93
10	<i>Quercus serrata</i>	36	172	5.46	30.80	36	172	5.46	30.80	36	172	5.46	30.80
11	<i>Quercus semicarpifolia</i>	16	28	0.67	6.74	16	28	0.67	6.74	16	28	0.67	6.74
12	<i>Rhododendron arboreum</i>	36	48	0.56	12.01	36	48	0.56	12.01	36	48	0.56	12.01
13	<i>Rhus javanica</i>	16	24	0.29	5.59	16	24	0.29	5.59	16	24	0.29	5.59
14	<i>Salix wallichiana</i>	32	92	0.58	13.57	32	92	0.58	13.57	32	92	0.58	13.57
Total		448	1840	40.74	300	448	1840	40.74	300	448	1840	40.74	300

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), B A- Basal area ($\text{m}^2 \text{ha}^{-1}$), IVI- Importance value index

Appendix II.3.108: Frequency, density and IVI of shrubs in Tawang- I HEP barrage site

Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
		Fr.	Dn.	IVI	Fr.	Dn.	IVI	Fr.	Dn.	IVI
1	<i>Aconogonum molle</i>	448	1792	27.48	448	1792	27.48	448	1792	27.48
2	<i>Artemesia nilagarica</i>	420	1680	25.77	420	1680	25.77	420	1680	25.77
3	<i>Arundinella malling</i>	128	512	7.85	128	512	7.85	128	512	7.85
4	<i>Budleja asiatica</i>	124	496	7.61	124	496	7.61	124	496	7.61
5	<i>Coriaria nepalensis</i>	268	1072	16.44	268	1072	16.44	268	1072	16.44
6	<i>Debregeesia longifolia</i>	344	1376	21.10	344	1376	21.10	344	1376	21.10
7	<i>Dicranopteis</i> sp.	224	896	13.74	224	896	13.74	224	896	13.74
8	<i>Elaeagnus parvifolia</i>	84	336	5.15	84	336	5.15	84	336	5.15
9	<i>Girardiana diversifolia</i>	136	544	8.34	136	544	8.34	136	544	8.34
10	<i>Hypericum</i>	44	176	2.70	44	176	2.70	44	176	2.70
11	<i>Morus rubra</i>	32	128	1.96	32	128	1.96	32	128	1.96
12	<i>Neilia thyriflora</i>	84	336	5.15	84	336	5.15	84	336	5.15
13	<i>Rubus ellipticus</i>	260	1040	15.95	260	1040	15.95	260	1040	15.95
14	<i>Rubus rugosus</i>	48	192	2.94	48	192	2.94	48	192	2.94
15	<i>Spirea</i> sp.	24	96	1.47	24	96	1.47	24	96	1.47
16	<i>Strobilanthes</i> sp.	180	720	11.04	180	720	11.04	180	720	11.04
17	<i>Triumfetta rhomboidea</i>	84	336	5.15	84	336	5.15	84	336	5.15
18	<i>Viburnum foetidum</i>	64	256	3.93	64	256	3.93	64	256	3.93
19	<i>Yushania hirsuta</i>	264	1056	16.20	264	1056	16.20	264	1056	16.20
Total		3260	13040	200	3260	13040	200	3260	13040	200

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), IVI- Importance value index

Appendix II.3.109: Frequency, density and IVI of herbs in Tawang- I barrage site

Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
		Fr.	Dn.	IVI	Fr.	Dn.	IVI	Fr.	Dn.	IVI
1	<i>Ageratum conyzoides</i>	40	13250	8.72	40	21000	5.53	17.5	8000	6.49
2	<i>Agrimonia pilosa</i>	20	3250	3.23	27.5	10000	3.19			
3	<i>Anaphalis margaritacea</i>	22.5	5000	4.08	30	12750	3.73	12.5	4000	3.99
4	<i>Anemone rivularis</i>	32.5	7750	6.08	25	9000	2.89			
5	<i>Ariesaema</i> sp.	22.5	5000	4.08	30	10000	3.36			
6	<i>Bidens pilosa</i>	17.5	5000	3.55	22.5	9000	2.72	12.5	4500	4.18
7	<i>Campanula pallida</i>				27.5	12250	3.50			
8	<i>Cannabis sativa</i>	17.5	4000	3.21	25	16750	3.95	10	6750	4.53
9	<i>Centella asiatica</i>	25	8250	5.44	37.5	16750	4.78	15	8250	6.09
10	<i>Cirsium</i> sp.	5	1000	0.87	17.5	4000	1.71			
11	<i>Crassocephalum crepidioides</i>	10	1500	1.57	32.5	11250	3.69	10	3000	3.12
12	<i>Cyathula tomentosus</i>				40	19750	5.36	30	10750	10.01
13	<i>Cymbopogon citratus</i>	20	3000	3.15	37.5	11750	4.09	20	5750	6.14
14	<i>Cynoglossum</i> sp.	32.5	10750	7.08	32.5	19500	4.82	22.5	8750	7.77
15	<i>Drymaria cordata</i>	40	18500	10.49	35	51250	9.34	17.5	16750	9.78
16	<i>Equisetum diffusum</i>	17.5	3500	3.05	22.5	8500	2.65	15	5750	5.15
17	<i>Eupatorium adenophorum</i>	32.5	7500	5.99	30	11250	3.53	30	8500	9.17
18	<i>Euphorbia hirta</i>	17.5	3750	3.13	27.5	12000	3.47			
19	<i>Fagopyrum esculentum</i>				35	8750	3.52			
20	<i>Fragaria nubicola</i>	42.5	16000	9.91	42.5	16250	5.04	22.5	16000	10.49
21	<i>Galinsoga parviflora</i>	35	13000	8.11	32.5	22250	5.20	27.5	18250	12.33

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Sl.	Name of species	Post-monsoon			Monsoon			Winter		
22	<i>Galium aparine</i>	27.5	6250	5.04	32.5	8250	3.28	7.5	3250	2.71
23	<i>Galium rotundifolium</i>	30	4750	4.80	20	4250	1.91	17.5	10750	7.52
24	<i>Geranium nepalensis</i>	5	1500	1.04	35	9250	3.59			
25	<i>Geranium</i> sp.	27.5	3250	4.03	17.5	3500	1.64	15	5750	5.15
26	<i>Houttuynia cordata</i>	32.5	10750	7.08	42.5	33500	7.41	17.5	3250	4.70
27	<i>Hydrocotyle nepalensis</i>	20	5000	3.82	35	13000	4.10			
28	<i>Hypoestes</i> sp.				32.5	28000	5.99			
29	<i>Impatiens</i> sp.	20	10250	5.58	22.5	16750	3.79			
30	<i>Ipomea</i> sp.				20	5250	2.04			
31	<i>Juncus</i> sp.				27.5	10750	3.29			
32	<i>Leucanthus peduncularis</i>	27.5	18750	9.23	40	51250	9.67	30	22500	14.43
33	<i>Musa</i> sp.	2.5	750	0.52	2.5	1000	0.30	2.5	750	0.78
34	<i>Oxalis corniculata</i>	35	32750	14.73	37.5	19500	5.16	15	14000	8.25
35	<i>Oxalis</i> sp.				32.5	2000	2.43			
36	<i>Peperomia tetraphylla</i>	20	4000	3.48	32.5	14000	4.07	7.5	2250	2.34
37	<i>Persicaria capitata</i>	22.5	7500	4.92	27.5	19000	4.42	17.5	13500	8.56
38	<i>Persicaria chinensis</i>	30	7750	5.81	52.5	32000	7.86	25	16750	11.27
39	<i>Piper pedicellose</i>				30	10750	3.46			
40	<i>Plantago major</i>	27.5	13000	7.30	42.5	23750	6.07	27.5	21000	13.37
41	<i>Pogostemon</i> sp.	7.5	1250	1.22	22.5	8500	2.65	7.5	2500	2.43
42	<i>Pedicularis</i> sp1				45	12500	4.69			
43	<i>Pedicularis</i> sp.				20	3250	1.77			
44	<i>Ranunculus diffusus</i>	30	7250	5.64	27.5	8500	2.99			
45	<i>Roscoea</i> sp.				7.5	1500	0.70			
46	<i>Rumex nepalensis</i>	27.5	6250	5.04				30	18250	12.83
47	<i>Pimpinella diversifolia</i>	32.5	13500	8.01	27.5	33750	6.45			
48	<i>Urtica dioica</i>	22.5	5000	4.08						
49	<i>Pimpinella diversifolia</i>				52.5	22250	6.53			
50	<i>Verbasacum thapsus</i>	5	1000	0.87	15	3250	1.44			
51	<i>Vernonia</i> sp.	17.5	5000	3.55	37.5	10750	3.96	10	3750	3.40
52	<i>Viola sikkimensis</i>	15	2500	2.44	22.5	5750	2.28	10	2750	3.02
Total		935	298000	200	1510	729750	200	502.5	266000	200

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), IVI- Importance value index

Appendix II.3.110: Frequency, density, basal area, and importance value index (IVI) for tree species in Tawang- I Power house site

Sl. No.	Name of species	Post-monsoon				Monsoon				Winter			
		Fr.	Dn.	BA	IVI	Fr.	Dn.	BA	IVI	Fr.	Dn.	BA	IVI
1	<i>Alangium chinensis</i>	20	40	0.31	6.70	20	40	0.31	6.70	20	40	0.31	6.70
2	<i>Albizia arunachalensis</i>	64	260	6.84	45.24	64	260	6.84	45.24	64	260	6.84	45.24
3	<i>Alnus nepalensis</i>	36	124	2.48	20.43	36	124	2.48	20.43	36	124	2.48	20.43
4	<i>Brassaiopsis mitis</i>	52	80	0.47	15.09	52	80	0.47	15.09	52	80	0.47	15.09
5	<i>Erythrina arborescence</i>	32	36	0.76	9.74	32	36	0.76	9.74	32	36	0.76	9.74
6	<i>Ficus auriculata</i>	28	40	0.89	9.62	28	40	0.89	9.62	28	40	0.89	9.62
7	<i>Ilex</i> sp.	4	8	0.19	1.69	4	8	0.19	1.69	4	8	0.19	1.69
8	<i>Litsea citrata</i>	12	20	0.34	4.20	12	20	0.34	4.20	12	20	0.34	4.20
9	<i>Merillopanax alpinus</i>	20	28	0.61	6.77	20	28	0.61	6.77	20	28	0.61	6.77
10	<i>Myrica</i> sp.	12	20	0.57	4.82	12	20	0.57	4.82	12	20	0.57	4.82
11	<i>Prunus cerasoides</i>	16	40	1.04	7.99	16	40	1.04	7.99	16	40	1.04	7.99
12	<i>Quercus griffithi</i>	64	280	6.56	45.73	64	280	6.56	45.73	64	280	6.56	45.73
13	<i>Quercus serrata</i>	24	40	1.22	9.83	24	40	1.22	9.83	24	40	1.22	9.83
14	<i>Rhus chinensis</i>	68	240	5.18	40.26	68	240	5.18	40.26	68	240	5.18	40.26
15	<i>Saurauia punduana</i>	8	16	0.26	3.04	8	16	0.26	3.04	8	16	0.26	3.04
16	<i>Schima wallichii</i>	20	48	1.89	11.42	20	48	1.89	11.42	20	48	1.89	11.42
17	<i>Torriceilia tiliifolia</i>	36	64	0.52	11.51	36	64	0.52	11.51	36	64	0.52	11.51
18	<i>Macaranga denticulata</i>	68	240	7.30	45.92	68	240	7.30	45.92	68	240	7.30	45.92
Total		584	1624	37	300	584	1624	37	300	584	1624	37	300

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), B A- Basal area ($\text{m}^2 \text{ha}^{-1}$), IVI- Importance value index

Appendix II.3.111: Frequency, density and IVI of shrubs in Tawang- II Power house site

Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
		Fr.	Dn.	IVI	Fr.	Dn.	IVI	Fr.	Dn.	IVI
1	<i>Aconogonum molle</i>	36	352	7.41	36	352	7.41	36	352	7.41
2	<i>Ardesia crenata</i>	32	256	6.13	32	256	6.13	32	256	6.13
3	<i>Artemesia nilagarica</i>	52	2864	29.55	52	2864	29.55	52	2864	29.55
4	<i>Boehmeria macrophylla</i>	32	432	7.54	32	432	7.54	32	432	7.54
5	<i>Buddleja asiatica</i>	44	368	8.56	44	368	8.56	44	368	8.56
6	<i>Butea buteiformis</i>	28	288	5.88	28	288	5.88	28	288	5.88
7	<i>Coriaria nepalensis</i>	48	768	12.27	48	768	12.27	48	768	12.27
8	<i>Cyathula tomentosa</i>	36	912	11.89	36	912	11.89	36	912	11.89
9	<i>Debregesia longifolia</i>	52	528	10.86	52	528	10.86	52	528	10.86
10	<i>Dobinia vulgaris</i>	16	144	3.19	16	144	3.19	16	144	3.19
11	<i>Elaeagnus parvifolia</i>	16	80	2.68	16	80	2.68	16	80	2.68
12	<i>Flemingia macrophylla</i>	32	448	7.67	32	448	7.67	32	448	7.67
13	<i>Hydrangea sp.</i>	36	336	7.28	36	336	7.28	36	336	7.28
14	<i>Indigofera sp.</i>	56	528	11.37	56	528	11.37	56	528	11.37
15	<i>Maesa indica</i>	52	896	13.80	52	896	13.80	52	896	13.80
16	<i>Mussaenda sp.</i>	24	192	4.60	24	192	4.60	24	192	4.60
17	<i>Rubus ellipticus</i>	48	944	13.68	48	944	13.68	48	944	13.68
18	<i>Rubus rugosus</i>	16	176	3.45	16	176	3.45	16	176	3.45
19	<i>Senecio sp.</i>	16	112	2.94	16	112	2.94	16	112	2.94
20	<i>Urena lobata</i>	28	416	6.90	28	416	6.90	28	416	6.90
21	<i>Woodfordia fruticosa</i>	36	560	9.07	36	560	9.07	36	560	9.07
22	<i>Solanum khasianum</i>	48	896	13.29	48	896	13.29	48	896	13.29
Total		784	12496	200	784	12496	200	784	12496	200

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), IVI- Importance value index

Appendix II.3.112: Frequency, density and IVI of herbs in Tawang- II Power house site

Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
		Fr.	Dn.	IVI	Fr.	Dn.	IVI	Fr.	Dn.	IVI
1	<i>Ageratum conyzoides</i>	40	20500	10.51	40	26000	8.07	17.5	8000	10.49
2	<i>Anaphalis margaritacea</i>	20	3750	3.30	25	9250	3.75	15	3500	6.75
3	<i>Bidens pilosa</i>	27.5	9500	5.85	27.5	11750	4.42	17.5	5000	8.49
4	<i>Campanula pallida</i>	25	5750	4.45	25	9000	3.71			
5	<i>Cannabis sativa</i>	35	13000	7.71	35	21250	6.79	22.5	6250	10.79
6	<i>Centella asiatica</i>	27.5	15750	7.72				15	11250	11.92
7	<i>Crassocephalum crepidioides</i>	30	9000	5.97	27.5	14500	4.93	12.5	4500	6.68
8	<i>Cymbopogon citratus</i>	27.5	10500	6.15	30	16000	5.41	20	6000	9.89
9	<i>Cymbopogon citratus</i>				27.5	13500	4.74			
10	<i>Cyperus</i>				30	11250	4.53			
11	<i>Delphinium sp.</i>	30	2750	4.09	22.5	4000	2.58			
12	<i>Drymaria cordata</i>	22.5	18500	8.00	42.5	21750	7.49	17.5	14000	14.50
13	<i>Eleusine coracana</i>				32.5	19500	6.26			
14	<i>Equisetum diffusum</i>	42.5	5250	6.21	40	15750	6.18	12.5	3000	5.68
15	<i>Eupatorium adenophorum</i>	32.5	13000	7.44	35	22250	6.97	17.5	4750	8.32
16	<i>Euphorbia hirta</i>	40	20750	10.58	32.5	19500	6.26			
17	<i>Fagopyrum esculentum</i>	35	10250	6.89	35	9250	4.57			
18	<i>Fragaria nubicola</i>	32.5	12500	7.29	30	14000	5.04	20	10500	12.89
19	<i>Galinsoga parviflora</i>	35	18250	9.29	35	18500	6.28	20	13750	15.06
20	<i>Galium sp.</i>				35	11250	4.94			
21	<i>Geranium sp.</i>	30	3750	4.39	27.5	8500	3.82	12.5	2000	5.01
22	<i>Houttuynia cordata</i>	42.5	8500	7.18	37.5	24000	7.50			
23	<i>Hydrocotyle nepalensis</i>	42.5	13000	8.53	42.5	12750	5.83	12.5	4000	6.35
24	<i>Pimpinella diversifolia</i>	45	20500	11.05	37.5	18000	6.39			
25	<i>Impatiens sp.</i>	42.5	29750	13.55	40	25250	7.93			

Appendices

Sl.	Name of species	Post-monsoon			Monsoon			Winter		
26	<i>Ipomea</i> sp.	27.5	5500	4.65	20	5750	2.70			
27	<i>Lindenbergia</i> sp.				42.5	11250	5.55			
28	<i>Lysionanthus</i> sp.				27.5	10250	4.14			
29	<i>Melastoma</i> sp.				22.5	4500	2.67			
30	<i>Oxalis corniculata</i>	27.5	18500	8.54	27.5	11250	4.33	15	11750	12.26
31	<i>Persicaria capitata</i>	32.5	7250	5.72	40	16750	6.37	17.5	10750	12.33
32	<i>Persicaria chinensis</i>				52.5	33500	10.48	27.5	11750	15.93
33	<i>Piper pedicelloseum</i>				20	4500	2.47			
34	<i>Plantago erosa</i>	37.5	12500	7.84	37.5	19500	6.67	22.5	11750	14.46
35	<i>Ranunculus diffusus</i>	20	7250	4.35						
36	<i>Seigesbeckia orientalis</i>	22.5	5750	4.18	30	8500	4.02	10	3000	4.94
37	<i>Pimpinella diversifolia</i>				42.5	16750	6.57			
38	<i>Vernonia</i> sp.	22.5	7500	4.70	27.5	8500	3.82			
39	<i>Vernonia</i> sp.				17.5	5750	2.49	15	4250	7.25
40	<i>Xanthium strumarium</i>	22.5	4750	3.88	22.5	8000	3.32			
Total		917.5	333500	200	1222.5	541500	200	340	149750	200

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), IVI- Importance value index

Appendix II.3.113: Frequency, density, basal area, and importance value index (IVI) for tree species in Tawang- II catchment area

Sl. No.	Name of species	Post-monsoon				Monsoon				Winter			
		Fr.	Dn.	BA	IVI	Fr.	Dn.	BA	IVI	Fr.	Dn.	BA	IVI
1	<i>Alnus nepalensis</i>	72	616	12.83	102.28	72	616	12.83	102.28	72	616	12.83	102.28
2	<i>Brassaiopsis glomerulata</i>	28	84	1.12	16.54	28	84	1.12	16.54	28	84	1.12	16.54
3	<i>Leucosceptum cannum</i>	20	32	0.34	8.40	20	32	0.34	8.40	20	32	0.34	8.40
4	<i>Photinia integrifolia</i>	24	28	0.30	9.00	24	28	0.30	9.00	24	28	0.30	9.00
5	<i>Pinus wallichiana</i>	48	152	3.55	34.18	48	152	3.55	34.18	48	152	3.55	34.18
6	<i>Quercus griffithii</i>	56	196	5.65	46.06	56	196	5.65	46.06	56	196	5.65	46.06
7	<i>Quercus serrata</i>	28	136	2.36	24.14	28	136	2.36	24.14	28	136	2.36	24.14
8	<i>Rhododendron arboreum</i>	16	36	0.54	8.32	16	36	0.54	8.32	16	36	0.54	8.32
9	<i>Salix wallichiana</i>	28	44	0.47	11.70	28	44	0.47	11.70	28	44	0.47	11.70
10	<i>Schima wallichii</i>	40	88	3.07	26.20	40	88	3.07	26.20	40	88	3.07	26.20
11	<i>Rhus chinensis</i>	32	44	0.61	13.17	32	44	0.61	13.17	32	44	0.61	13.17
Total		392	1456	30.84	300	392	1456	30.84	300	392	1456	30.84	300

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), B A- Basal area ($\text{m}^2 \text{ha}^{-1}$), IVI- Importance value index

Appendix II.3.114: Frequency, density and IVI of shrubs in Tawang- II catchment area

Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
		Fr.	Dn.	IVI	Fr.	Dn.	IVI	Fr.	Dn.	IVI
1	<i>Aconogonum molle</i>	60	1040	17.13	60	1040	17.13	60	1040	17.13
2	<i>Artemesia nilagarica</i>	52	1792	22.22	52	1792	22.22	52	1792	22.22
3	<i>Arundinella manni</i>	32	720	10.51	32	720	10.51	32	720	10.51
4	<i>Buddleja asiatica</i>	32	256	6.66	32	256	6.66	32	256	6.66
5	<i>Coriaria nepalensis</i>	36	944	12.93	36	944	12.93	36	944	12.93
6	<i>Debregesia longifolia</i>	48	1232	17.02	48	1232	17.02	48	1232	17.02
7	<i>Dicranopteis</i> sp.	52	1216	17.45	52	1216	17.45	52	1216	17.45
8	<i>Elaeagnus parvifolia</i>	36	336	7.90	36	336	7.90	36	336	7.90
9	<i>Girardiana diversifolia</i>	36	592	10.01	36	592	10.01	36	592	10.01
10	<i>Hypericum</i>	24	160	4.73	24	160	4.73	24	160	4.73
11	<i>Morus rubra</i>	12	96	2.50	12	96	2.50	12	96	2.50
12	<i>Neillia thyrsiflora</i>	36	288	7.50	36	288	7.50	36	288	7.50
13	<i>Rubus ellipticus</i>	56	992	16.17	56	992	16.17	56	992	16.17
14	<i>Rubus rugosus</i>	16	160	3.60	16	160	3.60	16	160	3.60
15	<i>Spirea</i> sp.	28	208	5.70	28	208	5.70	28	208	5.70
16	<i>Strobilanthes</i> sp.	48	752	13.04	48	752	13.04	48	752	13.04
17	<i>Triumfetta rhomboidea</i>	20	144	4.03	20	144	4.03	20	144	4.03
18	<i>Viburnum foetidum</i>	32	256	6.66	32	256	6.66	32	256	6.66
19	<i>Yushania hirsuta</i>	48	896	14.24	48	896	14.24	48	896	14.24
Total		704	12080	200	704	12080	200	704	12080	200

Appendices

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), IVI- Importance value index

Appendix II.3.115: Frequency, density and IVI of herbs in Tawang- II catchment area

Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
		Fr.	Dn.	IVI	Fr.	Dn.	IVI	Fr.	Dn.	IVI
1	<i>Ageratum conyzoides</i>	30	14000	7.21	30	20250	5.03	22.5	11000	11.44
2	<i>Agrimonia pilosa</i>	15	4000	2.83	20	6500	2.43			
3	<i>Anaphalis margaritacea</i>	20	5750	3.88	20	12000	3.15	7.5	2750	3.30
4	<i>Anemone rivularis</i>	25	8500	5.19	25	14750	3.91			
5	<i>Ariesaema</i> sp.	15	3000	2.57	22.5	9250	2.99			
6	<i>Bidens pilosa</i>	22.5	5750	4.18	27.5	14000	4.01	10	3250	4.17
7	<i>Campanula pallida</i>				17.5	8500	2.50			
8	<i>Cannabis sativa</i>	10	2250	1.78	27.5	18000	4.53			
9	<i>Centella asiatica</i>	22.5	11750	5.73	30	19750	4.96	15	8750	8.42
10	<i>Cirsium</i>	5	1000	0.86	17.5	5750	2.13			
11	<i>Cissampelos pareira</i>				22.5	9750	3.05			
12	<i>Crassocephalum crepidioides</i>	15	3500	2.70	32.5	11250	4.04	17.5	4750	6.77
13	<i>Cyathula tomentosa</i>				40	21750	6.01	20	6250	8.20
14	<i>Cynopogon citratus</i>	17.5	3500	3.00	35	14500	4.66	22.5	6000	8.65
15	<i>Cynoglossum</i> sp.	32.5	15500	7.89	32.5	16750	4.76	17.5	6750	7.89
16	<i>Drymaria cordata</i>	22.5	15500	6.69	35	34250	7.27	15	14750	11.77
17	<i>Equisetum diffusum</i>	35	8250	6.33	30	16750	4.57	17.5	4000	6.35
18	<i>Eupatorium adenophorum</i>	20	4500	3.56	22.5	8500	2.89	25	4500	8.40
19	<i>Euphorbia hirta</i>	22.5	10500	5.41	20	10250	2.92			
20	<i>Fagopyrum esculentum</i>				37.5	14500	4.86			
21	<i>Fragaria nubicola</i>	35	15500	8.19	27.5	19000	4.67	27.5	12750	13.59
22	<i>Galinsoga parviflora</i>	20	7000	4.20	22.5	17250	4.04	20	10750	10.71
23	<i>Galium asperifolium</i>	25	5500	4.42	32.5	10750	3.97	15	5250	6.46
24	<i>Galium rotundifolium</i>	12.5	2250	2.08	27.5	5750	2.92	10	3750	4.45
25	<i>Geranium nepalensis</i>	17.5	4000	3.13	30	8750	3.51	7.5	1500	2.60
26	<i>Geranium</i> sp.	22.5	8250	4.83	17.5	5750	2.13			
27	<i>Houttuynia cordata</i>	22.5	12750	5.98	35	24500	5.98			
28	<i>Hydrocotyle nepalensis</i>	30	11000	6.44	30	19500	4.93	7.5	3750	3.86
29	<i>Hypoestes</i>				37.5	31750	7.14			
30	<i>Impatiens</i> sp.	17.5	4500	3.26	35	36250	7.53			
31	<i>Ipomea</i> sp.				17.5	5750	2.13			
32	<i>Leucanthus peduncularis</i>	12.5	18250	6.20						
33	<i>Juncus</i> sp.				17.5	16250	3.52			
34	<i>Oxalis corniculata</i>	20	16000	6.52	32.5	26000	5.98			
35	<i>Oxalis</i> sp.				17.5	4250	1.93	12.5	9750	8.39
36	<i>Peperomia tetraphylla</i>	15	4500	2.96	22.5	8500	2.89	15	3000	5.21
37	<i>Persicaria capitata</i>	17.5	18250	6.80	25	19500	4.54	35	21750	20.39
38	<i>Persicaria chinensis</i>	35	29500	11.80	40	34250	7.66			
39	<i>Piper pedicelloseum</i>				30	8500	3.48			
40	<i>Plantago erosa</i>	25	18250	7.70	27.5	22250	5.10	27.5	14000	14.29
41	<i>Pogostemon</i> sp.	10	2000	1.72	20	6000	2.36	10	2000	3.47
42	<i>Pteridium aquilinum</i>	27.5	32250	11.60	35	37000	7.63			
43	<i>Ranunculus diffusus</i>	30	10000	6.18	22.5	10500	3.15			
44	<i>Roscoea</i> sp.				15	2750	1.54			
45	<i>Rumex nepalensis</i>	30	20500	8.88	40	39000	8.29	30	14250	15.02
46	<i>Selenium</i> sp.	35	19750	9.29	27.5	31250	6.29			
47	<i>Vernonia</i> sp.	20	4500	3.56	20	14000	3.42	17.5	3750	6.21
48	<i>Viola pilosa</i>				25	5000	2.62			
49	<i>Viola sikkimensis</i>	22.5	6750	4.44						
Total		832.5	388500	200.00	1275	757000	200.00	425	179000	200.00

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), IVI- Importance value index

Appendix II.3.116: Dominant and Co-dominant species determined on the basis of IVI/density values of species in the plant communities at Tawang- I site

Community components	Barrage	Powerhouse	Catchment area
Tree species*			
Dominant	<i>Alnus nepalensis</i>	<i>Macaranga denticulata</i>	<i>Alnus nepalensis</i>
Co-Dominant	<i>Quercus griffithii</i>	<i>Albizzia arunachalensis</i>	<i>Quercus griffithii</i>
Shrub species*			
Dominant	<i>Aconogonum molle</i>	<i>Artemesia nilagarica</i>	<i>Artemesia nilagarica</i>
Co-Dominant	<i>Artemesia nilagarica</i>	<i>Maesea indica</i>	<i>Dicranopteis sp.</i>
Herb species**			
i. Post-monsoon season			
Dominant	<i>Oxalis corniculata</i>	<i>Impatiens sp.</i>	<i>Persicaria chinensis</i>
Co-Dominant	<i>Drymaria cordata</i>	<i>Pimpinella diversifolia</i>	<i>Pteridium aquilinum</i>
i. Monsoon season			
Dominant	<i>Lecanthus peduncularis</i>	<i>Persicaria chinensis</i>	<i>Rumex nepalensis</i>
Co-Dominant	<i>Drymaria cordata</i>	<i>Ageratum conizoides</i>	<i>Persicaria chinensis</i>
ii. Winter			
Dominant	<i>Lecanthus peduncularis</i>	<i>Persicaria chinensis</i>	<i>Persicaria chinensis</i>
Co-Dominant	<i>Plantago major</i>	<i>Galinsoga parviflora</i>	<i>Rumex nepalensis</i>

* Dominance based on IVI, ** Dominance based on density

Appendix II.3.117: List of plant species recorded from Tawang-II HEP sites

Sl. No.	Species name	Family
TREES		
1	<i>Alangium chinensis</i>	Alangiaceae
2	<i>Albizzia arunacheles</i>	Mimosaceae
3	<i>Alnus nepalensis</i>	Betulaceae
4	<i>Brassaiaopsis glomerulata</i>	Araliaceae
5	<i>Cyathea sp</i>	Cyatheaceae
6	<i>Phyllanthus emblica</i>	Euphorbiaceae
7	<i>Ficus auriculata</i>	Moraceae
8	<i>Macaranga denticulata</i>	Euphorbiaceae
9	<i>Merillioanax alpinus</i>	Araliaceae
10	<i>Pinus wallichiana</i>	Pinaceae
11	<i>Quercus griffithii</i>	Fagaceae
12	<i>Rhus chinensis</i>	Anacardiaceae
13	<i>Rhus javanica</i>	Anacardiaceae
14	<i>Saurauia napaulensis</i>	Saurauiaceae
15	<i>Schima wallichii</i>	Theaceae
16	<i>Torricellia tiliifolia</i>	Torricelliaceae
17	<i>Viburnum foetidum</i>	Adoxaceae
18	<i>Wendlandia sp</i>	Rubiaceae
SHRUBS		
19	<i>Ardisia crenata</i>	Myrsinaceae
20	<i>Artemisia nilagirica</i>	Asteraceae
21	<i>Boehmeria macrophylla</i>	Urticaceae
22	<i>Buddleja asiatica</i>	Buddlejaceae
23	<i>Butea buteiformis</i>	Papilionaceae
24	<i>Coriaria nepalensis</i>	Coriariaceae
25	<i>Cyathula tomentosa</i>	Amaranthaceae
26	<i>Debregeasia longifolia</i>	Urticaceae
27	<i>Desmodium sp</i>	Papilionaceae
28	<i>Dobinia vulgaris</i>	Anacardiaceae
29	<i>Elaeagnus sp</i>	Elaeagnaceae
30	<i>Flemingia macrophylla</i>	Papilionaceae
31	<i>Girardinia sp</i>	Urticaceae
32	<i>Hydrangea sp</i>	Hydrangeaceae
33	<i>Indigofera sp</i>	Papilionaceae
34	<i>Maesa indica</i>	Myrsinaceae
35	<i>Mussaenda sp</i>	Rubiaceae

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Sl. No.	Species name	Family
36	<i>Rubus ellipticus</i>	Rosaceae
37	<i>Rubus rugosus</i>	Rosaceae
38	<i>Solanum khasianum</i>	Solanaceae
39	<i>Urena lobata</i>	Malvaceae
40	<i>Woodfordia fruticosa</i>	Lythraceae
HERBS		
41	<i>Acanthospermum hispidum</i>	Asteraceae
42	<i>Achyranthes aspera</i>	Amaranthaceae
43	<i>Ageratum conyzoides</i>	Asteraceae
44	<i>Anaphalis margaritacea</i>	Asteraceae
45	<i>Bidens pilosa</i>	Asteraceae
46	<i>Campanula pallida</i>	Capanulaceae
47	<i>Cannabis sativa</i>	Canabaceae
48	<i>Crassocephalum crepidioides</i>	Asteraceae
49	<i>Cyanoglossum</i> sp	Boraginaceae
50	<i>Cymbopogon citratus</i>	Poaceae
51	<i>Cyperus rotundus</i>	Cyperaceae
52	<i>Cyperus</i> sp	Cyperaceae
53	<i>Drymaria cordata</i>	Caryophyllaceae
54	<i>Eleusine coracana</i>	Poaceae
55	<i>Eleusine</i> sp	Poaceae
56	<i>Equisetum diffusum</i>	Equisetaceae
57	<i>Eupatorium adenophorum</i>	Asteraceae
58	<i>Eupatorium odoratum</i>	Asteraceae
59	<i>Euphorbia hirta</i>	Euphorbiaceae
60	<i>Fagopyrum esculentum</i>	Polygonaceae
61	<i>Fragaria nubicola</i>	Rosaceae
62	<i>Galinsoga parviflora</i>	Asteraceae
63	<i>Galium</i> sp	Rubiaceae
64	<i>Geranium</i> sp	Geraniaceae
65	<i>Houttuynia cordata</i>	Saururaceae
66	<i>Hydrocotyle nepalensis</i>	Araliaceae
67	<i>Hydrocotyle</i> sp	Araliaceae
68	<i>Hypoestes</i> sp	Acanthaceae
69	<i>Impatiens bicolor</i>	Balsaminaceae
70	<i>Impatiens</i> sp	Balsaminaceae
71	<i>Ipomea</i> sp	Convolvulaceae
72	<i>Lindenbergia</i> sp	Scrophulariaceae
73	<i>Lysionanthus</i> sp	Gesneriaceae
74	<i>Oxalis corniculata</i>	Oxalidaceae
75	<i>Persicaria capitata</i>	Polygonaceae
76	<i>Persicaria chinensis</i>	Polygonaceae
77	<i>Pimpinella diversifolia</i>	Apiaceae
78	<i>Piper pedicellatum</i>	Piperaceae
79	<i>Plantago erosa</i>	Plantaginaceae
80	<i>Seigesbeckia orientalis</i>	Asteraceae
81	<i>Strobilanthes</i> sp	Acanthaceae
82	<i>Urtica dioica</i>	Urticaceae
83	<i>Verbascum thapsus</i>	Schrophulariaceae
84	<i>Vernonia</i> sp	Asteraceae
85	<i>Xanthium strumarium</i>	Asteraceae
CLIMBERS		
87	<i>Clematis Buchaniana</i>	Ranunculaceae
88	<i>Cissampelos</i> sp	Menispermaceae
89	<i>Clematis</i> sp	Ranunculaceae
90	<i>Cuscuta reflexa</i>	Cuscutaceae
91	<i>Dioscorea bulbifera</i>	Dioscoreaceae

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Sl. No.	Species name	Family
92	<i>Ficus</i> sp	Moraceae
93	<i>Hedera helix</i>	Araliaceae
94	<i>Hedera nepalensis</i>	Araliaceae
95	<i>Holboellia latifolia</i>	Lardizabalaceae
96	<i>Periploca</i> sp.	Periplocaceae
97	<i>Rubia cordifolia</i>	Rubiaceae
98	<i>Smilax aspera</i>	Smilacaceae
99	<i>Stephania glandulifera</i>	Menispermaceae
ORCHIDS		
100	<i>Bulbophyllum</i> sp	Orchidaceae
101	<i>Coelogynae</i> sp.	Orchidaceae
102	<i>Cymbidium</i> sp	Orchidaceae
103	<i>Dendrobium</i> sp.	Orchidaceae
104	<i>Oberonia</i> sp	Orchidaceae
PTERIDOPHYTES		
105	<i>Blechnum</i> sp.	Blechnaceae
106	<i>Dicranopteris linearis</i>	Dicranopteridaceae
107	<i>Drynaria propinqua</i>	Drynariaceae
108	<i>Dryopteris wallichiana</i>	Dryopteridaceae
109	<i>Dynaria quercifolia</i>	Drynariaceae
110	<i>Lepisorus nudus</i>	Polypodiaceae
111	<i>Lycopodium clavatum</i>	Lycopodiaceae
112	<i>Asplenium</i> sp	Aspleniaceae
113	<i>Neprolepis cordifolia</i>	Lomariopsidaceae
114	<i>Polypodium</i> sp.	Polypodiaceae
115	<i>Pteridium aquilinum</i>	Pteridaceae
116	<i>Pteris</i> sp.	Pteridiaceae
117	<i>Pteris vittata</i>	Pteridaceae
118	<i>Pyrrosia nuda</i>	Polypodiaceae
119	<i>Pyrrosia</i> sp	Polypodiaceae
120	<i>Selaginella</i> sp.	Selaginellaceae
121	<i>Vittaria elongata</i>	Vittariaceae
BRYOPHYTES		
122	<i>Aerobryum</i> sp	Meteoriaceae
123	<i>Brachymerium</i> sp	Bryaceae
124	<i>Bryum billardieri</i>	Bryaceae
125	<i>Desmotheca</i> sp	Orthotrichaceae
126	<i>Hymenostylium</i> sp	Pottiaceae
127	<i>Lyellia</i> sp	Polytrichaceae
128	<i>Plagiobryum</i> sp	Bryaceae
LICHENS		
129	<i>Bulbothrix</i> sp.	Parmeliaceae
130	<i>Cladonia</i> sp.	Cladoniaceae
131	<i>Everniastrum nepalense</i>	Parmeliaceae
132	<i>Graphis</i> sp.	Graphidaceae
133	<i>Heterodermia</i> sp.	Physciaceae
134	<i>Lecanora perplexa</i>	Lecanoraceae
135	<i>Lobaria retigera</i>	Lobariaceae
136	<i>Parmelinella</i> sp.	Parmeliaceae
137	<i>Stereocaulon</i> sp.	Stereocaulaceae
FUNGI		
138	<i>Boletus reticulatus</i>	Boletaceae
139	<i>Coprinus disseminatus</i>	Agaricaceae
140	<i>Daldinia concentrica</i>	Xylariaceae
141	<i>Fomes pinicola</i>	Fomitopsidaceae
142	<i>Gloeophyllum sepiarium</i>	Gloeophyllaceae
143	<i>Hericium erinaceus</i>	Hericiaceae

Sl. No.	Species name	Family
144	<i>Hygrocybe miniata</i>	Hygrophoraceae
145	<i>Lactarius rubidus</i>	Russulaceae
146	<i>Phellinus schweintzii</i>	Hymenochaetaceae
147	<i>Poria monticola</i>	Polyporaceae
148	<i>Tremella mesenterica</i>	Tremellaceae
149	<i>Xylaria polymorpha</i>	Xylariaceae
150	<i>Cerrena consors</i>	Polyporaceae
151	<i>Coltricia cinnamomeus</i>	Hymenochaetaceae
152	<i>Daldinia concentrica</i>	Xylariaceae
153	<i>Daedalea incana</i>	Coriolaceae
154	<i>Flavodon flavus</i>	Meruliaceae
155	<i>Ganoderma lucidum</i>	Ganodermataceae
156	<i>Laccaria laccata</i>	Hydnangiaceae
157	<i>Lenzites acuta</i>	Coriolaceae
158	<i>Phellinus gilvus</i>	Hymenochaetaceae
159	<i>Pycnoporellus sanguineus</i>	Formitopsidaceae
160	<i>Schizophyllum commune</i>	Schizophyllaceae
161	<i>Trametes hirsuta</i>	Polyporaceae
162	<i>Xylaria longipes</i>	Xylariaceae

Appendix II.3.118: Different groups of plant species present at Tawang-II HEP site

Sl. No.	Species name	Family	Sl. No.	Species name	Family
Barrage and Powerhouse			Catchment area		
CLIMBERS			CLIMBERS		
1	<i>Clematis Buchaniana</i>	Ranunculaceae	1	<i>Clematis Buchaniana</i>	Ranunculaceae
2	<i>Cissampelos</i> sp	Menispermaceae	2	<i>Cuscuta reflexa</i>	Cuscutaceae
3	<i>Clematis</i> sp	Ranunculaceae	3	<i>Ficus</i> sp	Moraceae
4	<i>Cuscuta reflexa</i>	Cuscutaceae	4	<i>Hedera nepalensis</i>	Araliaceae
5	<i>Dioscorea bulbifera</i>	Dioscoreaceae	5	<i>Holboellia latifolia</i>	Lardizabalaceae
6	<i>Ficus</i> sp	Moraceae	6	<i>Periploca</i> sp.	Periplocaceae
7	<i>Hedera helix</i>	Araliaceae	7	<i>Rubia cordifolia</i>	Rubiaceae
8	<i>Hedera nepalensis</i>	Araliaceae	8	<i>Stephania glandulifera</i>	Menispermaceae
9	<i>Holboellia latifolia</i>	Lardizabalaceae	ORCHIDS		
10	<i>Periploca</i> sp.	Periplocaceae	1	<i>Bulbophyllum</i> sp	Orchidaceae
11	<i>Rubia cordifolia</i>	Rubiaceae	2	<i>Coelogynae</i> sp.	Orchidaceae
12	<i>Smilax aspera</i>	Smilacaceae	3	<i>Cymbidium</i> sp	Orchidaceae
13	<i>Stephania glandulifera</i>	Menispermaceae	PTERIDOPHYTES		
ORCHIDS			1	<i>Blechnum</i> sp.	Blechnaceae
1	<i>Bulbophyllum</i> sp	Orchidaceae	2	<i>Dicranopteris linearis</i>	Dicranopteridaceae
2	<i>Coelogynae</i> sp.	Orchidaceae	3	<i>Drynaria propinqua</i>	Drynariaceae
3	<i>Cymbidium</i> sp	Orchidaceae	4	<i>Dryopteris wallichiana</i>	Dryopteridaceae
4	<i>Dendrobium</i> sp.	Orchidaceae	5	<i>Dynaria quercifolia</i>	Drynariaceae
5	<i>Oberonia</i> sp	Orchidaceae	6	<i>Lepisorus nudus</i>	Polypodiaceae
PTERIDOPHYTES			7	<i>Lycopodium clavatum</i>	Lycopodiaceae
1	<i>Blechnum</i> sp.	Blechnaceae	8	<i>Neprolepsis cordifolia</i>	Lomariopsidaceae
2	<i>Dicranopteris linearis</i>	Dicranopteridaceae	9	<i>Pteridium aquilinum</i>	Pteridaceae
3	<i>Drynaria propinqua</i>	Drynariaceae	10	<i>Pteris vittata</i>	Pteridaceae
4	<i>Dryopteris wallichiana</i>	Dryopteridaceae	11	<i>Pyrrosia nuda</i>	Polypodiaceae
5	<i>Dynaria quercifolia</i>	Drynariaceae	12	<i>Selaginella</i> sp.	Selaginellaceae
7	<i>Lepisorus nudus</i>	Polypodiaceae	13	<i>Vittaria elongata</i>	Vittariaceae
8	<i>Lycopodium clavatum</i>	Lycopodiaceae	BRYOPHYTES		
9	<i>Asplenium</i> sp	Aspleniaceae	1	<i>Aerobryum</i> sp	Meteoriaceae
10	<i>Neprolepsis cordifolia</i>	Lomariopsidaceae	2	<i>Brachymerium</i> sp	Bryaceae
11	<i>Polypodium</i> sp.	Polypodiaceae	3	<i>Bryum billardieri</i>	Bryaceae
12	<i>Pteridium aquilinum</i>	Pteridaceae	4	<i>Hymenostylium</i> sp	Pottiaceae
13	<i>Pteris</i> sp.	Pteridiaceae	5	<i>Lyellia</i> sp	Polytrichaceae

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Sl. No.	Species name	Family	Sl. No.	Species name	Family
	Barrage and Powerhouse			Catchment area	
14	<i>Pteris vittata</i>	Pteridaceae	6	<i>Plagiobryum</i> sp	Bryaceae
15	<i>Pyrrosia nuda</i>	Polypodiaceae		LICHENS	
16	<i>Pyrrosia</i> sp	Polypodiaceae	1	<i>Bulbothrix</i> sp.	Parmeliaceae
17	<i>Selaginella</i> sp.	Selaginellaceae	2	<i>Cladonia</i> sp.	Cladoniaceae
18	<i>Vittaria elongata</i>	Vittariaceae	3	<i>Everniastrum nepalense</i>	Parmeliaceae
	BRYOPHYTES		4	<i>Graphis</i> sp.	Graphidaceae
1	<i>Aerobryum</i> sp	Meteoriaceae	5	<i>Heterodermia</i> sp.	Physciaceae
2	<i>Brachymerium</i> sp	Bryaceae	6	<i>Lobaria retigera</i>	Lobariaceae
3	<i>Bryum billardieri</i>	Bryaceae	7	<i>Parmelinella</i> sp.	Parmeliaceae
4	<i>Desmotheca</i> sp	Orthotrichaceae	8	<i>Stereocaulon</i> sp.	Stereocaulaceae
5	<i>Hymenostylium</i> sp	Pottiaceae			
6	<i>Lyellia</i> sp	Polytrichaceae			
7	<i>Plagiobryum</i> sp	Bryaceae			
	LICHENS				
1	<i>Bulbothrix</i> sp.	Parmeliaceae			
2	<i>Cladonia</i> sp.	Cladoniaceae			
3	<i>Everniastrum nepalense</i>	Parmeliaceae			
4	<i>Graphis</i> sp.	Graphidaceae			
5	<i>Heterodermia</i> sp.	Physciaceae			
6	<i>Lecanora perplexa</i>	Lecanoraceae			
7	<i>Lobaria retigera</i>	Lobariaceae			
8	<i>Parmelinella</i> sp.	Parmeliaceae			
9	<i>Stereocaulon</i> sp.	Stereocaulaceae			

Appendix II.3.119: Species list of macro-fungi recorded from barrage and powerhouse sites of Tawang-II

Species	Family	Species	Family
Barrage		Powerhouse	
<i>Boletus reticulatus</i>	Boletaceae	<i>Cerrena consors</i>	Polyporaceae
<i>Coprinus disseminatus</i>	Agaricaceae	<i>Coltricia cinnamomeus</i>	Hymenochaetaceae
<i>Daldinia concentrica</i>	Xylariaceae	<i>Daldinia concentrica</i>	Xylariaceae
<i>Fomes pinicola</i>	Fomitopsidaceae	<i>Daedalea incana</i>	Coriolaceae
<i>Gloeophyllum sepiarium</i>	Gloeophyllaceae	<i>Flavodon flavus</i>	Meruliaceae
<i>Hericium erinaceus</i>	Hericiaceae	<i>Ganoderma lucidum</i>	Ganodermataceae
<i>Hygrocybe miniata</i>	Hygrophoraceae	<i>Laccaria laccata</i>	Hydnangiaceae
<i>Lactarius rubidus</i>	Russulaceae	<i>Lenzites acuta</i>	Coriolaceae
<i>Phellinus schweintzii</i>	Hymenochaetaceae	<i>Phellinus gilvus</i>	Hymenochaetaceae
<i>Poria monticola</i>	Polyporaceae	<i>Pycnoporellus sanguineus</i>	Fomitopsidaceae
<i>Tremella mesenterica</i>	Tremellaceae	<i>Schizophyllum commune</i>	Schizophyllaceae
<i>Xylaria polymorpha</i>	Xylariaceae	<i>Trametes hirsuta</i>	Polyporaceae
		<i>Xylaria longipes</i>	Xylariaceae
Catchment area			
Species	Family		
<i>Boletus reticulatus</i>	Boletaceae		
<i>Coprinus disseminatus</i>	Agaricaceae		
<i>Daldinia concentrica</i>	Xylariaceae		
<i>Fomes pinicola</i>	Fomitopsidaceae		
<i>Hericium erinaceus</i>	Hericiaceae		
<i>Hygrocybe miniata</i>	Hygrophoraceae		
<i>Lactarius rubidus</i>	Russulaceae		
<i>Phellinus schweintzii</i>	Hymenochaetaceae		
<i>Poria monticola</i>	Polyporaceae		
<i>Tremella mesenterica</i>	Tremellaceae		
<i>Xylaria polymorpha</i>	Xylariaceae		

Appendix II.3.120: Frequency, density, basal area, and importance value index (IVI) for tree species in Tawang- II HEP barrage site

Sl. No.	Name of species	Post-monsoon				Monsoon				Winter			
		Fr.	Dn.	BA	IVI	Fr.	Dn.	BA	IVI	Fr.	Dn.	BA	IVI
1	<i>Alangium chinensis</i>	32	64	0.79	12.84	32	64	0.79	12.84	32	64	0.79	12.84
2	<i>Albizia arunachalesis</i>	48	136	7.42	32.60	48	136	7.42	32.60	48	136	7.42	32.60
3	<i>Alnus nepalensis</i>	76	580	19.91	88.92	76	580	19.91	88.92	76	580	19.91	88.92
4	<i>Brassaiopsis glomerulata</i>	28	64	1.15	12.54	28	64	1.15	12.54	28	64	1.15	12.54
5	<i>Macaranga denticulata</i>	48	224	8.63	40.28	48	224	8.63	40.28	48	224	8.63	40.28
6	<i>Merillopanax alpinus</i>	24	64	1.08	11.49	24	64	1.08	11.49	24	64	1.08	11.49
7	<i>Pinus wallichiana</i>	60	92	5.33	28.96	60	92	5.33	28.96	60	92	5.33	28.96
8	<i>Quercus griffithi</i>	36	180	10.00	37.07	36	180	10.00	37.07	36	180	10.00	37.07
9	<i>Rhus javanica</i>	40	92	2.64	19.68	40	92	2.64	19.68	40	92	2.64	19.68
10	<i>Saurauia napaulensis</i>	12	16	0.25	4.24	12	16	0.25	4.24	12	16	0.25	4.24
11	<i>Torriceilia tiliifolia</i>	20	36	0.45	7.71	20	36	0.45	7.71	20	36	0.45	7.71
12	<i>Viburnum foetidum</i>	8	24	0.17	3.67	8	24	0.17	3.67	8	24	0.17	3.67
Total		432	1572	57.81	300	432	1572	57.81	300	432	1572	57.81	300

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), B A- Basal area ($\text{m}^2 \text{ha}^{-1}$), IVI- Importance value index

Appendix II.3.121: Frequency, density and IVI of shrubs in Tawang- II barrage site

Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
		Fr.	Dn.	IVI	Fr.	Dn.	IVI	Fr.	Dn.	IVI
1	<i>Ardisia crenata</i>	12	96	2.01	12	96	2.01	12	96	2.01
2	<i>Artemisia nilagirica</i>	76	3696	33.57	76	3696	33.57	76	3696	33.57
3	<i>Boehmeria macrophylla</i>	36	192	5.37	36	192	5.37	36	192	5.37
4	<i>Buddleja asiatica</i>	48	512	8.89	48	512	8.89	48	512	8.89
5	<i>Butea buteiformis</i>	24	368	5.20	24	368	5.20	24	368	5.20
6	<i>Coriaria nepalensis</i>	64	1984	20.65	64	1984	20.65	64	1984	20.65
7	<i>Cyathula tomentosa</i>	40	896	10.58	40	896	10.58	40	896	10.58
8	<i>Debregeasia longifolia</i>	72	592	12.14	72	592	12.14	72	592	12.14
9	<i>Dobinia vulgaris</i>	8	112	1.66	8	112	1.66	8	112	1.66
10	<i>Flemingia macrophylla</i>	60	368	9.27	60	368	9.27	60	368	9.27
11	<i>Hydrangea</i> sp.	12	128	2.22	12	128	2.22	12	128	2.22
12	<i>Indigofera</i> sp.	56	720	11.20	56	720	11.20	56	720	11.20
13	<i>Maesa indica</i>	64	896	13.29	64	896	13.29	64	896	13.29
14	<i>Mussaenda</i> sp.	24	176	3.90	24	176	3.90	24	176	3.90
15	<i>Rubus ellipticus</i>	48	912	11.59	48	912	11.59	48	912	11.59
16	<i>Rubus rugosus</i>	28	208	4.57	28	208	4.57	28	208	4.57
17	<i>Solanum khasianum</i>	136	1488	25.44	136	1488	25.44	136	1488	25.44
18	<i>Urena lobata</i>	20	528	5.83	20	528	5.83	20	528	5.83
19	<i>Woodfordia fruticosa</i>	56	928	12.61	56	928	12.61	56	928	12.61
Total		884	14800	200	884	14800	200	884	14800	200

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), IVI- Importance value index

Appendix II.3.122: Frequency, density and IVI of herbs in Tawang- II barrage site

Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
		Fr.	Dn.	IVI	Fr.	Dn.	IVI	Fr.	Dn.	IVI
1	<i>Achyranthes aspera</i>	30	5000	5.64	32.5	10250	4.41	10	2000	3.99
2	<i>Ageratum conyzoides</i>	30	10500	7.72	47.5	21750	7.71	12.5	4750	6.36
3	<i>Anaphalis margaritacea</i>	32.5	7250	6.81	32.5	8250	4.04			
4	<i>Bidens pilosa</i>	25	6000	5.40	27.5	11250	4.21	12.5	4250	6.06
5	<i>Campanula pallida</i>				37.5	10750	4.89			
6	<i>Cannabis sativa</i>	27.5	10000	7.22	47.5	19000	7.19	22.5	11500	13.26
7	<i>Crassocephalum crepidioides</i>	32.5	7500	6.90	32.5	13500	5.02	20	10250	11.81
8	<i>Cyanoglossum</i> sp.	45	10000	9.41	45	19750	7.14	17.5	6500	8.82
9	<i>Cymbopogon citratus</i>	22.5	3500	4.14	37.5	19500	6.52			
10	<i>Cyperus</i> sp.				30	24000	6.79			
11	<i>Drymaria cordata</i>	45	30500	17.17	57.5	25250	9.13	17.5	11250	11.73
12	<i>Eleusine</i>				35	16000	5.68			
13	<i>Equisetum diffusum</i>	30	18750	10.85	30	15250	5.15	20	8500	10.73

Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
14	<i>Eupatorium adenophorum</i>	20	5500	4.58	37.5	17750	6.19	27.5	9250	13.26
15	<i>Euphorbia hirta</i>	35	13250	9.39	25	12750	4.30			
16	<i>Fagopyrum esculentum</i>	22.5	5000	4.70	32.5	9750	4.32			
17	<i>Fragaria nubicola</i>	27.5	13250	8.45	27.5	18500	5.57	17.5	7000	9.12
18	<i>Galinsoga parviflora</i>	30	10000	7.53	40	26000	7.93	22.5	14000	14.80
19	<i>Galium</i> sp.				25	10750	3.93			
20	<i>Geranium</i> sp.	22.5	5250	4.80	37.5	5750	3.95	17.5	4750	7.74
21	<i>Houttuynia cordata</i>				35	6750	3.95			
22	<i>Hydrocotyle</i> sp.	35	7500	7.21	22.5	8750	3.36	30	4250	10.88
23	<i>Hypoestes</i> sp.				40	14000	5.69			
24	<i>Impatiens bicolor</i>				15	2000	1.53			
25	<i>Impatiens</i> sp.	27.5	7750	6.37	30	17750	5.62			
26	<i>Ipomea</i> sp.				10	2250	1.19			
27	<i>Lindenbergia</i> sp.				7.5	10000	2.44			
28	<i>Lysionanthus</i>				22.5	5750	2.80			
29	<i>Oxalis corniculata</i>	25	13250	8.14	27.5	16750	5.24	17.5	13000	12.80
30	<i>Persicaria capitata</i>	37.5	20750	12.54	40	21750	7.13	22.5	11250	13.11
31	<i>Persicaria chinensis</i>	47.5	13500	11.05	47.5	24500	8.22	32.5	22250	22.62
32	<i>Pimpinella diversifolia</i>	22.5	5000	4.70	35	8250	4.23			
33	<i>Piper pedicellose</i>	10	2000	2.01	17.5	3500	2.00			
34	<i>Plantago erosa</i>	40	18500	12.00	40	18500	6.53	22.5	14250	14.95
35	<i>Seigesbeckia orientalis</i>	15	3500	3.20	30	11500	4.45			
36	<i>Strobilanthes</i>				45	16750	6.58			
37	<i>Urtica dioica</i>	12.5	2250	2.41	27.5	10750	4.12			
38	<i>Verbascum thapsus</i>	7.5	1000	1.32	25	4500	2.76			
39	<i>Vernonia</i> sp.	15	3250	3.10	30	8500	3.89	20	4000	7.97
40	<i>Xanthium strumarium</i>	27.5	4750	5.24	37.5	7250	4.23			
Total		800	264250	200	1302.5	535500	200	362.5	163000	200

