FINAL DRAFT

SURVEY REPORT ON BIODIVERSITY OF TESSO NILO

Mei – Agustus 2003

Authors

Dewi M. Prawiradilaga
Agustinus Suyanto
Woro A. Noerdjito
Achmad Saim
Purwaningsih
Ike Rachmatika
Siti Susiarti
Irvan Sidik
Alwin Marakarmah
Abdul Mun'im
Martua H. Sinaga
Endang Cholik
Ismail
Miladia Maharani
Y. Purwanto
Eko B. Waluyo

Lay out

Fahmi

RESEARCH CENTRE FOR BIOLOGY-LIPI AND WWF INDONESIA

EXECUTIVE SUMMARY

Rate of lowland forest loss in Sundaic region has occurred at immense speed. The World Bank even predicted that this type of forest will disappear from Sumatera island in year 2005 and in Kalimantan in year 2010. Indeed, the loss is caused by the impact of forest destruction as being exploited for commercial logging and being converted to agriculture land, settlements and development of other infrastructures.

Riau province is the largest area in Sumatera island and still has good lowland forest but it is being threatened by legal commercial concession and illegal logging. One of the threatened lowland forest areas in Riau is Tesso Nilo (previously called Air Sawan forest area) located in four districts: Inderagiri Hulu, Kuantan Sengingi, Pelalawan and Kampar.

Tesso Nilo area covering 188.000 ha previously was stated as production forest to supply raw material for plywood and other wood industries. Human and Elephant conflict has appeared since 1980s when Langgam area (a part of Tesso Nilo) was provided for transmigration area. Despite Tesso Nilo had been proposed as a reserve forest for Sumatran elephants by the State Minister of Environment of the Republic of Indonesia, however no follow up for the implementation. In 1992 the Regional Forest Office-Ministry of Forestry in Riau province conducted field survey in the development of plan of a reserve for Sumatran elephants and other wildlife species in some part of Tesso Nilo area. The results of survey had been reported to the Minister of Forestry RI but no follow up. Finally, in April 2001 the Governor of Riau Province supported by WWF Indonesia proposed Tesso Nilo area for conservation area of Sumatran elephants.

In order to provide scientific justification for conservation area of Tesso Nilo, WWF in collaboration with the Research Centre for Biology-LIPI conducted biodiversity survey in Tesso Nilo. The survey was carried out from 3 to 17 June 2003 and aimed to provide scientific data on the diversity of flora, medicinal plants, birds, mammals, reptiles, amphibians, fishes, insects and small mammal parasites as well as data on the capacity of habitat for conservation of Sumatran elephants. The selected survey locations in the Tesso Nilo were ex concession area of PT Hutani Sola Lestari, concession areas of PT Siak Raya Timber (Segati river) and PT Nanjak Makmur (Toro river, Mamahan river, tributary of Mamahan river and Sawan river).

Survey on the diversity of plants/flora was conducted in the studied plot around 1 ha (100 x 100 m2) located in the ex concession area of PT Hutani Sola Lestari. Tesso Nilo is a lowland forest with high species richness. Although it has been disturbed, the remaining forest contains very rich plant species. It can be seen from the records of tree species and sapling species in the 1 ha studied plot which covered a total of 360 species included in 165 genera and 57 families with 215 tree species and the number of sapling species 305.

In comparison with the richness of other lowland forests in Sumatera, the diversity of plant species in Tesso Nilo is very high. The high richness of plant species has been shown by the high value of Mennhenick index. The availability of vulnerable and protected species such as *Irvingia malayana*, *Koompasia malaccencis, Dyera polyphylla, Sindora sumatrana, Sindora brugemanni, Sindora leiocarpa*, *Sindora velutina, Scorodocarpus borneensis, Fagraea fragrans* in the studied area is alarmed. Despite it has been included in Red List of IUCN species such as 'gaharu' *Aquilaria malaccensis, Gonystylus bancanus*,

Dialium sp., *Shorea* spp., *Dipterocarpus* spp. and durians *Durio* spp. still occured in Tesso Nilo. Although all big trees with wide diameter were already cut down and only saplings with small diameters remained in the area.

Ethnobotanical survey was conducted at the community of Situgal village. Situgal village administratively is included in the sub district of Logas Tanah Darat, Kuantan-Sengingi district (Kuansing), Riau. There were 51 families or 216 residents in Situgal village. Situgal residents were divided into several community groups: Melayu, Kampung Selapan, Piliang and Mandehiling. The majority of their livelihood consists of rubber sap collectors (latex) and farmers. Most of Situgal residents were originally from Bukit Tinggi, West Sumatera. In Tesso Nilo, the local community has utilized around 83 species of medicinal plants and 4 species of toxic plants for fishing. Those medicinal and toxic plants are included in 80 genera or 48 families. The residents are dependent on their surrounding environment, they utilize 83 medicinal plant species to cure 38 diseases. Instead of utilizing the medicinal plants, the local community also complement with magic treatment. However, the most important medicinal plants were 'pagago' (*Centella asiatica*) and 'patalo bumi' (*Eurycoma longifolia*). The local community has planted pagago in the backyard. However, 'patalo bumi' has never been planted in the backyard though it is often utilized and its price is very expensive.

