THE UNIVERSITY OF THE SOUTH PACIFIC

Land Cover change detection on Tarawa in 1965 and 2015

Presenter: Kauaata BAIBUKE

Background

Case Study area: Tarawa (Kiribati)

- Capital of Kiribati, situated in the S.Pacific
- Isolated villages connected by causeways.
- Population: more than 56,000 in 2010, rural-urban migration

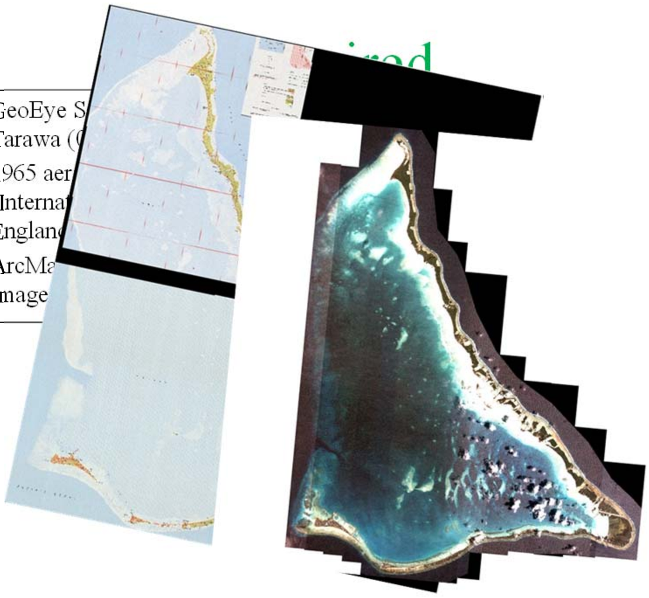
Why doing this project?

- to know the difference of Land Cover in the past 50 years
- to justify whether islets closer to causeways have undergoes land cover change or not (image interpretation).

Aims

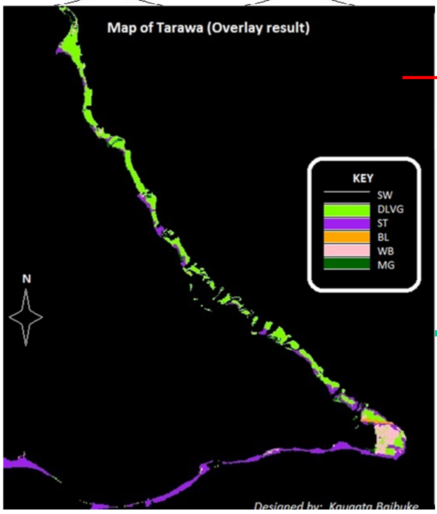
- To locate and measure the area extent of the change.
- To identify features that are recently occupying the land surface (2015) and factors contributing to their existence.
- To inspect whether / not islets disappear years after causeway construction through visual interpretation of the map.

