

WEST SETI HYDROELECTRIC PROJECT

Seti River Aquatic Ecology Extension Study

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1. Study Objectives

This Seti River aquatic ecology study was undertaken to extend the previous aquatic ecology study from Gopghat downstream to Matela (27 km), upstream of the Budhi Ganga confluence.

The study:

- assesses existing aquatic ecology along this stretch of the Seti River; and
- predicts the likely impact on aquatic ecology and fishing from the proposed West Seti Hydroelectric Project along this section of the river.

The original Seti River aquatic ecology study was undertaken 1997 and covered the 41 km stretch of the river from Deura downstream to Gopghat, as well as the lower sections of five tributaries that will be inundated by the proposed reservoir. This study surveyed water quality, plankton abundance and distribution of fish species (SMEC, 2000).

This extension study assists in determining the level of change from pre-impoundment to project operation river conditions, and should be read in conjunction with the original Seti River aquatic ecology study.

2. Background

The Seti River is snow fed, originating in the High Himalaya on the Nepal-China border. The river ecosystem changes from north to the south, supporting a range of different fish habitats. The proposed West Seti Hydroelectric Project (WSHEP) is located in the Middle Mountains of the Far-Western Development Region, at an elevation from 550-920 m asl. This 750 MW storage project located on the Seti River is proposed by West Seti Hydro Limited (WSH). The project will have a 2,060 ha reservoir area, creating one of the biggest reservoirs in Nepal. The reservoir catchment is approximately 4,022 km², around 53.9% of total Seti River catchments (LRMP, 1982-85).

The Seti River flows from High Himalaya, through the High Mountains and Middle Mountains where it enters the Karnali River. The watershed climate ranges from alpine in the high altitude upper catchment to warm temperate and sub-tropical monsoon at the main project site. The monsoon season starts in mid-June and runs till late September.

Historic monthly rainfall peaks ranged from 196.6 mm in July 2001 to 405.9 mm in June 2000 (Table 1). River flows normally peak in August, with the lowest river flows generally occur in February. The river discharge rate peaked at 2,000-3,000 m³/sec in June in 1998 and June 2000. Seti River water depth usually ranges from 2-2.5 m during January, February and March, up to 5-6 m in July, August and September (Table 1).

Water temperature varies from 10°C in January to 19°C in August (based on recorded temperatures between June 1995 and April 1999 – SMEC, 2000). Turbidity is highest during the monsoon season due sediment laden runoff.

Table 1: Minimum and maximum monthly rainfall, Seti River discharge and water depth at Gopghat

Year	Minimum	Month/s	Maximum	Month/s	Remarks
Rainfall					
2000	12.5 mm	January	405.9 mm	June	
2001	2.3 mm	November	196.1 mm	July	No rain in November & December
2002	2.2 mm	October	216.5 mm	August	
2003	0.8 mm	November	280.6 mm	July	No rain in October
2004	1.7 mm	February	206.6 mm	August	No rain in March
2005	15.4 mm	December	316.3 mm	September	No rain in November
2006	1.4 mm	January	249.4 mm	July	No rain in February
2007	33.2 mm	April	298.1 mm	August	No rain in January
River Discharge					
1998	35-40 m ³ /s	February, March	2000-3000 m ³ /s	June	
2000	35-40 m ³ /s	February, March	3000 m ³ /s	June	
2002	35-40 m ³ /s	February	1500 m ³ /s	August	
2007	35-40 m ³ /s	February	1700 m ³ /s	September	
River Water Depth					
1998	2-2.5 m	January, February, March	5-6 m	July, August, September	
2000	2-2.5 m	January, February, March	10-12 m	July, August, September	
2002	2-2.5 m	January, February, March	5-6 m	July, August, September	
2007	2-2.5 m	January, February, March	5-6 m	July, August, September	

Source: Gopghat Station, 2007.

3. Methodology

The Seti River between Gopghat and the confluence of the Budhi Ganga was sampled between 3-6 October 2007 at four confluences:

1. Golma Gad – 1 km upstream of Gopghat.
2. Lohakhadi Gad – 7 km downstream of Gopghat;
3. Kala Gad – 13 km downstream of Gopghat; and
4. Kutnai Gad (Matela) – 27 km downstream of Gopghat.

