



SABAH FORESTRY DEPARTMENT

DERAMAKOT FORESTRY DISTRICT
(DERAMAKOT FR-FMU 19A & TANGKULAP/Sg. PINANGAH FR-FMU 17A)

Standard Operating Procedures

Resource Protection

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1.0 BACKGROUND & PURPOSE

Sabah Forestry Department (SFD) has initiated a policy to pursue certification by meeting the requirements of FSC as well as national standards in its management systems for Sabah. To ensure that its operations are in line with FSC requirements the SFD has developed a series of Guidelines for forest management in 2008 that has been adopted into procedures for use in FMU 19A and FMU 17A.

The purpose of this procedure is to define the process of forest resource protection and forest fire prevention to meet the requirements of the FSC Forest Management Standard for FMU 19A & FMU 17A.

2.0 SCOPE

The scope of this procedure is limited to **forest resource protection on curbing illegal logging & encroachment and implement steps of forest fire prevention** within FMU 19A & 17A managed by SFD. The procedure is to ensure that work may be completed in a controlled, consistent and effective manner.

3.0 RESPONSIBILITIES

The Head of Forest Resource Protection is responsible for:

- Establishing forest resource protection and fire prevention plan
- Monitoring illegal activities and forest fire
- Training of forest officers
- Ensuring the implementation of this procedure

The Forest Officer (Forest Resource Protection) is responsible for:

- Identifying, marking & monitoring access to curb and prevent illegal activities
- Detecting, suppressing and preventing forest fire
- Communicate & cooperate with the communities in the forest
- Training of supervisors and rangers
- Reporting on illegal activities & forest fire

4.0 DEFINITIONS

This procedure contains definitions of common terms used by FSC, GFTN, GFS and SFD in the procedures for forest management.

FSC: Forest Stewardship Council, an international non-government organization that governs the Forest Management and Chain of Custody standard.

FMU: Forest Management Unit, a clear defined forest area with mapped boundaries, managed by a single managerial body to a set of explicit objectives which are expressed in a self –contained multi-year management plan.

GPS: Global Positioning System, to confirm geographical location of affected area and individual photos taken.

5.0 ILLEGAL ACTIVITIES

In the context of forest resource management, illegal activities are defined as any action undertaken by a person, or public or private body that is not in compliance with existing official government laws, rules and regulations related to forest management, transportation, processing, declaration, and trading of forest products. The most common non-compliance is **illegal logging**.

Besides illegal logging, **forest encroachment** is a significant contributor to the temporary or permanent loss of forest resources. The term “encroachment” is defined as, *any party intruding and/or extending gradually into areas reserved for timber production, forest conservation, or forest protection, for which a lawful and valid license agreement has been issued.*

In the State of Sabah, the encroaching party (people settling either within or outside the license area) typically consists of farmers who intrude into the forest area following the completion of timber harvesting operations. The forest access provided through forest road infrastructure and the harvested areas along roads facilitate encroachment. Typically, the residual forest is clear-felled and burnt to provide open space for cultivation of rice (padi), and other agricultural crops, such as fruit trees, rubber trees, and oil palms. These activities result in a change from forest land use to agriculture, hence a loss of forest resources.

Other illegal activities that may occur within a FMU include the **hunting of animals and collection of plants** (or parts thereof) protected by law, and the **establishment of settlement areas**.

All these illegal activities affect the biodiversity and sustainability of forests, and if left unchecked, will have serious negative impacts on the sustained supply of forest goods and ecosystem services.

6.0 DETECTION OF ILEGAL ACTIVITIES

As a first step of resource protection forest managers should identify and verify any occurrence of illegal activities within a FMU, either through regular monitoring and field-checking of critical areas with forest patrols, or on ad-hoc basis following information by the detecting individual/party.

6.1 Information Sources

Detection of illegal forest activities must rely on credible information from a variety of information sources which include:

- Staff of Forest Department, involved in monitoring forest operations, log scaling and royalty assessment, log tracking, assessment of environmental impact, forest conservation, and wildlife
- Forest license holders and their main/sub-contractors
- Members of local communities, public informants (individuals or non-government organizations anonymous sources including local residents and officers of other government departments;
- Anti corruption agency or other government agencies and departments, and the general public.

