

## **OBSERVATIONS OF SPAWNING CONDITION FISH IN THE ATLANTIC OCEAN OFF THE SOUTHEASTERN UNITED STATES**

*Farmer NA, Heyman WD, Karnauskas M, Kobara S, Smart T, Ballenger J, Reichert M, Wyanski D, Tishler MS, Lindeman KC, Sedberry G*

The following images show:

*Left Panel:* MARMAP/SEFIS/SEAMAP histological sampling (white X's) and positive observations of spawning condition females, by species, from 1990-2013.

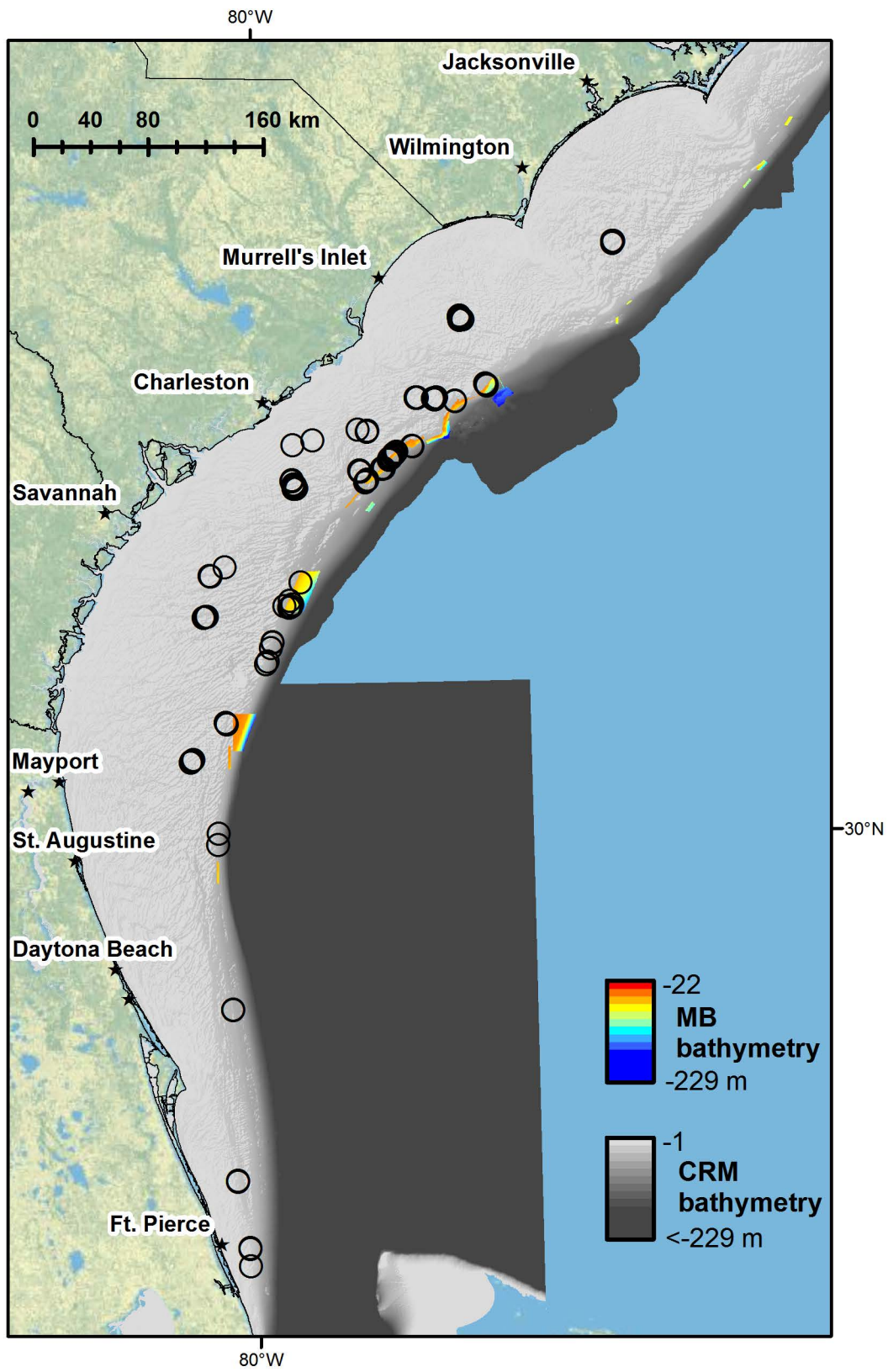
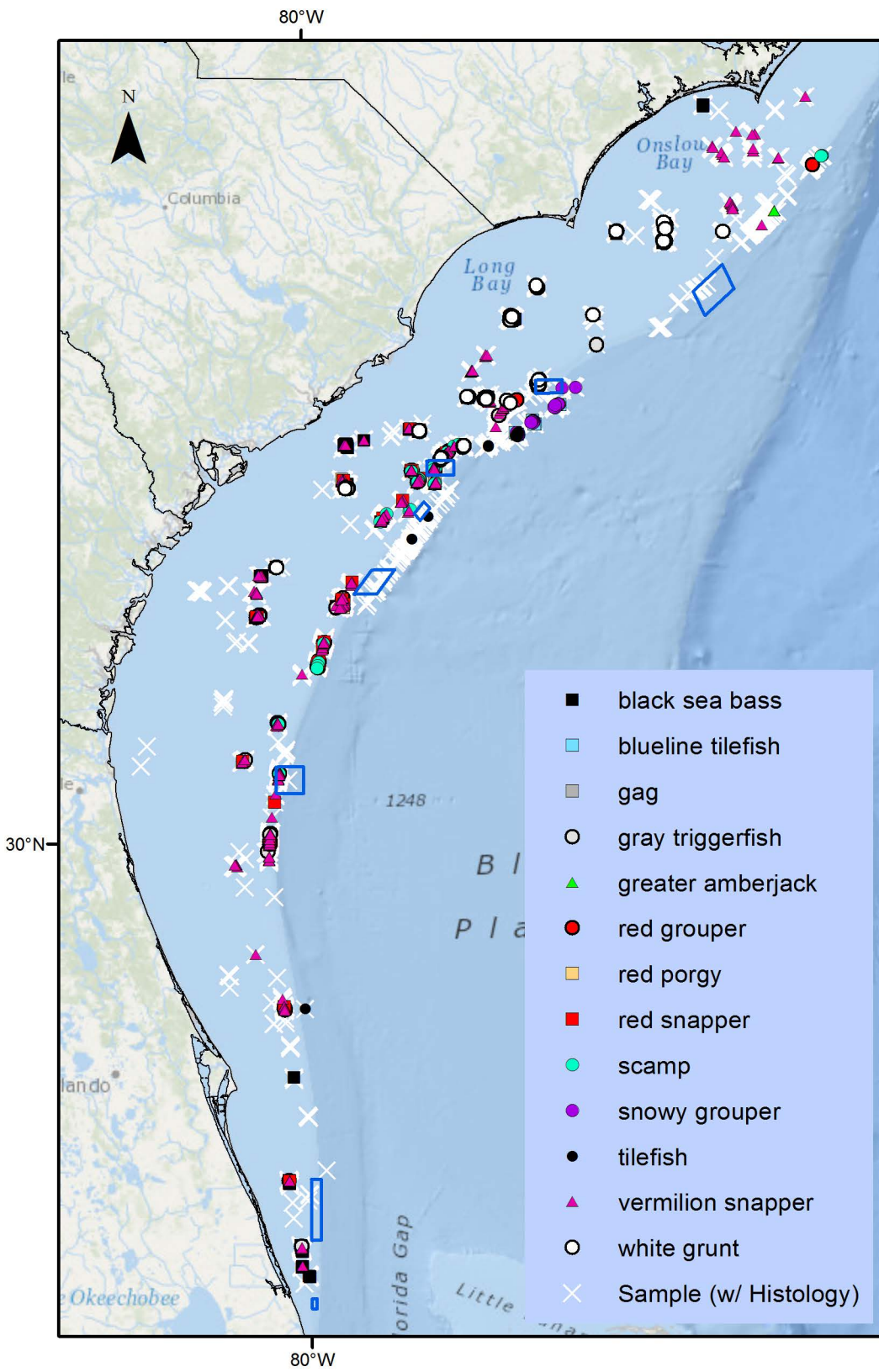
*Right Panel:* Sites with multiple species with females observed in spawning condition (i.e., 'multispecies spawning') overlaid on fine-scale (1-10 m resolution) multibeam ('MB') bathymetry and broad-scale (90 m resolution) NOAA Coastal Relief Model ('CRM') bathymetry.