Similar parameters to the previous aquatic ecology study were sampled, including water temperature ($^{\circ}\text{C}$), pH, conductivity ($\mu\text{mho/cm}$), total dissolved solids (g/L), turbidity (NTU), dissolved oxygen (mg/L), total hardness (mg/L as CaCO_3), total alkalinity (mg/L as CaCO_3), total nitrogen (mg/L), ammonium (mg/L), total phosphorus (mg/L), phosphorus (mg/L), chlorophyll^a (mg/m^3), phytoplankton (no/ml), zooplankton (no/L), benthos (no/ft^2), and fish species. Water temperature ($^{\circ}\text{C}$), dissolved oxygen (mg/L), pH, and conductivity ($\mu\text{mho/cm}$) were measured on site, whereas total dissolved solids (g/L), turbidity (NTU), total hardness (mg/L as CaCO_3), total alkalinity (mg/L as CaCO_3), total nitrogen (mg/L), ammonium (mg/L), total phosphorus (mg/L), phosphorus (mg/L), chlorophyll^a (mg/m^3), phytoplankton (no/ml), zooplankton (no/L) and benthos (no/ft^2) were analysed in the laboratory. Phytoplankton and zooplankton were analysed qualitatively and quantitatively. Fish species were identified using key taxonomy books of Day (1994), Jayaram (1981), Shrestha (1995), and Talwar and Jhingran (1991).

4. Survey Results

The results of the aquatic survey, including fishing, are described below.

4.1 Water Quality

Water temperature ranged 17.0-19.1°C between Gopghat and the Budhi Ganga confluence, whereas it was previously recorded to be between 10.0-16.5°C above the dam site. The higher water temperature below dam site was a function of the lower altitude and the pre-winter sampling (the previous sampling occurred at the start of winter). According to Mr Chaudhary, the WSH hydrologist stationed at Gopghat, the Seti River water temperature at Gopghat ranges between 10°C in November, December, January, and mid February and 20-21°C during May and June.

The dissolved oxygen content ranged from 8.8-9.5 mg/L below dam site compared to 7.8-15.0 mg/l previously recorded above dam site. Nutrient levels in the Seti River are higher further downstream due to the accumulation from runoff from the fertile Middle Hills. The dissolved oxygen level is low below dam site but still suitable for fish species. The pH ranged from 7.2-8.7 below Gopghat, whereas it was recorded as being similarly alkaline at 8.0-8.7 in the previous study above the dam site. The water is alkaline due to CO_3^{2-} increases, hydrolysing to increase OH^- . Alkalinity was observed between 29-76 mg/L as CaCO_3 and was within the favourable limits for fish fauna.

Conductivity was similar to previously recorded levels, ranging between 100-160 $\mu\text{mhos/cm}$ between Gopghat and the Budhi Ganga. Total hardness ranged from 60-96 mg/L as CaCO_3 from Gopghat downstream, suitable for aquatic life. The previously recorded total hardness had a high range of 80-260 mg/l as CaCO_3 , possibly due to more rocks at some sampling sites (Annex 1). The high value of total hardness is characteristic of river systems in Nepal.

Total dissolved solids were high, at between 0.73-1.05 g/L, due to the inflow of more dissolved solids from the high rate of runoff at the time of sampling. These levels may decrease after the monsoon with the decrease in runoff and river flow rate. Turbidity levels ranged from 8.35-23.49 NTU, higher than the previous study (0.4-3.3 NTU) due to the high river discharge rate and high amounts of sediment and nutrients.

Ammonia ($\text{NH}_3\text{-N}$) was found between 0.14-0.46 mg/L and total nitrogen ranged between 0.80-1.68 mg/L. The nitrogen was higher in the downstream section as opposed to the previously measured upstream section due to greater more nutrient levels in the river. Aquatic life in the Seti River will be unaffected by these levels because river water temperature is low due to snow melt and dissolved oxygen levels are high. Orthophosphate was found at 0.01-0.02 mg/L, about same level as previously recorded above dam site (0-0.014 mg/L), although total phosphorus was recorded in the higher ranges at 0.1-0.27 mg/L, compared to the previous levels of 0.001-0.022 mg/L upstream. Phosphorus is limiting in the running water and increases towards lentic

conditions. The chlorophyll^a amount was very low at between 0.8-1.46 mg/m³, characteristic of flowing water. The previous study observed similar low amounts of chlorophyll^a, ranging from 0-2 mg/m³.