- GeoEye S
  Tarawa (
- 1965 aer
  (Interna
  Englan
- ArcMa
  Image



Spatial Modeler to run Change Detection

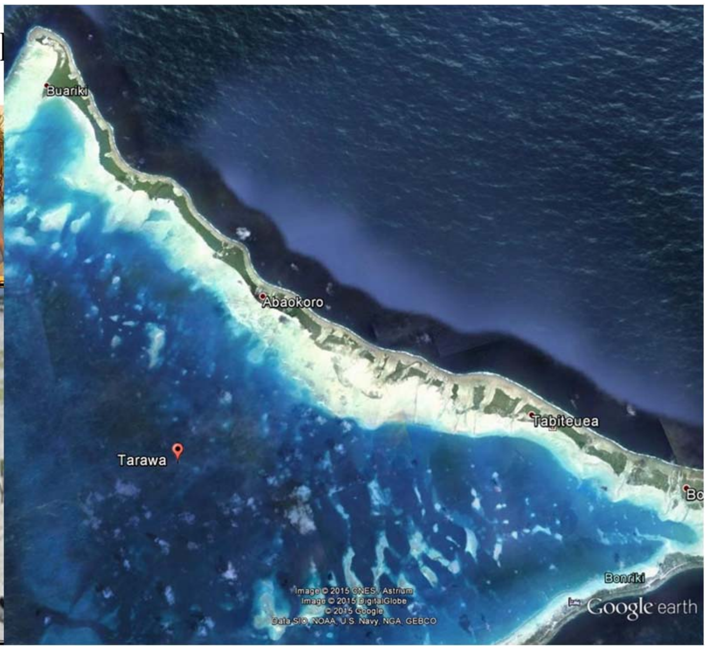
Change Detection map



ClassName	NoPixels	Hectare
BL 2015 - BL 1965	264079	26
BL 2015 - DLVG 1965	153707	15
BL 2015 - MG 1965	16141	2
BL 2015 - ST 1965	28534	3
BL 2015 - SW 1965	76787	8
BL 2015 - WB 1965	36070	4
DLVG 2015 - BL 1965	862761	86
DLVG 2015 - DLVG 1965	10425376	1043
DLVG 2015 - MG 1965	251629	25
DLVG 2015 - ST 1965	95281	10
DLVG 2015 - SW 1965	1623880	162
DLVG 2015 - WB 1965	960814	96
MG 2015 - BL 1965	22515	2
MG 2015 - DLVG 1965	218632	22
MG 2015 - MG 1965	324376	32
MG 2015 - ST 1965	19428	2
MG 2015 - SW 1965	844367	84
MG 2015 - WB 1965	28456	3
ST 2015 - BL 1965	295077	30
ST 2015 - DLVG 1965	4739990	474
ST 2015 - MG 1965	247698	25
ST 2015 - ST 1965	3498280	350
ST 2015 - WB 1965	325074	33
ST2015 - SW 1965	1110134	111
SW 2015 - BL 1965	26291	3
SW 2015 - DLVG 1965	1257237	126
SW 2015 - MG 1965	156343	16
SW 2015 - ST 1965	180425	18
SW 2015 - SW 1965	914131618	91413
SW 2015 - WB 1965	22711	2
WB 2015 - BL 1965	17606	2
WB 2015 - DLVG 1965	155675	16
WB 2015 - MG 1965	98059	10
WB 2015 - ST 1965	7066	1
WB 2015 - WB 1965	2058427	206
WB2015 - SW1965	326160	33

Class	1965	2015
Water Body	344	268
Settlement	384	1023
Bare Land	1023	384
Dry land vegetation	1422	1696
Mangrove	110	145
Non-Water	3283	3516
Note: Increase in Vegetation	1696	hectares
Different	233	hectares

Pl



Conclusion

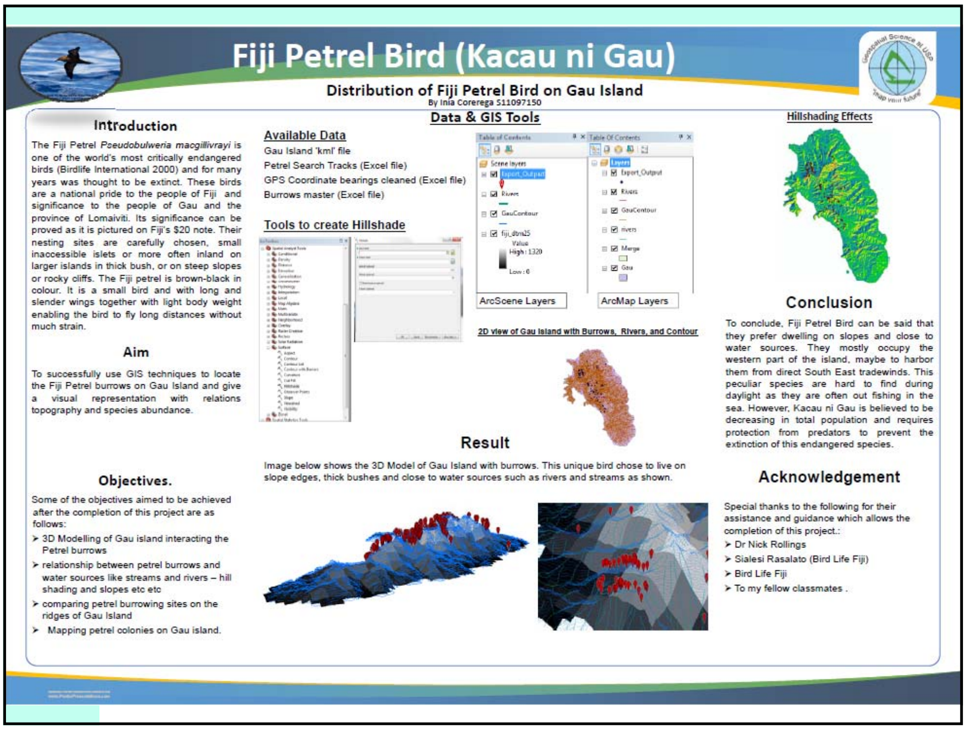
❖The land/ Tarawa Island increased by 233 ha (2015).

