Ministry of Lands & Natural Resources

Application of GIS - Spatial Analysis of the Status of Mangroves and Water Resources at Fanga'uta Lagoon Catchment(FLC)

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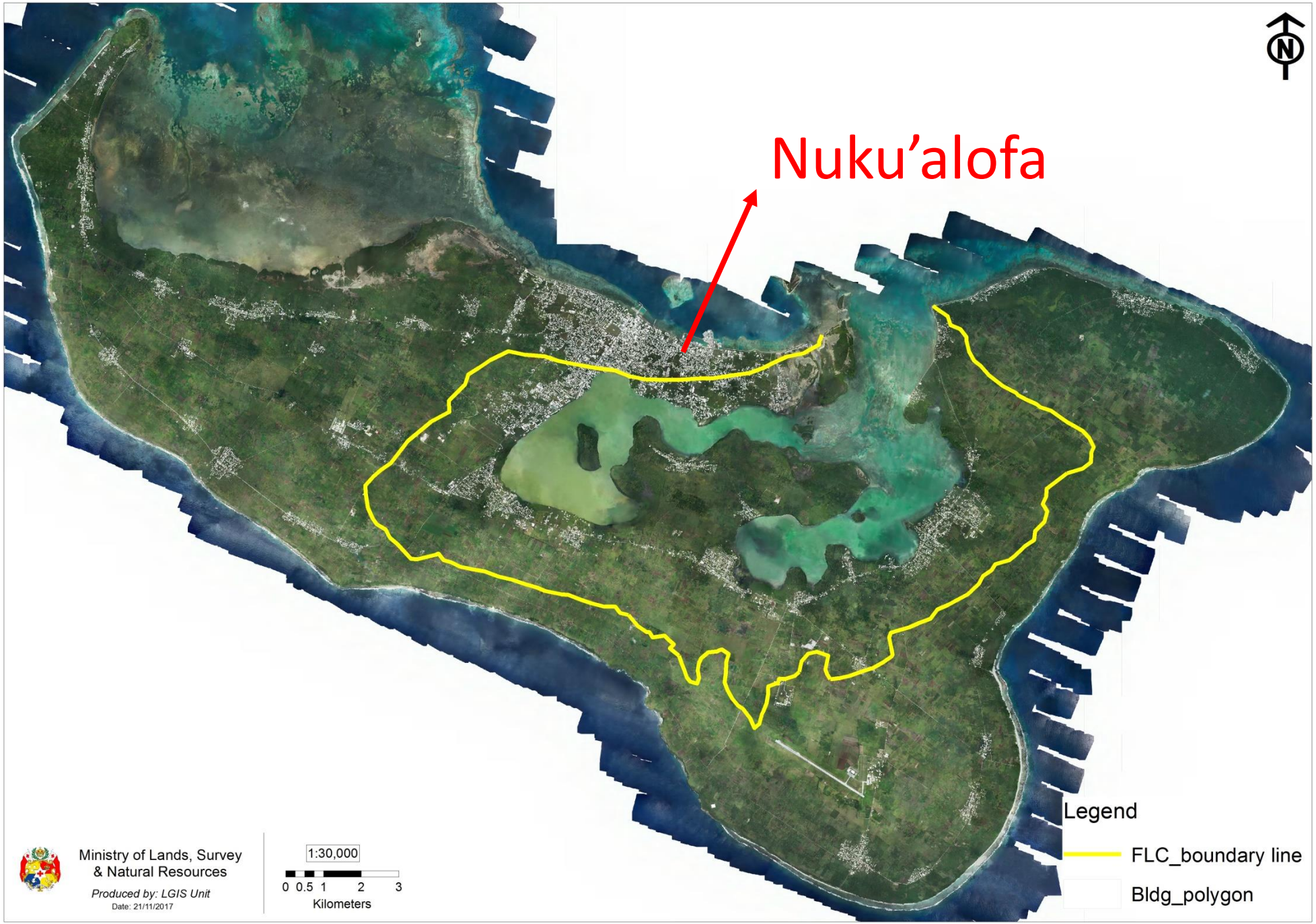
Fanga'uta Lagoon Catchment (FLC)

- Located on the main Island of Tongatapu

- FLC – area within the yellow line



Aim

- Using GIS based system to spatially analyse and visualise the status of FLC ecosystem goods and services, to support informed decision making on sustaining Mangroves and Water Resources in the FLC

