BY SPEED POST

No. J-12011/34/08-IA.I
Government of India
Ministry of Environment and Forests

Paryavaran Bhawan
CGO Complex, Lodhi Road
New Delhi –110 003
Telefax: 2436 2827

Dated:26.3.2009

Sr. Vice-President (Hydro)
Mountain Fall India Pvt. Ltd.
A-97-98, Lajpat Nagar, Part –I
New Delhi –110 024

Subject: Lohit river basin study – regarding.

Sir,

This has reference to your letter dated 23.2.2009 on the above mentioned subject. The Expert Appraisal Committee for River Valley and Hydroelectric Projects at its 11th meeting held on 21st February, 2008 desired that the basin study of Lohit basin should be undertaken by the project proponents, as several major projects are coming up in the basin. Cost of this study will be shared on pro rata basis by all the project proponents for the projects coming up on this Lohit river.

2. The above mentioned study has been entrusted to M/s WAPCOS at a cost of Rs.1 crore. The study will be completed in nine months. You are therefore, requested to share the cost on pro rata basis as desired by Expert Appraisal Committee. M/s Athena Demwe Power Pvt. Ltd. has already released Rs.3,90,148 for starting the work. A copy of the approved TOR is enclosed herewith.

Yours faithfully,

(Dr. S. Bhowmik)
Additional Director

Copy to:

1. Shri K. Seethayya
M/s Athena Demwe Power Private Ltd.
1st Floor, NBCC Tower, 15 Bhikaji Cama Place
New Dlehi 110 066

2. The Chief Engineer (Env.)
WAPCOS Ltd.
5th Floor, "Kailash"
Kasturba Gandhi Marg
New Delhi –110 001

ANNEXURE-II

NO.J 12011/5/2008-IAI
Government of India
Ministry of Environment &Forests
[IAI-- Division]

Paryavaran Bhavan
CGO Complex. Lodhi Road
New Delhi - 110003
Dated: 22 122010

Shri K. Seethayya
Managing Director.
Mis Athena Demwe Power Limited
Ist Floor. NBCC Tower.
15. Bhikaji Carna Place
New Delhi-11 0066

Subject Demwe Upper HE Project (1050 MW) in Anjaw District. Arunachal Pradesh by M/s Athena Demwe Power Limited- Downward revision of capacity -- TOR-regarding

Sir.

This has reference to your letter no ADPLIMoEF/DU/101008 dated 0810.2010 and 1511.2010 on the above mentioned subject. The above mentioned project was accorded prior environmental clearance on 25 3.2008 with installed capacity of 1800 MW. The Project proponent has now made a downward revision of the capacity to 1050 MW and reduced the FRL of the Project (without any change of dam location) from EL + 584m to EL + 525m to avoid submergence of proposed hospital site of Swami Camp. part of Hayuliang town. some habitat areas and considerable road length of strategic Importance. The reduction in FRL has resulted In reduction In submergence area from 1440 ha to about 749 ha and Installed Capacity from 1800 MW to 1050 MW

2 The project is proposed across Lohit River in Anjaw District of Arunachal Pradesh This is a run-of-the river scheme The project envisages construction of 162.03 m high (from deepest foundation level) concrete gravity dam with dam-toe powerhouse type to generate 1050 MW hydropower The underground power house is located on the right bank hill at the toe of the dam with 5 units of 205 MW + 1 unit of 25 MW. The total land required is around 967 ha out of which about 749 ha falls under submergence area (about 351 ha IS river bed area + forest/community land is 398 ha) The project cost is about Rs 11.05"1 Crores and will be completed in 6.4 years.

3 The above proposal was considered by Expert Appraisal Committee at its meeting held on 13. 11. 2010

4. The Ministry of Environment & Forests hereby accords clearance for pre-construction activities in the proposed site. as per the provisions of Environmental Impact Assessment Notifications, 2006 and its subsequent amendment. 2009. In addition to the Terms of reference (TOR) initially granted vide letter no. letter No: J- *12011/5/2008*- IAI dated 25th March 2008, the following additional TORs are to be included for revising the EIA report:

- Provision for minimum release shall be increased to 20 per cent of the average lean season flow of the 90% dependable year for four consecutive months by enhancing the Installed Capacity of dedicated unit to maintain the reasonable discharge for sustenance of aquatic life between Upper and Lower Demwe projects.
- The EMP should include measurable schemes with adequate financial provision should be made for the Management Plan as a part of EMP.
- Appropriate scheme for human resource development in local area as per CEA guidelines may also be included.
- Muck dumping site should be identified carefully with proper approach road and safe distance of Muck Disposal Sites from River/HFL
- Sewage Disposal/treatment for colonies/labour camps should De planned in details with adequate budget.
- Disaster Management Plan should incorporate the provision of adequate nos of G&D site in upstream area and proper mechanism for flood warning system in the downstream areas of Assam, especially.
- Details of Protected Area i.e. National Park! Sanctuary located within 10 Krn radius should be incorporated in the report.
- Hydrology data/series as approved by CWC shall be used for EIAIEMP.

5. As the study area of modified scheme falls with the study area of earlier approved scheme; hence the baseline data gathered so far be utilized for the preparation of EIAIEMP report of the Project.

6. The proposal for harnessing the hydropower potential of the allotted stretch upto EL 589 m wherein the proposal for a Barrage toe power house based project in the upstream reach is envisaged with provision of free flow river stretch of about 2 km between consecutive upstream and downstream projects; the TOR of new scheme shall be considered separately upon receipt of firm proposal from the developer.

7. For accreditation, the concerned consultant who will be engaged for preparation of EIAIEMP report is requested to register them with Quality Council of India (QCI)/NABET under the scheme of accreditation & register.

8. Consultants should include a "Certificate" in EIAIEMP report regarding portion of EIAIEMP prepared by them and data provided by other organization(s)/Laboratories including status of approval of such laboratories.

9. As per the provisions of the EIA Notification of 2006, you are requested to submit draft EIAIEMP report as per the above terms of reference to the State Pollution Control Board/Committee for conducting the Public hearing.

10. All the issues discussed in the Public Hearing/Public Consultations should be addressed to and incorporated in the final EIAIEMP report and submitted to the Ministry for considering the Proposal for Environment Clearance.

11. The prescribed TORs would be valid for a period of 2 years for submission of EIAIEMP reports, after public consultation.

Yours faithfully,

(Dr. S. Bhowmik)
Additional Director

Copy to:

1. Secretary, Ministry of Power, Shram Shakti, Bhawan, Rafi Marg, New Delhj~1
2. The Advisor (Power), Planning Commission, Yojna Bhavan, New Delhi-1
3. Secretary, Department of Power, *Govt.* of Arunachal Pradesh, Itanagar, Arunachal Pradesh -791 111.
4. Secretary, Department of Forest, Environment & Wiidlife Manaqernent, Governnent of Arunachal Pradesh, Forest Secretariat, Itanagar-791 111.
5. The Chief Engineer, Project Appraisal Directorate, Central Electricity Authority Sewa Bhawan, R.K. Purarn. New Delhi-110066.
6 The CCF, Regional Office, Ministry of Environment & Forests, Upland Road, Laitumkhrah, Shillonq, Meghalaya - 793003.
7. The Member Secretary, State Pollution Control Board, Department of Forests, Environment & Wildlife Management, Itanagar. Arunachal Pradesh - 791 111.
8. EI- Division, Ministry of Environment & Forests, New Delhi-110003.
9. Guard file.

(Dr. S. Bhowmik)
Additional Director

ANNEXURE-III

TERMS OF REFERNCE FOR CONDUCTING THE BASIN STUDY

1. INTRODUCTION

Basin study for any river basin can be defined as its ability to provide optimum support for various natural processes and allow sustainable activities undertaken by its inhabitants. The same is determined in terms of the following:

- Inventorisation and analysis of the existing resource base and its production, consumption and conservation levels.
- Determination of regional ecological fragility/sensitivity based on geo-physical, biological, socio-economic and cultural attributes.
- Review of existing and planned developments as per various developmental plans.
- Evaluation of impacts on various facets of environment due to existing and planned development.

The study involves assessment of stress/load due to varied activities covering, e.g. exploitation of natural resources, industrial development, population growth which lead to varying degree of impacts on various facets of environment. The basin study also envisages a broad framework of environmental action plan to mitigate the adverse impacts on environment which could be in the form of:

- preclusion of an activity
- infrastructure development
- modification in the planned activity
- implementation of set of measures for amelioration of adverse impacts.

Thus, basin study is a step beyond the EIA, as it incorporates an integrated approach to assess the impacts due to various developmental projects.

2. STUDY AREA

The Study Area to be covered as a part of the Basin Study for Lohit Basin is enclosed as Figure-1. The study shall be based on secondary as well as primary data collection .

3. PROJECTS ENVISAGED IN LOHIT BASIN

A total of 6 projects are envisaged in the study area to be covered in the Lohit basin. The list of the same is given in Table-1.

TABLE-1
Projects Proposed on Lohit River (Cascade development)

Particulars	Unit	Demwe Lower	Demwe Upper	Hutong-II	Hutong-I	Kalai-II	Kalai-I
Catchment Area	sq km	22000	20560	18450	17968	17846	16610
FRL	m	425	584	714.5	779.8	904.8	1065.2
Elevation of River Bed	M	305	430	589.5	755.8	779.8	915.25
Ht. of dam (From Deepest Foundation)	M	145	185	161	29	161	186
Installed capacity	MW	1200	1800	1250	588	1200	1450

4. DATA COLLECTION

In the present study emphasis will be laid on terrestrial and aquatic ecology**.** The estimation of supportive capacity of the basin would involve the preparation of the existing scenario i.e., the preparation of detailed database of the basin. This would be accomplished through the steps outlined in following sections.

4.1 Meteorology

Information on various meteorological aspects is proposed to be collected form India Meteorological Department (IMD) for meteorological stations located within the basin area or in vicinity to the basin boundary. The information on various aspects such as rainfall, temperature, wind, humidity, etc. will be collected.

4.2 Water Resources

As a part of the study, the information on following aspects is to be collected:

- Review of drainage characteristics of the basin, including various surface water bodies like rivers and lakes.
- Data collection and review of past studies/reports/data etc.
- Review of existing water sharing agreements for meeting various need-based existing and future demands viz. municipal, irrigation, power generation and industrial.
- Analysis of all past assessment of the water availability and assessing the

water availability, as per updated data for the system as a whole and at existing ongoing/proposed project locations on annual/monsoon/non-monsoon and monthly basis.

- Estimation of sediment load at various points in the basin based on available secondary data.
- Identification of perennial sources of water and their designated usages

4.3 Water Quality

As a part of the Studies, secondary data in proposal to be collected for water quality in the study area. In addition to above, information on human settlement, sewage generated and mode of collection, conveyance, treatment and disposal of sewage shall also be collected as a part of the present study. Water quality monitoring is proposed be conducted at 30 locations in the study area. The frequency of sampling shall be once per month for 6 months. The various parameters to be monitored include:

- pH
- Dissolved Oxygen (DO)
- Electrical Conductivity (EC)
- Total Suspended Solids (TSS)
- Total Dissolved Solids (TDS)
- Total Alkalinity
- Total Hardness
- Biochemical Oxygen Demand (BOD)
- Chemical Oxygen Demand (COD)
- Nitrates
- Chlorides
- Sulphates
- Phosphates
- Sodium
- Calcium
- Magnesium
- Potassium
- Iron
- Manganese
- Zinc
- Cadmium
- Lead
- Copper
- Mercury
- Total Chromium
- Total Coliform

4.4 Flora

The following data will be collected from various secondary sources for river Lohit and its tributaries in the basin area:

- Characterization of forest types in the study area and extent of each forest type.
- Information on general vegetation pattern and floral diversity
- Presence of economically important species in the basin area.
- Presence of Rare, Endangered and Threatened floral species as per the categorization Botanical Survey of India's Red Data list in the basin area.
- Presence of endemic floral species found in the basin area, if any shall be assessed as a part of the basin study.
- Location of wild life sanctuaries, national parks, biosphere reserves if any, in the study area

As a part of the Study, it is proposed to conduct primary data collection field studies to collect information on terrestrial ecology. It is proposed to conduct sampling at 30 locations in the study area. The monitoring shall be conducted for two seasons (one of which shall be rainy season) The following information is proposed to be covered as a part of the EIA Study:

- Identification of forest type and density, bio-diversity in the study area.
- Preparation of comprehensive checklist of flora (Angiosperms, Gymnosperms, Lichens, Pteridophytes, Bryophytes, Fungi, Algae etc;) with Botanical and local name.
- Importance value index of the dominant vegetation at various sampling locations
- Frequency, Abundance and density of each species of Trees, Shrubs and Herbs at representative sampling sites will be estimated.
- Identification and listing of Rare/Endangered species.
- Identification and listing of plants of genetically, biologically, economical and medicinal importance.
- Major forest produce, if any and dependence of locals on the same in the forests observed in the study area.

In addition, based on the published literature including various research papers, the information on forest types, presence of various species, biological diversity, etc. shall be collected for the study area.

4.6 Fauna

The following data will be collected from various secondary sources for the study area:

- Inventory of Birds (resident, migratory), land animals including mammals, reptiles, amphibians, fishes, etc. reported and surveyed in the basin area shall be prepared.
- Presence of Rare, Endangered and Threatened faunal species as per the categorization of IUCN Red Data list and as per different schedules of Indian Wildlife Protection Act, 1972 in the basin area.
- Presence of endemic faunal species found in the basin area, if any shall be assessed as a part of the Basin Study.
- Existence of barriers and corridors for wild animals, if any in the basin area shall be covered as a part of the study.
- Identification of threats to wildlife in the region
- Presence of National Park, Sanctuary, Biosphere, Reserve Forest etc. in the basin area shall be assessed.

During ecological survey, identification of faunal species will be carried out simultaneously. Indirect observations of mammals will be carried out by identification of tracks, droppings (scal), claw marks and calls, etc. The listing of faunal species by direct observation techniques will be carried out. The detailed list of faunal species will be formulated based on forest records and published literature.

4.7 Aquatic flora and fauna

The following data will be collected from various secondary sources for river Lohit and its tributaries in the basin area:

- presence of major fish species
- inventory of migratory fish species
- migratory routes of various fish species
- presence of major breeding and spawning sites.

As a part of the Study, it is proposed to conduct primary data collection field studies to collect information on aquatic ecology and fisheries. The sampling shall be conducted at 30 locations to identify the aquatic flora and fauna of the water bodies in the study area. The density and diversity of phytoplankton, zooplankton shall be

estimated. In addition, primary productivity shall be monitored at various locations to be covered as a part of the study.

The diversion of water for hydropower generation leads to reduction in flows downstream of the dam site up to disposal of tail race outfall. This leads to adverse impacts on riverine ecology. The dam could also act as a barrier for migration of fishes. The data on prevailing fish species will be collected from the Fisheries Department. To augment the existing data, a fisheries survey will be conducted at. 30 locations in the study area. The survey will be conducted once per month for six months. The details of the monitoring work proposed to be carried out are as follows:

- Assessment of biotic resources with special reference to primary productivity, zooplanktons, phytoplanktons, benthos, macrophytes, macro-invertebrates and fishes in the study area.
- Population densities and diversities of phytoplanktons, zooplanktons benthos, macrophytes, macro-invertebrates and fish shall be estimated. Diversity indices of these ecological groups will also be calculated separately.
- fish composition
- migratory route of migratory fishes
- Spawning & breeding grounds of fish species, if any, shall be identified

5. IMPACTS DUE TO HYDROPOWER DEVELOPMENT

As mentioned earlier, impacts on terrestrial and aquatic ecology shall only be studied as a part of the present studies. The scenario to be considered for assessment in the present study shall be based on the hydropower projects to be commissioned as listed in Table-1.

The key aspects to be covered are listed as below:

- Modification in hydrologic regime due to diversion of water for hydropower generation.
- Depth of water available in river stretches during lean season, and its assessment of its adequacy vis-à-vis various fish species.
- Length of river stretches with normal flow due to commissioning of various hydroelectric projects due to diversion of flow for hydropower generation.

- Impacts on discharge in river stretches during monsoon and lean seasons due to diversion of flow for hydropower generation.
- Impacts on water users in terms of water availability and quality
- Impacts on aquatic ecology including riverine fisheries as a result of diversion of flow for hydropower generation.
- Assessment of maintaining minimum releases of water during lean season to sustain riverine ecology, maintain water quality and meet water requirements of downstream users.
- Impacts due to loss of forests
- Impacts on rare, endangered and threatened species
- Impacts on economically important plant species
- Impacts due to increased human interferences
- Impacts due to agricultural practices.

6. OUTCOMES OF THE STUDY

The key outcomes of the study shall be to:

- provide sustainable and optimal ways of hydropower development of Lohit river, keeping in view of the environmental setting of the basin.
- Assess requirement of environmental flow during lean season with actual flow, depth and velocity at different level.

ANNEXURE-IV
Average Ten Daily Flow Series at various project sites for Case I
(Dependable flow analysis using flow series without any arrangement)

TABLE-1
Average Ten Daily Flow Series at Kalai HEP Stage-1 (1984-85 to 2002-03)

Average Ten Daily Flows Series at Kalai I H.E Project site as Derived from Hayuliang (19 years) in cumecs

Catchment Area of Kalai I site = 16610 Km2

			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19				
Tot Days	**Month**	**Ten Daily**	**1984-85**	**1985-86**	**1986-87**	**1987-88**	**1988-89**	**1989-90**	**1990-91**	**1991-92**	**1992-93**	**1993-94**	**1994-95**	**1995-96**	**1996-97**	**1997-98**	**1998-99**	**1999-00**	**2000-01**	**2001-02**	**2002-03**	**A.V. (cumec)**	**Max**	**Min**	**SD**
	June	I	1351	2406	491	1406	1733	1566	1964	2369	1046	1515	1296	1896	1896	1951	1605	1260	2624	1956	763	1636	2624	491	547
30		II	1466	1723	570	1304	1743	1901	1627	2606	1229	1440	1386	1960	1958	2077	1653	1230	2608	1961	855	1647	2608	570	516
		III	1492	1788	843	1553	1529	1723	1655	2082	1763	1454	1368	2311	2997	1995	2004	2012	3443	1920	841	1830	3443	841	623
	July	I	1624	2081	595	1646	2645	2763	2106	2082	1486	2498	1224	1750	2628	3005	2798	1832	2288	1627	1156	1991	3005	595	643
31		II	1752	1966	609	1364	1577	1910	2603	2149	1319	2522	1357	1574	3603	3212	2374	2181	2167	1694	1182	1953	3603	609	717
		III	1630	1908	525	1817	2012	1809	2165	1650	1349	1879	1674	1349	2756	2832	2192	2061	2197	1935	873	1822	2832	525	554
	August	I	1039	1608	479	1794	1249	1591	1568	1628	1221	1683	1555	1328	2665	3062	2092	1915	2712	1707	921	1675	3062	479	631
31		II	1039	1388	433	1956	1400	1571	1544	1602	1077	1622	1431	1293	2572	3087	2306	2390	2241	1094	918	1630	3087	433	653
		III	1033	1351	442	1781	3280	1379	1654	1419	1041	1497	1365	1175	2287	2641	2303	2621	2065	1170	662	1640	3280	442	729
	September	I	957	627	423	1643	1925	1522	1466	1255	776	1222	1316	1354	2161	2727	3395	2635	1999	1035	494	1523	3395	423	797
30		II	1381	454	625	1372	1209	1344	1351	1168	693	1102	1301	1165	1838	2820	1791	2414	1986	714	456	1326	2820	454	634
		III	933	696	249	1818	1457	1245	1140	1092	589	1127	1165	1125	1739	3031	1439	1647	1474	636	995	1242	3031	249	595
	October	I	659	647	331	1120	2106	1381	1321	911	429	1113	1058	2105	1907	1441	1044	1269	824	811	756	1117	2106	331	511
31		II	575	522	330	892	2013	1145	907	951	530	886	1016	1846	1566	946	1158	1534	586	590	445	970	2013	330	480
		III	407	507	259	744	1399	784	626	847	457	724	851	1449	1404	664	1554	1135	499	446	410	798	1554	259	402
	November	I	446	480	302	641	976	611	495	390	286	622	783	910	948	487	592	632	405	403	387	568	976	286	210
30		II	367	420	300	460	810	528	432	341	251	622	750	794	821	462	473	489	391	383	363	498	821	251	178
		III	276	385	269	401	728	412	386	310	234	532	730	762	706	449	527	455	375	359	338	454	762	234	166
	December	I	259	364	235	348	676	340	348	684	217	496	161	205	567	418	463	508	347	342	325	384	684	161	150
31		II	255	337	225	321	574	305	256	518	199	470	156	196	513	438	403	468	333	328	314	348	574	156	122
		III	246	322	267	281	502	283	250	412	183	449	513	780	498	406	376	413	326	310	301	375	780	183	137
	January	I	236	294	315	478	478	263	302	354	177	533	342	400	472	382	347	386	320	297	289	351	533	177	92
31		II	232	270	305	459	459	248	298	298	187	544	350	411	439	438	338	381	309	299	271	344	544	187	93
		III	231	258	283	439	439	271	304	274	170	537	303	352	420	362	326	384	308	305	282	329	537	170	86
	February	I	203	271	275	414	414	282	298	271	407	542	385	386	417	378	335	397	328	309	301	348	542	203	78
28/29		II	193	264	268	405	405	282	304	272	397	522	393	394	445	387	333	392	324	316	303	347	522	193	78
		III	202	266	287	421	421	261	328	271	402	533	493	451	439	387	333	380	331	315	304	359	533	202	87
	March	I	339	244	294	421	421	268	381	295	430	566	487	380	475	441	361	425	335	327	297	378	566	244	84
31		II	588	372	335	418	418	263	409	323	496	669	554	428	584	465	407	447	333	317	331	429	669	263	109
		III	549	342	406	524	517	403	461	328	664	1001	601	462	564	590	405	504	504	351	322	500	1001	322	157
	April	I	509	412	820	471	471	512	716	699	717	804	576	805	401	543	508	803	549	362	366	581	820	362	159
30		II	566	633	827	757	757	937	808	793	745	816	673	951	416	739	461	664	655	541	387	691	951	387	161
		III	732	378	755	1010	1010	1079	611	515	909	895	713	1010	418	777	834	862	728	522	390	745	1079	378	222
	May	I	976	976	356	706	982	1035	1117	1311	943	1221	1116	1670	1616	648	1428	1238	2280	949	603	1114	2280	356	436
31		II	1131	795	437	943	1406	990	1084	2079	1153	1302	1120	1878	2043	656	1339	949	2500	1002	831	1244	2500	437	531
		III	1331	1328	482	1022	2162	1486	1284	2193	991	1165	1200	1913	1857	800	2247	1959	2721	1470	852	1498	2721	482	588
																							3603	**156**	**360**
Leap Year	A. Flow (cumec-day)		277093	296292	154547	341678	432499	352843	351781	374293	255683	377413	323142	399211	499240	468956	434162	421438	452110	296373	201924				
	Annual Flow (cumec)		759	812	423	934	1185	967	964	1023	701	1034	885	1091	1368	1285	1189	1151	1239	812	553	**967**			
	Annual Volume (MCM)		23941	25600	13353	29521	37368	30486	30394	32339	22091	32609	27919	34492	43134	40518	37512	36412	39062	25607	17446	**30516**			
	A.V. basin (cumec)		**967**																						

TABLE-2
Average Ten Daily Flow Series at Kalai HEP Stage-2 (1984-85 to 2002-03)

Average Ten Daily Flow Series at Kalai II H.E Project site as Derived from Hagulang (19 years) in cumecs

Catchment Area of Kalai II site = 17846 Km2

			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19				
Tot Days	Month	Ten Daily	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	A.V. (cumec)	Max	Min	SD
30	June	I	1451	2585	527	1510	1862	1683	2110	2546	1124	1627	1392	2037	2036	2096	1725	1354	2819	2101	819	1758	2819	527	588
		II	1575	1851	612	1401	1873	2043	1748	2800	1321	1547	1489	2106	2103	2231	1776	1322	2802	2107	919	1770	2802	612	555
		III	1603	1921	906	1668	1643	1851	1778	2237	1894	1562	1469	2483	3220	2143	2153	2162	3699	2063	903	1966	3699	903	670
31	July	I	1745	2236	640	1769	2842	2969	2263	2237	1596	2684	1315	1880	2824	3228	3006	1969	2459	1748	1242	2140	3228	640	691
		II	1882	2112	654	1466	1694	2052	2796	2309	1417	2709	1457	1691	3871	3451	2551	2343	2328	1820	1270	2099	3871	654	771
		III	1752	2050	564	1952	2162	1944	2326	1773	1449	2018	1799	1449	2961	3043	2355	2214	2360	2079	938	1957	3043	564	595
31	August	I	1116	1728	514	1927	1342	1710	1685	1749	1312	1808	1671	1427	2863	3290	2248	2058	2913	1834	990	1799	3290	514	678
		II	1116	1492	465	2101	1504	1688	1659	1722	1157	1743	1537	1389	2764	3317	2477	2568	2408	1175	987	1751	3317	465	702
		III	1110	1452	475	1914	3524	1481	1777	1525	1118	1609	1466	1262	2457	2837	2474	2816	2219	1257	711	1762	3524	475	783
30	September	I	1028	673	454	1766	2068	1635	1575	1348	833	1313	1414	1455	2321	2930	3648	2831	2148	1112	530	1636	3648	454	856
		II	1484	488	672	1474	1299	1444	1452	1255	744	1184	1398	1252	1974	3030	1925	2594	2133	767	490	1424	3030	488	681
		III	1003	748	268	1953	1565	1338	1225	1173	633	1210	1252	1208	1869	3257	1546	1770	1583	683	1069	1334	3257	268	640
31	October	I	708	695	355	1203	2262	1484	1419	979	461	1195	1136	2261	2049	1549	1121	1364	885	871	812	1201	2262	355	549
		II	618	561	354	958	2162	1231	974	1021	570	952	1092	1984	1683	1016	1244	1649	629	633	478	1043	2162	354	516
		III	437	545	278	799	1503	842	673	910	491	778	914	1557	1508	714	1670	1220	536	479	441	858	1670	278	432
30	November	I	479	515	325	688	1049	657	532	419	307	668	841	978	1018	524	636	679	436	432	416	611	1049	307	225
		II	394	451	322	494	870	567	464	367	270	668	805	853	882	496	508	525	420	412	390	535	882	270	191
		III	297	414	289	430	783	442	415	333	251	572	784	818	759	482	566	489	403	386	363	488	818	251	179
31	December	I	278	391	252	374	727	365	374	735	233	533	184	237	609	449	497	546	373	367	349	414	735	184	159
		II	274	362	242	344	617	328	275	556	214	505	176	225	551	471	433	503	358	352	337	375	617	176	129
		III	265	346	287	302	539	304	268	443	197	483	534	809	535	436	404	443	350	333	324	400	809	197	141
31	January	I	254	316	339	514	514	282	324	380	190	573	367	430	507	410	373	415	344	319	310	377	573	190	98
		II	249	290	328	493	493	266	320	320	201	585	376	441	471	471	363	409	332	322	291	370	585	201	100
		III	248	277	304	471	471	291	327	294	183	577	325	378	451	389	351	413	331	328	303	353	577	183	92
28/29	February	I	218	291	295	445	445	303	320	291	437	582	414	415	448	406	360	427	352	332	323	374	582	218	84
		II	207	284	288	435	435	303	327	292	426	561	422	423	479	416	358	422	349	340	326	373	561	207	84
		III	218	286	308	453	453	280	353	291	432	573	530	484	471	416	357	408	356	338	327	386	573	218	94
31	March	I	364	262	316	452	452	288	410	317	463	608	524	408	510	474	387	457	360	352	319	406	608	262	90
		II	632	400	360	449	449	283	440	347	533	719	596	460	628	500	437	480	358	340	355	461	719	283	117
		III	590	368	437	562	555	433	495	353	714	1075	646	497	606	634	435	541	542	378	346	537	1075	346	168
30	April	I	546	443	881	506	506	550	769	751	770	864	618	865	431	583	545	863	590	389	393	625	881	389	171
		II	608	680	888	814	814	1007	869	852	800	876	723	1021	447	794	495	713	704	582	416	742	1021	416	173
		III	786	406	811	1085	1085	1159	656	554	977	961	766	1085	449	835	896	926	783	560	419	800	1159	406	238
31	May	I	1049	1049	383	759	1055	1112	1200	1409	1013	1312	1199	1794	1736	697	1534	1330	2449	1020	648	1197	2449	383	468
		II	1215	854	470	1013	1511	1064	1165	2234	1239	1399	1204	2018	2195	704	1438	1020	2686	1077	893	1337	2686	470	571
		III	1430	1426	518	1098	2323	1597	1380	2356	1065	1252	1290	2055	1995	859	2415	2105	2923	1579	915	1610	2923	518	631
																							3871	176	386
Leap Year	A. Flow (cumec-day)		297713	318340	166047	367103	464682	379099	377958	402145	274709	405498	347188	428918	536382	503852	466469	452799	485753	318427	216950				
	Annual Flow (cumec)		816	872	455	1003	1273	1039	1036	1099	753	1111	951	1172	1470	1380	1278	1237	1331	872	594	1039			
	Annual Volume (MCM)		25722	27505	14346	31718	40149	32754	32656	34745	23735	35035	29997	37058	46343	43533	40303	39122	41969	27512	18744	32787			
	A.V. basin (cumec)		1039																						

TABLE-3

Intermediate Ten Daily Flow Series between Kalai HEP Stage-2 and Kalai HEP Stage-1 (1984-85 to 2002-03)

			Intermediate Tendaily Flow Series between KL-2 & KL-1																	
			Intermediate Catchment Area = 1236 Km2																	
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Tot Days	**Month**	**Ten Daily**	**1984-85**	**1985-86**	**1986-87**	**1987-88**	**1988-89**	**1989-90**	**1990-91**	**1991-92**	**1992-93**	**1993-94**	**1994-95**	**1995-96**	**1996-97**	**1997-98**	**1998-99**	**1999-00**	**2000-01**	**2001-02**	**2002-03**
	June	I	101	179	37	105	129	117	146	176	78	113	96	141	140	145	119	94	195	146	57
30		II	109	128	42	97	130	141	121	194	91	107	103	146	146	155	123	92	194	146	64
		III	111	133	63	116	114	128	123	155	131	108	102	172	223	148	149	150	256	143	63
	July	I	121	155	44	123	197	206	157	155	111	186	91	130	196	224	208	136	170	121	86
31		II	130	146	45	102	117	142	194	160	98	188	101	117	268	239	177	162	161	126	88
		III	121	142	39	135	150	135	161	123	100	140	125	100	205	211	163	153	163	144	65
	August	I	77	120	36	133	93	118	117	121	91	125	116	99	198	228	156	143	202	127	69
31		II	77	103	32	146	104	117	115	119	80	121	106	96	191	230	172	178	167	81	68
		III	77	101	33	133	244	103	123	106	77	111	102	87	170	197	171	195	154	87	49
	September	I	71	47	31	122	143	113	109	93	58	91	98	101	161	203	253	196	149	77	37
30		II	103	34	47	102	90	100	101	87	52	82	97	87	137	210	133	180	148	53	34
		III	69	52	19	135	108	93	85	81	44	84	87	84	129	226	107	123	110	47	74
	October	I	49	48	25	83	157	103	98	68	32	83	79	157	142	107	78	94	61	60	56
31		II	43	39	25	66	150	85	67	71	39	66	76	137	117	70	86	114	44	44	33
		III	30	38	19	55	104	58	47	63	34	54	63	108	104	49	116	84	37	33	31
	November	I	33	36	22	48	73	46	37	29	21	46	58	68	71	36	44	47	30	30	29
30		II	27	31	22	34	60	39	32	25	19	46	56	59	61	34	35	36	29	29	27
		III	21	29	20	30	54	31	29	23	17	40	54	57	53	33	39	34	28	27	25
	December	I	19	27	17	26	50	25	26	51	16	37	22	32	42	31	34	38	26	25	24
31		II	19	25	17	24	43	23	19	39	15	35	20	29	38	33	30	35	25	24	23
		III	18	24	20	21	37	21	19	31	14	33	21	30	37	30	28	31	24	23	22
	January	I	18	22	23	36	36	20	22	26	13	40	25	30	35	28	26	29	24	22	22
31		II	17	20	23	34	34	18	22	22	14	40	26	31	33	33	25	28	23	22	20
		III	17	19	21	33	33	20	23	20	13	40	23	26	31	27	24	29	23	23	21
	February	I	15	20	20	31	31	21	22	20	30	40	29	29	31	28	25	30	24	23	22
28/29		II	14	20	20	30	30	21	23	20	30	39	29	29	33	29	25	29	24	24	23
		III	15	20	21	31	31	19	24	20	30	40	37	34	33	29	25	28	25	23	23
	March	I	25	18	22	31	31	20	28	22	32	42	36	28	35	33	27	32	25	24	22
31		II	44	28	25	31	31	20	30	24	37	50	41	32	43	35	30	33	25	24	25
		III	41	25	30	39	38	30	34	24	49	74	45	34	42	44	30	37	38	26	24
	April	I	38	31	61	35	35	38	53	52	53	60	43	60	30	40	38	60	41	27	27
30		II	42	47	62	56	56	70	60	59	55	61	50	71	31	55	34	49	49	40	29
		III	54	28	56	75	75	80	45	38	68	67	53	75	31	58	62	64	54	39	29
	May	I	73	73	26	53	73	77	83	98	70	91	83	124	120	48	106	92	170	71	45
31		II	84	59	33	70	105	74	81	155	86	97	83	140	152	49	100	71	186	75	62
		III	99	99	36	76	161	111	96	163	74	87	89	142	138	60	167	146	202	109	63

TABLE-4
Average Ten Daily Flow Series at Hutong HEP Stage-1 (1984-85 to 2002-03)

Average Ten Daily Flow Series at Hutong I H.E. Project site as Derived from Hutong II (19 years) in cumecs

Catchment Area of Hutong I site = 17968 Km2

			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19				
Tot Days	**Month**	**Ten Daily**	**1984-85**	**1985-86**	**1986-87**	**1987-88**	**1988-89**	**1989-90**	**1990-91**	**1991-92**	**1992-93**	**1993-94**	**1994-95**	**1995-96**	**1996-97**	**1997-98**	**1998-99**	**1999-00**	**2000-01**	**2001-02**	**2002-03**	**A.V. (cumec)**	**Max**	**Min**	**SD**
		I	1461	2602	531	1520	1875	1694	2124	2563	1132	1639	1401	2051	2039	2110	1737	1363	2839	2116	825	1770	2839	531	592
30	June	II	1586	1864	617	1411	1886	2057	1760	2819	1330	1558	1499	2121	2118	2246	1789	1331	2822	2121	925	1782	2822	617	559
		III	1614	1935	912	1680	1654	1864	1791	2252	1907	1573	1480	2500	3242	2158	2167	2177	3725	2077	909	1980	3725	909	674
		I	1757	2251	644	1781	2862	2989	2279	2252	1607	2702	1324	1893	2843	3250	3027	1982	2475	1759	1250	2154	3250	644	696
31	July	II	1895	2126	659	1476	1706	2066	2815	2325	1427	2728	1467	1703	3897	3475	2568	2359	2344	1832	1279	2113	3897	659	776
		III	1764	2064	567	1966	2177	1957	2342	1785	1459	2032	1811	1459	2981	3063	2371	2229	2376	2093	944	1971	3063	567	599
		I	1124	1739	518	1940	1351	1722	1696	1761	1321	1820	1682	1437	2882	3312	2263	2072	2933	1847	997	1811	3312	518	683
31	August	II	1123	1502	468	2116	1514	1700	1671	1733	1165	1755	1548	1398	2783	3340	2494	2585	2424	1183	993	1763	3340	468	707
		III	1118	1461	478	1927	3548	1491	1789	1535	1126	1620	1476	1271	2474	2857	2491	2835	2234	1266	716	1774	3548	478	789
		I	1036	678	458	1778	2082	1646	1586	1357	839	1322	1424	1465	2337	2950	3673	2851	2162	1119	534	1647	3673	458	862
30	September	II	1494	491	677	1484	1308	1454	1462	1264	750	1192	1408	1260	1988	3050	1938	2612	2148	773	494	1434	3050	491	686
		III	1009	753	270	1966	1576	1347	1233	1181	637	1219	1261	1217	1882	3279	1556	1782	1594	688	1076	1343	3279	270	644
		I	713	700	358	1211	2278	1494	1428	985	465	1204	1144	2277	2063	1559	1129	1373	891	877	818	1209	2278	358	553
31	October	II	622	564	357	965	2177	1239	981	1028	573	959	1100	1997	1694	1023	1253	1660	633	638	481	1050	2177	357	519
		III	440	548	280	805	1513	848	677	917	494	783	921	1567	1518	719	1681	1228	539	482	444	863	1681	280	435
		I	482	519	327	693	1056	661	536	422	309	673	847	985	1025	527	640	683	439	435	419	615	1056	309	227
30	November	II	397	454	324	497	876	571	467	369	271	673	811	859	888	500	511	529	423	414	393	538	888	271	192
		III	299	417	291	433	788	445	418	336	253	575	789	824	764	485	570	493	405	389	365	492	824	253	180
		I	280	393	254	377	732	368	376	757	235	537	175	222	614	452	501	549	376	370	351	417	757	175	164
31	December	II	276	364	244	347	621	330	277	560	215	509	169	212	555	474	436	506	361	355	340	376	621	169	132
		III	267	348	289	304	543	306	270	446	198	486	555	843	538	439	406	446	352	336	326	405	843	198	148
		I	256	318	341	517	517	284	327	383	191	577	370	433	510	413	376	417	347	321	313	379	577	191	99
31	January	II	250	292	330	496	496	268	323	323	202	588	379	444	475	474	366	412	334	324	293	372	588	202	101
		III	250	279	306	475	475	293	329	296	184	581	327	381	454	391	353	416	333	330	305	356	581	184	93
		I	219	293	297	448	448	305	322	293	440	586	417	418	451	409	362	430	354	334	325	377	586	219	85
28/29	February	II	209	285	290	438	438	305	329	294	429	564	425	426	482	419	360	424	351	342	328	376	564	209	84
		III	219	288	311	456	456	282	355	293	435	577	533	488	475	419	360	411	358	341	329	389	577	219	94
		I	367	263	318	455	455	290	412	319	466	613	527	411	514	477	390	460	362	354	322	409	613	263	91
31	March	II	636	403	362	452	452	285	443	349	537	724	600	463	632	503	440	483	361	343	358	464	724	285	117
		III	594	370	440	566	559	436	498	355	719	1082	651	500	610	638	438	545	545	380	348	541	1082	348	169
		I	550	446	887	509	509	554	774	756	775	869	623	871	434	587	549	869	594	392	396	629	887	392	172
30	April	II	612	685	894	819	819	1014	874	858	806	882	728	1028	450	800	498	718	709	585	419	747	1028	419	174
		III	792	408	817	1093	1093	1167	660	557	984	968	772	1093	452	841	902	933	788	564	422	806	1167	408	240
		I	1056	1056	385	764	1063	1119	1208	1419	1020	1321	1207	1806	1748	701	1545	1339	2466	1027	652	1205	2466	385	472
31	May	II	1224	860	473	1020	1521	1071	1173	2249	1248	1409	1212	2032	2210	709	1448	1027	2704	1084	899	1346	2704	473	575
		III	1440	1436	521	1106	2339	1608	1389	2372	1072	1260	1299	2069	2009	865	2431	2119	2943	1590	921	1621	2943	521	636
																							3897	**169**	**389**
Leap Year	A. Flow (cumec-day)		299748	320517	167183	369612	467859	381690	380542	405063	276587	408270	349561	431850	539940	507297	469658	455894	489073	320604	218433				
	Annual Flow (cumec)		821	878	458	1010	1282	1046	1043	1107	758	1119	958	1180	1479	1390	1287	1246	1340	878	598	**1046**			
	Annual Volume (MCM)		25898	27693	14445	31935	40423	32978	32879	34997	23897	35275	30202	37312	46651	43830	40578	39389	42256	27700	18873	**33011**			
	A.V. basin (cumec)		**1046**																						

TABLE-5
Average Ten Daily Flow Series at Hutong HEP Stage-2 (1984-85 to 2002-03)

Average Ten Daily Flow Series at Hutong II H.E. Project site as Derived from Haguliang (19 years) in cumecs

Catchment Area of Hutong II Site = 18450 Km2

			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19				
Tot Days	**Month**	**Ten Daily**	**1984-85**	**1985-86**	**1986-87**	**1987-88**	**1988-89**	**1989-90**	**1990-91**	**1991-92**	**1992-93**	**1993-94**	**1994-95**	**1995-96**	**1996-97**	**1997-98**	**1998-99**	**1999-00**	**2000-01**	**2001-02**	**2002-03**	**A.V. (cumec)**	**Max**	**Min**	**SD**
	June	I	1500	2672	545	1561	1925	1740	2181	2632	1162	1682	1439	2106	2094	2167	1783	1400	2915	2172	847	1817	2915	545	608
30		II	1629	1914	633	1449	1936	2112	1807	2895	1365	1600	1539	2178	2174	2307	1837	1367	2897	2178	950	1830	2897	633	573
		III	1658	1987	937	1725	1698	1914	1839	2312	1958	1615	1519	2567	3329	2216	2226	2235	3825	2133	934	2033	3825	934	692
	July	I	1804	2312	661	1829	2938	3069	2340	2313	1650	2775	1360	1944	2919	3337	3108	2035	2542	1807	1284	2212	3337	661	714
31		II	1946	2183	677	1515	1751	2121	2891	2387	1465	2801	1507	1749	4002	3568	2637	2422	2407	1882	1313	2170	4002	677	797
		III	1811	2119	583	2018	2235	2010	2405	1833	1498	2087	1860	1498	3061	3146	2435	2289	2440	2149	970	2023	3146	583	615
	August	I	1154	1786	532	1993	1388	1768	1742	1808	1357	1869	1727	1475	2960	3401	2324	2127	3012	1896	1023	1860	3401	532	701
31		II	1154	1542	481	2173	1555	1745	1716	1780	1196	1802	1589	1436	2857	3429	2561	2655	2490	1215	1020	1810	3429	481	726
		III	1148	1501	491	1979	3644	1531	1837	1577	1156	1663	1516	1305	2540	2933	2558	2911	2294	1300	735	1822	3644	491	810
	September	I	1063	696	470	1825	2138	1690	1628	1394	862	1357	1462	1504	2400	3029	3771	2927	2220	1149	548	1691	3771	470	885
30		II	1534	504	695	1524	1343	1493	1501	1298	770	1224	1445	1294	2041	3132	1990	2682	2206	793	507	1472	3132	504	704
		III	1036	773	277	2019	1618	1383	1266	1213	654	1251	1295	1249	1932	3367	1598	1830	1637	706	1105	1379	3367	277	661
	October	I	732	719	367	1244	2339	1534	1467	1012	477	1236	1175	2338	2118	1601	1159	1410	915	901	840	1241	2339	367	568
31		II	639	579	366	990	2235	1272	1007	1056	589	984	1129	2051	1740	1050	1287	1704	650	655	494	1078	2235	366	533
		III	452	563	288	826	1553	871	695	941	507	804	945	1609	1559	738	1726	1261	554	495	456	887	1726	288	446
	November	I	495	533	336	712	1084	679	550	434	317	691	870	1011	1053	541	658	702	450	447	430	631	1084	317	233
30		II	408	466	333	511	899	586	479	379	279	691	833	882	912	513	525	543	435	426	403	553	912	279	197
		III	307	428	299	445	809	457	429	345	260	591	810	846	784	498	585	506	416	399	375	505	846	260	185
	December	I	288	404	261	387	751	378	386	760	241	551	179	228	630	464	514	564	386	380	361	427	760	179	166
31		II	283	374	250	356	637	339	285	575	221	522	173	218	570	487	447	520	370	364	349	386	637	173	135
		III	274	358	296	313	557	315	277	458	203	499	570	866	553	451	417	458	362	345	335	416	866	203	152
	January	I	262	326	350	531	531	292	335	393	196	592	380	445	524	424	386	429	356	330	321	390	592	196	102
31		II	257	300	339	510	510	275	331	331	208	604	389	456	487	487	376	423	343	332	301	382	604	208	104
		III	257	287	314	487	487	301	338	304	189	596	336	391	467	402	363	427	342	339	313	365	596	189	96
	February	I	225	301	305	460	460	313	331	301	452	602	428	429	464	420	372	441	364	343	334	387	602	225	87
28/29		II	214	293	297	450	450	313	338	302	441	580	437	438	495	430	370	436	360	351	337	386	580	214	87
		III	225	296	319	468	468	290	365	301	446	592	547	501	487	430	370	422	368	350	338	399	592	225	97
	March	I	376	271	327	467	467	297	423	327	478	629	541	422	527	490	401	472	372	363	330	420	629	271	93
31		II	653	414	372	464	464	293	455	359	551	743	616	476	649	517	452	496	370	352	367	477	743	293	121
		III	610	380	451	582	574	447	512	365	738	1111	668	513	626	655	450	560	560	390	357	555	1111	357	174
	April	I	565	458	911	523	523	569	795	777	796	893	639	895	446	603	564	892	610	403	406	646	911	403	176
30		II	629	703	918	841	841	1041	898	881	827	906	748	1056	462	821	512	737	728	601	430	767	1056	430	179
		III	813	419	839	1122	1122	1199	678	572	1010	994	792	1122	464	863	927	958	809	579	433	827	1199	419	246
	May	I	1084	1084	395	785	1091	1149	1240	1457	1048	1356	1239	1855	1794	720	1586	1375	2532	1055	670	1238	2532	395	484
31		II	1256	883	486	1047	1562	1100	1204	2309	1281	1447	1245	2086	2269	728	1487	1054	2777	1113	923	1382	2777	486	590
		III	1479	1475	535	1135	2401	1651	1427	2435	1101	1294	1333	2125	2062	888	2496	2176	3022	1633	946	1664	3022	535	653
																							4002	**173**	**400**
Leap Year	A. Flow (cumec-day)		307789	329115	171668	379528	480410	391929	390750	415756	284007	419222	358938	443434	554424	520905	482257	468124	502193	329204	224293				
	Annual Flow (cumec)		843	902	470	1037	1316	1074	1071	1136	778	1149	983	1212	1519	1427	1321	1279	1376	902	615	**1074**			
	Annual Volume (MCM)		26593	28436	14832	32791	41507	33863	33761	35921	24538	36221	31012	38313	47902	45006	41667	40446	43389	28443	19379	**33896**			
	A.V. basin (cumec)		**1074**																						

