

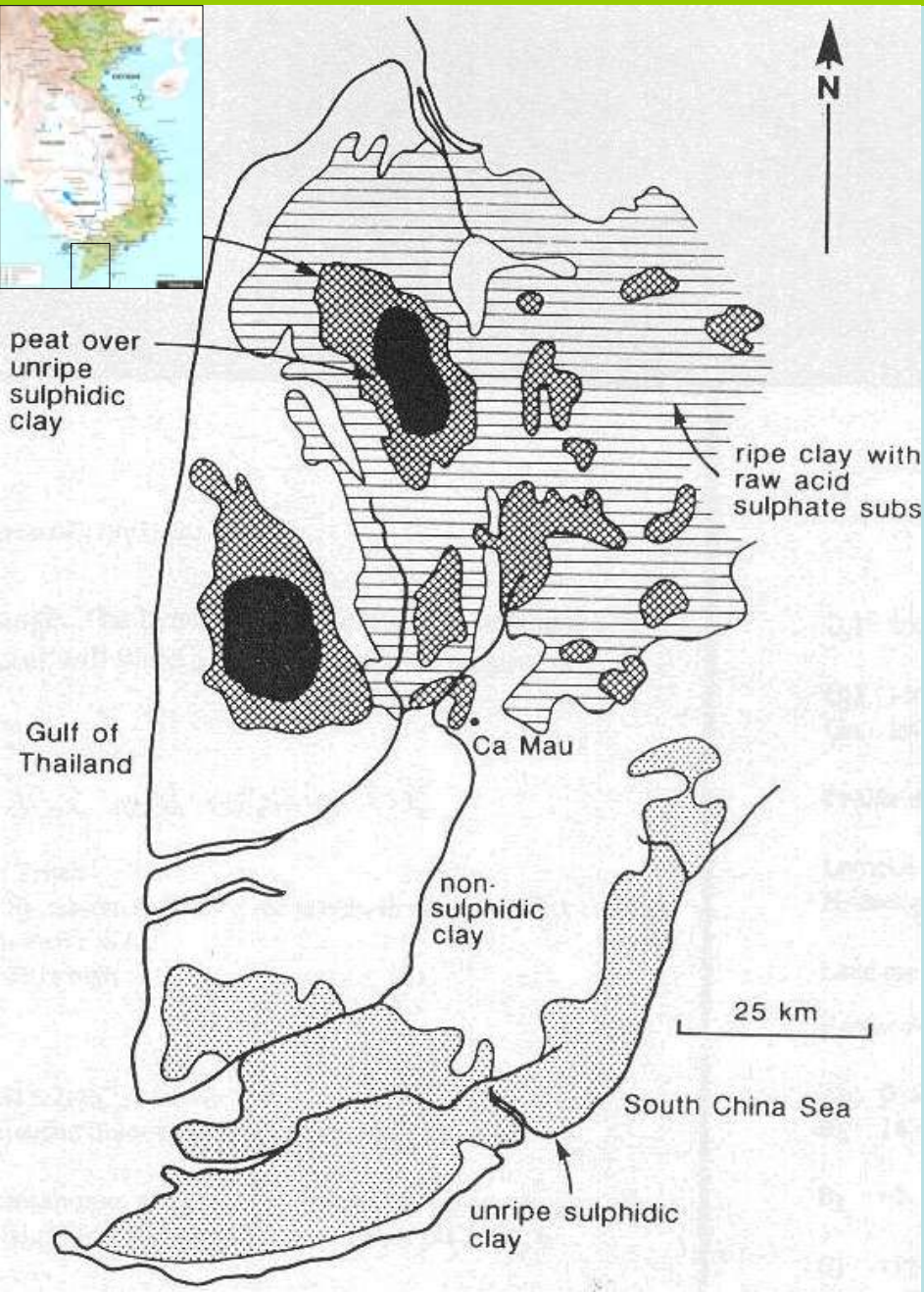
INTEGRATED FIRE AND WATER MANAGEMENT FOR ECOSYSTEM RESTORATION IN U MINH THUONG NATIONAL PARK

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OUTLINE

- 1. Overview**
- 2. Problems from water management**
- 3. Integrated fire and water management**
- 4. Remarks**

