Overview of Household Inventory on Eauripik Atoll 2015

2014 WorldView2 satellite imagery by Digital Globe

Legend

- Well
- Storage tank

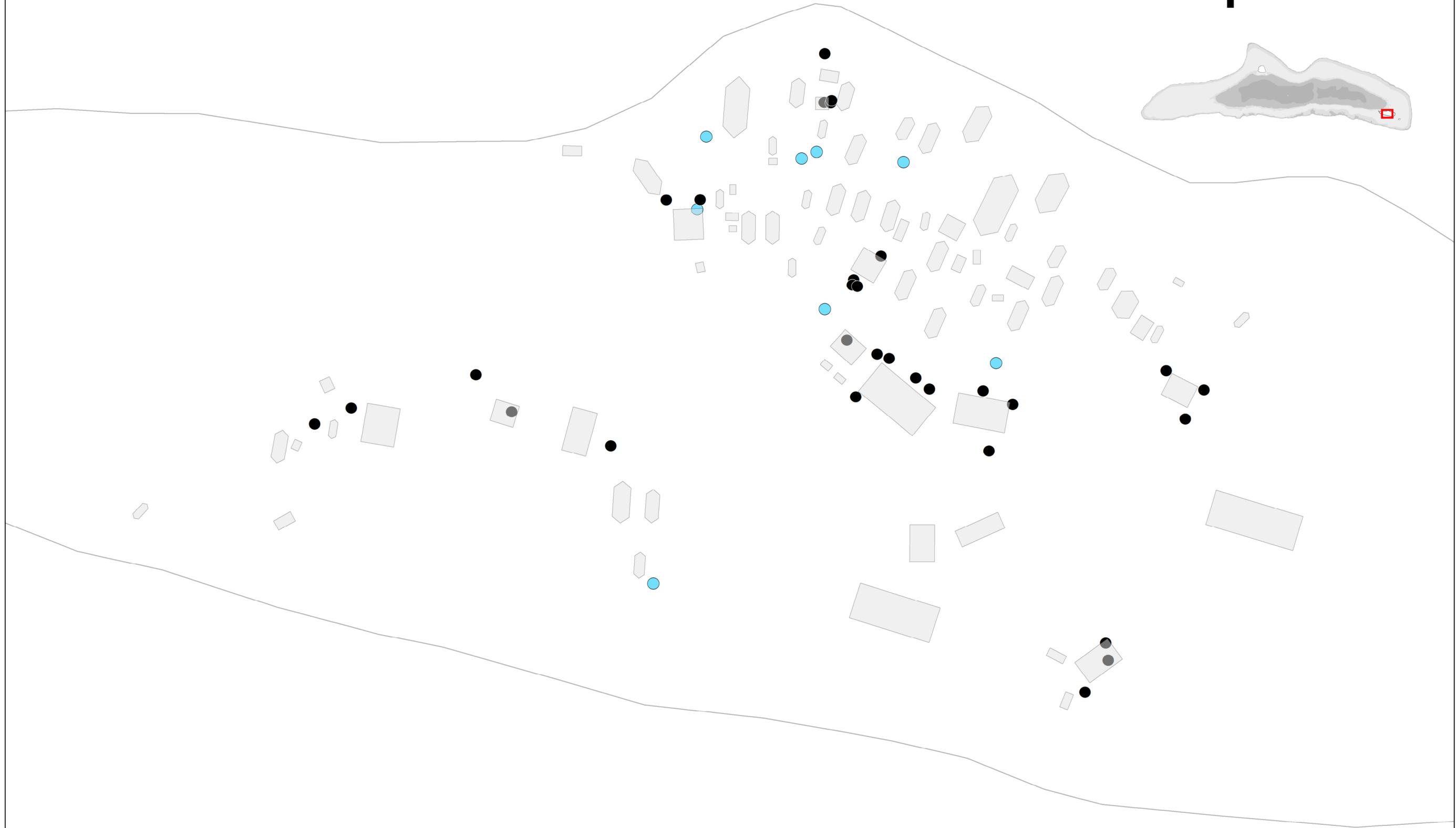0   25   50   100
Meters

N

Map created by Maria Kottermair, September 2015

Eauripik Atoll

N

0   0.5   1
Miles

20114 WorldView2 Imagery by Digital Globe

Map created by Maria Kottermair (iREi)   September 2015

N