TABLE-6

Intermediate Ten Daily Flow Series between Hutong HEP Stage-2 and Hutong HEP Stage-1 (1984-85 to 2002-03)

	Intermediate Tendaily Flow Series between HTG-2 & HTG-1																			
	Intermediate Catchment Area = 482 Km2																			
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Tot Days	**Month**	**Ten Daily**	**1984-85**	**1985-86**	**1986-87**	**1987-88**	**1988-89**	**1989-90**	**1990-91**	**1991-92**	**1992-93**	**1993-94**	**1994-95**	**1995-96**	**1996-97**	**1997-98**	**1998-99**	**1999-00**	**2000-01**	**2001-02**	**2002-03**
	June	I	39	70	14	41	50	45	57	69	30	44	38	55	55	57	47	37	76	57	22
30		II	43	50	17	38	51	55	47	76	36	42	40	57	57	60	48	36	76	57	25
		III	43	52	24	45	44	50	48	60	51	42	40	67	87	58	58	58	100	56	24
	July	I	47	60	17	48	77	80	61	60	43	72	36	51	76	87	81	53	66	47	34
31		II	51	57	18	40	46	55	76	62	38	73	39	46	105	93	69	63	63	49	34
		III	47	55	15	53	58	53	63	48	39	55	49	39	80	82	64	60	64	56	25
	August	I	30	47	14	52	36	46	46	47	35	49	45	39	77	89	61	56	79	50	27
31		II	30	40	13	57	41	46	45	46	31	47	42	38	75	90	67	69	65	32	27
		III	30	39	13	52	95	40	48	41	30	43	40	34	66	77	67	76	60	34	19
	September	I	28	18	12	48	56	44	43	36	23	35	38	39	63	79	99	76	58	30	14
30		II	40	13	18	40	35	39	39	34	20	32	38	34	53	82	52	70	58	21	13
		III	27	20	7	53	42	36	33	32	17	33	34	33	50	88	42	48	43	18	29
	October	I	19	19	10	32	61	40	38	26	12	32	31	61	55	42	30	37	24	24	22
31		II	17	15	10	26	58	33	26	28	15	26	29	54	45	27	34	45	17	17	13
		III	12	15	8	22	41	23	18	25	13	21	25	42	41	19	45	33	14	13	12
	November	I	13	14	9	19	28	18	14	11	8	18	23	26	28	14	17	18	12	12	11
30		II	11	12	9	13	23	15	13	10	7	18	22	23	24	13	14	14	11	11	11
		III	8	11	8	12	21	12	11	9	7	15	21	22	20	13	15	13	11	10	10
	December	I	8	11	7	10	20	10	10	3	6	14	5	6	16	12	13	15	10	10	9
31		II	7	10	7	9	17	9	7	15	6	14	5	6	15	13	12	14	10	10	9
		III	7	9	8	8	15	8	7	12	5	13	15	23	14	12	11	12	9	9	9
	January	I	7	9	9	14	14	8	9	10	5	15	10	12	14	11	10	11	9	9	8
31		II	7	8	9	13	13	7	9	9	5	16	10	12	13	13	10	11	9	9	8
		III	7	7	8	13	13	8	9	8	5	16	9	10	12	10	9	11	9	9	8
	February	I	6	8	8	12	12	8	9	8	12	16	11	11	12	11	10	12	10	9	9
28/29		II	6	8	8	12	12	8	9	8	12	15	11	11	13	11	10	11	9	9	9
		III	6	8	8	12	12	8	10	8	12	15	14	13	13	11	10	11	10	9	9
	March	I	10	7	9	12	12	8	11	9	12	16	14	11	14	13	10	12	10	9	9
31		II	17	11	10	12	12	8	12	9	14	19	16	12	17	13	12	13	10	9	10
		III	16	10	12	15	15	12	13	10	19	29	17	13	16	17	12	15	15	10	9
	April	I	15	12	24	14	14	15	21	20	21	23	17	23	12	16	15	23	16	11	11
30		II	16	18	24	22	22	27	23	23	22	24	20	28	12	21	13	19	19	16	11
		III	21	11	22	29	29	31	18	15	26	26	21	29	12	23	24	25	21	15	11
	May	I	28	28	10	20	29	30	32	38	27	35	32	48	47	19	41	36	66	28	17
31		II	33	23	13	27	41	29	31	60	33	38	33	55	59	19	39	28	73	29	24
		III	39	39	14	30	63	43	37	64	29	34	35	56	54	23	65	57	79	43	25

TABLE-7
Average Ten Daily Flow Series at Demwe Upper HEP (1987-88 to 2003-04)

			Average Ten daily flow series at Demwe Upper HE project site as derived from Mompani site (17 Years) in Cumecs																			
			Catchment Area of Demwe Upper HE project site = 18947 sq km																			
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17				
Total days	Maonth	Ten Daily	1987-88	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	Avearge Cumecs	Maximum	Minimum	SD
31	May	I	864	1239	1683	1277	2567	1116	1244	870	1768	1844	761	1634	1421	2589	1098	710	780	1380	2589	710	576
		II	1075	1781	1595	1512	2203	1583	2176	758	2164	2323	769	1534	1098	2809	1157	965	740	1544	2809	740	625
		III	1160	2499	1921	1668	1611	1293	1555	1166	2504	2114	930	2552	2229	3082	1681	989	852	1753	3082	852	660
30	June	I	1665	1880	1839	2660	1518	1551	2168	1794	2174	2145	2220	2197	1446	2974	2225	888	1072	1907	2974	888	530
		II	1473	1877	2125	2097	2092	1595	2102	2160	2008	2227	2360	2846	1413	2956	2231	992	1578	2008	2956	992	495
		III	1797	1716	1997	2139	2369	2982	2188	1848	2035	3391	2269	3002	2289	3891	2185	976	1737	2283	3891	976	696
31	July	I	1867	2840	3009	1975	3387	1787	3062	1407	2426	2978	3400	3168	2087	2598	1856	996	2142	2411	3400	996	716
		II	1442	1600	1902	2468	2252	1753	2279	1290	1729	4070	3633	2693	2560	2457	1932	1329	1277	2157	4070	1277	790
		III	1837	2050	1825	2285	2037	1678	2214	1447	1215	3121	3203	2492	2418	2495	2201	1407	918	2050	3203	918	617
31	August	I	1983	1288	1629	1942	2211	1481	1976	1278	990	3015	3423	2378	2180	3072	1946	1061	745	1917	3423	745	759
		II	2378	1456	1595	1594	2095	1383	1838	1176	2033	2916	3492	2700	2711	2545	1260	1063	688	1937	3492	688	762
		III	2074	3241	1415	1539	1883	1236	1803	1174	1332	2596	2992	2618	2970	2347	1345	776	726	1886	3241	726	790
30	September	I	1731	1935	1647	1392	1810	1125	1369	1151	1175	2399	2980	3667	2887	2233	1242	686	727	1774	3667	686	828
		II	1515	1272	1390	1526	1696	1057	1220	1093	1268	2067	3077	2024	2659	2219	913	648	697	1550	3077	648	671
		III	2093	1480	1324	1798	1667	842	1239	981	1837	1966	3298	1657	1871	1693	832	1201	601	1552	3298	601	629
31	October	I	1269	2212	1459	1993	1427	548	1258	821	823	2094	1617	1207	1439	981	968	912	556	1270	2212	548	502
		II	981	2089	1357	1481	1444	919	956	713	730	1744	1090	1323	1711	736	740	592	527	1126	2089	527	457
		III	784	2130	1027	1218	1279	630	875	667	667	1577	817	1731	1301	647	593	556	493	1000	2130	493	472
30	November	I	698	1362	778	997	1136	483	803	586	586	1494	690	873	942	547	546	516	439	793	1494	439	309
		II	533	1188	649	828	971	401	760	543	543	1272	646	664	693	522	508	473	418	683	1272	401	253
		III	466	1106	522	717	820	350	728	484	484	1072	622	759	634	493	466	429	398	621	1106	350	222
31	December	I	386	1006	424	658	743	320	678	466	466	829	614	647	726	446	436	406	382	567	1006	320	189
		II	362	899	383	565	600	287	645	453	453	759	605	543	657	421	412	388	365	517	899	287	162
		III	315	713	368	472	535	261	612	445	445	708	548	480	560	408	381	365	351	469	713	261	130
31	January	I	289	513	353	418	405	281	283	368	405	663	506	446	512	398	357	344	341	405	663	281	100
		II	286	489	341	393	373	306	280	338	389	605	491	429	504	378	362	312	340	389	605	280	89
		III	271	463	357	371	332	257	302	309	378	573	470	409	510	376	374	331	341	378	573	257	85
28	February	I	251	513	381	379	355	455	300	284	490	539	472	397	504	384	353	338	315	395	539	251	87
		II	277	489	373	391	342	569	286	323	518	588	487	394	496	378	365	342	310	407	588	277	98
		III	489	522	349	494	361	665	304	379	566	576	487	393	474	390	362	345	320	440	665	304	103
31	March	I	742	532	387	651	453	645	315	399	607	638	581	442	553	397	384	333	353	495	742	315	132
		II	1168	538	358	567	605	671	520	407	968	828	622	517	591	395	366	390	314	578	1168	314	230
		III	1084	626	650	743	1362	733	1275	471	1254	793	837	512	689	690	426	375	603	772	1362	375	301
30	April	I	926	715	807	1279	1250	792	690	556	1254	715	800	740	1250	812	489	494	600	833	1279	489	269
		II	1043	1064	1402	1272	1842	837	683	765	1361	582	1139	658	960	994	798	519	819	985	1842	519	342
		III	983	1644	1461	1059	1100	1037	769	1088	1685	585	1205	1303	1310	1121	764	537	951	1094	1685	537	327
																					4070	**251**	**417**
Leap Year	Av Flows (Cumec-Days)		390921	496478	416536	454412	498169	343776	423347	308819	423095	592156	549054	527549	499366	525955	350312	243150	251622				
	Annual Flow (Cumec)		1071	1360	1141	1245	1365	942	1160	846	1159	1622	1504	1445	1368	1441	960	666	689	**1176**			
	Annual Volume MCM		33776	42896	35989	39261	43042	29702	36577	26682	36555	51162	47438	45580	43145	45443	30267	21008	21740	37074			
	AV Basin (Cumec)		**1176**																				

TABLE-8
Average Ten Daily Flow Series at Demwe Lower HEP (1987-88 to 2003-04)

Average Ten daily flow series at Demwe Upper HE project site as derived from Mompani site (17 Years) in Cumecs																							
Catchment Area of Demwe Upper HE project site = 20174 sq km																							
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17				
Total days	Maonth	Ten Daily	1987-88	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	Avearge Cumecs	Maximum	Minimum	SD
31	May	I	907	1301	1767	1341	2696	1172	1306	914	1856	1936	799	1716	1492	2718	1153	745	820	1449	2718	745	605
		II	1129	1870	1675	1588	2313	1662	2285	796	2272	2439	807	1611	1152	2950	1215	1013	777	1621	2950	777	657
		III	1218	2624	2017	1751	1692	1357	1633	1224	2629	2220	977	2680	2340	3236	1765	1038	895	1841	3236	895	693
30	June	I	1749	1974	1931	2793	1594	1628	2277	1883	2283	2252	2331	2307	1518	3122	2336	933	1126	2002	3122	933	556
		II	1546	1971	2232	2202	2197	1675	2207	2268	2108	2338	2478	2988	1483	3104	2342	1042	1657	2108	3104	1042	520
		III	1887	1802	2097	2246	2488	3131	2298	1940	2136	3560	2382	3152	2403	4086	2294	1025	1824	2397	4086	1025	731
31	July	I	1961	2982	3159	2074	3557	1876	3215	1477	2548	3127	3570	3327	2191	2727	1949	1045	2249	2531	3570	1045	752
		II	1514	1680	1997	2592	2364	1840	2393	1355	1815	4273	3814	2828	2688	2580	2028	1396	1341	2265	4273	1341	830
		III	1929	2153	1916	2400	2139	1762	2325	1520	1276	3277	3363	2617	2539	2620	2311	1477	964	2152	3363	964	648
31	August	I	2082	1352	1710	2039	2322	1555	2074	1341	1039	3166	3594	2496	2289	3225	2043	1114	783	2013	3594	783	797
		II	2497	1529	1675	1674	2200	1452	1929	1235	2134	3061	3667	2835	2847	2672	1323	1116	723	2033	3667	723	800
		III	2178	3403	1486	1616	1977	1297	1893	1233	1399	2726	3142	2749	3119	2465	1412	814	762	1981	3403	762	829
30	September	I	1817	2032	1729	1461	1901	1181	1438	1209	1234	2519	3129	3851	3031	2345	1304	720	764	1863	3851	720	869
		II	1591	1336	1460	1603	1781	1110	1281	1148	1331	2170	3231	2125	2792	2330	958	680	732	1627	3231	680	705
		III	2198	1554	1391	1888	1750	884	1301	1030	1929	2064	3463	1740	1965	1778	874	1261	631	1629	3463	631	661
31	October	I	1333	2323	1532	2093	1499	576	1321	862	864	2199	1698	1267	1511	1030	1016	957	584	1333	2323	576	528
		II	1030	2193	1425	1556	1516	965	1004	749	766	1831	1144	1389	1797	773	778	622	553	1182	2193	553	480
		III	823	2237	1079	1279	1343	662	919	700	700	1656	858	1818	1366	679	622	584	517	1050	2237	517	495
30	November	I	733	1430	817	1047	1193	508	843	615	615	1569	725	917	989	574	573	541	461	832	1569	461	325
		II	559	1248	682	870	1020	421	798	570	570	1336	678	698	728	548	533	497	438	717	1336	421	266
		III	489	1161	548	753	861	368	764	508	508	1126	654	797	666	518	490	450	418	652	1161	368	233
31	December	I	405	1057	445	690	780	336	712	489	489	871	645	680	762	468	458	426	401	595	1057	336	199
		II	380	943	402	593	630	302	677	475	475	797	635	570	689	442	432	407	383	543	943	302	170
		III	331	748	386	496	562	274	643	467	467	743	575	504	588	429	400	383	368	492	748	274	137
31	January	I	304	538	371	438	425	295	298	387	425	696	531	468	538	418	375	361	358	425	696	295	105
		II	300	514	358	413	392	321	294	355	408	635	516	451	529	397	380	327	357	409	635	294	93
		III	284	486	375	389	349	270	317	324	397	601	493	429	536	394	393	348	358	397	601	270	89
28	February	I	263	538	400	398	372	478	315	298	515	566	495	417	530	404	370	355	330	414	566	263	91
		II	291	513	391	411	359	598	300	339	544	617	511	414	521	397	383	359	325	428	617	291	103
		III	514	548	367	518	379	698	319	398	595	605	511	413	498	410	381	362	336	462	698	319	109
31	March	I	779	558	406	683	476	677	331	419	637	670	610	464	580	417	403	349	371	520	779	331	139
		II	1227	565	376	596	635	704	546	428	1016	869	653	543	620	414	384	409	330	607	1227	330	241
		III	1139	658	683	780	1430	770	1339	494	1317	832	879	537	723	724	447	394	634	811	1430	394	316
30	April	I	972	751	848	1343	1313	831	724	584	1316	750	840	777	1312	852	513	519	630	875	1343	513	282
		II	1095	1117	1472	1336	1934	878	717	803	1429	611	1196	691	1008	1044	838	545	860	1034	1934	545	360
		III	1032	1726	1534	1112	1155	1089	807	1143	1769	614	1265	1369	1376	1177	802	564	998	1149	1769	564	343
																					4273	**263**	**438**
Leap Year	Av Flows (Cumec-Days)		410467	521302	437363	477132	523077	360965	444514	324260	444250	621764	576506	553927	524334	552253	367827	255307	264203				
	Annual Flow (Cumec)		1125	1428	1198	1307	1433	989	1218	888	1217	1703	1579	1518	1437	1513	1008	699	724	**1234**			
	Annual Volume MCM		35464	45041	37788	41224	45194	31187	38406	28016	38383	53720	49810	47859	45302	47715	31780	22059	22827				
	AV Basin (Cumec)		**1234**																				

ANNEXURE-V

Average Ten Daily Flow Series at various project sites for Case II
(Dependable flow analysis using Data series with common years (1987-1988 to 2002-2003)

TABLE-9
Average Ten Daily Flow Series at Kalai HEP Stage-1 Table (1987-88 to 2002-03)

Average Ten Daily Flows Series at Kalai I H.E Project site as Derived from Haguliang (16 years) in cumecs

Catchment Area of Kalai I site = 16610 Km2

			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16				
Tot Days	**Month**	**Ten Daily**	**1987-88**	**1988-89**	**1989-90**	**1990-91**	**1991-92**	**1992-93**	**1993-94**	**1994-95**	**1995-96**	**1996-97**	**1997-98**	**1998-99**	**1999-00**	**2000-01**	**2001-02**	**2002-03**	**A.V. (cumec)**	**Max**	**Min**	**SD**
	June	I	1406	1733	1566	1964	2369	1046	1515	1296	1896	1896	1951	1605	1260	2624	1956	763	1678	2624	763	475
30		II	1304	1743	1901	1627	2606	1229	1440	1386	1960	1958	2077	1653	1230	2608	1961	855	1721	2608	855	484
		III	1553	1529	1723	1655	2082	1763	1454	1368	2311	2997	1995	2004	2012	3443	1920	841	1916	3443	841	621
	July	I	1646	2645	2763	2106	2082	1486	2498	1224	1750	2628	3005	2798	1832	2288	1627	1156	2096	3005	1156	587
31		II	1364	1577	1910	2603	2149	1319	2522	1357	1574	3603	3212	2374	2181	2167	1694	1182	2049	3603	1182	696
		III	1817	2012	1809	2165	1650	1349	1879	1674	1349	2756	2832	2192	2061	2197	1935	873	1909	2832	873	495
	August	I	1794	1249	1591	1568	1628	1221	1683	1555	1328	2665	3062	2092	1915	2712	1707	921	1793	3062	921	584
31		II	1956	1400	1571	1544	1602	1077	1622	1431	1293	2572	3087	2306	2390	2241	1094	918	1757	3087	918	610
		III	1781	3280	1379	1654	1419	1041	1497	1365	1175	2287	2641	2303	2621	2065	1170	662	1771	3280	662	703
	September	I	1643	1925	1522	1466	1255	776	1222	1316	1354	2161	2727	3395	2635	1999	1035	494	1683	3395	494	761
30		II	1372	1209	1344	1351	1168	693	1102	1301	1165	1838	2820	1791	2414	1986	714	456	1420	2820	456	624
		III	1818	1457	1245	1140	1092	589	1127	1165	1125	1739	3031	1439	1647	1474	636	995	1357	3031	589	565
	October	I	1120	2106	1381	1321	911	429	1113	1058	2105	1907	1441	1044	1269	824	811	756	1225	2106	429	481
31		II	892	2013	1145	907	951	530	886	1016	1846	1566	946	1158	1534	586	590	445	1063	2013	445	465
		III	744	1399	784	626	847	457	724	851	1449	1404	664	1554	1135	499	446	410	875	1554	410	390
	November	I	641	976	611	495	390	286	622	783	910	948	487	592	632	405	403	387	598	976	286	214
30		II	460	810	528	432	341	251	622	750	794	821	462	473	489	391	383	363	523	821	251	182
		III	401	728	412	386	310	234	532	730	762	706	449	527	455	375	359	338	481	762	234	167
	December	I	348	676	340	348	684	217	496	161	205	567	418	463	508	347	342	325	403	684	161	155
31		II	321	574	305	256	518	199	470	156	196	513	438	403	468	333	328	314	362	574	156	126
		III	281	502	283	250	412	183	449	513	780	498	406	376	413	326	310	301	393	780	183	141
	January	I	478	478	263	302	354	177	533	342	400	472	382	347	386	320	297	289	364	533	177	93
31		II	459	459	248	298	298	187	544	350	411	439	438	338	381	309	299	271	358	544	187	94
		III	439	439	271	304	274	170	537	303	352	420	362	326	384	308	305	282	342	537	170	87
	February	I	414	414	282	298	271	407	542	385	386	417	378	335	397	328	309	301	367	542	271	69
28/29		II	405	405	282	304	272	397	522	393	394	445	387	333	392	324	316	303	367	522	272	66
		III	421	421	261	328	271	402	533	493	451	439	387	333	380	331	315	304	379	533	261	78
	March	I	421	421	268	381	295	430	566	487	380	475	441	361	425	335	327	297	394	566	268	80
31		II	418	418	263	409	323	496	669	554	428	584	465	407	447	333	317	331	429	669	263	108
		III	524	517	403	461	328	664	1001	601	462	564	590	405	504	504	351	322	513	1001	322	164
	April	I	471	471	512	716	699	717	804	576	805	401	543	508	803	549	362	366	581	805	362	156
30		II	757	757	937	808	793	745	816	673	951	416	739	461	664	655	541	387	694	951	387	169
		III	1010	1010	1079	611	515	909	895	713	1010	418	777	834	862	728	522	390	768	1079	390	222
	May	I	706	982	1035	1117	1311	943	1221	1116	1670	1616	648	1428	1238	2280	949	603	1179	2280	603	427
31		II	943	1406	990	1084	2079	1153	1302	1120	1878	2043	656	1339	949	2500	1002	831	1330	2500	656	523
		III	1022	2162	1486	1284	2193	991	1165	1200	1913	1857	800	2247	1959	2721	1470	852	1583	2721	800	578
																				3603	**156**	**346**
Leap Year	A. Flow (cumec-day)		341678	432499	352843	351781	374293	255683	377413	323142	399211	499240	468956	434162	421438	452110	296373	201924				
	Annual Flow (cumec)		934	1185	967	964	1023	701	1034	885	1091	1368	1285	1189	1151	1239	812	553	**1024**			
	Annual Volume (MCM)		29521	37368	30486	30394	32339	22091	32609	27919	34492	43134	40518	37512	36412	39062	25607	17446	**32307**			
	A.V. basin (cumec)		**1024**																			

TABLE-10
Average Ten Daily Flow Series at Kalai HEP Stage-2(1987-88 upto 2002-03)

Average Ten Daily Flow Series at Kalai II H.E Project site as Derived from Haguliang (16 years) in cumecs

Catchment Area of Kalai II site = 17846 Km2

			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16				
Tot Days	**Month**	**Ten Daily**	**1987-88**	**1988-89**	**1989-90**	**1990-91**	**1991-92**	**1992-93**	**1993-94**	**1994-95**	**1995-96**	**1996-97**	**1997-98**	**1998-99**	**1999-00**	**2000-01**	**2001-02**	**2002-03**	**A.V. (cumec)**	**Max**	**Min**	**SD**
	June	I	1510	1862	1683	2110	2546	1124	1627	1392	2037	2036	2096	1725	1354	2819	2101	819	1803	2819	819	510
30		II	1401	1873	2043	1748	2800	1321	1547	1489	2106	2103	2231	1776	1322	2802	2107	919	1849	2802	919	520
		III	1668	1643	1851	1778	2237	1894	1562	1469	2483	3220	2143	2153	2162	3699	2063	903	2058	3699	903	667
	July	I	1769	2842	2969	2263	2237	1596	2684	1315	1880	2824	3228	3006	1969	2459	1748	1242	2252	3228	1242	631
31		II	1466	1694	2052	2796	2309	1417	2709	1457	1691	3871	3451	2551	2343	2328	1820	1270	2202	3871	1270	748
		III	1952	2162	1944	2326	1773	1449	2018	1799	1449	2961	3043	2355	2214	2360	2079	938	2051	3043	938	532
	August	I	1927	1342	1710	1685	1749	1312	1808	1671	1427	2863	3290	2248	2058	2913	1834	990	1927	3290	990	627
31		II	2101	1504	1688	1659	1722	1157	1743	1537	1389	2764	3317	2477	2568	2408	1175	987	1887	3317	987	656
		III	1914	3524	1481	1777	1525	1118	1609	1466	1262	2457	2837	2474	2816	2219	1257	711	1903	3524	711	755
	September	I	1766	2068	1635	1575	1348	833	1313	1414	1455	2321	2930	3648	2831	2148	1112	530	1808	3648	530	818
30		II	1474	1299	1444	1452	1255	744	1184	1398	1252	1974	3030	1925	2594	2133	767	490	1526	3030	490	670
		III	1953	1565	1338	1225	1173	633	1210	1252	1208	1869	3257	1546	1770	1583	683	1069	1458	3257	633	607
	October	I	1203	2262	1484	1419	979	461	1195	1136	2261	2049	1549	1121	1364	885	871	812	1316	2262	461	516
31		II	958	2162	1231	974	1021	570	952	1092	1984	1683	1016	1244	1649	629	633	478	1142	2162	478	499
		III	799	1503	842	673	910	491	778	914	1557	1508	714	1670	1220	536	479	441	940	1670	441	419
	November	I	688	1049	657	532	419	307	668	841	978	1018	524	636	679	436	432	416	643	1049	307	229
30		II	494	870	567	464	367	270	668	805	853	882	496	508	525	420	412	390	562	882	270	195
		III	430	783	442	415	333	251	572	784	818	759	482	566	489	403	386	363	517	818	251	179
	December	I	374	727	365	374	735	233	533	184	237	609	449	497	546	373	367	349	435	735	184	164
31		II	344	617	328	275	556	214	505	176	225	551	471	433	503	358	352	337	390	617	176	134
		III	302	539	304	268	443	197	483	534	809	535	436	404	443	350	333	324	419	809	197	146
	January	I	514	514	282	324	380	190	573	367	430	507	410	373	415	344	319	310	391	573	190	100
31		II	493	493	266	320	320	201	585	376	441	471	471	363	409	332	322	291	385	585	201	101
		III	471	471	291	327	294	183	577	325	378	451	389	351	413	331	328	303	368	577	183	93
	February	I	445	445	303	320	291	437	582	414	415	448	406	360	427	352	332	323	394	582	291	75
28/29		II	435	435	303	327	292	426	561	422	423	479	416	358	422	349	340	326	395	561	292	71
		III	453	453	280	353	291	432	573	530	484	471	416	357	408	356	338	327	408	573	280	84
	March	I	452	452	288	410	317	463	608	524	408	510	474	387	457	360	352	319	424	608	288	86
31		II	449	449	283	440	347	533	719	596	460	628	500	437	480	358	340	355	461	719	283	116
		III	562	555	433	495	353	714	1075	646	497	606	634	435	541	542	378	346	551	1075	346	176
	April	I	506	506	550	769	751	770	864	618	865	431	583	545	863	590	389	393	625	865	389	167
30		II	814	814	1007	869	852	800	876	723	1021	447	794	495	713	704	582	416	745	1021	416	181
		III	1085	1085	1159	656	554	977	961	766	1085	449	835	896	926	783	560	419	825	1159	419	239
	May	I	759	1055	1112	1200	1409	1013	1312	1199	1794	1736	697	1534	1330	2449	1020	648	1267	2449	648	459
31		II	1013	1511	1064	1165	2234	1239	1399	1204	2018	2195	704	1438	1020	2686	1077	893	1429	2686	704	562
		III	1098	2323	1597	1380	2356	1065	1252	1290	2055	1995	859	2415	2105	2923	1579	915	1700	2923	859	621
																				3871	**176**	**371**
Leap Year	A. Flow (cumec-day)		367103	464682	379099	377958	402145	274709	405498	347188	428918	536382	503852	466469	452799	485753	318427	216950				
	Annual Flow (cumec)		1003	1273	1039	1036	1099	753	1111	951	1172	1470	1380	1278	1237	1331	872	594	**1100**			
	Annual Volume (MCM)		31718	40149	32754	32656	34745	23735	35035	29997	37058	46343	43533	40303	39122	41969	27512	18744	**34711**			
	A.V. basin (cumec)		**1100**																			

TABLE-11
Intermediate Ten Daily Flow Series between Kalai HEP Stage-2 and Kalai HEP Stage-1(1987-88 to 2002-03)

	Intermediate Tendaily Flow Series between KL-2 & KL-1																	
	Intermediate Catchment Area = 1236 Km2																	
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Tot Days	**Month**	**Ten Daily**	**1987-88**	**1988-89**	**1989-90**	**1990-91**	**1991-92**	**1992-93**	**1993-94**	**1994-95**	**1995-96**	**1996-97**	**1997-98**	**1998-99**	**1999-00**	**2000-01**	**2001-02**	**2002-03**
	June	I	105	129	117	146	176	78	113	96	141	140	145	119	94	195	146	57
30		II	97	130	141	121	194	91	107	103	146	146	155	123	92	194	146	64
		III	116	114	128	123	155	131	108	102	172	223	148	149	150	256	143	63
	July	I	123	197	206	157	155	111	186	91	130	196	224	208	136	170	121	86
31		II	102	117	142	194	160	98	188	101	117	268	239	177	162	161	126	88
		III	135	150	135	161	123	100	140	125	100	205	211	163	153	163	144	65
	August	I	133	93	118	117	121	91	125	116	99	198	228	156	143	202	127	69
31		II	146	104	117	115	119	80	121	106	96	191	230	172	178	167	81	68
		III	133	244	103	123	106	77	111	102	87	170	197	171	195	154	87	49
	September	I	122	143	113	109	93	58	91	98	101	161	203	253	196	149	77	37
30		II	102	90	100	101	87	52	82	97	87	137	210	133	180	148	53	34
		III	135	108	93	85	81	44	84	87	84	129	226	107	123	110	47	74
	October	I	83	157	103	98	68	32	83	79	157	142	107	78	94	61	60	56
31		II	66	150	85	67	71	39	66	76	137	117	70	86	114	44	44	33
		III	55	104	58	47	63	34	54	63	108	104	49	116	84	37	33	31
	November	I	48	73	46	37	29	21	46	58	68	71	36	44	47	30	30	29
30		II	34	60	39	32	25	19	46	56	59	61	34	35	36	29	29	27
		III	30	54	31	29	23	17	40	54	57	53	33	39	34	28	27	25
	December	I	26	50	25	26	51	16	37	22	32	42	31	34	38	26	25	24
31		II	24	43	23	19	39	15	35	20	29	38	33	30	35	25	24	23
		III	21	37	21	19	31	14	33	21	30	37	30	28	31	24	23	22
	January	I	36	36	20	22	26	13	40	25	30	35	28	26	29	24	22	22
31		II	34	34	18	22	22	14	40	26	31	33	33	25	28	23	22	20
		III	33	33	20	23	20	13	40	23	26	31	27	24	29	23	23	21
	February	I	31	31	21	22	20	30	40	29	29	31	28	25	30	24	23	22
28/29		II	30	30	21	23	20	30	39	29	29	33	29	25	29	24	24	23
		III	31	31	19	24	20	30	40	37	34	33	29	25	28	25	23	23
	March	I	31	31	20	28	22	32	42	36	28	35	33	27	32	25	24	22
31		II	31	31	20	30	24	37	50	41	32	43	35	30	33	25	24	25
		III	39	38	30	34	24	49	74	45	34	42	44	30	37	38	26	24
	April	I	35	35	38	53	52	53	60	43	60	30	40	38	60	41	27	27
30		II	56	56	70	60	59	55	61	50	71	31	55	34	49	49	40	29
		III	75	75	80	45	38	68	67	53	75	31	58	62	64	54	39	29
	May	I	53	73	77	83	98	70	91	83	124	120	48	106	92	170	71	45
31		II	70	105	74	81	155	86	97	83	140	152	49	100	71	186	75	62
		III	76	161	111	96	163	74	87	89	142	138	60	167	146	202	109	63

TABLE-12
Average Ten Daily Flow Series at Hutong HEP Satge-2 (1987-88 to 2002-03)

Average Ten Daily Flow Series at Hutong I H.E. Project site as Derived from Hutong II (16 years) in cumecs

Catchment Area of Hutong I site = 17968 Km2

			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16				
Tot Days	**Month**	**Ten Daily**	**1987-88**	**1988-89**	**1989-90**	**1990-91**	**1991-92**	**1992-93**	**1993-94**	**1994-95**	**1995-96**	**1996-97**	**1997-98**	**1998-99**	**1999-00**	**2000-01**	**2001-02**	**2002-03**	**A.V. (cumec)**	**Max**	**Min**	**SD**
	June	I	1520	1875	1694	2124	2563	1132	1639	1401	2051	2039	2110	1737	1363	2839	2116	825	1814	2839	825	513
30		II	1411	1886	2057	1760	2819	1330	1558	1499	2121	2118	2246	1789	1331	2822	2121	925	1862	2822	925	523
		III	1680	1654	1864	1791	2252	1907	1573	1480	2500	3242	2158	2167	2177	3725	2077	909	2072	3725	909	672
	July	I	1781	2862	2989	2279	2252	1607	2702	1324	1893	2843	3250	3027	1982	2475	1759	1250	2267	3250	1250	635
31		II	1476	1706	2066	2815	2325	1427	2728	1467	1703	3897	3475	2568	2359	2344	1832	1279	2217	3897	1279	753
		III	1966	2177	1957	2342	1785	1459	2032	1811	1459	2981	3063	2371	2229	2376	2093	944	2065	3063	944	535
	August	I	1940	1351	1722	1696	1761	1321	1820	1682	1437	2882	3312	2263	2072	2933	1847	997	1940	3312	997	631
31		II	2116	1514	1700	1671	1733	1165	1755	1548	1398	2783	3340	2494	2585	2424	1183	993	1900	3340	993	660
		III	1927	3548	1491	1789	1535	1126	1620	1476	1271	2474	2857	2491	2835	2234	1266	716	1916	3548	716	760
	September	I	1778	2082	1646	1586	1357	839	1322	1424	1465	2337	2950	3673	2851	2162	1119	534	1820	3673	534	823
30		II	1484	1308	1454	1462	1264	750	1192	1408	1260	1988	3050	1938	2612	2148	773	494	1536	3050	494	675
		III	1966	1576	1347	1233	1181	637	1219	1261	1217	1882	3279	1556	1782	1594	688	1076	1468	3279	637	611
	October	I	1211	2278	1494	1428	985	465	1204	1144	2277	2063	1559	1129	1373	891	877	818	1325	2278	465	520
31		II	965	2177	1239	981	1028	573	959	1100	1997	1694	1023	1253	1660	633	638	481	1150	2177	481	503
		III	805	1513	848	677	917	494	783	921	1567	1518	719	1681	1228	539	482	444	946	1681	444	422
	November	I	693	1056	661	536	422	309	673	847	985	1025	527	640	683	439	435	419	647	1056	309	231
30		II	497	876	571	467	369	271	673	811	859	888	500	511	529	423	414	393	566	888	271	196
		III	433	788	445	418	336	253	575	789	824	764	485	570	493	405	389	365	521	824	253	180
	December	I	377	732	368	376	757	235	537	175	222	614	452	501	549	376	370	351	437	757	175	169
31		II	347	621	330	277	560	215	509	169	212	555	474	436	506	361	355	340	392	621	169	137
		III	304	543	306	270	446	198	486	555	843	538	439	406	446	352	336	326	425	843	198	153
	January	I	517	517	284	327	383	191	577	370	433	510	413	376	417	347	321	313	393	577	191	101
31		II	496	496	268	323	323	202	588	379	444	475	474	366	412	334	324	293	387	588	202	102
		III	475	475	293	329	296	184	581	327	381	454	391	353	416	333	330	305	370	581	184	94
	February	I	448	448	305	322	293	440	586	417	418	451	409	362	430	354	334	325	397	586	293	75
28/29		II	438	438	305	329	294	429	564	425	426	482	419	360	424	351	342	328	397	564	294	72
		III	456	456	282	355	293	435	577	533	488	475	419	360	411	358	341	329	410	577	282	85
	March	I	455	455	290	412	319	466	613	527	411	514	477	390	460	362	354	322	427	613	290	86
31		II	452	452	285	443	349	537	724	600	463	632	503	440	483	361	343	358	464	724	285	117
		III	566	559	436	498	355	719	1082	651	500	610	638	438	545	545	380	348	554	1082	348	177
	April	I	509	509	554	774	756	775	869	623	871	434	587	549	869	594	392	396	629	871	392	168
30		II	819	819	1014	874	858	806	882	728	1028	450	800	498	718	709	585	419	751	1028	419	183
		III	1093	1093	1167	660	557	984	968	772	1093	452	841	902	933	788	564	422	831	1167	422	240
	May	I	764	1063	1119	1208	1419	1020	1321	1207	1806	1748	701	1545	1339	2466	1027	652	1275	2466	652	462
31		II	1020	1521	1071	1173	2249	1248	1409	1212	2032	2210	709	1448	1027	2704	1084	899	1438	2704	709	566
		III	1106	2339	1608	1389	2372	1072	1260	1299	2069	2009	865	2431	2119	2943	1590	921	1712	2943	865	625
																				3897	**169**	**374**
Leap Year	A. Flow (cumec-day)		369612	467859	381690	380542	405063	276587	408270	349561	431850	539940	507297	469658	455894	489073	320604	218433				
	Annual Flow (cumec)		1010	1282	1046	1043	1107	758	1119	958	1180	1479	1390	1287	1246	1340	878	598	**1107**			
	Annual Volume (MCM)		31935	40423	32978	32879	34997	23897	35275	30202	37312	46651	43830	40578	39389	42256	27700	18873	**34948**			
	A.V. basin (cumec)		**1107**																			

TABLE-13
Average Ten Daily Flow Series at Hutong HEP Satge-2 (1987-88 to 2002-03)

Average Ten Daily Flow Series at Hutong II H.E. Project site as Derived from Haguliang (16 years) in cumecs

Catchment Area of Hutong II Site = 18450 Km2

			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16				
Tot Days	**Month**	**Ten Daily**	**1987-88**	**1988-89**	**1989-90**	**1990-91**	**1991-92**	**1992-93**	**1993-94**	**1994-95**	**1995-96**	**1996-97**	**1997-98**	**1998-99**	**1999-00**	**2000-01**	**2001-02**	**2002-03**	**A.V. (cumec)**	**Max**	**Min**	**SD**
	June	I	1561	1925	1740	2181	2632	1162	1682	1439	2106	2094	2167	1783	1400	2915	2172	847	1863	2915	847	527
30		II	1449	1936	2112	1807	2895	1365	1600	1539	2178	2174	2307	1837	1367	2897	2178	950	1912	2897	950	537
		III	1725	1698	1914	1839	2312	1958	1615	1519	2567	3329	2216	2226	2235	3825	2133	934	2128	3825	934	690
	July	I	1829	2938	3069	2340	2313	1650	2775	1360	1944	2919	3337	3108	2035	2542	1807	1284	2328	3337	1284	652
31		II	1515	1751	2121	2891	2387	1465	2801	1507	1749	4002	3568	2637	2422	2407	1882	1313	2276	4002	1313	773
		III	2018	2235	2010	2405	1833	1498	2087	1860	1498	3061	3146	2435	2289	2440	2149	970	2121	3146	970	550
	August	I	1993	1388	1768	1742	1808	1357	1869	1727	1475	2960	3401	2324	2127	3012	1896	1023	1992	3401	1023	648
31		II	2173	1555	1745	1716	1780	1196	1802	1589	1436	2857	3429	2561	2655	2490	1215	1020	1951	3429	1020	678
		III	1979	3644	1531	1837	1577	1156	1663	1516	1305	2540	2933	2558	2911	2294	1300	735	1967	3644	735	780
	September	I	1825	2138	1690	1628	1394	862	1357	1462	1504	2400	3029	3771	2927	2220	1149	548	1869	3771	548	845
30		II	1524	1343	1493	1501	1298	770	1224	1445	1294	2041	3132	1990	2682	2206	793	507	1578	3132	507	693
		III	2019	1618	1383	1266	1213	654	1251	1295	1249	1932	3367	1598	1830	1637	706	1105	1508	3367	654	628
	October	I	1244	2339	1534	1467	1012	477	1236	1175	2338	2118	1601	1159	1410	915	901	840	1360	2339	477	534
31		II	990	2235	1272	1007	1056	589	984	1129	2051	1740	1050	1287	1704	650	655	494	1181	2235	494	516
		III	826	1553	871	695	941	507	804	945	1609	1559	738	1726	1261	554	495	456	971	1726	456	433
	November	I	712	1084	679	550	434	317	691	870	1011	1053	541	658	702	450	447	430	664	1084	317	237
30		II	511	899	586	479	379	279	691	833	882	912	513	525	543	435	426	403	581	912	279	202
		III	445	809	457	429	345	260	591	810	846	784	498	585	506	416	399	375	535	846	260	185
	December	I	387	751	378	386	760	241	551	179	228	630	464	514	564	386	380	361	448	760	179	172
31		II	356	637	339	285	575	221	522	173	218	570	487	447	520	370	364	349	402	637	173	140
		III	313	557	315	277	458	203	499	570	866	553	451	417	458	362	345	335	436	866	203	157
	January	I	531	531	292	335	393	196	592	380	445	524	424	386	429	356	330	321	404	592	196	104
31		II	510	510	275	331	331	208	604	389	456	487	487	376	423	343	332	301	398	604	208	105
		III	487	487	301	338	304	189	596	336	391	467	402	363	427	342	339	313	380	596	189	97
	February	I	460	460	313	331	301	452	602	428	429	464	420	372	441	364	343	334	407	602	301	77
28/29		II	450	450	313	338	302	441	580	437	438	495	430	370	436	360	351	337	408	580	302	74
		III	468	468	290	365	301	446	592	547	501	487	430	370	422	368	350	338	421	592	290	87
	March	I	467	467	297	423	327	478	629	541	422	527	490	401	472	372	363	330	438	629	297	89
31		II	464	464	293	455	359	551	743	616	476	649	517	452	496	370	352	367	476	743	293	120
		III	582	574	447	512	365	738	1111	668	513	626	655	450	560	560	390	357	569	1111	357	182
	April	I	523	523	569	795	777	796	893	639	895	446	603	564	892	610	403	406	646	895	403	173
30		II	841	841	1041	898	881	827	906	748	1056	462	821	512	737	728	601	430	771	1056	430	187
		III	1122	1122	1199	678	572	1010	994	792	1122	464	863	927	958	809	579	433	853	1199	433	247
	May	I	785	1091	1149	1240	1457	1048	1356	1239	1855	1794	720	1586	1375	2532	1055	670	1309	2532	670	475
31		II	1047	1562	1100	1204	2309	1281	1447	1245	2086	2269	728	1487	1054	2777	1113	923	1477	2777	728	581
		III	1135	2401	1651	1427	2435	1101	1294	1333	2125	2062	888	2496	2176	3022	1633	946	1758	3022	888	642
																				4002	**173**	**384**
Leap Year	A. Flow (cumec-day)		379528	480410	391929	390750	415756	284007	419222	358938	443434	554424	520905	482257	468124	502193	329204	224293				
	Annual Flow (cumec)		1037	1316	1074	1071	1136	778	1149	983	1212	1519	1427	1321	1279	1376	902	615	1137			
	Annual Volume (MCM)		32791	41507	33863	33761	35921	24538	36221	31012	38313	47902	45006	41667	40446	43389	28443	19379	35885			
	A.V. basin (cumec)		**1137**																			

TABLE-14
Intermediate Ten Daily Flow Series between Hutong HEP Stage-2 and Hutong HEP Stage-1(1987-88 to 2002-03)