Bird survey was conducted in three locations in which two locations were in the ex concession area of PT Hutani Sola Lestari ($0^0$08.898' S, $101^0$34.281' E, 133 m asl) with the distant between locations 0.5 km and one location was in the concession area of PT Nanjak Makmur ($0^0$10.227' S, $101^0$40.725' E, 133 m asl). The survey recorded 107 bird species from 27 families: Ardeidae, Accipitridae, Phasianidae, Turnicidae, Columbidae, Psittacidae, Strigidae, Cuculidae, Trogonidae, Alcedinidae, Bucerotidae, Capitonidae, Picidae, Eurylaimidae, Pittidae, Apodidae, Pycnonotidae, Aegithalidae, Timaliidae, Sylviidae, Rhipiduridae, Dicaeidae, Nectarniidae, Ploceidae, Sturnidae, Dicruridae and Corvidae. If the result of this survey is combined with the preliminary survey conducted previously by WWF, the diversity of birds at Tesso Nilo reaches 114 species or 29% of the total Sumatran bird species (397 species).

One of the bird species recorded in the area was Sumatran Hill mynah (*Gracula religiosa*) which is almost extinct. Tesso Nilo area is also the habitats of Crestless Fireback (*Lophura erythrophthalma*), Crested Fireback (*Lophura ignita*), Wrinkled Hornbill (*Aceros corrugatus*) and Hook-billed Bulbul (*Setornis criniger*) which are vulnerable and have not been protected by law. The presence of White-throated Fantail (*Rhipidura albicollis*) in the area is a new record for its altitudinal distribution. The presence of some species which occupy middle and top canopy such as hornbills and the Green Imperial pigeon (*Ducula aenea*) and woodpeckers which live on tree trunk has indicated that the condition of Tesso Nilo forest is still good.

Mammal survey was conducted in two locations : ex concession area of PT Hutani Sola Lestari and concession area of PT Nanjak Makmur. The total of mammal species recorded during survey was 34 species or 16.5% of 206 species of Sumatran mammals. The reconnaissance survey recorded 16 mammal species and capture and recapture method using traps and mistnets collected 7 species. From the data of reconnaissance survey, the diversity index of mammals species in the ex concession area of PT Hutani Sola Lestari was higher than in the concession area of PT Nanjak Makmur (3,094 vs 2,929). If the results of reconnaissance survey was combined with the result of capture and recapture method, the diversity index reaches 3.969 which means that the diversity of mammals in Tesso Nilo high with an assumption that the diversity index < 1 very low, 1-2 low, 2-3 moderate,

3-4 high, > 4 very high (maximum Shannon-Wienner index = 5). Also, the result of population study on small mammals in the studied plot has showed that the density of small mammals is low or 10 individuals/ha. It indicates that the condition of Tesso Nilo forest is relatively good. In the secondary forest or disturbed forest, the density of small mammals would reach 20 individuals/ha. Because the density of small mammals in the disturbed habitat increases as the disturbance increases. Instead using the density of small mammal as an indicator, the disturbed habitat can be indicated by an increase of the population of commensal or semi-commensal small mammals such as house rats (*Rattus tanezumi*), bush rats (*R. tiomanicus*) and short-nosed bat (*Cynopterus brachyotis*).

The presence of three primate species in the Tesso Nilo area has indicated the good quality of the forest. Primates usually select locations and forage in the middle and top canopy. The role of canopy is very important in the distribution of mammal species. Some mammal species in the Tesso Nilo area are protected, this indicates that the conservation value of the area is high. The presence of Sumateran tiger in the area as the top predator is an indicator of good quality of habitat.

The result of plant survey in the studied plot has indicated the abundance of elephant food plants and many rivers and streams flowing in the area for elephant drinking water. This means that the area has a good quality of habitat for Sumatran elephants (*Elephas maximus sumatrensis*). The plant food species for elephants recorded in the studied plot were *Artocarpus heterophyllus* (Moraceae), *A. kemando*, *A. elasticus*, *A. scortechirnii*, *Sloetia elongata*, *Oncosperma tigilarium* (Arecaceae), *Mangifera longipetiolaris* (Anacardiaceae), *Garcinia parviflora* (Clusiaceae), *G. maingayi*, *Nephelium cuspidatum* (Sapindaceae), *Baccaurea* spp. (5 species from Euphorbiaceae family), *Durio excelsus* (Bombaceae) and *Coelostegia griffithii* (Bombaceae).

Herpetofauna survey was conducted in six locations covering forests and rivers: Air Sawan, Sengkalalo, Toro and its tributaries, Segati river and Air Mamahan. There were 239 collected specimens and 10 observed individuals including the endangered False Gharial (*Tomistoma schlegelii*) recorded in the area. The total of herpetofauna species recorded in the area consist of 15 reptiles (8 snake species, 2 species of agamids, 1 flying lizard, 1 lizard, 1 water monitor, 1 crocodyle and 1 turtle species) and 18 species of amphibians or frogs. The critically endangered False Gharial is protected by Indonesian law. Among 18 frog species, the Spotted stream frog *Rana signata* could be used as bio indicator of good quality forest. Some reptiles which have been traded internationally such as *Python reticulatus* and *Python curtus* can be found in the area, however this survey did not collect those species.