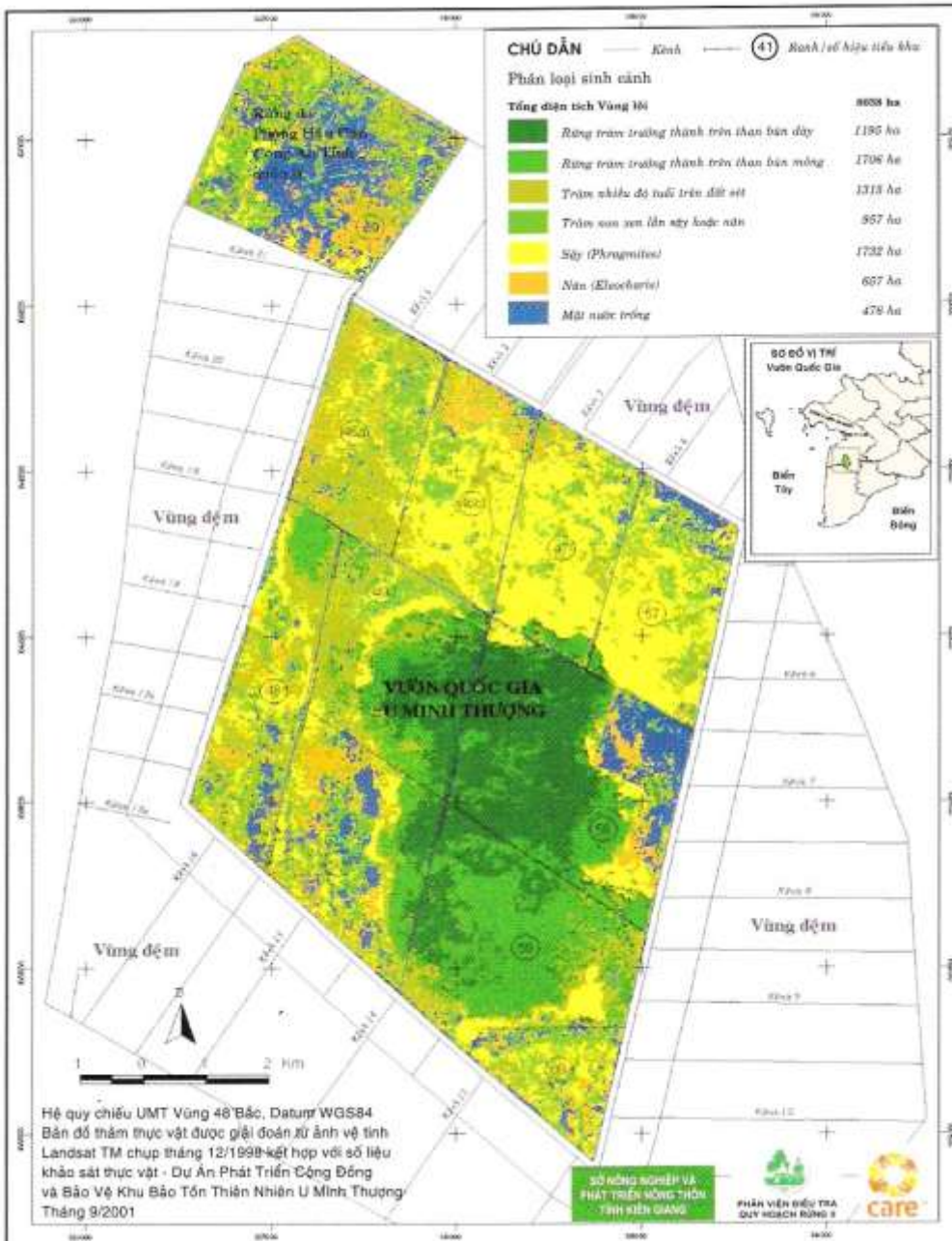
1. Overview



- There are some peatlands in Vietnam.
- Large area of peatlands has been converted to agricultural production and exploited for fertilizer production.
- There are two largest peatlands remaining at U Minh Ha and U Minh Thuong regions in Lower Mekong Delta.

1. Overview

- U Minh Thuong is one of the last significant areas of peat swamp forest remaining in Lower Mekong Delta.
- Peat swamp of U Minh Thuong is established as National Park



1. Overview



- Typical ecosystems
 - *Melaleuca forest*
 - *Seasonally inundated grass*
 - *Aquatic swamp*
- High biodiversity



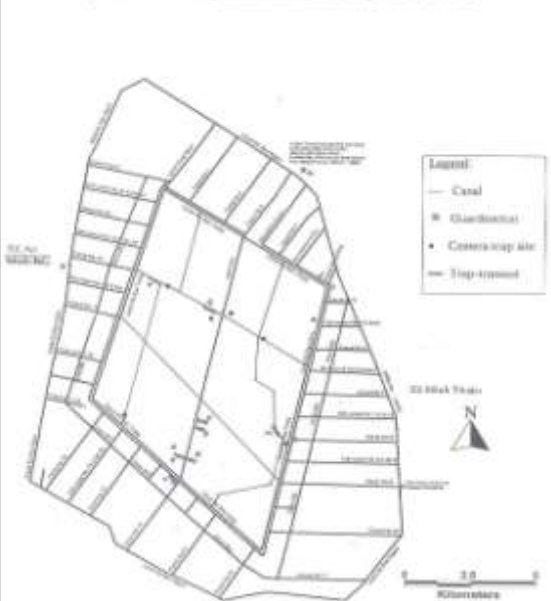
1. Overview



- Knowledge of peat land is limited, resulting in inappropriate managing models leading to increases in forest fire and peat decomposition due to oxidation.
- Fire in the peat swamp is a high threat as fire depletes ecosystems and consumes the peat layer.
- However, permanent deep flooding for fire control in melaleuca forest in UMT has negatively impacted on growth and development of forest, resulting in the degradation of ecosystems