### *Notes:*

Spawning condition females were defined based on histological sampling as within 48 hours of spawning or transitional if hermaphroditic. MARMAP/SEFIS/SEAMAP sampling is most intensive May-August. Data are aggregated over a 24 year period; thus, temporal patterns are obscured.

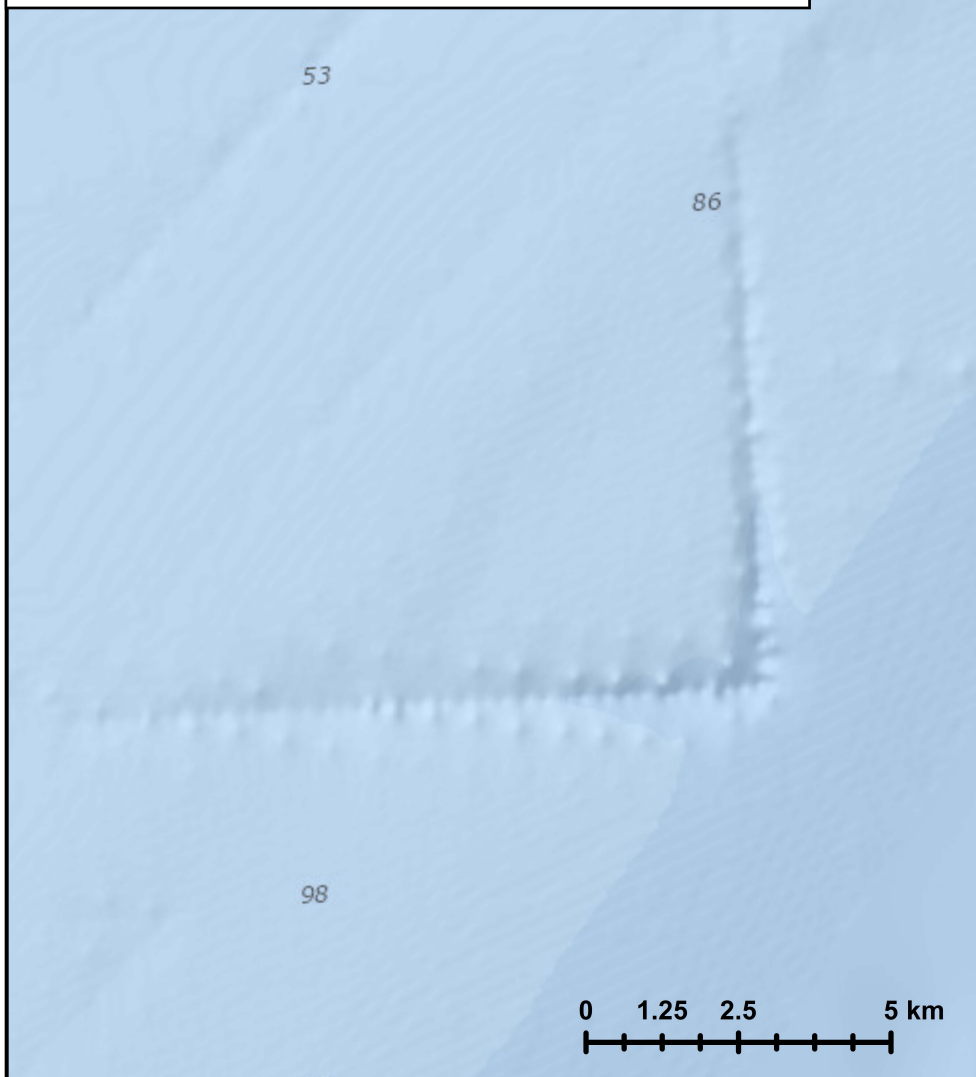
### Citation:

*Farmer NA, Heyman WD, Karnauskas M, Kobara S, Smart T, Ballenger J, Reichert M, Wyanski D, Tishler MS, Lindeman KC, Sedberry GR (in prep) Prediction and Verification of Reef Fish Spawning Sites in the Atlantic Ocean off the southeastern United States.*

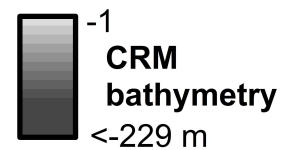
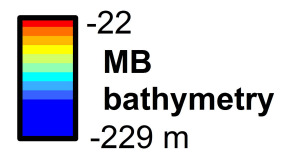


