FEDERATED STATES OF MICRONESIA

Important Forest Resource Areas (IFRA) Mapping Analysis

Forest Stewardship Program

Snyther Biza
College of Micronesia - FSM

10/1/2012

Table of Contents

Background:

All FSM States are required to identify/define important forest resource areas (IFRA) to satisfy their obligations on annual performance reporting to the USDA Forest Service Federal Programs. The IFRA will effectively be a priority area for private lands, addressing FSM SWARS issues food security, watersheds, production and sustainable harvesting, coastal stabilization (FSM SWARS pp. 16-18). With that, Forest Stewardship Program Coordinators need to spatially track Forest Stewardship Landowner Management Plan accomplishments and complete Forest Stewardship Landowner Plan geo-databases, so that the program's impact can be spatially represented with respect to IFRAs. As such, all States were required to provide raster data for IFRA at the end of FY11 however; FSM was not able to provide the data on their IFRAs due to limited GIS capacity of program coordinators. Also, the annual accomplishment report in the Performance Measures and Accountability System (PMAS) requires each Island State to provide number of Forest Stewardship landowner plans and acres that are within the IFRA. In addition, a new tool for annual accomplishment reporting (Stewardship Mapping Reporting Tool) will be launched in FY2013, replacing PMAS.

To comply with all these requirements, FSM R&D contracted the College of Micronesia-FSM to provide training and development of raster layers of IFRAs in all four FSM States. The expert will also develop procedures for program coordinators to update spatial maps as the need arises especially with respect to SWARS updating.

Objectives:

1. To develop GIS raster layers for FSM's IFRAs, which consist of the following values or classes:

    - "No Data" – Areas outside of the state boundary.
    - "0" (Non Stewardship Potential) – Areas within the state boundary that are not eligible to receive Forest Stewardship Program assistance.
    - "1" (Stewardship Potential) – Areas within the state that are eligible for program delivery (i.e., identified as having stewardship program potential in SAP analyses), but are not considered a priority
    - "2" (High Stewardship Potential) – State priority landscape areas, or "Important Forest Resource Areas" according to the national Forest Stewardship Program Standards and Guidelines.

2. Build capacity of Forest Stewardship Program Coordinators to spatially track Forest Stewardship Landowner Management Plan accomplishments and complete Forest Stewardship Landowner Plan geo-databases, so that the program's impact can be spatially represented with respect to IFRAs.

3. Prepare FSM Stewardship Coordinators to utilize SMART once implemented.

Geospatial Analysis Procedures:

This report provides the geospatial analysis that was used for the development of the FSM State's IFRA maps during August & September of this year 2012.

The *procedure* of the geospatial analysis includes:

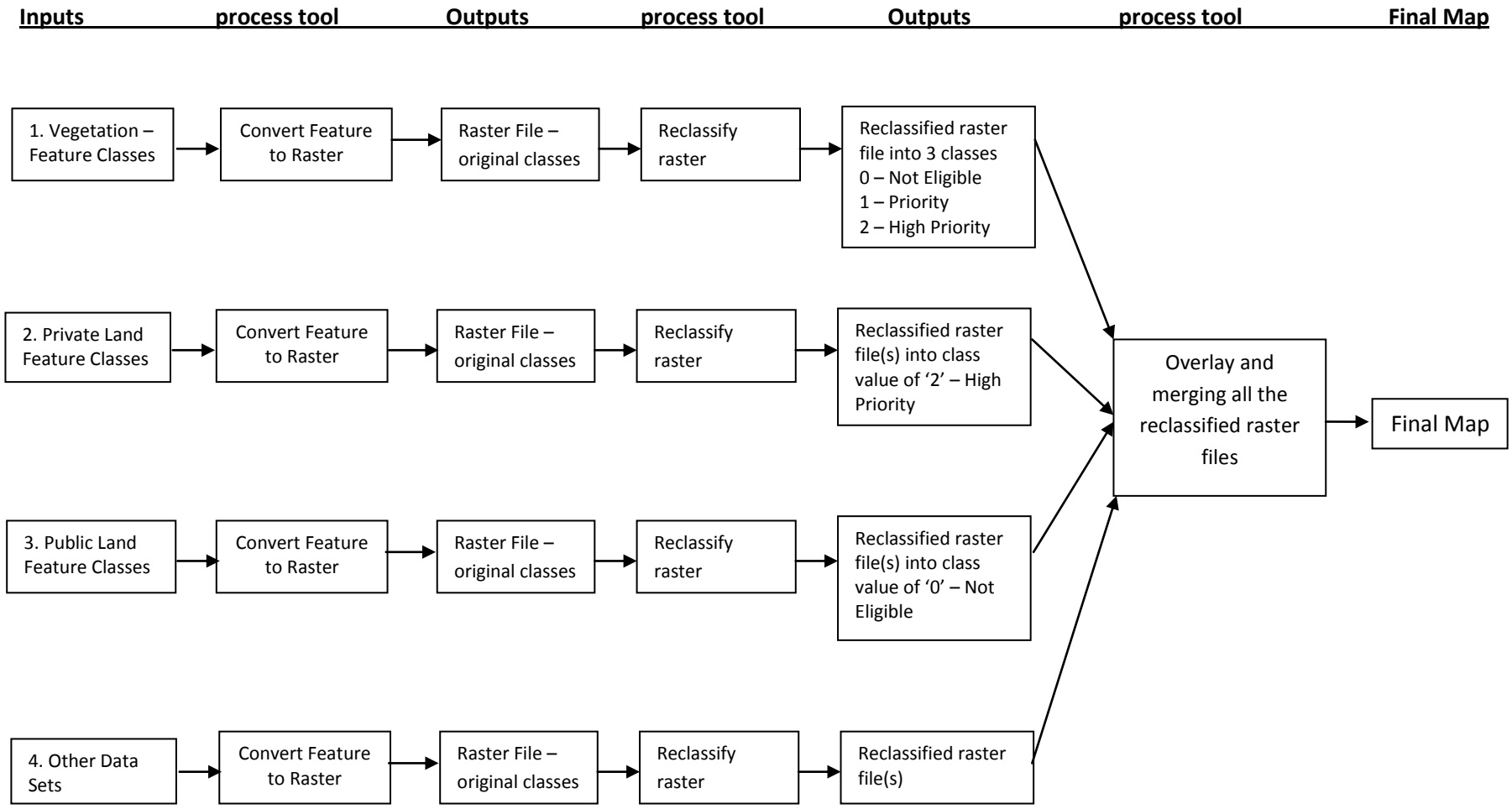
1. ***Setting*** the Analysis Mask, Extent and Cell Size,

2. ***Converting*** input feature layers into raster classes,

3. ***Reclassifying*** the raster classes/layers into *'2' for 'High Priority'*, *'1' for 'Priority'*, and *'0' for 'Not Eligible'*, and then

4. ***Overlaying and Merging*** all the reclassified raster classes/layers into the final map showing classes of High Priority (code 2), Priority (code 1) and Not Eligible (code 0) for the FSM States' Forest Stewardship Program.

Analysis Diagram



I. POHNPEI STATE

Data Analysis

This section provides the geospatial analysis and procedures of Pohnpei State's data sets for its' IFRA map.

Data Preparation

A group met on the week of July 30th to August 3rd, had a discussion in regards to the available data sets for Pohnpei State and made decisions that reclassification and overlaying/merging of available data sets will be the analysis used for developing Pohnpei State Important Forest Resource Areas (IFRA) map.

The available data sets used for this analysis include:

1. ***Pohnpei PIC Vegetation 2008 layer*** – polygon feature classes
   The Pohnpei PIC 2008 Vegetation layer has 13 classes under vegetation class. The classes are *Agroforest, Barren, Cropland, Mangrove forest, Marsh, Palm forest, Savanna, Secondary vegetation, Swamp, Upland forest, Urban builtup, Urban cultivated , and Water*. This layer will be converted from features to raster and then reclassify from 13-classes into 3-classes, which include 2 – 'high priority', 1 – 'priority', and 0 – 'not eligible' for Pohnpei forest stewardship.
   The vegetation classes that are **'high priority'** for Pohnpei State forest stewardship are the high priority classes used for the Food Security Issue for the SWARS. And these vegetation classes are Agroforest, Cropland, and Secondary vegetation.
   The vegetation classes that are **'priority'** for Pohnpei State forest stewardship are Upland forests, Palm forests, Marsh, Savanna, Swamp and Barren.
   The vegetation classes that are **'not eligible'** for Pohnpei State forest stewardship are Mangrove forests, Water, Urban builtup and Urban cultivated. Mangrove forest is a Pohnpei State government land and therefore is not eligible for forest stewardship.

2. ***Watershed layer*** – polygon class
   The Pohnpei State watershed is a government land and therefore is not eligible for the forest stewardship programs. It is used in the analysis because it covers some of Pohnpei's vegetation classes that are high priority for forest stewardship and mostly the priority classes.

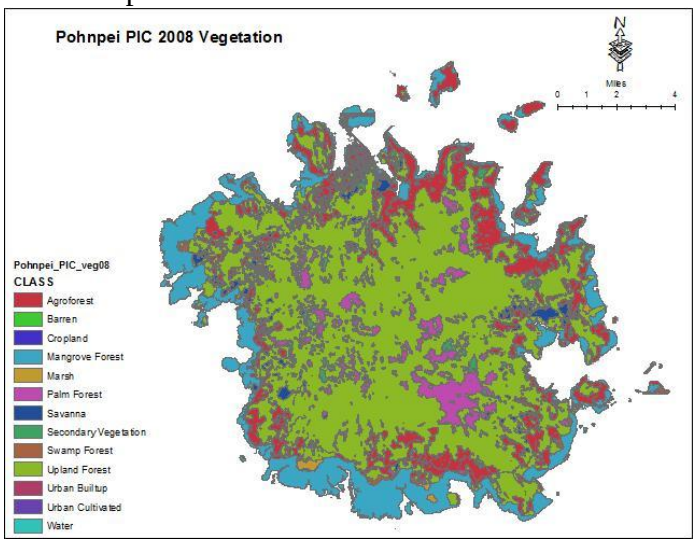
3. ***Public features*** – polygon, polyline, and point features
   These features include the houses and roads of Pohnpei. These features are not eligible for the forest stewardship programs.

4. ***Private land data*** – point and polygon feature classes
   The private land is a high priority land cover for this mapping purpose; however it is still yet to be obtained from Pohnpei Department of Land and Natural Resources (DLNR).

POHNPEI STATE Input Data Layers

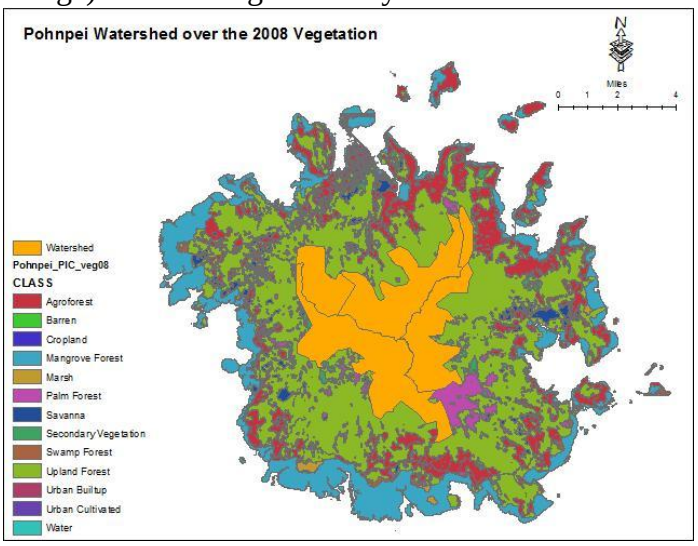
1. Pohnpei PIC Vegetation 2008 layer

This layer has 13 vegetation classes as shown below. Some of these classes are of high priority, some of priority and some are not eligible for Pohnpei forest stewardship.



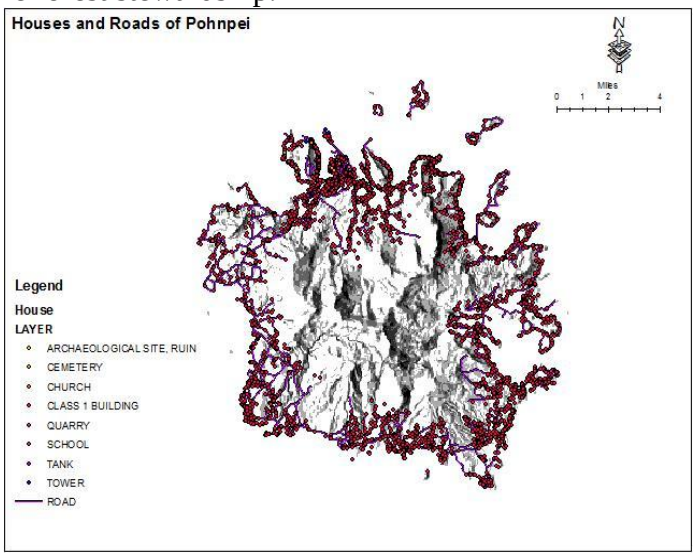
2. Watershed layer

This watershed layer is a government land and it covers mostly the upland forest and palm forest of Pohnpei. Shown below is the watershed layer (in orange) over the vegetation layer.



3. Houses and roads layers

The houses and roads layers are part of urban developed and cultivated areas and are not eligible for the forest stewardship.



4. Private Land data

This data set is still yet to be authorized and obtained. Once obtained it will be incorporated into the analysis given a high priority reclassification.

POHNPIE STATE Data Processing

STEP 1: Setting the Analysis Mask, Extent and the Cell size

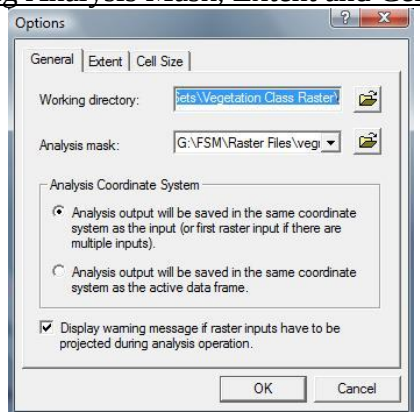
Before *converting the feature layers to raster, and reclassifying the raster classes, and then merging all the raster classes together by overlaying them*, make sure to set the Analysis Mask, Analysis Extent and the Cell Size. The Analysis Mask, Analysis Extent and the Cell Size needed to be set so that the analysis will take place within the set mask, set extent and that all output raster layers has the same cell size. Setting the working directory is also important so all the raster layers and reclassified layers are stored in the same directory.

To do this:

Select *Option* from the drop-down list of the Spatial Analyst toolbar. In the Option window, under General tab, set the working directory to a folder where your work should be saved (e.g. Pohnpei raster folder, or your liking), and then set the analysis mask (e.g. Pohnpei DEM), set analysis extent and snap extent to under Extent tab (e.g. Pohnpei DEM), and the cell size should be the cell size for the DEM layer, which is 10m.

Spatial Analyst Toolbar

Setting Analysis Mask, Extent and Cell size



As for Pohnpei, both the analysis mask and extent were set to the Pohnpei DEM layer, with its' cell size of 10meters. Now it's time to convert the input feaster layers to raster.

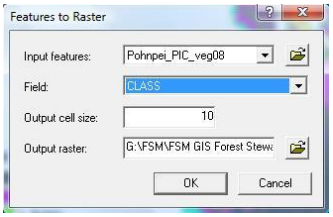
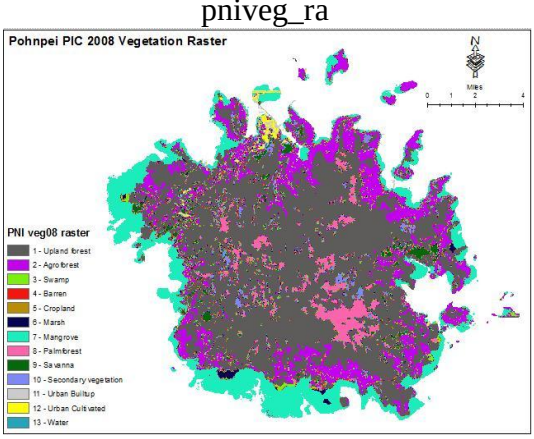
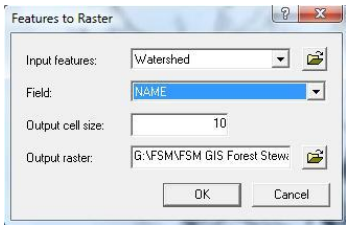
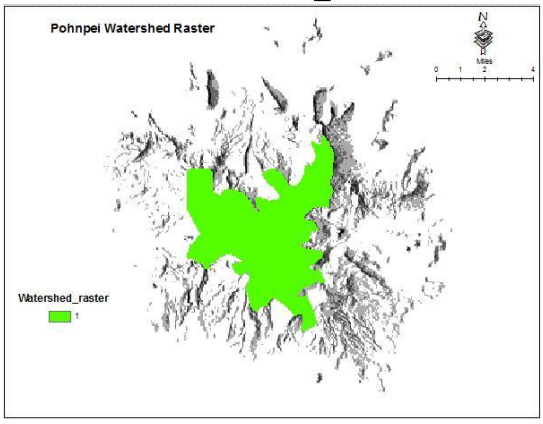
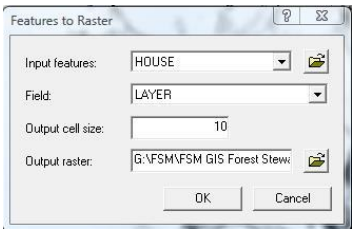
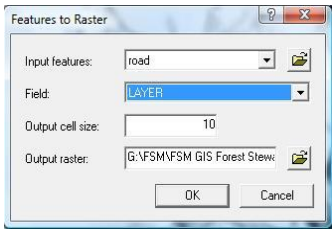
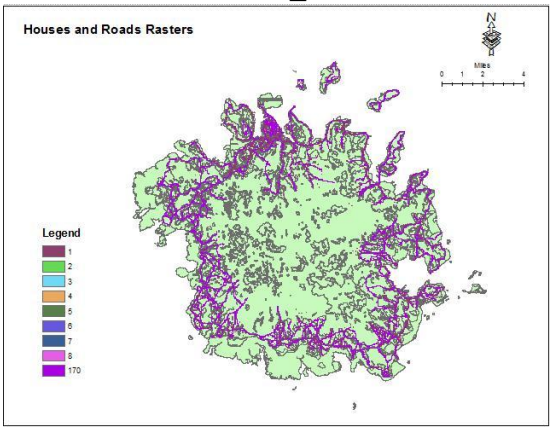
Step 2: Converting feature layers to raster

Because the final map should be in raster, all feature classes/layers should be converted to raster.

