FIS & Forest Fire Management

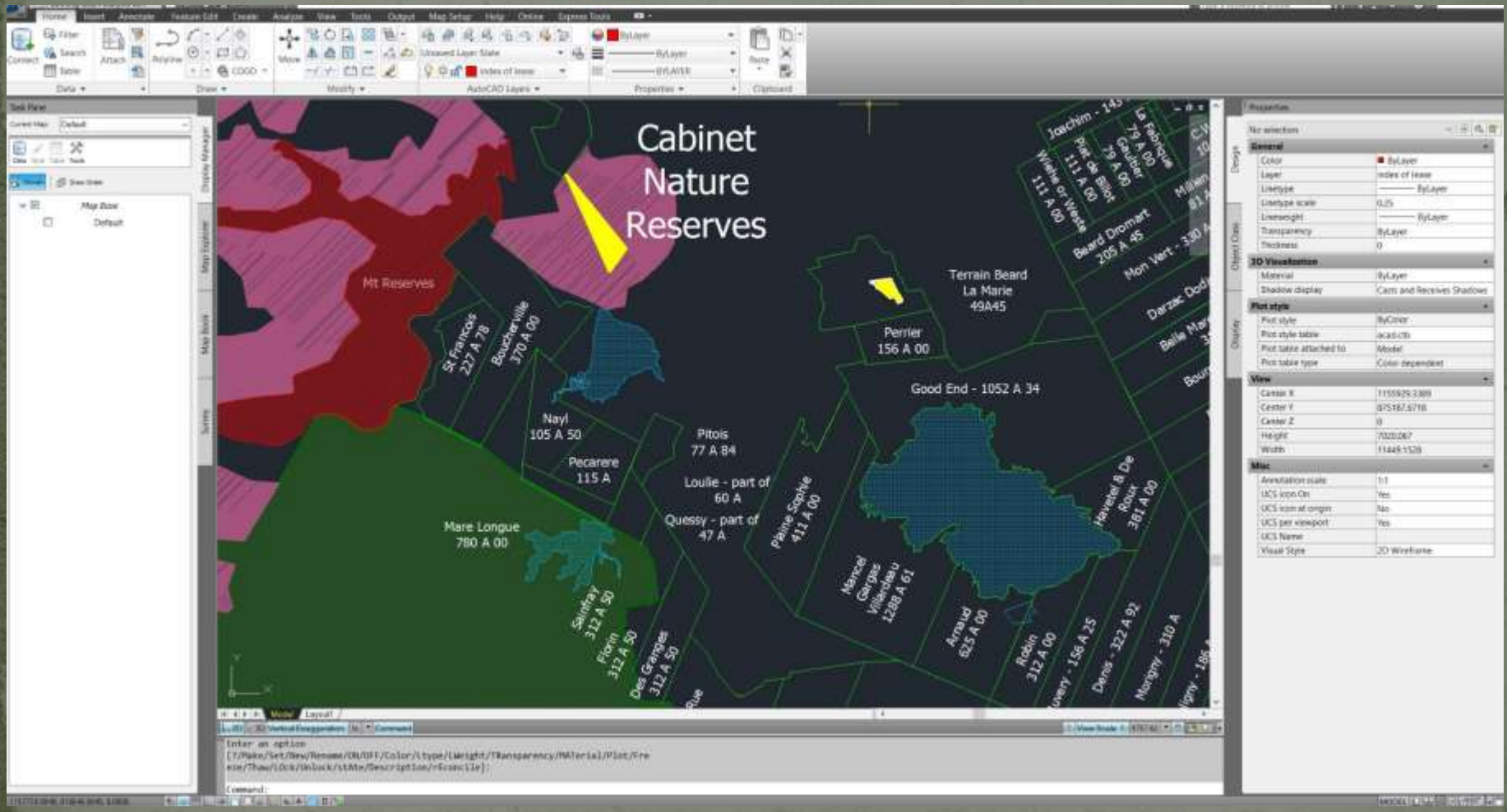
Forestry Service

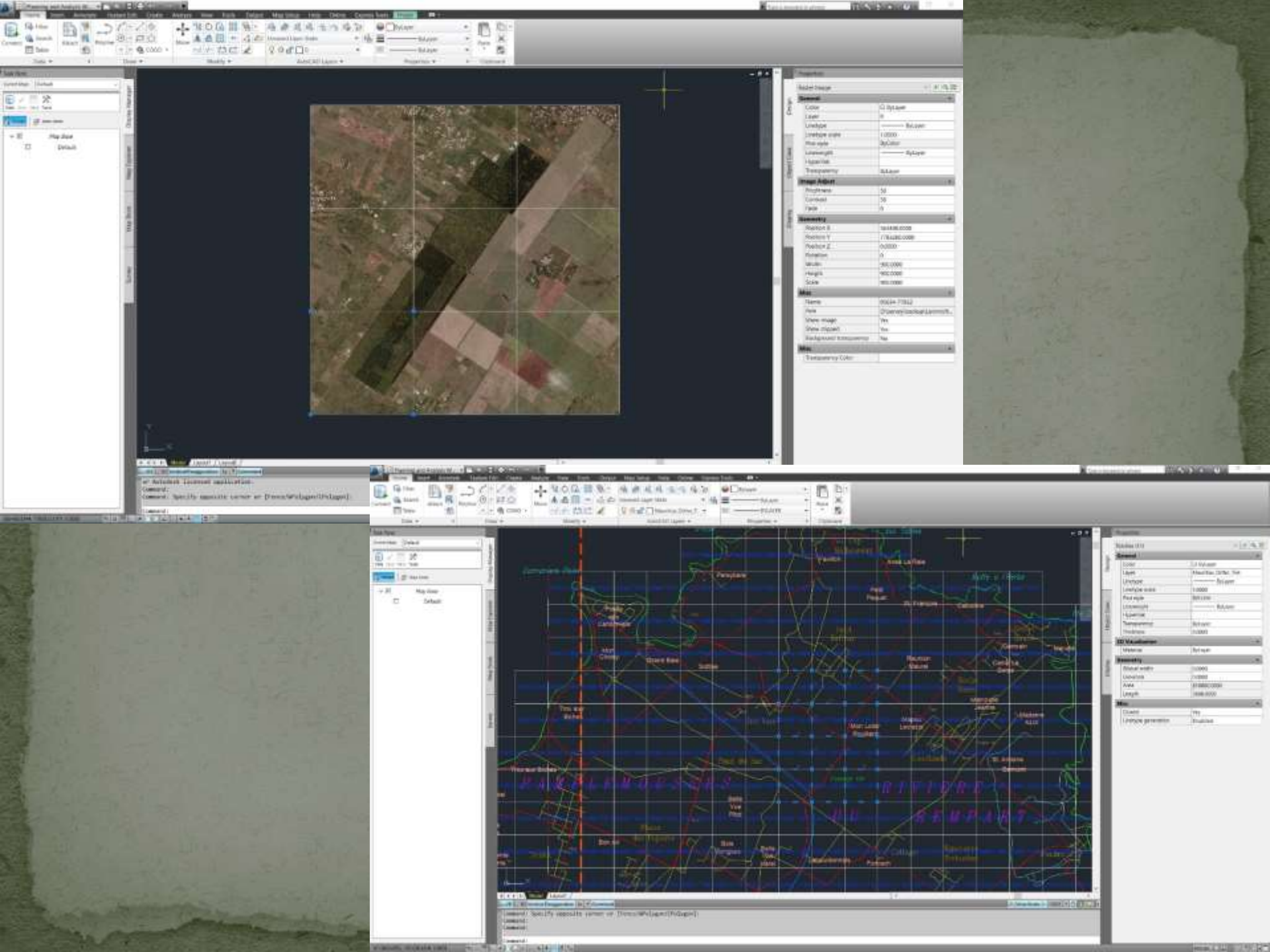
Ministry of Agro Industry and Food Security

