

# **Fire Incident Assessment**

## **U Minh Ha Forest and U Minh Thuong National Park**

### **Ca Mau and Kien Giang Provinces, Vietnam**

**20 April – 26 April 2002**

#### **Abstract**

U Minh Ha Forest and U Minh Thuong National Park are two isolated remnants of Melaleuca peat forests in the Mekong Delta that have recently been dramatically affected by wildfires. Fire suppression efforts, although heavily impacting the environment, were successful in stopping the fire spread. The combination of altered water regimes and use of these forests by the local population conflicts with U Minh management objectives for conservation of biodiversity and wildlife habitat. Opportunities exist to enhance suppression capabilities through additional training and equipment and to develop long-term strategies for fire management.

#### **Introduction**

Upon request of the Ministry of Agriculture and Rural Development, Forest Protection Department, Deutsche Gesellschaft für Technische Zusammenarbeit GmBh (GTZ) in collaboration with the Global Fire Monitoring Center, United Nations Development Program and the UN-Office for Coordinating Humanitarian Affairs conducted an assessment in U Minh Ha Forest and U Minh Thuong National Park, Vietnam in response to on-going large wildfires burning within the area's. A Fire Operations Expert from the Integrated Forest Fire Management Project (IFFM/GTZ) Samarinda, East Kalimantan, Indonesia visited the U Minh during the period from April 20 – April 26, 2002 to conduct the assessment with three objectives:

1. Assess immediate needs in support of the current fire suppression effort
2. Assess the mid- to long-term needs to enhance overall fire management capacities
3. Identify opportunities and process for requesting emergency and long-term fire management assistance.

The information presented in this report is based on site visits, observations, and interviews with U Minh staff, and National and Provincial officials. Any mistakes in this information are unintentional and maybe based on misunderstanding of translations.

#### **Background**

Only a limited literature review was accomplished because of the rapid nature of arranging this assessment.

The historic hydrologic regime of the Mekong Delta is characterized by a seasonal inundation of water followed by a dry season (December – May) with gradual recession of water levels. The Mekong Delta is the major agricultural (rice) and fisheries area in Vietnam. Increased human demand for natural resources and agricultural development

have significantly reduced the extent of natural and semi-natural habitats. The few areas of natural habitat that remain are subjected to increasing levels of non-sustainable human exploitation. Based on a BirdLife International assessment, the seasonally inundated grasslands, swamps, and mature semi-natural Melaleuca forest has the highest bird species richness in the Delta, supporting many threatened and near-threatened bird species. In 2000, BirdLife International ranked U Minh Thuong and the Vo Doi (U Minh Ha) Nature Reserves within the top 5 priority wetland sites for conservation. The Vietnamese government subsequently reclassified the area's from Nature Reserve to a National Parks (U Minh Ha is still in process and classified as a Special Uses Forest), providing them with the highest category of protection. Although specific management plans are not yet completed, both areas are now managed for the objective of preserving biodiversity and conservation.

The fire at U Minh Ha Forest occurred in Melaleuca peat forest previously classified as “production forest”, but currently proposed as “protection forest”. At U Minh Thuong



Park, the fire occurred in the “core zone” of natural Melaleuca peat forest. Access within both forests is primarily by boat via man-made canals that have been constructed within the past 10-15 years (Figure 1-2).

Figure 1. Melaleuca peat forest with canals

At U Minh Thuong, over 90 kilometers of canals exist within both the “core and buffer zones”. Both areas are essentially islands of forest and grasslands that are surrounded by high intensity agricultural uses.



Much of the history of these areas is referenced in terms of before, during and after the “War”. In relation to fire management, this is significant in assessing the “historical fire regime” of the area. Before the war, drainage canals were not present and the Melaleuca peat forest was dense and expanded over a large area. During the war, forests provided safe hiding cover for Vietnamese soldiers. The area was

Figure 2. Interior flare-ups

frequently bombed, sprayed with defoliants (agent orange) and burned by napalm. Interviews indicated that even with these disturbances, the high humidity and water levels within the forests often limited the extent of forest fires.

## Findings

### Human Impacts

The impacts of the fires on the local population relate to dealing with the smoke and the impacts on the common uses of the area, which include hunting, fishing, collecting honey, fruits, and gathering other forest commodities (*Figure 1*).



*Figure 3. Local population adjacent to burned area*

however, illegal, based on the area's current land status. The local population however has significantly contributed to the efforts of directly suppressing and supporting the suppression effort. Several injuries to firefighters were reported and include snakebites, smoke inhalation, and minor burns.

A potential exists for salt-water intrusion from the canals into existing fresh water drinking wells that are located around the U Minh boundaries or on the edge of the "core zone" because of the pumping of salt water into the canal system.