To do this:

Go to Spatial Analyst Toolbar and click the drop down list and select *Convert*, and then select *Features to Raster.* In the *Features to Raster* window make sure to select the *Input feature*, the *Field*, and then give a name of the *Output raster*. Notice that the *Output cell size* is 10. This was the result from step 1.

The process in converting the feature layers (e.g. Pohnpei vegetation, Watershed, Public land layers, and the Private land data) is exactly the same. Make sure to select the correct input feature, the field and give the name of the output raster with an *underscore (ra)* to indicate it is a raster. The output raster name cannot be more than 13 letters and numbers.

Input feature data and the process	Output raster data
2a. Converting Pohnpei 2008 vegetation features to raster • Select Convert > Features to Raster • In the Features to Raster window, select *Pohnpei_PIC_veg08* as Input features • Select *CLASS* as the field • Name the Output raster as *pniveg_ra* • Then click OK 	pniveg_ra 
2b. Converting Pohnpei watershed layer to raster • Select Convert > Features to Raster • In the Features to Raster window, select *Watershed* as Input features • Select *NAME* as the field • Name the Output raster as *watershed_ra* • Then click OK 	watershed_ra 
2c. Converting Houses and Roads layers to raster • Select Convert > Features to Raster • In the Features to Raster window, select *House* as Input features • Select *LAYER* as the field • Name the Output raster as *house_ra* • Then click OK • Apply same with *the road layer.*  	urban_ra 

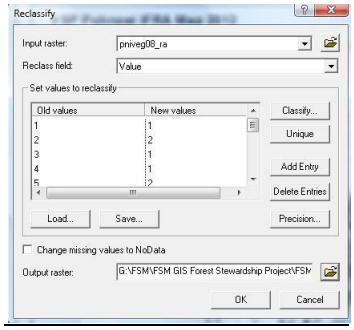
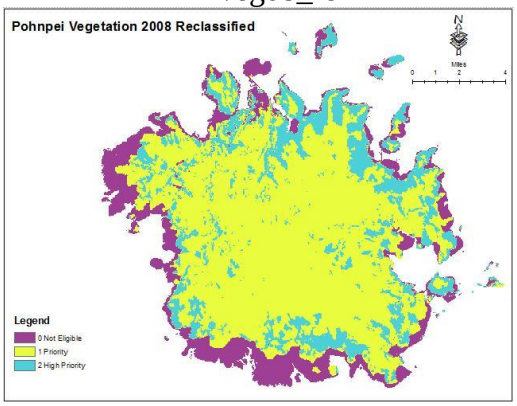
Now that all the available feature classes that will be used for producing the final map are now in raster, it is time to reclassify the classes for each raster to values of ***0, 1, and 2***. **'0'** are classes that are <u>not eligible</u> for forest stewardship, **'1'** are classes that are <u>priority</u> for forest stewardship, and **'2'** are classes that are <u>high priority</u> for forest stewardship.

<u>Step 3: Reclassifying raster classes</u>

<u>To do this:</u>

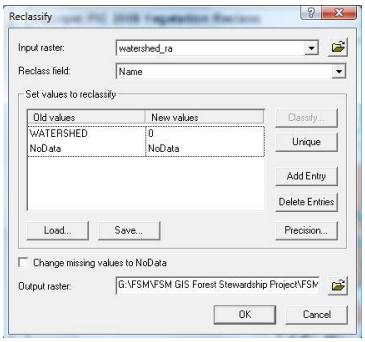
Go to Spatial Analyst drop down list and select Reclassify. In the Reclassify window, make sure to choose the correct Input raster, the Reclass field and then change the New values to their class code of '0', '1' and '2', for classes that are high priority, priority and not eligible. If a class is to be not eligible, make sure to change its new value to '0', same with other classes for '1' and '2'. Make sure to give an Output raster name with an underscore (re) to indicate it is a reclassify layer.

The process in reclassifying the raster classes is same for all the raster classes to be used for producing the final map.

<u>Input raster data and the process</u>	**<u>Output raster reclassify data</u>**
3a. Reclassify Pohnpei vegetation raster (pniveg08_ra) layer into three classes; 0, 1, 2 classes • Select *Reclassify* from the Spatial Analyst toolbar drop down list • Select *pniveg_ra* as the Input raster • Select *Value* as the Reclass field • Change the New values to '0', '1', and '2' to vegetation classes that are Not Eligible, Priority and High Priority • Name the Output raster as *pniveg08_re* • Then click OK  The classes that are 'Not Eligible' and set to '0' as the New values are: Mangrove, Urban Builtup, Urban Cultivated and Water. The classes that are 'Priority' and set to '1' as the New values are: Upland forest, Savanna, Marsh, Palm forest, Swamp, and Barren. The classes that are 'High Priority' and set to '2' as the New values are: Agroforest, Cropland, and Secondary vegetation.	The product of reclassifying the vegetation classes from 13 original classes down to 3 is the reclassified vegetation raster data called *'pniveg08_re'* as shown below. Pniveg08_re 

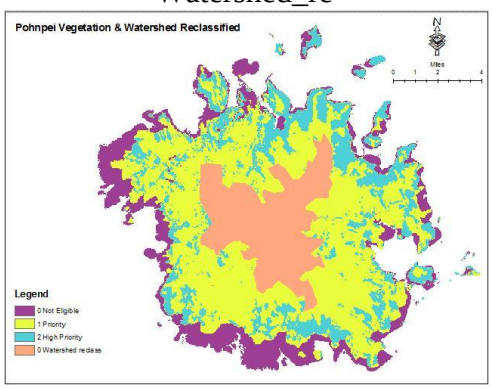
3b. Reclassify Pohnpei watershed raster (watershed_ra) layer into 0 – Not eligible class.

- Select *Reclassify* from the Spatial Analyst toolbar drop down list
- Select *watershed_ra* as the input raster
- Select *Name* as the Reclass field
- Change the New value to '0', for this is not an eligible class for Pohnpei forest stewardship
- Name the Output raster as *watersheds_re*
- Then click OK



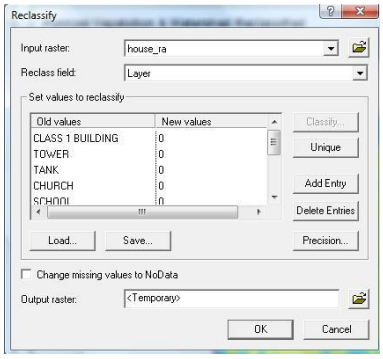
The product of reclassifying the Pohnpei watershed raster layer is the reclassified watershed raster data called *'watershed_re'* as shown below.

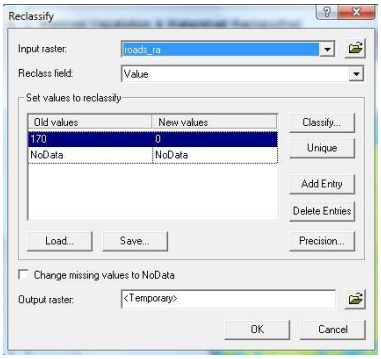
Watershed_re



3d. Reclassify House and Road Raster layers

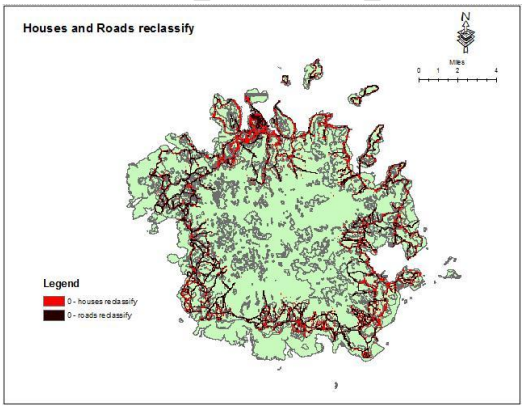
- Select *Reclassify* from the Spatial Analyst toolbar drop down list
- Select *road_ra* as the input raster
- Select Value as the Reclass field
- Change the New values to '0', for this is Not eligible for forest stewardship
- Name the Output raster as road_re
- Then click OK
- Apply the same with *house_ra* layer





The product of reclassifying the houses and roads is the reclassified raster data for houses and roads as shown below.

House_re and Road_re



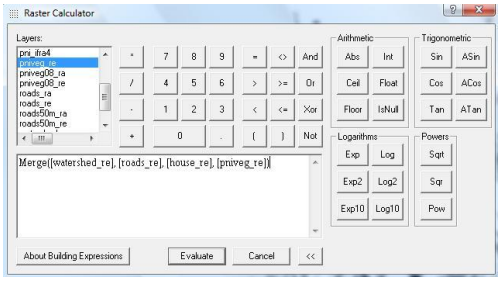
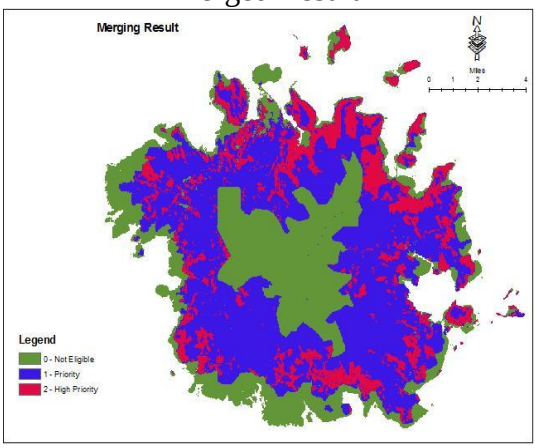
Now that all the raster layers are reclassified, it is time to overlay and merge them to produce the final map. And this is the final step of the analysis.

Step 4: Overlaying and Merging all reclassified data layers

Overlaying and merging will merge/combine all the reclassified raster layers values of '0' into one class, values of '1' into one class and values of '2' into another class, in one raster layer using the Raster Calculator from the Spatial Analyst Toolbar

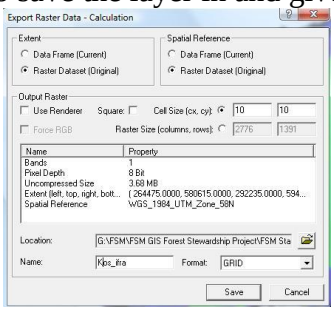
To do this:

Select the Raster Calculator from the drop down list of the Spatial Analyst tool bar. You can merge two or more raster files together at once. In the raster calculator, type in 'Merge', then right next to merge, place the open parenthesis '(', and then select all the raster files you want to merge, and when you have selected all raster files to merge, make sure to place the closed parenthesis ')' at last. Have a space next to each comma in between each raster file within the parenthesis. The raster layers or files can be selected by double-clicking each of the layers in the drop down list in the Raster Calculator window.

Input data layers and process	Final output/result
Overlaying and Merging the reclassified data layers • Choose the Raster Calculator from the Spatial Analyst toolbar drop down list • Type in Merge (, and then double click the *watershed_re, road_re, house_re and then the pniveg08_re*. Make sure to close the parenthesis at last with the). • When done, click Evaluate 	The product of merging all the reclassified data layers is the raster data of three classes ('0', '1', and '2') as shown belwo. Merged Result 

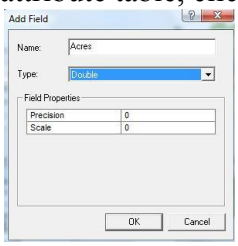
After merging all the reclassified raster layers, make sure to **EXPORT** the merged layer called the ***'Calculation'*** layer in the Table of Contents (TOC). Exporting this layer will save the layer as a new data layer where it can be used in the future. Save it in your raster folder and give a name of your liking.

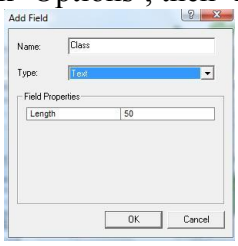
To do this, right click the 'Calculation' layer in the TOC, then select Data, then Export Data. In the Export Window, as shown below, select a folder to save the layer in and give a name, then click OK.

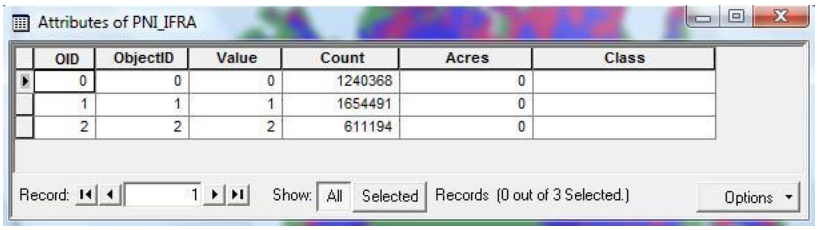


Final touch on the final map and its' attribute table.

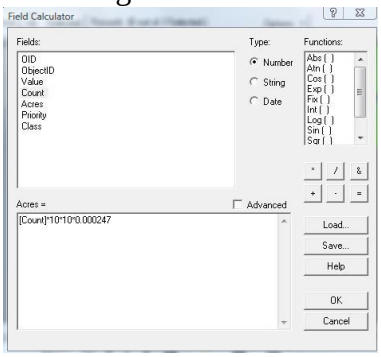
- Export the attribute of the final map so you can add other fields such as 'Acres', and 'Class' in the attribute table to present more information about the map. Open the attribute of the merged layer, then click 'Options' then 'Export'. Save the attribute in your raster file folder, then click OK. Add the attribute to the TOC, open it and then add other fields: 'Acres', and 'Class' fields. To add fields to the attribute table, click 'Options', then 'Add Field'.



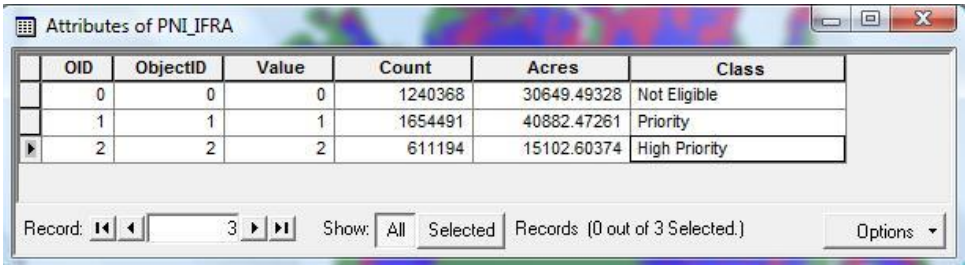




- To calculate the acres for each class, right click the 'Acres' heading of the attribute table and click 'Calculate Values'. In the Field Calculator window type, select 'Count'*10*10*0.0002471, then click OK. This will automatically calculate the acreages for each class in the attribute table.

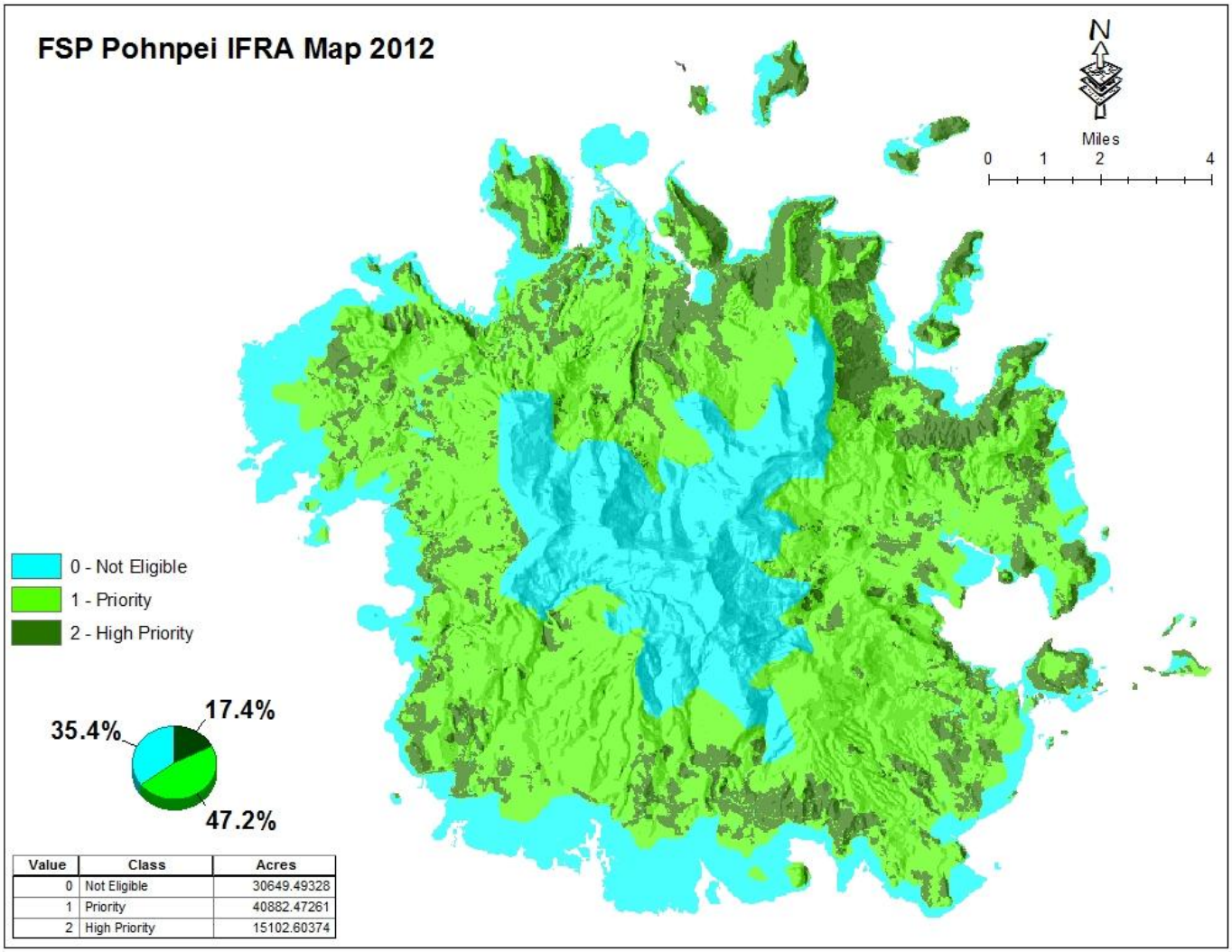


- To add class(s) in the class field of the attribute table, you have to turn 'ON' the Editor Toolbar first. After filling in the class field or doing edits, make sure to save your edits.