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), IVI- Importance value index

Appendix II.3.123: Frequency, density, basal area, and importance value index (IVI) for tree species in Tawang- II HEP Power house site

Sl. No.	Name of species	Post-monsoon				Monsoon				Winter			
		Fr.	Dn.	BA	IVI	Fr.	Dn.	BA	IVI	Fr.	Dn.	BA	IVI
1	<i>Embllica officinalis</i>	72	180	2.31	119.14	72	180	2.31	119.14	72	180	2.31	119.14
2	<i>Ficus auriculata</i>	56	68	1.74	71.02	56	68	1.74	71.02	56	68	1.74	71.02
3	<i>Pinus wallichiana</i>	36	52	1.82	57.34	36	52	1.82	57.34	36	52	1.82	57.34
4	<i>Schima wallichii</i>	36	44	1.63	52.50	36	44	1.63	52.50	36	44	1.63	52.50
Total		200	344	7.49	300	200	344	7.49	300	200	344	7.49	300

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), B A- Basal area ($\text{m}^2 \text{ha}^{-1}$), IVI- Importance value index

Appendix II.3.124: Frequency, density and IVI of shrubs in Tawang- II Power house site

Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
		Fr.	Dn.	IVI	Fr.	Dn.	IVI	Fr.	Dn.	IVI
1	<i>Artemesia nilagirica</i>	60	3120	38.07	60	3120	38.07	60	3120	38.07
2	<i>Buddleja asiatica</i>	28	224	7.47	28	224	7.47	28	224	7.47
3	<i>Coriaria nepalensis</i>	52	2016	27.24	52	2016	27.24	52	2016	27.24
4	<i>Cyathula tomentosa</i>	28	368	8.67	28	368	8.67	28	368	8.67
5	<i>Debregeasia longifolia</i>	28	512	9.88	28	512	9.88	28	512	9.88
6	<i>Flemingia macrophylla</i>	36	720	13.22	36	720	13.22	36	720	13.22
7	<i>Indigofera</i>	32	608	11.48	32	608	11.48	32	608	11.48
8	<i>Maesa indica</i>	40	656	13.48	40	656	13.48	40	656	13.48
9	<i>Rubus ellipticus</i>	36	1040	15.89	36	1040	15.89	36	1040	15.89
10	<i>Rubus rugosus</i>	16	112	4.14	16	112	4.14	16	112	4.14
11	<i>Solanum khasianum</i>	48	752	15.88	48	752	15.88	48	752	15.88
12	<i>Urena lobata</i>	60	944	19.89	60	944	19.89	60	944	19.89
13	<i>Woodfordia fruticosa</i>	36	896	14.69	36	896	14.69	36	896	14.69

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Sl.	Name of species	Post-monsoon			Monsoon			Winter		
Total		500	11968	200	500	11968	200	500	11968	200

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), IVI- Importance value index

Appendix II.3.125: Frequency, density and IVI of herbs in Tawang- II Power house site

Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
		Fr.	Dn.	IVI	Fr.	Dn.	IVI	Fr.	Dn.	IVI
1	<i>Acanthospermum hispidum</i>				20	3000	3.05			
2	<i>Ageratum conyzoides</i>	32.5	10250	12.37	30	14000	7.03	20	7750	11.62
3	<i>Anaphalis margaritacea</i>	15	3250	4.82	22.5	4250	3.66			
4	<i>Bidens pilosa</i>	32.5	6000	9.83	32.5	16250	7.90	15	4000	7.40
5	<i>Campanula pallida</i>				20	3000	3.05			
6	<i>Cannabis sativa</i>	42.5	18750	19.37	42.5	33500	13.50	32.5	22250	25.87
7	<i>Crassocephalum crepidioides</i>	35	10250	12.85	27.5	16750	7.46	17.5	5250	9.06
8	<i>Cyanoglossum</i> sp.	22.5	4750	7.16	20	10750	5.06			
9	<i>Cymbopogon citratus</i>	57.5	28250	27.92	47.5	41250	16.08	35	24000	27.89
10	<i>Cyperus rotundus</i>				30	18500	8.20			
11	<i>Drymaria cordata</i>	22.5	10250	10.45	22.5	16750	6.89			
12	<i>Eleusine coracana</i>				32.5	17750	8.29			
13	<i>Equisetum diffusum</i>	30	4750	8.61	20	5250	3.63	22.5	6750	11.65
14	<i>Eupatorium adenophorum</i>	25	7000	8.99	27.5	11250	6.04	17.5	10000	12.50
15	<i>Eupatorium odoratum</i>				30	19000	8.33			
16	<i>Euphorbia hirta</i>				22.5	6750	4.30			
17	<i>Fagopyrum esculentum</i>				20	5750	3.76			
18	<i>Fragaria nubicola</i>				30	8500	5.61	12.5	3500	6.29
19	<i>Galinsoga parviflora</i>	27.5	15750	14.69	37.5	19750	9.37	17.5	8750	11.59
20	<i>Galium</i> sp.				25	8500	5.04			
21	<i>Geranium</i> sp.	15	3250	4.82	22.5	5250	3.92	15	1750	5.78
22	<i>Hydrocotyle nepalensis</i>				22.5	6000	4.11	10	3000	5.18
23	<i>Impatiens</i> sp.	17.5	4250	5.90	15	3250	2.55			
24	<i>Lindenbergia</i> sp.				20	6500	3.96			
25	<i>Oxalis corniculata</i>	20	6000	7.43	30	16750	7.75	17.5	10500	12.86
26	<i>Persicaria capitata</i>	22.5	7500	8.80	42.5	19000	9.75	17.5	8500	11.41
27	<i>Persicaria chinensis</i>	20	5750	7.28				25	8000	13.31
28	<i>Plantago erosa</i>	25	10250	10.93	45	19750	10.23	20	5750	10.17
29	<i>Seigesbeckia orientalis</i>				20	8500	4.47	22.5	4000	9.66
30	<i>Pimpinella diversifolia</i>				25	4250	3.94			
31	<i>Strobilanthes</i>				20	2750	2.98			
32	<i>Urtica dioica</i>	20	4250	6.38	22.5	4750	3.79			
33	<i>Vernonia</i> sp.	20	4250	6.38	12.5	3000	2.20	15	4500	7.77
34	<i>Xanthium strumarium</i>	17.5	2750	5.01	22.5	6000	4.11			
Total		520	167500	200	880	386250	200	332.5	138250	200

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), IVI- Importance value index

Appendix II.3.126: Frequency, density, basal area, and importance value index (IVI) for tree species in Tawang- II HEP catchment area

Sl. No.	Name of species	Post-monsoon				Monsoon				Winter			
		Fr.	Dn.	BA	IVI	Fr.	Dn.	BA	IVI	Fr.	Dn.	BA	IVI
1	<i>Alangium chinensis</i>	24.00	44.00	0.55	8.36	24.00	44.00	0.55	8.36	24.00	44.00	0.55	8.36
2	<i>Albizzia arunachelesis</i>	60.00	136.00	4.24	29.62	60.00	136.00	4.24	29.62	60.00	136.00	4.24	29.62
3	<i>Alnus nepalensis</i>	76.00	500.00	12.24	73.65	76.00	500.00	12.24	73.65	76.00	500.00	12.24	73.65
4	<i>Cyathea</i> sp.	40.00	60.00	0.92	13.17	40.00	60.00	0.92	13.17	40.00	60.00	0.92	13.17
5	<i>ficus auriculata</i>	36.00	64.00	1.48	14.07	36.00	64.00	1.48	14.07	36.00	64.00	1.48	14.07
6	<i>Macaranga denticulata</i>	64.00	268.00	6.04	42.49	64.00	268.00	6.04	42.49	64.00	268.00	6.04	42.49
7	<i>Pinus wallichiana</i>	44.00	104.00	3.65	23.33	44.00	104.00	3.65	23.33	44.00	104.00	3.65	23.33
8	<i>Quercus griffithi</i>	56.00	224.00	5.27	36.52	56.00	224.00	5.27	36.52	56.00	224.00	5.27	36.52
9	<i>Rhus chinensis</i>	40.00	172.00	1.43	20.87	40.00	172.00	1.43	20.87	40.00	172.00	1.43	20.87
10	<i>Saurauia napaulensis</i>	16.00	32.00	0.51	6.08	16.00	32.00	0.51	6.08	16.00	32.00	0.51	6.08
11	<i>Schima wallichii</i>	32.00	64.00	2.54	16.02	32.00	64.00	2.54	16.02	32.00	64.00	2.54	16.02
12	<i>Toricellia tiliifolia</i>	48.00	64.00	0.52	13.87	48.00	64.00	0.52	13.87	48.00	64.00	0.52	13.87

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Sl.	Name of species	Post-monsoon			Monsoon			Winter		
13	<i>Wendlandia</i> sp.	4.00	12.00	0.21	1.95	4.00	12.00	0.21	1.95	1.95
Total		540	1744	40	300	540	1744	40	300	300

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), BA- Basal area ($\text{m}^2 \text{ha}^{-1}$), IVI- Importance value index

Appendix II.3.127: Frequency, density and IVI of shrubs in Tawang- II catchment area

Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
		Fr.	Dn.	IVI	Fr.	Dn.	IVI	Fr.	Dn.	IVI
1	<i>Ardisia crenata</i>	12	80	2.18	12	80	2.18	12	80	2.18
2	<i>Artemisia nilagirica</i>	64	3792	34.97	64	3792	34.97	64	3792	34.97
3	<i>Boehmeria macrophylla</i>	24	224	4.81	24	224	4.81	24	224	4.81
4	<i>Buddleja asiatica</i>	36	256	6.67	36	256	6.67	36	256	6.67
5	<i>Coriaria nepalensis</i>	36	1072	12.32	36	1072	12.32	36	1072	12.32
6	<i>Cyathula tomentosa</i>	28	544	7.57	28	544	7.57	28	544	7.57
7	<i>Debregeasia longifolia</i>	40	656	9.98	40	656	9.98	40	656	9.98
8	<i>Desmodium</i> sp.	24	224	4.81	24	224	4.81	24	224	4.81
9	<i>Dobinia vulgaris</i>	12	128	2.52	12	128	2.52	12	128	2.52
10	<i>Elaeagnus</i> sp.	12	80	2.18	12	80	2.18	12	80	2.18
11	<i>Flemingia macrophylla</i>	48	864	12.51	48	864	12.51	48	864	12.51
12	<i>Girardinia</i> sp.	32	384	7.01	32	384	7.01	32	384	7.01
13	<i>Hydrangea</i> sp.	36	224	6.44	36	224	6.44	36	224	6.44
14	<i>Indigofera</i>	48	496	9.96	48	496	9.96	48	496	9.96
15	<i>Maesa indica</i>	44	1168	14.07	44	1168	14.07	44	1168	14.07
16	<i>Mussaenda</i> sp.	28	208	5.25	28	208	5.25	28	208	5.25
17	<i>Rubus ellipticus</i>	48	912	12.84	48	912	12.84	48	912	12.84
18	<i>Rubus rugosus</i>	24	224	4.81	24	224	4.81	24	224	4.81
19	<i>Solanum khasianum</i>	52	1184	15.27	52	1184	15.27	52	1184	15.27
20	<i>Urena lobata</i>	52	576	11.06	52	576	11.06	52	576	11.06
21	<i>Woodfordia fruticosa</i>	36	1136	12.76	36	1136	12.76	36	1136	12.76
Total		736	14432	200	736	14432	200	736	14432	200

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), IVI- Importance value index

Appendix II.3.128: Frequency, density and IVI of herbs in Tawang- II catchment area

Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
		Fr.	Dn.	IVI	Fr.	Dn.	IVI	Fr.	Dn.	IVI
1	<i>Achyranthes aspera</i>	30	6000	5.98	37.5	11750	4.91	10	2750	4.82
2	<i>Ageratum conizoides</i>	42.5	12250	9.83	47.5	19000	6.95	20	8500	11.74
3	<i>Anaphalis margrateata</i>	32.5	8250	7.11	32.5	13500	4.84			
4	<i>Bidens pilosa</i>	30	7250	6.43	27.5	13000	4.38	12.5	4250	6.60
5	<i>Campanula pallida</i>				37.5	10250	4.64			
6	<i>Cannabis sativa</i>	27.5	9250	6.84	47.5	13500	5.97	20	9750	12.62
7	<i>Crassocephalum crepidioides</i>	27.5	8250	6.48	32.5	18000	5.64	15	4500	7.49
8	<i>Cymbopogon citratus</i>	17.5	3250	3.40	45	8500	4.89	12.5	3750	6.25
9	<i>Cyperus</i> sp.				40	16750	5.98			
10	<i>Cyanoglossum</i> sp.	35	11250	8.52	35	16750	5.61	20	6750	10.52
11	<i>Drymaria cordata</i>	45	30250	16.70	45	35500	9.69	20	17000	17.69
12	<i>Eleusine coracana</i>				27.5	14000	4.56			
13	<i>Equisetum diffusum</i>	30	10500	7.62	27.5	15750	4.87	22.5	8500	12.47
14	<i>Eupatorium adenophorum</i>	25	11000	7.16	32.5	16250	5.33	27.5	6500	12.52
15	<i>Euphorbia hirta</i>	35	7250	7.07	30	12500	4.48			
16	<i>Fagopyrum esculentum</i>	22.5	7750	5.67	30	15500	5.01			
17	<i>Fragaria nubicola</i>	32.5	15750	9.84	45	21000	7.12	22.5	11750	14.74
18	<i>Galinsoga parviflora</i>	30	15750	9.52	25	18000	5.08	20	12750	14.71
19	<i>Galium</i> sp.				20	5750	2.53			
20	<i>Geranium</i> sp.	30	8000	6.71	32.5	13250	4.80	10	2000	4.30
21	<i>Hydrocotyle nepalensis</i>	35	9750	7.98	40	19500	6.47			
22	<i>Hydrocotyle</i> sp.				40	15250	5.72	12.5	3000	5.72
23	<i>Hypoestes</i> sp.				45	28750	8.49			
24	<i>Impatiens bicolour</i>				22.5	5750	2.71			

Sl.	Name of species	Post-monsoon			Monsoon			Winter		
25	<i>Impatiens</i> sp.	27.5	13250	8.30						
26	<i>Ipomea</i> sp.				25	4250	2.63			
27	<i>Lindenbergia</i> sp.				35	9000	4.23			
28	<i>Lysionanthus</i>				42.5	12000	5.33			
29	<i>Oxalis corniculata</i>				37.5	20750	6.51	17.5	9250	11.54
30	<i>Persicaria capitata</i>	25	18000	9.71	35	14000	5.12	17.5	8250	10.84
31	<i>Persicaria chinensis</i>	37.5	15500	10.38	47.5	26500	8.28	25	7250	12.32
32	<i>Piper pedicellulosum</i>	17.5	2750	3.22	40	4250	3.76			
33	<i>Plantago erosa</i>	47.5	21250	13.74	40	28000	7.98	17.5	10750	12.59
34	<i>Pimpinella diversifolia</i>	40	6250	7.34	30	11000	4.21			
35	<i>Strobilanthes</i>				47.5	21750	7.44			
36	<i>Seigesbeckia orientalis</i>				30	8500	3.77	12.5	3000	5.72
37	<i>Vernonia</i> sp.	22.5	5750	4.94	22.5	8250	3.16	10	2750	4.82
38	<i>Urtica dioica</i>	27.5	7500	6.21	27.5	9000	3.67			
39	<i>Xanthium strumarium</i>	17.5	3000	3.31	25	7750	3.26			
Total		790	275000	200.00	1330	562750	200.00	345	143000	200.00

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), IVI- Importance value index

Appendix II.3.129: Dominant and Co-dominant species determined on the basis of IVI/density values of species in the plant communities at Tawang- II

Community components	Barrage	Powerhouse	Catchment areas
Tree species*			
Dominant	<i>Alnus nepalensis</i>	<i>Embelica officinalis</i>	<i>Alnus nepalensis</i>
Co-Dominant	<i>Macaranga denticulata</i>	<i>Ficus auriculata</i>	<i>Macaranga denticulata</i>
Shrub species**			
Dominant	<i>Artemesia nilagarica</i>	<i>Artemesia nilagarica</i>	<i>Artemesia nelagarica</i>
Co-Dominant	<i>Solanum khasianum</i>	<i>Coriaria nepalensis</i>	<i>Solanum khasianum</i>
Herb species**			
i. Post monsoon season			
Dominant	<i>Drymaria cordata</i>	<i>Cymbopogon citratus</i>	<i>Drymaria cordata</i>
Co-Dominant	<i>Persicaria capitata</i>	<i>Canabis sativus</i>	<i>Plantago major</i>
ii. Monsoon season			
Dominant	<i>Drymaria cordata</i>	<i>Cymbopogon citratus</i>	<i>Drymaria cordata</i>
Co-Dominant	<i>Persicaria chinensis</i>	<i>Canabis sativus</i>	<i>Hypoetes</i> sp.
iii. Winter			
Dominant	<i>Persicaria chinensis</i>	<i>Canabis sativus</i>	<i>Drymaria cordata</i>
Co-Dominant	<i>Plantago major</i>	<i>Cymbopogon citratus</i>	<i>Frageria nubicola</i>

* Dominance based on IVI ** Dominance based on density

Appendix II.3.130: List of plant species recorded from Nyamjang chu HEP sites

Sl. No.	Species name	Family
TREES		
1	<i>Albizia lucida</i>	Mimosaceae
2	<i>Alnus nepalensis</i>	Betulaceae
3	<i>Betula alnoides</i>	Betulaceae
4	<i>Cryptomeria japonica</i>	Cupressaceae
5	<i>Cupressus</i> sp.	Cupressaceae
6	<i>Erythrina arborescens</i>	Papilionaceae
7	<i>Ilex</i> sp.	Aquifoliaceae
8	<i>Juglans regia</i>	Juglandaceae
9	<i>Lyonia ovalifolia</i>	Ericaceae
10	<i>Macaranga denticulata</i>	Euphorbiaceae
11	<i>Morus</i> sp.	Moraceae
12	<i>Populus gamblei</i>	Salicaceae
13	<i>Quercus griffithii</i>	Fagaceae
14	<i>Rhododendron campanulatum</i>	Ericaceae
15	<i>Rhododendron maddenii</i>	Ericaceae

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Sl. No.	Species name	Family
16	<i>Rhododendron nerifolium</i>	Ericaceae
17	<i>Salix</i> sp.	Salicaceae
18	<i>Schima khasiana</i>	Theaceae
	SHRUBS	
19	<i>Artemisia nilagirica</i>	Asteraceae
20	<i>Cotoneaster</i> sp.	Rosaceae
21	<i>Debregaesia longifolia</i>	Urticaceae
22	<i>Drynaria propinqua</i>	Polypodiaceae
23	<i>Elaeagnus</i> sp.	Elaeagnaceae
24	<i>Gaultheria fragrantissima</i>	Ericaceae
25	<i>Maesa indica</i>	Myrsinaceae
26	<i>Mussaenda roxburghii</i>	Rubiaceae
27	<i>Neillia thyrsoflora</i>	Rosaceae
28	<i>Plectranthus coetsa</i>	Lamiaceae
29	<i>Prinsepia utilis</i>	Rosaceae
30	<i>Rhus chinensis</i>	Anacardiaceae
31	<i>Rubus ellipticus</i>	Rosaceae
32	<i>Rubus hypergynus</i>	Rosaceae
33	<i>Rubus rugosus</i>	Rosaceae
34	<i>Saccharum spontaneum</i>	Poaceae
35	<i>Spiraea canescens</i>	Rosaceae
36	<i>Viburnum erubescens</i>	Adoxaceae
	HERBS	
37	<i>Aconogonum</i> sp.	Polygonaceae
38	<i>Anaphalis triplinervis</i>	Asteraceae
39	<i>Anemone vitifolia</i>	Ranunculaceae
40	<i>Axonopus compressus</i>	Poaceae
41	<i>Bidens pilosa</i>	Asteraceae
42	<i>Bistorta</i> sp.	Polygonaceae
43	<i>Blechnum</i> sp.	Blechnaceae
44	<i>Cannabis sativa</i>	Cannabaceae
45	<i>Centella asiatica</i>	Apiaceae
46	<i>Cirsium</i> sp.	Asteraceae
47	<i>Corydalis rutifolia</i>	Papaveraceae
48	<i>Cynoglossum furcatum</i>	Boraginaceae
49	<i>Cypsella bursa-pastoris</i>	Brassicaceae
50	<i>Equisetum</i> sp.	Equisetaceae
51	<i>Fagopyrum dibotrys</i>	Polygonaceae
52	<i>Fragaria indica</i>	Rosaceae
53	<i>Galinsoga parvifolia</i>	Asteraceae
54	<i>Galium asperifolium</i>	Rubiaceae
55	<i>Geranium nepalense</i>	Geraniaceae
56	<i>Gerardinia diversifolia</i>	Urticaceae
57	<i>Gnaphalium</i> sp.	Asteraceae
58	<i>Heracleum</i> sp.	Apiaceae
59	<i>Houttuynia cordata</i>	Saururaceae
60	<i>Hydrocotyle javanica</i>	Apiaceae
61	<i>Inula cappa</i>	Asteraceae
62	<i>Lepisorus nudus</i>	Polypodiaceae
63	<i>Leucas ciliata</i>	Lamiaceae
64	<i>Lycopodium clavatum</i>	Lycopodiaceae
65	<i>Mazus surculosus</i>	Scrophulariaceae
66	<i>Nicandra physalodes</i>	Solanaceae
67	<i>Oenanthe</i> sp.	Apiaceae
68	<i>Oxalis corniculata</i>	Oxalidaceae
69	<i>Parochaetus communis</i>	Papilionaceae
70	<i>Paspalum</i> sp.	Poaceae

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Sl. No.	Species name	Family
71	<i>Periploca</i> sp.	Periplocaceae
72	<i>Pilea lineolatum</i>	Urticaceae
73	<i>Plantago major</i>	Plantaginaceae
74	<i>Poa annua</i>	Poaceae
75	<i>Polygonum capitatum</i>	Polygonaceae
76	<i>Potentilla fulgens</i>	Rosaceae
77	<i>Pouzolzia hirta</i>	Urticaceae
78	<i>Pouzolzia</i> sp.	Urticaceae
79	<i>Pteridium aquilinum</i>	Dennstaedtiaceae
80	<i>Ranunculus scleratus</i>	Ranunculaceae
81	<i>Rosa sericea</i>	Rosaceae
82	<i>Rubia cordifolia</i>	Rubiaceae
83	<i>Rumex nepalensis</i>	Polygonaceae
84	<i>Sedum multicaule</i>	Crassulaceae
85	<i>Selaginella</i> sp.	Selaginellaceae
86	<i>Smithia</i> sp.	Papilionaceae
87	<i>Solanum viarum</i>	Solanaceae
88	<i>Stellaria</i> sp.	Caryophyllaceae
89	<i>Urtica dioica</i>	Urticaceae
90	<i>Viola</i> sp.	Violaceae
91	<i>Vittaria</i> sp.	Vittariaceae
CLIMBERS		
92	<i>Clematis Bucchianiana</i>	Ranunculaceae
93	<i>Clematis</i> sp.	Ranunculaceae
94	<i>Dioscorea bulbifera</i>	Dioscoreaceae
95	<i>Ficus</i> sp.	Moraceae
96	<i>Hedera nepalensis</i>	Araliaceae
97	<i>Periploca</i> sp.	Periplocaceae
98	<i>Rubia cordifolia</i>	Rubiaceae
99	<i>Smilax</i> sp.	Smilacaceae
100	<i>Stephania glandulifera</i>	Menispermaceae
ORCHIDS		
101	<i>Bulbophyllum</i> sp.	Orchidaceae
102	<i>Coelogynae</i> sp.	Orchidaceae
103	<i>Cymbidium</i> sp.	Orchidaceae
104	<i>Dendrobium</i> sp.	Orchidaceae
PTERIDOPHYTES		
105	<i>Adiantum</i> sp.	Adiantaceae
106	<i>Blechnum</i> sp.	Blechnaceae
107	<i>Dicranopteris linearis</i>	Dicranopteridaceae
108	<i>Drynaria propinqua</i>	Drynariaceae
109	<i>Lepisorus nudus</i>	Polypodiaceae
110	<i>Lycopodium clavatum</i>	Lycopodiaceae
111	<i>Osmunda cinnamomea</i>	Osmundaceae
112	<i>Polypodium</i> sp.	Polypodiaceae
113	<i>Pteridium aquilinum</i>	Pteridaceae
114	<i>Pteris</i> sp.	Pteridiaceae
115	<i>Pteris vittata</i>	Pteridaceae
116	<i>Pyrrosia</i> sp.	Crptogrammaceae
117	<i>Selaginella</i> sp.	Selaginellaceae
118	<i>Vittaria elongata</i>	Vittariaceae
BRYOPHYTES		
119	<i>Brachymerium</i> sp.	Bryaceae
120	<i>Bryum billardieri</i>	Bryaceae
121	<i>Funaria</i>	Funariaceae
122	<i>Hymenostylium aurantiacum</i>	Pottiaceae
123	<i>Marchantia</i>	Marchantiaceae

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Sl. No.	Species name	Family
124	<i>Pohlia minor</i>	Mniaceae
LICHENS		
125	<i>Aderkomyces albostrigosus</i>	Gomphillaceae
126	<i>Cladonia</i> sp.	Cladoniaceae
127	<i>Everniastrum nepalense</i>	Parmeliaceae
128	<i>Graphis</i> sp.	Graphidaceae
129	<i>Lecanora perplexa</i>	Lecanoraceae
130	<i>Lobaria</i> sp.	Lobariaceae
131	<i>Parmelaria</i> sp.	Parmeliaceae
132	<i>Parmotrema</i> sp.	Parmeliaceae
133	<i>Stereocaulon</i> sp.	Stereocaulaceae
134	<i>Sticta</i> sp.	Lobariaceae
135	<i>Usnea</i> sp.	Parmeliaceae
FUNGI		
136	<i>Auricularia auriculiformis</i>	Auriculariaceae
137	<i>Boletus reticulatus</i>	Boletaceae
138	<i>Clathrus rubra</i>	Phallaceae
139	<i>Coprinus disseminatus</i>	Agaricaceae
140	<i>Daldinia concentrica</i>	Xylariaceae
141	<i>Fomes pinicola</i>	Fomitopsidaceae
142	<i>Gloeophyllum sepiarium</i>	Gloeophyllaceae
143	<i>Hydnum repandum</i>	Hydnaceae
144	<i>Hygrocybe miniata</i>	Hygrophoraceae
145	<i>Laccaria laccata</i>	Hydnangiaceae
146	<i>Lactarius rubidus</i>	Russulaceae
147	<i>Polyporus arcularius</i>	Polyporaceae
148	<i>Poria monticola</i>	Polyporaceae
149	<i>Schizophyllum commune</i>	Schizophyllaceae
150	<i>Strobilomyces strobilaceus</i>	Boletaceae
151	<i>Thelephora penicillata</i>	Thelephoraceae
152	<i>Xylaria polymorpha</i>	Xylariaceae
153	<i>Cerrena consors</i>	Polyporaceae
154	<i>Coltricia cinnamomeus</i>	Hymenochaetaceae
155	<i>Daldinia concentrica</i>	Xylariaceae
156	<i>Daedalea incana</i>	Coriolaceae
157	<i>Ganoderma lucidum</i>	Ganodermataceae
158	<i>Hexagonia tenuis</i>	Polyporaceae
159	<i>Junghuhnia nitida</i>	Meruliaceae
160	<i>Microporus xanthopus</i>	Polyporaceae
161	<i>Pseudotrametes gibbosa</i>	Polyporaceae
162	<i>Pycnoporellus sanguineus</i>	Formitopsidaceae
163	<i>Trichaptum versatilis</i>	Polyporaceae
164	<i>Trametes hirsuta</i>	Polyporaceae
165	<i>Xylaria longipes</i>	Xylariaceae

Appendix II.3.131: Different groups of plant species present at Nyamjang chu HEP site

Sl. No.	Species name	Family	Sl. No.	Species name	Family
Barrage and Powerhouse			Catchment area		
1	<i>Clematis Buchaniana</i>	Ranunculaceae	1	<i>Clematis Buchaniana</i>	Ranunculaceae
2	<i>Clematis</i> sp.	Ranunculaceae	2	<i>Clematis</i> sp.	Ranunculaceae
3	<i>Dioscorea bulbifera</i>	Dioscoreaceae	3	<i>Dioscorea bulbifera</i>	Dioscoreaceae
4	<i>Ficus</i> sp.	Moraceae	4	<i>Ficus</i> sp.	Moraceae
5	<i>Hedera nepalensis</i>	Araliaceae	5	<i>Hedera nepalensis</i>	Araliaceae
6	<i>Periploca</i> sp.	Periplocaceae	6	<i>Periploca</i> sp.	Periplocaceae
7	<i>Rubia cordifolia</i>	Rubiaceae	7	<i>Rubia cordifolia</i>	Rubiaceae

Sl. No.	Species name	Family	Sl. No.	Species name	Family
	Barrage and Powerhouse			Catchment area	
8	<i>Smilax</i> sp	Smilacaceae	8	<i>Smilax</i> sp	Smilacaceae
9	<i>Stephania glandulifera</i>	Menispermaceae		ORCHIDS	
	ORCHIDS		1	<i>Bulbophyllum</i> sp	Orchidaceae
1	<i>Bulbophyllum</i> sp	Orchidaceae	2	<i>Coelogynae</i> sp.	Orchidaceae
2	<i>Coelogynae</i> sp.	Orchidaceae	3	<i>Cymbidium</i> sp sp	Orchidaceae
3	<i>Cymbidium</i> sp sp	Orchidaceae		PTERIDOPHYTES	
4	<i>Dendrobium</i> sp.	Orchidaceae	1	<i>Adiantum</i> sp.	Adiantaceae
	PTERIDOPHYTES		2	<i>Blechnum</i> sp.	Blechnaceae
1	<i>Adiantum</i> sp.	Adiantaceae	3	<i>Lepisorus nudus</i>	Polypodiaceae
2	<i>Blechnum</i> sp.	Blechnaceae	4	<i>Lycopodium clavatum</i>	Lycopodiaceae
3	<i>Dicranopteris linearis</i>	Dicranopteridaceae	5	<i>Polypodium</i> sp.	Polypodiaceae
4	<i>Drynaria propinqua</i>	Drynariaceae	6	<i>Pteridium aquilinum</i>	Pteridaceae
5	<i>Lepisorus nudus</i>	Polypodiaceae	7	<i>Pteris</i> sp.	Pteridiaceae
6	<i>Lycopodium clavatum</i>	Lycopodiaceae	8	<i>Pyrrosia</i> sp.	Crptogrammaceae
7	<i>Osmunda cinnamomea</i>	Osmundaceae	9	<i>Selaginella</i> sp.	Selaginellaceae
8	<i>Polypodium</i> sp.	Polypodiaceae	10	<i>Vittaria elongata</i>	Vittariaceae
9	<i>Pteridium aquilinum</i>	Pteridaceae		BRYOPHYTES	
10	<i>Pteris</i> sp.	Pteridiaceae	1	<i>Brachymenium</i> sp	Bryaceae
11	<i>Pteris vittata</i>	Pteridaceae	2	<i>Funaria</i>	Funariaceae
12	<i>Pyrrosia</i> sp.	Crptogrammaceae	3	<i>Hymenostylium aurantiacum</i>	Pottiaceae
13	<i>Selaginella</i> sp.	Selaginellaceae	4	<i>Pohlia minor</i>	Mniaceae
14	<i>Vittaria elongata</i>	Vittariaceae		LICHENS	
	BRYOPHYTES		1	<i>Aderkomyces albostrigosus</i>	Gomphillaceae
1	<i>Brachymenium</i> sp	Bryaceae	2	<i>Everniastrum nepalense</i>	Parmeliaceae
2	<i>Bryum billardieri</i>	Bryaceae	3	<i>Graphis</i> sp.	Graphidaceae
3	<i>Funaria</i>	Funariaceae	4	<i>Lecanora perplexa</i>	Lecanoraceae
4	<i>Hymenostylium aurantiacum</i>	Pottiaceae	5	<i>Lobaria</i> sp	Lobariaceae
5	<i>Marchantia</i>	Marchantiaceae	6	<i>Parmelaria</i> sp.	Parmeliaceae
6	<i>Pohlia minor</i>	Mniaceae	7	<i>Stereocaulon</i> sp.	Stereocaulaceae
	LICHENS		8	<i>Sticta</i> sp	Lobariaceae
1	<i>Aderkomyces albostrigosus</i>	Gomphillaceae	9	<i>Usnea</i> sp	Parmeliaceae
2	<i>Cladonia</i> sp.	Cladoniaceae			
3	<i>Everniastrum nepalense</i>	Parmeliaceae			
4	<i>Graphis</i> sp.	Graphidaceae			
5	<i>Lecanora perplexa</i>	Lecanoraceae			
6	<i>Lobaria</i> sp	Lobariaceae			
7	<i>Parmelaria</i> sp.	Parmeliaceae			
8	<i>Parmotrema</i> sp	Parmeliaceae			
9	<i>Stereocaulon</i> sp.	Stereocaulaceae			
10	<i>Sticta</i> sp	Lobariaceae			
11	<i>Usnea</i> sp	Parmeliaceae			

Appendix II.3.132: Species list of macro-fungi recorded from barrage and powerhouse sites of Nyamjang chu

Species	Family	Species	Family
Barrage		Powerhouse	
<i>Auricularia auriculiformis</i>	Auriculariaceae	<i>Cerrena consors</i>	Polyporaceae
<i>Boletus reticulatus</i>	Boletaceae	<i>Coltricia cinnamomeus</i>	Hymenochaetaceae
<i>Clathrus rubra</i>	Phallaceae	<i>Daldinia concentrica</i>	Xylariaceae
<i>Coprinus disseminatus</i>	Agaricaceae	<i>Daedalea incana</i>	Coriolaceae
<i>Daldinia concentrica</i>	Xylariaceae	<i>Ganoderma lucidum</i>	Ganodermataceae
<i>Fomes pinicola</i>	Fomitopsidaceae	<i>Hexagonia tenuis</i>	Polyporaceae
<i>Gloeophyllum sepiarium</i>	Gloeophyllaceae	<i>Junghuhnia nitida</i>	Meruliaceae
<i>Hydnum repandum</i>	Hydnaceae	<i>Laccaria laccata</i>	Hydnangiaceae
<i>Hygrocybe miniata</i>	Hygrophoraceae	<i>Microporus xanthopus</i>	Polyporaceae

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Species	Family	Species	Family
<i>Laccaria laccata</i>	Hydnangiaceae	<i>Pseudotrametes gibbosa</i>	Polyporaceae
<i>Lactarius rubidus</i>	Russulaceae	<i>Pycnoporellus sanguineus</i>	Formitopscidaceae
<i>Polyporus arcularius</i>	Polyporaceae	<i>Schizophyllum commune</i>	Schizophyllaceae
<i>Poria monticola</i>	Polyporaceae	<i>Trichaptum versatilis</i>	Polyporaceae
<i>Schizophyllum commune</i>	Schizophyllaceae	<i>Trametes hirsuta</i>	Polyporaceae
<i>Strobilomyces strobilaceus</i>	Boletaceae	<i>Xylaria longipes</i>	Xylariaceae
<i>Thelephora penicillata</i>	Thelephoraceae		
<i>Xylaria polymorpha</i>	Xylariaceae		
Catchment area			
Species	Family		
<i>Auricularia auriculiformis</i>	Auriculariaceae		
<i>Boletus reticulatus</i>	Boletaceae		
<i>Coprinus disseminatus</i>	Agaricaceae		
<i>Daldinia concentrica</i>	Xylariaceae		
<i>Fomes pinicola</i>	Fomitopsidaceae		
<i>Gloeophyllum sepiarium</i>	Gloeophyllaceae		
<i>Hydnum repandum</i>	Hydnaceae		
<i>Hygrocybe miniata</i>	Hygrophoraceae		
<i>Laccaria laccata</i>	Hydnangiaceae		
<i>Lactarius rubidus</i>	Russulaceae		
<i>Polyporus arcularius</i>	Polyporaceae		
<i>Poria monticola</i>	Polyporaceae		
<i>Schizophyllum commune</i>	Schizophyllaceae		
<i>Xylaria polymorpha</i>	Xylariaceae		

Appendix II.3.133: Frequency, density, basal area, and importance value index (IVI) for tree species in Nyamjang chu barrage site

Sl. No.	Name of species	Monsoon			
		Fr.	Dn.	B A	IVI
1	<i>Alnus nepalensis</i>	45	125	3.12	126.08
2	<i>Cryptomeria japonica</i>	30	20	0.37	31.89
3	<i>Cupressus</i> sp.	20	30	0.51	31.95
4	<i>Ilex</i> sp.	10	10	0.23	13.65
5	<i>Lyonia ovalifolia</i>	10	20	0.39	20.09
6	<i>Morus</i> sp.	10	20	0.12	15.70
7	<i>Rhododendron campanulatum</i>	20	15	0.29	22.61
8	<i>Rhododendron maddenii</i>	20	20	1.12	38.02
	Total	165	260	6.15	300

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), B A- Basal area ($\text{m}^2 \text{ha}^{-1}$), IVI- Importance value index

Appendix II.3.134: Frequency, density and IVI of shrubs in Nyamjang chu barrage site

Sl. No.	Name of species	Monsoon		
		Fr.	Dn.	IVI
1	<i>Artemisia nilagirica</i>	30	140	19.40
2	<i>Elaeagnus</i> sp.	50	590	53.43
3	<i>Gaultheria fragrantissima</i>	30	60	14.66
4	<i>Prinsepia utilis</i>	20	60	10.96
5	<i>Rubus ellipticus</i>	90	650	71.79
6	<i>Plectranthus coetsa</i>	20	40	9.77
7	<i>Spiraea canescens</i>	30	150	19.99
Total		270	1690	200

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), IVI- Importance value index

Appendix II.3.135: Frequency, density and IVI of herbs in Nyamjang chu barrage site

Sl. No.	Name of species	Monsoon		
		Fr.	Dn.	IVI

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Sl. No.	Name of species	Monsoon		
		Fr.	Dn.	IVI
1	<i>Anaphalis triplinervis</i>	20	15000	4.46
2	<i>Axonopus compressus</i>	15	12000	3.44
3	<i>Bidens pilosa</i>	15	13000	3.58
4	<i>Cannabis sativa</i>	35	36000	9.09
5	<i>Centella asiatica</i>	30	33000	8.07
6	<i>Cirsium</i> sp.	40	41000	10.37
7	<i>Cynoglossum furcatum</i>	5	5000	1.28
8	<i>Fagopyrum dibotrys</i>	65	63000	16.37
9	<i>Fragaria indica</i>	25	25000	6.40
10	<i>Galinsoga parviflora</i>	100	98000	25.33
11	<i>Galium asperifolium</i>	5	6000	1.41
12	<i>Gerardinia diversifolia</i>	25	24000	6.27
13	<i>Gnaphalium</i> sp.	15	15000	3.84
14	<i>Houttuynia cordata</i>	20	19000	4.99
15	<i>Hydrocotyl javanica</i>	25	28000	6.79
16	<i>Inula cappa</i>	5	6000	1.41
17	<i>Leucas ciliata</i>	10	7000	2.16
18	<i>Lycopodium clavatum</i>	10	8000	2.30
19	<i>Mazus surculosus</i>	5	4000	1.15
20	<i>Nicandra physalodes</i>	10	8000	2.30
21	<i>Oxalis corniculata</i>	35	37000	9.22
22	<i>Parochaetus communis</i>	15	13000	3.58
23	<i>Paspalum</i> sp.	25	28000	6.79
24	<i>Pouzolzia hirta</i>	20	16000	4.59
25	<i>Pilea lineolatum</i>	10	9000	2.43
26	<i>Plantago major</i>	20	15000	4.46
27	<i>Polygonum capitatum</i>	70	70000	17.92
28	<i>Pteridium aequilinum</i>	5	4000	1.15
29	<i>Ranunculus scleratus</i>	15	12000	3.44
30	<i>Rubia cordifolia</i>	5	1000	0.75
31	<i>Rumex nepalensis</i>	15	11000	3.31
32	<i>Sedum multicaule</i>	15	14000	3.71
33	<i>Selaginella</i> sp.	20	23000	5.51
34	<i>Solanum viarum</i>	15	12000	3.44
35	<i>Stellaria</i> sp.	15	11000	3.31
36	<i>Smythea</i> sp.	10	6000	2.03
37	<i>Urtica dioica</i>	5	5000	1.28
38	<i>Urtica</i> sp.	10	6000	2.03
Total		805	759000	200

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), IVI- Importance value index

Appendix II.3.136: Frequency, density, basal area, and importance value index (IVI) for tree species in Nyamjang chu Power house site

Sl. No.	Name of species	Monsoon			
		Fr.	Dn.	B A	IVI
1	<i>Albizia lucida</i>	20	15	0.71	17.95
2	<i>Alnus nepalensis</i>	60	220	10.53	147.31
3	<i>Erythrina arborescens</i>	20	20	0.67	19.02
4	<i>Macaranga denticulata</i>	50	65	2.67	57.14
5	<i>Quercus griffithii</i>	30	50	2.27	40.96
6	<i>Schima khasiana</i>	20	15	0.65	17.61
Total		200	385	17.5	300

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), B A- Basal area ($\text{m}^2 \text{ha}^{-1}$), IVI- Importance value index

Appendix II.3.137: Frequency, density and IVI of shrubs in Nyamjang chu Power house site

Sl. No.	Name of species	Monsoon		
		Fr.	Dn.	IVI

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1	<i>Artemesia nilagirica</i>	45	215	65.83
2	<i>Cotoneaster</i> sp.	25	40	20.36
3	<i>Debregaesia longifolia</i>	15	25	12.42
4	<i>Elaeagnus</i> sp.	30	55	25.86
5	<i>Maesa indica</i>	10	20	8.96
6	<i>Mussaenda roxburghii</i>	15	45	16.50
7	<i>Neillia thyrsoflora</i>	15	20	11.40
8	<i>Rubus ellipticus</i>	20	30	15.88
9	<i>Saccharum spontaneum</i>	15	15	10.38
10	<i>Spirea canescens</i>	10	15	7.94
11	<i>Viburnum erubescens</i>	5	10	4.48
Total		205	490	200

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), IVI- Importance value index

Appendix II.3.138: Frequency, density and IVI of herbs in Nyamjang chu Power house site

Sl. No.	Name of species	Monsoon		
		Fr.	Dn.	IVI
1	<i>Anaphalis triplinervis</i>	25	21000	11.72
2	<i>Bidens pilosa</i>	35	31000	16.83
3	<i>Centella asiatica</i>	30	27000	14.55
4	<i>Cynoglossum furcatum</i>	10	8000	4.58
5	<i>Equisetum</i> sp.	15	12000	6.87
6	<i>Fagopyrum dibotrys</i>	35	31000	16.83
7	<i>Fragaria indica</i>	25	21000	11.72
8	<i>Galinsoga parvifolia</i>	30	29000	15.09
9	<i>Houttuynia cordata</i>	25	21000	11.72
10	<i>Hydrocotyle javanica</i>	25	23000	12.26
11	<i>Lycopodium clavatum</i>	10	7000	4.31
12	<i>Mazus surculosus</i>	15	13000	7.14
13	<i>Oxalis corniculata</i>	5	4000	2.29
14	<i>Polygonum capitatum</i>	35	31000	16.83
15	<i>Pouzolzia hirta</i>	15	15000	7.68
16	<i>Rubia cordifolia</i>	40	37000	19.67
17	<i>Rumex nepalensis</i>	40	38000	19.94
Total		415	369000	200

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), IVI- Importance value index

Appendix II.3.139: Frequency, density, basal area, and importance value index (IVI) for tree species in Nyamjang chu catchment area

Sl. No.	Name of species	Monsoon			
		Fr.	Dn.	B A	IVI
1	<i>Alnus nepalensis</i>	25	80	1.9	58.31
2	<i>Betula alnoides</i>	15	20	0.43	17.63
3	<i>Cupressus</i> sp.	20	20	0.44	19.84
4	<i>Erythrina arborescens</i>	30	55	0.87	39.68
5	<i>Juglans regia</i>	20	30	0.72	26.39
6	<i>Lyonia ovalifolia</i>	15	15	0.42	16.07
7	<i>Macaranga denticulata</i>	25	45	0.6	31.18
8	<i>Populus gamblei</i>	20	20	0.48	20.37
9	<i>Quercus griffithii</i>	15	10	0.44	14.90
10	<i>Rhododendron campanulatum</i>	15	10	0.63	17.41
11	<i>Rhododendron nerifolium</i>	20	25	0.35	20.09
12	<i>Salix</i> sp.	20	20	0.31	18.13
Total		240	350	7.59	300

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), B A- Basal area ($\text{m}^2 \text{ha}^{-1}$), IVI- Importance value index

Appendix II.3.140: Frequency, density and IVI of shrubs in Nyamjang chu catchment area

Sl. No.	Name of species	Monsoon
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Sl. No.	Name of species	Monsoon		
		Fr.	Dn.	IVI
1	<i>Artemisia nilagirica</i>	80	250	20.76
2	<i>Drynaria propinqua</i>	40	50	7.58
3	<i>Elaeagnus</i> sp.	70	730	37.24
4	<i>Gaultheria fragrantissima</i>	70	160	15.97
5	<i>Prinsepia utilis</i>	60	420	24.24
6	<i>Rhus chinensis</i>	80	250	20.76
7	<i>Rubus ellipticus</i>	110	440	32.13
8	<i>Rubus hypergynus</i>	50	80	10.13
9	<i>Rubus rugosus</i>	60	70	11.18
10	<i>Spiraea canescens</i>	80	230	20.01
Total		700	2680	200

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), IVI- Importance value index

Appendix II.3.141: Frequency, density and IVI of herbs in Nyamjang chu catchment area

Sl. No.	Name of species	Monsoon		
		Fr.	Dn.	IVI
1	<i>Anemone vitifolia</i>	15	14000	3.92
2	<i>Aconogonum</i> sp.	15	15000	4.06
3	<i>Anaphalis triplinervis</i>	75	73000	20.02
4	<i>Bistorta</i> sp.	50	50000	13.54
5	<i>Blechnum</i> sp.	10	10000	2.71
6	<i>Cannabis sativa</i>	35	33000	9.19
7	<i>Cypsella bursa-pastoris</i>	40	37000	10.41
8	<i>Cirsium</i> sp.	5	5000	1.35
9	<i>Corydalis rutifolia</i>	15	11000	3.50
10	<i>Cynoglossum furcatum</i>	5	5000	1.35
11	<i>Fagopyrum dibotrys</i>	30	26000	7.56
12	<i>Fragaria indica</i>	25	24000	6.63
13	<i>Galium asperifolium</i>	10	10000	2.71
14	<i>Geranium nepalense</i>	20	19000	5.27
15	<i>Gerardinia diversifolia</i>	20	18000	5.13
16	<i>Gnaphalium</i> sp.	5	4000	1.21
17	<i>Heracleum</i> sp.	10	7000	2.28
18	<i>Houttuynia cordata</i>	25	21000	6.20
19	<i>Hydrocotyl javanica</i>	40	37000	10.41
20	<i>Lepisorus nudus</i>	10	9000	2.57
21	<i>Mazus surculosus</i>	5	4000	1.21
22	<i>Oenanthe</i> sp.	10	8000	2.43
23	<i>Oxalis corniculata</i>	20	18000	5.13
24	<i>Periploca</i> sp.	25	25000	6.77
25	<i>Pilea lineolatum</i>	10	9000	2.57
26	<i>Piptanthus nepalensis</i>	15	15000	4.06
27	<i>Plantago major</i>	15	13000	3.78
28	<i>Poa annua</i>	60	56000	15.68
29	<i>Polygonum capitatum</i>	60	58000	15.96
30	<i>Potentilla fulgens</i>	5	4000	1.21
31	<i>Pouzolzia</i> sp.	25	23000	6.49
32	<i>Pteridium aequilinum</i>	10	8000	2.43
33	<i>Rosa sericea</i>	15	12000	3.64
34	<i>Rumex nepalensis</i>	10	9000	2.57
35	<i>Solanum viarum</i>	10	6000	2.14
36	<i>Stellaria</i> sp.	5	3000	1.07
37	<i>Viola</i> sp.	5	6000	1.49
38	<i>Stellaria</i> sp.	5	5000	1.35
Total		770	710000	200

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), IVI- Importance value index

Appendix II.3.142: Dominant and Co-dominant species determined on the basis of IVI/density values of species in the plant communities at Nyamjang chu

Community components	Dam site	Powerhouse	Catchment area
Tree species: *			
Dominant	<i>Alnus nepalensis</i>	<i>Macaranga denticulata</i>	<i>Alnus nepalensis</i>
Co-Dominant	<i>Rhododendron maddenii</i>	<i>Alnus nepalensis</i>	<i>Erythrina arborescens</i>
Shrub species: * *			
Dominant	<i>Rubus ellipticus</i>	<i>Artemisia nilagirica</i>	<i>Eleagnus</i> sp.
Co-Dominant	<i>Elaeagnus</i> sp.	<i>Eleagnus</i> sp.	<i>Rubus ellipticus</i>
Herb species: **			
Dominant	<i>Galinsoga parviflora</i>	<i>Rumex nepalensis</i>	<i>Anaphalis triplinervis</i>
Co-Dominant	<i>Polygonum capitatum</i>	<i>Rubia cordifolia</i>	<i>Polygonum capitatum</i>

* Dominance based on IVI; ** Dominance based on density

Appendix II.3.143: List of plant species recorded from Paikangrong chu HEP sites

Sl. No.	Species name	Family
TREES		
1	<i>Alnus nepalensis</i>	Betulaceae
2	<i>Lindera</i> sp	Lauraceae
3	<i>Pinus wallichiana</i>	Pinaceae
4	<i>Quercus griffithii</i>	Fagaceae
5	<i>Quercus serrata</i>	Fagaceae
6	<i>Rhododendron arboreum</i>	Ericaceae
7	<i>Schima wallichii</i>	Theaceae
SHRUBS		
8	<i>Artemisia nilagirica</i>	Asteraceae
9	<i>Berberis</i> sp	Berberidaceae
10	<i>Buddleja asiatica</i>	Buddlejaceae
11	<i>Coriaria nepalensis</i>	Coriariaceae
12	<i>Elaeagnus</i> sp	Elaegnaceae
13	<i>Neillia thyrsiflora</i>	Rosaceae
14	<i>Rubus ellipticus</i>	Rosaceae
15	<i>Triumfetta rhomboidea</i>	Malvaceae
16	<i>Viburnum foetidum</i>	Adoxaceae
HERBS		
17	<i>Ageratum conyzoides</i>	Asteraceae
18	<i>Bidens pilosa</i>	Asteraceae
19	<i>Centella asiatica</i>	Apiaceae
20	<i>Crassocephalum crepidioides</i>	Asteraceae
21	<i>Cyanoglossum</i> sp	Boraginaceae
22	<i>Drymaria cordata</i>	Caryophyllaceae
23	<i>Equisetum</i> sp	Equisetaceae
24	<i>Eupatorium adenophorum</i>	Asteraceae
25	<i>Fragaria nubicola</i>	Rosaceae
26	<i>Galinsoga parviflora</i>	Asteraceae
27	<i>Galium rotundifolium</i>	Rubiaceae
28	<i>Geranium</i> sp	Geraniaceae
29	<i>Oxalis corniculata</i>	Oxalidaceae
30	<i>Peperomia tetraphylla</i>	Piperaceae
31	<i>Plantago major</i>	Plantaginaceae
32	<i>Rumex nepalensis</i>	Polygonaceae
33	<i>Viola pilosa</i>	Violaceae
CLIMBERS		
34	<i>Clematis</i> sp	Ranunculaceae
35	<i>Ficus</i> sp	Moraceae
36	<i>Hedera nepalensis</i>	Araliaceae
37	<i>Periploca</i> sp.	Periplocaceae

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Sl. No.	Species name	Family
38	<i>Rubia cordifolia</i>	Rubiaceae
39	<i>Smilax</i> sp	Smilacaceae
40	<i>Stephania glandulifera</i>	Menispermaceae
ORCHIDS		
41	<i>Bulbophyllum</i> sp	Orchidaceae
42	<i>Calanthe tricarinata</i>	Orchidaceae
43	<i>Coelogynae</i> sp.	Orchidaceae
44	<i>Cymbidium</i> sp	Orchidaceae
45	<i>Dendrobium</i> sp.	Orchidaceae
46	<i>Oberonia</i> sp	Orchidaceae
47	<i>Pleione praecox</i>	Orchidaceae
48	<i>Vanda</i> sp	Orchidaceae
PTERIDOPHYTES		
49	<i>Dicranopteris linearis</i>	Dicranopteridaceae
50	<i>Dynaria quercifolia</i>	Drynariaceae
51	<i>Lepisorus nudus</i>	Polypodiaceae
52	<i>Lycopodium clavatum</i>	Lycopodiaceae
53	<i>Polypodium</i> sp.	Polypodiaceae
54	<i>Pteris</i> sp.	Pteridiaceae
55	<i>Pyrrosia nuda</i>	Polypodiaceae
56	<i>Selaginella</i> sp.	Selaginellaceae
57	<i>Vittaria elongata</i>	Vittariaceae
BRYOPHYTES		
58	<i>Desmotheca</i> sp	Orthotrichaceae
59	<i>Diphyscium</i> sp	Buxbaumiaceae
60	<i>Lyellia</i> sp	Polytrichaceae
LICHENS		
61	<i>Cladonia</i> sp.	Cladoniaceae
62	<i>Graphis</i> sp.	Graphidaceae
63	<i>Lobaria</i> sp	Lobariaceae
64	<i>Parmelia</i> sp	Parmeliaceae
65	<i>Stereocaulon</i> sp	Stereocaulaceae
66	<i>Sticta</i> sp	Lobariaceae
67	<i>Usnea</i> sp	Parmeliaceae
FUNGI		
68	<i>Boletus reticulatus</i>	Boletaceae
69	<i>Coprinus disseminatus</i>	Agaricaceae
70	<i>Daldinia concentrica</i>	Xylariaceae
71	<i>Fomes pinicola</i>	Fomitopsidaceae
72	<i>Hygrocybe miniata</i>	Hygrophoraceae
73	<i>Lactarius rubidus</i>	Russulaceae
74	<i>Polyporus arcularius</i>	Polyporaceae
75	<i>Poria monticola</i>	Polyporaceae
76	<i>Tremella mesenterica</i>	Tremellaceae

Appendix II.3.144: Different groups of plant species present at Paikangrong chu HEP site

