DO CANALS IN THE FLORIDA KEYS IMPACT NEARSHORE WATER QUALITY?
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WHY IS NEAR SHORE WATER QUALITY IMPORTANT?

- Near shore habitats are connected to off shore reefs and protected marine resources.
- Healthy near shore waters are important to human health and coastal residents
- Healthy near shore waters are valued by residents and tourists

STRATEGIES TO ADDRESS THIS QUESTION?

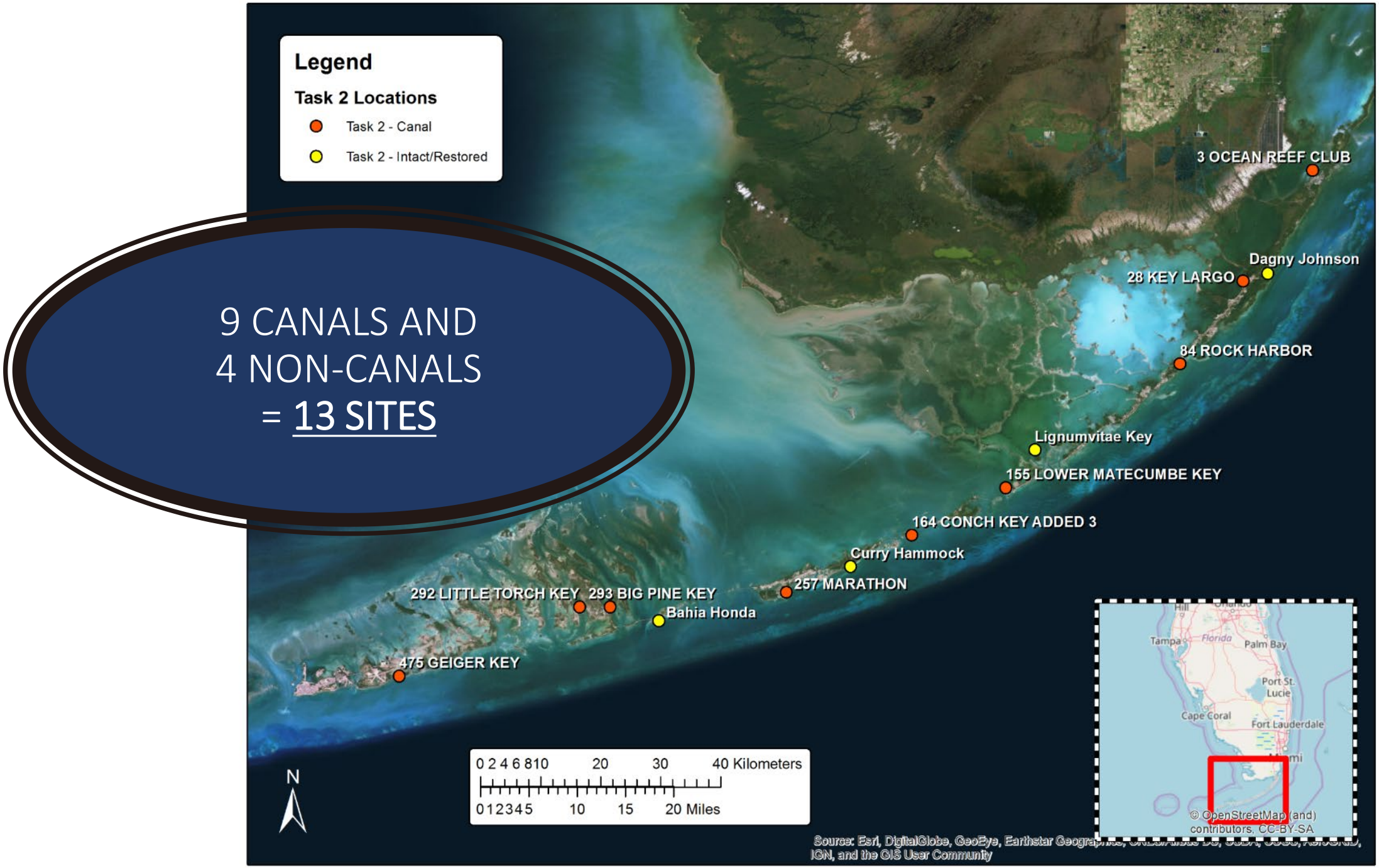
Look at CANALS and “NON-CANALS”