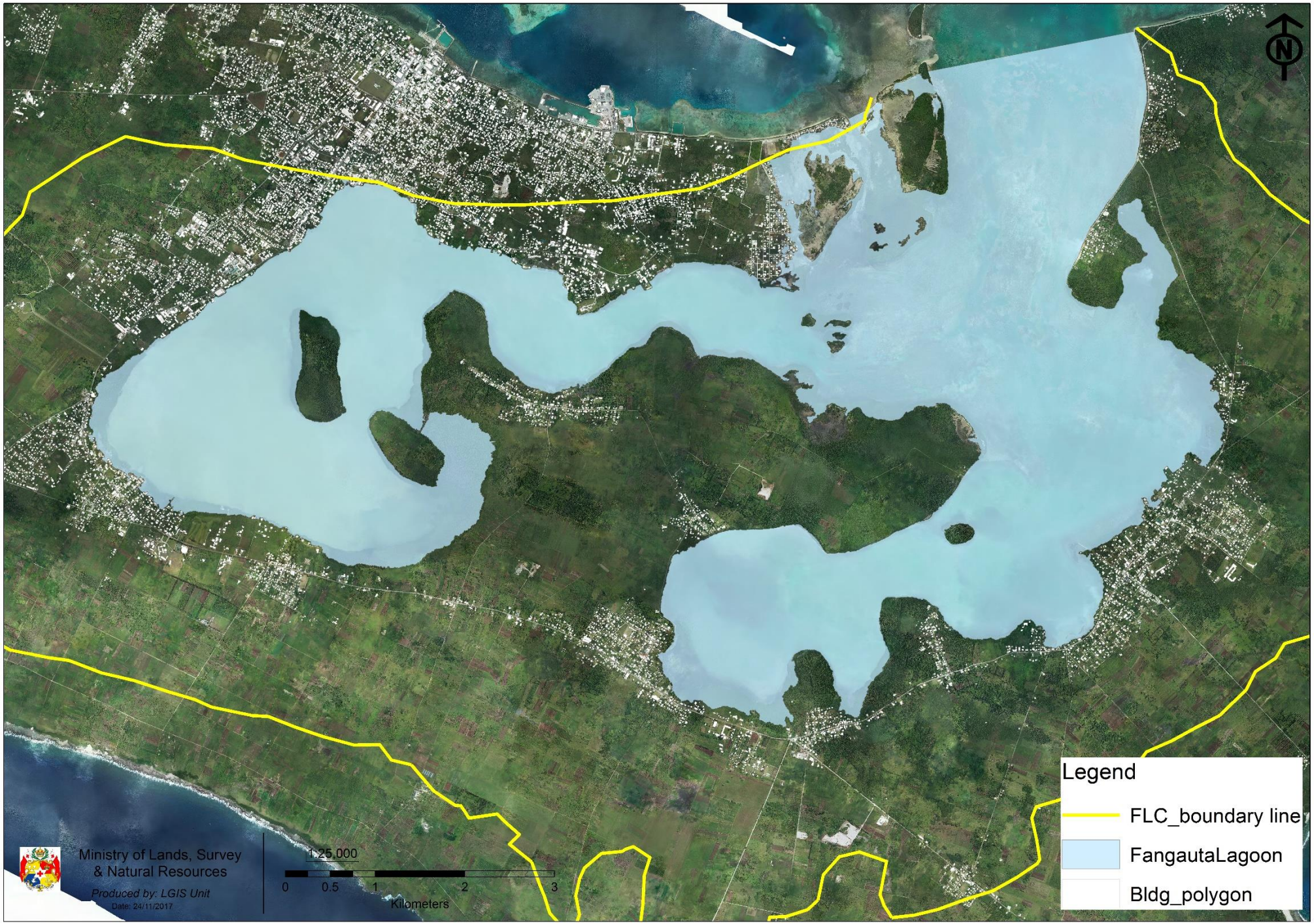
Objectives

- Use GIS based system to monitor and analyse the status of water quality in Water Springs and Well bores within the FLC.

- Use GIS based system to monitor and analyse the status of mangrove ecosystem(carbon sink) at Fanga'uta lagoon Catchments

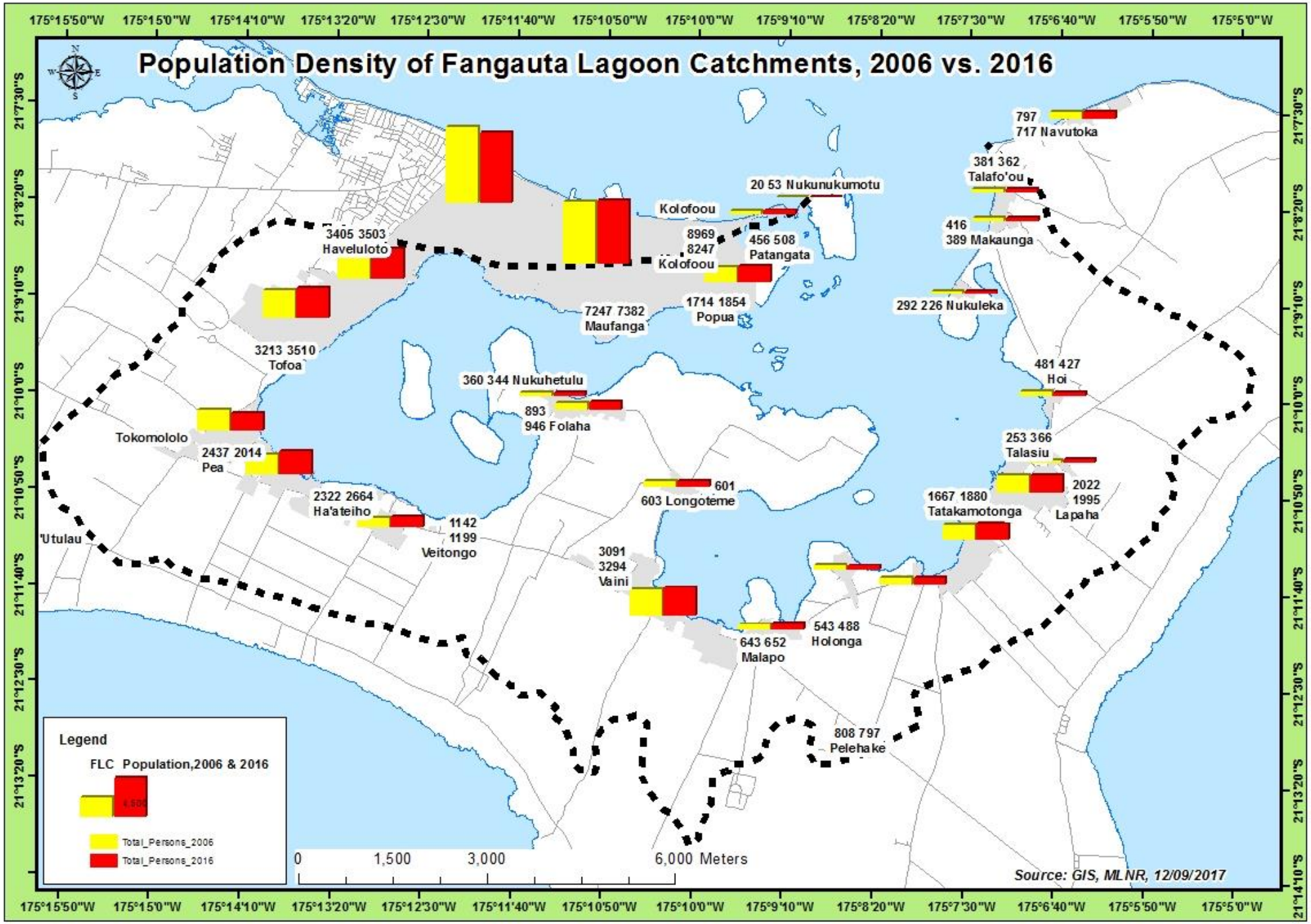
BACKGROUND OF FLC

- FLC is a R2R Project
- 64% of Total Population
- 31% of Total Land Area
- 29 Villages
- Importance to the wellbeing and livelihood of communities
- Last monitoring in 2001 under the TEMPP



Population Density of FLC

- FLC Comparison of 2006 – 2016
- Steady but estimated to increase in years to come



Stakeholders

- Donors (UNDP, GEF)
- Line Ministries (Statistics, Environment, Waste Authority, Health, Ministry of Lands & Natural Resources etc.)
- NGOs (Civil Society, Geo-recycling)
- Communities (Town officers, Residents)

FINDINGS IN THE FANGA'UTA LAGOON CATCHMENT

Water Quality

Detemined by measure of

- Salinity of water
- Water depth
- Temperature
- Faecal Coliform

(Bacteria count)