- Join the exported attribute table to the final map attribute table (optional)
- Change the color codes of the three classes as shown in the map below
- Change the display of the final map to 30% transparency
- Add Map Title, North Arrow, Scale bar, Legend, texts, attribute table and graphs on the map.

POHNPEI STATE
Final Map



Value	Class	Acres
0	Not Eligible	30649.49328
1	Priority	40882.47261
2	High Priority	15102.60374

Private land data sets and other Government land data sets are still yet to be incorporated into the map once obtained.

II. KOSRAE STATE

Data Analysis

This section provides the geospatial analysis and procedures of Kosrae State's data sets for its' IFRA map.

Data Preparation

The team met on August 19 & 20, had a discussion in regards to the available data sets and made decisions that the reclassification and then overlaying and merging of vegetation classes, watersheds & ABSs, private and public land classes above and below the Japanese line and the urban developed & urban cultivated data sets will be the method used for developing Kosrae State Important Forest Resource Areas.

The available data sets used for this analysis include:

1. ***Kosrae Vegetation data 2008*** – polygon feature classes
   The Kosrae 2008 Vegetation layer has 10 vegetation classes. The classes are *Agroforest, Montane Cloud Forest, Mangrove Forest, Freshwater Marsh, Swamp Forest, Savanna/grassland, Secondary Vegetation, Upland Broadleaf Forest, Freshwater and Urban*. This layer will be converted from features to raster and then reclassify from 10-classes into 3-classes, which include 2 – 'high priority', 1 – 'priority', and 0 – 'not eligible' for Kosrae forest stewardship.
   The vegetation classes that are **'high priority'** for Kosrae State forest stewardship are Agroforest, Secondary vegetation, and Swamp forests.
   The vegetation classes that are **'priority'** for Kosrae State forest stewardship are Upland broadleaf forests, Marsh, Savanna, and Montane cloud forest.
   The vegetation classes that are **'not eligible'** for Kosrae State forest stewardship are Mangrove forests, Freshwater, and Urban. Mangrove forest is a Kosrae State government land and therefore is not eligible for forest stewardship.

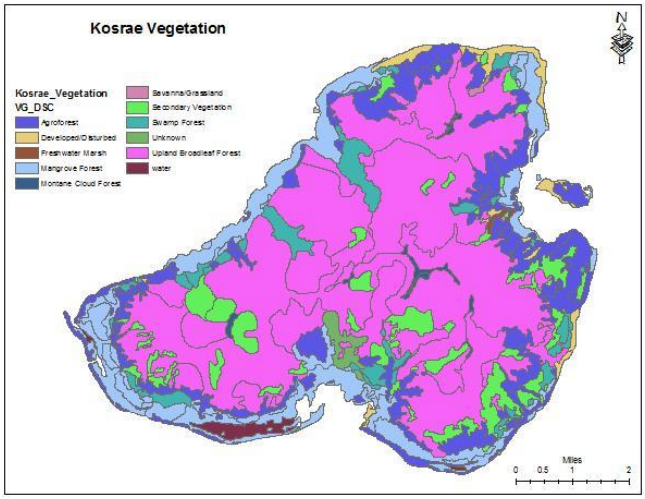
2. ***Private land data*** – polygon feature classes
   Private land data for Kosrae State include all Land Parcels, ABSs and Watersheds that are BELOW the Japanese line.
   - Land Parcels data
   - All ABSs and Watersheds BELOW the Japanese line

3. ***Public land data*** – polygon feature classes
   Public land for Kosrae State include all land cover Vegetation classes, Watersheds and ABSs that are ABOVE the Japanese line.
   - Vegetation classes
   - ABSs and Watersheds ABOVE the Japanese line.

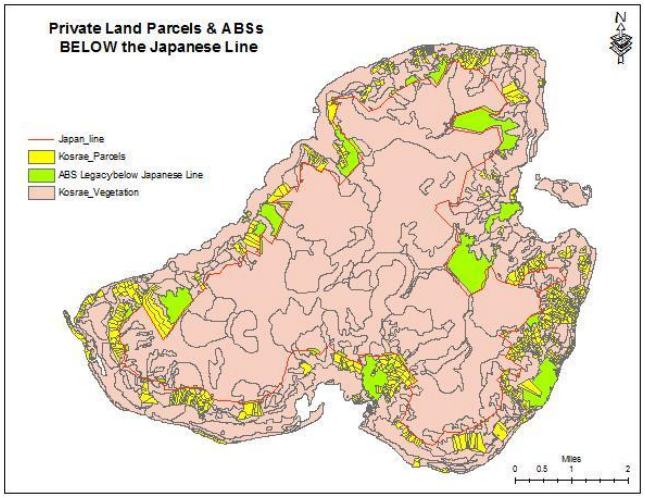
4. ***Urban Developed & Cultivated data*** – polygon feature classes
   - Roads, houses, airport, and other cultivated and built-ups.

KOSRAE STATE Input Data Layers

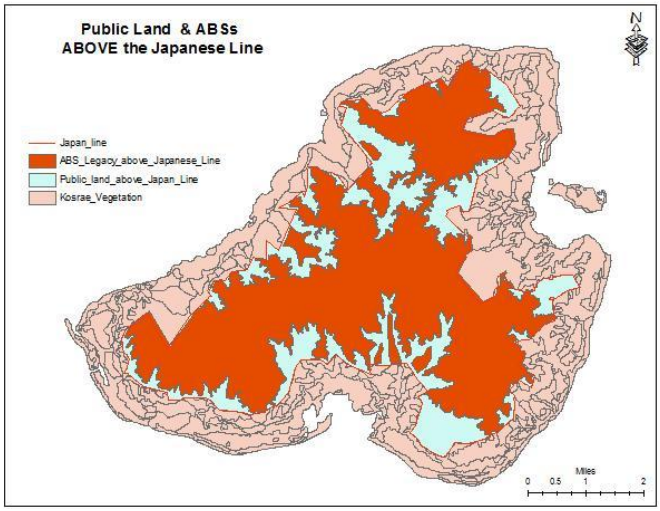
1. Kosrae Vegetation Layer



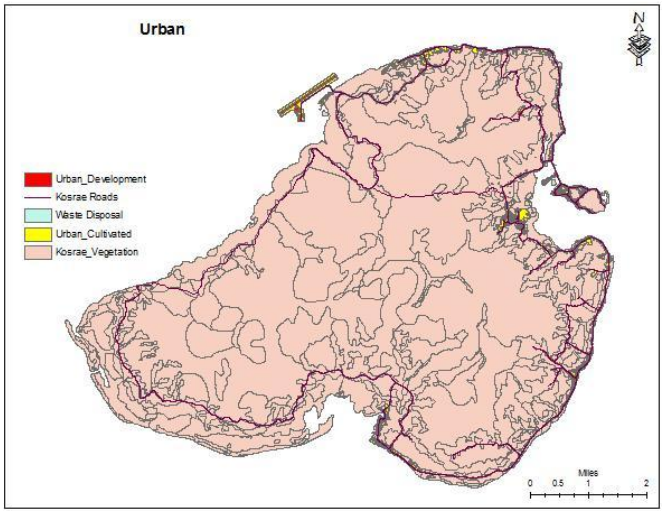
2. Private Land Data



3. Public/Government Land Data



4. Urban Developed & Cultivated Data



KOSRAE STATE Data Processing

STEP 1: Setting the Analysis Mask, Extent and the Cell size

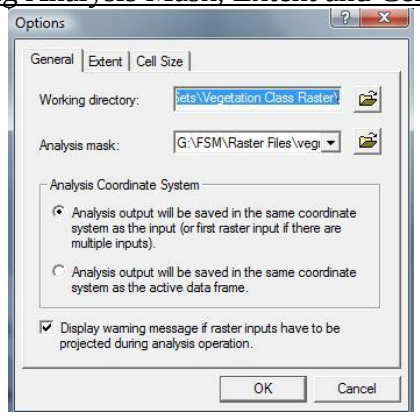
Before *converting the feature layers to raster, and reclassifying the raster classes, and then merging all the raster classes together by overlaying them*, make sure to set the Analysis Mask, Analysis Extent and the Cell Size. The Analysis Mask, Analysis Extent and the Cell Size needed to be set so that the analysis will take place within the set mask, set extent and that all output raster layers has the same cell size. Setting the working directory is also important so all the raster layers and reclassified layers are stored in the same directory.

To do this:

Select *Option* from the drop-down list of the Spatial Analyst toolbar. In the Option window, under General tab, set the working directory to a folder where your work should be saved (e.g. Kosrae raster folder, or your liking), and then set the analysis mask to Kosrae DEM, set analysis extent and snap extent to under Extent tab also to Kosrae DEM, and the cell size should be the cell size for the Kosrae DEM layer, which is 10m.

Spatial Analyst Toolbar

Setting Analysis Mask, Extent and Cell size



Now it's time to convert the input feaster layers to raster.

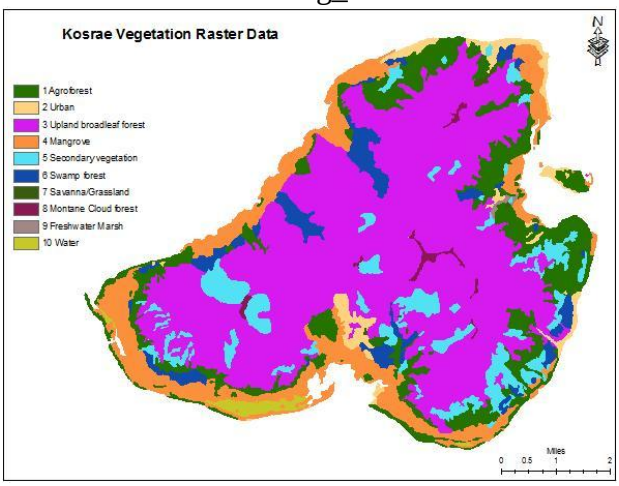
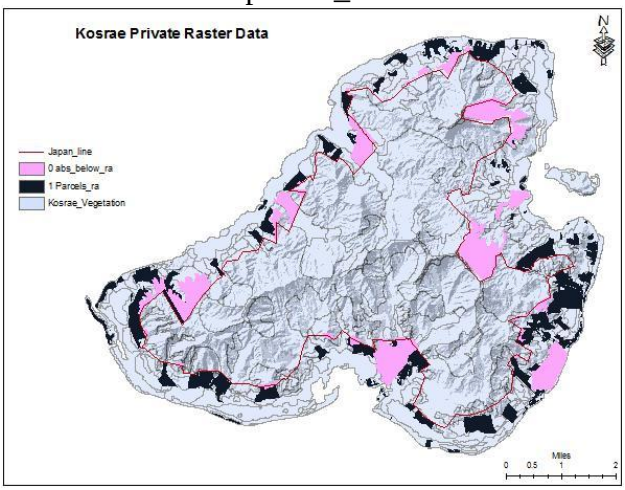
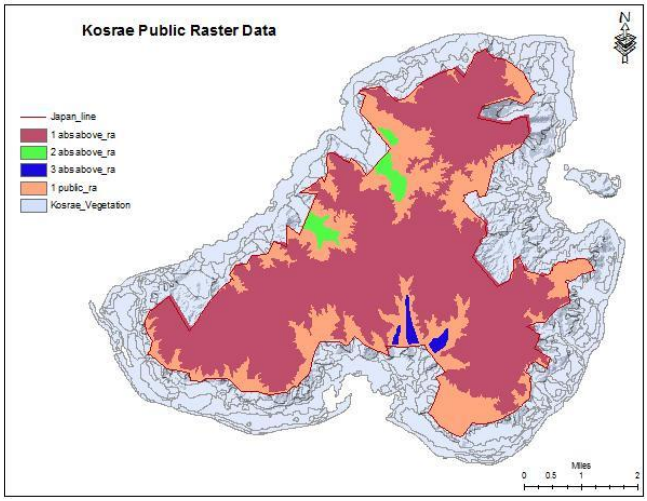
Step 2: Converting feature layers to raster

Because the final map should be in raster, all feature classes/layers must first be converted to raster.

To do this:

Go to Spatial Analyst Toolbar and click the drop down list and select *Convert*, and then select *Features to Raster.* In the *Features to Raster* window make sure to select the *Input feature*, the *Field*, and then give a name of the *Output raster*. Notice that the *Output cell size* is 10. This was the result from step 1.

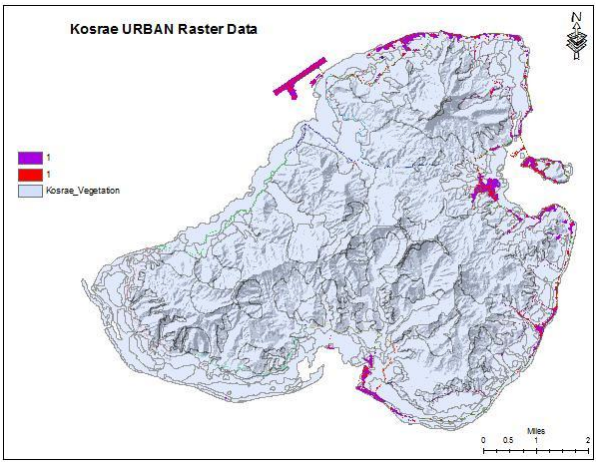
The process in converting the feature layers (e.g. Kosrae vegetation, Private land, Public land layers, and the Urban cultivated and developed data) is exactly the same. Make sure to select the correct input feature, the field and give the name of the output raster with an *underscore (ra)* to indicate it is a raster. The output raster name cannot be more than 13 letters and numbers.

Input feature data and the process	Output raster data
2a. Converting Kosrae 2008 vegetation features to raster • Select Convert > Features to Raster • In the Features to Raster window, select *kosrae_veg* as Input features • Select *CLASS* as the field • Name the Output raster as *kosveg_ra* • Then click OK	kosveg_ra 
2b. Converting Kosrae private land layers to raster • Select Convert > Features to Raster • In the Features to Raster window, select *Parcels* as Input features • Select *NAME* as the field • Name the Output raster as *parcel_ra* • Then click OK • Apply same to the ABSs and watersheds below the Japanese line.	private_ra 
2c. Converting Kosrae public land layers to raster • Select Convert > Features to Raster • In the Features to Raster window, select *ABS above* as Input features • Select *NAME* as the field • Name the Output raster as *ABSup_ra* • Then click OK • Apply the same to the watersheds and the public data above the Japanese line.	public_ra 

2d. Converting Urban cultivated & built-ups layers to raster

- Select Convert > Features to Raster
- In the Features to Raster window, select *Urban Caltivated* as Input features
- Select *LAYER* as the field
- Name the Output raster as *urbanc_ra*
- Then click OK
- Apply same to the urban builtups and roads.

urban_ra



Now that all the available feature classes that will be used for producing the final map are now in raster, it is time to reclassify the classes for each raster to values of ***0, 1, and 2***. Assign **'0'** to classes that are not eligible for forest stewardship, **'1'** to classes that are priority for forest stewardship, and **'2'** to classes that are high priority for Kosrae State forest stewardship.

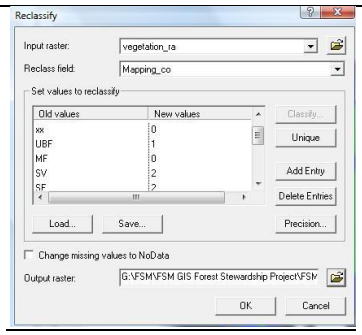
Step 3: Reclassifying raster classes

To do this:

Go to Spatial Analyst drop down list and select Reclassify. In the Reclassify window, make sure to choose the correct *Input raster*, the *Reclass* field and then change the *New values* to their class code of '0', '1' and '2', for classes that are high priority, priority and not eligible. If a class is to be not eligible, make sure to change its new value to '0', same with other classes for '1' and '2'. Make sure to give an *Output raster* name with an underscore (*re*) to indicate it is a reclassify layer.

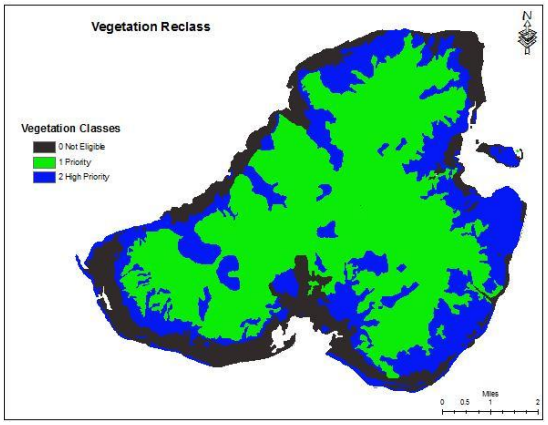
The process in reclassifying the raster classes is same for the other raster classes to be used for producing the final map.

