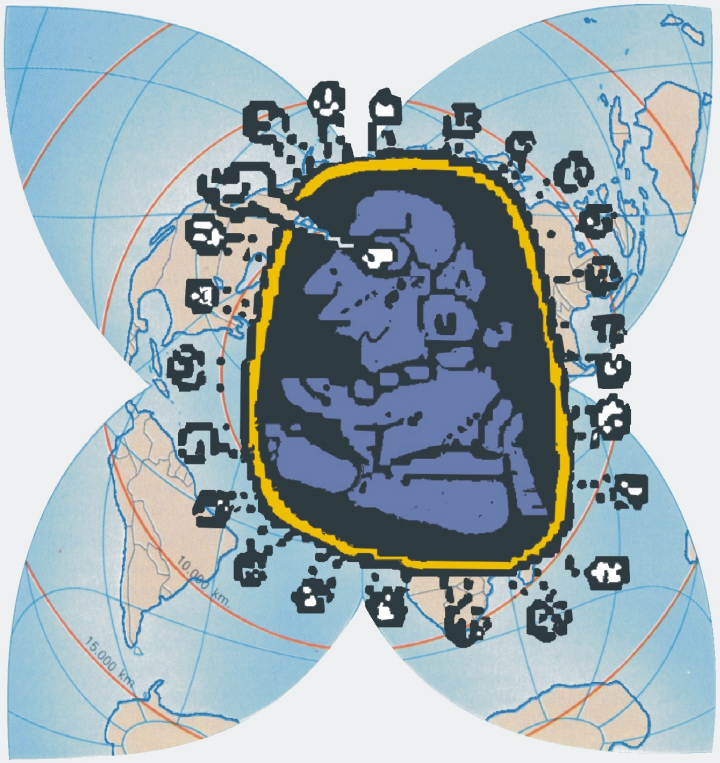
STATE GOVERNMENT OF VERACRUZ

PAPALOAPAN DEVELOPMENT COUNCIL

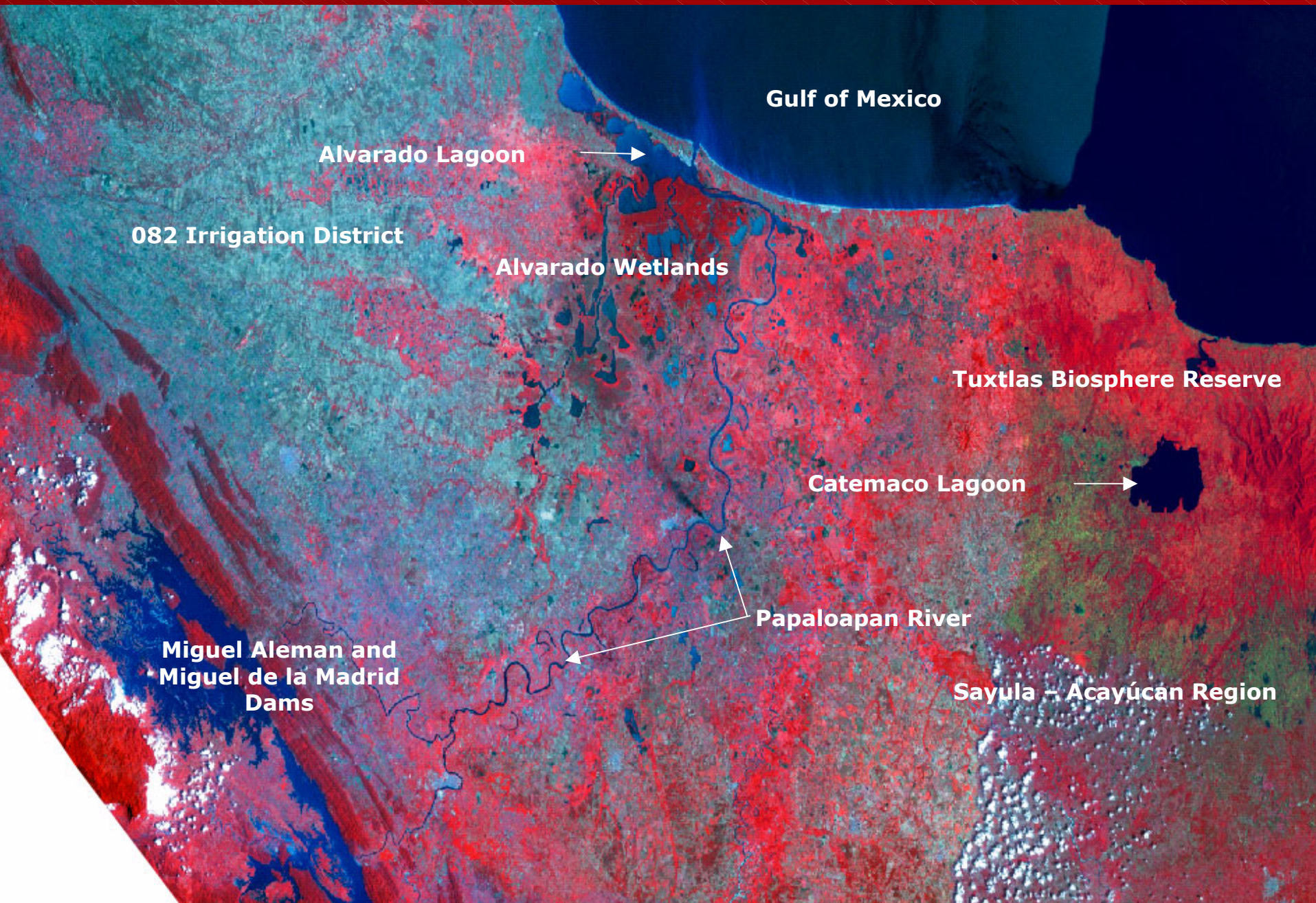
GIS AND REMOTE SENSING LABORATORY



LABORATORIO DE SISTEMAS DE INFORMACION GEOGRAFICA Y SENSORES REMOTOS DEL PAPALOAPAN

Objective:Digital information analysis of environmental factors such as water, soil, vegetation, climate and topography using GIS and remote sensing to support project development in the areas of irrigated agriculture, reforestation, aquaculture and for the monitoring and prediction of factors that affect marine resources in the Papaloapan river basin region.

Zone of Influence (43 Municipalities of Veracruz)



The GIS & RS Lab of the Papaloapan Basin is integrated with:

a) Digital información, software and equipment:

1. Satellite imagery, total coverage of various spatial resolutions of the Papalopan river basin region.
2. Digital cartography at 1:200,000 and 1:50,000 scales covering 43 municipalities of the Papaloapan basin within the Veracruz area.
3. GIS & RS software: ARCGIS, ERDAS, ENVI.
4. Georeferentiation systems.

b) Spatial and statiscal modelling techniques:

1. Soil potential maps elaboration through climatic modelling.
2. Watershed delimitation and runoff-area location.
3. Location of susceptible areas for reforestation and monitoring of ongoing reforestation programs through biomass percent determination.
4. Red Tide monitoring on affected regions (in process).

Comparison of Three Different Spatial Resolutions from Satellite Imagery

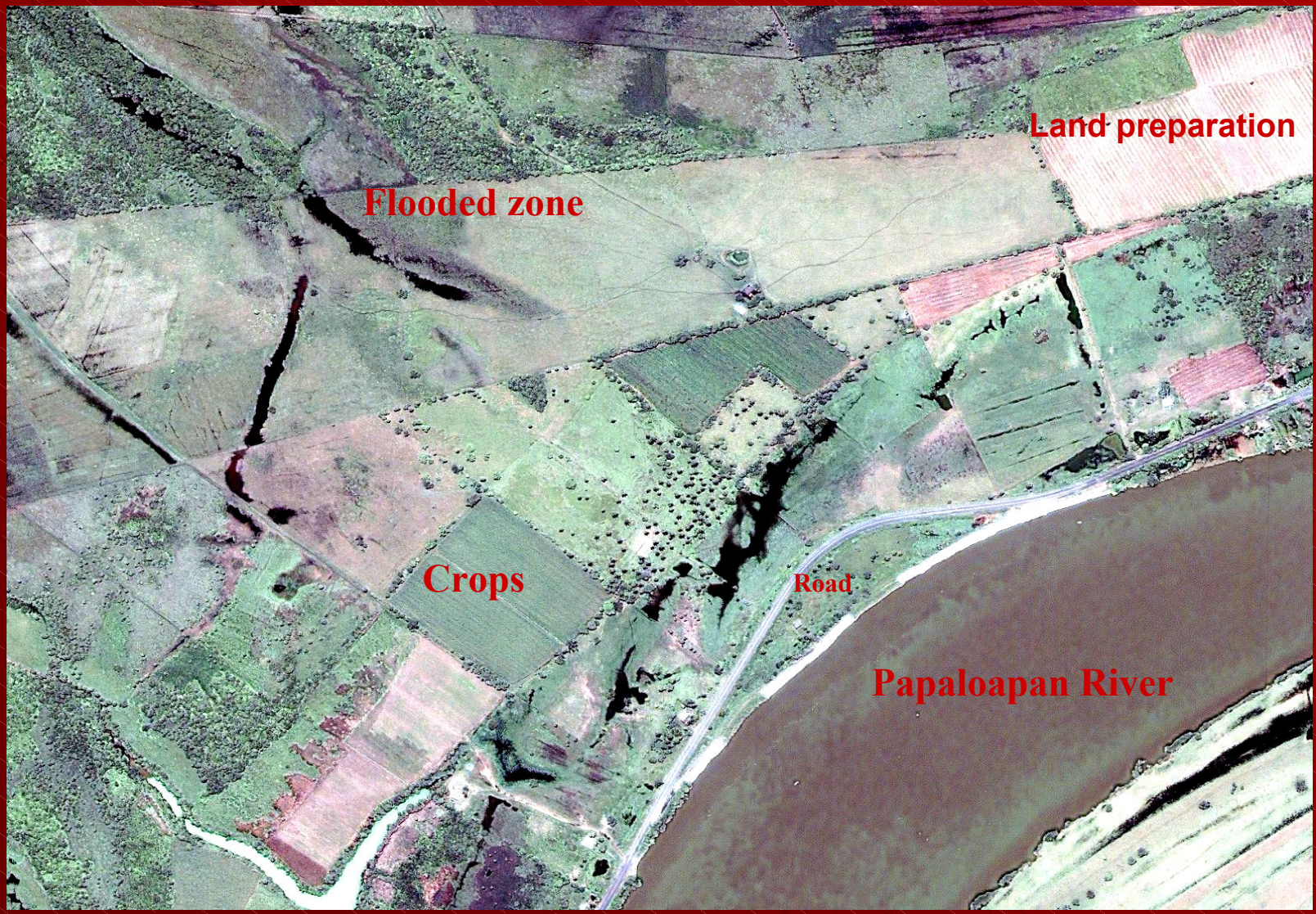
LANDSAT 7 (30 m)

IRS (5.8)

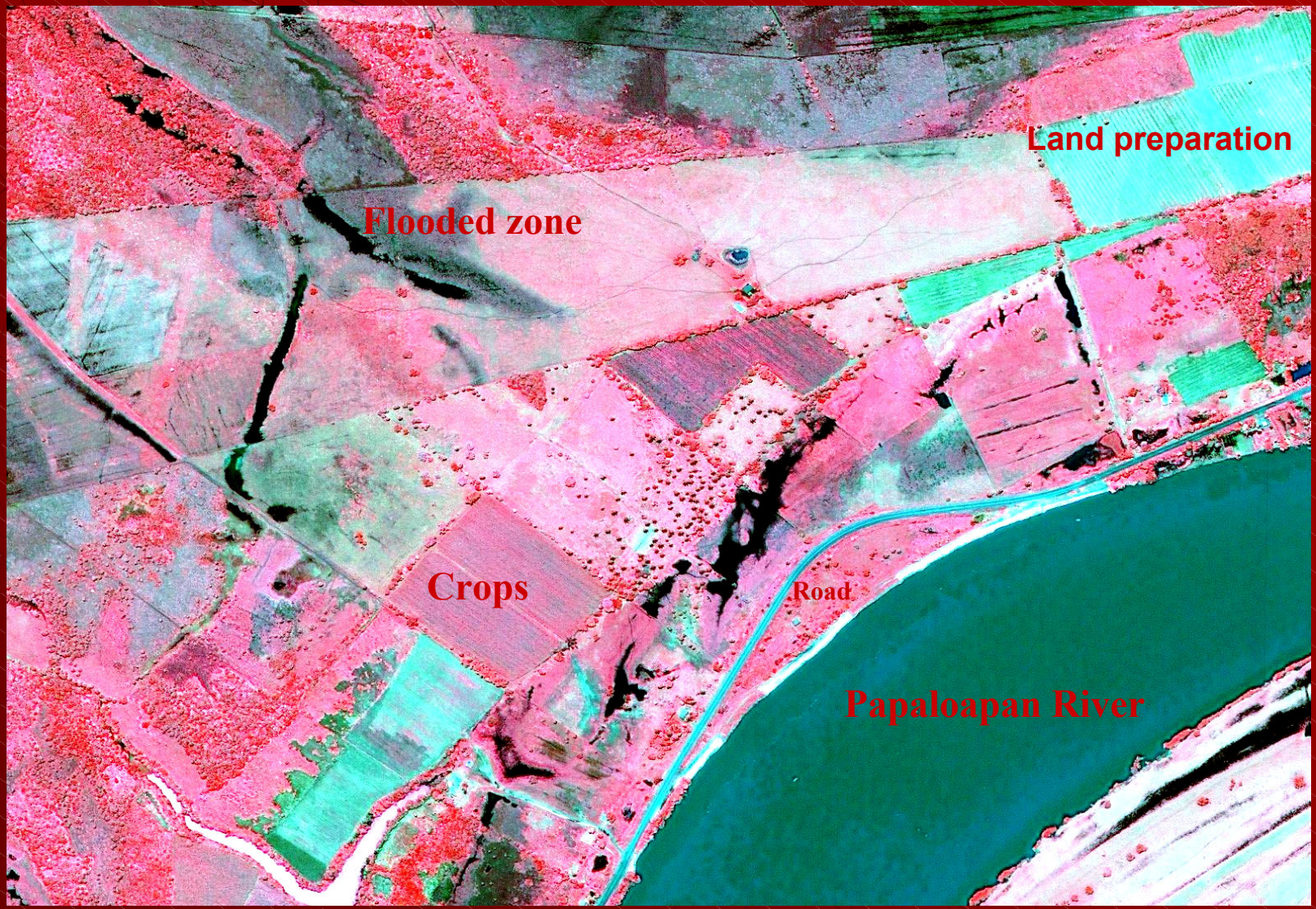
IKONOS (1 m)

High-resolution Ikonos image processing to map present soil use and potential to individual plot level.