2. Problems from water management

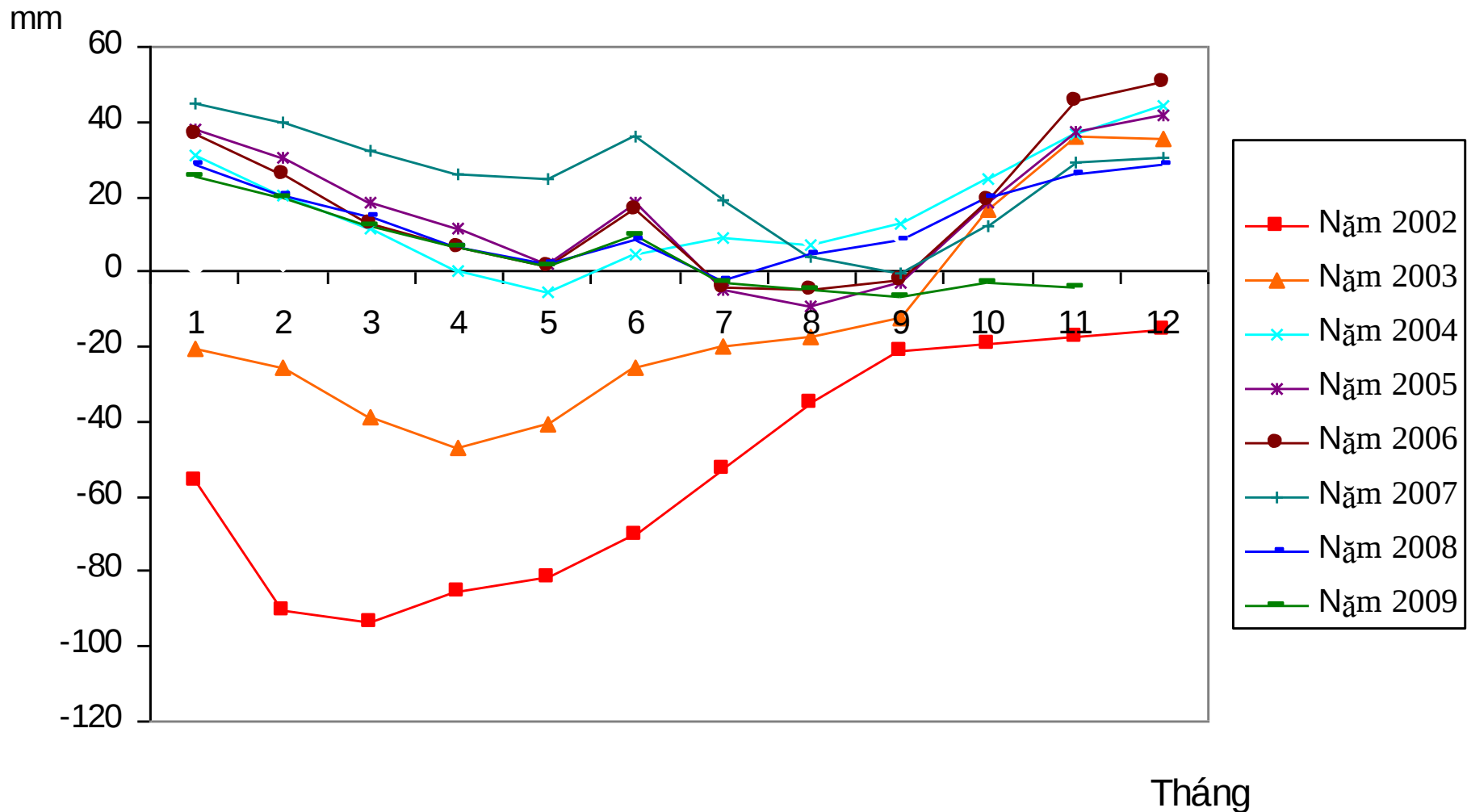
Figure 1: Location of trap-transects and Camera-trap sites in UMY/SB



■ Forest fire control

- ***Canal system was established inside peatlands for fire control.***
- ***The peat layer is subject to extreme dry conditions in the dry season due to that the canal systems causes a great and rapid loss of water in the dry season.***
- ***Peat can catch fire easily and burn for very long periods.***

2. Problems from water management



- Ground water level dropped too deep in the dry season, 2002.
- Such water level condition was prone to forest fires in peatlands

