

Chapter 3

Materials and Methods

Research Plan, Methods and Scope

Site Selection

After surveying Salween Wildlife Sanctuary, I selected four sampling areas that were representative of the sanctuary's rich abundance. The determination of study area used geographic map and ground survey. Riparian forest along Mae Ngae gully (GL), deciduous forest (DF), dry dipterocarp forest (DDF), and dry evergreen forest (DEF) were selected as study areas for this research.

1. The riparian forest along Mae Ngae gully. This sampling area is approximately 20 kilometres long and passes through the major parts of the Salween Wildlife Sanctuary, altitude ranging from 200-250 m.asl., which results in a diverse research area (GL).

2. The Administration Office of Salween Wildlife Sanctuary, with approximately 60 rai surrounding area, altitude ranging from 500-750 m.asl., is situated at Sub-district Bangat, Mae Sarieng District, Mae Hong Son Province. This area is comprised of a rich deciduous forest and consisting of teak and other timbers (DF).

3. The Forest Protection Unit "Huai Pa Pao", Sub-district Sao Hin, Mae Sarieng District, Mae Hong Son Province. This area is used as proxy for all other ten protection units due to its location in the middle of the Salween Wildlife Sanctuary, with altitude average 520 m.asl. The area around is comprised of dry dipterocarp forest (DDF).

4. The access path, approximately 40 kilometres long, altitude ranging from 900-1100 m.sl., is between the administration office and the Forest Protection Unit "Pho so". This area is comprised of dry evergreen forest (DEF).

Methods

1. Avian study

Line transect methods (Buckland *et al.* 1993) were used to estimate bird diversity and a line transect was assigned for collecting data in each area, so four transects were used in this research. Each transect went through the forest and gully. The total length of transect set up in each forest type was three kilometres which was divided into 30 stations as point-counts, with observation with in the 100 m between each station. The data collection was conducted in the morning (0700-1000) and in the afternoon (1400-1700), monthly for each transect for one year. The perpendicular distance from transect for collecting data was about 30-50 metres for birds sighted or calls recognized. The collected data focused only on diurnal species with some days waiting until there was enough light under the dense canopy of montane forest to be able to sight and identify birds and trying to avoid surveying when there was light rain and rain clouds covering the area. Walking slowly along the transect, birds were searched for and calls listened for and then data recorded at the point-count stations. Sometimes the flight characteristics were analyzed (Harrison and Greensmith, 2000). Each day, weather, species, and number of individuals were recorded. The transect survey was started in July 2002 and ended in August 2003.

2. Plant study

Eight plots of 30x50 m were set up in each habitat type. Each plot was divided into 15 sub-plots of 10x10 m. Profile diagrams were produced from each plot. In total, 32 profile diagrams were produced. In addition, photographs were taken vertically to supplement the profile diagrams.

In sub-plots, trees dbh>4.5 cm were identified, measured, located, and counted. Crown cover was determined by the methods of Mueller-Dombois and Ellenberg (1974). Tree height was measured using a Hega hypsometer. Frequency,

density, dominance, Important Value Index (IVI), and Shannon Diversity Index were calculated.

3. Hydrological data

Welty (1962) stated that factors affecting the occurrence of birds included temperature, day-length, relative humidity, and rain. In the present study, these factors were recorded at Protected Sub-units in Salween Wildlife Sanctuary.

4. Data interpretation

Number of birds and bird species were calculated for each census. A comparison of study site, both forest types and birds, was done using similarity index of Morisita Index (Krebs, 1989). Bird and plant diversity (H') was calculated using Shannon's Diversity Index. Analysis of variance (ANOVA) was used to test differences among plant sites. T-test was used for comparing diversity index of birds and plants. Chi-squared was used to test the differences between tree size classes and for comparing number of bird species. Cluster analysis was used to classify groups of forest type and flocks of birds within the year. Linear and multiple linear regression were used to calculate correlation for predicted number of species of birds.

5. Hypothesis of this research

Two major hypotheses were set up in the study. They were:

1. Null hypotheses concerning diversity.

1.1 No difference in bird diversity among habitat types.

To test this, Student's t-test was used following Magurran (1991).