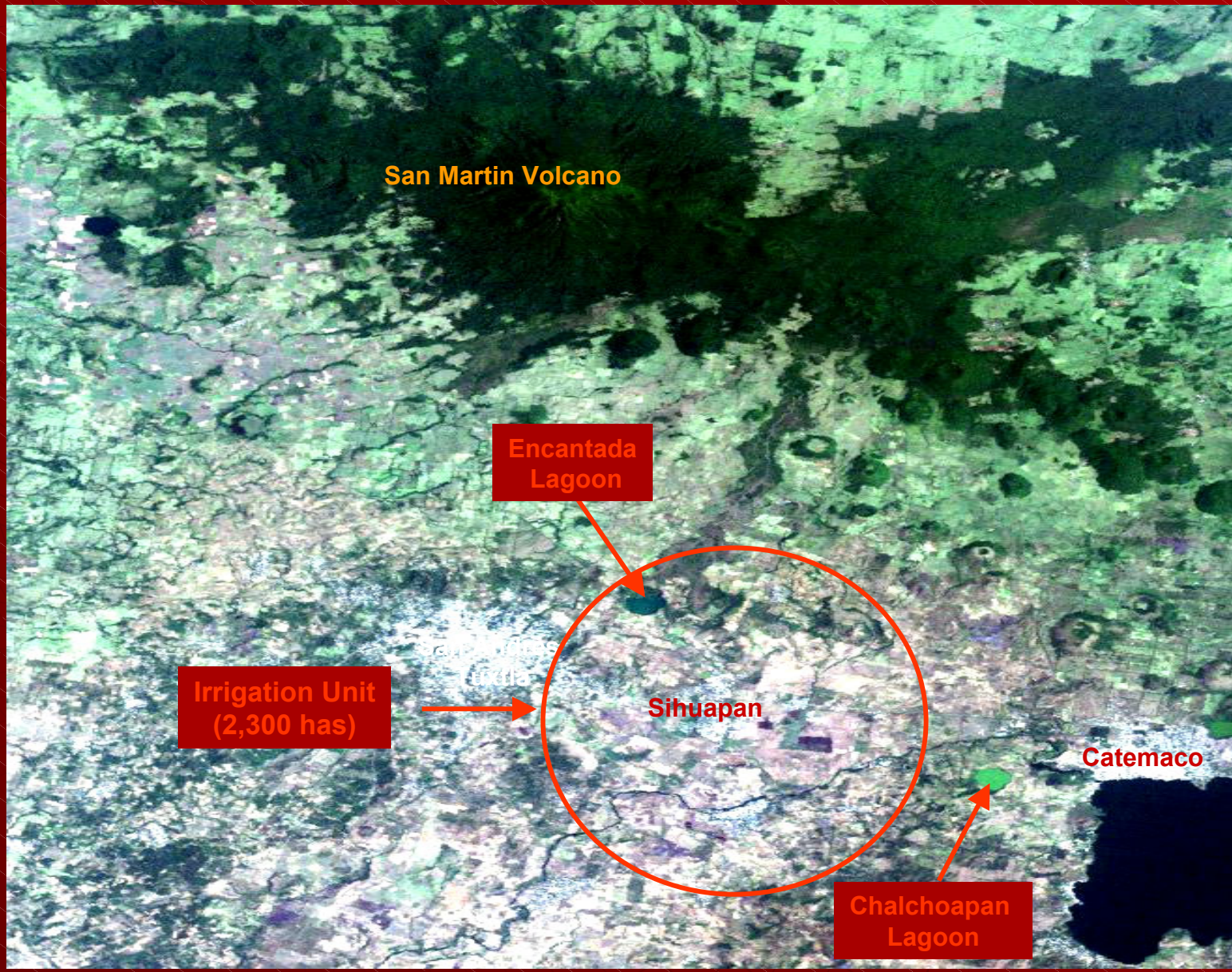
Visible-Color Composite



Infrared-Visible Composite



The use of satellite imagery and digital cartography allow watershed delimitation, as in this case, for the Laguna Encantada Irrigation Unit.



Native Species Reforestation Pilot Project at the influence zone of Laguna Encantada Irrigation Unit

1. Plant nursery and germoplasm bank facilities for native forest species with high potential for wood and fruit production, in collaboration with the National University of Mexico Tropical Biology Station, located at the heart of Tuxtlas Biosphere Reserve.

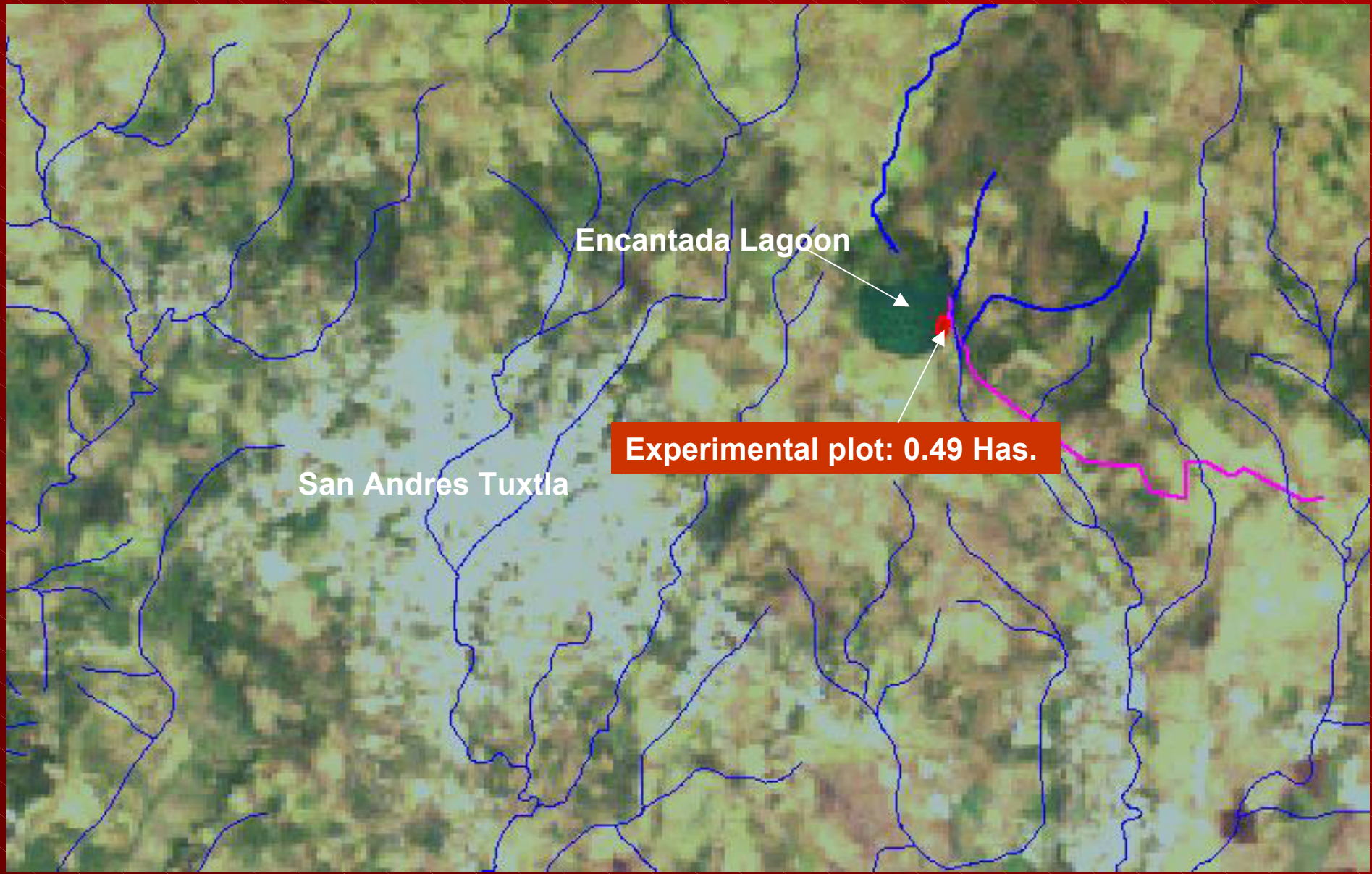
2. Site selection to establish an experimental reforestation plot.

3. Plot establishment with native species of rapid growth with potential for the production of wood, fruits, condiments and medicinal herbs of commercial value.

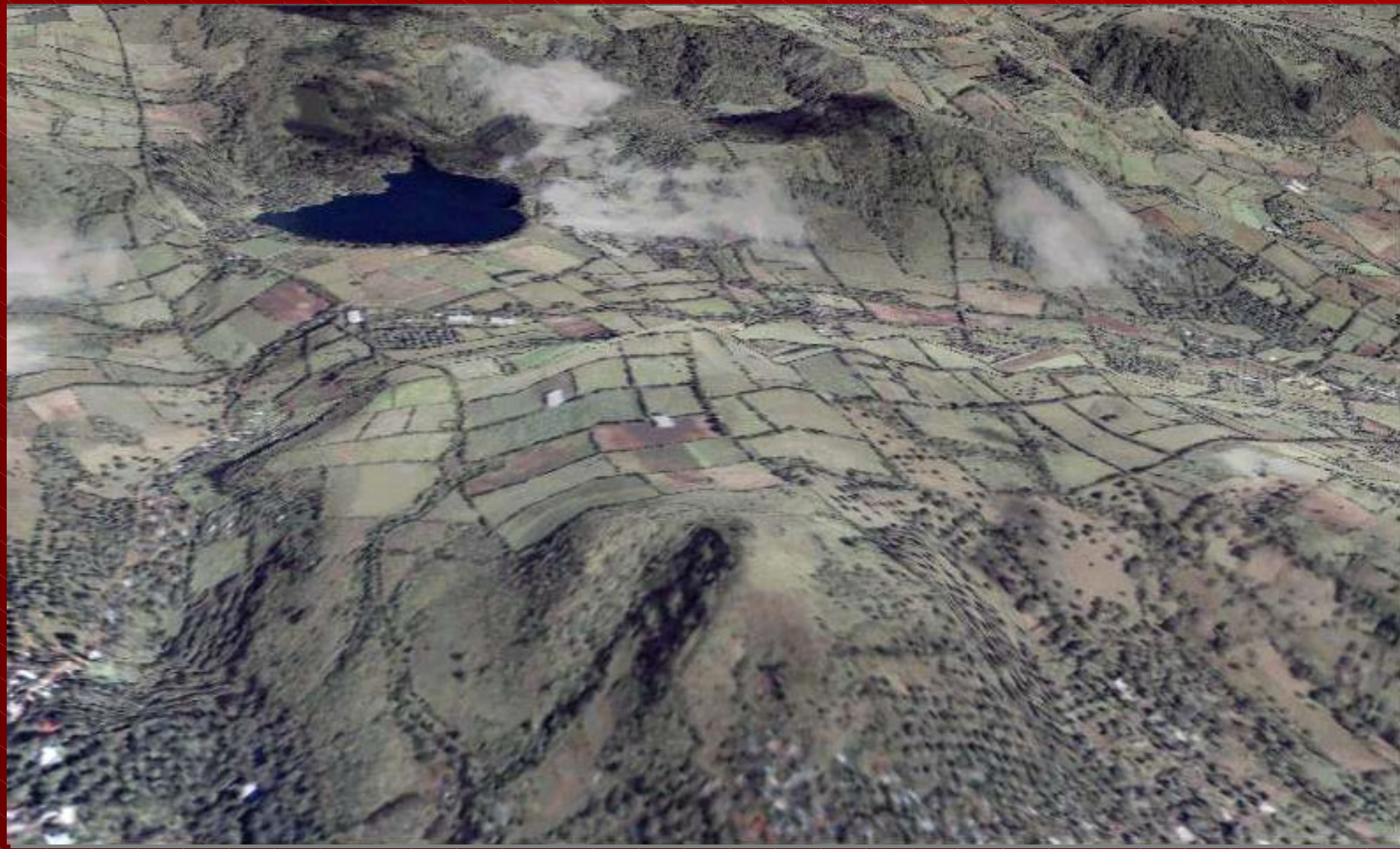
4. Elaboration of a Practical Handbook for farmers for field identification, management and use of native species.

5. Training of local forestry technicians and farmers.

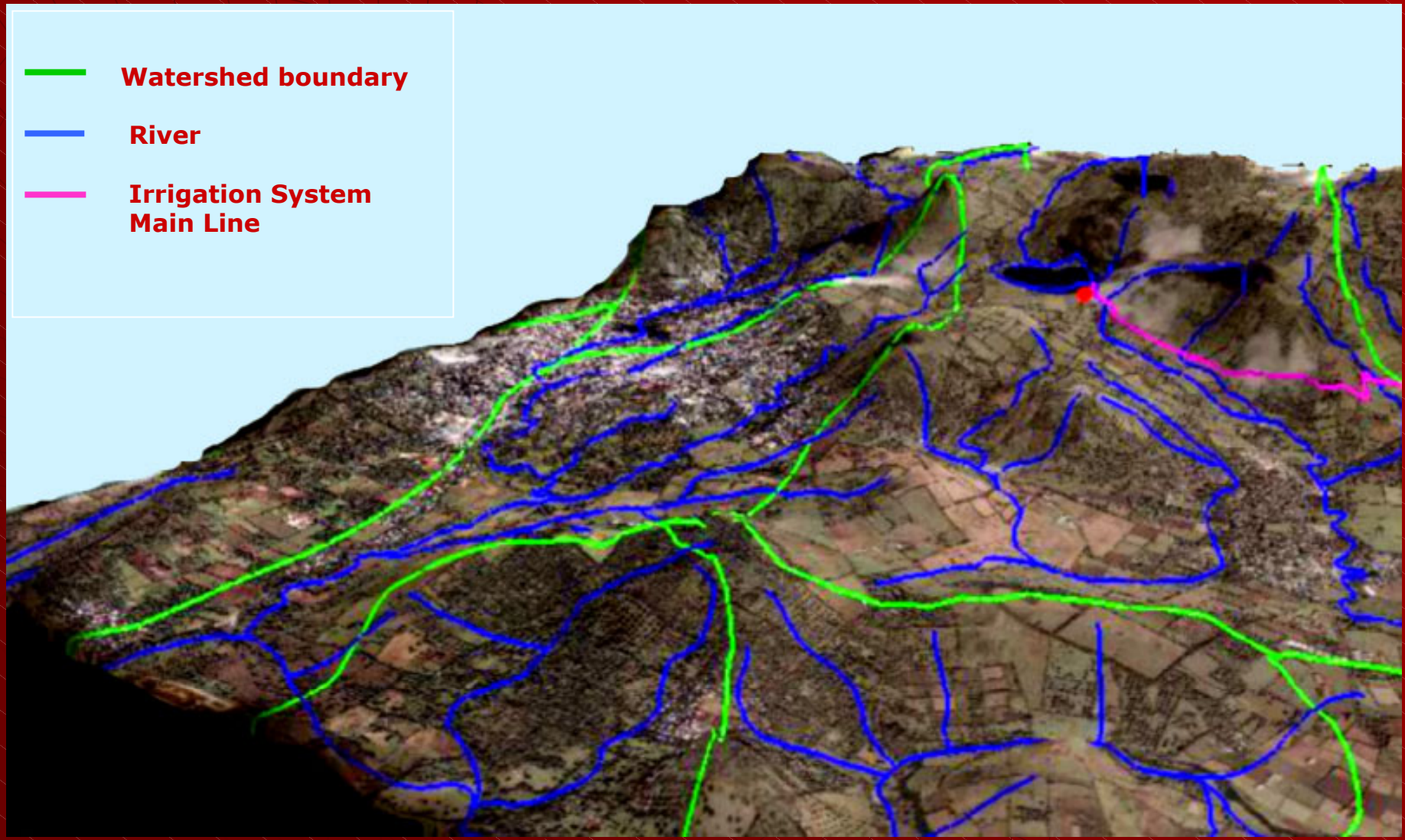
Landsat Satellite Image of Encantada Lagoon



