Assessing the status of tigers in the Western Forest Complex of Thailand and developing a landscape scale management plan

A project funded by the National Fish and Wildlife Foundation

June 2000

The purpose of this report is to provide information on project activities during the period October 1999 through June 2000. This report covers:

- A summary of field methods and activities
- A summary of GIS database development to date
- Progress toward project goals and deliverables

Field activities carried out from October 1999 through June 2000

Summary schedule of field trips

6—20 October 1999 (Salak Phra Wildlife Sanctuary and Chalerm Rattanakosin National Park)
Interview surveys with rangers and villagers

15—17 November 1999 (Salak Phra Wildlife Sanctuary)
Interview surveys with rangers and villagers
Wildlife travel route surveys

16--31 December 1999 (Umphang Wildlife Sanctuary)
Interview surveys with rangers and villagers

10--31 January 2000 (Thung Yai East Wildlife Sanctuary)
Interview surveys with rangers and villagers
Wildlife travel route surveys

2—17 March 2000 (Thung Yai West Wildlife Sanctuary)
Training with RFD staff and local residents
Wildlife travel route surveys
Pellet/dung surveys

29 March – 7 April 2000 (Huai Kha Khaeng Wildlife Sanctuary):
Training with RFD staff and local residents
Wildlife travel route surveys
Pellet/dung surveys

22 April – 4 May 2000 (Umphang Wildlife Sanctuary and Mae Wong National Park):
Interview surveys with rangers and villagers
Training with RFD staff and local residents
Wildlife travel route surveys
Pellet/dung surveys

2—3 June 2000 (Thung Yai West Wildlife Sanctuary)
Training with RFD staff and local residents
Wildlife travel route surveys

11 June 2000 (Erawan National Park)
Wildlife travel route surveys

Training

Our training focuses on the basics of field surveys and follows a field manual that has been developed and enhanced in the course of the project. All participants subsequently practice the techniques for a period of one to three weeks in coordination with project staff.

The manual is written in easy-to-understand terms and includes illustrations and photos. It covers the following topics:

- Understanding and defining survey units
- Documenting ecological data
- Carrying out carnivore sign surveys,
- Carrying out tiger habitat assessments,
- A key to distinguishing various carnivore and herbivore sign,
- Description of the UTM coordinate system
- Interview guidelines for gathering data on tigers and their habitat
- Instructions for use of Garmin handheld GPS units.

The 40 page manual has been produced and field tested in both Thai and English language.

Wildlife Travel Route Surveys

These surveys form the basis of a growing GIS database with detailed information on survey routes, encounters with animals and animal sign, human impacts, and other features of wildlife habitat. Routes selected are those that tigers are most likely to use for travel through an area (forest roads, elephant trails, ridgetops, dry riverbeds, etc.)

The routes surveyed to date form the basis for a rigorous monitoring system that is now being developed in conjunction with the Royal Forest Department.

Pellet/Dung Transects

Pellet/Dung transect locations serve as the primary data for a model of tiger habitat quality throughout the study area. Each transect is 500m in length and consists of a straight line with 25 evenly spaced 10 m2 circular plots that are carefully searched for animal pellets/dung as well as tracks and other sign. In addition to the within-plot data, sign observed at any point in the length of the transect serves to establish the presence of various species in the area.

Interviews

In the course of fieldwork over the last 2 years, and in conjunction with Robert Steinmetz of WWF Thailand and the Western Forest Elephant Conservation Project, we have adopted an interview approach comprising both individual interviews and focus groups. We feel that this two-pronged approach provides a more accurate and complete picture of wildlife observations and various types of human impact in the areas surrounding villages and RFD substations.

Individual interviews focus on the informant's individual experiences in detail such as tiger sightings, sign encounters or a favorite hunting spot. For this effort, at least 10% of the households in a village are interviewed to provide some level of representation and an opportunity for cross-checking informant reports.