### Ecologic Impacts

The ecologic impacts of the fires are significant in terms of the massive extent of peat forest that has burned and the near total removal of 8 – 45 year old trees. The depth of peat has been reduced by 30 – 100 cm (from an estimated original 150 cm) and nearly 30% of the *Melaleuca* peat forest in these areas has burned (*Figure 4-5*).



*Figure 4. Fire consumed organic peat layer*

Habitat for deer, wild pigs, monkey's and hundred of bird species has been significantly altered. The fire suppression effort, although successful in it's short-term objective of stopping the spread of the fires, has resulted in at least 15 kilometers of

additional canals within the area's. As part of the suppression effort, salt water has been pumped into both areas, which can lead to negative impacts on fresh water plants, organisms, and native wildlife.



*Figure 8 Burned Melaleuca peat forest*

Suppression Response

Initial Attack (IA - quick response to small fires) successfully occurred on several occasions within U Minh prior to the current large fire events. The strategy for IA is to access the area by boat via canals, use direct attack where possible, or fallback to canals for indirect attack. The existing capacity of the IA organization needs improvement to enhance the efficiency of response times and tactical deployments of crews.

Large fire suppression tactics included clearing 60-80 meter wide fuel breaks using chainsaws, handsaws, and axes; constructing 5 meter wide by 1-2 meter deep canals using excavators; pumping in salt water to fill the canals and mopping up the inner edge of the fire with water from the canal using a boat mounted water pump and hose (Figure 6-8 and Table 1).



Figure 6. Approximately 15 km of newly constructed canals



Figure 7. Mop-up operations



Figure 8. Salt water pumped into canal system for fire control

Table 1. Summary of suppression efforts.

Item	U Minh Ha	U Minh Thuong
Estimated fire size	3,000 ha	2,500+ ha
Maximum people	4,000	1,400
New canal constructed	5 kilometers	10 kilometers
Salt water pumping began	April 12	After January 22
New road	15 kilometers	--

### Coordination

The National, Provincial and U Minh staffs of the Forest Protection Department (FPD) have a well-established organization. Additionally, close coordination between FPD and provincial steering committees was clearly evident. Their organizational ability, initiative, motivation, and capacity in mobilizing people, equipment, and supplies and managing these two large fire emergencies are commendable. The spirit of community assistance and cooperation was prevalent at all levels.

The cost of these efforts is estimated at 7-8 billion Dong (US\$500,000.00), however an accurate accounting is not yet available. After the emergency was readily apparent, provincial steering committees began spending without hesitation to purchase pumps, boats, chainsaws and move heavy equipment. Telephone communications were established on the fireline by the Vietnamese Post Office/Telecommunications Department, military radios were used, and ICOM HF-radios were also witnessed. Food, drinking water, fuel, oil, hose, fittings, bathing facilities, shelter and transportation were all available and in use.

The Global Fire Monitoring Center – Freiburg, Germany provided daily updates from involved agencies on the situation in Vietnam that included satellite images, daily and mid- to long-range precipitation and fire weather forecasts (fire danger) via their website ([www.uni-freiburg.de/fireglobe/](http://www.uni-freiburg.de/fireglobe/)).

### Fire Causes

Specific causes for the fires are unknown. Suspected cause of the U Minh Ha fire is related to evidence of finding animal traps in the area of the origin of the fire. At U Minh Thuong, speculative cause includes activities for collecting honey, which include making a small fire to smoke-out the bees from their hive. Underlying causes of the fires are local people having unrestricted access into the Parks for gathering forest products and using the area for activities that would be considered illegal based on the area's status as a conservation area for biodiversity and wildlife. **A primary contributor to the Melaleuca peat forests being susceptible to ignitions by illegal users is the presence of canals.** The canals alter the historic/natural water regime in the peat forest, causing lower than normal soil ground water levels that increase the severity and extent of seasonal drying within the peat.

### **Discussion**

Fire is often a symptom of non-sustainable, exploitive and often illegal land use practices. Fire management should not drive the land management process, but should contribute to and support the process. Fire management objectives should be tiered to land management objectives and fire suppression methods should be designed to be compatible and enhance land management objectives.

### Canals

The land management objectives for the U Minh Ha Forest and U Minh Thuong Park are for conservation of biodiversity and protection of wildlife habitat. The presence of the canals has altered the historic/natural water regimes of these peat forests, causing lower than normal soil ground water levels that increase the severity and extent of seasonal

drying and fragment the habitat of the area. These impacts make it difficult to achieve the current land management objectives of the area's. Altered seasonal drying patterns cause fine fuels to become more susceptible to ignition, therefore increasing the probability of ignition by the illegal use of the area by hunters, honey collectors and others. The canals facilitate this illegal access and are a source of exotic or non-native seeds/plants that are encroaching the area. The canals also facilitate easy access for fire crews and provide a potential source of water for fire control, but this alone does not justify keeping the canals. Other access options are available that can be less damaging to the hydrologic cycles of the area.