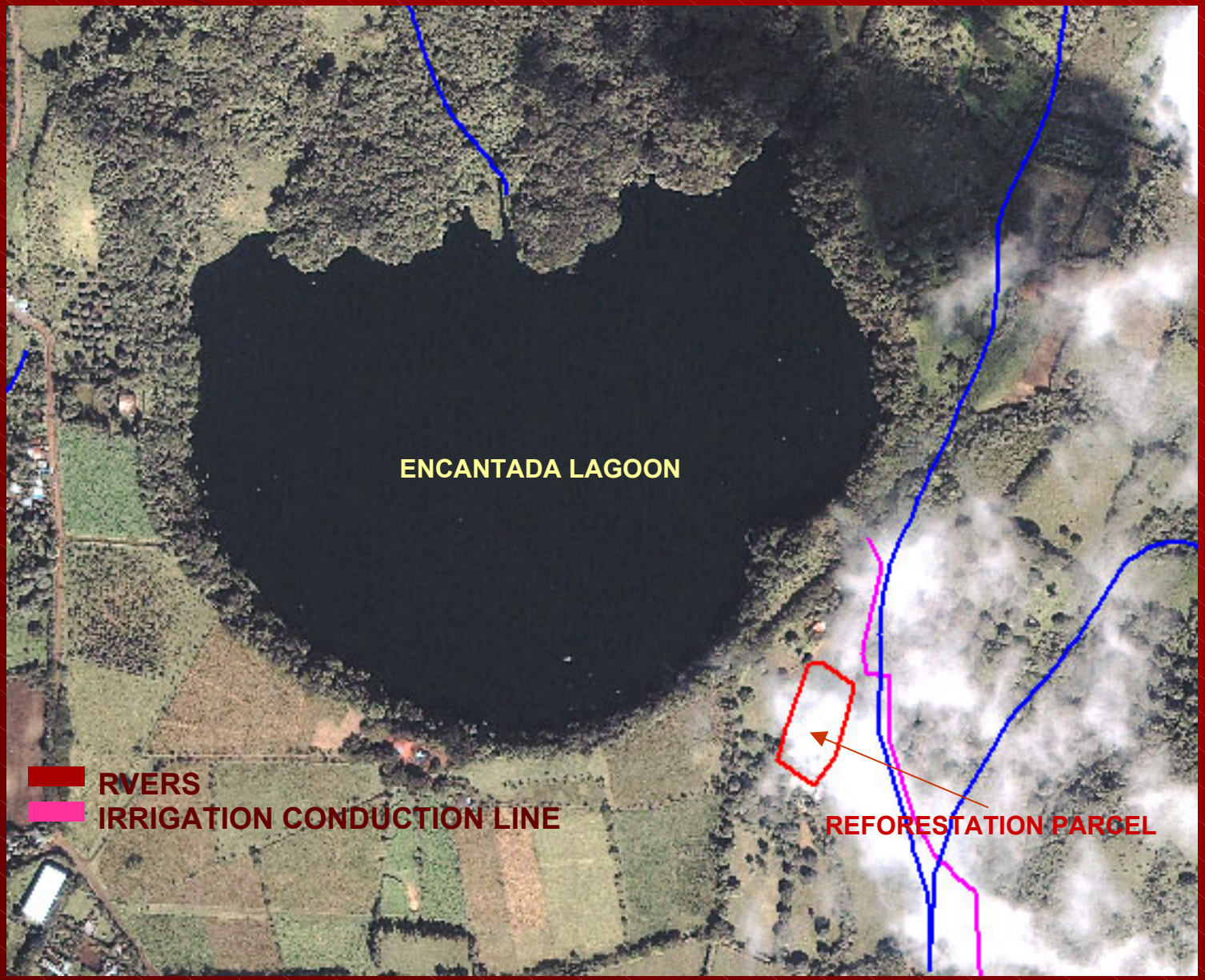
HIGH RESOLUTION SATELLITE IMAGE ON A DIGITAL ELEVATION MODEL OF ENCANTADA LAGOON, SAN ANDRES TUXTLA, VER.



Tridimentional Model of Encantada Lagoon Watershed in San Andrés Tuxtla, Ver.



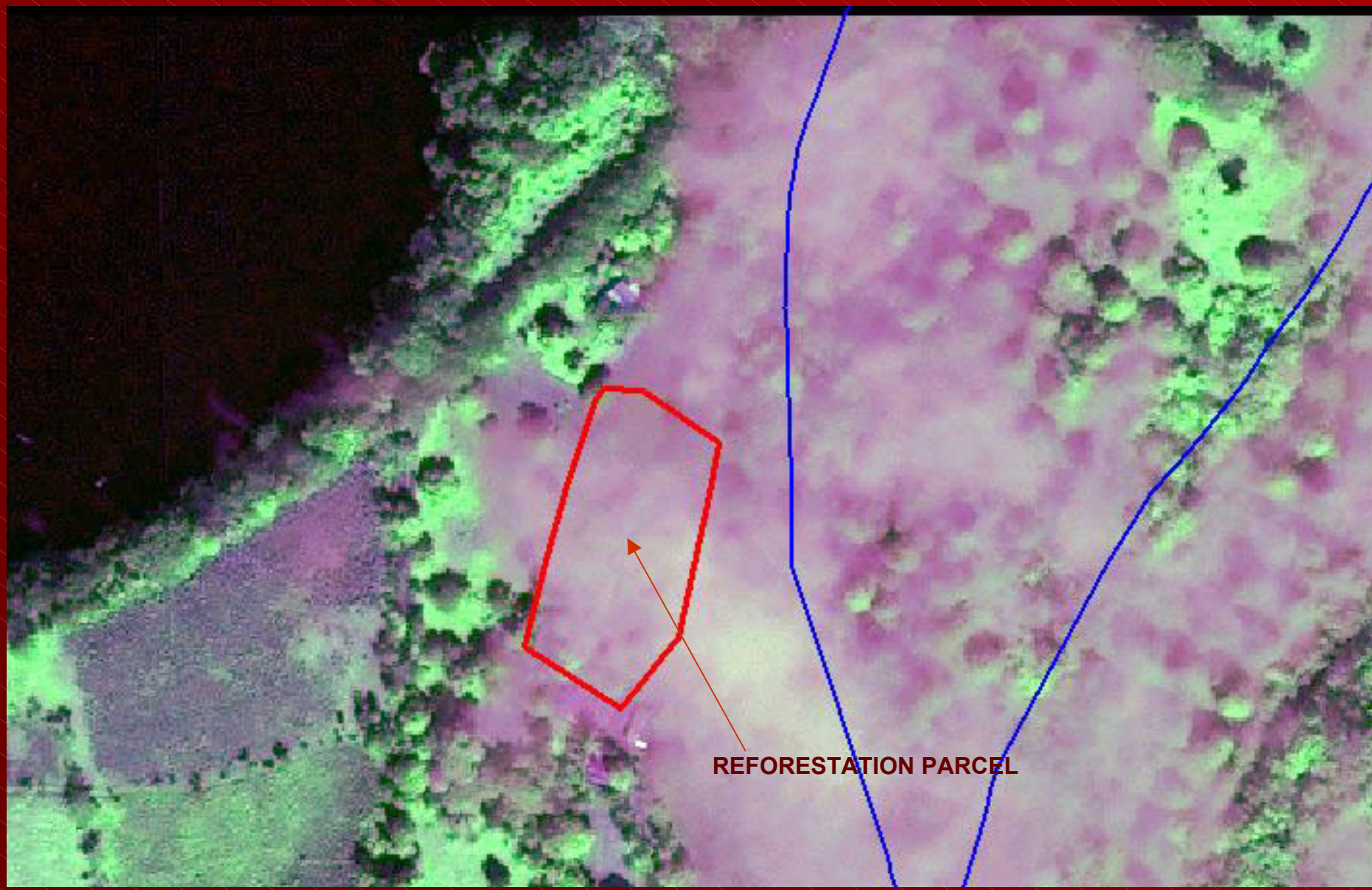
IKONOS IMAGE VISIBLE-COLOR COMPOSITE SHOWING DEFORESTED AREAS AROUND ENCANTADA LAGOON AND THE NATIVE FOREST SPECIES EXPERIMENTAL PLOT LOCATION.



IKONOS IMAGE INFRARED-VISIBLE COMPOSITE SHOWING DEFORESTED AREAS AROUND ENCANTADA LAGOON AND NUBOSITY OVER THE EXPERIMENTAL PLOT. IT IS POSSIBLE TO DETECT BIOMASS VOLUME.

IKONOS IMAGE FALSE-COLOR COMPOSITE SHOWING DEFORESTED AREAS AROUND ENCANTADA LAGOON. BAND COMBINATION ALLOWS A BETTER VIEW THROUGH THE CLOUDS.

IKONOS IMAGE FALSE-COLOR COMPOSITE CLOSE UP. LIGHT COLORS ZONES INDICATE LOW VEGETATION COVER. GPS GEOREFERENCED POLIGON, HALF A HECTARE (0.49 HAS.). PARTIAL FILTERING OF NUBOSITY.



DEMOSTRATIVE REFORESTING PLOT WITH NATIVE SPECIES WITH HIGH POTENTIAL FOR WOOD AND FRUIT PRODUCTION IN LOS TUXTLAS. FIELD VISIT: REMOTE SENSING DATA WAS CONFIRMED.

FIELD VISIT: IRRIGATION SYSTEM INSTALLED AND OPERATING EFFICIENTLY

21 NATIVE SPECIES WERE PLANTED FOR WOOD AND FRUIT PRODUCTION, USING SEED COLLECTED BY BIOLOGISTS AT THE TROPICAL BIOLOGY STATION OF UNAM.

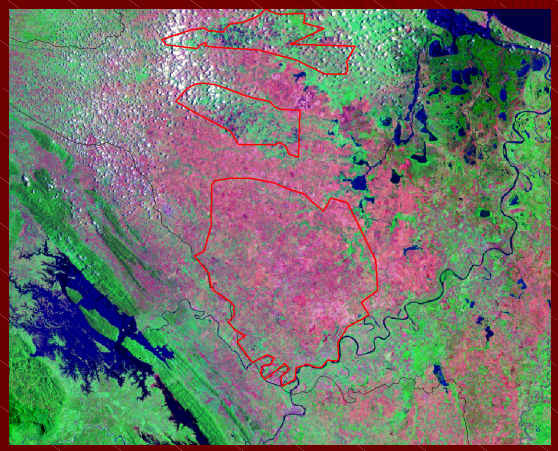

AZUD

Implementation of the Geographical Information System (GIS) of the Papaloapan Basin in Collaboration with CIMMYT (International Center for Corn and Wheat Improvement)

Objective: To learn, analize, model and attend problems related to sustainable agriculture and natural resource conservation.

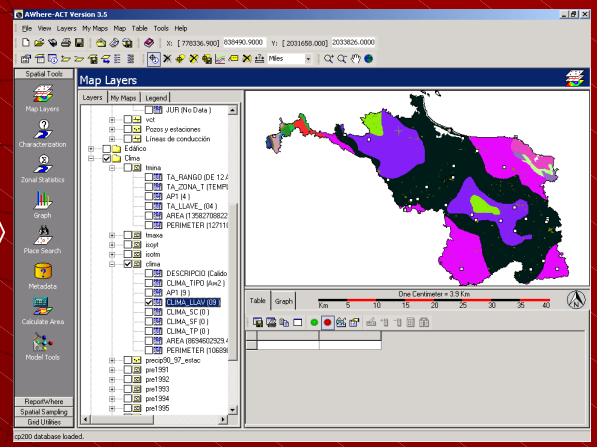
Specific Objectives :

- To define agricultural potential areas according to climatic and edaphic requirements of selected crops.
- To promote the participation of the different sectors involved in the development of agriculture in the region, through consultive meetings in order to define and gather geospatial information according to local needs in the decision-making process.
- To establish a training program to manipulate, analize and manage geospatial data sets using GIS software (Act Where) for key social sectors.