COLLECT SURFACE WATER QUALITY SAMPLES FROM STRATEGIC LOCATIONS FROM THE CANAL TO 500 m OFF SHORE

MEASURE WATER QUALITY QUARTERLY ON OUT-GOING TIDES

MEASURE WATER QUALITY AFTER EXTREME WEATHER EVENTS

LINK TRENDS IN WATER QUALITY WITH TRENDS IN BENTHIC (BOTTOM) DIVERSITY OF MARINE PLANTS AND ANIMALS


Legend
Task 2 Locations
Task 2 - Canal
Task 2 - Intact/Restored
3 OCEAN REEF CLUB
Dagny Johnson
28 KEY LARGO
84 ROCK HARBOR
Lignumvitae Key
155 LOWER MATECUMBE KEY
164 CONCH KEY ADDED 3
Curry Hammock
257 MARATHON
292 LITTLE TORCH KEY
293 BIG PINE KEY
Bahia Honda
475 GEIGER KEY
9 CANALS AND
4 NON-CANALS
= 13 SITES
0 2 4 6 8 10 20 30 40 Kilometers
0 1 2 3 4 5 10 15 20 Miles
N
Tampa
Florida
Palm Bay
Port St. Lucie
Cape Coral
Fort Lauderdale
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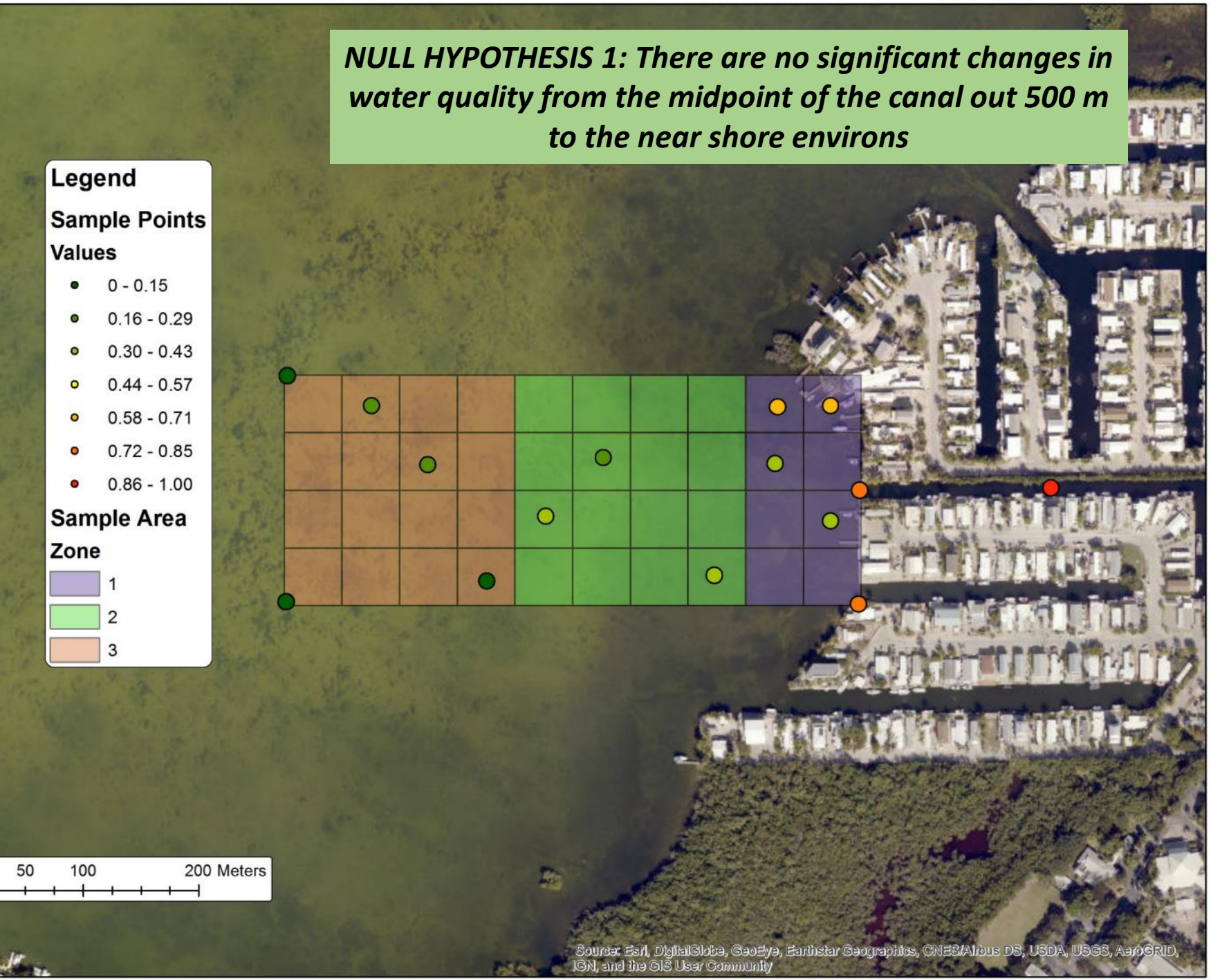
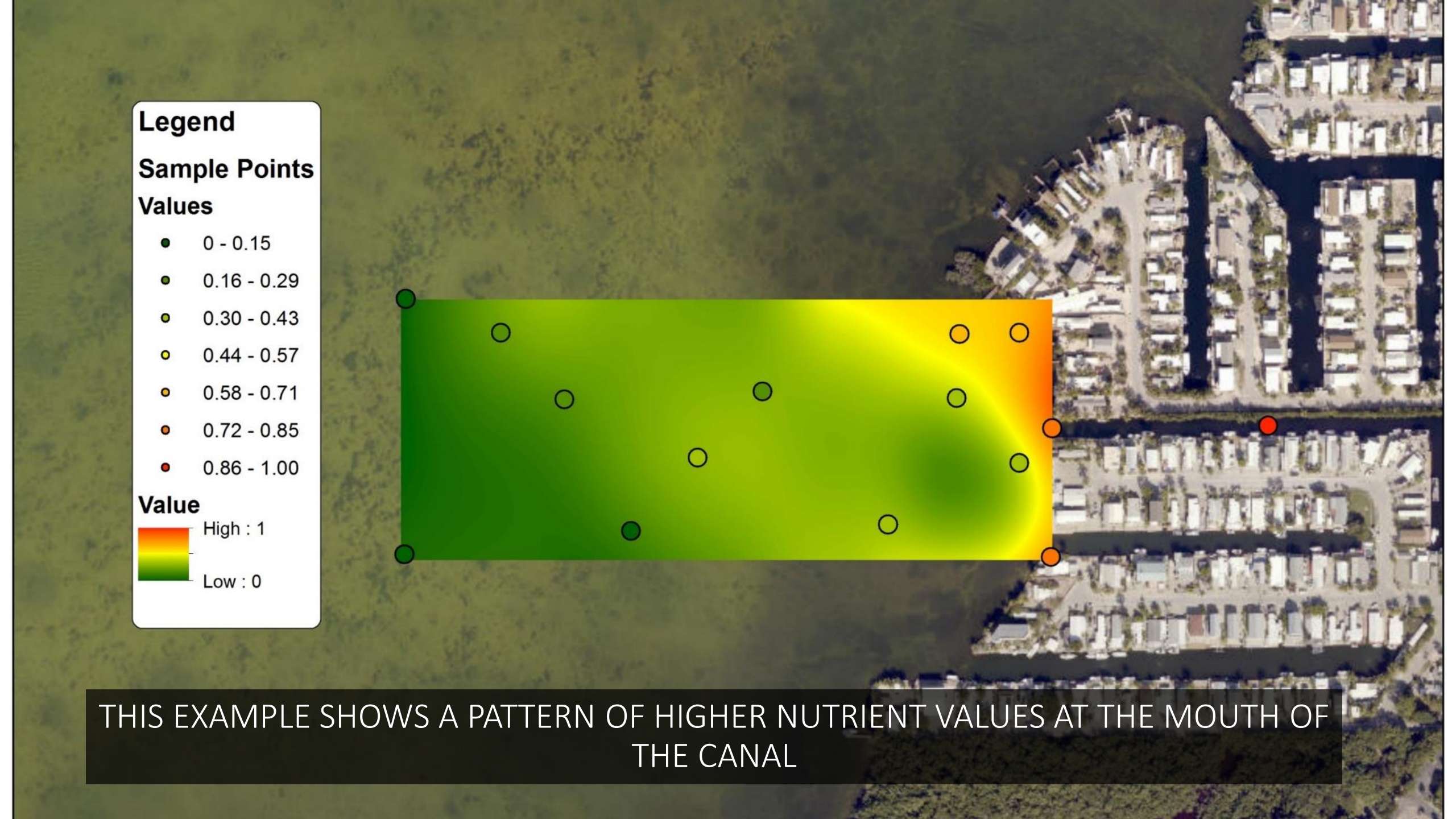
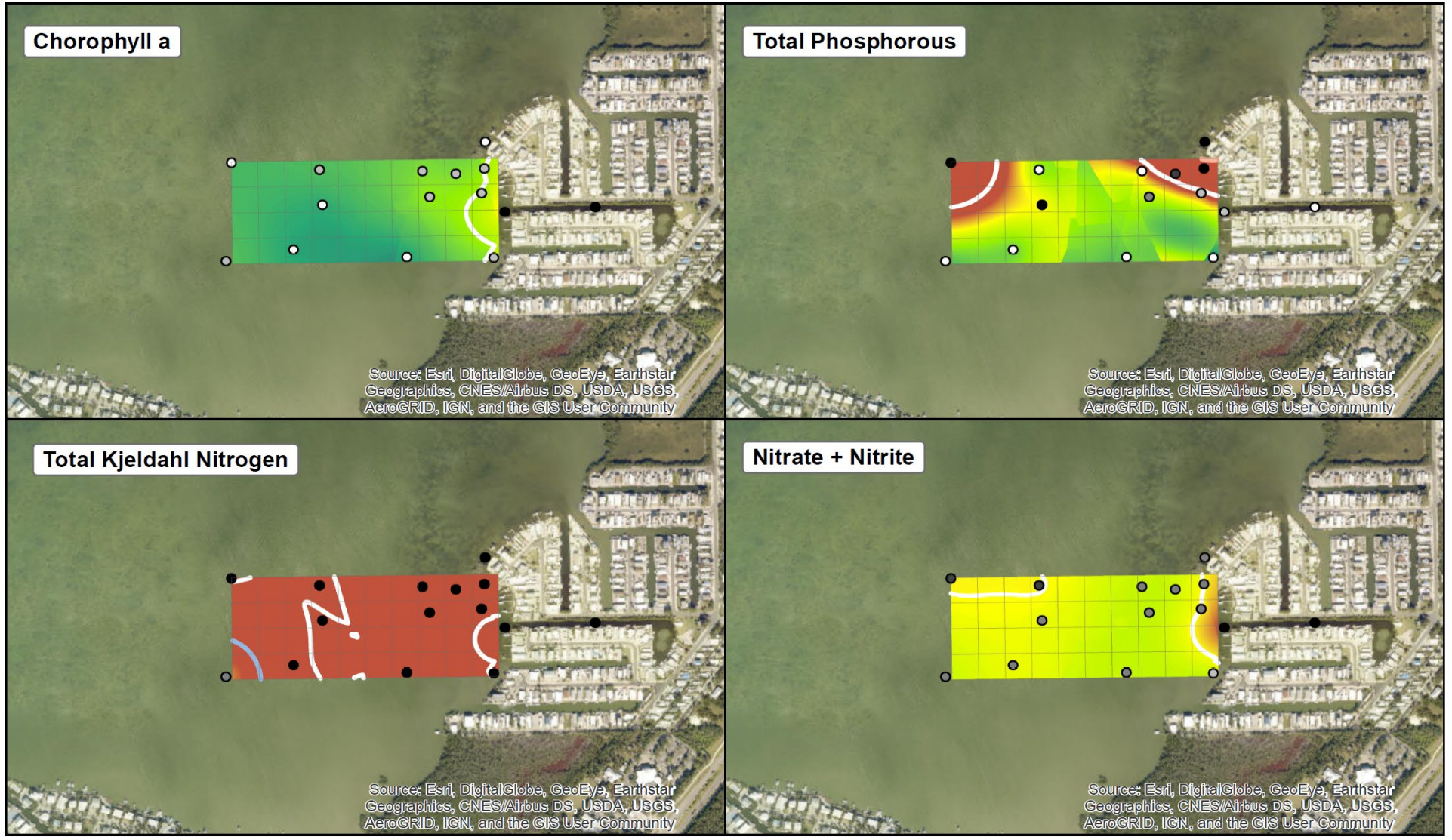
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