Focus group interviews are better suited to capture more general information pertaining to the village community and its interactions with wildlife and wildlife habitats. A group is much more

likely to share information about general hunting and trade patterns, for instance, as the reports will not be traced to a single informant. A group format is also better suited to the production of detailed maps (we use large newsprint sheets and colored markers to facilitate the mapping of relevant information) that summarize wildlife distribution and human impacts in the areas surrounding a village or substation. Questions asked of villagers and rangers differ to reflect the different roles and activities of the informants. For example, some questions asked in ranger focus group interviews cover patrol routes and risks while on patrol.

Although a single person can carry out individual interviews, at least 2 people are necessary to carry out an effective focus group interview. Typically, one person is responsible for keeping the conversation flowing while the other person's primary responsibility is to record the important points of the conversation. When working with maps of the area, it is often necessary for both interviewers to supervise the addition of information to the large format maps used.

Summary of Village and Substation Interviews to Date

Because our interview approach has changed during the course of the project, early interviews were substantially more cursory and perhaps not as representative as the current technique. Therefore, for the purposes of comparing and tracking interview efforts, a given location is said to have had an interview carried out if at least the following information was sought from at least one informant during the course of a visit:

Tiger occurrence:
1) All reports of tiger sightings or occurrences of tiger sign within the last 3 years.
2) All reports of attacks or predation on livestock by tigers over the last 3 years
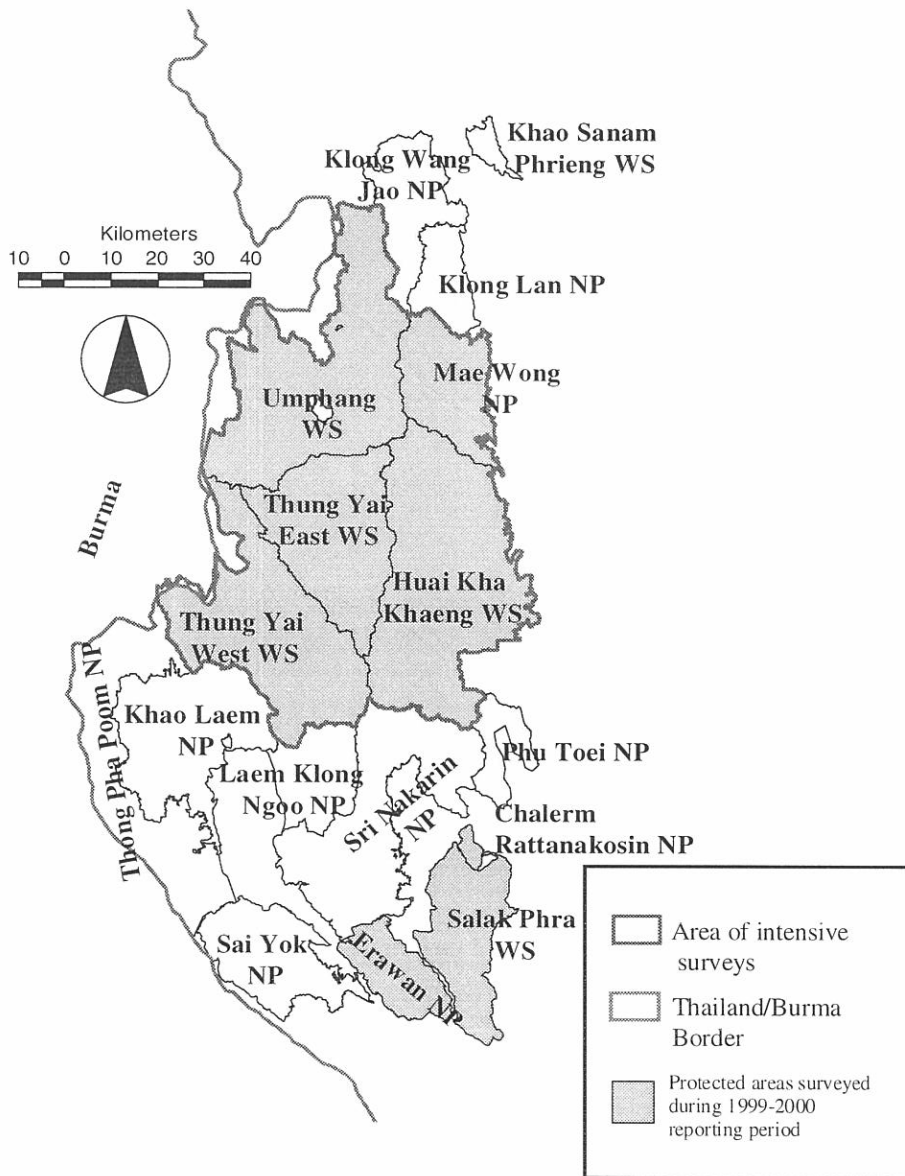
Prey occurrence:
1) What species have been seen within the patrol/knowledge area of the station/village in the last 3 years.
2) *(for villages only)* What species and how many individuals are killed each year by people in the village?