Eauripik Atoll

Storage Tank and Well Inventory

- ● Storage tank
- ● Well
- ▢ Structure

0   0.02   0.04
Miles

Eauripik Atoll

N

0   0.04
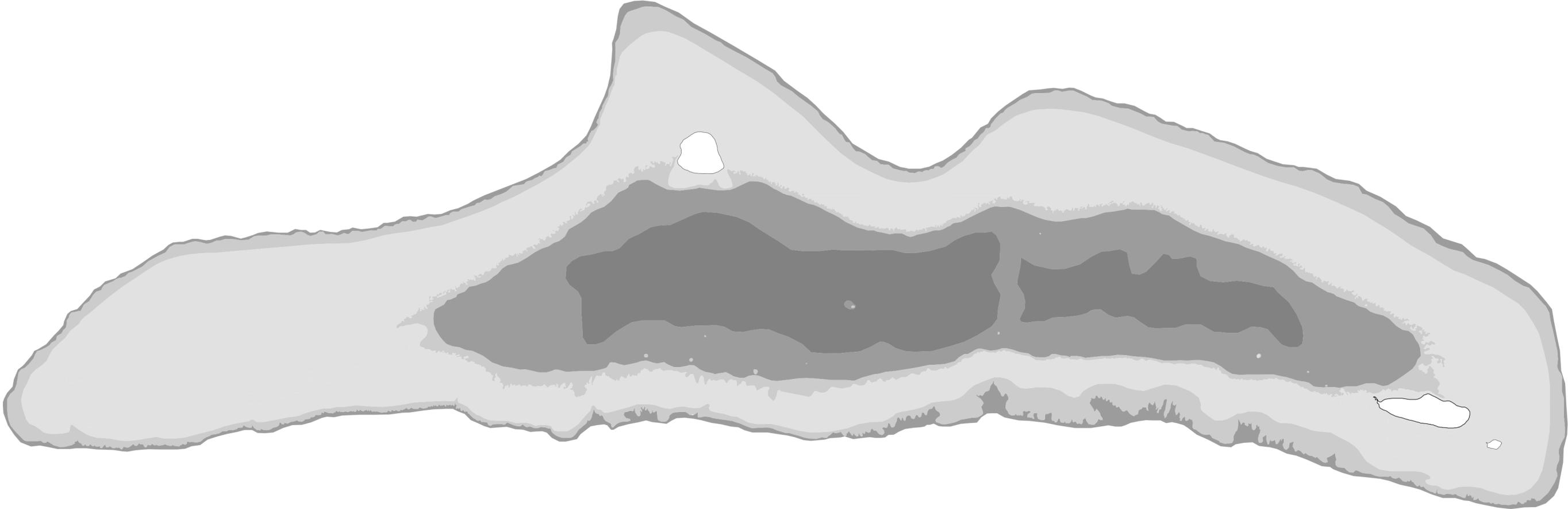Miles

Eauripik Atoll

Storage Tank and Well Inventory

- ● Storage tank
- ● Well
- ▢ Other structure
- ▢ Church
- ▢ Community house
- ▢ School
- ▢ Early childhood education
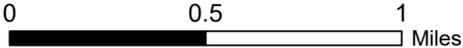- ▢ Dispensary