Sl. No.	Species name	Family	Sl. No.	Species name	Family
Barrage and Powerhouse			Catchment area		
CLIMBERS			CLIMBERS		
1	<i>Clematis Buchaniana</i>	Ranunculaceae	1	<i>Clematis Buchaniana</i>	Ranunculaceae
2	<i>Cissampelos</i> sp	Menispermaceae	2	<i>Clematis</i> sp	Ranunculaceae
3	<i>Clematis</i> sp	Ranunculaceae	3	<i>Ficus</i> sp	Dioscoreaceae
4	<i>Ficus</i> sp	Dioscoreaceae	4	<i>Hedera nepalensis</i>	Araliaceae
5	<i>Hedera nepalensis</i>	Araliaceae	5	<i>Herpetospermum pedunculatum</i>	Araliaceae
6	<i>Herpetospermum</i>	Araliaceae	6	<i>Holboellia latifolia</i>	Lardizabalaceae

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Sl. No.	Species name	Family	Sl. No.	Species name	Family
	Barrage and Powerhouse			Catchment area	
	<i>pedunculosum</i>				
7	<i>Holboellia latifolia</i>	Lardizabalaceae	7	<i>Periploca</i> sp.	Periplocaceae
8	<i>Periploca</i> sp.	Periplocaceae	8	<i>Rubia cordifolia</i>	Rubiaceae
9	<i>Philadelphus tomentosus</i>	Hydrangeaceae	9	<i>Smilax aspera</i>	Smilacaceae
10	<i>Rubia cordifolia</i>	Rubiaceae	10	<i>Thladiantha cordifolia</i>	Cucubitaceae
11	<i>Smilax aspera</i>	Smilacaceae		ORCHIDS	
12	<i>Stephania glandulifera</i>	Menispermaceae	1	<i>Bulbophyllum</i> sp	Orchidaceae
13	<i>Thladiantha cordifolia</i>	Cucubitaceae	2	<i>Calanthe tricarinata</i>	Orchidaceae
	ORCHIDS		3	<i>Coelogynae</i> sp.	Orchidaceae
1	<i>Bulbophyllum</i> sp	Orchidaceae	4	<i>Cymbidium</i> sp	Orchidaceae
2	<i>Calanthe tricarinata</i>	Orchidaceae	5	<i>Dendrobium</i> sp.	Orchidaceae
3	<i>Coelogynae</i> sp.	Orchidaceae	6	<i>Oberonia</i> sp	Orchidaceae
4	<i>Cymbidium</i> sp	Orchidaceae		PTERIDOPHYTES	
5	<i>Dendrobium</i> sp.	Orchidaceae	1	<i>Botrychium</i> sp	Ophioglossaceae
6	<i>Oberonia</i> sp	Orchidaceae	2	<i>Dicranopteris linearis</i>	Dicranopteridaceae
	PTERIDOPHYTES		3	<i>Dryopteris wallichiana</i>	Dryopteridaceae
1	<i>Botrychium</i> sp	Ophioglossaceae	4	<i>Lepisorus</i> sp.	Polypodiaceae
2	<i>Dicranopteris linearis</i>	Dicranopteridaceae	5	<i>Polypodium</i> sp.	Polypodiaceae
3	<i>Dryopteris wallichiana</i>	Dryopteridaceae	6	<i>Pteris vittata</i>	Pteridaceae
4	<i>Lepisorus</i> sp.	Polypodiaceae	7	<i>Pyrrosia nuda</i>	Polypodiaceae
5	<i>Polypodium</i> sp.	Polypodiaceae	8	<i>Selaginella</i> sp.	Selaginellaceae
6	<i>Pteris</i> sp.	Pteridiaceae		BRYOPHYTES	
7	<i>Pteris vittata</i>	Pteridaceae	1	<i>Funaria</i> sp	Funariaceae
8	<i>Pyrrosia nuda</i>	Polypodiaceae	2	<i>Lyellia</i> sp	Polytrichaceae
9	<i>Selaginella</i> sp.	Selaginellaceae	3	<i>Marchantia</i> sp	Marchantiaceae
	BRYOPHYTES		4	<i>Plagiobryum</i> sp	Bryaceae
1	<i>Desmotecha</i> sp	Orthotrichaceae		LICHENS	
2	<i>Diphyscium</i> sp	Buxbaumiaceae	1	<i>Alectoria</i> sp	Alectoriaceae
3	<i>Funaria</i> sp	Funariaceae	2	<i>Cladonia</i> sp.	Cladoniaceae
4	<i>Lyellia</i> sp	Polytrichaceae	3	<i>Graphis</i> sp.	Graphidaceae
5	<i>Marchantia</i> sp	Marchantiaceae	4	<i>Lobaria</i> sp	Lobariaceae
6	<i>Plagiobryum</i> sp	Bryaceae	5	<i>Parmelia</i> sp	Parmeliaceae
	LICHENS		6	<i>Stereocaulon</i> sp	Stereocaulaceae
1	<i>Alectoria</i> sp	Alectoriaceae	7	<i>Sticta</i> sp	Lobariaceae
2	<i>Cladonia</i> sp.	Cladoniaceae	8	<i>Teloschistes</i> sp	Teloschistaceae
3	<i>Graphis</i> sp.	Graphidaceae	9	<i>Usnea</i> sp	Parmeliaceae
4	<i>Lobaria</i> sp	Lobariaceae			
5	<i>Parmelia</i> sp	Parmeliaceae			
6	<i>Parmotrema</i> sp	Parmeliaceae			
7	<i>Pseudocyphellaria</i> sp	Lobariaceae			
8	<i>Stereocaulon</i> sp	Stereocaulaceae			
9	<i>Sticta</i> sp	Lobariaceae			
10	<i>Teloschistes</i> sp	Teloschistaceae			
11	<i>Usnea</i> sp	Parmeliaceae			
	FUNGI				
	Barrage site			Catchment area	
	<i>Boletus reticulatus</i>	Boletaceae		<i>Boletus reticulatus</i>	Boletaceae
	<i>Coprinus disseminatus</i>	Agaricaceae		<i>Coprinus disseminatus</i>	Agaricaceae
	<i>Daldinia concentrica</i>	Xylariaceae		<i>Daldinia concentrica</i>	Xylariaceae
	<i>Fomes pinicola</i>	Fomitopsidaceae		<i>Fomes pinicola</i>	Fomitopsidaceae
	<i>Hygrocybe miniata</i>	Hygrophoraceae		<i>Lactarius rubidus</i>	Russulaceae
	<i>Lactarius rubidus</i>	Russulaceae		<i>Polyporus arcularius</i>	Polyporaceae
	<i>Polyporus arcularius</i>	Polyporaceae		<i>Poria monticola</i>	Polyporaceae
	<i>Poria monticola</i>	Polyporaceae		<i>Tremella mesenterica</i>	Tremellaceae
	<i>Tremella mesenterica</i>	Tremellaceae			

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Sl. No.	Species name	Family	Sl. No.	Species name	Family
	Barrage and Powerhouse			Catchment area	
	Powerhouse				
	Species	Family			
	<i>Boletus reticulatus</i>	Boletaceae			
	<i>Coprinus disseminatus</i>	Agaricaceae			
	<i>Daldinia concentrica</i>	Xylariaceae			
	<i>Fomes pinicola</i>	Fomitopsidaceae			
	<i>Lactarius rubidus</i>	Russulaceae			
	<i>Poria monticola</i>	Polyporaceae			
	<i>Tremella mesenterica</i>	Tremellaceae			

Appendix II.3.145: Frequency, density, basal area, and importance value index (IVI) for tree species in Paikangrong chu barrage site

Sl. No.	Name of species	Post-monsoon				Monsoon				Winter			
		Fr.	Dn.	BA	IVI	Fr.	Dn.	BA	IVI	Fr.	Dn.	BA	IVI
1	<i>Quercus serrata</i>	60	130	3.73	76.87	60	130	3.73	76.87	60	130	3.73	76.87
2	<i>Alnus nepalensis</i>	40	80	1.39	40.85	40	80	1.39	40.85	40	80	1.39	40.85
3	<i>Schima wallichii</i>	40	60	1.33	36.30	40	60	1.33	36.30	40	60	1.33	36.30
4	<i>Rhododendron arboreum</i>	50	70	1.59	43.81	50	70	1.59	43.81	50	70	1.59	43.81
5	<i>Pinus wallichiana</i>	40	50	1.98	39.68	40	50	1.98	39.68	40	50	1.98	39.68
6	<i>Quercus griffithii</i>	50	80	1.81	47.65	50	80	1.81	47.65	50	80	1.81	47.65
7	<i>Lindera sp.</i>	20	30	0.26	14.83	20	30	0.26	14.83	20	30	0.26	14.83
Total		300	500	12.08	300	300	500	12.08	300	300	500	12.08	300

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), B A- Basal area ($\text{m}^2 \text{ha}^{-1}$), IVI- Importance value index

Appendix II. 3.146: Frequency, density and IVI of shrubs and herbs in Paikangrong chu barrage site

Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
		Fr.	Dn.	IVI	Fr.	Dn.	IVI	Fr.	Dn.	IVI
Shrub										
1	<i>Artemesia nilagarica</i>	36	688	47.34	36	688	47.34	36	688	47.34
2	<i>Buddleja asiatica</i>	44	272	31.33	44	272	31.33	44	272	31.33
3	<i>Coriaria nepalensis</i>	40	272	29.64	40	272	29.64	40	272	29.64
4	<i>Elaeagnus</i>	20	112	13.70	20	112	13.70	20	112	13.70
5	<i>Neilia thyriflora</i>	16	176	14.99	16	176	14.99	16	176	14.99
6	<i>Rubus ellipticus</i>	48	368	37.50	48	368	37.50	48	368	37.50
7	<i>Triumfetta rhomboidea</i>	16	128	12.75	16	128	12.75	16	128	12.75
8	<i>Viburnum foetidum</i>	16	128	12.75	16	128	12.75	16	128	12.75
	Total	236	2144	200	236	2144	200	236	2144	200
Herb										
1	<i>Ageratum conyzoides</i>	24	5200	13.11	36	9200	14.30	28	6400	12.72
2	<i>Bidens pilosa</i>	16	3200	8.45	32	7200	12.03	20	4000	8.60
3	<i>Centella asiatica</i>				20	4800	7.73	16	3600	7.22
4	<i>Crassocephalum crepidioides</i>	24	4000	11.79	24	3600	7.77	16	4400	7.90
5	<i>Cyanoglossum</i> sp.	28	6400	15.66	28	5600	10.04	24	7600	12.69
6	<i>Drymaria cordata</i>	24	9600	17.93	20	13600	13.86	40	20400	27.70
7	<i>Equisetum</i> sp.				24	4800	8.61	24	5200	10.66
8	<i>Eupatorium adenophorum</i>	28	6400	15.66	16	3600	6.02	16	3600	7.22
9	<i>Fragaria nubicola</i>	44	13600	28.49	44	18000	22.18	48	17200	27.08
10	<i>Galinsoga parviflora</i>	20	6000	12.75	24	12800	14.18	28	10000	15.77
11	<i>Galium rotundifolium</i>	20	5200	11.87	32	6800	11.75	12	3200	5.84
12	<i>Geranium</i> sp.	28	4000	13.03	52	7600	16.70	16	3600	7.22
13	<i>Plantago major</i>	32	14400	25.67	28	14800	16.45	36	10800	18.53
14	<i>Peperomia tetraphylla</i>	16	2800	8.01	12	3200	4.86	16	4400	7.90
15	<i>Oxalis corniculata</i>	20	10400	17.58	56	26800	30.94	36	12000	19.54
16	<i>Viola pilosa</i>				8	1200	2.59	8	1600	3.44

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Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
	Total	324	91200	200.00	456	143600	200.00	384	118000	200.00

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), IVI- Importance value index

Appendix II.3.147: Frequency, density, basal area, and importance value index (IVI) for tree species in Paikangrong chu Power house site

Sl. No.	Name of species	Post-monsoon				Monsoon				Winter			
		Fr.	Dn.	BA	IVI	Fr.	Dn.	BA	IVI	Fr.	Dn.	BA	IVI
1	<i>Quercus serrata</i>	70	120	2.82	87.80	70	120	2.82	87.80	70	120	2.82	87.80
2	<i>Alnus nepalensis</i>	40	80	1.14	47.89	40	80	1.14	47.89	40	80	1.14	47.89
3	<i>Schima wallichii</i>	30	50	1.60	41.39	30	50	1.60	41.39	30	50	1.60	41.39
4	<i>Rhododendron arboreum</i>	40	90	1.91	58.28	40	90	1.91	58.28	40	90	1.91	58.28
5	<i>Pinus wallichiana</i>	20	40	1.01	28.51	20	40	1.01	28.51	20	40	1.01	28.51
6	<i>Quercus griffithii</i>	30	50	1.10	36.13	30	50	1.10	36.13	30	50	1.10	36.13
Total		230	430	9.58	300	230	430	9.58	300	230	430	9.58	300

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), B A- Basal area ($\text{m}^2 \text{ha}^{-1}$), IVI- Importance value index

Appendix II.3.148: Frequency, density and IVI of shrubs in Paikangrong chu Power house site

Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
		Fr.	Dn.	IVI	Fr.	Dn.	IVI	Fr.	Dn.	IVI
1	<i>Artemesia nilagarica</i>	44	624	46.35	44	624	46.35	44	624	46.35
2	<i>Buddleja asiatica</i>	28	192	20.00	28	192	20.00	28	192	20.00
3	<i>Coriaria nepalensis</i>	44	368	34.50	44	368	34.50	44	368	34.50
4	<i>Elaeagnus</i>	48	96	23.49	48	96	23.49	48	96	23.49
5	<i>Neilia thyrsoiflora</i>	20	144	14.60	20	144	14.60	20	144	14.60
6	<i>Rubus ellipticus</i>	40	544	41.06	40	544	41.06	40	544	41.06
7	<i>Viburnum foetidum</i>	28	192	20.00	28	192	20.00	28	192	20.00
Total		252	2160	200	252	2160	200	252	2160	200

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), IVI- Importance value index

Appendix II.3.149: Frequency, density and IVI of herbs in Paikangrong chu Power house site

Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
		Fr.	Dn.	IVI	Fr.	Dn.	IVI	Fr.	Dn.	IVI
1	<i>Ageratum conyzoides</i>	28	8000	15.80	36	11200	14.42	28	8000	16.08
2	<i>Bidens pilosa</i>	20	4000	9.65	16	3200	5.25	16	4000	8.67
3	<i>Centella asiatica</i>				36	12400	15.19			
4	<i>Crassocephalum crepidioides</i>	16	6800	11.16	48	10000	16.02	20	6800	12.47
5	<i>Cyanoglossum</i> sp.	44	20000	31.95	32	9200	12.32	28	6000	14.28
6	<i>Drymaria cordata</i>	20	6000	11.56	48	23200	24.59	48	20000	33.24
7	<i>Equisetum</i> sp.				20	4400	6.83	16	4000	8.67
8	<i>Eupatorium adenophorum</i>	16	3600	8.10	12	2800	4.20	16	3600	8.31
9	<i>Fragaria nubicola</i>	48	14000	27.36	48	17200	20.69	32	14000	22.76
10	<i>Galinsoga parviflora</i>	28	10000	17.72	36	13200	15.71	28	10000	17.89
11	<i>Galium rotundifolium</i>	12	2400	5.79	20	4800	7.09	12	3600	7.05
12	<i>Geranium</i> sp.	8	1600	3.86	12	2800	4.20	8	1600	3.98
13	<i>Oxalis corniculata</i>	36	12000	21.96	40	15200	17.81	16	12000	15.89
14	<i>Peperomia tetraphylla</i>	4	1200	2.31	16	3200	5.25	8	2400	4.70
15	<i>Plantago major</i>	28	5600	13.50	36	8800	12.86	20	5600	11.38
16	<i>Rumex nepalensis</i>	36	9200	19.28	48	12400	17.58	20	9200	14.63
Total		344	104400	200	504	154000	200	316	110800	200

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), IVI- Importance value index

Appendix II.3.150: Frequency, density, basal area, and importance value index (IVI) for tree species in Paikangrong chu catchment area

Sl. No.	Name of species	Post-monsoon				Monsoon				Winter			
		Fr.	Dn.	BA	IVI	Fr.	Dn.	BA	IVI	Fr.	Dn.	BA	IVI

Sl.	Name of species	Post-monsoon				Monsoon				Winter			
1	<i>Quercus serrata</i>	40	70	1.29	60.82	40	70	1.29	60.82	40	70	1.29	60.82
2	<i>Alnus nepalensis</i>	40	60	0.61	48.04	40	60	0.61	48.04	40	60	0.61	48.04
3	<i>Rhododendron arboreum</i>	50	120	2.86	103.73	50	120	2.86	103.73	50	120	2.86	103.73
4	<i>Pinus wallichiana</i>	20	30	0.92	32.90	20	30	0.92	32.90	20	30	0.92	32.90
5	<i>Quercus griffithii</i>	40	50	1.27	54.52	40	50	1.27	54.52	40	50	1.27	54.52
Total		190	330	6.96	300	190	330	6.96	300	190	330	6.96	300

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), B A- Basal area ($\text{m}^2 \text{ha}^{-1}$), IVI- Importance value index

Appendix II.3.151: Frequency, density and IVI of shrubs in Paikangrong chu catchment area

Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
		Fr.	Dn.	IVI	Fr.	Dn.	IVI	Fr.	Dn.	IVI
1	<i>Artemesia nilagirica</i>	48	656	52.79	48	656	52.79	48	656	52.79
2	<i>Berberis</i> sp.	20	176	17.52	20	176	17.52	20	176	17.52
3	<i>Buddleja asiatica</i>	32	240	26.12	32	240	26.12	32	240	26.12
4	<i>Coriaria nepalensis</i>	32	272	27.59	32	272	27.59	32	272	27.59
5	<i>Neillia thyrsiflora</i>	20	208	18.99	20	208	18.99	20	208	18.99
6	<i>Rubus ellipticus</i>	48	512	46.17	48	512	46.17	48	512	46.17
7	<i>Triumfetta rhomboidea</i>	12	112	10.81	12	112	10.81	12	112	10.81
Total		212	2176	200	212	2176	200	212	2176	200

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), IVI- Importance value index

Appendix II.3.152: Frequency, density and IVI of herbs in Paikangrong chu catchment area

Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
		Fr.	Dn.	IVI	Fr.	Dn.	IVI	Fr.	Dn.	IVI
1	<i>Ageratum conyzoides</i>	32	8.25	17.89	24	8400	14.17	20	6400	14.13
2	<i>Bidens pilosa</i>	16	4.37	9.19	20	5200	10.16	16	3200	9.27
3	<i>Centella asiatica</i>	16	2.43	7.25	16	3600	7.61	36	12800	26.79
4	<i>Crassocephalum crepidioides</i>	16	4.37	9.19	28	6000	13.04			
5	<i>Cyanoglossum</i> sp.	24	5.83	13.05	28	7200	14.14	24	8400	17.72
6	<i>Drymaria cordata</i>				36	19200	27.32	32	15200	27.87
7	<i>Oxalis corniculata</i>	32	20.39	30.03						
8	<i>Eupatorium adenophorum</i>	36	8.25	19.10	44	9200	20.28	20	7200	14.98
9	<i>Fragaria nubicola</i>	52	17.96	33.62	52	17200	29.79	44	19200	36.52
10	<i>Galinsoga parviflora</i>	28	7.28	15.72	28	8400	15.25	16	6400	12.66
11	<i>Galium rotundifolium</i>	20	4.85	10.88	24	6400	12.33	12	3600	8.23
12	<i>Geranium</i> sp.	12	2.43	6.04	20	3600	8.69	8	1600	4.64
13	<i>Drymaria cordata</i>	32	9.22	18.86	28	9200	15.98	28	7200	17.92
14	<i>Peperomia tetraphylla</i>	16	4.37	9.19	24	5200	11.23	16	3200	9.27
Total		332	100.00	200	372	108800	200	272	94400	200

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), IVI- Importance value index

Appendix II.3.153: Dominant and Co-dominant species determined on the basis of IVI/density values of species in the plant communities at Paikangrong chu site

Community components	Barrage	Powerhouse	Catchment areas
Tree species*			
Dominant	<i>Quercus serrata</i>	<i>Quercus serrata</i>	<i>Rhododendron arboreum</i>
Co-Dominant	<i>Quercus griffithii</i>	<i>Rhododendron arboreum</i>	<i>Quercus serrata</i>
Shrub species*			
Dominant	<i>Artemesia nilagarica</i>	<i>Artemesia nilagarica</i>	<i>Artemesia nilagarica</i>
Co-Dominant	<i>Rubus ellipticus</i>	<i>Rubus ellipticus</i>	<i>Rubus ellipticus</i>
Herb species**			
i. Post monsoon season			
Dominant	<i>Fragaria nubicola</i>	<i>Cynoglossum</i> sp.	<i>Fragaria nubicola</i>
Co-Dominant	<i>Plantago major</i>	<i>Fragaria nubicola</i>	<i>Oxalis corniculata</i>
ii. Monsoon season			
Dominant	<i>Oxalis corniculata</i>	<i>Drymaria cordata</i>	<i>Fragaria nubicola</i>
Co-Dominant	<i>Fragaria nubicola</i>	<i>Fragaria nubicola</i>	<i>Drymaria cordata</i>

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Community components	Barrage	Powerhouse	Catchment areas
iii. Winter			
Dominant	<i>Drymaria cordata</i>	<i>Drymaria cordata</i>	<i>Fragaria nubicola</i>
Co-Dominant	<i>Fragaria nubicola</i>	<i>Fragaria nubicola</i>	<i>Drymaria cordata</i>

* Dominance based on IVI; ** Dominance based on density

Appendix II.3.154: List of plant species recorded from Jaswantgarh Stage-I HEP sites

Sl. No.	SPECIES NAME	FAMILY
TREES		
1	<i>Abies densa</i>	Pinaceae
2	<i>Acer</i> sp	Aceraceae
3	<i>Juniperus</i> sp	Cupressaceae
4	<i>Rhododendron</i> sp	Ericaceae
5	<i>Salix</i> sp	Salicaceae
SHRUBS		
6	<i>Berberis</i> sp	Berberidaceae
7	<i>Periscaria chinensis</i>	Polygonaceae
8	<i>Rhododendron nivale</i>	Ericaceae
9	<i>Rhododendron</i> sp	Ericaceae
10	<i>Rosa</i> sp	Rosaceae
HERBS		
11	<i>Aconogonon alpinum</i>	Polygonaceae
12	<i>Elsholtzia strobilifera</i>	Lamiaceae
13	<i>Fragaria</i> sp	Rosaceae
14	<i>Galinsoga parviflora</i>	Asteraceae
15	<i>Galium</i> sp	Rubiaceae
16	<i>Meconopsis</i> sp	Papaveraceae
17	<i>Polygonum</i> sp	Polygonaceae
18	<i>Primula denticulata</i>	Primulaceae
19	<i>Primula</i> sp	Primulaceae
20	<i>Rumex nepalensis</i>	Polygonaceae
21	<i>Swertia paniculata</i>	gentianaceae
22	<i>Swertia</i> sp	gentianaceae
ORCHIDS		
23	<i>Bulbophyllum</i> sp	Orchidaceae
PTERIDOPHYTES		
24	<i>Equisetum diffusum</i>	Equisetaceae
25	<i>Lycopodium japonicum</i>	Lycopodiaceae
26	<i>Selaginella indica</i>	Selaginellaceae
LICHENS		
27	<i>Cladia</i> sp	Cladoniaceae
28	<i>Stereocaulon</i> sp	Stereocaulaceae
29	<i>Usnea dasaea</i>	Parmeliaceae

Appendix II.3.155: Different groups of plant species present at Jaswantgarh Stage- I HEP site

Sl. No.	Species name	Family	Sl. No.	Species name	Family
Barrage and Powerhouse			Catchment area		
ORCHIDS			ORCHIDS		
1	<i>Bulbophyllum</i> sp	Orchidaceae	1	<i>Bulbophyllum</i> sp	Orchidaceae
PTERIDOPHYTES			PTERIDOPHYTES		
1	<i>Equisetum diffusum</i>	Equisetaceae	1	<i>Lycopodium japonicum</i>	Lycopodiaceae
2	<i>Lycopodium japonicum</i>	Lycopodiaceae	2	<i>Selaginella indica</i>	Selaginellaceae
3	<i>Selaginella indica</i>	Selaginellaceae	LICHENS		
LICHENS			1	<i>Cladia</i> sp	Cladoniaceae
1	<i>Cladia</i> sp	Cladoniaceae	2	<i>Stereocaulon</i> sp	Stereocaulaceae
2	<i>Stereocaulon</i> sp	Stereocaulaceae	3	<i>Usnea dasaea</i>	Parmeliaceae

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Sl. No.	Species name	Family	Sl. No.	Species name	Family
	Barrage and Powerhouse			Catchment area	
3	<i>Usnea dasaea</i>	Parmeliaceae			

Appendix II.3.156: Species list of macro-fungi recorded from barrage and powerhouse sites of Paikangrong

Species	Family	Species	Family
Barrage		Powerhouse	
<i>Boletus reticulatus</i>	Boletaceae	<i>Boletus reticulatus</i>	Boletaceae
<i>Coprinus disseminatus</i>	Agaricaceae	<i>Coprinus disseminatus</i>	Agaricaceae
<i>Daldinia concentrica</i>	Xylariaceae	<i>Daldinia concentrica</i>	Xylariaceae
<i>Fomes pinicola</i>	Fomitopsidaceae	<i>Fomes pinicola</i>	Fomitopsidaceae
<i>Hygrocybe miniata</i>	Hygrophoraceae	<i>Lactarius rubidus</i>	Russulaceae
<i>Lactarius rubidus</i>	Russulaceae	<i>Poria monticola</i>	Polyporaceae
<i>Polyporus arcularius</i>	Polyporaceae	<i>Tremella mesenterica</i>	Tremellaceae
<i>Poria monticola</i>	Polyporaceae		
<i>Tremella mesenterica</i>	Tremellaceae		
Catchment area			
Species	Family		
<i>Boletus reticulatus</i>	Boletaceae		
<i>Coprinus disseminatus</i>	Agaricaceae		
<i>Daldinia concentrica</i>	Xylariaceae		
<i>Fomes pinicola</i>	Fomitopsidaceae		
<i>Lactarius rubidus</i>	Russulaceae		
<i>Polyporus arcularius</i>	Polyporaceae		
<i>Poria monticola</i>	Polyporaceae		
<i>Tremella mesenterica</i>	Tremellaceae		

Appendix II.3.157: Frequency, density, basal area, and importance value index (IVI) for tree species in Jaswantgarh Stage-I barrage site

Sl. No.	Name of species	Post-monsoon				Monsoon				Winter			
		Fr.	Dn.	BA	IVI	Fr.	Dn.	BA	IVI	Fr.	Dn.	BA	IVI
1	<i>Abies densa</i>	70	130	3.7	147.7	70	130	3.7	147.7	70	130	3.7	147.7
2	<i>Acer</i> sp.	40	40	0.8	49.7	40	40	0.8	49.7	40	40	0.8	49.7
3	<i>Juniperus</i> sp.	30	30	0.7	39.3	30	30	0.7	39.3	30	30	0.7	39.3
4	<i>Rhododendron</i> sp.	20	20	1.0	33.9	20	20	1.0	33.9	20	20	1.0	33.9
5	<i>Salix</i> sp.	30	20	0.3	29.4	30	20	0.3	29.4	30	20	0.3	29.4
Total		190	240	6.6	300	190	240	6.6	300	190	240	6.6	300

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), B A- Basal area ($\text{m}^2 \text{ha}^{-1}$), IVI- Importance value index

Appendix II.3.158: Frequency, density and IVI of shrubs in Jaswantgarh Stage- I barrage site

Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
		Fr.	Dn.	IVI	Fr.	Dn.	IVI	Fr.	Dn.	IVI
1	<i>Berberis</i> sp.	24	304	37	24	304	37	24	304	37
2	<i>Rhododendron nivale</i>	56	592	79	56	592	79	56	592	79
3	<i>Rhododendron</i> sp.	40	464	59	40	464	59	40	464	59
4	<i>Rosa</i> sp.	20	144	24	20	144	24	20	144	24
Total		140	1504	200	140	1504	200	140	1504	200

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), IVI- Importance value index

Appendix II.3.159: Frequency, density and IVI of herbs in Jaswantgarh Stage- I barrage site

Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
		Fr.	Dn.	IVI	Fr.	Dn.	IVI	Fr.	Dn.	IVI
1	<i>Aconogonon alpinum</i>	24	9600	30.82	20	4800	12.26	24	3600	23.57
2	<i>Elsholtzia strobilifera</i>	28	8400	30.77	28	4400	14.34	28	10000	41.31
3	<i>Fragaria</i> sp.				32	6800	18.55			
4	<i>Galinsoga parviflora</i>	44	13600	49.10	36	13600	28.12	24	6800	31.19

Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
5	<i>Galium</i> sp.				24	6800	15.98			
6	<i>Meconopsis</i> sp.				16	3600	9.52			
7	<i>Polygonum</i> sp.	20	6000	21.98	44	18000	36.05	24	6800	31.19
8	<i>Primula</i> sp.	40	11200	42.48	68	15600	40.82	32	8400	40.00
9	<i>Swertia</i> sp.				16	3600	9.52			
10	<i>Rumex nepalensis</i>	28	5200	24.85	28	4800	14.83	28	6400	32.74
Total		184	54000	200.00	312	82000	200.00	160	42000	200.00

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), IVI- Importance value index

Appendix II.3.160: Frequency, density, basal area, and importance value index (IVI) for tree species in Jaswantgarh Stage-I Power house site

Sl. No.	Name of species	Post-monsoon				Monsoon				Winter			
		Fr.	Dn.	BA	IVI	Fr.	Dn.	BA	IVI	Fr.	Dn.	BA	IVI
1	<i>Abies densa</i>	50	120	2.38	150.78	50	120	2.38	150.78	50	120	2.38	150.78
2	<i>Acer</i> sp.	30	30	0.62	51.73	30	30	0.62	51.73	30	30	0.62	51.73
3	<i>Juniperus</i> sp.	20	20	0.56	37.59	20	20	0.56	37.59	20	20	0.56	37.59
4	<i>Rhododendron</i> sp.	10	10	0.82	30.66	10	10	0.82	30.66	10	10	0.82	30.66
5	<i>Salix</i> sp.	20	20	0.18	29.24	20	20	0.18	29.24	20	20	0.18	29.24
Total		130	200	4.55	300	130	200	4.55	300	130	200	4.55	300

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), B A- Basal area ($\text{m}^2 \text{ha}^{-1}$), IVI- Importance value index

Appendix II.3.161: Frequency, density and IVI of shrubs in Jaswantgarh Stage- I Power house site

Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
		Fr.	Dn.	IVI	Fr.	Dn.	IVI	Fr.	Dn.	IVI
1	<i>Berberis</i> sp.	20	176	30.80	20	176	30.80	20	176	30.80
2	<i>Periscaria chinensis</i>	28	336	50.58	28	336	50.58	28	336	50.58
3	<i>Rhododendron nivale</i>	40	432	68.26	40	432	68.26	40	432	68.26
4	<i>Rhododendron</i> sp.	20	144	28.13	20	144	28.13	20	144	28.13
5	<i>Rosa</i> sp.	16	112	22.24	16	112	22.24	16	112	22.24
Total		124	1200	200.00	124	1200	200.00	124	1200	200.00

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), IVI- Importance value index

Appendix II.3.162: Frequency, density and IVI of herbs in Jaswantgarh Stage- I Power house site

Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
		Fr.	Dn.	IVI	Fr.	Dn.	IVI	Fr.	Dn.	IVI
1	<i>Aconogonon alpinum</i>	20	4000	28.29	16	4400	13.39	16	3600	20.25
2	<i>Elsholtzia strobilifera</i>	36	10800	61.40	32	7600	24.81	48	17200	76.44
3	<i>Fragaria</i> sp.				36	9200	28.98			
4	<i>Galinsoga parviflora</i>	24	8400	44.42	24	6800	20.41	28	10000	44.51
5	<i>Galium</i> sp.				28	5200	19.32			
6	<i>Meconopsis</i> sp.				28	4800	18.66			
7	<i>Rumex nepalensis</i>	24	7600	42.09	28	5200	19.32	20	4400	25.07
8	<i>Primula denticulata</i>				44	12400	37.32			
9	<i>Primula</i> sp.	16	3600	23.80				28	5600	33.73
10	<i>Swertia</i> sp.				24	5200	17.78			
Total		120	34400	200	260	60800	200	140	40800	200

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), IVI- Importance value index

Appendix II.3.163: Frequency, density, basal area, and importance value index (IVI) for tree species in Jaswantgarh Stage-I catchment area

Sl. No.	Name of species	Post-monsoon				Monsoon				Winter			
		Fr.	Dn.	BA	IVI	Fr.	Dn.	BA	IVI	Fr.	Dn.	BA	IVI
1	<i>Abies densa</i>	50	110	1.72	156.83	50	110	1.72	156.83	50	110	1.72	156.83
2	<i>Acer</i> sp.	20	20	0.67	48.18	20	20	0.67	48.18	20	20	0.67	48.18
3	<i>Juniperus</i> sp.	10	10	0.61	30.68	10	10	0.61	30.68	10	10	0.61	30.68
4	<i>Rhododendron</i> sp.	10	10	0.87	37.09	10	10	0.87	37.09	10	10	0.87	37.09
5	<i>Salix</i> sp.	10	20	0.23	27.27	10	20	0.23	27.27	10	20	0.23	27.27
Total		100	170	4.09	300	100	170	4.09	300	100	170	4.09	300

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), B A- Basal area ($\text{m}^2 \text{ha}^{-1}$), IVI- Importance value index

Appendix II.3.164: Frequency, density and IVI of shrubs in Jaswantgarh Stage- I catchment area

Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
		Fr.	Dn.	IVI	Fr.	Dn.	IVI	Fr.	Dn.	IVI
1	<i>Berberis</i> sp.	20	128	29.24	20	128	29.24	20	128	29.24
2	<i>Rhododendron nivale</i>	48	448	84.61	48	448	84.61	48	448	84.61
3	<i>Rhododendron</i> sp.	40	272	60.12	40	272	60.12	40	272	60.12
4	<i>Rosa</i> sp.	16	128	26.01	16	128	26.01	16	128	26.01
Total		124	976	200	124	976	200	124	976	200

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), IVI- Importance value index

Appendix II.3.165: Frequency, density and IVI of herbs in Jaswantgarh Stage- I catchment area

Sl. No.	Name of species	Post-monsoon			Monsoon			Winter		
		Fr.	Dn.	IVI	Fr.	Dn.	IVI	Fr.	Dn.	IVI
1	<i>Aconogonon alpinum</i>	32	6800	33.52	16	4400	11.94	36	6800	35.50
2	<i>Elsholtzia strobilifera</i>	52	10400	52.96	48	17200	41.09	36	7200	36.38
3	<i>Fragaria</i> sp.				44	12400	33.24			
4	<i>Galinsoga parviflora</i>	40	8400	41.67	36	7200	23.32	16	3600	17.06
5	<i>Galium</i> sp.				16	3600	10.89			
6	<i>Meconopsis</i> sp.				36	4800	20.16			
7	<i>Rumex nepalensis</i>	20	4800	22.22	16	4400	11.94	48	17200	65.33
8	<i>Primula denticulata</i>				40	20400	42.23			
9	<i>Primula</i> sp.	36	12800	49.63				24	7600	30.45
10	<i>Swertia paniculata</i>				8	1600	5.18	16	2800	15.29
Total		180	43200	200	260	76000	200	176	45200	200

Fr.- Frequency percentage, Dn.-Density (ha^{-1}), IVI- Importance value index

Appendix II.3.166: Dominant and co-dominant species determined on the basis of IVI/density values of species in the plant communities at Jaswantgarh

Community components	Dam site	Powerhouse	Catchment area
Tree species: *			
Dominant	<i>Abies densa</i>	<i>Abies densa</i>	<i>Abies densa</i>
Co-Dominant	<i>Acer</i> sp	<i>Acer</i> sp	<i>Acer</i> sp
Shrub species: **			
Dominant	<i>Rhododendron nivale</i>	<i>Rhododendron nivale</i>	<i>Rhododendron nivale</i>
Co-Dominant	<i>Rhododendron</i> sp	<i>Periscaria chinensis</i>	<i>Rhododendron</i> sp
Herb species: **			
i. Post monsoon season			
Dominant	<i>Galinsoga parviflora</i>	<i>Elsholtzia strobilifera</i>	<i>Elsholtzia strobilifera</i>
Co-Dominant	<i>Primula</i> sp	<i>Galinsoga parviflora</i>	<i>Primula</i> sp
ii. Monsoon season			
Dominant	<i>Primula denticulata</i>	<i>Fragaria</i> sp	<i>Primula denticulata</i>
Co-Dominant	<i>Polygonum</i> sp	<i>Primula denticulata</i>	<i>Elsholtzia strobilifera</i>
iii. Winter season			
Dominant	<i>Elsholtzia strobilifera</i>	<i>Elsholtzia strobilifera</i>	<i>Rumex nepalensis</i>
Co-Dominant	<i>Primula denticulata</i>	<i>Galinsoga parviflora</i>	<i>Elsholtzia strobilifera</i>

* Dominance based on IVI; ** Dominance based on density

Appendix II. 3.167: Probable list of Herpetofauna that could occur in Tawang district (Common to all the sites)

Sl. No.	Name	Altitude in m	Project area	IUCN Red List 2013	IWPA 1972 Schedule
A.	Amphibians				
I.	Megophryidae				
1	Mountain Horned Frog (<i>Xenophrys parva</i>)	150-2700	*	LC	
II.	Dicroglossidae				
2	Indian Skipping /Skittering Frog (<i>Euphlyctis cyanophlyctis</i>)	40-2500	*	LC	IV
III.	Rhacophoridae				
3	Twin-spotted Tree Frog (<i>Rhacophorus bipunctatus</i>)	80-2200	*	LC	
4	Large Tree Frog (<i>Rhacophorus maximus</i>)	80-2000	*	LC	
IV.	Salamandridae				
5	Himalayan Newt (<i>Tylototriton verrucosus</i>)	1300-2727	*		
B.	Reptiles				
V.	Agamidae				
6	Jerdon's Forest Lizard (<i>Calotes jerdoni</i>)	500-2500	*	DD	
7	Indian Garden Lizard (<i>Calotes versicolor</i>)	Up to 2700	*	NT	IV
VI.	Geckkonidae				
8	Flat-tailed Gecko (<i>Hemidactylus Platyurus</i>)	50-2500	*	LC	IV
VII.	Anuguidae				
9	Asian Glass Lizard (<i>Ophisaurus gracilis</i>)	500-2500	*	NT	
C.	Snakes				
VIII.	Elapidae				
10	Banded Krait (<i>Bungarus fasciatus</i>)	40-2300	*	NT	IV
11	King Cobra (<i>Ophiophagus hannah</i>)	60-2700	*	NT	II
IX.	Viperidae				
12	Jerdon's Pit Viper (<i>Protobothrops jerdonii</i>)	1300-2700	*		IV
D.	Turtles and Tortoises				
X.	Geoemydidae				
13	Keeled Box Turtle (<i>Cuora mouhotii</i>)	200-2500	*	EN	

Secondary source Ahmed *et al.* (2009) - Project Area: * possibility of occurrence, EN - Endangered, NT - Near threatened, LC – Least concern, DD- Data deficient.

Appendix II.3.168: Check list and ecological status of birds recorded in the Tsa chu-I project area

Sl. No.	Family and species	Common name	FS	MS	CS	PM	M	W	Overall
1	Accipitridae								
1	<i>Milvus migrans lineatus</i>	Black (eared) Kite	C	WV	LC	-	1	0	1
2	<i>Gyps himalayensis</i>	Himalayan Vulture	C	WV	LC	-	0	2	2
2	Apodidae								
3	<i>Apus pacificus</i>	Pacific Swift	I	BV	LC	-	9	0	9
3	Certhiidae								
4	<i>Certhia familiaris mandellii</i>	Eurasian Treecreeper	I	R	LC	-	6	0	6
5	<i>Certhia nepalensis</i>	Rusty-flanked Treecreeper	I	R	LC	-	2	0	2
4	Columbidae								
6	<i>Streptopelia orientalis</i>	Oriental Turtle-dove	G	WV	LC	-	0	2	2
5	Corvidae								
7	<i>Dendrocitta formosae</i>	Grey Treepie	O	R	LC	-	0	1	1
8	<i>Corvus culminatus</i>	Large-billed Crow	O	R	LC	-	0	2	2
9	<i>Nucifraga caryocatactes</i>	Spotted Nutcracker	Nu	R	LC	-	0	4	4
10	<i>Urocissa flavirostris</i>	Yellow-bellied Blue Magpie	C	R	LC	-	2	0	2
6	Emberizidae								
11	<i>Emberiza godlewskii</i>	Godlewski's Bunting	G	R	LC	-	0	9	9
7	Estrildidae								
12	<i>Lon chura punctulata</i>	Scaly-breasted Munia	G	R	LC	-	1	0	1
8	Fringillidae								
13	<i>Carpodacus nepalensis</i>	Dark-breasted Rosefinch	G	R	LC	-	13	2	15

Sl. No.	Family and species	Common name	FS	MS	CS	PM	M	W	Overall
14	<i>Carpodacus edwardsii</i>	Dark-rumped Rosefinch	G	R	LC	-	15	0	15
15	<i>Leucosticte nemoricola</i>	Plain Mountain-finch	G	R	LC	-	42	0	42
16	<i>Mycerobas carripes</i>	White-winged Grosbeak	G	R	LC	-	0	5	5
9	Hirundinidae								
17	<i>Delichon dasypus</i>	Asian House Martin	I	BV	LC	-	113	0	113
10	Motacillidae								
18	<i>Anthus hodgsoni hodgsoni</i>	Olive-backed Pipit	I	R	LC	-	13	0	13
11	Muscicapidae								
19	<i>Phoenicurus ochruros</i>	Black Redstart	I	WV	LC	-	1	0	1
20	<i>Phoenicurus frontalis</i>	Blue-fronted Redstart	I	BV	LC	-	1	2	3
21	<i>Saxicola torquatus indicus</i>	Common Stonechat	I	BV	LC	-	2	0	2
22	<i>Muscicapa ferruginea</i>	Ferruginous Flycatcher	I	BV	LC	-	1	0	1
23	<i>Saxicola ferreus</i>	Grey Bushchat	I	R	LC	-	1	0	1
24	<i>Ficidula strophilata</i>	Orange-gorgeted Flycatcher	I	R	LC	-	5	0	5
25	<i>Rhyacornis fuliginosa</i>	Plumbeous Water-redstart	I	R	LC	-	2	0	2
26	<i>Chaimarrornis leucocephalus</i>	White-capped River-chat	I	R	LC	-	2	0	2
12	Paridae								
27	<i>Parus ater</i>	Coal Tit	I	R	LC	-	2	0	2
28	<i>Parus monticolus</i>	Green-backed Tit	I	R	LC	-	2	0	2
29	<i>Parus rubidiventris</i>	Rufous-vented Tit	I	R	LC	-	3	0	3
13	Prunellidae								
30	<i>Prunella rubeculoides</i>	Robin Accentor	I	WV	LC	-	0	2	2
31	<i>Prunella strophilata</i>	Rufous-breasted Accentor	I	R	LC	-	0	12	12
14	Sylviidae								
32	<i>Phylloscopus reguloides</i>	Blyth's Leaf-Warbler	I	WV	LC	-	12	0	12
33	<i>Phylloscopus pulcher</i>	Buff-barred Warbler	I	BV	LC	-	3	0	3
34	<i>Seicercus castaniceps</i>	Chestnut-crowned Warbler	I	BV	LC	-	2	0	2
35	<i>Phylloscopus coronatus</i>	Eastern Crowned Warbler	I	WV	LC	-	5	0	5
36	<i>Seicercus burkii</i>	Green-crowned Warbler	I	BV	LC	-	3	0	3
37	<i>Phylloscopus trochiloides</i>	Greenish Warbler	I	WV	LC	-	4	0	4
38	<i>Phylloscopus maculipennis</i>	Grey-faced Leaf-warbler	I	R	LC	-	3	0	3
39	<i>Cettia brunnifrons</i>	Grey-sided Bush-Warbler	I	BV	LC	-	3	0	3
40	<i>Phylloscopus chloronotus</i>	Lemon-rumped Leaf Warbler	I	BV	LC	-	4	0	4
15	Timaliidae								
41	<i>Trochalopteron imbricatum</i>	Bhutan Laughingthrush	I	R	LC	-	0	4	4
42	<i>Trochalopteron affine</i>	Black-faced Laughingthrush	I	R	LC	-	3	5	8
43	<i>Trochalopteron erthrocephalum</i>	Red-headed Laughingthrush	I	R	LC	-	1	4	5
16	Troglodytidae								
44	<i>Troglodytes troglodytes</i>	Winter Wren	I	R	LC	-	1	0	1
17	Turdidae								
45	<i>Myophonus caeruleus</i>	Blue Whistling-thrush	I	R	LC	-	4	0	4
46	<i>Turdus albocinctus</i>	White-collared Blackbird	I	R	LC	-	0	1	1

FS: Aq-Aquatic Feeder, C-Carnivores, F-Frugivore, G-Granivore, I-Insectivore, N-Nectarivore, Nc-Nucivore, O-Omnivore, P-Piscivore; MS-Migratory Status-BV-Breeding Visitor, IR-Isolated Record, R-Resident, WV-Winter Visitor; CS-Conservation status-IUCN Red List and WPA-1972 Schedule: VU-Vulnerable, LC-Least Concern; PM-Post monsoon, M-Monsoon, W-Winter

Appendix II.3.169: List of possible mammalian fauna of the Tawang region and contribution of species reported in the Tsa chu-I project area

Sl. No.	Common name	Scientific name	SPA	Conservation status	
	Primates			IUCN	IWPA
1	Arunachal macaque	<i>Macaca munzala</i>		EN	-
2	Assamese macaque	<i>M. assamensis</i>		NT	II
3	Capped langur	<i>Trachypithecus pileatus</i>		VU	I
4	Slow loris	<i>Nycticebus coucang</i>		VU	I
	Ungulates				
5	Barking deer	<i>Muntiacus muntjak</i>		LC	III
6	Bharal	<i>Pseudois nayaur</i>		LC	I

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Sl. No.	Common name	Scientific name	SPA	Conservation status	
7	Chinese goral	<i>Nemorhaedus caudatus</i>		VU	III
8	Himalayan goral	<i>N. goral</i>	*	NT	III
9	Musk deer	<i>Mos chus</i> sp.		EN	-
10	Sambar	<i>Cervus unicolor</i>		VU	III
11	Serow	<i>N. sumatraensis</i>			
12	Wild pig	<i>Sus scrofa</i>	*	LC	III
	Carnivores				
13	Common leopard	<i>Panthera pardus</i>		NT	I
14	Jungle Cat	<i>Felis Chaus</i>	*	LC	II
15	Dhole	<i>Cuon alpinus</i>		EN	II
16	Himalayan black bear	<i>Ursus thibetanus</i>		VU	II
17	Himalayan palm civet	<i>Paguma larvata</i>	*	LC	II
18	Leopard cat	<i>Prionailurus bengalensis</i>		LC	-
19	Otter	<i>Lutra</i> sp.		VU	-
20	Red panda	<i>Ailurus fulgens</i>		VU	I
21	Snow leopard	<i>Uncia uncia</i>		EN	I
22	Yellow-throated marten	<i>Martes flavigula</i>	*	LC	II
	Rodents				
23	Hairy-footed flying squirrel	<i>Belomys pearsonii</i>		DD	II
24	Himalayan marmot	<i>Marmota himalayana</i>		LC	II
25	Himalayan striped squirrel	<i>Tamiops maccllellandi</i>	*	LC	-
26	Orange-bellied Himalayan squirrel	<i>Dremomys lokriah</i>		LC	-
	*Hoary-bellied Himalayan Squirrel	<i>Callosciurus pygerythrus</i>		LC	-
27	Porcupine	<i>Hystrix</i> sp.		LC	IV
	*Chesnut rat	<i>Niviventer fluvescens</i>		LC	V
	Lagomorphs				
28	Large-eared pika	<i>Ochotona macrotis</i>		LC	-
29	Moupin pika	<i>Ochotona thibetana</i>		LC	-
	29 species		6 species R% 20.68%		

Data Source: 1–Mishra et al. 2006, SPA–Species of Project Area, * additional species reported during the study

Appendix II.3.170: Status of birds at Tsa chu-I barrage and powerhouse site

Sl. No.	Family/Genus/Species	Common name	FS	MS	CS	No of birds recorded
1	Accipitridae					
1	<i>Milvus migrans lineatus</i>	Black (eared) Kite	C	WV	LC	1
2	Columbidae					
2	<i>Streptopelia orientalis</i>	Oriental Turtle-dove	G	WV	LC	1
3	Corvidae					
3	<i>Urocissa flavirostris</i>	Yellow-bellied Blue Magpie	C	R	LC	1
4	Motacillidae					
4	<i>Anthus hodgsoni hodgsoni</i>	Olive-backed Pipit	I	R	LC	8
5	<i>Motacilla cinerea</i>	Grey Wagtail	I	WV	LC	2
5	Muscicapidae					
6	<i>Chaimarrornis leucocephalus</i>	White-capped River-chat	I	R	LC	2
7	<i>Ficidula strophiate</i>	Orange-gorgeted Flycatcher	I	R	LC	3
8	<i>Phoenicurus ochruros</i>	Black Redstart	I	WV	LC	5
9	<i>Rhyacornis fuliginosa</i>	Plumbeous Water-redstart	I	R	LC	7
6	Paridae					
10	<i>Parus monticolus</i>	Green-backed Tit	I	R	LC	2
7	Sylviidae					
11	<i>Cettia major</i>	Large/Chest-crowned Bush Warbler	I	R	LC	6
12	<i>Phylloscopus fuligiventer</i>	Smoky Leaf-warbler	I	WV	LC	2
13	<i>Phylloscopus pulcher</i>	Orange-barred Leaf-warbler	I	WV	LC	1
14	<i>Phylloscopus reguloides</i>	Blyth's Leaf-warbler	I	WV	LC	4
15	<i>Phylloscopus trochiloides</i>	Greenish Warbler	I	WV	LC	5
16	<i>Seicercus burkii</i>	Green-crowned Warbler	I	BV	LC	5

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Sl. No.	Family/Genus/Species	Common name	FS	MS	CS	No of birds recorded
17	<i>Seicercus castaniceps</i>	Chestnut-crowned Warbler	I	BV	LC	2
8	Timaliidae					
18	<i>Trochalopteron affine</i>	Black-faced Laughing thrush	I	R	LC	5
9	Troglodytidae					
19	<i>Troglodytes troglodytes</i>	Winter Wren	I	R	LC	1
10	Turdidae					
20	<i>Monticola solitarius</i>	Blue Rock-thrush	I	WV	LC	1
21	<i>Myophonus caeruleus</i>	Blue Whistling-thrush	I	R	LC	2

FS-Foraging Status: C–Carnivores, G–Granivore, I–Insectivore; MS–Migratory Status–BV–Breeding Visitor, R–Resident, WV–Winter Visitor; CS–Conservation status–IUCN Red List and WPA–1972 Schedule: LC–Least Concern

Appendix II.3.171: Check List and ecological status of birds recorded in the proposed Tsa chu–I Lower HEP area

Sl. No.	Family and species	Common name	FS	MS	CS	PM	M	W	Overall
1	Accipitridae								
1	<i>Milvus migrans lineatus</i>	Black (eared) Kite	C	WV	LC		2	0	2
2	<i>Gyps himalayensis</i>	Himalayan Vulture	C	WV	LC		0	2	2
2	Apodidae								
3	<i>Apus pacificus</i>	Pacific Swift	I	BV	LC		9	0	9
3	Columbidae								
4	<i>Streptopelia orientalis</i>	Oriental Turtle-dove	G	WV	LC		1	2	3
5	<i>Columba leuconota</i>	Snow Pigeon	G	R	LC		76	0	76
4	Corvidae								
6	<i>Dendrocitta formosae</i>	Grey Treepie	O	R	LC		0	1	1
7	<i>Corvus culminatus</i>	Large-billed Crow	O	R	LC		0	2	2
8	<i>Nucifraga caryocatactes</i>	Spotted Nutcracker	Nu	R	LC		0	4	4
9	<i>Urocissa flavirostris</i>	Yellow-bellied Blue Magpie	C	R	LC		1	0	1
5	Emberizidae								
10	<i>Emberiza godlewskii</i>	Godlewski's Bunting	G	R	LC		0	9	9
6	Estrildidae								
11	<i>Lonchura punctulata</i>	Scaly-breasted Munia	G	R	LC		1	0	1
7	Fringillidae								
12	<i>Carpodacus nepalensis</i>	Dark-breasted Rosefinch	G	R	LC		0	2	2
13	<i>Mycerobas carinipes</i>	White-winged Grosbeak	G	R	LC		0	5	5
8	Hirundinidae								
14	<i>Delichon dasypus</i>	Asian House Martin	I	BV	LC		113	0	113
9	Motacillidae								
15	<i>Motacilla cinerea</i>	Grey Wagtail	I	WV	LC		2	0	2
16	<i>Anthus hodgsoni hodgsoni</i>	Olive-backed Pipit	I	R	LC		13	0	13
17	<i>Motacilla alba alboides</i>	White Wagtail	I	WV	LC		3	0	3
10	Muscicapidae								
18	<i>Phoenicurus ochruros</i>	Black Redstart	I	WV	LC		6	0	6
19	<i>Phoenicurus frontalis</i>	Blue-fronted Redstart	I	BV	LC		0	2	2
20	<i>Saxicola ferreus</i>	Grey Bushchat	I	R	LC		1	0	1
21	<i>Ficedula strophilata</i>	Orange-gorgeted Flycatcher	I	R	LC		7	0	7
22	<i>Rhyacornis fuliginosa</i>	Plumbeous Water-redstart	I	R	LC		12	0	12
23	<i>Chaimarrornis leucocephalus</i>	White-capped River-chat	I	R	LC		2	0	2
11	Paridae								
24	<i>Parus monticolus</i>	Green-backed Tit	I	R	LC		2	0	2
12	Prunellidae								
25	<i>Prunella rubeculoides</i>	Robin Accentor	I	WV	LC		0	2	2
26	<i>Prunella strophilata</i>	Rufous-breasted Accentor	I	R	LC		0	12	12
13	Sylviidae								
27	<i>Phylloscopus reguloides</i>	Blyth's Leaf-Warbler	I	WV	LC		10	0	10
28	<i>Phylloscopus pulcher</i>	Buff-barred Warbler	I	BV	LC		1	0	1
29	<i>Seicercus castaniceps</i>	Chestnut-crowned Warbler	I	BV	LC		2	0	2
30	<i>Phylloscopus coronatus</i>	Eastern Crowned Warbler	I	WV	LC		6	0	6
31	<i>Seicercus burkii</i>	Green-crowned Warbler	I	BV	LC		5	0	5

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Sl. No.	Family and species	Common name	FS	MS	CS	PM	M	W	Overall
32	<i>Phylloscopus trochiloides</i>	Greenish Warbler	I	WV	LC		10	0	10
33	<i>Phylloscopus maculipennis</i>	Grey-faced Leaf-warbler	I	R	LC		2	0	2
34	<i>Cettia brunnifrons</i>	Grey-sided Bush-Warbler	I	BV	LC		1	0	1
35	<i>Cettia flavolivacea</i>	Himalayan' Aberrant Bush-warbler	I	WV	LC		2	0	2
36	<i>Phylloscopus fuligiventer</i>	Smoky Leaf-warbler	I	WV	LC		2	0	2
14	Timaliidae								
37	<i>Trochaloxyeron imbricatum</i>	Bhutan Laughingthrush	I	R	LC		0	4	4
38	<i>Trochaloxyeron affine</i>	Black-faced Laughingthrush	I	R	LC		5	5	10
39	<i>Trachalopteron erthrocephalum</i>	Red-headed Laughingthrush	I	R	LC		1	4	5
15	Troglodytidae								
40	<i>Troglodytes troglodytes</i>	Winter Wren	I	R	LC		1	0	1
16	Turdidae								
41	<i>Monticola solitarius</i>	Blue Rock-thrush	I	WV	LC		1	0	1
42	<i>Myophonus caeruleus</i>	Blue Whistling-thrush	I	R	LC		7	0	7
43	<i>Turdus albocinctus</i>	White-collared Blackbird	I	R	LC		0	1	1