The construction of new canals and widening of existing canals to stop the current fire event was a remarkable, well-coordinated, and successful effort, but canals are not the long-term solution to fire control. The pumping of salt water into the canal system for fire control accomplished the short-term objective of suppressing the fire, but the long-term impacts of the salt water, especially if this practice is needed more often, will only compound problems that are contributing to the deterioration of the peat forest.

If the canals (which act as "water sinks" and allow for outflows and increased evapotranspiration) were not present and fresh water was stored in the peat forest soils, then peat moisture levels would not normally be dry enough to sustain a fire, even during a seasonal drying trend (except in extreme cases). In short, the canals are the source of the problem that is currently being experienced with fire control. To properly manage the park, a return to the historic natural water regime is needed. Any proposal to build additional canals for the purpose of fire control should not be implemented, as this will only increase the problems that already exist in the park. If the park is to be managed for biodiversity and wildlife, the existing canals within the peat forest should be reduced or eliminated. This in turn would minimize the illegal use of the area by local people, which would subsequently reduce the potential for a fire to be ignited by humans.

### Defining Fire

A fire management organization must define when, where, and which fires are "wanted" or "unwanted" as an integral step to developing relevant fire management policies, planning processes, and implementing fire prevention/suppression activities. Fires are generally categorized as being a prescribed fire (wanted) or wildfire (unwanted), with the primary difference being that a prescribed fire meets or achieves management objectives and a wildfire does not. Specific parameters for defining a fire include its ignition source (cause), location, timing, threat to resource values, and whether or not the fire is achieving land management objectives.

Fire ignition sources are either "natural" (lightning) or "human-caused" (any purposeful or accidental activity related to human activities such as land-clearing fires, forest residue reduction burning, powerlines, cigarettes, cooking fires, etc). Wildfires resulting from coal seam fires are usually the result of previous vegetation fires and may be classified as "other". Depending upon land use management objectives, any fire occurring within a designated area may be considered a wildfire and require immediate suppression. Timing is related to a quantifiable drought index (i.e. Fire Danger Rating) and/or seasonal trends.

Resource values include lives, property, timber, grass, watershed, recreation, wildlife habitat, agriculture or other natural or improved commodity. Agency policy must provide clear direction in defining a fire so local protection units can appropriately apply this direction within their area of protection responsibility. Local protection units should be delegated full authority to implement this direction.

### **Recommendations**

Unfortunately, this assessment arrived on scene after the fires were contained, mop-up was occurring and demobilization of a majority of the people had already taken place. Therefore, immediate assistance to the suppression effort was determined unnecessary. Again, all participants and managers involved in the suppression effort should be commended for their effective mobilization and suppression of the fires. However, from the humanitarian standpoint, an immediate assessment/resolution of the potential impacts of salt water intrusion to fresh water drinking wells should be accomplished within both Parks.

Following is a summary of the recommendations for mid- to long-term fire management needs. Specifics and elaboration of these recommendations can occur through follow-up discussions:

1. Begin a focused planning effort to rehabilitate the Melaleuca peat forest by restoring the historic/natural water regimes. This would include reducing/eliminating the number and extent of canals within the peat forests.
2. Begin a National strategy for developing fire management policies in support of land management policies.
3. Improve detection/reporting and response system for Initial Attack.
  - a. High Frequency (HF) radios, binoculars, maps, and compasses (Osborne Fire Finder's) available for all lookout posts at both Parks. A High Frequency (ICOM) radio system consisting of base stations (Park HQ and each major outpost), portable radios for the lookouts, and handheld radios for all park employee's or field staff.
  - b. While the canals are still in place, long boats should be designated and equipped as follows:
    - 2 - patrolling/enforcement
    - 3 - Initial Attack with pumps and hose
    - 1 - equipment re-supply
    - 1 - Park Director or other supervisor
  - c. Chainsaws, backpack pumps and a prototype Mark III pump kit with hose for evaluation and use. Before major changes or additions of suppression equipment are made, evaluation, effectiveness and compatibility issues should be considered based on small amounts of equipment.
  - d. Enhance and standardize Operating Procedures for fire preparedness and response.
  - e. Begin planning and identifying alternate means of access and suppression response to be more compatible in peat forest types, as rehabilitation of the canals progresses. This may include using roads/trails and lightweight all-

terrain vehicles, as well as pre-established freshwater sources maintained by deep well pumps.