Input raster data and the process	Output raster reclassify data
3a. Reclassify Kosrae vegetation raster (kosveg08_ra) layer into three classes: 0, 1, 2 classes • Select *Reclassify* from the Spatial Analyst toolbar drop down list • Select *kosveg_ra* as the Input raster • Select *Value* as the Reclass field • Change the New values to '0', '1', and '2' to vegetation classes that are Not Eligible, Priority and High Priority • Name the Output raster as *kosveg08_re* • Then click OK	The product of reclassifying the vegetation classes from 10 original classes down to 3 is the reclassified vegetation raster data called *'kosveg08_re'* shown below.



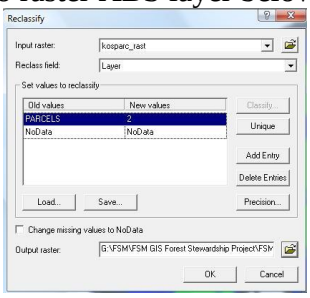
The classes that are '**Not Eligible**' and set to '**0**' as the New values are: *Mangrove, Freshwater and Urban.*
The classes that are '**Priority**' and set to '**1**' as the New values are: *Upland forest, Savanna, Marsh, Palm forest, Swamp, and Barren.*
The classes that are '**High Priority**' and set to '**2**' as the New values are: *Agroforest, Swamp forests and Secondary vegetation.*

kosveg08_re



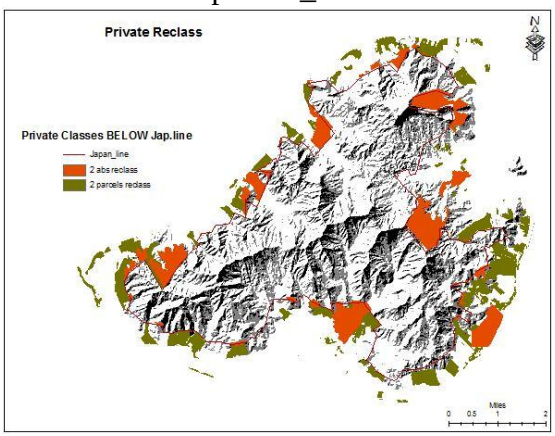
3b. Reclassify Kosrae private raster (private_ra) layer into 2 – High Priority class.

- Select *Reclassify* from the Spatial Analyst toolbar drop down list
- Select *kosparc* as the input raster
- Select *Name* as the Reclass field
- Change the New value to '2', for this is a High Priority class for Kosrae forest stewardship
- Name the Output raster as *parcels_re*
- Then click OK
- Apply same to raster ABS layer below the Japanese line.



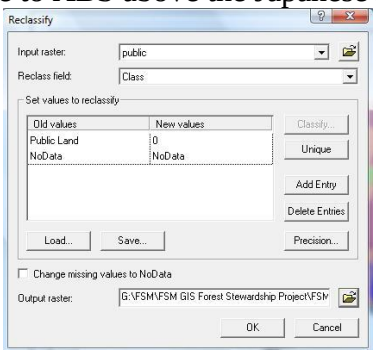
The product of reclassifying the Kosrae private raster layers below the Japanese line is the reclassified raster data shown below.

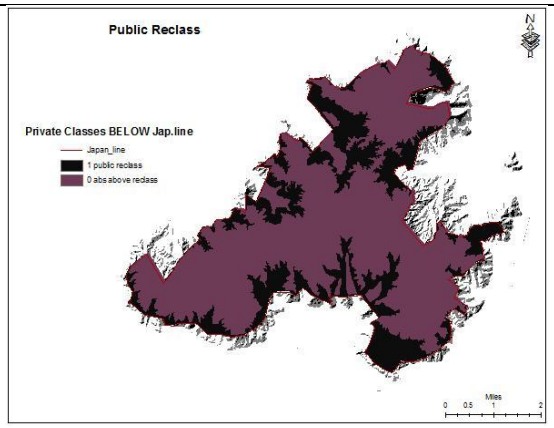
private_re



3c. Reclassify Kosrae public land raster layer into 1 – Priority class.

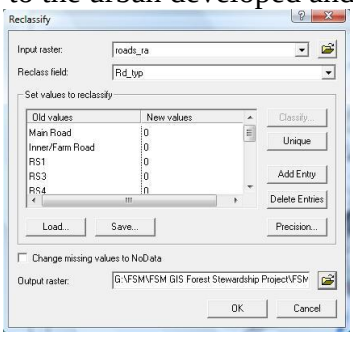
- Select *Reclassify* from the Spatial Analyst toolbar drop down list
- Select *public_ra* as the input raster
- Select *Name* as the Reclass field
- Change the New value to '1', for this is a Priority class for Kosrae forest stewardship
- Name the Output raster as *public_re*
- Then click OK
- Apply same to ABS above the Japanese line.





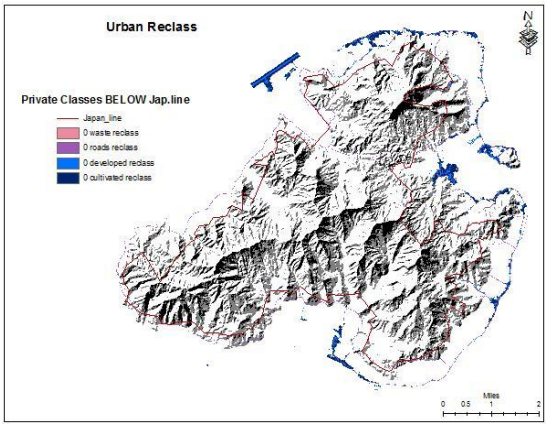
3d. Reclassify Urban Raster layers into 0 – Not Eligible.

- Select *Reclassify* from the Spatial Analyst toolbar drop down list
- Select *roads_ra* as the input raster
- Select Value as the Reclass field
- Change the New values to '0', for this is Not eligible for forest stewardship
- Name the Output raster as *roads_re*
- Then click OK
- Apply same to the urban developed and cultivated rasters.



The product of reclassifying the urban raster layer is the reclassified raster data as shown below.

urban_re



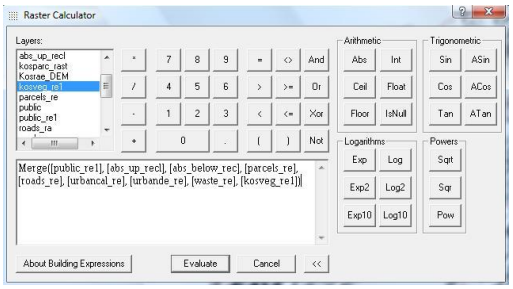
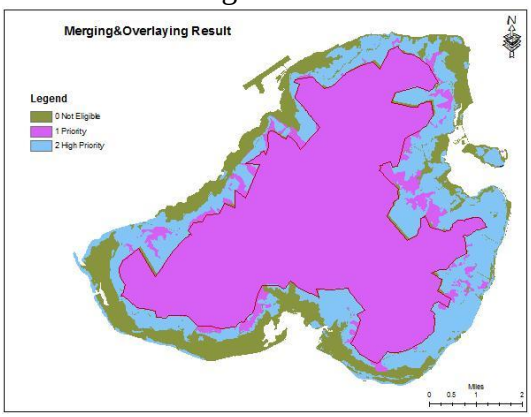
Now that all the raster layers are reclassified, it is time to overlay and merge them to produce the final map. And this is the final step of the analysis.

Step 4: Overlaying and Merging all reclassified data layers

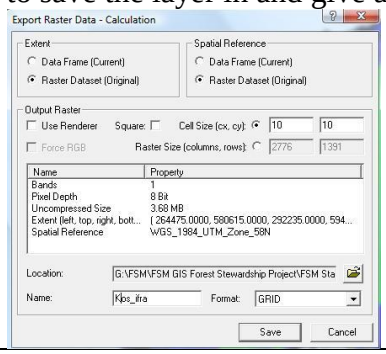
Overlaying and merging will merge/combine all the reclassified raster layers values of '0' into one class, values of '1' into one class and values of '2' into another class, in one raster layer using the Spatial Analyst Toolbar Raster Calculator.

To do this:

Select the Raster Calculator from the drop down list of the Spatial Analyst tool bar. You can merge two or more raster files together at once. In the raster calculator, type in 'Merge', then right next to merge, place the open parenthesis '(', and then select all the raster files you want to merge, and when you have selected all raster files to merge, make sure to place the closed parenthesis ')' at last. Have a space next to each comma in between each raster file within the parenthesis. The raster layers or files can be selected by double-clicking each of the layers in the drop down list in the Raster Calculator window.

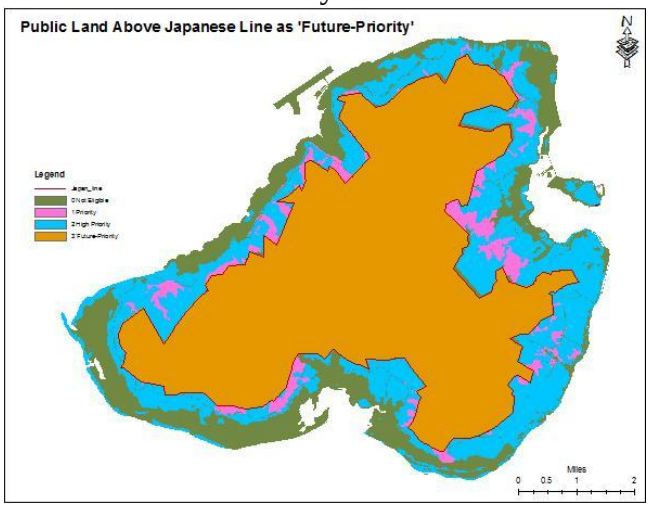
Input data layers and process	Final output/result
Overlaying and Merging the reclassified data layers • Choose the Raster Calculator from the Spatial Analyst toolbar drop down list • Type in Merge (, and then double click all the reclassified layers. Make sure to close the parenthesis at last with the). • When done, click Evaluate 	The product of merging all the reclassified data layers is the raster data of three classes ('0', '1', and '2') shown below. Merged Result 

After merging all the reclassified raster layers, make sure to **EXPORT** the merged layer called the ***'Calculation'*** layer in the Table of Contents (TOC). Exporting this layer will save the layer as a new data layer where it can be used in the future. Save it in your raster folder and give a name of your liking.
To do this, right click the 'Calculation' layer in the TOC, then select Data, then Export Data. In the Export Window, as shown below, select a folder to save the layer in and give a name, then click OK.



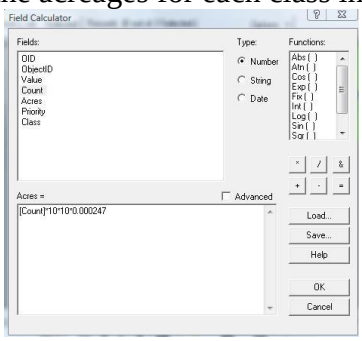
All land cover classes above the Japanese line in Kosrae State are government/public land, however, since these lands will soon be given back to land owners, another map was developed showing all public land above the Japanese line as '***Future – Priority***' and given a code/value of '**3**'.

Future Priority Public Land



Final touch on the final maps and their attribute tables.

- Export the attribute of the final maps so you can add other fields such as 'Acres', and 'Class' in the attribute tables to present more information about the map. Open the attribute of the merged layer, then click 'Options' then 'Export'. Save the attribute in your raster file folder, then click OK. Add the attribute to the TOC, open it and then add other fields: 'Acres', and 'Class' fields. To add fields to the attribute table, click 'Options', then 'Add Field'.
- To calculate the acres for each class, right click the 'Acres' heading of the attribute table and click 'Calculate Values'. In the Field Calculator window type, select 'Count'*10*10*0.0002471, then click OK. This will automatically calculate the acreages for each class in the attribute table.



- To add class(s) in the class field of the attribute table, you have to turn 'ON' the Editor Toolbar first. After filling in the class field or doing edits, make sure to save your edits.
- Join the exported attribute table to the final map attribute table (optional)
- Change the color codes of the classes as shown in the maps below
- Change the display of the final maps to 30% transparency
- Add Map Title, North Arrow, Scale bar, Legend, texts, attribute table and graphs on the map.

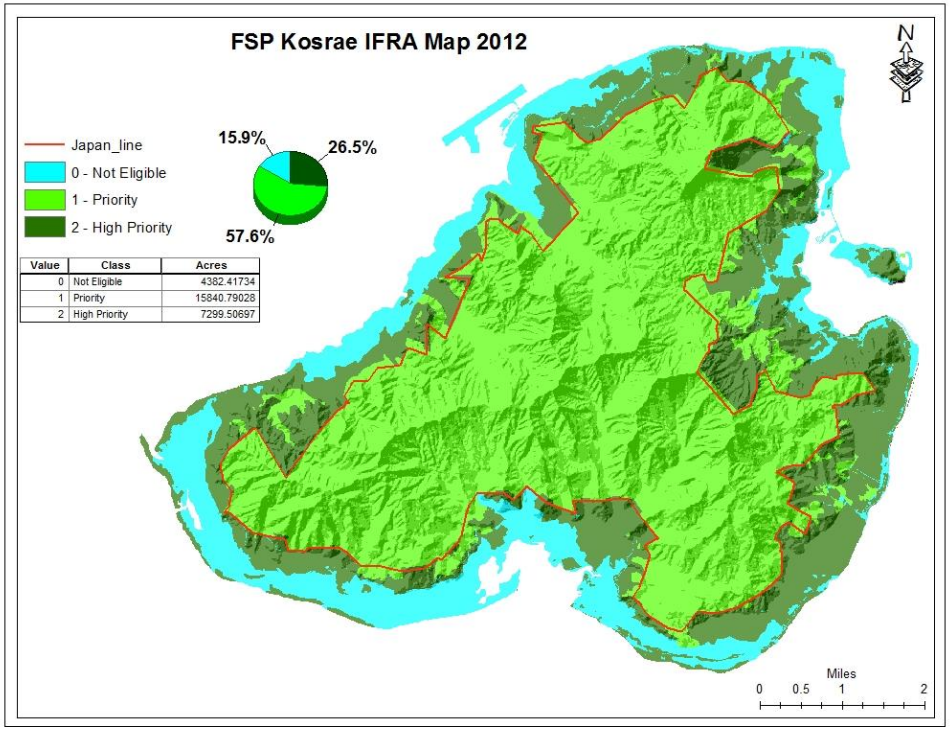
Kosrae Final Attribute for Map1

Attributes of Kos_FSP_3

OID	ObjectID	Value	Count	Class	Acres
0	0	0	177354	Not Eligible	4382.41734
1	1	1	641068	Priority	15840.79028
2	2	2	295407	High Priority	7299.50697

Record: 1 Show: All Selected Records (0 out of 3 Selected.) Options

KOSRAE IFRA MAP1



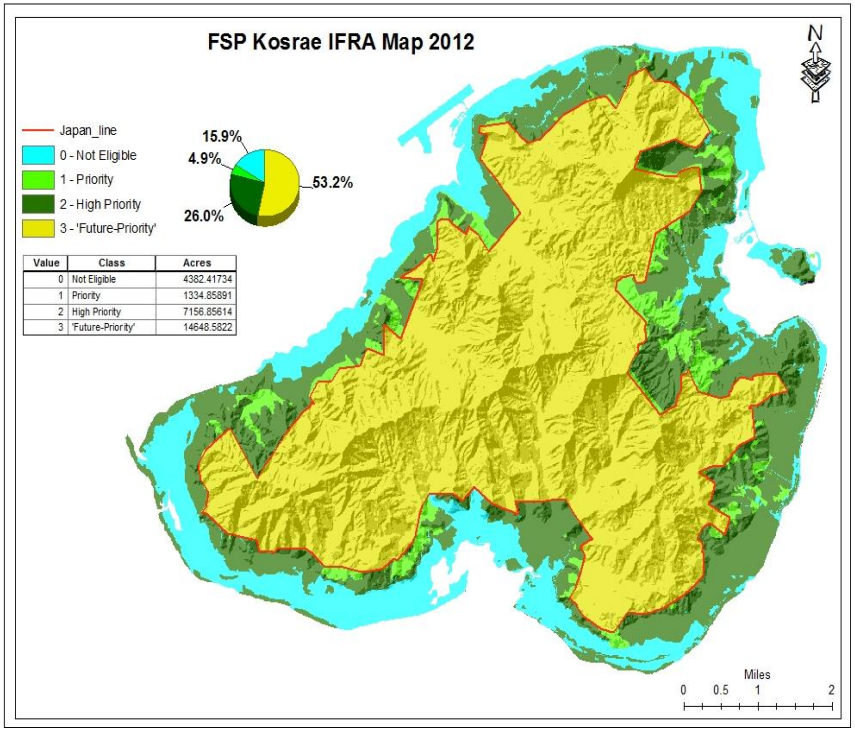
Kosrae Final Attribute for Map2

Attributes of Kos_FSP_4

OID	ObjectID	Value	Count	Class	Acres
0	0	0	177354	Not Eligible	4382.41734
1	1	1	54021	Priority	1334.85891
2	2	2	289634	High Priority	7156.85614
3	3	3	592820	'Future-Priority'	14648.5822

Record: 1 Show: All Selected Records (0 out of 4 Selected.) Options

KOSRAE IFRA MAP2



III. CHUUK STATE

Data Analysis

This section provides the geospatial analysis and procedures of Chuuks State's data sets for its' IFRA map.

Data Preparation

The team met on August 23 & 24, had a discussion in regards to the Chuuk available data sets and made decisions that the reclassification and merging/overlaying of Chuuk vegetation classes, Chuuk rivers 50m riparian, and Chuuk urban developed & cultivated data sets will be the method used for developing Chuuk Important Forest Resource Areas map.

