

Annex H: Forest & Vegetation Types

Following annex describes the characteristics of the various forest types and habitats found within the areas affected by the Project. Their extent and distribution is indicated in Figure H.1.

Dry Evergreen Forest: small pockets of dry evergreen forest are found at upper elevations of the Nakai Plateau. These forests are made up of non-deciduous species, usually bounded by coniferous or conifer/broadleaf formations. The understorey is dominated by ferns and palms, including rattan. The small areas of forest tend to follow local hollows and drainage lines on fertile soils with good moisture retention capacity or near sub-surface springs. Their predominant feature is the presence of *Dipterocarpus alatus* and other tall trees emerging from a multiple layered canopy. Other characteristic tree species are *Hopea* spp., *Pterocarpus* sp., *Dipterocarpus alatus*, *Lagerstroemia* spp. and *Anisoptera* spp.

Dry evergreen forests appear to have been logged selectively for valuable hardwood. Closed canopy areas of the ecotype are rare outside of the NNT NBCA, but can be found on river tributaries up to the eastern dividing hills, in the Nam Malou Basin, opposite the Nam Malou basin on the western facing Nakai Plateau escarpment, and in small areas near the dam site. Relatively good soils and higher moisture content make dry evergreen forests favoured sites for shifting cultivation.

Mixed Deciduous Forest: mixed deciduous forests are commonly found in the inundation zone and fringing uplands of the Nakai Plateau. These forests are generally on drier soils. Dominant species include *Dipterocarpus alatus*, *Lagerstroemia floribunda*, *Pometia pinnata*, *Schima moronhae*, *Storeospermum fimbriatum* and *Cratoxylon prunifolium*. High-value hardwoods including *Pterocarpus* are also present, along with *Keetalariala evelyana*, and scattered *Pinus latteri*. Many of the trees in these forests have been selectively harvested, though extensive areas in good to excellent condition remain at upper elevations on both sides of the proposed reservoir.

In lowland and hilly areas *Azalia xylocarpa*, *Xylia kerrii*, *Peltophorum dasyrachis*, *Pterocarpus macrocarpus* and species of the *Lagerstroemia* and *Vatica* genera also frequently occur. About 85% of tree species shed their leaves in the dry period.

All transition zones between the mixed deciduous and broadleaf/coniferous forest types have significant understorey elements in common. The highest degree of similarity occurs between the Nakai Plateau and the escarpment boundaries, where 50% of the dominant understorey species are the same (*Crypsinus*, *Salacca*, *Dalbergia*, *Abrus*, *Pteris* and *Wendlandia*). The tall fibrous grass, *Cymbopogon*, is represented as a major understorey type in all mixed deciduous and broadleaf/coniferous forest intergrades. Many of the understorey species increase in prominence with disturbance to the tree canopy.

Dry Dipterocarp Forest: dry Dipterocarp forests comprise only about two percent of the total area of the inundation zone. They are located on deep drying soils of poor fertility and display a semi-open canopy structure. The dry Dipterocarp forests are more common on the hills surrounding the Nakai Plateau and at lower elevations in the NNT NBCA. This ecotype is comprised principally of twelve species dominated by Dipterocarps, primarily *Dipterocarpus obtusifolius* and *Dipterocarpus alatus*. These two species account for up to 90% of the trees in these forests.

The dry Dipterocarp forest type also shares the majority of its dominant understorey species with the mixed deciduous and broadleaf/coniferous forest types. Virtually no difference in the understorey array was found between the upper and lower intergrades of the dry Dipterocarp forest, the mixed deciduous forest and the dry evergreen forest types.

On the lowland plains, dry Dipterocarp forests occur in open stands, usually in areas with shallow soils. Tree diameters are comparatively small and tree crowns do not spread out widely. If the crown cover is less than twenty percent and the stand is not “disturbed”, this forest type could be classified as savannah. The height of these forests varies from 8 to 25 m. Characteristic species on the lowland plains are fire tolerant, with thick bark, and include *Dipterocarpus intricatus*, *Shorea obtusa*, *Dipterocarpus obtusifolius*, *Terminalia tomentosa* and *Shorea siamensis*.