Current Situation

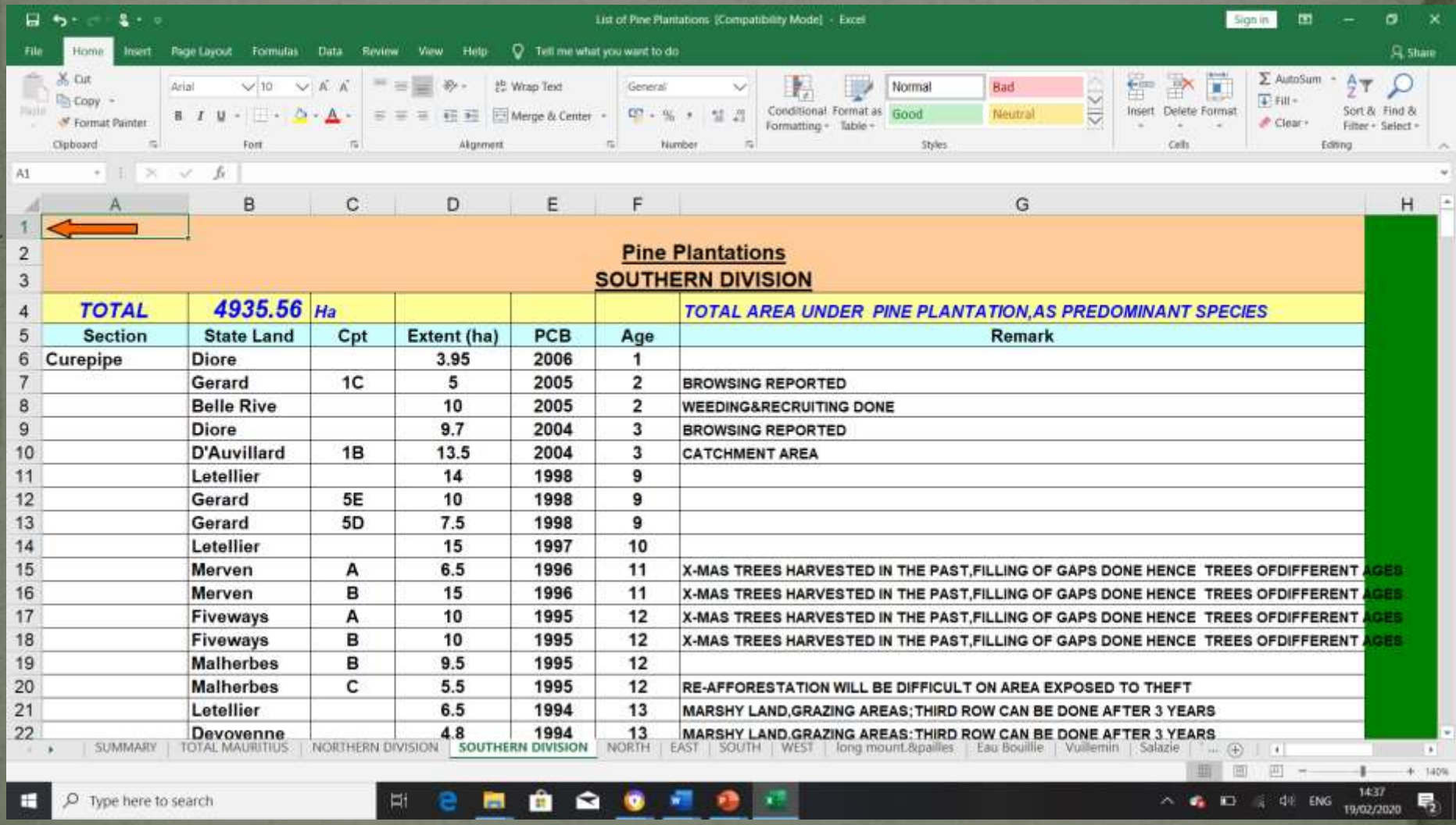
- No complete Forest Information System
- More than 50% of the forests in Mauritius are privately Forest Reserve Act of 1983 does not make provision for the protection of private forest land outside of Mountain Reserves, River Reserves and Road Reserves
- The last inventory of private forests dates back to 2006.
- Current system of the Forestry Service for mapping purpose are: AutoCAD Map 3D 2012 and AutoCAD 2015.
- Forestry data are collected in Excel workbook and in Record book

Current system AutoCAD





Forest Data collected in Excel Workbook



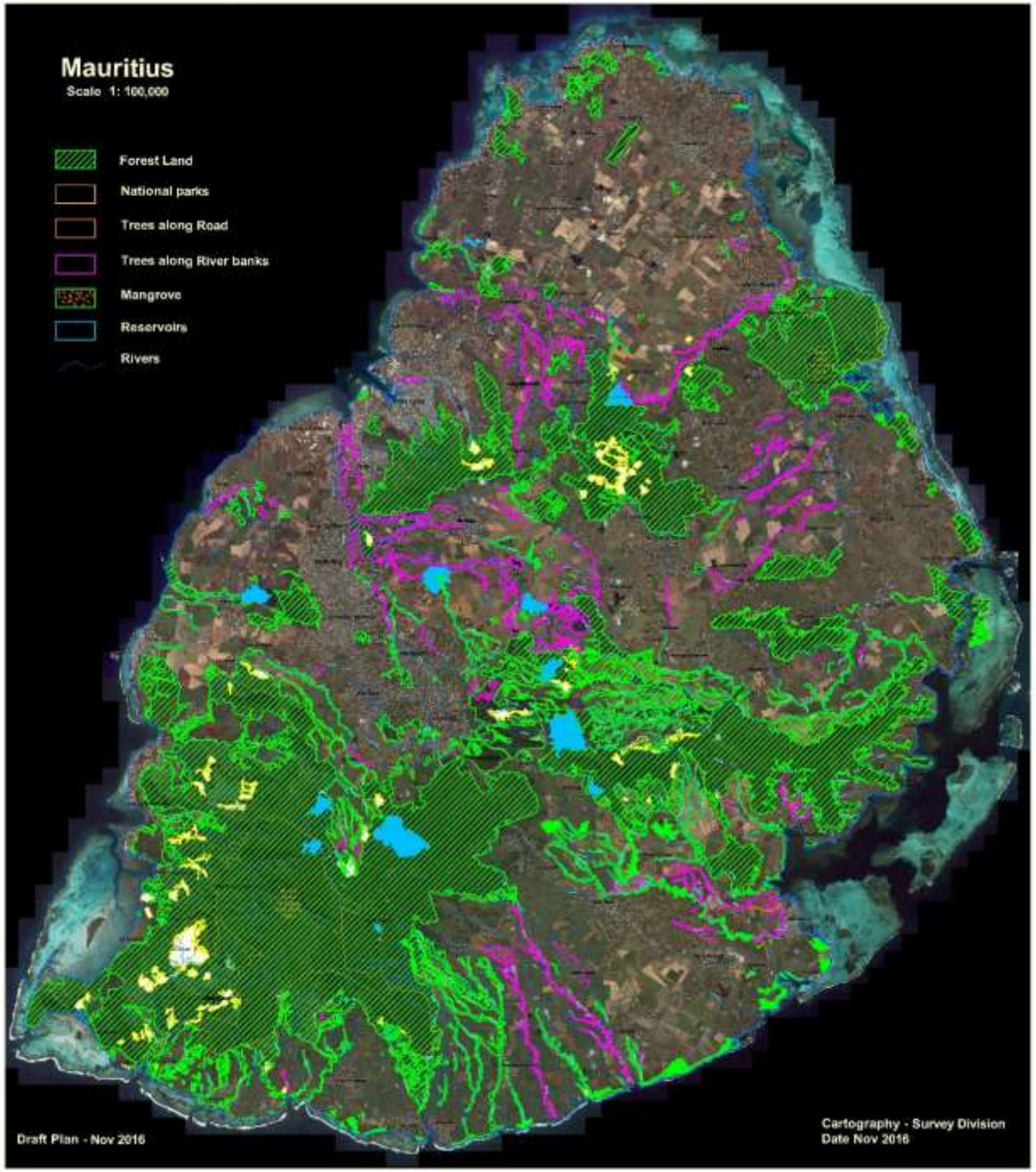
List of Pine Plantations [Compatibility Mode] - Excel