2. Problems from water management

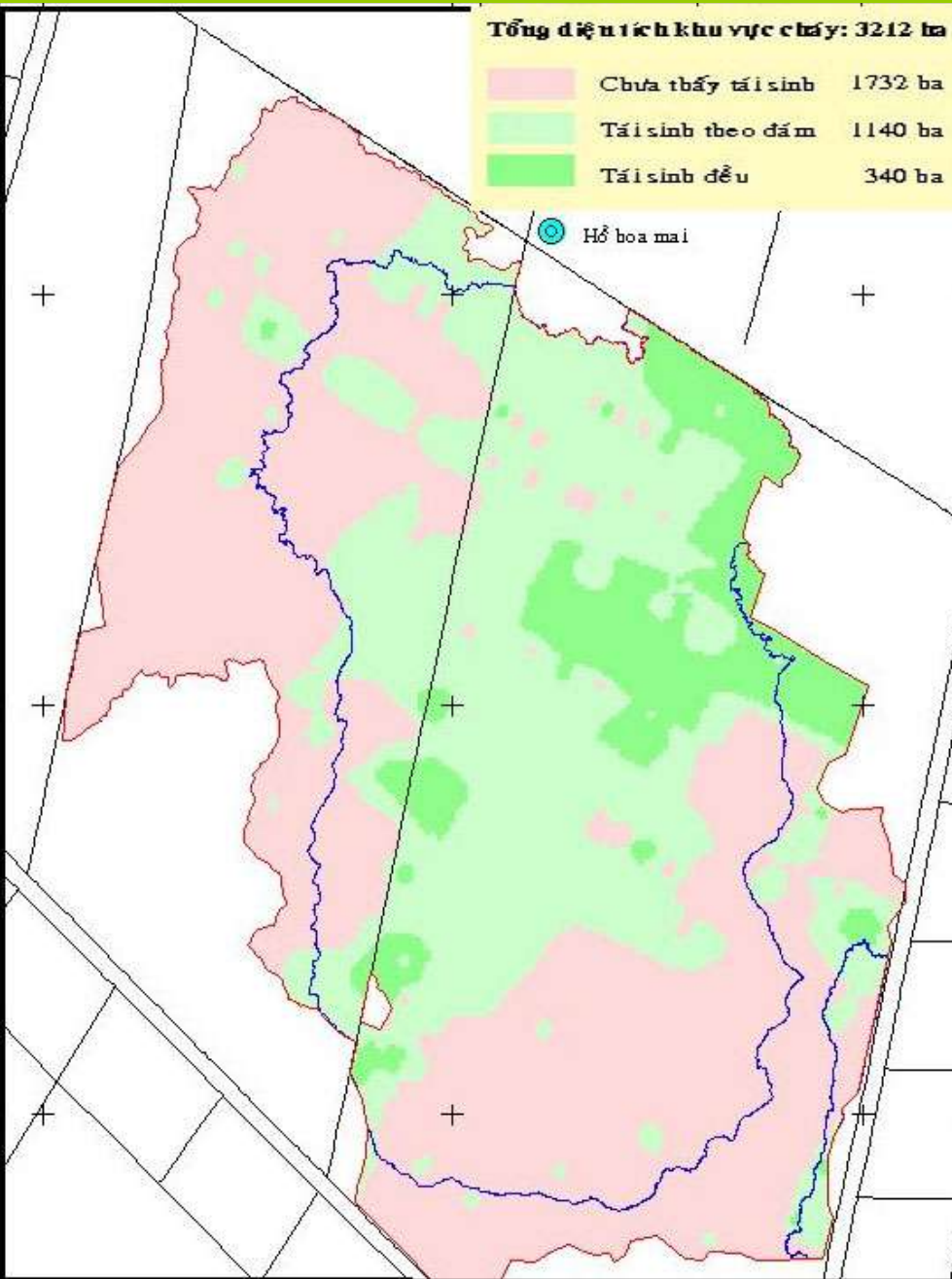


**Forest fire and
peat fire in 2002**

**80 percent of area
of U Minh Thuong
National Park
was fired.**

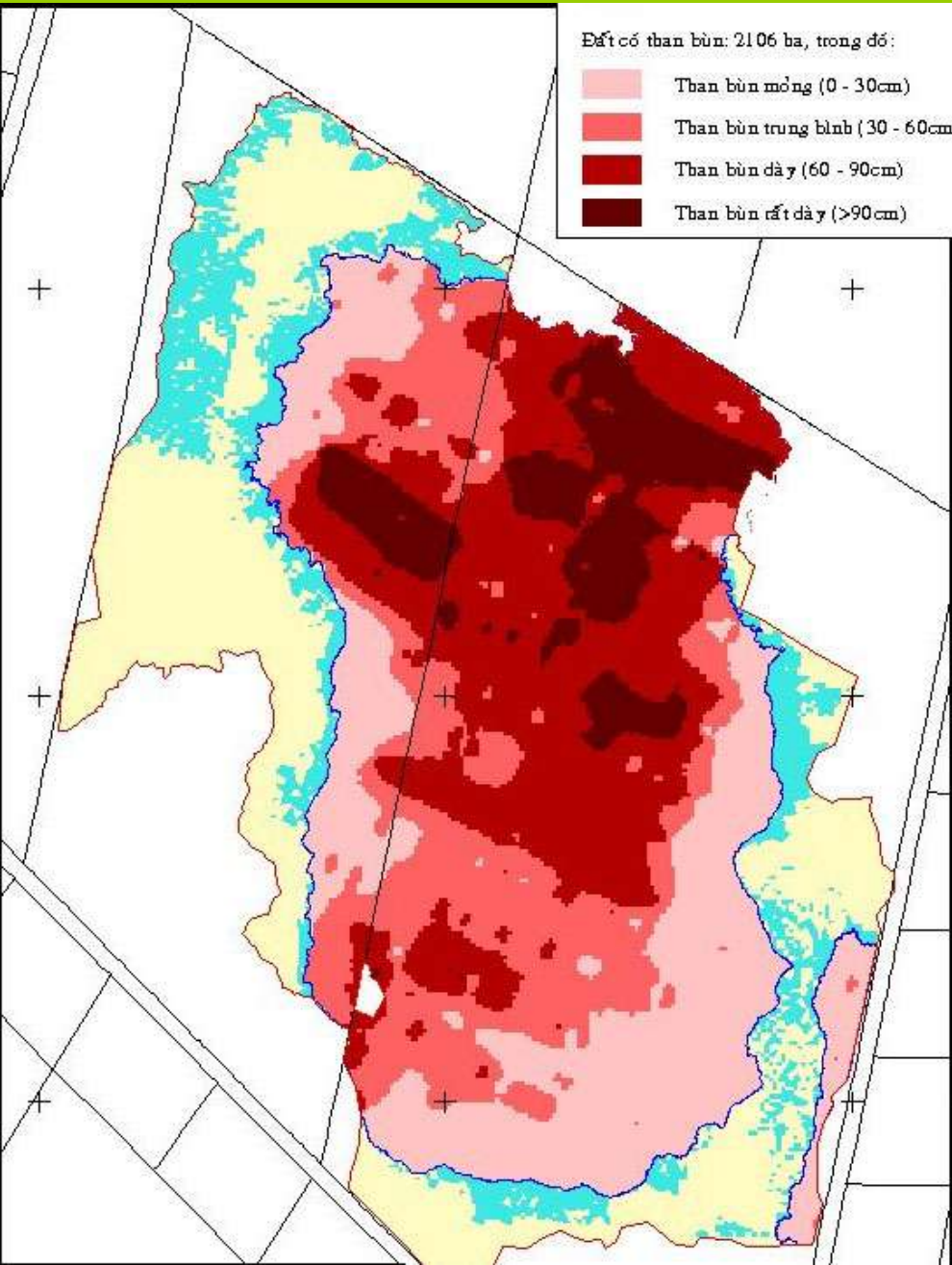


2. Problems from water management



- *On about 4,000 ha of **Melaleuca** forest was fired.*
- *Damaged to ecosystems and biodiversity*

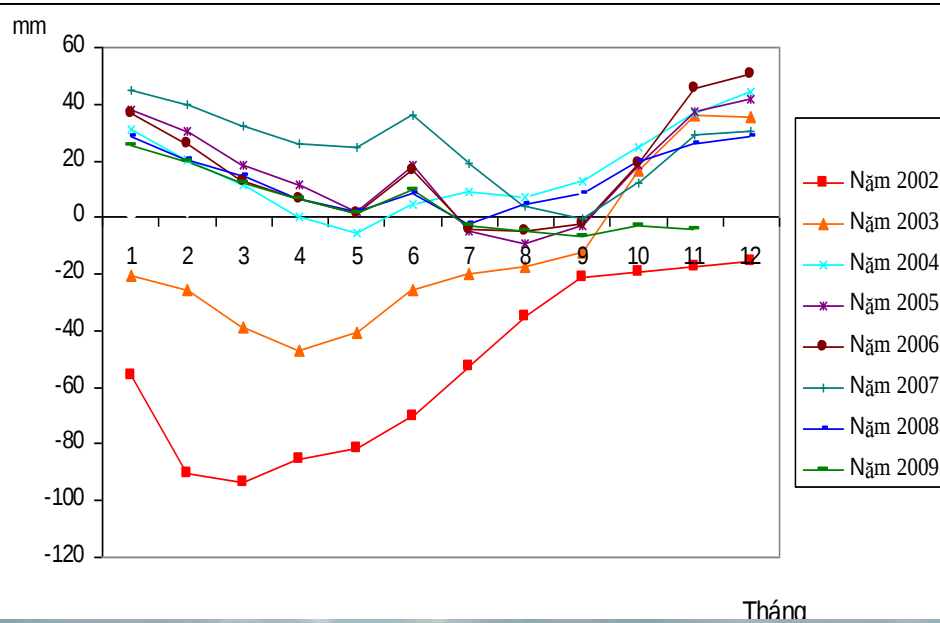
2. Problems from water management



- ***About 6,000 ha of peatland in UMTNP (in 2000).***
- ***On about 3,500 ha of peat soils were lost by fire in 2000 - 2002.***



2. Problems from water management



Peatland forest fire control:

- The main approach to peat management applied has been using canals and tall dykes to prevent fire.



kept high water levels in the national park throughout the year (in dry season, 2009)

2. Problems from water management



Problems from high water level.