(1)

(2)

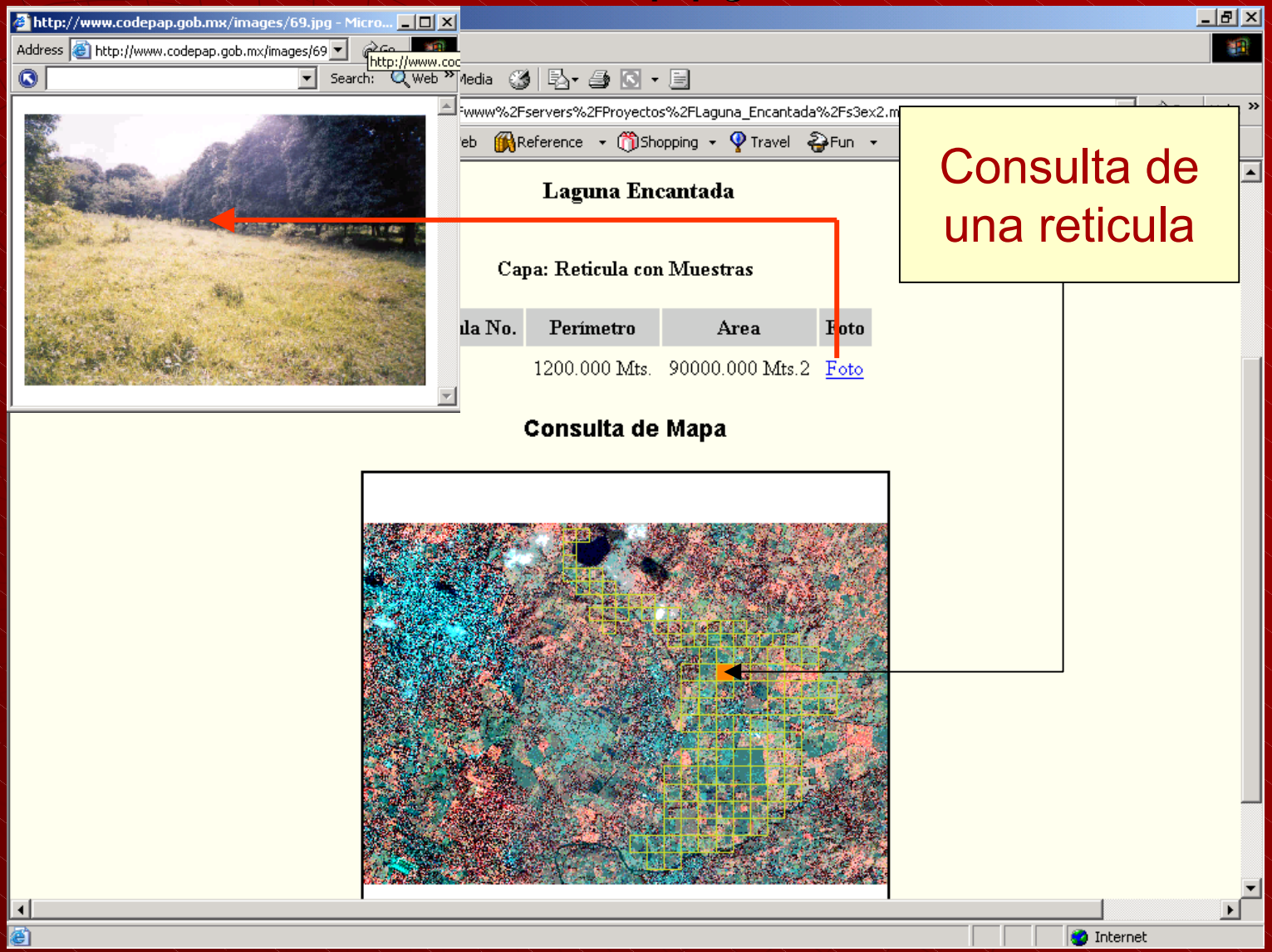


(3)

Geographical Information System in the Internet

Interactive web page for the difusion of Geographic Information of the irrigated agriculture projects under development by CODEPAP.

www.codepap.gob.mx



Area of influence of the Mangrove Reforestation Projects
Landsat Image Visible Color Composite

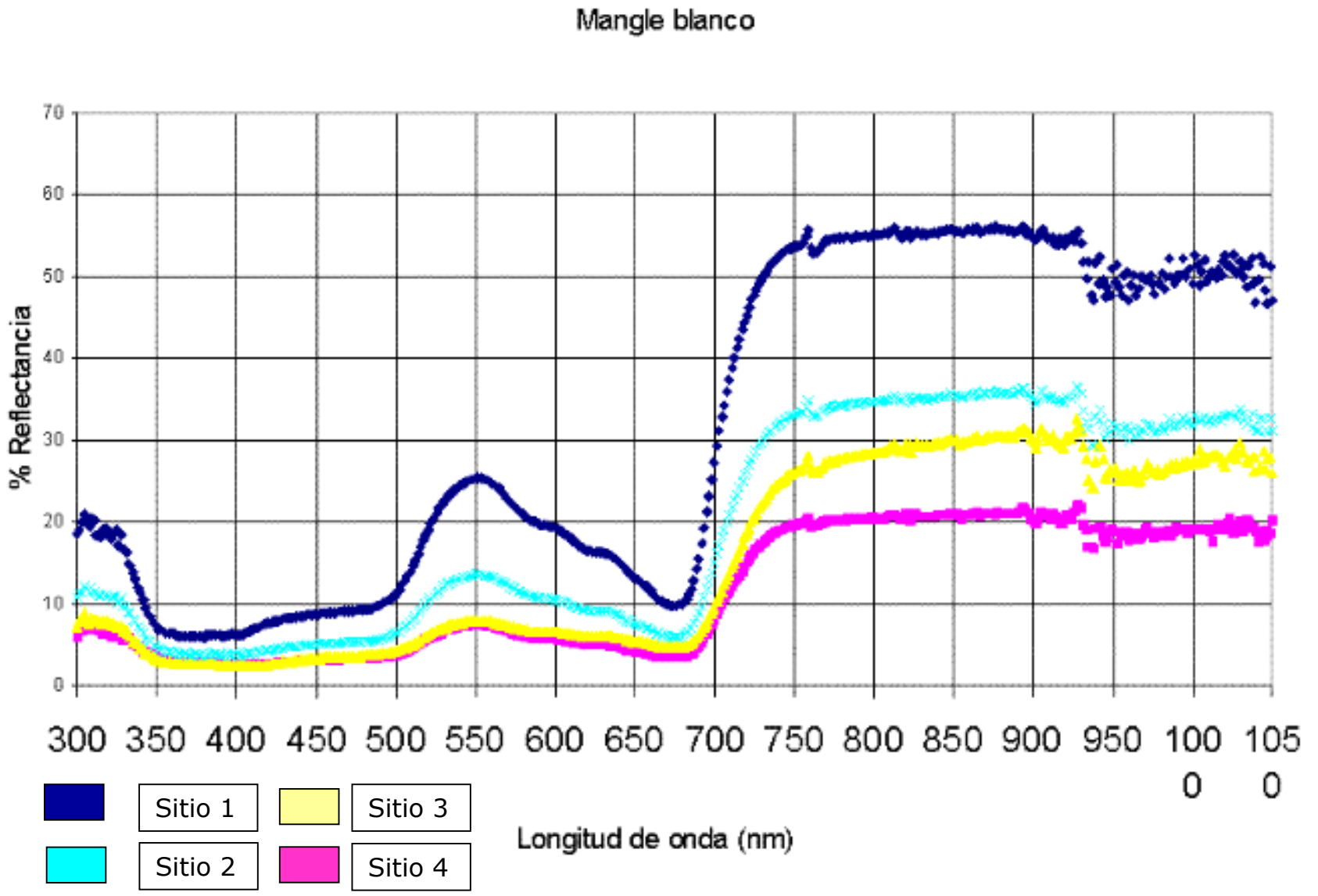
Mangrove Deforestation

Training Site Surveying with GPS for image analysis

ALVARADO WETLANDS SATELLITE IMAGE TO IDENTIFY MANGROVE REFORESTATION AREAS

Training Sites Location with GPS and Reflectance Measurement with a Hand-held Spectroradiometer.

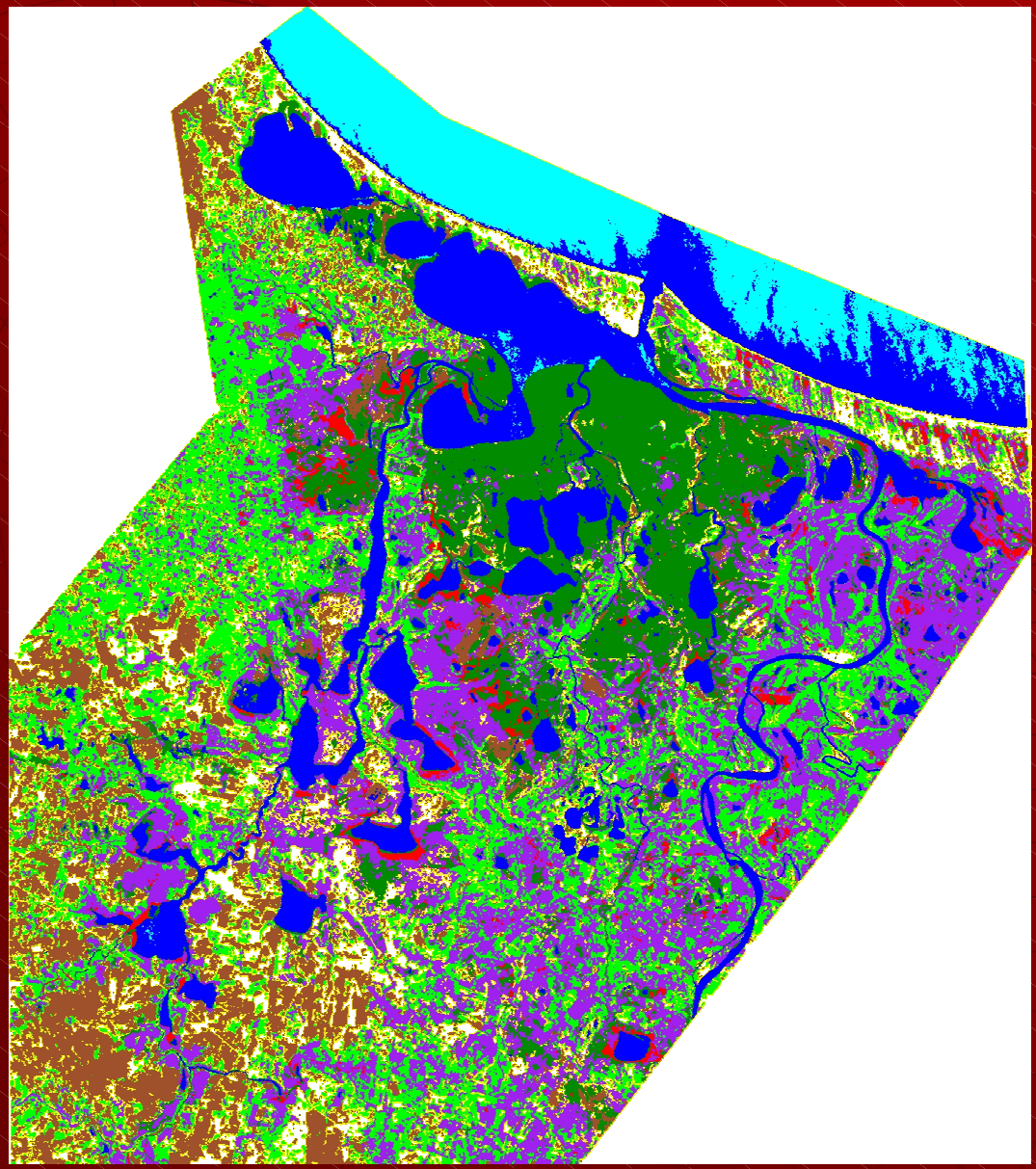
Spectral Signature Measured in the Field (White Mangrove)



ALVARADO WETLANDS
IRS Satellite Image Visible-Color Composite

Alvarado Wetlands Soil Use

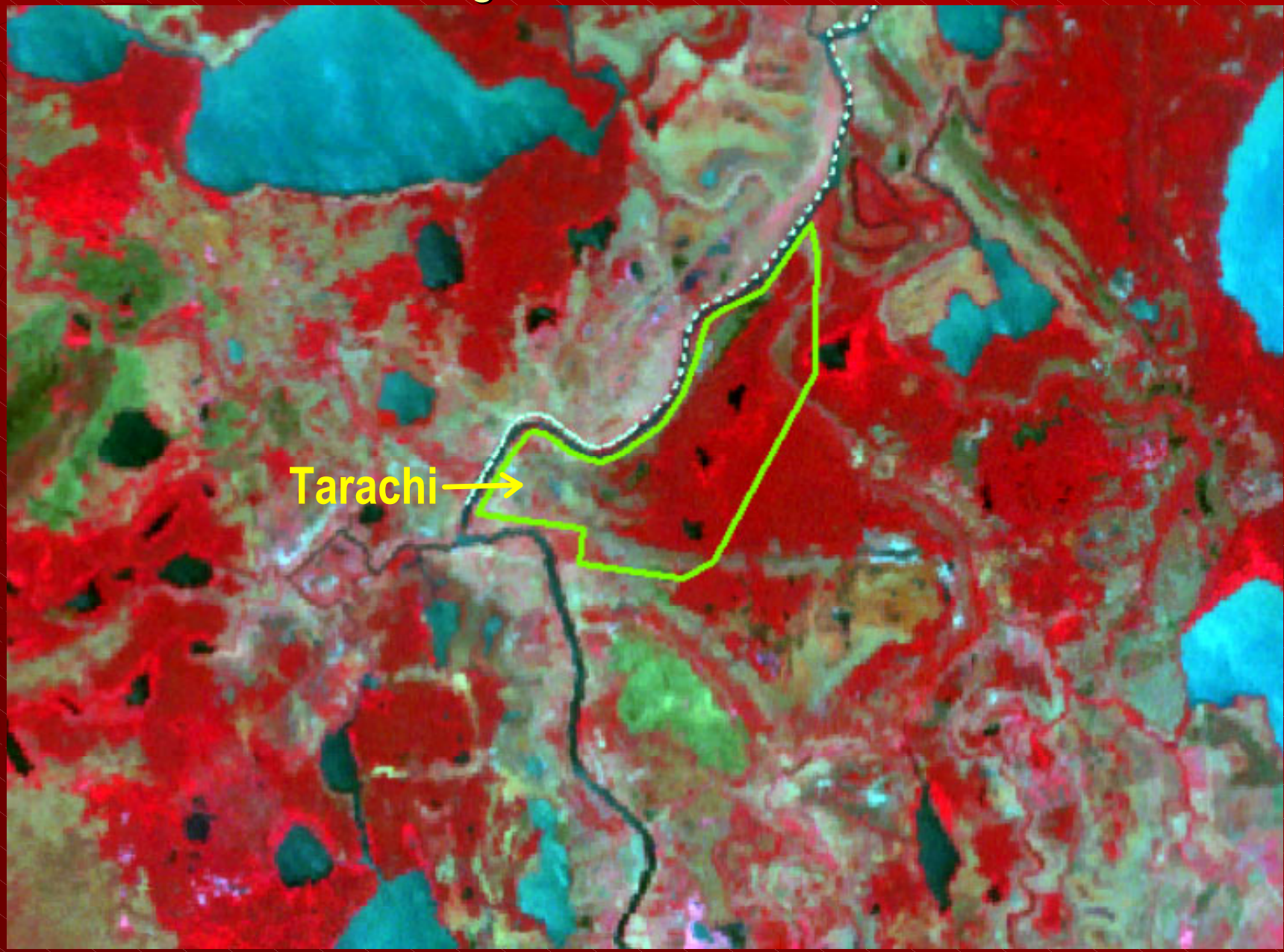
Classified IRS Image



- Mangrove (25,676 has)
- Water lily (3,954 has)
- Crops
- Pastures
- Dried grass
- Barren areas
- Fresh water
- Sea water

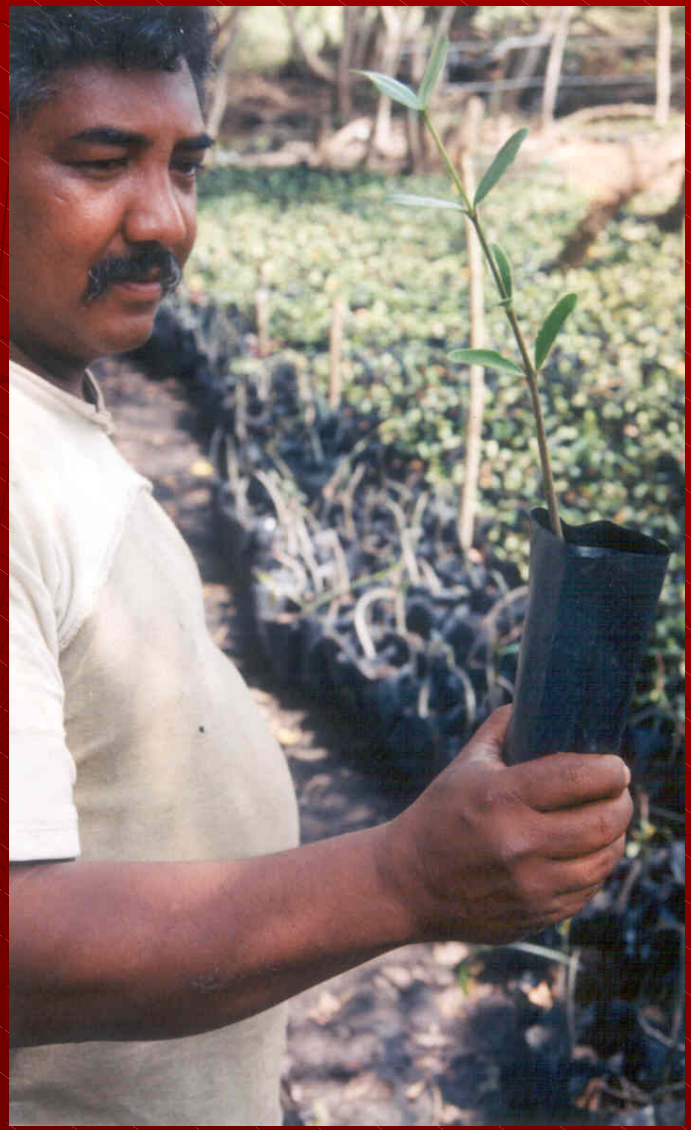
GPS Survey of Mangrove Reforestation Areas at Tarachi, Alvarado, Ver.