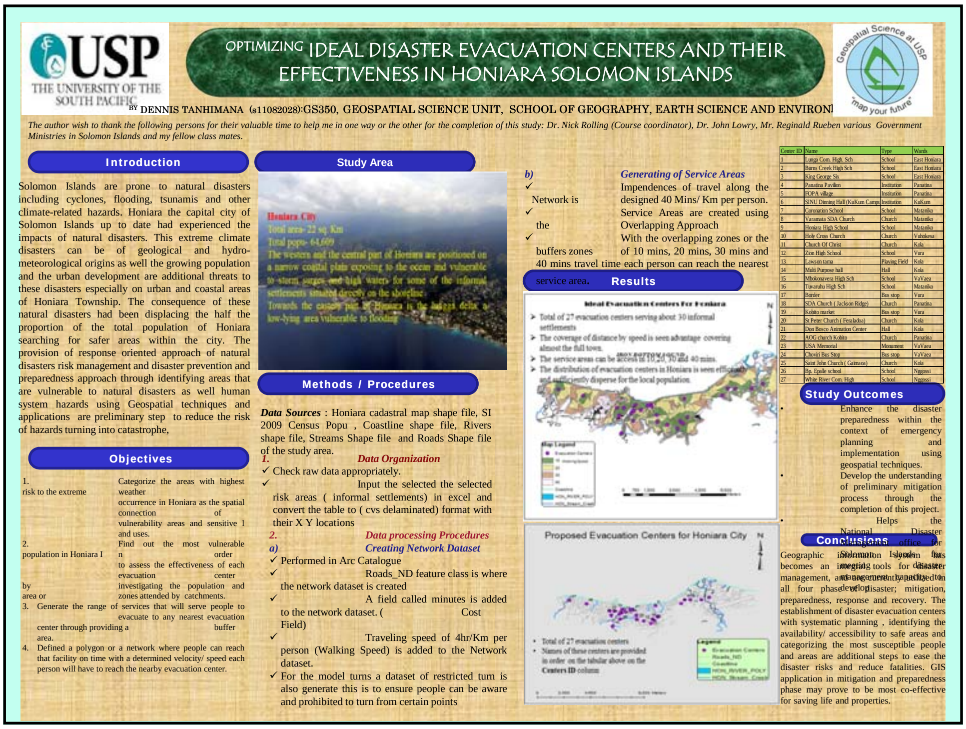
❖In 2015:

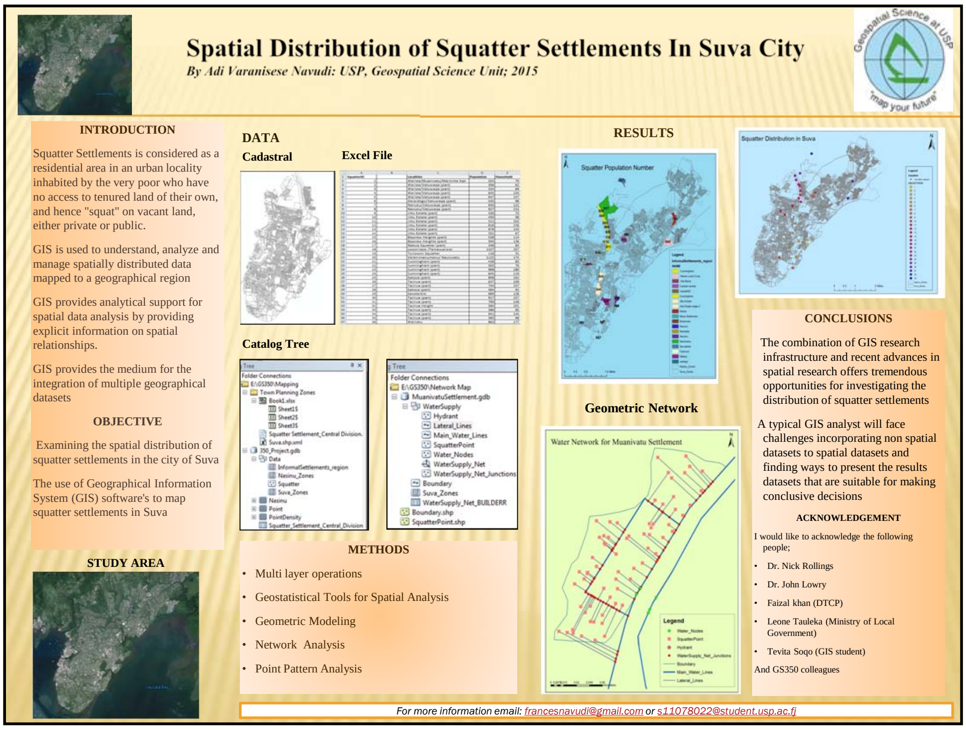
- ST increased from 384 ha to1023 ha.
- WB & BL decreased due to the increase in Settlement.
- MG increased
- DLVG increased

❖Maungatabu Islet closer to Nanikaai & Teaoraereke (Anderson Causeway) existed before 1965(no causeway) until causeway1980, later, in the 2015 satellite imagery, this islet disappeared.