FS : Aq-Aquatic Feeder, C -Carnivores, F -Frugivore, G -Granivore, I -Insectivore, N -Nectarivore, Nc -Nucivore, O -Omnivore, P -Piscivore; MS -Migratory Status -BV -Breeding Visitor, IR -Isolated Record, R -Resident, WV -Winter Visitor; CS -Conservation status -IUCN Red List and WPA-1972 Schedule: VU -Vulnerable, LC -Least Concern; PM-Post monsoon, M -Monsoon, W -Winter

Appendix II.3.172: List of possible mammalian fauna of the Tawang region and contribution of species reported in the Tsa chu-I Lower HEP Area

Sl. No.	Common name	Scientific name	SPA	Conservation status	
	Primates			IUCN	IWPA
1	Arunachal macaque	<i>Macaca munzala</i>		EN	-
2	Assamese macaque	<i>M. assamensis</i>		NT	II
3	Capped langur	<i>Trachypithecus pileatus</i>		VU	I
4	Slow loris	<i>Nycticebus coucang</i>		VU	I
	Ungulates				
5	Barking deer	<i>Muntiacus muntjak</i>		LC	III
6	Bharal	<i>Pseudois nayaur</i>		LC	I
7	Chinese goral	<i>Nemorhaedus caudatus</i>		VU	III
8	Himalayan goral	<i>N. goral</i>	*	NT	III
9	Musk deer	<i>Mos chus</i> sp.		EN	-
10	Sambar	<i>Cervus unicolor</i>		VU	III
11	Serow	<i>N. sumatraensis</i>			
12	Wild pig	<i>Sus scrofa</i>	*	LC	III
	Carnivores				
13	Common leopard	<i>Panthera pardus</i>		NT	I
14	Jungle Cat	<i>Felis Chaus</i>	*	LC	II
15	Dhole	<i>Cuon alpinus</i>		EN	II
16	Himalayan black bear	<i>Ursus thibetanus</i>		VU	II
17	Himalayan palm civet	<i>Paguma larvata</i>		LC	II
18	Leopard cat	<i>Prionailurus bengalensis</i>		LC	-
19	Otter	<i>Lutra</i> sp.		VU	-
20	Red panda	<i>Ailurus fulgens</i>		VU	I
21	Snow leopard	<i>Uncia uncia</i>		EN	I
22	Yellow-throated marten	<i>Martes flavigula</i>	*	LC	II
	Rodents				
23	Hairy-footed flying squirrel	<i>Belomys pearsonii</i>		DD	II
24	Himalayan marmot	<i>Marmota himalayana</i>		LC	II
25	Himalayan striped squirrel	<i>Tamiops maclellandi</i>	*	LC	-
26	Orange-bellied Himalayan squirrel	<i>Dremomys lokriah</i>	*	LC	-
	*Hoary-bellied Himalayan Squirrel	<i>Callosciurus pygerythrus</i>		LC	-
27	Porcupine	<i>Hystrix</i> sp.		LC	IV
	*Chesnut rat	<i>Niviventer flavescent</i>		LC	V

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Sl. No.	Common name	Scientific name	SPA	Conservation status	
	Lagomorphs				
28	Large-eared pika	<i>Ochotona macrotis</i>		LC	–
29	Moupin pika	<i>Ochotona thibetana</i>		LC	–
	29 species		6 species R% 20.68%		

Data Source: 1–Mishra et al 2006, SPA–Species of Project Area, * Additional species reported during the Study

Appendix II.3.173: Status of birds at barrage and powerhouse site of Tsa chu–I Lower

Sl. No.	Family/Genus/Species	Common name	FS	MS	CS	No of birds recorded
1	Apodidae					
1	<i>Aerodramus brevirostris</i>	Himalayan Swiftlet	I	R	LC	5
2	Certhiidae					
2	<i>Certhia nepalensis</i>	Rusty-flanked Treecreeper	I	R	LC	3
3	Dicruridae					
3	<i>Dicrurus leucophaeus</i>	Ashy Drongo	O	WV	LC	4
4	<i>Dicrurus macrocercus</i>	Black Drongo	O	R	LC	2
4	Fringillidae					
5	<i>Fringilla montifringilla</i>	Brambling	I	IR	LC	4
5	Hirundinidae					
6	<i>Delichon dasypus</i>	Asian House Martin	I	BV	LC	3
7	<i>Delichon nipalense</i>	Nepal House Martin	I	R	LC	8
6	Leiothrichidae					
8	<i>Heterophasia capistrata</i>	Rufous Sibia	O	R	LC	4
7	Muscicapidae					
9	<i>Enicurus scouleri</i>	Little Forktail	I	R	LC	1
10	<i>Phoenicurus frontalis</i>	Blue-fronted Redstart	I	BV	LC	4
11	<i>Phoenicurus hodgsoni</i>	Hodgson's Redstart	I	WV	LC	1
8	Nectariniidae					
12	<i>Aethopyga nipalensis</i>	Green-tailed Sunbird	N	R	LC	2
9	Paridae					
13	<i>Melanochlora sultanea</i>	Sultan Tit	I	R	LC	2
14	<i>Parus dichrous</i>	Grey-crested Tit	I	R	LC	2
15	<i>Parus monticolus</i>	Green-backed Tit	I	R	LC	2
10	Prunellidae					
16	<i>Prunella immaculata</i>	Maroon-backed Accentor	I	WV	LC	9
11	Pycnonotidae					
17	<i>Hemixos flava</i>	Ashy Bulbul	O	R	LC	1
18	<i>Hypsipetes leucocephalus</i>	Himalayan Black Bulbul	O	R	LC	2
12	Stenostiridae					
19	<i>Culicicapa ceylonensis</i>	Grey-headed Canary-flycatcher	I	BV	LC	2
13	Sylviidae					
20	<i>Phylloscopus coronatus</i>	Eastern Crowned Warbler	I	WV	LC	3
21	<i>Phylloscopus reguloides</i>	Blyth's Leaf-warbler	I	WV	LC	1
22	<i>Phylloscopus trochiloides</i>	Greenish Warbler	I	WV	LC	1
23	<i>Phylloscopus xanthoschistos</i>	Grey-hooded Warbler	I	R	LC	4
14	Timaliidae					
24	<i>Trachalopteron erthrocephalum</i>	Red-headed Laughingthrush	I	R	LC	3
25	<i>Trochalopteron affine</i>	Black-faced Laughingthrush	I	R	LC	3
26	<i>Trochalopteron imbricatum</i>	Bhutan Laughing Thrush	I	R	LC	5
15	Turdidae					
27	<i>Monticola cinclorhyn chus</i>	Blue-headed Rock-thrush	I	BV	LC	2
28	<i>Myophonus caeruleus</i>	Blue Whistling-thrush	I	R	LC	4

FS–Foraging Status: I –Insectivore, N –Nectarivore, Nc –Nucivore, O –Omnivore, MS –Migratory Status –BV –Breeding Visitor, IR –Isolated Record, R –Resident, WV –Winter Visitor; CS –Conservation status –IUCN Red List and WPA–1972 Schedule: LC –Least Concern

Appendix II.3.174: Ecological status of birds recorded in the Tsa chu-II HEP area

Sl. No.	Family and Species	Common name	FS	MS	CS	PM	M	W	Overall
1	Accipitridae								
1	<i>Gyps himalayensis</i>	Himalayan Vulture	C	WV	LC	-	0	2	2
2	Apodidae								
2	<i>Aerodramus brevirostris</i>	Himalayan Swiftlet	I	R	LC	-	22	0	22
3	Certhiidae								
3	<i>Certhia familiaris mandellii</i>	Eurasian Treecreeper	I	R	LC	-	2	0	2
4	Columbidae								
4	<i>Streptopelia orientalis</i>	Oriental Turtle-dove	G	WV	LC	-	0	2	2
5	Corvidae								
5	<i>Dendrocitta formosae</i>	Grey Treepie	O	R	LC	-	0	1	1
6	<i>Corvus culminatus</i>	Large-billed Crow	O	R	LC	-	0	2	2
7	<i>Nucifraga caryocatactes</i>	Spotted Nutcracker	Nu	R	LC	-	0	4	4
6	Dicaeidae								
8	<i>Dicaeum ignipectus</i>	Fire-breasted Flowerpecker	N	R	LC	-	2	0	2
7	Emberizidae								
9	<i>Emberiza godlewskii</i>	Godlewski's Bunting	G	R	LC	-	0	9	9
8	Fringillidae								
10	<i>Carpodacus nepalensis</i>	Dark-breasted Rosefinch	G	R	LC	-	3	2	5
11	<i>Mycerobas carinipes</i>	White-winged Grosbeak	G	R	LC	-	0	5	5
9	Hirundinidae								
12	<i>Delichon dasypus</i>	Asian House Martin	I	BV	LC	-	52	0	52
13	<i>Delichon nipalense</i>	Nepal House-martin	I	R	LC	-	32	0	32
10	Leiothrichidae								
14	<i>Heterophasia capistrata</i>	Rufous Sibia	O	R	LC	-	9	0	9
11	Motacillidae								
15	<i>Anthus hodgsoni hodgsoni</i>	Olive-backed Pipit	I	R	LC	-	5	0	5
12	Muscicapidae								
16	<i>Phoenicurus ochruros</i>	Black Redstart	I	WV	LC	-	2	0	2
17	<i>Phoenicurus frontalis</i>	Blue-fronted Redstart	I	BV	LC	-	0	2	2
18	<i>Muscicapa sibirica</i>	Dark-sided Flycatcher	I	BV	LC	-	1	0	1
19	<i>Ficidula strophilata</i>	Orange-gorgeted Flycatcher	I	R	LC	-	3	0	3
20	<i>Rhyacornis fuliginosa</i>	Plumbeous Water-redstart	I	R	LC	-	5	0	5
21	<i>Chaimarrornis leucocephalus</i>	White-capped River-chat	I	R	LC	-	3	0	3
13	Paridae								
22	<i>Parus monticolus</i>	Green-backed Tit	I	R	LC	-	5	0	5
14	Prunellidae								
23	<i>Prunella rubeculoides</i>	Robin Accentor	I	WV	LC	-	0	2	2
24	<i>Prunella strophilata</i>	Rufous-breasted Accentor	I	R	LC	-	0	12	12
15	Stenostiridae								
25	<i>Culicicapa ceylonensis</i>	Grey-headed Canary-flycatcher	I	BV	LC	-	1	0	1
16	Sylviidae								
26	<i>Phylloscopus reguloides</i>	Blyth's Leaf-Warbler	I	WV	LC	-	9	0	9
27	<i>Phylloscopus pulcher</i>	Buff-barred Warbler	I	BV	LC	-	4	0	4
28	<i>Seicercus castaniceps</i>	Chestnut-crowned Warbler	I	BV	LC	-	1	0	1
29	<i>Phylloscopus coronatus</i>	Eastern Crowned Warbler	I	WV	LC	-	2	0	2
30	<i>Seicercus burkii</i>	Green-crowned Warbler	I	BV	LC	-	2	0	2
31	<i>Phylloscopus trochiloides</i>	Greenish Warbler	I	WV	LC	-	8	0	8
32	<i>Seicercus poliogenys</i>	Grey-cheeked Warbler	I	R	LC	-	2	0	2
33	<i>Phylloscopus maculipennis</i>	Grey-faced Leaf-warbler	I	R	LC	-	3	0	3
34	<i>Phylloscopus xanthoschistos</i>	Grey-hooded Warbler	I	R	LC	-	2	0	2
35	<i>Phylloscopus chloronotus</i>	Lemon-rumped Leaf Warbler	I	BV	LC	-	3	0	3
36	<i>Cettia fortipes</i>	Strong-footed Bush-warbler	I	R	LC	-	1	0	1
17	Timaliidae								
37	<i>Trochalopteron imbricatum</i>	Bhutan Laughingthrush	I	R	LC	-	4	4	8
38	<i>Trochalopteron affine</i>	Black-faced Laughingthrush	I	R	LC	-	3	5	8
39	<i>Trochalopteron erthrocephalum</i>	Red-headed Laughingthrush	I	R	LC	-	5	4	9

Appendices

Sl. No.	Family and Species	Common name	FS	MS	CS	PM	M	W	Overall
40	<i>Yuhina flavicollis</i>	Whiskered Yuhina	I	R	LC	-	3	0	3
18	Troglodytidae								
41	<i>Troglodytes troglodytes</i>	Winter Wren	I	R	LC	-	1	0	1
19	Turdidae								
42	<i>Myophonus caeruleus</i>	Blue Whistling-Thrush	I	R	LC	-	5	0	5
43	<i>Turdus albocinctus</i>	White-collared Blackbird	I	R	LC	-	0	1	1

FS : Aq-Aquatic Feeder, C - Carnivores, F - Frugivore, G - Granivore, I - Insectivore, N - Nectarivore, Nc - Nucivore, O - Omnivore, P - Piscivore; MS - Migratory Status - BV - Breeding Visitor, IR - Isolated Record, R - Resident, WV - Winter Visitor; CS - Conservation status - IUCN Red List and WPA -1972 Schedule: VU - Vulnerable, LC - Least Concern; PM- Post monsoon, M - Monsoon, W – Winter

Appendix II. 3.175. List of Possible mammalian fauna of the Tawang Region and contribution of species reported in the Tsa chu-II HEP area

Sl. No	Common Name	Scientific Name	SPA	Conservation Status	
	Primates			IUCN	IWPA
1	Arunachal macaque	<i>Macaca munzala</i>		EN	-
2	Assamese macaque	<i>M. assamensis</i>		NT	II
3	Capped langur	<i>Trachypithecus pileatus</i>		VU	I
4	Slow loris	<i>Nycticebus coucang</i>		VU	I
	Ungulates				
5	Barking deer	<i>Muntiacus muntjak</i>	*	LC	III
6	Bharal	<i>Pseudois nayaur</i>		LC	I
7	Chinese goral	<i>Nemorhaedus caudatus</i>		VU	III
8	Himalayan goral	<i>N. goral</i>	*	NT	III
9	Musk deer	<i>Moschus sp.</i>		EN	-
10	Sambar	<i>Cervus unicolor</i>		VU	III
11	Serow	<i>N. sumatraensis</i>			
12	Wild pig	<i>Sus scrofa</i>	*	LC	III
	Carnivores				
13	Common leopard	<i>Panthera pardus</i>		NT	I
14	Jungle Cat	<i>Felis Chaus</i>	*	LC	II
15	Dhole	<i>Cuon alpinus</i>		EN	II
16	Himalayan black bear	<i>Ursus thibetanus</i>		VU	II
17	Himalayan palm civet	<i>Paguma larvata</i>		LC	II
18	Leopard cat	<i>Prionailurus bengalensis</i>		LC	-
19	Otter	<i>Lutra sp.</i>		VU	-
20	Red panda	<i>Ailurus fulgens</i>		VU	I
21	Snow leopard	<i>Uncia uncia</i>		EN	I
22	Yellow-throated marten	<i>Martes flavigula</i>	*	LC	II
	Rodents				
23	Hairy-footed flying squirrel	<i>Belomys pearsonii</i>		DD	II
24	Himalayan marmot	<i>Marmota himalayana</i>		LC	II
25	Himalayan striped squirrel	<i>Tamiops maclellandi</i>	*	LC	-
26	Orange-bellied Himalayan squirrel	<i>Dremomys lokriah</i>		LC	-
	*Hoary-bellied Himalayan Squirrel	<i>Callosciurus pygerythrus</i>	*	LC	-
27	Porcupine	<i>Hystrix sp.</i>		LC	IV
	*Chesnut rat	<i>Niviventer fluvescens</i>		LC	V
	Lagomorphs				
28	Large-eared pika	<i>Ochotona macrotis</i>		LC	-
29	Moupin pika	<i>Ochotona thibetana</i>		LC	-
	29 species		7 species	R% 24.13%	

Data Source:1 – Mishra et al 2006, SPA –Species of Project Area, * additional species reported during the study

Appendix II.3.176: Status of birds at Tsa chu-II barrage and powerhouse site

Sl. No.	Family/Genus/Species	Common name	FS	MS	CS	No of Birds Recorded
1	Accipitridae					

Appendices

Sl. No.	Family/Genus/Species	Common name	FS	MS	CS	No of Birds Recorded
1	<i>Accipiter gentilis</i>	Northern Goshawk	C	WV	LC	2
2	<i>Hieraetus fasciatus</i>	Bonelli's Eagle	C	R	LC	1
2	Campephagidae					
3	<i>Pericrocotus ethologus</i>	Long-tailed Minivet	I	BV	LC	2
4	<i>Pericrocotus speciosus</i>	Scarlet Minivet	I	R	LC	5
3	Cinclidae					
5	<i>Cinclus cinclus</i>	White-throated Dipper	I	R	LC	1
4	Leiothrichidae					
6	<i>Heterophasia capistrata</i>	Rufous Sibia	O	R	LC	2
5	Muscicapidae					
7	<i>Cyomis magnirostris</i>	Large Blue Flycatcher	I	BV	LC	1
8	<i>Ficedula hodgsonii</i>	Slaty-backed Flycatcher	I	WV	LC	1
6	Paridae					
9	<i>Parus ater</i>	Coal Tit	I	R	LC	1
7	Stenostiridae					
10	<i>Chelidorhynch hypoxantha</i>	Yellow-bellied Fantail	I	R	LC	2
8	Sylviidae					
11	<i>Phylloscopus maculipennis</i>	Grey-faced Leaf-warbler	I	R	LC	7
12	<i>Phylloscopus xanthoschistos</i>	Grey-hooded Warbler	I	R	LC	2
9	Timaliidae					
13	<i>Actinodura egertoni</i>	Rusty-fronted Barwing	I	R	LC	7
14	<i>Alcippe dubia</i>	Rusty-capped Fulvetta	I	R	LC	2
15	<i>Dryonastes caerulatus</i>	Grey-sided Laughingthrush	I	R	LC	6
16	<i>Minla ignotincta</i>	Red-tailed Minla	I	R	LC	5
17	<i>Yuhina flavicollis</i>	Whiskered Yuhina	I	R	LC	5
10	Troglodytidae					
18	<i>Troglodytes troglodytes</i>	Winter Wren	I	R	LC	1

FS-Foraging Status: C - Carnivores, I - Insectivore, O - Omnivore; MS - Migratory Status - BV - Breeding Visitor, Record, R - Resident, WV - Winter Visitor; CS - Conservation status - IUCN Red List and WPA -1972 Schedule: LC - Least Concern

Appendix II.3.177: Check list and ecological status of birds recorded in the Thingbu chu HEP area

Sl. No.	Family & species	Common name	FS	MS	CS	PM	M	W	TNB
1	Accipitridae								
1	<i>Gyps himalayensis</i>	Himalayan Vulture	C	WV	LC	0	0	2	2
2	Aegithalidae								
2	<i>Aegithalos iouschistos</i>	Rufous-fronted Tit	I	R	LC	0	0	13	13
3	Apodidae								
3	<i>Aerodramus brevirostris</i>	Himalayan Swiftlet	I	R	LC	0	62	0	62
4	Campephagidae								
4	<i>Hemipus picatus</i>	Pied Flycatcher-shrike	I	R	LC	2	0	0	2
5	Certhiidae								
5	<i>Certhia familiaris mandellii</i>	Eurasian Treecreeper	I	R	LC	0	0	3	3
6	<i>Certhia nepalensis</i>	Rusty-flanked Treecreeper	I	R	LC	0	0	1	1
6	Cinclidae								
7	<i>Cinclus pallasi</i>	Brown Dipper	Aq	R	LC	2	0	0	2
8	<i>Cinclus cinclus</i>	White-throated Dipper	I	R	LC	0	1	15	16
7	Columbidae								
9	<i>Ducula badia</i>	Mountain Imperial-pigeon	G	R	LC	3	3	0	6
10	<i>Treron sphenurus</i>	Wedge-tailed Green-pigeon	G	R	LC	9	0	0	9
8	Corvidae								
11	<i>Nucifraga caryocatactes</i>	Spotted Nutcracker	Nu	R	LC	0	17	0	17
9	Cuculidae								
12	<i>Hierococcyx sparveriioides</i>	Large Hawk-cuckoo	I	BV	LC	2	0	0	2
10	Dicaeidae								
13	<i>Dicaeum ignipectus</i>	Fire-breasted Flowerpecker	N	R	LC	5	3	0	8

Appendices

Sl. No.	Family & species	Common name	FS	MS	CS	PM	M	W	TNB
11	Dicruridae								
14	<i>Dicrurus leucophaeus</i>	Ashy Drongo	O	WV	LC	7	2	0	9
15	<i>Dicrurus macrocercus</i>	Black Drongo	O	R	LC	12	0	0	12
16	<i>Dicrurus aeneus</i>	Bronzed Drongo	O	R	LC	5	0	0	5
12	Fringillidae								
17	<i>Carpodacus nepalensis</i>	Dark-breasted Rosefinch	G	R	LC	0	2	0	2
13	Hirundinidae								
18	<i>Delichon nipalense</i>	Nepal House-martin	I	R	LC	0	70	0	70
14	Leiothrichidae								
19	<i>Heterophasia capistrata</i>	Rufous Sibia	O	R	LC	12	3	0	15
15	Motacillidae								
20	<i>Anthus hodgsoni hodgsoni</i>	Olive-backed Pipit	I	R	LC	0	3	0	3
21	<i>Motacilla alba alboides</i>	White Wagtail	I	WV	LC	0	6	0	6
16	Muscicapidae								
22	<i>Phoenicurus frontalis</i>	Blue-fronted Redstart	I	BV	LC	0	0	6	6
23	<i>Muscicapa sibirica</i>	Dark-sided Flycatcher	I	BV	LC	0	1	0	1
24	<i>Tarsiger chrysaeus</i>	Golden Bush-robin	I	R	LC	0	0	2	2
25	<i>Tarsiger rufilatus</i>	Himalayan Red-flanked Bush Robin	I	R	LC	0	0	1	1
26	<i>Enicurus scouleri</i>	Little Forktail	I	R	LC	0	2	4	6
27	<i>Ficedula westermanni</i>	Little Pied Flycatcher	I	R	LC	0	1	0	1
28	<i>Ficedula strophia</i>	Orange-gorgeted Flycatcher	I	R	LC	0	2	0	2
29	<i>Rhyacornis fuliginosa</i>	Plumbeous Water-redstart	I	R	LC	11	21	0	32
30	<i>Ficedula tricolor</i>	Slaty-blue Flycatcher	I	BV	LC	0	1	0	1
31	<i>Eumyias thalassinus</i>	Verditer Flycatcher	I	BV	LC	4	0	0	4
32	<i>Niltava (vivda) catesi</i>	Vivid Niltava	I	BV	LC	0	1	0	1
33	<i>Chaimarrornis leucocephalus</i>	White-capped River-chat	I	R	LC	8	16	6	30
17	Nectariniidae								
34	<i>Aethopyga saturata</i>	Black-breasted Sunbird	N	R	LC	0	1	0	1
35	<i>Aethopyga nipalensis</i>	Green-tailed Sunbird	N	R	LC	7	0	1	8
18	Oriolidae								
36	<i>Oriolus tenuirostris</i>	Slender-billed Oriole	O	R	LC	2	0	0	2
19	Paridae								
37	<i>Parus ater</i>	Coal Tit	I	R	LC	0	0	19	19
38	<i>Parus monticolus</i>	Green-backed Tit	I	R	LC	6	6	2	14
39	<i>Parus dichrous</i>	Grey-crested Tit	I	R	LC	2	0	0	2
20	Prunellidae								
40	<i>Prunella collaris</i>	Alpine Accentor	I	WV	LC	0	0	5	5
41	<i>Prunella strophia</i>	Rufous-breasted Accentor	I	R	LC	0	0	3	3
21	Pycnonotidae								
42	<i>Hypsipetes leucocephalus</i>	Himalayan Black Bulbul	O	R	LC	38	0	0	38
22	Sittidae								
43	<i>Sitta himalayensis</i>	White-tailed Nuthatch	I	R	LC	3	0	0	3
23	Stenostiridae								
44	<i>Culicicapa ceylonensis</i>	Grey-headed Canary-flycatcher	I	BV	LC	6	2	0	8
45	<i>Chelidorhynch hypoxantha</i>	Yellow-bellied Fantail	I	R	LC	0	2	0	2
24	Sylviidae								
46	<i>Phylloscopus reguloides</i>	Blyth's Leaf-Warbler	I	WV	LC	3	15	1	19
47	<i>Phylloscopus pulcher</i>	Buff-barred Warbler	I	BV	LC	0	14	0	14
48	<i>Seicercus castaniceps</i>	Chestnut-crowned Warbler	I	BV	LC	0	2	0	2
49	<i>Phylloscopus coronatus</i>	Eastern Crowned Warbler	I	WV	LC	8	0	0	8
50	<i>Phylloscopus trochiloides</i>	Greenish Warbler	I	WV	LC	7	11	0	18
51	<i>Seicercus poliogenys</i>	Grey-cheeked Warbler	I	R	LC	0	1	0	1
52	<i>Phylloscopus maculipennis</i>	Grey-faced Leaf-warbler	I	R	LC	0	8	3	11
53	<i>Phylloscopus xanthoschistos</i>	Grey-hooded Warbler	I	R	LC	5	8	0	13
54	<i>Phylloscopus chloronotus</i>	Lemon-rumped Leaf Warbler	I	BV	LC	0	10	0	10
55	<i>Phylloscopus fuligiventer</i>	Smoky Leaf-warbler	I	WV	LC	0	3	0	3
56	<i>Cettia fortipes</i>	Strong-footed Bush-warbler	I	R	LC	0	3	0	3

Appendices

Sl. No.	Family & species	Common name	FS	MS	CS	PM	M	W	TNB
57	<i>Phylloscopus affinis</i>	Tickell's Leaf-warbler	I	BV	LC	0	4	0	4
25	Tichodromidae								
58	<i>Tichodroma muraria</i>	Wallcreeper	I	WV	LC	0	0	2	2
26	Timaliidae								
59	<i>Trochalopteron imbricatum</i>	Bhutan Laughingthrush	I	R	LC	0	7	15	22
60	<i>Trochalopteron affine</i>	Black-faced Laughingthrush	I	R	LC	0	0	7	7
61	<i>Trachalopteron erthrocephalum</i>	Red-headed Laughingthrush	I	R	LC	10	0	6	16
62	<i>Ianthocincla rufogularis</i>	Rufous-chinned Laughingthrush	I	R	LC	5	0	0	5
63	<i>Yuhina flavicollis</i>	Whiskered Yuhina	I	R	LC	7	0	0	7
27	Troglodytidae								
64	<i>Troglodytes troglodytes</i>	Winter Wren	I	R	LC	0	0	5	5
28	Turdidae								
65	<i>Myophonus caeruleus</i>	Blue Whistling-thrush	I	R	LC	14	2	3	19
66	<i>Monticola rufiventris</i>	Chestnut-bellied Rock Thrush	I	R	LC	1	0	0	1
67	<i>Turdus albocinctus</i>	White-collared Blackbird	I	R	LC	0	0	3	3

FS: Aq-Aquatic Feeder, C - Carnivores, F - Frugivore, G - Granivore, I - Insectivore, N - Nectarivore, Nc - Nucivore, O - Omnivore, P - Piscivore; MS - Migratory status - BV - Breeding visitor, IR - Isolated record, R - Resident, WV - Winter visitor; CS - Conservation status - IUCN Red List & WPA -1972 Schedule: VU - Vulnerable, LC - Least concern; PM-Post monsoon, M - Monsoon, W – Winter, TNB – Total number of birds Reported.

Appendix II.3.178: List of possible mammalian fauna of Tawang region and Thingbu chu HEP area

Sl. no.	Common name	Scientific name	SPA	Conservation status	
	Primates			IUCN	IWPA
1	Arunachal macaque	<i>Macaca munzala</i>	*	EN	-
2	Assamese macaque	<i>M. assamensis</i>		NT	II
3	Capped langur	<i>Trachypitecus pileatus</i>		VU	I
4	Slow loris	<i>Nycticebus coucang</i>		VU	I
	Ungulates				
5	Barking deer	<i>Muntiacus muntjak</i>		LC	III
6	Bharal	<i>Pseudois nayaur</i>		LC	I
7	Chinese goral	<i>Nemorhaedus caudatus</i>		VU	III
8	Himalayan goral	<i>N. goral</i>	*	NT	III
9	Musk deer	<i>Mos chus sp.</i>		EN	-
10	Sambar	<i>Cervus unicolor</i>		VU	III
11	Serow	<i>N. sumatraensis</i>			
12	Wild pig	<i>Sus scrofa</i>	*	LC	III
	Carnivores				
13	Common leopard	<i>Panthera pardus</i>		NT	I
14	Jungle Cat	<i>Felis Chaus</i>	*	LC	II
15	Dhole	<i>Cuon alpinus</i>		EN	II
16	Himalayan black bear	<i>Ursus thibetanus</i>		VU	II
17	Himalayan palm civet	<i>Paguma larvata</i>	*	LC	II
18	Leopard cat	<i>Prionailurus bengalensis</i>		LC	-
19	Otter	<i>Lutra sp.</i>		VU	-
20	Red panda	<i>Ailurus fulgens</i>		VU	I
21	Snow leopard	<i>Uncia uncia</i>		EN	I
22	Yellow-throated marten	<i>Martes flavigula</i>	*	LC	II
	Rodents				
23	Hairy-footed flying squirrel	<i>Belomys pearsonii</i>		DD	II
24	Himalayan marmot	<i>Marmota himalayana</i>		LC	II
25	Himalayan striped squirrel	<i>Tamiops maclellandi</i>	*	LC	-
26	Orange-bellied Himalayan squirrel	<i>Dremomys lokriah</i>	*	LC	-
	*Hoary-bellied Himalayan Squirrel	<i>Callosciurus pygerythrus</i>	*	LC	-
27	Porcupine	<i>Hystrix sp.</i>		LC	IV
	Chesnut rat	<i>Niviventer fluvescens</i>		LC	V
	Lagomorphs				
28	Large-eared pika	<i>Ochotona macrotis</i>		LC	-
29	*Moupin pika	<i>Ochotona thibetana</i>		LC	-
	29 species		9 species R% 34.42%		

Data Source:1 – Mishra *et al.* 2006, SPA –Species of Project Area , * Additional Species Reported during the study

Appendix II.3.179: Status of birds at Thingbu chu Barrage and powerhouse site

Sl. no.	Family/Genus/Species	Common name	FS	MS	CS	No of birds recorded
1	Accipitridae					
1	<i>Gyps himalayensis</i>	Himalayan Vulture	C	WV	LC	2
2	Aegithalidae					
2	<i>Aegithalos iouschistos</i>	Rufous-fronted Tit	I	R	LC	8
3	Apodidae					
3	<i>Aerodramus brevirostris</i>	Himalayan Swiftlet	I	R	LC	62
4	Certhiidae					
4	<i>Certhia familiaris mandellii</i>	Eurasian Treecreeper	I	R	LC	2
5	<i>Certhia nepalensis</i>	Rusty-flanked Treecreeper	I	R	LC	1
5	Cinclidae					
6	<i>Cinclus cinclus</i>	White-throated Dipper	I	R	LC	3
6	Corvidae					
7	<i>Corvus culminatus</i>	Large-billed Crow	O	R	LC	1

Appendices

Sl. no.	Family/Genus/Species	Common name	FS	MS	CS	No of birds recorded
8	<i>Nucifraga caryocatactes</i>	Spotted Nutcracker	Nu	R	LC	4
7	Dicaeidae					
9	<i>Dicaeum ignipectus</i>	Fire-breasted Flowerpecker	N	R	LC	3
8	Dicruridae					
10	<i>Dicrurus leucophaeus</i>	Ashy Drongo	O	WV	LC	1
9	Fringillidae					
11	<i>Leucosticte nemoricola</i>	Plain Mountain-finch	G	R	LC	1
10	Laniidae					
12	<i>Lanius cristatus</i>	Brown Shrike	I	WV	LC	1
13	<i>Lanius tephronotus</i>	Grey-backed Shrike	I	BV	LC	1
11	Leiothrichidae					
14	<i>Heterophasia capistrata</i>	Rufous Sibia	O	R	LC	2
12	Motacillidae					
15	<i>Anthus hodgsoni hodgsoni</i>	Olive-backed Pipit	I	R	LC	4
16	<i>Motacilla alba alboides</i>	White Wagtail	I	WV	LC	1
13	Muscicapidae					
17	<i>Chaimarrornis leucocephalus</i>	White-capped River-chat	I	R	LC	7
18	<i>Enicurus scouleri</i>	Little Forktail	I	R	LC	2
19	<i>Ficedula hodgsonii</i>	Slaty-backed Flycatcher	I	WV	LC	1
20	<i>Ficedula tricolor</i>	Slaty-blue Flycatcher	I	BV	LC	1
21	<i>Ficidula strophiatea</i>	Orange-gorgeted Flycatcher	I	R	LC	1
22	<i>Muscicapa sibirica</i>	Dark-sided Flycatcher	I	BV	LC	1
23	<i>Phoenicurus frontalis</i>	Blue-fronted Redstart	I	BV	LC	2
24	<i>Rhyacornis fuliginosa</i>	Plumbeous Water-redstart	I	R	LC	9
25	<i>Tarsiger rufilatus</i>	Himalayan Red-flanked Bush Robin	I	R	LC	1
14	Nectariniidae					
26	<i>Aethopyga saturata</i>	Black-breasted Sunbird	N	R	LC	1
15	Paridae					
27	<i>Parus ater</i>	Coal Tit	I	R	LC	6
28	<i>Parus monticolus</i>	Green-backed Tit	I	R	LC	2
16	Picidae					
29	<i>Picus flavinucha</i>	Greater Yellownape	I	R	LC	3
17	Prunellidae					
30	<i>Prunella strophiatea</i>	Rufous-breasted Accentor	I	R	LC	3
18	Stenostiridae					
31	<i>Culicicapa ceylonensis</i>	Grey-headed Canary-flycatcher	I	BV	LC	2
32	<i>Chelidorhynch hypoxantha</i>	Yellow-bellied Fantail	I	R	LC	2
19	Sylviidae					
33	<i>Phylloscopus maculipennis</i>	Ashy-throated Warbler	I	R	LC	1
34	<i>Phylloscopus reguloides</i>	Blyth's Leaf-warbler	I	WV	LC	10
35	<i>Seicercus burkii</i>	Green-crowned Warbler	I	BV	LC	3
36	<i>Phylloscopus trochiloides</i>	Greenish Warbler	I	WV	LC	7
37	<i>Seicercus poliogenys</i>	Grey-cheeked Warbler	I	R	LC	2
38	<i>Phylloscopus maculipennis</i>	Grey-faced Leaf-warbler	I	R	LC	5
39	<i>Phylloscopus xanthoschistos</i>	Grey-hooded Warbler	I	R	LC	5
40	<i>Phylloscopus chloronotus</i>	Lemon-rumped Leaf Warbler	I	BV	LC	6
41	<i>Phylloscopus pulcher</i>	Orange-barred Leaf-warbler	I	WV	LC	9
42	<i>Phylloscopus fulgiventis</i>	Smoky Leaf-warbler	I	WV	LC	2
43	<i>Phylloscopus affinis</i>	Tickell's Leaf-warbler	I	BV	LC	1
44	<i>Phylloscopus inornatus</i>	Yellow-browed Leaf-warbler	I	WV	LC	2
20	Tichodromidae					
45	<i>Tichodroma muraria</i>	Wallcreeper	I	WV	LC	2
21	Timaliidae					
46	<i>Trochalopteron imbricatum</i>	Bhutan Laughing Thrush	I	R	LC	6
47	<i>Trochalopteron affine</i>	Black-faced Laughingthrush	I	R	LC	5
48	<i>Trochalopteron squamatum</i>	Blue-winged Laughingthrush	I	R	LC	4
49	<i>Trachalopteron erthrocephalum</i>	Red-headed Laughingthrush	I	R	LC	6

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Sl. no.	Family/Genus/Species	Common name	FS	MS	CS	No of birds recorded
50	<i>Lanthocincla ocellata</i>	Spotted Laughingthrush	I	R	LC	1
51	<i>Yuhina gularis</i>	Stripe-throated Yuhina	O	R	LC	3
52	<i>Pteruthius flaviscapis</i>	White-browed Shrike-babbler	I	R	LC	1
22	Troglodytidae					
53	<i>Troglodytes troglodytes</i>	Winter Wren	I	R	LC	2
23	Turdidae					
54	<i>Myophonus caeruleus</i>	Blue Whistling-thrush	I	R	LC	3
55	<i>Turdus albocinctus</i>	White-collared Blackbird	I	R	LC	2

FS – Foraging Status: C - Carnivores, F - Frugivore, G - Granivore, I - Insectivore, N - Nectarivore, Nc - Nucivore, O - Omnivore, MS - Migratory status - BV - Breeding visitor, R - Resident, WV - Winter visitor; CS - Conservation status - IUCN Red List & WPA -1972 Schedule: LC - Least concern;

Appendix II.3.180: Ecological status of bird species recorded in the New Melling HEP area

Sl. No.	Family and Species	Common name	FS	MS	CS	PM	M	W	Overall
1	Aegithalidae								
1	<i>Aegithalos iouschistos</i>	Rufous-fronted Tit	I	R	LC	0	0	8	8
2	Apodidae								
2	<i>Aerodramus brevirostris</i>	Himalayan Swiftlet	I	R	LC	0	20	0	20
3	Campephagidae								
3	<i>Hemipus picatus</i>	Pied Flycatcher-shrike	I	R	LC	11	0	0	11
4	Certhiidae								
4	<i>Certhia familiaris mandellii</i>	Eurasian Treecreeper	I	R	LC	0	1	2	3
5	<i>Certhia nepalensis</i>	Rusty-flanked Treecreeper	I	R	LC	0	0	3	3
5	Cinclidae								
6	<i>Cinclus pallasii</i>	Brown Dipper	Aq	R	LC	1	0	0	1
7	<i>Cinclus cinclus</i>	White-throated Dipper	I	R	LC	0	3	16	19
6	Cisticolidae								
8	<i>Prinia atrogularis</i>	Black-throated Prinia	I	R	LC	0	0	3	3
7	Columbidae								
9	<i>Ducula badia</i>	Mountain Imperial-pigeon	G	R	LC	0	3	0	3
10	<i>Treron sphenurus</i>	Wedge-tailed Green-pigeon	G	R	LC	21	0	0	21
8	Corvidae								
11	<i>Corvus culminatus</i>	Large-billed Crow	O	R	LC	0	0	3	3
12	<i>Nucifraga caryocatactes</i>	Spotted Nutcracker	Nu	R	LC	0	12	1	13
9	Cuculidae								
13	<i>Chrysococcyx maculatus</i>	Asian Emerald Cuckoo	I	BV	LC	1	0	0	1
14	<i>Hierococcyx sparveroides</i>	Large Hawk-cuckoo	I	BV	LC	11	0	0	11
10	Dicaeidae								
15	<i>Dicaeum ignipectus</i>	Fire-breasted Flowerpecker	N	R	LC	12	0	0	12
11	Dicruridae								
16	<i>Dicrurus leucophaeus</i>	Ashy Drongo	O	WV	LC	12	1	0	13
17	<i>Dicrurus macrocercus</i>	Black Drongo	O	R	LC	16	0	0	16
18	<i>Dicrurus aeneus</i>	Bronzed Drongo	O	R	LC	21	0	0	21
12	Fringillidae								
19	<i>Carpodacus rubescens</i>	Blandford's Rosefinch	G	R	LC	0	4	0	4
20	<i>Carpodacus dubius</i>	Chinese White-browed Rosefinch	G	IR	LC	0	0	11	11
21	<i>Carpodacus nepalensis</i>	Dark-breasted Rosefinch	G	R	LC	0	2	0	2
22	<i>Carpodacus edwardsii</i>	Dark-rumped Rosefinch	G	R	LC	0	0	20	20
23	<i>Carduelis spinoides</i>	Himalayan Greenfinch	G	WV	LC	0	3	0	3
13	Hirundinidae								
24	<i>Delichon dasypus</i>	Asian House Martin	I	BV	LC	0	0	5	5
25	<i>Delichon nipalense</i>	Nepal House-martin	I	R	LC	12	70	83	165
14	Leiothrichidae								
26	<i>Heterophasia capistrata</i>	Rufous Sibia	O	R	LC	21	4	0	25
15	Motacillidae								
27	<i>Anthus hodgsoni hodgsoni</i>	Olive-backed Pipit	I	R	LC	0	6	0	6

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Sl. No.	Family and Species	Common name	FS	MS	CS	PM	M	W	Overall
28	<i>Motacilla alba alboides</i>	White Wagtail	I	WV	LC	0	9	1	10
16	Muscicapidae								
29	<i>Phoenicurus frontalis</i>	Blue-fronted Redstart	I	BV	LC	0	0	7	7
30	<i>Muscicapa sibirica</i>	Dark-sided Flycatcher	I	BV	LC	0	2	0	2
31	<i>Cyomis magnirostris</i>	Large Blue Flycatcher	I	BV	LC	0	1	0	1
32	<i>Enicurus scouleri</i>	Little Forktail	I	R	LC	0	1	2	3
33	<i>Rhyacornis fuliginosa</i>	Plumbeous Water-redstart	I	R	LC	21	22	0	43
34	<i>Ficedula hodgsonii</i>	Slaty-backed Flycatcher	I	WV	LC	0	1	0	1
35	<i>Eumyias thalassinus</i>	Verditer Flycatcher	I	BV	LC	17	0	0	17
36	<i>Niltava (vivda) catesi</i>	Vivid Niltava	I	BV	LC	0	3	0	3
37	<i>Chaimarrornis leucocephalus</i>	White-capped River-chat	I	R	LC	17	9	12	38
38	<i>Myiomela leucura</i>	White-tailed Blue Robin	I	R	LC	3	0	0	3
17	Nectariniidae								
39	<i>Aethopyga nipalensis</i>	Green-tailed Sunbird	N	R	LC	13	1	1	15
18	Oriolidae								
40	<i>Oriolus tenuirostris</i>	Slender-billed Oriole	O	R	LC	3	0	0	3
19	Paridae								
41	<i>Parus ater</i>	Coal Tit	I	R	LC	0	0	13	13
42	<i>Parus monticolus</i>	Green-backed Tit	I	R	LC	0	9	5	14
43	<i>Parus dichrous</i>	Grey-crested Tit	I	R	LC	13	0	0	13
20	Passeridae								
44	<i>Passer montanus</i>	Eurasian Tree Sparrow	G	R	LC	0	0	4	4
21	Prunellidae								
45	<i>Prunella collaris</i>	Alpine Accentor	I	WV	LC	0	0	11	11
46	<i>Prunella strophiaata</i>	Rufous-breasted Accentor	I	R	LC	0	0	8	8
22	Pycnonotidae								
47	<i>Hypsipetes leucocephalus</i>	Himalayan Black Bulbul	O	R	LC	60	0	0	60
23	Sylviidae								
48	<i>Phylloscopus reguloides</i>	Blyth's Leaf-Warbler	I	WV	LC	0	0	2	2
49	<i>Phylloscopus pulcher</i>	Buff-barred Warbler	I	BV	LC	0	5	0	5
50	<i>Seicercus castaniceps</i>	Chestnut-crowned Warbler	I	BV	LC	0	2	0	2
51	<i>Phylloscopus coronatus</i>	Eastern Crowned Warbler	I	WV	LC	16	0	0	16
52	<i>Seicercus burkii</i>	Green-crowned Warbler	I	BV	LC	2	0	0	2
53	<i>Phylloscopus trochiloides</i>	Greenish Warbler	I	WV	LC	0	6	0	6
54	<i>Phylloscopus maculipennis</i>	Grey-faced Leaf-warbler	I	R	LC	0	3	3	6
55	<i>Phylloscopus xanthoschistos</i>	Grey-hooded Warbler	I	R	LC	0	4	1	5
56	<i>Phylloscopus chloronotus</i>	Lemon-rumped Leaf Warbler	I	BV	LC	0	8	0	8
57	<i>Phylloscopus fuligiventer</i>	Smoky Leaf-warbler	I	WV	LC	0	1	0	1
58	<i>Cettia fortipes</i>	Strong-footed Bush-warbler	I	R	LC	0	1	0	1
24	Timaliidae								
59	<i>Trochalopteron imbricatum</i>	Bhutan Laughingthrush	I	R	LC	0	4	28	32
60	<i>Trochalopteron affine</i>	Black-faced Laughingthrush	I	R	LC	0	0	25	25
61	<i>Trochalopteron erthrocephalum</i>	Red-headed Laughingthrush	I	R	LC	16	12	7	35
62	<i>Ianthocincla rufogularis</i>	Rufous-chinned Laughingthrush	I	R	LC	12	0	0	12
63	<i>Yuhina flavicollis</i>	Whiskered Yuhina	I	R	LC	11	0	0	11
25	Troglodytidae								
64	<i>Troglodytes troglodytes</i>	Winter Wren	I	R	LC	0	0	3	3
26	Turdidae								
65	<i>Myophonus caeruleus</i>	Blue Whistling-thrush	I	R	LC	23	3	7	33
66	<i>Monticola rufiventris</i>	Chestnut-bellied Rock Thrush	I	R	LC	2	0	0	2
67	<i>Turdus albocinctus</i>	White-collared Blackbird	I	R	LC	0	0	8	8

FS : Aq–Aquatic Feeder, C–Carnivores, F–Frugivore, G–Granivore, I–Insectivore, N–Nectarivore, Nc–Nucivore, O–Omnivore, P–Piscivore; MS–Migratory Status–BV–Breeding Visitor, IR–Isolated Record, R–Resident, WV–Winter Visitor; CS–Conservation status–IUCN Red List and WPA–1972 Schedule: VU–Vulnerable, LC–Least Concern; PM–Post monsoon, M–Monsoon, W–Winter

Appendix II.3.181: List of Possible mammalian fauna of the Tawang Region and contribution of species reported in the New Melling HEP area

Appendices

Sl. No.	Common name	Scientific name	SPA	Conservation status	
				IUCN	IWPA
	Primates				
1	Arunachal macaque	<i>Macaca munzala</i>	*	EN	–
2	Assamese macaque	<i>M. assamensis</i>		NT	II
3	Capped langur	<i>Trachypithecus pileatus</i>		VU	I
4	Slow loris	<i>Nycticebus coucang</i>		VU	I
	Ungulates				
5	Barking deer	<i>Muntiacus muntjak</i>	*	LC	III
6	Bharal	<i>Pseudois nayaur</i>		LC	I
7	Chinese goral	<i>Nemorhaedus caudatus</i>		VU	III
8	Himalayan goral	<i>N. goral</i>	*	NT	III
9	Musk deer	<i>Mos chus</i> sp.		EN	–
10	Sambar	<i>Cervus unicolor</i>		VU	III
11	Serow	<i>N. sumatraensis</i>			
12	Wild pig	<i>Sus scrofa</i>	*	LC	III
	Carnivores				
13	Common leopard	<i>Panthera pardus</i>		NT	I
14	Jungle Cat	<i>Felis Chaus</i>		LC	II
15	Dhole	<i>Cuon alpinus</i>		EN	II
16	Himalayan black bear	<i>Ursus thibetanus</i>		VU	II
17	Himalayan palm civet	<i>Paguma larvata</i>	*	LC	II
18	Leopard cat	<i>Prionailurus bengalensis</i>		LC	–
19	Otter	<i>Lutra</i> sp.		VU	–
20	Red panda	<i>Ailurus fulgens</i>		VU	I
21	Snow leopard	<i>Uncia uncia</i>		EN	I
22	Yellow-throated marten	<i>Martes flavigula</i>		LC	II
	Rodents				
23	Hairy-footed flying squirrel	<i>Belomys pearsonii</i>		DD	II
24	Himalayan marmot	<i>Marmota himalayana</i>		LC	II
25	Himalayan striped squirrel	<i>Tamiops macclellandi</i>		LC	–
26	Orange-bellied Himalayan squirrel	<i>Dremomys lokriah</i>		LC	–
	*Hoary-bellied Himalayan Squirrel	<i>Callosciurus pygerythrus</i>	*	LC	–
27	Porcupine	<i>Hystrix</i> sp.		LC	IV
	*Chesnut rat	<i>Niviventer flavesceus</i>	*	LC	V
	Lagomorphs				
28	Large-eared pika	<i>Ochotona macrotis</i>		LC	–
29	Moupin pika	<i>Ochotona thibetana</i>		LC	–
	29 species		7 species R% 24.13%		

Data Source: 1–Mishra *et al.* 2006, SPA–Species of Project Area. * Additional species reported during the study

Appendix II.3.182: Status of birds at New Melling barrage site

Sl. No.	Family/Genus/Species	Common name	FS	MS	CS	No of Birds Recorded
1	Campephagidae					
1	<i>Hemipus picatus</i>	Pied Flycatcher–shrike	I	R	LC	2
2	Certhiidae					
2	<i>Certhia nepalensis</i>	Rusty-flanked Treecreeper	I	R	LC	1
3	Cinclidae					
3	<i>Cinclus cinclus</i>	White-throated Dipper	I	R	LC	3
4	Cisticolidae					
4	<i>Prinia atrogularis</i>	Black-throated Prinia	I	R	LC	2
5	Columbidae					
5	<i>Treron sphenurus</i>	Wedge-tailed Green-pigeon	G	R	LC	3
6	Cuculidae					
6	<i>Hierococcyx sparveroides</i>	Large Hawk-cuckoo	I	BV	LC	1
7	Dicaeidae					
7	<i>Dicaeum ignipectus</i>	Fire-breasted Flowerpecker	N	R	LC	2
8	Dicruridae					

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Sl. No.	Family/Genus/Species	Common name	FS	MS	CS	No of Birds Recorded
8	<i>Dicrurus aeneus</i>	Bronzed Drongo	O	R	LC	2
9	<i>Dicrurus leucophaeus</i>	Ashy Drongo	O	WV	LC	1
10	<i>Dicrurus macrocercus</i>	Black Drongo	O	R	LC	4
9	Fringillidae					
11	<i>Carpodacus edwardsii</i>	Dark-rumped Rosefinch	G	R	LC	8
10	Hirundinidae					
12	<i>Delichon nipalense</i>	Nepal House Martin	I	R	LC	9
11	Leiothrichidae					
13	<i>Heterophasia capistrata</i>	Rufous Sibia	O	R	LC	5
12	Muscicapidae					
14	<i>Phoenicurus frontalis</i>	Blue-fronted Redstart	I	BV	LC	2
15	<i>Rhyacornis fuliginosa</i>	Plumbeous Water-redstart	I	R	LC	2
13	Nectariniidae					
16	<i>Aethopyga nipalensis</i>	Green-tailed Sunbird	N	R	LC	2
14	Prunellidae					
17	<i>Prunella collaris</i>	Alpine Accentor	I	WV	LC	3
18	<i>Prunella strophiata</i>	Rufous-breasted Accentor	I	R	LC	4
15	Pycnonotidae					
19	<i>Hypsipetes leucocephalus</i>	Himalayan Black Bulbul	O	R	LC	17
16	Sylviidae					
20	<i>Phylloscopus coronatus</i>	Eastern Crowned Warbler	I	WV	LC	2
21	<i>Seicercus burkii</i>	Green-crowned Warbler	I	BV	LC	1
17	Timaliidae					
22	<i>Ianthocincla rufogularis</i>	Rufous-chinned Laughingthrush	I	R	LC	6
23	<i>Trochalopteron affine</i>	Black-faced Laughingthrush	I	R	LC	4
24	<i>Trachalopteron erthrocephalum</i>	Red-headed Laughingthrush	I	R	LC	3
25	<i>Trochalopteron imbricatum</i>	Bhutan Laughing Thrush	I	R	LC	9
18	Turdidae					
26	<i>Monticola rufiventris</i>	Chestnut-bellied Rock Thrush	I	R	LC	1
27	<i>Myophonus caeruleus</i>	Blue Whistling-thrush	I	R	LC	2

FS–Foraging Status, G–Granivore, I–Insectivore, N–Nectarivore, O–Omnivore, MS–Migratory Status–BV–Breeding Visitor, R–Resident, WV–Winter Visitor; CS–Conservation status–IUCN Red List and WPA–1972 Schedule: LC–Least Concern;

Appendix II.3.183: Ecological status of birds recorded in the Mago chu HEP area

Sl. No.	Family and Species	Common name	FS	MS	CS	PM	M	W	Overall
1	Accipitridae								
1	<i>Hieraaetus fasciatus</i>	Bonelli's Eagle	C	R	LC	0	1	0	1
2	<i>Buteo rufinus</i>	Long-legged Buzzard	C	WV	LC	0	1	0	1
2	Aegithalidae								
3	<i>Aegithalos iouschistos</i>	Rufous-fronted Tit	I	R	LC	0	0	3	3
3	Apodidae								
4	<i>Aerodramus brevirostris</i>	Himalayan Swiftlet	I	R	LC	16	88	70	174
4	Bucerotidae								
5	<i>Aceros nipalensis*</i>	Rufous-necked Hornbill	F	R	VU	1	0	0	1
5	Campephagidae								
6	<i>Pericrocotus speciosus</i>	Scarlet Minivet	I	R	LC	0	9	0	9
6	Certhiidae								
7	<i>Certhia familiaris mandellii</i>	Eurasian Treecreeper	I	R	LC	0	2	1	3
8	<i>Certhia nepalensis</i>	Rusty-flanked Treecreeper	I	R	LC	0	0	2	2
7	Cinclidae								
9	<i>Cinclus pallasii</i>	Brown Dipper	Aq	R	LC	1	0	0	1
10	<i>Cinclus cinclus</i>	White-throated Dipper	I	R	LC	0	2	9	11
8	Cisticolidae								