- *Water retention whole year resulted in slow-growing Melaleuca forest.*
- *Damage to ecosystems in peatlands*

Seasonally inundated grass lands were disappeared

2. Problems from water management



Water retention whole year resulted in:

- *slow-growing Melaleuca forest.*
- *loss of seasonally inundated grass lands*



Do not hold water, **the high fire risk**, resulting in:

- *Loss of peatlands*
- *Damage to ecosystems, biodiversity*

3. Integrated fire and water management



Workshop on conservation and sustainable development in U Minh Thuong National Park (2009)

discussed on integrated fire and water management for biodiversity rehabilitation and conservation in peatlands.

- The conflict in fire and water management on peatland to be solved by appropriate water management scheme.
- Sustainable maintenance of the U Minh Thuong national park peat lands needs an integrated fire and water management

3. Integrated fire and water management

to apply the method of fire and water management in peatlands of the national park, should have basic data:

- *Topography*
- *Peatlands distribution*
- *Peat layer thickness*
- *Hydrological regime*
- *Land covers*

But all kind of data was nothing at that time.

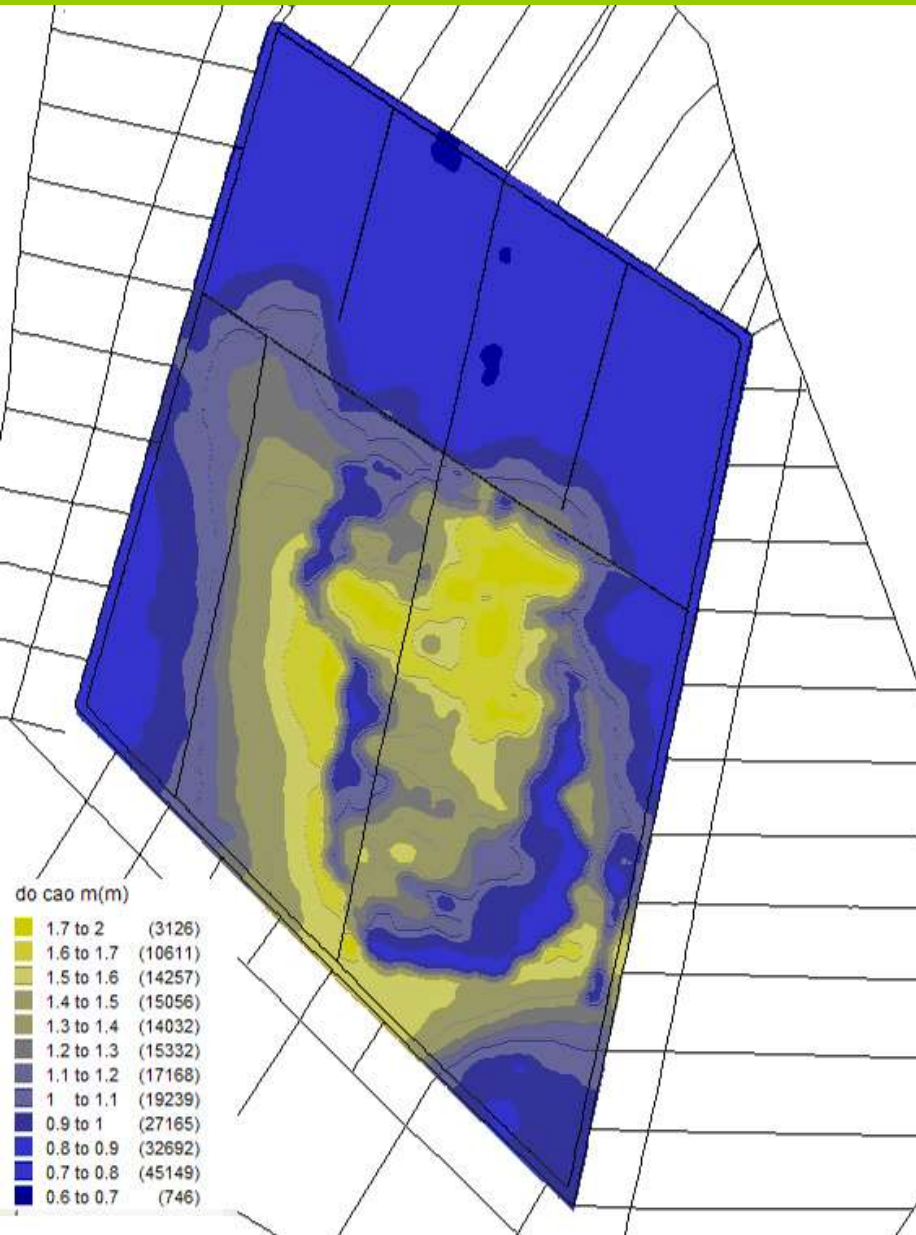
The difference in elevation between the different parts of the peat domes also presents an additional challenge to hydrology management

3. Integrated fire and water management

**In 2010 – 2011: under supported from
ASEAN Peatland Forest Project:
Some information were mapped.**

- *Topography*
- *Peatlands distribution*
- *Peat layer thickness*
- *Landcovers*