6.2 Means of Detection and Reporting

The technical means of detecting illegal activities include

- Photos of the affected area for visual evidence
- Global Positioning System (GPS) to confirm geographical location of affected area and individual photos taken
- Forest maps to indicate location
- Remotely sensed information, such as aerial photos or satellite images
- Helicopter flights, as required (mostly in larger or remote areas with no or limited ground access

Following the detection and verification of an illegal activity proper evidence must be provided by the forest manager. The evidence should be given through a report, issued by the license holder or responsible forest manager, containing the following information:

- Date of detection
- Location and area affected (use geographical coordinates or indicate on forest map)
- Type and scope of illegal activity (e.g. illegal cutting of trees, indication of number of trees through stump counts, approximate timber volume removed, other forest damages and impacts)
- Indication of parties that might be held responsible

Following verification of all details the report shall be signed by the responsible party (license holder/forest manager) and forwarded to SFD for ground verification and further action according to applicable laws and regulations.

7.0 PREVENTION OF ILLEGAL ACTIVITIES

Prevention is defined as *a single or several measures that assist in avoiding an undesirable event or development*. Prevention is the most important measure to combat illegal forest utilization and

loss of forest area. The combined measures described below are an effective prevention and suppression tool to combat illegal forest utilization.

7.1 Boundary marking, maintenance and monitoring

The following steps shall be implemented by the forest manager:

- Assign staff and responsibilities for marking, maintenance and monitoring FMU boundaries
- carry out a physical marking of the external (license area) and internal (harvesting coupes, compartments, conservation & protection areas) FMU boundaries, as defined in the license agreement and relevant guidelines on boundary marking and maintenance. This activity demonstrates the legal rights to manage and utilize the forest resource.
- maintain boundaries as prescribed by SFD guidelines
- carry out regular monitoring of boundaries, timber harvesting areas, and conservation & protection areas
- immediately report any illegal activity to the responsible authority for further action

7.2 Restriction of forest access

Forest access should be restricted in areas with high risk level for illegal activities. These areas include:

- All road and river entry/exit points into the FMU
Risk: illegal transport of forest products
Prevention measure: entry/exit of all such points shall be permanently controlled through checking stations with barriers/gates
- Log yards/stumping points
Risk: illegal transport of forest products
Prevention measure: set up access/exit gates and checking stations, implement log tracking system (refer following paragraph)
- Recently harvested areas
Risk: illegal settlement and agricultural activities
Prevention measure: following block closure and inspection, break feeder road linkage/dismantle bridges/erect gates leading to harvesting area to prohibit access with vehicles and motor bikes
- Forest conservation areas
Risk: illegal hunting and collection of non-timber forest products
Prevention measure: prohibit direct access by roads

7.3 Log Recording and Tracking Systems

These systems include the following components:

- Computerized log tracking systems designed to facilitate detection of illegal activities
- Establishment of permanent checking stations at forest exits (e.g., at main rivers used for log transportation. These stations operate 24 hours per day, checking log arrival, storage

and shipments to ensure they originate from legitimate sources, and are accompanied by the prescribed transportation documents (royalty pass, transit permits...).

- Establishment of temporary log monitoring stations at strategic locations
- Inspection of wood processing operations, including log-input versus product-output volumes
- Aerial surveillance checks using helicopter at irregular intervals, as required

7.4 Public Information Campaigns

Information of communities affected by the timber harvesting operations is an important prevention measure:

- Conduct a public information campaign addressed to all communities within and nearby the FMU. Focus on the importance of key forest functions, the meaning of external and internal boundary marks, and the impact of any illegal activities on the forest environment and sustainability.
- Encourage local people to instantly report incidents of illegal activities to the responsible Forest Officer in charge.
- Forest Officers may employ community members to assist in forest monitoring activities nearby their settlement.
- Community Protection Officers should be appointed to ensure protection of protected / endangered species.

8.0 FIRE PREVENTION, DETECTION & SUPPRESSION

8.1 Background

Forest fires are a major cause of forest destruction, with effects on forest resources that are known to be more devastating than any other type of forest damage. Recent studies indicate that more than 80% of the forest reserves that were logged-over forest are exposed to an above average fire risk (*Sabah Forestry Department, 2005*). Therefore, comprehensive fire crew training and guidelines for preventing, detecting and combating forest fires are essential to minimize the risk of fire occurrence, and to effectively suppress forest fires.

8.2 Sources of Forest Fire

The source of forest fires can be divided into three categories: human activities, weather and fuel.