## MARMAP Observed Spawning Condition

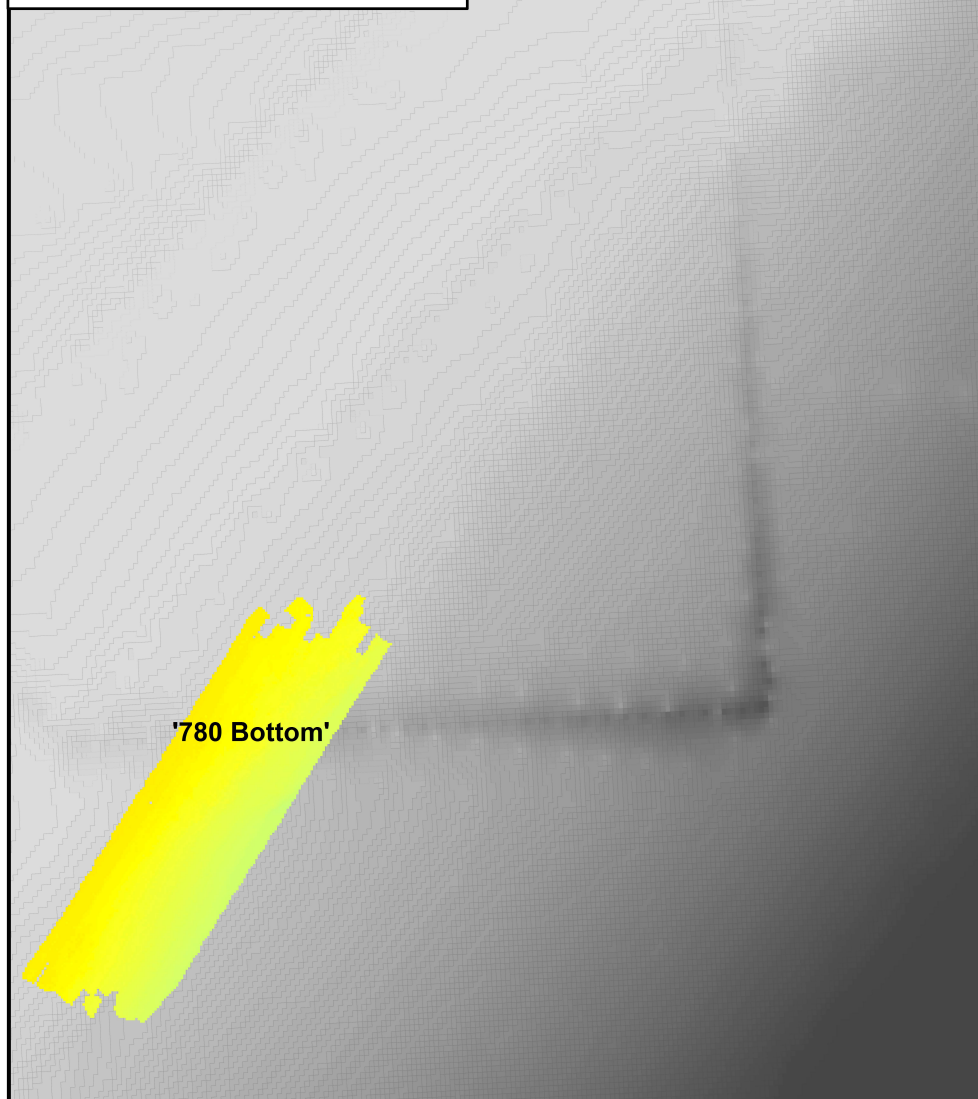
- |                     |                         |
|---------------------|-------------------------|
| ■ black sea bass    | ■ red snapper           |
| ■ blueline tilefish | ● scamp                 |
| ■ gag               | ● snowy grouper         |