3. Integrated fire and water management

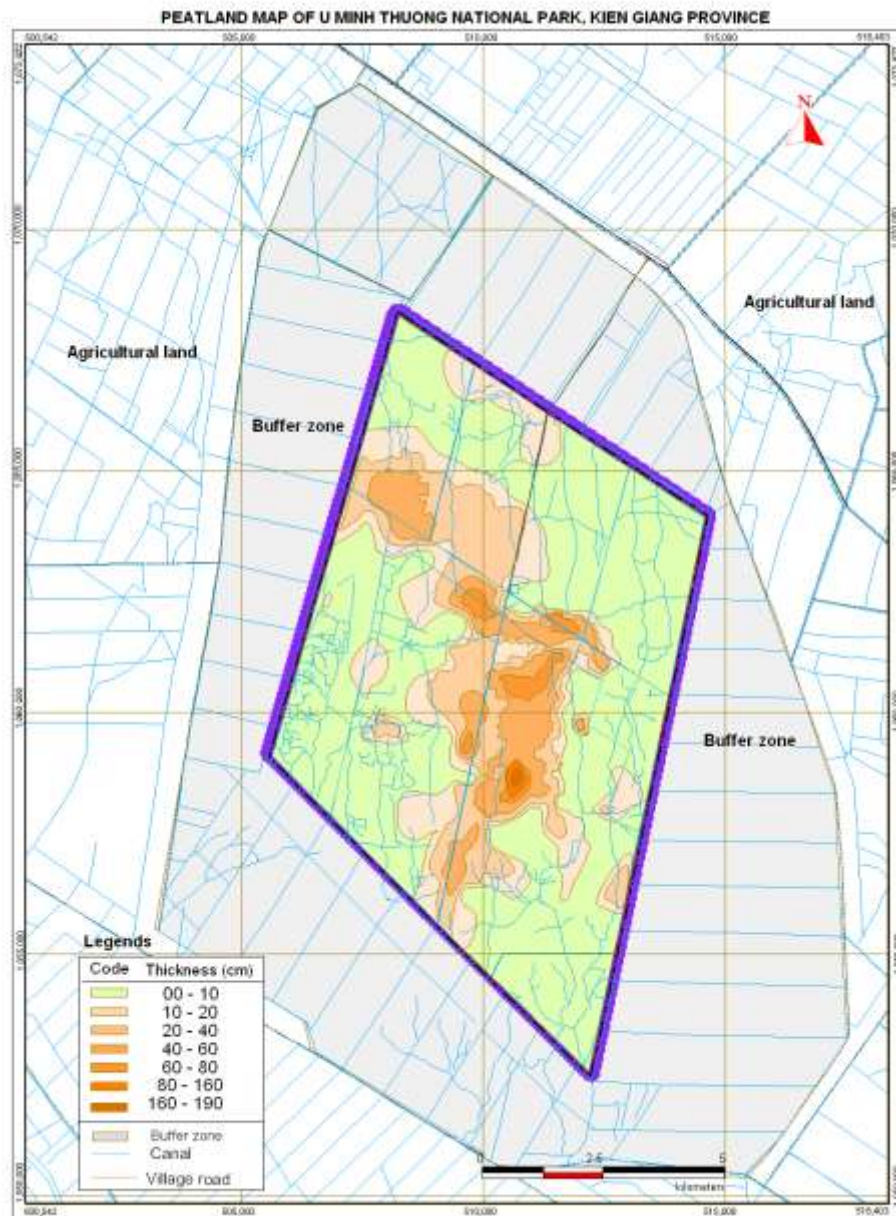


Topography in UMTNP

	Elevation (m)	Area (ha)	%
1	0.6 - 0.8	1718	21.5
2	0.8 - 1.0	2102	26.3
3	1.0 - 1.2	1391	17.4
4	1.2 - 1.4	1144	14.3
5	1.4 - 1.6	1103	13.8
6	1.6 - 1.8	545	6.8
Tổng		8,003	100.0

3. Integrated fire and water management

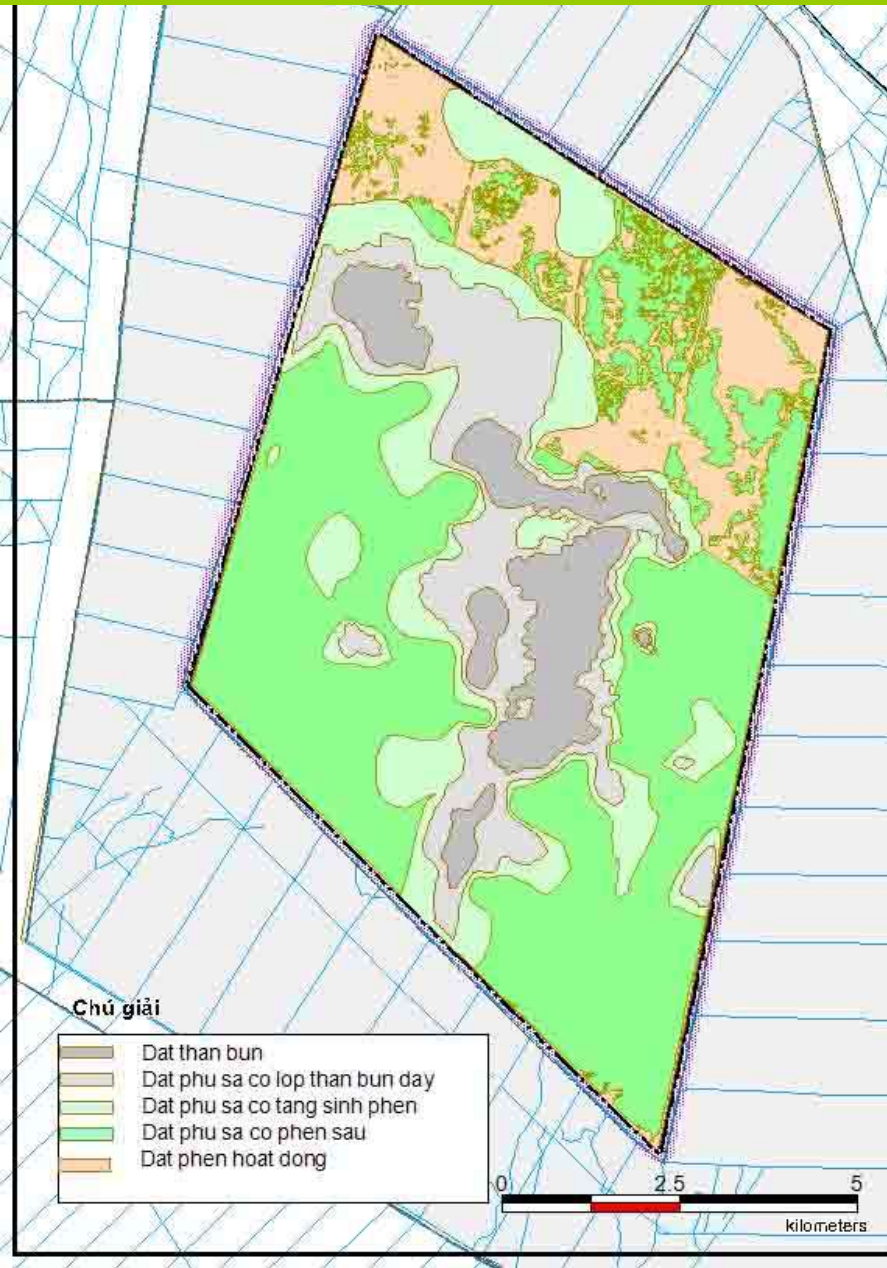
- Peatlands distribution and peat layer thickness (2011)
- It has been useful for establishing water monitoring system and water management.