❖Bikeman Islet -BL




OPTIMIZING IDEAL DISASTER EVACUATION CENTERS AND THEIR EFFECTIVENESS IN HONIARA SOLOMON ISLANDS
THE UNIVERSITY OF THE SOUTH PACIFIC
BY DENNIS TANHIMANA (s11082028):GS350, GEOSPATIAL SCIENCE UNIT, SCHOOL OF GEOGRAPHY, EARTH SCIENCE AND ENVIRON
The author wish to thank the following persons for their valuable time to help me in one way or the other for the completion of this study: Dr. Nick Rolling (Course coordinator), Dr. John Lowry, Mr. Reginald Rueben various Government Ministries in Solomon Islands and my fellow class mates.
Geospatial Science at USP
"map your future"
Introduction
Solomon Islands are prone to natural disasters including cyclones, flooding, tsunamis and other climate-related hazards. Honiara the capital city of Solomon Islands up to date had experienced the impacts of natural disasters. This extreme climate disasters can be of geological and hydro-meteorological origins as well the growing population and the urban development are additional threats to these disasters especially on urban and coastal areas of Honiara Township. The consequence of these natural disasters had been displacing the half the proportion of the total population of Honiara searching for safer areas within the city. The provision of response oriented approach of natural disasters risk management and disaster prevention and preparedness approach through identifying areas that are vulnerable to natural disasters as well human system hazards using Geospatial techniques and applications are preliminary step to reduce the risk of hazards turning into catastrophe,
Objectives
1. risk to the extreme Categorize the areas with highest weather occurrence in Honiara as the spatial connection of vulnerability areas and sensitive l and uses.
2. population in Honiara I Find out the most vulnerable n order to assess the effectiveness of each evacuation center by area or investigating the population and zones attended by catchments.
3. Generate the range of services that will serve people to evacuate to any nearest evacuation center through providing a buffer area.
4. Defined a polygon or a network where people can reach that facility on time with a determined velocity/ speed each person will have to reach the nearby evacuation center.
Study Area
Honiara City
Methods / Procedures
Data Sources : Honiara cadastral map shape file, SI 2009 Census Popu , Coastline shape file, Rivers shape file, Streams Shape file and Roads Shape file of the study area.
1. Data Organization
✓ Check raw data appropriately.
✓ Input the selected the selected risk areas (informal settlements) in excel and convert the table to (cvs delaminated) format with their X Y locations
2. Data processing Procedures
a) Creating Network Dataset
✓ Performed in Arc Catalogue
✓ Roads_ND feature class is where the network dataset is created
✓ A field called minutes is added to the network dataset. (Cost Field)
✓ Traveling speed of 4hr/Km per person (Walking Speed) is added to the Network dataset.
✓ For the model turns a dataset of restricted turn is also generate this is to ensure people can be aware and prohibited to turn from certain points
b) Generating of Service Areas
✓ Network is Impendences of travel along the designed 40 Mins/ Km per person.
✓ Service Areas are created using the Overlapping Approach
✓ With the overlapping zones or the buffers zones of 10 mins, 20 mins, 30 mins and 40 mins travel time each person can reach the nearest service area.
Results
Proposed Evacuation Centers for Honiara City
Center ID | Name | Type | Wards
1 | Lunga Com. High. Sch | School | East Honiara
2 | Burns Creek High Sch | School | East Honiara
3 | King George Six | School | East Honiara
4 | Panatina Pavilion | Institution | Panatina
5 | FOPA village | Institution | Panatina
6 | SINU Dinning Hall (KuKum Campu | Institution | KuKum
7 | Coronation School | School | Mataniko
8 | Varamata SDA Church | Church | Mataniko
9 | Honiara High School | School | Mataniko
10 | Holy Cross Church | Church | Vuhokesa
11 | Church Of Christ | Church | Kola
12 | Zion High School | School | Vura
13 | Lawson tama | Playing Field | Kola
14 | Multi Purpose hall | Hall | Kola
15 | Mbokonavera High Sch | School | VaVaea
16 | Tuvaruhu High Sch | School | Mataniko
17 | Border | Bus stop | Vura
18 | SDA Church (Jackson Ridge) | Church | Panatina
19 | Kobito market | Bus stop | Vura
20 | St Peter Church (Feraladoa) | Church | Kola
21 | Don Bosco Animation Center | Hall | Kola
22 | AOG church Kobito | Church | Panatina
23 | USA Memorial | Monument | VaVaea
24 | Choviri Bus Stop | Bus stop | VaVaea
25 | Saint John Church (Gaimaoa) | Church | Kola
26 | Bp. Epalle school | School | Nggossi
27 | White River Com. High | School | Nggossi
Study Outcomes
• Enhance the disaster preparedness within the context of emergency planning and implementation using geospatial techniques.
• Develop the understanding of preliminary mitigation process through the completion of this project.
• Helps the National Disaster Management office for Solomon Islands for meeting disaster management capacity to develop
Conclusions
Geographic information system has becomes an integral tools for disaster management, and are currently utilized in all four phase of disaster; mitigation, preparedness, response and recovery. The establishment of disaster evacuation centers with systematic planning , identifying the availability/ accessibility to safe areas and categorizing the most susceptible people and areas are additional steps to ease the disaster risks and reduce fatalities. GIS application in mitigation and preparedness phase may prove to be most co-effective for saving life and properties.