	Table 6B. Intermediate Tendaily Flow Series between HTG-2 & HTG-1																
	Intermediate Catchment Area = 482 Km2																
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Tot Days	**Month**	**Ten Daily**	**1987-88**	**1988-89**	**1989-90**	**1990-91**	**1991-92**	**1992-93**	**1993-94**	**1994-95**	**1995-96**	**1996-97**	**1997-98**	**1998-99**	**1999-00**	**2000-01**	**2001-02**	**2002-03**
	June	I	41	50	45	57	69	30	44	38	55	55	57	47	37	76	57	22
30		II	38	51	55	47	76	36	42	40	57	57	60	48	36	76	57	25
		III	45	44	50	48	60	51	42	40	67	87	58	58	58	100	56	24
	July	I	48	77	80	61	60	43	72	36	51	76	87	81	53	66	47	34
31		II	40	46	55	76	62	38	73	39	46	105	93	69	63	63	49	34
		III	53	58	53	63	48	39	55	49	39	80	82	64	60	64	56	25
	August	I	52	36	46	46	47	35	49	45	39	77	89	61	56	79	50	27
31		II	57	41	46	45	46	31	47	42	38	75	90	67	69	65	32	27
		III	52	95	40	48	41	30	43	40	34	66	77	67	76	60	34	19
	September	I	48	56	44	43	36	23	35	38	39	63	79	99	76	58	30	14
30		II	40	35	39	39	34	20	32	38	34	53	82	52	70	58	21	13
		III	53	42	36	33	32	17	33	34	33	50	88	42	48	43	18	29
	October	I	32	61	40	38	26	12	32	31	61	55	42	30	37	24	24	22
31		II	26	58	33	26	28	15	26	29	54	45	27	34	45	17	17	13
		III	22	41	23	18	25	13	21	25	42	41	19	45	33	14	13	12
	November	I	19	28	18	14	11	8	18	23	26	28	14	17	18	12	12	11
30		II	13	23	15	13	10	7	18	22	23	24	13	14	14	11	11	11
		III	12	21	12	11	9	7	15	21	22	20	13	15	13	11	10	10
	December	I	10	20	10	10	3	6	14	5	6	16	12	13	15	10	10	9
31		II	9	17	9	7	15	6	14	5	6	15	13	12	14	10	10	9
		III	8	15	8	7	12	5	13	15	23	14	12	11	12	9	9	9
	January	I	14	14	8	9	10	5	15	10	12	14	11	10	11	9	9	8
31		II	13	13	7	9	9	5	16	10	12	13	13	10	11	9	9	8
		III	13	13	8	9	8	5	16	9	10	12	10	9	11	9	9	8
	February	I	12	12	8	9	8	12	16	11	11	12	11	10	12	10	9	9
28/29		II	12	12	8	9	8	12	15	11	11	13	11	10	11	9	9	9
		III	12	12	8	10	8	12	15	14	13	13	11	10	11	10	9	9
	March	I	12	12	8	11	9	12	16	14	11	14	13	10	12	10	9	9
31		II	12	12	8	12	9	14	19	16	12	17	13	12	13	10	9	10
		III	15	15	12	13	10	19	29	17	13	16	17	12	15	15	10	9
	April	I	14	14	15	21	20	21	23	17	23	12	16	15	23	16	11	11
30		II	22	22	27	23	23	22	24	20	28	12	21	13	19	19	16	11
		III	29	29	31	18	15	26	26	21	29	12	23	24	25	21	15	11
	May	I	20	29	30	32	38	27	35	32	48	47	19	41	36	66	28	17
31		II	27	41	29	31	60	33	38	33	55	59	19	39	28	73	29	24
		III	30	63	43	37	64	29	34	35	56	54	23	65	57	79	43	25

TABLE-15
Average Ten Daily Flow Series at Demwe Upper HEP (1987-88 to 2002-03)

	Average Ten daily flow series at Demwe Upper HE project site as derived from Mompani site (16 Years) in Cumecs																					
	Catchment Area of Demwe Upper HE project site = 18947 sq km																					
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16				
Total days	Maonth	Ten Daily	1987-88	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	Avearge Cumecs	Maximum	Minimum	SD
31	May	I	864	1239	1683	1277	2567	1116	1244	870	1768	1844	761	1634	1421	2589	1098	710	1418	2589	710	573
		II	1075	1781	1595	1512	2203	1583	2176	758	2164	2323	769	1534	1098	2809	1157	965	1594	2809	758	609
		III	1160	2499	1921	1668	1611	1293	1555	1166	2504	2114	930	2552	2229	3082	1681	989	1810	3082	930	638
30	June	I	1665	1880	1839	2660	1518	1551	2168	1794	2174	2145	2220	2197	1446	2974	2225	888	1959	2974	888	500
		II	1473	1877	2125	2097	2092	1595	2102	2160	2008	2227	2360	2846	1413	2956	2231	992	2035	2956	992	499
		III	1797	1716	1997	2139	2369	2982	2188	1848	2035	3391	2269	3002	2289	3891	2185	976	2317	3891	976	705
31	July	I	1867	2840	3009	1975	3387	1787	3062	1407	2426	2978	3400	3168	2087	2598	1856	996	2428	3400	996	736
		II	1442	1600	1902	2468	2252	1753	2279	1290	1729	4070	3633	2693	2560	2457	1932	1329	2212	4070	1290	782
		III	1837	2050	1825	2285	2037	1678	2214	1447	1215	3121	3203	2492	2418	2495	2201	1407	2120	3203	1215	562
31	August	I	1983	1288	1629	1942	2211	1481	1976	1278	990	3015	3423	2378	2180	3072	1946	1061	1991	3423	990	720
		II	2378	1456	1595	1594	2095	1383	1838	1176	2033	2916	3492	2700	2711	2545	1260	1063	2015	3492	1063	714
		III	2074	3241	1415	1539	1883	1236	1803	1174	1332	2596	2992	2618	2970	2347	1345	776	1959	3241	776	755
30	September	I	1731	1935	1647	1392	1810	1125	1369	1151	1175	2399	2980	3667	2887	2233	1242	686	1839	3667	686	808
		II	1515	1272	1390	1526	1696	1057	1220	1093	1268	2067	3077	2024	2659	2219	913	648	1603	3077	648	655
		III	2093	1480	1324	1798	1667	842	1239	981	1837	1966	3298	1657	1871	1693	832	1201	1611	3298	832	598
31	October	I	1269	2212	1459	1993	1427	548	1258	821	823	2094	1617	1207	1439	981	968	912	1314	2212	548	483
		II	981	2089	1357	1481	1444	919	956	713	730	1744	1090	1323	1711	736	740	592	1163	2089	592	444
		III	784	2130	1027	1218	1279	630	875	667	667	1577	817	1731	1301	647	593	556	1031	2130	556	468
30	November	I	698	1362	778	997	1136	483	803	586	586	1494	690	873	942	547	546	516	815	1494	483	305
		II	533	1188	649	828	971	401	760	543	543	1272	646	664	693	522	508	473	700	1272	401	252
		III	466	1106	522	717	820	350	728	484	484	1072	622	759	634	493	466	429	635	1106	350	222
31	December	I	386	1006	424	658	743	320	678	466	466	829	614	647	726	446	436	406	578	1006	320	189
		II	362	899	383	565	600	287	645	453	453	759	605	543	657	421	412	388	527	899	287	163
		III	315	713	368	472	535	261	612	445	445	708	548	480	560	408	381	365	476	713	261	131
31	January	I	289	513	353	418	405	281	283	368	405	663	506	446	512	398	357	344	409	663	281	102
		II	286	489	341	393	373	306	280	338	389	605	491	429	504	378	362	312	392	605	280	91
		III	271	463	357	371	332	257	302	309	378	573	470	409	510	376	374	331	380	573	257	87
28	February	I	251	513	381	379	355	455	300	284	490	539	472	397	504	384	353	338	400	539	251	87
		II	277	489	373	391	342	569	286	323	518	588	487	394	496	378	365	342	414	588	277	98
		III	489	522	349	494	361	665	304	379	566	576	487	393	474	390	362	345	447	665	304	102
31	March	I	742	532	387	651	453	645	315	399	607	638	581	442	553	397	384	333	504	742	315	131
		II	1168	538	358	567	605	671	520	407	968	828	622	517	591	395	366	390	594	1168	358	227
		III	1084	626	650	743	1362	733	1275	471	1254	793	837	512	689	690	426	375	782	1362	375	308
30	April	I	926	715	807	1279	1250	792	690	556	1254	715	800	740	1250	812	489	494	848	1279	489	271
		II	1043	1064	1402	1272	1842	837	683	765	1361	582	1139	658	960	994	798	519	995	1842	519	351
		III	983	1644	1461	1059	1100	1037	769	1088	1685	585	1205	1303	1310	1121	764	537	1103	1685	537	336
																				4070	251	408
Leap Year	Av Flows (Cumec-Days)		390921	496478	416536	454412	498169	343776	423347	308819	423095	592156	549054	527549	499366	525955	350312	243150				
	Annual Flow (Cumec)		1071	1360	1141	1245	1365	942	1160	846	1159	1622	1504	1445	1368	1441	960	666	1206			
	Annual Volume MCM		33776	42896	35989	39261	43042	29702	36577	26682	36555	51162	47438	45580	43145	45443	30267	21008	38033			
	AV Basin (Cumec)		1206																			

TABLE-16
Average Ten Daily Flow Series at Demwe Lower HEP (1987-88 to 2002-03)

Average Ten daily flow series at Demwe Upper HE project site as derived from Mompani site (16 Years) in Cumecs																						
Catchment Area of Demwe Upper HE project site = 20174 sq km																						
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16				
Total days	**Maonth**	**Ten Daily**	**1987-88**	**1988-89**	**1989-90**	**1990-91**	**1991-92**	**1992-93**	**1993-94**	**1994-95**	**1995-96**	**1996-97**	**1997-98**	**1998-99**	**1999-00**	**2000-01**	**2001-02**	**2002-03**	**Avearge Cumecs**	**Maximum**	**Minimum**	**SD**
31	**May**	**I**	907	1301	1767	1341	2696	1172	1306	914	1856	1936	799	1716	1492	2718	1153	745	1489	2718	745	602
		II	1129	1870	1675	1588	2313	1662	2285	796	2272	2439	807	1611	1152	2950	1215	1013	1674	2950	796	640
		III	1218	2624	2017	1751	1692	1357	1633	1224	2629	2220	977	2680	2340	3236	1765	1038	1900	3236	977	670
30	**June**	**I**	1749	1974	1931	2793	1594	1628	2277	1883	2283	2252	2331	2307	1518	3122	2336	933	2057	3122	933	525
		II	1546	1971	2232	2202	2197	1675	2207	2268	2108	2338	2478	2988	1483	3104	2342	1042	2136	3104	1042	524
		III	1887	1802	2097	2246	2488	3131	2298	1940	2136	3560	2382	3152	2403	4086	2294	1025	2433	4086	1025	740
31	**July**	**I**	1961	2982	3159	2074	3557	1876	3215	1477	2548	3127	3570	3327	2191	2727	1949	1045	2549	3570	1045	773
		II	1514	1680	1997	2592	2364	1840	2393	1355	1815	4273	3814	2828	2688	2580	2028	1396	2322	4273	1355	821
		III	1929	2153	1916	2400	2139	1762	2325	1520	1276	3277	3363	2617	2539	2620	2311	1477	2226	3363	1276	590
31	**August**	**I**	2082	1352	1710	2039	2322	1555	2074	1341	1039	3166	3594	2496	2289	3225	2043	1114	2090	3594	1039	756
		II	2497	1529	1675	1674	2200	1452	1929	1235	2134	3061	3667	2835	2847	2672	1323	1116	2115	3667	1116	750
		III	2178	3403	1486	1616	1977	1297	1893	1233	1399	2726	3142	2749	3119	2465	1412	814	2057	3403	814	793
30	**September**	**I**	1817	2032	1729	1461	1901	1181	1438	1209	1234	2519	3129	3851	3031	2345	1304	720	1931	3851	720	849
		II	1591	1336	1460	1603	1781	1110	1281	1148	1331	2170	3231	2125	2792	2330	958	680	1683	3231	680	688
		III	2198	1554	1391	1888	1750	884	1301	1030	1929	2064	3463	1740	1965	1778	874	1261	1692	3463	874	628
31	**October**	**I**	1333	2323	1532	2093	1499	576	1321	862	864	2199	1698	1267	1511	1030	1016	957	1380	2323	576	507
		II	1030	2193	1425	1556	1516	965	1004	749	766	1831	1144	1389	1797	773	778	622	1221	2193	622	466
		III	823	2237	1079	1279	1343	662	919	700	700	1656	858	1818	1366	679	622	584	1083	2237	584	492
30	**November**	**I**	733	1430	817	1047	1193	508	843	615	615	1569	725	917	989	574	573	541	855	1569	508	320
		II	559	1248	682	870	1020	421	798	570	570	1336	678	698	728	548	533	497	735	1336	421	265
		III	489	1161	548	753	861	368	764	508	508	1126	654	797	666	518	490	450	666	1161	368	233
31	**December**	**I**	405	1057	445	690	780	336	712	489	489	871	645	680	762	468	458	426	607	1057	336	199
		II	380	943	402	593	630	302	677	475	475	797	635	570	689	442	432	407	553	943	302	171
		III	331	748	386	496	562	274	643	467	467	743	575	504	588	429	400	383	500	748	274	137
31	**January**	**I**	304	538	371	438	425	295	298	387	425	696	531	468	538	418	375	361	429	696	295	107
		II	300	514	358	413	392	321	294	355	408	635	516	451	529	397	380	327	412	635	294	95
		III	284	486	375	389	349	270	317	324	397	601	493	429	536	394	393	348	399	601	270	91
28	**February**	**I**	263	538	400	398	372	478	315	298	515	566	495	417	530	404	370	355	420	566	263	92
		II	291	513	391	411	359	598	300	339	544	617	511	414	521	397	383	359	434	617	291	103
		III	514	548	367	518	379	698	319	398	595	605	511	413	498	410	381	362	470	698	319	107
31	**March**	**I**	779	558	406	683	476	677	331	419	637	670	610	464	580	417	403	349	529	779	331	138
		II	1227	565	376	596	635	704	546	428	1016	869	653	543	620	414	384	409	624	1227	376	238
		III	1139	658	683	780	1430	770	1339	494	1317	832	879	537	723	724	447	394	822	1430	394	323
30	**April**	**I**	972	751	848	1343	1313	831	724	584	1316	750	840	777	1312	852	513	519	890	1343	513	284
		II	1095	1117	1472	1336	1934	878	717	803	1429	611	1196	691	1008	1044	838	545	1045	1934	545	369
		III	1032	1726	1534	1112	1155	1089	807	1143	1769	614	1265	1369	1376	1177	802	564	1158	1769	564	352
																				4273	**263**	**429**
Leap Year	**v Flows (Cumec-Days)**		410467	521302	437363	477132	523077	360965	444514	324260	444250	621764	576506	553927	524334	552253	367827	255307				
	Annual Flow (Cumec)		1125	1428	1198	1307	1433	989	1218	888	1217	1703	1579	1518	1437	1513	1008	699	1266			
	Annual Volume MCM		35464	45041	37788	41224	45194	31187	38406	28016	38383	53720	49810	47859	45302	47715	31780	22059				
	AV Basin (Cumec)		**1266**																			

ANNEXURE-VI

Average Ten Daily Flow Series at various project sites for Case III considering data series for 20 years (from 1984-1985 to 2003-2004)

TABLE-17

Average Ten Daily Flow Series at Kalai HEP Satge-1 (1984-85 to 2003-04)

Average Ten Daily Flows Series at Kalai I H.E Project site as Derived from Hagulianga (20 years) in cumecs

Catchment Area of Kalai I site = 16610 Km2

			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20		
Tot Days	Month	Ten Daily	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	A.V. (cumec)	Max
30	June	I	1351	2406	491	1406	1733	1566	1964	2369	1046	1515	1296	1896	1896	1951	1605	1260	2624	1956	763	866	1598	2624
		II	1466	1723	570	1304	1743	1901	1627	2606	1229	1440	1386	1960	1958	2077	1653	1230	2608	1961	855	1275	1629	2608
		III	1492	1788	843	1553	1529	1723	1655	2082	1763	1454	1368	2311	2997	1995	2004	2012	3443	1920	841	1403	1809	3443
31	July	I	1624	2081	595	1646	2645	2763	2106	2082	1486	2498	1224	1750	2628	3005	2798	1832	2288	1627	1156	1731	1978	3005
		II	1752	1966	609	1364	1577	1910	2603	2149	1319	2522	1357	1574	3603	3212	2374	2181	2167	1694	1182	1032	1907	3603
		III	1630	1908	525	1817	2012	1809	2165	1650	1349	1879	1674	1349	2756	2832	2192	2061	2197	1935	873	742	1768	2832
31	August	I	1039	1608	479	1794	1249	1591	1568	1628	1221	1683	1555	1328	2665	3062	2092	1915	2712	1707	921	602	1621	3062
		II	1039	1388	433	1956	1400	1571	1544	1602	1077	1622	1431	1293	2572	3087	2306	2390	2241	1094	918	556	1576	3087
		III	1033	1351	442	1781	3280	1379	1654	1419	1041	1497	1365	1175	2287	2641	2303	2621	2065	1170	662	586	1588	3280
30	September	I	957	627	423	1643	1925	1522	1466	1255	776	1222	1316	1354	2161	2727	3395	2635	1999	1035	494	588	1476	3395
		II	1381	454	625	1372	1209	1344	1351	1168	693	1102	1301	1165	1838	2820	1791	2414	1986	714	456	563	1287	2820
		III	933	696	249	1818	1457	1245	1140	1092	589	1127	1165	1125	1739	3031	1439	1647	1474	636	995	486	1204	3031
31	October	I	659	647	331	1120	2106	1381	1321	911	429	1113	1058	2105	1907	1441	1044	1269	824	811	756	449	1084	2106
		II	575	522	330	892	2013	1145	907	951	530	886	1016	1846	1566	946	1158	1534	586	590	445	425	943	2013
		III	407	507	259	744	1399	784	626	847	457	724	851	1449	1404	664	1554	1135	499	446	410	398	778	1554
30	November	I	446	480	302	641	976	611	495	390	286	622	783	910	948	487	592	632	405	403	387	355	558	976
		II	367	420	300	460	810	528	432	341	251	622	750	794	821	462	473	489	391	383	363	337	490	821
		III	276	385	269	401	728	412	386	310	234	532	730	762	706	449	527	455	375	359	338	322	448	762
31	December	I	259	364	235	348	676	340	348	684	217	496	161	205	567	418	463	508	347	342	325	309	381	684
		II	255	337	225	321	574	305	256	518	199	470	156	196	513	438	403	468	333	328	314	295	345	574
		III	246	322	267	281	502	283	250	412	183	449	513	780	498	406	376	413	326	310	301	283	370	780
31	January	I	236	294	315	478	478	263	302	354	177	533	342	400	472	382	347	386	320	297	289	275	347	533
		II	232	270	305	459	459	248	298	298	187	544	350	411	439	438	338	381	309	299	271	275	341	544
		III	231	258	283	439	439	271	304	274	170	537	303	352	420	362	326	384	308	305	282	276	326	537
28/29	February	I	203	271	275	414	414	282	298	271	407	542	385	386	417	378	335	397	328	309	301	254	343	542
		II	193	264	268	405	405	282	304	272	397	522	393	394	445	387	333	392	324	316	303	250	343	522
		III	202	266	287	421	421	261	328	271	402	533	493	451	439	387	333	380	331	315	304	258	354	533
31	March	I	339	244	294	421	421	268	381	295	430	566	487	380	475	441	361	425	335	327	297	285	374	566
		II	588	372	335	418	418	263	409	323	496	669	554	428	584	465	407	447	333	317	331	254	421	669
		III	549	342	406	524	517	403	461	328	664	1001	601	462	564	590	405	504	504	351	322	488	499	1001
30	April	I	509	412	820	471	471	512	716	699	717	804	576	805	401	543	508	803	549	362	366	484	576	820
		II	566	633	827	757	757	937	808	793	745	816	673	951	416	739	461	664	655	541	387	662	689	951
		III	732	378	755	1010	1010	1079	611	515	909	895	713	1010	418	777	834	862	728	522	390	768	746	1079
31	May	I	976	976	356	706	982	1035	1117	1311	943	1221	1116	1670	1616	648	1428	1238	2280	949	603	631	1090	2280
		II	1131	795	437	943	1406	990	1084	2079	1153	1302	1120	1878	2043	656	1339	949	2500	1002	831	598	1212	2500
		III	1331	1328	482	1022	2162	1486	1284	2193	991	1165	1200	1913	1857	800	2247	1959	2721	1470	852	689	1458	2721
																								3603
Leap Year	A. Flow (cumec-day)		277093	296292	154547	341678	432499	352843	351781	374293	255683	377413	323142	399211	499240	468956	434162	421438	452110	296373	201924	203699		
Syntetic years	Annual Flow (cumec)		759	812	423	934	1185	967	964	1023	701	1034	885	1091	1368	1285	1189	1151	1239	812	553	557	947	
	Annual Volume (MCM)		23941	25600	13353	29521	37368	30486	30394	32339	22091	32609	27919	34492	43134	40518	37512	36412	39062	25607	17446	17600	29870	
	A.V. basin (cumec)		947																					

TABLE-18
Average Ten Daily Flow Series at Kalai HEP Satge-2 (1984-85 to 2003-04)

Average Ten Daily Flow Series at Kalai II H.E Project site as Derived from Hagulianga (20 years) in cumecs

Catchment Area of Kalai II site = 17846 Km2

Tot Days	Month	Ten Daily	1 1984-85	2 1985-86	3 1986-87	4 1987-88	5 1988-89	6 1989-90	7 1990-91	8 1991-92	9 1992-93	10 1993-94	11 1994-95	12 1995-96	13 1996-97	14 1997-98	15 1998-99	16 1999-00	17 2000-01	18 2001-02	19 2002-03	20 2003-04	A.Y. (cumec)	Max	Min	SD
		I	1451	2585	527	1510	1862	1683	2110	2546	1124	1627	1392	2037	2036	2096	1725	1354	2819	2101	819	930	1717	2819	527	602
30	June	II	1575	1851	612	1401	1873	2043	1748	2800	1321	1547	1489	2106	2103	2231	1776	1322	2802	2107	919	1370	1750	2802	612	547
		III	1603	1921	906	1668	1643	1851	1778	2237	1894	1562	1469	2483	3220	2143	2153	2162	3699	2063	903	1508	1943	3699	903	660
		I	1745	2236	640	1769	2842	2969	2263	2237	1596	2684	1315	1880	2824	3228	3006	1969	2459	1748	1242	1860	2126	3228	640	675
31	July	II	1882	2112	654	1466	1694	2052	2796	2309	1417	2709	1457	1691	3871	3451	2551	2343	2328	1820	1270	1109	2049	3871	654	782
		III	1752	2050	564	1952	2162	1944	2326	1773	1449	2018	1799	1449	2961	3043	2355	2214	2360	2079	938	797	1899	3043	564	635
		I	1116	1728	514	1927	1342	1710	1685	1749	1312	1808	1671	1427	2863	3290	2248	2058	2913	1834	990	647	1742	3290	514	709
31	August	II	1116	1492	465	2101	1504	1688	1659	1722	1157	1743	1537	1389	2764	3317	2477	2568	2408	1175	987	597	1693	3317	465	730
		III	1110	1452	475	1914	3524	1481	1777	1525	1118	1609	1466	1262	2457	2837	2474	2816	2219	1257	711	630	1706	3524	475	803
		I	1028	673	454	1766	2068	1635	1575	1348	833	1313	1414	1455	2321	2930	3648	2831	2148	1112	530	631	1586	3648	454	863
30	September	II	1484	488	672	1474	1299	1444	1452	1255	744	1184	1398	1252	1974	3030	1925	2594	2133	767	490	605	1383	3030	488	688
		III	1003	748	268	1953	1565	1338	1225	1173	633	1210	1252	1208	1869	3257	1546	1770	1583	683	1069	522	1294	3257	268	649
		I	708	695	355	1203	2262	1484	1419	979	461	1195	1136	2261	2049	1549	1121	1364	885	871	812	482	1165	2262	355	558
31	October	II	618	561	354	958	2162	1231	974	1021	570	952	1092	1984	1683	1016	1244	1649	629	633	478	457	1013	2162	354	519
		III	437	545	278	799	1503	842	673	910	491	778	914	1557	1508	714	1670	1220	536	479	441	428	836	1670	278	431
		I	479	515	325	688	1049	657	532	419	307	668	841	978	1018	524	636	679	436	432	416	381	599	1049	307	225
30	November	II	394	451	322	494	870	567	464	367	270	668	805	853	882	496	508	525	420	412	390	362	526	882	270	190
		III	297	414	289	430	783	442	415	333	251	572	784	818	759	482	566	489	403	386	363	346	481	818	251	177
		I	278	391	252	374	727	365	374	735	233	533	184	237	609	449	497	546	373	367	349	332	410	735	184	156
31	December	II	274	362	242	344	617	328	275	556	214	505	176	225	551	471	433	503	358	352	337	317	372	617	176	126
		III	265	346	287	302	539	304	268	443	197	483	534	809	535	436	404	443	350	333	324	304	395	809	197	139
		I	254	316	339	514	514	282	324	380	190	573	367	430	507	410	373	415	344	319	310	296	373	573	190	97
31	January	II	249	290	328	493	493	266	320	320	201	585	376	441	471	471	363	409	332	322	291	295	366	585	201	99
		III	248	277	304	471	471	291	327	294	183	577	325	378	451	389	351	413	331	328	303	296	350	577	183	91
		I	218	291	295	445	445	303	320	291	437	582	414	415	448	406	360	427	352	332	323	273	369	582	218	85
28/29	February	II	207	284	288	435	435	303	327	292	426	561	422	423	479	416	358	422	349	340	326	269	368	561	207	85
		III	218	286	308	453	453	280	353	291	432	573	530	484	471	416	357	408	356	338	327	278	381	573	218	94
		I	364	262	316	452	452	288	410	317	463	608	524	408	510	474	387	457	360	352	319	307	401	608	262	90
31	March	II	632	400	360	449	449	283	440	347	533	719	596	460	628	500	437	480	358	340	355	272	452	719	272	121
		III	590	368	437	562	555	433	495	353	714	1075	646	497	606	634	435	541	542	378	346	524	536	1075	346	164
		I	546	443	881	506	506	550	769	751	770	864	618	865	431	583	545	863	590	389	393	520	619	881	389	168
30	April	II	608	680	888	814	814	1007	869	852	800	876	723	1021	447	794	495	713	704	582	416	711	741	1021	416	168
		III	786	406	811	1085	1085	1159	656	554	977	961	766	1085	449	835	896	926	783	560	419	825	801	1159	406	232
		I	1049	1049	383	759	1055	1112	1200	1409	1013	1312	1199	1794	1736	697	1534	1330	2449	1020	648	677	1171	2449	383	470
31	May	II	1215	854	470	1013	1511	1064	1165	2234	1239	1399	1204	2018	2195	704	1438	1020	2686	1077	893	643	1302	2686	470	577
		III	1430	1426	518	1098	2323	1597	1380	2356	1065	1252	1290	2055	1995	859	2415	2105	2923	1579	915	740	1566	2923	518	645
																								3871	176	390
Leap Year	A. Flow (cumec-day)		297713	318340	166047	367103	464682	379099	377958	402145	274709	405498	347188	428918	536382	503852	466469	452799	485753	318427	216950	218858				
Syntetic years	Annual Flow (cumec)		816	872	455	1003	1273	1039	1036	1099	753	1111	951	1172	1470	1380	1278	1237	1331	872	594	598	1017			
	Annual Volume (MCM)		25722	27505	14346	31718	40149	32754	32656	34745	23735	35035	29997	37058	46343	43533	40303	39122	41969	27512	18744	18909	32093			
	A.V. basin (cumec)		1017																							

TABLE-19

Intermediate Ten Daily Flow Series between Kalai HEP Stage-2 and Kalai HEP Stage-1 (1984-85 to 2003-04)

			Intermediate Tendaily Flow Series between KL-2 & KL-1																		
			Intermediate Catchment Area = 1236 Km2																		
Tot Days	Month	Ten Daily	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04
	June	I	101	179	37	105	129	117	146	176	78	113	96	141	140	145	119	94	195	146	57	123
30		II	109	128	42	97	130	141	121	194	91	107	103	146	146	155	123	92	194	146	64	128
		III	111	133	63	116	114	128	123	155	131	108	102	172	223	148	149	150	256	143	63	151
	July	I	121	155	44	123	197	206	157	155	111	186	91	130	196	224	208	136	170	121	86	234
31		II	130	146	45	102	117	142	194	160	98	188	101	117	268	239	177	162	161	126	88	210
		III	121	142	39	135	150	135	161	123	100	140	125	100	205	211	163	153	163	144	65	180
	August	I	77	120	36	133	93	118	117	121	91	125	116	99	198	228	156	143	202	127	69	176
31		II	77	103	32	146	104	117	115	119	80	121	106	96	191	230	172	178	167	81	68	171
		III	77	101	33	133	244	103	123	106	77	111	102	87	170	197	171	195	154	87	49	156
	September	I	71	47	31	122	143	113	109	93	58	91	98	101	161	203	253	196	149	77	37	169
30		II	103	34	47	102	90	100	101	87	52	82	97	87	137	210	133	180	148	53	34	148
		III	69	52	19	135	108	93	85	81	44	84	87	84	129	226	107	123	110	47	74	143
	October	I	49	48	25	83	157	103	98	68	32	83	79	157	142	107	78	94	61	60	56	70
31		II	43	39	25	66	150	85	67	71	39	66	76	137	117	70	86	114	44	44	33	62
		III	30	38	19	55	104	58	47	63	34	54	63	108	104	49	116	84	37	33	31	49
	November	I	33	36	22	48	73	46	37	29	21	46	58	68	71	36	44	47	30	30	29	39
30		II	27	31	22	34	60	39	32	25	19	46	56	59	61	34	35	36	29	29	27	34
		III	21	29	20	30	54	31	29	23	17	40	54	57	53	33	39	34	28	27	25	32
	December	I	19	27	17	26	50	25	26	51	16	37	22	32	42	31	34	38	26	25	24	29
31		II	19	25	17	24	43	23	19	39	15	35	20	29	38	33	30	35	25	24	23	27
		III	18	24	20	21	37	21	19	31	14	33	21	30	37	30	28	31	24	23	22	27
	January	I	18	22	23	36	36	20	22	26	13	40	25	30	35	28	26	29	24	22	22	33
31		II	17	20	23	34	34	18	22	22	14	40	26	31	33	33	25	28	23	22	20	35
		III	17	19	21	33	33	20	23	20	13	40	23	26	31	27	24	29	23	23	21	28
	February	I	15	20	20	31	31	21	22	20	30	40	29	29	31	28	25	30	24	23	22	24
28/29		II	14	20	20	30	30	21	23	20	30	39	29	29	33	29	25	29	24	24	23	25
		III	15	20	21	31	31	19	24	20	30	40	37	34	33	29	25	28	25	23	23	33
	March	I	25	18	22	31	31	20	28	22	32	42	36	28	35	33	27	32	25	24	22	22
31		II	44	28	25	31	31	20	30	24	37	50	41	32	43	35	30	33	25	24	25	26
		III	41	25	30	39	38	30	34	24	49	74	45	34	42	44	30	37	38	26	24	28
	April	I	38	31	61	35	35	38	53	52	53	60	43	60	30	40	38	60	41	27	27	51
30		II	42	47	62	56	56	70	60	59	55	61	50	71	31	55	34	49	49	40	29	62
		III	54	28	56	75	75	80	45	38	68	67	53	75	31	58	62	64	54	39	29	66
	May	I	73	73	26	53	73	77	83	98	70	91	83	124	120	48	106	92	170	71	45	50
31		II	84	59	33	70	105	74	81	155	86	97	83	140	152	49	100	71	186	75	62	57
		III	99	99	36	76	161	111	96	163	74	87	89	142	138	60	167	146	202	109	63	58

TABLE-20
Average Ten Daily Flow Series at Hutong HEP Stage-1 (1984-85 to 2003-04)

Average Ten Daily Flow Series at Hutong I H.E. Project site as Derived from Hutong II (20 years) in cumecs

Catchment Area of Hutong I site = 17968 Km2

Tot Days	Month	Ten Daily	1 1984-85	2 1985-86	3 1986-87	4 1987-88	5 1988-89	6 1989-90	7 1990-91	8 1991-92	9 1992-93	10 1993-94	11 1994-95	12 1995-96	13 1996-97	14 1997-98	15 1998-99	16 1999-00	17 2000-01	18 2001-02	19 2002-03	20 2003-04	A.V. (cumec)	Max	Min	SD
		I	1461	2602	531	1520	1875	1694	2124	2563	1132	1639	1401	2051	2039	2110	1737	1363	2839	2116	825	937	1728	2839	531	605
30	June	II	1586	1864	617	1411	1886	2057	1760	2819	1330	1558	1499	2121	2118	2246	1789	1331	2822	2121	925	1379	1762	2822	617	551
		III	1614	1935	912	1680	1654	1864	1791	2252	1907	1573	1480	2500	3242	2158	2167	2177	3725	2077	909	1518	1957	3725	909	664
		I	1757	2251	644	1781	2862	2989	2279	2252	1607	2702	1324	1893	2843	3250	3027	1982	2475	1759	1250	1872	2140	3250	644	680
31	July	II	1895	2126	659	1476	1706	2066	2815	2325	1427	2728	1467	1703	3897	3475	2568	2359	2344	1832	1279	1116	2063	3897	659	788
		III	1764	2064	567	1966	2177	1957	2342	1785	1459	2032	1811	1459	2981	3063	2371	2229	2376	2093	944	803	1912	3063	567	639
		I	1124	1739	518	1940	1351	1722	1696	1761	1321	1820	1682	1437	2882	3312	2263	2072	2933	1847	997	651	1753	3312	518	714
31	August	II	1123	1502	468	2116	1514	1700	1671	1733	1165	1755	1548	1398	2783	3340	2494	2585	2424	1183	993	601	1705	3340	468	735
		III	1118	1461	478	1927	3548	1491	1789	1535	1126	1620	1476	1271	2474	2857	2491	2835	2234	1266	716	634	1717	3548	478	809
		I	1036	678	458	1778	2082	1646	1586	1357	839	1322	1424	1465	2337	2950	3673	2851	2162	1119	534	636	1597	3673	458	869
30	September	II	1494	491	677	1484	1308	1454	1462	1264	750	1192	1408	1260	1988	3050	1938	2612	2148	773	494	610	1393	3050	491	692
		III	1009	753	270	1966	1576	1347	1233	1181	637	1219	1261	1217	1882	3279	1556	1782	1594	688	1076	525	1303	3279	270	653
		I	713	700	358	1211	2278	1494	1428	985	465	1204	1144	2277	2063	1559	1129	1373	891	877	818	486	1173	2278	358	562
31	October	II	622	564	357	965	2177	1239	981	1028	573	959	1100	1997	1694	1023	1253	1660	633	638	481	460	1020	2177	357	522
		III	440	548	280	805	1513	848	677	917	494	783	921	1567	1518	719	1681	1228	539	482	444	431	842	1681	280	434
		I	482	519	327	693	1056	661	536	422	309	673	847	985	1025	527	640	683	439	435	419	384	603	1056	309	227
30	November	II	397	454	324	497	876	571	467	369	271	673	811	859	888	500	511	529	423	414	393	365	530	888	271	191
		III	299	417	291	433	788	445	418	336	253	575	789	824	764	485	570	493	405	389	365	348	484	824	253	178
		I	280	393	254	377	732	368	376	757	235	537	175	222	614	452	501	549	376	370	351	334	413	757	175	161
31	December	II	276	364	244	347	621	330	277	560	215	509	169	212	555	474	436	506	361	355	340	319	373	621	169	129
		III	267	348	289	304	543	306	270	446	198	486	555	843	538	439	406	446	352	336	326	306	400	843	198	146
		I	256	318	341	517	517	284	327	383	191	577	370	433	510	413	376	417	347	321	313	298	375	577	191	98
31	January	II	250	292	330	496	496	268	323	323	202	588	379	444	475	474	366	412	334	324	293	297	368	588	202	100
		III	250	279	306	475	475	293	329	296	184	581	327	381	454	391	353	416	333	330	305	298	353	581	184	91
		I	219	293	297	448	448	305	322	293	440	586	417	418	451	409	362	430	354	334	325	275	371	586	219	85
28/29	February	II	209	285	290	438	438	305	329	294	429	564	425	426	482	419	360	424	351	342	328	271	371	564	209	85
		III	219	288	311	456	456	282	355	293	435	577	533	488	475	419	360	411	358	341	329	279	383	577	219	95
		I	367	263	318	455	455	290	412	319	466	613	527	411	514	477	390	460	362	354	322	309	404	613	263	91
31	March	II	636	403	362	452	452	285	443	349	537	724	600	463	632	503	440	483	361	343	358	274	455	724	274	122
		III	594	370	440	566	559	436	498	355	719	1082	651	500	610	638	438	545	545	380	348	527	540	1082	348	165
		I	550	446	887	509	509	554	774	756	775	869	623	871	434	587	549	869	594	392	396	524	624	887	392	169
30	April	II	612	685	894	819	819	1014	874	858	806	882	728	1028	450	800	498	718	709	585	419	716	746	1028	419	169
		III	792	408	817	1093	1093	1167	660	557	984	968	772	1093	452	841	902	933	788	564	422	831	807	1167	408	234
		I	1056	1056	385	764	1063	1119	1208	1419	1020	1321	1207	1806	1748	701	1545	1339	2466	1027	652	682	1179	2466	385	474
31	May	II	1224	860	473	1020	1521	1071	1173	2249	1248	1409	1212	2032	2210	709	1448	1027	2704	1084	899	647	1311	2704	473	581
		III	1440	1436	521	1106	2339	1608	1389	2372	1072	1260	1299	2069	2009	865	2431	2119	2943	1590	921	745	1577	2943	521	649
																								3897	**169**	**393**
Leap Year	A. Flow (cumec-day)		299748	320517	167183	369612	467859	381690	380542	405063	276587	408270	349561	431850	539940	507297	469658	455894	489073	320604	218433	220353				
Syntetic years	Annual Flow (cumec)		821	878	458	1010	1282	1046	1043	1107	758	1119	958	1180	1479	1390	1287	1246	1340	878	598	602	**1024**			
	Annual Volume (MCM)		25898	27693	14445	31935	40423	32978	32879	34997	23897	35275	30202	37312	46651	43830	40578	39389	42256	27700	18873	19038	**32312**			
	A.V. basin (cumec)		**1024**																							

TABLE-21
Average Ten Daily Flow Series at Hutong HEP Stage-2 (1984-85 to 2003-04)

Average Ten Daily Flow Series at Hutong II H.E. Project site as Derived from Hayuliang (20 years) in cumecs

Catchment Area of Hutong II Site = 18450 Km2

			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20				
Tot Days	**Month**	**Ten Daily**	**1984-85**	**1985-86**	**1986-87**	**1987-88**	**1988-89**	**1989-90**	**1990-91**	**1991-92**	**1992-93**	**1993-94**	**1994-95**	**1995-96**	**1996-97**	**1997-98**	**1998-99**	**1999-00**	**2000-01**	**2001-02**	**2002-03**	**2003-04**	**A.V. (cumec)**	**Max**	**Min**	**SD**
30	June	I	1500	2672	545	1561	1925	1740	2181	2632	1162	1682	1439	2106	2094	2167	1783	1400	2915	2172	847	962	1774	2915	545	622
		II	1629	1914	633	1449	1936	2112	1807	2895	1365	1600	1539	2178	2174	2307	1837	1367	2897	2178	950	1416	1809	2897	633	566
		III	1658	1987	937	1725	1698	1914	1839	2312	1958	1615	1519	2567	3329	2216	2226	2235	3825	2133	934	1559	2009	3825	934	682
31	July	I	1804	2312	661	1829	2938	3069	2340	2313	1650	2775	1360	1944	2919	3337	3108	2035	2542	1807	1284	1923	2197	3337	661	698
		II	1946	2183	677	1515	1751	2121	2891	2387	1465	2801	1507	1749	4002	3568	2637	2422	2407	1882	1313	1146	2119	4002	677	809
		III	1811	2119	583	2018	2235	2010	2405	1833	1498	2087	1860	1498	3061	3146	2435	2289	2440	2149	970	824	1963	3146	583	656
31	August	I	1154	1786	532	1993	1388	1768	1742	1808	1357	1869	1727	1475	2960	3401	2324	2127	3012	1896	1023	669	1800	3401	532	733
		II	1154	1542	481	2173	1555	1745	1716	1780	1196	1802	1589	1436	2857	3429	2561	2655	2490	1215	1020	618	1751	3429	481	755
		III	1148	1501	491	1979	3644	1531	1837	1577	1156	1663	1516	1305	2540	2933	2558	2911	2294	1300	735	651	1763	3644	491	831
30	September	I	1063	696	470	1825	2138	1690	1628	1394	862	1357	1462	1504	2400	3029	3771	2927	2220	1149	548	653	1639	3771	470	892
		II	1534	504	695	1524	1343	1493	1501	1298	770	1224	1445	1294	2041	3132	1990	2682	2206	793	507	626	1430	3132	504	711
		III	1036	773	277	2019	1618	1383	1266	1213	654	1251	1295	1249	1932	3367	1598	1830	1637	706	1105	539	1337	3367	277	671
31	October	I	732	719	367	1244	2339	1534	1467	1012	477	1236	1175	2338	2118	1601	1159	1410	915	901	840	499	1204	2339	367	577
		II	639	579	366	990	2235	1272	1007	1056	589	984	1129	2051	1740	1050	1287	1704	650	655	494	473	1048	2235	366	536
		III	452	563	288	826	1553	871	695	941	507	804	945	1609	1559	738	1726	1261	554	495	456	442	864	1726	288	446
30	November	I	495	533	336	712	1084	679	550	434	317	691	870	1011	1053	541	658	702	450	447	430	394	619	1084	317	233
		II	408	466	333	511	899	586	479	379	279	691	833	882	912	513	525	543	435	426	403	375	544	912	279	196
		III	307	428	299	445	809	457	429	345	260	591	810	846	784	498	585	506	416	399	375	357	497	846	260	183
31	December	I	288	404	261	387	751	378	386	760	241	551	179	228	630	464	514	564	386	380	361	343	423	760	179	163
		II	283	374	250	356	637	339	285	575	221	522	173	218	570	487	447	520	370	364	349	327	383	637	173	132
		III	274	358	296	313	557	315	277	458	203	499	570	866	553	451	417	458	362	345	335	315	411	866	203	149
31	January	I	262	326	350	531	531	292	335	393	196	592	380	445	524	424	386	429	356	330	321	306	385	592	196	101
		II	257	300	339	510	510	275	331	331	208	604	389	456	487	487	376	423	343	332	301	305	378	604	208	102
		III	257	287	314	487	487	301	338	304	189	596	336	391	467	402	363	427	342	339	313	306	362	596	189	94
28/29	February	I	225	301	305	460	460	313	331	301	452	602	428	429	464	420	372	441	364	343	334	282	381	602	225	88
		II	214	293	297	450	450	313	338	302	441	580	437	438	495	430	370	436	360	351	337	278	380	580	214	88
		III	225	296	319	468	468	290	365	301	446	592	547	501	487	430	370	422	368	350	338	287	393	592	225	98
31	March	I	376	271	327	467	467	297	423	327	478	629	541	422	527	490	401	472	372	363	330	317	415	629	271	93
		II	653	414	372	464	464	293	455	359	551	743	616	476	649	517	452	496	370	352	367	282	467	743	282	125
		III	610	380	451	582	574	447	512	365	738	1111	668	513	626	655	450	560	560	390	357	542	555	1111	357	169
30	April	I	565	458	911	523	523	569	795	777	796	893	639	895	446	603	564	892	610	403	406	538	640	911	403	173
		II	629	703	918	841	841	1041	898	881	827	906	748	1056	462	821	512	737	728	601	430	735	766	1056	430	174
		III	813	419	839	1122	1122	1199	678	572	1010	994	792	1122	464	863	927	958	809	579	433	853	828	1199	419	240
31	May	I	1084	1084	395	785	1091	1149	1240	1457	1048	1356	1239	1855	1794	720	1586	1375	2532	1055	670	700	1211	2532	395	486
		II	1256	883	486	1047	1562	1100	1204	2309	1281	1447	1245	2086	2269	728	1487	1054	2777	1113	923	664	1346	2777	486	597
		III	1479	1475	535	1135	2401	1651	1427	2435	1101	1294	1333	2125	2062	888	2496	2176	3022	1633	946	765	1619	3022	535	666
																								4002	**173**	**404**
Leap Year	A. Flow (cumec-day)		307789	329115	171668	379528	480410	391929	390750	415756	284007	419222	358938	443434	554424	520905	482257	468124	502193	329204	224293	226264				
Syntetic year	Annual Flow (cumec)		843	902	470	1037	1316	1074	1071	1136	778	1149	983	1212	1519	1427	1321	1279	1376	902	615	618	**1051**			
	Annual Volume (MCM)		26593	28436	14832	32791	41507	33863	33761	35921	24538	36221	31012	38313	47902	45006	41667	40446	43389	28443	19379	19549	**33178**			
	A.V. basin (cumec)		**1051**																							

TABLE-22
Intermediate Ten Daily Flow Series between Hutong HEP Stage-2 and Hutong HEP Stage-1 (1984-85 to 2003-04)