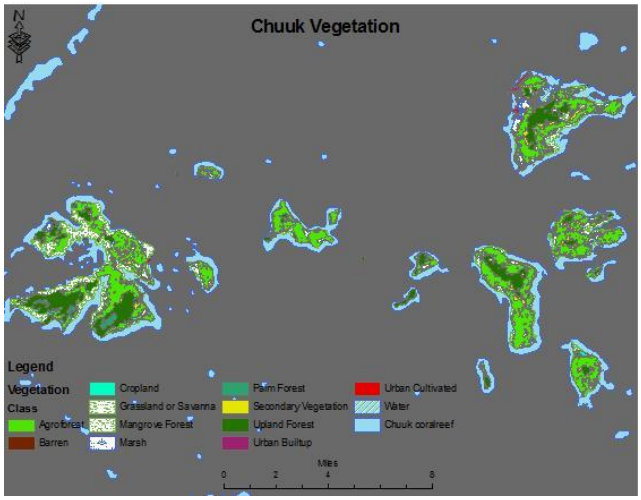
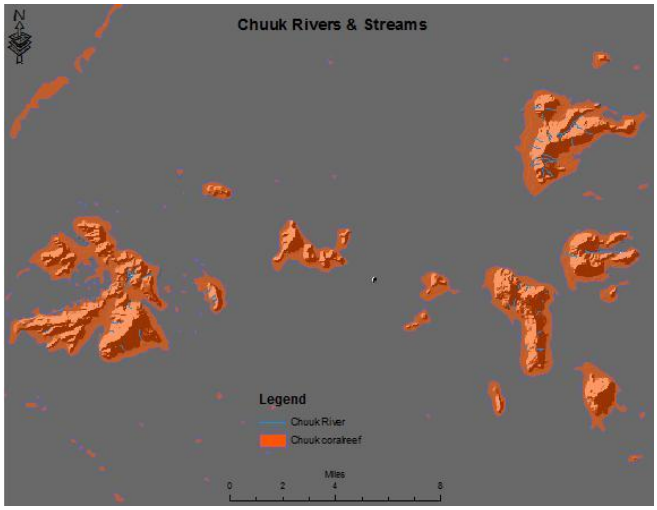
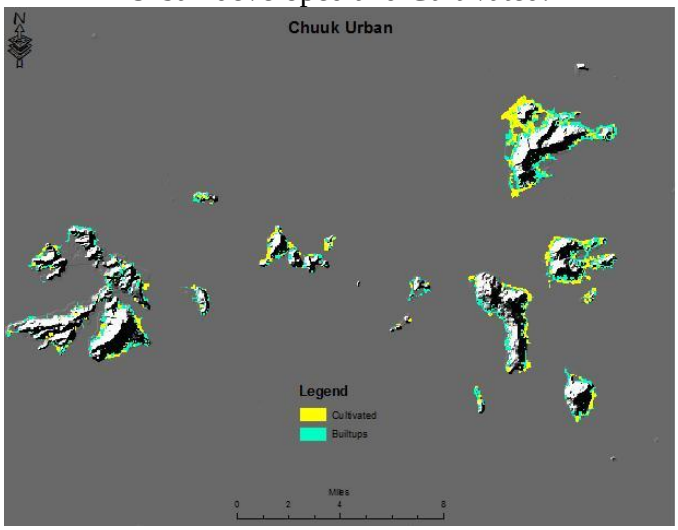
Land cover classes all over Chuuk State are mostly privately owned. The only public land includes the urban developed and urban cultivated areas. However, the focus for high priority areas for forest stewardship will be the vegetation classes that are high priority for the SWARS Food Security issue and the 50m riparian.

The available data sets used for this task/analysis include:

1. ***Chuuk PIC 2008 Vegetation layer***
   Chuuk vegetation layer contains 12 vegetation classes, which include *agroforest, barren, cropland, grassland & savanna, mangrove forest, marsh, palm forest, secondary vegetation, upland forest, urban built-up, urban cultivated, and water*. This layer will be converted from features to raster and then reclassify from 10-classes into 3-classes, which include 2 – 'high priority', 1 – 'priority', and 0 – 'not eligible' for Chuuk forest stewardship.
   The vegetation classes that are **'high priority'** for Chuuk State forest stewardship are the high priority classes used for the Food Security Issues for the SWARS. And these vegetation classes are Agroforest, Secondary vegetation, and Cropland.
   The vegetation classes that are **'priority'** for Chuuk State forest stewardship are Upland forests, Mangrove forests, Marsh, Grassland & Savanna, and Palm forests.
   The vegetation classes that are **'not eligible'** for Chuuk State forest stewardship are Water, and Urban built-ups and urban cultivated.

2. ***Rivers 50m riparian layer***
   Chuuks watersheds are the 50 meters riparian surrounding each river and these are considered high priority for Chuuks' forest stewardship. This layer will first be converted to raster and then reclassified to '2' as high priority.

3. ***Urban developed & cultivated data sets***
   Urban developed and urban cultivated areas are not eligible for forest stewardship, and therefore, needed to be reclassified and merged with land cover classes that are not eligible for Chuuk State's forest stewardship. These include houses, airfield area, roads, government buildings, school buildings, churches, and other developed and cultivated areas.

CHUUK STATE Input Data Layers	
1. Chuuk vegetation layer: Originally has 12 vegetation classes: Agroforest, Barren, Cropland, Grassland & Savanna, Mangrove forest, Marsh, Palm forest, Secondary vegetation, Upland forest, Urban Builtup, Urban Cultivated, and Water. 	**2. Rivers and streams 50m riparian layer:** Chuuks rivers and streams are all located in private lands and the 50 meters riparian around each river and stream are the watersheds for Chuuk state. These riparian areas/watersheds are high priority for forest stewardship. 
3. Urban Developed & Cultivated layers: This layer includes urban developed and cultivated such as the <u>airfield area, urban areas, school buildings, churches, roads, and other developed and cultivated areas</u> in Chuuk state. All urban land cover classes are not eligible for forest stewardship	Urban developed and Cultivated: 

CHUUK STATE Data Processing

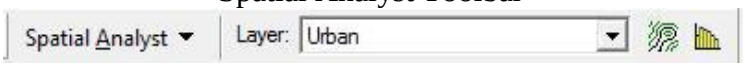
STEP 1: Setting the Analysis Mask, Extent and the Cell size

Before *converting features to raster, reclassifying raster classes, and then merging all the raster classes together by overlaying them*, make sure to set the Analysis Mask, Analysis Extent and the Cell Size. The Analysis Mask, Analysis Extent and the Cell Size needed to be set so that the analysis will take place within the set mask, set extent and that all output raster layers has the same cell size. Setting the working directory is also important so all the raster layers and reclassified layers are stored in the same directory.

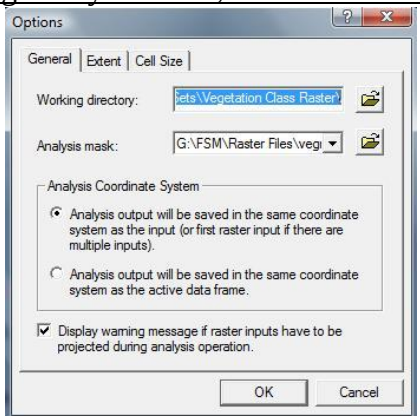
To do this:

Select *Option* from the drop-down list of the Spatial Analyst toolbar. In the Option window, under General tab, set the working directory to a folder where your work should be saved (e.g. Chuuk raster folder, or your liking), and then set the analysis mask (e.g. Chuuk DEM), set analysis extent and snap extent to under Extent tab (e.g. Chuuk DEM), and the cell size should be the cell size for the DEM layer, which is 10m.

Spatial Analyst Toolbar



Setting Analysis Mask, Extent and Cell size



As for Chuuk, both the analysis mask and extent were set to the Chuuk DEM layer, with its' cell size of 10meters. Now it's time to convert the input feaster layers to raster.

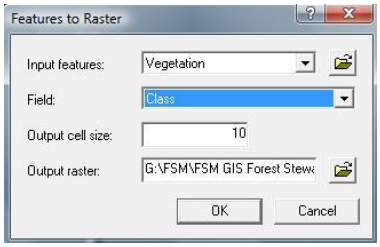
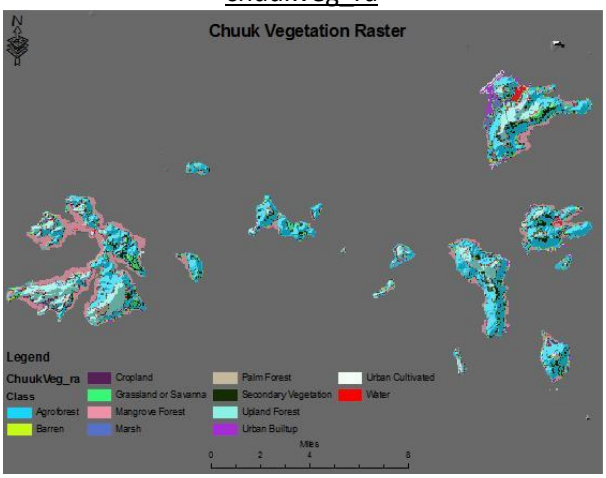
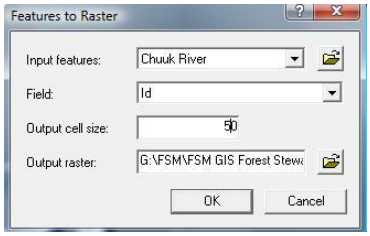
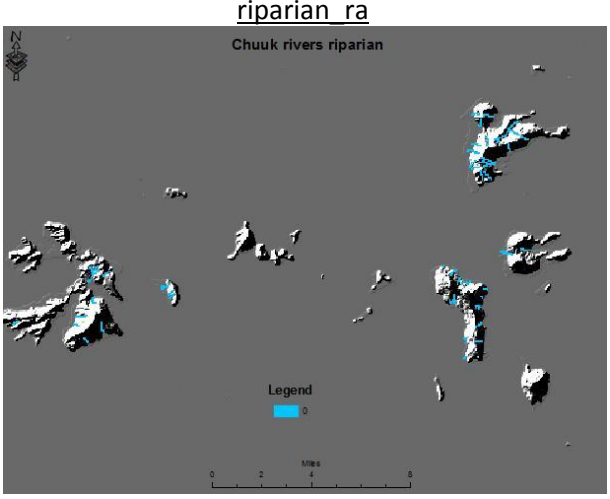
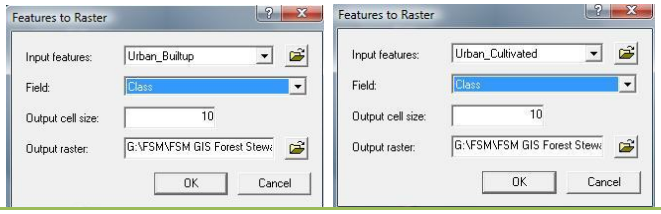
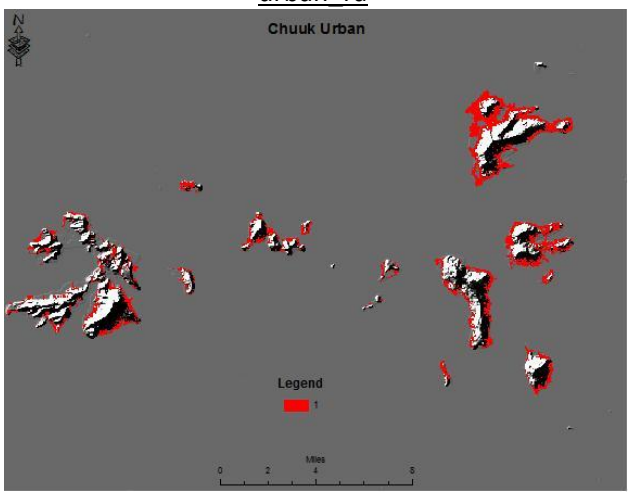
Step 2: Converting feature layers to raster

Because the final map should be in raster, all feature classes/layers should be converted to raster.

To do this:

Go to Spatial Analyst Toolbar and click the drop down list and select *Convert*, and then select *Features to Raster*. In the *Features to Raster* window make sure to select the *Input feature*, the *Field*, and then give a name of the *Output raster*. Notice that the *Output cell size* is 10. This was the result from step 1.

The process in converting the feature layers (e.g. Chuuk vegetation, Rivers 50m riparian and the Urban developed and Urban cultivated layers) is exactly the same. Make sure to select the correct input feature, the field and give the name of the output raster with an *underscore (ra)* to indicate it is a raster. The output raster name cannot be more than 13 letters and numbers.

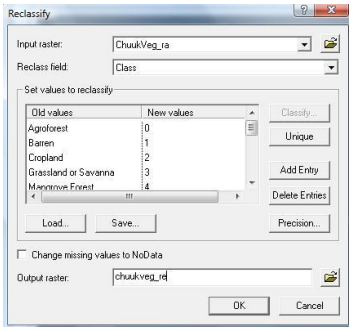
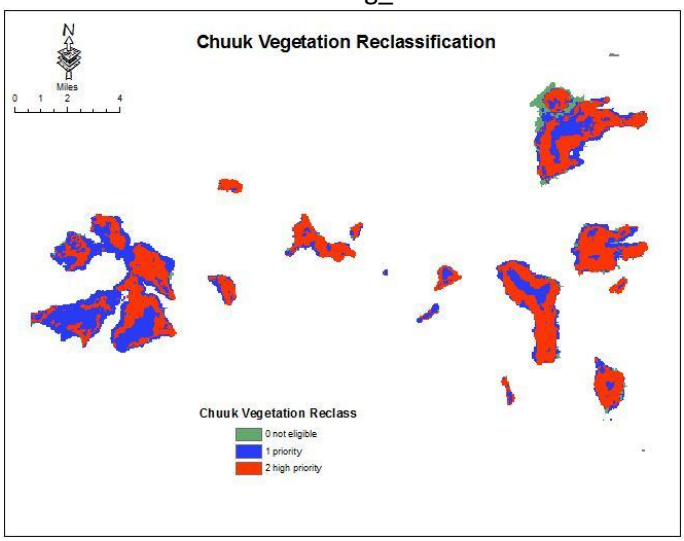
Input feature data and the process	Output raster data
2a. Converting Chuuk vegetation features to raster • Select Convert > Features to Raster • In the Features to Raster window, select *Chuuk Vegetation* as Input features • Select Class as the field • Name the Output raster as *chuukveg_ra* • Then click OK 	chuukveg_ra 
2b. Converting Chuuk River layer to raster • Select Convert > Features to Raster • In the Features to Raster window, select *River* as Input features • Select ID as the field • Name the Output raster as *riverr_ra* • Then click OK 	riparian_ra 
2c. Converting Urban developed & cultivated layers to raster • **Select Convert > Features to Raster** • **In the Features to Raster window, select *Urban_Builtups* as Input features** • **Select CLASS as the field** • **Name the Output raster as *Urban_ra*** • **Then click OK** • **Apply same with Urban_Cultivated** 	urban_ra 

Now that all the feature classes that will be used for producing the final map are in raster, it is time to reclassify the classes for each raster to 0, 1, and 2. '0' are classes that are not eligible for forest stewardship, '1' are classes that are priority for forest stewardship, and '2' are classes that are high priority for forest stewardship.

Step 3: Reclassifying raster classes

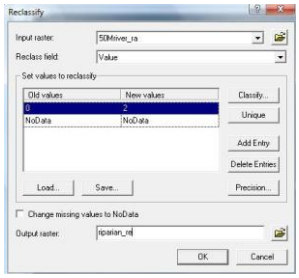
To do this:

Go to Spatial Analyst drop down list and select Reclassify. In the Reclassify window, make sure to choose the correct Input raster, Reclass field and the reclassification occur by changing the New values to their class code of '0', '1' and '2'. If a class is to be not eligible, make sure to change its new value to '0', same with other classes for '1' and '2'. Make sure to give an Output raster name with an underscore (re) to indicate it is a reclassify layer. The process in reclassifying the raster classes is same for all the raster classes to be used for producing the final map.