Spatial Distribution of Squatter Settlements In Suva City
By Adi Varanisese Navudi: USP, Geospatial Science Unit; 2015
Geospatial Science at USP
"map your future"
INTRODUCTION
Squatter Settlements is considered as a residential area in an urban locality inhabited by the very poor who have no access to tenured land of their own, and hence "squat" on vacant land, either private or public.
GIS is used to understand, analyze and manage spatially distributed data mapped to a geographical region
GIS provides analytical support for spatial data analysis by providing explicit information on spatial relationships.
GIS provides the medium for the integration of multiple geographical datasets
OBJECTIVE
Examining the spatial distribution of squatter settlements in the city of Suva
The use of Geographical Information System (GIS) software's to map squatter settlements in Suva
STUDY AREA
DATA
Cadastral
Excel File
Catalog Tree
METHODS
• Multi layer operations
• Geostatistical Tools for Spatial Analysis
• Geometric Modeling
• Network Analysis
• Point Pattern Analysis
RESULTS
Squatter Population Number
Squatter Distribution in Suva
Geometric Network
Water Network for Muanivatu Settlement
Legend
CONCLUSIONS
The combination of GIS research infrastructure and recent advances in spatial research offers tremendous opportunities for investigating the distribution of squatter settlements
A typical GIS analyst will face challenges incorporating non spatial datasets to spatial datasets and finding ways to present the results datasets that are suitable for making conclusive decisions
ACKNOWLEDGEMENT
I would like to acknowledge the following people;
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• Leone Tauleka (Ministry of Local Government)
• Tevita Soqo (GIS student)
And GS350 colleagues
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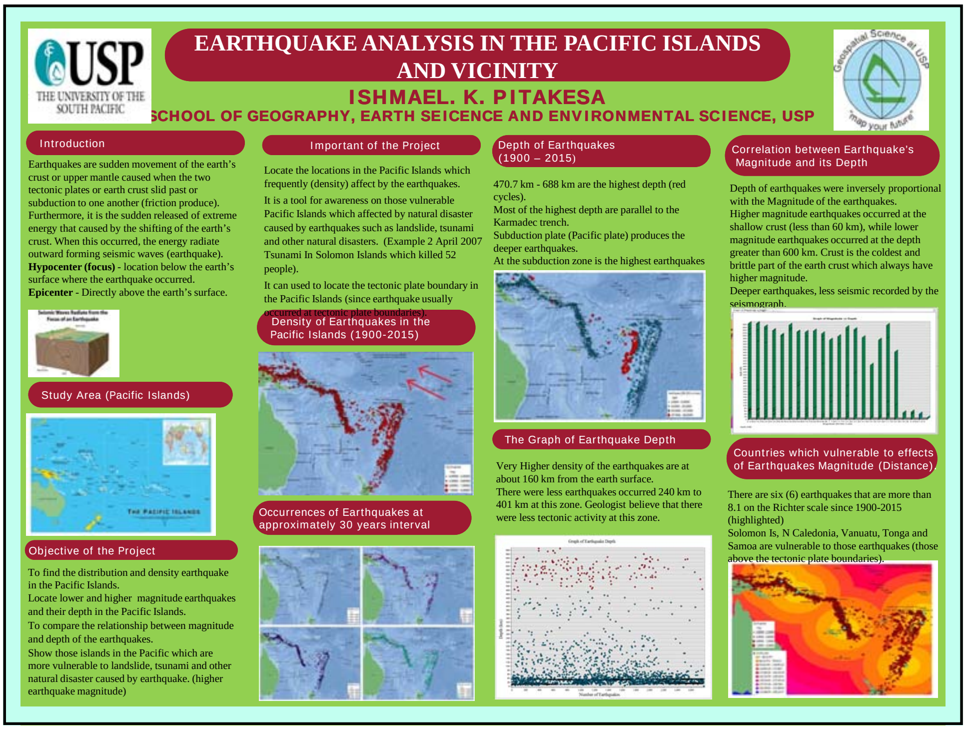
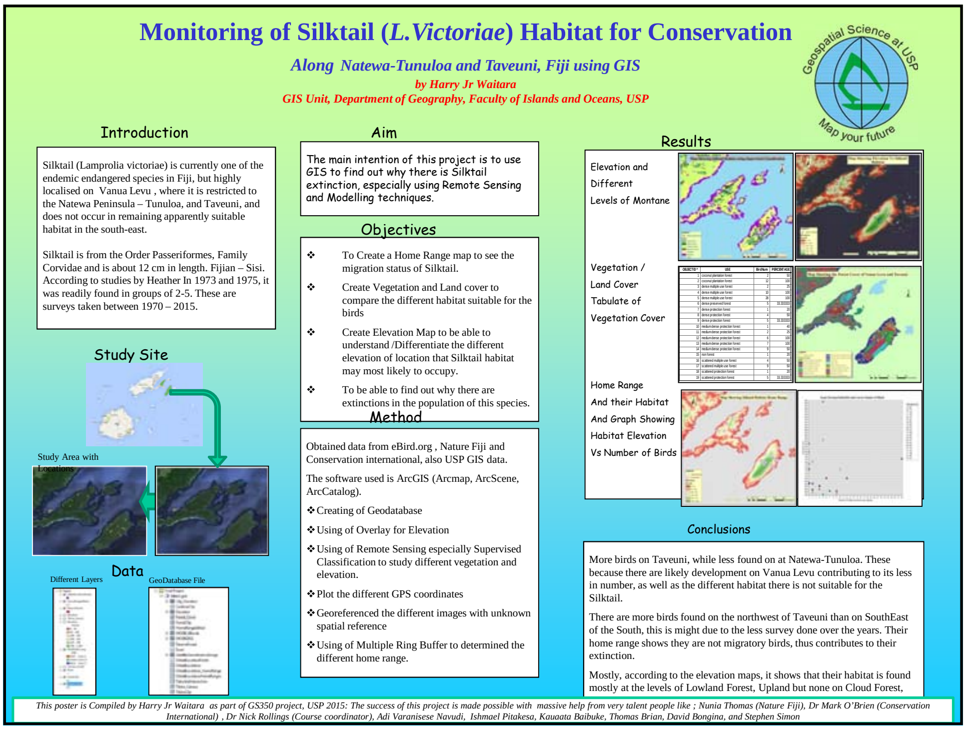