| ○ gray triggerfish  | ● tilefish              |
| ▲ greater amberjack | ▲ vermilion snapper     |
| ● red grouper       | ○ white grunt           |
| ■ red porgy         | X Sample (w/ Histology) |



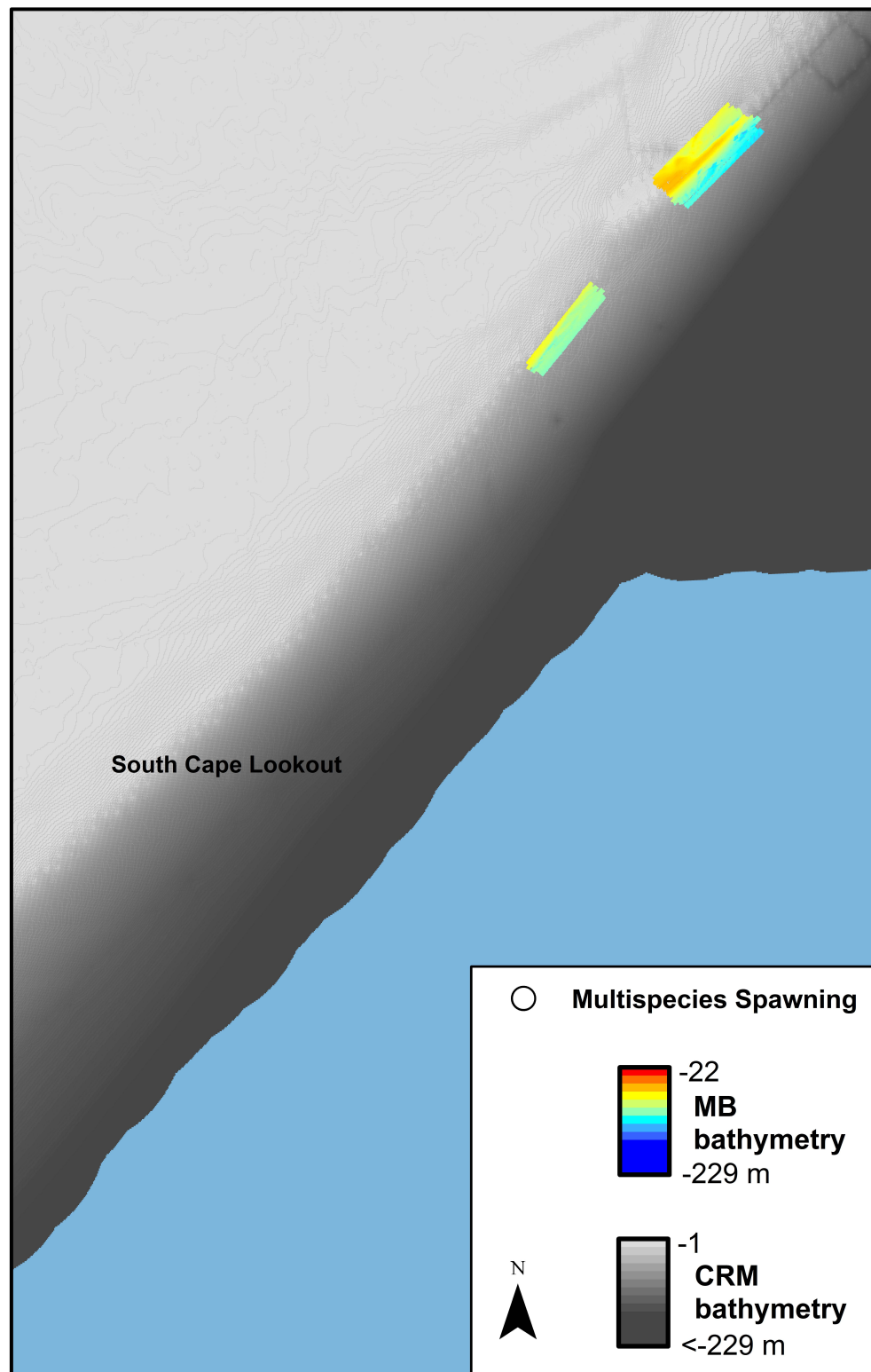
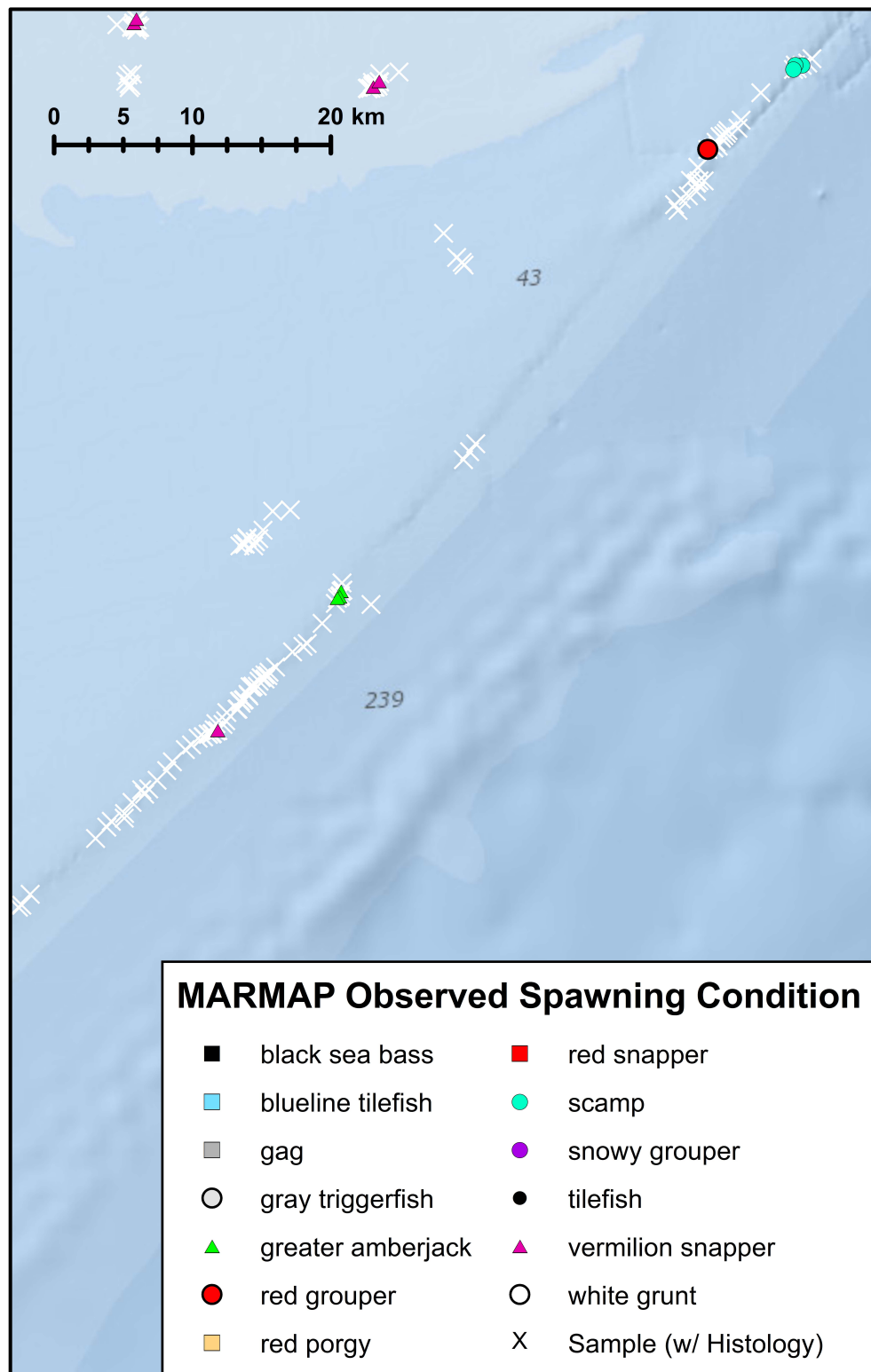
## Multispecies Spawning