The diversity of fish was studied at Sawan river, Sangkalalo river, Toro river and its tributary, Segati river and tributary and tributary of Mamahan river. Sangkalalo river flows to Kuantan river, while Toro river, Segati river and Mamahan river flow to Nilo river. The survey collected 50 fish species which are grouped into 31 genera, 16 families or 4 orders. The number of fish species represents 18% of the total Sumatran fish (272 species). In general, the diversity of fish in Tesso Nilo is very high as indicated by the number of species (50 species) and high diversity index (Simpson index) which is 0.883. Comparison of the diversity index between surveyed rivers showed that Toro river has the highest diversity index because it flows in relatively dense forest.

The presence of *Rasbora* spp., *Luciocephalus pulcer*, *Hemirhamphus pogonognathus* and *Spaerichthys osphromenoides* and other fishes that obligate to live in swamp forest stream indicated that the ecosystem of surveyed areas was still good and healthy. *Breinsteinea* sp and *Chaca bankanensis* are unique and rare species recorded from Toro river and

tributary of Mamahan river. Some fish species have been utilized for consumption, ornamental and sport. Food fishes include *Hemibagrus nemurus*; Chaniid fishes such as *Channa striata*, *C. lucius*, *C. micropeltes*; *Clarias* sp.; *Ompok hypothalamus*; *Cyclocheilichthys apogon* and *C. armatus*. Ornamental fishes which have been known as trade commodity from this area are *Rasbora heteromorpha*, *R. cephalotaenia*, *R. caumadiculata*, *R. trinileata*, *Epalzeorhynchus kallopterus*, *C. micropeltes* and *Chaca bankanensis*. The most expensive and popular Arowana fish (*Sclerophagus formosus*) which is threatened and included in CITES Appendix 1, can also be found in Segati river, however current survey did not collect the species. Sport fish include *Channa micropeltes*, *Hampala macrolepidota*, *Cyclocheilichthys* spp., *Hemibagrus nemurus* and *Wallago attu*. Even *Channa micropeltes* has been exported to Singapore and Peninsular Malaysia.

Insect survey was carried out in the ex concession area of PT Hutani Sola Lestari. The survey was focused on beetles because this group of insect has the highest number of species which have several functions in ecosystem such as polinator, decomposer and borer. A total of 2851 beetles were collected using seven types of traps and active collection. From these beetles, 2719 specimens could be identified morphologically while the remaining 126 specimens were tiny beetles with total length 1-2 mm and incomplete specimens. The identified beetles were classified into 644 species and 34 families. Among those families, only Longhorn beetles (Cerambycidae) and scarab beetles (Scarabaeidae) indicated the highest species diversity. The longhorn beetles consisted of 81 species (578 specimens) and the scarab beetles consisted of 76 species (698 specimens).

Survey on parasites of small mammals was conducted in the ex concession area of PT Hutani Sola Lestari. The survey collected 26 captured individuals of small mammals as hosts. Twenty five individuals out of 26 captured individuals were infected by parasites in which 96.1% was ectoparasites and the remaining was endoparasites. There were 1706 ectoparasites specimens collected from those hosts. The ectoparasites were categorised into 14 species containing 4 species of ticks, 6 species of mites, 1 species of lice, 2 species of fleas and 1 species of batflies. The hosts consisted of 4 species of rats (*Maxomys rajah, M. surifer, M. whiteheadi, Sundamys mulleri*), 1 species of treeshrew (*Tupaia glis*) and 1 species of bat (*Balionycteris maculata*). *Maxomys rajah* was infected by 4 species of ectoparasites, *M. surifer* by 9 species, *M. whiteheadi* by 7 species, *Sundamys muellerii* by 3 species, *Tupaia glis* by 5 species and *Balionycteris maculata* by 1 species. The collected endoparasites were categorised into 2 orders (Cestodes and Acantocephala) and 3 species (*Hydatigera taeniaeformis* and *Hymenolepis* sp. and *Moniliformis* sp.). Two species of Cestodes i.e. *Hydatigera taeniaeformis* and *Hymenolepis* sp. were collected from *Maxomys rajah* and *Sundamys mulleri*. One species of Acantocephala i.e. *Moniliformis* sp. was collected from *M. rajah*.

RECOMMENDATION

Tesso Nilo is recommended as a conservation area since it has very high species richness on plant diversity, large and rare mammals such as tiger, elephant, tapir, gibbon and sunbear, fishes and lowland forest birds. The endangered and threatened False Gharial and almost extinct Hill mynah can also be found. The location is accessible from Pekanbaru and functions as water catchment area.

Road access from being logged has caused disturbances from the local community such as being used for agriculture land and rubber plantation. In order to reduce the rate of forest loss, it is urgently to conduct law enforcement and formalize plans and implementation for preparing the area to as a conservation area.