Rapid environmental impact assessment of

Moyar Ultimate Stage Hydro-electric Project

(Tamil Nadu Electricity Board)

Salim Ali Centre For
Ornithology & Natural History
Coimbatore, Tamil Nadu
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PROJECT TEAM

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EXECUTIVE SUMMARY

1) The Moyar Ultimate Stage Hydro Electric Project (MUSHEP) at Masinagudi, with 50 MW power generation capacity, is proposed to meet the peak hour power demands. The major activity in the implementation of the project is construction of a power house and water conducting system from Moyar Fore-bay to the power house and widening of the Maravakandy - Moyar flume by 2 m to conduct the peak discharge. Although the project is envisaged in the land owned by Tamil Nadu Electricity Board, the project sites skirt the Mudumalai Wildlife Sanctuary, an important wildlife sanctuary in the country.

2) In the impact assessment, emphasis is given to wildlife and the ecological importance of the area and its strategic location connecting Mudumalai Wildlife Sanctuary with other important habitats. The potential impacts associated with the two major phases of the project implementation, namely i) the construction and ii) the operation phase are examined. In order to assess the impacts, baseline data on local meteorology, ambient air quality, water and soil quality, noise level, traffic density, status of flora and fauna, animal use pattern and socio - economic status of the inhabitants in the project location and its environs were collected and analyzed.

3) The study of flora and fauna involved: i) intensive survey of the project locations, namely the power plant site and the banks of the Maravakandy - Moyar flume and ii) sample survey of the vegetation within 10 km radial distance from the project site. The usage of the project area by various animals has been assessed based on the direct and indirect sightings. The forest adjacent to the Maravakandy - Moyar flume and the banks all along the flume on either side were exhaustively covered on foot to find the animals using the area and the intensity of it. The crossways across the flume were also examined for animal usage. The socio-economic status of the people residing in the environs of the project area were examined using data collected by i) direct interviews and ii) consultation of government documents such as Census of India and other government records.

4) The vegetation of both the sides of the flume channel comprises elements of both scrub and deciduous forests. The common trees are *Acacia leucophloea*, A. *chundra*, *Anogeissus latifolia, Bombax malabaricum, Dalbergia lanceolaria, Premna tomentosa, Pterocarpus marsupium, Santalum album, Ziziphus mauritiana* and *Z. xylopyrus*. The plants present in the proposed power house site are mostly deciduous. The common species are *Albizia amara, A. odoratissima, Gyrocarpus americanus, Mangifera indica, Tamarindus indica* and *Ziziphus mauritiana*. The inaccessible Moyar slope where the penstock and the pressure

shall will be installed in more or less barren and occupied by elements of deciduous and scrub vegetation.

5) Twenty eight species of fish, 9 of amphibians, 38 of reptiles, 103 of birds and 27 of mammals were recorded from the study area. Of the 38 species of reptiles, 4 were turtles and tortoises, 5 geckos, 6 agamid lizards, 3 skinks, 1 chameleon, 1 monitor lizard, 1 crocodile and the rest (18) snakes. A number of important long ranging mammals such as Elephant and Gaur were seen in the area. Of the total of 205 species of vertebrates recorded in the environs of the project, 15 mammals, 3 birds and 9 reptiles are endangered and listed in the Schedules I & II of the Indian Wildlife Protection Act 1972.

6) The forest stretch, sandwiched between the Masinagudi - Moyar road and the flume, extending from 25 to 150 m in width and short of 8 km in length, is one of the two existing vital forest corridors connecting the Mudumalai Wildlife Sanctuary with the forests of Eastern Ghats and is widely used by various animals, especially elephants for their routine migration. Although, this forest patch is small in size, its resources are important to various species such as Elephants, Sloth Bear, Hyaena, Indian Wild Dog and smaller mammals such as civets, mongooses and lesser cats. Elephants use this area intensively and regularly for their routine movement between the sanctuary and reserve forests.

7) The immediate banks of the flume are used by animals more than the areas away from the flume, mainly because of the availability of water round the year and also because of its location as corridor between two major habitats.

8) 19 species of mammals use the existing bridges over the flume. However, except where the bridges are wide, in all the other bridges the signs of medium to large herbivores such as Elephant, Gaur, Sambar and Chital were absent, especially in the middle, because the bridges are narrow for animals to walk through. Of the two wide bridges, one has a cross bar across it and hence, is not used by elephants.

9) The construction and operation of the power house, water conducting system, winch and haulage do not pose any serious direct repercussions on wildlife or the environment. A few trees at the power house site will be felled, of which the majority are *Albizia amara, A. odoratissima, Gyrocarpus americanus, Mangifera indica, Tamarindus indica* and *Ziziphus mauritiana* which are widely distributed elsewhere in the area.

10) The major impact of widening the flume is expected during the construction phase. It involves large number of workmen and may take about 8 - 12 months. About 21000 m^3 of debris will have to be removed, amounting to more or less 3500 truck loads. Since, the flume lies in a very critical wildlife corridor, such disturbance, if happens in summer, when the animal activity in the area is highest, will have serious repercussions on the wildlife.

11) The MUSHEP, during the construction phase, may also cause localized hike in noise, increase in suspended particulate matter in the air and water and disturbance to local wildlife because of the movement of man and materials. The impacts of these disturbance are expected to be short-term if proper mitigatory measures are adopted.