1.2 No difference in species of birds among habitat

types. To verify this, Chi-square test for homogeneity was employed.

1.3 Null hypotheses concerning structure of forests.

1.3.1 No difference in dbh size class of trees among forest types. To test this, Chi-square test for association was used.

1.3.2 No difference in vertical parameter among habitat types. To test this, One-way ANOVA was employed.

1.3.3 No difference in tree diversity index among forest types. To test this, Student's t-test was used following Magurran (1991).

2. Null hypotheses concerning environmental data predicting bird diversity.

2.1 There are no correlations between environmental data and diversity of birds in each habitat type. To test this, F-test was used.

2.2 Rain, humidity, daylength and mean temperature cannot be used to predict diversity of birds in each habitat type. To test this, Student's t-test was used.

In this thesis, descriptive and calculative statistics were performed. Unless otherwise mentioned, probability was set at 0.05.

The materials used in this research were:

- Binoculars (8 x 42) and a telescope ((20-60) x 60)
- The bird identification handbook (Lekagul and Round, 1991) "A Guide to the Birds of Thailand" .
- Salween Wildlife Sanctuary topographic map scale 1:50,000; No.4545 I, 4545 IV, 4546 II, 4546 III, 4445 I, 4446 II
- Measuring tape
- Digital camera with lenses 28 x 70 and 70 x 300
- Spray colour for making line transects
- Note book.