Physico-chemical water quality conditions are tabulated in Annex 1.

4.2 Plankton Community, Benthic Community and Aquatic Insects

The recorded plankton population was low, characteristic of running water. The phytoplankton density range was 2-17 (No/ml) below the dam site, lower than the previously recorded upstream levels 60-809 (No/ml) due to the greater volume of river flow during the recent study period. Recorded species were *Cyclotella* spp, *Synedra ulna*, *Melosira granulata* and *Peridinium* spp, with *Synedra ulna* dominant. The phytoplankton species that dominated the previous recordings were *Synedra ulna*, *Synedra ulna*, *Melosira granulata*, *Navicula* spp and *Fragilaria* spp, with *Synedra ulna* the dominant species under bacillariophyceae. The dominant species was *Synedra ulna* in both studies. The zooplankton population was recorded at between 29-57 (No/L) for the species *Conochilus* spp., *Trichocerca* spp., *Brachionus* spp., *Synchaeta* spp. and *Keratella* spp., with the previously recorded upstream dominant species being *Conochilus* spp., *Calanoida*, *Bryocaptus*, *Ploesoma truncatum*, *Trichocerca* spp., *Brachionus* spp. and *nauplius*. Chironomus was available ranging from 0-2 (No/ft²) below the dam site, with some nymphs attached on the stones but less than previous study, possibly due to higher river flows. The bright red midge larvae population was previously recorded at 0-9 (No/ft²) in the reservoir area including chironomids, some nymphs of Mayflies attached on the stones were also available.

4.3 Fish Fauna

Twenty-four fish species were recorded between Gopghat and the Budhi Ganga confluence during this study (Annex 2). Of these species, nineteen were caught and five species were listed based on personal communication with professional fishers. The previous upstream study in proposed reservoir area recorded only 13 fish species, 11 less than the most recent survey, indicating that fish species diversity is greater in the lower part of the Seti River.

The snow fed Seti River is always cool to cold, which is favourable for cold water fish species like Asla (Snow trout). Asla species (*Schizothoraichthys* spp and *Schizothorax* spp) were found to be the dominant fish in the Seti River in both the original and recent surveys, representing more than 80% of the local catch. Asla, an economically high value fish, is a mid-range migratory fish, preferring cold and highly oxygenated water such as occurs in the Seti River system. Two species of Sahar, *Tor putitora* and *T. tor*, were found in this study area, but only *T. putitora* was found in the previous study above dam site. Sahar is a large omnivorous fish which migrates during monsoon season for spawning. Fishers catch Sahar during the migration season. According to fishers, two types of Eel occur seasonally in the Seti River, *Anguila bengalensis* and *Amphipnous cuchia*. *Anguila bengalensis* is a long migratory fish, spawning near the sea and growing in fresh water. Fishermen reported that two types of Jalkapoor occur seasonally during

the monsoon, *Ompak bimaculatus* and *Clupisoma garua*. These fish species are economically very important. Apart from these species, Katle (*Neolissocheilus hexagonolepis*) is also common.

4.4 Fishing

There are few local fishers on in the area. Local fishers mainly catch fish for domestic consumption, with very few taking their catch to market.

The professional fishers in the area are mostly from the central terai region, well outside the local area. They reside in the area for about seven months of the year to catch fish from the Seti River (Annex 3), mainly using cast nets at midnight to early morning. Electric fishing, dynamiting and fish poisoning are not used to catch fish in the surveyed section of the Seti River. Professional fishers commonly fish in groups of 4-5 persons. The catch of one fisher can exceed more than 5 kg/day, and sometimes exceeds 15-20 kg/day, selling at Rs 100/kg for all species in local village markets. However, if larger catches are made then fish may be sold at the larger regional markets of Dipayal and Silgardi at around Rs 150/kg.

Local people reported that fishing pressure has increased due to outside professional fishers conducting heavy fishing over the last six years. The outsider fishermen depend entirely on fishing for their livelihoods for seven months of the year, and then seek seasonal work for the remaining period (Annex 3). According to fisher's information, about 6-7 groups of professional fishers fish daily between Gopghat to the Budhi Ganga during the fishing season.

Local people are concerned about the heavy rate of fishing by outside professionals. They commented that fish species can be conserved by controlling outsider fishers, and giving authority to the local community for conservation and fishing.