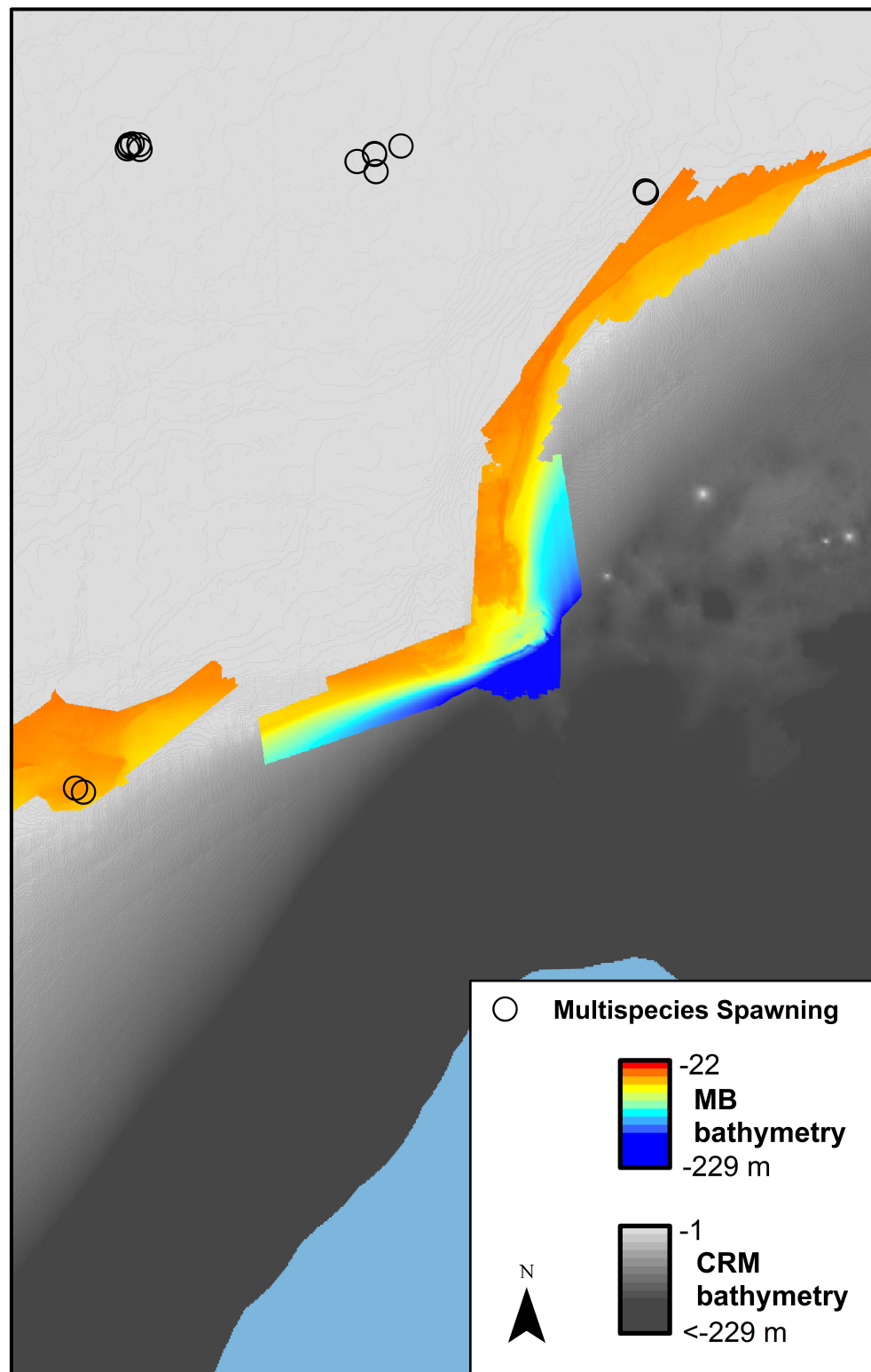
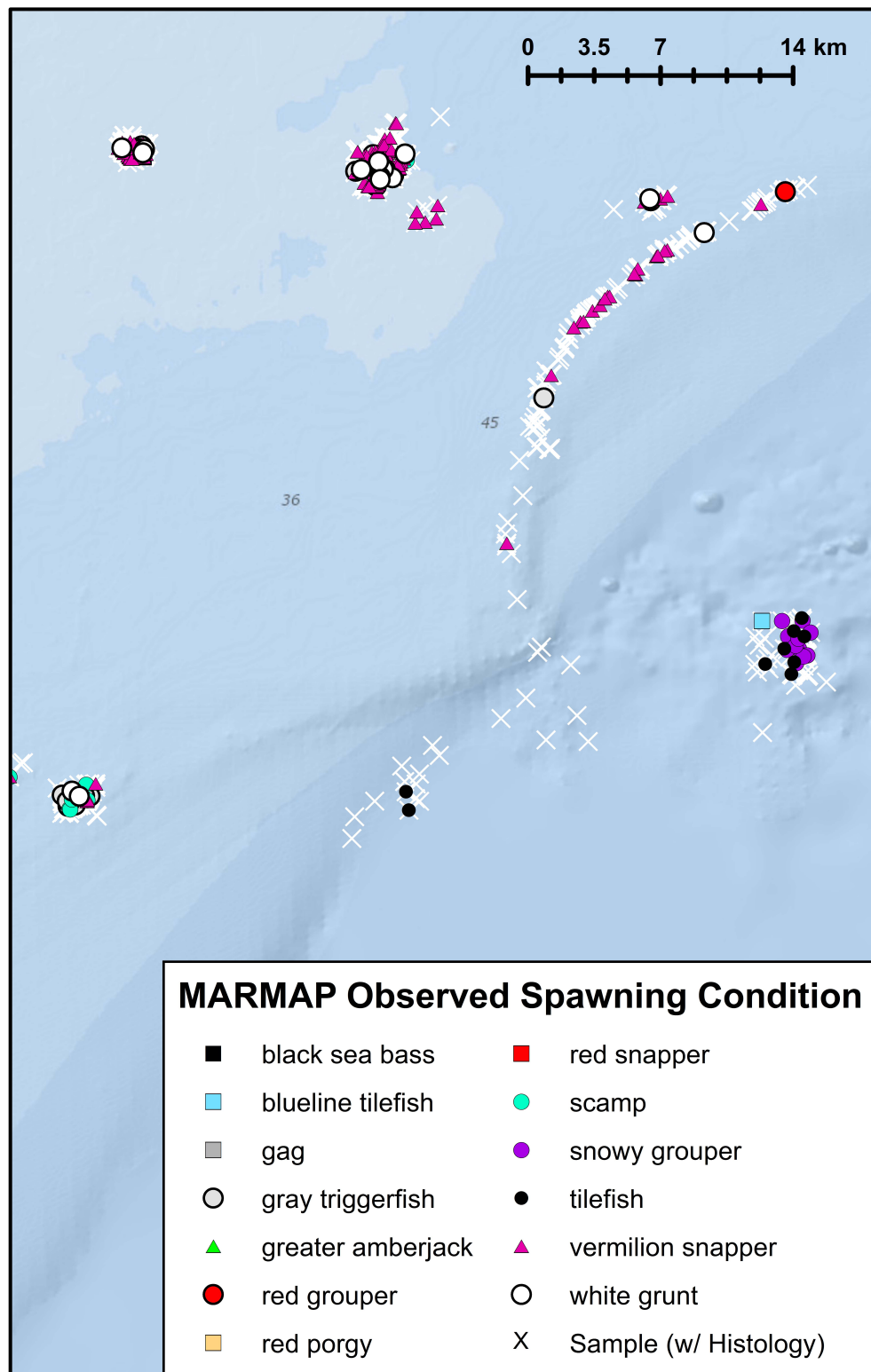
Malchase  
Wreck