			Intermediate Tendaily Flow Series between HTG-2 & HTG-1																			
			Intermediate Catchment Area = 482 Km2																			
Tot Days	Month	Ten Daily	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04
	June	I	39	70	14	41	50	45	57	69	30	44	38	55	55	57	47	37	76	57	22	48
30		II	43	50	17	38	51	55	47	76	36	42	40	57	57	60	48	36	76	57	25	50
		III	43	52	24	45	44	50	48	60	51	42	40	67	87	58	58	58	100	56	24	59
	July	I	47	60	17	48	77	80	61	60	43	72	36	51	76	87	81	53	66	47	34	91
31		II	51	57	18	40	46	55	76	62	38	73	39	46	105	93	69	63	63	49	34	82
		III	47	55	15	53	58	53	63	48	39	55	49	39	80	82	64	60	64	56	25	70
	August	I	30	47	14	52	36	46	46	47	35	49	45	39	77	89	61	56	79	50	27	69
31		II	30	40	13	57	41	46	45	46	31	47	42	38	75	90	67	69	65	32	27	67
		III	30	39	13	52	95	40	48	41	30	43	40	34	66	77	67	76	60	34	19	61
	September	I	28	18	12	48	56	44	43	36	23	35	38	39	63	79	99	76	58	30	14	66
30		II	40	13	18	40	35	39	39	34	20	32	38	34	53	82	52	70	58	21	13	58
		III	27	20	7	53	42	36	33	32	17	33	34	33	50	88	42	48	43	18	29	56
	October	I	19	19	10	32	61	40	38	26	12	32	31	61	55	42	30	37	24	24	22	27
31		II	17	15	10	26	58	33	26	28	15	26	29	54	45	27	34	45	17	17	13	24
		III	12	15	8	22	41	23	18	25	13	21	25	42	41	19	45	33	14	13	12	19
	November	I	13	14	9	19	28	18	14	11	8	18	23	26	28	14	17	18	12	12	11	15
30		II	11	12	9	13	23	15	13	10	7	18	22	23	24	13	14	14	11	11	11	13
		III	8	11	8	12	21	12	11	9	7	15	21	22	20	13	15	13	11	10	10	13
	December	I	8	11	7	10	20	10	10	3	6	14	5	6	16	12	13	15	10	10	9	11
31		II	7	10	7	9	17	9	7	15	6	14	5	6	15	13	12	14	10	10	9	10
		III	7	9	8	8	15	8	7	12	5	13	15	23	14	12	11	12	9	9	9	11
	January	I	7	9	9	14	14	8	9	10	5	15	10	12	14	11	10	11	9	9	8	13
31		II	7	8	9	13	13	7	9	9	5	16	10	12	13	13	10	11	9	9	8	13
		III	7	7	8	13	13	8	9	8	5	16	9	10	12	10	9	11	9	9	8	11
	February	I	6	8	8	12	12	8	9	8	12	16	11	11	12	11	10	12	10	9	9	9
28/29		II	6	8	8	12	12	8	9	8	12	15	11	11	13	11	10	11	9	9	9	10
		III	6	8	8	12	12	8	10	8	12	15	14	13	13	11	10	11	10	9	9	13
	March	I	10	7	9	12	12	8	11	9	12	16	14	11	14	13	10	12	10	9	9	9
31		II	17	11	10	12	12	8	12	9	14	19	16	12	17	13	12	13	10	9	10	10
		III	16	10	12	15	15	12	13	10	19	29	17	13	16	17	12	15	15	10	9	11
	April	I	15	12	24	14	14	15	21	20	21	23	17	23	12	16	15	23	16	11	11	20
30		II	16	18	24	22	22	27	23	23	22	24	20	28	12	21	13	19	19	16	11	24
		III	21	11	22	29	29	31	18	15	26	26	21	29	12	23	24	25	21	15	11	26
	May	I	28	28	10	20	29	30	32	38	27	35	32	48	47	19	41	36	66	28	17	20
31		II	33	23	13	27	41	29	31	60	33	38	33	55	59	19	39	28	73	29	24	22
		III	39	39	14	30	63	43	37	64	29	34	35	56	54	23	65	57	79	43	25	23

TABLE-23
Average Ten Daily Flow Series at Demwe Upper HEP (1984-85 to 2003-04)

						Average Ten daily flow series at Demwe Upper HE project site as derived from Mompani site (20 Years) in Cumecs																			
						Catchment Area of Demwe Upper HE project site = 18947 sq km																			
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20				
Total days	Month	Ten Daily	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	Avearge Cumecs	Maximum	Minimum	SD
31	May	I	1209	1208	441	864	1239	1683	1277	2567	1116	1244	870	1768	1844	761	1634	1421	2589	1098	710	780	1316	2589	441	570
		II	1400	984	541	1075	1781	1595	1512	2203	1583	2176	758	2164	2323	769	1534	1098	2809	1157	965	740	1458	2809	541	626
		III	1648	1643	597	1160	2499	1921	1668	1611	1293	1555	1166	2504	2114	930	2552	2229	3082	1681	989	852	1685	3082	597	658
30	June	I	1672	2978	607	1665	1880	1839	2660	1518	1551	2168	1794	2174	2145	2220	2197	1446	2974	2225	888	1072	1884	2978	607	623
		II	1815	2133	706	1473	1877	2125	2097	2092	1595	2102	2160	2008	2227	2360	2846	1413	2956	2231	992	1578	1939	2956	706	542
		III	1848	2214	1044	1797	1716	1997	2139	2369	2982	2188	1848	2035	3391	2269	3002	2289	3891	2185	976	1737	2196	3891	976	701
31	July	I	2011	2576	737	1867	2840	3009	1975	3387	1787	3062	1407	2426	2978	3400	3168	2087	2598	1856	996	2142	2315	3400	737	761
		II	2169	2433	754	1442	1600	1902	2468	2252	1753	2279	1290	1729	4070	3633	2693	2560	2457	1932	1329	1277	2101	4070	754	794
		III	2018	2362	649	1837	2050	1825	2285	2037	1678	2214	1447	1215	3121	3203	2492	2418	2495	2201	1407	918	1994	3203	649	653
31	August	I	1286	1990	592	1983	1288	1629	1942	2211	1481	1976	1278	990	3015	3423	2378	2180	3072	1946	1061	745	1823	3423	592	768
		II	1286	1718	536	2378	1456	1595	1594	2095	1383	1838	1176	2033	2916	3492	2700	2711	2545	1260	1063	688	1823	3492	536	777
		III	1279	1672	547	2074	3241	1415	1539	1883	1236	1803	1174	1332	2596	2992	2618	2970	2347	1345	776	726	1778	3241	547	793
30	September	I	1185	776	524	1731	1935	1647	1392	1810	1125	1369	1151	1175	2399	2980	3667	2887	2233	1242	686	727	1632	3667	524	842
		II	1710	562	774	1515	1272	1390	1526	1696	1057	1220	1093	1268	2067	3077	2024	2659	2219	913	648	697	1469	3077	562	676
		III	1154	862	309	2093	1480	1324	1798	1667	842	1239	981	1837	1966	3298	1657	1871	1693	832	1201	601	1435	3298	309	659
31	October	I	816	801	409	1269	2212	1459	1993	1427	548	1258	821	823	2094	1617	1207	1439	981	968	912	556	1181	2212	409	515
		II	712	646	408	981	2089	1357	1481	1444	919	956	713	730	1744	1090	1323	1711	736	740	592	527	1045	2089	408	466
		III	504	628	320	784	2130	1027	1218	1279	630	875	667	667	1577	817	1731	1301	647	593	556	493	922	2130	320	475
30	November	I	552	594	374	698	1362	778	997	1136	483	803	586	586	1494	690	873	942	547	546	516	439	750	1494	374	305
		II	454	519	371	533	1188	649	828	971	401	760	543	543	1272	646	664	693	522	508	473	418	648	1272	371	249
		III	342	477	333	466	1106	522	717	820	350	728	484	484	1072	622	759	634	493	466	429	398	585	1106	333	223
31	December	I	321	450	291	386	1006	424	658	743	320	678	466	466	829	614	647	726	446	436	406	382	535	1006	291	192
		II	316	417	279	362	899	383	565	600	287	645	453	453	759	605	543	657	421	412	388	365	490	899	279	164
		III	305	399	330	315	713	368	472	535	261	612	445	445	708	548	480	560	408	381	365	351	450	713	261	129
31	January	I	293	364	390	289	513	353	418	405	281	283	368	405	663	506	446	512	398	357	344	341	396	663	281	95
		II	287	334	378	286	489	341	393	373	306	280	338	389	605	491	429	504	378	362	312	340	381	605	280	85
		III	286	319	350	271	463	357	371	332	257	302	309	378	573	470	409	510	376	374	331	341	369	573	257	81
28	February	I	251	336	340	251	513	381	379	355	455	300	284	490	539	472	397	504	384	353	338	315	382	539	251	87
		II	239	327	331	277	489	373	391	342	569	286	323	518	588	487	394	496	378	365	342	310	391	588	239	100
		III	251	330	355	489	522	349	494	361	665	304	379	566	576	487	393	474	390	362	345	320	421	665	251	107
31	March	I	419	302	364	742	532	387	651	453	645	315	399	607	638	581	442	553	397	384	333	353	475	742	302	132
		II	728	461	415	1168	538	358	567	605	671	520	407	968	828	622	517	591	395	366	390	314	571	1168	314	218
		III	680	424	503	1084	626	650	743	1362	733	1275	471	1254	793	837	512	689	690	426	375	603	736	1362	375	293
30	April	I	630	510	1015	926	715	807	1279	1250	792	690	556	1254	715	800	740	1250	812	489	494	600	816	1279	489	265
		II	701	784	1023	1043	1064	1402	1272	1842	837	683	765	1361	582	1139	658	960	994	798	519	819	962	1842	519	324
		III	906	467	935	983	1644	1461	1059	1100	1037	769	1088	1685	585	1205	1303	1310	1121	764	537	951	1045	1685	467	334
																								4070	**239**	**425**
Leap Year	Av Flows (Cumec-Days)		341468	364997	191351	390921	496478	416536	454412	498169	343776	423347	308819	423095	592156	549054	527549	499366	525955	350312	243150	251622				
	Annual Flow (Cumec)		936	1000	524	1071	1360	1141	1245	1365	942	1160	846	1159	1622	1504	1445	1368	1441	960	666	689	1122			
	Annual Volume MCM		29503	31536	16533	33776	42896	35989	39261	43042	29702	36577	26682	36555	51162	47438	45580	43145	45443	30267	21008	21740	35392			
	AV Basin (Cumec)		**1122**																							

TABLE-24
Average Ten Daily Flow Series at Demwe Lower HEP (1984-85 to 2003-04)

Average Ten daily flow series at Demwe Upper HE project site as derived from Mompani site (20 Years) in Cumecs

Catchment Area of Demwe Upper HE project site = 20174 sq km

Total days	Month	10 Daily	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	Avearge Cumecs	Maximum	Minimum	SD
31	May	I	1287	1287	469	907	1301	1767	1341	2696	1172	1306	914	1856	1936	799	1716	1492	2718	1153	745	820	1384	2718	469	598
		II	1491	1048	576	1129	1870	1675	1588	2313	1662	2285	796	2272	2439	807	1611	1152	2950	1215	1013	777	1533	2950	576	656
		III	1755	1750	635	1218	2624	2017	1751	1692	1357	1633	1224	2629	2220	977	2680	2340	3236	1765	1038	895	1772	3236	635	690
30	June	I	1780	3171	647	1749	1974	1931	2793	1594	1628	2277	1883	2283	2252	2331	2307	1518	3122	2336	933	1126	1982	3171	647	657
		II	1933	2271	751	1546	1971	2232	2202	2197	1675	2207	2268	2108	2338	2478	2988	1483	3104	2342	1042	1657	2040	3104	751	568
		III	1967	2357	1111	1887	1802	2097	2246	2488	3131	2298	1940	2136	3560	2382	3152	2403	4086	2294	1025	1824	2309	4086	1025	734
31	July	I	2141	2743	785	1961	2982	3159	2074	3557	1876	3215	1477	2548	3127	3570	3327	2191	2727	1949	1045	2249	2435	3570	785	798
		II	2309	2591	803	1514	1680	1997	2592	2364	1840	2393	1355	1815	4273	3814	2828	2688	2580	2028	1396	1341	2210	4273	803	834
		III	2149	2515	691	1929	2153	1916	2400	2139	1762	2325	1520	1276	3277	3363	2617	2539	2620	2311	1477	964	2097	3363	691	685
31	August	I	1370	2119	631	2082	1352	1710	2039	2322	1555	2074	1341	1039	3166	3594	2496	2289	3225	2043	1114	783	1917	3594	631	805
		II	1369	1830	570	2497	1529	1675	1674	2200	1452	1929	1235	2134	3061	3667	2835	2847	2672	1323	1116	723	1917	3667	570	814
		III	1362	1781	583	2178	3403	1486	1616	1977	1297	1893	1233	1399	2726	3142	2749	3119	2465	1412	814	762	1870	3403	583	831
30	September	I	1262	826	558	1817	2032	1729	1461	1901	1181	1438	1209	1234	2519	3129	3851	3031	2345	1304	720	764	1716	3851	558	882
		II	1820	598	824	1591	1336	1460	1603	1781	1110	1281	1148	1331	2170	3231	2125	2792	2330	958	680	732	1545	3231	598	709
		III	1229	918	329	2198	1554	1391	1888	1750	884	1301	1030	1929	2064	3463	1740	1965	1778	874	1261	631	1509	3463	329	690
31	October	I	868	853	436	1333	2323	1532	2093	1499	576	1321	862	864	2199	1698	1267	1511	1030	1016	957	584	1241	2323	436	540
		II	758	688	434	1030	2193	1425	1556	1516	965	1004	749	766	1831	1144	1389	1797	773	778	622	553	1098	2193	434	488
		III	537	668	341	823	2237	1079	1279	1343	662	919	700	700	1656	858	1818	1366	679	622	584	517	969	2237	341	498
30	November	I	587	632	398	733	1430	817	1047	1193	508	843	615	615	1569	725	917	989	574	573	541	461	788	1569	398	319
		II	484	553	395	559	1248	682	870	1020	421	798	570	570	1336	678	698	728	548	533	497	438	681	1336	395	261
		III	364	508	355	489	1161	548	753	861	368	764	508	508	1126	654	797	666	518	490	450	418	615	1161	355	233
31	December	I	342	479	309	405	1057	445	690	780	336	712	489	489	871	645	680	762	468	458	426	401	562	1057	309	201
		II	336	444	297	380	943	402	593	630	302	677	475	475	797	635	570	689	442	432	407	383	516	943	297	172
		III	325	424	352	331	748	386	496	562	274	643	467	467	743	575	504	588	429	400	383	368	473	748	274	134
31	January	I	311	387	415	304	538	371	438	425	295	298	387	425	696	531	468	538	418	375	361	358	417	696	295	100
		II	305	356	402	300	514	358	413	392	321	294	355	408	635	516	451	529	397	380	327	357	401	635	294	89
		III	305	340	373	284	486	375	389	349	270	317	324	397	601	493	429	536	394	393	348	358	388	601	270	85
28	February	I	267	357	362	263	538	400	398	372	478	315	298	515	566	495	417	530	404	370	355	330	402	566	263	91
		II	254	348	353	291	513	391	411	359	598	300	339	544	617	511	414	521	397	383	359	325	411	617	254	104
		III	267	351	378	514	548	367	518	379	698	319	398	595	605	511	413	498	410	381	362	336	442	698	267	112
31	March	I	447	321	388	779	558	406	683	476	677	331	419	637	670	610	464	580	417	403	349	371	499	779	321	138
		II	775	491	441	1227	565	376	596	635	704	546	428	1016	869	653	543	620	414	384	409	330	601	1227	330	229
		III	724	451	536	1139	658	683	780	1430	770	1339	494	1317	832	879	537	723	724	447	394	634	774	1430	394	307
30	April	I	670	543	1081	972	751	848	1343	1313	831	724	584	1316	750	840	777	1312	852	513	519	630	858	1343	513	278
		II	746	835	1089	1095	1117	1472	1336	1934	878	717	803	1429	611	1196	691	1008	1044	838	545	860	1012	1934	545	339
		III	965	498	996	1032	1726	1534	1112	1155	1089	807	1143	1769	614	1265	1369	1376	1177	802	564	998	1099	1769	498	349
																								4273	**254**	**445**
Leap Year	Av Flows (Cumec-Days)		363581	388635	203743	410467	521302	437363	477132	523077	360965	444514	324260	444250	621764	576506	553927	524334	552253	367827	255307	264203				
	Annual Flow (Cumec)		996	1065	558	1125	1428	1198	1307	1433	989	1218	888	1217	1703	1579	1518	1437	1513	1008	699	724	**1180**			
	Annual Volume MCM		**31413**	**33578**	**17603**	**35464**	**45041**	**37788**	**41224**	**45194**	**31187**	**38406**	**28016**	**38383**	**53720**	**49810**	**47859**	**45302**	**47715**	**31780**	**22059**	**22827**				
	AV Basin (Cumec)		**1180**																							

ANNEXURE-VII

Density of phytoplanktons (no of individuals/Lit) at various sampling sites

APRIL 2009

Class	Genus	Kalai HEP, Stage-1					Kalai HEP, Stage-2				
		S1	**S2**	**S3**	**S4**	**S5**	**S6**	**S7**	**S8**	**S9**	**S10**
Bacillariophyceae	*Anomoeonus*	-	1	-	-	-	-	-	-	-	-
	Frustulia rhomboids	-	1	-	1	-	-	1	-	1	-
	Mastogloia denseii	-	-	1	-	-	-	-	-	-	-
	Neidium affinis	-	-	1	-	-	-	-	-	-	-
Chlorophyceae	*Actinastrum hantzschii*	8	-	1	-	-	7	7	16	3	8
	Closteriopsis longissima	-	-	-	-	1	-	-	-	-	-
	Closterium abruptum	-	5	-	3	-	1	3	4	-	-
	Chlorella vulgaris	8	-	6	-	1	-	8	-	-	12
	Penium simplex	-	-	2	-	-	-	-	-	-	-
Cyanophyceae	*Anabaena oscillarioides*	-	-	-	-	-	-	8	-	-	-
	Lyngbya birgei	-	-	1	-	-	-	-	-	-	-
	Microcystis sp.	-	-	-	-	-	-	-	1	-	1
	Oscillatoria acuminata	-	-	-	1	-	-	-	-	-	-
	Unidentified-1	-	-	-	-	-	-	1	-	1	-
Total		**16**	**7**	**12**	**5**	**2**	**8**	**28**	**21**	**5**	**21**

APRIL 2009

Class	Genus	Hutong HEP, Stage-1					Hutong HEP, Stage-2				
		S11	**S12**	**S13**	**S14**	**S15**	**S16**	**S17**	**S18**	**S19**	**S20**
Bacillariophyceae	*Anomoeonus sphaerophora*	-	1	-	1	-	1	-	1	-	-
	Ceratoneis arcus	-	-	-	-	-	-	-	1	-	-
	Cymbella cistula	-	-	-	-	-	-	1	-	-	-
	Gomphonema geminatum	-	1	-	-	-	-	1	-	-	-
	Mastogloia denseii	-	-	1	-	-	-	-	-	-	-
Chlorophyceae	*Closterium abruptum*	-	3	1	1	1	-	-	-	-	-
	Penium simplex	-	-	-	-	-	-	-	2	-	1
Cyanophyceae	*Microcystis* sp.	4	9	12	11	1	-	14	11	-	1
	Unidentified-1	-	1	1	-	-	4	-	2	2	-
	Synechocystis sp.	-	-	-	-	-	-	-	-	-	1
Total		**4**	**15**	**15**	**13**	**2**	**5**	**16**	**17**	**2**	**3**

APRIL 2009

Class	Genus	Demwe Upper HEP					Demwe Lower HEP				
		S21	**S22**	**S23**	**S24**	**S25**	**S26**	**S27**	**S28**	**S29**	**S30**
Bacillariophyceae	*Anomoeonus sphaerophora*	-	-	-	-	2	-	-	-	-	-
	Ceratoneis arcus	-	-	-	-	-	-	-	-	-	2
	Cymbella cistula	-	-	2	-	3	-	-	-	-	-
	Frustulia rhomboids	-	-	2	-	3	-	-	-	-	-
	Gomphonema geminatum	-	-	1	-	-	-	-	-	-	-
	Mastogloia denseii	-	-	1	-	-	-	-	-	-	-
	Neidium affinis	-	-	-	-	1	-	-	-	-	-
Chlorophyceae	*Actinastrum hantzschii*	-	2	-	-	2	1	1	-	1	1
	Closteriopsis longissima	-	-	-	4	-	-	-	-	-	-
	Closterium abruptum	-	-	-	-	1	-	1	1	1	1
	Chlorella vulgaris	2	3	-	-	2	-	-	-	-	-
	Penium simplex	-	-	-	8	4	-	-	1	-	-
Cyanophyceae	*Gloeothece* sp.	-	-	1	-	-	-	-	-	-	-
	Microcystis sp.	-	-	-	1	-	-	-	-	-	-

Class	Genus	Demwe Upper HEP					Demwe Lower HEP				
		S21	S22	S23	S24	S25	S26	S27	S28	S29	S30
	Oscillatoria acuminata	-	-	-	-	-	-	-	-	-	1
	Rivularia bornetiana	-	-	-	-	-	1	-	1	-	-
	Unidentified-1	-	-	-	-	-	-	-	-	-	2
	Synechoccus sp.	-	-	1	-	-	-	-	-	-	-
	Synechocystis sp.	3	-	4	1	-	1	-	1	-	4
Total		**5**	**5**	**12**	**14**	**18**	**3**	**2**	**4**	**2**	**11**

May 2009

Class	Genus	Kalai HEP, Stage-1					Kalai HEP, Stage-2				
		S1	S2	S3	S4	S5	S6	S7	S8	S9	S10
Bacillariophyceae	*Cymbella cistula*	1	1	-	-	1	-	1	1	-	1
	Mastogloia denseii	-	-	2	1	-	1	-	-	1	-
Chlorophyceae	*Chlorella vulgaris*	5	6	1	8	1	2	-	1	-	1
	Pediastrum tetras	-	1	-	1	-	-	-	-	-	-
Cyanophyceae	*Anabaena oscillarioides*	-	1	-	-	1	-	1	-	1	-
	Unidentified-1	-	-	-	-	-	-	1	-	-	-
Total		**6**	**9**	**3**	**10**	**3**	**3**	**3**	**2**	**2**	**2**

May 2009

Class	Genus	Hutong HEP, Stage-1					Hutong HEP, Stage-2				
		S11	S12	S13	S14	S15	S16	S17	S18	S19	S20
Bacillariophyceae	*Cymbella cistula*	-	-	1	-	-	-	1	-	-	-
Chlorophyceae	*Chlorella vulgaris*	3	2	-	-	1	2	-	1	1	1
Cyanophyceae	*Anabaena oscillarioides*	4	-	1	-	1	-	3	2	5	-
	Unidentified-1	-	-	1	1	-	-	1	1	-	1
Total		**7**	**2**	**3**	**1**	**2**	**2**	**5**	**4**	**6**	**2**

May 2009

Class	Genus	Demwe Upper HEP					Demwe Lower HEP				
		S21	**S22**	**S23**	**S24**	**S25**	**S26**	**S27**	**S28**	**S29**	**S30**
Bacillariophyceae	*Cocconeis placentula*	-	-	-	-	-	1	-	1	-	1
	Cymbella cistula	2	1	-	2	-	-	-	-	-	1
	Frustulia rhomboids	1	-	-	1	-	-	-	-	-	-
	Gomphonema geminatum	-	-	-	-	1	-	-	-	-	2
	Mastogloia denseii	1	1	1	-	1	-	1	-	-	
	Navicula radiosa	-	-	-	-	-	-	3	-	1	-
Chlorophyceae	*Actinastrum hantzschii*	2	-	-	1	2	-	1	-	-	3
	Chlorella vulgaris	1	-	4	2	-	-	-	-	-	2
	Closteriopsis longissima	-	-	1	1	-	-	-	-	-	-
	Pediastrum tetras	-	-	1	1	-	-	1	-	-	-
	Penium simplex	-	-	-	1	-	-	-	-	-	
	Spirogyra varians	2	-	-	2	-	-	-	-	-	2
	Trochiscia pachyderma	-	-	-	-	-	-	1	-	1	-
Cyanophyceae	*Anabaena oscillarioides*	1	-	1	-	-	-	-	-	-	-
	Hyalotheca bissiliens	2	-	-	2	-	-	-	-	1	1
	Lyngbya birgei	-	-	-	-	-	-	5	-	-	2
	Microcystis sp.	-	-	-	-	-	-	1	-	-	-
	Oscillatoria acuminata	2	-	-	3	-	-	-	-	1	-
	Phormidium ambiguum	-	-	-	-	-	-	-	-	-	1
	Unidentified-1	-	-	-	3	-	-	-	-	-	-
	Spirulina caldaria	-	-	-	-	-	-	3	-	-	-
Total		**14**	**2**	**8**	**19**	**4**	**1**	**16**	**1**	**4**	**15**

June 2009

Class	Genus	Kalai HEP, Stage-1					Kalai HEP, Stage-2				
		S1	S2	S3	S4	S5	S6	S7	S8	S9	S10
Bacillariophyceae	*Anomoeonus sphaerophora*	-	1	-	-	-	-	-	-	-	-
	Neidium affinis	-	-	1	-	-	-	-	-	-	-
Chlorophyceae	*Actinastrum hantzschii*	2	-	1	-	-	7	7	11	2	2
	Closteriopsis longissima	-	-	-	-	1	-	-	-	-	-
	Closterium abruptum	-	5	-	2	-	1	2	1	-	-
	Chlorella vulgaris	2	-	1	-	1	-	2	-	-	12
	Penium simplex	-	-	2	-	-	-	-	-	-	-
Cyanophyceae	*Anabaena oscillarioides*	-	-	-	-	-	-	2	-	-	-
	Lyngbya birgei	-	-	1	-	-	-	-	-	-	-
	Microcystis sp.	-	-	-	-	-	-	-	1	-	1
Total		**4**	**6**	**6**	**2**	**2**	**8**	**13**	**13**	**2**	**15**

June 2009

Class	Genus	Hutong HEP, Stage-1					Hutong HEP, Stage-2				
		S11	S12	S13	S14	S15	S16	S17	S18	S19	S20
Bacillariophyceae	*Anomoeonus sphaerophora*	-	1	-	1	-	1	-	1	-	-
	Ceratoneis arcus	-	-	-	-	-	-	-	1	-	-
	Cymbella cistula	-	-	-	-	-	-	1	-	-	-
Chlorophyceae	*Closterium abruptum*	-	2	1	1	1	-	-	-	-	-
	Penium simplex	-	-	-	-	-	-	-	2	-	1
Cyanophyceae	*Microcystis* sp.	1	9	12	11	1	-	11	11	-	1
Total		**1**	**12**	**13**	**13**	**2**	**1**	**12**	**15**	**0**	**2**

June 2009

Class	Genus	Demwe Upper HEP					Demwe Lower HEP				
		S21	S22	S23	S24	S25	S26	S27	S28	S29	S30
Bacillariophyceae	*Anomoeonus sphaerophora*	-	-	-	-	1	-	-	-	-	-
	Ceratoneis arcus	-	-	-	-	-	-	-	-	-	2
	Cymbella cistula	-	-	2	-	4	-	-	-	-	-
	Neidium affinis	-	-	-	-	4	-	-	-	-	-
Chlorophyceae	*Actinastrum hantzschii*	-	2	-	-	2	1	1	-	1	1
	Closteriopsis longissima	-	-	-	1	-	-	-	-	-	-
	Closterium abruptum	-	-	-	-	1	-	1	3	1	1
	Chlorella vulgaris	2	2	-	-	4	-	-	-	-	-
	Penium simplex	-	-	-	2	1	-	-	1	-	-
Cyanophyceae	*Gloeothece* sp.	-	-	1	-	-	-	-	-	-	-
	Microcystis sp.	-	-	-	1	-	-	-	-	-	-
Total		**2**	**4**	**3**	**4**	**17**	**1**	**2**	**4**	**2**	**4**

July 2009

Class	Genus	Kalai HEP, Stage-1					Kalai HEP, Stage-2				
		S1	S2	S3	S4	S5	S6	S7	S8	S9	S10
Bacillariophyceae	*Frustulia rhomboids*	-	4	-	2	-	-	1	-	1	-
	Mastogloia denseii	-	-	1	-	-	-	-	-	-	-
	Neidium affinis	-	-	1	-	-	-	-	-	-	-
	Tabellaria fenestrata	-	3	-	3	-	-	1	-	1	1
	Atthiya zachariasi	-	-	1	-	-	-	-	1	-	-
	Amphora ovalis	-	-	1	-	-	-	-	-	-	-
Chlorophyceae	*Actinastrum hantzschii*	8	-	1	-	-	7	7	16	3	8
	Closteriopsis longissima	-	-	-	-	5	-	-	-	-	-
Cyanophyceae	*Anabaena oscillarioides*	-	-	-	-	-	-	8	-	-	-
	Lyngbya birgei	-	-	1	-	-	-	-	-	-	-
Total		**8**	**7**	**6**	**5**	**5**	**7**	**17**	**17**	**5**	**9**

July 2009

Class	Genus	Hutong HEP, Stage-1					Hutong HEP, Stage-2				
		S11	**S12**	**S13**	**S14**	**S15**	**S16**	**S17**	**S18**	**S19**	**S20**
Bacillariophyceae	*Cymbella cistula*	-	-	-	-	-	-	1	-	1	-
	Frustulia rhomboids	-	-	-	-	-	4	-	-	-	-
	Gomphonema geminatum	-	1	-	-	-	-	1	-	-	-
	Mastogloia denseii	-	-	1	-	-	2	-	-	2	-
	Melosira ambigua	-	-	-	-	-	-	1	-	-	-
	Unidentified-1	-	1	-	-	-	3	1	-	-	-
	Atthiya zachariasi	-	-	1	-	-	-	-	-	-	-
Chlorophyceae	*Actinastrum hantzschii*	-	-	-	-	-	-	-	-	4	2
Cyanophyceae	*Microcystis* sp.	4	9	12	11	6	-	14	11	-	3
Total		**4**	**11**	**14**	**11**	**6**	**9**	**18**	**11**	**7**	**5**

July 2009

Class	Genus	Demwe Upper HEP					Demwe Lower HEP				
		S21	**S22**	**S23**	**S24**	**S25**	**S26**	**S27**	**S28**	**S29**	**S30**
Bacillariophyceae	*Cymbella cistula*	4	-	2	-	4	-	-	-	-	-
	Frustulia rhomboids	-	-	2	-	2	-	-	-	-	2
	Gomphonema geminatum	-	-	1	-	-	-	-	-	3	-
	Mastogloia denseii	-	-	1	-	-	-	-	-	-	-
	Neidium affinis	-	-	-	-	2	-	-	-	-	-
	Melosira ambigua	-	-	2	-	3	-	2	6	-	-
	Tabellaria fenestrata	2	-	2	-	2	2	-	-	2	6
	Unidentified-1	-	-	1	-	-	-	-	-	-	-
	Atthiya zachariasi	-	-	1	-	-	-	-	2	-	-
	Amphora ovalis	1	-	-	-	1	-	-	-	-	-
Chlorophyceae	*Actinastrum hantzschii*	-	2	-	-	1	4	3	-	5	4
	Closteriopsis longissima	-	-	-	4	-	-	-	-	-	-
Cyanophyceae	*Anabaena oscillarioides*	-	-	-	-	-	-	-	3	-	-
	Unidentified-2	1	-	1	-	-	-	-	-	-	-
	Microcystis sp.	-	-	-	1	-	-	-	-	-	-
Total		**8**	**2**	**13**	**5**	**15**	**6**	**5**	**11**	**10**	**12**

August 2009

Class	Genus	Kalai HEP, Stage-1					Kalai HEP, Stage-2				
		S1	S2	S3	S4	S5	S6	S7	S8	S9	S10
Bacillariophyceae	*Melosira ambigua*	2	4	-	-	2	-	3	6	-	3
	Atthiya zachariasi	-	-	2	3	-	3	-	-	8	2
Chlorophyceae	*Pediastrum tetras*	-	3	-	2	-	-	-	-	-	-
Cyanophyceae	*Anabaena oscillarioides*	-	3	-	-	2	-	2	-	1	-
Total		**2**	**10**	**2**	**5**	**4**	**3**	**5**	**6**	**9**	**5**

August 2009

Class	Genus	Hutong HEP, Stage-1					Hutong HEP, Stage-2				
		S11	S12	S13	S14	S15	S16	S17	S18	S19	S20
Bacillariophyceae	*Melosira ambigua*	-	-	5	-	-	-	1	-	-	-
	Tabellaria fenestrata	-	2	-	-	-	2	-	-	-	-
	Unidentified-1	-	-	-	3	-	-	-	-	-	-
	Atthiya zachariasi	-	-	-	-	-	-	-	-	-	2
Cyanophyceae	*Anabaena oscillarioides*	4	-	2	-	2	-	3	2	5	-
Total		**4**	**2**	**7**	**3**	**2**	**2**	**4**	**2**	**5**	**2**

August 2009

Class	Genus	Demwe Upper HEP					Demwe Lower HEP				
		S21	S22	S23	S24	S25	S26	S27	S28	S29	S30
Bacillariophyceae	*Navicula radiosa*	-	-	-	-	-	-	3	-	1	-
	Pinnularia nobilis	-	-	-	1	-	5	-	6	-	-
	Melosira ambigua	2	1	-	2	-	-	-	-	-	5
	Tabellaria fenestrata	4	-	-	-	-	-	-	-	-	1
	Unidentified-1	-	-	-	2	1	-	-	-	-	-
	Atthiya zachariasi	3	5	1	5	1	-	1	-	-	-
	Amphora ovalis	-	-	-	-	-	-	3	-	2	-
Chlorophyceae	*Actinastrum hantzschii*	2	-	-	3	2	-	1	-	-	3
	Pediastrum tetras	-	-	1	-	-	-	1	-	-	1
Cyanophyceae	*Anabaena oscillarioides*	3	-	1	-	-	-	-	-	-	-
	Unidentifed-2	2	-	-	1	-	-	-	-	1	2
Total		**16**	**6**	**3**	**14**	**4**	**5**	**9**	**6**	**4**	**12**

September 2009

Class	Genus	Kalai HEP, Stage-1					Kalai HEP, Stage-2				
		S1	**S2**	**S3**	**S4**	**S5**	**S6**	**S7**	**S8**	**S9**	**S10**
Bacillariophyceae	*Anomoeonus sphaerophora*	3	1	-	-	-	-	-	-	-	4
	Ceratoneis arcus	-	-	-	-	-	-	-	1	5	-
	Undentified-1	1	-	-	-	2	4	2	-	-	-
	Atthiya zachariasi	-	-	-	-	-	-	-	-	-	2
	Amphora ovalis	-	-	2	-	-	-	-	-	3	-
Chlorophyceae	*Closteriopsis longissima*	-	-	-	-	3	-	-	-	-	-
	Unidentified-2	-	5	-	2	-	2	2	3	1	1
Total		**4**	**6**	**2**	**2**	**5**	**6**	**4**	**4**	**9**	**7**

September 2009

Class	Genus	Hutong HEP, Stage-1					Hutong HEP, Stage-2				
		S11	**S12**	**S13**	**S14**	**S15**	**S16**	**S17**	**S18**	**S19**	**S20**
Bacillariophyceae	*Anomoeonus sphaerophora*	5	6	3	5	-	6	-	1	5	4
	Ceratoneis arcus	-	-	-	-	2	-	3	6	3	-
	Amphora ovalis	-	-	-	-	-	-	2	-	-	-
Chlorophyceae	*Closterium abruptum*	-	-	1	1	1	-	-	-	-	-
Cyanophyceae	*Unidentified-3*	-	-	-	-	-	-	6	-	-	-
Total		**5**	**6**	**4**	**6**	**3**	**6**	**11**	**7**	**8**	**4**

September 2009

Class	Genus	Demwe Upper HEP					Demwe Lower HEP				
		S21	**S22**	**S23**	**S24**	**S25**	**S26**	**S27**	**S28**	**S29**	**S30**
Bacillariophyceae	*Anomoeonus sphaerophora*	5	-	-	-	1	-	-	-	-	-
	Ceratoneis arcus	6	2	-	-	-	-	-	2	4	2
	Unidentified-1	-	-	1	-	-	4	1	-	-	-
	Amphora ovalis	-	1	2	-	-	-	-	-	-	-
Chlorophyceae	*Closteriopsis longissima*	-	-	-	1	-	-	-	-	-	-
	Unidentified-2	-	-	-	-	2	-	3	1	1	1
Cyanophyceae	*Unidentified-3*	-	5	3	-	-	-	-	-	-	-
Total		**11**	**8**	**6**	**1**	**3**	**4**	**4**	**3**	**5**	**3**

ANNEXURE-VIII

Density of zooplanktons (no of individuals/Lit) at various sampling sites

April 2009

Genus	**Kalai HEP, Stage-1**					**Kalai HEP,stage-2**				
	S1	**S2**	**S3**	**S4**	**S5**	**S6**	**S7**	**S8**	**S9**	**S10**
Difflugia	6	7	6	9	6	4	2	3	6	5
Keratella	1	2	3	6	3	1	-	-	-	2
Polyarthra	-	-	-	-	-	-	-	-	1	1
Testudinella	-	-	-	-	-	2	-	-	3	-
Ceriodaphnia	-	-	-	-	-	-	1	-	-	-
Cyclops	-	-	-	-	1	-	-	-	1	1
Monostyla	-	-	-	1	1	-	-	-	-	-
Philodina	-	-	-	1	1	-	-	-	-	-
Arcella	1	-	4	3	-	-	-	-	-	-
Colurella	9	7	2	2	1	-	-	-	-	-
Bosminopsis	1	3	5	1	-	-	-	-	7	9
Unidentified-2	4	5	6	3	2	-	-	-	3	2
Trichocerca	-	-	-	-	-	-	-	-	1	1
Total	22	24	26	26	15	7	3	3	22	21
Genus	**Hutong HEP, Stage-1**					**Hutong HEP, Stage-2**				
	S11	**S12**	**S13**	**S14**	**S15**	**S16**	**S17**	**S18**	**S19**	**S20**
Difflugia	-	7	-	-	-	5	1	12	-	-
Polyarthra	-	-	5	-	-	3	-	7	1	-
Ceriodaphnia	-	-	-	-	1	-	-	-	-	1
Cyclops	-	-	-	-	-	1	-	2	-	-
Monostyla	-	-	-	-	-	1	-	-	-	3
Mytillina	-	-	-	-	-	2	-	-	-	-
Philodina	3	2	-	-	5	-	-	1	1	-
Arcella	-	-	-	-	-	1	-	-	-	-
Colurella	-	-	-	-	-	-	-	-	-	1
Unidentified-3	-	-	-	2	-	-	-	1	-	-
Bosmina	-	-	-	-	-	1	-	-	-	-
Bosminopsis	-	3	-	-	-	1	-	-	-	5
Brachionus	-	-	-	-	-	3	-	-	-	-
Unidentified-2	-	-	-	-	5	-	-	-	-	-
Filinia	-	-	-	-	-	-	-	2	-	-
Lecane	-	-	-	-	-	1	-	-	-	-
Total	3	12	5	2	11	19	1	25	2	10
Genus	**Demwe Upper HEP**					**Demwe Lower HEP**				
	S21	**S22**	**S23**	**S24**	**S25**	**S26**	**S27**	**S28**	**S29**	**S30**
Difflugia	2	-	1	1	4	5	3	-	2	5
Keratella	-	-	-	-	2	4	1	2	-	2
Polyarthra	-	-	4	-	5	-	-	-	-	-
Testudinella	1	-	-	-	4	6	4	-	1	-

Ceriodaphnia	-	2	-	-	-	-	-	-	-	-
Monostyla	-	-	-	1	-	-	-	-	-	-
Mytillina	-	5	-	-	-	-	-	-	-	1
Philodina	-	-	-	-	-	5	6	-	-	-
Arcella	-	-	-	-	-	3	-	-	2	1
Unidentified-3	1	-	1	-	-	-	-	-	-	-
Bosminopsis	-	-	-	-	6	-	-	-	-	-
Unidentified-2	-	-	3	-	-	2	-	-	1	1
Lecane	-	-	1	-	-	-	-	-	-	-
Total	4	7	10	2	21	25	14	2	6	10

May 2009

Genus	**Kalai HEP, Stage-1**					**Kalai HEP,stage-2**				
	S1	**S2**	**S3**	**S4**	**S5**	**S6**	**S7**	**S8**	**S9**	**S10**
Difflugia	3	7	6	1	6	4	2	3	6	5
Keratella	1	2	3	6	3	1	-	-	-	2
Polyarthra	-	-	-	-	-	-	-	-	1	1
Testudinella	-	-	-	-	-	2	-	-	3	-
Ceriodaphnia	-	-	-	-	-	-	1	-	-	-
Cyclops	-	-	-	-	1	-	-	-	1	1
Monostyla	-	-	-	1	1	-	-	-	-	-
Bosminopsis	1	3	5	1	-	-	-	-	8	1
Brachionus	-	-	-	-	-	-	-	-	-	-
Unidentified-2	4	5	6	3	2	-	-	-	3	2
Total	**9**	**17**	**20**	**12**	**13**	**7**	**3**	**3**	**22**	**12**
Genus	**Hutong HEP, Stage-1**					**Hutong HEP, Stage-2**				
	S11	**S12**	**S13**	**S14**	**S15**	**S16**	**S17**	**S18**	**S19**	**S20**
Difflugia	-	7	-	-	-	6	5	3	5	-
Polyarthra	-	-	5	-	-	3	-	7	-	-
Testudinella	5	-	-	-	-	-	-	-	-	-
Ceriodaphnia	-	-	-	2	1	-	-	-	6	1
Cyclops	-	-	-	-	-	1	3	2	-	-
Monostyla	-	-	-	-	-	1	1	-	-	3
Unidentified-3	4	-	-	3	-	-	-	1	-	-
Bosmina	-	-	-	-	-	1	-	-	-	-
Bosminopsis	-	3	-	-	-	1	-	-	-	5
Brachionus	-	-	-	-	-	3	-	-	-	-
Unidentified-2	-	-	-	-	5	-	-	-	-	-
Total	**9**	**10**	**5**	**5**	**6**	**16**	**9**	**13**	**11**	**9**
Genus	**Demwe Upper HEP**					**Demwe Lower HEP**				
	S21	**S22**	**S23**	**S24**	**S25**	**S26**	**S27**	**S28**	**S29**	**S30**
Difflugia	2	-	1	1	4	5	3	1	2	5
Keratella	-	-	-	-	2	9	1	7	1	2
Polyarthra	-	-	4	-	5	-	-	-	-	-
Testudinella	1	-	-	-	4	6	4	1	-	-
Ceriodaphnia	-	2	-	-	-	-	-	-	-	-
Monostyla	-	-	-	1	-	-	-	-	-	-
Unidentified-3	1	-	1	-	-	-	-	-	-	-

Bosminopsis	-	-	-	-	6	-	-	-	-	-
Unidentified-2	-	-	3	-	-	2	-	1	1	1
Total	**4**	**2**	**9**	**2**	**21**	**22**	**8**	**10**	**4**	**8**

June2009

Genus	**Kalai HEP, Stage-1**					**Kalai HEP,stage-2**				
	S1	**S2**	**S3**	**S4**	**S5**	**S6**	**S7**	**S8**	**S9**	**S10**
Keratella	1	2	3	6	3	1	-	-	-	2
Polyarthra	-	-	-	-	-	-	-	5	2	5
Testudinella	-	-	-	-	-	2	-	-	3	-
Ceriodaphnia	-	-	-	-	-	-	5	2	-	-
Unidentified-2	13	5	6	3	2	-	-	-	3	2
Filinia	-	-	-	-	-	-	3	2	-	-
Trichocerca	-	-	-	-	-	-	-	-	3	1
Total	**14**	**7**	**9**	**9**	**5**	**3**	**8**	**9**	**11**	**10**
Genus	**Hutong HEP, Stage-1**					**Hutong HEP, Stage-2**				
	S11	**S12**	**S13**	**S14**	**S15**	**S16**	**S17**	**S18**	**S19**	**S20**
Keratella	-	4	-	-	-	-	-	-	3	5
Polyarthra	-	-	7	-	-	3	6	7	-	-
Testudinella	6	2	-	-	-	-	-	-	-	-
Ceriodaphnia	-	-	-	-	1	-	-	-	-	4
Unidentified-3	2	1	2	2	-	-	2	6	2	-
Unidentified-2	-	-	-	-	5	-	-	-	-	-
Filinia	-	-	-	-	-	-	-	2	1	1
Lecane	1	1	1	-	-	5	1	-	-	-
Total	**9**	**8**	**10**	**2**	**6**	**8**	**9**	**15**	**6**	**10**
Genus	**Demwe Upper HEP**					**Demwe Lower HEP**				
	S21	**S22**	**S23**	**S24**	**S25**	**S26**	**S27**	**S28**	**S29**	**S30**
Keratella	-	-	-	-	2	8	5	7	-	3
Polyarthra	-	-	4	5	5	-	-	-	-	-
Testudinella	5	-	-	-	4	6	4	6	2	-
Ceriodaphnia	-	5	-	-	-	-	-	-	-	-
Unidentified-3	2	-	3	2	-	-	-	-	-	-
Unidentified-2	-	-	3	2	-	2	-	2	2	6
Lecane	-	1	1	1	-	-	-	-	-	-
Trichocerca	-	1	-	-	-	-	-	-	-	1
Total	**7**	**7**	**11**	**10**	**11**	**16**	**9**	**15**	**4**	**10**