N

0   0.02   0.04 Miles
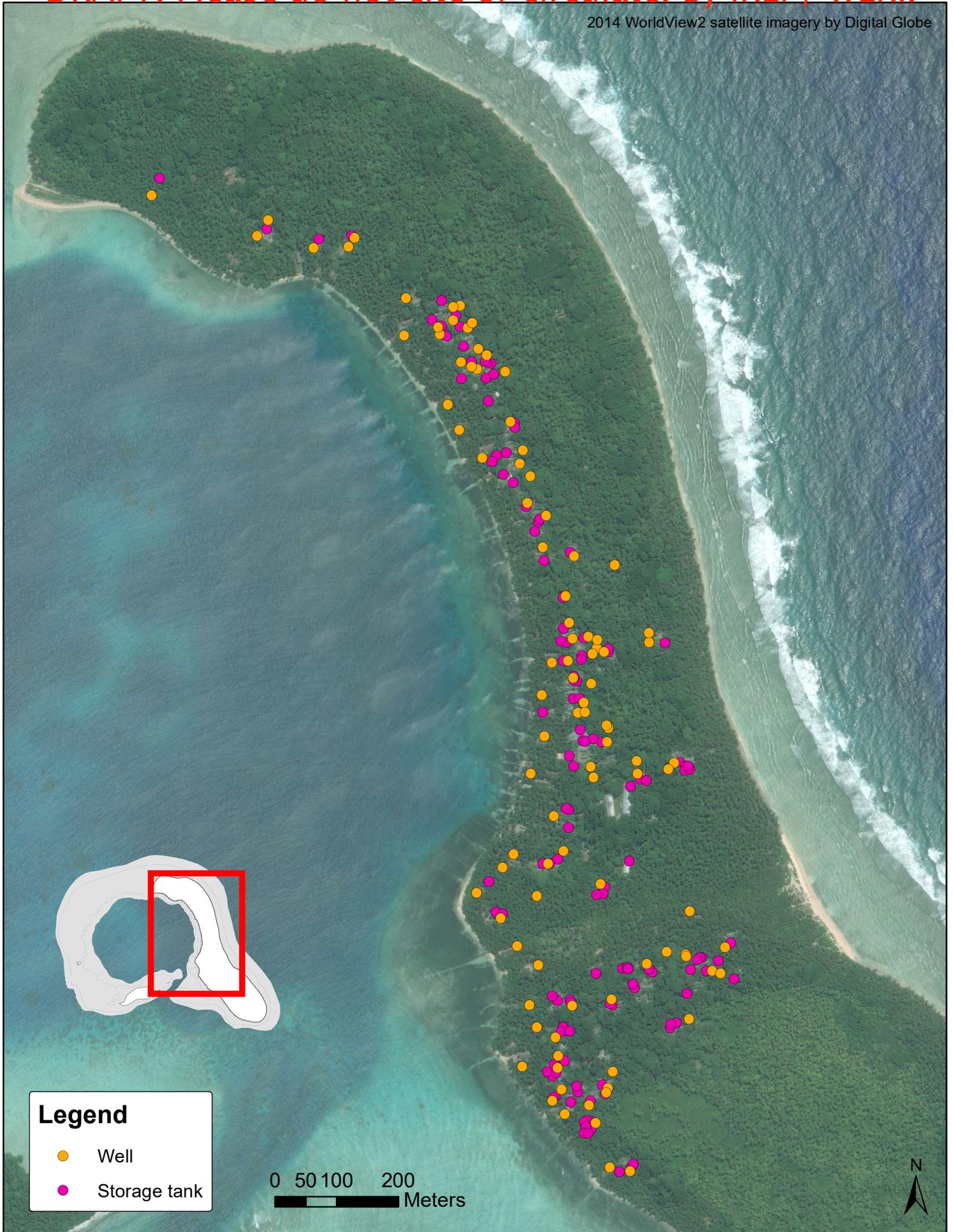
20114 WorldView2 Imagery by Digital Globe

Eauripik Atoll

Legend

☐ Land

Shallow Reef

Middle Reef

Deep Reef

Very deep Reef

0   0.5   1
Miles

Overview of Household Inventory on Ifalik Atoll 2015

2014 WorldView2 satellite imagery by Digital Globe

Legend

- Well
- Storage tank

0 50 100   200
Meters

N

Map created by Maria Kottermair, September 2015

IFALIK ATOLL

Mapping of Wells and Water Storage Tanks 2015

by Maria Kottermair

Methodology

Recording GPS locations

A hand-held Trimble Juno 5 GPS unit was used to record the locations of all wells and rainwater storage tanks of every household on Ifalik Atoll. Prior to the trip, a imagery background file (using a 2014 WorldView2 satellite imagery from Digital Globe) and a data dictionary were created in the Trimble GPS Pathfinder Office software and then uploaded to the GPS unit. The data dictionary allows creating feature types, associated attribute fields, and domains *etc*. beforehand, which makes collecting data in the field easier as it is faster and less prone to mistakes. Here, the data dictionary was kept simple but included two features types (well and storage tank) with fields for ID, Material, and Notes. In addition, a field was added that automatically stores the path and ID of a photo which can be taken directly with the GPS unit.