- Nitrate
- Nitrite
- Phosphate
- Ammonia

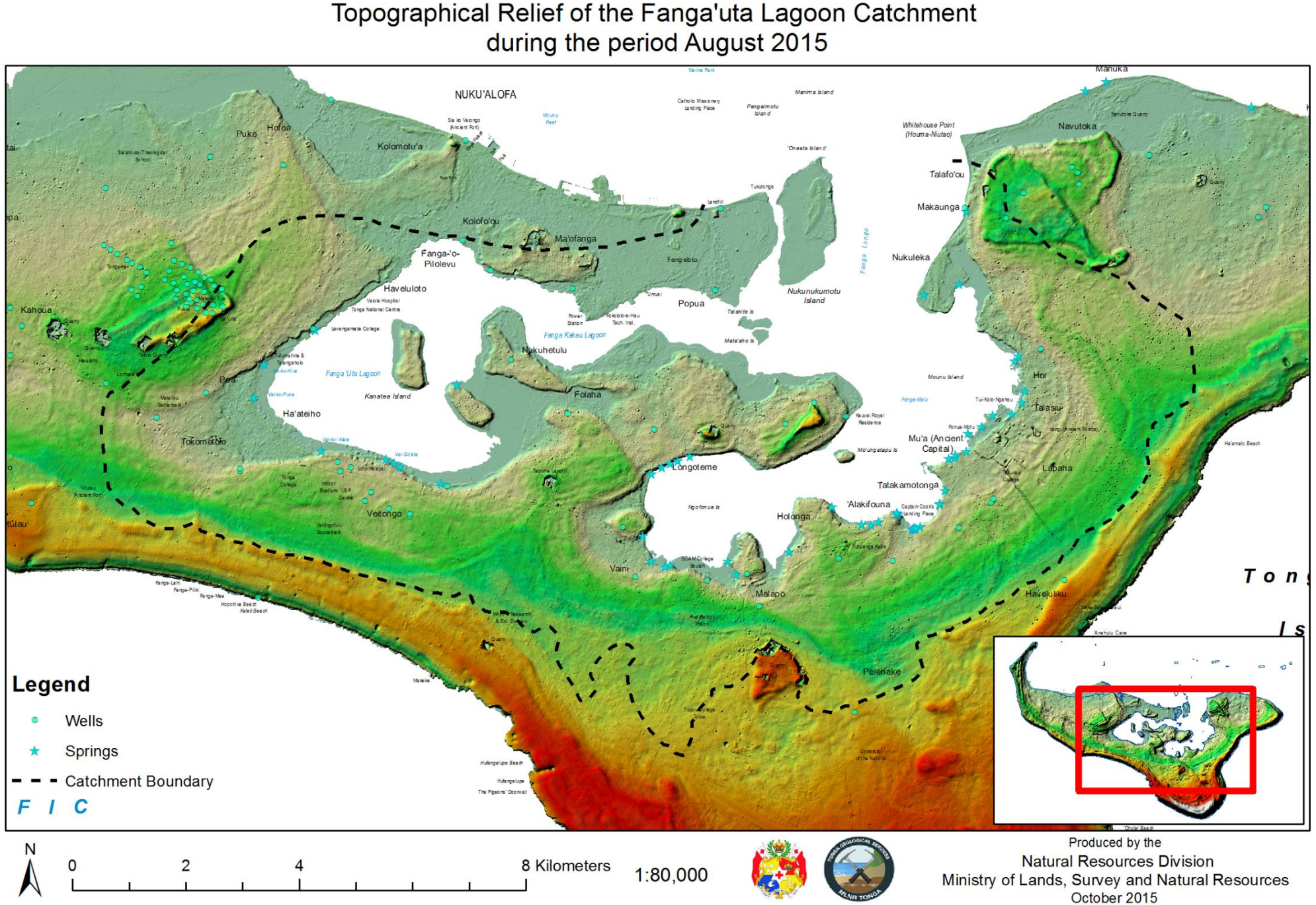
Conductivity were measure Using Solonist