July 2009

Genus	**Kalai HEP, Stage-1**					**Kalai HEP,stage-2**				
	S1	**S2**	**S3**	**S4**	**S5**	**S6**	**S7**	**S8**	**S9**	**S10**
Difflugia	2	2	3	4	3	4	2	3	4	5
Keratella	1	1	3	3	3	1	-	-	-	2
Polyarthra	-	-	-	-	-	-	-	-	1	1
Testudinella	-	-	-	-	-	2	-	-	3	-
Ceriodaphnia	-	-	-	-	-	-	1	-	-	-
Cyclops	-	-	-	-	1	-	-	-	1	1
Colurella	2	4	2	2	1	-	-	-	-	-

Epistylis	2	1	1	1	2	-	-	-	2	2
Unidentified-a	-	-	-	-	-	-	-	-	1	1
Total	**7**	**8**	**9**	**10**	**10**	**7**	**3**	**3**	**12**	**12**
Genus	**Hutong HEP, Stage-1**					**Hutong HEP, Stage-2**				
	S11	**S12**	**S13**	**S14**	**S15**	**S16**	**S17**	**S18**	**S19**	**S20**
Difflugia	-	7	-	-	-	5	3	2	1	-
Keratella	-	-	-	-	-	-	-	-	-	-
Polyarthra	-	-	5	-	-	3	-	7	-	-
Testudinella	4	-	-	-	-	-	-	-	-	-
Ceriodaphnia	-	-	-	2	1	-	-	-	-	1
Cyclops	-	-	-	-	-	1	1	2	-	-
Colurella	2	-	-	-	-	-	-	-	-	1
Epistylis	-	-	-	3	5	-	-	-	-	-
Filinia	-	-	-	-	-	-	-	2	-	-
Unidentified-b	-	-	-	-	-	1	-	-	-	-
Total	**6**	**7**	**5**	**5**	**6**	**10**	**4**	**13**	**1**	**2**
Genus	**Demwe Upper HEP**					**Demwe Lower HEP**				
	S21	**S22**	**S23**	**S24**	**S25**	**S26**	**S27**	**S28**	**S29**	**S30**
Difflugia	2	-	1	1	4	5	3	1	2	5
Keratella	-	-	-	-	2	8	1	7	-	2
Polyarthra	-	-	4	-	5	-	-	-	-	-
Testudinella	1	-	-	-	4	6	4	1	1	-
Ceriodaphnia	-	2	-	-	-	-	-	-	-	-
Epistylis	-	-	3	-	-	2	-	1	1	1
Unidentified-b	-	-	1	-	-	-	-	-	-	-
Total	**3**	**2**	**9**	**1**	**15**	**21**	**8**	**10**	**4**	**8**

August 2009

Genus	**Kalai HEP, Stage-1**					**Kalai HEP,stage-2**				
	S1	**S2**	**S3**	**S4**	**S5**	**S6**	**S7**	**S8**	**S9**	**S10**
Difflugia	1	2	1	1	2	4	2	3	2	5
Keratella	1	2	3	3	3	1	-	-	-	2
Polyarthra	-	-	-	-	-	-	-	-	1	1
Testudinella	-	-	-	-	-	2	-	-	3	-
Monostyla	-	-	-	1	1	-	-	-	-	-
Bosminopsis	1	3	1	1	-	-	-	-	2	1
Brachionus	-	-	-	-	-	-	-	-	-	-
Epistylis	4	2	2	3	2	-	-	-	3	2
Total	**7**	**9**	**7**	**9**	**8**	**7**	**2**	**3**	**11**	**11**
Genus	**Hutong HEP, Stage-1**					**Hutong HEP, Stage-2**				
	S11	**S12**	**S13**	**S14**	**S15**	**S16**	**S17**	**S18**	**S19**	**S20**
Difflugia	-	2	-	2	-	4	5	3	5	-
Keratella	-	-	-	-	-	-	-	-	-	-
Polyarthra	-	-	5	-	-	3	-	7	-	-
Testudinella	5	1	-	-	-	-	-	-	-	-
Monostyla	-	-	-	4	-	1	1	-	-	3
Bosminopsis	-	3	-	-	-	1	-	-	-	5

Brachionus	3	-	-	-	-	3	-	-	-	-
Epistylis	-	-	-	1	5	-	-	-	-	-
Total	**8**	**6**	**5**	**7**	**5**	**12**	**6**	**10**	**5**	**8**
Genus	**Demwe Upper HEP**					**Demwe Lower HEP**				
	S21	**S22**	**S23**	**S24**	**S25**	**S26**	**S27**	**S28**	**S29**	**S30**
Difflugia	2	-	1	1	2	5	3	1	2	5
Keratella	-	4	-	-	2	2	1	7	-	2
Polyarthra	-	-	4	-	5	-	-	-	-	-
Testudinella	1	-	-	-	4	3	4	1	1	-
Monostyla	-	-	-	1	-	-	-	-	-	-
Bosminopsis	-	2	-	-	3	-	-	-	-	-
Brachionus	-	-	-	-	-	-	-	-	-	-
Epistylis	-	-	3	-	-	2	-	1	1	1
Total	**3**	**6**	**8**	**2**	**16**	**12**	**8**	**10**	**4**	**8**

September 2009

Genus	**Kalai HEP, Stage-1**					**Kalai HEP,stage-2**				
	S1	**S2**	**S3**	**S4**	**S5**	**S6**	**S7**	**S8**	**S9**	**S10**
Keratella	2	2	2	3	3	1	-	-	-	2
Polyarthra	-	-	-	-	-	-	-	5	2	5
Filinia	-	-	-	-	-	-	3	2	-	-
Unidentified-a	1	-	-	1	-	-	-	-	-	-
Unidentified-b	-	-	1	-	-	-	-	-	3	1
Total	**3**	**2**	**3**	**4**	**3**	**1**	**3**	**7**	**5**	**8**
Genus	**Hutong HEP, Stage-1**					**Hutong HEP, Stage-2**				
	S11	**S12**	**S13**	**S14**	**S15**	**S16**	**S17**	**S18**	**S19**	**S20**
Keratella	-	4	-	-	-	-	-	-	3	5
Polyarthra	-	-	7	2	-	3	6	7	-	-
Filinia	-	-	-	-	2	-	-	2	1	1
Unidentified-b	1	1	1	1	-	5	1	-	-	-
Total	**1**	**5**	**8**	**3**	**2**	**8**	**7**	**9**	**4**	**6**
Genus	**Demwe Upper HEP**					**Demwe Lower HEP**				
	S21	**S22**	**S23**	**S24**	**S25**	**S26**	**S27**	**S28**	**S29**	**S30**
Keratella	3	-	-	-	2	8	5	7	4	3
Polyarthra	-	-	4	5	5	-	-	-	-	-
Filinia	2	-	-	-	-	-	-	-	2	-
Unidentified-b	1	1	1	1	-	-	-	-	-	-
Unidentified-c	-	1	-	-	-	-	-	-	1	1
Total	**6**	**2**	**5**	**6**	**7**	**8**	**5**	**7**	**7**	**4**

ANNEXURE-IX

Density of Periphytons at various sampling sites (Unit: No. of individuals/cm^2)

April 2009

Class	**Genus**	**Kalai HEP Stage-1**					**Kalai HEP, Stage-2**				
		S1	**S2**	**S3**	**S4**	**S5**	**S6**	**S7**	**S8**	**S9**	**S10**
Nitzschiaceae	*Nitzchia bacata*	50	20	30	60	30	10	-	-	-	20
Bacillariophyceae	*Cymbella cistula*	-	-	-	-	-	-	-	-	10	10
Chlorophyceae	*Hormidium* sp.	-	-	-	-	-	20	-	-	30	-
Chlorophyceae	*Cosmerium* sp.	-	-	-	-	-	-	10	-	-	-
Chlorophyceae	*Spirotaena* sp.	-	-	-	-	10	-	-	-	10	10
Chlorophyceae	*Spirogyra varians*	20	70	60	10	50	40	20	30	60	50
Chlorophyceae	*Chlorella vulgaris*	-	-	-	10	10	-	-	-	-	-
	Total	**70**	**90**	**90**	**80**	**100**	**70**	**30**	**30**	**110**	**90**
Class	**Genus**	**Hutong HEP, Stage-1**					**Hutong HEP, Stage-2**				
		S11	**S12**	**S13**	**S14**	**S15**	**S16**	**S7**	**S18**	**S19**	**S20**
Nitzschiaceae	*Nitzchia bacata*	50	20	-	10	50	-	-	-	-	-
Bacillariophyceae	*Cymbella cistula*	20	-	50	10	0	30	30	70	50	-
Chlorophyceae	*Hormidium* sp.	-	10	-	30	20	-	30	-	60	20
Chlorophyceae	*Cosmerium* sp.	-	10	20	-	10	-	20	-	-	10
Chlorophyceae	*Spirotaena* sp.	10	-	20	-	0	10	-	20	-	-
Chlorophyceae	*Spirogyra varians*	10	70	-	10	20	40	10	20	10	10
Cyanophyceae	*Gloeocapsa* sp.	20	-	-	-	-	-	-	-	-	10
Chlorophyceae	*Chlorella vulgaris*	-	-	-	20	-	10	10	-	-	20
Cyanophyceae	*Nostoc* sp.	-	-	-	-	-	20	-	-	-	-
	Total	**110**	**110**	**90**	**80**	**100**	**110**	**100**	**110**	**120**	**70**
Class	**Genus**	**Demwe Upper HEP**					**Demwe Lower HEP**				
		S21	**S22**	**S23**	**S24**	**S25**	**S26**	**S27**	**S28**	**S29**	**S30**
Nitzschiaceae	*Nitzchia bacata*	40	-	10	10	20	50	10	70	-	20
Bacillariophyceae	*Cymbella cistula*	-	50	40	-	50	-	-	-	-	-
Chlorophyceae	*Hormidium* sp.	20	-	-	20	40	60	40	10	10	-
Chlorophyceae	*Cosmerium* sp.	-	30	20	-	-	-	-	-	-	-
Chlorophyceae	*Spirogyra varians*	30	-	30	10	40	50	30	10	20	50
Chlorophyceae	*Chlorella vulgaris*	10	-	50	10	-	-	-	-	-	-
Cyanophyceae	*Nostoc* sp.	20	50	-	-	-	-	-	10	-	10
	Total	**120**	**130**	**150**	**50**	**150**	**160**	**80**	**100**	**30**	**80**

May 2009

Class	Genus	Kalai HEP Stage-1					Kalai HEP, Stage-2				
		S1	**S2**	**S3**	**S4**	**S5**	**S6**	**S7**	**S8**	**S9**	**S10**
Nitzschiaceae	*Nitzchia bacata*	50	20	30	60	30	10	20	30	-	20
Bacillariophyceae	*Cymbella cistula*	10	10	-	-	-	-	-	-	10	10
Chlorophyceae	*Hormidium* sp.	10	-	10	20	20	20	-	20	30	-
Chlorophyceae	*Cosmerium* sp.	-	10	-	20	-	-	10	20	20	30
Cyanophyceae	*Gloeocapsa* sp.	20	-	20	-	50	30	10	10	10	-
	Total	**90**	**40**	**60**	**100**	**100**	**60**	**40**	**80**	**70**	**60**
Class	**Genus**	**Hutong HEP, Stage-1**					**Hutong HEP, Stage-2**				
		S11	**S12**	**S13**	**S14**	**S15**	**S16**	**S17**	**S18**	**S19**	**S20**
Nitzschiaceae	*Nitzchia bacata*	40	10	-	10	30	-	50	10	50	60
Bacillariophyceae	*Cymbella cistula*	-	-	50	-	-	30	-	70	-	20
Chlorophyceae	*Hormidium* sp.	60	50	-	20	30	-	60	-	20	-
Chlorophyceae	*Cosmerium* sp.	0	20	30	-	10	20	-	30	10	10
Cyanophyceae	*Gloeocapsa* sp.	10	-	-	50	-	-	10	-	10	-
	Total	**110**	**80**	**80**	**80**	**70**	**50**	**120**	**110**	**90**	**90**
Class	**Genus**	**Demwe Upper HEP**					**Demwe Lower HEP**				
		S21	**S22**	**S23**	**S24**	**S25**	**S26**	**S27**	**S28**	**S29**	**S30**
Nitzschiaceae	*Nitzchia bacata*	30	20	20	50	20	60	10	70	30	20
Bacillariophyceae	*Cymbella cistula*	-	20	40	-	50	-	-	-	-	-
	Hormidium sp.	10	10	-	20	40	60	40	10	10	50
	Cosmerium sp.	-	20	10	20	-	10	10	10	10	20
Cyanophyceae	*Gloeocapsa* sp.	50	-	10	10	10	10	10	10	10	10
	Total	**90**	**70**	**80**	**100**	**120**	**140**	**70**	**100**	**60**	**100**

June 2009

Class	Genus	Kalai HEP Stage-1					Kalai HEP, Stage-2				
		S1	**S2**	**S3**	**S4**	**S5**	**S6**	**S7**	**S8**	**S9**	**S10**
Nitzschiaceae	*Nitzchia bacata*	50	20	30	60	30	30	-	40	-	20
Bacillariophyceae	*Cymbella cistula*	-	-	-	-	-	-	20	-	30	30
Cyanophyceae	*Gloeocapsa* sp.	20	-	-	-	-	-	-	-	-	-
Chlorophyceae	*Chlorella vulgaris*	-	60	-	30	30	-	10	20	-	-
Cyanophyceae	*Nostoc* sp.	-	-	-	-	-	-	-	-	-	-
	Total	**70**	**80**	**30**	**90**	**60**	**30**	**30**	**60**	**30**	**50**
Class	**Genus**	**Hutong HEP, Stage-1**					**Hutong HEP, Stage-2**				
		S11	**S12**	**S13**	**S14**	**S15**	**S16**	**S7**	**S18**	**S19**	**S20**
Nitzschiaceae	*Nitzchia bacata*	30	10	-	30	20	-	30	-	10	-
Bacillariophyceae	*Cymbella cistula*	-	-	50	-	-	30	-	70	-	-
Cyanophyceae	*Gloeocapsa* sp.	50	10	-	60	10	-	20	-	20	-
Chlorophyceae	*Chlorella vulgaris*	-	-	-	-	-	30	10	-	40	30
Cyanophyceae	*Nostoc* sp.	-	20	-	-	10	20	-	-	-	-
	Total	**80**	**40**	**50**	**90**	**40**	**80**	**60**	**70**	**70**	**30**
Class	**Genus**	**Demwe Upper HEP**					**Demwe Lower HEP**				
		S21	**S22**	**S23**	**S24**	**S25**	**S26**	**S27**	**S28**	**S29**	**S30**
Nitzschiaceae	*Nitzchia bacata*	20	-	-	-	20	20	30	20	50	20
Bacillariophyceae	*Cymbella cistula*	-	-	40	-	50	-	-	-	-	-
Cyanophyceae	*Gloeocapsa* sp.	30	-	-	-	-	10	-	20	30	-
Chlorophyceae	*Chlorella vulgaris*	-	-	-	30	-	10	-	-	-	-
Cyanophyceae	*Nostoc* sp.	-	50	-	-	-	-	-	10	10	30
	Total	**50**	**50**	**40**	**30**	**70**	**40**	**30**	**50**	**90**	**50**

ANNEXURE-X

Density of benthic invertebrates at various sampling sites

April 2009

Order	**Family**	**Kalai HEP, Stage-1**					**Kalai HEP, Stage-2**				
		S1	**S2**	**S3**	**S4**	**S5**	**S6**	**S7**	**S8**	**S9**	**S10**
Ephemeroptera	Baetidae	12	7	6	10	6	4	2	3	6	5
	Ecdyonuridae	1	2	3	6	3	1	-	4	-	2
	Heptageniidae	-	-	-	-	-	3	3	2	1	1
	Leptophlebiidae	-	-	-	-	-	2	-	1	3	-
Plecoptera	Nemouridae	-	-	-	-	-	-	1	-	-	-
	Perlidae	-	-	-	-	1	1	2	-	1	1
Trichoptera	Glossosomatidae	-	-	-	1	1	2	-	-	-	-
	Molannidae	-	-	-	1	1	1	3	-	-	-
	Philopotamidae	1	-	4	3	-	-	-	4	2	-
	Psychomyiidae	9	7	2	2	1	-	1	-	1	-
Diptera	Chironomidae	1	3	5	1	-	6	4	1	2	1
	Simulidae	4	5	6	3	2	-	-	2	3	2
Coleoptera	Elmidae	-	-	-	-	-	-	-	-		1
Total		**28**	**24**	**26**	**27**	**15**	**20**	**16**	**17**	**19**	**13**
Order	**Family**	**Hutong HEP, Stage-1**					**Hutong HEP, Stage-2**				
		S11	**S12**	**S13**	**S14**	**S15**	**S16**	**S17**	**S18**	**S19**	**S20**
Ephemeroptera	Baetidae	-	7	1	2	1	8	4	5	1	-
	Heptageniidae	2	2	5	3	-	3	4	4	3	5
Plecoptera	Nemouridae	-	-	-	-	1	-	-	-	-	1
	Perlidae	-	-	-	-	-	1	-	2	2	-
Trichoptera	Glossosomatidae	-	-	-	-	-	1	-	-	-	3
	Leptoceridae	-	-	-	-	-	2	-	-	-	-
	Molannidae	3	2	-	-	5	-	1	1	1	-
	Philopotamidae	-	-	-	-	-	1	-	-	-	-
	Psychomyiidae	2	1	1	-	-	-	-	-	1	1
Odonata	Gomphidae	-	-	-	2	-	-	-	1	-	-
Hemiptera	Mesovelidae	-	-	-	-	-	1	-	-	-	-
Diptera	Chironomidae	1	1	-	-	-	1	1	-	-	1
	Rhagionidae	-	-	-	-	-	3	-	-	-	-
	Simulidae	-	-	-	-	5	-	-	-	-	-
	Tabaenidae	-	-	-	-	-	-	-	2	-	-
	Tipulidae	-	-	-	-	-	1	-	-	-	-
Megaloptera	Corydalidae	1	-	-	1	-	-	-	-	-	
Total		**9**	**13**	**7**	**8**	**12**	**22**	**10**	**15**	**8**	**11**
Order	**Family**	**Demwe Upper HEP**					**Demwe Lower HEP**				
		S21	**S22**	**S23**	**S24**	**S25**	**S26**	**S27**	**S28**	**S29**	**S30**
Ephemeroptera	Baetidae	2	-	1	1	4	5	3	1	2	5
	Ecdyonuridae	-	-	-	-	2	2	1	7	-	2
	Heptageniidae	2	2	4	2	5	4	-	1	2	-
	Leptophlebiidae	1	-	-	2	4	2	4	1	1	-
Plecoptera	Nemouridae	-	2	-	-	-	-	-	-	-	-
Trichoptera	Glossosomatidae	-	-	-	1	-	-	-	-	-	-
	Leptoceridae	-	5	1	-	-	-	-	1	-	1
	Molannidae	-	-	-	-	-	5	6	-	-	-

	Philopotamidae	-	-	-	-	-	4	-	-	2	1
Odonata	Gomphidae	1	-	1	-	-	-	-	-	-	-
Diptera	Chironomidae	-	-	-	1	2	-	-	-	-	-
	Simulidae	-	-	3	-	-	2	-	1	1	1
	Tipulidae	-	-	1	-	-	-	-	-	-	-
Megaloptera	Corydalidae	-	-		-	-	-	-	-	-	-
Total		**6**	**9**	**11**	**7**	**17**	**24**	**14**	**12**	**8**	**10**

May 2009

Order	**Family**	**Kalai HEP, Stage-1**					**Kalai HEP, Stage-2**				
		S1	**S2**	**S3**	**S4**	**S5**	**S6**	**S7**	**S8**	**S9**	**S10**
Ephemeroptera	Baetidae	10	12	6	7	3	6	5	-	8	9
	Ecdyonuridae	2	1	-	1	2	2	-	3	2	-
	Ephemerellidae	4	-	4	1	-	-	-	-	-	-
	Heptageniidae	9	-	1	-	19	7	6	6	8	2
Plecoptera	Nemouridae	-	-	-	-	-	-	-	-	-	-
	Perlidae	4	-	-	3	-	4	1	-	1	-
Odonata	Cordulegastridae	-	-	-	-	-	1	3	-	5	-
Diptera	Chironomidae	1	1	-	-	-	2	-	5	2	1
Total		**30**	**14**	**20**	**12**	**24**	**22**	**15**	**14**	**26**	**12**
Order	**Family**	**Hutong HEP, Stage-1**					**Hutong HEP, Stage-2**				
		S11	**S12**	**S13**	**S14**	**S15**	**S16**	**S17**	**S18**	**S19**	**S20**
Ephemeroptera	Baetidae	-	-	-	-	-	-	-	1	1	1
	Ecdyonuridae	1	2	2	6	1	-	-	-	1	2
	Heptageniidae	-	-	3	-	2	1	3	4	2	3
Plecoptera	Nemouridae	-	-	-	-	-	2	1	-	-	1
	Perlodideae	5	4	3	3	2	-	-	1	2	-
Trichoptera	Polycentropidae	-	-	1	-	-	2	-	-	-	-
Odonata	Cordulegastridae	5	2	-	1	1	-	-	-	-	-
Diptera	Chironomidae	-	-	-	-	1	-	-	1	1	1
Megaloptera	Corydalidae	-	-	-	-	-	-	-	1	-	-
Total		**11**	**8**	**9**	**10**	**7**	**5**	**4**	**8**	**7**	**8**
Order	**Family**	**Demwe Upper HEP**					**Demwe Lower HEP**				
		S21	**S22**	**S23**	**S24**	**S25**	**S26**	**S27**	**S28**	**S29**	**S30**
Ephemeroptera	Baetidae	2	1	3	4	3	3	5	3	2	3
Plecoptera	Perlodideae	4	2	2	1	2	1	2	1	1	1
Trichoptera	Polycentropidae	-	-	1	-	-	2	1	-	-	-
Coleoptera	Dytiscidae	1	-	1	1	-	-	-	1	-	-
	Elmidae	1	2	1	-	2	1	1	3	-	1
Total		**8**	**5**	**8**	**6**	**7**	**7**	**9**	**8**	**3**	**5**

June 2009

Order	Family	Kalai HEP, Stage-1					Kalai HEP, Stage-2				
		S1	S2	S3	S4	S5	S6	S7	S8	S9	S10
Ephemeroptera	Baetidae	7	1	1	1	1	8	5	9	1	1
	Ecdyonuridae	-	-	2	-	1	-	-	2	-	1
	Heptageniidae	2	4	2	2	3	2	2	3	5	3
	Leptophlebiidae	1	2	2	-	2	-	-	-	1	-
Plecoptera	Perlidae	1	1	3	1	2	1	-	2	1	-
Coleoptera	Gyrinidae	1	-	-	1	-	1	-	-	-	1
Total		**12**	**8**	**10**	**5**	**9**	**12**	**7**	**16**	**8**	**6**
Order	Family	Hutong HEP, Stage-1					Hutong HEP, Stage-2				
		S11	S12	S13	S14	S15	S16	S17	S18	S19	S20
Ephemeroptera	Baetidae	1	3	6	1	1	1	-	-	-	1
	Ecdyonuridae	-	-	3	-	3	2	1	3	3	2
	Heptageniidae	2	4	2	2	3	2	2	5	2	3
Plecoptera	Peltoperlidae	-	1	2	1	-	-	-	-	-	-
	Perlidae	1	1	4	-	-	1	-	2	-	1
Diptera	Chironomidae	-	-	-	1	-	1	-	1	-	1
Total		**4**	**9**	**17**	**5**	**7**	**7**	**3**	**11**	**5**	**8**
Order	**Family**	**Demwe Upper HEP**					**Demwe Lower HEP**				
		S21	S22	S23	S24	S25	S26	S27	S28	S29	S30
Ephemeroptera	Ecdyonuridae	1	1	1	1	-	1	1	-	-	-
	Heptageniidae	3	2	2	1	3	4	3	5	-	1
	Leptophlebiidae	-	1	1	1	-	-	1	-	-	-
Plecoptera	Perlodideae	1	-	1	-	1	2	1	-	1	1
Total		**5**	**4**	**5**	**3**	**4**	**7**	**6**	**5**	**1**	**2**

July 2009

Order	Family	Kalai HEP, Stage-1					Kalai HEP, Stage-2				
		S1	S2	S3	S4	S5	S6	S7	S8	S9	S10
Ephemeroptera	Heptageniidae	5	2	4	2	1	3	2	1	4	1
	Ecdyonuridae	1	2	3	6	3	5	-	2	2	2
Plecoptera	Nemouridae	-	1	-	-	-	-	3	-	-	1
	Taeniopterygidae	-	-	-	-	-	-	-	2	1	-
Trichoptera	Glossosomatidae	-	-	1	1	1	-	-	-	-	1
	Leptoceridae	1	1	1	-	1	2	3	1	1	2
	Molannidae	-	-	-	1	1	2	-	1	1	1
Hemiptera	Mesovelidae	-	-	-	-	-	-	-	-	-	-
Diptera	Chironomidae	1	3	3	1	-	-	3	1	1	1
Megaloptera	Corydalidae	-	-	-	-	-	-	-	-	-	1
Total		**8**	**9**	**12**	**11**	**7**	**12**	**11**	**8**	**10**	**10**
Order	**Family**	**Hutong HEP, Stage-1**					**Hutong HEP, Stage-2**				
		S11	S12	S13	S14	S15	S16	S17	S18	S19	S20
Ephemeroptera	Ecdyonuridae	1	1	1	-	1	1	2	1	1	-
	Heptageniidae	1	1	-	1	2	1	2	1	-	-
Plecoptera	Nemouridae	-	-	-	-	1	-	-	3	1	1
	Taeniopterygidae	-	-	3	-	-	-	5	-	1	-

Trichoptera	Glossosomatidae	-	-	-	-	-	1	-	-	-	3
	Leptoceridae	-	1	1	-	-	2	-	1	1	-
	Molannidae	3	2	-	-	5	-	3	5	3	-
Hemiptera	Mesovelidae	-	-	-	-	-	1	-	-	-	-
Diptera	Chironomidae	-	3	-	1	-	1	-	-	1	5
Megaloptera	Corydalidae	1	-	-	1	-	-	-	1	-	1
Total		**6**	**8**	**5**	**3**	**9**	**7**	**12**	**12**	**8**	**10**
Order	**Family**	**Demwe Upper HEP**					**Demwe Lower HEP**				
		S21	**S22**	**S23**	**S24**	**S25**	**S26**	**S27**	**S28**	**S29**	**S30**
Ephemeroptera	Heptageniidae	1	2	3	1	-	3	1	1	1	2
	Ecdyonuridae	5	-	-	-	2	4	1	7	2	2
Plecoptera	Nemouridae	-	2	-	-	-	1	1	-	-	-
	Taeniopterygidae	-	-	2	-	-	-	-	-	3	-
Trichoptera	Glossosomatidae	4	-	-	3	-	-	-	-	-	-
	Leptoceridae	-	5	-	-	-	1	1	1	-	1
	Molannidae	-	-	-	-	-	3	6	-	1	-
Hemiptera	Mesovelidae	1	-	-	2	-	-	-	-	-	-
Diptera	Chironomidae	-	-	-	1	6	1	-	-	-	-
Megaloptera	Corydalidae	-	-	6	2	-	-	-	-	-	-
Total		**11**	**9**	**11**	**9**	**8**	**13**	**10**	**9**	**7**	**5**

August 2009

Order	**Family**	**Kalai HEP, Stage-1**					**Kalai HEP, Stage-2**				
		S1	**S2**	**S3**	**S4**	**S5**	**S6**	**S7**	**S8**	**S9**	**S10**
Ephemeroptera	Ecdyonuridae	2	1	2	1	2	2	1	3	2	1
Plecoptera	Nemouridae	-	-	3	3	-	-	-	-	1	3
	Perlidae	4	-	1	3	-	4	1	1	1	2
Trichoptera	Hydropsychidae	-	2	-	-	-	-	-	-	-	-
Megaloptera	Corydalidae	-	-	-	1	-	-	-	1	1	-
Total		**6**	**3**	**6**	**8**	**2**	**6**	**2**	**5**	**5**	**6**
Order	**Family**	**Hutong HEP, Stage-1**					**Hutong HEP, Stage-2**				
		S11	**S12**	**S13**	**S14**	**S15**	**S16**	**S17**	**S18**	**S19**	**S20**
Ephemeroptera	Ecdyonuridae	3	1	2	6	4	1	-	-	3	1
Plecoptera	Nemouridae	-	1	1	-	-	3	2	-	4	1
	Perlidae	1	1	1	-	-	1	-	3	-	-
Trichoptera	Hydropsychidae	-	-	-	-	-	1	1	-	-	1
Megaloptera	Corydalidae	-	1	2	-	-	1	-	2	-	-
Total		**4**	**4**	**6**	**6**	**4**	**7**	**3**	**5**	**7**	**3**
Order	**Family**	**Demwe Upper HEP**					**Demwe Lower HEP**				
		S21	**S22**	**S23**	**S24**	**S25**	**S26**	**S27**	**S28**	**S29**	**S30**
Ephemeroptera	Ecdyonuridae	3	4	2	1	3	2	1	2	4	2
Plecoptera	Nemouridae	1	2	1	1	-	-	-	-	-	1
	Perlidae	2	3	1	1	1	2	-	-	1	1
Trichoptera	Hydropsychidae	-	-	1	1	-	-	1	2	2	-
Megaloptera	Corydalidae	1	1	1	1	1	-	-	-	-	-
Total		**7**	**10**	**6**	**5**	**5**	**4**	**2**	**4**	**7**	**4**

September 2009

Order	Family	Kalai HEP, Stage-1					Kalai HEP, Stage-2				
		S1	**S2**	**S3**	**S4**	**S5**	**S6**	**S7**	**S8**	**S9**	**S10**
Ephemeroptera	Ecdyonuridae	-	2	2	1	-	1	1	3	2	2
Plecoptera	Peltoperlidae	-	-	-	1	-	1	1	-	1	-
	Perlidae	3	-	2	1	2	-	-	2	1	2
Hemiptera	Corixidae	-	1	-	-	-	-	1	-	-	-
Diptera	Tabanidae	-	-	1	-	-	-	1	-	1	-
Total		**3**	**3**	**5**	**3**	**2**	**2**	**4**	**5**	**5**	**4**
Order	**Family**	**Hutong HEP, Stage-1**					**Hutong HEP, Stage-2**				
		S11	**S12**	**S13**	**S14**	**S15**	**S16**	**S17**	**S18**	**S19**	**S20**
Ephemeroptera	Ecdyonuridae	1	2	6	1	1	2	4	9	3	2
Plecoptera	Peltoperlidae	1	2	2	2	-	3	-	-	-	-
	Perlidae	1	1	3	-	4	3	-	2	3	1
Hemiptera	Corixidae	1	-	-	1	2	-	-	-	-	-
Diptera	Tabanidae	1	1	-	-	1	-	-	-	1	-
Total		**5**	**6**	**11**	**4**	**8**	**8**	**4**	**11**	**7**	**3**
Order	**Family**	**Demwe Upper HEP**					**Demwe Lower HEP**				
		S21	**S22**	**S23**	**S24**	**S25**	**S26**	**S27**	**S28**	**S29**	**S30**
Ephemeroptera	Ecdyonuridae		2	1	2	1	1	4	3		2
Plecoptera	Peltoperlidae	-	-	1	1	1	1	-	1	-	5
	Perlidae	1	-	2	2	3	5	-	2	1	-
Hemiptera	Corixidae	-	2	1	1	-	-	2	1	-	2
Diptera	Tabanidae	-	-	1	1	2	2	-	1	-	-
Total		**1**	**4**	**6**	**7**	**7**	**9**	**6**	**8**	**1**	**9**

ANNEXURE-XI

Primary Productivity at various sampling sites

April 2009

Productivity	**Kalai HEP Stage-1**					**Kalai HEP Stage-2**				
	S1	**S2**	**S3**	**S4**	**S5**	**S6**	**S7**	**S8**	**S9**	**S10**
Gross Primary Productivity ($mgC/m^3/day$)	18.7	37.5	28.1	28.1	37.5	37.5	37.5	37.5	37.5	28.1
Net Primary Productivity ($mgC/m^3/day$)	12.5	37.5	25.0	25.0	25.0	25.0	37.5	25.0	25.0	25.0
Productivity	**Hutong HEP Stage-1**					**Hutong HEP Stage-2**				
	S11	**S12**	**S13**	**S14**	**S15**	**S16**	**S17**	**S18**	**S19**	**S20**
Gross Primary Productivity ($mgC/m^3/day$)	18.7	28.1	28.1	18.7	28.1	37.5	37.5	37.5	28.1	37.5
Net Primary Productivity ($mgC/m^3/day$)	12.5	12.5	25.0	12.5	12.5	25.0	25.0	37.5	12.5	25.0
Productivity	**Demwe Upper HEP**					**Demwe Lower HEP**				
	S21	**S22**	**S23**	**S24**	**S25**	**S26**	**S27**	**S28**	**S29**	**S30**
Gross Primary Productivity ($mgC/m^3/day$)	37.5	46.9	56.3	28.1	18.8	37.5	28.1	28.1	18.7	28.1
Net Primary Productivity ($mgC/m^3/day$)	25.0	37.5	50.0	12.5	12.5	12.5	12.5	25.0	12.5	12.5

May 2009

Productivity	**Kalai HEP Stage-1**					**Kalai HEP Stage-2**				
	S1	**S2**	**S3**	**S4**	**S5**	**S6**	**S7**	**S8**	**S9**	**S10**
Gross Primary Productivity ($mgC/m^3/day$)	31.2	46.8	46.8	62.5	93.7	46.8	78.1	62.5	78.1	78.1
Net Primary Productivity ($mgC/m^3/day$)	15.6	15.6	31.2	31.2	46.8	31.2	46.8	31.2	31.2	62.5
Productivity	**Hutong HEP Stage-1**					**Hutong HEP Stage-2**				
	S11	**S12**	**S13**	**S14**	**S15**	**S16**	**S17**	**S18**	**S19**	**S20**
Gross Primary Productivity ($mgC/m^3/day$)	46.8	62.5	62.5	46.8	62.5	78.1	62.5	78.1	31.2	31.2
Net Primary Productivity ($mgC/m^3/day$)	15.6	31.2	31.2	15.6	23.4	31.2	15.6	46.8	15.6	15.6
Productivity	**Demwe Upper HEP**					**Demwe Lower HEP**				
	S21	**S22**	**S23**	**S24**	**S25**	**S26**	**S27**	**S28**	**S29**	**S30**
Gross Primary Productivity ($mgC/m^3/day$)	62.5	46.8	46.8	31.2	31.2	46.8	62.5	62.5	78.1	78.1
Net Primary Productivity ($mgC/m^3/day$)	31.2	31.2	15.6	15.6	15.6	15.6	15.6	31.2	31.25	31.2

June 2009

Productivity	**Kalai HEP Stage-1**					**Kalai HEP Stage-2**				
	S1	**S2**	**S3**	**S4**	**S5**	**S6**	**S7**	**S8**	**S9**	**S10**
Gross Primary Productivity ($mgC/m^3/day$)	78.1	78.1	93.8	46.9	78.1	93.7	46.9	78.1	62.5	78.1
Net Primary Productivity ($mgC/m^3/day$)	31.3	23.4	23.4	15.6	46.9	46.9	15.6	31.2	46.9	46.9
Productivity	**Hutong HEP Stage-1**					**Hutong HEP Stage-2**				
	S11	**S12**	**S13**	**S14**	**S15**	**S16**	**S17**	**S18**	**S19**	**S20**
Gross Primary Productivity ($mgC/m^3/day$)	46.9	46.9	62.5	62.5	31.2	46.9	78.1	62.5	62.5	62.5
Net Primary Productivity ($mgC/m^3/day$)	15.6	15.6	54.7	15.6	23.4	31.3	54.7	23.4	15.6	31.3
Productivity	**Demwe Upper HEP**					**Demwe Lower HEP**				
	S21	**S22**	**S23**	**S24**	**S25**	**S26**	**S27**	**S28**	**S29**	**S30**
Gross Primary Productivity ($mgC/m^3/day$)	62.5	62.5	54.7	46.9	46.9	78.1	62.5	46.9	93.7	46.9
Net Primary Productivity ($mgC/m^3/day$)	15.6	15.6	31.3	15.6	15.6	46.9	15.6	15.6	62.5	31.2

July 2009

Productivity	**Kalai HEP Stage-1**					**Kalai HEP Stage-2**				
	S1	**S2**	**S3**	**S4**	**S5**	**S6**	**S7**	**S8**	**S9**	**S10**
Gross Primary Productivity ($mgC/m^3/day$)	18.7	17.5	18.1	18.1	17.5	17.5	17.5	17.6	17.5	18.1
Net Primary Productivity ($mgC/m^3/day$)	11.5	13.5	12.0	12.5	13.0	12.0	13.5	12.3	25.0	12.2
Productivity	**Hutong HEP Stage-1**					**Hutong HEP Stage-2**				
	S11	**S12**	**S13**	**S14**	**S15**	**S16**	**S17**	**S18**	**S19**	**S20**
Gross Primary Productivity ($mgC/m^3/day$)	18.7	18.1	18.1	18.7	18.1	17.5	17.5	17.5	18.1	17.5
Net Primary Productivity ($mgC/m^3/day$)	12.5	12.5	12.0	12.5	12.5	11.5	12.4	13.5	12.5	12.0
Productivity	**Demwe Upper HEP**					**Demwe Lower HEP**				
	S21	**S22**	**S23**	**S24**	**S25**	**S26**	**S27**	**S28**	**S29**	**S30**
Gross Primary Productivity ($mgC/m^3/day$)	17.5	16.9	16.3	18.1	18.8	17.5	18.1	18.1	18.7	18.1
Net Primary Productivity ($mgC/m^3/day$)	14.0	13.5	12.0	12.5	12.5	12.5	12.5	25.0	12.5	12.5

August 2009

Productivity	**Kalai HEP Stage-1**					**Kalai HEP Stage-2**				
	S1	**S2**	**S3**	**S4**	**S5**	**S6**	**S7**	**S8**	**S9**	**S10**
Gross Primary Productivity ($mgC/m^3/day$)	18.2	18.8	17.8	18.5	19.7	16.8	18.1	18.5	18.1	18.1
Net Primary Productivity ($mgC/m^3/day$)	12.6	13.6	11.2	12.2	14.8	11.2	12.8	12.2	12.2	12.5
Productivity	**Hutong HEP Stage-1**					**Hutong HEP Stage-2**				
	S11	**S12**	**S13**	**S14**	**S15**	**S16**	**S17**	**S18**	**S19**	**S20**
Gross Primary Productivity ($mgC/m^3/day$)	16.8	16.5	16.5	16.8	16.5	18.1	16.5	17.1	17.2	17.2
Net Primary Productivity ($mgC/m^3/day$)	11.6	10.2	12.2	11.6	12.4	13.2	11.6	10.8	11.6	12.6
Productivity	**Demwe Upper HEP**					**Demwe Lower HEP**				
	S21	**S22**	**S23**	**S24**	**S25**	**S26**	**S27**	**S28**	**S29**	**S30**
Gross Primary Productivity ($mgC/m^3/day$)	16.5	16.8	16.8	17.2	16.2	16.8	16.5	16.5	17.1	17.1
Net Primary Productivity ($mgC/m^3/day$)	11.2	11.4	11.6	12.6	11.6	11.6	12.6	11.2	12.25	11.2

September 2009

Productivity	**Kalai HEP Stage-1**					**Kalai HEP Stage-2**				
	S1	**S2**	**S3**	**S4**	**S5**	**S6**	**S7**	**S8**	**S9**	**S10**
Gross Primary Productivity ($mgC/m^3/day$)	17.5	18.8	18.1	17.5	19.7	18.8	17.8	17.5	17.6	18.1
Net Primary Productivity ($mgC/m^3/day$)	11.5	12.5	12.0	13.5	14.8	12.5	11.5	11.5	11.5	12.0
Productivity	**Hutong HEP Stage-1**					**Hutong HEP Stage-2**				
	S11	**S12**	**S13**	**S14**	**S15**	**S16**	**S17**	**S18**	**S19**	**S20**
Gross Primary Productivity ($mgC/m^3/day$)	16.7	18.1	17.1	17.8	18.1	16.5	17.3	16.5	18.7	17.5
Net Primary Productivity ($mgC/m^3/day$)	11.5	12.5	12.0	12.5	12.5	11.5	12.4	11.2	12.8	12.0
Productivity	**Demwe Upper HEP**					**Demwe Lower HEP**				
	S21	**S22**	**S23**	**S24**	**S25**	**S26**	**S27**	**S28**	**S29**	**S30**
Gross Primary Productivity ($mgC/m^3/day$)	17.2	16.9	16.3	18.1	18.8	17.5	17.1	18.5	17.8	18.1
Net Primary Productivity ($mgC/m^3/day$)	12.6	11.8	11.0	12.5	13.6	12.5	10.8	12.2	11.5	12.5

ANNEXURE-XII

Community characteristics of the vegetation at various sampling locations of Kalai Hydroelectric Project,Stage-1

1. Dam site

S. No.	Trees	Frequency (%)	Density (No./ha)	Basal area (m^2/ha)	IVI
1	*Albizia* sp.	60	180	0.52	59.82
2	*Albizia* sp.	10	10	0.64	12.92
3	*Alnus nepaulensis*	10	20	0.15	8.92
4	*Betula alnoides*	20	20	0.4	15.52
5	*Ficus cunia*	10	10	0.1	6.65
6	*Grewia* sp.	10	60	0.08	15.11
7	*Gynocardia odorata*	10	10	0.39	9.97
8	*Itea macrophylla*	20	30	0.05	13.27
9	*Lagerstroemia muniticarpa*	30	30	4.12	64.15
10	*Macaranga denticulata*	40	50	0.63	30.87
11	*Schfellera hypoleuca*	10	10	0.1	6.59
12	*Sterculia* sp.	10	20	1.12	20.19
13	*Wallichiana* sp. (Palm)	20	100	0.18	27.03
14	Unidentified sp.	10	20	0.16	9.01
	Total	**270**	**570**	**8.64**	**300**

S. No.	Shrubs	Frequency %	Density (No./ha)	IVI
1	*Artemisia nilagirica*	40	100	15.03
2	*Boehmeria longifolia*	60	700	51.57
3	*Boehmeria macrophylla*	30	210	18.40
4	*Debregessia longifolia*	80	380	39.56
5	*Rubus ellipticus*	20	20	5.93
6	*Rubus* sp.	10	30	4.02
7	*Solanum nigrum*	20	30	6.46
8	*Solanum xanthocarpum*	20	20	5.93
9	*Solanum xanthocarpum*	20	80	9.10
10	*Spirea* sp.	70	80	21.29
11	*Inula cappa*	10	35	4.29
12	*Urena lobata*	30	210	18.40
	Total	**410**	**1895**	**199.98**

S. No.	Herbs (April)	Frequency %	Density	IVI
1	*Ageratum conyzoides*	30	90000	36.56
2	*Anaphalis* sp.	10	4000	3.36
3	*Crossesophelum*	10	3000	3.02
4	*Elatostemma* sp.	30	2000	6.68
5	*Fagopyrum dibotrys*	50	17000	15.77
6	*Imperata cylindrica*	20	29500	14.02
7	*Inula cappa*	30	4000	7.36
8	*Lygodium flexuosum*	40	5000	9.70
9	*Nephrolepis cordifolia*	60	23000	19.81
10	*Phyrnium pubinerve*	10	7000	4.38
11	*Pilea umbrosa*	30	27000	15.17
12	*Polygonum capitatum*	30	22000	13.47
13	*Saccharum spontaneum*	40	43000	22.60
14	*Senecio cappa*	30	6000	8.04
15	*Thysanolaena maxima*	30	2000	6.68
16	*Urtica dioca*	20	9000	7.06
17	*Trichosanthes* sp.	10	1000	2.34
18	*Periploca* sp.	20	20	4.01
	Total	**500**	**294520**	200.00

S. No.	Herbs (August)	Frequency (%)	Density (No./ha)	IVI
1	*Ageratum conyzoides*	40	81000	29.49
2	*Anaphalis sp.*	20	9000	6.03
3	*Begonia sp.*	15	2500	3.35
4	*Commelina paludosa*	15	6000	4.31
5	*Crossesophelum crepezoides*	20	6000	5.20
6	*Elatostemma sp.*	30	7500	7.38
7	*Fagopyrum dibotrys*	50	27000	16.32
8	*Imperata cylindrica*	20	43500	15.57
9	*Inula cappa*	30	4500	6.55
10	*Lygodium flexuosum*	40	6000	8.74
11	*Nephrolepis cordifolia*	60	4000	11.73
12	*Periploca sp.*	20	2500	4.23
13	*Phyrnium pubinerve*	10	8500	4.12
14	*Pilea umbrosa*	30	2500	6.00
15	*Polygonum capitatum*	30	24000	11.95
16	*Saccharum spontaneum*	40	80000	29.21
17	*Senecio cappa*	30	7000	7.25
18	*Thysanolaena maxima*	35	28000	13.94
19	*Trichosanthes sp.*	10	1500	2.18