Other field work

Sign measurements: In addition to information collected on sign found while on surveys, measurements of sign of individuals of known species, age class, sex, weight, etc. are collected whenever possible on an opportunistic basis. Sometimes this involves visits to captive facilities such as zoos and RFD breeding centers while in other cases, field circumstances allow high-confidence identification (e.g. in an area where leopards are known not to occur, large cat sign can unambiguously be diagnosed as that of tiger. These measurements will be used to interpret sign measurements and collections from the field. Information being actively collected includes:
- Track measurements (including stride and straddle measurements)
- Feces appearance, composition and defecation behavior
- Hair structure and color

Western Forest Complex
Ecosystem Management Unit
Reference Map

Kilometers

10 0 10 20 30 40

Burma

Klong Wang
Jao NP

Khao Sanam
Phrieng WS

Klong Lan NP

Mae Wong
NP

Umphang
WS

Thung Yai
East WS

Huai Kha
Khaeng WS

Thung Yai
West WS

Thong Pha Poom NP

Khao Laem
NP

Laem Klong
Ngoo NP

Sri Nakarin NP

Phu Toei NP

Chalerm
Rattanakosin NP

Salak Phra
WS

Sai Yok
NP

Erawan NP

Area of intensive
surveys

Thailand/Burma
Border

Protected areas surveyed
during 1999-2000
reporting period

Laos

Thailand

**Area of
Detail**

Cambodia

**Protected Areas in
Thailand**

Malaysia

Summary table of activities in the Western Forest Complex (see reference map on preceding pages)

Name of Protected Area	Training	Wildlife Travel Route Surveys	Pellet/Dung transects	Interviews
Umphang Wildlife Sanctuary	1 RFD ranger and 1 local resident take part in training 2 formerly trained RFD rangers return to assist with surveys	• 114 kilometers surveyed along forest paths, small streams, ridgetops, and wildlife trails	1 transect in remote region of protected area	Interviews carried out at 14 out of 31 villages within the protected area Interviews carried out at 13 out of 13 Royal Forest Department (RFD) stations
Mae Wong National Park	3 formerly trained RFD rangers return to assist with surveys	• 427 kilometers surveyed along dirt roads, forest paths, small streams, ridgetops, and wildlife trails	11 transects	Interviews carried out at 2 out of 8 RFD stations
Thung Yai Naresuan East Wildlife Sanctuary		• 48 kilometers surveyed along dirt roads and forest paths		Interviews carried out at 7 out of 7 villages within the protected area Interviews carried out at 8 out of RFD stations
Thung Yai Naresuan West Wildlife Sanctuary	4 RFD rangers and 5 local residents take part in training and survey activities	143 kilometers surveyed along dirt roads, forest paths, small streams, ridgetops, and wildlife trails	12 transects	Interviews carried out at 1 out of 8 villages within the protected area
Huai Kha Khaeng Wildlife Sanctuary	5 RFD rangers take part in training and survey activities	• 85 kilometers surveyed along dirt roads, forest paths, small streams, ridgetops, and wildlife trails	14 transects	Interviews carried out at 1 out of RFD stations
Salak Phra Wildlife Sanctuary		• 51 kilometers surveyed along dirt roads, forest paths, small streams, ridgetops, and wildlife trails		Interviews carried out at 1 out of 17 villages in and around the protected area Interviews carried out at 13 out of RFD stations