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Sl. No.	Family and Species	Common name	FS	MS	CS	PM	M	W	Overall
11	<i>Prinia atrogularis</i>	Black-throated Prinia	I	R	LC	0	0	1	1
9	Columbidae								
12	<i>Streptopelia orientalis</i>	Oriental Turtle-dove	G	WV	LC	0	2	3	5
10	Corvidae								
13	<i>Corvus culminatus</i>	Large-billed Crow	O	R	LC	0	0	4	4
14	<i>Nucifraga caryocatactes</i>	Spotted Nutcracker	Nu	R	LC	0	0	1	1
11	Cuculidae								
15	<i>Cuculus poliocephalus</i>	Small Cuckoo	I	BV	LC	0	0	1	1
12	Dicaeidae								
16	<i>Dicaeum ignipectus</i>	Fire-breasted Flowerpecker	N	R	LC	0	0	3	3
17	<i>Dicaeum minullum</i>	Plain Flowerpecker	N	R	LC	0	4	0	4
13	Dicruridae								
18	<i>Dicrurus leucophaeus</i>	Ashy Drongo	O	WV	LC	16	1	0	17
19	<i>Dicrurus macrocercus</i>	Black Drongo	O	R	LC	17	0	0	17
14	Falconidae								
20	<i>Falco tinnunculus</i>	Common Kestrel	C	WV	LC	0	0	1	1
15	Fringillidae								
21	<i>Carpodacus rubescens</i>	Blandford's Rosefinch	G	R	LC	0	4	0	4
22	<i>Carpodacus edwardsii</i>	Dark-rumped Rosefinch	G	R	LC	0	0	5	5
23	<i>Carduelis spinoides</i>	Himalayan Greenfinch	G	WV	LC	0	3	0	3
24	<i>Pyrrhula erythrocephala</i>	Red-headed Bullfinch	G	R	LC	0	0	7	7
25	<i>Haematospiza sipahi</i>	Scarlet Finch	G	R	LC	0	6	0	6
16	Hirundinidae								
26	<i>Delichon dasypus</i>	Asian House Martin	I	BV	LC	0	0	5	5
27	<i>Delichon nipalense</i>	Nepal House-martin	I	R	LC	0	27	106	133
17	Leiiothrichidae								
28	<i>Heterophasia capistrata</i>	Rufous Sibia	O	R	LC	24	24	12	60
18	Motacillidae								
29	<i>Anthus hodgsoni hodgsoni</i>	Olive-backed Pipit	I	R	LC	0	5	0	5
30	<i>Motacilla alba alboides</i>	White Wagtail	I	WV	LC	11	3	0	14
19	Muscicapidae								
31	<i>Phoenicurus ochruros</i>	Black Redstart	I	WV	LC	0	0	1	1
32	<i>Phoenicurus frontalis</i>	Blue-fronted Redstart	I	BV	LC	0	0	2	2
33	<i>Cyornis rubeculoides</i>	Blue-throated Flycatcher	I	BV	LC	0	0	1	1
34	<i>Muscicapa sibirica</i>	Dark-sided Flycatcher	I	BV	LC	0	4	0	4
35	<i>Cyornis magnirostris</i>	Large Blue Flycatcher	I	BV	LC	0	1	0	1
36	<i>Niltava grandis</i>	Large Niltava	I	R	LC	0	1	0	1
37	<i>Enicurus scouleri</i>	Little Forktail	I	R	LC	0	1	1	2
38	<i>Ficedula strophilata</i>	Orange-gorgeted Flycatcher	I	R	LC	0	2	0	2
39	<i>Copsychus saularis</i>	Oriental Magpie-robin	I	R	LC	0	0	1	1
40	<i>Rhyacornis fuliginosa</i>	Plumbeous Water-redstart	I	R	LC	22	19	3	44
41	<i>Niltava sundara</i>	Rufous-bellied Niltava	I	BV	LC	0	3	0	3
42	<i>Ficedula hodgsonii</i>	Slaty-backed Flycatcher	I	WV	LC	0	1	0	1
43	<i>Ficedula supercilialis</i>	Ultramarine Flycatcher	I	BV	LC	6	0	0	6
44	<i>Eumyias thalassinus</i>	Verditer Flycatcher	I	BV	LC	16	0	0	16
45	<i>Niltava (vivda) catesi</i>	Vivid Niltava	I	BV	LC	0	2	0	2
46	<i>Chaimarrornis leucocephalus</i>	White-capped River-chat	I	R	LC	16	9	4	29
47	<i>Myiomela leucura</i>	White-tailed Blue Robin	I	R	LC	2	0	0	2
20	Nectariniidae								
48	<i>Aethopyga saturata</i>	Black-breasted Sunbird	N	R	LC	0	0	1	1
49	<i>Aethopyga nipalensis</i>	Green-tailed Sunbird	N	R	LC	14	6	4	24
50	<i>Aethopyga goulgiae</i>	Mrs Gould's Sunbird	N	R	LC	2	0	0	2
21	Oriolidae								
51	<i>Oriolus tenuirostris</i>	Slender-billed Oriole	O	R	LC	5	0	0	5
22	Paridae								
52	<i>Parus spilonotus</i>	Black-spotted Yellow Tit	I	R	LC	8	0	0	8
53	<i>Parus ater</i>	Coal Tit	I	R	LC	5	0	3	8

Appendices

Sl. No.	Family and Species	Common name	FS	MS	CS	PM	M	W	Overall
54	<i>Parus monticolus</i>	Green-backed Tit	I	R	LC	18	12	10	40
55	<i>Parus dichrous</i>	Grey-crested Tit	I	R	LC	15	0	0	15
23	Passeridae								
56	<i>Passer montanus</i>	Eurasian Tree Sparrow	G	R	LC	0	0	2	2
24	Picidae								
57	<i>Dendrocopos darjellensis</i>	Darjeeling Pied Woodpecker	I	R	LC	2	0	0	2
25	Prunellidae								
58	<i>Prunella collaris</i>	Alpine Accentor	I	WV	LC	0	0	4	4
59	<i>Prunella strophiatea</i>	Rufous-breasted Accentor	I	R	LC	0	0	5	5
26	Pycnonotidae								
60	<i>Hypsipetes leucocephalus</i>	Himalayan Black Bulbul	O	R	LC	48	0	0	48
61	<i>Pycnonotus cafer</i>	Red-vented Bulbul	O	R	LC	0	0	2	2
27	Sittidae								
62	<i>Sitta himalayensis</i>	White-tailed Nuthatch	I	R	LC	9	1	0	10
28	Stenostiridae								
63	<i>Culicicapa ceylonensis</i>	Grey-headed Canary-flycatcher	I	BV	LC	16	3	0	19
64	<i>Chelidorhynch hypoxantha</i>	Yellow-bellied Fantail	I	R	LC	0	8	0	8
29	Sylviidae								
65	<i>Abroscopus schisticeps</i>	Black-faced Warbler	I	R	LC	0	5	0	5
66	<i>Phylloscopus reguloides</i>	Blyth's Leaf-Warbler	I	WV	LC	11	7	1	19
67	<i>Phylloscopus pulcher</i>	Buff-barred Warbler	I	BV	LC	0	5	0	5
68	<i>Seicercus castaniceps</i>	Chestnut-crowned Warbler	I	BV	LC	0	4	0	4
69	<i>Tesia castaneocoronata</i>	Chestnut-headed Tesia	I	R	LC	0	2	0	2
70	<i>Seicercus burkii</i>	Green-crowned Warbler	I	BV	LC	0	2	0	2
71	<i>Phylloscopus trochiloides</i>	Greenish Warbler	I	WV	LC	0	5	0	5
72	<i>Seicercus poliogenys</i>	Grey-cheeked Warbler	I	R	LC	0	2	0	2
73	<i>Phylloscopus maculipennis</i>	Grey-faced Leaf-warbler	I	R	LC	0	5	4	9
74	<i>Phylloscopus xanthoschistos</i>	Grey-hooded Warbler	I	R	LC	16	3	3	22
75	<i>Phylloscopus chloronotus</i>	Lemon-rumped Leaf Warbler	I	BV	LC	0	8	0	8
76	<i>Orthotomus cuculatus</i>	Mountain Tailorbird	I	R	LC	14	0	0	14
77	<i>Phylloscopus fulgiventis</i>	Smoky Leaf-warbler	I	WV	LC	0	1	0	1
78	<i>Cettia fortipes</i>	Strong-footed Bush-warbler	I	R	LC	4	5	0	9
30	Tichodromidae								
79	<i>Tichodroma muraria</i>	Wallcreeper	I	WV	LC	0	0	4	4
31	Timaliidae								
80	<i>Trochalopteron imbricatum</i>	Bhutan Laughingthrush	I	R	LC	0	10	30	40
81	<i>Trochalopteron affine</i>	Black-faced Laughingthrush	I	R	LC	0	0	9	9
82	<i>Trochalopteron squamatum</i>	Blue-winged Laughingthrush	I	R	LC	0	0	5	5
83	<i>Alcippe nipalensis</i>	Nepal Fulvetta	I	R	LC	0	3	0	3
84	<i>Pellorneum ruficeps</i>	Puff-throated Babbler	I	R	LC	2	0	0	2
85	<i>Leiothrix lutea</i>	Red-billed Leiothrix	O	R	LC	0	4	0	4
86	<i>Trachalopteron erthrocephalum</i>	Red-headed Laughingthrush	I	R	LC	0	23	5	28
87	<i>Ianthocincla rufogularis</i>	Rufous-chinned Laughingthrush	I	R	LC	11	0	0	11
88	<i>Yuhina occipitalis</i>	Rufous-vented Yuhina	I	R	LC	0	4	0	4
89	<i>Actinodura waldeni</i>	Streak-throated Barwing	I	R	LC	4	0	0	4
90	<i>Yuhina flavicollis</i>	Whiskered Yuhina	I	R	LC	12	0	3	15
32	Troglodytidae								
91	<i>Troglodytes troglodytes</i>	Winter Wren	I	R	LC	0	0	3	3
33	Turdidae								
92	<i>Turdus atrogularis</i>	Black-throated Thrush	I	WV	LC	0	0	1	1
93	<i>Myophonus caeruleus</i>	Blue Whistling-thrush	I	R	LC	21	6	6	33
94	<i>Turdus albocinctus</i>	White-collared Blackbird	I	R	LC	0	0	8	8
34	Zosteropidae								
95	<i>Zosterops palpebrosus</i>	Oriental White-eye	I	R	LC	0	0	1	1

FS : Aq-Aquatic Feeder, C - Carnivores, F - Frugivore, G - Granivore, I - Insectivore, N - Nectarivore, Nc - Nucivore, O - Omnivore, P - Piscivore; MS - Migratory Status - BV - Breeding Visitor, IR - Isolated Record, R - Resident, WV - Winter Visitor; CS - Conservation status - IUCN Red List and WPA -1972 Schedule: VU - Vulnerable, LC - Least Concern; PM- Post monsoon, M - Monsoon, W - Winter

Appendix II.3.184: List of possible mammalian fauna of the Tawang region and the Mago chu HEP area

Sl. No.	Common name	Scientific name	SPA	Conservation status	
	Primates			IUCN	IWPA
1	Arunachal macaque	<i>Macaca munzala</i>		EN	-
2	Assamese macaque	<i>M. assamensis</i>		NT	II
3	Capped langur	<i>Trachypithecus pileatus</i>		VU	I
4	Slow loris	<i>Nycticebus coucang</i>		VU	I
	Ungulates				
5	Barking deer	<i>Muntiacus muntjak</i>	*	LC	III
6	Bharal	<i>Pseudois nayaur</i>		LC	I
7	Chinese goral	<i>Nemorhaedus caudatus</i>		VU	III
8	Himalayan goral	<i>N. goral</i>	*	NT	III
9	Musk deer	<i>Mos chus sp.</i>		EN	-
10	Sambar	<i>Cervus unicorn</i>		VU	III
11	Serow	<i>N. sumatraensis</i>			
12	Wild pig	<i>Sus scrofa</i>	*	LC	III
	Carnivores				
13	Common leopard	<i>Panthera pardus</i>		NT	I
14	Jungle Cat	<i>Felis Chaus</i>	*	LC	II
15	Dhole	<i>Cuon alpinus</i>		EN	II
16	Himalayan black bear	<i>Ursus thibetanus</i>		VU	II
17	Himalayan palm civet	<i>Paguma larvata</i>	*	LC	II
18	Leopard cat	<i>Prionailurus bengalensis</i>		LC	-
19	Otter	<i>Lutra sp.</i>		VU	-
20	Red panda	<i>Ailurus fulgens</i>		VU	I
21	Snow leopard	<i>Uncia uncia</i>		EN	I
22	Yellow-throated marten	<i>Martes flavigula</i>	*	LC	II
	Rodents				
23	Hairy-footed flying squirrel	<i>Belomys pearsonii</i>		DD	II
24	Himalayan marmot	<i>Marmota himalayana</i>		LC	II
25	Himalayan striped squirrel	<i>Tamias maccllellandi</i>	*	LC	-
26	Orange-bellied Himalayan squirrel	<i>Dremomys lokriah</i>	*	LC	-
	*Hoary-bellied Himalayan Squirrel	<i>Callosciurus pygerythrus</i>	*	LC	-
27	Porcupine	<i>Hystrix sp.</i>		LC	IV
	*Chesnut rat	<i>Niviventer fluvescens</i>	*	LC	V
	Lagomorphs				
28	Large-eared pika	<i>Ochotona macrotis</i>		LC	-
29	Moupin pika	<i>Ochotona thibetana</i>		LC	-
	29 species		10 species R% 34.48%		

Data Source:1 – Mishra *et al.* 2006, SPA –Species of Project Area, * Additional species reported during the study

Appendix II.3.185: Status of birds at Mago chu barrage site

Sl. No.	Family/Genus/Species	Common name	FS	MS	CS	Total
1	Apodidae					
1	<i>Aerodramus brevirostris</i>	Himalayan Swiftlet	I	R	LC	78
2	Bucerotidae					
2	<i>Aceros nipalensis</i>	Rufous-necked Hornbill	F	R	VU	1
3	Cinclididae					
3	<i>Cinclus cinclus</i>	White-throated Dipper	I	R	LC	2
4	Cuculidae					
4	<i>Chrysococcyx maculatus</i>	Asian Emerald Cuckoo	I	BV	LC	2
5	Dicruridae					
5	<i>Dicrurus leucophaeus</i>	Ashy Drongo	O	WV	LC	1

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Sl. No.	Family/Genus/Species	Common name	FS	MS	CS	Total
6	Fringillidae					
6	<i>Pyrrhula erythrocephala</i>	Red-headed Bullfinch	G	R	LC	7
7	Hirundinidae					
7	<i>Delichon nipalense</i>	Nepal House-martin	I	R	LC	30
8	Leiothrichidae					
8	<i>Heterophasia capistrata</i>	Rufous Sibia	O	R	LC	4
9	Motacillidae					
9	<i>Anthus hodgsoni hodgsoni</i>	Olive-backed Pipit	I	R	LC	2
10	Muscicapidae					
10	<i>Phoenicurus frontalis</i>	Blue-fronted Redstart	I	BV	LC	1
11	<i>Chaimarrornis leucocephalus</i>	White-capped River-chat	I	R	LC	1
12	<i>Enicurus scouleri</i>	Little Forktail	I	R	LC	1
13	<i>Rhyacornis fuliginosa</i>	Plumbeous Water-redstart	I	R	LC	7
11	Nectariniidae					
14	<i>Aethopyga nipalensis</i>	Green-tailed Sunbird	N	R	LC	3
12	Paridae					
15	<i>Parus spilonotus</i>	Black-spotted Yellow Tit	I	R	LC	2
16	<i>Parus ater</i>	Coal Tit	I	R	LC	2
17	<i>Parus dichrous</i>	Grey-crested Tit	I	R	LC	2
18	<i>Parus monticolus</i>	Green-backed Tit	I	R	LC	6
13	Pycnonotidae					
19	<i>Hypsipetes leucocephalus</i>	Himalayan Black Bulbul	O	R	LC	7
14	Stenostiridae					
20	<i>Culicicapa ceylonensis</i>	Grey-headed Canary-flycatcher	I	BV	LC	1
15	Sylviidae					
21	<i>Orthotomus cuculatus</i>	Mountain Tailorbird	I	R	LC	2
22	<i>Phylloscopus reguloides</i>	Blyth's Leaf-warbler	I	WV	LC	2
23	<i>Phylloscopus xanthoschistos</i>	Grey-hooded Warbler	I	R	LC	2
16	Tichodromidae					
24	<i>Tichodroma muraria</i>	Wallcreeper	I	WV	LC	2
17	Timaliidae					
25	<i>Yuhina flavicollis</i>	Whiskered Yuhina	I	R	LC	5
18	Turdidae					
26	<i>Myophonus caeruleus</i>	Blue Whistling-thrush	I	R	LC	3
27	<i>Turdus atrogularis</i>	Black-throated Thrush	I	WV	LC	1

Fs – Foraging Status, F - Frugivore, G - Granivore, I - Insectivore, N - Nectarivore, O - Omnivore, MS - Migratory Status - BV - Breeding Visitor, , R - Resident, WV - Winter Visitor; CS - Conservation status - IUCN Red List and WPA -1972 Schedule: VU- Vulnerable LC - Least Concern;

Appendix II.3.186: Status of birds at Mago chu powerhouse site

Sl. No.	Family/Genus/Species	Common name	FS	MS	CS	No of birds recorded
1	Accipitridae					
1	<i>Elanus caeruleus</i>	Black-winged Kite	C	R	LC	5
2	<i>Gyps fulvus</i>	Griffon Vulture	C	WV	LC	3
3	<i>Nisaetus nipalensis</i>	Mountain-hawk Eagle	C	R	LC	3
2	Aegithalidae					
4	<i>Aegithalos concinnus</i>	Red-headed Tit	I	R	LC	5
3	Apodidae					
5	<i>Apus pacificus</i>	Pacific Swift	I	BV	LC	2
4	Campephagidae					
6	<i>Pericrocotus speciosus</i>	Scarlet Minivet	I	R	LC	4
5	Cinclidae					
7	<i>Cinclus cinclus</i>	White-throated Dipper	I	R	LC	1
6	Cisticolidae					
8	<i>Prinia crinigera</i>	Striated Prinia	I	R	LC	15
9	<i>Prinia hodgsonii</i>	Grey-breasted Prinia	I	R	LC	2

Appendices

Sl. No.	Family/Genus/Species	Common name	FS	MS	CS	No of birds recorded
7	Cuculidae					
10	<i>Chrysococcyx maculatus</i>	Asian Emerald Cuckoo	I	BV	LC	1
11	<i>Hierococcyx sparveroides</i>	Large Hawk-cuckoo	I	BV	LC	1
12	<i>Phaenicophaeus tristis</i>	Green-billed Malkoha	O	R	LC	2
8	Dicruridae					
13	<i>Dicrurus leucophaeus</i>	Ashy Drongo	O	WV	LC	3
9	Emberizidae					
14	<i>Emberiza pusilla</i>	Little Bunting	G	WV	LC	4
10	Fringillidae					
15	<i>Carpodacus pulcherrimus</i>	Himalayan Beautiful Rosefinch	G	WV	LC	6
16	<i>Carduelis spinoides</i>	Himalayan Greenfinch	G	WV	LC	25
11	Hirundinidae					
17	<i>Delichon nipalense</i>	Nepal House Martin	I	R	LC	12
12	Laniidae					
18	<i>Lanius schach tricolor</i>	Black-headed' Long-tailed Shrike	I	BV	LC	2
13	Leiothrichidae					
19	<i>Heterophasia capistrata</i>	Rufous Sibia	O	R	LC	2
14	Megalaimidae					
20	<i>Megalaima asiatica</i>	Blue-throated Barbet	F	R	LC	7
21	<i>Megalaima franklinii</i>	Golden-throated Barbet	F	R	LC	1
22	<i>Megalaima virens</i>	Great Barbet	F	R	LC	6
15	Motacillidae					
23	<i>Anthus hodgsoni hodgsoni</i>	Olive-backed Pipit	I	R	LC	2
16	Muscicapidae					
24	<i>Enicurus leschenaulti</i>	White-crowned Forktail	I	R	LC	5
25	<i>Muscicapa ferruginea</i>	Ferruginous Flycatcher	I	BV	LC	2
26	<i>Niltava (vivda) catesi</i>	Vivid Niltava	I	BV	LC	2
27	<i>Niltava sundara</i>	Rufous-bellied Niltava	I	BV	LC	1
28	<i>Phoenicurus frontalis</i>	Blue-fronted Redstart	I	BV	LC	1
29	<i>Rhyacornis fuliginosa</i>	Plumbeous Water-redstart	I	R	LC	3
30	<i>Saxicola ferreus</i>	Grey Bushchat	I	R	LC	2
17	Paridae					
31	<i>Parus ater</i>	Coal Tit	I	R	LC	2
32	<i>Parus dichrous</i>	Grey-crested Tit	I	R	LC	2
33	<i>Parus monticolus</i>	Green-backed Tit	I	R	LC	2
18	Picidae					
34	<i>Dendrocopos canicapillus</i>	Grey-capped Pygmy Woodpecker	I	R	LC	2
35	<i>Picus flavinucha</i>	Greater Yellownape	I	R	LC	2
19	Prunellidae					
36	<i>Prunella rubeculoides</i>	Robin Accentor	O	R	LC	24
20	Rhipiduridae					
37	<i>Rhipidura albicollis</i>	White-throated Fantail	I	R	LC	1
21	Stenostiridae					
38	<i>Chelidorhynch hypoxantha</i>	Yellow-bellied Fantail	I	R	LC	6
22	Sylviidae					
39	<i>Abroscopus schisticeps</i>	Black-faced Warbler	I	R	LC	5
40	<i>Phylloscopus chloronotus</i>	Lemon-rumped Leaf Warbler	I	BV	LC	1
41	<i>Phylloscopus inornatus</i>	Yellow-browed Leaf-warbler	I	WV	LC	4
42	<i>Phylloscopus maculipennis</i>	Ashy-throated Warbler	I	R	LC	1
43	<i>Phylloscopus maculipennis</i>	Grey-faced Leaf-warbler	I	R	LC	2
44	<i>Phylloscopus pulcher</i>	Orange-barred Leaf-warbler	I	WV	LC	2
45	<i>Seicercus burkii</i>	Green-crowned Warbler	I	BV	LC	4
46	<i>Seicercus castaniceps</i>	Chestnut-crowned Warbler	I	BV	LC	3
47	<i>Seicercus poliogenys</i>	Grey-cheeked Warbler	I	R	LC	4
23	Timaliidae					
48	<i>Alcippe nipalensis</i>	Nepal Fulvetta	I	R	LC	3
49	<i>Leiothrix lutea</i>	Red-billed Leiothrix	O	R	LC	4

Appendices

Sl. No.	Family/Genus/Species	Common name	FS	MS	CS	No of birds recorded
50	<i>Trachalopteron erthrocephalum</i>	Red-headed Launghingthrush	I	R	LC	16
51	<i>Yuhina occipitalis</i>	Rufous-vented Yuhina	I	R	LC	4
24	Troglodytidae					
52	<i>Troglodytes troglodytes</i>	Winter Wren	I	R	LC	1
25	Turdidae					
53	<i>Turdus albocinctus</i>	White-collared Blackbird	I	R	LC	2
26	Zosteropidae					
54	<i>Zosterops palpebrosus</i>	Oriental White-eye	I	R	LC	1

FS- Foraging Status, F - Frugivore, G - Granivore, I - Insectivore, O - Omnivore, MS - Migratory Status - BV - Breeding Visitor, R - Resident, WV - Winter Visitor; CS - Conservation status - IUCN Red List and WPA -1972 Schedule: LC - Least Concern

Appendix II.3.187: Ecological status of birds recorded in the Nykcharong chu HEP area

Sl. No.	Family and Species	Common name	FS	MS	CS	PM	M	W	Overall
1	Accipitridae								
1	<i>Hieraetus fasciatus</i>	Bonelli's Eagle	C	R	LC	0	1	0	1
2	<i>Buteo rufinus</i>	Long-legged Buzzard	C	WV	LC	0	1	0	1
2	Aegithalidae								
3	<i>Aegithalos concinnus</i>	Red-headed Tit	I	R	LC	0	0	11	11
3	Apodidae								
4	<i>Aerodramus brevirostris</i>	Himalayan Swiftlet	I	R	LC	0	138	5	143
5	<i>Apus pacificus</i>	Pacific Swift	I	BV	LC	5	0	0	5
4	Campephagidae								
6	<i>Pericrocotus ethologus</i>	Long-tailed Minivet	I	BV	LC	0	0	4	4
7	<i>Hemipus picatus</i>	Pied Flycatcher-shrike	I	R	LC	14	0	0	14
8	<i>Pericrocotus speciosus</i>	Scarlet Minivet	I	R	R	0	9	0	9
5	Certhiidae								
9	<i>Certhia discolor</i>	Brown-throated Treecreeper	I	R	LC	0	0	2	2
10	<i>Certhia familiaris mandellii</i>	Eurasian Treecreeper	I	R	LC	0	2	0	2
11	<i>Certhia nepalensis</i>	Rusty-flanked Treecreeper	I	R	LC	0	0	14	14
6	Cinclidae								
12	<i>Cinclus pallasii</i>	Brown Dipper	Aq	R	LC	1	0	0	1
13	<i>Cinclus cinclus</i>	White-throated Dipper	I	R	LC	0	0	4	4
7	Columbidae								
14	<i>Ducula badia</i>	Mountain Imperial-pigeon	G	R	LC	6	0	1	7
15	<i>Streptopelia orientalis</i>	Oriental Turtle-dove	G	WV	LC	0	2	3	5
8	Corvidae								
16	<i>Corvus culminatus</i>	Large-billed Crow	O	R	LC	0	0	3	3
17	<i>Nucifraga caryocatactes</i>	Spotted Nutcracker	Nu	R	LC	0	0	2	2
9	Cuculidae								
18	<i>Chrysococcyx maculatus</i>	Asian Emerald Cuckoo	I	BV	LC	1	0	0	1
19	<i>Cuculus poliocephalus</i>	Small Cuckoo	I	BV	LC	0	0	1	1
10	Dicaeidae								
20	<i>Dicaeum ignipectus</i>	Fire-breasted Flowerpecker	N	R	LC	11	3	3	17
21	<i>Dicaeum minullum</i>	Plain Flowerpecker	N	R	LC	0	4	0	4
22	<i>Dicaeum melanoanthum</i>	Yellow-bellied Flowerpecker	N	R	LC	0	0	2	2
23	<i>Dicaeum chrysorrheum</i>	Yellow-vented Flowerpecker	N	R	LC	0	3	0	3
11	Dicruridae								
24	<i>Dicrurus leucophaeus</i>	Ashy Drongo	O	WV	LC	17	1	0	18
25	<i>Dicrurus macrocercus</i>	Black Drongo	O	R	LC	20	0	0	20
12	Falconidae								
26	<i>Falco tinnunculus</i>	Common Kestrel	C	WV	LC	0	0	1	1
13	Fringillidae								
27	<i>Fringilla montifringilla</i>	Brambling	I	IR	LC	0	0	7	7
28	<i>Haematospiza sipahi</i>	Scarlet Finch	G	R	LC	0	10	0	10

Appendices

Sl. No.	Family and Species	Common name	FS	MS	CS	PM	M	W	Overall
14	Hirundinidae								
29	<i>Delichon dasypus</i>	Asian House Martin	I	BV	LC	0	0	6	6
30	<i>Delichon nipalense</i>	Nepal House-martin	I	R	LC	0	77	33	110
15	Laniidae								
31	<i>Lanius cristatus</i>	Brown Shrike	I	WV	LC	0	2	0	2
16	Leiothrichidae								
32	<i>Heterophasia capistrata</i>	Rufous Sibia	O	R	LC	25	37	15	77
17	Motacillidae								
33	<i>Anthus hodgsoni hodgsoni</i>	Olive-backed Pipit	I	R	LC	0	2	0	2
18	Muscicapidae								
34	<i>Phoenicurus ochruros</i>	Black Redstart	I	WV	LC	0	0	1	1
35	<i>Phoenicurus frontalis</i>	Blue-fronted Redstart	I	BV	LC	0	0	8	8
36	<i>Cyornis rubeculoides</i>	Blue-throated Flycatcher	I	BV	LC	0	0	1	1
37	<i>Muscicapa sibirica</i>	Dark-sided Flycatcher	I	BV	LC	0	3	0	3
38	<i>Phoenicurus hodgsoni</i>	Hodgson's Redstart	I	WV	LC	0	0	1	1
39	<i>Niltava grandis</i>	Large Niltava	I	R	LC	0	1	0	1
40	<i>Enicurus scouleri</i>	Little Forktail	I	R	LC	0	0	1	1
41	<i>Ficedula strophliata</i>	Orange-gorgeted Flycatcher	I	R	LC	0	3	2	5
42	<i>Copsychus saularis</i>	Oriental Magpie-robin	I	R	LC	0	0	1	1
43	<i>Cymnitis poliolegens</i>	Pale-chinned Flycatcher	I	R	LC	0	0	2	2
44	<i>Rhyacornis fuliginosa</i>	Plumbeous Water-redstart	I	R	LC	24	14	3	41
45	<i>Muscicapella hodgsoni</i>	Pygmy Blue Flycatcher	I	R	LC	0	0	1	1
46	<i>Niltava sundara</i>	Rufous-bellied Niltava	I	BV	LC	0	3	0	3
47	<i>Ficedula tricolor</i>	Slaty-blue Flycatcher	I	BV	LC	0	1	0	1
48	<i>Ficedula superciliosa</i>	Ultramarine Flycatcher	I	BV	LC	0	2	0	2
49	<i>Chaimarrornis leucocephalus</i>	White-capped River-chat	I	R	LC	19	8	1	28
50	<i>Myiomela leucura</i>	White-tailed Blue Robin	I	R	LC	7	0	0	7
51	<i>Myiomela leucura</i>	White-tailed Blue Robin	I	R	LC	4	0	0	4
19	Nectariniidae								
52	<i>Aethopyga saturata</i>	Black-breasted Sunbird	N	R	LC	0	0	1	1
53	<i>Aethopyga nipalensis</i>	Green-tailed Sunbird	N	R	LC	14	14	9	37
20	Oriolidae								
54	<i>Oriolus tenuirostris</i>	Slender-billed Oriole	O	R	LC	6	0	0	6
21	Paridae								
55	<i>Parus ater</i>	Coal Tit	I	R	LC	0	0	3	3
56	<i>Parus monticolus</i>	Green-backed Tit	I	R	LC	20	13	15	48
57	<i>Parus dichrous</i>	Grey-crested Tit	I	R	LC	14	0	0	14
58	<i>Melanochlora sultanea</i>	Sultan Tit	I	R	LC	2	0	0	2
59	<i>Sylviparus modestus</i>	Yellow-browed Tit	I	R	LC	0	0	10	10
22	Passeridae								
60	<i>Passer montanus</i>	Eurasian Tree Sparrow	G	R	LC	0	0	2	2
23	Prunellidae								
61	<i>Prunella collaris</i>	Alpine Accentor	I	WV	LC	0	0	1	1
62	<i>Prunella immaculata</i>	Maroon-backed Accentor	I	WV	LC	0	0	9	9
63	<i>Prunella strophliata</i>	Rufous-breasted Accentor	I	R	LC	0	0	1	1
24	Pycnonotidae								
64	<i>Hemixos flava</i>	Ashy Bulbul	O	R	LC	6	0	0	6
65	<i>Hypsipetes leucocephalus</i>	Himalayan Black Bulbul	O	R	LC	75	0	0	75
66	<i>Hypsipetes mccllellandi</i>	Mountain Bulbul	O	R	LC	0	2	0	2
67	<i>Pycnonotus cafer</i>	Red-vented Bulbul	O	R	LC	0	0	2	2
25	Sittidae								
68	<i>Sitta himalayensis</i>	White-tailed Nuthatch	I	R	LC	15	1	2	18
26	Stenostiridae								
69	<i>Culicicapa ceylonensis</i>	Grey-headed Canary-flycatcher	I	BV	LC	20	4	0	24
70	<i>Chelidorhynch hypoxantha</i>	Yellow-bellied Fantail	I	R	LC	0	21	2	23
27	Sylviidae								
71	<i>Abroscopus schisticeps</i>	Black-faced Warbler	I	R	LC	0	9	0	9

Sl. No.	Family and Species	Common name	FS	MS	CS	PM	M	W	Overall
72	<i>Phylloscopus reguloides</i>	Blyth's Leaf-Warbler	I	WV	LC	15	14	4	33
73	<i>Phylloscopus pulcher</i>	Buff-barred Warbler	I	BV	LC	0	11	0	11
74	<i>Seicercus castaneiceps</i>	Chestnut-crowned Warbler	I	BV	LC	0	5	0	5
75	<i>Tesia castaneocoronata</i>	Chestnut-headed Tesia	I	R	LC	0	2	0	2
76	<i>Phylloscopus coronatus</i>	Eastern Crowned Warbler	I	WV	LC	19	1	0	20
77	<i>Seicercus burkii</i>	Green-crowned Warbler	I	BV	LC	0	5	0	5
78	<i>Phylloscopus trochiloides</i>	Greenish Warbler	I	WV	LC	20	10	0	30
79	<i>Seicercus poliogenys</i>	Grey-cheeked Warbler	I	R	LC	0	3	0	3
80	<i>Phylloscopus maculipennis</i>	Grey-faced Leaf-warbler	I	R	LC	0	10	5	15
81	<i>Phylloscopus xanthoschistos</i>	Grey-hooded Warbler	I	R	LC	20	5	9	34
82	<i>Phylloscopus chloronotus</i>	Lemon-rumped Leaf Warbler	I	BV	LC	0	11	0	11
83	<i>Orthotomus cuculatus</i>	Mountain Tailorbird	I	R	LC	0	0	1	1
84	<i>Phylloscopus fulgiventis</i>	Smoky Leaf-warbler	I	WV	LC	0	1	0	1
85	<i>Cettia fortipes</i>	Strong-footed Bush-warbler	I	R	LC	0	5	0	5
86	<i>Phylloscopus inornatus</i>	Yellow-browed Leaf-warbler	I	WV	LC	0	0	1	1
28	Tichodromidae								
87	<i>Tichodroma muraria</i>	Wallcreeper	I	WV	LC	0	0	2	2
29	Timaliidae								
88	<i>Trochalopteron imbricatum</i>	Bhutan Laughingthrush	I	R	LC	0	14	39	53
89	<i>Yuhina nigrimenta</i>	Black-chinned Yuhina	I	R	LC	0	4	0	4
90	<i>Trochalopteron affine</i>	Black-faced Laughingthrush	I	R	LC	0	0	15	15
91	<i>Trochalopteron squamatum</i>	Blue-winged Laughingthrush	I	R	LC	0	0	5	5
92	<i>Alcippe nipalensis</i>	Nepal Fulvetta	I	R	LC	0	3	0	3
93	<i>Leiothrix lutea</i>	Red-billed Leiothrix	O	R	LC	0	4	0	4
94	<i>Trachalopteron erthrocephalum</i>	Red-headed Laughingthrush	I	R	LC	20	28	8	56
95	<i>Ianthocincla rufogularis</i>	Rufous-chinned Laughingthrush	I	R	LC	14	0	0	14
96	<i>Yuhina occipitalis</i>	Rufous-vented Yuhina	I	R	LC	0	14	3	17
97	<i>Actinodura waldeni</i>	Streak-throated Barwing	I	R	LC	9	0	0	9
98	<i>Yuhina gularis</i>	Stripe-throated Yuhina	O	R	LC	0	4	0	4
99	<i>Yuhina flavicollis</i>	Whiskered Yuhina	I	R	LC	15	9	6	30
100	<i>Garrulax albogularis</i>	White-throated Laughingthrush	I	R	LC	9	0	0	9
30	Troglodytidae								
101	<i>Troglodytes troglodytes</i>	Winter Wren	I	R	LC	0	0	2	2
31	Turdidae								
102	<i>Myophonus caeruleus</i>	Blue Whistling-thrush	I	R	LC	24	9	5	38
103	<i>Monticola cinclorhynchus</i>	Blue-headed Rock-thrush	I	BV	LC	22	0	0	22
104	<i>Monticola rufiventris</i>	Chestnut-bellied Rock Thrush	I	R	LC	2	0	0	2
105	<i>Turdus albocinctus</i>	White-collared Blackbird	I	R	LC	0	0	9	9
32	Zosteropidae								
106	<i>Zosterops palpebrosus</i>	Oriental White-eye	I	R	LC	0	3	1	4

FS : Aq-Aquatic Feeder, C-Carnivores, F-Frugivore, G-Granivore, I-Insectivore, N-Nectarivore, Nc-Nucivore, O-Omnivore, P-Piscivore; MS-Migratory Status-BV-Breeding Visitor, IR-Isolated Record, R-Resident, WV-Winter Visitor; CS-Conservation status-IUCN Red List and WPA -1972 Schedule: VU-Vulnerable, LC-Least Concern; PM-Post monsoon, M-Monsoon, W-Winter

Appendix II.3.188: List of possible mammalian fauna of the Tawang Region and contribution of species reported in the Nykcharong chu HEP area

Sl. No.	Common name	Scientific name	SPA	Conservation status	
				IUCN	IWPA
	Primates				
1	Arunachal macaque	<i>Macaca munzala</i>	*	EN	-
2	Assamese macaque	<i>M. assamensis</i>		NT	II
3	Capped langur	<i>Trachypithecus pileatus</i>		VU	I
4	Slow loris	<i>Nycticebus coucang</i>		VU	I
	Ungulates				
5	Barking deer	<i>Muntiacus muntjak</i>	*	LC	III
6	Bharal	<i>Pseudois nayaur</i>		LC	I
7	Chinese goral	<i>Nemorhaedus caudatus</i>		VU	III

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Sl. No.	Common name	Scientific name	SPA	Conservation status	
8	Himalayan goral	<i>N. goral</i>	*	NT	III
9	Musk deer	<i>Mos chus</i> sp.		EN	-
10	Sambar	<i>Cervus unicolor</i>		VU	III
11	Serow	<i>N. sumatraensis</i>			
12	Wild pig	<i>Sus scrofa</i>	*	LC	III
	Carnivores				
13	Common leopard	<i>Panthera pardus</i>	*	NT	I
14	Jungle Cat	<i>Felis Chaus</i>	*	LC	II
15	Dhole	<i>Cuon alpinus</i>	*	EN	II
16	Himalayan black bear	<i>Ursus thibetanus</i>		VU	II
17	Himalayan palm civet	<i>Paguma larvata</i>		LC	II
18	Leopard cat	<i>Prionailurus bengalensis</i>	*	LC	-
19	Otter	<i>Lutra</i> sp.		VU	-
20	Red panda	<i>Ailurus fulgens</i>		VU	I
21	Snow leopard	<i>Uncia uncia</i>		EN	I
22	Yellow-throated marten	<i>Martes flavigula</i>	*	LC	II
	Rodents				
23	Hairy-footed flying squirrel	<i>Belomys pearsonii</i>		DD	II
24	Himalayan marmot	<i>Marmota himalayana</i>		LC	II
25	Himalayan striped squirrel	<i>Tamiops maccllellandi</i>	*	LC	-
26	Orange-bellied Himalayan squirrel	<i>Dremomys lokriah</i>	*	LC	-
	*Hoary-bellied Himalayan Squirrel	<i>Callosciurus pygerythrus</i>	*	LC	-
27	Porcupine	<i>Hystrix</i> sp.	*	LC	IV
	*Chesnut rat	<i>Niviventer flavescent</i>		LC	V
	Lagomorphs				
28	Large-eared pika	<i>Ochotona macrotis</i>		LC	-
29	Moupin pika	<i>Ochotona thibetana</i>		LC	-
	29 species		13 species R% 44.82%		

Data Source: 1–Mishra et al 2006, SPA –Species of Project Area. * Additional species reported during the study

Appendix II.3.189: Status of birds at Nykcharong chu barrage site

Sl. No.	Family/Genus/Species	Common name	FS	MS	CS	No of birds recorded
1	Apodidae					
1	<i>Aerodramus brevirostris</i>	Himalayan Swiftlet	I	R	LC	5
2	Certhiidae					
2	<i>Certhia nepalensis</i>	Rusty-flanked Treecreeper	I	R	LC	10
3	Dicaeidae					
3	<i>Dicaeum ignipectus</i>	Fire-breasted Flowerpecker	N	R	LC	2
4	Dicruridae					
4	<i>Dicrurus leucophaeus</i>	Ashy Drongo	O	WV	LC	5
5	<i>Dicrurus macrocercus</i>	Black Drongo	O	R	LC	2
5	Fringillidae					
6	<i>Fringilla montifringilla</i>	Brambling	I	IR	LC	4
6	Hirundinidae					
7	<i>Delichon dasypus</i>	Asian House Martin	I	BV	LC	3
8	<i>Delichon nipalense</i>	Nepal House Martin	I	R	LC	8
7	Leiothrichidae					
9	<i>Heterophasia capistrata</i>	Rufous Sibia	O	R	LC	4
8	Muscicapidae					
10	<i>Enicurus scouleri</i>	Little Forktail	G	WV	LC	1
11	<i>Phoenicurus frontalis</i>	Blue-fronted Redstart	I	BV	LC	4
12	<i>Phoenicurus hodgsoni</i>	Hodgson's Redstart	I	WV	LC	1
9	Nectariniidae					
13	<i>Aethopyga nipalensis</i>	Green-tailed Sunbird	N	R	LC	5
10	Paridae					

Sl. No.	Family/Genus/Species	Common name	FS	MS	CS	No of birds recorded
14	<i>Melanochlora sultanea</i>	Sultan Tit	I	R	LC	2
15	<i>Parus dichrous</i>	Grey-crested Tit	I	R	LC	2
16	<i>Parus monticolus</i>	Green-backed Tit	I	R	LC	4
17	<i>Sylviparus modestus</i>	Yellow-browed Tit	I	R	LC	3
11	Prunellidae					
18	<i>Prunella immaculata</i>	Maroon-backed Accentor	I	WV	LC	9
12	Pycnonotidae					
19	<i>Hemixos flava</i>	Ashy Bulbul	O	R	LC	1
20	<i>Hypsipetes leucocephalus</i>	Himalayan Black Bulbul	O	R	LC	2
13	Stenostiridae					
21	<i>Culicicapa ceylonensis</i>	Grey-headed Canary-flycatcher	I	BV	LC	3
14	Sylviidae					
22	<i>Phylloscopus coronatus</i>	Eastern Crowned Warbler	I	WV	LC	3
23	<i>Phylloscopus maculipennis</i>	Ashy-throated Warbler	I	R	LC	2
24	<i>Phylloscopus reguloides</i>	Blyth's Leaf-warbler	I	WV	LC	2
25	<i>Phylloscopus trochiloides</i>	Greenish Warbler	I	WV	LC	3
26	<i>Phylloscopus xanthoschistos</i>	Grey-hooded Warbler	I	R	LC	5
15	Timaliidae					
27	<i>Trochalopteron affine</i>	Black-faced Laughingthrush	I	R	LC	3
28	<i>Trochalopteron imbricatum</i>	Bhutan Laughing Thrush	I	R	LC	5
29	<i>Trachalopteron erthrocephalum</i>	Red-headed Laughingthrush	I	R	LC	3
16	Turdidae					
30	<i>Monticola cinclorhynchus</i>	Blue-headed Rock-thrush	I	BV	LC	2
31	<i>Myophonus caeruleus</i>	Blue Whistling-thrush	I	R	LC	4

FS : Foraging Status, G-Granivore, I-Insectivore, N-Nectarivore, O-Omnivore, MS-Migratory Status-BV-Breeding Visitor, IR-Isolated Record, R-Resident, WV-Winter Visitor; CS-Conservation status-IUCN Red List and WPA -1972 Schedule: LC-Least Concern;

Appendix II.3.190: Status of birds at Nykcharong chu powerhouse site

Sl. No.	Family/Genus/Species	Common name	FS	MS	CS	No of birds recorded
1	Accipitridae					
1	<i>Elanus caeruleus</i>	Black-winged Kite	C	R	LC	5
2	<i>Gyps fulvus</i>	Griffon Vulture	C	WV	LC	3
3	<i>Nisaetus nipalensis</i>	Mountain-hawk Eagle	C	R	LC	3
2	Aegithalidae					
4	<i>Aegithalos concinnus</i>	Red-headed Tit	I	R	LC	5
3	Apodidae					
5	<i>Apus pacificus</i>	Pacific Swift	I	BV	LC	2
4	Campephagidae					
6	<i>Pericrocotus speciosus</i>	Scarlet Minivet	I	R	LC	4
5	Cinclidae					
7	<i>Cinclus cinclus</i>	White-throated Dipper	I	R	LC	1
6	Cisticolidae					
8	<i>Prinia crinigera</i>	Striated Prinia	I	R	LC	15
9	<i>Prinia hodgsonii</i>	Grey-breasted Prinia	I	R	LC	2
7	Cuculidae					
10	<i>Chrysococcyx maculatus</i>	Asian Emerald Cuckoo	I	BV	LC	1
11	<i>Hierococcyx sparveroides</i>	Large Hawk-cuckoo	I	BV	LC	1
12	<i>Phaenicophaeus tristis</i>	Green-billed Malkoha	O	R	LC	2
8	Dicruridae					
13	<i>Dicrurus leucophaeus</i>	Ashy Drongo	O	WV	LC	3
9	Emberizidae					
14	<i>Emberiza pusilla</i>	Little Bunting	G	WV	LC	4
10	Fringillidae					
15	<i>Carpodacus pulcherrimus</i>	Himalayan Beautiful Rosefinch	G	WV	LC	6
16	<i>Carduelis spinoides</i>	Himalayan Greenfinch	G	WV	LC	25
11	Hirundinidae					

Appendices

Sl. No.	Family/Genus/Species	Common name	FS	MS	CS	No of birds recorded
17	<i>Delichon nipalense</i>	Nepal House Martin	I	R	LC	12
12	Laniidae					
18	<i>Lanius schach tricolor</i>	Black-headed' Long-tailed Shrike	I	BV	LC	2
13	Leiothrichidae					
19	<i>Heterophasia capistrata</i>	Rufous Sibia	O	R	LC	2
14	Megalaimidae					
20	<i>Megalaima asiatica</i>	Blue-throated Barbet	F	R	LC	7
21	<i>Megalaima franklinii</i>	Golden-throated Barbet	F	R	LC	1
22	<i>Megalaima virens</i>	Great Barbet	F	R	LC	6
15	Motacillidae					
23	<i>Anthus hodgsoni hodgsoni</i>	Olive-backed Pipit	I	R	LC	2
16	Muscicapidae					
24	<i>Enicurus leschenaulti</i>	White-crowned Forktail	I	R	LC	5
25	<i>Muscicapa ferruginea</i>	Ferruginous Flycatcher	I	BV	LC	2
26	<i>Niltava (virda) catesi</i>	Vivid Niltava	I	BV	LC	2
27	<i>Niltava sundara</i>	Rufous-bellied Niltava	I	BV	LC	1
28	<i>Phoenicurus frontalis</i>	Blue-fronted Redstart	I	BV	LC	1
29	<i>Rhyacornis fuliginosa</i>	Plumbeous Water-redstart	I	R	LC	3
30	<i>Saxicola ferreus</i>	Grey Bushchat	I	R	LC	2
17	Paridae					
31	<i>Parus ater</i>	Coal Tit	I	R	LC	2
32	<i>Parus dichrous</i>	Grey-crested Tit	I	R	LC	2
33	<i>Parus monticolus</i>	Green-backed Tit	I	R	LC	2
18	Picidae					
34	<i>Dendrocopos canicapillus</i>	Grey-capped Pygmy Woodpecker	I	R	LC	2
35	<i>Picus flavinucha</i>	Greater Yellownappe	I	R	LC	2
19	Prunellidae					
36	<i>Prunella rubeculoides</i>	Robin Accentor	O	R	LC	24
20	Rhipiduridae					
37	<i>Rhipidura albicollis</i>	White-throated Fantail	I	R	LC	1
21	Stenostiridae					
38	<i>Chelidorhynch hypoxantha</i>	Yellow-bellied Fantail	I	R	LC	6
22	Sylviidae					
39	<i>Abroscopus schisticeps</i>	Black-faced Warbler	I	R	LC	5
40	<i>Phylloscopus chloronotus</i>	Lemon-rumped Leaf Warbler	I	BV	LC	1
41	<i>Phylloscopus inornatus</i>	Yellow-browed Leaf-warbler	I	WV	LC	4
42	<i>Phylloscopus maculipennis</i>	Ashy-throated Warbler	I	R	LC	1
43	<i>Phylloscopus maculipennis</i>	Grey-faced Leaf-warbler	I	R	LC	2
44	<i>Phylloscopus pulcher</i>	Orange-barred Leaf-warbler	I	WV	LC	2
45	<i>Seicercus burkii</i>	Green-crowned Warbler	I	BV	LC	4
46	<i>Seicercus castaneiceps</i>	Chestnut-crowned Warbler	I	BV	LC	3
47	<i>Seicercus poliogenys</i>	Grey-cheeked Warbler	I	R	LC	4
23	Timaliidae					
48	<i>Alcippe nipalensis</i>	Nepal Fulvetta	I	R	LC	3
49	<i>Leiothrix lutea</i>	Red-billed Leiothrix	O	R	LC	4
50	<i>Trachalopteron erthrocephalum</i>	Red-headed Laungthingthrush	I	R	LC	16
51	<i>Yuhina occipitalis</i>	Rufous-vented Yuhina	I	R	LC	4
24	Troglodytidae					
52	<i>Troglodytes troglodytes</i>	Winter Wren	I	R	LC	1
25	Turdidae					
53	<i>Turdus albocinctus</i>	White-collared Blackbird	I	R	LC	2
26	Zosteropidae					
54	<i>Zosterops palpebrosus</i>	Oriental White-eye	I	R	LC	1

FS- Foraging Status, F-Frugivore, G-Granivore, I-Insectivore, O-Omnivore, MS-Migratory Status-BV-Breeding Visitor, R-Resident, WV-Winter Visitor; CS-Conservation status-IUCN Red List and WPA -1972 Schedule: LC-Least Concern

Appendix II.3.191: Ecological status of bird species recorded in the Rho HEP area

Appendices

Sl. No.	Family and Species	Common name	FS	MS	CS	PM	M	W	Overall
1	Accipitridae								
1	<i>Hieraaetus fasciatus</i>	Bonelli's Eagle	C	R	LC	0	1	0	1
2	<i>Gyps himalayensis</i>	Himalayan Vulture	C	WV	LC	0	0	1	1
3	<i>Buteo rufinus</i>	Long-legged Buzzard	C	WV	LC	0	1	0	1
2	Apodidae								
4	<i>Aerodramus brevirostris</i>	Himalayan Swiftlet	I	R	LC	18	88	0	106
3	Campephagidae								
5	<i>Pericrocotus ethologus</i>	Long-tailed Minivet	I	BV	LC	0	0	2	2
6	<i>Pericrocotus speciosus</i>	Scarlet Minivet	I	R	R	0	11	0	11
4	Certhiidae								
7	<i>Certhia familiaris mandellii</i>	Eurasian Treecreeper	I	R	LC	0	2	0	2
8	<i>Certhia nepalensis</i>	Rusty-flanked Treecreeper	I	R	LC	0	0	1	1
5	Charadriidae								
9	<i>Charadrius placidus</i>	Long-billed Plover	I	WV	LC	0	2	0	2
6	Cinclidae								
10	<i>Cinclus pallasii</i>	Brown Dipper	Aq	R	LC	1	0	0	1
11	<i>Cinclus cinclus</i>	White-throated Dipper	I	R	LC	0	0	6	6
7	Columbidae								
12	<i>Streptopelia orientalis</i>	Oriental Turtle-dove	G	WV	LC	0	3	3	6
13	<i>Treron sphenurus</i>	Wedge-tailed Green-pigeon	G	R	LC	21	0	0	21
8	Corvidae								
14	<i>Dendrocitta formosae</i>	Grey Treepie	O	R	LC	0	0	5	5
15	<i>Corvus culminatus</i>	Large-billed Crow	O	R	LC	0	0	4	4
16	<i>Nucifraga caryocatactes</i>	Spotted Nutcracker	Nu	R	LC	0	0	3	3
9	Cuculidae								
17	<i>Chrysococcyx maculatus</i>	Asian Emerald Cuckoo	I	BV	LC	3	0	0	3
18	<i>Hierococcyx sparverioides</i>	Large Hawk-cuckoo	I	BV	LC	11	0	0	11
19	<i>Cuculus poliocephalus</i>	Small Cuckoo	I	BV	LC	0	0	1	1
10	Dicaeidae								
20	<i>Dicaeum ignipectus</i>	Fire-breasted Flowerpecker	N	R	LC	12	0	2	14
21	<i>Dicaeum minullum</i>	Plain Flowerpecker	N	R	LC	0	4	0	4
22	<i>Dicrurus leucophaeus</i>	Ashy Drongo	O	WV	LC	18	1	0	19
11	Dicruridae								
23	<i>Dicrurus macrocercus</i>	Black Drongo	O	R	LC	16	0	0	16
24	<i>Dicrurus aeneus</i>	Bronzed Drongo	O	R	LC	21	0	0	21
12	Fringillidae								
25	<i>Carpodacus nepalensis</i>	Dark-breasted Rosefinch	G	R	LC	0	0	9	9
26	<i>Carpodacus edwardsii</i>	Dark-rumped Rosefinch	G	R	LC	0	0	16	16
27	<i>Haematospiza sipahi</i>	Scarlet Finch	G	R	LC	0	6	0	6
28	<i>Mycerobas melanozanthos</i>	Spot-winged Grosbeak	G	R	LC	0	2	0	2
29	<i>Mycerobas carpinus</i>	White-winged Grosbeak	G	R	LC	0	0	3	3
13	Halcyonidae								
30	<i>Halcyon smyrnensis</i>	White-throated Kingfisher	P	R	LC	2	0	0	2
14	Hirundinidae								
31	<i>Delichon nipalense</i>	Nepal House-martin	I	R	LC	14	27	0	41
15	Laniidae								
32	<i>Lanius schach tricolor</i>	Black-headed' Long-tailed Shrike	I	BV	LC	0	0	1	1
16	Leiothrichidae								
33	<i>Heterophasia capistrata</i>	Rufous Sibia	O	R	LC	22	60	13	95
17	Megalaimidae								
34	<i>Megalaima virens</i>	Great Barbet	F	R	LC	12	0	0	12
18	Motacillidae								
35	<i>Motacilla cinerea</i>	Grey Wagtail	I	WV	LC	0	2	0	2
36	<i>Anthus hodgsoni hodgsoni</i>	Olive-backed Pipit	I	R	LC	0	9	0	9
37	<i>Motacilla alba alboides</i>	White Wagtail	I	WV	LC	13	0	0	13
19	Muscicapidae								
38	<i>Phoenicurus frontalis</i>	Blue-fronted Redstart	I	BV	LC	0	0	4	4