During the household survey, one team member was responsible to record the compound name and statistics in addition to assigning a compound ID consisting of the village and a number; another one recorded the well characteristics; two others measured the RWCS system; and the author recorded the GPS locations of the wells and storage tanks. The author assigned an ID to each feature which consisted of the compound ID and feature number plus a "w" or "s" to indicated whether it is a well or storage tank respectively. This ID was also noted by the other teams to later link the information.

A challenge was to keep track of all the features since both, the well and RWCS team, did their assessment simultaneously while the author was switching around to record locations of wells and the tanks. In some cases, the wells were close to the houses, hence close to the storage tanks, but in other cases, they were further away. Due to this challenge, a few features were accidentally not recorded.

Post-processing (differential correction) was done in Trimble GPS Pathfinder Office software. The accuracy after post-processing is about 3-5 meters. The features were then exported to shapefile format.

Further editing of the shapefiles was done in ArcMap 10.2.2. Edits included deleting duplicates, correcting typos and adding additional attribute information (*e.g.*, latitude/ longitude).

After comparing IDs with the data from the well survey and the storage tanks, IDs were edited as needed. The shapefiles were then imported to a personal geodatabase (.mdb) which can easily be shared and also accessed by other programs.

On Eauripik Atoll, locations of wells and storage tanks were also recorded but no additional information such as measurements or usage was collected due to time constraints. The features were processed similar to the Ifalik data. See more information on Eauripik Report.

Geo-tagged pictures with a point-and-shoot camera

A digital point-and-shoot Olympus TG2 camera was also used to document the island life and field work in general, in the well and rainwater catchment and storage system in particular. The camera is waterproof and GPS-enabled where the GPS location is automatically stored as part of the picture information. The so-called geo-tagged pictures can later be processed with different software to display them in applications such as Google Earth or a GIS system.

The geo-tagged photos were imported into ArcMap and converted to shapefiles. Unlike the shapefiles created from the GPS points from the Juno that store information like feature ID and comments *etc*. that were inputted in the field, these points only include the following attribute information: picture number and path, direction of picture, and date.

Results

Geodatabase

A geodatabase with two feature data sets, one for Ifalik and one for Eauripik, was created. Each feature data set contains separate feature classes with wells, storage tanks, building footprints, and island outline. The latter two types were imported from another iREi project.

GPS locations

The locations recorded for different features are incorporated in the respective reports.

Hyperlinks

The recorded features can be displayed in ArcMap or other geospatial software. To activate the hyperlinks in ArcMap 10 (to open the linked photo just by clicking on the feature), the "Support Hyperlinks using field " in the Layer Properties must be checked and the "Path" field must be selected; in addition, the path to the folder must be specified in the Map Document Properties (File menu). After this initial setup, it is very easy to select a feature and see it's associated picture.

Maps

Several maps were created showing the location of the wells and storage tanks on Ifalik and Eauripik Atoll (see separate document). Maps have also been embedded in the other field reports.

Geo-tagged pictures

The geo-tagged pictures were displayed in ArcMap. It turns out that the location was not very accurately recorded. Many features were generally between 20-80 meters off, making it too difficult or impossible to match the pictures to actual households. To avoid confusion only the pictures but not the shapefile with highly inaccurate locations is included in the data package. Also, an extensive

and more accurate geo-tagged photo documentation was done by Danko Taborosǐ; he used a GPS logger and later linked the photos to the GPS location.
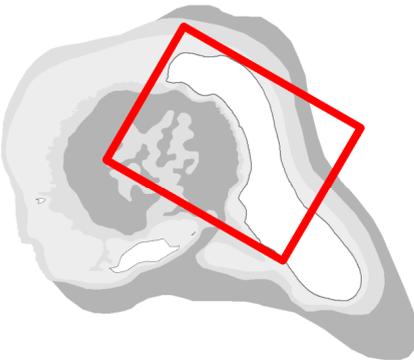
<u>General Remarks</u>

The unit 's capability to take and store pictures along with a way point proved very useful, especially in verifying information later, *e.g.* comparing IDs from the other surveys. Without the pictures some mismatches would not have been solved otherwise. In addition, it was very helpful to have the data dictionary and background imagery in the field but also for in respect to post-processing. To have two different feature types for well and storage tank saved time recording the feature in the field but also allowed to easily export the two feature types separately as different shapefiles alter. It was also good to have already separate fields to add information such as material of the feature and other comments. If only one field would have been available to add all the information (the default without a data dictionary), then the post-processing would have been more time-consuming as well. Therefore, it is highly recommended using GPS units with camera and data dictionary functions for all future field inventories.