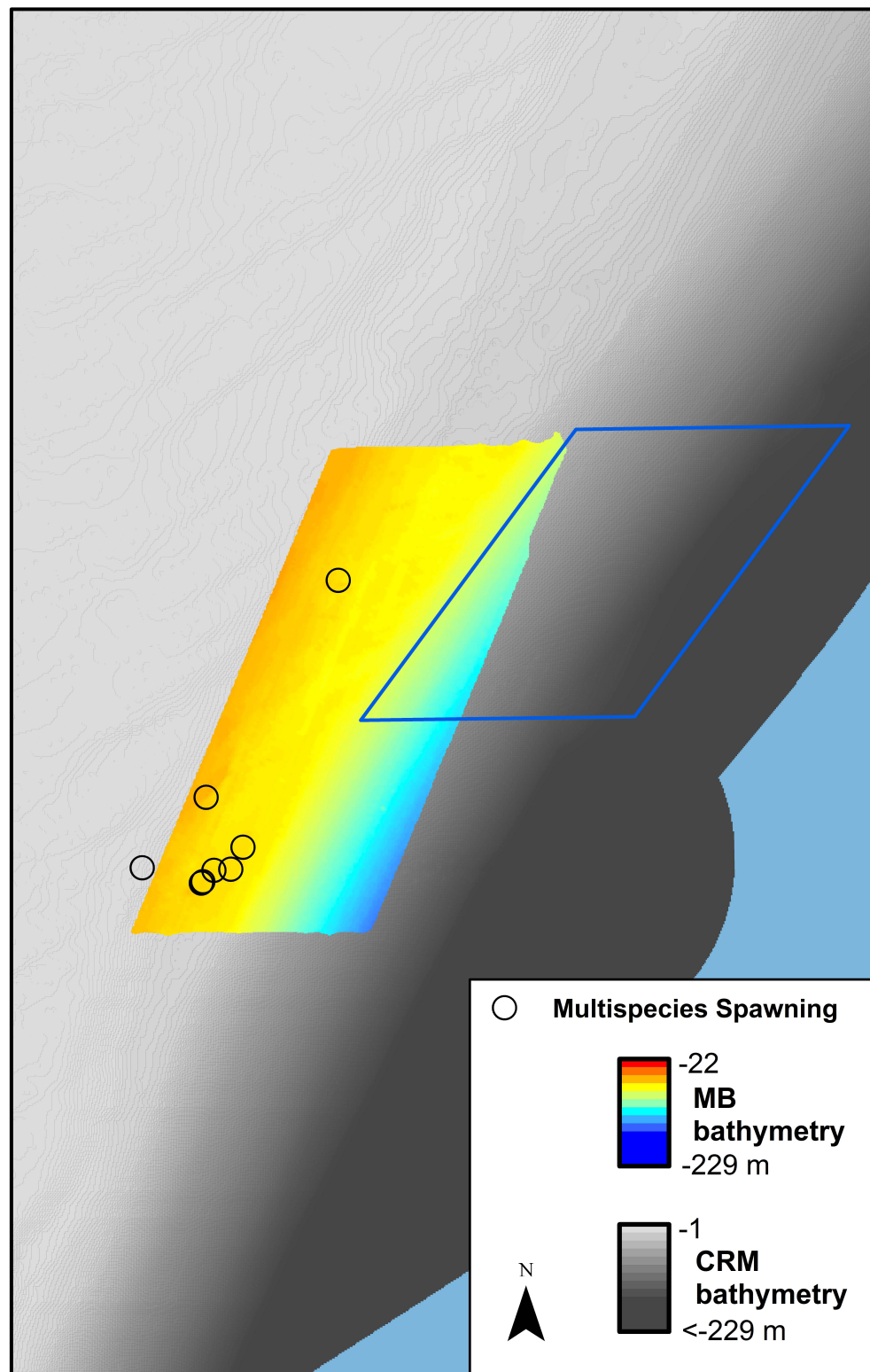
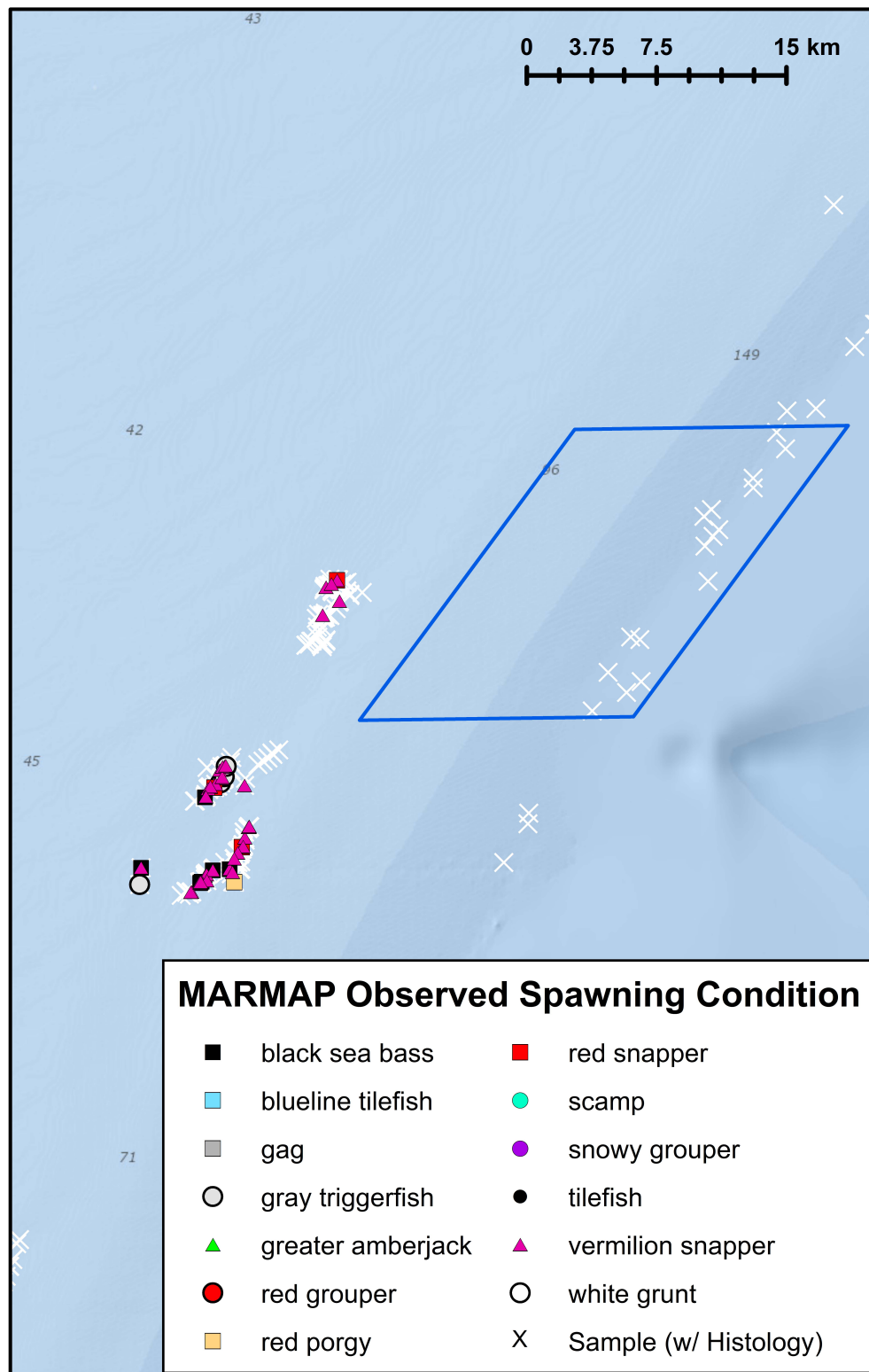