EARTHQUAKE ANALYSIS IN THE PACIFIC ISLANDS AND VICINITY
ISHMAEL. K. PITAKESA
SCHOOL OF GEOGRAPHY, EARTH SEICENCE AND ENVIRONMENTAL SCIENCE, USP
THE UNIVERSITY OF THE SOUTH PACIFIC
Geospatial Science at USP "map your future"
Introduction
Earthquakes are sudden movement of the earth's crust or upper mantle caused when the two tectonic plates or earth crust slid past or subduction to one another (friction produce). Furthermore, it is the sudden released of extreme energy that caused by the shifting of the earth's crust. When this occurred, the energy radiate outward forming seismic waves (earthquake).
Hypocenter (focus) - location below the earth's surface where the earthquake occurred.
Epicenter - Directly above the earth's surface.
Seismic Waves Radiate from the Focus of an Earthquake
Study Area (Pacific Islands)
The Pacific Islands
Objective of the Project
To find the distribution and density earthquake in the Pacific Islands.
Locate lower and higher magnitude earthquakes and their depth in the Pacific Islands.
To compare the relationship between magnitude and depth of the earthquakes.
Show those islands in the Pacific which are more vulnerable to landslide, tsunami and other natural disaster caused by earthquake. (higher earthquake magnitude)
Important of the Project
Locate the locations in the Pacific Islands which frequently (density) affect by the earthquakes.
It is a tool for awareness on those vulnerable Pacific Islands which affected by natural disaster caused by earthquakes such as landslide, tsunami and other natural disasters. (Example 2 April 2007 Tsunami In Solomon Islands which killed 52 people).
It can used to locate the tectonic plate boundary in the Pacific Islands (since earthquake usually occurred at tectonic plate boundaries).
Density of Earthquakes in the Pacific Islands (1900-2015)
Occurrences of Earthquakes at approximately 30 years interval
Depth of Earthquakes (1900 – 2015)
470.7 km - 688 km are the highest depth (red cycles).
Most of the highest depth are parallel to the Karmadec trench.
Subduction plate (Pacific plate) produces the deeper earthquakes.
At the subduction zone is the highest earthquakes
The Graph of Earthquake Depth
Very Higher density of the earthquakes are at about 160 km from the earth surface.
There were less earthquakes occurred 240 km to 401 km at this zone. Geologist believe that there were less tectonic activity at this zone.
Graph of Earthquake Depth
Depth (km)
Number of Earthquakes
Correlation between Earthquake's Magnitude and its Depth
Depth of earthquakes were inversely proportional with the Magnitude of the earthquakes.
Higher magnitude earthquakes occurred at the shallow crust (less than 60 km), while lower magnitude earthquakes occurred at the depth greater than 600 km. Crust is the coldest and brittle part of the earth crust which always have higher magnitude.
Deeper earthquakes, less seismic recorded by the seismograph.
Graph of Magnitude vs Depth
Countries which vulnerable to effects of Earthquakes Magnitude (Distance).
There are six (6) earthquakes that are more than 8.1 on the Richter scale since 1900-2015 (highlighted)
Solomon Is, N Caledonia, Vanuatu, Tonga and Samoa are vulnerable to those earthquakes (those above the tectonic plate boundaries).