Erawan National Park		• 10 kilometers surveyed along dirt roads and forest paths		Interviews carried out at 1 out of approximately 10 villages in and around the protected area Interviews carried out at 1 out of 9 RFD stations
Chalerm Rattanakosin National Park		• 876 kilometers surveyed along dirt roads, forest paths, small streams, ridgetops, and wildlife trails		Interviews carried out at 1 out of 1 village within the protected area Interviews carried out at 1 out of 2 RFD stations
Summary (1999-2000 Season)	14 field assistants (8 RFD rangers and 5 local Karen villagers) took part in training.	• Approximately 875 kilometers surveyed along dirt roads, forest paths, small streams, ridgetops and wildlife trails	38 transects	Interviews carried out at 25 Villages Interviews carried out at 39 RFD stations
Summary (1998-2000)	45 people have taken part in training and survey activities	• Over 2000 surveyed along dirt roads, forest paths, small streams, ridgetops, and wildlife trails • Tiger sign has been found in over 250 locations within the study area.	112 transects	Interviews carried out at 25 Villages Interviews carried out at approximately 50 RFD stations

Progress Toward Project Deliverables

Below are the deliverables specified in the original proposal with notes on progress to date.

1.   An assessment of the Western Forest Complex tiger population and a GIS-based management plan for this tiger population. The management plan will address general and site-specific tiger management issues.

- All available secondary information regarding the WFC tiger population has been compiled. Sources include:
    - Published papers
    - RFD survey data from 1995 surveys
    - Recent camera-trap surveys carried out by Wildlife Technical Division Staff
    - Consultations with government and non-government researchers operating in the WFC

- Extensive field surveys (see first section) have been carried out to increase the resolution of available data and to confirm and update previous data.

- Linkages with all appropriate Thai Royal Forest Department (RFD) units have provided broad access to RFD policy and current management practices. The following units have been consulted in the process of developing a management plan:

    - Office of the Director General
    - Wildlife Conservation Division
    - Wildlife Technical Division
    - National Parks Division
    - Forest Engineering Division
    - Western Forest Complex Conservation and Management Committee
    - Biodiversity Promotion Committee

- Urgent management actions have been initiated in collaboration with the RFD prior to the completion of this project. Actions include RFD staff capacity building and the implementation of a long-term monitoring system within the Western Forest Complex.

2.   A forest classification of the Western Forest Complex based on LANDSAT Thematic Mapper data that assesses the quality of tiger habitat.

- Data collected during field surveys has been used successfully as a training set for an automated classification of most of the Western Forest.

- These data also serve as a validation set for forest classification maps that have previously been produced for a limited area.

- New forest classification data extends well into Myanmar providing a basis for the first rigorous assessment of tiger habitat continuity in these border areas.

3.   A spatial database including the distribution of tigers in relation to other habitat variables.

- ## Database Development

The following is a summary of the growing database. <u>Underlined themes</u> represent data collected or enhanced during the course of this project; plain text represents data acquired or to be acquired through other sources. Open bullets represent data not yet acquired. For spatially explicit data, the vector data type (point, line, or polygon) is indicated. All spatially explicit data will be converted to ~50m pixel-size grid data for the purposes of constructing a spatial model.

Background data. Although not used directly as predictors in a model, the following data areas will serve to contextualize and help interpret other data in the model.