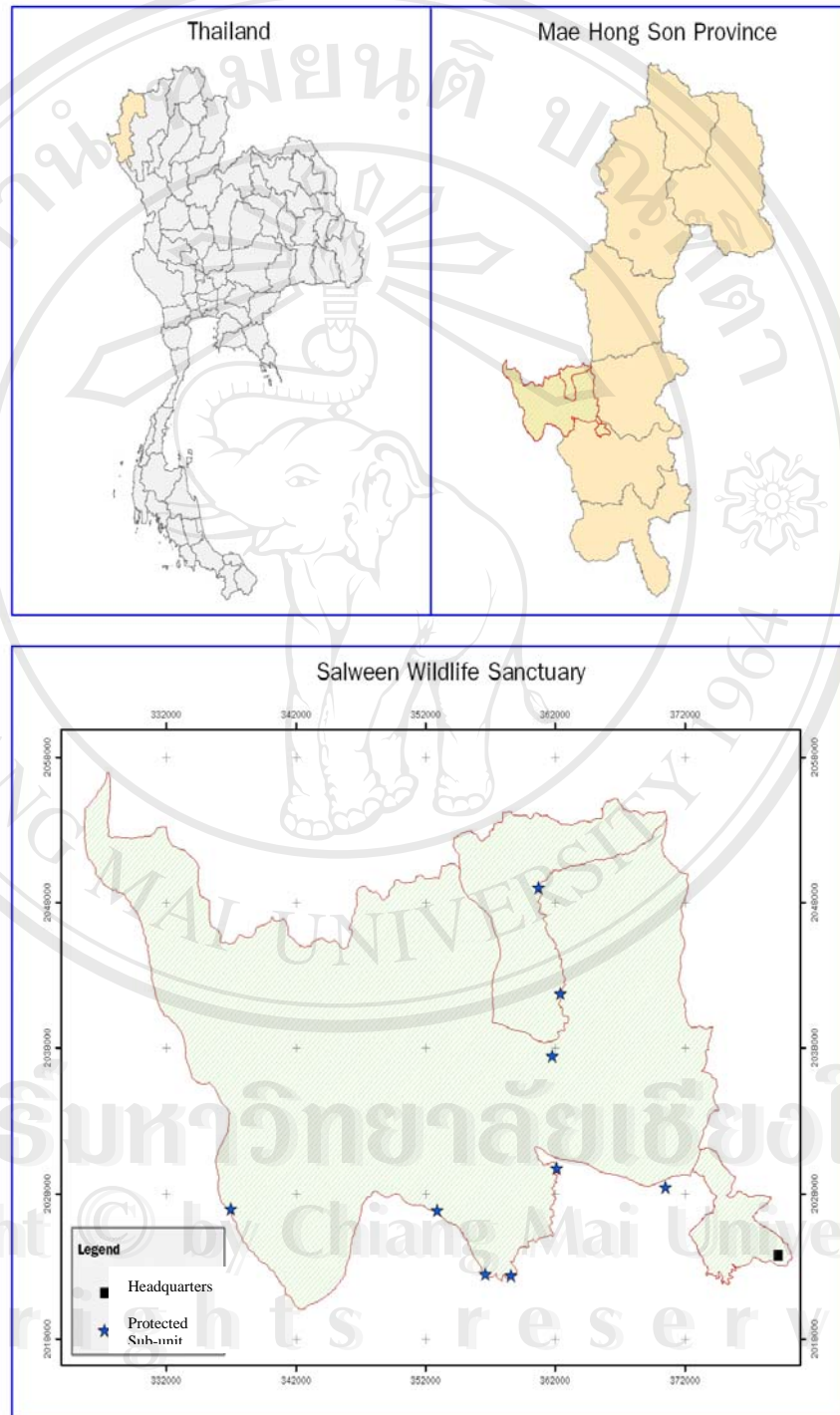


Figure 1 Location maps of Salween Wildlife Sanctuary.

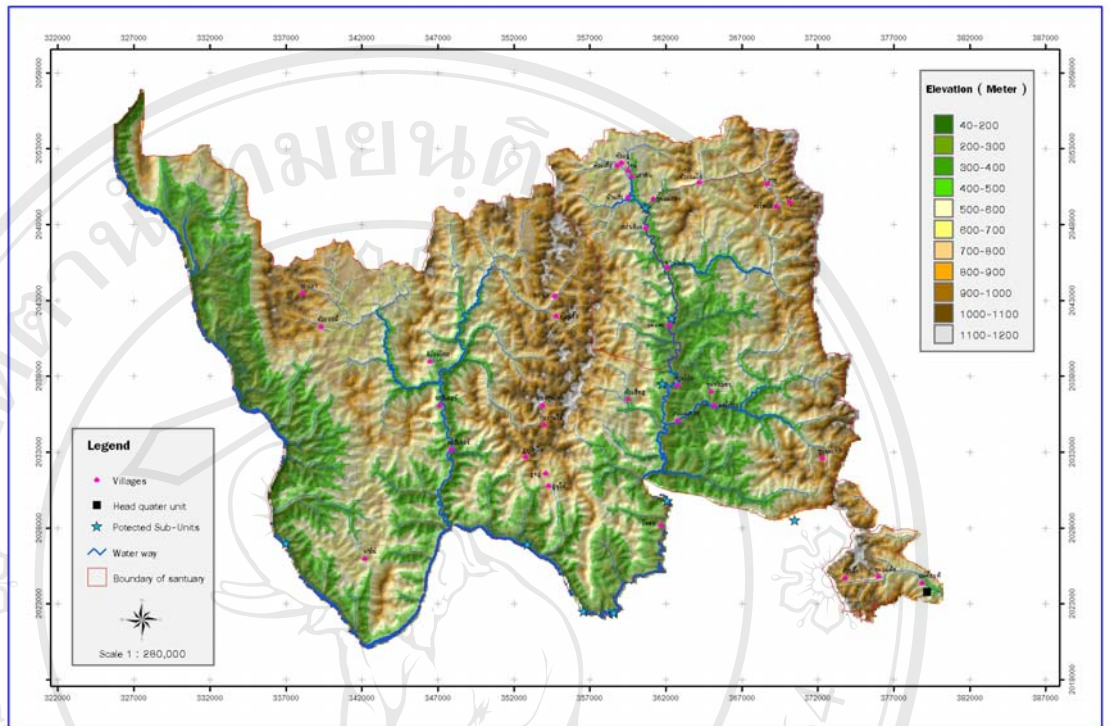


Figure 2 Topographic map of Salween Wildlife Sanctuary.