Location area for Mangrove Reforestation and Natural Regeneration: 150 Has.



From mangrove seed collection in Alvarado Wetlands...

...to mangrove seedlings.



Mangrove nursery construction in the area.

“El Tarachi” Ejido, Alvarado, Ver.

“La Mojarra” Ejido, Acula, Ver.

High-Tech Mangrove Nursery at Tarachi area (Alvarado).

Complementary Economic Activities

Payment to farmers for their mangrove reforestation work

Aquaculture associated to natural habitat preservation

Mangrove honey production

Ecoturism promotion

Integration of the GIS Network between CODEPAP and three Technological Institutes located within the Papaloapan region.

LABORATORIO DE SISTEMAS DE INFORMACION GEOGRAFICA Y SENSORES REMOTOS DEL PAPALOAPAN

- GIS and Remote Sensing training.
- Donation of GIS and remote sensing software (ENVI and ArcView).
- GPS equipment.

Papaloapan Aquatic Ecosystems Study Laboratory CODEPAP, Alvarado, Ver

- Georeferenced information surveys
- Water sampling for phytoplankton and water quality analysis.
- Red Tide monitoring.

GIS Network

Technological Institute Tierra Blanca

Technological Institute San Andrés Tuxtla

Technological Institute Cosamaloapan

Red Tide:

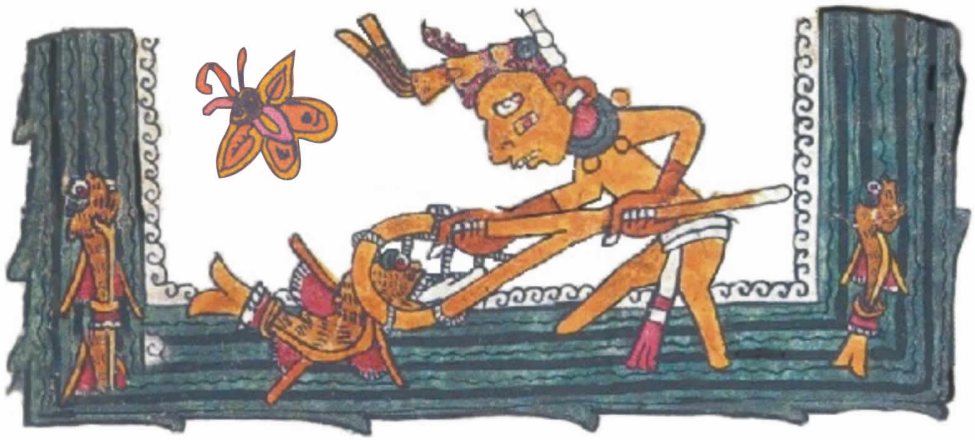
- We collaborate with the Health Secretariat in monitoring the Gulf coast at the Papaloapan Basin influence area, through the Papaloapan Aquatic Ecosystems Study Laboratory in Alvarado.
- We have highly specialized equipment and nautical and lagoon transport.

ACCORD OF THE STATES of the Gulf OF MEXICO

Red Tide:

CODEPAP has two associated labs that generate Remote Sensing and water quality assesment data from wetlands and estuaries of the Papaloapan river basin.

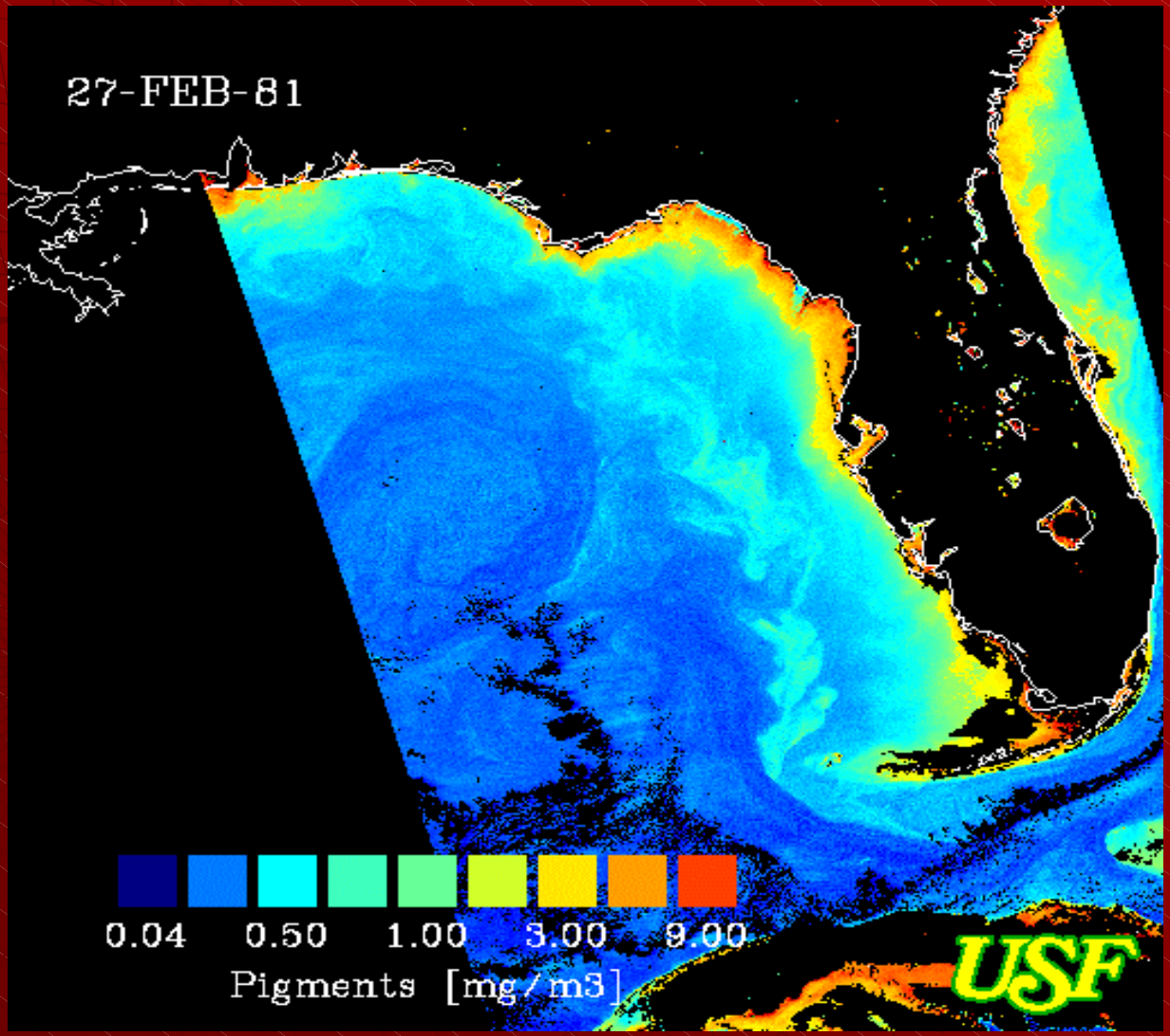
LABORATORIO DE SISTEMAS DE INFORMACION GEOGRAFICA Y SENSORES REMOTOS DEL PAPALOAPAN



LABORATORIO PARA EL ESTUDIO DE ECOSISTEMAS ACUATICOS DEL PAPALOAPAN

Red Tide:

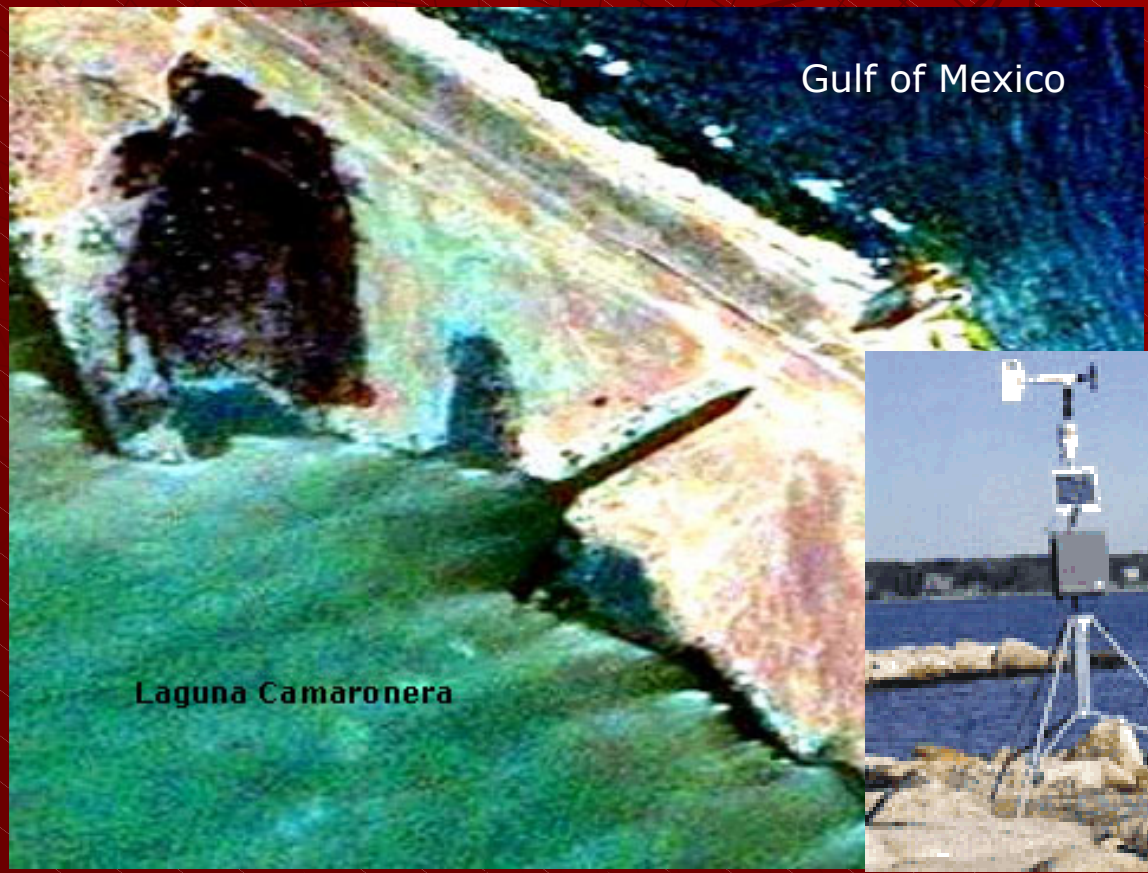
Collaboration between Gulf states will allow data exchange to perform region-wide monitoring of the phenomenon.



Source: University of Southern Florida

Multiparametric Station

The State Government of Veracruz has the commitment to install a fixed buoy equipped with a multiparametric sonde and an automated weather station located at a jetty in front of Camaronera Lagoon on the Gulf of Mexico. This equipment will allow water quality analisys and the monitoring of environmental factors that influence the Red Tide phenomenon.