Appendices

Sl. No.	Family and Species	Common name	FS	MS	CS	PM	M	W	Overall
39	<i>Cyornis rubeculoides</i>	Blue-throated Flycatcher	I	BV	LC	0	0	1	1
40	<i>Muscicapa sibirica</i>	Dark-sided Flycatcher	I	BV	LC	0	2	0	2
41	<i>Niltava grandis</i>	Large Niltava	I	R	LC	0	1	0	1
42	<i>Ficedula strophata</i>	Orange-gorgeted Flycatcher	I	R	LC	0	2	0	2
43	<i>Copsychus saularis</i>	Oriental Magpie-robin	I	R	LC	0	0	3	3
44	<i>Rhyacornis fuliginosa</i>	Plumbeous Water-redstart	I	R	LC	24	16	5	45
45	<i>Niltava sundara</i>	Rufous-bellied Niltava	I	BV	LC	0	3	0	3
46	<i>Ficedula superciliaris</i>	Ultramarine Flycatcher	I	BV	LC	8	0	0	8
47	<i>Eumyias thalassinus</i>	Verditer Flycatcher	I	BV	LC	18	4	0	22
48	<i>Chaimarrornis leucocephalus</i>	White-capped River-chat	I	R	LC	18	8	3	29
20	Nectariniidae								
49	<i>Aethopyga saturata</i>	Black-breasted Sunbird	N	R	LC	8	0	1	9
50	<i>Aethopyga ignicauda</i>	Fire-tailed Sunbird	N	R	LC	0	0	1	1
51	<i>Aethopyga nipalensis</i>	Green-tailed Sunbird	N	R	LC	12	5	2	19
21	Paradoxornithidae								
52	<i>Paradoxornis nipalensis</i>	Black-throated Parrotbill	G	R	LC	0	0	21	21
22	Paridae								
53	<i>Parus spilonotus</i>	Black-spotted Yellow Tit	I	R	LC	11	0	0	11
54	<i>Parus ater</i>	Coal Tit	I	R	LC	8	0	2	10
55	<i>Parus monticolus</i>	Green-backed Tit	I	R	LC	0	9	12	21
56	<i>Parus dichrous</i>	Grey-crested Tit	I	R	LC	11	0	0	11
57	<i>Melanochlora sultanea</i>	Sultan Tit	I	R	LC	3	0	0	3
58	<i>Sylviparus modestus</i>	Yellow-browed Tit	I	R	LC	0	0	2	2
23	Passeridae								
59	<i>Passer rutilans</i>	Cinnamon Sparrow	G	R	LC	15	0	0	15
60	<i>Passer montanus</i>	Eurasian Tree Sparrow	G	R	LC	0	0	7	7
24	Picidae								
61	<i>Blythipicus pyrrhotis</i>	Bay Woodpecker	I	R	LC	0	1	0	1
62	<i>Dendrocopos canicapillus</i>	Grey-capped Pygmy Woodpecker	I	R	LC	0	0	2	2
25	Prunellidae								
63	<i>Prunella collaris</i>	Alpine Accentor	I	WV	LC	0	0	2	2
64	<i>Prunella rubeculoides</i>	Robin Accentor	I	WV	LC	0	0	3	3
65	<i>Prunella strophata</i>	Rufous-breasted Accentor	I	R	LC	0	0	2	2
26	Pycnonotidae								
66	<i>Hemixos flava</i>	Ashy Bulbul	O	R	LC	3	0	0	3
67	<i>Hypsipetes leucocephalus</i>	Himalayan Black Bulbul	O	R	LC	52	0	0	52
68	<i>Pycnonotus cafer</i>	Red-vented Bulbul	O	R	LC	0	3	4	7
27	Sittidae								
69	<i>Sitta himalayensis</i>	White-tailed Nuthatch	I	R	LC	11	2	0	13
28	Stenostiridae								
70	<i>Culicicapa ceylonensis</i>	Grey-headed Canary-flycatcher	I	BV	LC	18	4	0	22
71	<i>Chelidorhynch hypoxantha</i>	Yellow-bellied Fantail	I	R	LC	0	9	0	9
29	Sylviidae								
72	<i>Abroscopus schisticeps</i>	Black-faced Warbler	I	R	LC	0	5	0	5
73	<i>Phylloscopus reguloides</i>	Blyth's Leaf-Warbler	I	WV	LC	0	7	1	8
74	<i>Phylloscopus pulcher</i>	Buff-barred Warbler	I	BV	LC	0	6	0	6
75	<i>Seicercus castaniceps</i>	Chestnut-crowned Warbler	I	BV	LC	0	3	0	3
76	<i>Tesia castaneocoronata</i>	Chestnut-headed Tesia	I	R	LC	0	2	0	2
77	<i>Orthotomus sutorius</i>	Common Tailorbird	I	R	LC	0	0	3	3
78	<i>Seicercus burkii</i>	Green-crowned Warbler	I	BV	LC	0	4	0	4
79	<i>Phylloscopus trochiloides</i>	Greenish Warbler	I	WV	LC	0	12	0	12
80	<i>Seicercus poliogenys</i>	Grey-cheeked Warbler	I	R	LC	0	2	0	2
81	<i>Phylloscopus maculipennis</i>	Grey-faced Leaf-warbler	I	R	LC	0	11	2	13
82	<i>Phylloscopus xanthoschistos</i>	Grey-hooded Warbler	I	R	LC	17	11	0	28
83	<i>Phylloscopus chloronotus</i>	Lemon-rumped Leaf Warbler	I	BV	LC	0	10	0	10
84	<i>Cettia fortipes</i>	Strong-footed Bush-warbler	I	R	LC	0	8	0	8
85	<i>Phylloscopus inornatus</i>	Yellow-browed Leaf-warbler	I	WV	LC	0	0	1	1

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Sl. No.	Family and Species	Common name	FS	MS	CS	PM	M	W	Overall
30	Tichodromidae								
86	<i>Tichodroma muraria</i>	Wallcreeper	I	WV	LC	0	0	2	2
31	Timaliidae								
87	<i>Trochalopteron imbricatum</i>	Bhutan Laughingthrush	I	R	LC	0	10	33	43
88	<i>Trochalopteron affine</i>	Black-faced Laughingthrush	I	R	LC	0	0	5	5
89	<i>Trochalopteron squamatum</i>	Blue-winged Laughingthrush	I	R	LC	0	0	5	5
90	<i>Dryonastes caeruleus</i>	Grey-sided Laughingthrush	I	R	LC	0	3	0	3
91	<i>Stachyris nigriceps</i>	Grey-throated Babbler	I	R	LC	0	0	7	7
92	<i>Alcippe nipalensis</i>	Nepal Fulvetta	I	R	LC	0	8	0	8
93	<i>Pellorneum ruficeps</i>	Puff-throated Babbler	I	R	LC	4	0	0	4
94	<i>Leiothrix lutea</i>	Red-billed Leiothrix	O	R	LC	0	4	0	4
95	<i>Trachalopteron erthrocephalum</i>	Red-headed Laughingthrush	I	R	LC	0	22	12	34
96	<i>Minla ignotincta</i>	Red-tailed Minla	I	R	LC	0	0	5	5
97	<i>Lanthocincla rufogularis</i>	Rufous-chinned Laughingthrush	I	R	LC	11	0	0	11
98	<i>Yuhina occipitalis</i>	Rufous-vented Yuhina	I	R	LC	0	13	12	25
99	<i>Lanthocincla ocellata</i>	Spotted Laughingthrush	I	R	LC	0	2	0	2
100	<i>Pomatorhinus ruficollis</i>	Streak-breasted Scimitar-babbler	I	R	LC	0	0	2	2
101	<i>Actinodura waldeni</i>	Streak-throated Barwing	I	R	LC	6	0	0	6
102	<i>Yuhina gularis</i>	Stripe-throated Yuhina	O	R	LC	11	0	0	11
103	<i>Yuhina flavicollis</i>	Whiskered Yuhina	I	R	LC	12	6	7	25
104	<i>Pomatorhinus schisticeps</i>	White-browed Scimitar-babbler	I	R	LC	0	0	2	2
105	<i>Garrulax albogularis</i>	White-throated Laughingthrush	I	R	LC	7	0	0	7
32	Troglodytidae								
106	<i>Troglodytes troglodytes</i>	Winter Wren	I	R	LC	0	0	2	2
33	Turdidae								
107	<i>Myophonus caeruleus</i>	Blue Whistling-thrush	I	R	LC	22	13	7	42
108	<i>Zoothera dixonii</i>	Long-tailed Thrush	I	BV	LC	0	1	1	2
109	<i>Turdus albocinctus</i>	White-collared Blackbird	I	R	LC	0	0	10	10
34	Zosteropidae								
110	<i>Zosterops palpebrosus</i>	Oriental White-eye	I	R	LC	0	0	4	4

FS: Aq–Aquatic Feeder, C–Carnivores, F–Frugivore, G–Granivore, I–Insectivore, N–Nectarivore, Nc–Nucivore, O–Omnivore, P–Piscivore; MS–Migratory Status–BV–Breeding Visitor, IR–Isolated Record, R–Resident, WV–Winter Visitor; CS–Conservation status–IUCN Red List and WPA–1972 Schedule; VU–Vulnerable, LC–Least Concern; PM–Post monsoon, M–Monsoon, W–Winter

Appendix II.3.192: List of possible mammalian fauna of the Tawang region and Rho HEP area

Sl. No.	Common name	Scientific name	SPA	Conservation status	
				IUCN	IWPA
	Primates				
1	Arunachal macaque	<i>Macaca munzala</i>	*	EN	–
2	Assamese macaque	<i>M. assamensis</i>		NT	II
3	Capped langur	<i>Trachypithecus pileatus</i>		VU	I
4	Slow loris	<i>Nycticebus coucang</i>		VU	I
	Ungulates				
5	Barking deer	<i>Muntiacus muntjak</i>	*	LC	III
6	Bharal	<i>Pseudois nayaur</i>		LC	I
7	Chinese goral	<i>Nemorhaedus caudatus</i>		VU	III
8	Himalayan goral	<i>N. goral</i>	*	NT	III
9	Musk deer	<i>Mos chus</i> sp.		EN	–
10	Sambar	<i>Cervus unicolor</i>		VU	III
11	Serow	<i>N. sumatraensis</i>			
12	Wild pig	<i>Sus scrofa</i>	*	LC	III
	Carnivores				
13	Common leopard	<i>Panthera pardus</i>		NT	I
14	Jungle Cat	<i>Felis Chaus</i>	*	LC	II
15	Dhole	<i>Cuon alpinus</i>		EN	II

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Sl.	Common name	Scientific name	SPA	Conservation status	
16	Himalayan black bear	<i>Ursus thibetanus</i>		VU	II
17	Himalayan palm civet	<i>Paguma larvata</i>		LC	II
18	Leopard cat	<i>Prionailurus bengalensis</i>		LC	–
19	Otter	<i>Lutra sp.</i>		VU	–
20	Red panda	<i>Ailurus fulgens</i>		VU	I
21	Snow leopard	<i>Uncia uncia</i>		EN	I
22	Yellow-throated marten	<i>Martes flavigula</i>	*	LC	II
	Rodents				
23	Hairy-footed flying squirrel	<i>Belomys pearsonii</i>		DD	II
24	Himalayan marmot	<i>Marmota himalayana</i>		LC	II
25	Himalayan striped squirrel	<i>Tamias maclellandi</i>	*	LC	–
26	Orange-bellied Himalayan squirrel	<i>Dremomys lokriah</i>		LC	–
	*Hoary-bellied Himalayan Squirrel	<i>Callosciurus pygerythrus</i>	*	LC	–
27	Porcupine	<i>Hystrix sp.</i>		LC	IV
	*Chesnut rat	<i>Niviventer fluscens</i>		LC	V
	Lagomorphs				
28	Large-eared pika	<i>Ochotona macrotis</i>		LC	–
29	Moupin pika	<i>Ochotona thibetana</i>		LC	–
	29 species		8 species	R% 27.58%	

Data source: 1–Mishra et al. 2006, SPA –Species of Project Area, * Additional species reported during the study

Appendix II.3.193: Status of birds at Rho barrage site

Sl. No.	Family/Genus/Species	Common name	FS	MS	CS	No. of birds recorded
1	Accipitridae					
1	<i>Hieraaetus fasciatus</i>	Bonelli's Eagle	C	R	LC	1
2	Apodidae					
2	<i>Aerodramus brevirostris</i>	Himalayan Swiftlet	I	R	LC	5
3	Certhiidae					
3	<i>Certhia nepalensis</i>	Rusty-flanked Treecreeper	I	R	LC	1
4	Cinclidae					
4	<i>Cinclus cinclus</i>	White-throated Dipper	I	R	LC	2
5	Columbidae					
5	<i>Streptopelia orientalis</i>	Oriental Turtle-dove	G	WV	LC	2
6	<i>Treron sphenurus</i>	Wedge-tailed Green-pigeon	G	R	LC	4
6	Cuculidae					
7	<i>Cuculus poliocephalus</i>	Small Cuckoo	I	BV	LC	1
7	Dicaeidae					
8	<i>Dicaeum ignipectus</i>	Fire-breasted Flowerpecker	N	R	LC	4
8	Fringillidae					
9	<i>Carpodacus edwardsii</i>	Dark-rumped Rosefinch	G	R	LC	13
10	<i>Haematospiza sipahi</i>	Scarlet Finch	G	R	LC	2
9	Hirundinidae					
11	<i>Delichon nipalense</i>	Nepal House Martin	I	R	LC	15
10	Leiothrichidae					
12	<i>Heterophasia capistrata</i>	Rufous Sibia	O	R	LC	9
11	Megalaimidae					
13	<i>Megalaima virens</i>	Great Barbet	F	R	LC	2
12	Muscicapidae					
14	<i>Chaimarrornis leucocephalus</i>	White-capped River-chat	I	R	LC	7
15	<i>Ficedula superciliosus</i>	Ultramarine Flycatcher	I	BV	LC	2
16	<i>Muscicapa sibirica</i>	Dark-sided Flycatcher	I	BV	LC	1
17	<i>Phoenicurus frontalis</i>	Blue-fronted Redstart	I	BV	LC	1
18	<i>Rhyacornis fuliginosa</i>	Plumbeous Water-redstart	I	R	LC	11
13	Nectariniidae					

Sl. No.	Family/Genus/Species	Common name	FS	MS	CS	No. of birds recorded
19	<i>Aethopyga nipalensis</i>	Green-tailed Sunbird	N	R	LC	2
14	Paridae					
20	<i>Parus monticolus</i>	Green-backed Tit	I	R	LC	1
21	<i>Sylviparus modestus</i>	Yellow-browed Tit	I	R	LC	2
15	Prunellidae					
22	<i>Prunella rubeculoides</i>	Robin Accentor	O	R	LC	1
16	Pycnonotidae					
23	<i>Hypsipetes leucocephalus</i>	Himalayan Black Bulbul	O	R	LC	7
17	Sittidae					
24	<i>Sitta himalayensis</i>	White-tailed Nuthatch	I	R	LC	2
18	Stenostiridae					
25	<i>Culicicapa ceylonensis</i>	Grey-headed Canary-flycatcher	I	BV	LC	1
19	Sylviidae					
26	<i>Phylloscopus inornatus</i>	Yellow-browed Leaf-warbler	I	WV	LC	1
27	<i>Phylloscopus maculipennis</i>	Grey-faced Leaf-warbler	I	R	LC	2
28	<i>Phylloscopus reguloides</i>	Blyth's Leaf-warbler	I	WV	LC	1
29	<i>Phylloscopus trochiloides</i>	Greenish Warbler	I	WV	LC	1
30	<i>Phylloscopus xanthoschistos</i>	Grey-hooded Warbler	I	R	LC	4
31	<i>Tesia castaneocoronata</i>	Chestnut-headed Tesia	I	R	LC	2
20	Timaliidae					
32	<i>Ianthocincla rufogularis</i>	Rufous-chinned Laughingthrush	I	R	LC	3
33	<i>Trachalopteron erthrocephalum</i>	Red-headed Laughingthrush	I	R	LC	4
34	<i>Trochalopteron imbricatum</i>	Bhutan Laughing Thrush	I	R	LC	3
35	<i>Trochalopteron squamatum</i>	Blue-winged Laughingthrush	I	R	LC	5
36	<i>Yuhina flavicollis</i>	Whiskered Yuhina	I	R	LC	3
37	<i>Yuhina gularis</i>	Stripe-throated Yuhina	O	R	LC	4
21	Turdidae					
38	<i>Monticola solitarius</i>	Blue Rock-thrush	I	WV	LC	1
39	<i>Myophonus caeruleus</i>	Blue Whistling-thrush	I	R	LC	2

FS–Foraging status, Aq–Aquatic Feeder, C–Carnivores, F–Frugivore, G–Granivore, I–Insectivore, N–Nectarivore, O–Omnivore, MS–Migratory Status–BV–Breeding Visitor, R–Resident, WV–Winter Visitor; CS–Conservation status–IUCN Red List and WPA–1972 Schedule: LC–Least Concern;

Appendix II.3.194: Status of birds at Rho powerhouse site

Sl. No.	Genus/Family/Species	Common name	FS	MS	CS	No of birds recorded
1	Apodidae					
1	<i>Aerodramus brevirostris</i>	Himalayan Swiftlet	I	WV	LC	8
2	Columbidae					
2	<i>Streptopelia orientalis</i>	Oriental Turtle-dove	G	WV	LC	3
3	Corvidae					
3	<i>Corvus culminatus</i>	Large-billed Crow	O	R	LC	2
4	Dicaeidae					
4	<i>Dicaeum ignipectus</i>	Fire-breasted Flowerpecker	N	R	LC	3
5	Dicruridae					
5	<i>Dicrurus aeneus</i>	Bronzed Drongo	O	R	LC	6
6	<i>Dicrurus leucophaeus</i>	Ashy Drongo	O	WV	LC	3
7	<i>Dicrurus macrocercus</i>	Black Drongo	O	R	LC	1
6	Leiothrichidae					
8	<i>Heterophasia capistrata</i>	Rufous Sibia	O	R	LC	7
7	Megalaimidae					
9	<i>Megalaima virens</i>	Great Barbet	F	R	LC	2
8	Motacillidae					
10	<i>Anthus hodgsoni hodgsoni</i>	Olive-backed Pipit	I	R	LC	5
11	<i>Motacilla cinerea</i>	Grey Wagtail	I	WV	LC	2
9	Muscicapidae					

Sl. No.	Genus/Family/Species	Common name	FS	MS	CS	No of birds recorded
12	<i>Rhyacornis fuliginosa</i>	Plumbeous Water-redstart	I	R	LC	6
10	Paridae					
13	<i>Parus ater</i>	Coal Tit	I	R	LC	2
14	<i>Parus monticolus</i>	Green-backed Tit	I	R	LC	2
11	Pycnonotidae					
15	<i>Hemixos flavala</i>	Ashy Bulbul	O	R	LC	1
16	<i>Hypsipetes leucocephalus</i>	Himalayan Black Bulbul	C	R	LC	7
12	Stenostiridae					
17	<i>Culicicapa ceylonensis</i>	Grey-headed Canary-flycatcher	I	BV	LC	2
13	Sylviidae					
18	<i>Phylloscopus trochiloides</i>	Greenish Warbler	I	WV	LC	2
19	<i>Phylloscopus xanthoschistos</i>	Grey-hooded Warbler	I	R	LC	1
14	Timaliidae					
20	<i>Dryonastes caerulatus</i>	Grey-sided Laughingthrush	I	R	LC	3
21	<i>Lanthocincla ocellata</i>	Spotted Laughingthrush	I	R	LC	2
22	<i>Trachalopteron erthrocephalum</i>	Red-headed Laughingthrush	I	R	LC	6
23	<i>Trochalopteron imbricatum</i>	Bhutan Laughing Thrush	I	R	LC	3
15	Turdidae					
24	<i>Myophonus caeruleus</i>	Blue Whistling-thrush	I	R	LC	3
25	<i>Turdus albocinctus</i>	White-collared Blackbird	I	R	LC	2
26	<i>Zoothera dixonii</i>	Long-tailed Thrush	I	BV	LC	1

FS–Foraging status: C–Carnivores, F–Frugivore, G–Granivore, I–Insectivore, N–Nectarivore, O–Omnivore, MS–Migratory Status–BV–Breeding Visitor, R–Resident, WV–Winter Visitor; CS–Conservation status–IUCN Red List and WPA–1972 Schedule: LC–Least Concern

Appendix II.3.1 95: Check list and ecological status of birds recorded in the proposed Tawang–I HEP area

Sl. No.	Species	Common name	FS	MS	CS	PM	M	W	Over
1	Accipitridae								
1	<i>Gypaetus barbatus</i>	Bearded Vulture	C	R	LC	1	0	0	1
2	<i>Accipiter nisus</i>	Eurasian Sparrowhawk	C	R	LC	0	1	0	1
3	<i>Circus cyaneus</i>	Hen Harrier	C	WV	LC	0	0	1	1
4	<i>Accipiter gentilis</i>	Northern Goshawk	C	WV	LC	0	3	0	3
2	Aegithinidae								
5	<i>Aegithinaphia</i>	Common Iora	I	R	LC	13	0	0	13
3	Apodidae								
6	<i>Aerodramus brevirostris</i>	Himalayan Swiftlet	I	R	LC	17	1	1	19
4	Certhiidae								
7	<i>Certhia familiaris mandellii</i>	Eurasian Treecreeper	I	R	LC	0	2	1	3
8	<i>Certhia nepalensis</i>	Rusty-flanked Treecreeper	I	R	LC	0	4	0	4
5	Chloropseidae								
9	<i>Chloropsis hardwickii</i>	Orange-bellied Leafbird	I	R	LC	0	4	0	4
6	Cisticolidae								
10	<i>Prinia atrogularis</i>	Black-throated Prinia	I	R	LC	0	6	2	8
11	<i>Prinia hodgsonii</i>	Grey-breasted Prinia	I	R	LC	0	0	2	2
12	<i>Prinia crinitigera</i>	Striated Prinia	I	R	LC	0	5	0	5
7	Columbidae								
13	<i>Ducula badia</i>	Mountain Imperial-pigeon	G	R	LC	0	0	3	3
14	<i>Streptopelia orientalis</i>	Oriental Turtle-dove	G	WV	LC	25	6	3	34
15	<i>Columba leuconota</i>	Snow Pigeon	G	R	LC	14	6	0	20
16	<i>Spilopelia chinensis</i>	Spotted Dove	G	R	LC	0	1	0	1
17	<i>Treron sphenurus</i>	Wedge-tailed Green-pigeon	G	R	LC	0	8	3	11
8	Corvidae								
18	<i>Dendrocitta formosae</i>	Grey Treepie	O	R	LC	0	9	0	9
19	<i>Corvus culminatus</i>	Large-billed Crow	O	R	LC	0	7	1	8
20	<i>Dendrocitta vagabunda</i>	Rufous Treepie	O	R	LC	0	2	0	2

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Sl. No.	Species	Common name	FS	MS	CS	PM	M	W	Over
21	<i>Urocissaflavirostris</i>	Yellow-bellied Blue Magpie	C	R	LC	0	3	0	3
9	Cuculidae								
22	<i>Hierococcyxvarius</i>	Common Hawk-cuckoo	I	R	LC	19	0	0	19
23	<i>Phaenicophaeustris</i>	Green-billed Malkoha	O	R	LC	0	1	0	1
24	<i>Hierococcyxsparveroides</i>	Large Hawk-cuckoo	I	BV	LC	12	0	0	12
25	<i>Cacomantismerulinus</i>	Plaintive Cuckoo	I	R	LC	0	5	3	8
26	<i>Cuculuspoliocephalus</i>	Small Cuckoo	I	BV	LC	0	4	1	5
10	Dicaeidae								
27	<i>Dicaeumignipectus</i>	Fire-breasted Flowerpecker	N	R	LC	15	2	6	23
11	Dicruridae								
28	<i>Dicrurusleucophaeus</i>	Ashy Drongo	O	WV	LC	0	4	0	4
29	<i>Dicrurusmacrocerus</i>	Black Drongo	O	R	LC	19	0	0	19
12	Emberizidae								
30	<i>Melophuslathamii</i>	Crested Bunting	G	R	LC	25	0	1	26
31	<i>Emberizagodlewskii</i>	Godlewski's Bunting	G	R	LC	0	0	4	4
32	<i>Emberizapusilla</i>	Little Bunting	G	WV	LC	0	2	1	3
13	Estrildidae								
33	<i>Lonchurapunctulata</i>	Scaly-breasted Munia	G	R	LC	0	3	0	3
14	Fringillidae								
34	<i>Fringillamontifringilla</i>	Brambling	I	IR	LC	24	0	0	24
35	<i>Carpodacus nepalensis</i>	Dark-breasted Rosefinch	G	R	LC	0	0	2	2
36	<i>Pyrhulaerythrocephala</i>	Red-headed Bullfinch	G	R	LC	20	7	6	33
37	<i>Haematospizaspahi</i>	Scarlet Finch	G	R	LC	17	3	0	20
38	<i>Mycerobascarnipes</i>	White-winged Grosbeak	G	R	LC	0	1	0	1
15	Halcyonidae								
39	<i>Halcyon smyrnensis</i>	White-throated Kingfisher	P	R	LC	10	0	0	10
16	Hirundinidae								
40	<i>Delichondasypus</i>	Asian House Martin	I	BV	LC	0	14	0	14
41	<i>Delichonnipalense</i>	Nepal House-martin	I	R	LC	0	1	0	1
17	Laniidae								
42	<i>Laniusschachtricolor</i>	Black-headed' Long-tailed Shrike	I	BV	LC	16	0	1	17
18	Megalaimidae								
43	<i>Megalaimafranklinii</i>	Golden-throated Barbet	F	R	LC	13	1	0	14
44	<i>Megalaimavirens</i>	Great Barbet	F	R	LC	0	2	0	2
19	Motacillidae								
45	<i>Anthushodgsonihodgsoni</i>	Olive-backed Pipit	I	R	LC	3	0	0	3
20	Muscicapidae								
46	<i>Phoenicurusochruros</i>	Black Redstart	I	WV	LC	0	0	4	4
47	<i>Phoenicurusfrontalis</i>	Blue-fronted Redstart	I	BV	LC	0	0	1	1
48	<i>Muscicapasibirica</i>	Dark-sided Flycatcher	I	BV	LC	0	1	0	1
49	<i>Muscicapaferruginea</i>	Ferruginous Flycatcher	I	BV	LC	0	2	0	2
50	<i>Saxicolaferreus</i>	Grey Bushchat	I	R	LC	0	2	3	5
51	<i>Tarsigeruffilatus</i>	Himalayan Red-flanked Bush Robin	I	R	LC	20	86	20	126
52	<i>Enicuruscouleri</i>	Little Forktail	I	R	LC	8	0	0	8
53	<i>Ficedulastrophia</i>	Orange-gorgeted Flycatcher	I	R	LC	14	0	2	16
54	<i>Copsychus saularis</i>	Oriental Magpie-robin	I	R	LC	0	1	0	1
55	<i>Cymrnispoliogenys</i>	Pale-chinned Flycatcher	I	R	LC	13	0	0	13
56	<i>Muscicapellahodgsoni</i>	Pygmy Blue Flycatcher	I	R	LC	14	0	0	14
57	<i>Niltavasundara</i>	Rufous-bellied Niltava	I	BV	LC	0	2	0	2
58	<i>Ficedulahodgsonii</i>	Slaty-backed Flycatcher	I	WV	LC	0	0	1	1
59	<i>Ficedulatricolor</i>	Slaty-blue Flycatcher	I	BV	LC	9	0	1	10
60	<i>Ficedulasuperciliaris</i>	Ultramarine Flycatcher	I	BV	LC	0	8	0	8
61	<i>Tarsiger indicus</i>	White-browed Bush-robin	I	R	LC	0	0	3	3
62	<i>Chaimarrornis leucocephalus</i>	White-capped River-chat	I	R	LC	15	0	2	17
63	<i>Enicurus leschenaulti</i>	White-crowned Forktail	I	R	LC	7	1	0	8
64	<i>Myiometula leucura</i>	White-tailed Blue Robin	I	R	LC	1	0	0	1
65	<i>Phoenicurus schisticeps</i>	White-throated Redstart	I	R	LC	0	0	3	3

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Sl. No.	Species	Common name	FS	MS	CS	PM	M	W	Over
21	Nectariniidae								
66	<i>Aethopygasaturata</i>	Black-breasted Sunbird	N	R	LC	0	3	0	3
67	<i>Aethopyganipalensis</i>	Green-tailed Sunbird	N	R	LC	15	8	2	25
68	<i>Aethopygagoulgiae</i>	Mrs Gould's Sunbird	N	R	LC	25	0	0	25
22	Paridae								
69	<i>Parusdichrous</i>	Grey-crested Tit	I	R	LC	0	5	0	5
70	<i>Parusrubdiventris</i>	Rufous-vented Tit	I	R	LC	0	9	0	9
71	<i>Melanochlorasultanea</i>	Sultan Tit	I	R	LC	0	7	0	7
23	Passeridae								
72	<i>Passer montanus</i>	Eurasian Tree Sparrow	G	R	LC	21	2	6	29
24	Phasianidae								
73	<i>Lophuraleucomelanos</i>	Kaleej Pheasant	O	R	LC	0	1	0	1
25	Picidae								
74	<i>Dryocopusmartius</i>	Black Woodpecker	I	R	LC	0	1	0	1
75	<i>Picusflavinucha</i>	Greater Yellownappe	I	R	LC	0	11	4	15
76	<i>Dendrocoposcanicapillus</i>	Grey-capped Pygmy Woodpecker	I	R	LC	0	1	0	1
26	Prunellidae								
77	<i>Prunellarubeculoides</i>	Robin Accentor	I	WV	LC	21	61	12	94
27	Pycnonotidae								
78	<i>Hypsipetesleucocephalus</i>	Himalayan Black Bulbul	O	R	LC	12	0	0	12
79	<i>Pycnonotuscafer</i>	Red-vented Bulbul	O	R	LC	0	0	2	2
28	Stenostiridae								
80	<i>Culicicapacylonensis</i>	Grey-headed Canary-flycatcher	I	BV	LC	0	23	8	31
29	Sylviidae								
81	<i>Phylloscopusreguloides</i>	Blyth's Leaf-Warbler	I	WV	LC	0	11	1	12
82	<i>Phylloscopuspulcher</i>	Buff-barred Warbler	I	BV	LC	0	7	0	7
83	<i>Orthotomussutorius</i>	Common Tailorbird	I	R	LC	0	0	3	3
84	<i>Seicercusburkii</i>	Green-crowned Warbler	I	BV	LC	0	24	0	24
85	<i>Phylloscopustrochiloides</i>	Greenish Warbler	I	WV	LC	0	6	1	7
86	<i>Phylloscopusmaculipennis</i>	Grey-faced Leaf-warbler	I	R	LC	13	8	0	21
87	<i>Phylloscopusxanthoschistos</i>	Grey-hooded Warbler	I	R	LC	12	0	0	12
88	<i>Cettiaflavolivacea</i>	Himalayan' Aberrant Bush-warbler	I	WV	LC	86	8	0	94
89	<i>Cettia brunescens</i>	Hume's Bush-warbler	I	R	LC	11	0	0	11
90	<i>Cettia major</i>	Large/Chest-crowned Bush Warbler	I	BV	LC	25	0	3	28
30	Tichodromidae								
91	<i>Tichodromamuraria</i>	Wallcreeper	I	WV	LC	23	0	0	23
31	Timaliidae								
92	<i>Minlastrigula</i>	Bar-throated Minla	I	R	LC	0	5	0	5
93	<i>Trochalopteronimbricatum</i>	Bhutan Laughingthrush	I	R	LC	0	2	21	23
94	<i>Pellomeumtickelli</i>	Buff-breasted Babbler	I	R	LC	0	0	1	1
95	<i>Stachyrisnigricaps</i>	Grey-throated Babbler	I	R	LC	17	0	0	17
96	<i>Pomatorhinushypoleucos</i>	Large Scimitar-babbler	I	R	LC	0	4	0	4
97	<i>Alcippenipalensis</i>	Nepal Fulvetta	I	R	LC	15	25	40	80
98	<i>Trachalopteronerthrocephalum</i>	Red-headed Laughingthrush	I	R	LC	0	3	0	3
99	<i>Minlainotincta</i>	Red-tailed Minla	I	R	LC	25	16	23	64
100	<i>Ianthocinclarufogularis</i>	Rufous-chinned Laughingthrush	I	R	LC	15	0	0	15
101	<i>Lanthocinclaocellata</i>	Spotted Laughingthrush	I	R	LC	7	0	1	8
102	<i>Grammatoptilastratus</i>	Striated Laughingthrush	I	R	LC	25	0	0	25
103	<i>Yuhinagularis</i>	Stripe-throated Yuhina	O	R	LC	8	4	0	12
104	<i>Yuhinaflavicollis</i>	Whiskered Yuhina	I	R	LC	0	3	2	5
105	<i>Erporniszantholeuca</i>	White-bellied Erpornis	I	R	LC	0	0	2	2
106	<i>Pomatorhinusschisticeps</i>	White-browed Scimitar-babbler	I	R	LC	0	4	0	4
107	<i>Pteruthiusflaviscapis</i>	White-browed Shrike-babbler	I	R	LC	20	3	4	27
32	Turdidae								
108	<i>Monticola solitarius</i>	Blue Rock-thrush	I	WV	LC	14	0	0	14
109	<i>Myophonus caeruleus</i>	Blue Whistling-thrush	I	R	LC	25	9	10	44
110	<i>Monticola cinclorhynchus</i>	Blue-headed Rock-thrush	I	BV	LC	21	1	0	22

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Sl. No.	Species	Common name	FS	MS	CS	PM	M	W	Over
111	<i>Turdusboulboul</i>	Grey-winged Blackbird	I	R	LC	19	0	0	19
112	<i>Turdusalbocinctus</i>	White-collared Blackbird	I	R	LC	0	1	0	1
33	Upupidae								
113	<i>Upupaepops</i>	Common Hoopoe	I	WV	LC	5	0	0	5
34	Zosteropidae								
114	<i>Zosteropsalpebrosus</i>	Oriental White-eye	I	R	LC	0	11	0	11

FS: Aq–Aquatic Feeder, C–Carnivores, F–Frugivore, G–Granivore, I–Insectivore, N–Nectarivore, Nc–Nucivore, O–Omnivore, P–Piscivore; MS–Migratory Status–BV–Breeding Visitor, IR–Isolated Record, R–Resident, WV–Winter Visitor; CS–Conservation status–IUCN Red List and WPA–1972 Schedule: VU–Vulnerable, LC–Least Concern; PM–Post monsoon, M–Monsoon, W–Winter

Appendix II.3.196: List of possible mammalian fauna of Tawang region and Tawang–I HEP area

Sl. No.	Common name	Scientific name	SPA	Conservation status	
	Primates			IUCN	IWPA
1	Arunachal macaque	<i>Macaca munzala</i>	*	EN	–
2	Assamese macaque	<i>M. assamensis</i>		NT	II
3	Capped langur	<i>Trachypithecus pileatus</i>		VU	I
4	Slow loris	<i>Nycticebuscoucang</i>		VU	I
	Ungulates				
5	Barking deer	<i>Muntiacusmuntjak</i>	*	LC	III
6	Bharal	<i>Pseudoisnayaur</i>		LC	I
7	Chinese goral	<i>Nemorhaedus caudatus</i>		VU	III
8	Himalayan goral	<i>N. goral</i>		NT	III
9	Musk deer	<i>Mos chus</i> sp.		EN	–
10	Sambar	<i>Cervus unicolor</i>		VU	III
11	Serow	<i>N. sumatraensis</i>			
12	Wild pig	<i>Sus scrofa</i>	*	LC	III
	Carnivores				
13	Common leopard	<i>Panthera pardus</i>		NT	I
14	Jungle Cat	<i>FelisChaus</i>	*	LC	II
15	Dhole	<i>Cuon alpinus</i>		EN	II
16	Himalayan black bear	<i>Ursus thibetanus</i>		VU	II
17	Himalayan palm civet	<i>Pagumalarvata</i>	*	LC	II
18	Leopard cat	<i>Prionailurusbengalensis</i>	*	LC	–
19	Otter	<i>Lutrasp.</i>		VU	–
20	Red panda	<i>Ailurusfulgens</i>		VU	I
21	Snow leopard	<i>Uncia uncia</i>		EN	I
22	Yellow-throated marten	<i>Martesflavigula</i>	*	LC	II
	Rodents				
23	Hairy-footed flying squirrel	<i>Belomyspearsonii</i>		DD	II
24	Himalayan marmot	<i>Marmotahimalayana</i>		LC	II
25	Himalayan striped squirrel	<i>Tamiopsmaccllelandi</i>	*	LC	–
26	Orange-bellied Himalayan squirrel	<i>Dremomyslokriah</i>		LC	–
	*Hoary-bellied Himalayan Squirrel	<i>Callosciuruspygerythrus</i>	*	LC	–
27	Porcupine	<i>Hystrixsp.</i>		LC	IV
	*Chesnut rat	<i>Niviventerfluvesscens</i>		LC	V
	Lagomorphs				
28	Large-eared pika	<i>Ochotonamacrotis</i>		LC	–
29	Moupinpika	<i>Ochotonathibetana</i>		LC	–
	29 species		8 species	R% 27.58	

Data Source: 1–Mishra et al 2006, SPA–Species of Project Area, * Additional species reported during the study

Appendix II.3.197: Status of birds at Tawang–I barrage site

Sl. No.	Family/Genus/Species	Common name	FS	MS	CS	No. of birds recorded
1	Accipitridae					
1	<i>Accipiter gentilis</i>	Northern Goshawk	C	WV	LC	1

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Sl. No.	Family/Genus/Species	Common name	FS	MS	CS	No. of birds recorded
2	Apodidae					
2	<i>Aerodramusbrevirostris</i>	Himalayan Swiftlet	I	R	LC	8
3	Campephagidae					
3	<i>Pericrocotusspeciosus</i>	Scarlet Minivet	I	R	LC	2
4	Charadriidae					
4	<i>Charadriusplacidus</i>	Long-billed Plover	I	WV	LC	2
5	Columbidae					
5	<i>Streptopelia orientalis</i>	Oriental Turtle-dove	G	WV	LC	4
6	Corvidae					
6	<i>Corvusculminatus</i>	Large-billed Crow	O	R	LC	2
7	Dicaeidae					
7	<i>Dicaeumigniptectus</i>	Fire-breasted Flowerpecker	N	R	LC	3
8	Dicruridae					
8	<i>Dicrurusaeneus</i>	Bronzed Drongo	O	R	LC	6
9	<i>Dicrurusleucophaeus</i>	Ashy Drongo	O	WV	LC	3
10	<i>Dicrurusmacrocerus</i>	Black Drongo	O	R	LC	1
9	Leiothrichidae					
11	<i>Heterophasiacapistrata</i>	Rufous Sibia	O	R	LC	21
10	Megalaimidae					
12	<i>Megalaimavirens</i>	Great Barbet	F	R	LC	2
11	Motacillidae					
13	<i>Anthushodgsonihodgsoni</i>	Olive-backed Pipit	I	R	LC	3
14	<i>Motacillacinerea</i>	Grey Wagtail	I	WV	LC	2
12	Muscicapidae					
15	<i>Chaimarrornisleucocephalus</i>	White-capped River-chat	I	R	LC	1
16	<i>Eumyiasthalassinus</i>	Verditer Flycatcher	I	BV	LC	3
17	<i>Niltavasundara</i>	Rufous-bellied Niltava	I	BV	LC	2
18	<i>Rhyacornisfuliginosa</i>	Plumbeous Water-redstart	I	R	LC	11
19	<i>Saxicolaferreus</i>	Grey Bushchat	I	R	LC	1
13	Paridae					
20	<i>Parusater</i>	Coal Tit	I	R	LC	2
21	<i>Parusmonticolus</i>	Green-backed Tit	I	R	LC	5
14	Pycnonotidae					
22	<i>Hemixosflavala</i>	Ashy Bulbul	O	R	LC	1
23	<i>Hypsipetesleucocephalus</i>	Himalayan Black Bulbul	O	R	LC	7
15	Stenostiridae					
24	<i>Culicicapaceylonensis</i>	Grey-headed Canary-flycatcher	I	BV	LC	2
16	Sylviidae					
25	<i>Phylloscopusinornatus</i>	Yellow-browed Leaf-warbler	I	WV	LC	2
26	<i>Phylloscopustrochiloides</i>	Greenish Warbler	I	WV	LC	2
27	<i>Phylloscopusxanthoschistos</i>	Grey-hooded Warbler	I	R	LC	2
17	Timaliidae					
28	<i>Dryonastescaerulatus</i>	Grey-sided Laughingthrush	I	R	LC	3
29	<i>Grammatoptilastratus</i>	Striated Laughingthrush	I	R	LC	3
30	<i>Trachalopteronerthrocephalum</i>	Red-headed Laughingthrush	I	R	LC	6
31	<i>Yuhinaflavicollis</i>	Whiskered Yuhina	I	R	LC	6
32	<i>Yuhinaoccipitalis</i>	Rufous-vented Yuhina	I	R	LC	9
18	Turdidae					
33	<i>Myophonuscaeruleus</i>	Blue Whistling-thrush	I	R	LC	5
34	<i>Zootheradixoni</i>	Long-tailed Thrush	I	BV	LC	1

FS–Foraging Status: C–Carnivores, F–Frugivore, G–Granivore, I–Insectivore, N–Nectarivore, O–Omnivore, MS–Migratory Status–BV–Breeding Visitor, R–Resident, WV–Winter Visitor; CS–Conservation status–IUCN Red List and WPA–1972 Schedule: LC–Least Concern

Appendix II.3.198: Status of birds at Tawang–I Powerhouse site

Sl. No.	Family/Genus/Species	Common name	FS	MS	CS	No of birds recorded
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Appendices

Sl. No.	Family/Genus/Species	Common name	FS	MS	CS	No of birds recorded
1	Apodidae					
1	<i>Aerodramusbrevirostris</i>	Himalayan Swiftlet	I	R	LC	6
2	Cisticolidae					
2	<i>Priniaatrogularis</i>	Black-throated Prinia	I	R	LC	5
3	<i>Priniacrinigera</i>	Striated Prinia	I	R	LC	1
4	<i>Prinia sylvatica</i>	Jungle Prinia	I	R	LC	1
3	Dicaeidae					
5	<i>Dicaeumignipectus</i>	Fire-breasted Flowerpecker	N	R	LC	2
4	Leiothrichidae					
6	<i>Heterophasiacapistrata</i>	Rufous Sibia	O	R	LC	2
5	Megalaimidae					
7	<i>Megalaimavirens</i>	Great Barbet	F	R	LC	1
6	Motacillidae					
8	<i>Anthushodgsonihodgsoni</i>	Olive-backed Pipit	I	R	LC	2
9	<i>Motacillacinerea</i>	Grey Wagtail	I	WV	LC	1
7	Muscicapidae					
10	<i>Chaimarrornisleucocephalus</i>	White-capped River-chat	I	R	LC	3
11	<i>Eumyias thalassinus</i>	Verditer Flycatcher	I	BV	LC	2
12	<i>Ficidula strophilata</i>	Orange-gorgeted Flycatcher	I	R	LC	1
13	<i>Phoenicurus hodgsoni</i>	Hodgson's Redstart	I	WV	LC	2
14	<i>Rhyacornis fuliginosa</i>	Plumbeous Water-redstart	I	R	LC	3
15	<i>Saxicola ferreus</i>	Grey Bushchat	I	R	LC	1
8	Nectariniidae					
16	<i>Aethopyganipalensis</i>	Green-tailed Sunbird	N	R	LC	5
17	<i>Aethopygasaturata</i>	Black-breasted Sunbird	N	R	LC	3
9	Paridae					
18	<i>Parus monticolus</i>	Green-backed Tit	I	R	LC	2
10	Picidae					
19	<i>Picus flavinucha</i>	Greater Yellownappe	I	R	LC	1
11	Pycnonotidae					
20	<i>Pycnonotus cafer</i>	Red-vented Bulbul	I	WV	LC	2
12	Stenostiridae					
21	<i>Culicicapaceylonensis</i>	Grey-headed Canary-flycatcher	I	BV	LC	3
13	Sylviidae					
22	<i>Phylloscopus reguloides</i>	Blyth's Leaf-warbler	I	WV	LC	2
23	<i>Phylloscopus trochiloides</i>	Greenish Warbler	I	WV	LC	7
24	<i>Phylloscopus xanthoschistos</i>	Grey-hooded Warbler	I	R	LC	7
14	Timaliidae					
25	<i>Trochalopteron imbricatum</i>	Bhutan Laughing Thrush	I	R	LC	3
26	<i>Trachalopteron erthrocephalum</i>	Red-headed Laughingthrush	I	R	LC	2
27	<i>Yuhina flavicollis</i>	Whiskered Yuhina	I	R	LC	2
28	<i>Yuhina singularis</i>	Stripe-throated Yuhina	O	R	LC	3
15	Turdidae					
29	<i>Myophonus caeruleus</i>	Blue Whistling-thrush	I	R	LC	7
16	Zosteropidae					
30	<i>Zosterops palpebrosus</i>	Oriental White-eye	I	R	LC	5

FS–Foraging Status: F–Frugivore, I–Insectivore, N–Nectarivore, O–Omnivore, MS–Migratory Status–BV–Breeding Visitor, R–Resident, WV–Winter Visitor; CS–Conservation status–IUCN Red List and WPA–1972 Schedule: LC–Least Concern

Appendix II.3.199: Check list and ecological status of birds recorded in the Tawang–II HEP area

Sl. No.	Family and species	Common name	FS	MS	CS	PM	M	W	Overall
1	Accipitridae								
1	<i>Gypaetus barbatus</i>	Bearded Vulture	C	R	LC	0	1	0	1
2	<i>Ictinaetus malayensis</i>	Black Eagle	C	R	LC	2	0	0	2
3	<i>Elanus caeruleus</i>	Black-winged Kite	C	R	LC	0	0	1	1
4	<i>Spilornis cheela</i>	Crested Serpent Eagle	C	R	LC	0	0	2	2

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Sl. No.	Family and species	Common name	FS	MS	CS	PM	M	W	Overall
5	<i>Accipiter nisus</i>	Eurasian Sparrowhawk	C	R	LC	0	0	1	1
6	<i>Circus cyaneus</i>	Hen Harrier	C	WV	LC	0	0	1	1
7	<i>Buteo burmanicus</i>	Himalayan Buzzard	C	WV	LC	0	1	2	3
8	<i>Buteo rufinus</i>	Long-legged Buzzard	C	WV	LC	0	0	2	2
9	<i>Nisaetus nipalensis</i>	Mountain-hawk Eagle	C	R	LC	0	0	1	1
10	<i>Accipiter badius</i>	Shikra	C	R	LC	0	0	1	1
2	Aegithalidae								
11	<i>Aegithalos concinnus</i>	Red-headed Tit	I	R	LC	0	0	8	8
3	Apodidae								
12	<i>Aerodramus brevirostris</i>	Himalayan Swiftlet	I	R	LC	0	0	40	40
13	<i>Apus pacificus</i>	Pacific Swift	I	BV	LC	0	0	4	4
14	<i>Hirundapus caudacutus</i>	White-throated Needletail	I	BV	LC	0	0	14	14
4	Campephagidae								
15	<i>Pericrocotus ethologus</i>	Long-tailed Minivet	I	BV	LC	0	4	0	4
16	<i>Hemipus picatus</i>	Pied Flycatcher-shrike	I	R	LC	11	0	0	11
17	<i>Pericrocotus speciosus</i>	Scarlet Minivet	I	R	LC	19	0	0	19
5	Certhiidae								
18	<i>Certhia nepalensis</i>	Rusty-flanked Treecreeper	I	R	LC	0	0	2	2
6	Cinclidae								
19	<i>Cinclus pallasii</i>	Brown Dipper	Aq	R	LC	1	0	0	1
7	Cisticolidae								
20	<i>Prinia atrogularis</i>	Black-throated Prinia	I	R	LC	0	2	2	4
21	<i>Prinia hodgsonii</i>	Grey-breasted Prinia	I	R	LC	0	0	6	6
22	<i>Prinia sylvatica</i>	Plain Prinia	I	R	LC	0	14	0	14
23	<i>Prinia inornata</i>	Plain Prinia	I	R	LC	0	0	2	2
24	<i>Prinia crinigera</i>	Striated Prinia	I	R	LC	21	2	10	33
25	<i>Prinia flaviventris</i>	Yellow-bellied Prinia	I	R	LC	12	0	0	12
8	Columbidae								
26	<i>Streptopelia orientalis</i>	Oriental Turtle-dove	G	WV	LC	25	14	13	52
27	<i>Treron apicauda</i>	Pin-tailed Green Pigeon	F	R	LC	13	0	0	13
28	<i>Spilopelia chinensis</i>	Spotted Dove	G	R	LC	11	0	0	11
29	<i>Treron sphenurus</i>	Wedge-tailed Green-pigeon	G	R	LC	21	0	0	21
9	Corvidae								
30	<i>Dendrocitta formosae</i>	Grey Treepie	O	R	LC	0	8	8	16
31	<i>Corvus culminatus</i>	Large-billed Crow	O	R	LC	23	7	4	34
32	<i>Dendrocitta vagabunda</i>	Rufous Treepie	O	R	LC	3	0	0	3
33	<i>Nucifraga caryocatactes</i>	Spotted Nutcracker	Nu	R	LC	6	0	4	10
10	Cuculidae								
34	<i>Phaenicophaeus tristis</i>	Green-billed Malkoha	O	R	LC	14	0	0	14
35	<i>Cuculus micropterus</i>	Indian Cuckoo	I	BV	LC	14	0	0	14
36	<i>Cacomantis merulinus</i>	Plaintive Cuckoo	I	R	LC	19	0	0	19
11	Dicaeidae								
37	<i>Dicaeum ignipectus</i>	Fire-breasted Flowerpecker	N	R	LC	13	0	28	41
38	<i>Dicaeum minullum</i>	Plain Flowerpecker	N	R	LC	13	0	0	13
12	Dicruridae								
39	<i>Dicrurus macrocerus</i>	Black Drongo	O	R	LC	16	6	0	22
40	<i>Dicrurus aeneus</i>	Bronzed Drongo	O	R	LC	22	0	0	22
41	<i>Dicrurus hottentottus</i>	Hair-Crested Drongo	O	R	LC	6	0	0	6
13	Emberizidae								
42	<i>Melophus lathami</i>	Crested Bunting	G	R	LC	23	0	0	23
43	<i>Emberiza pusilla</i>	Little Bunting	G	WV	LC	0	0	5	5
14	Estrildidae								
44	<i>Lonchura punctulata</i>	Scaly-breasted Munia	G	R	LC	15	3	14	32
45	<i>Lonchura striata</i>	White-rumped Munia	G	R	LC	0	5	5	10
15	Falconidae								
46	<i>Falco cherug milvipes</i>	Eastern' Saker Falcon	C	IR	LC	0	0	1	1
16	Fringillidae								

Appendices

Sl. No.	Family and species	Common name	FS	MS	CS	PM	M	W	Overall
47	<i>Carpodacus nepalensis</i>	Dark-breasted Rosefinch	G	R	LC	0	0	5	5
48	<i>Carduelis spinoides</i>	Himalayan Greenfinch	G	WV	LC	0	4	2	6
49	<i>Mycerobas melanozanthos</i>	Spot-winged Grosbeak	G	R	LC	0	0	3	3
17	Hirundinidae								
50	<i>Delichon dasypus</i>	Asian House Martin	I	BV	LC	0	0	12	12
51	<i>Delichon nipalense</i>	Nepal House-martin	I	R	LC	0	0	90	90
18	Laniidae								
52	<i>Lanius schach tricolor</i>	Black-headed' Long-tailed Shrike	I	BV	LC	17	5	9	31
53	<i>Lanius cristatus</i>	Brown Shrike	I	WV	LC	2	0	0	2
54	<i>Lanius tephronotus</i>	Grey-backed Shrike	I	BV	LC	0	3	0	3
19	Leiothrichidae								
55	<i>Heterophasia capistrata</i>	Rufous Sibia	O	R	LC	25	9	12	46
20	Megalaimidae								
56	<i>Megalaima asiatica</i>	Blue-throated Barbet	F	R	LC	0	0	7	7
57	<i>Megalaima franklinii</i>	Golden-throated Barbet	F	R	LC	0	0	9	9
58	<i>Megalaima virens</i>	Great Barbet	F	R	LC	11	1	4	16
21	Motacillidae								
59	<i>Anthus hodgsoni hodgsoni</i>	Olive-backed Pipit	I	R	LC	0	3	1	4
60	<i>Motacilla alba alboides</i>	White Wagtail	I	WV	LC	0	12	3	15
22	Muscicapidae								
61	<i>Phoenicurus ochruros</i>	Black Redstart	I	WV	LC	0	3	2	5
62	<i>Phoenicurus frontalis</i>	Blue-fronted Redstart	I	BV	LC	0	0	10	10
63	<i>Cyornis rubeculoides</i>	Blue-throated Flycatcher	I	BV	LC	9	0	0	9
64	<i>Muscicapa sibirica</i>	Dark-sided Flycatcher	I	BV	LC	0	2	1	3
65	<i>Phoenicurus hodgsoni</i>	Daurian Redstart	I	R	LC	1	0	0	1
66	<i>Muscicapa ferruginea</i>	Ferruginous Flycatcher	I	BV	LC	0	2	0	2
67	<i>Saxicola ferreus</i>	Grey Bushchat	I	R	LC	13	9	16	38
68	<i>Tarsiger rufilatus</i>	Himalayan Red-flanked Bush Robin	I	R	LC	0	0	2	2
69	<i>Phoenicurus hodgsoni</i>	Hodgson's Redstart	I	WV	LC	0	0	37	37
70	<i>Ficedula strophliata</i>	Orange-gorgeted Flycatcher	I	R	LC	0	3	0	3
71	<i>Copsychus saularis</i>	Oriental Magpie-robin	I	R	LC	12	3	5	20
72	<i>Rhyacornis fuliginosa</i>	Plumbeous Water-redstart	I	R	LC	0	0	6	6
73	<i>Ficedula tricolor</i>	Slaty-blue Flycatcher	I	BV	LC	0	0	3	3
74	<i>Eumyias thalassinus</i>	Verditer Flycatcher	I	BV	LC	20	6	0	26
75	<i>Chaimarrornis leucocephalus</i>	White-capped River-chat	I	R	LC	0	3	5	8
76	<i>Phoenicurus schisticeps</i>	White-throated Redstart	I	R	LC	0	0	2	2
23	Nectariniidae								
77	<i>Aethopyga saturata</i>	Black-breasted Sunbird	N	R	LC	0	2	0	2
78	<i>Aethopyga saturata</i>	Black-throated Sunbird	N	R	LC	0	0	1	1
79	<i>Aethopyga nipalensis</i>	Green-tailed Sunbird	N	R	LC	0	7	2	9
24	Oriolidae								
80	<i>Oriolus traillii</i>	Maroon Oriole	O	R	LC	0	0	3	3
81	<i>Oriolus tenuirostris</i>	Slender-billed Oriole	O	R	LC	7	0	4	11
25	Paridae								
82	<i>Parus ater</i>	Coal Tit	I	R	LC	0	0	15	15
83	<i>Parus monticolus</i>	Green-backed Tit	I	R	LC	0	5	22	27
84	<i>Parus rubidiventris</i>	Rufous-vented Tit	I	R	LC	0	0	6	6
26	Passeridae								
85	<i>Passer montanus</i>	Eurasian Tree Sparrow	G	R	LC	24	6	28	58
27	Phasianidae								
86	<i>Lophura leucomelanos</i>	Kaleej Pheasant	O	R	LC	0	0	7	7
28	Picidae								
87	<i>Dryocopus martius</i>	Black Woodpecker	I	R	LC	2	0	0	2
88	<i>Picus flavinucha</i>	Greater Yellownape	I	R	LC	0	2	0	2
89	<i>Dendrocopos canicapillus</i>	Grey-capped Pygmy	I	R	LC	0	0	3	3