Monitoring of Silktail (L.Victoriae) Habitat for Conservation
Along Natewa-Tunuloa and Taveuni, Fiji using GIS
by Harry Jr Waitara
GIS Unit, Department of Geography, Faculty of Islands and Oceans, USP
Geospatial Science at USP Map your future
Introduction
Silktail (Lamprolia victoriae) is currently one of the endemic endangered species in Fiji, but highly localised on Vanua Levu , where it is restricted to the Natewa Peninsula – Tunuloa, and Taveuni, and does not occur in remaining apparently suitable habitat in the south-east.
Silktail is from the Order Passeriformes, Family Corvidae and is about 12 cm in length. Fijian – Sisi. According to studies by Heather In 1973 and 1975, it was readily found in groups of 2-5. These are surveys taken between 1970 – 2015.
Study Site
Study Area with Locations
Data
Different Layers
GeoDatabase File
Aim
The main intention of this project is to use GIS to find out why there is Silktail extinction, especially using Remote Sensing and Modelling techniques.
Objectives
❖ To Create a Home Range map to see the migration status of Silktail.
❖ Create Vegetation and Land cover to compare the different habitat suitable for the birds
❖ Create Elevation Map to be able to understand /Differentiate the different elevation of location that Silktail habitat may most likely to occupy.
❖ To be able to find out why there are extinctions in the population of this species.
Method
Obtained data from eBird.org , Nature Fiji and Conservation international, also USP GIS data.
The software used is ArcGIS (Arcmap, ArcScene, ArcCatalog).
❖ Creating of Geodatabase
❖ Using of Overlay for Elevation
❖ Using of Remote Sensing especially Supervised Classification to study different vegetation and elevation.
❖ Plot the different GPS coordinates
❖ Georeferenced the different images with unknown spatial reference
❖ Using of Multiple Ring Buffer to determined the different home range.
Results
Elevation and Different Levels of Montane
Vegetation / Land Cover Tabulate of Vegetation Cover
Home Range And their Habitat And Graph Showing Habitat Elevation Vs Number of Birds
Conclusions
More birds on Taveuni, while less found on at Natewa-Tunuloa. These because there are likely development on Vanua Levu contributing to its less in number, as well as the different habitat there is not suitable for the Silktail.
There are more birds found on the northwest of Taveuni than on SouthEast of the South, this is might due to the less survey done over the years. Their home range shows they are not migratory birds, thus contributes to their extinction.
Mostly, according to the elevation maps, it shows that their habitat is found mostly at the levels of Lowland Forest, Upland but none on Cloud Forest,
This poster is Compiled by Harry Jr Waitara as part of GS350 project, USP 2015: The success of this project is made possible with massive help from very talent people like ; Nunia Thomas (Nature Fiji), Dr Mark O'Brien (Conservation International) , Dr Nick Rollings (Course coordinator), Adi Varanisese Navudi, Ishmael Pitakesa, Kauaata Baibuke, Thomas Brian, David Bongina, and Stephen Simon

Thank you all

Questions and Comments Please.