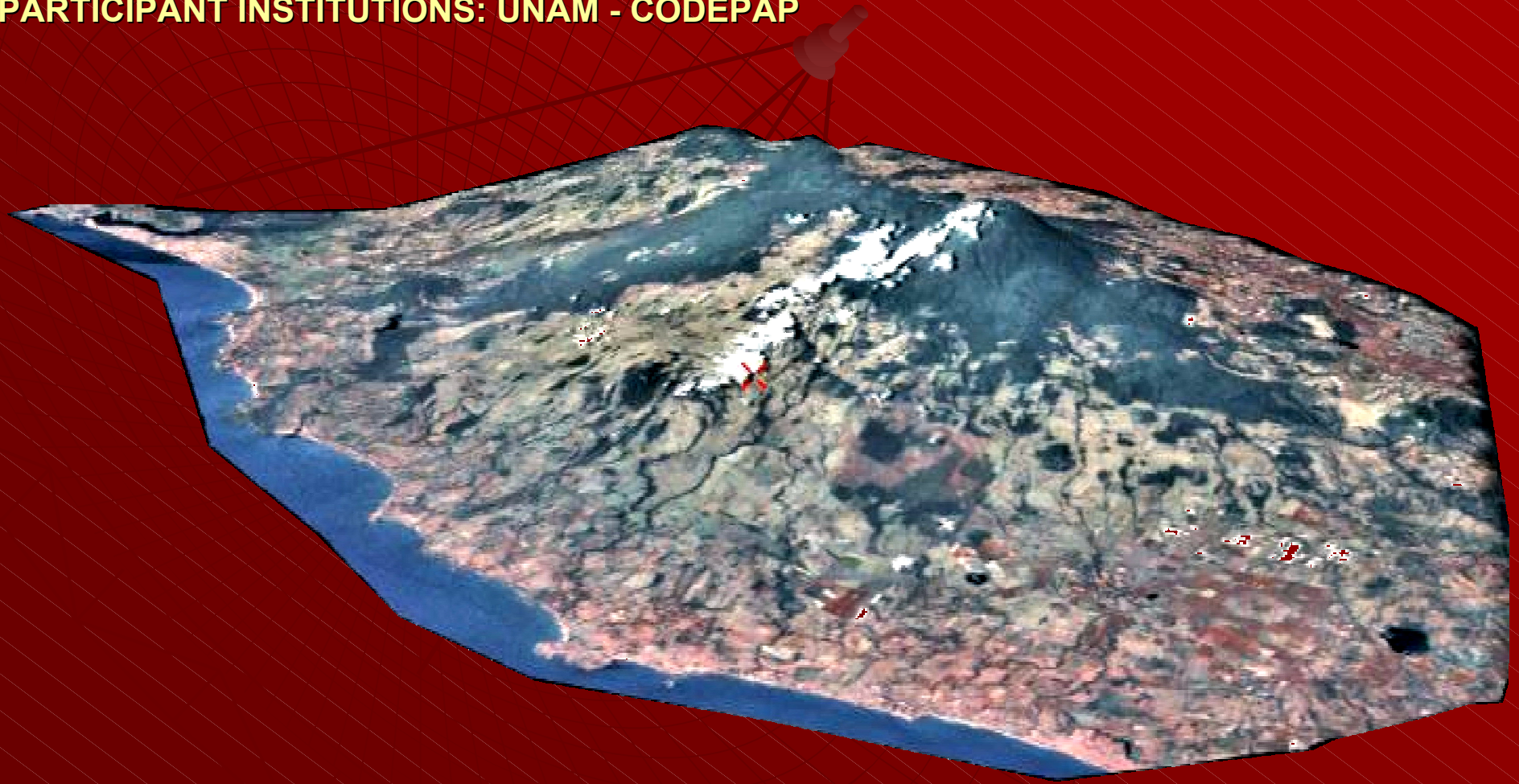
Off-shore Multiparametric and Weather Station Location

ONGOING PROJECTS:

1. STUDY OF NATIVE FORESTAL SPECIES AT SAN MARTIN VOLCANO AND LOS TUXTLAS BIOSPHERE RESERVE

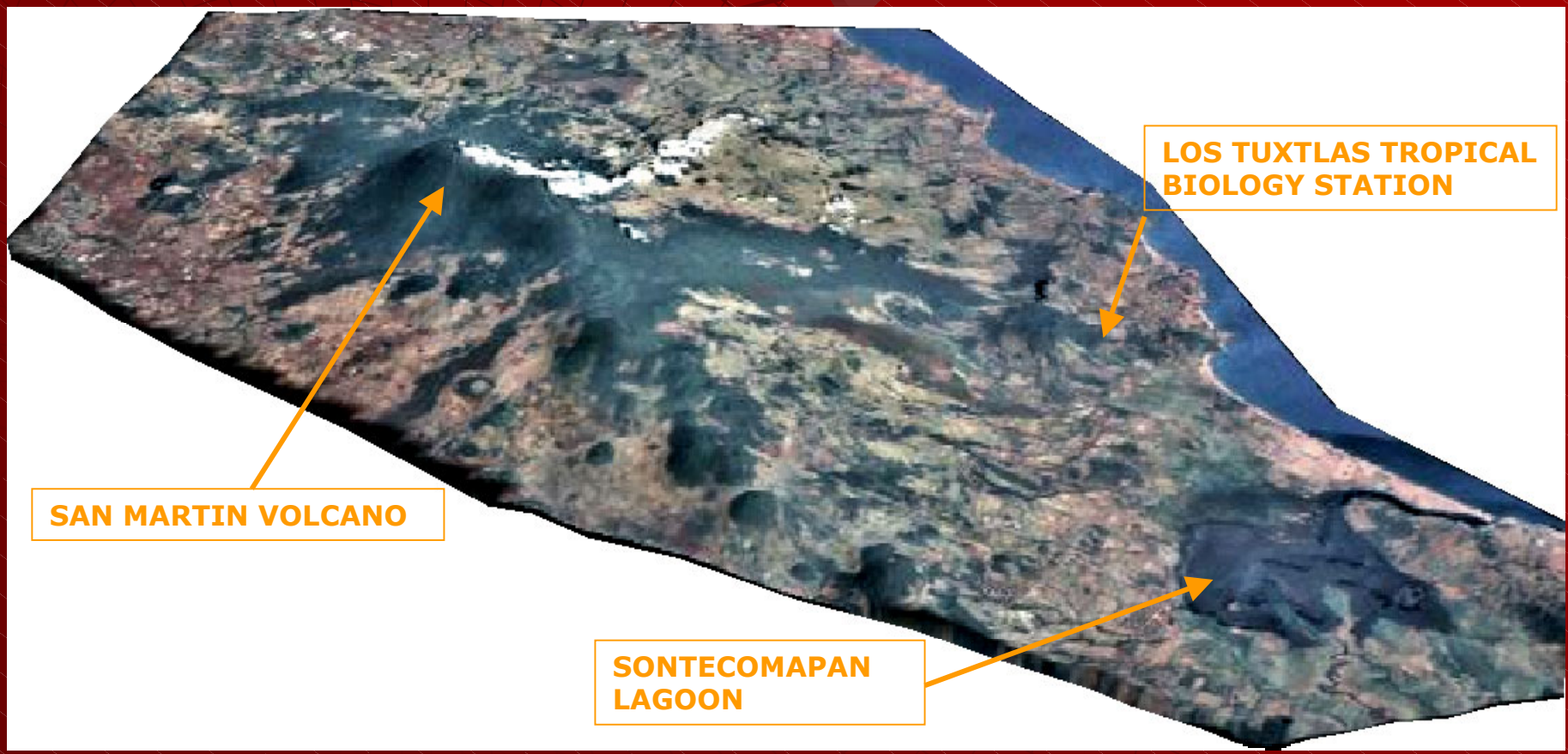
PROJECT LEADER: DR. MARTIN RICKER, PROFESSOR
LOS TUXTLAS TROPICAL BIOLOGY STATION, INSTITUTE OF BIOLOGY
NATIONAL AUTONOMOUS UNIVERSITY OF MEXICO (UNAM)

PARTICIPANT INSTITUTIONS: UNAM - CODEPAP



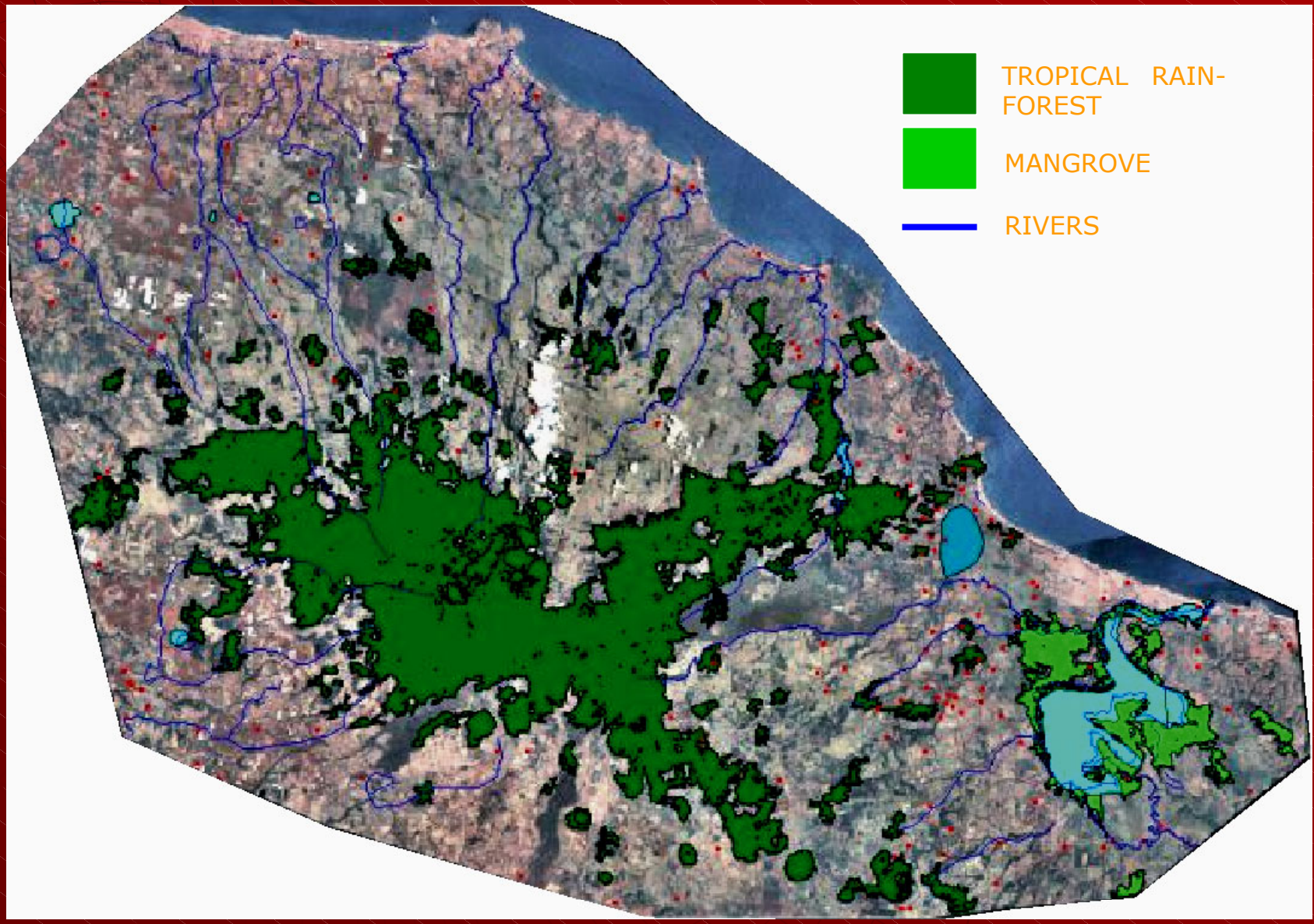
OBJECTIVES

1. Forest coverage diagnosis around San Martin Volcano (150 km2) using remote sensing.
2. Plant sample collection for herbarium identification of tree species with at least 10 cm of trunk diameter.
3. Handbook elaboration: Identification of tree species around San Martin Volcano in the Biosphere Reserve, including their present and potential uses.



COVERAGE ESTIMATION OF TROPICAL FOREST AND MANGROVE AROUND SAN MARTIN VOLCANO

IRS SATELLITE CLASSIFIED IMAGE



ONGOING PROJECTS:

2. SOIL USE MAPPING AND INVENTORY OF THE PAPALOAPAN RIVER REGION

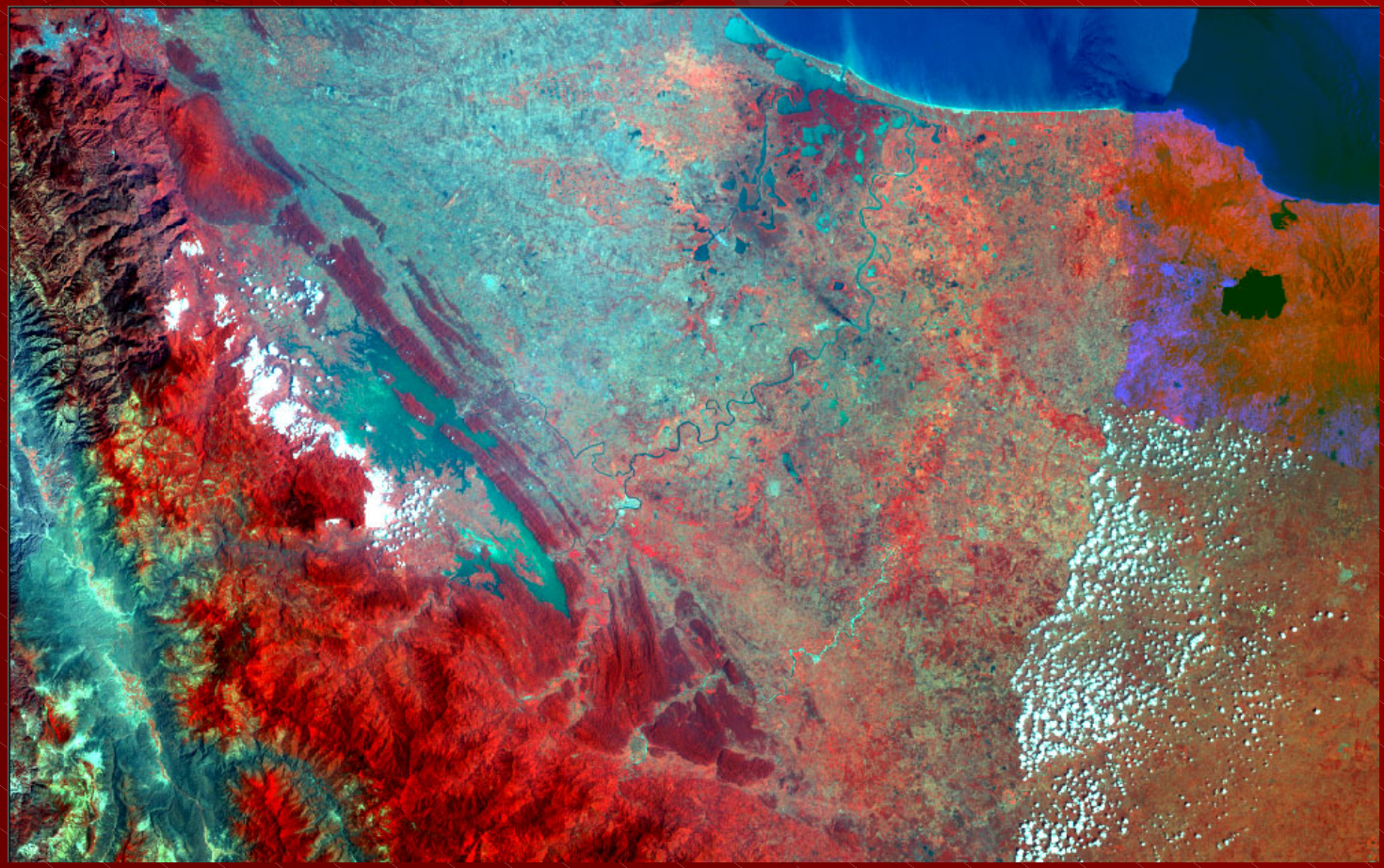
PROJECT LEADER: VERONICA PIEDRA CASTILLO