Faecal Coliforms using reagents In the water lab

Green point – Spring Water
Red point – Well Bores

Topographical Relief of FLC

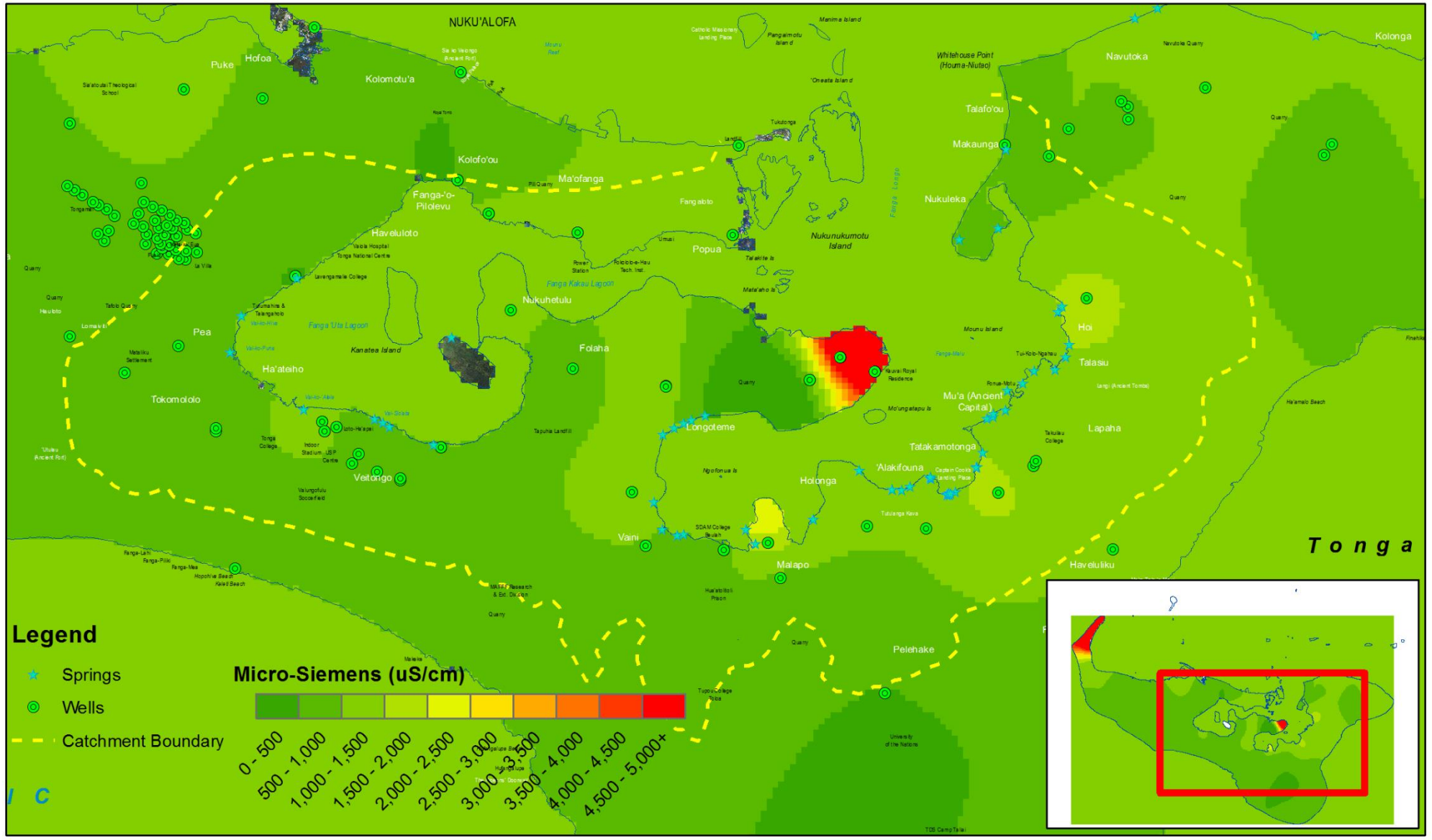
- Fresh Water Discharge



Conductivity

- Micro – Siemens
  0 – 5000+

Conductivity of Wells and Springs measured within the Fanga'uta Lagoon Catchment during the period August 2015



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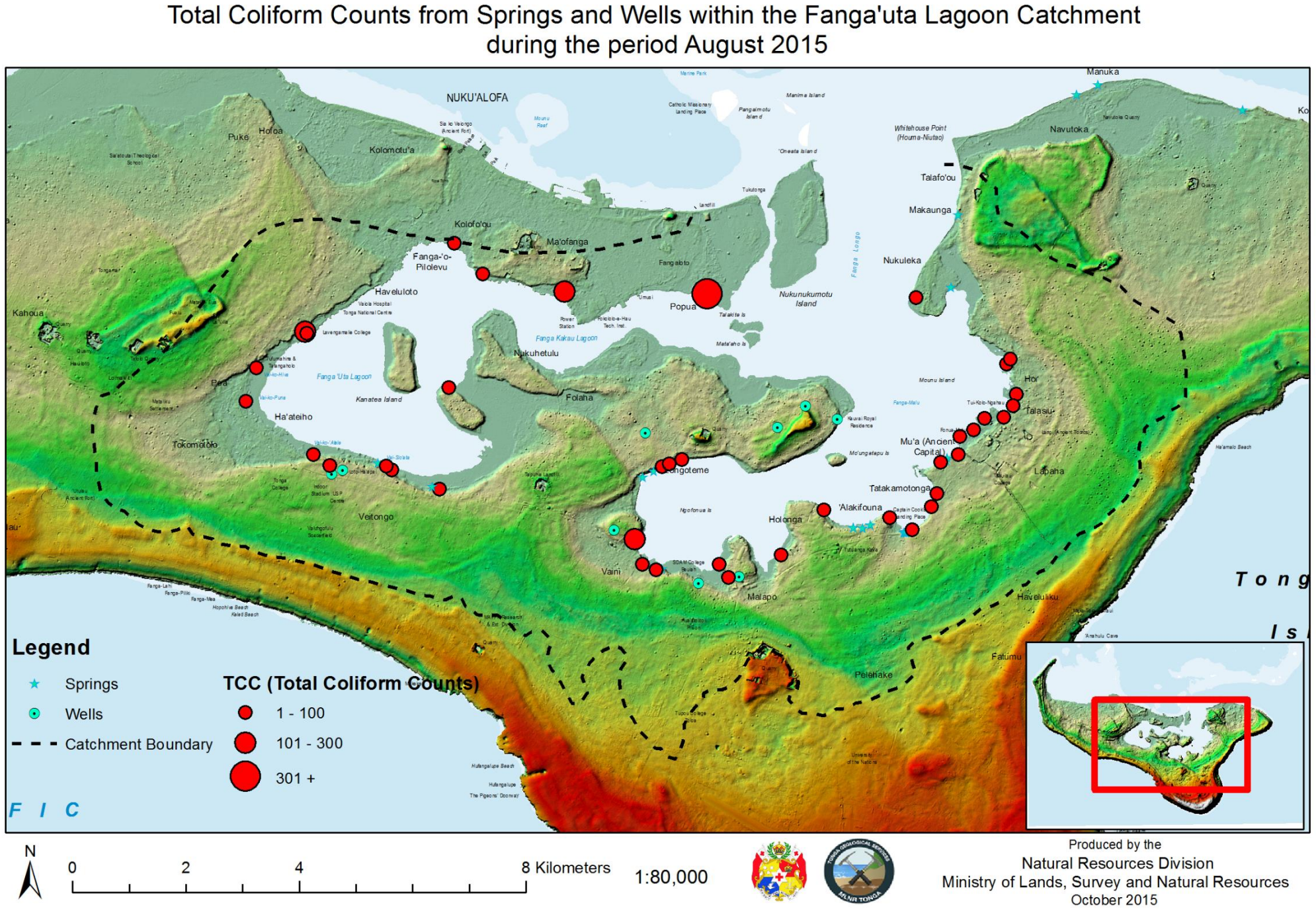
Ministry of Lands, Survey and Natural Resources
October 2015