S. No.	Herbs (August)	Frequency (%)	Density (No./ha)	IVI
20	*Urtica dioca*	20	10500	6.44
	Total	**565**	**361500**	200.00

2. Submergence Area

S. No.	Trees	Frequency (%)	Density (No./ha)	Basal area (m^2/ha)	IVI
1	*Albizzia* sp.	10	10	0.11	8.13
2	*Alnus nepalensis*	20	30	0.28	18.8
3	*Betula alnoides*	10	10	0.25	9.95
4	*Ficus cunia*	50	170	0.66	63.57
5	*Grewia* sp.	10	40	0.08	13.06
6	*Macaranga denticulata*	20	20	0.32	17.51
7	*Mallotus* sp.	10	10	0.06	7.42
8	*Pinus* sp.	50	220	5.17	133.57
9	*Quercus* sp.	10	10	0.34	11.12
10	*Saurauria napalensis*	20	30	0.14	16.84
	Total	**210**	**550**	**7.41**	**299.97**

S. No.	Shrubs	Frequency (%)	Density (No./ha)	IVI
1	*Artemisia nilagirica*	70	710	47.36
2	*Boehmeria longifolia*	80	190	26.44
3	*Debregessia longifolia*	90	560	45.17
4	*Inula cappa*	30	40	8.52
5	*Piper* sp.	15	140	9.61
6	*Rubus ellipticus*	20	20	5.39
7	*Solanum nigrum*	30	130	12.53
8	*Solanum xanthocarpum*	10	10	2.69
9	*Spirea* sp.	30	180	14.76
10	*Trichosanthes* sp.	40	35	10.55
11	*Unidentified* sp.	30	230	16.99
	Total	**445**	**2245**	**200.01**

Sl. No.	Herbs (April)	Frequency (%)	Density (No./ha)	IVI
1	*Ageratum conyzoides*	60	83000	44.07
2	*Carex* sp.	10	2500	3.15
3	*Elatostemma* sp.	30	17000	12.96
4	*Imperata cylindrica*	70	108000	55.56
5	*Lygodium flexuosum*	50	18000	17.78
6	*Nephrolepis cordifolia*	40	6000	11.11
7	*Ophiopogon intermedius*	10	2500	3.15
8	*Periploca* sp.	20	2000	5.18
9	*Pilea umbrosa*	50	5000	12.96
10	*Polygonum capitatum*	50	9000	14.44
11	*Thysanolaena maxima*	30	12000	11.11
12	*Urtica dioca*	30	5000	8.52
	Total	**450**	**270000**	200

S. No.	Herbs (August)	Frequency (%)	Density (No./ha)	IVI
1	*Ageratum conyzoides*	70	79000	37.37
2	*Carex sp.*	15	13500	7.04
3	*Elatostemma sp.*	30	75000	27.64
4	*Imperata cylindrica*	70	95000	41.89
5	*Lygodium flexuosum*	50	18500	15.98
6	*Nephrolepis cordifolia*	40	6000	10.30
7	*Ophiopogon intermedius*	10	25000	9.21
8	*Periploca sp.*	20	2500	5.01
9	*Pilea umbrosa*	50	6000	12.45
10	*Polygonum capitatum*	50	9000	13.30
11	*Thysanolaena maxima*	30	8500	8.85
12	*Urtica dioca*	30	16000	10.97
	Total	**465**	**354000**	**200**

3. Upstream Area

S. No.	Trees	Frequency (%)	Density (No./ha)	Basal area (m^2/ha)	IVI
1.	*Pinus merkusii*	100	280	18.23	287.23
2.	*Quercus* sp.	10	10	0.05	12.79
	Total	**110**	**290**	**18.28**	**300.02**

S. No.	Shrubs	Frequency %	Density (No./ha)	IVI
1	*Artemisia nilagirica*	80	570	64.23
2	*Artemisia* sp.	90	300	46.41
3	*Boehmeria longifolia*	50	120	22.25
4	*Crotolaria* sp.	20	50	9.05
5	*Debregessia longifolia*	70	140	29.03
6	*Inula cappa*	10	30	4.90
7	*Rubus ellipticus*	20	50	9.05
8	*Rubus* sp.	20	30	7.54
9	*Senecio cappa*	20	30	7.54
	Total	**380**	**1320**	**200**

S. No.	Herbs (April)	Frequency %	Density (No./ha)	IVI
1	*Ageratum conyzoides*	70	38000	30.49
2	*Carex* sp.	10	2500	3.37
3	*Imperata cylindrica*	100	170500	82.63
4	*Lygodium flexuosum*	90	21000	29.84
5	*Nephrolepis cordifolia*	50	38000	25.43
6	*Ophiopogon intermedius*	5	3500	2.44
7	*Polygonum capitatum*	30	9000	10.62
8	*Thysanolaena maxima*	40	15000	15.17
	Total	**395**	**297500**	200

Sl. No.	Herbs (August)	Frequency %	Density (No./ha)	IVI
1	*Ageratum conyzoides*	60	32000	24.20
2	*Carex* sp.	15	2500	4.60
3	*Imperata cylindrica*	100	270500	97.41
4	*Lygodium flexuosum*	80	19000	26.05
5	*Nephrolepis cordifolia*	55	33000	23.15
6	*Ophiopogon intermedius*	5	1500	1.71
7	*Polygonum capitatum*	25	8000	8.68
8	*Thysanolaena maxima*	40	14000	14.21
		380	**380500**	200

4. 1 km downstream of dam site

S. No.	Trees	Frequency (%)	Density (No./ha)	Basal area (m^2/ha)	IVI
1	*Ficus cunia*	55	90	0.40	53.66
2	*Saurauria nepalensis*	30	45	0.15	27.49
3	*Macaranga denticulata*	25	40	0.19	24.21
4	*Alnus nepalensis*	10	10	0.04	7.57
5	*Betula alnoides*	10	10	0.08	7.90
6	*Pinus merkusii*	10	15	0.36	11.80
7	*Sterculia villosa*	15	20	0.64	17.83
8	*Vitex peduncularis*	15	15	1.57	24.24
9	*Lagerstroemia muniticarpa*	20	40	5.45	66.99
10	*Toona ciliata*	10	10	0.75	13.68
11	*Albizzia* sp.	10	15	0.62	14.04
12	*Spondias pinnata*	5	5	0.46	7.58
13	*Canarium strictum*	5	5	0.67	9.36
14	*Euvodia* sp.	10	10	0.31	9.85
15	*Grewia* sp.	5	5	0.02	3.82
	Total	**235**	**335**	**11.71**	**300.0**

S. No.	Shrubs	Frequency %	Density (No./ha)	IVI
1	*Artemisia nilagirica*	85	2430	78.81
2	*Boehmeria longifolia*	70	600	30.73
3	*Boehmeria macrophylla*	35	270	14.63
4	*Debregessia longifolia*	60	280	20.62
5	*Rubus ellipticus*	20	40	5.57
6	*Rubus sp.*	10	20	2.79
7	*Solanum nigrum*	15	30	4.18
8	*Solanum xanthocarpum*	20	60	6.06
9	*Spirea sp.*	70	60	17.56
10	*Inula cappa*	10	25	2.91
11	*Urena lobata*	30	270	13.48
12	*Oxospora paniculata*	10	15	2.66
	Total	**435**	**4100**	**200.00**

S. No.	Herbs (April)	Frequency (%)	Density (No./ha)	IVI
1	*Ageratum conyzoides*	80	42500	32.54
2	*Anaphalis sp.*	35	5000	8.52
3	*Crossesophelum crepezoides*	10	4000	3.52
4	*Elatostemma sp.*	30	13180	11.04
5	*Fagopyrum dibotrys*	60	18000	18.57
6	*Imperata cylindrica*	50	60500	34.59
7	*Lygodium flexuosum*	15	7000	5.69
8	*Nephrolepis cordifolia*	65	27500	23.48
9	*Pilea umbrosa*	15	7500	5.90
10	*Polygonum capitatum*	60	15800	17.65
11	*Saccharum spontaneum*	45	17500	15.61
12	*Thysanolaena maxima*	30	11000	10.13
13	*Urtica dioca*	20	7500	6.82
14	*Trichosanthes sp.*	10	1000	2.26
15	*Periploca sp.*	20	20	3.68
	Total	**545**	**238000**	200

S.	Herbs (August)	Frequency	Density (No./ha)	IVI
1	*Ageratum conyzoides*	70	74500	30.50
2	*Anaphalis* sp.	35	9000	7.71
3	*Crossesophelum crepezoides*	20	6000	4.63
4	*Elatostemma* sp.	30	25000	11.22
5	*Fagopyrum dibotrys*	60	20000	14.43
6	*Imperata cylindrica*	50	98000	33.74
7	*Drymaria cordata*	40	28000	13.54
8	*Inula cappa*	25	3500	4.72
9	*Lygodium flexuosum*	40	7000	7.93
10	*Nephrolepis cordifolia*	65	14500	13.72
11	*Pilea umbrosa*	35	12000	8.51
12	*Polygonum capitatum*	50	15500	11.71
13	*Saccharum spontaneum*	35	32500	13.98
14	*Senecio cappa*	25	3500	4.72
15	*Thysanolaena maxima*	30	15500	8.68
16	*Urtica dioca*	20	9000	5.43
17	*Trichosanthes* sp.	10	1000	1.78
18	*Periploca* sp.	20	25	3.04
	Total	**660**	**374525**	200

5. 3 km downstream of Wallang village

Sl. No.	Trees	Frequency %	Density (No./ha)	Basal area (m^2/ha)	IVI
1	*Ficus cunia*	50	100	0.43	69.13
2	*Brassiopsis glomerata*	20	25	0.06	20.80
3	*Macaranga denticulata*	25	35	0.15	28.57
4	*Litsea citrata*	10	10	0.03	9.52
5	*Pinus* merkussi	50	135	4.34	156.89
6	*Betula alnoides*	5	5	0.05	5.48
7	*Grewia* sp.	10	10	0.03	9.57
	Total	**170**	**320**	**5.09**	**299.96**

S. No.	Shrubs	Frequency %	Density (No./ha)	IVI
1	*Artemisia nilagirica*	90	1080	73.32
2	*Artemisia sp.*	70	525	42.93
3	*Boehmeria longifolia*	55	270	27.36
4	*Crotolaria sp.*	25	85	10.75
5	*Debregessia longifolia*	75	205	30.01
6	*Rubus ellipticus*	20	30	6.90
7	*Rubus sp.*	25	40	8.73
	Total	**360**	**2235**	**200.00**

S. No.	Herbs (April)	Frequency (%)	Density (No./ha)	IVI
1	*Ageratum conyzoides*	60	38500	29.26
2	*Carex sp.*	25	8000	9.29
3	*Imperata cylindrica*	100	175500	88.88
4	*Lygodium flexuosum*	75	17000	25.36
5	*Nephrolepis cordifolia*	40	14000	15.30
6	*Ophiopogon intermedius*	15	2700	4.82
7	*Polygonum capitatum*	35	7800	11.79
8	*Thysanolaena maxima*	40	14000	15.30
	Total	**390**	**277500**	200

S. No.	Herbs (August)	Frequency (%)	Density (No./ha)	IVI
1	*Ageratum conyzoides*	50	26500	20.25
2	*Carex sp.*	25	4500	7.90
3	*Imperata cylindrica*	100	311500	106.19
4	*Lygodium flexuosum*	60	10500	18.88
5	*Nephrolepis cordifolia*	40	20500	16.02
6	*Ophiopogon intermedius*	15	2500	4.69
7	*Polygonum capitatum*	40	7000	12.59
8	*Thysanolaena maxima*	40	10500	13.48
	Total	**370**	**393500**	200

ANNEXURE-XIII
Community characteristics of the vegetation at various Sampling locations of Kalai Hydroelectric Project, Stage-2

1. Dam Site

S. No.	Trees	Frequency (%)	Density (No./ha)	Basal area (m^2/ha)	IVI
1	*Albizzia sp.*	15	15	0.50	13.32
2	*Altingia excelsa*	15	15	0.73	15.76
3	*Brassiopsis gromerulata*	45	60	0.26	29.66
4	*Callicarpa arborea*	10	10	0.12	6.63
5	*Canarium strictum*	15	25	2.22	33.60
6	*Ficus cunea*	25	70	0.80	30.64
7	*Grewia sp.*	35	80	0.91	37.12
8	*Gynocardia odorata*	10	10	0.28	8.31
9	*Macaranga denticulata*	25	30	0.62	20.92
10	*Mallotos*	20	35	0.36	17.41
11	*Pandanus odoratissimus*	30	90	1.44	42.97
12	*Rhus acuminata*	35	40	0.95	29.71
13	*Saurauria nepalensis*	15	35	0.19	13.95
		295	**515**	**9.38**	**300**

S. No.	Shrubs	Frequency (%)	Density (No./ha)	IVI
1	*Acacia pinnata*	15	30	7.19
2	*Artemisia nilagirica*	15	120	13.23
3	*Boehmeria longifolia*	65	405	49.60
4	*Boehmeria macrophylla*	15	90	11.21
5	*Debregessia longifolia*	55	285	38.09
6	*Mussanda roxburghii*	15	30	7.19
7	*Oxospora paniculata*	20	90	12.94
8	*Rubus ellipticus*	20	35	9.25
9	*Solanum nigrum*	25	55	12.31
10	*Solanum xanthocarpum*	15	35	7.52
11	*Urena lobata*	30	315	31.49
	Total	290	**1490**	**200**

S. No.	Herbs (April)	Frequency (%)	Density (No./ha)	IVI
1	*Begonia sp.*	10	2500	2.85
2	*Bidens pilosa*	30	4000	6.76
3	*Commelina sp.*	15	7500	6.18
4	*Costos speciosus*	5	1000	1.30
5	*Crossocephalum sp.*	20	5000	5.69
6	*Cyanotis vaga*	5	2500	2.06
7	*Drymria cordata*	70	30000	26.29
8	*Elatostemma sp.*	20	9000	7.73
9	*Forrestica sp.*	20	3000	4.68
10	*Gerardinia sp.*	15	1000	2.87
11	*Hydrocotyl javanica*	35	1500	6.28
12	*Lygodium flexuosum*	15	4000	4.40
13	*Galinsoga parviflora*	30	19000	14.39
14	*Nephrolepis cordifolia*	60	22500	20.90
15	*Ophiopogon intermedius*	20	4000	5.19
16	*Paderia foetida*	20	6500	6.46
17	*Phyrnium pubinerve*	10	5500	4.37
18	*Pilea umbrosa*	35	22500	16.96
19	*Pogonotherum sp.*	20	12500	9.51
20	*Polygonum capitatum*	30	8000	8.80
21	*Pteris sp.*	10	4000	3.61
22	*Saccharum spontaneum*	35	7000	9.07
23	*Periploca callosa*	10	1500	2.34
24	*Siegesosbekia orientalis*	20	3000	4.68
25	*Spilanthes paniculata*	50	2500	9.15
26	*Thladanthia sp.*	10	4000	3.61
27	*Thysanolaena maxima*	15	3000	3.89
		635	**196500**	200

S. No.	Herbs (August)	Frequency (%)	Density (No./ha)	IVI
1	*Begonia sp.*	10	3500	2.47
2	*Bidens pilosa*	30	9000	6.98
3	*Commelina sp.*	25	6500	5.53
4	*Costos speciosus*	10	2500	2.18
5	*Crossocephalum sp.*	20	9000	5.51
6	*Cyanotis vaga*	25	8500	6.10
7	*Drymria cordata*	70	53000	25.39
8	*Elatostemma sp.*	20	20500	8.78
9	*Forrestica sp.*	20	10500	5.93
10	*Galinsoga parviflora*	30	25000	11.53
11	*Gerardinia sp.*	15	10500	5.20
12	*Hydrocotyl javanica*	40	18500	11.15
13	*Lygodium flexuosum*	15	4000	3.35
14	*Nephrolepis cordifolia*	60	34500	18.65
15	*Ophiopogon intermedius*	25	6000	5.39
16	*Paderia foetida*	15	3500	3.20
17	*Periploca callosa*	10	1500	1.90
18	*Phyrnium pubinerve*	10	8500	3.89
19	*Pilea umbrosa*	35	33000	14.55
20	*Pogonotherum sp.*	25	10500	6.67
21	*Polygonum capitatum*	35	7000	7.14
22	*Pteris sp.*	15	3000	3.06
23	*Saccharum spontaneum*	25	10000	6.53
24	*Siegesosbekia orientalis*	20	12000	6.36
25	*Spilanthes paniculata*	50	22500	13.76
26	*Thladanthia sp.*	10	4000	2.61
27	*Thysanolaena maxima*	15	14000	6.19
	Total		**351000**	200

2. Submergence area

S. No.	Trees	Frequency (%)	Density (No./ha)	Basal Area (m^2/ha)	IVI
1	*Pandanus odoratissimus*	25	30	0.28	20.15
2	*Saurauria nepalensis*	65	135	0.40	51.84
3	*Mallotus tetracoccus*	40	70	0.38	33.72
4	*Ficus cunia*	45	80	0.47	39.46
5	*Betula alnoides*	40	60	0.35	31.21

S. No.	Trees	Frequency (%)	Density (No./ha)	Basal Area (m^2/ha)	IVI
6	*Alnus nepalensis*	25	35	0.14	16.82
7	*Rhus acuminata*	15	20	0.24	14.55
8	*Grewia* sp.	20	25	0.15	14.08
9	*Callicarpa arborea*	30	60	0.31	27.39
10	*Brassiopsis gromerulata*	30	45	0.14	19.54
11	*Albizzia* sp.	20	30	0.22	17.03
12	*Ficus roxburghii*	15	15	0.11	9.85
13	*Gynocardia odorata*	5	5	0.07	4.31
	Total	**375**	**610**	**3.25**	**299.95**

S. No.	Shrubs	Frequency (%)	Density (No./ha)	IVI
1	*Accacia pinnata*	15	25	3.98
2	*Artemisia nilagirica*	70	1075	50.10
3	*Boehmeria longifolia*	60	390	25.46
4	*Boehmeria macrophylla*	25	105	8.72
5	*Clerodendron coolebrokianum*	40	60	10.39
6	*Debregessia longifolia*	50	225	17.93
7	*Desmodium laxiflora*	15	40	4.47
8	*Mussanda roxburghii*	15	20	3.82
9	*Oxospora paniculata*	35	80	10.00
10	*Rubus ellipticus*	15	20	3.82
11	*Rubus mollucanus*	10	15	2.60
12	*Solanum nigrum*	25	50	6.91
13	*Solanum xanthocarpum*	15	25	3.98
14	*Tetrastigma* sp.	10	10	2.43
15	*Urena lobata*	75	900	45.39
	Total	**475**	**3040**	**200.00**

S. No.	Herbs (April)	Frequency (%)	Density (No./ha)	IVI
1	*Bidens pilosa*	40	12000	12.62
2	*Commelina sp.*	25	10500	9.49
3	*Crossocephalum sp.*	20	4000	5.24
4	*Cyanotis vaga*	30	11000	10.53
5	*Drymria cordata*	15	9000	7.14
6	*Elatostemma sp.*	25	6000	7.08
7	*Forrestica sp.*	20	3000	4.71
8	*Gerardinia sp.*	15	10000	7.67
9	*Hydrocotyl javanica*	45	7000	10.72
10	*Lygodium flexuosum*	15	2500	3.66
11	*Galinsoga*	40	10000	11.55
12	*Nephrolepis cordifolia*	65	25000	23.45

S. No.	Herbs (April)	Frequency (%)	Density (No./ha)	IVI
13	*Ophiopogon intermedius*	15	2000	3.40
14	*Paderia foetida*	5	1000	1.31
15	*Pilea sp.*	30	12500	11.34
16	*Pogonotherum* sp.	20	8000	7.38
17	*Polygonum capitatum*	65	6000	13.29
18	*Pteris sp.*	10	3000	3.15
19	*Saccharum spontaneum*	35	8000	9.70
20	*Periploca sp.*	10	1500	2.35
21	*Spilanthes paniculata*	75	31500	28.47
22	*Thladanthia sp.*	10	1000	2.09
23	*Thysanolaena maxima*	15	2500	3.66
	Total	**645**	**187000**	**200**

S.	Herbs (August)	Frequency (%)	Density (No./ha)	IVI
1	*Begonia sp.*	15	4000	3.50
2	*Bidens pilosa*	35	22500	12.80
3	*Commelina sp.*	25	9500	6.84
4	*Costos speciosus*	20	13500	7.54
5	*Crossocephalum sp.*	20	6000	4.91
6	*Cyanotis vaga*	30	12000	8.41
7	*Drymria cordata*	65	16000	14.71
8	*Elatostemma sp.*	25	18000	9.82
9	*Forrestica sp.*	20	4000	4.20
10	*Gerardinia sp.*	15	11000	5.96
11	*Hydrocotyl javanica*	35	10500	8.59
12	*Lygodium flexuosum*	15	3500	3.33
13	*Galinsoga*	40	7500	8.23
14	*Nephrolepis cordifolia*	65	23500	17.35
15	*Ophiopogon intermedius*	15	2000	2.80
16	*Paderia foetida*	5	1000	1.05
17	*Pilea sp.*	30	20500	11.40
18	*Pogonotherum* sp.	20	10000	6.31
19	*Polygonum capitatum*	65	18000	15.42
20	*Pteris sp.*	10	2500	2.28
21	*Saccharum spontaneum*	35	15000	10.17
22	*Periploca sp.*	10	1500	1.93
23	*Spilanthes paniculata*	75	37000	23.49
24	*Thladanthia sp.*	10	1500	1.93
25	*Thysanolaena maxima*	15	14000	7.02
	Total	**715**	**284500**	**200**

3. Upstream site

S. No.	Trees	Frequency %	Density (No./ha)	Basal area (m2/ha)	IVI
1	*Albizzia sp.*	55	160	2.64	49.09
2	*Albizzia sp.*	10	10	0.36	5.45
3	*Alnus nepaulensis*	10	20	0.25	7.27
4	*Betula alnoides*	20	20	0.32	10.91
5	*Ficus cunia*	10	10	0.14	5.45
6	*Grewia sp.*	15	60	1.06	16.36
7	*Gynocardia odorata*	10	10	0.29	5.45
8	*Itea macrophylla*	20	30	0.12	12.73
9	*Lagerstroemia minuticarpa*	25	30	0.18	14.55
10	*Macaranga denticulata*	40	50	0.67	23.64
11	*Schfellera hypoleuca*	15	10	0.08	7.27
12	*Sterculia sp.*	10	20	0.12	7.27
13	*Wallichiana sp. (Palm)*	15	100	1.18	23.64
14	*Unidentified sp.*	20	20	0.16	10.91
		275	550	7.57	

S. No.	Shrubs	Frequency (%)	Density (No./ha)	IVI
1	*Artemisia nilagirica*	40	100	16.16
2	*Boehmeria longifolia*	50	500	42.32
3	*Boehmeria macrophylla*	30	210	20.08
4	*Debregessia longifolia*	70	380	40.37
5	*Rubus ellipticus*	20	20	6.31
6	*Rubus sp.*	10	30	4.33
7	*Solanum nigrum*	20	30	6.90
8	*Solanum sp.*	20	20	6.31
9	*Solanum xanthocarpum*	20	80	9.85
10	*Spirea sp.*	70	80	22.67
11	*Inula cappa*	10	35	4.63
12	*Urena lobata*	30	210	20.08
	Total	390	**1695**	200

S. No.	Herbs (April)	Frequency (%)	Density (No./ha)	IVI
1	*Ageratum conyzoides*	65	62000	33.42
2	*Anaphalis sp.*	40	16000	13.01
3	*Crossesophelum*	40	12000	11.64
4	*Elatostemma sp.*	25	13500	9.32
5	*Fagopyrum dibotrys*	30	16000	11.12
6	*Imperata cylindrica*	50	25500	18.14
7	*Inula cappa*	15	2000	3.51
8	*Lygodium flexuosum*	15	2500	3.68
9	*Nephrolepis cordifolia*	45	49000	25.21
10	*Periploca callosa*	10	1500	2.40
11	*Phyrnium pubinerve*	20	10000	7.19
12	*Pilea umbrosa*	40	24000	15.74
13	*Polygonum capitatum*	25	6000	6.76
14	*Saccharum spontaneum*	50	28000	18.99
15	*Senecio cappa*	10	1000	2.23
16	*Thysanolaena maxima*	25	10500	8.30
17	*Trichosanthes sp.*	10	1500	2.40
18	*Urtica dioca*	15	12000	6.93
	Total	**530**	**293000**	200

S. No.	Herbs (August)	Frequency (%)	Density (No./ha)	IVI
1	*Ageratum conyzoides*	40	77000	32.54
2	*Anaphalis sp.*	30	10000	9.50
3	*Crossesophelum*	20	18000	9.87
4	*Elatostemma sp.*	25	28000	14.06
5	*Fagopyrum dibotrys*	50	31000	20.31
6	*Imperata cylindrica*	40	47500	23.33
7	*Inula cappa*	15	2500	3.97
8	*Lygodium flexuosum*	15	3500	4.28
9	*Nephrolepis cordifolia*	50	24500	18.28
10	*Periploca callosa*	10	1500	2.60
11	*Phyrnium pubinerve*	20	14000	8.62
12	*Pilea umbrosa*	40	2500	9.29
13	*Polygonum capitatum*	25	12000	9.06
14	*Saccharum spontaneum*	30	14000	10.75
15	*Senecio cappa*	10	3000	3.06
16	*Thysanolaena maxima*	25	14500	9.84
17	*Trichosanthes sp.*	10	1500	2.60
18	*Urtica dioca*	15	15500	8.03
	Total	470	320500	200

4. 1km downstream of Hawai

S. No.	Trees	Frequency (%)	Density (No./ha)	Basal Area (m^2/ha)	IVI
1	*Pandanus odoratissimus*	40	65	0.60	42.75
2	*Saurauria nepalensis*	50	75	0.22	34.43
3	*Mallotus tetracoccus*	20	25	0.10	13.16
4	*Ficus cunea*	70	130	0.70	65.89
5	*Rhus acuminata*	15	15	0.11	10.49
6	*Grewia* sp.	55	100	0.49	49.33
7	*Callicarpa arborea*	30	40	0.25	23.67
8	*Brassiopsis gromerulata*	40	65	0.18	28.44
9	*Albizzia* sp.	10	15	0.09	8.56
10	*Ficus roxburghii*	15	25	0.10	11.88
11	*Macropanax disperma*	10	10	0.05	6.33
12	*Wendlendia* sp	10	10	0.01	4.92
	Total	**365**	**575**	**2.92**	**300.0**

S. No.	Shrub	Frequency (%)	Density (No./ha)	IVI
1	*Accacia pinnata*	10	25	3.89
2	*Artemisia nilagirica*	50	1225	57.10
3	*Boehmeria longifolia*	50	370	27.82
4	*Boehmeria macrophylla*	20	60	8.12
5	*Debregessia longifolia*	50	270	24.40
6	*Mussanda roxburghii*	10	15	3.54
7	*Oxospora paniculata*	25	95	10.83
8	*Rubus ellipticus*	10	25	3.89
9	*Solanum nigrum*	30	60	11.15
10	*Solanum xanthocarpum*	20	45	7.60
11	*Urena lobata*	55	730	41.67
		330	**2920**	**200.00**

S. No.	Herbs (April)	Frequency (%)	Density (No./ha)	IVI
1	*Ageratum conyzoides*	50	32500	24.60
2	*Bidens pilosa*	60	39000	29.52
3	*Commelina sp.*	20	7500	7.07
4	*Crossocephalum sp.*	25	2500	5.39
5	*Cyanotis vaga*	10	3500	3.41
6	*Drymria cordata*	15	7000	6.00
7	*Elatostemma sp.*	20	12500	9.59
8	*Forrestica sp.*	20	2000	4.31
9	*Gerardinia sp.*	25	3000	5.64

S. No.	Herbs (April)	Frequency (%)	Density (No./ha)	IVI
10	*Hydrocotyl javanica*	20	8500	7.58
11	*Lygodium flexuosum*	25	3500	5.89
12	*Galinsoga*	20	9000	7.83
13	*Nephrolepis cordifolia*	50	11000	13.79
14	*Ophiopogon intermedius*	25	3500	5.89
15	*Pilea sp.*	35	9000	10.31
16	*Polygonum capitatum*	65	7000	14.26
17	*Pteris sp.*	20	11000	8.83
18	*Saccharum spontaneum*	25	5000	6.64
19	*Periploca sp.*	10	1000	2.16
20	*Spilanthes paniculata*	50	12500	14.55
21	*Thysanolaena maxima*	15	8500	6.75
	Total	**605**	**199000**	**200**

S.	Herbs (August)	Frequency (%)	Density (No./ha)	IVI
1	*Begonia sp.*	10	2500	2.25
2	*Ageratum conyzoides*	60	32500	20.27
3	*Bidens pilosa*	70	36000	22.91
4	*Commelina sp.*	35	12500	9.33
5	*Crossocephalum sp.*	40	18500	12.29
6	*Cyanotis vaga*	5	4000	2.19
7	*Drymria cordata*	70	6000	11.34
8	*Elatostemma sp.*	20	9000	6.05
9	*Forrestica sp.*	20	6000	4.89
10	*Gerardinia sp.*	25	8000	6.31
11	*Hydrocotyl javanica*	30	10000	7.73
12	*Hedychium sp.*	10	2000	2.06
13	*Lygodium flexuosum*	25	4500	4.96
14	*Galinsoga*	50	12000	11.08
15	*Nephrolepis cordifolia*	50	9500	10.11
16	*Ophiopogon intermedius*	25	14500	8.813
17	*Pilea sp.*	35	15000	10.3
18	*Polygonum capitatum*	70	19500	16.55
19	*Pteris sp.*	25	6000	5.54
20	*Saccharum spontaneum*	25	7500	6.12
21	*Periploca sp.*	10	1500	1.87
22	*Spilanthes paniculata*	50	12500	11.27
23	*Thysanolaena maxima*	15	10000	5.79
		775	259500	200

5. 3-5 km downstream

S. No.	Trees	Frequency (%)	Density (No./ha)	Basal area (m^2/ha)	IVI
1	*Albizia* sp.	30	40	0.35	20.01
2	*Alnus nepalensis*	45	60	0.54	30.49
3	*Aralia thomsonii*	30	35	0.10	14.30
4	*Betula alnoides*	40	50	0.89	34.77
5	*Brassiopsis glomerulata*	45	75	0.22	26.20
6	*Ficus cunia*	75	140	0.91	57.03
7	*Macaranga denticulata*	45	60	0.61	31.89
8	*Rhus acuminata*	40	45	0.22	20.47
9	*Mallotus tetracoccus*	20	25	0.19	12.22
10	*Pandanus odoratissimus*	20	25	0.39	16.33
11	*Grewia* sp.	50	75	0.50	33.12
12	*Macropanax dispermus*	5	10	0.03	3.27
		445	**640**	**4.95**	**300**

S. No.	Shrubs	Frequency (%)	Density (No./ha)	IVI
1	*Accacia pinnata*	15	20	4.27
2	*Artemisia nilagirica*	40	605	35.11
3	*Boehmeria longifolia*	75	490	38.12
4	*Boehmeria macrophylla*	15	60	5.99
5	*Clerodendron colebrokianum*	30	40	8.54
6	*Debregessia longifolia*	65	310	28.11
7	*Desmodium laxiflora*	15	25	4.48
8	*Maesa indica*	30	90	10.69
9	*Mussanda roxburghii*	10	20	3.13
10	*Oxospora paniculata*	30	140	12.84
11	*Rubus ellipticus*	10	20	3.13
12	*Solanum nigrum*	25	40	7.40
13	*Solanum xanthocarpum*	20	40	6.27
14	*Tetrastigma* sp.	15	20	4.27
15	*Urena lobata*	45	405	27.65
		440	**2325**	**200.00**

S. No.	Herbs (April)	Frequency (%)	Density (No./ha)	IVI
1	*Ageratum conyzoides*	60	33000	26.49
2	*Bidens pilosa*	50	6500	10.75
3	*Commelina sp.*	45	9000	11.37
4	*Cyanotis vaga*	45	12000	12.99
5	*Drymaria cordata*	15	39000	23.20
6	*Elatostemma sp.*	45	5000	9.22
7	*Equisetum sp.*	20	5000	5.59
8	*Galinsoga parviflora*	70	2500	11.49
9	*Hydrocotyl javanica*	15	3000	3.79
10	*Lygodium flexuosum*	25	3500	5.51
11	*Nephrolepis cordifolia*	65	34000	27.75
12	*Ophiopogon intermedius*	10	2500	2.80
13	*Paderia foetida*	15	1500	2.98
14	*Periploca sp.*	10	1000	1.99
15	*Phyrnium pubinerve*	5	2500	2.07
16	*Pilea sp.*	45	4000	8.68
17	*Polygonum capitatum*	45	6000	9.76
18	*Saccharum spontaneum*	45	8000	10.83
19	*Spilanthes paniculata*	60	1500	9.50
20	*Thysanolaena maxima*	20	6000	6.13
	Total	**690**	**185500**	**200**

S. No.	Herbs (August)	Frequency (%)	Density (No./ha)	IVI
1	*Ageratum conyzoides*	60	44000	22.51
2	*Begonia sp.*	20	6000	4.60
3	*Bidens pilosa*	50	9000	9.50
4	*Commelina sp.*	40	8000	7.87
5	*Costos speciosus*	10	2500	2.14
6	*Cyanotis vaga*	40	14000	9.88
7	*Drymaria cordata*	60	64500	29.36
8	*Elatostemma sp.*	45	9000	8.85
9	*Equisetum sp.*	20	7000	4.94
10	*Forrestica sp.*	15	6000	3.96
11	*Galinsoga parviflora*	60	13500	12.31
12	*Hydrocotyl javanica*	15	6000	3.96
13	*Lygodium flexuosum*	25	4500	4.75
14	*Nephrolepis cordifolia*	70	34000	20.46
15	*Ophiopogon intermedius*	10	1500	1.80
16	*Paderia foetida*	10	4500	2.80
17	*Periploca sp.*	10	2000	1.97
18	*Phyrnium pubinerve*	5	12000	4.66

S. No.	Herbs (August)	Frequency (%)	Density (No./ha)	IVI
19	*Pilea sp.*	45	8500	8.69
20	*Polygonum capitatum*	45	7000	8.19
21	*Pteris sp.*	10	5000	2.97
22	*Saccharum spontaneum*	45	10500	9.36
23	*Spilanthes paniculata*	60	7000	10.13
24	*Symethea ciliata*	15	4000	3.29
25	*Thysanolaena maxima*	20	9000	5.61
	Total	**770**	**299000**	**200**

Annexure-XIV
Community characteristics of the vegetation at various sampling locations at different sites of Hutong hydroelectric project, stage-1

1. Dam Site

S. No.	Trees	Frequency (%)	Density (No./ha)	Basal area (m^2/ha)	IVI
1	*Albizzia sp.*	35	60	1.38	44.2
2	*Alnus nepalensis*	55	100	1.71	63.48
3	*Aralia thomsonii*	15	15	0.06	8.48
4	*Betula alnoides*	10	10	0.13	7.08
5	*Brassiopsis glomerulata*	55	80	0.27	37.17
6	*Ficus cunia*	75	120	1.31	67.47
7	*Macaranga denticulata*	50	75	1.03	46.47
8	*Rhus acuminata*	30	40	0.54	25.65
	Total	**325**	**500**	**6.43**	**300**

S. No.	Shrubs	Frequency (%)	Density (No./ha)	IVI
1	*Acacia pinnata*	10	15	4.42
2	*Artemisia nilagirica*	15	90	11.02
3	*Boehmeria longifolia*	70	485	55.63
4	*Boehmeria macrophylla*	10	45	6.37
5	*Debregessia longifolia*	60	295	39.85
6	*Mussanda roxburghii*	15	20	6.47
7	*Oxospora paniculata*	25	155	18.69
8	*Rubus ellipticus*	10	20	4.75
9	*Solanum nigrum*	15	25	6.80
10	*Solanum xanthocarpum*	20	35	9.17
	Urena lobata	40	355	36.85
	Total	**290**	**1540**	**200.02**

S. No.	Herbs (April)	Frequency (%)	Density (No./ha)	IVI
1	*Ageratum conyzoides*	40	30000	21.70
2	*Begonia sp.*	10	3700	3.52
3	*Bidens pilosa*	20	6000	6.34
4	*Commelina sp.*	35	8000	9.84
5	*Costos speciosus*	10	2500	2.92
6	*Cyanotis vaga*	20	7500	7.09
7	*Drymaria cordata*	60	29000	24.54

S. No.	Herbs (April)	Frequency (%)	Density (No./ha)	IVI
8	*Elatostemma sp.*	35	7000	9.34
9	*Equisetum sp.*	25	5000	6.67
10	*Forrestica sp.*	10	4000	3.67
11	*Galinsoga parviflora*	40	3500	8.42
12	*Hydrocotyl javanica*	10	7500	5.43
13	*Lygodium flexuosum*	20	5000	5.84
14	*Nephrolepis cordifolia*	60	7000	13.51
15	*Ophiopogon intermedius*	10	2500	2.92
16	*Paderia foetida*	20	3500	5.09
17	*Periploca sp.*	10	2700	3.02
18	*Phyrnium pubinerve*	5	5000	3.34
19	*Pilea sp.*	35	13000	12.35
20	*Polygonum capitatum*	40	11000	12.18
21	*Pteris sp.*	10	5500	4.42
22	*Saccharum spontaneum*	25	7600	7.98
23	*Spilanthes paniculata*	50	8000	12.34
24	*Symethea ciliata*	15	6000	5.51
25	*Thysanolaena maxima*	25	9000	8.68
	Total	**600**	**199500**	**200**

S. No.	Herbs (August)	Frequency (%)	Density (No./ha)	IVI
1	*Ageratum conyzoides*	50	33000	15.98
2	*Begonia sp.*	15	3500	3.12
3	*Bidens pilosa*	20	16000	7.12
4	*Commelina sp.*	35	17500	9.72
5	*Costos speciosus*	10	12000	4.61
6	*Cyanotis vaga*	20	9000	5.29
7	*Drymaria cordata*	60	18000	13.53
8	*Elatostemma sp.*	40	26000	12.68
9	*Equisetum sp.*	25	18000	8.38
10	*Forrestica sp.*	15	5000	3.51
11	*Galinsoga parviflora*	40	11500	8.89
12	*Hydrocotyl javanica*	10	9000	3.82
13	*Lygodium flexuosum*	20	6000	4.51
14	*Nephrolepis cordifolia*	60	28500	16.27
15	*Ophiopogon intermedius*	10	13000	4.87
16	*Paderia foetida*	20	13500	6.47
17	*Periploca sp.*	10	15000	5.39
18	*Phyrnium pubinerve*	5	5500	2.17
19	*Pilea sp.*	35	14500	8.94

S. No.	Herbs (August)	Frequency (%)	Density (No./ha)	IVI
20	*Polygonum capitatum*	40	23000	11.90
21	*Pteris sp.*	10	9000	3.82
22	*Saccharum spontaneum*	25	26000	10.47
23	*Spilanthes paniculata*	50	13000	10.75
24	*Symethea ciliata*	30	21000	9.90
25	*Thysanolaena maxima*	25	16000	7.86
	Total	**680**	382500	200

2. Submergence Area

S. No.	Trees	Frequency (%)	Density (No./ha)	Basal area (m^2/ha)	IVI
1	*Albizzia sp.*	25	45	0.35	20.76
2	*Alnus nepalensis*	35	65	0.0768	20.08
3	*Aralia thomsonii*	30	35	0.0892	14.34
4	*Betula alnoides*	40	50	0.804	35.12
5	*Brassiopsis glomerulata*	65	95	0.054	31.08
6	*Ficus cunia*	75	65	0.91	47.66
7	*Macaranga denticulata*	35	60	0.61	31.28
8	*Rhus acuminata*	45	45	0.282	23.63
9	*Mallotos tetraccos*	25	25	0.192	13.92
10	*Pandanas odoratissima*	20	30	0.563	22.01
11	*Grewia sp.*	55	85	0.48	36.85
12	*Macropanax disperma*	5	10	0.024	3.28
	Total	**455**	**610**	**4.435**	**300**

S. No.	Shrubs	Frequency (%)	Density (No./ha)	IVI
1	*Accacia pinnata*	10	20	3.14
2	*Artemisia nilagirica*	45	320	25.52
3	*Boehmeria longifolia*	45	290	24.03
4	*Boehmeria macrophylla*	15	60	6.20
5	*Clerodendron colebrokianum*	30	40	8.43
6	*Debregessia longifolia*	45	165	17.85
7	*Desmodium laxiflora*	15	25	4.46
8	*Maesa indica*	30	90	10.91
9	*Mussanda roxburghii*	10	20	3.14
10	*Oxospora paniculata*	60	340	29.73
11	*Rubus ellipticus*	35	80	11.49
12	*Solanum nigrum*	25	55	8.10
13	*Solanum xanthocarpum*	30	65	9.67
14	*Tetrastigma sp.*	25	45	7.60
15	*Urena lobata*	45	405	29.73
	Total	**465**	**2020**	

S. No.	Herbs (April)	Frequency (%)	Density (No./ha)	IVI
1	*Ageratum conyzoides*	60	33000	24.71
2	*Bidens pilosa*	50	12500	13.20
3	*Commelina sp.*	45	9000	10.77
4	*Cyanotis vaga*	45	6000	9.29
5	*Drymaria cordata*	15	12000	8.02
6	*Elatostemma sp.*	45	9000	10.77
7	*Equisetum sp.*	20	8000	6.76
8	*Galinsoga parviflora*	70	6500	13.06
9	*Hydrocotyl javanica*	15	3000	3.59
10	*Lygodium flexuosum*	25	3500	5.25
11	*Nephrolepis cordifolia*	65	37000	27.38
12	*Ophiopogon intermedius*	10	2500	2.64
13	*Paderia foetida*	15	1500	2.85
14	*Periploca sp.*	10	1000	1.90
15	*Phyrnium pubinerve*	5	3000	2.18
16	*Pilea sp.*	45	13000	12.74
17	*Polygonum capitatum*	45	7000	9.79
18	*Saccharum spontaneum*	45	14000	13.23
19	*Spilanthes paniculata*	60	12500	14.61
20	*Thysanolaena maxima*	20	9000	7.25
	Total		**203000**	**200**

S. No.	Herbs (August)	Frequency (%)	Density (No./ha)	IVI
1	*Ageratum conyzoides*	60	44000	17.89
2	*Begonia sp.*	20	6000	3.54
3	*Bidens pilosa*	50	19000	14.23
4	*Commelina sp.*	40	9000	19.66
5	*Costos speciosus*	10	15000	4.15
6	*Cyanotis vaga*	40	8000	11.48
7	*Drymaria cordata*	60	50500	7.47
8	*Elatostemma sp.*	45	13000	5.40
9	*Equisetum sp.*	20	17000	7.19
10	*Forrestica sp.*	15	6000	21.46
11	*Galinsoga parviflora*	60	19500	9.20
12	*Hydrocotyl javanica*	15	6000	7.20
13	*Lygodium flexuosum*	25	4500	3.53
14	*Nephrolepis cordifolia*	70	21000	12.86
15	*Ophiopogon intermedius*	10	11500	3.53
16	*Paderia foetida*	10	1500	4.35
17	*Periploca sp.*	10	21000	14.52
18	*Phyrnium pubinerve*	5	13000	4.43
19	*Pilea sp.*	45	13500	1.66
20	*Polygonum capitatum*	45	10000	7.07
21	*Pteris sp.*	10	6000	4.23
22	*Saccharum spontaneum*	45	13500	9.33
23	*Spilanthes paniculata*	60	17500	8.36
24	*Symethea ciliata*	15	4000	2.91
25	*Thysanolaena maxima*	20	10500	9.33
	Total	**805**	**360500**	

3. Upstream Area

S. No.	Trees	Frequency (%)	Density (No./ha)	Basal area (m^2/ha)	IVI
1	*Albizzia sp.*	15	15	0.42	13.83
2	*Altingia excelsa*	10	20	0.078	8.00
3	*Brassiopsis glomerulata*	45	70	0.36	32.38
4	*Callicarpa arborea*	10	10	0.012	5.10
5	*Canarium strictum*	15	45	1.02	28.72
6	*Ficus cunia*	30	70	0.762	34.01
7	*Grewia sp.*	35	65	1.26	42.24
8	*Gynocardia odorata*	10	10	0.048	5.66

S. No.	Trees	Frequency (%)	Density (No./ha)	Basal area (m^2/ha)	IVI
9	*Macaranga denticulata*	25	30	0.062	14.19
10	*Mallotos*	20	35	0.264	16.72
11	*Pandanas odoratissima*	65	85	1.24	54.80
12	*Rhus acuminata*	35	40	0.802	30.48
13	*Saurauria nepalensis*	15	35	0.176	13.86
	Total	**330**	**530**	**6.504**	