Appendices

Sl. No.	Family and species	Common name	FS	MS	CS	PM	M	W	Overall
		Woodpecker							
29	Prunellidae								
90	<i>Prunella strophiatea</i>	Rufous-breasted Accentor	I	R	LC	3	0	13	16
30	Pycnonotidae								
91	<i>Hypsipetes leucocephalus</i>	Himalayan Black Bulbul	O	R	LC	92	9	5	106
92	<i>Pycnonotus leucogenys</i>	Himalayan Bulbul	O	R	LC	17	19	17	53
93	<i>Pycnonotus cafer</i>	Red-vented Bulbul	O	R	LC	24	27	140	191
94	<i>Pycnonotus striatus</i>	Striated Bulbul	O	R	LC	0	0	5	5
31	Stenostiridae								
95	<i>Culicicapa ceylonensis</i>	Grey-headed Canary-flycatcher	I	BV	LC	0	9	2	11
32	Sylviidae								
96	<i>Phylloscopus reguloides</i>	Blyth's Leaf-Warbler	I	WV	LC	0	2	0	2
97	<i>Phylloscopus pulcher</i>	Buff-barred Warbler	I	BV	LC	0	0	4	4
98	<i>Orthotomus sutorius</i>	Common Tailorbird	I	R	LC	0	5	24	29
99	<i>Seicercus burkii</i>	Green-crowned Warbler	I	BV	LC	5	1	0	6
100	<i>Phylloscopus trochiloides</i>	Greenish Warbler	I	WV	LC	19	14	0	33
101	<i>Phylloscopus maculipennis</i>	Grey-faced Leaf-warbler	I	R	LC	20	0	5	25
102	<i>Phylloscopus xanthoschistos</i>	Grey-hooded Warbler	I	R	LC	20	17	16	53
103	<i>Cettia brunnifrons</i>	Grey-sided Bush-Warbler	I	BV	LC	0	0	1	1
104	<i>Cettia flavolivacea</i>	Himalayan' Aberrant Bush-warbler	I	WV	LC	0	0	4	4
105	<i>Phylloscopus chloronotus</i>	Lemon-rumped Leaf Warbler	I	BV	LC	0	0	2	2
106	<i>Orthotomus cuculatus</i>	Mountain Tailorbird	I	R	LC	0	0	2	2
107	<i>Phylloscopus fulgiventis</i>	Smoky Leaf-warbler	I	WV	LC	15	2	1	18
108	<i>Cettia fortipes</i>	Strong-footed Bush-warbler	I	R	LC	7	0	2	9
109	<i>Phylloscopus affinis</i>	Tickell's Leaf-warbler	I	BV	LC	0	0	6	6
110	<i>Seicercus conspicillata</i>	White-spectacled Warbler	I	R	LC	12	0	0	12
111	<i>Abroscopus superciliosus</i>	Yellow-bellied Warbler	I	R	LC	0	0	2	2
112	<i>Phylloscopus inornatus</i>	Yellow-browed Leaf-warbler	I	WV	LC	0	0	3	3
33	Tephrodornithidae								
113	<i>Tephrodornis gularis</i>	Large Woodshrike	I	R	LC	11	0	0	11
34	Timaliidae								
114	<i>Alcippe dubia</i>	Rusty-capped Fulvetta	I	R	LC	0	2	0	2
115	<i>Alcippe nipalensis</i>	Nepal Fulvetta	I	R	LC	0	0	4	4
116	<i>Garrulax albogularis</i>	White-throated Laughingthrush	I	R	LC	8	0	0	8
117	<i>Leiothrix lutea</i>	Red-billed Leiothrix	O	R	LC	0	0	4	4
118	<i>Minla ignotincta</i>	Red-tailed Minla	I	R	LC	0	0	7	7
119	<i>Pellorneum ruficeps</i>	Puff-throated Babbler	I	R	LC	3	0	0	3
120	<i>Pomatorhinus erythrogenys</i>	Rusty-cheeked Scimitar-babbler	I	R	LC	14	4	5	23
121	<i>Pomatorhinus hypoleucos</i>	Large Scimitar-babbler	I	R	LC	0	3	0	3
122	<i>Pomatorhinus schisticeps</i>	White-browed Scimitar-babbler	I	R	LC	0	0	2	2
123	<i>Trochalopteron erthrocephalum</i>	Red-headed Laughingthrush	I	R	LC	0	5	4	9
124	<i>Trochalopteron imbricatum</i>	Bhutan Laughingthrush	I	R	LC	0	5	5	10
125	<i>Yuhina flavicollis</i>	Whiskered Yuhina	I	R	LC	15	2	20	37
126	<i>Yuhina gularis</i>	Stripe-throated Yuhina	O	R	LC	0	5	17	22
127	<i>Yuhina occipitalis</i>	Rufous-vented Yuhina	I	R	LC	0	0	23	23
35	Turdidae								
128	<i>Monticola solitarius</i>	Blue Rock-thrush	I	WV	LC	12	2	0	14
129	<i>Myophonus caeruleus</i>	Blue Whistling-thrush	I	R	LC	24	6	6	36
130	<i>Monticola cinclorhynchus</i>	Blue-headed Rock-thrush	I	BV	LC	23	2	0	25
131	<i>Monticola rufiventris</i>	Chestnut-bellied Rock Thrush	I	R	LC	0	0	2	2
132	<i>Turdus boulboul</i>	Grey-winged Blackbird	I	R	LC	19	0	0	19
133	<i>Zoothera dixonii</i>	Long-tailed Thrush	I	BV	LC	0	0	1	1

Appendices

Sl. No.	Family and species	Common name	FS	MS	CS	PM	M	W	Overall
134	<i>Turdus albocinctus</i>	White-collared Blackbird	I	R	LC	0	0	4	4
36	Upupidae								
135	<i>Upupa epops</i>	Common Hoopoe	I	WV	LC	0	3	0	3
37	Zosteropidae								
136	<i>Zosterops palpebrosus</i>	Oriental White-eye	I	R	LC	24	12	25	61

FS : Aq–Aquatic Feeder, C–Carnivores, F–Frugivore, G–Granivore, I–Insectivore, N–Nectarivore, Nc–Nucivore, O–Omnivore, P–Piscivore; MS–Migratory Status–BV–Breeding Visitor, IR–Isolated Record, R–Resident, WV–Winter Visitor; CS–Conservation status–IUCN Red List and WPA–1972 Schedule: VU–Vulnerable, LC–Least Concern; PM–Post monsoon, M–Monsoon, W–Winter

Appendix II.3.200 List of possible mammalian fauna of Tawang region and Twang–II HEP area

Sl. No.	Common name	Scientific name	SPA	Conservation status	
	Primates			IUCN	IWPA
1	Arunachal macaque	<i>Macaca munzala</i>	*	EN	–
2	Assamese macaque	<i>M. assamensis</i>		NT	II
3	Capped langur	<i>Trachypithecus pileatus</i>	*	VU	I
4	Slow loris	<i>Nycticebus coucang</i>		VU	I
	Ungulates				
5	Barking deer	<i>Muntiacus muntjak</i>	*	LC	III
6	Bharal	<i>Pseudois nayaur</i>		LC	I
7	Chinese goral	<i>Nemorhaedus caudatus</i>		VU	III
8	Himalayan goral	<i>N. goral</i>		NT	III
9	Musk deer	<i>Moschus</i> sp.		EN	–
10	Sambar	<i>Cervus unicolor</i>		VU	III
11	Serow	<i>N. sumatraensis</i>			
12	Wild pig	<i>Sus scrofa</i>	*	LC	III
	Carnivores				
13	Common leopard	<i>Panthera pardus</i>		NT	I
14	Jungle Cat	<i>Felis Chaus</i>	*	LC	II
15	Dhole	<i>Cuon alpinus</i>	*	EN	II
16	Himalayan black bear	<i>Ursus thibetanus</i>	*	VU	II
17	Himalayan palm civet	<i>Paguma larvata</i>	*	LC	II
18	Leopard cat	<i>Prionailurus bengalensis</i>	*	LC	–
19	Otter	<i>Lutra</i> sp.		VU	–
20	Red panda	<i>Ailurus fulgens</i>		VU	I
21	Snow leopard	<i>Uncia uncia</i>		EN	I
22	Yellow-throated marten	<i>Martes flavigula</i>	*	LC	II
	Rodents				
23	Hairy-footed flying squirrel	<i>Belomys pearsonii</i>		DD	II
24	Himalayan marmot	<i>Marmota himalayana</i>		LC	II
25	Himalayan striped squirrel	<i>Tamiops maccllellandi</i>	*	LC	–
26	Orange-bellied Himalayan squirrel	<i>Dremomys lokriah</i>		LC	–
	*Hoary-bellied Himalayan Squirrel	<i>Callosciurus pygerythrus</i>	*	LC	–
27	Porcupine	<i>Hystrix</i> sp.		LC	IV
	*Chesnut rat	<i>Niviventer fluvescens</i>		LC	V
	Lagomorphs				
28	Large-eared pika	<i>Ochotona macrotis</i>		LC	–
29	Moupin pika	<i>Ochotona thibetana</i>		LC	–
	29 species		12 species	R% 41.37%	

Data Source: 1–Mishra et al 2006, SPA–Species of Project Area. * additional species reported during the study

Appendix II.3.201: Status of birds at Tawang–II barrage site

Sl. No.	Family/Genus/Species	Common name	FS	MS	CS	No of birds recorded
1	Accipitridae					
1	<i>Accipiter badius</i>	Shikra	C	R	LC	1

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Sl. No.	Family/Genus/Species	Common name	FS	MS	CS	No of birds recorded
2	Cisticolidae					
2	<i>Prinia atrogularis</i>	Black-throated Prinia	I	R	LC	2
3	<i>Prinia sylvatica</i>	Jungle Prinia	I	R	LC	1
3	Leiothrichidae					
4	<i>Heterophasia capistrata</i>	Rufous Sibia	O	R	LC	4
4	Megalaimidae					
5	<i>Megalaima virens</i>	Great Barbet	F	R	LC	1
5	Muscicapidae					
6	<i>Chaimarrornis leucocephalus</i>	White-capped River-chat	I	R	LC	2
7	<i>Eumyias thalassinus</i>	Verditer Flycatcher	I	BV	LC	4
8	<i>Ficedula strophilata</i>	Orange-gorgeted Flycatcher	I	R	LC	3
9	<i>Muscicapa ferruginea</i>	Ferruginous Flycatcher	I	BV	LC	2
10	<i>Muscicapa sibirica</i>	Dark-sided Flycatcher	I	BV	LC	2
6	Nectariniidae					
11	<i>Aethopyga nipalensis</i>	Green-tailed Sunbird	N	R	LC	5
12	<i>Aethopyga saturata</i>	Black-breasted Sunbird	N	R	LC	2
7	Paridae					
13	<i>Parus monticolus</i>	Green-backed Tit	I	R	LC	5
8	Picidae					
14	<i>Picus flavinucha</i>	Greater Yellownape	I	R	LC	2
9	Stenostiridae					
15	<i>Culicicapa ceylonensis</i>	Grey-headed Canary-flycatcher	I	BV	LC	8
10	Sylviidae					
16	<i>Phylloscopus fuligiventer</i>	Smoky Leaf-warbler	I	WV	LC	2
17	<i>Phylloscopus reguloides</i>	Blyth's Leaf-warbler	I	WV	LC	2
18	<i>Phylloscopus trochiloides</i>	Greenish Warbler	I	WV	LC	13
19	<i>Phylloscopus xanthoschistos</i>	Grey-hooded Warbler	I	R	LC	13
11	Timaliidae					
20	<i>Trachalopteron erthrocephalum</i>	Red-headed Laungthingthrush	I	R	LC	2
21	<i>Yuhina flavicollis</i>	Whiskered Yuhina	I	R	LC	2
22	<i>Yuhina gularis</i>	Stripe-throated Yuhina	O	R	LC	5
12	Turdidae					
23	<i>Monticola cinclorhynchus</i>	Blue-headed Rock-thrush	I	BV	LC	1
24	<i>Myophonus caeruleus</i>	Blue Whistling-thrush	I	R	LC	5
13	Zosteropidae					
25	<i>Zosterops palpebrosus</i>	Oriental White-eye	I	R	LC	5

FS–Foraging Status: C–Carnivores, F–Frugivore, I–Insectivore, N–Nectarivore, O–Omnivore, MS–Migratory Status–BV–Breeding Visitor, R–Resident, WV–Winter Visitor; CS–Conservation status–IUCN Red List and WPA–1972 Schedule: LC–Least Concern

Appendix II.3.202: Status of Birds at Tawang–II Powerhouse site

Sl. No.	Family/Genus/Species	Common name	FS	MS	CS	No of birds recorded
1	Campephagidae					
1	<i>Pericrocotus ethologus</i>	Long-tailed Minivet	I	BV	LC	1
2	Cisticolidae					
2	<i>Prinia sylvatica</i>	Jungle Prinia	I	R	LC	1
3	Corvidae					
3	<i>Dendrocitta formosae</i>	Grey Treepie	O	R	LC	5
4	<i>Urocissa flavirostris</i>	Yellow-bellied Blue Magpie	C	R	LC	1
4	Fringillidae					
5	<i>Carpodacus pulcherrimus</i>	Himalayan Beautiful Rosefinch	G	WV	LC	3
6	<i>Leucosticte nemoricola</i>	Plain Mountain-finch	G	R	LC	16
5	Motacillidae					
7	<i>Anthus rufulus</i>	Paddyfield Pipit	I	R	LC	9
6	Muscicapidae					
8	<i>Enicurus maculatus</i>	Spotted Forktail	I	R	LC	2

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Sl. No.	Family/Genus/Species	Common name	FS	MS	CS	No of birds recorded
9	<i>Phoenicurus frontalis</i>	Blue-fronted Redstart	I	BV	LC	10
7	Passeridae					
10	<i>Passer montanus</i>	Eurasian Tree Sparrow	G	R	LC	2
8	Sylviidae					
11	<i>Phylloscopus affinis</i>	Tickell's Leaf-warbler	I	BV	LC	1
12	<i>Phylloscopus fuligiventer</i>	Smoky Leaf-warbler	I	WV	LC	2
13	<i>Phylloscopus inornatus</i>	Yellow-browed Leaf-warbler	I	WV	LC	2
14	<i>Phylloscopus maculipennis</i>	Grey-faced Leaf-warbler	I	R	LC	3
15	<i>Tesia castaneocoronata</i>	Chestnut-headed Tesia	I	R	LC	1
9	Troglodytidae					
16	<i>Troglodytes troglodytes</i>	Winter Wren	I	R	LC	1

FS–Foraging Status: C–Carnivores, I–Insectivore, G–Granivore, O–Omnivore, MS–Migratory Status–BV–Breeding Visitor, R–Resident, WV–Winter Visitor; CS–Conservation status–IUCN Red List and WPA–1972 Schedule: LC–Least Concern;

Appendix II.3.203: Birds recorded in the Nyamjang chu HEP area

Sl. No.	Family Genera Species	Common name	FS	MS	CS	Monsoon/Overall
1	Accipitridae					
1	<i>Nisaetus nipalensis</i>	Mountain-hawk Eagle	C	R	LC	1
2	Apodidae					
2	<i>Aerodramus brevirostris</i>	Himalayan Swiftlet	I	R	LC	1
3	Campephagidae					
3	<i>Pericrocotus ethologus</i>	Long-tailed Minivet	I	BV	LC	5
4	Caprimulgidae					
4	<i>Caprimulgus jotaka</i>	Grey Nightjar	I	R	LC	2
5	Chloropseidae					
5	<i>Chloropsis hardwickii</i>	Orange-bellied Leafbird	I	R	LC	4
6	Cisticolidae					
6	<i>Prinia atrogularis</i>	Black-throated Prinia	I	R	LC	3
7	<i>Prinia sylvatica</i>	Jungle Prinia	I	R	LC	4
8	<i>Prinia crinigera</i>	Striated Prinia	I	R	LC	5
7	Columbidae					
9	<i>Streptopelia orientalis</i>	Oriental Turtle-dove	G	WV	LC	22
10	<i>Spilopelia chinensis</i>	Spotted Dove	G	R	LC	8
11	<i>Treron sphenurus</i>	Wedge-tailed Green-pigeon	G	R	LC	3
8	Corvidae					
12	<i>Corvus culminatus</i>	Large-billed Crow	O	R	LC	1
13	<i>Nucifraga caryocatactes</i>	Spotted Nutcracker	Nu	R	LC	2
9	Cuculidae					
14	<i>Chrysococcyx maculatus</i>	Asian Emerald Cuckoo	I	BV	LC	1
15	<i>Cuculus canorus</i>	Common Cuckoo	I	BV	LC	3
16	<i>Surniculus (lugubris) dicruroides</i>	Fork-tailed' Drongo Cuckoo	I	BV	LC	1
17	<i>Cuculus micropterus</i>	Indian Cuckoo	I	BV	LC	1
18	<i>Hierococcyx sparverioides</i>	Large Hawk-cuckoo	I	BV	LC	3
10	Dicaeidae					
19	<i>Dicaeum ignipectus</i>	Fire-breasted Flowerpecker	N	R	LC	14
11	Dicruridae					
20	<i>Dicrurus leucophaeus</i>	Ashy Drongo	O	WV	LC	8
21	<i>Dicrurus macrocercus</i>	Black Drongo	O	R	LC	13
22	<i>Dicrurus aeneus</i>	Bronzed Drongo	O	R	LC	4
12	Emberizidae					
23	<i>Melophus lathami</i>	Crested Bunting	G	R	LC	8
13	Falconidae					
24	<i>Falco tinnunculus</i>	Common Kestrel	C	WV	LC	2
14	Fringillidae					
25	<i>Carduelis spinoides</i>	Himalayan Greenfinch	G	WV	LC	4

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Sl. No.	Family Genera Species	Common name	FS	MS	CS	Monsoon/Overall
26	<i>Haematospiza sipahi</i>	Scarlet Finch	G	R	LC	5
15	Hirundinidae					
27	<i>Delichon dasypus</i>	Asian House Martin	I	BV	LC	10
16	Laniidae					
28	<i>Lanius schach tricolor</i>	Black-headed' Long-tailed Shrike	I	BV	LC	14
29	<i>Lanius cristatus</i>	Brown Shrike	I	WV	LC	2
30	<i>Lanius tephronotus</i>	Grey-backed Shrike	I	BV	LC	1
17	Leiothrichidae					
31	<i>Heterophasia capistrata</i>	Rufous Sibia	O	R	LC	43
18	Megalaimidae					
32	<i>Megalaima virens</i>	Great Barbet	F	R	LC	7
19	Motacillidae					
33	<i>Anthus hodgsoni hodgsoni</i>	Olive-backed Pipit	I	R	LC	3
34	<i>Anthus rufulus</i>	Paddyfield Pipit	I	R	LC	6
35	<i>Motacilla alba alboides</i>	White Wagtail	I	WV	LC	4
20	Muscicapidae					
36	<i>Phoenicurus ochruros</i>	Black Redstart	I	WV	LC	3
37	<i>Muscicapa sibirica</i>	Dark-sided Flycatcher	I	BV	LC	4
38	<i>Muscicapa ferruginea</i>	Ferruginous Flycatcher	I	BV	LC	38
39	<i>Saxicola ferreus</i>	Grey Bushchat	I	R	LC	13
40	<i>Ficedula strophiatea</i>	Orange-gorgeted Flycatcher	I	R	LC	1
41	<i>Copsychus saularis</i>	Oriental Magpie-robin	I	R	LC	1
42	<i>Rhyacornis fuliginosa</i>	Plumbeous Water-redstart	I	R	LC	9
43	<i>Ficedula tricolor</i>	Slaty-blue Flycatcher	I	BV	LC	7
44	<i>Ficedula superciliosa</i>	Ultramarine Flycatcher	I	BV	LC	2
45	<i>Eumyias thalassinus</i>	Verditer Flycatcher	I	BV	LC	13
46	<i>Tarsiger indicus</i>	White-browed Bush-robin	I	R	LC	4
47	<i>Ficedula monileger</i>	White-gorgeted Flycatcher	I	R	LC	5
21	Nectariniidae					
48	<i>Aethopyga saturata</i>	Black-throated Sunbird	N	R	LC	1
49	<i>Aethopyga goulgiae</i>	Mrs Gould's Sunbird	N	R	LC	3
22	Oriolidae					
50	<i>Oriolus traillii</i>	Maroon Oriole	O	R	LC	2
23	Paridae					
51	<i>Parus monticolus</i>	Green-backed Tit	I	R	LC	19
24	Passeridae					
52	<i>Passer rutilans</i>	Cinnamon Sparrow	G	R	LC	12
53	<i>Passer montanus</i>	Eurasian Tree Sparrow	G	R	LC	5
25	Picidae					
54	<i>Dendrocopos cathpharius</i>	Crimson-breasted Pied Woodpecker	I	R	LC	2
26	Pycnonotidae					
55	<i>Hemixos flava</i>	Ashy Bulbul	O	R	LC	1
56	<i>Hyphantornis leucocephalus</i>	Himalayan Black Bulbul	O	R	LC	70
57	<i>Pycnonotus leucogenys</i>	Himalayan Bulbul	O	R	LC	31
58	<i>Pycnonotus cafer</i>	Red-vented Bulbul	O	R	LC	43
27	Sittidae					
59	<i>Sitta himalayensis</i>	White-tailed Nuthatch	I	R	LC	5
28	Stenostiridae					
60	<i>Culicicapa ceylonensis</i>	Grey-headed Canary-flycatcher	I	BV	LC	1
29	Sylviidae					
61	<i>Abroscopus schisticeps</i>	Black-faced Warbler	I	R	LC	2
62	<i>Phylloscopus reguloides</i>	Blyth's Leaf-Warbler	I	WV	LC	1
63	<i>Bradypterus luteiventris</i>	Brown Bush-warbler	I	BV	LC	2
64	<i>Tesia castaneocoronata</i>	Chestnut-headed Tesia	I	R	LC	2
65	<i>Orthotomus sutorius</i>	Common Tailorbird	I	R	LC	6
66	<i>Phylloscopus coronatus</i>	Eastern Crowned Warbler	I	WV	LC	8
67	<i>Seicercus poliogenys</i>	Grey-cheeked Warbler	I	R	LC	8

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Sl. No.	Family Genera Species	Common name	FS	MS	CS	Monsoon/Overall
68	<i>Phylloscopus xanthoschistos</i>	Grey-hooded Warbler	I	R	LC	6
69	<i>Orthotomus cuculatus</i>	Mountain Tailorbird	I	R	LC	2
30	Timaliidae					
70	<i>Trochalopteron imbricatum</i>	Bhutan Laughingthrush	I	R	LC	31
71	<i>Alcippe nipalensis</i>	Nepal Fulvetta	I	R	LC	4
72	<i>Pellorneum ruficeps</i>	Puff-throated Babbler	I	R	LC	2
73	<i>Ianthocincla rufogularis</i>	Rufous-chinned Laughingthrush	I	R	LC	10
74	<i>Yuhina occipitalis</i>	Rufous-vented Yuhina	I	R	LC	4
75	<i>Alcippe dubia</i>	Rusty-capped Fulvetta	I	R	LC	2
76	<i>Pomatorhinus erythrogenys</i>	Rusty-cheeked Scimitar-babbler	I	R	LC	1
77	<i>Yuhina gularis</i>	Stripe-throated Yuhina	O	R	LC	6
78	<i>Yuhina flavicollis</i>	Whiskered Yuhina	I	R	LC	12
79	<i>Pomatorhinus schisticeps</i>	White-browed Scimitar-babbler	I	R	LC	1
80	<i>Garrulax albogularis</i>	White-throated Laughingthrush	I	R	LC	10
31	Turdidae					
81	<i>Monticola solitarius</i>	Blue Rock-thrush	I	WV	LC	1
82	<i>Myophonus caeruleus</i>	Blue Whistling-thrush	I	R	LC	18
83	<i>Monticola cinclorhyn chus</i>	Blue-headed Rock-thrush	I	BV	LC	6
84	<i>Zoothera dixonii</i>	Long-tailed Thrush	I	BV	LC	2
32	Upupidae					
85	<i>Upupa epops</i>	Common Hoopoe	I	WV	LC	3
33	Zosteropidae					
86	<i>Zosterops palpebrosus</i>	Oriental White-eye	I	R	LC	5

FS : C–Carnivores, F–Frugivore, G–Granivore, I–Insectivore, N–Nectarivore, Nc–Nucivore, O–Omnivore; MS–Migratory Status–BV–Breeding Visitor, IR–Isolated Record, R–Resident, WV–Winter Visitor; CS–Conservation status–IUCN Red List and WPA–1972 Schedule: VU–Vulnerable, LC–Least Concern

Appendix II.3.204: List of possible mammalian fauna of Nyamjang chu HEP area

Sl. No	Common name	Scientific name	SPA	Conservation status	
	Primates			IUCN	IWPA
1	Arunachal macaque	<i>Macaca munzala</i>	*	EN	–
2	Assamese macaque	<i>M. assamensis</i>		NT	II
3	Capped langur	<i>Trachypitecus pileatus</i>	*	VU	I
4	Slow loris	<i>Nycticebus coucang</i>		VU	I
	Ungulates				
5	Barking deer	<i>Muntiacus muntjak</i>	*	LC	III
6	Bharal	<i>Pseudois nayaur</i>		LC	I
7	Chinese goral	<i>Nemorhaedus caudatus</i>		VU	III
8	Himalayan goral	<i>N. goral</i>	*	NT	III
9	Musk deer	<i>Mos chus</i> sp.		EN	–
10	Sambar	<i>Cervus unicolor</i>		VU	III
11	Serow	<i>N. sumatraensis</i>			
12	Wild pig	<i>Sus scrofa</i>	*	LC	III
	Carnivores				
13	Common leopard	<i>Panthera pardus</i>		NT	I
14	Jungle Cat	<i>Felis Chaus</i>	*	LC	II
15	Dhole	<i>Cuon alpinus</i>		EN	II
16	Himalayan black bear	<i>Ursus thibetanus</i>		VU	II
17	Himalayan palm civet	<i>Paguma larvata</i>	*	LC	II
18	Leopard cat	<i>Prionailurus bengalensis</i>	*	LC	–
19	Otter	<i>Lutra</i> sp.		VU	–
20	Red panda	<i>Ailurus fulgens</i>	*	VU	I
21	Snow leopard	<i>Uncia uncia</i>		EN	I
22	Yellow-throated marten	<i>Martes flavigula</i>	*	LC	II
	Rodents				
23	Hairy-footed flying squirrel	<i>Belomys pearsonii</i>		DD	II

Sl. No	Common name	Scientific name	SPA	Conservation status	
24	Himalayan marmot	<i>Marmota himalayana</i>		LC	II
25	Himalayan striped squirrel	<i>Tamiops maccllelandi</i>		LC	–
26	Orange-bellied Himalayan squirrel	<i>Dremomys lokriah</i>		LC	–
	*Hoary-bellied Himalayan Squirrel	<i>Callosciurus pygerythrus</i>	*	LC	–
27	Porcupine	<i>Hystrix</i> sp.	*	LC	IV
	*Chesnut rat	<i>Niviventer flavescent</i>		LC	V
	Lagomorphs				
28	Large-eared pika	<i>Ochotona macrotis</i>		LC	–
29	Moupin pika	<i>Ochotona thibetana</i>		LC	–
	29 species		12 species R% 41.37%		

Data Source:1–Mishra et al 2006, SPA–Species of Project Area * Additional species reported during the study

Appendix II.3.205: Status of birds at Nyamjang chu barrage site

Sl. No.	Family/Genus/Species	Common name	FS	MS	CS	No of birds recorded
1	Apodidae					
1	<i>Aerodramus brevirostris</i>	Himalayan Swiftlet	I	R	LC	1
2	Campephagidae					
2	<i>Pericrocotus ethologus</i>	Long-tailed Minvet	I	BV	LC	3
3	Chloropseidae					
3	<i>Chloropsis hardwickii</i>	Orange-bellied Leafbird	I	R	LC	2
4	Columbidae					
4	<i>Spilopelia chinensis</i>	Spotted Dove	G	R	LC	1
5	<i>Streptopelia orientalis</i>	Oriental Turtle-dove	G	WV	LC	10
6	<i>Treron sphenurus</i>	Wedge-tailed Green-pigeon	G	R	LC	3
5	Cuculidae					
7	<i>Cuculus canorus</i>	Common Cuckoo	I	BV	LC	2
8	<i>Cuculus micropterus</i>	Indian Cuckoo	I	BV	LC	1
9	<i>Hierococcyx sparveroides</i>	Large Hawk-cuckoo	I	BV	LC	1
6	Dicruridae					
10	<i>Dicrurus aeneus</i>	Bronzed Drongo	O	R	LC	1
11	<i>Dicrurus leucophaeus</i>	Ashy Drongo	O	WV	LC	2
7	Laniidae					
12	<i>Lanius schach tricolor</i>	Black-headed' Long-tailed Shrike	I	BV	LC	4
8	Leiothrichidae					
13	<i>Heterophasia capistrata</i>	Rufous Sibia	O	R	LC	16
9	Motacillidae					
14	<i>Anthus rufulus</i>	Paddyfield Pipit	I	R	LC	6
15	<i>Motacilla alba alboides</i>	White Wagtail	I	WV	LC	4
10	Muscicapidae					
16	<i>Eumyias thalassinus</i>	Verditer Flycatcher	I	BV	LC	1
17	<i>Ficedula monileger</i>	White-gorgeted Flycatcher	I	R	LC	2
18	<i>Muscicapa ferruginea</i>	Ferruginous Flycatcher	I	BV	LC	11
19	<i>Muscicapa sibirica</i>	Dark-sided Flycatcher	I	BV	LC	2
20	<i>Rhyacornis fuliginosa</i>	Plumbeous Water-redstart	I	R	LC	6
21	<i>Saxicola ferreus</i>	Grey Bushchat	I	R	LC	1
11	Oriolidae					
22	<i>Oriolus traillii</i>	Maroon Oriole	O	R	LC	2
12	Paridae					
23	<i>Parus monticolus</i>	Green-backed Tit	I	R	LC	4
13	Passeridae					
24	<i>Passer montanus</i>	Eurasian Tree Sparrow	G	R	LC	1
14	Picidae					
25	<i>Dendrocopos cathpharius</i>	Crimson-breasted Pied Woodpecker	I	R	LC	1
15	Pycnonotidae					

Sl. No.	Family/Genus/Species	Common name	FS	MS	CS	No of birds recorded
26	<i>Hypsipetes leucocephalus</i>	Himalayan Black Bulbul	O	R	LC	17
27	<i>Pycnonotus cafer</i>	Red-vented Bulbul	O	R	LC	16
28	<i>Pycnonotus leucogenys</i>	Himalayan Bulbul	O	R	LC	10
16	Sittidae					
29	<i>Sitta himalayensis</i>	White-tailed Nuthatch	I	R	LC	2
17	Sylviidae					
30	<i>Abroscopus schisticeps</i>	Black-faced Warbler	I	R	LC	2
31	<i>Orthotomus sutorius</i>	Common Tailorbird	I	R	LC	1
32	<i>Phylloscopus coronatus</i>	Eastern Crowned Warbler	I	WV	LC	2
33	<i>Phylloscopus xanthoschistos</i>	Grey-hooded Warbler	I	R	LC	1
18	Timaliidae					
34	<i>Garrulax albogularis</i>	White-throated Laughingthrush	I	R	LC	6
35	<i>Trochalopteron imbricatum</i>	Bhutan Laughingthrush	I	R	LC	5
36	<i>Yuhina flavicollis</i>	Whiskered Yuhina	I	R	LC	5
19	Turdidae					
37	<i>Myophonus caeruleus</i>	Blue Whistling-thrush	I	R	LC	4
20	Zosteropidae					
38	<i>Zosterops palpebrosus</i>	Oriental White-eye	I	R	LC	2

FS–Foraging Status : G–Granivore, I–Insectivore, O–Omnivore; MS–Migratory Status–BV–Breeding Visitor, R–Resident, WV–Winter Visitor; CS–Conservation status–IUCN Red List and WPA–1972 Schedule: LC–Least Concern

Appendix II.3.206: Status of birds at Nyamjang chu powerhouse site

Sl. No.	Family/Genus/Species	Common name	FS	MS	CS	No of birds Recorded
1	Cisticolidae					
1	<i>Prinia crinigera</i>	Striated Prinia	I	R	LC	9
2	Columbidae					
2	<i>Spilopelia chinensis</i>	Spotted Dove	G	R	LC	5
3	<i>Streptopelia orientalis</i>	Oriental Turtle-dove	G	WV	LC	2
3	Corvidae					
4	<i>Corvus culminatus</i>	Large-billed Crow	O	R	LC	1
4	Cuculidae					
5	<i>Surniculus (lugubris) dicruroides</i>	Fork-tailed' Drongo Cuckoo	I	BV	LC	1
5	Dicaeidae					
6	<i>Dicaeum ignipectus</i>	Fire-breasted Flowerpecker	N	R	LC	2
6	Dicruridae					
7	<i>Dicrurus macrocercus</i>	Black Drongo	O	R	LC	8
7	Emberizidae					
8	<i>Melophus lathami</i>	Crested Bunting	G	R	LC	8
8	Falconidae					
9	<i>Falco tinnunculus</i>	Common Kestrel	C	WV	LC	2
9	Fringillidae					
10	<i>Carduelis spinoides</i>	Himalayan Greenfinch	G	WV	LC	4
10	Hirundinidae					
11	<i>Delichon dasypus</i>	Asian House Martin	I	BV	LC	10
11	Laniidae					
12	<i>Lanius cristatus</i>	Brown Shrike	I	WV	LC	2
13	<i>Lanius schach tricolor</i>	Black-headed' Long-tailed Shrike	I	BV	LC	8
12	Motacillidae					
14	<i>Anthus hodgsoni hodgsoni</i>	Olive-backed Pipit	I	R	LC	3
13	Muscicapidae					
15	<i>Copsychus saularis</i>	Oriental Magpie-robin	I	R	LC	1
16	<i>Phoenicurus ochruros</i>	Black Redstart	I	WV	LC	3
17	<i>Saxicola ferreus</i>	Grey Bushchat	I	R	LC	6
18	<i>Tarsiger indicus</i>	White-browed Bush-robin	I	R	LC	2
14	Paradoxornithidae					

Sl. No.	Family/Genus/Species	Common name	FS	MS	CS	No of birds Recorded
19	<i>Paradoxornis nipalensis</i>	Black-throated Parrotbill	G	R	LC	1
15	Pycnonotidae					
20	<i>Hypsipetes leucocephalus</i>	Himalayan Black Bulbul	O	R	LC	9
22	<i>Pycnonotus cafer</i>	Red-vented Bulbul	O	R	LC	18
21	<i>Pycnonotus leucogenys</i>	Himalayan Bulbul	O	R	LC	19
16	Sylviidae					
23	<i>Orthotomus sutorius</i>	Common Tailorbird	I	R	LC	5
24	<i>Phylloscopus xanthoschistos</i>	Grey-hooded Warbler	I	R	LC	2
17	Timaliidae					
25	<i>Alcippe dubia</i>	Rusty-capped Fulvetta	I	R	LC	2
26	<i>Pomatorhinus erythrogenys</i>	Rusty-cheeked Scimitar-babbler	I	R	LC	1
18	Turdidae					
27	<i>Monticola cinclorhynchus</i>	Blue-headed Rock-thrush	I	BV	LC	3
28	<i>Myophonus caeruleus</i>	Blue Whistling-thrush	I	R	LC	1
19	Upupidae					
29	<i>Upupa epops</i>	Common Hoopoe	I	WV	LC	3

FS–Foraging Status : C–Carnivores, G–Granivore, I–Insectivore, N–Nectarivore, O–Omnivore; MS–Migratory Status–BV–Breeding Visitor, R–Resident, WV–Winter Visitor; CS–Conservation status–IUCN Red List and WPA–1972 Schedule: LC–Least Concern;

Appendix II.3.207: Ecological status of bird species recorded in the Paikangrong chu HEP area

Sl. No.	Family and species	Common name	FS	MS	CS	PM	M	W	Overall
1	Accipitridae								
1	<i>Accipiter nisus</i>	Eurasian Sparrowhawk	C	R	LC	0	0	1	1
2	Aegithalidae								
2	<i>Aegithalos concinnus</i>	Red-headed Tit	I	R	LC	0	0	10	10
3	Campephagidae								
3	<i>Pericrocotus ethologus</i>	Long-tailed Minivet	I	BV	LC	0	0	2	2
4	<i>Pericrocotus speciosus</i>	Scarlet Minivet	I	R	LC	0	2	0	2
4	Charadriidae								
5	<i>Charadrius placidus</i>	Long-billed Plover	I	WV	LC	0	2	0	2
5	Cisticolidae								
6	<i>Prinia crinigera</i>	Striated Prinia	I	R	LC	7	0	0	7
6	Columbidae								
7	<i>Streptopelia orientalis</i>	Oriental Turtle-dove	G	WV	LC	15	22	0	37
7	Corvidae								
8	<i>Dendrocitta formosae</i>	Grey Treepie	O	R	LC	0	1	2	3
9	<i>Corvus culminatus</i>	Large-billed Crow	O	R	LC	14	0	0	14
10	<i>Nucifraga caryocatactes</i>	Spotted Nutcracker	Nu	R	LC	0	9	2	11
11	<i>Urocissa flavirostris</i>	Yellow-bellied Blue Magpie	C	R	LC	0	1	0	1
8	Cuculidae								
12	<i>Hierococcyx sparveroides</i>	Large Hawk-cuckoo	I	BV	LC	9	0	0	9
9	Dicaeidae								
13	<i>Dicaeum ignipectus</i>	Fire-breasted Flowerpecker	N	R	LC	5	0	0	5
10	Dicruridae								
14	<i>Dicrurus leucophaeus</i>	Ashy Drongo	O	WV	LC	8	0	0	8
15	<i>Dicrurus macrocercus</i>	Black Drongo	O	R	LC	8	0	0	8
11	Emberizidae								
16	<i>Emberiza pusilla</i>	Little Bunting	G	WV	LC	0	0	2	2
12	Fringillidae								
17	<i>Carpodacus davidianus</i>	Chinese Beautiful Rosefinch	G	WV	LC	0	2	0	2
18	<i>Carpodacus nepalensis</i>	Dark-breasted Rosefinch	G	R	LC	0	0	10	10
19	<i>Carpodacus edwardsii</i>	Dark-rumped Rosefinch	G	R	LC	0	0	6	6
20	<i>Carduelis spinoides</i>	Himalayan Greenfinch	G	WV	LC	0	48	0	48

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Sl. No.	Family and species	Common name	FS	MS	CS	PM	M	W	Overall
21	<i>Mycerobas melanozanthos</i>	Spot-winged Grosbeak	G	R	LC	0	2	0	2
13	Hirundinidae								
22	<i>Delichon nipalense</i>	Nepal House-martin	I	R	LC	13	0	0	13
14	Leiothrichidae								
23	<i>Heterophasia capistrata</i>	Rufous Sibia	O	R	LC	14	47	8	69
15	Megalaimidae								
24	<i>Megalaima virens</i>	Great Barbet	F	R	LC	11	0	0	11
16	Motacillidae								
25	<i>Motacilla cinerea</i>	Grey Wagtail	I	WV	LC	0	2	0	2
26	<i>Anthus hodgsoni hodgsoni</i>	Olive-backed Pipit	I	R	LC	0	21	0	21
27	<i>Anthus rufulus</i>	Paddyfield Pipit	I	R	LC	0	1	0	1
17	Muscicapidae								
28	<i>Phoenicurus frontalis</i>	Blue-fronted Redstart	I	BV	LC	0	0	3	3
29	<i>Cyornis rubeculoides</i>	Blue-throated Flycatcher	I	BV	LC	3	0	0	3
30	<i>Saxicola ferreus</i>	Grey Bushchat	I	R	LC	0	2	0	2
31	<i>Phoenicurus hodgsoni</i>	Hodgson's Redstart	I	WV	LC	0	0	2	2
32	<i>Rhyacornis fuliginosa</i>	Plumbeous Water-redstart	I	R	LC	7	4	0	11
33	<i>Eumyias thalassinus</i>	Verditer Flycatcher	I	BV	LC	5	4	0	9
34	<i>Chaimarrornis leucocephalus</i>	White-capped River-chat	I	R	LC	0	1	0	1
35	<i>Myiomela leucura</i>	White-tailed Blue Robin	I	R	LC	2	0	0	2
18	Nectariniidae								
36	<i>Aethopyga saturata</i>	Black-breasted Sunbird	N	R	LC	4	0	0	4
37	<i>Aethopyga ignicauda</i>	Fire-tailed Sunbird	N	R	LC	0	9	2	11
38	<i>Aethopyga nipalensis</i>	Green-tailed Sunbird	N	R	LC	9	0	0	9
19	Paradoxornithidae								
39	<i>Paradoxornis nipalensis</i>	Black-throated Parrotbill	G	R	LC	0	0	21	21
20	Paridae								
40	<i>Parus ater</i>	Coal Tit	I	R	LC	0	0	2	2
41	<i>Parus monticolus</i>	Green-backed Tit	I	R	LC	0	4	6	10
21	Passeridae								
42	<i>Passer rutilans</i>	Cinnamon Sparrow	G	R	LC	4	0	0	4
22	Picidae								
43	<i>Blythipicus pyrrhotis</i>	Bay Woodpecker	I	R	LC	0	1	0	1
23	Prunellidae								
44	<i>Prunella collaris</i>	Alpine Accentor	I	WV	LC	0	0	1	1
45	<i>Prunella strophia</i>	Rufous-breasted Accentor	I	R	LC	0	0	1	1
24	Pycnonotidae								
46	<i>Hypsipetes leucocephalus</i>	Himalayan Black Bulbul	O	R	LC	33	2	0	35
47	<i>Hypsipetes mccllellandi</i>	Mountain Bulbul	O	R	LC	0	0	2	2
48	<i>Pycnonotus cafer</i>	Red-vented Bulbul	O	R	LC	0	8	0	8
25	Rhipiduridae								
49	<i>Rhipidura albicollis</i>	White-throated Fantail	I	R	LC	3	0	0	3
26	Sittidae								
50	<i>Sitta himalayensis</i>	White-tailed Nuthatch	I	R	LC	0	1	0	1
27	Stenostiridae								
51	<i>Culicicapa ceylonensis</i>	Grey-headed Canary-flycatcher	I	BV	LC	0	1	0	1
52	<i>Chelidorhynch hypoxantha</i>	Yellow-bellied Fantail	I	R	LC	0	1	0	1
28	Sylviidae								
53	<i>Phylloscopus reguloides</i>	Blyth's Leaf-Warbler	I	WV	LC	9	4	0	13
54	<i>Phylloscopus pulcher</i>	Buff-barred Warbler	I	BV	LC	0	8	0	8
55	<i>Phylloscopus coronatus</i>	Eastern Crowned Warbler	I	WV	LC	9	0	0	9
56	<i>Seicercus burkii</i>	Green-crowned Warbler	I	BV	LC	1	10	0	11
57	<i>Phylloscopus trochiloides</i>	Greenish Warbler	I	WV	LC	0	9	0	9
58	<i>Phylloscopus maculipennis</i>	Grey-faced Leaf-warbler	I	R	LC	0	4	0	4
59	<i>Phylloscopus xanthoschistos</i>	Grey-hooded Warbler	I	R	LC	0	6	0	6
60	<i>Cettia brunnifrons</i>	Grey-sided Bush-Warbler	I	BV	LC	7	1	0	8
61	<i>Cettia brunescens</i>	Hume's Bush-warbler	I	R	LC	0	1	0	1

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Sl. No.	Family and species	Common name	FS	MS	CS	PM	M	W	Overall
62	<i>Phylloscopus chloronotus</i>	Lemon-rumped Leaf Warbler	I	BV	LC	0	9	0	9
63	<i>Cettia fortipes</i>	Strong-footed Bush-warbler	I	R	LC	0	3	0	3
29	Timaliidae								
64	<i>Minla strigula</i>	Bar-throated Minla	I	R	LC	0	16	0	16
65	<i>Trochalopteron imbricatum</i>	Bhutan Laughingthrush	I	R	LC	0	5	16	21
66	<i>Trochalopteron squamatum</i>	Blue-winged Laughingthrush	I	R	LC	0	9	0	9
67	<i>Dryonastes caerulatus</i>	Grey-sided Laughingthrush	I	R	LC	0	3	0	3
68	<i>Stachyris nigriceps</i>	Grey-throated Babbler	I	R	LC	0	0	7	7
69	<i>Pomatorhinus hypoleucos</i>	Large Scimitar-babbler	I	R	LC	2	0	0	2
70	<i>Alcippe nipalensis</i>	Nepal Fulvetta	I	R	LC	0	5	0	5
71	<i>Pellorneum ruficeps</i>	Puff-throated Babbler	I	R	LC	3	0	0	3
72	<i>Leiothrix lutea</i>	Red-billed Leiothrix	O	R	LC	0	2	0	2
73	<i>Trachalopteron erthrocephalum</i>	Red-headed Laughingthrush	I	R	LC	0	3	7	10
74	<i>Minla ignotincta</i>	Red-tailed Minla	I	R	LC	0	7	14	21
75	<i>Yuhina occipitalis</i>	Rufous-vented Yuhina	I	R	LC	0	40	12	52
76	<i>Lanthocincla ocellata</i>	Spotted Laughingthrush	I	R	LC	0	4	0	4
77	<i>Pomatorhinus ruficollis</i>	Streak-breasted Scimitar -babbler	I	R	LC	0	0	2	2
78	<i>Grammatoptila striatus</i>	Striated Laughingthrush	I	R	LC	14	0	0	14
79	<i>Yuhina flavicollis</i>	Whiskered Yuhina	I	R	LC	0	25	10	35
80	<i>Erpornis zantholeuca</i>	White-bellied Erpornis	I	R	LC	0	0	4	4
81	<i>Pteruthius flaviscapis</i>	White-browed Shrike-babbler	I	R	LC	0	2	0	2
30	Troglodytidae								
82	<i>Troglodytes troglodytes</i>	Winter Wren	I	R	LC	2	0	0	2
31	Turdidae								
83	<i>Turdus atrogularis</i>	Black-throated Thrush	I	WV	LC	0	0	1	1
84	<i>Myophonus caeruleus</i>	Blue Whistling-thrush	I	R	LC	11	14	4	29
85	<i>Zoothera dixonii</i>	Long-tailed Thrush	I	BV	LC	0	1	1	2
86	<i>Turdus albocinctus</i>	White-collared Blackbird	I	R	LC	0	0	5	5

FS : Aq-Aquatic Feeder, C - Carnivores, F - Frugivore, G - Granivore, I - Insectivore, N - Nectarivore, Nc - Nucivore, O - Omnivore, P - Piscivore; MS - Migratory Status - BV - Breeding Visitor, IR - Isolated Record, R - Resident, WV - Winter Visitor; CS - Conservation status - IUCN Red List and WPA -1972 Schedule: VU - Vulnerable, LC - Least Concern; PM- Post monsoon, M - Monsoon, W – Winter

Appendix II.3.208: List of possible mammalian fauna of the Tawang region and contribution of species reported in the Paikangrong chu HEP area

Sl. No.	Common name	Scientific name	SPA	Conservation status	
				IUCN	IWPA
	Primates				
1	Arunachal macaque	<i>Macaca munzala</i>	*	EN	-
2	Assamese macaque	<i>M. assamensis</i>		NT	II
3	Capped langur	<i>Trachypithecus pileatus</i>		VU	I
4	Slow loris	<i>Nycticebus coucang</i>		VU	I
	Ungulates				
5	Barking deer	<i>Muntiacus muntjak</i>	*	LC	III
6	Bharal	<i>Pseudois nayaur</i>		LC	I
7	Chinese goral	<i>Nemorhaedus caudatus</i>		VU	III
8	Himalayan goral	<i>N. goral</i>	*	NT	III
9	Musk deer	<i>Moschus sp.</i>		EN	-
10	Sambar	<i>Cervus unicolor</i>		VU	III
11	Serow	<i>N. sumatraensis</i>			
12	Wild pig	<i>Sus scrofa</i>	*	LC	III
	Carnivores				
13	Common leopard	<i>Panthera pardus</i>		NT	I
14	Jungle Cat	<i>Felis Chaus</i>	*	LC	II
15	Dhole	<i>Cuon alpinus</i>		EN	II
16	Himalayan black bear	<i>Ursus thibetanus</i>		VU	II
17	Himalayan palm civet	<i>Paguma larvata</i>		LC	II
18	Leopard cat	<i>Prionailurus bengalensis</i>		LC	-

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Sl.	Common name	Scientific name	SPA	Conservation status	
19	Otter	<i>Lutra sp.</i>		VU	-
20	Red panda	<i>Ailurus fulgens</i>		VU	I
21	Snow leopard	<i>Uncia uncia</i>		EN	I
22	Yellow-throated marten	<i>Martes flavigula</i>		LC	II
	Rodents				
23	Hairy-footed flying squirrel	<i>Belomys pearsonii</i>		DD	II
24	Himalayan marmot	<i>Marmota himalayana</i>		LC	II
25	Himalayan striped squirrel	<i>Tamiops macclellandi</i>		LC	-
26	Orange-bellied Himalayan squirrel	<i>Dremomys lokriah</i>	*	LC	-
	*Hoary-bellied Himalayan Squirrel	<i>Callosciurus pygerythrus</i>	*	LC	-
27	Porcupine	<i>Hystrix sp.</i>		LC	IV
	Chesnut rat	<i>Niviventer fluvescens</i>		LC	V
	Lagomorphs				
28	Large-eared pika	<i>Ochotona macrotis</i>		LC	-
29	Moupin pika	<i>Ochotona thibetana</i>		LC	-
	29 species		7 species R% = 24.13		

Data Source:1 – Mishra et al 2006, SPA –Species of Project Area, * additional species reported during the study

Appendix II.3.209: Status of birds at Paikangrong chu barrage and powerhouse site

Sl. No.	Family/Genus/Species	Common name	FS	MS	CS	No of birds recorded
1	Accipitridae					
1	<i>Gyps himalayensis</i>	Himalayan Vulture	C	WV	LC	2
2	Aegithalidae					
2	<i>Aegithalos concinnus</i>	Red-headed Tit	I	R	LC	3
3	Apodidae					
3	<i>Aerodramus brevirostris</i>	Himalayan Swiftlet	I	R	LC	1
4	Campephagidae					
4	<i>Pericrocotus speciosus</i>	Scarlet Minivet	I	R	LC	3
5	Certhiidae					
5	<i>Certhia familiaris mandellii</i>	Eurasian Treecreeper	I	R	LC	1
6	Cinclidae					
6	<i>Cinclus pallasii</i>	Brown Dipper	Aq	R	LC	2
7	Cuculidae					
7	<i>Hierococcyx sparveriioides</i>	Large Hawk-cuckoo	I	BV	LC	2
8	<i>Phaenicophaeus tristis</i>	Green-billed Malkoha	O	R	LC	2
8	Dicruridae					
9	<i>Dicrurus leucophaeus</i>	Ashy Drongo	O	WV	LC	2
10	<i>Dicrurus macrocercus</i>	Black Drongo	O	R	LC	2
9	Emberizidae					
11	<i>Emberiza lathami</i>	Crested Bunting	G	R	LC	2
10	Hirundinidae					
12	<i>Delichon nipalense</i>	Nepal House Martin	I	R	LC	2
11	Leiothrichidae					
13	<i>Heterophasia capistrata</i>	Rufous Sibia	O	R	LC	13
12	Motacillidae					
14	<i>Motacilla alba alboides</i>	White Wagtail	I	WV	LC	1
15	<i>Motacilla cinerea</i>	Grey Wagtail	I	WV	LC	1
13	Muscicapidae					
16	<i>Phoenicurus hodgsoni</i>	Daurian Redstart	I	R	LC	2
14	Paridae					
17	<i>Parus spilonotus</i>	Black-spotted Yellow Tit	I	R	LC	4
18	<i>Parus monticolus</i>	Green-backed Tit	I	R	LC	4
15	Stenostiridae					
19	<i>Chelidonyx hypoxantha</i>	Yellow-bellied Fantail	I	R	LC	3
20	<i>Culicicapa ceylonensis</i>	Grey-headed Canary-flycatcher	I	BV	LC	1

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16	Sylviidae					
21	<i>Phylloscopus affinis</i>	Tickell's Leaf-warbler	I	BV	LC	2
22	<i>Phylloscopus chloronotus</i>	Lemon-rumped Leaf Warbler	I	BV	LC	4
23	<i>Phylloscopus coronatus</i>	Eastern Crowned Warbler	I	WV	LC	1
24	<i>Phylloscopus inornatus</i>	Yellow-browed Leaf-warbler	I	WV	LC	2
25	<i>Phylloscopus maculipennis</i>	Grey-faced Leaf-warbler	I	R	LC	5
26	<i>Phylloscopus pulcher</i>	Orange-barred Leaf-warbler	I	WV	LC	5
27	<i>Phylloscopus reguloides</i>	Blyth's Leaf-warbler	I	WV	LC	4
28	<i>Phylloscopus trochiloides</i>	Greenish Warbler	I	WV	LC	4
29	<i>Phylloscopus xanthoschistos</i>	Grey-hooded Warbler	I	R	LC	1
17	Timaliidae					
30	<i>Trachalopteron erthrocephalum</i>	Red-headed Laughingthrush	I	R	LC	3
31	<i>Pteruthius flaviscapis</i>	White-browed Shrike-babbler	I	R	LC	4
32	<i>Yuhina gularis</i>	Stripe-throated Yuhina	O	R	LC	2
33	<i>Yuhina occipitalis</i>	Rufous-vented Yuhina	I	R	LC	4
18	Turdidae					
34	<i>Myophonus caeruleus</i>	Blue Whistling-thrush	I	R	LC	3
35	<i>Turdus bouboul</i>	Grey-winged Blackbird	I	R	LC	15

FS- Foraging Status, : Aq-Aquatic Feeder, C - Carnivores, G - Granivore, I - Insectivore, O - Omnivore, MS - Migratory Status - BV - Breeding Visitor, R - Resident, WV - Winter Visitor; CS - Conservation status - IUCN Red List and WPA - 1972 Schedule: LC - Least Concern

Appendix II.3.210: Check list and ecological status of bird species recorded in the proposed Jaswantgarh Stage-I HEP area

Sl. No.	Family and species	Common name	FS	MS	CS	PM	M	W	Overall
1	Campephagidae								
1	<i>Pericrocotus ethologus</i>	Long-tailed Minivet	I	BV	LC	0	0	2	2
2	Cisticolidae								
2	<i>Prinia crinigera</i>	Striated Prinia	I	R	LC	14	0	0	14
3	Columbidae								
3	<i>Streptopelia orientalis</i>	Oriental Turtle-dove	G	WV	LC	6	21	0	27
4	Corvidae								
4	<i>Dendrocitta formosae</i>	Grey Treepie	O	R	LC	0	1	2	3
5	<i>Corvus culminatus</i>	Large-billed Crow	O	R	LC	8	0	0	8
6	<i>Nucifraga caryocatactes</i>	Spotted Nutcracker	Nu	R	LC	0	8	6	14
7	<i>Urocissa flavirostris</i>	Yellow-bellied Blue Magpie	C	R	LC	0	3	0	3
5	Cuculidae								
8	<i>Hierococcyx sparverioides</i>	Large Hawk-cuckoo	I	BV	LC	3	1	0	4
6	Dicaeidae								
9	<i>Dicaeum ignipectus</i>	Fire-breasted Flowerpecker	N	R	LC	8	2	0	10
7	Dicruridae								
10	<i>Dicrurus leucophaeus</i>	Ashy Drongo	O	WV	LC	3	0	0	3
11	<i>Dicrurus macrocercus</i>	Black Drongo	O	R	LC	8	0	0	8
8	Fringillidae								
12	<i>Carpodacus davidianus</i>	Chinese Beautiful Rosefinch	G	WV	LC	0	2	0	2
13	<i>Carpodacus nepalensis</i>	Dark-breasted Rosefinch	G	R	LC	0	13	10	23
14	<i>Carpodacus edwardsii</i>	Dark-rumped Rosefinch	G	R	LC	0	4	0	4
15	<i>Carduelis spinoides</i>	Himalayan Greenfinch	G	WV	LC	0	50	0	50
9	Halcyonidae								
16	<i>Halcyon smyrnensis</i>	White-throated Kingfisher	P	R	LC	1	0	0	1
10	Leiothrichidae								
17	<i>Heterophasia capistrata</i>	Rufous Sibia	O	R	LC	8	7	4	19
11	Megalaimidae								