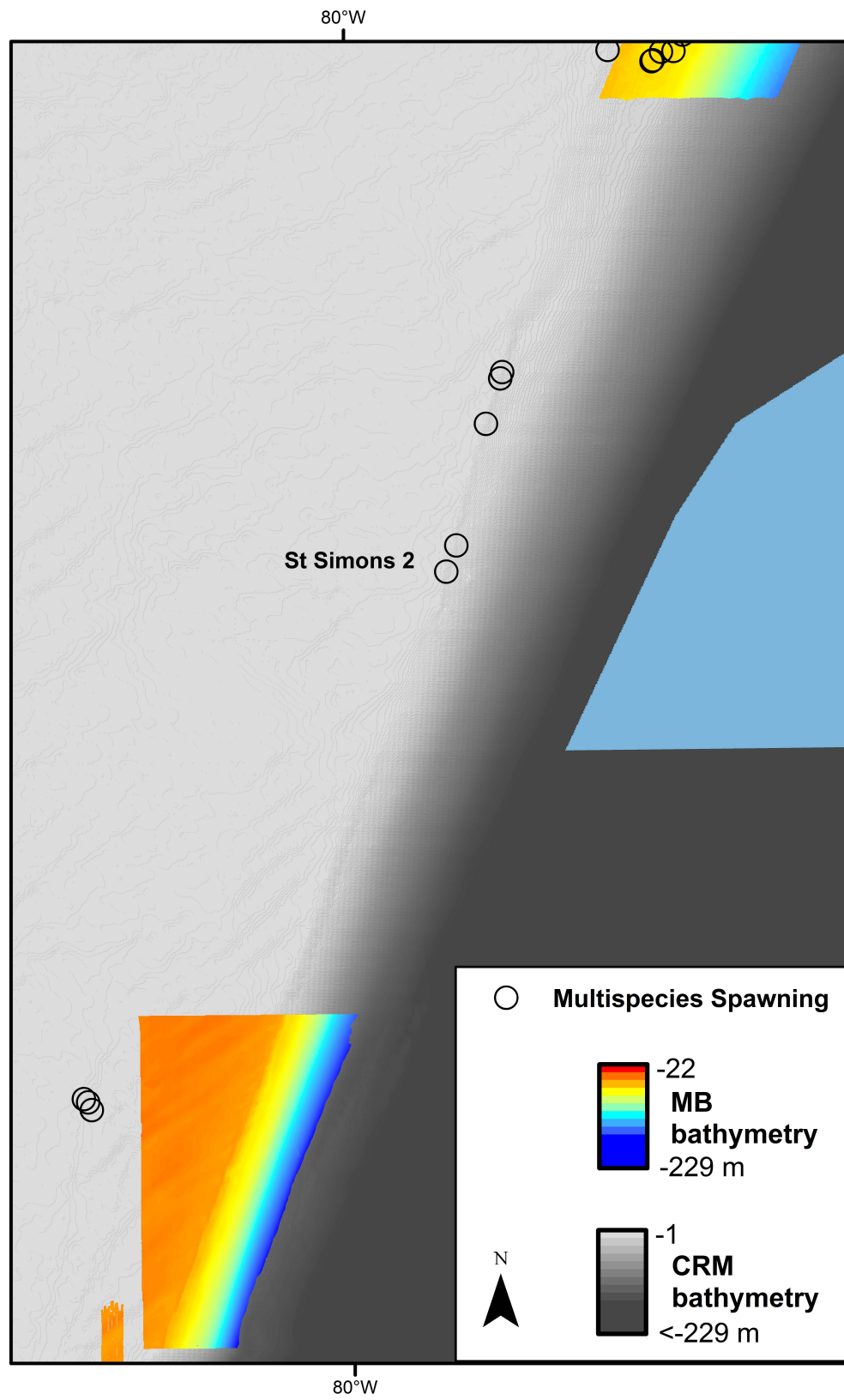
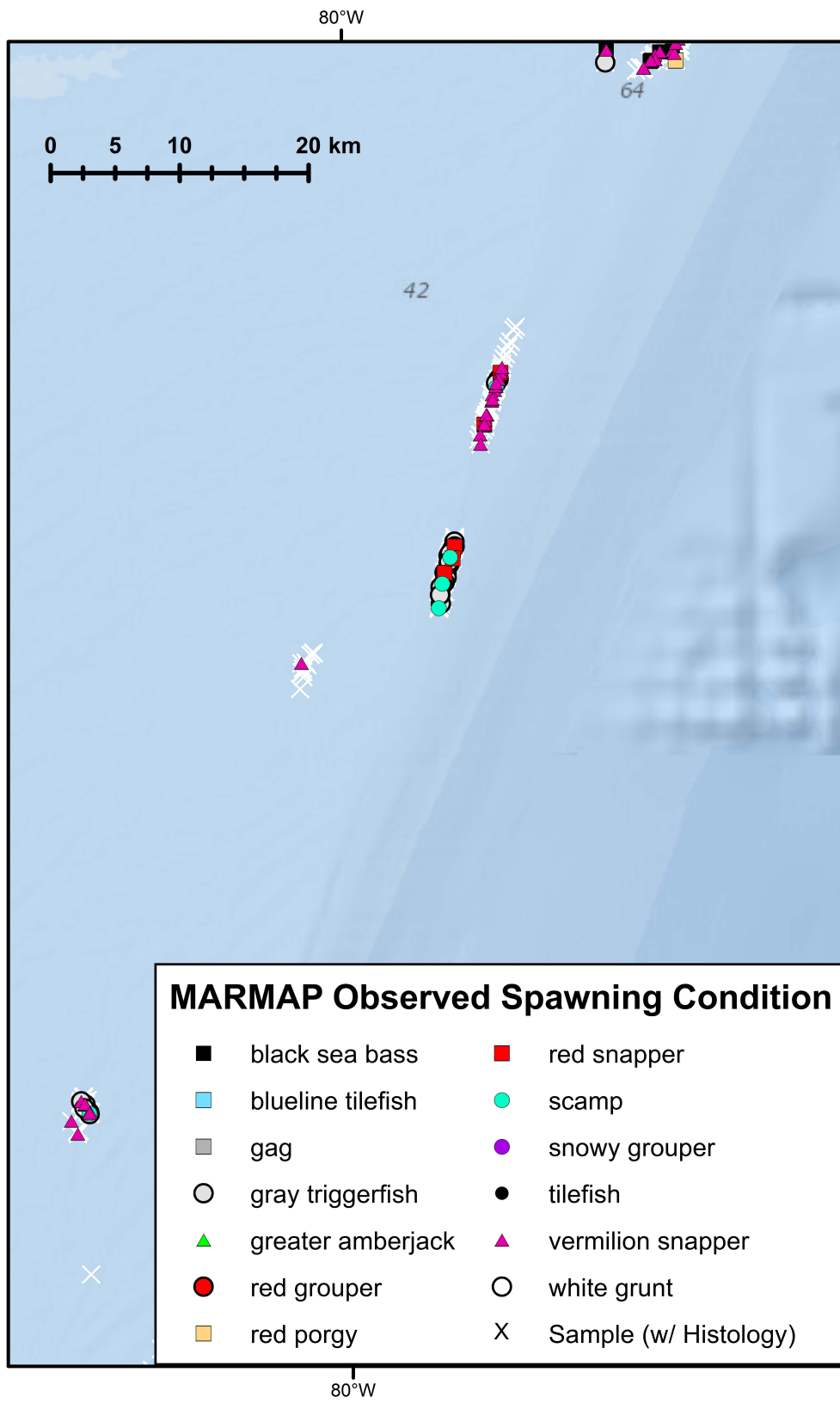