REMOTE SENSING SPECIALIST, SYSTEMS ENGINEER, PAPALOAPAN DEVELOPMENT COUNCIL

PARTICIPANT INSTITUTIONS: CODEPAP- SIAP

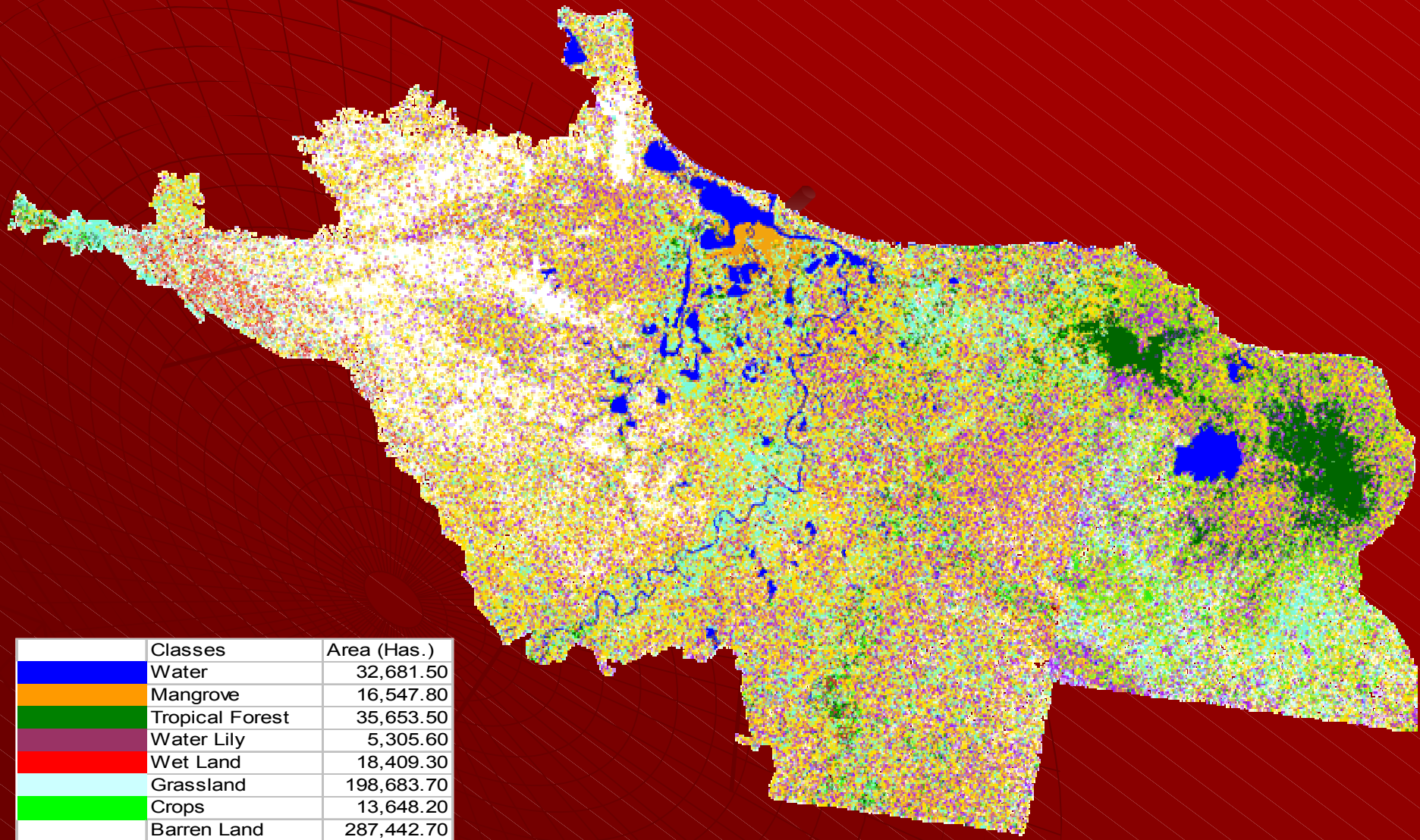
INFORMATION SYSTEM FOR AGRICULTURE AND FISHERIES

SECRETARIAT OF AGRICULTURE, LIVESTOCK, FOOD AND FISHERIES RESOURCES



SOIL USE MAP AND INVENTORY OF THE PAPALOAPAN BASIN REGION

LANDSAT CLASSIFIED IMAGE



	Classes	Area (Has.)
	Water	32,681.50
	Mangrove	16,547.80
	Tropical Forest	35,653.50
	Water Lily	5,305.60
	Wet Land	18,409.30
	Grassland	198,683.70
	Crops	13,648.20
	Barren Land	287,442.70
	Urban Areas	42,648.40
	Sugar Cane	501,856.80
	Bush Vegetation	157,238.90

Scale: 1:100,000

ONGOING PROJECTS:

3. TAJIN ARCHAEOLOGICAL SITE SURVEY

PROJECT LEADER: DR. JÜRGEN K. BRÜGGEMANN

TAJIN PROJECT DIRECTOR, INAH

PARTICIPANT INSTITUTIONS: INAH - CODEPAP

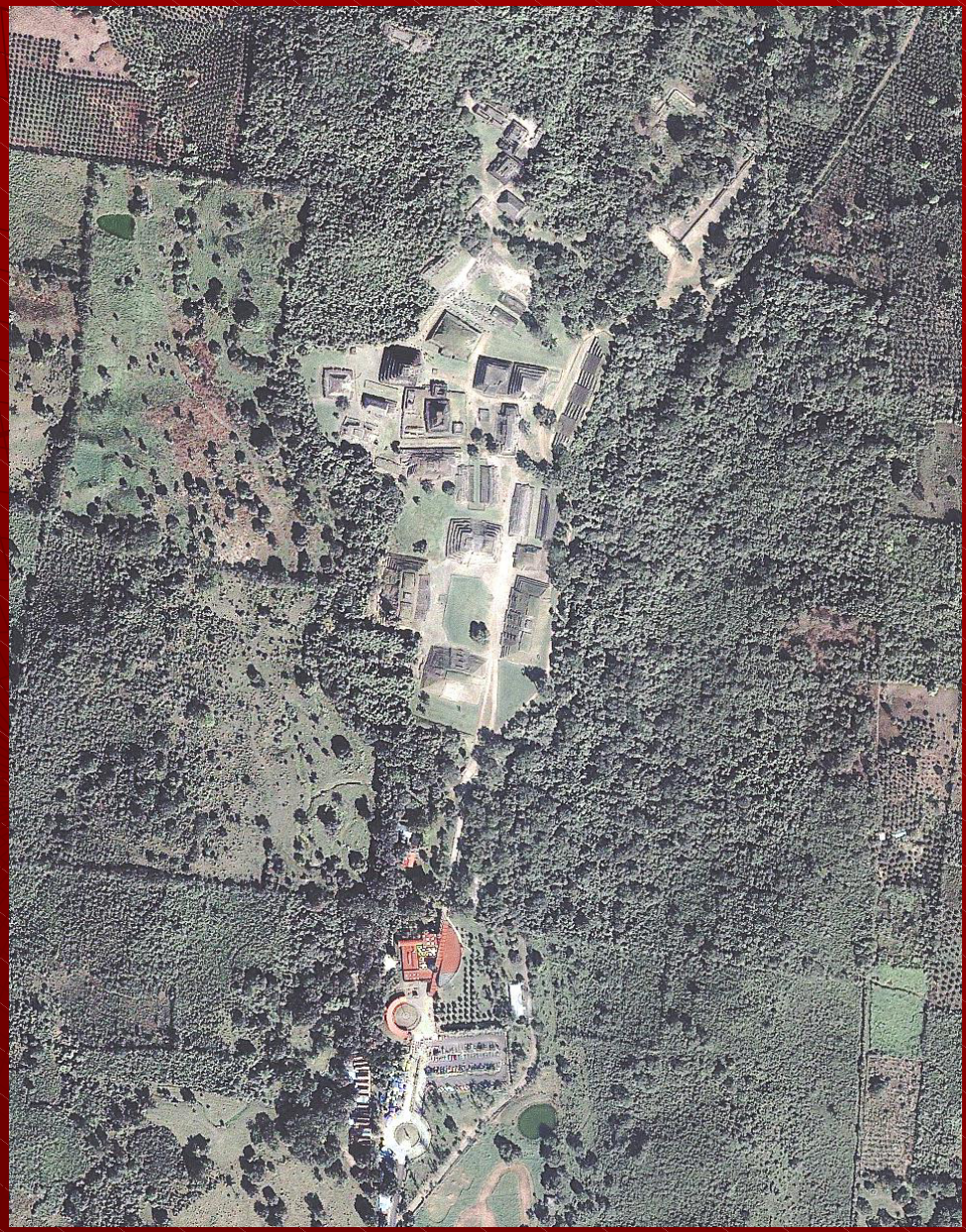
NATIONAL INSTITUTE OF ANTHROPOLOGY AND HISTORY

TAJIN ARCHAEOLOGICAL SITE LOCATION

LANDSAT IMAGE VISIBLE-COLOR COMPOSITE

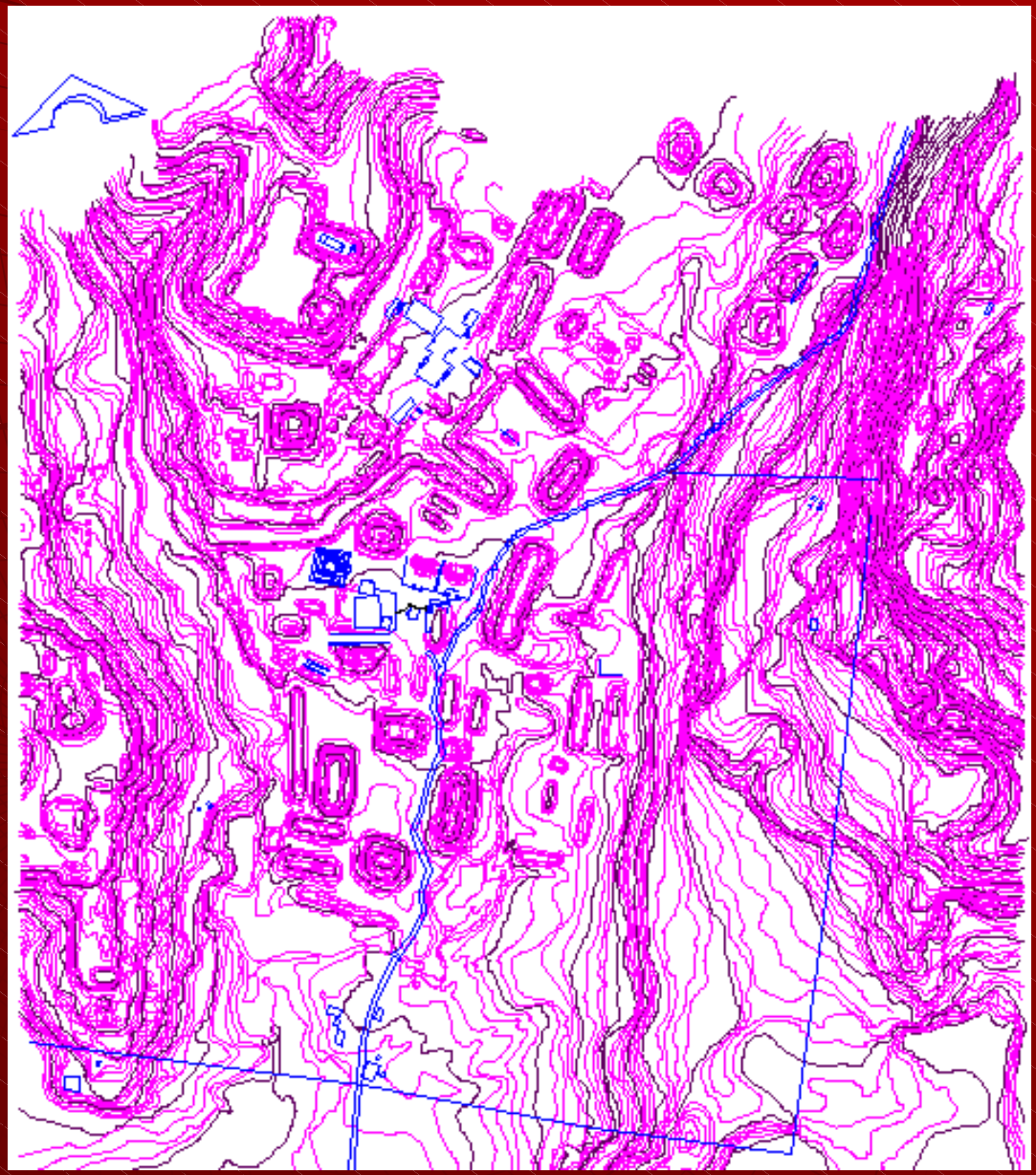
TAJIN ARCHAEOLOGICAL SITE LOCATION

IKONOS IMAGE VISIBLE-COLOR COMPOSITE



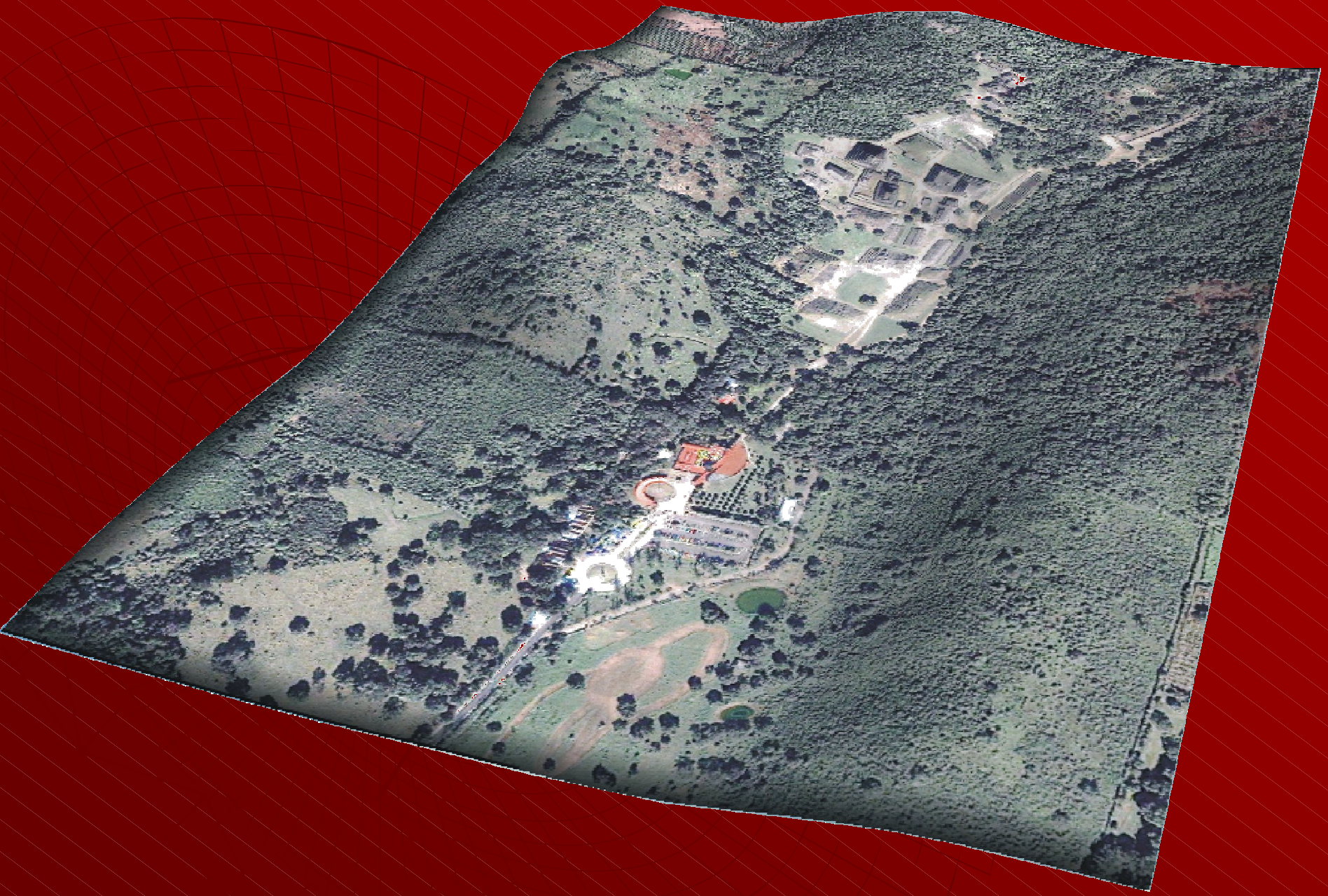
TAJIN ARCHAEOLOGICAL SITE SURVEY

ONE METER CONTOUR TOPOGRAPHICAL MAP



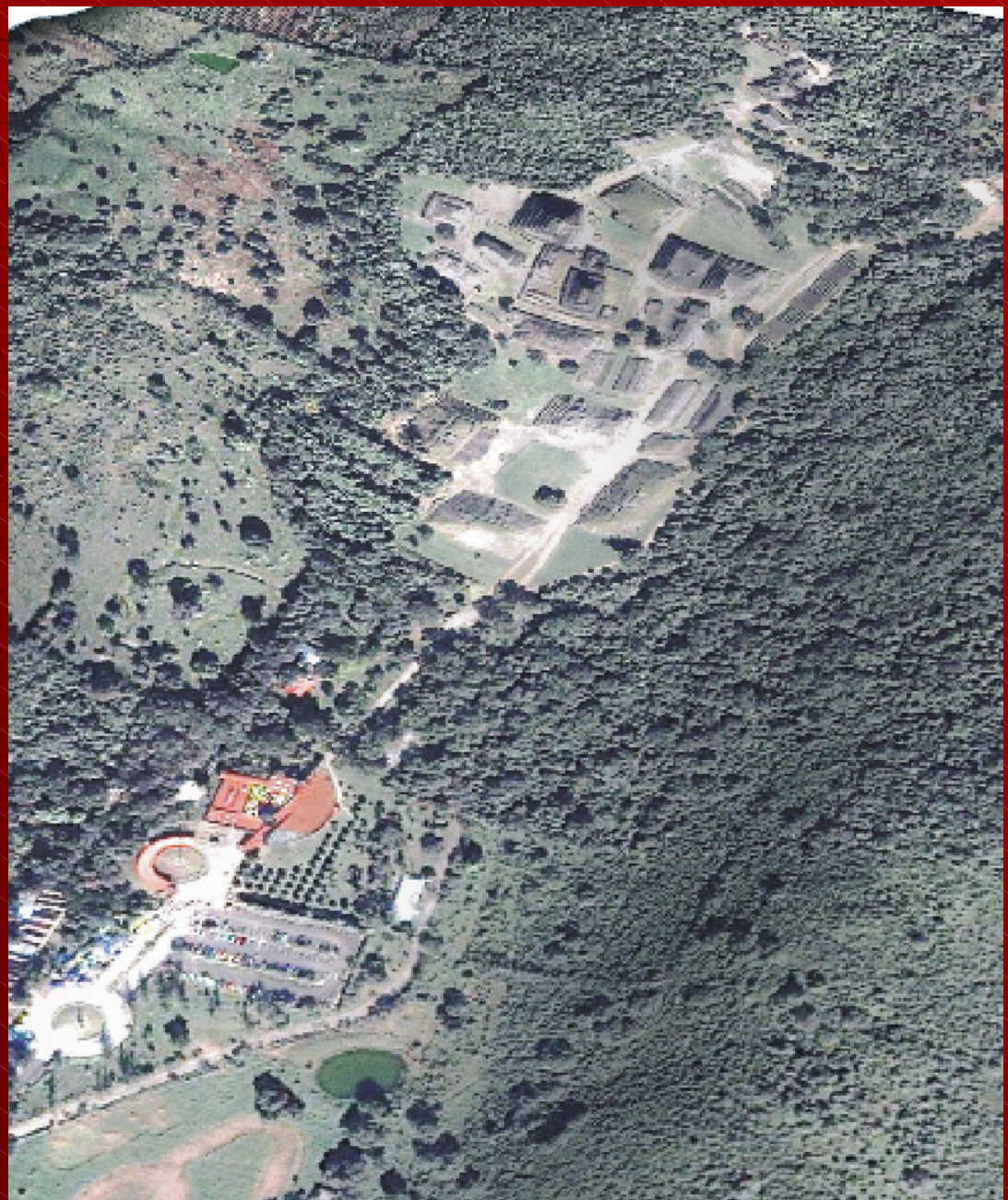
TAJIN ARCHAEOLOGICAL SITE LOCATION

TRIDIMENTIONAL IKONOS IMAGE



TAJIN ARCHAEOLOGICAL SITE LOCATION

TRIDIMENTIONAL IKONOS IMAGE CLOSE UP



ONGOING PROJECTS:

4. TLACOJALPAN ARCHAEOLOGICAL SITE SURVEY

PROJECT LEADER: DR. PEDRO JIMENEZ
PROFESSOR, UNIVERSITY OF VERACRUZ
PARTICIPANT INSTITUTIONS: U.V. - INAH - CODEPAP
UNIVERSITY OF VERACRUZ, NATIONAL INSTITUTE OF ANTHROPOLOGY AND HISTORY

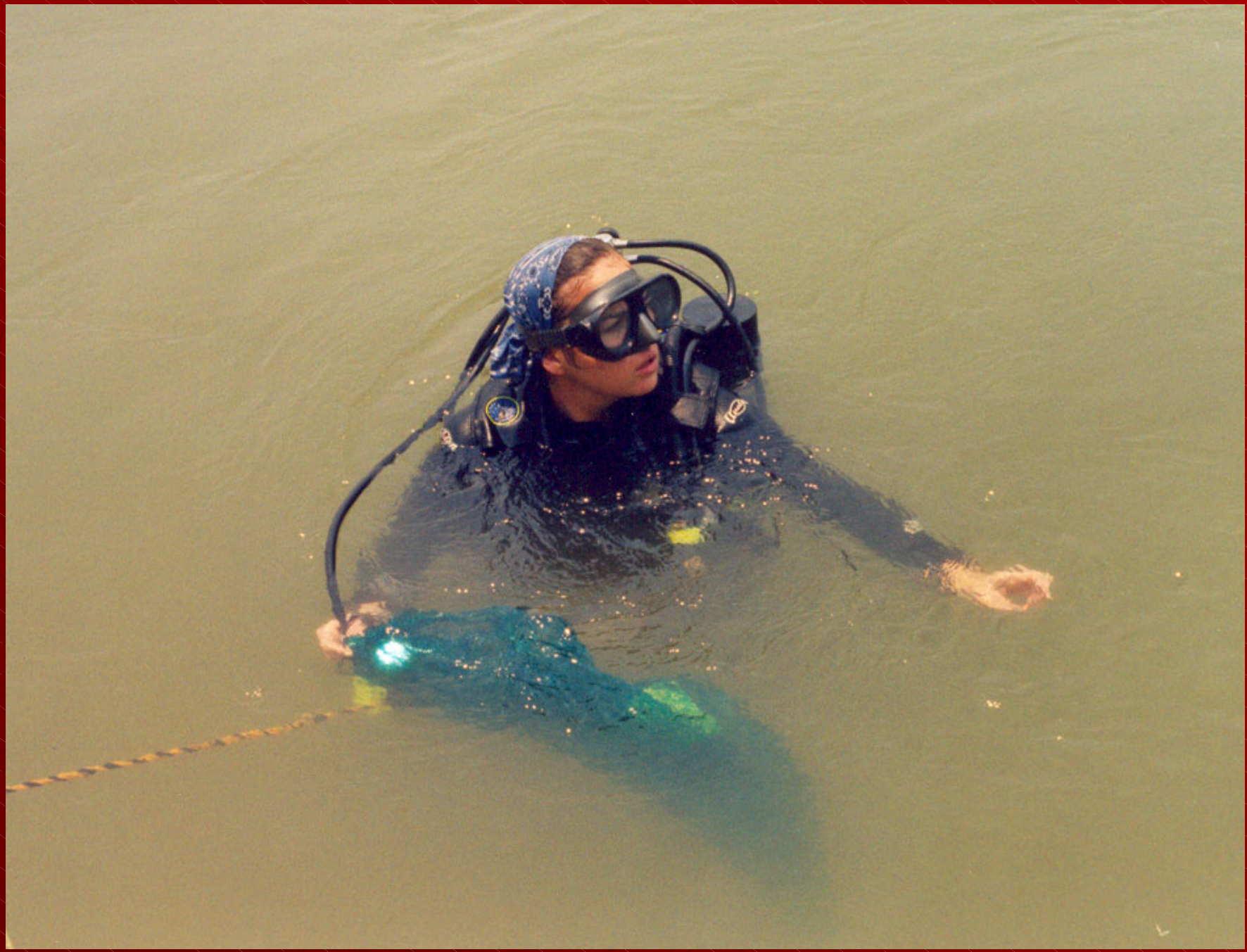
TLACOJALPAN ARCHAEOLOGICAL SITE LOCATION

IKONOS IMAGE VISIBLE-COLOR COMPOSITE

TLACOJALPAN ARCHAEOLOGICAL SITE LOCATION

IKONOS IMAGE INFRARED-VISIBLE COMPOSITE


NEMESIS



ONGOING PROJECTS:

5. EL PITAL ARCHAEOLOGICAL SITE SURVEY

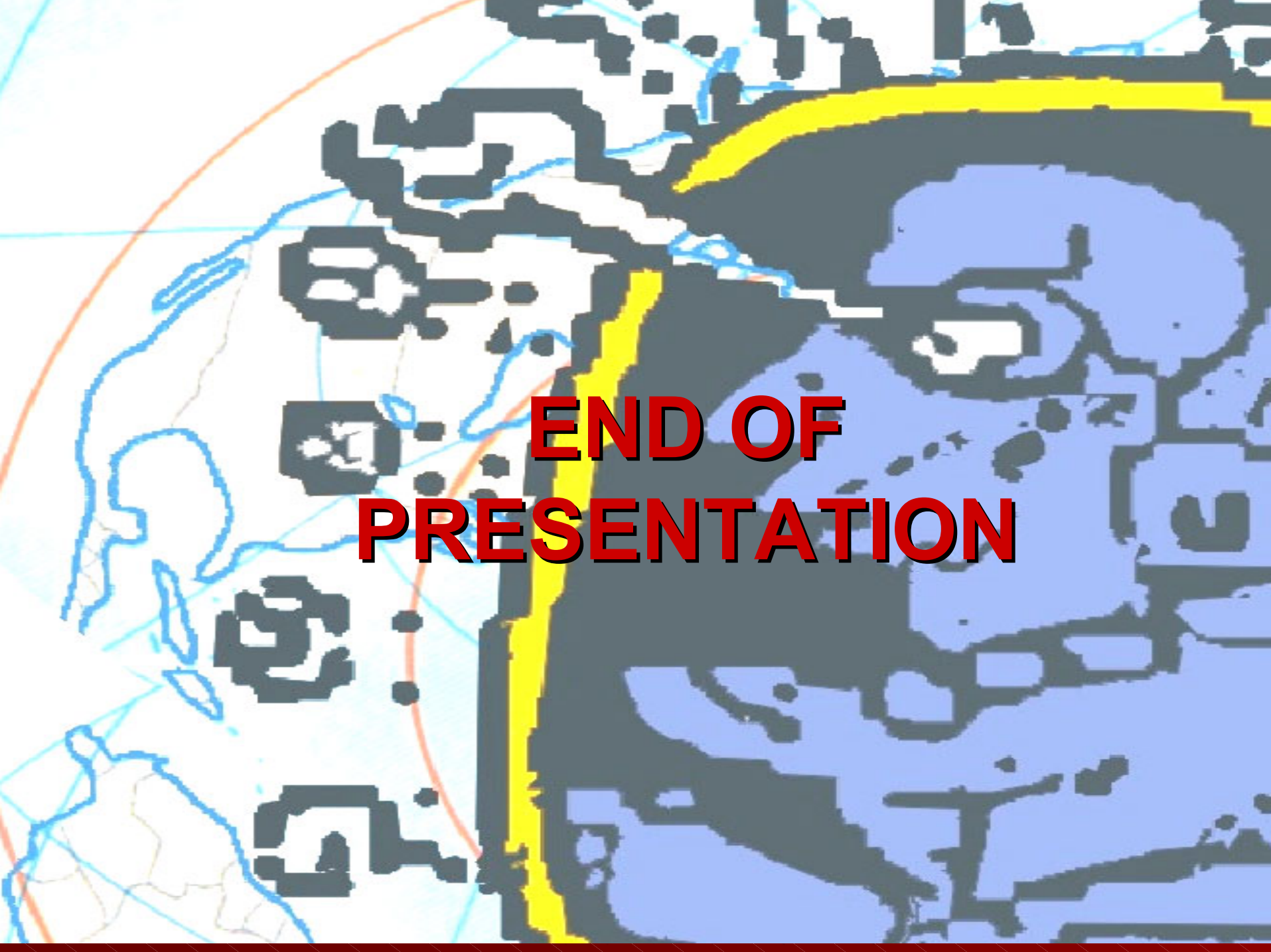
PROJECT LEADER: DR. S. JEFFREY D. WILKERSON, DIRECTOR
INSTITUTE FOR CULTURAL ECOLOGY OF THE TROPICS
PARTICIPANT INSTITUTIONS: ICET - CODEPAP
INSTITUTE FOR CULTURAL ECOLOGY OF THE TROPICS

EL PITAL ARCHAEOLOGICAL SITE LOCATION

IKONOS IMAGE VISIBLE-COLOR COMPOSITE

EL PITAL ARCHAEOLOGICAL SITE LOCATION

IKONOS IMAGE CLOSE-UP INFRARED-VISIBLE COMPOSITE


END OF
PRESENTATION