4. Technical training for Park staff in suppression tactics, equipment maintenance and supervision of suppression operations.
5. International training and study tours for review and evaluation of other fire management programs (i.e. IFFM – Indonesia, Thailand, United States, Australia, Canada).
6. Improve the delivery of the fire prevention message, and increase the awareness of local people on the importance of preserving the Melaleuca peat forest for its biodiversity and wildlife benefits.
  - a. Additional economic incentives for participating in the “Green Book” contract to protect the forest.
  - b. Develop/promote a National mascot to enhance the fire prevention message and/or environmental awareness themes.



### Suggested contacts for immediate follow-up

Following is a list of contacts for future emergency and long-term fire management assistance. Follow-up discussions on fire management and forestry issues can be facilitated through GTZ/REFAS in Hanoi.

Contact Agency	Contact Person	Phone	E-mail/web	Type of Assistance
UNDP - Hanoi	Ms Pham Thanh Hang	84-4 942-1495	<a href="mailto:hang@undp.org.vn">hang@undp.org.vn</a> <a href="http://www.undp.org.vn">www.undp.org.vn</a>	International Emergency Assistance
GTZ – REFAS - Hanoi	Dr Laslo Pancel	84-04-7339978	<a href="mailto:Gtzrefas.cta@netnam.vn">Gtzrefas.cta@netnam.vn</a>	Forest Policy Advice
GTZ- Integrated Forest Fire Management Project – Samarinda, Indonesia	Dr Helmut Dotzauer	62-0541-733434	<a href="mailto:iffmfire@samarinda.org">iffmfire@samarinda.org</a> <a href="mailto:dotzauer@samarinda.org">dotzauer@samarinda.org</a> <a href="http://www.iffm.org">www.iffm.org</a>	Technical Fire Management and Policy Advice
Global Fire Monitoring Center – Freiburg, Germany	Dr Johann G. Goldammer	49-170-2347484 or 49-761-808011	<a href="mailto:johann.goldammer@fire.uni-freiburg.de">johann.goldammer@fire.uni-freiburg.de</a> <a href="http://www.uni-freiburg.de/fireglobe/">www.uni-freiburg.de/fireglobe/</a>	National Longterm Planning & International Cooperation

### References

BirdLife International. Wetlands in the Balance. A strategy for balance and harmony in wetland resource management in the Mekong Delta. 2000.

Shulman, Deanne. Fire Management Assessment, Tram Chim National Park, Dong Thap Province. IFFN No. 26 – January 2002, p. 106.

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## **Glossary**

**Backfire (Burnout)** – a fire set along the inner edge of a fireline to consume fuel in the path of a wildfire between the control line and fire edge, and/or change the direction of spread of the fire's convection column.

**Control Line** – all constructed or natural barriers used to stop a spreading fire.

**Direct Attack** – a fire suppression treatment applied directly to burning fuel such as wetting, smothering, or chemically treating the fire or by physically separating the burning from unburned fuel (fireline).

**Escaped Fire** – Fire that has exceeded or is expected to exceed initial attack capabilities or prescription.

**Fire Danger Rating** – the constant and variable factors (such as weather, fuel type, and terrain that affecting the ignition, spread, resistance to control, and subsequent damage) that are integrated and expressed as one or more qualitative and/or quantitative indices.

**Fireline** – the part of the control line that is scraped or dug to mineral soil (or other unburnable material, i.e. water, ice) to stop the spread of a fire.

**Fire Management** – activities required for the protection of burnable wildland values from fire and the use of prescribed fire to meet land management objectives.

**Fuelbreak** – a natural or manmade change in fuel characteristics that affects fire behavior so that fires burning into them can be more readily controlled.

**Incendiary Fire** – a wildfire willfully ignited by anyone to burn, or spread to, vegetation or property without consent of the owner or manager (also Arson Fire).

**Indirect Attack** – a fire suppression method in which the control line is located away from the fire's active flaming edge. Normally done when the fire is fast-spreading and/or high-intensity. Utilizes natural or constructed firelines or fuelbreaks and favorable topography. The unburned fuel is normally backfired, but depending on conditions, the main fire is allowed to burn to the control line.

**Initial Attack** – the actions taken by the first resources to arrive at a wildfire to protect lives and property, and prevent further spread of the fire.

**Presuppression (Preparedness)** – Organizational activities that occur prior to a fire occurring to ensure effective suppression action. Activities include planning, recruiting, training, purchasing equipment and supplies, maintenance of equipment and facilities, and negotiating cooperative and/or mutual aide agreements.

Prescribed Fire – controlled application of fire to vegetation in either a natural or modified condition, using specific environmental conditions (relative humidity, wind, temperature), which allow the fire to be confined to a predetermined area, and produce the fire behavior and fire affects desired to achieve resource management objectives.

Protection Boundary – the exterior perimeter of an area within which a specific agency has responsibility for wildfire control. Additional lands outside the boundary may be included for which the agency has jurisdiction and contractual responsibility.

Wildfire – a fire occurring on wildland that is not meeting resource management objectives and thus requires suppression response.