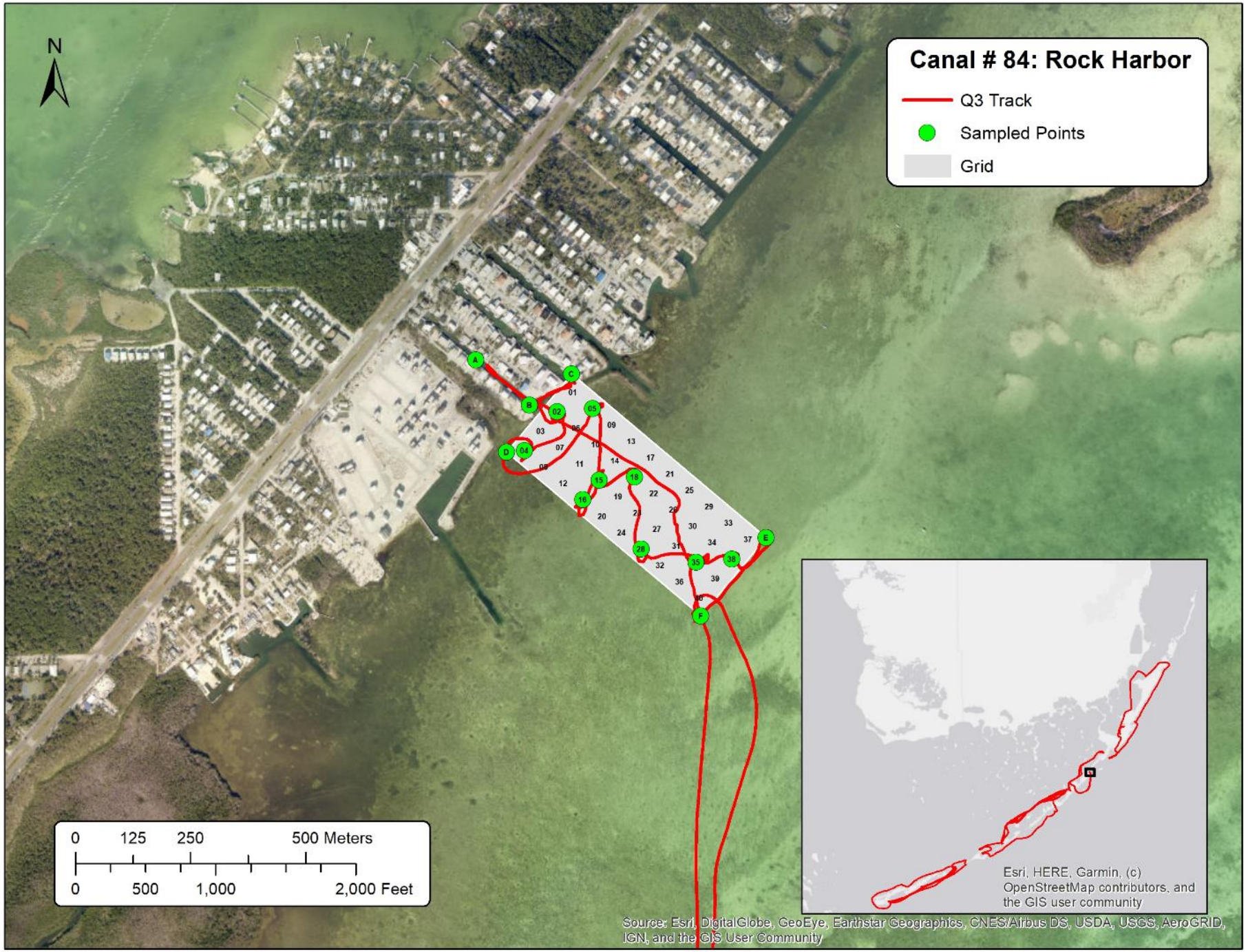


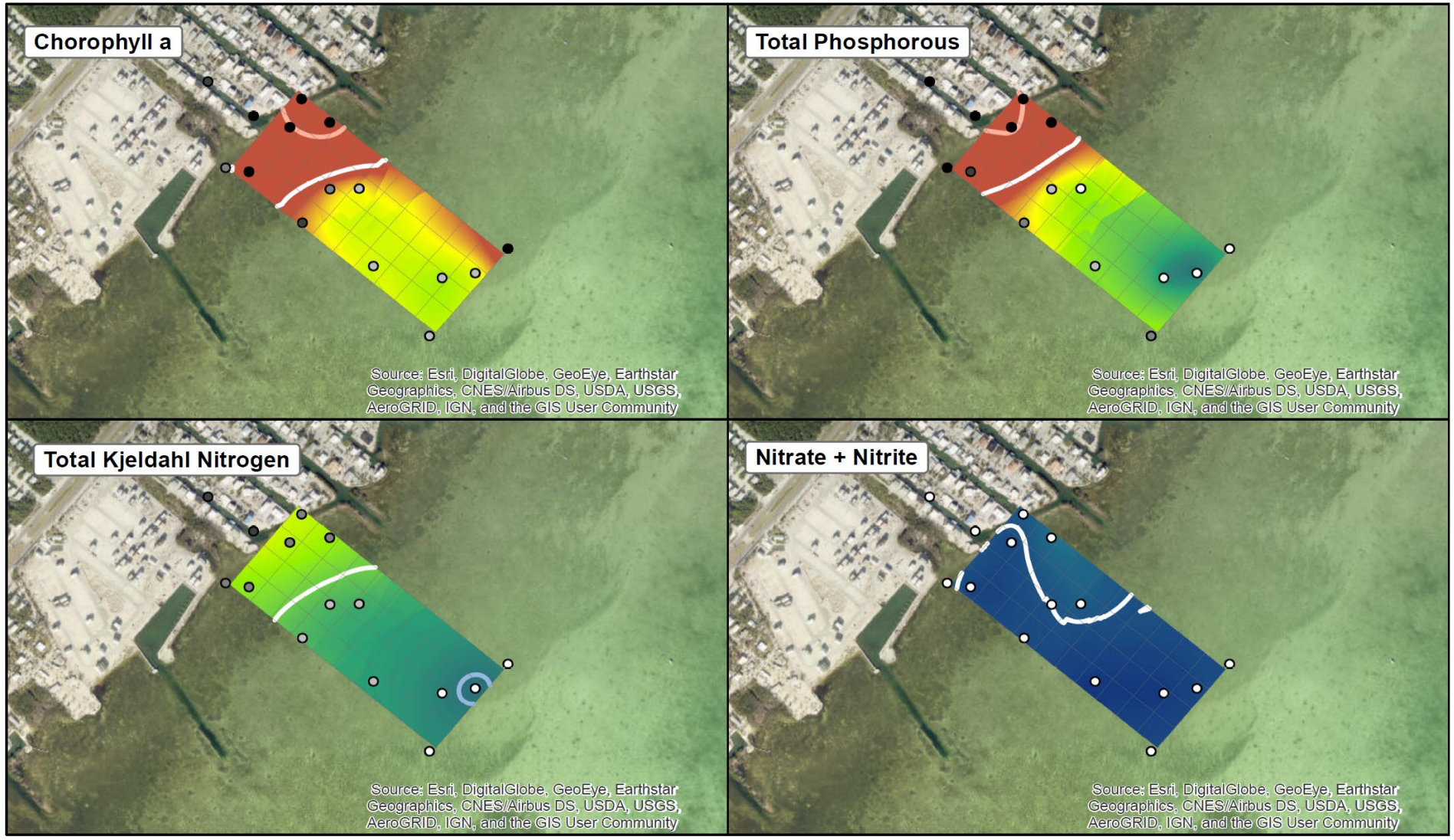
- ✓ RANDOMIZED BLOCK PATTERN OF SAMPLING (rather than transect)
- ✓ 15 STATIONS AT EACH CANAL SITE SAMPLED ON OUTGOING TIDES
- ✓ SAMPLES REPEATED QUARTERLY
- ✓ SAMPLES TAKEN AFTER AN “EXTREME EVENT”
- ✓ SAMPLES USED TO UNDERSTAND PATTERNS IN WATER QUALITY