5. Predicted Impact of Project Operation

Riverine aquatic ecology changes depending on water quality, flow rate and the availability of fish habitats such as spawning grounds, as well as terrestrial activities along the river banks and in the watershed. The WSHEP will create different impacts on different sections of the Seti River. The existing aquatic environment will be divided into four different habitat sections, each with different flow conditions. These sections, from upstream to downstream, will be:

- reservoir area;
- dam to tailrace outlet;
- tailrace outlet to re-regulation weir; and
- downstream of re-regulation weir.

5.1 Reservoir

The WSHEP reservoir will form a deep water habitat along approximately 25 km of the Seti River and 28 km in total along five tributaries. The surface water temperature will increase by up to 3-4°C above existing river water temperatures. Breeding grounds and nursery beds will be destroyed and fish migration past the dam for will be prevented, mainly affecting long migratory fishes *Tor spp* and *Anguila bengalensis*. The lotic system will become lentic, therefore lotic species are likely to decline in favour of lentic species. Asla and Sahar, high value native riverine fish species that need special stone gravels and clear water with high oxygenated water for spawning and incubation, will be adversely affected by impoundment. Asla is likely to disappear from the reservoir area following impoundment, as was the case in the Kulekhani Reservoir, an area dominated by Asla before impoundment (Rai, 1989; Swar, 1992). Other planktivorous fish species are likely to be dominant in the reservoir.

5.2 Dam to Tailrace Outlet

The Seti River between the dam and tailrace outlet (19.2 km) will resemble a small stream for 8-11 months a year, when no spill flows from the reservoir will occur (SMEC, 2000). Water flow between the dam and the tailrace outlet will reduce due to storage in the reservoir and flow diversion through power station. A 4 m³/s environmental flow will be released from the reservoir at the dam to supply stock and wildlife water. Flood flows down the river between the dam and the tailrace outlet will occur for a reduced period in the monsoon season when the reservoir spills.

The environmental release will be drawn off the reservoir at a depth of between 15-75 m, with an annual temperature range between 13-17.5°C. This release will be warmed by solar radiation as it flows down the river, possibly rising to 20°C by the time it reaches the tailrace outlet (SMEC, 2000). The turbidity of discharged water will generally substantially lower than existing conditions except during monsoon when reservoir water highly turbid.

The reduced water flow along this section of the river will substantially reduce aquatic life along this section, removing the habitat of microflora, periphytons and invertebrate fauna, leading to a depauperate ecosystem. Resident fish numbers will decrease substantially, with only a limited fish population likely to remain. Fish spawning and nursery areas will be greatly reduced and fish migration along this section of the Seti River is only likely when spill flows occur.

5.3 Tailrace Outlet to Re-regulation Weir

Aquatic ecology between the tailrace outlet and the re-regulation weir (6.0 km) will be dictated by the highly variable daily flow along this section of the river due to intermittent power station releases predominantly in the dry season. Power station discharges across each day will vary by as much as 0-330 m³/s during the dry season and will be close to 330 m³/s for close to the entire day in the mid to late monsoon season, when spill flows are also likely for part of the time.

The quality of released water will be good throughout the project life, but riverine aquatic life will largely be limited by the minimum daily flow along this section of the river. In the dry season the minimum during the day will consist of the environmental release plus intermediate catchment flows, thus totalling around 4-6 m³/s. The limited flow will substantially reduce aquatic life along this section in the dry season, removing most of the existing habitat. In addition, the re-regulation weir will create an obstacle to upstream fish movement but may stress the fish population and food sources, although some migration is still likely up to the tailrace outlet. When power station releases are made fish are likely to concentrate at the tailrace outlet, attracted by the dominant flow.

5.4 Re-regulation Weir to Karnali River Confluence

The riverine habitat along the Seti River from the re-regulation weir to the Karnali River confluence (57 km) will be changed due to altered daily and seasonally river flows. Flows downstream of the re-regulation weir will be attenuated by the weir, but still vary substantially in rate across the day. Increased dry season flows and reduced wet season flows in Seti River will have a corresponding effect on Karnali River seasonal flows.

The re-regulation weir will release flows fluctuating from 50-240 m³/s across the day from November to May (SMEC, 2000). The minimum flow of 50 m³/s will support the base habitat of the existing aquatic ecosystem along the 57 km stretch of the Seti River downstream to the Karnali River confluence.