8.2.1 Human Activities

Since man is the most likely source of fire outbreaks, forest access should be limited especially during the dry season. The majority of fires are believed to be directly related to human activities, with a greater proportion of fires in Malaysia caused by actors of both small- and large-scale agriculture, as well as plantation activities (*Ganz et al., 2006*).

8.2.2 Dry Weather Conditions

Extended dry weather conditions puts Sabah's forest at high fire risk, as demonstrated by fire breakouts during the years 1997-98, 2000, and 2005 (*Ganz et al., 2006*). These fires mainly occurred due to droughts (El-Nino phenomenon). An important tool for monitoring the drought season in each District of Sabah is the Keetch Byram Drought Index (KBDI). It requires each forest station (logging camps) to set up its own weather station. The basic input parameters to calculate the Index include rainfall, temperature and relative humidity. These parameters are recorded by the weather stations on a daily basis and used to calculate the daily fire risk index.

8.2.3 Fuel

Logged-over forests often contain excessive logging debris that dries out and acts as fuel for fire. Areas opened up through the harvesting process allow sunlight penetration to the forest floor. The dry leaves, twigs and log residues offer a significant amount of fuel during drought conditions. High fuel loads can greatly contribute to the severity of the fire and become the key accelerating factor for a fire spreading into the residual forest.

9.0 FIRE PREVENTION

Fire prevention involves fire risk monitoring in the entire Forest Reserve areas of Sabah, with an emphasis given to the most fire prone areas (Sabah Forestry Department, 2005). In general, the fires occurred in natural forest and most frequently, in secondary forest, peat swamp forest, gelam forest on raised sand beaches, and in forest plantations of Sabah (*Ganz et al., 2006*). Several measures can be taken to prevent or minimize the occurrence of forest fires apart from frequent forest patrolling by the field staff in dry weather periods, the Fire Danger Rate System (FDRS) is used by SFD as an important fire prevention tool. The FDRS is the result of a collaboration project between SFD and the Canadian International Development Agency (CIDA). This program generates a fire risk map, based on a Geographic Information System (GIS). Several GIS maps are generated for this purpose on a state-wide basis, showing the distribution of:

- *Rainfall*
- *Air temperature*
- *Relative humidity (RH)*
- *Fine Fuel Moisture Code (FFMC)*
- *Drought Code (DC), and*
- *Fire Weather Index (FWI)*

(Sabah Forestry Department, 2003)

The FDRS provides an indication of the ability of a fire to start, spread and cause damage. It provides an early warning method for serious fire problems, enabling preparation and prevention to be stepped up before the fire situation runs out of control. With the development of 6 electronic weather stations and the provision of all District Forest Officers (DFO) with weather recording instruments the recording of weather data has been greatly enhanced in recent years.

With the following procedures the fire prevention system for monitoring risk, planning detection and suppression has been established:

- weather stations located at strategic points within the concession, conforming to the Malaysian Meteorological Services (MMS) standards
- established lookout points within the FMUs to be monitored during the fire season
- mapping of all accessible water sources within the FMUs
- setting up a fire operations base with adequate and appropriate facilities and equipment
- stocking up of local area water sources
- provision and maintenance of all fire fighting equipment and facilities at attack bases
- establishment of contacts with other agencies for additional equipment and support, as required
- make known and control the main access and other entry points into the forests, especially during the dry season
- Forest managers to authorize and control entry and movement of fire fighting teams within the license area.

9.1 Forest Fire Zoning

The Forest Management Unit needs to be identified according to high-risk zones based on population activities and characteristics that may create and fuel a forest fire. Priority should be given to all fire prone and high risk areas and signage shall be installed at strategic locations. Fire danger level indicators shall be placed at base and field camps that are daily updated.

Table 1. The indication of the level and risk of forest fire occurrence is summarized

| Level | Risk |
|--------------|--|
| Low | Few fires are expected. Any occurring fire is expected to be small and isolated. |
| Medium | Fires may be more common and moderate in size. |
| High | Entering the dry conditions period. Potential for larger burning areas exists. |
| Extreme | Approaching severe drought with dangerous burning conditions. |

During times of High to Extreme risk conditions the license holder and its contractor(s) should undertake several actions to communicate the conditions to field staff, contractors and local communities

- Place fire weather indicators and notice boards at strategic locations within the FMU.
- Burning restrictions inside the FMU must be enforced. This must be clearly indicated at all forest entry points
- Regular fire awareness briefings shall be conducted with staff / contractors / local community representatives, operating/settling within the FMU.
- Regular monitoring of high risk areas for fire and smoke

10.0 FIRE DETECTION AND MONITORING

Detection and early reaction to any fire occurrence is crucial to curb the resulting damage. Regular ground patrols to all high-risk zones shall be conducted. In times of high fire risk, the frequency and intensity of monitoring shall be increased.