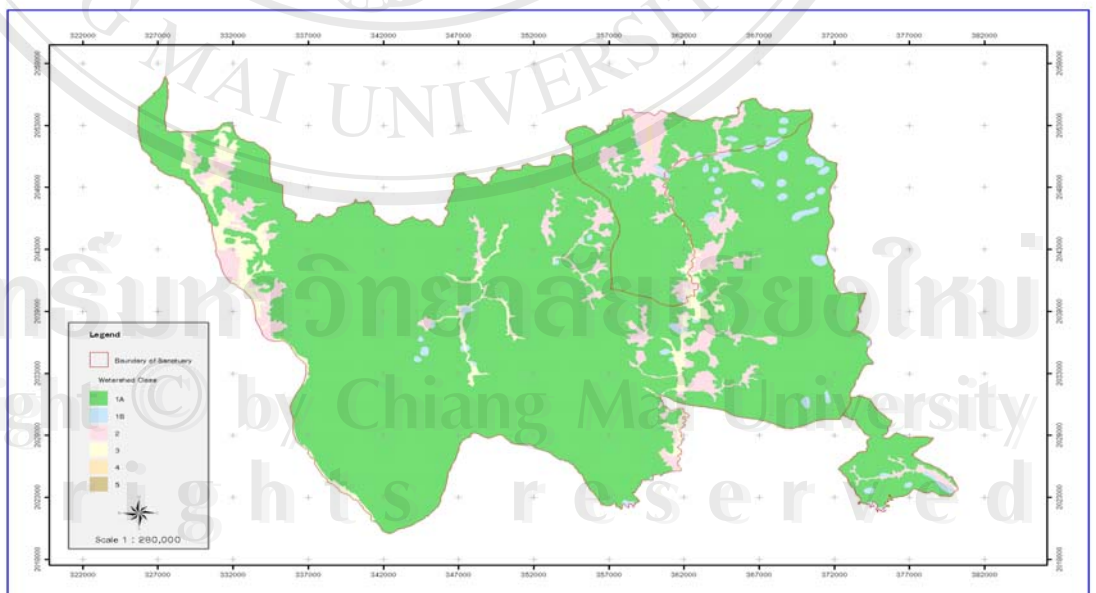


Figure 3 Map of watershed classification for Salween Wildlife Sanctuary.

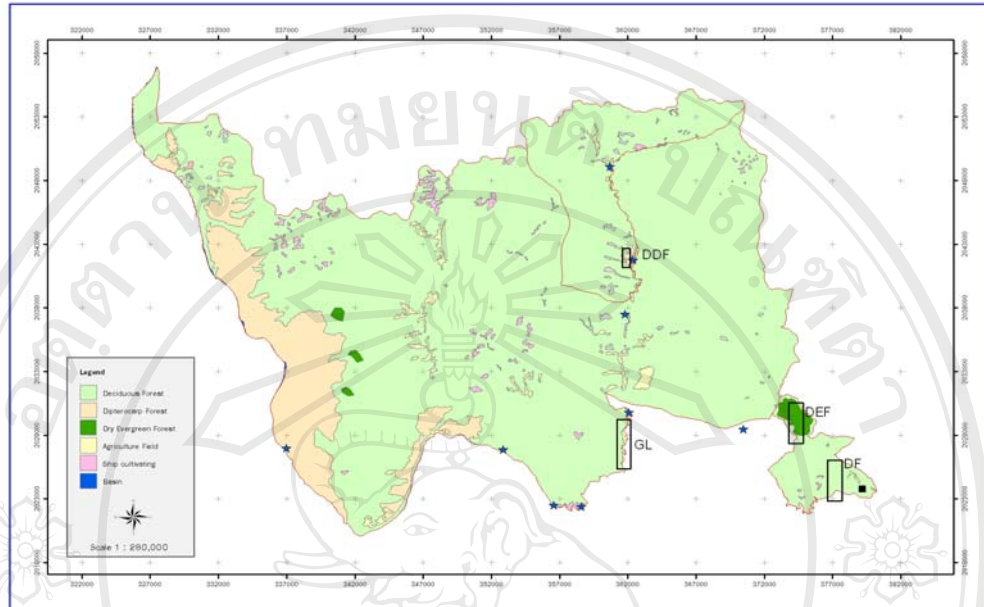


Figure 4 Habitat map of Salween Wildlife Sanctuary showing the sampling areas.