	A	B	C	D	E	F	G	H
1								
2				**Pine Plantations**				
3				**SOUTHERN DIVISION**				
4	***TOTAL***	***4935.56***	***Ha***				***TOTAL AREA UNDER PINE PLANTATION,AS PREDOMINANT SPECIES***	
5	**Section**	**State Land**	**Cpt**	**Extent (ha)**	**PCB**	**Age**	**Remark**	
6	Curepipe	Diore		3.95	2006	1		
7		Gerard	1C	5	2005	2	BROWSING REPORTED	
8		Belle Rive		10	2005	2	WEEDING&RECRUITING DONE	
9		Diore		9.7	2004	3	BROWSING REPORTED	
10		D'Auvillard	1B	13.5	2004	3	CATCHMENT AREA	
11		Letellier		14	1998	9		
12		Gerard	5E	10	1998	9		
13		Gerard	5D	7.5	1998	9		
14		Letellier		15	1997	10		
15		Merven	A	6.5	1996	11	X-MAS TREES HARVESTED IN THE PAST,FILLING OF GAPS DONE HENCE TREES OFDIFFERENT AGES	
16		Merven	B	15	1996	11	X-MAS TREES HARVESTED IN THE PAST,FILLING OF GAPS DONE HENCE TREES OFDIFFERENT AGES	
17		Fiveways	A	10	1995	12	X-MAS TREES HARVESTED IN THE PAST,FILLING OF GAPS DONE HENCE TREES OFDIFFERENT AGES	
18		Fiveways	B	10	1995	12	X-MAS TREES HARVESTED IN THE PAST,FILLING OF GAPS DONE HENCE TREES OFDIFFERENT AGES	
19		Malherbes	B	9.5	1995	12		
20		Malherbes	C	5.5	1995	12	RE-AFFORESTATION WILL BE DIFFICULT ON AREA EXPOSED TO THEFT	
21		Letellier		6.5	1994	13	MARSHY LAND,GRAZING AREAS;THIRD ROW CAN BE DONE AFTER 3 YEARS	
22		Devoyenne		4.8	1994	13	MARSHY LAND,GRAZING AREAS;THIRD ROW CAN BE DONE AFTER 3 YEARS	

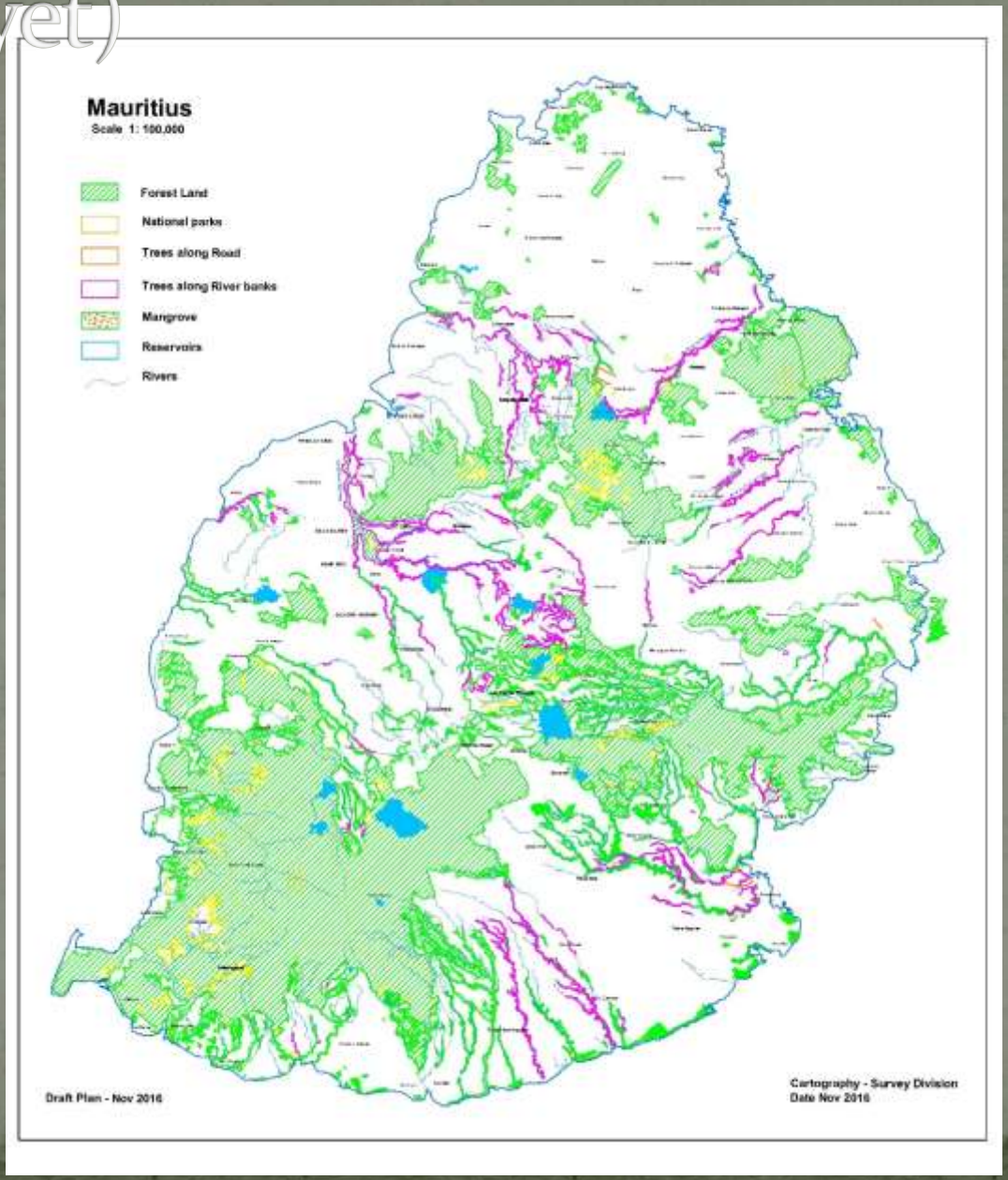
SUMMARY | TOTAL MAURITIUS | NORTHERN DIVISION | SOUTHERN DIVISION | NORTH | EAST | SOUTH | WEST | long mount.&pailles | Eau Bouillie | Vuillemin | Salazie

Type here to search

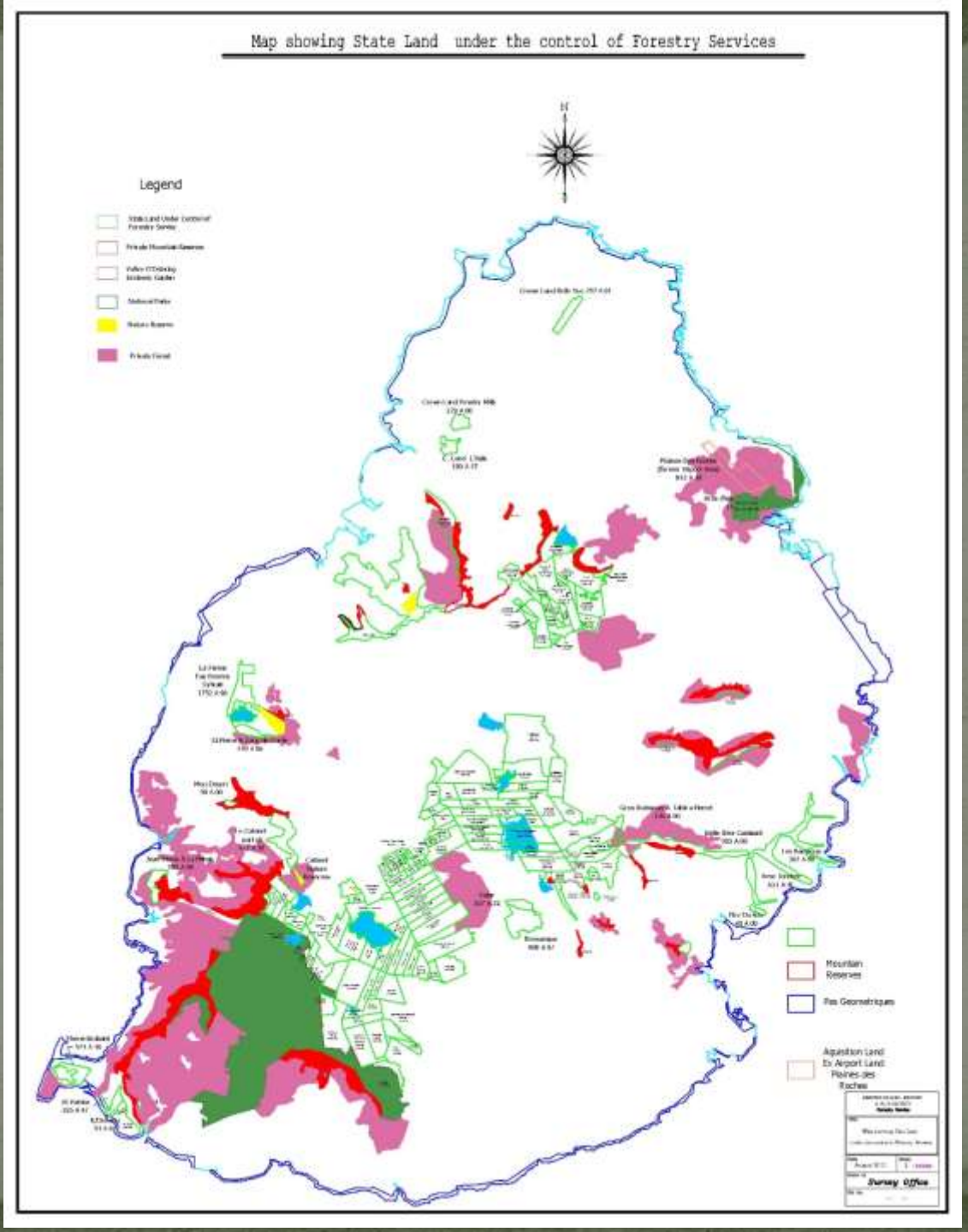
ENG 14:37 19/02/2020


Mauritius
Scale 1: 100,000
Forest Land
National parks
Trees along Road
Trees along River banks
Mangrove
Reservoirs
Rivers
Draft Plan - Nov 2016
Cartography - Survey Division
Date Nov 2016