Broadleaf/Coniferous Forest: broadleaf/coniferous forests are the second most prominent forest type in the reservoir area and surrounding hills. They are found on acidic soils with fair to good fertility. *Pterocarpus macrocarpus* is prominent, with *Dipterocarpus alatus* and *Dipterocarpus obtusifolius*. In some areas, *Pinus latteri* becomes a dominant species with over half of the trees in the forest being of this species. Other well-represented species include *Pometia*, *Schima* sp. and *Keetalariala evelyana* is scattered throughout the forests, but is fairly scarce. The valuable hardwoods *Dalbergia cochinchinensis* and *Xylia kerrii* have been harvested from broadleaf/coniferous forests in the Project area.

It is likely that the mixed deciduous and broadleaf/coniferous forest types offer a continuum of habitats for both arboreal and ground dwelling animals and that wildlife movement between different forests (lowland, escarpment, and the Nakai Plateau) would be unrestricted by floristics or structure of the understorey. In the same way, the similarity between the understorey arrays of the mixed deciduous and broadleaf/coniferous forest types and the lowland and highland Dipterocarp forests is suggestive of a high degree of continuity of ground level habitat.

In areas of mixed deciduous and broadleaf/coniferous forest types, however, there is a tendency for these forests to be dominated by *Cyperus* and *Cymbopogon*. This creates a significantly different grassy community and a potential discontinuity of habitat types. Another discontinuity between forest types occurs between evergreen forests and surrounding mixed deciduous and broadleaf/coniferous forests, where the fern and palm dominated understorey is most likely to favour ground dwelling reptiles and amphibians adapted to the particularly dark, wet and humic environment of the understorey.

Coniferous Forest: coniferous forests are found on sandy acidic soils of poor fertility throughout the inundation zone and in areas adjacent to the eastern and western sides of the proposed reservoir area. These forests are strongly dominated by *Pinus latteri*, with a complement of other species including *Dipterocarpus obtusifolius*, and the rare and distinctive conifer *Keetalariala evelyana*. Most of these conifer forests have been intensively logged. Several old-growth stands remain outside the reservoir area.

Lowland Riverine Forest: lowland riverine forests are located adjacent to the Nam Theun and to a lesser extent along its tributaries, mostly along low velocity reaches of the river channel where the banks are not eroded and are not much higher than the river