All access points to fire prone forest areas should be monitored. Detection of fire is often made through ground surveillance, or can be supported by aerial surveys conducted during high and extreme risk periods. Another very effective method is the construction of fire observation towers at strategic locations to facilitate detection and movement of fires.

All facilities and equipment required for monitoring the fire risk needs to be checked and kept functional at all times in those district areas where operations are implemented.

11.0 FIRE SUPPRESSION

The suppression of forest fires involves equipment for fire fighting and specific training of fire crews on methods and technologies relating to combating forest fires.

11.1 Fire Fighting Equipment

Besides having the knowledge of fire fighting methods, the effectiveness of fire crews is greatly enhanced with the availability of appropriate fire fighting equipment.

Table 2. Summary of the basic equipment

| Hand tools | Water Delivery Systems | Safety | Others |
|---|---|---|---------------------------------|
| <i>Shovels Pulaskis Parangs Axes Hoes Drip Torches Fire rakes or fire swatter</i> | <i>Water pump Hank tank pumps Water hoses 1.5"x 100' (lined) 1.5" x 100' (unlined) 5/8 "x 50' 2" x 10' suction hose Hose stranglers Water thieves Portable relay tanks Pick-up truck with slip on water tanks</i> | <i>Goggles Hard hats with ear muff and face screen First aid kit Boots with fire resistant soles Gloves</i> | <i>Radio sets Chainsaws</i> |

Source: Lagan, 2000

11.2 Training of Fire Crews

Training of fire crews is extremely important, as they are in the front line to combat the forest fire. The most important steps in training the fire crews include:

- Development of training programs and formulation of detailed training contents and schedules. Keep records of all training sessions conducted and evaluate every course.
- Identify and train instructors in fire fighting, logistics and timing, first aid and occupational safety, data collection and management, reporting and communication procedures, etc.
- Include personal safety awareness for each aspect in all courses.
- Establish and regularly review personal safety procedures.
- Hold fire fighting courses annually, preferably before the forthcoming dry season

Fire training should encompass fire prevention and fire control. The recommended training modules for fire crews are listed below.

- Safety and first aid
- Fire suppression tactics
- Fire guard construction
- Burning off
- Mop-up
- Usage of hand tools and maintenance
- Manning portable water pumps
- Water delivery systems and layout of water hoses
- Communication with radios
- Fire weather and fire behavior
- Fire line organization
- Fire assessment
- Fire cause investigation

The most popular ways to suppress forest fire include the use of water, fire isolation and backfire.

11.3 Water

Water is an effective way to extinguish small fires that are contained on the ground vegetation. Larger fires that enter the forest canopy can be contained or suppressed by water but may need a combination of methods that include isolation and backfiring to control fires.

Water spraying: Fire apparatus most commonly used in urban fire fighting and bush fire. Requires large crew of 20 or more people who travel to the fire in trucks. Use of portable pumps to douse small fires and chainsaws to construct firebreaks.

Helicopter: Fire on a particularly steep hills, or densely forested areas with lack of good access infrastructure. Requires 5-8 people. Helicopter employs rappel or fast rope.

Aircraft: Places where fire is extremely remote. Firefighters known as smokejumpers, may parachute from the fixed wing craft. Places too remote and inaccessible. Aircraft can deliver larger quantities of water and/or flame-retardant chemicals.

Hand tools: ground crews construct firebreaks and removal of fuels around the perimeter of the fire to halt its spread including shovels, rakes, and Pulaski (a tool unique to wild land firefighting).

11.4 Fire Isolation

Another method of curbing the forest fire is isolation. Some large fires cannot be put out by firefighting services, therefore another alternative technique is applied. The alternative approach is through by creating control lines (fire breaks) on which the area does not contain any combustible material. The control lines can be produced by physically removing fuel, e.g. through the use of bulldozers. The cleared control lines will isolate the fire until it is burnt out.

11.5 Backfire

Forest fires can also be suppressed through the use of backfires. The backfire is initiated opposite of the fire front. The objective is to burn all flammable material in a controlled way. This controlled fire may then be extinguished by firefighters, directed in such a way that both fires meet at the main fire front, at which point both fires run out of flammable material and are thus extinguished.