THIS EXAMPLE SHOWS A PATTERN OF HIGHER NUTRIENT VALUES AT THE MOUTH OF THE CANAL


Chorophyll a
Total Phosphorous
Total Kjeldahl Nitrogen
Nitrate + Nitrite
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
High: Q3+1.5(IQR)
Median TMDL
Low: 0
Standard Deviations
3 2 1 0 -1 -2 -3
N
0 0.1 0.2 0.3 0.4 0.5 Miles
0 0.2 0.4 0.6 0.8 1 Kilometers
UB04 - Canal # 28 KEY LARGO


N
Canal # 84: Rock Harbor
Q3 Track
Sampled Points
Grid
0 125 250 500 Meters
0 500 1,000 2,000 Feet
Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community



High: Q3+1.5(IQR) Median TMDL Low: 0

Standard Deviations

3 2 1 0 -1 -2 -3

N

0 0.1 0.2 0.3 0.4 0.5 Miles

0 0.2 0.4 0.6 0.8 1 Kilometers

UA16 - Canal # 84 ROCK HARBOR

NULL HYPOTHESIS 2: There are no significant changes in benthic diversity with distance from the canal.

ASSUMPTIONS: Benthic Diversity is a function of Benthic Habitat, and Benthic diversity should mirror Water Quality patterns