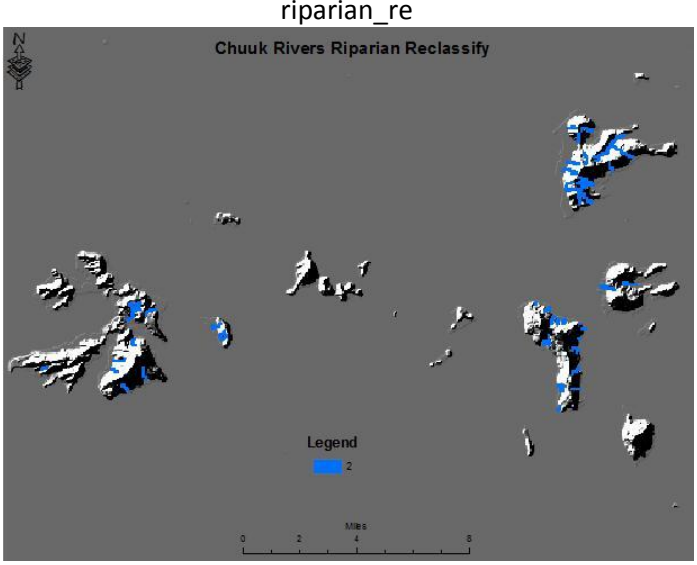
Input raster data and the process	Output raster reclassify data
3a. Reclassify Chuuk vegetation raster (chuukveg_ra) layer • Select *Reclassify* from the Spatial Analyst toolbar drop down list • Select *chuukveg_ra* as the Input raster • Select Veg_desc as the Reclass field • Change the New values to '0', '1', and '2' to vegetation classes that are Not Eligible, Priority and High Priority • Name the Output raster as chuukveg_re • Then OK  The classes that are 'Not Eligible' and set to '0' as the New values are: • Water and urban built-ups and cultivated. The class that is a 'Priority' and set to '1' as the New value is: • Barren, mangrove, upland forest, swamp, savanna & grassland, palm forests. The classes that are 'High Priority' and set to '2' as the New values are: • Agroforest, cropland, secondary vegetation.	The product of reclassifying the vegetation classes from 12 original classes down to 3 is the vegetation raster reclassify data called *'chuukveg_re'* is shown below. chuukveg_re 

3b. Reclassify Chuuk river riparian raster (river_ra) layer

- Select *Reclassify* from the Spatial Analyst toolbar drop down list
- Select *river_ra* as the input raster
- Select Value as the Reclass field
- Change the New values to '2', for this is a High Priority for Chuuk
- Name the Output raster as river_re
- Then OK

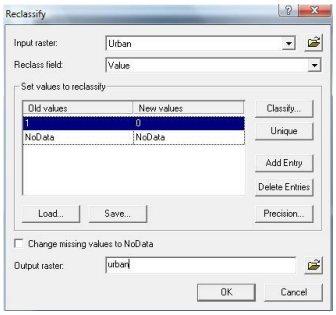


riparian_re

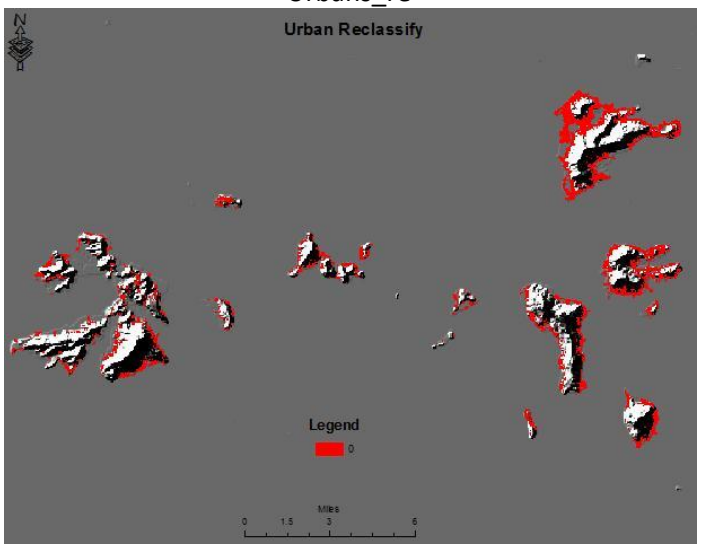


3c. Reclassify Chuuk Urban raster (urban_ra) layer

- Select *Reclassify* from the Spatial Analyst toolbar drop down list
- Select *urban_ra* as the input raster
- Select Value as the Reclass field
- Change the New values to '0', for this is Not eligible for forest stewardship
- Name the Output raster as *urbans_re*
- Then OK



Urbans_re



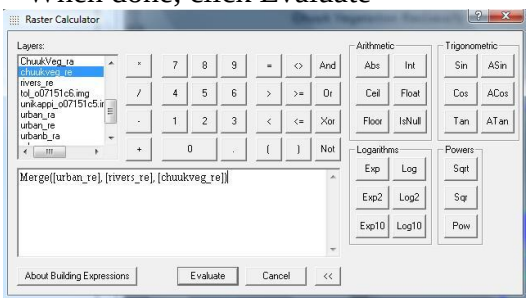
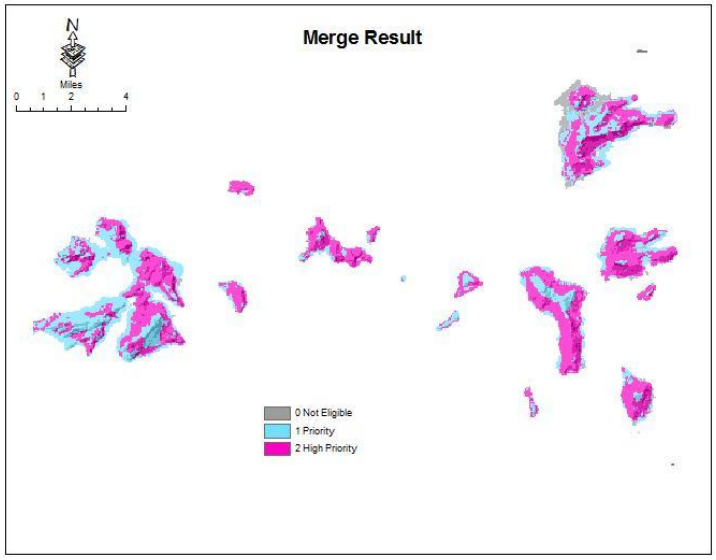
Now that all the raster layers are reclassified to their class code for the ranging of the final mapping, it is time to overlay or merge all the reclassified raster layers, which the final step of this process.

<u>Step 4: Overlaying and Merging all reclassified data layers</u>

Overlaying and merging is simply putting together all the reclassified raster layers into one raster layer using the <u>Raster Calculator</u> from the Spatial Analyst toolbar.

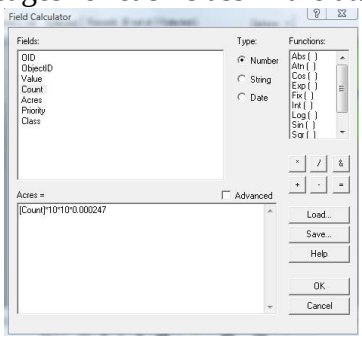
To do this:

Select the Raster Calculator from the drop down list of the Spatial Analyst tool bar. You can merge two or more raster files together at once. In the raster calculator, type in 'Merge', then right next to merge, place the open parenthesis '(', and then select all the raster files you want to merge, and when you have selected all raster files to merge, make sure to place the closed parenthesis ')' at last. Have a space next to each comma in between each raster file within the parenthesis. The raster layers or files can be selected by double-clicking each of the layers in the drop down list in the Raster Calculator window.

Input data layers and process	Final output/result
Overlaying and Merging the reclassified data layers • Choose the Raster Calculator from the Spatial Analyst toolbar drop down list • Type in Merge(, then double click the layers to merge, and then make sure to close the parenthesis at last). • When done, click Evaluate 	Merging result 

Final touch on the map

- Export the attribute of the final maps so you can add other fields such as 'Acres', and 'Class' in the attribute tables to present more information about the map. Open the attribute of the merged layer, then click 'Options' then 'Export'. Save the attribute in your raster file folder, then click OK. Add the attribute to the TOC, open it and then add other fields: 'Acres', and 'Class' fields. To add fields to the attribute table, click 'Options', then 'Add Field'.
- To calculate the acres for each class, right click the 'Acres' heading of the attribute table and click 'Calculate Values'. In the Field Calculator window type, select 'Count'*10*10*0.0002471, then click OK. This will automatically calculate the acreages for each class in the attribute table.



- To add class(s) in the class field of the attribute table, you have to turn 'ON' the Editor Toolbar first. After

filling in the class field or doing edits, make sure to save your edits.

- Join the exported attribute table to the final map attribute table (optional)
- Change the color codes of the classes as shown in the maps below
- Change the display of the final maps to 30% transparency
- Add Map Title, North Arrow, Scale bar, Legend, and graphs on the map.

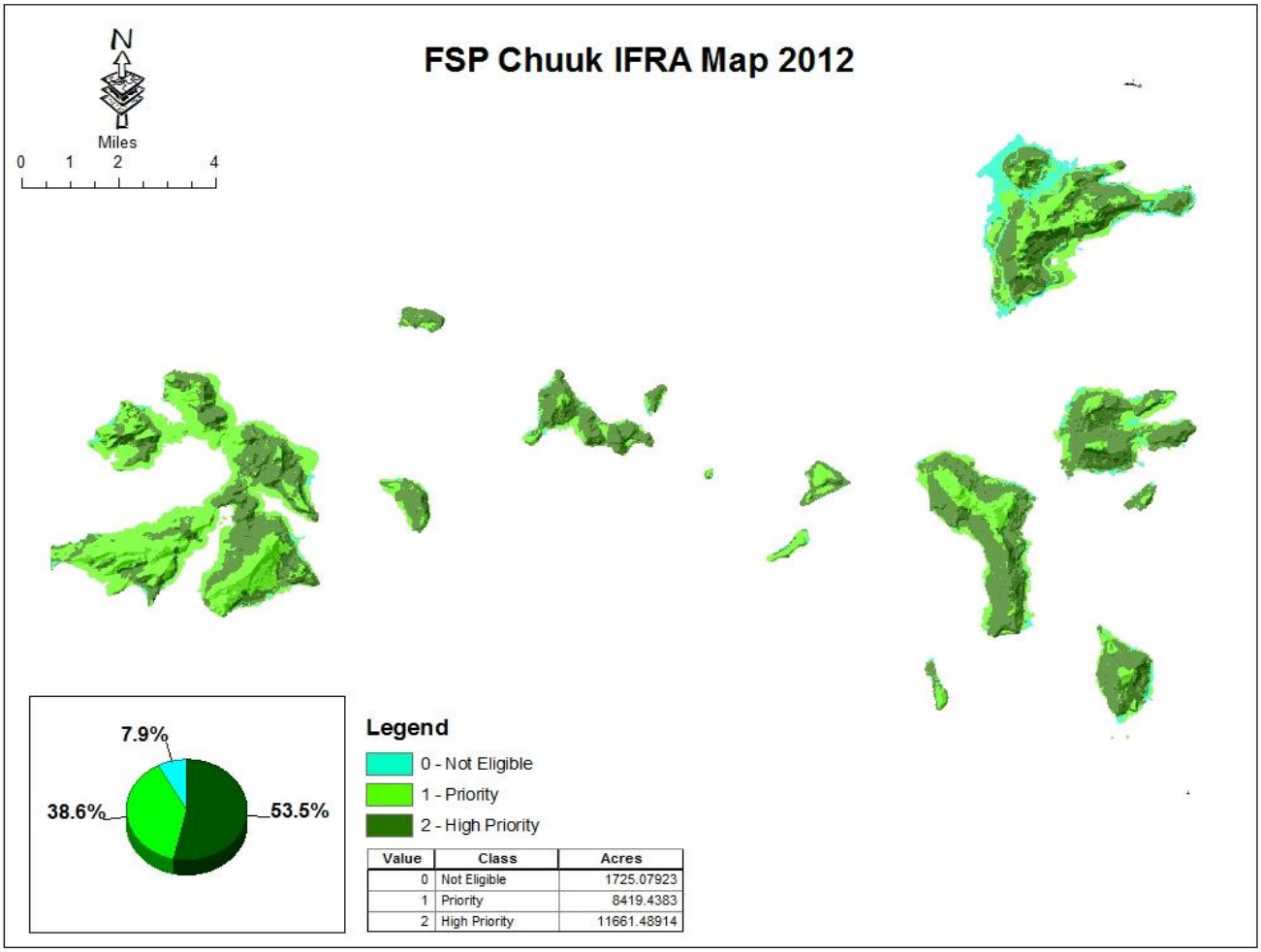
Chuuk Final Attribute Table

Attributes of CHUUK_IFRA

OID	ObjectID	Value	Count	Class	Acres
0	0	0	69813	Not Eligible	1725.07923
1	1	1	340730	Priority	8419.4383
2	2	2	471934	High Priority	11661.48914

Record: 1 Show: All Selected Records (0 out of 3 Selected.)

CHUUK FINAL MAP



IV. YAP STATE

Data Analysis

This section provides the geospatial analysis and procedures of Yap State's data sets for its' IFRA map.

Data Preparation

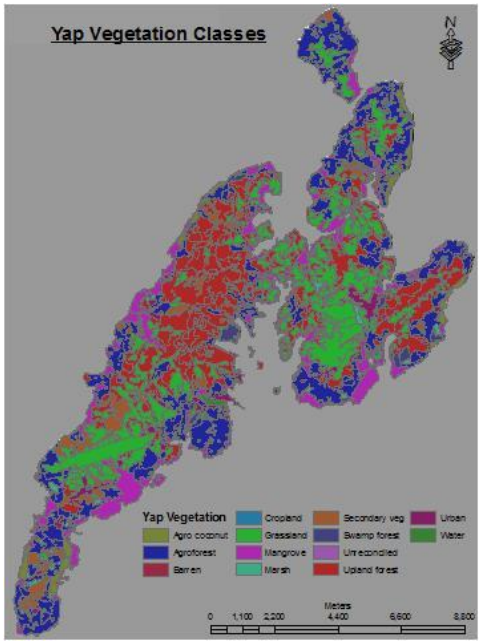
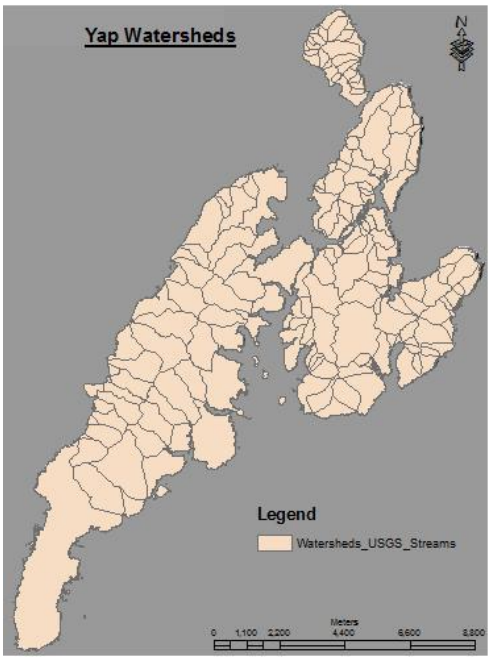
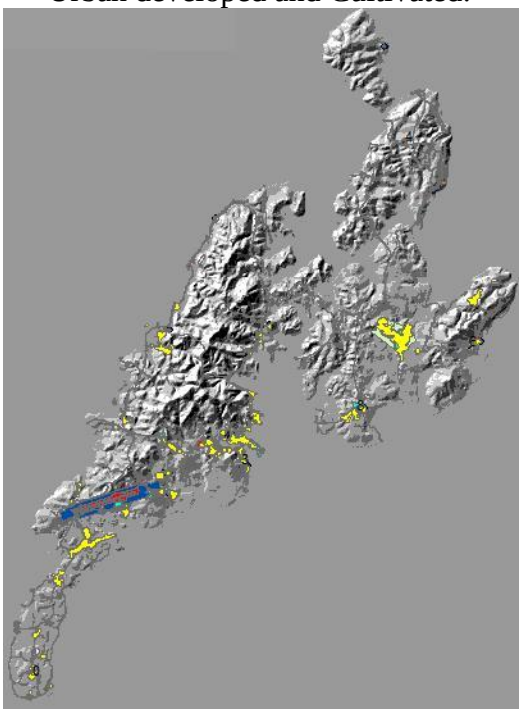
The team met on August 28 – 31, had a discussion in regards to the Yap's available data sets and made decisions that the *reclassification and then overlaying and merging* of Yap vegetation layer, Yap watersheds, and Yap urban developed & urban cultivated layers (roads, buildings & houses, community centers, airport, etc) will be the method used for developing Yaps' Important Forest Resource Areas map.

The available data sets used for this task/project include:

1. ***Yap Vegetation layer*** – polygon feature classes
   Originally has 12 vegetation classes: Agroforest, Agro coconut, Barren, Cropland, Grassland, Mangrove forest, Marsh, Secondary vegetation, Swamp forest, Upland forest, Urban, Water and lakes.This layer will be converted from features to raster and then reclassify from 12-classes into 3-classes, which include 2 – 'high priority', 1 – 'priority', and 0 – 'not eligible' for Yap forest stewardship.
   The vegetation classes that are **'high priority'** for Yap State forest stewardship are Agroforest, Agro-coconut, Grassland, Cropland and Mangrove.
   The vegetation classes that are **'priority'** for Yap State forest stewardship are Barren, Marsh, Upland forest, Secondary vegetation, and Swamp.
   The vegetation classes that are **'not eligible'** for Yap State forest stewardship are Water, and Urban.

2. ***Watersheds layer*** – polygon feature classes
   Yap's watersheds layer covers most of the island. All watersheds are private lands and therefore are high priority for forest stewardship.

3. ***Urban Developed & Cultivated data sets*** – polygon, polyline and point feature classes
   This layer includes individual urban developed and cultivated such as the airfield area, burial grounds area, men's houses locations, school buildings, churches, roads, coast guard reservation area, COM Yap campus area and other developed and cultivated areas in Yap state. All these urban land cover classes are not eligible for forest stewardship

YAP STATE Input Data Layers	
1. Yap Vegetation layer: Originally has 12 vegetation classes: Agroforest, Agro coconut, Barren, Cropland, Grassland, Mangrove forest, Marsh, Secondary vegetation, Swamp forest, Upland forest, Urban, Water and lakes 	**2. Watersheds layer:** Yap's watersheds layer covers the entire island. All watersheds are private lands and therefore are high priority for forest stewardship. 
3. Urban Developed & Cultivated layers: This layer includes individual urban developed and cultivated such as the airfield area, burial grounds area, men's houses locations, school buildings, churches, roads, coast guard reservation area, COM Yap campus area and other developed and cultivated areas in Yap state. All these urban land cover classes are not eligible for forest stewardship	Urban developed and Cultivated: 

YAP STATE Data Processing

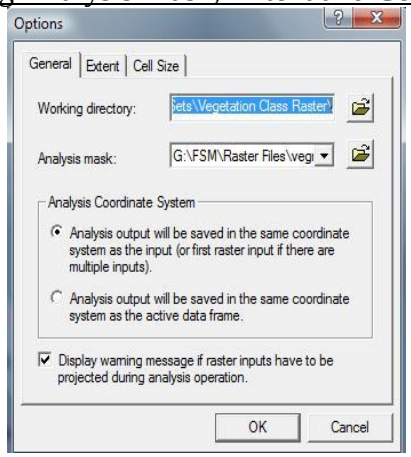
STEP 1: Setting the Analysis Mask, Extent and the Cell size

Before converting features to raster, reclassifying raster classes, and then merging all the raster classes together by overlaying them, make sure to set the Analysis Mask, Analysis Extent and the Cell Size. The Analysis Mask, Analysis Extent and the Cell Size needed to be set so that the analysis will take place within the set mask, set extent and that all output raster layers has the same cell size. Setting the working directory is also important so all the raster layers and reclassified layers are stored in the same directory.

To do this:
Select *Option* from the drop-down list of the Spatial Analyst toolbar. In the Option window, under General tab, set the working directory to a folder where your work should be saved (e.g. yap raster folder, or your liking), and then set the analysis mask (e.g. Yap DEM), set analysis extent and snap extent to under Extent tab (e.g. Yap DEM), and the cell size should be the cell size for the DEM layer, which is 10m.