The daily fluctuation in dry season flows will add a stress the system and reduce fish diversity due to the high river flow fluctuation between 50-240 m³/s from November to May (SMEC 2000). This stress will reduce further downstream as river flow attenuation occurs due to the topography of the river bed and as tributary flows discharge into the river and increase the minimum flow. Most notably, the inflow of the Budhi Ganga, located approximately 41 km

below the weir and 22 km upstream of the Karnali River confluence, will add 30% or greater to the minimum daily flow in the dry season.

5.5 Impact on Fishing

Loss of Fishing

Reduced river flows between the dam and the tailrace outlet during most months of the year will substantially reduce fish numbers and hence substantially reduce the potential for fishing along this section of the Seti River.

The rapid and large daily fluctuations in river flows between the tailrace outlet and the re-regulation weir will also substantially reduce fish numbers along this 6 km section of the Seti River and destroy fish habitat, hence substantially reducing the potential for fishing. This will either result in fishers along this section of the river moving further downstream or result in a loss of income to these fishers. If fishers continue to fish in this section of the river fishing will be more difficult and hazardous.

Fishing below the re-regulation weir may also decrease in the dry season due to a reduction in the base flow and high daily flow rate changes. Given that a 50 m³/s minimum base flow will be created by the re-regulation weir, the change in downstream fishing is not expected to be substantial in the six dry season months from November to April as the existing mean monthly flow rates during this period range between 43-89 m³/s. Fishing in the remaining dry season months of May and October may be reduced as the existing mean monthly flow rates are 130-186 m³/s.

In addition, fishing intensity is likely to increase during project construction due to the large workforce that will temporarily migrate into the valley. During project operation the project staff may also fish but this is likely to be fairly limited for recreation only.

Aquaculture Potential

The reservoir will provide a deep water habitat for fish. Katle (*Neolissocheilus hexagonolepis*) and Sahar (*Tor spp.*) could be supported by the reservoir but would need to be bred artificially, grown to fingerlings then regularly stocked in the reservoir. A station for cold water fish hatchery near the reservoir need to be established for fingerling production and regular reservoir monitoring will help to protect and conserve these valuable fish species.

Water quality will change after impoundment, mainly due to sedimentation and the decomposition of organic matter, and will modify the biology of the water. A large volume of sediment will be deposited in the reservoir. Phosphorus and nitrogen will accumulate and surface temperatures will increase, with plankton growth resulting that will assist the growth of planktivorous fish species, as occurred in the Kulekhani Reservoir (Rai, 1989). Both cage culture and open water fish stocking can be done to enhance fish production. An estimated 3-5 kg/m³ is

achieved from cage fish culture in Kulekhani reservoir and in the lakes of Pokhara valley (Rai and Yamazaki, 1995; Rai, 1989).

Local people may gain employment and increase earnings from the development of a reservoir-based fish industry, particularly if cage fish culture is practiced. Technology transfer will assist in establishing a local industry based on local labour. This fish production will help to increase fish consumption from 1,676 g/yr in 2004/05 (DoFD, 2004/05) and help to contribute to the national animal protein requirement.

The cage culture of planktivorous fish species is highly successful in the Kulekhani Reservoir. About 54,197 m³ of production cages are used in the 220 ha reservoir by more than 231 farmers, producing more than 217 Mt fish annually (RFDC, 2005/06) and making these enterprises profitable. A similar participatory scheme could be applied in the West Seti reservoir (SMEC, 1997) where a good fishery industry could be developed.

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Annex 1: Physico-Chemical Water Quality of the Seti River

Parameter	Golma Gad (near Gopghat)	Lohakhadi Gad	Kala Gad	Kutnai Gad
Weather	Sunny	Cloudy	Cloudy	Sunny
Physical				
Water temperature (°C)	17.0	17.2	19.1	17.8
pH	8.5	7.2	8.7	8.5
Dissolved oxygen (mg/L)	8.82	9.40	9.55	9.27
Total dissolved solids (g/L)	0.92	0.95	1.05	0.73
Conductivity (µmho/cm)	120	100	160	140
Turbidity (NTU)	8.87	8.35	23.49	11.74
Chemical				
Total nitrogen (mg/L)	1.39	1.05	0.80	1.68
Ammonium (mg/L)	0.29	0.46	0.14	0.23
Total Alkalinity as CaCO ₃ (mg/L)	30.8	76.0	35.0	29.0
Total hardness as CaCO ₃ (mg/L)	60	66	96	68
Total phosphorus (mg/L)	0.27	0.1	0.16	0.21
Orthophosphate (mg/L)	0.02	0.02	0.01	0.02
Biological				
Chlorophyll ^a (mg/L)	0	0	0	2
Phytoplankton (No/ml)	2	3	-	17
Zooplankton (No/L)	38	37	54	30
Benthos (Chironomids) (No/ft ²)	2	-	-	-