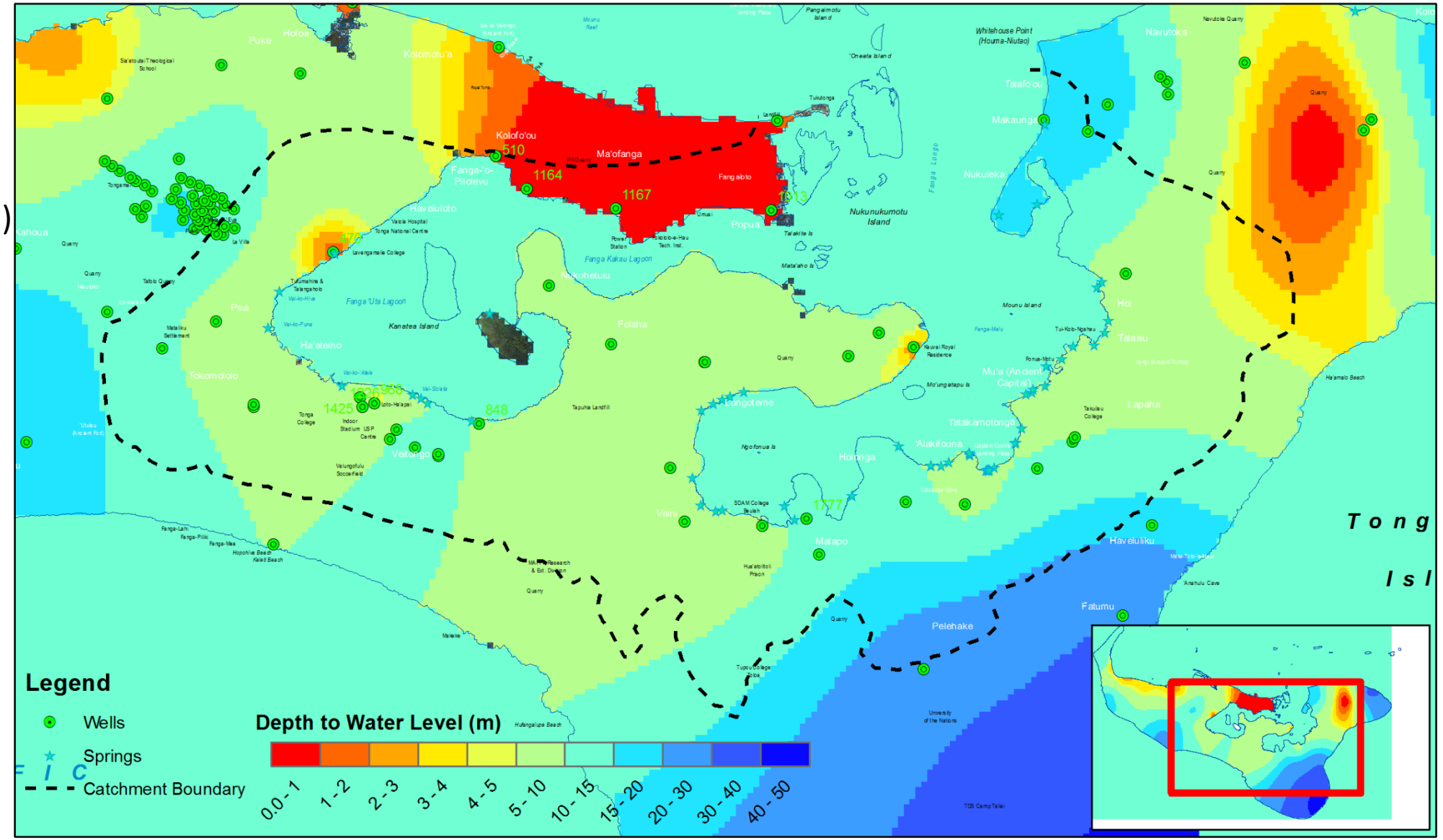
Coliform Counts from Springs and Wells



Groundwater

- Depth to water level (m)
  0.0 - 50

Depth to Groundwater Surface Levels within the Fanga'uta Lagoon Catchment during the period August 2015