N

Legend

Sample Area

Zone

1

2

3

Benthic Habitat

CONTINUOUS SEAGRASS

PATCHY (DISCONTINUOUS) SEAGRASS

HARDBOTTOM WITH SEAGRASS

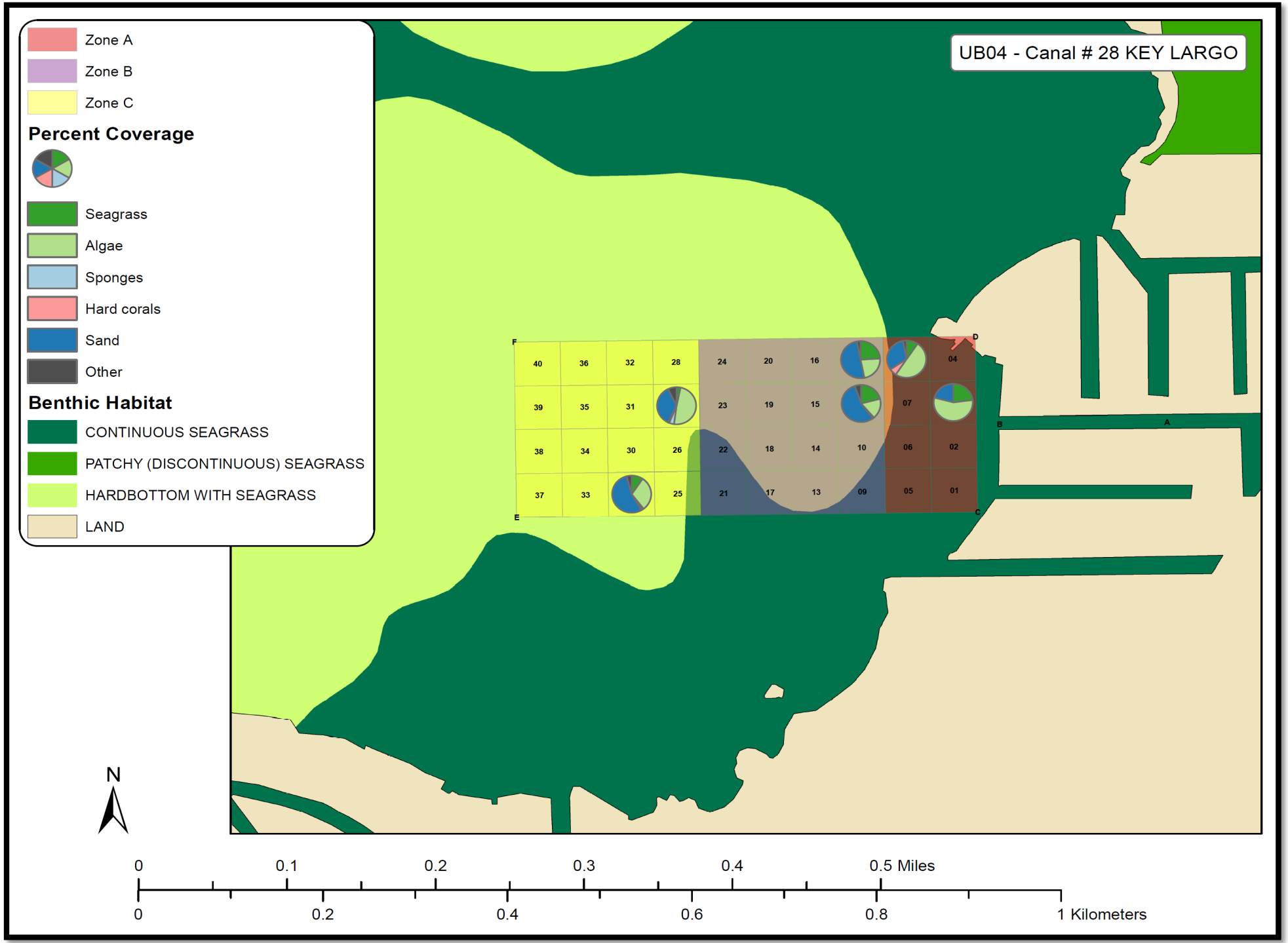
LAND

0 50 100 200 Meters

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

INVERTEBRATE EPIFAUNA

MARINE PLANTS (SAV)


Zone A
Zone B
Zone C
Percent Coverage
Seagrass
Algae
Sponges
Hard corals
Sand
Other
Benthic Habitat
CONTINUOUS SEAGRASS
PATCHY (DISCONTINUOUS) SEAGRASS
HARDBOTTOM WITH SEAGRASS
LAND
UB04 - Canal # 28 KEY LARGO
N
0 0.1 0.2 0.3 0.4 0.5 Miles
0 0.2 0.4 0.6 0.8 1 Kilometers

Questions?

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