Annex 2: Fish Species in the Seti River

Fish Species	Local Name	Migratory	Status
1. <i>Tor putitora</i>	Sahar, Satto	Long range migrant	Vulnerable
2. <i>Tor tor</i>	Sahar, Satto	Long migratory	Endangered
3. <i>Schizothorichthys labiatus</i> (McClelland)	Chiu, Chuche Asla	Mid-range migrant	Insufficiently known
4. <i>Schizothorax richardsoni</i>	Puko, Buche Asla	Mid-range migrant	Vulnerable
5. <i>Neolissocheilus hexagonolepis</i>	Paupo, Katle	Mid-range migrant	Vulnerable
6. <i>Pseudecheneis sulcatus</i>	Tutrikathiyal, Kavre	Resident	Insufficiently known
7. <i>Glyptothorax garhwali</i>	Kathiyal, Kavre	Resident	Insufficiently known
8. <i>Glyptothorax Nelsoni</i> Ganguly, Datta & Sen	Khasre, Kavre	Resident	Insufficiently known
9. <i>Glyptothorax stoliczkae</i> (Steindachner)	Khasre, Kavre	Resident	Insufficiently known
10. <i>Botia almorhae</i> Gray	Baghi, Baghe	Resident	Insufficiently known
11. <i>Labeo pangusia</i> (Hamilton-Buchanan)	Kalach	Resident	Insufficiently known
12. <i>Schismatorhynchus nukta</i> (Sykes)	Nakkatta	Resident	Insufficiently known
13. <i>Garra gotyla gotyla</i> (Gray)	Gedhe	Resident	Fairly known
14. <i>Garra gotyla stenorhynchus</i>	Githi	Resident	Common
15. <i>Barilius vagra</i> (Hamilton-Buchanan)	Jhojho	Resident	Common
16. <i>Barilius bendelisis</i> (Hamilton-Buchanan)	Garado, Fageta	Resident	Common
17. <i>Crossocheilus burmanicus</i> Hora	Sunkatta, Goila	Resident	Insufficiently known
18. <i>Crossocheilus latius latius</i> (Hamilton-Buchana)	Goila	Resident	Common
19. <i>Psilorhynchus homaloptera</i> (Hora & Mukerji)	Dhami	Resident	Occasional
20. <i>Clupisoma garua</i> *	Jalkapoor	Migratory	Fairly common
21. <i>Ompak bimaculatus</i> *	Jalkapoor	Migratory	Common
22. <i>Anguilla bengalensis bengalensis</i> (Gray)*	Bam, Raj bam	Long migratory	Vulnerable
23. <i>Mastacembelus armatus</i> *	Bam	Migratory	Occasional
24. <i>Bagarius yarrellii</i> (Sykes)*	Goch, tote	Long migratory	Occasional

Note: *Species 20-24: not found during survey but seasonally occurring from Gopghat to the Budhi Ganga based on personnel communication with fishers.

Annex 3: Fishing in the Seti River between Gopghat and Matela

Months	Local Fishers	Outside Fishers		Remarks
		Nepal: Rautahat & Siraha	India: Madhumani & Sitamani	
Feb/Mar	√		√	<ul style="list-style-type: none"> • Outsider fishers fish in groups of 4-5 persons • Average fish catch 4-5 kg per person per day • Fishing is done at night from 10:00 pm to 4:00 am • Local individual fishers and fishing done for own consumption only • Local fishers fish during day time • 6/7 groups within survey area
Mar/April	√		√	
April/May	√		√	
May/June	√		√	
June/July	√		√	
July/Aug	√		X	
Aug/Sept	√		X	
Sept/Oct	√		√	
Oct/Nov	√		√	
Nov/Dec	√		X	
Dec/Jan	√		X	
Jan/Feb	√		X	