Spatial Analyst Toolbar

Setting Analysis Mask, Extent and Cell size



As for Yap, both the analysis mask and extent were set to the Yap DEM layer, with its' cell size of 10meters.

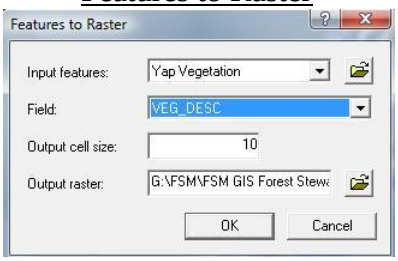
Now it's time to convert the input feaster layers to raster.

Step 2: Converting feature layers to raster

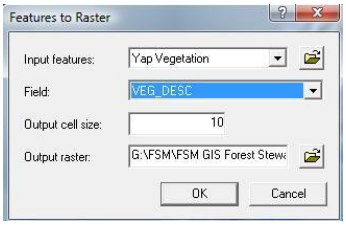
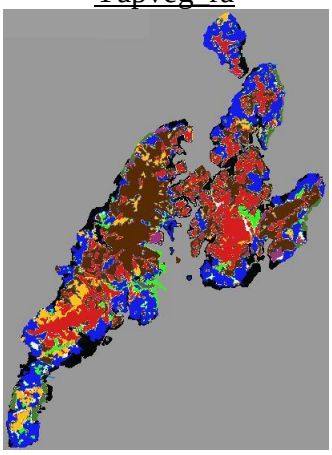
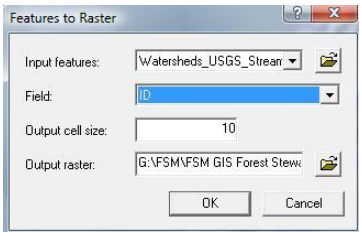
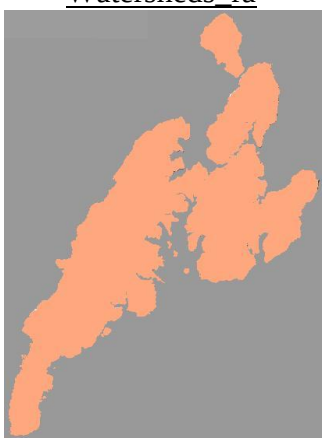
Because the final map should be in raster, all feature classes/layers should be converted to raster.

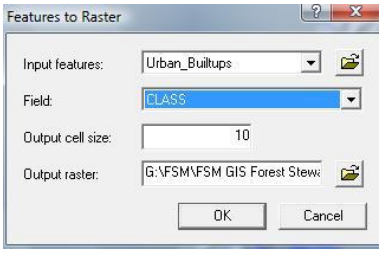
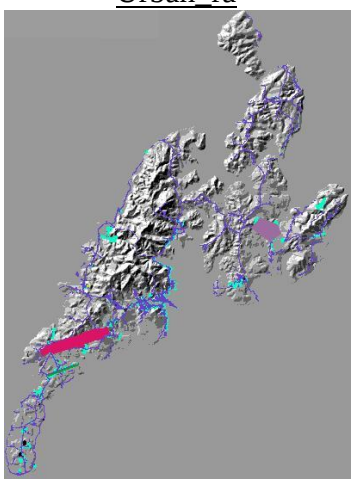
To do this:
Go to Spatial Analyst Toolbar and click the drop down list and select *Convert*, and then select *Features to Raster*. In the *Features to Raster* window make sure to select the *Input feature*, the *Field*, and then give a name of the *Output raster*. Notice that the *Output cell size* is 10. This was the result from step 1.

Features to Raster



The process in converting the feature layers (e.g. Yap vegetation, Watersheds and the Urban developed and Urban cultivated layers) is exactly the same. Make sure to select the correct input feature, the field and give the name of the output raster with an *underscore (ra)* to indicate it is a raster. The output raster name cannot be more than 13 letters and numbers.

Input feature data and the process	**Output raster data**
2a. Converting Yap vegetation features to raster • Select Convert > Features to Raster • In the Features to Raster window, select *Yap Vegetation* as Input features • Select VEG_DESC as the field • Name the Output raster as *Yapveg_ra* • Then OK 	Yapveg_ra 
2b. Converting Yap watersheds layer to raster • Select Convert > Features to Raster • In the Features to Raster window, select *Watersheds_USGS_Streams* as Input features • Select ID as the field • Name the Output raster as *Watersheds_ra* • Then OK 	Watersheds_ra 

2c. Converting Urban developed & cultivated layers to raster • Select Convert > Features to Raster • In the Features to Raster window, select *Urban_Builtups* as Input features • Select CLASS as the field • Name the Output raster as *Urban_ra* • Then OK 	Urban_ra 

Now that all the feature classes that will be used for producing the final map are in raster, it is time to reclassify the classes for each raster to 0, 1, and 2. '0' are classes that are not eligible for forest stewardship, '1' are classes that are priority for forest stewardship, and '2' are classes that are high priority for forest stewardship.

Step 3: Reclassifying raster classes

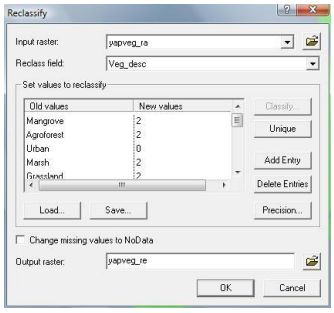
To do this:

Go to Spatial Analyst drop down list and select Reclassify. In the Reclassify window, make sure to choose the correct Input raster, Reclass field and the reclassification occur by changing the New values to their class code of '0', '1' and '2'. If a class is to be not eligible, make sure to change its new value to '0', same with other classes for '1' and '2'. Make sure to give an Output raster name with an underscore (re) to indicate it is a reclassify layer.

The process in reclassifying the raster classes is same for all the raster classes to be used for producing the final map.

Input feature data and the process	Output raster data
3a. Reclassify Yap vegetation raster (yapveg_ra) layer • Select *Reclassify* from the Spatial Analyst toolbar drop down list • In the Reclassify window, select *yapveg_ra* as the input raster • Select Veg_desc as the Reclass field • Change the New values to '0', '1', and '2' to vegetation classes that are Not Eligible, Priority and High Priority • Name the Output raster as yapveg_re	The product of reclassifying the vegetation classes from 12 original classes down to 3 is the vegetation raster reclassified data called *'yapveg_re'* as shown below.

- Then OK



The classes that are 'Not Eligible' and set to '0' as the New values are:

- Water and Urban

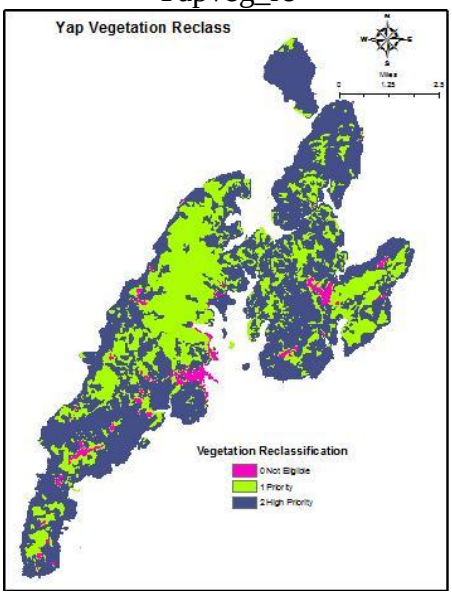
The classes that are 'Priority' and set to '1' as the New value are:

- Barren, Marsh, Upland forest, Secondary vegetation, and Swamp.

The classes that are 'High Priority' and set to '2' as the New values are:

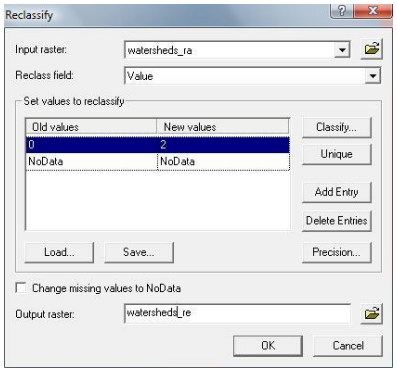
- Agroforest, Agro-coconut, Grassland, Cropland and Mangrove.

Yapveg_re

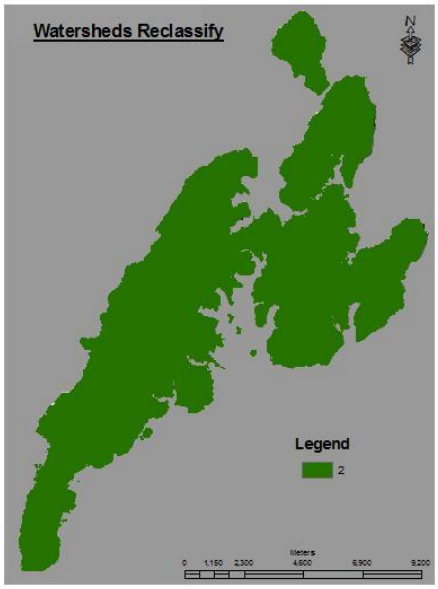


3b. Reclassify Yap watersheds raster (watersheds_ra) layer

- Select *Reclassify* from the Spatial Analyst toolbar drop down list
- In the Reclassify window, select *watersheds_ra* as the input raster
- Select Value as the Reclass field
- Change the New values to '2', for this is a High Priority for Yap
- Name the Output raster as watersheds_re
- Then OK

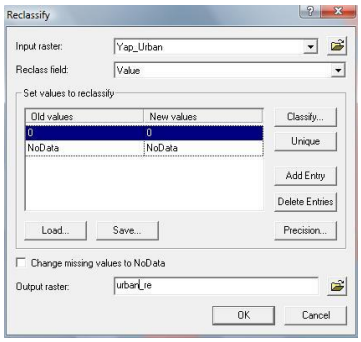


Watersheds_re

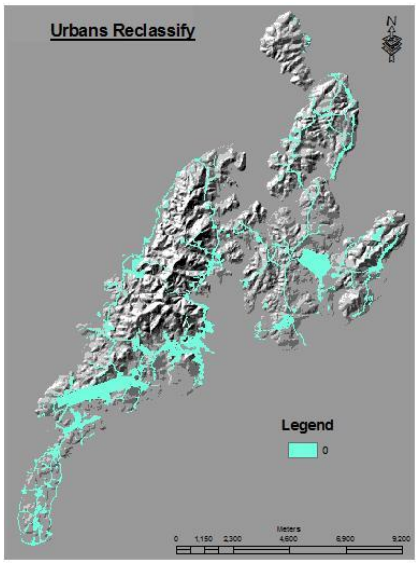


3c. Reclassify Yap Urban raster (urban_ra) layer

- Select *Reclassify* from the Spatial Analyst toolbar drop down list
- In the Reclassify window, select *yapurban_ra* as the input raster
- Select Value as the Reclass field
- Change the New values to '0', for this is Not eligible for forest stewardship
- Name the Output raster as urbans_re
- Then OK



Urbans_re



Now that all the raster layers are reclassified to their class code for the ranging of the final mapping, it is time to merge the reclassified raster layers, which the final step in this process.

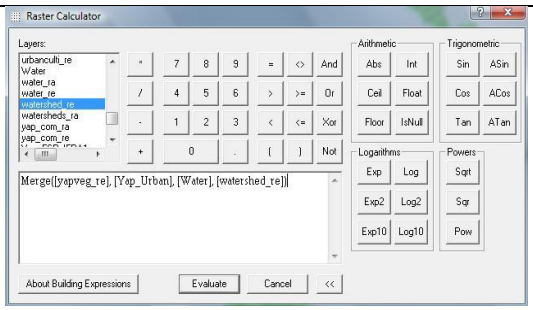
Step 4: Merging or combining all reclassified data layers

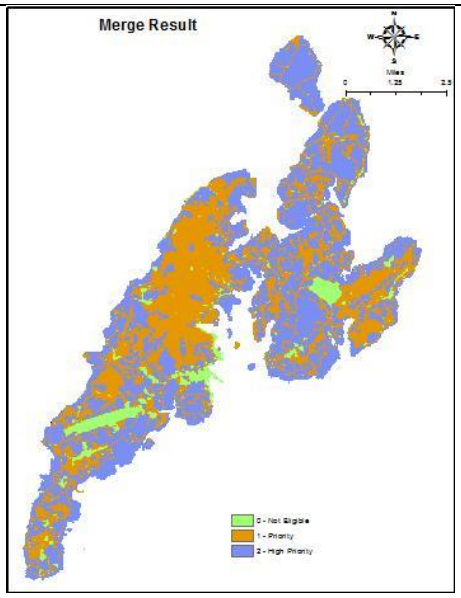
Merging is simply putting together all the reclassified raster layers into one raster layer using the Raster Calculator from the Spatial Analyst toolbar.

To do this:

Select the Raster Calculator from the drop down list of the Spatial Analyst tool bar. You can merge two or more raster files together at once. In the raster calculator, type in 'Merge', then right next to merge, place the open parenthesis '(', and then select all the raster files you want to merge, and when you have selected all raster files to merge, make sure to place the closed parenthesis ')' at last. Have a space next to each comma in between each raster file within the parenthesis. The raster layers or files can be selected by double-clicking each of the layers in the drop down list in the Raster Calculator window.

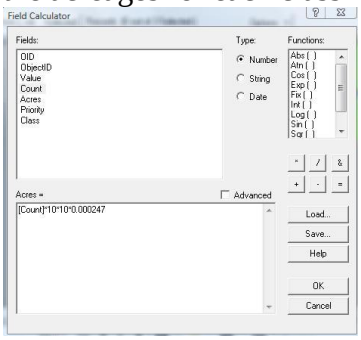
Input data layers and process	Final output/result
Merging the reclassified data layers • Choose the Raster Calculator from the Spatial Analyst toolbar drop down list • Type in Merge(, then double click all the reclassified layers. Make sure to close the parenthesis at last. • When done, click Evaluate	Merging result





Final touch on the map

- Export the attribute of the final maps so you can add other fields such as 'Acres', and 'Class' in the attribute tables to present more information about the map. Open the attribute of the merged layer, then click 'Options' then 'Export'. Save the attribute in your raster file folder, then click OK. Add the attribute to the TOC, open it and then add other fields: 'Acres', and 'Class' fields. To add fields to the attribute table, click 'Options', then 'Add Field'.
- To calculate the acres for each class, right click the 'Acres' heading of the attribute table and click 'Calculate Values'. In the Field Calculator window type, select 'Count'*10*10*0.0002471, then click OK. This will automatically calculate the acreages for each class in the attribute table.



- To add class(s) in the class field of the attribute table, you have to turn 'ON' the Editor Toolbar first. After filling in the class field or doing edits, make sure to save your edits.
- Join the exported attribute table to the final map attribute table (optional)
- Change the color codes of the classes as shown in the maps below
- Change the display of the final maps to 30% transparency
- Add Map Title, North Arrow, Scale bar, Legend, texts, attribute table and graphs on the map.

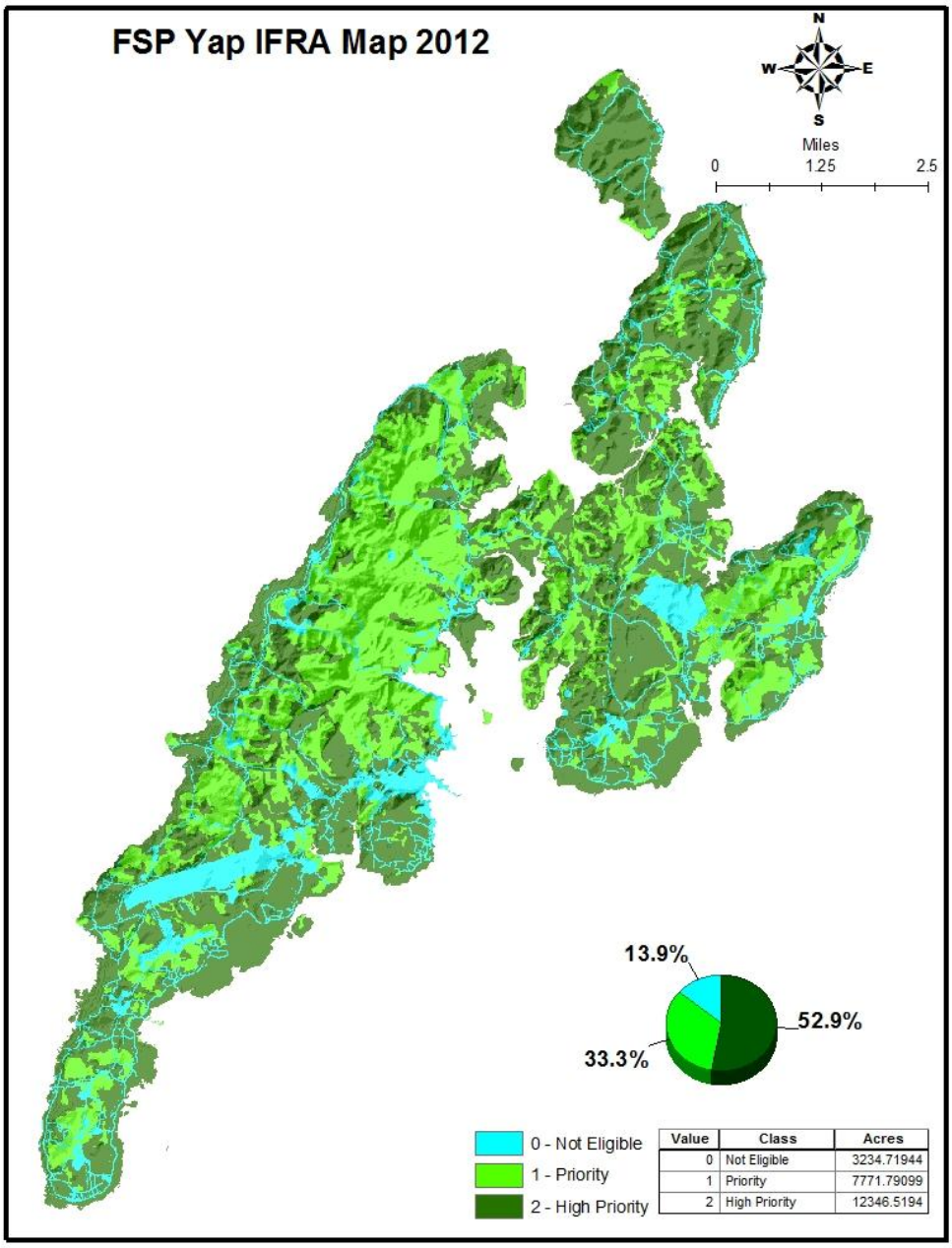
Yap Final Attribute Table

Attributes of Yap_IFRA3

OID	ObjectID	Value	Count	Class	Acres
0	0	0	133832	Not Eligible	3234.71944
1	1	1	321547	Priority	7771.79099
2	2	2	510820	High Priority	12346.5194