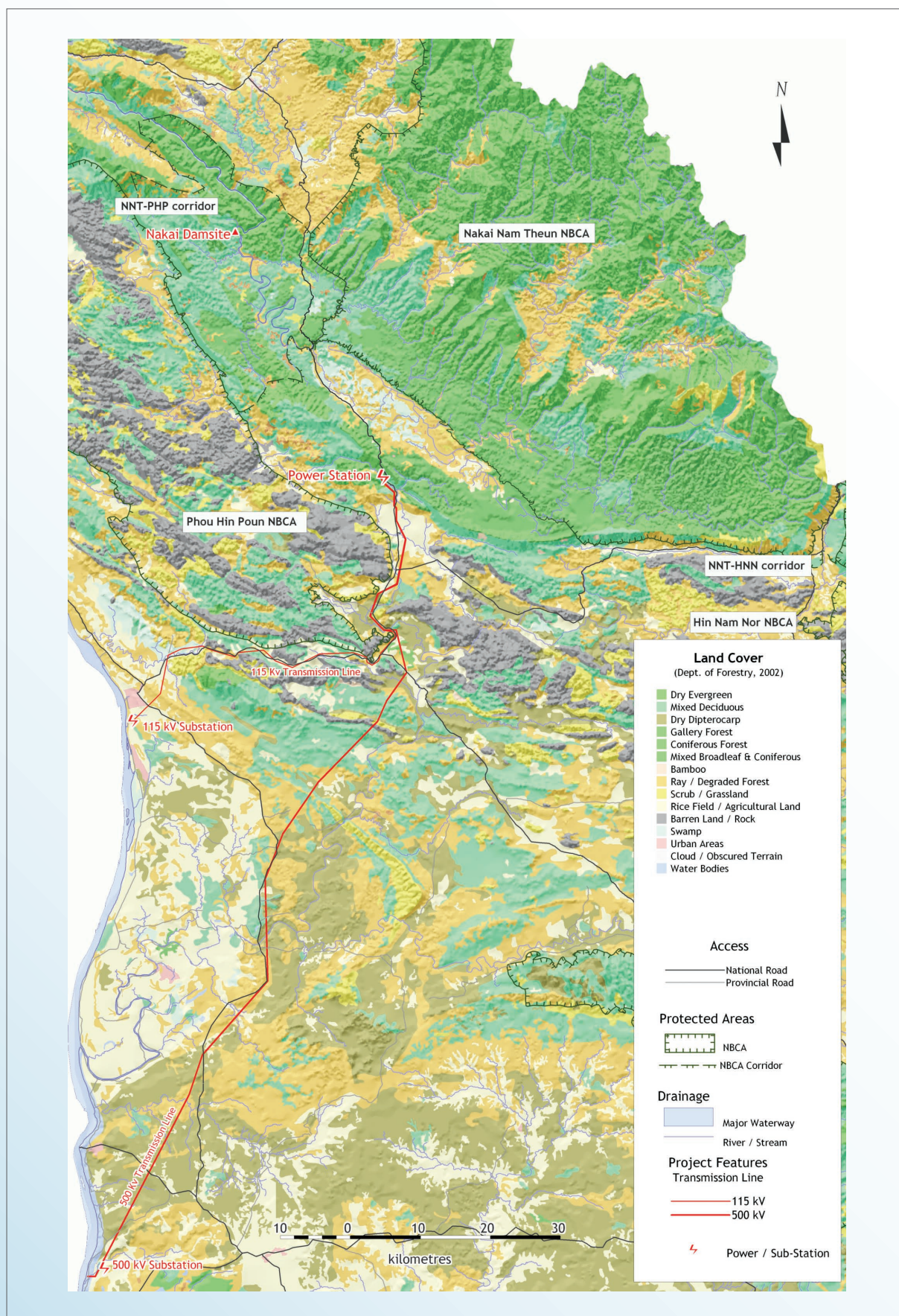


Figure H.1: Forest types within an surrounding the Project affected area

surface. These areas are subject to seasonal flooding and have a distinctive character. They are limited in extent but are especially valuable as wildlife habitats.

Riparian Gallery Forest: riparian gallery forests also occur adjacent to rivers and tributaries, but are found in areas where the channel is significantly deeper than the river banks and where the natural topography places the river surface well below its banks. Since these forests are much less susceptible to flooding, they are different in composition from the lowland riverine forests.

Open Woodland Forest: open woodland forests often occur as a result of human activity, such as where slash and burn agriculture has been practiced. Regeneration is impeded by the destruction of viable seed stock and further retarded by burning and grazing. These forests are also impacted by seasonal flooding, intensive logging and fuel wood collection. While sparsely covered, the open woodlands are an important component of optimal wildlife habitat. Many have an understorey of grasses and other types of vegetation that are valuable forage for ruminants and ungulates, and habitat for prey of larger predators.

Savannah: savannah is comprised of shrubby vegetation (devoid or nearly devoid of trees) occurring naturally or resulting from

human impact and alteration of lowland ecosystems. Savannah is often associated with riverine or swampy area fringes where frequent flooding plays a role in preventing the establishment of a forest. These areas are also a vital component of the lowland wildlife habitat complex.

Grassland: natural or anthropogenic grasslands are found in low-lying areas of the inundation zone, often associated with swamps or seasonal wetlands and savannah. The mosaic forms an important ecosystem for wildlife and aquatic species.

Wetland: wetlands comprise nearly ten percent of the total area of the Nakai Plateau. The wetlands are of two types – permanent and seasonal. Permanent wetlands are swamps and ponds whereas seasonal wetlands take on water during floods, but are subject to wet-dry cycles. Wetland depressions are generally associated with fringing grasslands and savannah.

Unstocked Forest & Regrowth: These are previously forested areas in which crown cover density has been reduced to less than 20% due to logging, shifting cultivation or other severe disturbance. Crown cover is often less than ten percent.