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October 2015

Mangrove 2006

3 Sectors showing the loss of Mangroves.

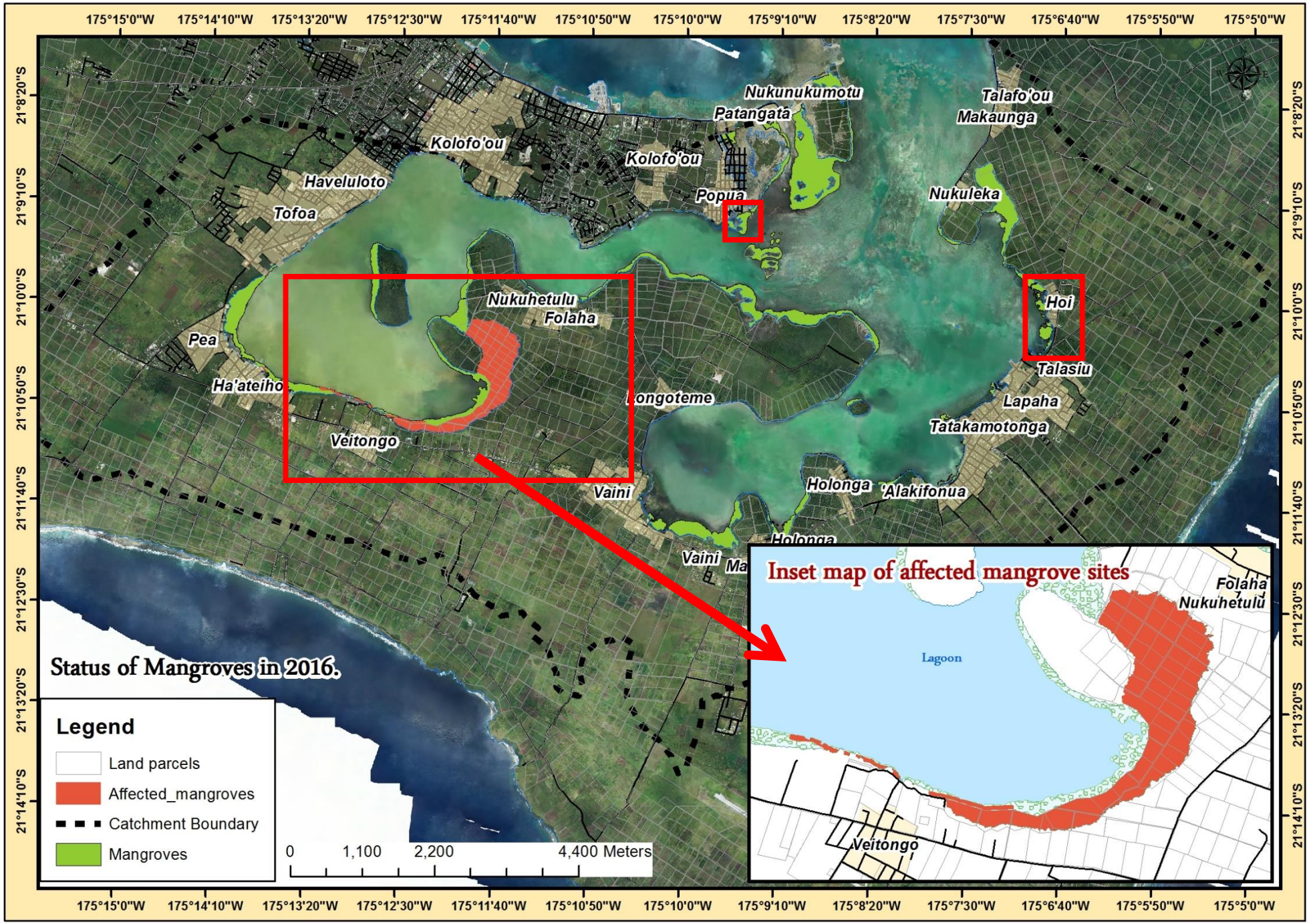
- Popua
- Hoi
- Nuku

- Approximately 417.69 ha of Mangrove at site

Mangrove 2015

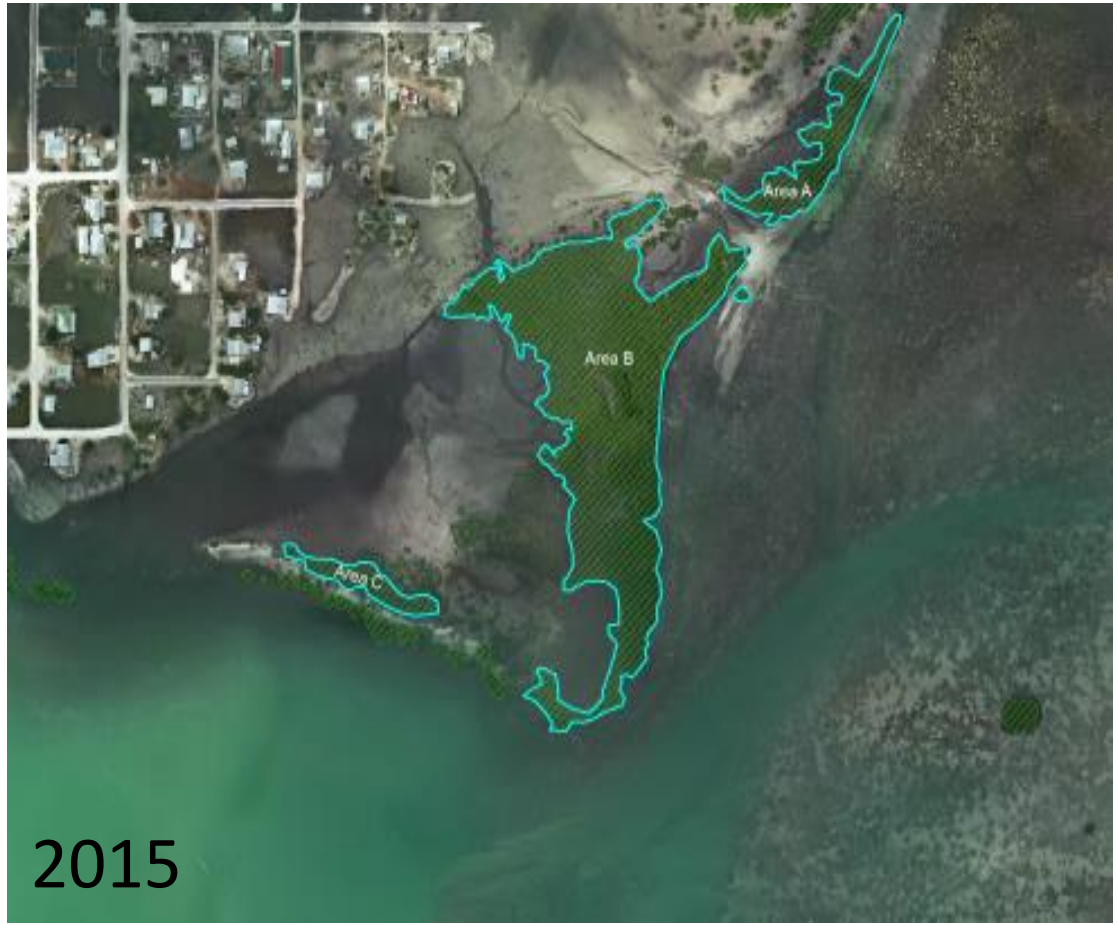
Sites

1. Popua
2. Hoi
3. Nuku



Popua Mangrove

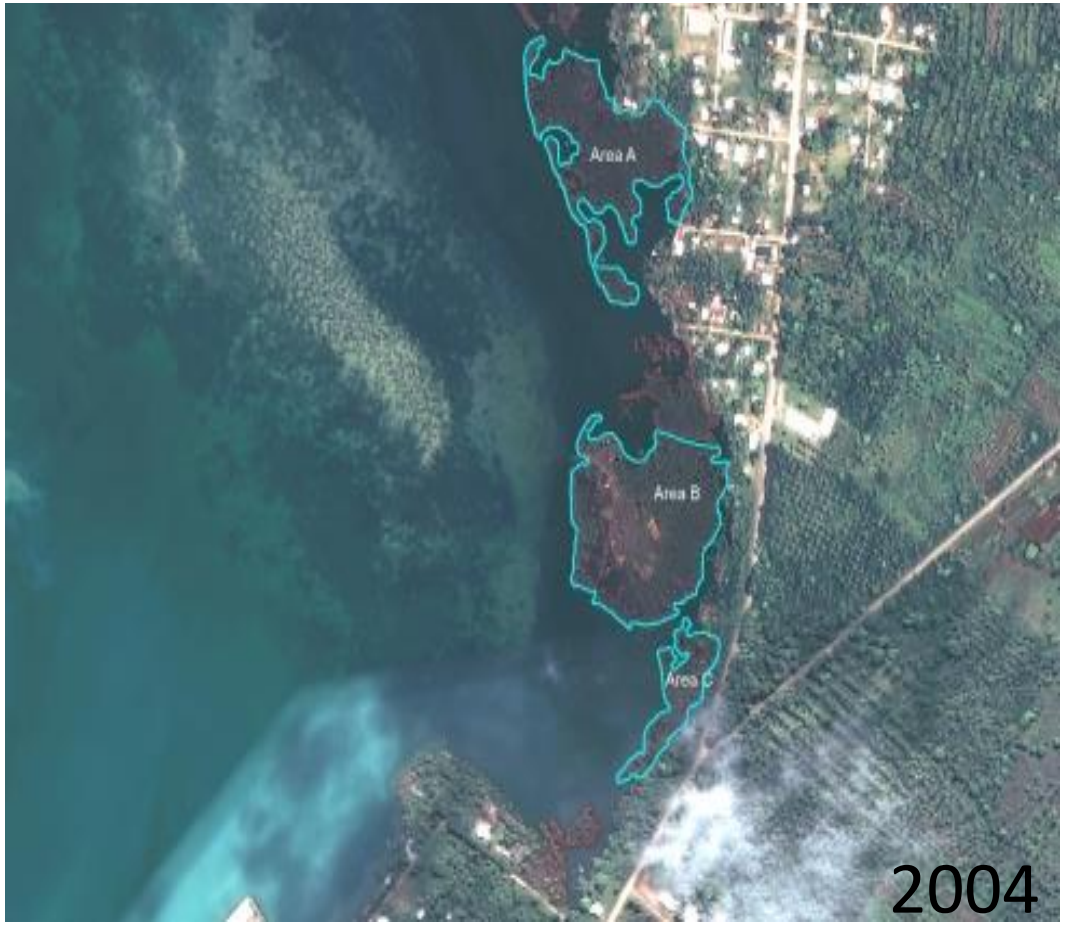
Sector I

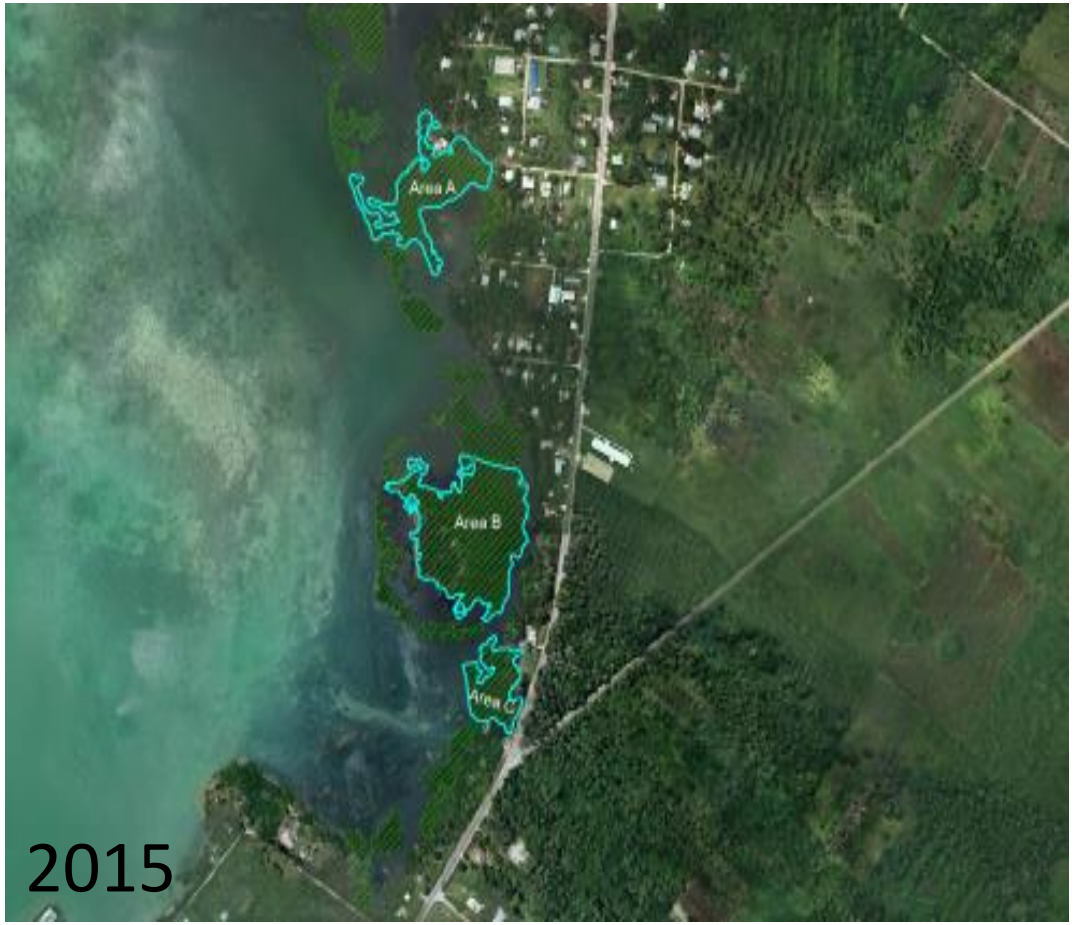


Mangrove loss – Approx 48.7 %

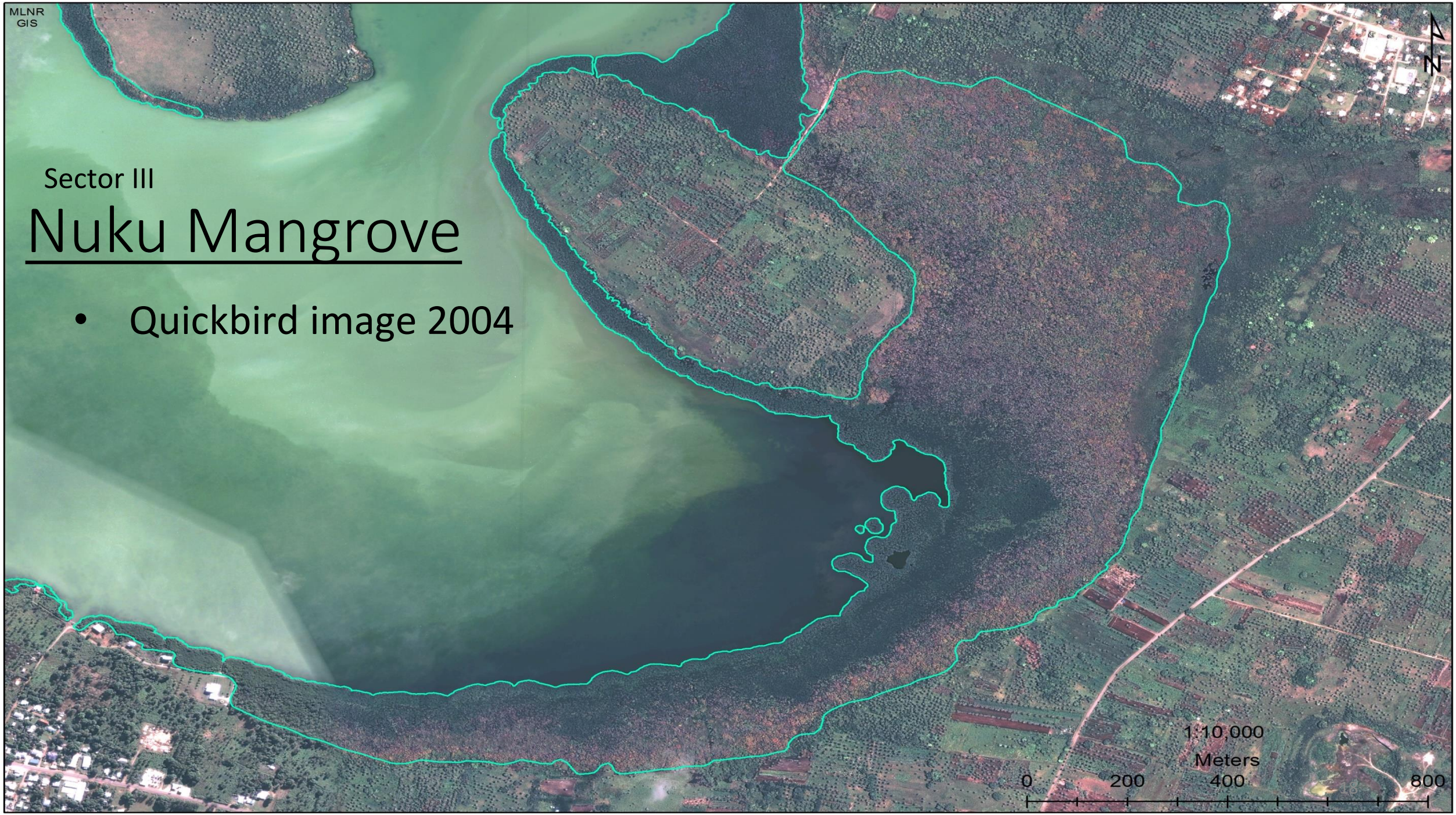