In general, two GPS units of the same model would be recommended for similar studies if funding allows (Note: we did have two smaller hand-held Garmin units as backups). This way, each team (well and RWCS) can have their own unit and features would less likely be missed as a problem of running back and forth to cover all wells and storage tanks. In addition, having two units also allows having a backup in case one fails to work.
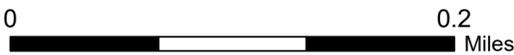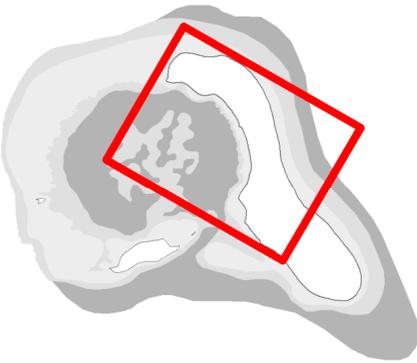
Ifalik Atoll

0   0.4
                Miles

20114 WorldView2 Imagery by Digital Globe

Map created by Maria Kottermair (iREi)

September 2015

Ifalik Atoll

Structures

- Other
- Church
- Community house
- School
- Early childhood education
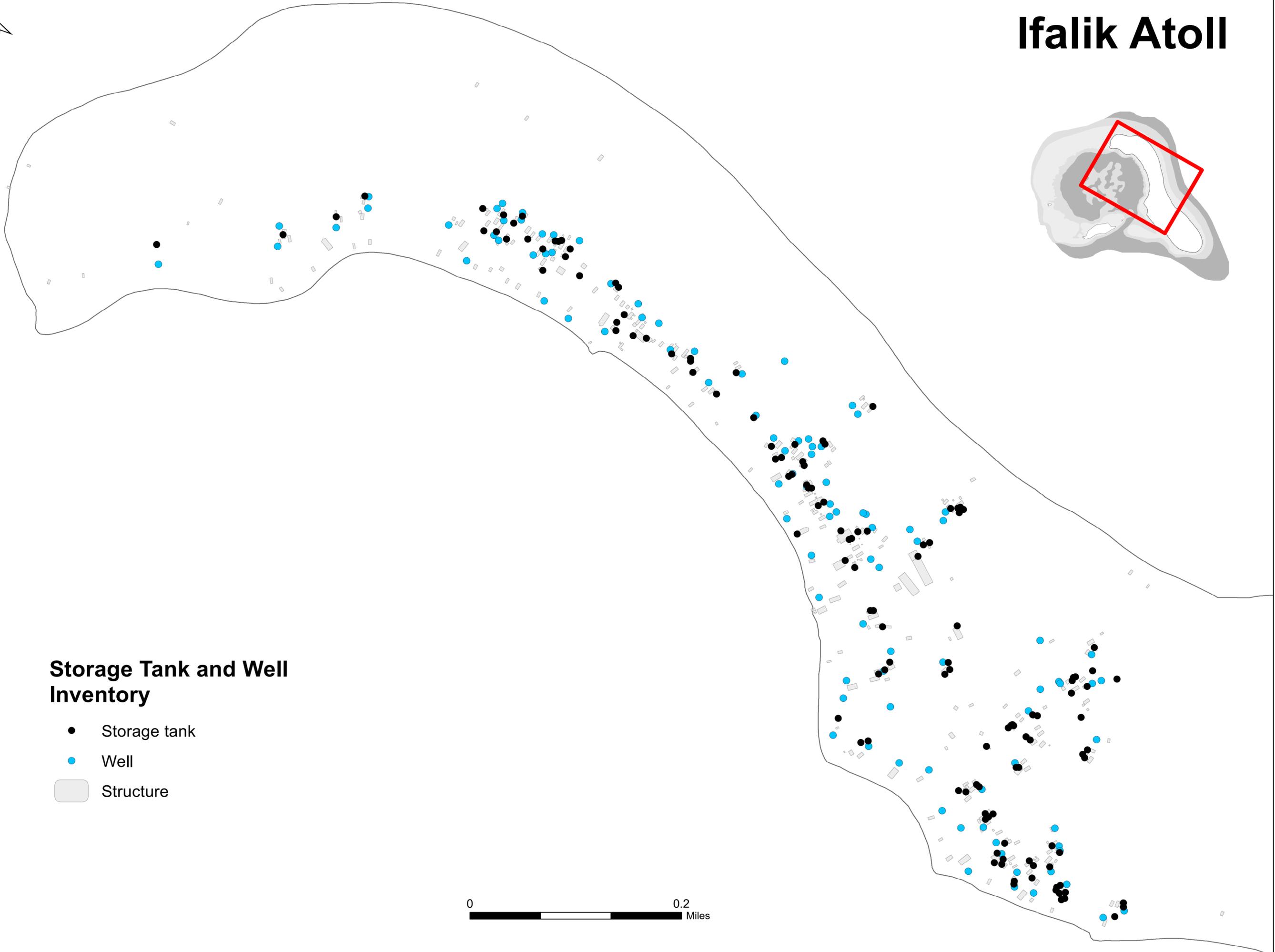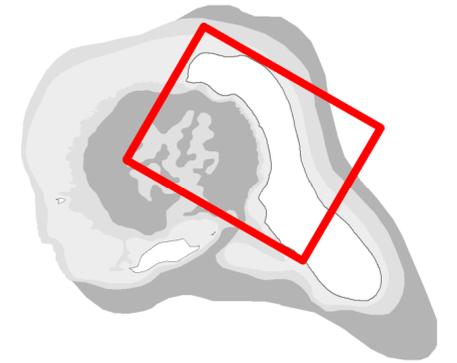- Dispensary