S. No.	Shrubs	Frequency (%)	Density (No./ha)	IVI
1	*Acacia pinnata*	15	30	7.15
2	*Artemisia nilagirica*	15	120	13.15
3	*Boehmeria longifolia*	65	405	49.33
4	*Boehmeria*	15	90	11.15
5	*Debregessia longifolia*	55	295	38.91
6	*Mussanda roxburghii*	15	30	7.15
7	*Oxospora paniculata*	20	90	12.87
8	*Rubus ellipticus*	20	35	9.21
9	*Solanum nigrum*	25	55	12.26
10	*Solanum*	15	35	7.49
11	*Urena lobata*	30	315	31.31
	Total	**290**	**1500**	200

S. No.	Herbs (April)	Frequency (%)	Density (No./ha)	IVI
1	*Begonia sp.*	10	2500	2.30
2	*Bidens pilosa*	30	14000	8.73
3	*Commelina sp.*	15	7500	4.51
4	*Costos speciosus*	5	1000	1.08
5	*Crossocephalum crepezoides*	20	5000	4.60
6	*Cyanotis vaga*	5	2000	1.36
7	*Drymria cordata*	60	58000	25.89
8	*Elatostemma* sp.	20	14000	7.13
9	*Forrestica sp.*	20	3000	4.04
10	*Gerardinia sp.*	15	12000	5.77
11	*Hydrocotyl javanica*	35	12500	9.11
12	*Lygodium flexuosum*	15	4000	3.52
13	*Galinsoga parviflora*	30	29000	12.95
14	*Nephrolepis cordifolia*	60	43500	21.82

15	*Ophiopogon intermedius*	20	4000	4.32
16	*Paderia foetida*	20	3500	4.18
17	*Phyrnium pubinerve*	10	8500	3.99
18	*Pilea umbrosa*	35	33500	15.01
19	*Pogonotherum sp.*	20	12500	6.71
20	*Polygonum capitatum*	30	7000	6.77
21	*Pteris* sp.	10	4000	2.72
22	*Saccharum spontaneum*	35	19000	10.94
23	*Periploca sp.*	10	1500	2.02
24	*Siegesosbekia orientalis*	20	9000	5.73
25	*Spilanthes paniculata*	50	28500	16.01
26	*Thladanthia* sp.	10	4000	2.72
27	*Thysanolaena maxima*	15	13000	6.05
	Total	**625**	**356000**	**200**

S. No.	Herbs (August)	Frequency (%)	Density (No./ha)	IVI
1	*Begonia sp.*	15	3000	2.96
2	*Bidens pilosa*	35	18000	9.96
3	*Commelina sp.*	25	13000	7.15
4	*Costos speciosus*	10	2000	1.97
5	*Crossocephalum sp.*	20	9500	5.47
6	*Cyanotis vaga*	15	19000	7.40
7	*Drymria cordata*	75	22500	16.88
8	*Elatostemma sp.*	25	16000	7.99
9	*Forrestica sp.*	25	7000	5.49
10	*Gerardinia sp.*	15	14000	6.01
11	*Hydrocotyl javanica*	35	16000	9.40
12	*Lygodium flexuosum*	15	4500	3.38
13	*Galinsoga*	35	30500	13.43
14	*Nephrolepis cordifolia*	60	16000	12.95
15	*Ophiopogon intermedius*	20	5000	4.22
16	*Paderia foetida*	20	4500	4.09
17	*Phyrnium pubinerve*	10	9500	4.05
18	*Pilea sp.*	39	34000	14.97
19	*Pogonotherum* sp.	25	17500	8.40
20	*Polygonum capitatum*	30	12300	7.67
21	*Pteris sp.*	15	6040	3.80
22	*Saccharum spontaneum*	35	21000	10.79
23	*Periploca sp.*	10	1500	1.83
24	*Siegesosbekia orientalis*	20	20500	8.53

25	*Spilanthes paniculata*	50	17500	11.95
26	*Thladanthia sp.*	15	5000	3.52
27	*Thysanolaena maxima*	15	15000	6.29
	Total	**705**	**360340**	**200**

4. 1 km downstream of dam site

S. No.	Trees	Frequency (%)	Density (No./ha)	Basal area (m^2/ha)	IVI
1	*Albizzia* sp.	25	25	0.30	14.79
2	*Alnus nepalensis*	75	150	0.96	55.67
3	*Aralia thomsonii*	25	30	0.09	11.22
4	*Betula alnoides*	60	95	1.28	51.31
5	*Brassiopsis glomerulata*	30	55	0.15	16.94
6	*Ficus cunia*	70	150	0.84	52.14
7	*Macaranga denticulata*	30	40	0.54	22.68
8	*Rhus acuminata*	35	45	0.19	17.55
9	*Mallotos tetraccos*	30	40	0.13	14.58
10	*Pandanas odoratissima*	15	15	0.19	8.98
11	*Grewia* sp.	60	90	0.33	31.82
12	*Macropanax disperma*	5	5	0.03	2.34
	Total	**460**	**740**	**5.03**	**300.03**

S. No.	Shrubs	Frequency (%)	Density (No./ha)	IVI
1	*Accacia pinnata*	15	20	2.89
2	*Artemisia nilagirica*	60	825	33.07
3	*Boehmeria longifolia*	75	380	22.52
4	*Boehmeria macrophylla*	20	180	8.28
5	*Clerodendron coolebrokianum*	30	70	6.64
6	*Debregessia longifolia*	65	375	20.84
7	*Desmodium laxiflorum*	15	45	3.61
8	*Dioscorea sp.*	5	10	1.06
9	*Maesa indica*	45	100	9.81
10	*Melastoma sp.*	60	225	15.73
11	*Mussanda roxburghii*	15	20	2.89
12	*Oxospora paniculata*	45	145	11.11
13	*Peuraria wallichii*	10	15	1.97
14	*Piper sp.*	30	340	14.44
15	*Rubus ellipticus*	30	45	5.92
16	*Rubus sp.*	30	40	5.77

17	*Solanum nigrum*	25	45	5.15
18	*Solanum xanthocarpum*	10	15	1.97
19	*Tetrastigma sp.*	20	25	3.80
20	*Urena lobata*	45	540	22.53
	Total	**650**	**3460**	**200**

S. No.	Herbs (April)	Frequency %	Density (No./ha)	IVI
1	*Ageratum conyzoides*	75	22500	21.48
2	*Bidens pilosa*	60	10000	13.23
3	*Commelina sp.*	30	8000	8.10
4	*Cyanotis vaga*	30	9000	8.59
5	*Drymaria cordata*	25	7000	6.91
6	*Elatostemma sp.*	50	19000	16.30
7	*Forrestica sp.*	15	2500	3.31
8	*Galinsoga parviflora*	50	17000	15.31
9	*Hydrocotyl javanica*	25	9000	7.90
10	*Lygodium flexuosum*	15	3000	3.55
11	*Nephrolepis cordifolia*	60	28500	22.38
12	*Ophiopogon intermedius*	15	4000	4.05
13	*Paderia foetida*	15	2500	3.31
14	*Periploca sp.*	15	1500	2.81
15	*Phyrnium pubinerve*	10	6000	4.35
16	*Pilea sp.*	40	10000	10.47
17	*Polygonum capitatum*	55	7500	11.30
18	*Pteris sp.*	15	2500	3.31
19	*Saccharum spontaneum*	45	13000	12.64
20	*Spilanthes paniculata*	65	12000	14.91
21	*Thysanolaena maxima*	15	7500	5.78
	Total	725	202000	200

S. No.	Herbs (August)	Frequency %	Density (No./ha)	IVI
1	*Ageratum conyzoides*	70	16000	13.11
2	*Begonia sp.*	10	17500	6.27
3	*Bidens pilosa*	60	9000	9.87
4	*Commelina sp.*	30	12000	7.10
5	*Costos speciosus*	10	18000	6.41
6	*Cyanotis vaga*	30	12000	7.10
7	*Drymaria cordata*	70	80550	31.77

S. No.	Herbs (August)	Frequency %	Density (No./ha)	IVI
8	*Elatostemma sp.*	50	11450	9.37
9	*Forrestica sp.*	20	11000	5.60
10	*Galinsoga parviflora*	50	10500	9.10
11	*Hydrocotyl javanica*	25	7000	5.05
12	*Lygodium flexuosum*	15	9500	4.56
13	*Nephrolepis cordifolia*	60	16500	12.04
14	*Ophiopogon intermedius*	25	9000	5.63
15	*Paderia foetida*	20	9500	5.17
16	*Periploca sp.*	15	10000	4.71
17	*Phyrnium pubinerve*	10	9000	3.81
18	*Pilea sp.*	40	9500	7.59
19	*Polygonum capitatum*	60	14500	11.46
20	*Pteris sp.*	15	9000	4.42
21	*Saccharum spontaneum*	45	15000	9.79
22	*Spilanthes paniculata*	65	12000	11.35
23	*Symethea ciliata*	15	7000	3.84
24	*Thysanolaena maxima*	15	10500	4.85
	Total	**825**	**346000**	**200**

ANNEXURE-XV

Community characteristics of the vegetation at various sampling locations at different sites of Hutong Hydroelectric project, Stage-2

1. Dam site

S. No.	Trees	Frequency (%)	Density (No./ha)	Basal area (m^2/ha)	IVI
1	*Albizzia sp*	25	55	1.10	23.82
2	*Albizzia sp*	10	10	0.52	8.18
3	*Altingia excelsa*	25	35	2.61	30.77
4	*Canarium strictum*	5	5	0.19	3.66
5	*Eurya acuminate*	5	20	0.13	5.53
6	*Ficus cunia*	40	70	0.66	27.94
7	*Gynocardia odorata*	10	10	0.25	6.41
8	*Lagerstroemia minuticarpa*	20	20	3.02	29.63
9	*Litsea monopetala*	10	10	0.24	6.33
10	*Macaranga denticulate*	20	45	0.31	15.41
11	*Micromelon intigrefolia*	5	5	0.05	2.69
12	*Musa* sp	40	235	2.98	69.07
13	*Pterospermum acerifolium*	5	5	0.25	4.06
14	*Quercus griffithii*	15	20	0.45	10.88
15	*Rhus acuminate*	30	35	0.62	19.13
16	*Saurauria napalensis*	20	30	0.31	13.06
17	*Spondias pinnata*	5	5	0.14	3.32
18	*Terminalia myriocarpa*	10	10	0.57	8.55
19	*Wallichiana (palm)*	5	10	0.12	3.95
20	*Wendlandia* sp	10	10	0.43	7.59
	Total	**250**	**645**	**14.95**	**299.98**

S. No.	Shrubs	Frequency (%)	Density (No./ha)	IVI
1	*Acacia pinnata*	50	190	16.57
2	*Acacia pruniscens*	15	100	6.00
3	*Artemisia nilagirica*	50	1705	52.64
4	*Boehmeria longifolia*	20	90	6.96
5	*Boehmeria macrophylla*	10	60	3.84
6	*Buddleja asiatica*	5	15	1.56
7	*Clerodendron coolebrokianum*	20	50	6.01
8	*Debregessia longifolia*	15	35	4.45
9	*Desmodium sp*	5	10	1.44
10	*Grewia disperma*	10	35	3.24
11	*Laportea crenulata*	5	15	1.56
12	*Maesa indica*	20	40	5.77
13	*Murraya paniculata*	5	15	1.56

S. No.	Shrubs	Frequency (%)	Density (No./ha)	IVI
14	*Oxospora paniculata*	15	90	5.76
15	*Piper* sp	30	535	19.97
16	*Rhynchotecium* sp.	10	60	3.84
17	*Rubus ellipticus*	15	35	4.45
18	*Smilax* sp	15	20	4.09
19	*Solanum nigrum*	15	50	4.80
20	*Solanum xanthocarpum*	30	40	8.18
21	*Urena lobata*	50	1000	35.86
22	*Zanthoxylum* sp.	5	10	1.44
	Total	**415**	**4200**	200

S. No.	Herbs (April)	Frequency (%)	Density (No./ha)	IVI
1	*Ageratum conyzoides*	70	32500	27.54
2	*Borreria articularis*	50	11500	14.21
3	*Polygonum capitata*	60	13500	16.91
4	*Crassocephalum crepezoides*	20	9000	7.74
5	*Bidens pilosa*	30	15500	12.54
6	*Nephrolepis cordifolia*	40	9500	11.51
7	*Dicrenopteris linearis*	20	7500	7.04
8	*Fagopyrum dibotrys*	40	6000	9.88
9	*Spilanthus paniculata*	30	11000	10.44
10	*Carex sp.*	15	2500	3.82
11	*Gnaphalium sp.*	15	5700	5.31
12	*Impatiens sp.*	10	4800	4.01
13	*Tetrastigma sp.*	15	4500	4.75
14	*Paderia foetida*	20	6000	6.34
15	*Thysanolaena maxima*	15	9500	7.08
16	*Saccharum spontaneum*	30	10000	9.97
17	*Ophiopogon intermedius*	10	2500	2.94
18	*Periploca callosa*	10	3000	3.17
19	*Begonia sp.*	5	2500	2.05
20	*Pothos scandens*	5	3500	2.52
21	*Urtica dioca*	10	12500	7.60
22	*Phyrnium pubinerve*	5	6000	3.68
23	*Oplismenus sp.*	10	9000	5.97
24	*Pilea umbrosa*	20	9500	7.97
25	*Mikania micrantha*	10	7000	5.03
	Total	565	214500	200

Sl.	Herbs (August)	Frequency (%)	Density (No./ha)	IVI
1	*Ageratum conyzoides*	80	80500	33.79
2	*Begonia sp.*	15	4500	3.44
3	*Bidens pilosa*	40	19000	11.08
4	*Borreria articularies*	50	15000	11.46
5	*Carex*	10	3500	2.43
6	*Costos speciosus*	10	7500	3.52
7	*Crossocephalum crepezoides*	20	9000	5.40
8	*Drymaria cordata*	35	15500	9.39
9	*Elatostemma dissectum*	20	14000	6.77
10	*Fagopyrum dibotrys*	50	10500	10.23
11	*Hedychium sp.*	20	4500	4.17
12	*Mikania micrantha*	25	6000	5.32
13	*Nephrolepis cordifolia*	40	15000	9.99
14	*Ophiopogon intermedius*	10	2500	2.15
15	*Opliomenus sp.*	20	18000	7.87
16	*Paderia foetida*	20	8500	5.27
17	*Phrynium pubinerve*	10	5000	2.84
18	*Pilea umbrosa*	25	13000	7.23
19	*Polygonum capitatum*	60	19500	14.16
20	*Pothos scandens*	5	11000	3.74
21	*Pratia begonifolia*	10	8000	3.66
22	*Pteris sp.*	5	11000	3.74
23	*Rubia cordifolia*	5	9500	3.33
24	*Saccarum spoteneum*	30	13000	7.97
25	*Spilanthes paniculata*	30	17000	9.06
26	*Thysonolena maxima*	20	14500	6.91
27	*Urtica dioca*	15	10500	5.08
		680	365500	200

2. Submergence Area

S. No.	Trees	Frequency (%)	Density (No./ha)	Basal area (m^2/ha)	IVI
1	*Albizia* sp	15	15	0.40	10.45
2	*Altingia excelsa*	15	20	0.65	13.13
3	*Brassiopsis glomerulata*	10	15	0.05	6.21
4	*Callicarpa arborea*	10	10	0.12	5.86
5	*Castanopsis purpurella*	10	10	0.76	10.57
6	*Dendrocalamus sp*	20	200	0.56	43.38
7	*Erythrina stricta*	5	20	3.62	31.53
8	*Ficus cunia*	40	60	1.66	35.47
9	*Gynocardia odorata*	10	10	0.26	6.92
10	*Itea* sp.	10	30	0.06	8.68
11	*Lagerstroemia minuticarpa*	5	5	0.40	5.43
12	*Litsea monopetala*	30	65	2.31	37.71
13	*Macaranga denticulata*	20	25	0.32	13.17
14	*Mangletia* sp.	5	5	0.14	3.56
15	*Musa* sp.	5	20	0.25	6.76
16	*Prunus* sp.	5	5	0.02	2.62
17	*Quercus griffithii*	15	15	1.18	16.17
18	*Rhus acuminata*	20	25	0.25	12.65
19	*Saurauria nepalensis*	10	10	0.05	5.41
20	*Spondias axillaries*	5	5	0.05	2.87
21	*Talauma hodgsonii*	5	5	0.10	3.24
22	*Unidentified plant*	10	20	0.30	8.81
23	*Wendlendia* sp.	15	20	0.14	9.38
	Total	**295**	**615**	**13.65**	**300**

S. No.	Shrubs	Frequency (%)	Density (No./ha)	IVI
1	*Acacia pinnata*	40	45	9.25
2	*Acacia pruniscens*	30	60	8.27
3	*Artemisia nilagirica*	70	735	49.58
4	*Boehmeria longifolia*	15	50	5.15
5	*Boehmeria macrophylla*	15	35	4.39
6	*Buddleja asiatica*	10	35	3.52
7	*Clerodendron coolebrookianum*	40	40	8.99
8	*Debregessia longifolia*	15	30	4.14
9	*Desmodium longifolia*	10	15	2.50
10	*Grewia disperma*	15	35	4.39
11	*Inula cappa*	10	25	3.01

12	*Laportea cunia*	15	15	3.37
13	*Maesa indica*	45	30	9.35
14	*Murraya paniculata*	10	20	2.76
15	*Oxospora paniculata*	45	550	35.82
16	*Piper* sp	40	45	9.25
17	*Rubus ellipticus*	20	35	5.26
18	*Smilax* sp	10	15	2.50
19	*Solanum nigrum*	20	30	5.00
20	*Solanum xanthocarpum*	15	35	4.39
21	*Toddelia asiatica*	5	5	1.12
22	*Urena lobata*	45	25	9.10
23	*Vernonia volkemarifolia*	5	10	1.38
24	*Zanthoxylum* sp	30	45	7.51
	Total	**575**	**1965**	200

S. No.	Herbs (April)	Frequency (%)	Density (No./ha)	IVI
1	*Ageratum conyzoides*	50	44500	33.41
2	*Begonia* sp	10	5500	4.88
3	*Bidens pilosa*	20	5500	6.84
4	*Borreria articularis*	35	9500	11.90
5	*Carex* sp	15	4000	5.06
6	*Crassocephalum crepezoides*	20	3000	5.51
7	*Dicrenopteris linearis*	15	5000	5.59
8	*Fagopyrum dibotrys*	15	3500	4.80
9	*Gnaphalium* sp	15	4000	5.06
10	*Impatiens* sp.	10	2500	3.29
11	*Melastoma* sp.	5	7000	4.69
12	*Mikania micrantha*	15	9000	7.72
13	*Nephrolepis cordifolia*	35	8500	11.37
14	*Ophiopogon intermedius*	15	4500	5.33
15	*Oplismenus* sp	10	5500	4.88
16	*Paderia foetida*	15	4500	5.33
17	*Periploca callosa*	5	2000	2.04
18	*Phyrnium pubinerve*	5	6000	4.16
19	*Polygonum capitata*	50	9500	14.84
20	*Pothos scandens*	10	6000	5.14
21	*Saccharum spontaneum*	35	6500	10.31

22	*Spilanthus paniculata*	60	8500	16.27
23	*Tetrastigma* sp	20	6500	7.37
24	*Thysanolaena maxima*	10	8500	6.47
25	*Urtica dioca*	15	9000	7.72
	Total		**188500**	200

S. No.	Herbs (August)	Frequency %	Density (No./ha)	IVI
1	*Ageratum conyzoides*	55	58000	29.37
2	*Begonia sp.*	15	8500	5.56
3	*Bidens pilosa*	25	9000	7.52
4	*Borreria articularies*	35	6500	8.49
5	*Carex*	15	6000	4.72
6	*Costos speciosus*	10	9700	5.06
7	*Crossocephalum crepezoides*	20	10500	7.13
8	*Dicrenopteris linearis*	15	8500	5.56
9	*Fagopyrum dibotrys*	15	10000	6.06
10	*Gnaphalium crepezoides*	20	6500	5.78
11	*Impatiens sp.*	10	6500	3.98
12	*Melostoma sp.*	5	14500	5.77
13	*Mikania micrantha*	15	9000	5.72
14	*Nephrolepis cordifolia*	35	7300	8.76
15	*Ophiopogon intermedius*	10	9500	4.99
16	*Opliomenus sp.*	15	8000	5.39
17	*Paderia foetida*	20	13000	7.97
18	*Periploca callosa*	5	9000	3.92
19	*Phrynium pubinerve*	5	6000	2.91
20	*Polygonum capitatum*	60	14000	15.51
21	*Pothos scandens*	10	8000	4.49
22	*Pratia begonifolia*	10	6000	3.82
23	*Pteris sp.*	5	7000	3.25
24	*Saccarum spoteneum*	35	9000	9.33
25	*Spilanthes paniculata*	60	17000	16.52
26	*Thysonolena maxima*	10	10000	5.16
27	*urtica dioca*	20	11000	7.29
		555	298000	200

3. Upstream Area

S. No.	Trees	Frequency (%)	Density (No./ha)	Basal area (m^2/ha)	IVI
1	*Albizia* sp.	35	60	1.23	44.31
2	*Alnus nepalensis*	60	110	1.76	71.91
3	*Aralia thomsonii*	15	15	0.0023	8.26
4	*Betula alnoides*	10	10	0.052	6.32
5	*Brassiopsis glomerulata*	45	80	0.245	36.14
6	*Ficus cunia*	55	75	1.25	54.53
7	*Macaranga denticulata*	50	75	1.26	53.02
8	*Rhus acuminata*	30	40	0.432	25.54
	Total	**300**	465	**6.2313**	

S. No.	Shrubs	Frequency (%)	Density (No./ha)	IVI
1	*Acacia pinnata*	10	15	4.65
2	*Artemisia nilagirica*	15	90	13.82
3	*Boehmeria longifolia*	55	135	30.89
4	*Boehmeria macrophylla*	20	45	10.82
5	*Debregessia longifolia*	80	295	54.95
6	*Mussanda roxburghii*	15	35	8.24
7	*Oxospora paniculata*	25	155	23.55
8	*Rubus ellipticus*	35	60	17.03
9	*Solanum nigrum*	25	45	12.38
10	*Solanum xanthocarpum*	20	35	9.80
11	*Urena lobata*	20	75	13.86
	Total	**320**	**985**	200.00

S. No.	Herbs (April)	Frequency (%)	Density (No./ha)	IVI
1	*Ageratum conyzoides*	40	3000	7.63
2	*Begonia* sp.	10	2500	2.74
3	*Bidens pilosa*	20	14000	9.78
4	*Commelina* sp.	35	17000	13.54
5	*Costos speciosus*	10	2500	2.74
6	*Cyanotis vaga*	20	7500	6.68
7	*Drymaria cordata*	45	7000	10.32
8	*Elatostemma* sp.	35	4000	7.34
9	*Equisetum sp.*	45	6000	9.84
10	*Forrestica* sp.	10	4000	3.46
11	*Galinsoga parviflora*	40	33500	22.19

S. No.	Herbs (April)	Frequency (%)	Density (No./ha)	IVI
12	*Hydrocotyl javanica*	10	7500	5.13
13	*Lygodium flexuosum*	20	5000	5.49
14	*Nephrolepis cordifolia*	50	7000	11.09
15	*Ophiopogon intermedius*	10	2500	2.74
16	*Paderia foetida*	20	3500	4.77
17	*Periploca callosa*	10	2000	2.51
18	*Phyrnium pubinerve*	5	5000	3.16
19	*Pilea* sp.	35	34000	21.66
20	*Polygonum capitatum*	40	11000	11.45
21	*Pteris* sp.	10	3500	3.22
22	*Saccharum spontaneum*	25	3500	5.55
23	*Spilanthes paniculata*	60	4000	11.21
24	*Symethea ciliate*	15	6000	5.19
25	*Thysanolaena maxima*	25	14000	10.56
	Total	**645**	**209500**	200

S. No.	Herbs (August)	Frequency (%)	Density (No./ha)	IVI
1	*Ageratum conyzoides*	40	6000	8.37
2	*Begonia sp.*	10	3000	2.50
3	*Bidens pilosa*	20	14000	7.20
4	*Commelina sp.*	35	17500	10.68
5	*Costos speciosus*	15	2500	3.21
6	*Cyanotis vaga*	20	10500	6.24
7	*Drymaria cordata*	30	14000	8.88
8	*Elatostemma sp.*	35	20500	11.51
9	*Equisetum sp.*	25	47500	17.23
10	*Forrestica*	10	6500	3.46
11	*Galinsoga parviflora*	40	44500	18.93
12	*Hydrocotyl javanica*	10	8000	3.88
13	*Lygodium flexuosum*	20	5500	4.87
14	*Nephrolepis cordifolia*	60	21000	15.85
15	*Ophiopogon intermedius*	10	3500	2.64
16	*Paderia foetida*	20	4000	4.46
17	*Periploca callosa*	10	1500	2.09
18	*Phrynium pubinerve*	5	5500	2.35
19	*Pilea sp.*	35	17500	10.68
20	*Polygonum capitatum*	30	23000	11.35

S. No.	Herbs (August)	Frequency (%)	Density (No./ha)	IVI
21	*Pteris sp.*	10	1500	2.09
22	*Saccharum spontaneum*	25	28000	11.88
23	*Spilanthes paniculata*	40	26000	13.86
24	*Symethea ciliata*	15	10500	5.40
25	*Thysanolaena maxima*	25	22500	10.37
		595	**364500**	200

4. 1 km downstream of damsite

S. No.	Trees	Frequency (%)	Density (No./ha)	Basal area (m^2/ha)	IVI
1	*Macaranga denticulata*	25	40	0.43	17.04
2	*Musa* sp.	40	270	3.77	73.59
3	*Altingia excelsa*	25	45	4.19	33.46
4	*Terminalia myriocarpa*	15	15	1.08	12.17
5	*Saurauria nepalensis*	15	25	0.12	9.84
6	*Rhus acuminata*	20	25	0.34	12.49
7	*Quercus griffithii*	10	10	0.61	7.65
8	*Litsea monopetala*	5	5	0.07	2.86
9	*Wendlandia* sp.	5	5	0.05	2.78
10	*Micromelon integifolia*	5	10	0.06	3.62
11	*Ficus cunia*	20	25	0.27	12.21
12	*Pterospermum acerifolium*	10	10	0.61	7.66
13	*Canarium strictum*	10	10	0.99	9.26
14	*Albizia* sp.	35	50	2.06	28.96
15	*Lagerstroemia minuticarpa*	35	60	8.88	58.87
16	*Spondias axillaries*	10	10	0.58	7.55
	Total	**285**	**615**	**24.11**	**300**

S. No.	Shrubs	Frequency (%)	Density (No./ha)	IVI
1	*Accacia* sp.	50	90	10.74
2	*Artemisia* sp.	50	730	29.32
3	*Artemisia nilagirica*	70	905	37.65
4	*Boehmeria macrophylla*	30	210	10.97
5	*Boehmeria* sp.	55	280	17.07
6	*Clerodendron*	45	60	9.06
7	*Debregessia longifolia*	60	175	14.84
8	*Desmodium laxiflorum*	5	10	1.10
9	*Dioscorea* sp.	5	5	0.96
10	*Melastoma* sp.	50	225	14.66
11	*Maesa indica*	30	50	6.33
12	*Oxospora paniculata*	35	65	7.58

S. No.	Shrubs	Frequency (%)	Density (No./ha)	IVI
13	*Peuraria wallichii*	10	15	2.06
14	*Piper* sp.	25	150	8.42
15	*Rubus ellipticus*	20	25	3.98
16	*Rubus* sp.	10	25	2.35
17	*Rubus* sp.	10	10	1.92
18	*Solanum* sp.	20	35	4.27
19	*Urena lobata*	35	380	16.72
	Total	**615**	3445	200

S. No.	Herbs (April)	Frequency (%)	Density (No./ha)	IVI
1	*Achyranthes aspera*	20	6000	5.22
2	*Ageratum conyzoides*	60	39000	26.18
3	*Bidens pilosa*	30	11000	8.83
4	*Borreria articularies*	45	3000	6.48
5	*Crossocephalum*	20	3000	3.71
6	*Drymaria cordata*	15	6000	4.66
7	*Elatostemma dissectum*	35	2500	5.12
8	*Fagopyrum dibotrys*	45	5000	7.48
9	*Lygodium flexus*	35	2000	4.87
10	*Mikania micrantha*	60	5500	9.39
11	*Nephrolepis cordifolia*	80	47000	32.40
12	*Ophiopogon intermedius*	30	3500	5.07
13	*Opliomenus sp.*	45	6000	7.98
14	*Paderia foetida*	35	5000	6.37
15	*Phrynium pubinerve*	25	4000	4.77
16	*Pilea umbrosa*	45	5500	7.73
17	*Polygonum capitatum*	60	2000	7.63
18	*Polygonum sp.*	25	5000	5.27
19	*Pratia begonifolia*	30	4000	5.32
20	*Pteris sp.*	35	5500	6.62
21	*Rubia cordifolia*	5	6500	3.81
22	*Saccharum spontaneum*	35	3500	5.62
23	*Spilanthes paniculata*	60	7500	10.39
24	*Urtica dioca*	10	5000	3.61
25	*Thysanolaena maxima*	20	6500	5.47
	Total	**905**	199500	200

S. No.	Herbs (August)	Frequency (%)	Density (No./ha)	IVI
1	*Achyranthes aspera*	20	8000	4.40
2	*Ageratum conyzoides*	60	73500	26.97
3	*Begonia sp.*	15	3000	2.46
4	*Bidens pilosa*	25	17500	7.59
5	*Borreria articularies*	45	10000	7.67
6	*Costos speciosus*	10	5000	2.48
7	*Crossocephalum crepezoides*	15	7000	3.58
8	*Drymaria cordata*	25	18000	7.72
9	*Elatostemma dissectum*	30	15000	7.43
10	*Fagopyrum dibotrys*	30	12000	6.60
11	*Hedychium sp.*	10	6000	2.76
12	*Lygodium flexus*	35	9500	6.45
13	*Mikania micrantha*	60	12500	10.00
14	*Nephrolepis cordifolia*	80	55000	23.99
15	*Ophiopogon intermedius*	30	4000	4.37
16	*Opliomenus sp.*	30	17000	7.99
17	*Paderia foetida*	35	6000	5.47
18	*Phrynium pubinerve*	25	11500	5.92
19	*Pilea umbrosa*	35	14000	7.70
20	*Polygonum capitatum*	60	12500	10.00
21	*Polygonum sp.*	25	4000	3.83
22	*Pratia begonifolia*	30	3000	4.10
23	*Pteris sp.*	35	6000	5.47
24	*Rubia cordifolia*	10	4500	2.34
25	*Saccharum spontaneum*	35	8000	6.03
26	*Spilanthes paniculata*	60	4000	7.63
27	*Urtica dioca*	10	6000	2.76
28	*Thysanolaena maxima*	40	7000	6.29
	Total	920	359500	200

5. Confluence point of Lohit and Dau River

S. No.	Trees	Frequency (%)	Density (No./ha)	Basal area (m^2/ha)	IVI
1	*Ficus cunia*	45	70	0.56	38.06
2	*Grewia* sp.	25	35	0.23	19.65
3	*Euvodia* sp.	5	5	0.03	3.34
4	*Saurauria nepalensis*	20	30	0.12	15.76
5	*Castanopsis* sp.	10	10	0.10	7.00
6	*Pandanas odoratissima*	5	5	0.06	3.56
7	*Ostodes paniculata*	15	15	0.18	10.72

S. No.	Trees	Frequency (%)	Density (No./ha)	Basal area (m^2/ha)	IVI
8	*Lagerstroemia minuticarpa*	30	50	3.49	48.27
9	*Engelhardtia spicata*	5	5	0.25	4.96
10	*Talauma hodgsonii*	5	5	0.22	4.74
11	*Albizzia* sp.	5	5	0.36	5.69
12	*Macaranga denticulata*	20	40	1.23	25.93
13	*Vitex peduncularis*	5	10	1.96	18.23
14	*Canarium strictum*	5	5	1.61	14.60
15	*Pterospermum acerifolium*	5	10	0.54	8.15
16	*Altingia excelsa*	15	20	1.72	22.84
17	*Musa* sp.	20	100	1.27	40.04
18	*Callicarpa arborea*	10	15	0.14	8.44
	Total	**250**	**435**	**14.07**	**299.97**

S. No.	Shrubs	Frequency (%)	Density (No./ha)	IVI
1	*Accacia* sp.	55	95	12.43
2	*Artemisia* sp.	30	340	15.96
3	*Artimesia nilagirica*	40	940	36.77
4	*Boehmeria macrophylla*	30	220	12.13
5	*Boehmeria* sp.	50	265	16.99
6	*Clerodendron coolebrokianum*	45	85	10.40
7	*Debregessia longifolia*	50	210	15.23
8	*Desmodium laxiflorum*	5	10	1.17
9	*Dioscorea* sp.	5	10	1.17
10	*Melastoma* sp.	50	175	14.12
11	*Maesa indica*	25	60	6.18
12	*Oxospora paniculata*	20	45	4.85
13	*Peuraria wallichii*	25	30	5.23
14	*Piper* sp.	20	165	8.67
15	*Rubus ellipticus*	35	45	7.42
16	*Rubus sp.*	10	15	2.19
17	*Rubus sp.*	10	10	2.03
18	*Smilax sp.*	5	30	1.81
19	*Solanum sp.*	45	75	10.08
20	*Urena lobata*	30	315	15.16
	Total	**585**	**3140**	200

S. No.	Herbs (April)	Frequency (%)	Density (No./ha)	IVI
1	*Achyranthes aspera*	20	5000	4.58
2	*Ageratum conyzoides*	60	18500	15.31
3	*Bidens pilosa*	25	5500	5.39
4	*Borreria articularies*	40	9000	8.71
5	*Costos speciosus*	5	3000	1.93
6	*Crossocephalum crepezoides*	15	5500	4.22
7	*Drymaria cordata*	10	6000	3.86
8	*Elatostemma dissectum*	30	8000	7.10
9	*Equisetum sp.*	10	7500	4.53
10	*Fagopyrum dibotrys*	20	9000	6.38
11	*Lygodium flexus*	35	6500	7.01
12	*Mikania micrantha*	75	9500	13.03
13	*Nephrolepis cordifolia*	80	28000	21.91
14	*Ophiopogon intermedius*	35	5000	6.34
15	*Opliomenus* sp.	10	4000	2.96
16	*Paderia foetida*	40	6000	7.37
17	*Phrynium pubinerve*	20	11500	7.50
18	*Pilea umbrosa*	30	8000	7.10
19	*Polygonum capitatum*	55	7000	9.57
20	*Polygonum sp.*	20	9000	6.38
21	*Pratia begonifolia*	25	5000	5.17
22	*Pteris sp.*	45	6000	7.95
23	*Rubia cordifolia*	10	3500	2.74
24	*Saccharum spontaneum*	45	8000	8.85
25	*Spilanthes paniculata*	50	12000	11.23
26	*Urtica dioca*	20	6000	5.03
27	*Thysanolaena maxima*	25	11000	7.86
	Total	**855**	**223000**	200

S. No.	Herbs (August)	Frequency (%)	Density (No./ha)	IVI
1	*Achyranthes aspera*	20	6500	3.88
2	*Ageratum conyzoides*	55	61500	22.59
3	*Begonia sp.*	15	3000	2.40
4	*Bidens pilosa*	25	12000	5.91
5	*Borreria articularies*	40	30000	12.41

S. No.	Herbs (August)	Frequency (%)	Density (No./ha)	IVI
6	*Costos speciosus*	20	3000	2.92
7	*Crossocephalum crepezoides*	15	3500	2.54
8	*Drymaria cordata*	25	24500	9.33
9	*Elatostemma dissectum*	30	7500	5.21
10	*Equisetum sp.*	20	8500	4.43
11	*Fagopyrum dibotrys*	20	18500	7.16
12	*Hedychium* sp.	20	6000	3.74
13	*Lygodium flexus*	35	8500	6.01
14	*Mikania micrantha*	75	9500	10.49
15	*Nephrolepis cordifolia*	80	64000	25.91
16	*Ophiopogon intermedius*	35	6000	5.32
17	*Opliomenus* sp.	30	4500	4.39
18	*Paderia foetida*	40	6500	5.99
19	*Phrynium pubinerve*	20	12500	5.52
20	*Pilea umbrosa*	30	5500	4.66
21	*Polygonum capitatum*	55	6000	7.43
22	*Polygonum* sp.	20	5000	3.47
23	*Pratia begonifolia*	25	9000	5.09
24	*Pteris sp.*	45	7500	6.79
25	*Rubia cordifolia*	15	4500	2.81
26	*Saccharum spontaneum*	45	6000	6.38
27	*Spilanthes paniculata*	50	3000	6.08
28	*Urtica dioca*	20	14500	6.07
29	*Thysanolaena maxima*	25	9000	5.09
	Total	**950**	**366000**	200

ANNEXURE-XVI

Community characteristics of the vegetation at various sampling locations at different sites in Upper Demwe Hydroelectric Project

1. Dam site

S. No.	Trees	Frequency %	Density (No./ha)	Basal area (m^2/ha)	IVI
1	*Duabanga grandiflora*	25	40	2.85	35.21
2	*Albizia chinensis*	20	35	1.45	24.05
3	*Macaranga denticulata*	25	35	1.37	25.40
4	*Ficus cunia*	15	15	0.67	12.92
5	*Delbergia pinnata*	5	5	0.14	3.82
6	*Callicarpa arborea*	10	10	0.29	7.71
7	*Aralia* sp.	15	20	0.14	11.03
8	*Scheffelera hypoleuca*	5	10	0.09	4.72
9	*Saurauria nepalensis*	5	5	0.02	3.13
10	*Betula alnoides*	10	20	1.26	15.74
11	*Brassiopsis glomerulata*	5	5	0.02	3.12
12	*Laportea* sp.	5	5	0.19	4.12
13	*Cinnamomum obtusifolia*	5	5	0.08	3.47
14	*Musa* sp.	10	35	0.46	14.64
15	*Euvodia* sp.	10	15	0.24	8.60
16	*andanas odoratissima*	5	15	0.15	6.26
17	*Itea macrophylla*	10	15	0.15	8.08
18	*Pterospermum acerifolium*	15	25	1.83	22.07
19	*Lagerstroemia minuticarpa*	5	10	0.60	7.69
20	*Gaurga gamblei*	5	5	0.48	5.80
21	*Ostodes paniculata*	5	10	0.60	7.69
22	*Altingia excelsa*	5	10	0.17	5.19
23	*Ailanthus intigrefolia*	15	15	0.69	13.04
24	*Mallotus tetracoccus*	10	10	0.20	7.18
25	*Terminalia myriocarpa*	10	15	1.97	18.68
26	*Acrocarpus fraxinifolius*	5	5	0.48	5.80
27	*Cyathea spinulosa*	5	10	0.10	4.78
28	*Kydia calycina*	5	5	0.32	4.87
29	*Meliosma simplicifolia*	5	10	0.16	5.13
	Total	**275**	**420**	**17.17**	300

S. No.	Shrubs	Frequency (%)	Density (No./ha)	IVI
1	*Acacia pennata*	10	15	3.51
2	*Acacia pruinescens*	10	25	4.34
3	*Ardisia* sp.	10	20	3.93
4	*Artimesia nilagirica*	55	245	32.83
5	*Boehmeria longifolia*	15	75	9.63
6	*Boehmeria macrophylla*	15	50	7.56
7	*Buddleja asiatica*	20	50	8.69
8	*Calamus leptospadix*	10	35	5.18
9	*Clerodendron coolebrokianum*	25	35	8.58
10	*Debregessia longifolia*	50	105	20.07
11	*Desmodium laxiflorum*	15	35	6.31
12	*Embelia* sp.	10	15	3.51
13	*Eupatorium odoratum*	10	25	4.35
14	*Grewia disperma*	20	50	8.69
15	*Maesa indica*	20	40	7.86
16	*Mucana sp.*	10	15	3.52
17	*Murraya paniculata*	20	35	7.45
18	*Oxospora paniculata*	15	100	11.71
19	*Piper* sp.	10	110	11.40
20	*Rhaphidophora* sp.	10	15	3.52
21	*Rubus ellipticus*	15	15	4.65
22	*Rubus mollucanus*	10	10	3.10
23	*Senecio cappa*	15	25	5.48
24	*Solanum viarum*	10	10	3.10
25	*Solanum xanthocarpum*	10	10	3.10
26	*Tetrastigma* sp.	20	40	7.86
	Total	**440**	**1205**	200

S.No.	Herbs (April)	Frequency (%)	Density (No./ha)	IVI
1	*Begonia* sp.	10	1500	2.46
2	*Bidens pilosa*	10	12000	8.10
3	*Commelina* sp.	35	17000	14.92
4	*Costos speciosus*	10	2500	2.99
5	*Crossocephalum crepezoides*	5	2500	2.17
6	*Cyanotis vaga*	20	4000	5.45
7	*Drymaria cordata*	10	16500	10.52
8	*Elatostemma sp.*	20	20000	14.06
9	*Forrestica* sp.	10	2500	2.99
10	*Gerardinia* sp.	10	4000	3.80
11	*Hydrocotyl javanica*	15	5000	5.16
12	*Lygodium flexuosum*	35	7000	9.55

S.No.	Herbs (April)	Frequency (%)	Density (No./ha)	IVI
13	*Mikania micrantha*	50	12000	14.72
14	*Molineria cucurboides*	15	2500	3.82
15	*Nephrolepis cordifolia*	40	12000	13.06
16	*Nycandra physalis*	10	1000	2.19
17	*Ophiopogon intermedius*	20	3500	5.18
18	*Paderia foetida*	60	7000	13.68
19	*Photos scandens*	10	3500	3.53
20	*Phyrnium pubinerve*	10	4000	3.80
21	*Pilea* sp.	25	7000	7.89
22	*Pogonotherum* sp.	15	3500	4.36
23	*Polygonum capitatum*	10	2500	2.99
24	*Pteris* sp.	10	2000	2.728
25	*Saccharum spontaneum*	65	14000	18.27
26	*Periploca callosa*	15	2500	3.82
27	*Siegesosbekia orientalis*	15	2500	3.82
28	*Spilanthes paniculata*	25	8000	8.43
29	*Thladanthia sp.*	5	1500	1.63
30	*Thysanolaena maxima*	15	2500	3.82
	Total	**605**	**186000**	200

S. No.	Herbs (August)	Frequency %	Density (No./ha)	IVI
1	*Begonia sp.*	15	2500	2.88
2	*Bidens pilosa*	30	21000	10.69
3	*Commelina sp.*	35	40500	17.41
4	*Costos speciosus*	15	3000	3.037
5	*Crossocephalum sp.*	15	12500	5.96
6	*Cyanotis vaga*	25	17500	8.91
7	*Drymaria cordata*	25	30500	12.92
8	*Elatostemma sp.*	25	24500	11.07
9	*Forrestica sp.*	10	4500	2.80
10	*Gerardinia sp.*	10	5000	2.95
11	*Hydrocotyl javanica*	15	10500	5.35
12	*Lygodium flexuosum*	35	7500	7.24
13	*Mikania micrantha*	60	14500	12.92
14	*Molineria cucurboides*	15	2500	2.88
15	*Nephrolepis cordifolia*	40	20000	11.80
16	*Nycandra physalis*	10	3000	2.33
17	*Ophiopogon intermedius*	20	5000	4.36

S. No.	Herbs (August)	Frequency %	Density (No./ha)	IVI
18	*Paderia foetida*	60	8000	10.92
19	*Periploca sp.*	15	3000	3.04
20	*Photos scandens*	10	5000	2.95
21	*Phyrnium pubinerve*	10	5000	2.95
22	*Pilea sp.*	25	19500	9.54
23	*Pogonotherum* sp.	15	7000	4.27
24	*Polygonum capitatum*	10	5000	2.95
25	*Pteris sp.*	10	2500	2.18
26	*Saccharum spontaneum*	65	26000	17.17
27	*Siegesosbekia orientalis*	20	6000	4.67
28	*Spilanthes paniculata*	50	4000	8.27
29	*Thladanthia sp.*	5	1500	1.17
30	*Thysanolaena maxima*	15	7500	4.42
	Total	**710**	**324500**	200

2. Submergence area

S. No.	Trees	Frequency %	Density (No./ha)	Basal area (m^2/ha)	IVI
1	*Altingia excelsa*	10	20	0.76	8.52
2	*Dysoxylon hamiltonii*	10	15	0.48	6.45
3	*Populas gamblei*	10	15	0.3	5.58
4	*Acrocarpus fraxinifolius*	10	10	0.8	7.27
5	*Biscofia javanica*	10	10	0.74	6.99
6	*Kydia calcynia*	15	15	0.52	7.63
7	*Albizia chinensis*	45	85	0.93	25.62
8	*Duabanga grandiflora*	30	10	0.95	11.96
9	*Ficus cunia*	30	30	0.86	14.40
10	*Terminalia myriocarpa*	15	20	2.27	16.79
11	*Betula alnoides*	15	20	0.67	9.08
12	*Canarium strictum*	15	20	2.98	20.21
13	*Alangium begonifolium*	35	65	0.27	17.58
14	*Callicarpa arborea*	35	25	0.96	15.15
15	*Ostodes paniculata*	10	15	0.27	5.44
16	*Saurauria nepalensis*	35	25	0.33	12.12
17	*Macaranga denticulata*	35	35	0.98	16.69