New Digitised Forest Layer (Not Ground truthed yet)



Forest Areas Mauritius



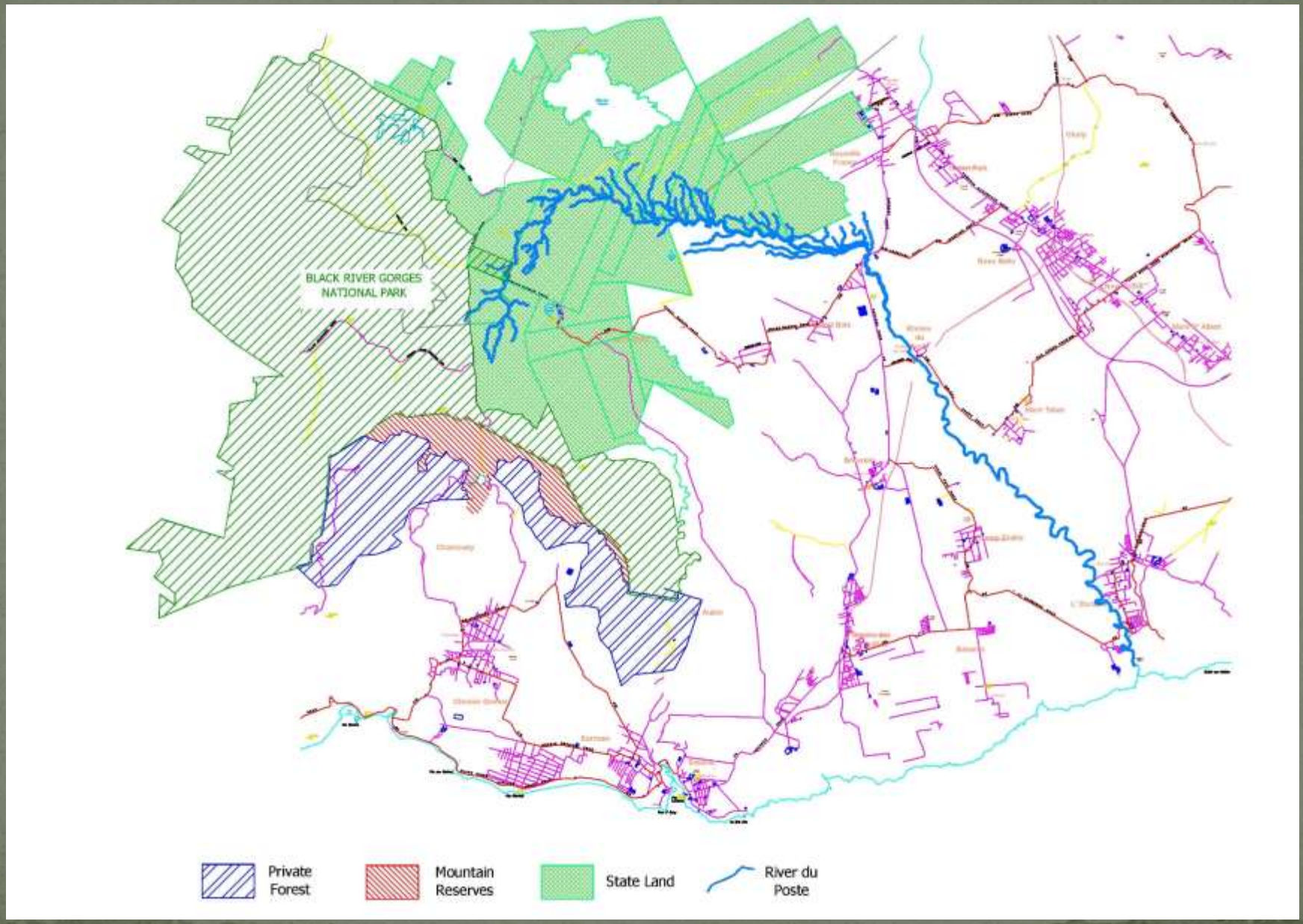
Difficulty update Changes in Forest Land Cover

	Area (hectares)		% of total land area	
	2007	2016	2007	2016
Forests lands : of which	47,176	47,066	25.3	25.2
State owned	22,176	22,066	11.9	11.8
Plantations	11,878	11,798	6.4	6.3
Land Protected areas and Nature reserves	8,254	8,374	4.4	4.5
Other Forest Land	1,413	1,271	0.8	0.7
Pas Geometriques	631	623	0.3	0.3
Privately owned lands [1]	25,000	25,000	13.4	13.4
Reserves (land protected areas)	6,540	6,540	3.5	3.5
Other	18,460	18,460	9.9	9.9

[1] include plantations, reserves, scrub and grazing lands.

Current Forest data are not linked with Map and makes the process of updating changes in forest cover very tedious

Riviere du Poste



Forest Land Information System (FLIS)

- Previous attempt to create a Forest Information SystemGIS for forest land in Mauritius started in 2006.
- Platform –ArcGIS (ESRI)

Acquisition of satellite imagery and aerial photography

- SPOT (5m) - 2006
- Quickbird (60 cm) - 2006
- Acquired ortho-rectified aerial imagery from LAVIMS Project -Digital aerial imagery for the whole island (15 cm digital aerial imagery) – 2008 (Very Expensive)

Why the previous FIS could not be sustained?

Prohibitive cost:

- Acquisition of high resolution satellite imagery and aerial photography.
- Renewal GIS license.
- Backup hardware – large storage capacity hard drive for storage of satellite imagery and aerial photographs was expensive in 2006.

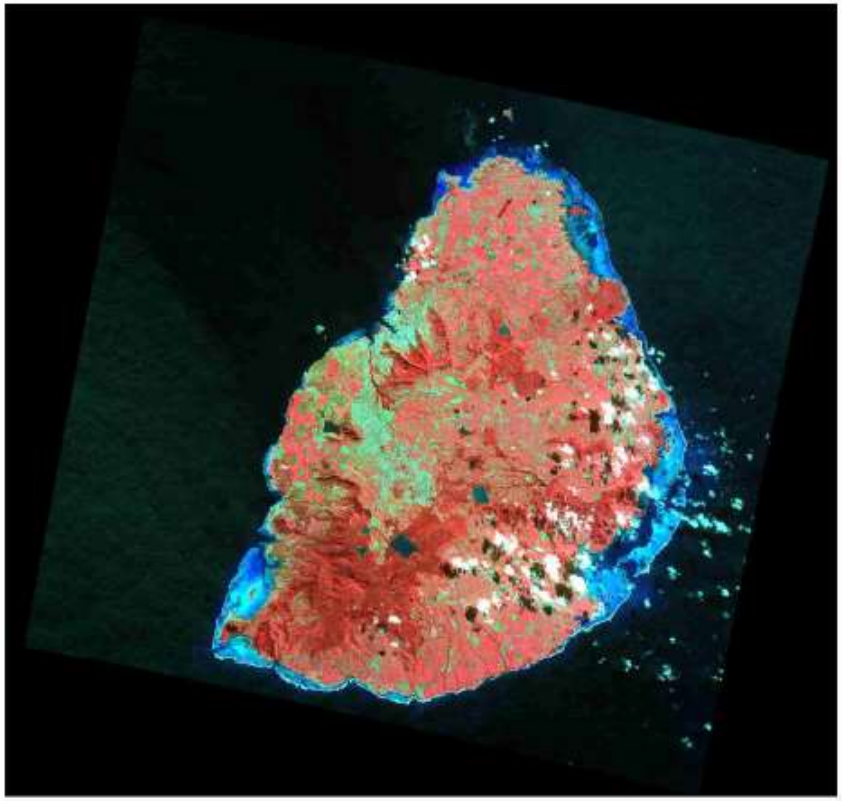
Hardware Failure:

- Computer System fried during electrical storm (2009)
- Damaged back up hardware (data loss)

Lack of Capacity:

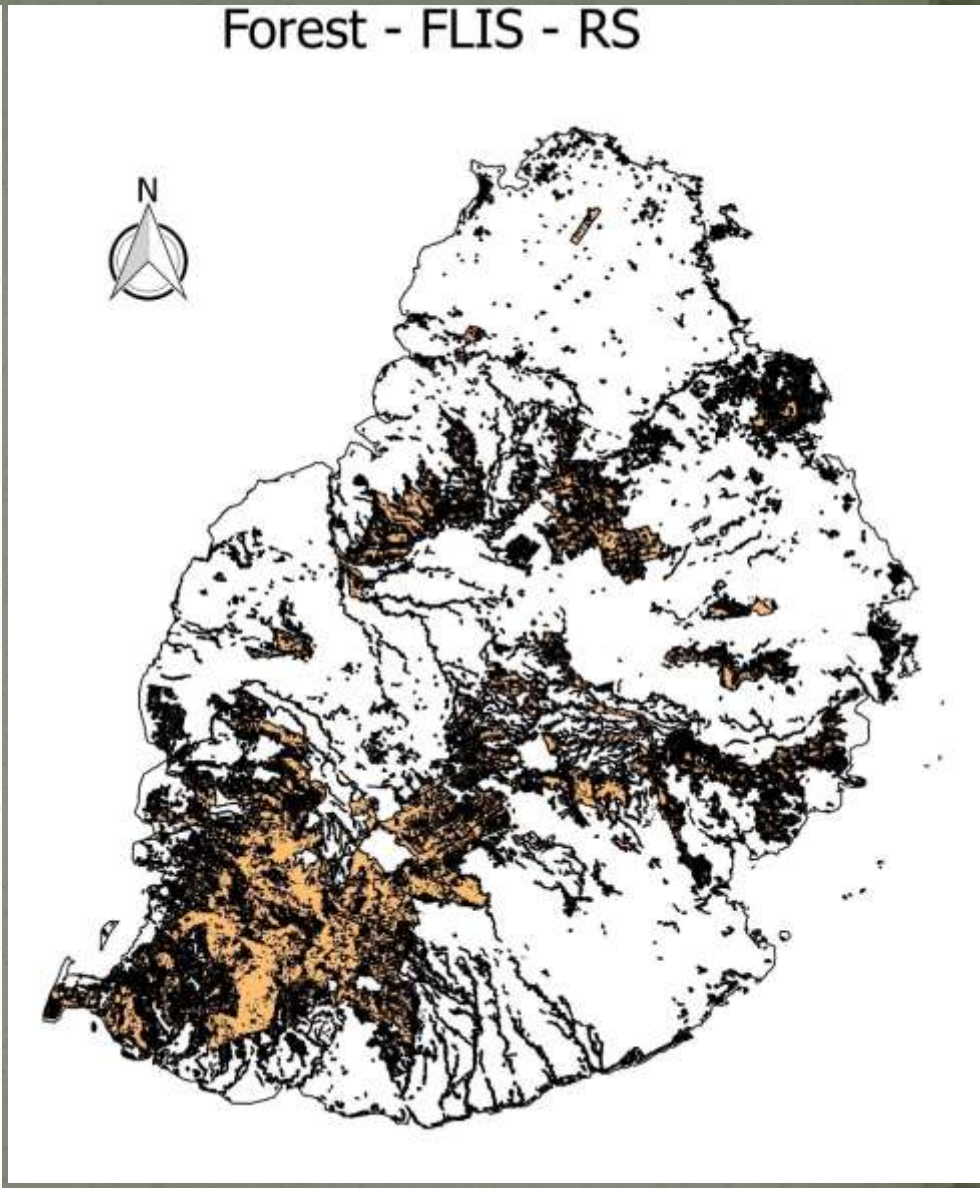
- Because the system remained dormant (new staff could not be trained)

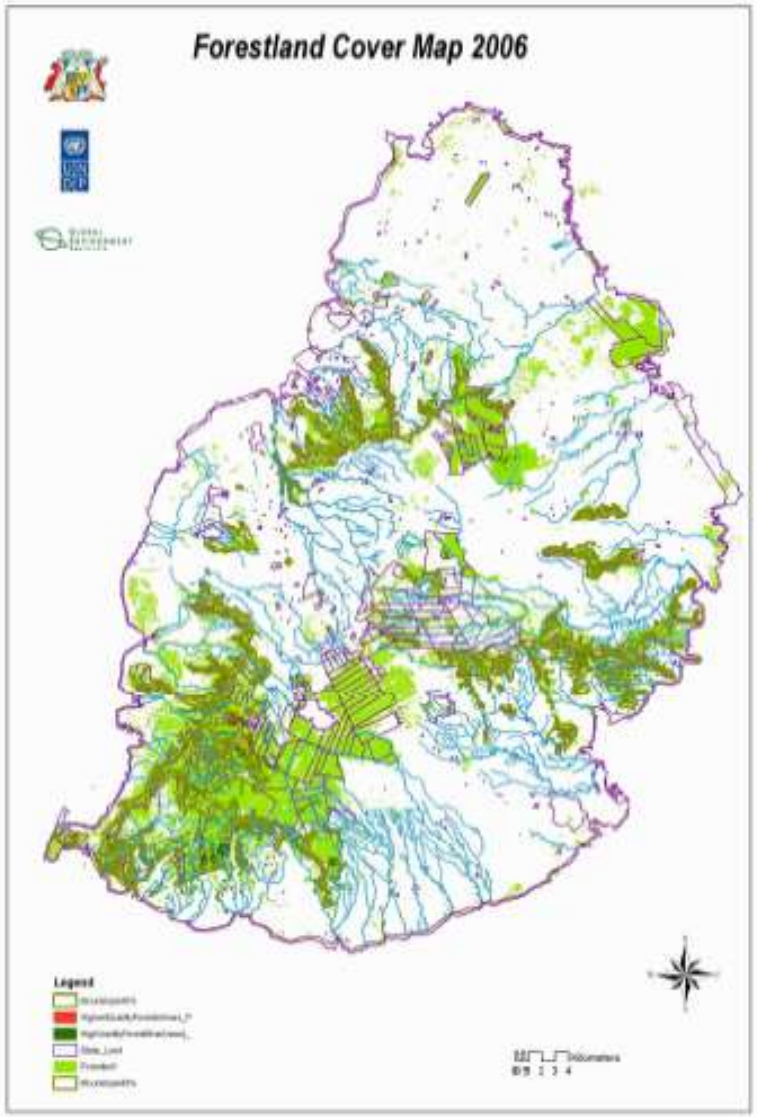
Mauritius -Spot Imagery 2006 (5m resolution)