0   0.2
Miles

Ifalik Atoll

**Storage Tank and Well
Inventory**

- ● Storage tank
- ● Well
- ▢ Other
- ▢ Church
- ▢ Community house
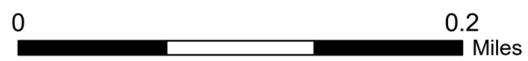- ▢ School
- ▢ Early childhood education
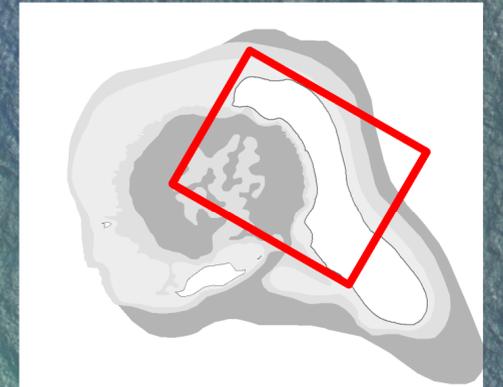- ▢ Dispensary

0   0.2
Miles

Ifalik Atoll

**Storage Tank and Well
Inventory**

- ● Storage tank
- ● Well
- ▭ Structure

0   0.2
Miles

Ifalik Atoll

Structures
- Other
- Church
- Community house
- School
- Early childhood education
- Dispensary

0   0.2
                     Miles

20114 WorldView2 Imagery by Digital Globe

Map created by Maria Kottermair (iREi)   September 2015
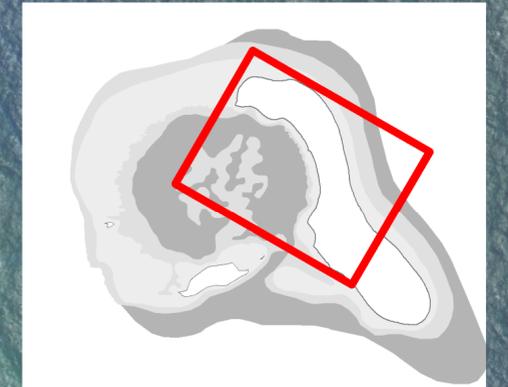
Ifalik Atoll

Storage Tank and Well Inventory

- ● Storage tank
- ● Well
- ▬ Other
- ▬ Church
- ▬ Community house
- ▬ School
- ▬ Early childhood education
- ▬ Dispensary

0   0.2
Miles

20114 WorldView2 Imagery by Digital Globe

Map created by Maria Kottermair (iREi)