TT	OM (cm)	Area (ha)
1	0 - 10	4878.32
2	10 - 20	1340.55
Peat layer (cm)		
3	20 - 40	1104.8
4	40 - 60	651.77
5	60 - 80	112.15
6	80 - 160	15.92
7	160 - 190	6.14
Total area		8109.65

3. Integrated fire and water management

- Soil map of U Minh Thuong National Park (2011).
- The result shows peat soils and minerals soil in the park.



Soil types		(ha)
Soil Taxonomy	Vietnamese	
1 Humaquents	Đất than bùn	786
2 Histic Hydraquent	Đất phù sa trầm thủy có lớp than bùn dày	1.105
3 Umbric Sulfic Hydraquents	Đất phù sa trầm thủy có tầng sinh phèn	1.341
4 Sulfic Hydraquents	Đất phù sa có tầng sinh phèn sâu	3.765
5 Sulfaquept/Sulfic Tropaquept	Đất phèn hoạt động và đất phù sa có tầng phèn	1.113
Total area		8.110

3. Integrated fire and water management

Vegetation land covers in UMTNP (2009 - 2010).

- *Melaleuca forest*
- *Aquatic swamps*

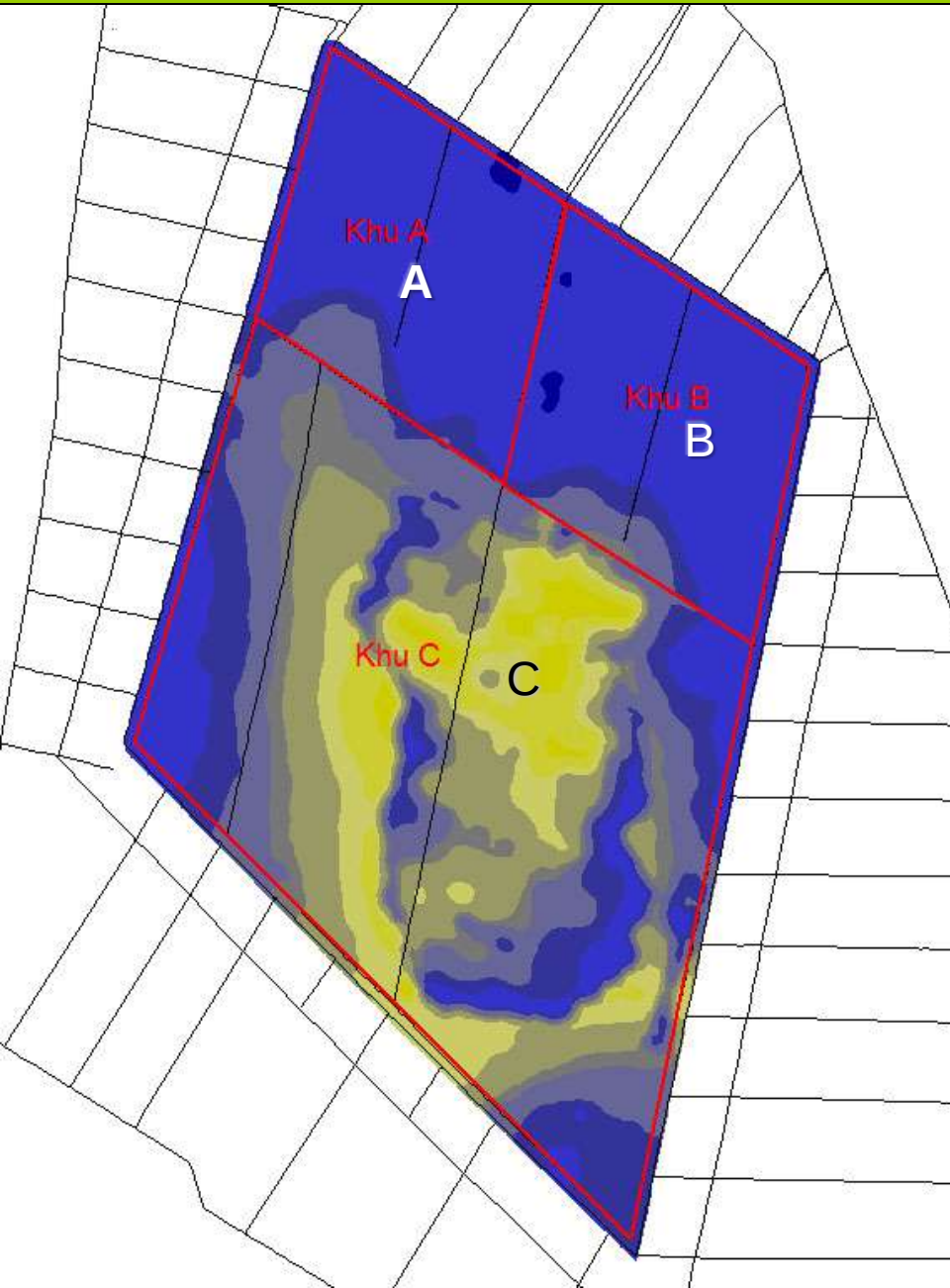


3. Integrated fire and water management

Scientific basis in fire and water management based on:

- *Peat and mineral soils characteristics (pore space, capillary force).*
- *Changes in topography in the park.*
- *Hydrological regime*
- *Current canal and dike systems*

3. Integrated fire and water management



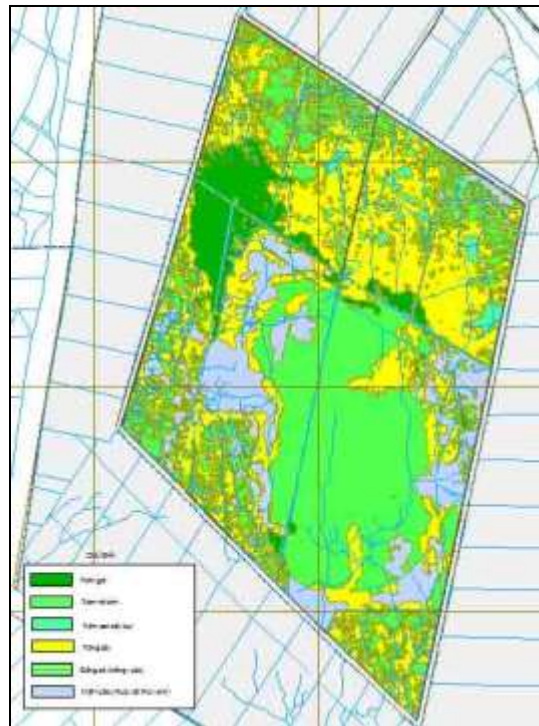
- Based on the change of topography and dyke system applied for water retention, the park area is divided into three zones for water management.
- **Zone A:** High topography: *dry in soil surface, but soil still moist enough*
- **Zone B:** Medium topography: *soil always moist*
- **Zone A:** Low topography: *inundated from 20 – 40 cm*

3. Integrated fire and water management

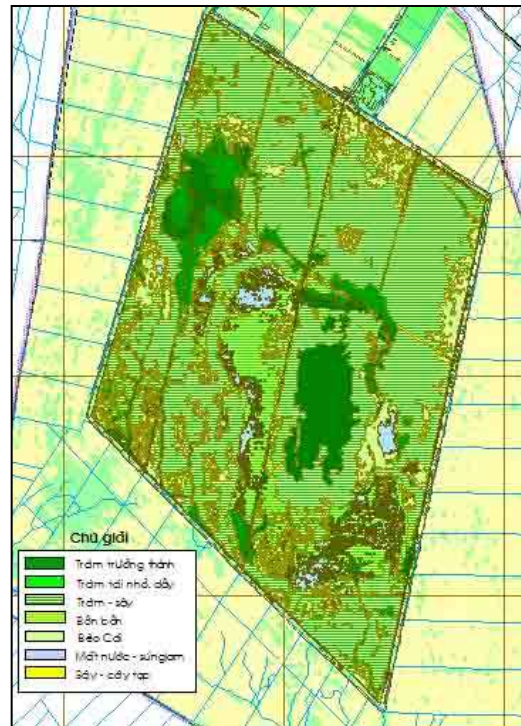
- **Limit flooding during the rainy season and regulate the appropriate water level in the dry season.**
- **Due to capillary force in the soil, as water level drop of 50 cm from soil surface, the upper peat layer is in high moisture content.**
- **Therefore, the water level does not exceed 50 cm in depth.**
- **The adjustment of such water level is due to the dike system and sluices.**

3. Integrated fire and water management

Changes of ecosystems after applying integrated fire and water management



Ecosystems in UMTNP, 2006



Ecosystems in UMTNP, 2009



Ecosystems in UMTNP, 2011

	Ecosystems	Area(ha)		Ecosystems	Area(ha)		Ecosystems	Area(ha)
1	Maleuca forest	3.904,16	1	Maleuca forest	4.440,87	1	Maleuca forest	4.460,78
2	Grass land	2.772,50	2	Grass land	0	2	Grass land	1.447,69
3	Aquatic swamp	1.126,74	3	Aquatic swamp	3.393,37	3	Aquatic swamp	1.912,8
4	Shrubs	141,8	4	Shrubs	142,55	4	Shrubs	142,55

4. Remarks

- **Forest fires on peatland has been the obsession of the U Minh Thuong national park management, because not only damage to forest but also to the peat layer.**
- **Inappropriate water management will damage ecosystems and biodiversity in peatlands.**
- **Change in topography is one of difficult issues in the water management in peatlands.**
- **Initially application of the integrated fire and water management at U Minh Thuong National Park has drawn as reasonable, but need further research to be able to have more definitive conclusion.**

Độ cao mặt đất	Diện tích (ha)			
	Khu A	Khu B	Khu C	Tổng
0.6-0.8m	892	826		1718
0.8-1.0m	366	447	1288	2101
1.0-1.2m	91	88	1212	1391
1.2-1.4m		12	1132	1144
1.4-1.6m			1103	1103
1.6-1.8m			545	545
Tổng diện tích	1349	1374	5280	8003

- A water management regime is now in place in UMTNP using a hydrological model developed by Asso. prof. Dr. Vuong Van Quynh at the Vietnam Forest University