12) The number of vehicles, especially trucks, plying on the road to Moyar will be increased during construction. Proper planning of the vehicle movement has to be done and no vehicles in connection with the construction should be allowed during night and early morning.

13) The transport of debris may be reduced to the minimum. However, this should not be used to build a motorable pathway along the banks of the flume for, i) a motorable road on the sides is not inevitable since, the flume does not need regular intensive maintenance, ii) construction of the road means more vehicle, machinery, labour and higher disturbance to animals, and iii) the road will further open up the area for poachers.

14) No access road to the site of excavation, to transport man, machinery, materials and debris from excavation, shall be made across the small stretch of forest, existing between the Masinagudi - Moyar road and the flume. This forest stretch is vital for the animals and such roads will be devastating the vegetation and wildlife habitat in the area.

15) The number of animals in the vicinity of the flume is the highest during summer. Proper scheduling of the work, avoiding the seasons and timing when animal activity, movement or number is high would reduce the disturbance considerably. By all means construction in summer shall not be allowed. All construction, excavation and related activities during the morning, late evenings and night should be banned.

16) The presence of large number of labourers in the project area may lead to a great deal of pressure, on the habitat, because they would, as experienced elsewhere, start extracting the local vegetation for fuel wood. The number of labourers have to be limited to the minimum required. The laborers should be recruited from the local inhabitants so that

additional burden on the local vegetation could be avoided. The TNEB should make sure of these matters with the contractors. Further infra structure support for labour force such as space for dwelling and essential items such as fire wood / gas / water and other essential commodities should be arranged to relieve the pressure on forest.

17) The major problem wild animals would face during the operation phase of MUSHEP is due to the increased peak water flow. After commissioning PUSHEP, with the additional release of water, the velocity of water which is currently 0.84 m s^{-1} will be almost doubled. However, the peak flow (ie; 28.9 cumecs) in the flume will be only for 1.5 h in the morning and 1.5 h in the evening. The width of the flume at locations which are frequently used by animals may be increased by about 4 m on either side, for a distance 20-30 m length. This will reduce the peak flow rate to about 0.8 m s^{-1}. In these widened areas the slope of the sides may also be reduced by at least one fold (1:2 or 1:3) for easy access of the animals.

18) The proposed lining of the slopes, especially in locations which are used by animals, by cement is not congenial for animal usage. In these locations the bottom lining if necessary should be of rubbles.

19) The extent between chainage 1200 - 2700 m had 28 (65.3%) elephant crossing sites and the area between 4500-5700 m had 9 crossings. Other animals also use these stretches for crossing the flume, drinking and other water borne activities. In the 1200 - 2700 m stretch the flume may be made wider at least two or three locations at an approximate distance of 500m. Similarly in the second stretch at another three locations the width may be increased by 4 - 5 meters on either side. The length of these widened bays may be about 50 m. The animals will find the area convenient for crossing as well as for other activities. A wider bridge may also be provided between 3000 - 4000 m. The possibility of making a cause-way may also be explored, in case the floorings are made with roughened short slices of slabs, tiles or flat rubbles.

20) At certain stretches along the flume the substratum is hard rock, and for widening these areas certain level of surface blasting is required, which will cause serious disturbance to wild animals. Hence, an alternative method for widening needs to be identified.

21) The approaches to some of the bridges are overgrown by inaccessible thickets of *Lantana* and *Opuntia*. The thick bushes prevent most of the middle sized animals from using the route. Similar is the case with some of the underground cross ways. The hindrances have to be cleared.

22) The TNEB should ensure that the men working in the project do not maintain any livestock. The livestock add to competition for resources with wild species. The possibility of cattle transmitting diseases to the wild species is also high.

23) Man and machinery should be allowed in the area only for the minimum required time. Protracted work schedule will cause irreversible damage to the environment.

24) In some places cement revetment, embankments and iron railing are erected on the bank of the flume. Any such constructions or a dwarf wall along the banks of the flume, as proposed by TNEB, would affect animal movements and hence should be removed or avoided.

25) If the flow of water is stopped during the widening of the flume, alternative sources of water may be provided to animals. Water may be released in Avari halla which may take care the needs of animals.

26) There are a number of narrow bridges (storm water drains) across the flume having cross bars. Because of these bars only small mammals and Sloth Bear are capable of using them. The removal of these bars is suggested to make it open for other mammals.

27) A few trees would be felled during the construction activities. As a compensation, TNEB may take up a programme of tree planting in their land or any available site to be decided in consultation with the Forest Department.

28) The population of elephants in the Mudumalai Wildlife Sanctuary is mainly because of its connectivity with the forests on the Eastern Ghats. In recent years the south - western corridor (S-M) has been functionally reduced to less than 100 m width, because of the proliferation of farm houses and resorts in the Bokkapuram village. Further reduction in the size of the corridor and increase in human disturbance in this stretch of forest will drastically disrupt the regular movement of the animals to forests in the Eastern Ghats and back. The district administration needs to look into these issues and need to adopt necessary precautions to conserve the corridor.

29) During the construction phase of the project a committee (Ecological Monitoring Committee - EMC) consisting of officials from forest department and TNEB, scientists and other experts on wildlife and local environment should be constituted by Ministry of Environment and Forests, Government of India, to supervise the implementation of the project with respect to