September 2015

Ifalik Atoll

Storage Tank Inventory

- • Storage tank
- ▢ Other
- ▢ Church
- ▢ Community house
- ▢ School
- ▢ Early childhood education
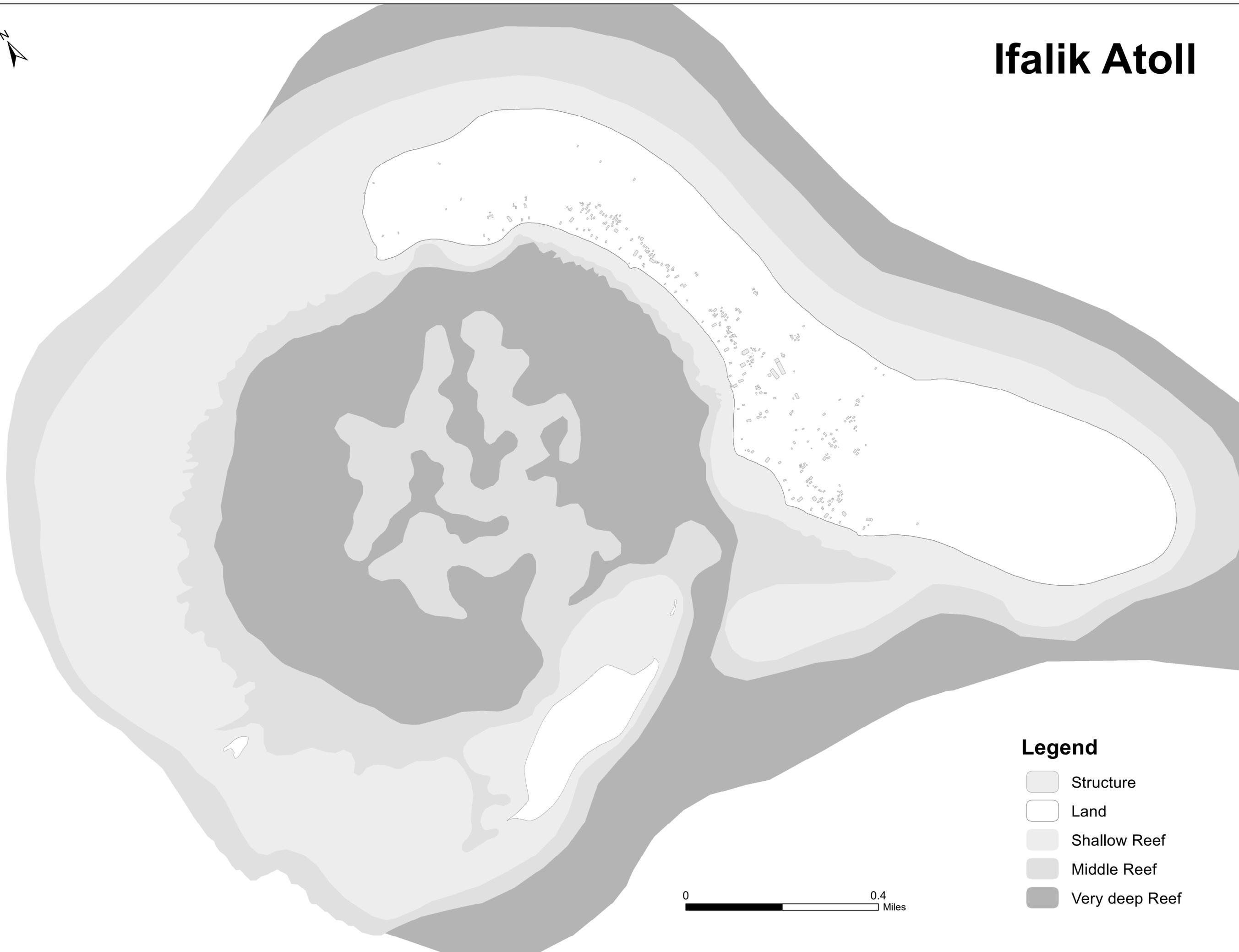- ▢ Dispensary

0   0.2 Miles

Ifalik Atoll

Well Inventory

- 🔵 Well
- ⬜ Other
- 🟨 Church
- 🟪 Community house
- 🟧 School
- 🟪 Early childhood education
- 🟦 Dispensary

0   0.2   Miles

Ifalik Atoll

Legend

- Structure
- Land
- Shallow Reef
- Middle Reef
- Very deep Reef

0   0.4

Miles