Appendices

Sl. No.	Family and species	Common name	FS	MS	CS	PM	M	W	Overall
18	<i>Megalaima virens</i>	Great Barbet	F	R	LC	3	0	0	3
12	Motacillidae								
19	<i>Motacilla cinerea</i>	Grey Wagtail	I	WV	LC	0	2	0	2
20	<i>Anthus hodgsoni hodgsoni</i>	Olive-backed Pipit	I	R	LC	0	25	0	25
13	Muscicapidae								
21	<i>Phoenicurus frontalis</i>	Blue-fronted Redstart	I	BV	LC	0	1	1	2
22	<i>Saxicola torquatus indicus</i>	Common Stonechat	I	BV	LC	0	2	0	2
23	<i>Saxicola ferreus</i>	Grey Bushchat	I	R	LC	0	2	0	2
24	<i>Phoenicurus hodgsoni</i>	Hodgson's Redstart	I	WV	LC	0	0	3	3
25	<i>Ficedula strophliata</i>	Orange-gorgeted Flycatcher	I	R	LC	0	3	0	3
26	<i>Rhyacornis fuliginosa</i>	Plumbeous Water-redstart	I	R	LC	14	0	0	14
27	<i>Ficedula hodgsonii</i>	Slaty-backed Flycatcher	I	WV	LC	0	2	0	2
28	<i>Eumyias thalassinus</i>	Verditer Flycatcher	I	BV	LC	7	0	0	7
29	<i>Chaimarrornis leucocephalus</i>	White-capped River-chat	I	R	LC	0	6	1	7
30	<i>Phoenicurus schisticeps</i>	White-throated Redstart	I	R	LC	0	1	0	1
14	Nectariniidae								
31	<i>Aethopyga saturata</i>	Black-breasted Sunbird	N	R	LC	2	0	0	2
32	<i>Aethopyga ignicauda</i>	Fire-tailed Sunbird	N	R	LC	0	2	1	3
33	<i>Aethopyga nipalensis</i>	Green-tailed Sunbird	N	R	LC	2	2	0	4
15	Paradoxornithidae								
34	<i>Paradoxornis nipalensis</i>	Black-throated Parrotbill	G	R	LC	0	0	21	21
16	Paridae								
35	<i>Parus ater</i>	Coal Tit	I	R	LC	0	0	2	2
36	<i>Parus monticolus</i>	Green-backed Tit	I	R	LC	0	6	2	8
17	Passeridae								
37	<i>Passer rutilans</i>	Cinnamon Sparrow	G	R	LC	8	0	0	8
18	Prunellidae								
38	<i>Prunella collaris</i>	Alpine Accentor	I	WV	LC	0	0	2	2
19	Pycnonotidae								
39	<i>Hypsipetes leucocephalus</i>	Himalayan Black Bulbul	O	R	LC	22	3	0	25
40	<i>Pycnonotus cafer</i>	Red-vented Bulbul	O	R	LC	0	8	0	8
20	Stenostiridae								
41	<i>Culicicapa ceylonensis</i>	Grey-headed Canary-flycatcher	I	BV	LC	0	1	0	1
21	Sylviidae								
42	<i>Phylloscopus reguloides</i>	Blyth's Leaf-Warbler	I	WV	LC	2	3	0	5
43	<i>Phylloscopus pulcher</i>	Buff-barred Warbler	I	BV	LC	0	2	0	2
44	<i>Phylloscopus coronatus</i>	Eastern Crowned Warbler	I	WV	LC	5	0	0	5
45	<i>Seicercus burkii</i>	Green-crowned Warbler	I	BV	LC	0	6	0	6
46	<i>Phylloscopus trochiloides</i>	Greenish Warbler	I	WV	LC	0	13	0	13
47	<i>Phylloscopus maculipennis</i>	Grey-faced Leaf-warbler	I	R	LC	0	5	0	5
48	<i>Phylloscopus xanthoschistos</i>	Grey-hooded Warbler	I	R	LC	0	3	0	3
49	<i>Cettia brunnifrons</i>	Grey-sided Bush-Warbler	I	BV	LC	4	1	0	5
50	<i>Cettia brunnescens</i>	Hume's Bush-warbler	I	R	LC	0	1	0	1
51	<i>Phylloscopus chloronotus</i>	Lemon-rumped Leaf Warbler	I	BV	LC	0	12	0	12
52	<i>Cettia fortipes</i>	Strong-footed Bush-warbler	I	R	LC	0	3	0	3
22	Timaliidae								
53	<i>Minla strigula</i>	Bar-throated Minla	I	R	LC	0	20	0	20
54	<i>Trochalopteron imbricatum</i>	Bhutan Laughingthrush	I	R	LC	0	0	10	10
55	<i>Trochalopteron squamatum</i>	Blue-winged Laughingthrush	I	R	LC	0	9	0	9
56	<i>Dryonastes caerulatus</i>	Grey-sided Laughingthrush	I	R	LC	0	3	0	3
57	<i>Stachyris nigriceps</i>	Grey-throated Babbler	I	R	LC	0	0	7	7
58	<i>Alcippe nipalensis</i>	Nepal Fulvetta	I	R	LC	0	9	0	9
59	<i>Leiothrix lutea</i>	Red-billed Leiothrix	O	R	LC	0	12	0	12
60	<i>Trachalopteron erthrocephalum</i>	Red-headed Laughingthrush	I	R	LC	0	12	5	17
61	<i>Minla ignotincta</i>	Red-tailed Minla	I	R	LC	0	10	0	10
62	<i>Yuhina occipitalis</i>	Rufous-vented Yuhina	I	R	LC	0	6	12	18
63	<i>Lanthocincla ocellata</i>	Spotted Laughingthrush	I	R	LC	0	2	0	2

Appendices

Sl. No.	Family and species	Common name	FS	MS	CS	PM	M	W	Overall
64	<i>Pomatorhinus ruficollis</i>	Streak-breasted Scimitar-babbler	I	R	LC	0	0	2	2
65	<i>Grammatoptila striatus</i>	Striated Laughingthrush	I	R	LC	5	0	0	5
66	<i>Yuhina gularis</i>	Stripe-throated Yuhina	O	R	LC	0	12	0	12
67	<i>Yuhina flavicollis</i>	Whiskered Yuhina	I	R	LC	0	13	10	23
68	<i>Pteruthius flaviscapris</i>	White-browed Shrike-babbler	I	R	LC	0	2	0	2
23	Troglodytidae								
69	<i>Troglodytes troglodytes</i>	Winter Wren	I	R	LC	1	0	0	1
24	Turdidae								
70	<i>Myophonus caeruleus</i>	Blue Whistling-thrush	I	R	LC	9	11	2	22
71	<i>Zoothera dixonii</i>	Long-tailed Thrush	I	BV	LC	0	1	1	2
72	<i>Turdus albocinctus</i>	White-collared Blackbird	I	R	LC	0	1	3	4
25	Zosteropidae								
73	<i>Zosterops palpebrosus</i>	Oriental White-eye	I	R	LC	0	4	0	4

FS : Aq–Aquatic Feeder, C–Carnivores, F–Frugivore, G–Granivore, I–Insectivore, N–Nectarivore, Nc–Nucivore, O–Omnivore, P–Piscivore; MS–Migratory Status–BV–Breeding Visitor, IR–Isolated Record, R–Resident, WV–Winter Visitor; CS–Conservation status–IUCN Red List and WPA–1972 Schedule: VU–Vulnerable, LC–Least Concern; PM–Post monsoon, M–Monsoon, W–Winter, HEP–Hydroelectric project

Appendix II.3.211: List of possible mammalian fauna of the Tawang region and contribution of species reported in the Jaswantgarh Stage-I HEP area

Sl. No.	Common name	Scientific name	SPA	Conservation status	
				IUCN	IWPA
	Primates				
1	Arunachal macaque	<i>Macaca munzala</i>	*	EN	–
2	Assamese macaque	<i>M. assamensis</i>		NT	II
3	Capped langur	<i>Trachypithecus pileatus</i>		VU	I
4	Slow loris	<i>Nycticebus coucang</i>		VU	I
	Ungulates				
5	Barking deer	<i>Muntiacus muntjak</i>		LC	III
6	Bharal	<i>Pseudois nayaur</i>		LC	I
7	Chinese goral	<i>Nemorhaedus caudatus</i>		VU	III
8	Himalayan goral	<i>N. goral</i>		NT	III
9	Musk deer	<i>Moschus</i> sp.		EN	–
10	Sambar	<i>Cervus unicolor</i>		VU	III
11	Serow	<i>N. sumatraensis</i>			
12	Wild pig	<i>Sus scrofa</i>	*	LC	III
	Carnivores				
13	Common leopard	<i>Panthera pardus</i>		NT	I
14	Jungle Cat	<i>Felis Chaus</i>	*	LC	II
15	Dhole	<i>Cuon alpinus</i>		EN	II
16	Himalayan black bear	<i>Ursus thibetanus</i>		VU	II
17	Himalayan palm civet	<i>Paguma larvata</i>		LC	II
18	Leopard cat	<i>Prionailurus bengalensis</i>		LC	–
19	Otter	<i>Lutra</i> sp.		VU	–
20	Red panda	<i>Ailurus fulgens</i>		VU	I
21	Snow leopard	<i>Uncia uncia</i>		EN	I
22	Yellow-throated marten	<i>Martes flavigula</i>		LC	II
	Rodents				
23	Hairy-footed flying squirrel	<i>Belomys pearsonii</i>		DD	II
24	Himalayan marmot	<i>Marmota himalayana</i>		LC	II
25	Himalayan striped squirrel	<i>Tamias maclellandi</i>		LC	–
26	Orange-bellied Himalayan squirrel	<i>Dremomys lokriah</i>		LC	–
	*Hoary-bellied Himalayan Squirrel	<i>Callosciurus pygerythrus</i>	*	LC	–
27	Porcupine	<i>Hystrix</i> sp.		LC	IV
	*Chesnut rat	<i>Niviventer flavesces</i>		LC	V
	Lagomorphs				
28	Large-eared pika	<i>Ochotona macrotis</i>		LC	–

Appendices

Sl. No.	Common name	Scientific name	SPA	Conservation status	
29	Moupin pika	<i>Ochotona thibetana</i>		LC	–
	29 species		4 species R% 13.79		

Data Source: 1–Mishra *et al* 2006, SPA–Species of the Project Area,* additional species reported during the study, HEP–Hydroelectric project

Appendix II.3.212: Status of birds at Jaswantgarh Stage–I barrage and powerhouse site

Sl. No.	Family/Genus/Species	Common name	FS	MS	CS	No of birds reported
1	Aegithalidae					
1	<i>Aegithalos concinnus</i>	Red–headed Tit	I	R	LC	3
2	Campephagidae					
2	<i>Pericrocotus speciosus</i>	Scarlet Minivet	I	R	LC	3
3	Certhiidae					
3	<i>Certhia familiaris mandellii</i>	Eurasian Treecreeper	I	R	LC	1
4	Columbidae					
4	<i>Streptopelia orientalis</i>	Oriental Turtle–dove	G	WV	LC	2
5	Corvidae					
5	<i>Corvus culminatus</i>	Large–billed Crow	O	R	LC	2
6	Cuculidae					
6	<i>Hierococcyx sparveroides</i>	Large Hawk–cuckoo	I	BV	LC	1
7	Dicaeidae					
7	<i>Dicaeum ignipectus</i>	Fire–breasted Flowerpecker	N	R	LC	2
8	Dicruridae					
8	<i>Dicrurus leucophaeus</i>	Ashy Drongo	O	WV	LC	2
9	<i>Dicrurus macrocerus</i>	Black Drongo	O	R	LC	2
9	Leiothrichidae					
10	<i>Heterophasia capistrata</i>	Rufous Sibia	O	R	LC	16
10	Megalaimidae					
11	<i>Megalaima virens</i>	Great Barbet	F	R	LC	1
11	Motacillidae					
12	<i>Motacilla alba alboides</i>	White Wagtail	I	WV	LC	1
13	<i>Motacilla cinerea</i>	Grey Wagtail	I	WV	LC	1
12	Nectariniidae					
14	<i>Aethopyga nipalensis</i>	Green–tailed Sunbird	N	R	LC	2
13	Paridae					
15	<i>Parus monticolus</i>	Green–backed Tit	I	R	LC	4
14	Passeridae					
16	<i>Passer rutilans</i>	Cinnamon Sparrow	G	R	LC	2
15	Pycnonotidae					
17	<i>Hypsipetes leucocephalus</i>	Himalayan Black Bulbul	O	R	LC	15
16	Stenostiridae					
18	<i>Chelidorhynch hypoxantha</i>	Yellow–bellied Fantail	I	R	LC	3
19	<i>Culicicapa ceylonensis</i>	Grey–headed Canary–flycatcher	I	BV	LC	1
17	Sylviidae					
20	<i>Cettia brunnifrons</i>	Grey–sided Bush–warbler	I	BV	LC	2
21	<i>Phylloscopus affinis</i>	Tickell's Leaf–warbler	I	BV	LC	2
22	<i>Phylloscopus chloronotus</i>	Lemon–rumped Leaf Warbler	I	BV	LC	4
23	<i>Phylloscopus coronatus</i>	Eastern Crowned Warbler	I	WV	LC	2
24	<i>Phylloscopus inornatus</i>	Yellow–browed Leaf–warbler	I	WV	LC	2
25	<i>Phylloscopus maculipennis</i>	Grey–faced Leaf–warbler	I	R	LC	3
26	<i>Phylloscopus pulcher</i>	Orange–barred Leaf–warbler	I	WV	LC	5
27	<i>Phylloscopus reguloides</i>	Blyth's Leaf–warbler	I	WV	LC	5
28	<i>Phylloscopus trochiloides</i>	Greenish Warbler	I	WV	LC	4
29	<i>Phylloscopus xanthoschistos</i>	Grey–hooded Warbler	I	R	LC	1
18	Timaliidae					
30	<i>Pomatorhinus hypoleucos</i>	Large Scimitar–babbler	I	R	LC	2
31	<i>Pteruthius flaviscapis</i>	White–browed Shrike–babbler	I	R	LC	4
32	<i>Yuhina gularis</i>	Stripe–throated Yuhina	O	R	LC	2

Appendices

Sl. No.	Family/Genus/Species	Common name	FS	MS	CS	No of birds reported
33	<i>Yuhina occipitalis</i>	Rufous-vented Yuhina	I	R	LC	4
19	Turdidae					
34	<i>Myophonus caeruleus</i>	Blue Whistling-thrush	I	R	LC	6

G–Granivore, I–Insectivore, N–Nectarivore, O–Omnivore, MS–Migratory Status–BV–Breeding Visitor, R–Resident, WV–Winter Visitor; CS–Conservation status–IUCN Red List and WPA–1972 Schedule: LC–Least Concern; HEP–Hydroelectric project

Appendix VI. 5.1: Suggested activity phasing (indicative only): (A) Tawang River Basin Development Plan (R&R/TRBDP), and (B) Environment, forests and biodiversity management plans in Tawang River Basin

Activities/Components	PCP	CONSTRUCTION PHASE					OPERATION PHASE				
	TIME FRAME (Years)										
	1	2	3	4	5	6	7	8	9	10	upto 20
A. TAWAND RIVER BASIN DECELOPMENT PLAN (R&R/TRBDP)											
Rehabilitation grant (Compensation and Compensation towards customary rights of land)											
Grant for community welfare centres											
School infrastructure development and merit scholarship scheme											
Health											
Road construction and network expansion scheme											
Power connection and tariff subsidies											
Water supply & irrigation schemes											
Land compensation and Agriculture development package											
Animal husbandry											
Horticultural development scheme											
Grant for Craft Centre and skill development scheme											
Tourism Grant											
Livelihood enhancement and income generation scheme, employment generation											
Subsistence grant											
Monitoring											

Activities/Components	PCP	CONSTRUCTION PHASE					OPERATION PHASE				
	TIME FRAME (Years)										
	1	2	3	4	5	6	7	8	9	10	upto 20
B. ENVIRONMENT, FOREST & BIODIVERSITY MANAGEMENT PLANS											
Public Awareness Programme											
*Catchment Area Treatment Plan											
*Muck management /Disposal Plan											
*Sanitation and Solid Waste Management Plan/ Waste management											
*Water Air quality & Noise Environment Management./ water pollution control plans											
*Environmental Management in labour camp											
* Environmental management in road construction											
*Control of Pollution from Labour Camps											
*Reservoir Rim Treatment &Soil Erosion											
* Control and Maintenance of Air & Water Quality and Noise Level.											
*Compensatory Afforestation Plan											
Forest Protection Plan											
Creation of Greenbelt											
Creation and maintenance of Alternate Habitat for Avifauna											
Management of aquatic ecology and provision of Fish Ladder											
Creation/upgradation of existing hatchery											
*Monitoring Plan/ Environment Monitoring Program & Studies											

* To be carried out during HEP project construction phase at construction sites (Quarries/workers camp/project sites etc.); PCP=Pre-construction phase

Colour code :



Compensation



Creation/Activity/implementation duration



One time grant/ activity



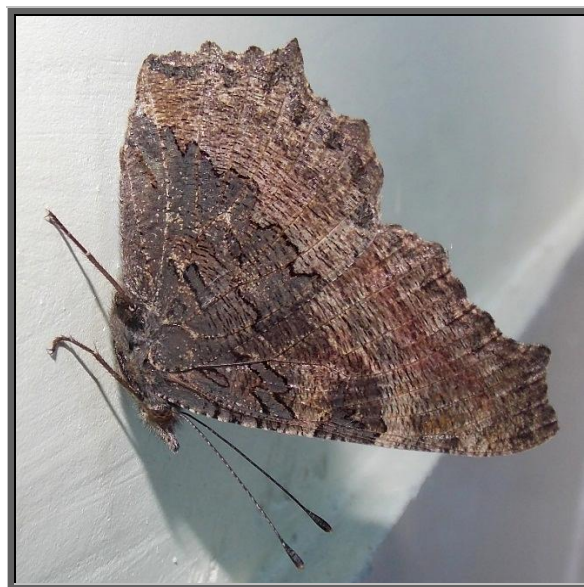
Maintenance duration

PHOTOPLATES

PLATE-1: BUTTERFLY SPECIES



Common Bluebottle (*Graphium sarpedon sarpedon*)



Indian Tortoiseshell (*Aglaia kaschmirensis*)



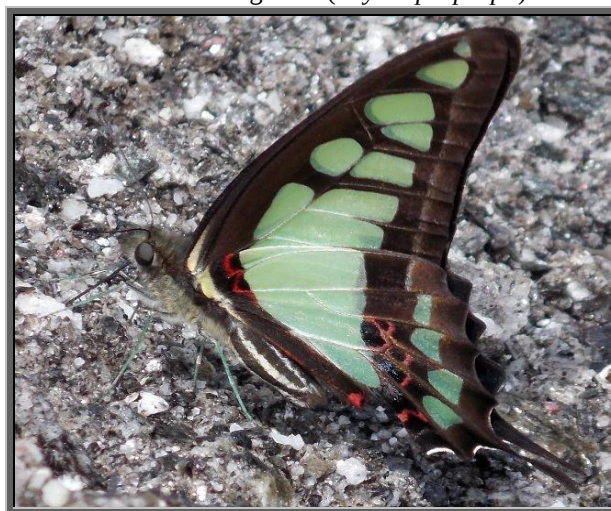
Common Flash (*Rapala nissa*)



Common Hedgeblue (*Acyrtolopis puspa*)



Eastern Comma (*Polygonia c-album agnicula*)



Glassy Tiger (*Graphium cloanthus*)



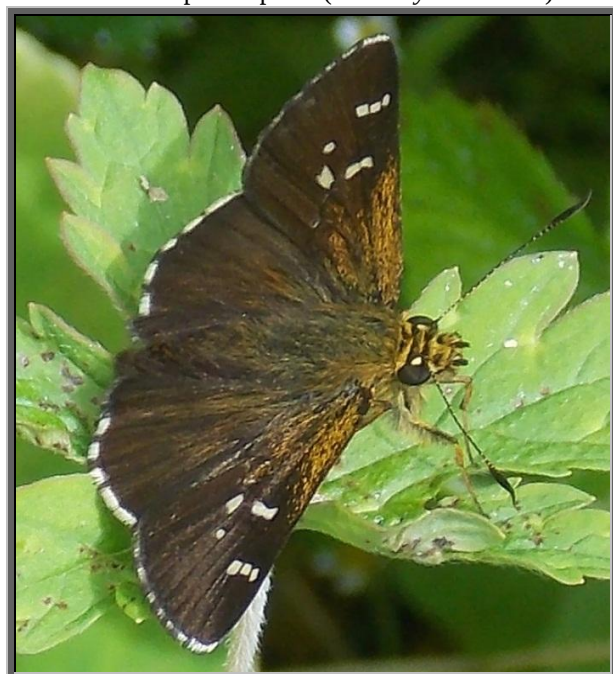
Green Sapphire (*Heliophorus moorei*)



Indian Purple Emperor (*Mimathyma ambica*)



Large Hedgeblue (*Celastrina hugelioreana*)



Lucas' Ace (*Sovia lucasii magna*)



Large Silverstripe (*Argynnis childreni*)



Lucas Ace (*Sovia lucasii magna*)



Spotted Sawtooth (*Prioneris thestylis thestylis*)



Peablue (*Lampides boeticus*)



Scarce Woodbrown (*Lethe sidereal*)

PLATE-2: BIRD SPECIES



Blue-headed Rock-thrush



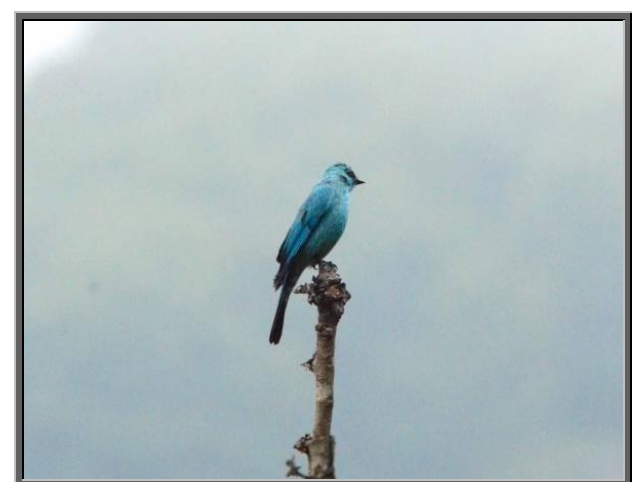
Rufous Sibia



Green-backed Tit



Oriental White-eye



Verditer Flycatcher



Large-hawk Cuckoo



Jungle Prinia



White Wagtail



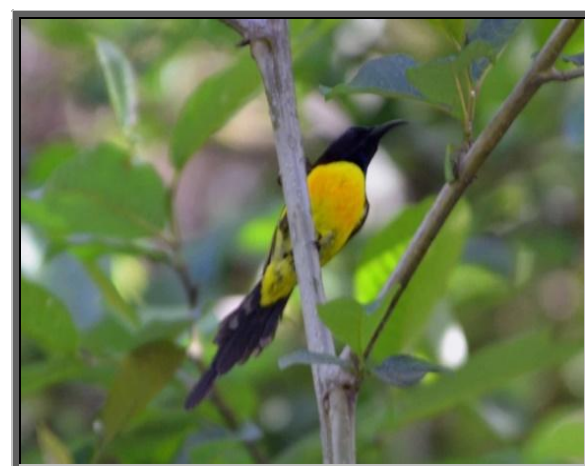
White-collared Blackbird



Himalayan Black Bulbul



Fire-breasted Flowerpecker



Green-tailed Sunbird



Wedge-tailed Green-pigeon



Oriental Turtle-dove



Eurasian Tree Sparrow



Cinnamon Sparrow

PLATE-3: DIRECT AND INDIRECT EVIDENCES OF MAMMALS



Capped Langur



Arunachal Macaque



Goral



Goral Pallet



Dropping of Asiatic Black Bear



Tracks of Himalayan Palm Civet



Tracks of Wild Pig



Leopard Scat and Goral Pallet

PLATE-4: FISH FAUNA



Schizothorax richardsonii, (Gray, 1832)
Common snow trout



Schizothorax progastus (McClelland, 1839)
Dinnawah snowtrout



Salmo trutta fario (Linnaeus 1758) Brown trout



Botia rostrata (Günther, 1868)



Syncrossus berdmorei (Blyth, 1860)



Mystus vitatus (Bloch, 1794)



Exostoma berdmorei (Blyth, 1860)



Gagata cenia (Hamilton, 1822)

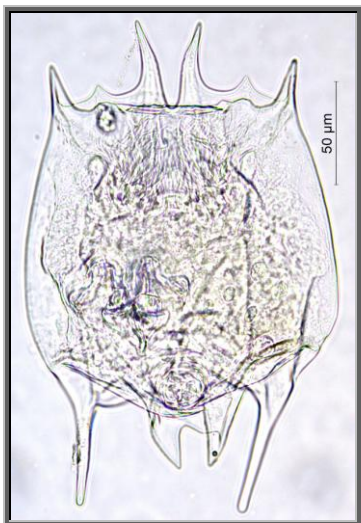


Amblyceps mangois (Hamilton, 1822)



Erethistoides Montana (Hora, 1950)

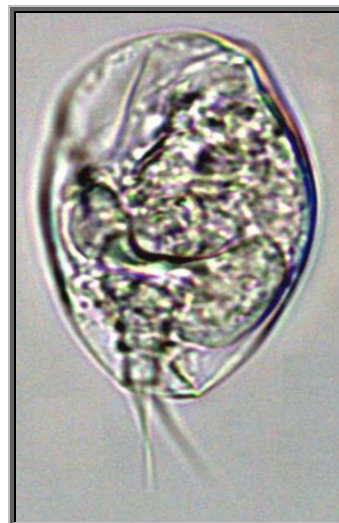
**PLATE-5: SPECIES BELONGING TO PHYLUM ROTIFERA AT DIFFERENT HEP
SITES OF TAWANG RIVER BASIN**



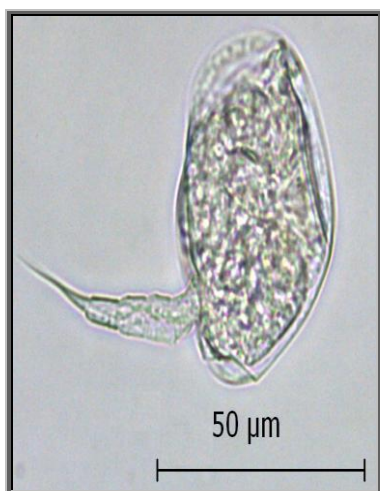
Brachionus quadridentatus



Cephalodella gibba



Colurella obtusa



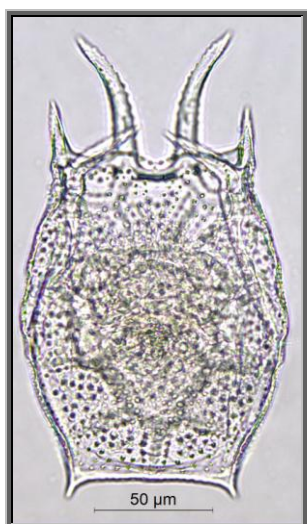
Colurella sulcata



Epiphanes brachionus spinosa



Euchlanis dilatata



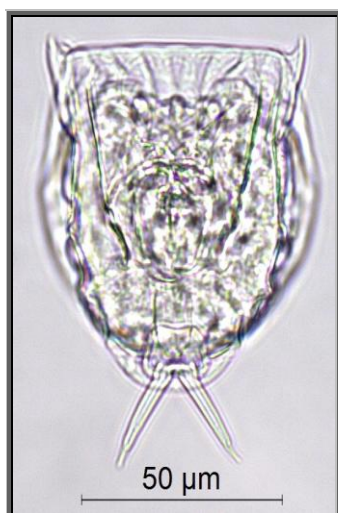
Keratella serrulata



Lecane bulla



Lecane clostercerca



Lecane flexilis



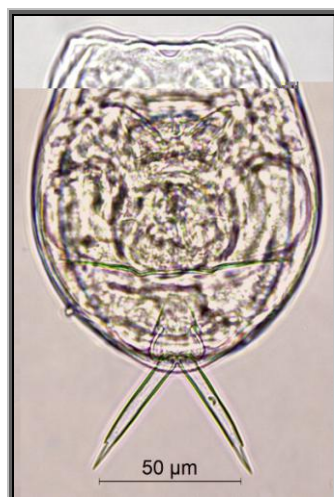
Lecane leontina



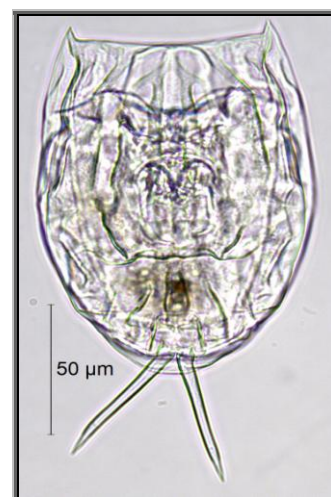
Lecane luna



Lecane lunaris



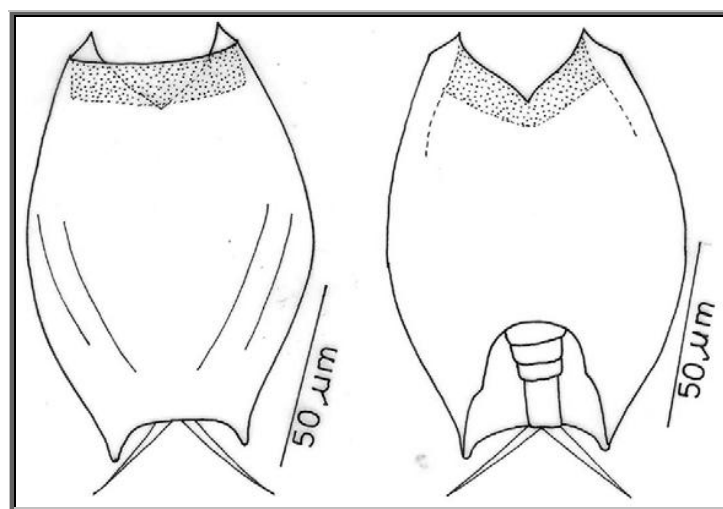
Lecane papuana



Lecane signifera



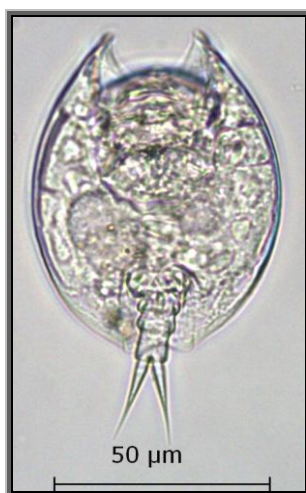
Lepadella acuminata



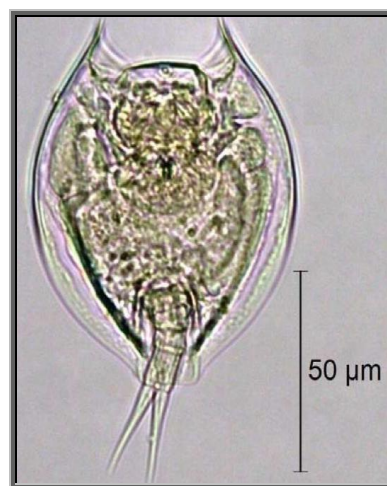
Lepadella nartiangensis



Lepadella ovalis



Lepadella patella



Lepadella quadricarinata



Lepadella vandenbrandei



Mytilina ventralis



Notholca squamula



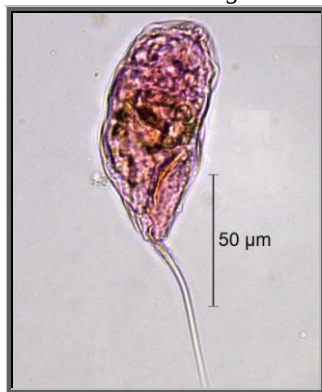
Testudinella emarginula



Testudinella patina



Trichocerca bidens

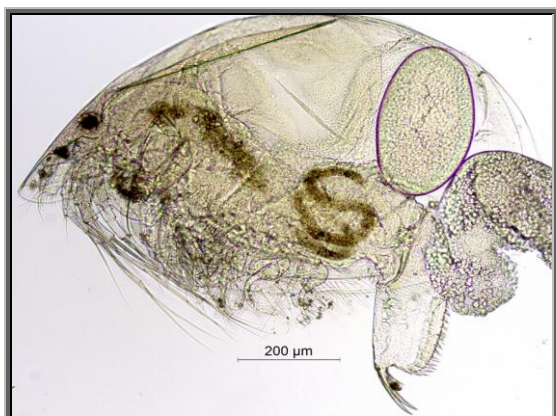


Trichocerca pusilla

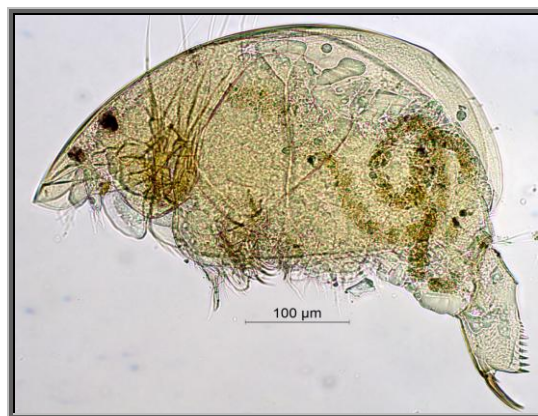


Trichocerca weberi

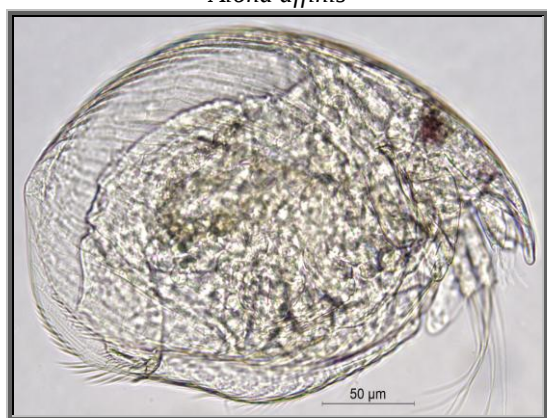
**PLATE-6: SPECIES BELONGING TO ORDER CLADOCERA AT DIFFERENT HEP
SITES OF TAWANG RIVER BASIN**



Alona affinis



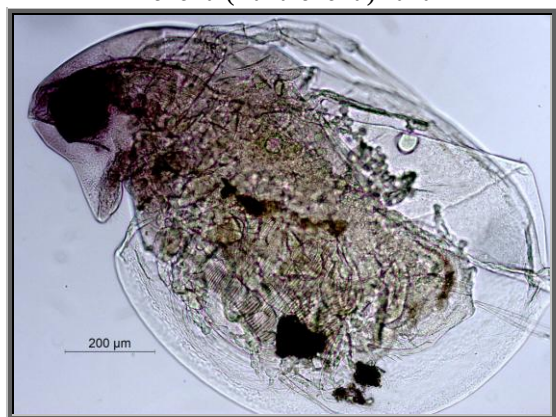
Alona cheni



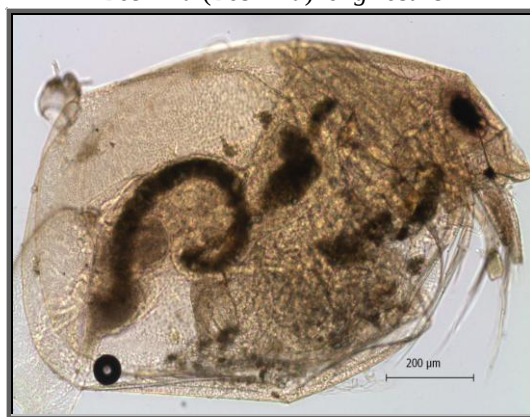
Alonella (Nanalonella) nana



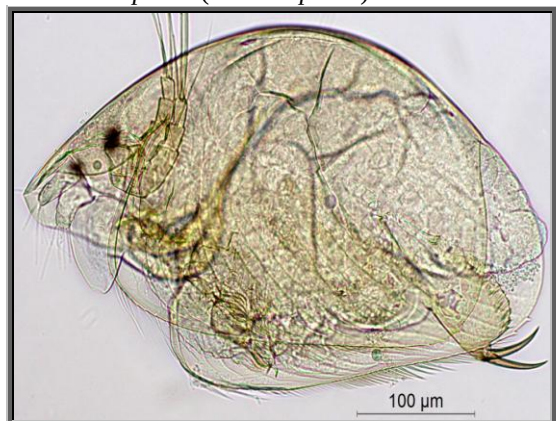
Bosmina (Bosmina) longirostris



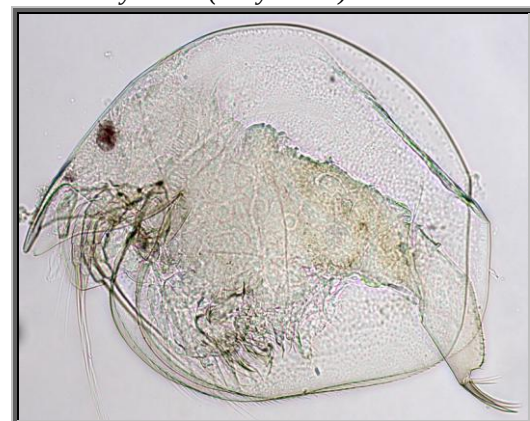
Daphnia (Ctenodaphnia) tibetana



Eurycerus (Eurycerus) lamellatus



Karualona karua



Leberis diaphanus

PLATE-7: CAMERA TRAP PHOTOS OF ANIMALS OBTAINED DURING THE STUDY AT DIFFERENT HEP SITES



Himalayan Goral



Barking Deer



Arunachal Macaque



Himalayan Crestless Porcupine



Himalayan Black Bear



Himalayan Serow



Golden cat



Serow



Wild Pig



Picture: Sighting of Black-necked crane in Pangchen Valley in December 2013 (WWF India)

PLATE-8: FUNGI COLLECTED FROM DIFFERENT HEP AREAS OF TAWANG RIVER BASIN



Auricularia auricular



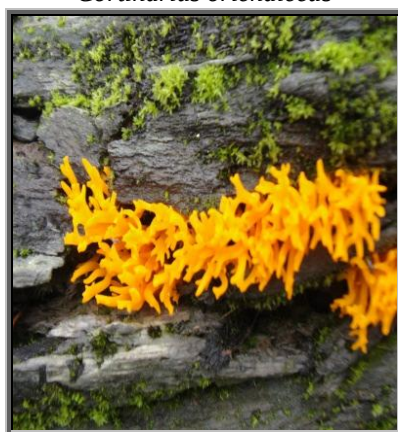
Cheilymenia sp



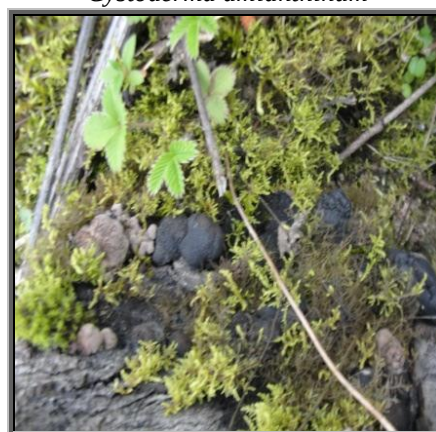
Cortinarius orichalceus



Cystoderma amianthinum



Dacryopinax spathularia



Daldinia concentrica



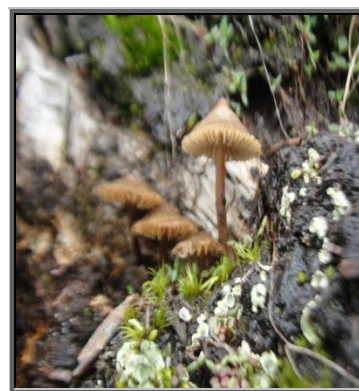
Favolus alveolaris



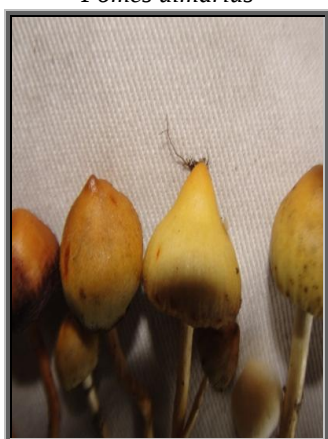
Fomes fomentarius



Fomes ulmarius



Hygrocybe conica



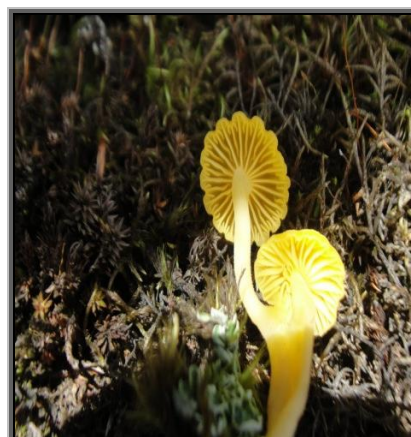
Inocybe sp.



Laccaria laccata



Nectria cinnabavina coral spot fungus



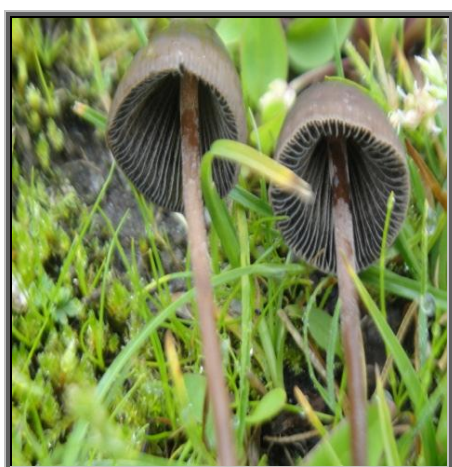
Omphalina chromacea



Omphalina chrysophylla



Oudemansiella mucida



Panaeolina foenisecii



Panaeolus subbalteatus



Tremella mesenterica



Pleurotus ostreatus



Poria eupora



Russula persanguinea



Schizophyllum commune



Stereum ostrea



Stereum princeps



Suillus granulata



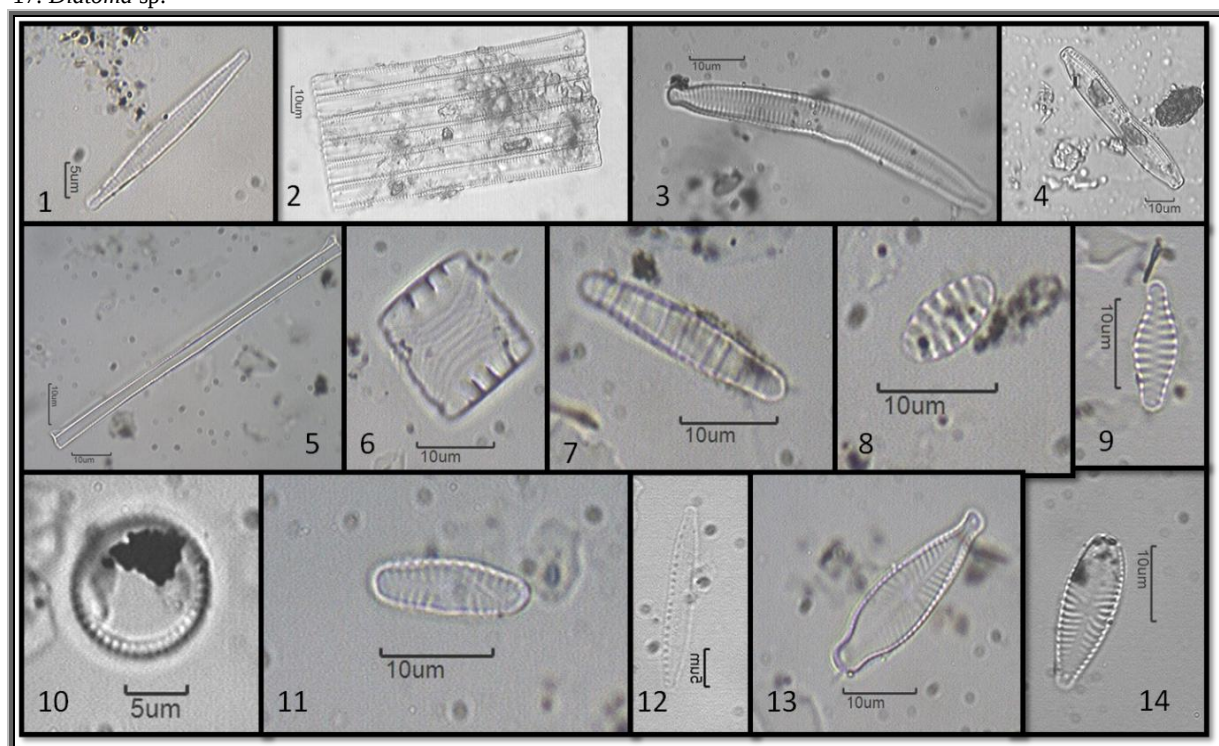
Trametes zonata

PLATE-9: PERIPHYTON SPECIES



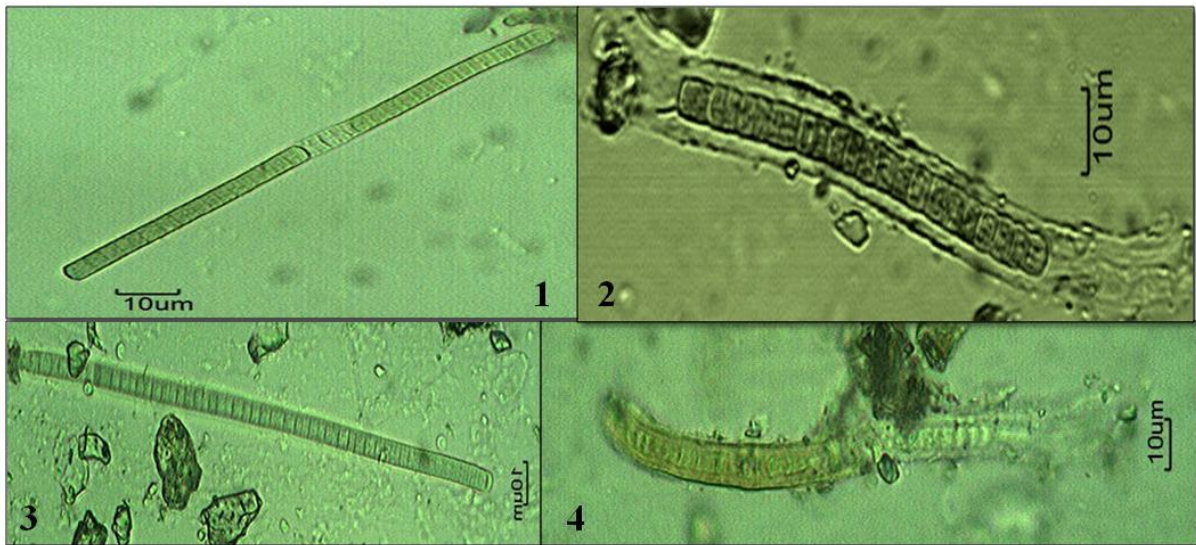
BACILLARIOPHYCEAE FAMILY

- | | | | |
|-------------------------------|----------------------------------|------------------------------------|-----------------------------------|
| 1. <i>Rhoicosphaenia</i> sp. | 2. <i>Acanthidium pyrenaicum</i> | 3. <i>Achnantheridium rivulare</i> | 4. <i>Achnanthes biporoma</i> |
| 5. <i>Achnantheridium</i> sp. | 6. <i>Amphora</i> sp. | 7. <i>Encyonema prostratum</i> | 8. <i>Encyonema minutum</i> |
| 9. <i>Cocconeis</i> | 10. <i>Caloneis ventricosa</i> | 11. <i>Cymbella affinis</i> | 12. <i>Cymbella delicatula</i> |
| 13. <i>Cymbella ermine</i> | 14. <i>Cymbella tumida</i> | 15. <i>Cocconeis placentula</i> | 16. <i>Didymosphenia erminate</i> |
| 17. <i>Diatoma</i> sp. | | | |



BACILLARIOPHYCEAE FAMILY

- | | | | |
|------------------------------------|---------------------------------|---|-----------------------------------|
| 1. <i>Fragillaria vaucheriae</i> | 2. <i>Fragillaria bicep</i> | 3. <i>Eunotia bilunaris</i> | 4. <i>Hantzschia amphioxys</i> |
| 5. <i>Synedra ulna</i> | 6. <i>Hydrosera</i> sp. | 7. <i>Meridion circulare</i> | 8. <i>Opephora</i> sp. |
| 9. <i>Pseudostaurosira</i> sp. | 10. <i>Thalassiosira</i> sp. | 11. <i>Planothidium frequentissimum</i> | 12. <i>Nitzschia palea</i> |
| 13. <i>Gomphonema olivaceoides</i> | 14. <i>Gomphonema olivaceum</i> | 15. <i>Cocconeis placentula</i> | 16. <i>Didymosphenia erminate</i> |
| 17. <i>Diatoma</i> sp. | | | |



CYANOPHYCEAE FAMILY

1. *Phormidium* sp.

2. *Lyngbya* sp.

3. *Oscillatoria* sp.

4. *Calothrix* sp.

PLATE-10: THREATENED AND ENDEMIC PLANT SPECIES



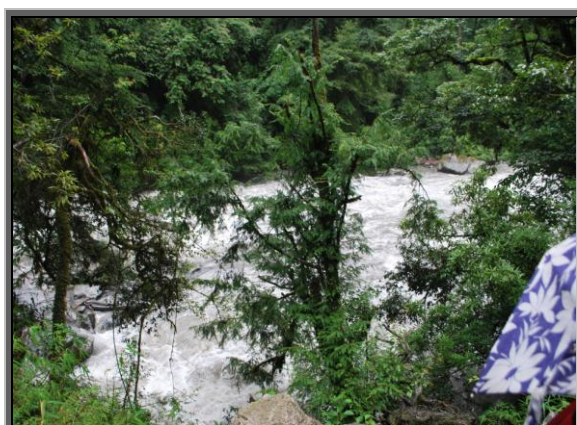
Acer hookeri



Acer sikkimensis



Panax bipinnatifidus



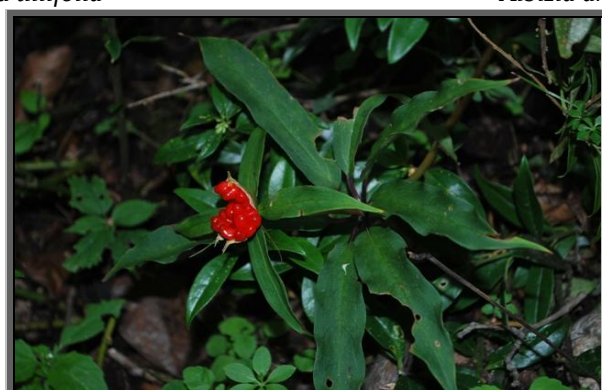
Taxus wallichiana



Toricillia tiliifolia



Albizia arunachalensis



Paris polyphylla

PLATE-11: NON-TIMBER FOREST PRODUCTS



Edible algae



Cordyceps sinensis

PLATE-12: FEW PLANT SPECIES OF TAWANG RIVER BASIN



Oberonia sp.



Pteris sp.



Daphne papyracea



Calanthe tricarinata



Polypodium sp.



Clethra delavayi



Delphinium sp.



Aristolochia griffithii



Satyrium nepalense



Actinidia callosa



Dyopteris wallichiana



Aconitum elwesii



Rubus nubicola



Colquhounia coccinea



Ardisia crenata



Benthamia capitata



Bergenia ciliata



Botrychium sp



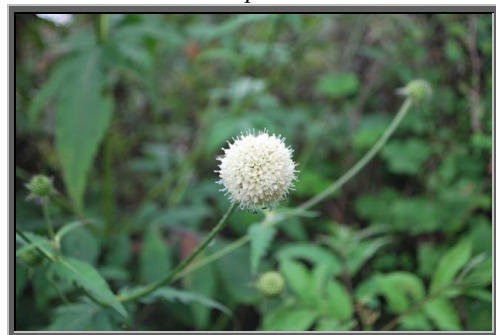
Butea buteiformis



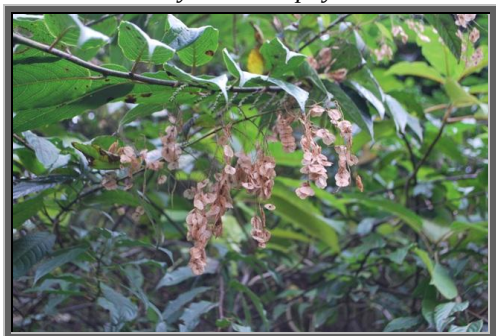
Celastrus paniculatus



Corylus heterophylla



Dipsacus asper



Dobinea vulgaris



Erythrina arborescens



Euphorbia sikkimensis



Verbascum thapsus



Halenia elliptica



Hedera nepalensis



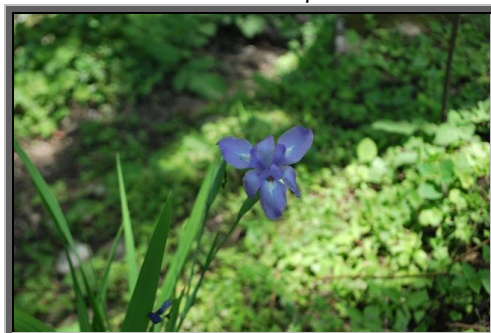
Herpetospermum pedunculatum



Holboellia latifolia



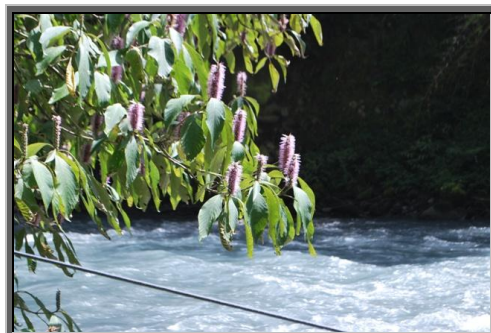
Hymenopogon parasiticus



Iris lactea



Larix griffithii



Leucosceptrum canum



Maesa indica



Codonopsis gracilis



Photinia integrifolia



Ophiopogon intermedius



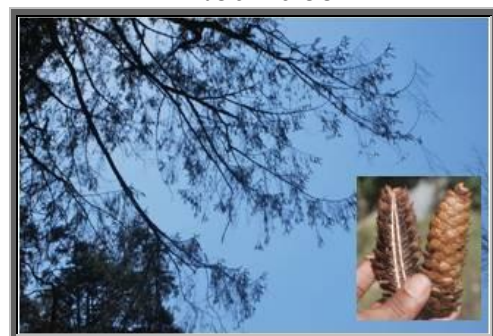
Valeriana hardwickii



Rhus chinensis



Parochetus communis



Picea spinulosa



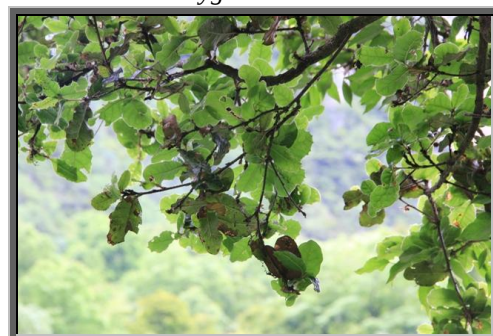
Piptanthus nepalensis



Polygala arillata



Prunella vulgaris



Quercus semecarpifolia



Rhododendron arboreum



Thladiantha cordifolia



Clematis montana



Anemone sp.

PLATE-13: TRADITIONAL HANDICRAFTS OF MONPA TRIBE IN TAWANG



Traditional crafts



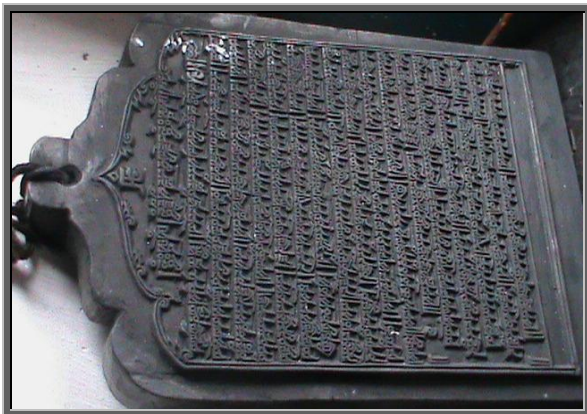
Wooden plunger/butter churner



A collection of traditional masks



Monpa artisan with traditional clay pot



Traditional clay inscription



Locally made religious items



A Monpa weaving traditional craft



Traditional pig feeder

**PLATE-14: INTERACTIONS WITH THE VILLAGERS, VILLAGE COUNCILS
AND ZILLA PARISHAD OF TAWANG**



Mirba village



Seru village



Seru village



Seru village



Shyaro village



Yusum village



Yusum village



Interactions with Zilla Parishad Chairman



Khet village



Bomba village



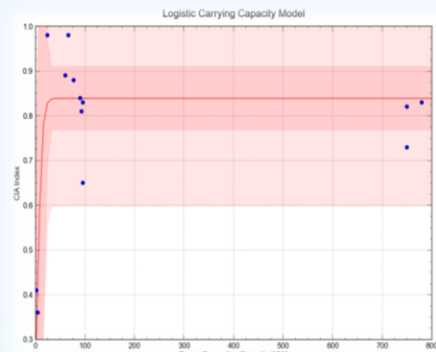
Questionnaire survey at Gomkelling



Yusum village



Interaction with headman at Rho village



Carrying Capacity of Tawang Basin