Record: 1 Show: All Selected Records (0 out of 3 Selected

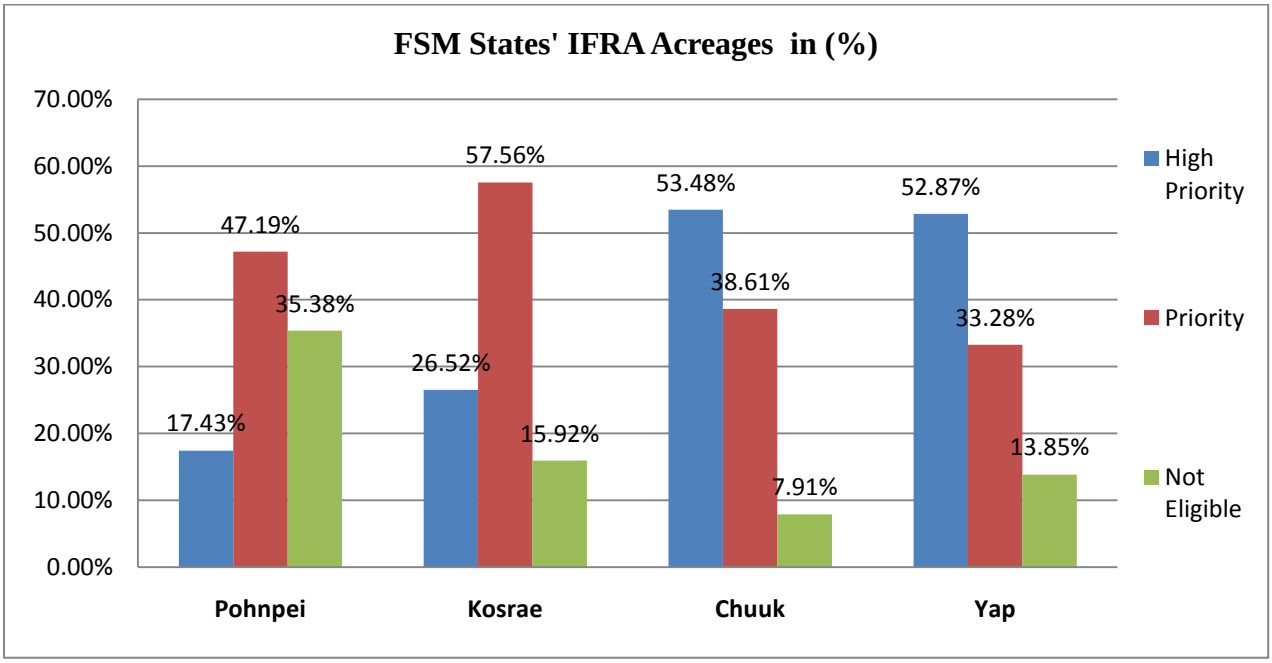
Yap Final Map



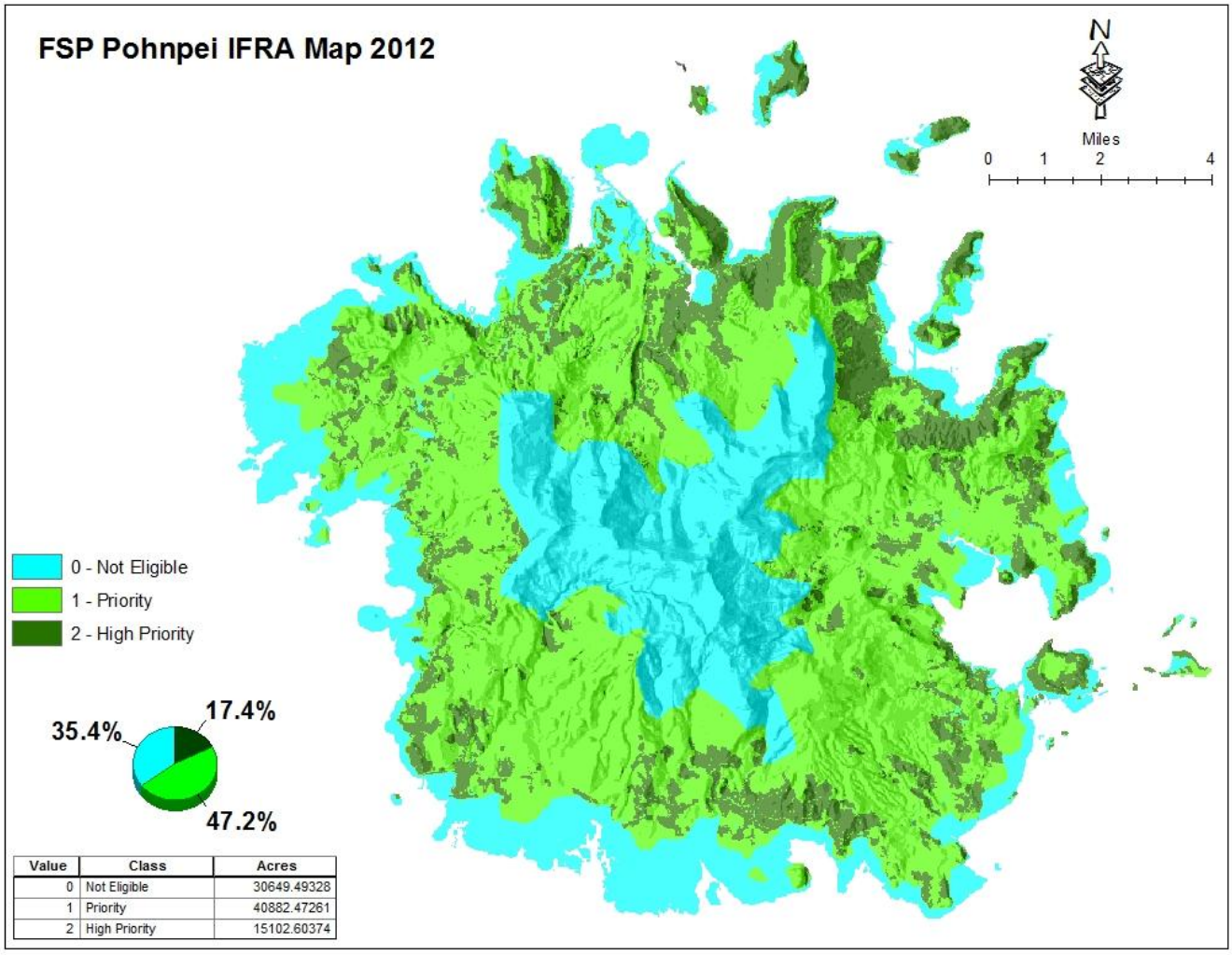
FSM States' Total Acreages for 'Not Eligible', 'Priority' and 'High Priority' classes:

FSM Important Forest Resource Areas				
FSM State	**Not Eligible Class Acreages**	**Priority Class Acreages**	**High Priority Acreages**	**Total Acreages**
Pohnpei State	**30649.49 35.38%**	**40882.47 47.19%**	**15102.60 17.43%**	**86634.56 100%**
Chuuk State	**1725.08 7.91%**	**8419.44 38.61%**	**11661.49 53.48%**	**21806.01 100%**
Yap State	**3234.72 13.85%**	**7771.79 33.28%**	**12346.52 52.87%**	**23353.03 100%**
Kosrae State	**4382.42 15.92%**	**15840.79 57.56%**	**7299.51 26.52%**	**27522.72 100%**

FSM Total Acreages	**Not Eligible Class**	**Priority Class**	**High Priority Class**	**TOTAL**
	39991.71	**72914.49**	**46410.12**	**159316.32**
	25.10%	**45.77%**	**29.13%**	**100%**

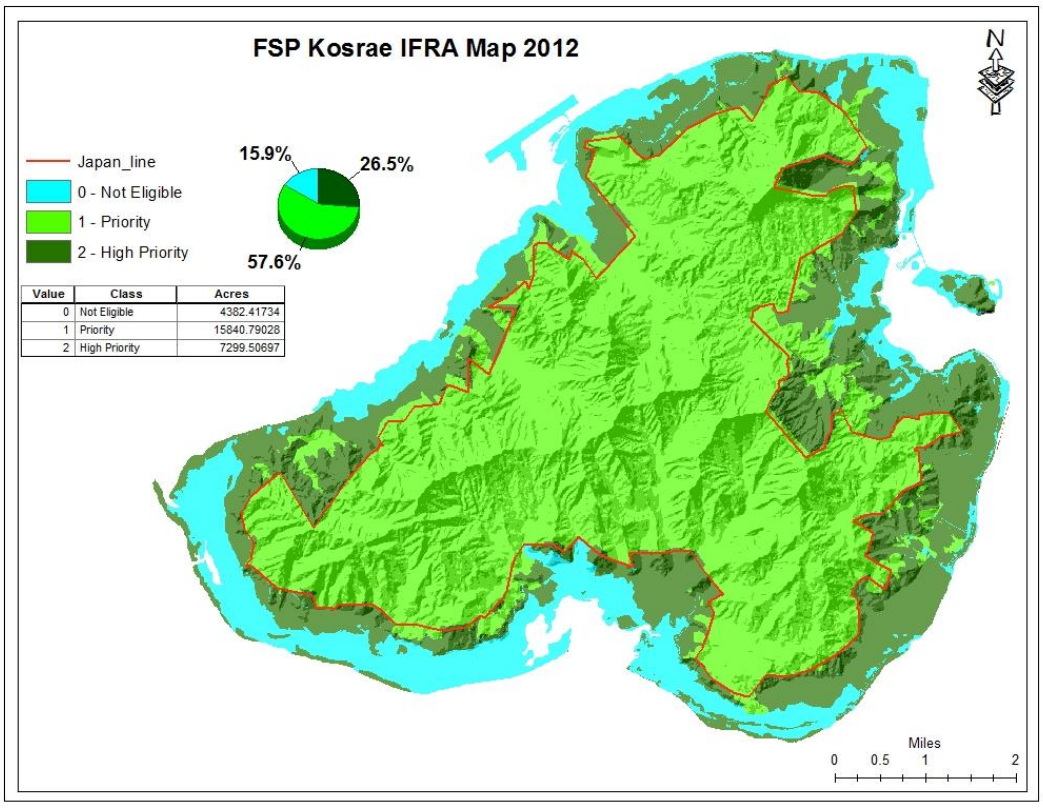


Pohnpei State IFRA Map

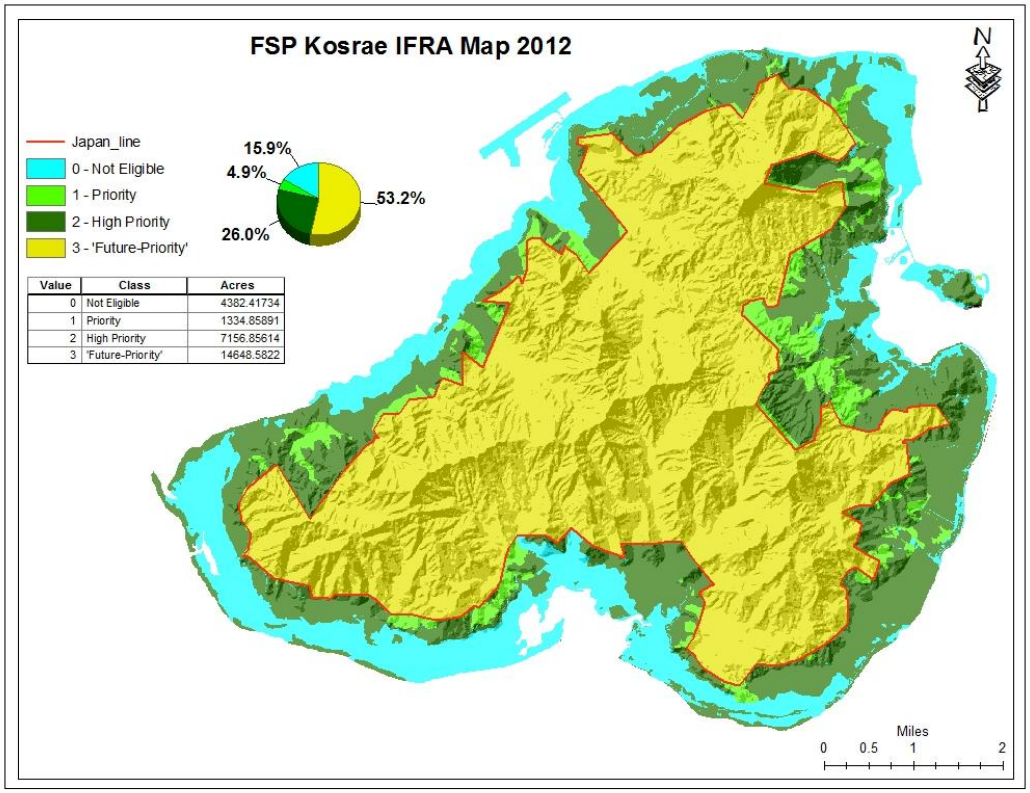


Value	Class	Acres
0	Not Eligible	30649.49328
1	Priority	40882.47261
2	High Priority	15102.60374

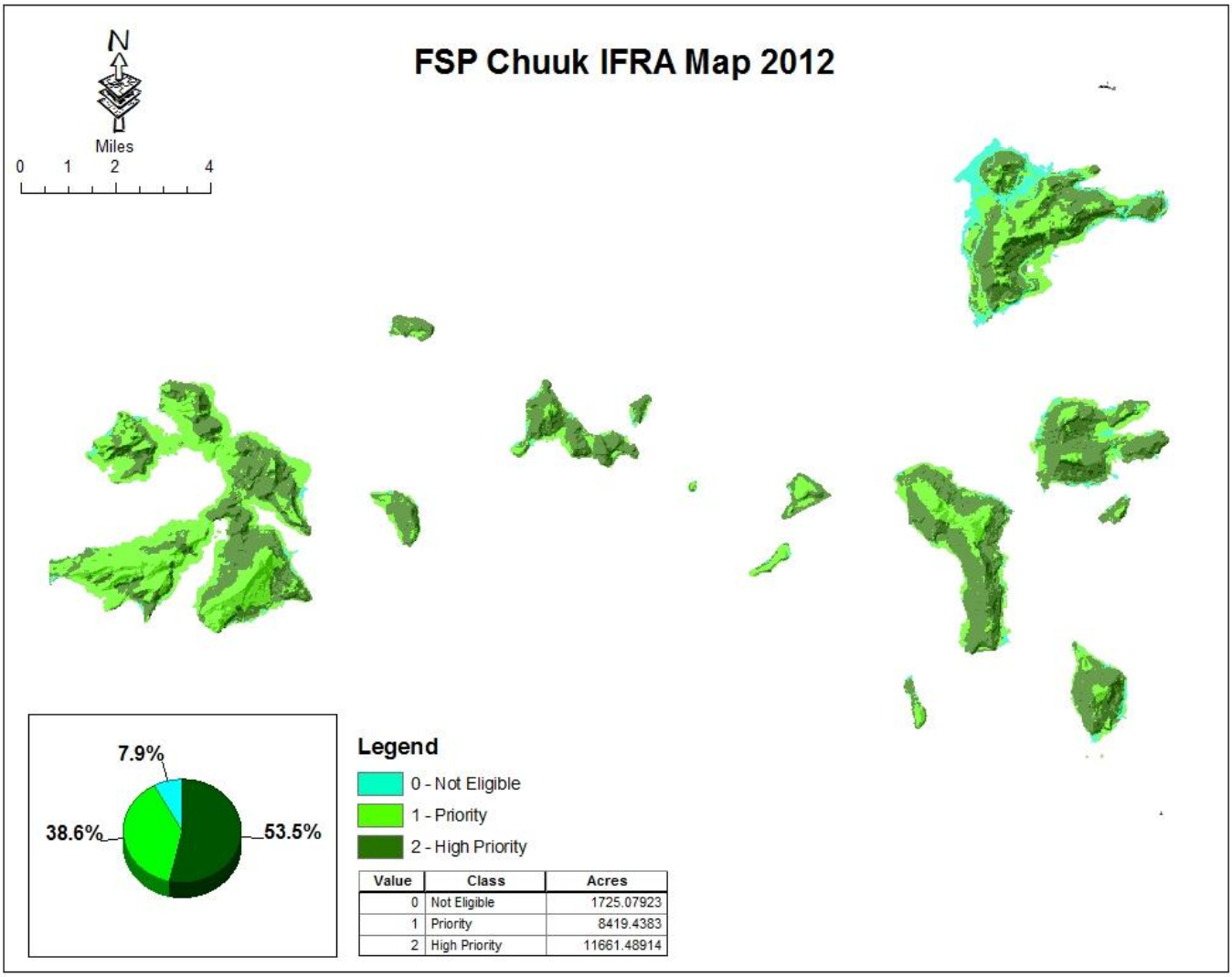
Kosrae State IFRA Map1



Kosrae State IFRA Map2



Chuuk State IFRA Map



Yap State IFRA Map