Baseline ecological, infrastructure, and logistical data

- **Rainfall** (**polygon**: based on interpolated data from 3 or 4 sites within and bounding the study area)
- **Temperature** (**polygon**: based on interpolated data from 3 or 4 sites within and bounding the study area)
- **History of Human Occupation/Impacts** (**polygon:** based on location of villages and other known human impacts within and bordering the protected areas--data from interviews with WEFCOM staff and printed material)
- **Management History** (**polygon / non-spatial:** based on changing boundaries and protection level of study area over 30 year period--data from interviews with WEFCOM staff and printed material)
- <u>**Personnel**</u> (**non-spatial:** information on selection and training of field technician participants)
- <u>**Logistics**</u> (**non-spatial:** information on access routes, equipment, and other logistical considerations for carrying out surveys)
- <u>**Travel routes**</u> (**line:** combines data from RFD/Kaset project with new route data to give a clearer picture of the route network within the study area)

Effort tracking

- <u>**Transect distribution**</u> (**point**: number of transects by veg. class, el. zone, etc.)
- <u>**Kilometers traversed**</u> (**line**: survey effort in kilometers covered by veg. class, elevational zone, etc.)
- <u>**Person/Days**</u> (**polygon**: level of survey effort by veg. class, elevational zone, etc.)

Sign Identification (source: measurements of sign of known individuals of various species)

- <u>**Tiger/Leopard distinction**</u> (**non-spatial**: averages, variances, and confidence intervals for assigning species ID based on various sign measurements collected in the field)
- <u>**Tiger prey species identification**</u> (**non-spatial**: averages, variances, and confidence intervals for assigning species ID based on various sign measurements collected in the field)

Prey / Tiger Distribution Model Predictors. The following data areas will be part of the model development process (although it is likely that not all will appear in the final model). All themes will likely be converted into raster format (50m pixels) for modeling purposes.

Landuse / landcover (source: groundtruthed vegetation maps developed by Kasetsart University and RFD)

- **Landcover** (polygon: directly from Kaset/RFD themes plus newly digitized MW data)
  - **Landcover Complexity** (**polygon**: algorithm yet to be determined)
  - **Landcover Diversity** (**polygon**: algorithm yet to be determined)

These data are both complete and accurate. I have digitized what for now is the best available vegetation data for MW that I will validate with recently collected field data.

Topological metrics (source: 20m contour data from Office of Environmental Policy and Planning and other sources).
- **Elevation (polygon)**
- **Ruggedness** (**polygon**: algorithm yet to be determined)
- **Topographic profile** (**polygon**: assigns ridge, midslope, and bottom values to all points in the study area--algorithm yet to be selected)

The dataset from which these themes will be generated is not ready but once complete will be very accurate and of high resolution. Processing of the contours to generate various topometrics will require substantial computing power.

Water resources (source: streams digitized (may need editing) by Kaset/RFD from1:50000 mapsheets)
- **Permanent water source proximity (polygon (buffer))**
- **Stream density** (**polygon**: algorithm yet to be determined)

Human impact (source: Existing village location and demographic data plus interviews conducted throughout study area).

- **Village take** (**point**: index of local impact on prey species as indicated by reported annual take)
- **Impact sites** (**point:** hunting camps, blinds, traps, and other point locations of human impact)
- **Impact routes** (**line:** routes used for hunting, collecting, tourism, etc.)
- **Human impact zones** (**polygon**:spatial representation of and projected areas of impact)

More interviews need to be conducted for us to claim representative coverage for all parts of the study area. In addition, we have only translated part of the existing data into line and polygon themes.

Prey / Tiger Distribution (source: field surveys)
- **Prey relative abundance** (**point**: prey dung / pellet survey results).
- **Tiger distribution** (**point**: evidence of tiger presence, breeding status)

Prey / Tiger Distribution Model Response(s): . The following will be the primary outputs of the modeling effort.
- **Predicted prey relative abundance** (**polygon**: validated model output).
- **Predicted tiger distribution** (**polygon**: validated model output)

Ancillary Data
- **Large mammal sign** (**point**: from herbivore transects and survey routes)
- **Large mammal trails** (**line**: from survey routes)