S. No.	Trees	Frequency %	Density (No./ha)	Basal area (m^2/ha)	IVI
18	*Ficus roxburghii*	10	15	0.34	5.78
19	*Hoveonia acerba.*	10	10	0.2	4.38
20	*Melia azedarach*	5	5	0.29	3.11
21	*Tea macrophylla*	20	20	0.11	7.37
22	*Pterospermum acerifolium*	15	25	1.33	12.98
23	*Caryota urens*	5	5	0.22	2.77
24	*Dendrocalamus hamiltonii*	10	70	0.13	12.68
25	*Laportea* sp.	10	15	0.26	5.39
26	*Lagerstroemia minuticarpa*	10	10	1.96	12.86
27	*Brassiopsis glomerulata*	10	15	0.07	4.48
28	*Musa* sp.	10	40	0.21	8.75
29	*Euvodia* sp.	10	15	0.22	5.20
30	*Aralia* sp.	5	5	0.04	1.90
31	*Mallotus tetracoccus*	5	5	0.25	2.91
32	*Meliosma simplicifolia*	5	5	0.05	1.95
	Total	**505**	**695**	**20.75**	300

S. No.	Shrubs	Frequency %	Density (No./ha)	IVI
1	*Acacia pennata*	15	35	5.50
2	*Acacia pruinescens*	10	15	3.13
3	*Artimesia nilagirica*	60	495	44.67
4	*Boehmeria longifolia*	25	120	13.10
5	*Boehmeria macrophylla*	10	25	3.77
6	*Buddleja asiatica*	10	40	4.73
7	*Calamus leptospadix*	15	50	6.46
8	*Clerodendron coolebrookianum*	25	40	7.99
9	*Debregessia longifolia*	20	80	9.46
10	*Desmodium laxiflorum*	25	50	8.63
11	*Embelia* sp.	15	25	4.86
12	*Entada phaseoloides*	10	15	3.13
13	*Gnetum sp.*	5	10	1.73
14	*Grewia disperma*	15	35	5.50
15	*Maesa indica*	25	50	8.63
16	*Mucana* sp.	5	15	2.05
17	*Murraya paniculata*	15	25	4.86

S. No.	Shrubs	Frequency %	Density (No./ha)	IVI
18	*Oxospora paniculata*	15	75	8.05
19	*Peuraria wallichii*	10	20	3.45
20	*Piper* sp.	20	175	15.53
21	*Ardisia* sp.	10	10	2.81
22	*Rhaphidophora* sp.	15	25	4.86
23	*Rubus ellipticus*	10	20	3.45
24	*Rubus mollucanus*	15	25	4.86
25	*Solanum viarum*	20	25	5.95
26	*Solanum xanthocarpum*	15	20	4.54
27	*Tetrastigma* sp.	25	45	8.31
	Total	**460**	**1565**	200

S. No.	Herbs (April)	Frequency %	Density (No./ha)	IVI
1	*Begonia* sp.	5	1500	1.56
2	*Bidens pilosa*	10	12000	7.23
3	*Commelina* sp.	10	6000	4.49
4	*Costos speciosus*	5	4000	2.70
5	*Crossocephalum crepezoides*	10	2500	2.90
6	*Cyanotis vaga*	10	7500	5.18
7	*Drymaria cordata*	50	38000	26.12
8	*Elatostemma* sp.	25	22500	14.66
9	*Forrestica* sp.	25	5000	6.67
10	*Gerardinia* sp.	10	5000	4.04
11	*Globba clarkeii*	10	6000	4.49
12	*Hydrocotyl javanica*	10	5000	4.04
13	*Lygodium flexuosum*	10	2000	2.67
14	*Mikania micrantha*	40	14500	13.64
15	*Molineria cucurboides*	15	3500	4.23
16	*Nephrolepis cordifolia*	60	2500	11.67
17	*Nycandra physalis*	10	11500	7.01
18	*Ophiopogon intermedius*	15	2500	3.77
19	*Paderia foetida*	20	3000	4.88
20	*Periploca callosa*	10	2500	2.90
21	*Photos scandens*	10	7500	5.18
22	*Phyrnium pubinerve*	5	4000	2.70

S. No.	Herbs (April)	Frequency %	Density (No./ha)	IVI
23	*Pilea* sp.	20	7500	6.93
24	*Pogonotherum* sp.	10	2000	2.67
25	*Polygonum capitatum*	15	5000	4.91
26	*Pteris* sp.	10	2500	2.90
27	*Saccharum spontaneum*	55	4500	11.70
28	*Senecio cappa*	15	3500	4.23
29	*Siegesosbekia orientalis*	10	1000	2.21
30	*Spilanthes paniculata*	20	14000	9.90
31	*Thladanthia* sp.	5	1500	1.56
32	*Thysanolaena maxima*	35	9000	10.25
	Total	**570**	**219000**	200

S. No.	Herbs (August)	Frequency %	Density (No./ha)	IVI
1.	*Begonia sp.*	10	2500	2.46
2.	*Bidens pilosa*	30	32500	15.07
3.	*Commelina sp.*	15	9000	5.31
4.	*Costos speciosus*	5	1500	1.31
5.	*Crossocephalum sp.*	10	4000	2.92
6.	*Cyanotis vaga*	10	9000	4.46
7.	*Drymaria cordata*	60	17500	15.55
8.	*Elatostemma sp.*	30	27000	13.38
9.	*Forrestica sp.*	25	14000	8.54
10.	*Gerardinia sp.*	10	4000	2.92
11.	*Globba clarkeii*	10	5000	3.23
12.	*Hydrocotyl javanica*	10	6000	3.54
13.	*Lygodium flexuosum*	10	2000	2.31
14.	*Mikania micrantha*	40	25500	14.61
15.	*Molineria cucurboides*	15	3500	3.62
16.	*Nephrolepis cordifolia*	60	34500	20.77
17.	*Nycandra physalis*	10	2500	2.46
18.	*Ophiopogon intermedius*	15	3000	3.46
19.	*Paderia foetida*	20	5000	4.93
20.	*Periploca sp.*	10	2500	2.46
21.	*Photos scandens*	10	9000	4.46
22.	*Phyrnium pubinerve*	5	4000	2.08

S. No.	Herbs (August)	Frequency %	Density (No./ha)	IVI
23.	*Pilea sp.*	20	21000	9.84
24.	*Pogonotherum* sp.	10	6000	3.54
25.	*Polygonum capitatum*	15	7000	4.69
26.	*Pteris sp.*	10	2500	2.46
27.	*Saccharum spontaneum*	55	27000	17.62
28.	*Senecio cappa*	15	4500	3.92
29.	*Siegesosbekia orientalis*	10	2500	2.46
30.	*Spilanthes paniculata*	25	16000	9.15
31.	*Thladanthia sp.*	10	3500	2.77
32.	*Thysanolaena maxima*	35	12000	9.62
	Total	**590**	**325500**	200

3. Upstream area

S. No.	Trees	Frequency %	Density (No./ha)	Basal area (m^2/ha)	IVI
1	*Canarium strictum*	30	40	4.46	25.25
2	*Altingia excelsa*	35	40	4.31	25.90
3	*Trema orientalis*	15	20	1.41	10.33
4	*Albizia chinensis*	15	15	0.72	7.59
5	*Ficus* sp.	5	10	1.49	6.83
6	*Talauma hodgsonii*	10	10	0.26	4.45
7	*Sapium baccatum*	5	5	0.29	2.66
8	*Pterospermum acerifolium*	35	45	3.72	25.03
9	*Duabanga grandiflora*	10	10	0.54	5.22
10	*Terminalia myriocarpa*	30	35	3.82	22.66
11	*Ostodes paniculata*	20	20	0.90	9.96
12	*Cyathea spinulosa*	10	10	0.39	4.81
13	*Hoveonia acerba*	10	10	0.28	4.51
14	*Spondias axallaris*	5	5	0.48	3.21
15	*Lagerstroemia minuticarpa*	10	10	0.73	5.77
16	*Dendocalamus* sp.	5	50	0.49	10.38
17	*Quercus* sp.	5	10	0.26	3.38
18	*Callicarpa arborea*	10	10	0.26	4.45
19	*Macaranga denticulata*	20	20	1.50	11.65
20	*Caryota urens*	5	5	0.17	2.33
21	*Alangium begonifolium*	5	5	0.03	1.95
22	*Chukrassia tubalaris*	5	5	0.48	3.21
23	*Sapindus rarak*	10	10	0.47	5.03
24	*Brassiopsis glomerulata*	10	10	0.05	3.84
25	*Macropanax sp.*	5	10	0.20	3.20

S. No.	Trees	Frequency %	Density (No./ha)	Basal area (m^2/ha)	IVI
26	*Aralia* sp.	10	10	0.05	3.86
27	*Kydia calycina*	15	20	1.06	9.34
28	*Bischofia javanica*	15	25	1.54	11.47
29	*Ammora wallichii*	10	15	1.03	7.41
30	*Acrocarpus fraxinifolius*	5	10	0.49	4.03
31	*Dysoxylon hamiltonii*	25	25	1.21	12.67
32	*Mallotus tetracoccus*	20	20	1.17	10.71
33	*Castanopsis* sp.	10	15	0.39	5.61
34	*Saurauria nepalensis*	15	25	0.23	7.82
35	*Musa* sp.	10	35	0.58	9.31
36	*Litsea* sp.	5	5	0.02	1.92
37	*Syzygium tetragonum*	5	5	0.14	2.26
	Total	**470**	**630**	**35.62**	**300.01**

S. No.	Shrubs	Frequency (%)	Density (No./ha)	IVI
1	*Acacia pennata*	5	10	1.74
2	*Acacia pruinescens*	5	5	1.38
3	*Ardisia* sp.	10	15	3.12
4	*Boehmeria longifolia*	35	150	18.02
5	*Boehmeria macrophylla*	15	35	5.59
6	*Calamas erectus*	40	200	22.68
7	*Calamus leptospadix*	35	60	11.45
8	*Clerodendron coolebrokianum*	20	50	7.69
9	*Debregessia sp.*	25	60	9.43
10	*Desmodium laxiflorum*	10	10	2.75
11	*Dracena* sp.	10	85	8.22
12	*Embelia* sp.	10	15	3.12
13	*Entada phaseoloides*	20	35	6.60
14	*Gnetum* sp.	15	20	4.49
15	*Grewia disperma*	15	25	4.86
16	*Grewia disperma*	5	10	1.74
17	*Maesa indica*	30	70	11.17
18	*Mucana* sp.	10	15	3.12
19	*Murraya paniculata*	20	30	6.23
20	*Oxospora paniculata*	10	40	4.94
21	*Peuraria wallichii*	15	20	4.49
22	*Phlogancanthus tubiflorus*	5	40	3.93

S. No.	Shrubs	Frequency (%)	Density (No./ha)	IVI
23	*Piper* sp.	55	235	28.26
24	*Rhaphidophora* sp.	15	35	5.59
25	*Rubus ellipticus*	5	10	1.74
26	*Rubus mollucanus*	10	25	3.85
27	*Solanum viarum*	10	10	2.75
28	*Solanum xanthocarpum*	10	10	2.75
29	*Tetrastigma sp.*	25	45	8.34
	Total	**495**	**1370**	200

S. No.	Herbs (April)	Frequency %	Density (No./ha)	IVI
1	*Begonia* sp.	15	3500	4.17
2	*Commelina* sp.	60	23000	20.87
3	*Costos speciosus*	10	2500	2.86
4	*Cyanotis vaga*	50	18000	16.85
5	*Drymaria cordata*	10	23000	12.39
6	*Elatostemma* sp.	50	38500	26.38
7	*Forrestica* sp.	25	2500	5.40
8	*Gerardinia* sp.	10	2500	2.86
9	*Globba clarkeii*	15	7500	6.03
10	*Hydrocotyl javanica*	20	1000	3.85
11	*Lygodium flexuosum*	15	3500	4.17
12	*Mikania micrantha*	10	3500	3.32
13	*Molineria cucurboides*	25	5000	6.56
14	*Nephrolepis cordifolia*	55	6500	12.35
15	*Nycandra physalis*	5	1000	1.31
16	*Ophiopogon intermedius*	25	9000	8.42
17	*Paderia foetida*	10	3500	3.32
18	*Periploca callosa*	5	1000	1.31
19	*Photos scandens*	20	14000	9.90
20	*Phyrnium pubinerve*	10	2500	2.86
20	*Pilea* sp.	25	9000	8.42
21	*Pogonotherum* sp.	10	2500	2.86
22	*Polygonum capitatum*	15	3500	4.17
23	*Pteris* sp.	25	6000	7.03
24	*Senecio cappa*	10	3500	3.32
25	*Siegesosbekia orientalis*	10	2500	2.86

S. No.	Herbs (April)	Frequency %	Density (No./ha)	IVI
26	*Spilanthes paniculata*	15	10000	7.19
27	*Thladanthia sp.*	10	1500	2.39
28	*Thysanolaena maxima*	25	5000	6.56
	Total	**590**	**215000**	200

S. No.	Herbs (August)	Frequency %	Density (No./ha)	IVI
1	*Begonia sp.*	15	5000	4.00
2	*Commelina sp.*	60	32000	19.84
3	*Costos speciosus*	10	2500	2.4
4	*Cyanotis vaga*	50	20500	14.56
5	*Drymaria cordata*	25	34000	14.88
6	*Elatostemma sp.*	50	22000	15.04
7	*Forrestica sp.*	25	20000	10.4
8	*Gerardinia sp.*	10	3000	2.56
9	*Globba clarkeii*	15	6000	4.32
10	*Hydrocotyl javanica*	20	14000	7.68
11	*Lygodium flexuosum*	15	4000	3.68
12	*Mikania micrantha*	10	4500	3.04
13	*Molineria cucurboides*	25	6000	5.92
14	*Nephrolepis cordifolia*	55	30500	18.56
15	*Nycandra physalis*	10	2500	2.4
16	*Ophiopogon intermedius*	30	12000	8.64
17	*Paderia foetida*	15	4000	3.68
18	*Periploca sp.*	5	1000	1.12
19	*Photos scandens*	20	15000	8
20	*Phyrnium pubinerve*	10	5000	3.2
21	*Pilea sp.*	25	21000	10.72
22	*Pogonotherum* sp.	10	5000	3.2
23	*Polygonum capitatum*	15	6000	4.32
24	*Pteris sp.*	25	6000	5.92
25	*Senecio cappa*	10	4000	2.88
26	*Siegesosbekia orientalis*	15	6000	4.32
27	*Spilanthes paniculata*	25	10500	7.36
28	*Thladanthia sp.*	10	1500	2.08
29	*Thysanolaena maxima*	15	9000	5.28
		625	**312500**	200

4. 1 km downstream of Tidding and Lohit river confluence point

S. No.	Trees	Frequency %	Density (No./ha)	Basal area (m^2/ha)	IVI
1	*Brassiopsis glomerulata*	25	35	0.11	15.65
2	*Duabanga grandiflora*	20	20	0.52	16.35
3	*Ficus cunia*	50	75	0.28	32.90
4	*Kydia* sp.	15	15	0.18	9.80
5	*Musa* sp.	45	335	4.12	116.74
6	*Ficus roxburghii*	10	15	0.13	7.46
7	*Dysoxylon* sp.	15	15	0.13	9.22
8	*Ailanthus excelsa*	5	5	0.46	8.01
9	*Terminalia myriocarpa*	10	10	0.80	14.48
10	*Gynocardia odorata*	15	15	0.49	13.44
11	*Toona ciliata*	5	5	0.45	7.81
12	*Macropanax disperma*	20	30	0.25	14.72
13	*Ostodes paniculata*	10	10	0.07	6.01
14	*Pandanas odoratissima*	15	30	0.32	13.75
15	*Albizzia* sp.	20	25	0.23	13.72
	Total	**280**	**640**	**8.53**	**300.05**

S. No.	Shrubs	Frequency %	Density (No./ha)	IVI
1	*Acacia pennata*	25	60	7.37
2	*Acacia pruinescens*	10	15	2.36
3	*Ardisia* sp.	10	15	2.36
4	*Boehmeria longifolia*	60	140	17.43
5	*Boehmeria macrophylla*	25	60	7.37
6	*Calamas erectus*	40	135	14.34
7	*Calamus leptospadix*	35	60	8.75
8	*Clerodendron coolebrokianum*	45	70	10.78
9	*Debregessia* sp.	55	85	13.14
10	*Desmodium laxiflorum*	10	20	2.69
11	*Dracena* sp.	10	85	6.93
12	*Embelia* sp.	5	10	1.34
13	*Entada phaseoloides*	5	10	1.34
14	*Gnetum* sp.	5	10	1.34
15	*Grewia disperma*	60	95	14.49
16	*Maesa indica*	45	40	8.82
17	*Mucana* sp.	5	10	1.34
18	*Murraya paniculata*	30	50	7.41
19	*Oxospora paniculata*	40	70	10.09
20	*Peuraria wallichii*	15	20	3.38

S. No.	Shrubs	Frequency %	Density (No./ha)	IVI
21	*Phlogancanthus tubiflorus*	10	45	4.32
22	*Piper* sp.	70	175	21.09
23	*Rubus ellipticus*	15	35	4.36
24	*Rubus mollucanus*	10	25	3.01
25	*Solanum viarum*	25	40	6.06
26	*Solanum xanthocarpum*	30	105	11.00
27	*Tetrastigma* sp.	30	45	7.08
		725	**1530**	200

S. No.	Herbs (April)	Frequency %	Density (No./ha)	IVI
1	*Commelina* sp.	35	13000	10.78
2	*Cyanotis vaga*	40	12500	11.30
3	*Drymaria cordata*	55	17000	15.46
4	*Elatostemma* sp.	75	36000	26.59
5	*Forrestica* sp.	10	4500	3.42
6	*Gerardinia* sp.	10	5500	3.85
7	*Hydrocotyl javanica*	20	2500	4.04
8	*Lygodium flexuosum*	25	4000	5.42
9	*Mikania micrantha*	15	3500	3.73
10	*Molineria cucurboides*	30	6000	7.03
11	*Nephrolepis cordifolia*	60	24500	19.43
12	*Nycandra physalis*	10	1000	1.91
13	*Ophiopogon intermedius*	25	5000	5.85
14	*Paderia foetida*	35	4500	7.12
15	*Periploca sp.*	10	2000	2.34
16	*Photos scandens*	20	10000	7.26
17	*Phyrnium pubinerve*	10	9000	5.35
18	*Pilea* sp.	25	12500	9.08
19	*Pogonotherum* sp.	10	2500	2.56
20	*Polygonum capitatum*	55	19500	16.54
21	*Pteris* sp.	15	4500	4.16
22	*Spilanthes paniculata*	40	10500	10.44
23	*Thladanthia sp.*	15	2500	3.30
24	*Thysanolaena maxima*	30	20000	13.05
	Total	**675**	**232500**	200

S. No.	Herbs (August)	Frequency %	Density (No./ha)	IVI
1	*Begonia sp.*	15	2500	2.72
2	*Commelina sp.*	40	20500	11.68
3	*Costos speciosus*	10	2500	2.08
4	*Cyanotis vaga*	40	38500	17.43
5	*Drymaria cordata*	60	22500	14.88
6	*Elatostemma sp.*	75	20500	16.16
7	*Forrestica sp.*	40	25000	13.12
8	*Gerardinia sp.*	10	6000	3.20
9	*Globba clarkeii*	20	10500	5.92
10	*Hydrocotyl javanica*	20	20500	9.11
11	*Lygodium flexuosum*	30	6000	5.76
12	*Mikania micrantha*	15	5000	3.52
13	*Molineria cucurboides*	30	6000	5.76
14	*Nephrolepis cordifolia*	60	26500	16.16
15	*Nycandra physalis*	10	2500	2.08
16	*Ophiopogon intermedius*	25	8000	5.76
17	*Paderia foetida*	35	5000	6.08
18	*Periploca sp.*	10	2500	2.08
19	*Photos scandens*	20	12500	6.56
20	*Phyrnium pubinerve*	10	6000	3.20
21	*Pilea sp.*	25	10500	6.56
22	*Pogonotherum* sp.	10	3000	2.24
23	*Polygonum capitatum*	55	13500	11.36
24	*Pteris sp.*	15	6000	3.84
25	*Senecio cappa*	15	3500	3.04
26	*Siegesosbekia orientalis*	10	2500	2.08
27	*Spilanthes paniculata*	30	9500	6.88
28	*Thladanthia sp.*	15	2500	2.72
29	*Thysanolaena maxima*	30	13000	8.00
	Total	**780**	**313000**	200

5. Confluence point of Dalai and Lohit

S. No.	Trees	Frequency %	Density (No./ha)	Basal area (m^2/ha)	IVI
1	*Euvodia* sp.	15	20	0.04	7.19
2	*Pandanas odoratissima*	60	145	1.33	45.50
3	*Vitex peduncularis*	20	25	0.96	14.35
4	*Talauma hodgsonii*	10	15	0.01	5.00
5	*Pterospermum acerifolium*	5	5	0.45	4.54
6	*Ficus cunea*	35	40	0.27	16.74
7	*Polyalthia jenkensii*	10	15	0.18	5.90
8	*Glochidium* sp.	5	5	0.02	2.20
9	*Calophyllum polyanthium*	5	5	0.67	5.76
10	*Mallotus* sp.	20	35	0.58	13.84
11	*Altingia excelsa*	25	35	1.58	20.60
12	*Wendlandia* sp.	5	5	0.03	2.22
13	*Callicarpa arborea*	30	45	0.56	17.86
14	*Ostodes paniculata*	10	10	0.11	4.73
15	*Macaranga denticulata*	25	55	2.07	26.41
16	*Stercularia villosa*	20	30	0.54	12.84
17	*Gynocardia odorata*	15	15	0.66	9.84
18	*Brassiopsis glomerulata*	15	30	0.08	9.03
19	*Albizzia* sp.	20	30	1.30	17.00
20	*Macropanax disperma*	10	15	0.09	5.40
21	*Saurauria nepalensis*	5	5	0.04	2.27
22	*Lagerstroemia minuticarpa*	25	50	6.65	50.81
	Total	**390**	**635**	**18.21**	**300**

S. No.	Shrubs	Frequency %	Density (No./ha)	IVI
1	*Ardisia sp.*	15	25	3.20
2	*Artemesia nilagirica*	60	560	27.58
3	*Artemesia sp.*	20	245	11.07
4	*Bauhinia sp.*	5	5	0.96
5	*Boehmeria macrophylla*	20	160	8.34
6	*Boehmeria sp.*	60	175	15.22
7	*Boehmeria sp.*	30	280	13.79
8	*Buddlejia asiatica*	25	45	5.44
9	*Clerodendron coolebrokianum*	25	45	5.44
10	*Debregessia longifolia*	30	115	8.49
11	*Dioscorea sp.*	5	5	0.96
12	*Gerardinia sp.*	15	105	5.77
13	*Melastoma sp.*	30	90	7.69

S. No.	Shrubs	Frequency %	Density (No./ha)	IVI
14	*Maesa indica*	40	70	8.65
15	*Oxospora paniculata*	25	105	7.37
16	*Peuraria wallichii*	15	40	3.68
17	*Piper sp.*	35	165	10.90
18	*Plectranthus striatus*	50	565	26.14
19	*Rubus ellipticus*	15	25	3.20
20	*Rubus sp.*	10	10	1.92
21	*Rubus sp.*	5	10	1.12
22	*Smilax sp.*	10	20	2.24
23	*Solanum sp.*	20	70	5.45
24	*Solanum sp.2*	10	25	2.40
25	*Tetrastigma sp.*	20	35	4.32
26	*Urena lobata*	15	60	4.33
	Total	**625**	**3115**	200

S.No.	Herbs (April)	Frequency %	Density (No./ha)	IVI
1	*Achyranthes aspera*	10	1500	1.97
2	*Ageratum conyzoides*	60	31000	21.37
3	*Bidens pilosa*	35	17000	12.00
4	*Commelina paludosa*	25	6000	5.90
5	*Crossocephalum crepezoides*	10	3500	2.84
6	*Cyanotis vaga*	10	10000	5.66
7	*Drymaria cordata*	60	16000	14.85
8	*Elatostemma dissectum*	25	24000	13.72
9	*Equisetum sp.*	15	9000	5.89
10	*Hydrocotyl javanica*	25	3500	4.81
11	*Lygodium flexus*	40	6000	7.87
12	*Nephrolepis cordifolia*	60	1000	8.33
13	*Ophiopogon intermedius*	15	2000	2.84
14	*Opliomenus sp.*	30	2000	4.82
15	*Paderia foetida*	20	3500	4.15
16	*Pilea umbrosa*	25	9000	7.20
17	*Polygonum capitatum*	35	2500	5.69
18	*Polygonum sp.*	45	7000	8.96
19	*Polygonum sp.*	10	2500	2.40
20	*Pratia begonifolia*	45	6000	8.53

S.No.	Herbs (April)	Frequency %	Density (No./ha)	IVI
21	*Pteris sp.*	25	3500	4.81
22	*Rubia cordifolia*	10	1000	1.75
23	*Saccharum spontaneum*	40	10000	9.61
24	*Spilanthes paniculata*	25	7500	6.55
25	*Thysanolaena maxima*	30	35000	19.16
26	*Urtica dioca*	30	10000	8.30
	Total	**760**	**230000**	200

S.No.	Herbs (August)	Frequency %	Density (No./ha)	IVI
1	*Achyranthes aspera*	10	1500	1.63
2	*Ageratum conyzoides*	70	33500	18.28
3	*Begonia sp.*	15	5000	3.26
4	*Bidens pilosa*	35	17000	9.22
5	*Commelina paludosa*	25	22000	9.54
6	*Costos speciosus*	10	1000	1.48
7	*Crossocephalum crepezoides*	10	3500	2.23
8	*Cyanotis vaga*	10	10500	4.32
9	*Drymaria cordata*	75	14000	13.02
10	*Elatostemma dissectum*	25	20500	9.09
11	*Equisetum sp.*	15	11000	5.06
12	*Forrestica sp.*	10	4000	2.38
13	*Hydrocotyl javanica*	25	9000	5.64
14	*Impatiens sp.*	10	2000	1.78
15	*Lygodium flexus*	40	8500	7.25
16	*Nephrolepis cordifolia*	60	31000	16.35
17	*Ophiopogon intermedius*	15	2000	2.36
18	*Opliomenus sp.*	30	21000	9.83
19	*Paderia foetida*	20	4000	3.55
20	*Pilea umbrosa*	25	14000	7.14
21	*Polygonum capitatum*	45	10500	8.44
22	*Polygonum sp.*	45	7000	7.39
23	*Polygonum sp.*	25	3500	3.99
24	*Pratia begonifolia*	45	11500	8.74
25	*Pteris sp.*	20	5000	3.85
26	*Rubia cordifolia*	10	1500	1.63
27	*Saccharum spontaneum*	40	12000	8.30

S.No.	Herbs (August)	Frequency %	Density (No./ha)	IVI
28	*Spilanthes paniculata*	25	14000	7.14
29	*Thysanolaena maxima*	30	19500	9.38
30	*Urtica dioca*	30	14000	7.73
	Total	**850**	**333500**	200

ANNEXURE-XVII

Community characteristics of the vegetation at various sampling locations at different sites in Demwe Lower project site

1. Dam and Power House site

S. No.	Trees	Frequency (%)	Density (No./ha)	Basal area (m^2/ha)	IVI
1	*Alangium chinensis*	40	100	0.89	43.07
2	*Albizzia procera*	30	70	2.24	42.78
3	*Bombax cieba*	10	10	0.56	9.92
4	*Aglaia spectabilis*	10	10	0.15	6.90
5	*Dalbergia sisso*	20	50	1.19	27.02
6	*Callicarpa arborea*	20	30	0.27	15.80
7	*Duabanga grandiflora*	20	20	0.26	13.50
8	*Engelhardtia spicata*	20	30	1.09	21.84
9	*Ficus sp.*	10	10	0.78	11.54
10	*Garuga gamblei*	10	10	0.95	12.79
11	*Gynocardia odorata*	10	10	0.17	7.05
12	*Macaranga denticulata*	10	20	0.20	9.49
13	*Macropanax disperma*	10	10	0.07	6.31
14	*Pterospermum acerifolium*	10	10	1.85	19.43
15	*Spondias pinnata*	20	30	2.26	30.46
16	*Brassiopsis glomerulata*	10	10	0.10	6.53
17	*Trema orientalis*	10	10	0.03	6.01
18	*Terminalia myriocarpa*	10	10	0.51	9.55
	Total	**280**	**450**	**13.57**	**300.0**

S. No.	Shrubs	Frequency %	Density (No./ha)	IVI
1	*Draceana angustifolia*	40	850	36.37
2	*Budlejja asiatica*	20	30	8.43
3	*Calamus floribundus*	40	1180	44.52
4	*Phlogocanthus thrysiflorus*	10	20	4.34
5	*Debregessia longifolia*	10	30	4.59
6	*Boehmeria macrophylla*	60	1750	66.29
7	*Eupatorium odoratum*	20	40	8.68
8	*Paramignya monophylla*	10	40	4.83
9	*Glochidion sp.*	20	30	8.43
10	*Murraya paniculata*	10	50	5.08
11	*Rubus sp.*	10	10	4.09
12	*Strobilanthes geniculatus*	10	20	4.34
	Total	**260**	**4050**	**200**

S. No.	Herbs (April)	Frequency (%)	Density (No./ha)	IVI
1	*Begonia sp.*	20	2500	6.86
2	*Bidens pilosa*	60	40000	43.86
3	*Equisetum sp.*	20	4000	7.93
4	*Cyperus sp.*	25	2000	7.76
5	*Elatostemma sp.*	25	18000	19.23
6	*Eupatorium odoratum*	70	10000	24.89
7	*Imperata cylindrica*	15	16000	15.27
8	*Mikania micrantha*	5	1000	1.98
9	*Molineria sp.*	10	2000	3.97
10	*Neprolepis cordifolia*	10	3000	4.68
11	*Ophiopogon sp.*	10	3000	4.68
12	*Paderia foetida*	25	5000	9.91
13	*Paspalum sp.*	5	3000	3.42
14	*Photos scandens*	5	2000	2.7
15	*Lygodium sp.*	5	2000	2.7
16	*Polypodium sp.*	10	2000	3.97
17	*Pteris sp.*	10	3000	4.68
18	*Saccharum sp.*	25	10000	13.5
19	*Sonchus sp.*	10	2000	3.97
20	*Senecio cappa*	15	2000	5.23
21	*Urtica dioca*	15	7000	8.82
	Total	**395**	**139500**	**200**

S. No.	Herbs (August)	Frequency (%)	Density (No./ha)	IVI
1	*Begonia sp.*	25	4500	6.6
2	*Bidens pilosa*	80	62500	37.75
3	*Equisetum sp.*	40	19000	14.64
4	*Cyperus sp.*	25	5000	6.78
5	*Elatostemma sp.*	50	45500	25.82
6	*Eupatorium odoratum*	25	15500	10.4
7	*Imperata cylindrica*	30	44500	21.43
8	*Mikania micrantha*	10	2500	2.88
9	*Molineria sp.*	10	4000	3.4
10	*Neprolepis cordifolia*	10	3500	3.23
11	*Ophiopogon sp.*	10	3000	3.06
12	*Paderia foetida*	35	6000	9.14
13	*Paspalum sp.*	5	6000	3.08

S. No.	Herbs (August)	Frequency (%)	Density (No./ha)	IVI
14	*Phyrium pubinerve*	10	1500	2.54
15	*Photos scandens*	5	3000	2.05
16	*Lygodium sp.*	10	5500	3.92
17	*Polypodium sp.*	10	2500	2.88
18	*Pteris sp.*	25	7500	7.64
19	*Saccharum sp.*	40	29000	18.1
20	*Sonchus sp.*	10	2500	2.88
21	*Senecio cappa*	15	4500	4.58
22	*Urtica dioca*	15	12000	7.18
	Total	**495**	**289500**	**200**

2. Submergence area

S. No.	Trees	Frequency (%)	Density (No./ha)	Basal area (m^2/ha)	IVI
1	*Toona ciliata*	10	10	0.88	14.37
2	*Alangium sp.*	10	20	0.17	12.03
3	*Brassiopsis glomerulata*	10	10	0.05	7.73
4	*Callicarpa arborea*	20	20	0.78	20.91
5	*Dysoxylon sp.*	10	20	0.66	15.95
6	*Ficus glomerata*	10	10	0.15	8.53
7	*Ficus semicordata*	10	10	0.13	8.37
8	*Ficus sp.*	10	10	2.75	29.33
9	*Gynocardia odorata*	20	20	0.36	17.55
10	*Knema angustifolia*	10	10	0.07	7.89
11	*Kydia calycinia*	10	10	0.86	14.21
12	*Macaranga denticulata*	70	90	0.71	63.68
13	*Macropanax sp.*	10	10	0.1	8.13
14	*Pterospermum acerifolium*	10	20	1.95	26.27
15	*Saurauria roxburghii*	10	10	0.1	8.13
16	*Terminalia myriocarpa*	20	20	2.78	36.91
		250	**300**	**12.5**	**300**

S. No.	Shrubs	Frequency %	Density (No./ha)	IVI
1	*Boehmeria sp.*	50	770	60.53
2	*Boehmeria macrophylla*	60	630	57.16
3	*Budlejja asiatica*	10	40	6.11
4	*Debregessia longifolia*	30	95	17.00
5	*Leea aequata*	20	80	12.21
6	*Murraya paniculata*	40	80	20.21
7	*Oxyspora paniculata*	20	75	11.95
8	*Rubus sp.*	10	40	6.11
9	*Strobilanthes petiolaris*	10	90	8.74
	Total	**250**	**1900**	200.00

S. No.	Herbs (April)	Frequency %	Density (No./ha)	IVI
1	*Begonia sp.*	5	1000	1.8
2	*Colocossia sp.*	25	3000	7.44
3	*Commelina sp.*	10	2000	3.6
4	*Cyanotis cappa*	10	2250	3.79
5	*Cyperus*	10	2000	3.6
6	*Elatostemma platyphyllum*	35	19500	22.32
7	*Equisetem sp.*	10	4000	5.15
8	*Eupatorium odoratum*	15	3750	5.98
9	*Forrestica sp.*	10	2000	3.6
10	*Imperata cylindrica*	20	8750	10.89
11	*Lygodium sp.*	5	1000	1.8
12	*Mastersia sp.*	10	2000	3.6
13	*Mikania micrantha*	20	3000	6.42
14	*Molininera sp.*	15	2000	4.62
15	*Neprolepis cordifolia*	10	2000	3.6
16	*Ophiopogan sp.*	15	3000	5.4
17	*Paderia foetida*	5	1000	1.8
18	*Paspalum sp.*	15	3000	5.4
19	*Photos scandens*	10	2000	3.6
20	*Phyrnium pubinerve*	35	13000	17.26
21	*Pilea sp.*	70	18000	28.29
22	*Polypodium sp.*	15	3000	5.4
23	*Pteris sp.*	10	1250	3.01
24	*Saccharum spontaneum*	25	12000	14.44
25	*Senecio cappa*	25	2000	6.66
26	*Sonchus sp.*	15	2000	4.62
27	*Thladanthia sp.*	15	1000	3.84
28	*Thysoleana maxima*	10	2000	3.6

29	*Urtica dioca*	15	7000	8.51
	Total	**490**	**128500**	**200**

S. No.	Herbs (August)	Frequency %	Density (No./ha)	IVI
1	*Begonia sp.*	15	2500	4.01
2	*Colocossia sp.*	25	5500	7.22
3	*Commelina sp.*	15	9000	6.64
4	*Cyanotis cappa*	15	12000	7.85
5	*Cyperus*	10	4500	3.82
6	*Elatostemma sp.*	65	47500	32.19
7	*Equisetem sp.*	10	7000	4.83
8	*Forrestica sp.*	25	9000	8.64
9	*Imperata cylindrica*	20	17500	11.07
10	*Lygodium sp.*	10	2500	3.01
11	*Mastersia sp.*	10	1500	2.61
12	*Mikania micrantha*	20	4000	5.62
13	*Molininera sp.*	10	2000	2.81
14	*Neprolepis cordifolia*	15	7500	6.03
15	*Ophiopogan sp.*	25	9500	8.84
16	*Paderia foetida*	20	3500	5.41
17	*Paspalum sp.*	20	17000	10.87
18	*Periploca callosa*	10	1500	2.61
19	*Photos scandens*	10	5500	4.22
20	*Phyrnium pubinerve*	40	28500	19.52
21	*Pilea sp.*	25	11500	9.65
22	*Polypodium sp.*	15	4500	4.82
23	*Pteris sp.*	30	6000	8.42
24	*Saccharum sp.*	15	18000	10.27
25	*Senecio cappa*	5	2000	1.81
26	*Sonchus sp.*	5	1500	1.61
27	*Thladanthia sp.*	5	500	1.2
28	*Thysoleana maxima*	5	3500	2.41
29	*Urtica dioca*	5	2500	2.01
	Total	**500**	**247500**	**200**

3. Upstream area

S. No.	Trees	Frequency (%)	Density (No./ha)	Basal area (m^2/ha)	IVI
1	*Actinodaphne obovata*	10	10	0.05	6.28
2	*Ailanthus excelsa*	30	30	2.97	35.09
3	*Alangium chinensis*	20	40	0.4	19.47
4	*Artocarpus chaplasha*	10	10	1.31	13.52
5	*Brassiopsis glomerulata*	20	30	0.2	15.72
6	*Caryota urens*	20	20	0.2	13.15
7	*Chukrassia tubularis*	10	10	0.96	11.53
8	*Duabanga grandiflora*	20	30	2.81	30.73
9	*Dysoxylon binectiferum*	20	20	1.77	22.18
10	*Ficus semicorcdata*	40	60	1.14	35.69
11	*Ficus roxburghii*	10	10	0.14	6.79
12	*Knema angustifolia*	10	20	1.42	16.71
13	*Kydia calycina*	20	20	1.97	23.32
14	*Leea sp.*	10	20	0.17	9.58
15	*Ostodes paniculata*	10	10	0.19	7.1
16	*Pandanas nepalensis*	10	30	0.28	12.72
17	*Sarcosperma griffithi*	10	10	0.38	8.17
18	*Terminalia myriocarpa*	10	10	1.09	12.26
		290	**390**	**17.43**	**300**

S. No.	Shrubs	Frequency %	Density (No./ha)	IVI
1	*Boehmeria longifolia*	60	650	55.97
2	*Boehmeria macrophylla*	40	500	41.19
3	*Budlejja asiatica*	20	30	7.80
4	*Clerodendron coolebrokianum*	40	90	17.35
5	*Debregessia longifolia*	30	80	13.74
6	*Eupatorium odoratum*	10	60	6.52
7	*Grewia disperma*	30	60	12.58
8	*Oxospora paniculata*	20	120	13.04
9	*Laportea crenulata*	10	20	4.19
10	*Murraya paniculata*	40	60	15.61
11	*Rubus ellipticus*	10	20	4.19
12	*Solanum xanthocarpum*	20	30	7.80
	Total	**330**	**1720**	200.0 0

S. No.	Herbs (April)	Frequency %	Density (No./ha)	IVI
1	*Begonia sp.*	10	1000	2.78
2	*Colocasia sp.*	25	2750	7.15
3	*Commelina sp.*	10	2000	3.55
4	*Cyanotis cappa*	10	2000	3.55
5	*Elatostemma sp.*	50	16500	22.7
6	*Equisetum*	5	4000	4.06
7	*Eupatorium odoratum*	10	2500	3.93
8	*Forrestica sp.*	10	2000	3.55
9	*Imperata cylindrica*	15	7750	8.95
10	*Lygodium sp.*	10	1000	2.78
11	*Mastersia sp.*	15	2000	4.56
12	*Mikania micrantha*	10	3000	4.31
13	*Molineria sp.*	25	2000	6.58
14	*Neprolepis cordifolia*	5	2000	2.54
15	*Ophiopogon sp.*	30	3500	8.73
16	*Paderia foetida*	20	1500	5.19
17	*Paspallum*	5	3000	3.3
18	*Photos scandens*	5	2000	2.54
19	*Phyrnium pubinerve*	50	14000	20.79
20	*Pilea sp.*	15	18000	16.77
21	*Pogonetum sp.*	10	2000	3.55
22	*Polypodium sp.*	15	3000	5.32
23	*Pteris sp.*	25	7000	10.39
24	*Sacharum spontaneum*	30	12000	15.22
25	*Senecio cappa*	25	2500	6.96
26	*Sonchus sp.*	20	2000	5.57
27	*Thladentia sp.*	10	1000	2.78
28	*Thysoenolena sp.*	10	2000	3.55
29	*Urtica dioca*	15	7000	8.37
	Total	**495**	**131000**	**200**

S. No.	Herbs (August)	Frequency %	Density (No./ha)	IVI
1	*Begonia sp.*	15	2500	3.41
2	*colocasia sp.*	35	6000	8.02
3	*Commelina sp.*	15	9000	5.67
4	*Cyanotis cappa*	15	7000	4.98
5	*Elatostemma sp.*	60	34000	22
6	*Equisetum sp.*	5	9500	4.15
7	*Eupatorium odoratum*	10	4500	3.26
8	*Forrestica sp.*	20	9000	6.52
9	*Imperata cylindrica*	15	14500	7.59
10	*Lygodium sp.*	10	3500	2.91
11	*Mastersia sp.*	10	1500	2.22
12	*Mikania micrantha*	25	7500	6.85
13	*Molineria sp.*	5	2500	1.72
14	*Neprolepis cordifolia*	15	6000	4.63
15	*Ophiopogon sp.*	15	5000	4.28
16	*Paderia foetida*	10	2500	2.56
17	*Paspallum*	15	12000	6.72
18	*Periploca callosa*	5	1000	1.2
19	*Photos scandens*	10	5000	3.43
20	*Phyrnium pubinerve*	55	32500	20.63
21	*Pilea sp.*	70	40000	25.78
22	*Pogonetum sp.*	10	5000	3.43
23	*Polypodium sp.*	10	2500	2.56
24	*Pteris sp.*	25	8000	7.02
25	*Sacharum sp.*	30	25500	13.95
26	*Senecio cappa*	25	3000	5.28
27	*Sonchus sp.*	20	4500	4.96
28	*Thladentia sp.*	10	2000	2.39
29	*Thysoenolena sp.*	10	6000	3.78
30	*Urtica dioca*	15	16000	8.11
	Total	**590**	**287500**	**200**

4. Downstream (Near Colony) area

S. No.	Trees	Frequency (%)	Density (No./ha)	Basal area (m^2/ha)	IVI
1	*Albizia chinensis*	50	110	2.67	61.07
2	*Bombax cieba*	40	50	7.53	59.37
3	*Emblica officinalis*	40	90	0.72	44.08
4	*Sterculia villosa*	70	130	15.65	123.89
5	*Syzygium* sp.	15	15	0.22	11.60
	Total	**215**	**395**	**26.79**	**300.00**

S. No.	Shrubs	Frequency (%)	Density (No./ha)	IVI
1	*Eupatorium odoratum*	90	2710	123.4
2	*Solanum- xanthocarpum*	5	5	2.64
3	*Budleja asiatica*	15	30	8.37
4	*Phlogocanthus thysiflorus*	40	350	30.13
5	*Debregessia longifolia*	5	5	2.64
6	*Grewia disperma*	10	30	5.87
7	*Plectranthus striatus*	10	240	11.95
8	*Rubus ellipticus*	10	25	5.72
9	*Boehmeria longifolia*	5	20	3.08
10	*Clerodendron coolebrokianum*	10	40	6.16
	Total	**200**	**3455**	**200**

S. No.	Herbs (April)	Frequency (%)	Density (No./ha)	IVI
1	*Ageratum conyzoides*	100	68000	68.98
2	*Bidens pilosa*	12.5	8000	8.29
3	*Borreria articularis*	100	12000	32.14
4	*Cyanotis vaga*	15	4000	6.27
5	*Eupatorium odoratum*	5	4000	3.84
6	*Imperata cylindrica*	40	18000	21.54
7	*Lygodium flexosum*	37.5	4000	11.72
8	*Mikania micrantha*	27.5	15000	16.54
9	*Paderia foetida*	25	2000	7.38
10	*Paspalum* sp.	15	6000	7.58
11	*Polygonum capitatum*	20	5000	8.14
12	*Thysanolaena maxima*	2.5	4000	3.24
13	*Urena lobata*	12.5	2000	4.35
	Total	**412.5**	**152000**	**200.00**

S. No.	Herbs (August)	Frequency (%)	Density (No./ha)	IVI
1	*Ageratum conyzoides*	100	76000	70.16
2	*Bidens pilosa*	10	10000	8.49
3	*Borreria articularis*	100	18000	34.57
4	*Cyanotis vaga*	12.5	6000	6.62
5	*Eupatorium odoratum*	5	4000	3.63
6	*Imperata cylindrica*	45	16000	20.40
7	*Lygodium flexosum*	40	2000	10.64
8	*Mikania micrantha*	25	6000	9.56
9	*Paderia foetida*	30	2000	8.29
10	*Paspalum* sp.	15	8000	8.44
11	*Polygonum capitatum*	25	8000	10.79
12	*Thysanolaena maxima*	2.5	4000	3.04
13	*Urena lobata*	15	3000	5.37
	Total	**425**	**163000**	**200.00**