Hoi Mangrove

Sector II





Mangrove loss – Approx 30.7 %



Sector III

Nuku Mangrove

- Quickbird image 2004

Sector III

Nuku Mangrove

- 2015 Image
- 35% loss

Sector III

Nuku Mangrove

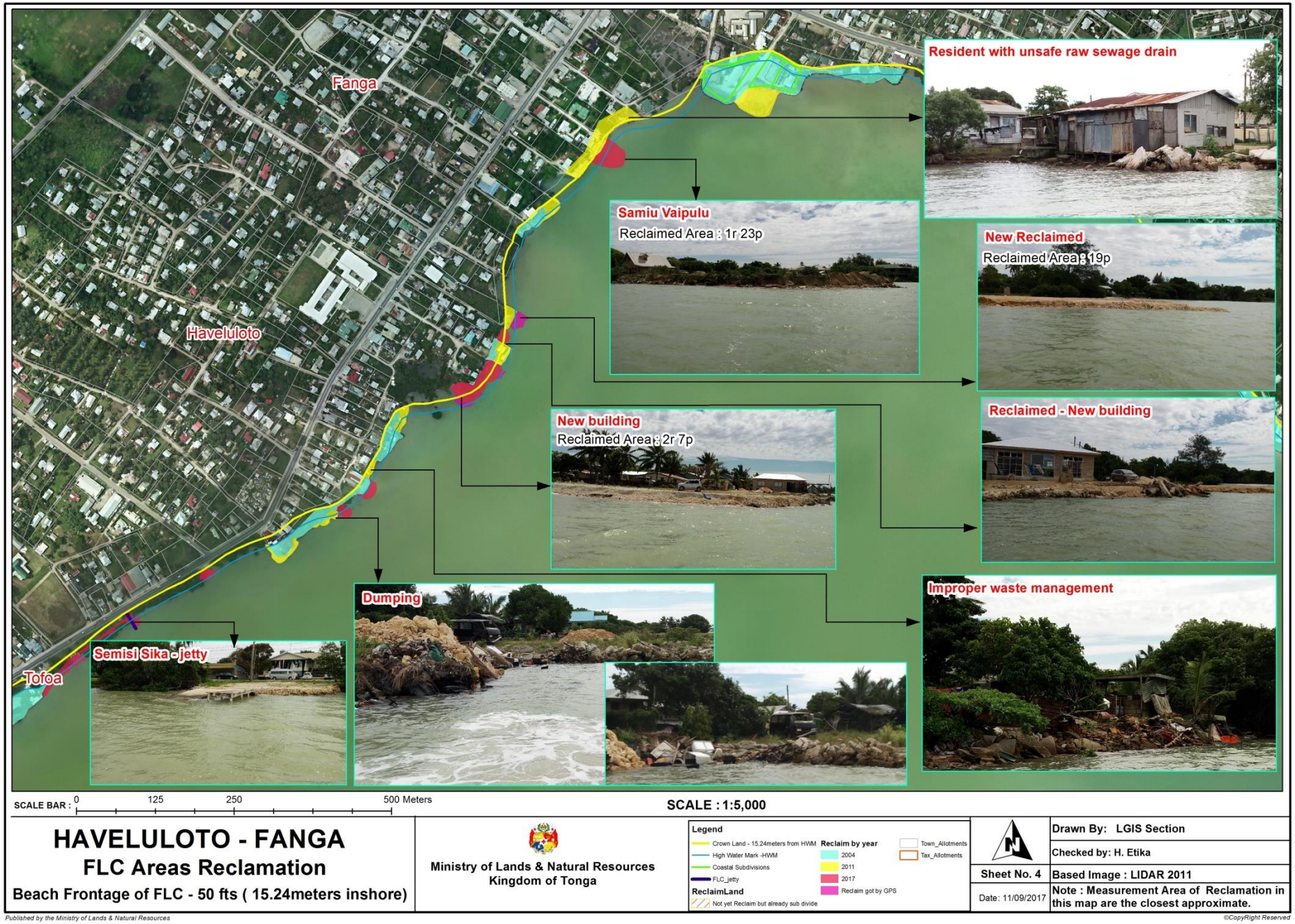
- The Change in use

Conclusion

Population Impact In the FLC

- Land Reclamation & Subdivision beyond the High water mark

- Survey done in 2017



References

- Hokafonu, T.F., Matoto, A.L. & Kaly, U.L. (eds) 2016. Fanga'uta Lagoon Catchment Monitoring Manual 2016. Report for United Nations Development Programme (UNDP), 60pp., Department of Environment, MEIDECC. Nuku'alofa, Tonga.
- Aholahi, H., Aleamotu'a, P., Butler, D.J., Etika, H., Faka'osi, T., Hamani, S., Helu, T.M., Hokafonu, T.F., Kaly, U., Kautoke, R.A., Manu, V.T., Matoto, A.L., Ma'u, P., (2017) Status of Fanga'uta Lagoon in 2016. Report for United Nations Development Programme (UNDP), 42pp., Department of Environment, MEIDECC. Nuku'alofa, Tonga.

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