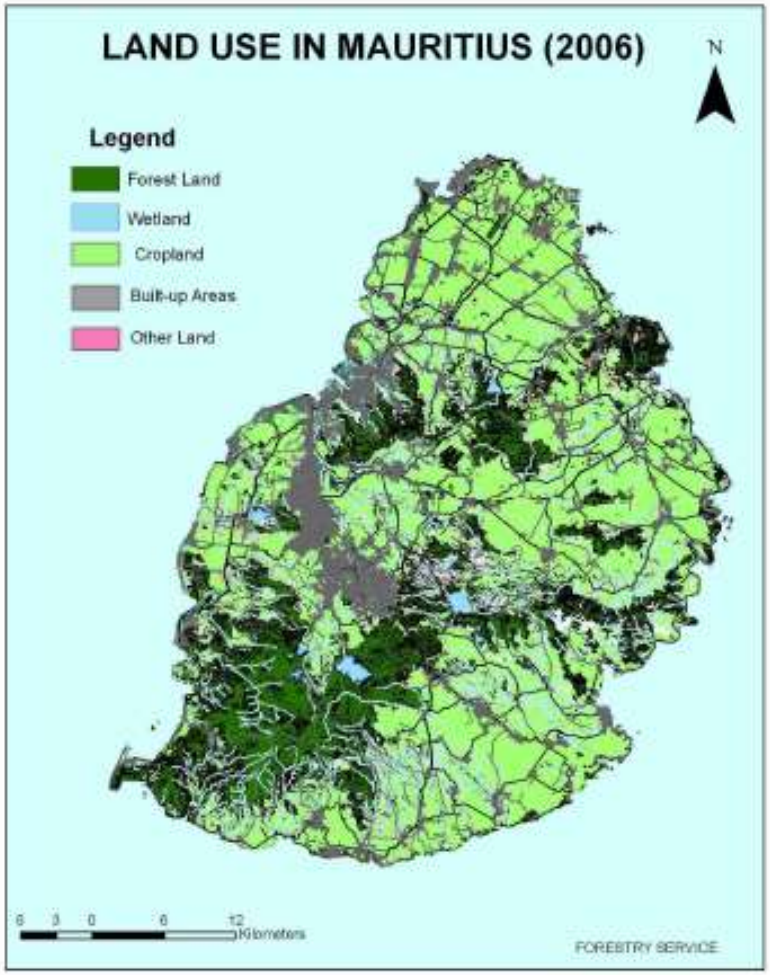


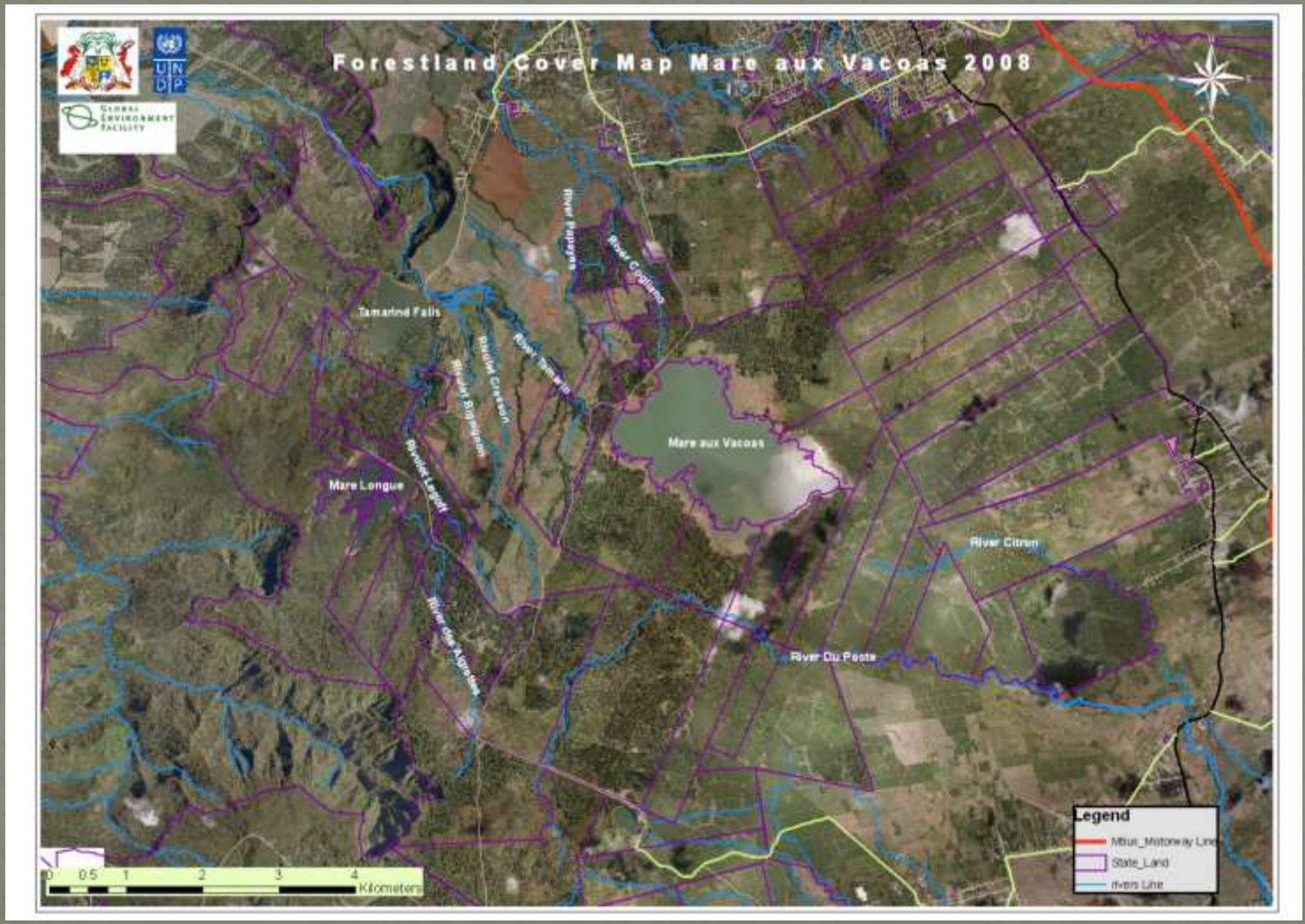
Rodrigues - Quickbird Imagery 2006 (60 cm resolution)

Forest - FLIS - RS




Forestland Cover Map 2006
Legend


LAND USE IN MAURITIUS (2006)
N
Legend
Forest Land
Wetland
Cropland
Built-up Areas
Other Land
Kilometers
FORESTRY SERVICE


Forestland Cover Map Mare aux Vacoas 2008
Tamarind Falls
Mare aux Vacoas
Mare Longue
River Citron
River Du Poste
Legend
State_Land
rivers Line
0 0.5 1 2 3 4
Kilometers

Lesson learnt/training Acquired

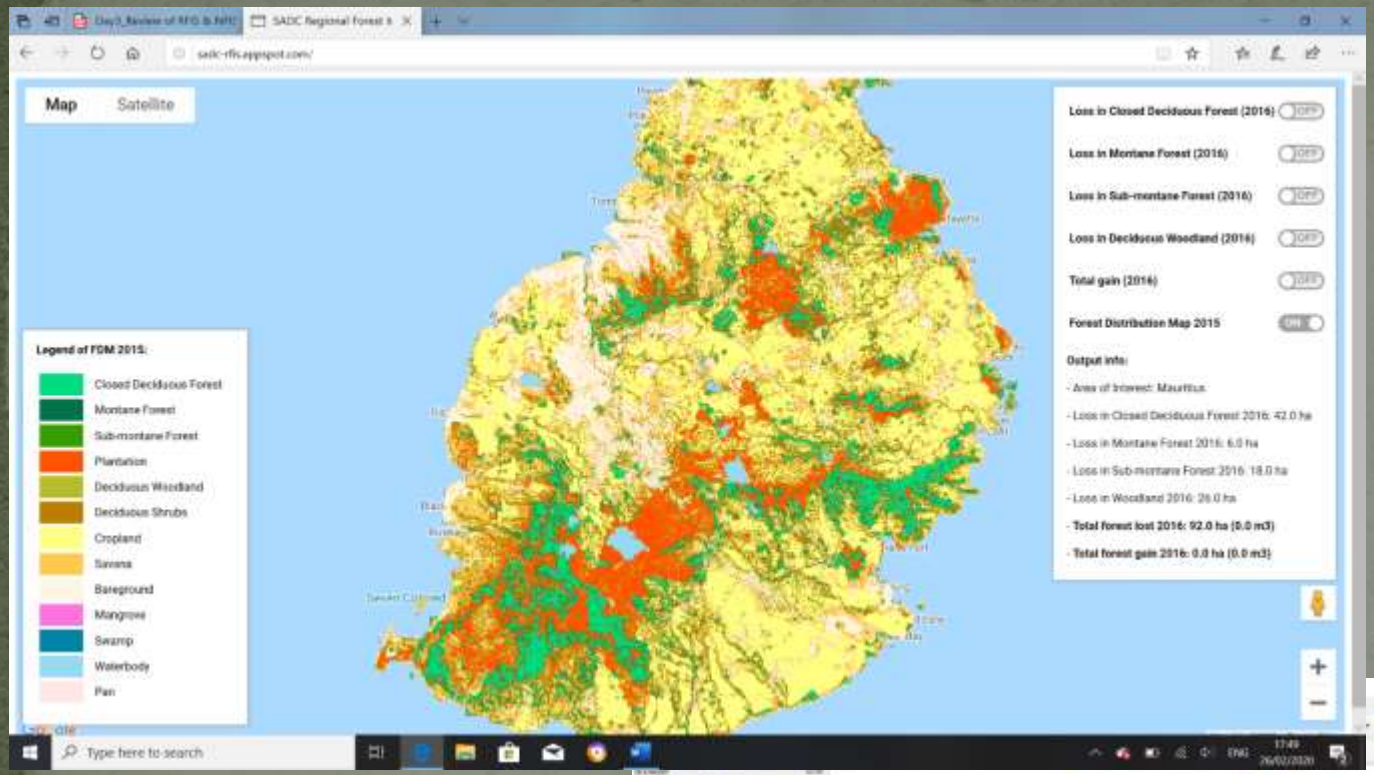
- Learnt how to use QGIS
- Developed skills/knowledge to acquire, process and analyze satellite imagery and also carry ou.t ground truthing exercise for the monitoring of forest resources
- Knowhow of the open source database PostgreSQL and its interaction with QGIS.
- Learnt how to use Google Earth Engine for the monitoring of forest change
- Use of Python Script (including the use of PyQGIS and PyQt5) for the design, building, debugging and configuration of plugins for QGIS.
- Use of SADC Collect App for the collection of field data.

Way forward for FIS

- Provide training to Forest Officers in QGIS (already started) and PostgreSQL
- Ground truthing exercise for existing forest map (in progress since March 2019)
- Recruitment of additional Staff (E.g. GIS Officer, Forest Officers for a forest inventory and ground truthing)
- Acquisition of satellite imagery
- Creation of Forest Information Database in QGIS (NFIS)

Way forward for FIS

- Use of QGIS database as a support for forest management and planning of forest operation
- Use of GEE for change detection
- Designing a country specific SADC Collect Form for the collection of field data and use of PC tablet for monitoring and ground truthing of forest areas.
- Updating the RFIS.


Map
Satellite
Loss in Closed Deciduous Forest (2016)
Loss in Montane Forest (2016)
Loss in Sub-montane Forest (2016)
Loss in Deciduous Woodland (2016)
Total gain (2016)
Forest Distribution Map 2015
Output info:
- Area of Interest: Mauritius
- Loss in Closed Deciduous Forest 2016: 42.0 ha
- Loss in Montane Forest 2016: 6.0 ha
- Loss in Sub-montane Forest 2016: 18.0 ha
- Loss in Woodland 2016: 26.0 ha
- Total forest lost 2016: 92.0 ha (0.0 m3)
- Total forest gain 2016: 0.0 ha (0.0 m3)
Legend of FDM 2015:
Closed Deciduous Forest
Montane Forest
Sub-montane Forest
Plantation
Deciduous Woodland
Deciduous Shrubs
Cropland
Savana
Bareground
Mangrove
Swamp
Waterbody
Pan
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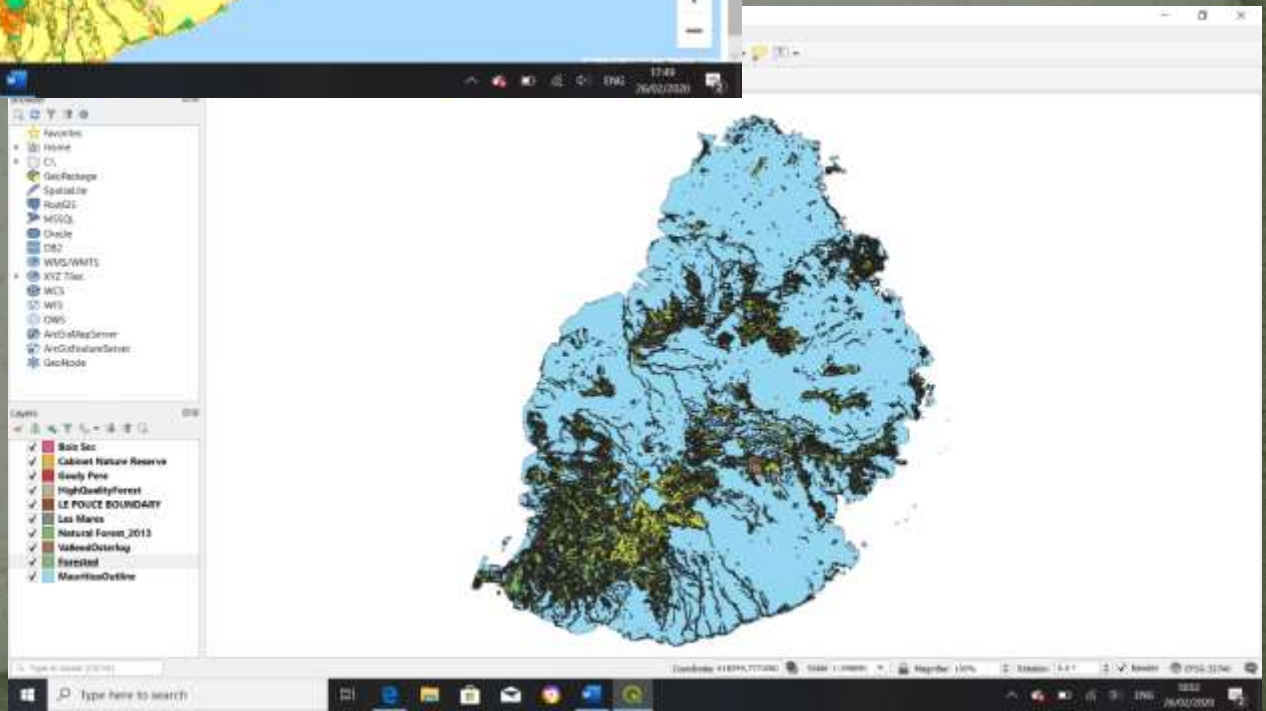
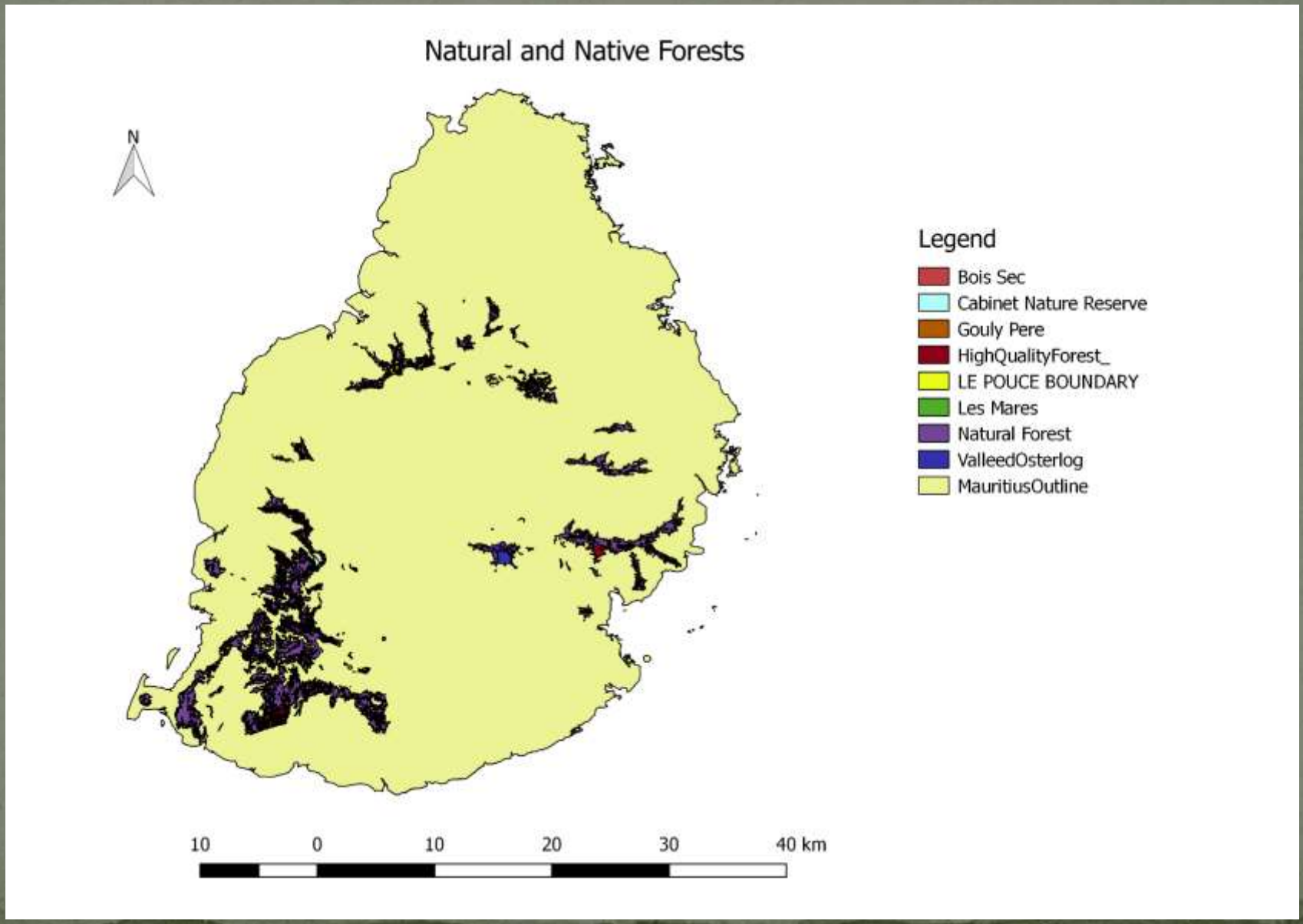

Bois Sec
Cabinet Nature Reserve
Gouly Pere
HighQualityForest
LE POUCE BOUNDARY
Les Mares
Natural Forest_2013
ValleedOsterlag
Forested
MauritiusOutline
Type here to search

Natural and Native Forest



Forest Fire Management

Current Situation

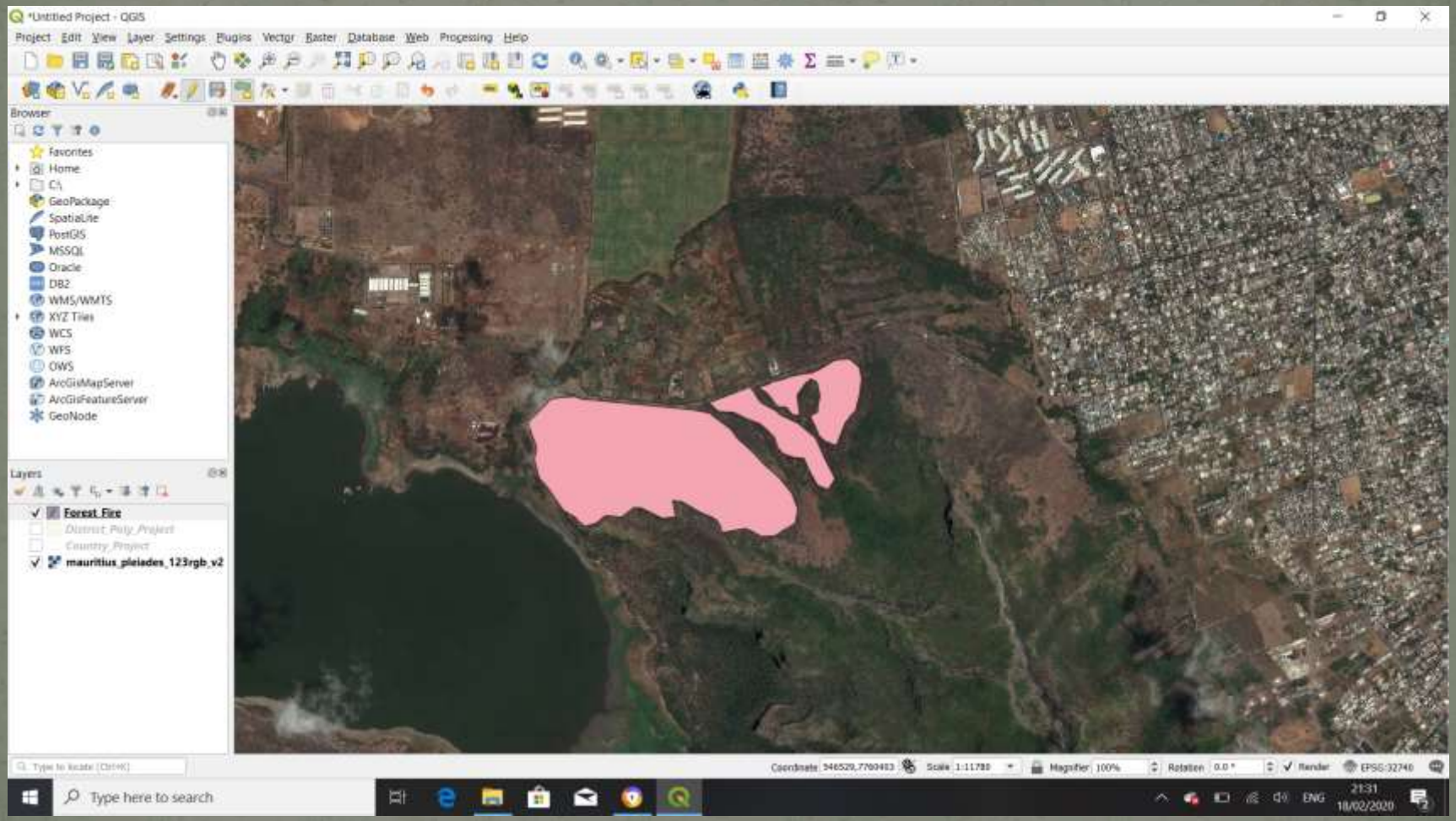
- NO Forest fire database
- NO Forest maps
- Records of Forest fires are kept in fire occurrence report
- Existing approach for forest management is currently limited to: creation and management of firebreaks in fire prone areas

Fire on Signal Mountain

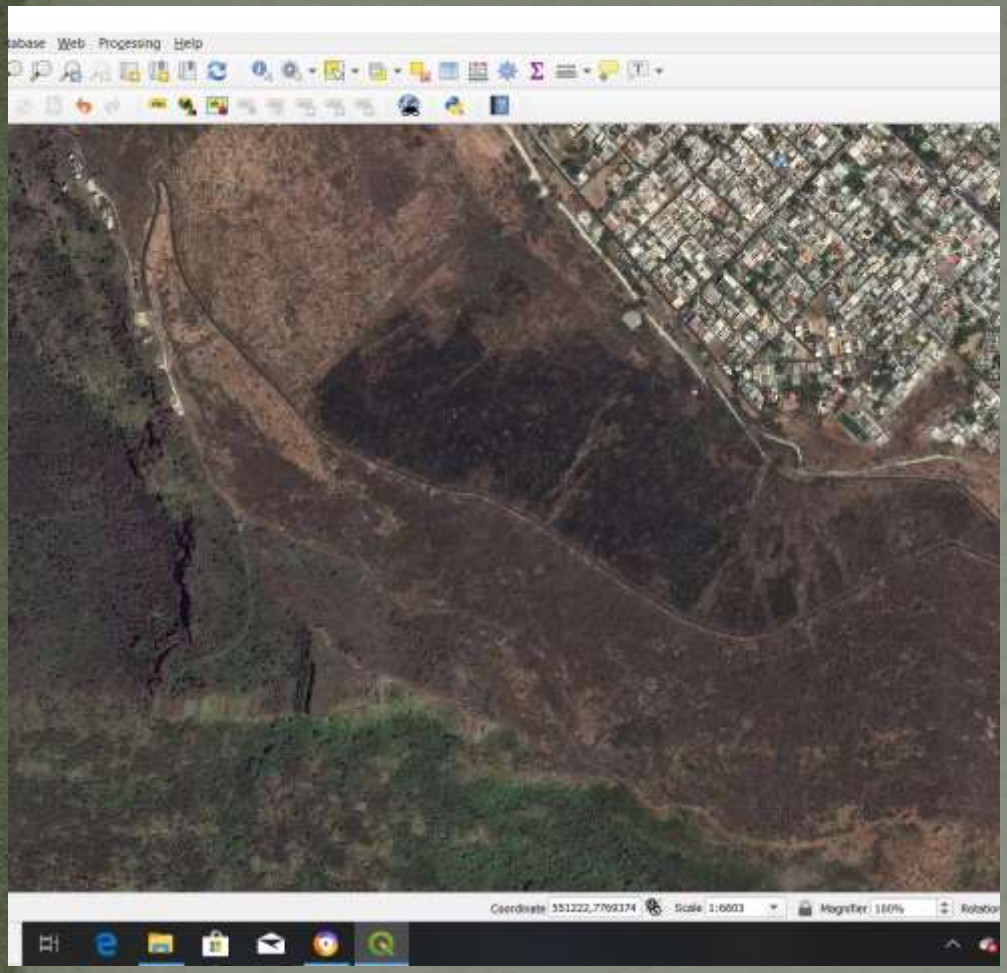
Lessons Learnt

- Acquisition of satellite imagery
- Use of Google Earth Engine to monitor forest fire
- Development and updating forest fire database and maps
- Use of PC tablet for monitoring and ground truthing of affected areas.

Mapping and Creating a Forest Fire database using Landsat and Pleiades Satellite imagery



Forest Fire at La Ferme


Database Web Processing Help
Coordinate 551222,7769374
Scale 1:6603
Magnifier 100%

Fire Management

Fire Breaks - About 30 Km of fire breaks are opened annually on fire prone and sensitive areas (Ile D'Ambre, Ile aux Bennitiers and Signal Mountain).

Way Forward for FFM

The knowledge acquired during the training will help the Forestry Service to:

- Map forest areas affected by forest fire/ and fire prone region.
- Create a forest fire database
- Better plan forest fire management/prevention measures.
- Monitor forest fire prone region

Way Forward for FFM

- The final guidelines will be circulated among the relevant stakeholders including planning authorities.
- The awareness and sensitization programme will be undertaken with all relevant institutions/authorities include Government Fire and Rescue Service as well as public at large.
- Preparation of awareness raising material in local context.
- Integration of recommendation of the regional guidelines in national policies and strategies relevant to climate change.

Thank You