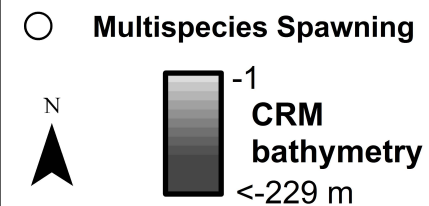




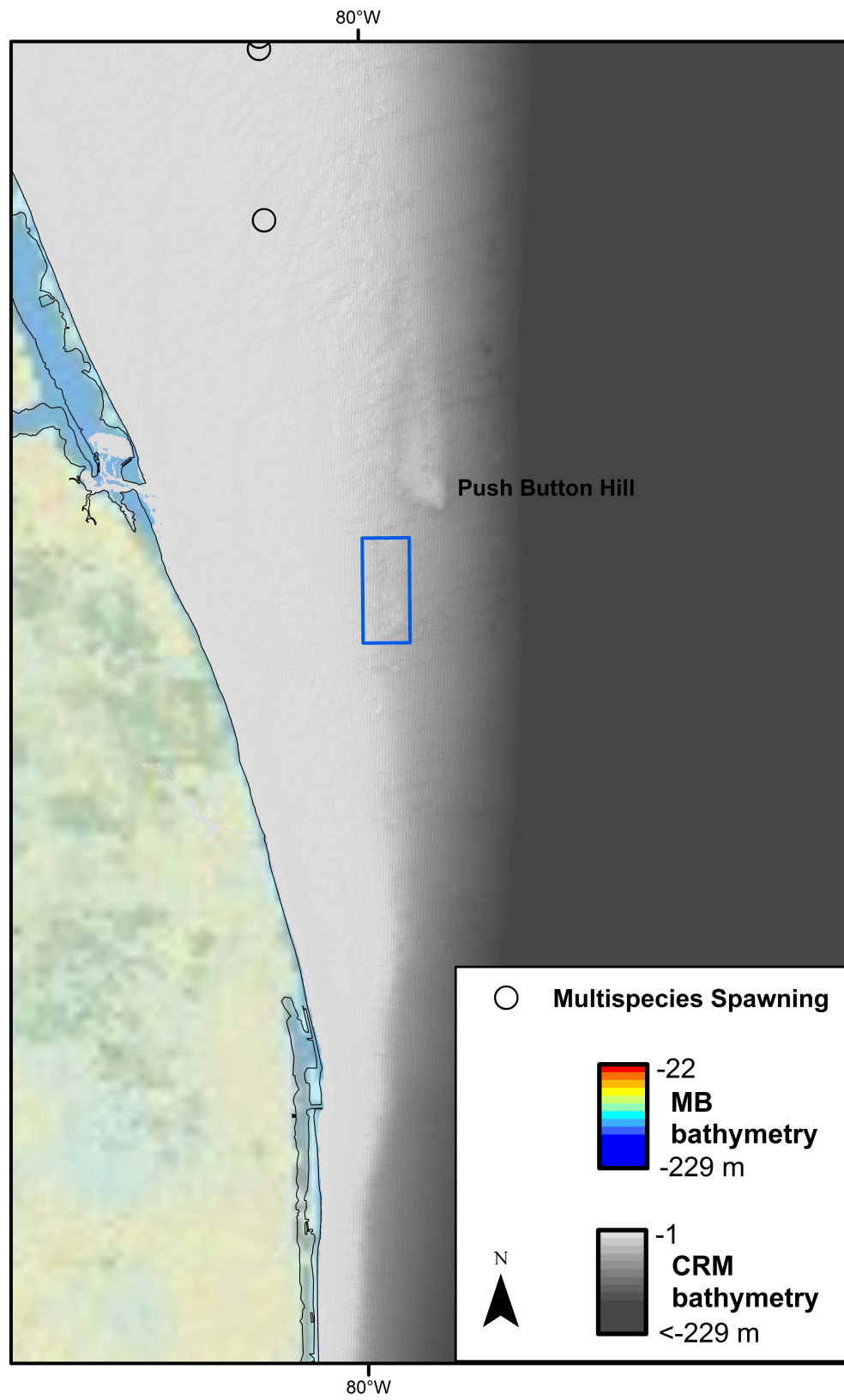
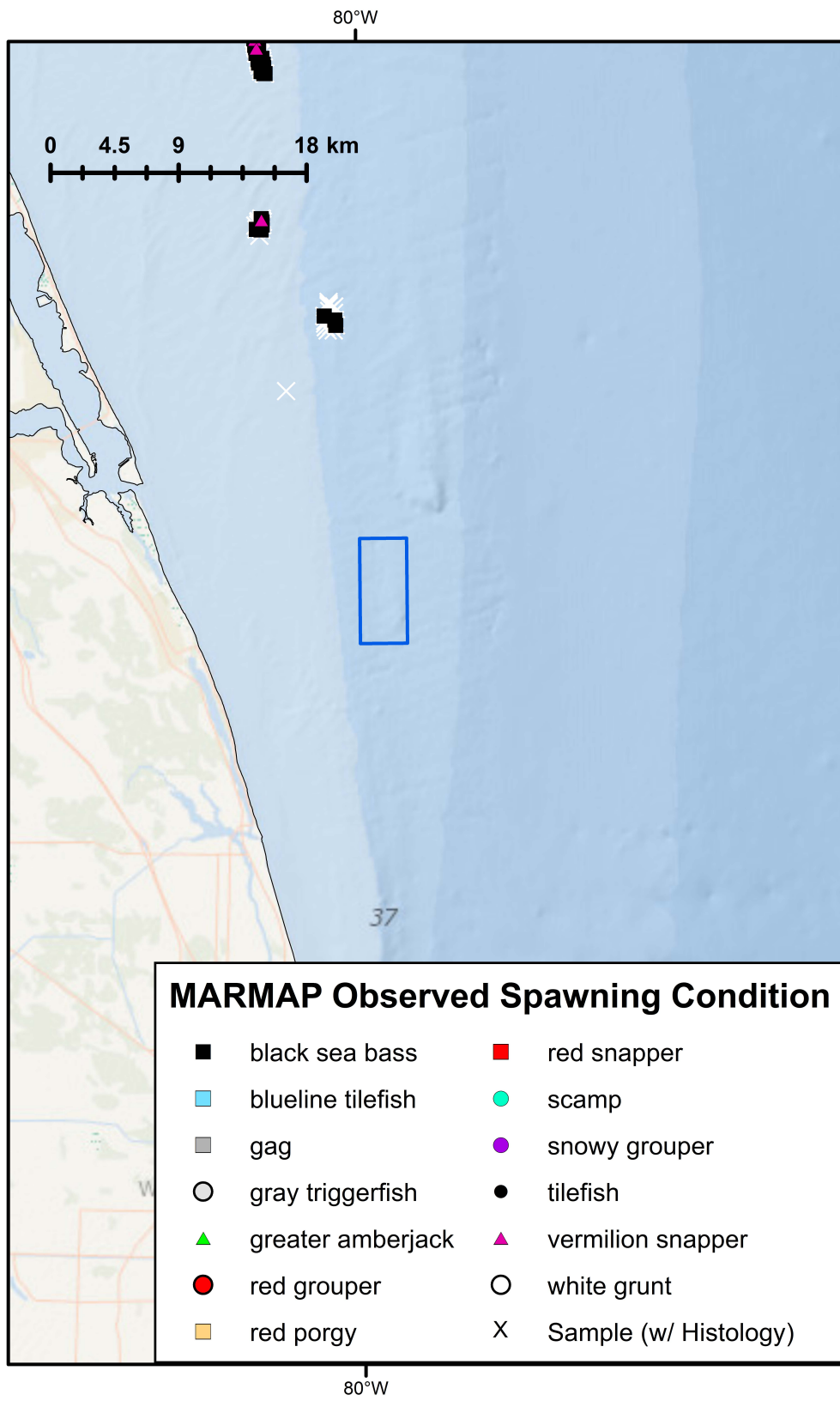
## MARMAP Observed Spawning Condition

- |                     |                         |
|---------------------|-------------------------|
| ■ black sea bass    | ■ red snapper           |
| ■ blueline tilefish | ● scamp                 |
| ■ gag               | ● snowy grouper         |
| ○ gray triggerfish  | ● tilefish              |
| ▲ greater amberjack | ▲ vermilion snapper     |
| ● red grouper       | ○ white grunt           |
| ■ red porgy         | X Sample (w/ Histology) |

0 0.5 1 2 km



Daytona  
Steeple



0 0.5 1 2 km

67

73

### MARMAP Observed Spawning Condition

- |                     |                         |
|---------------------|-------------------------|
| ■ black sea bass    | ■ red snapper           |
| ■ blueline tilefish | ● scamp                 |
| ■ gag               | ● snowy grouper         |
| ○ gray triggerfish  | ● tilefish              |
| ▲ greater amberjack | ▲ vermilion snapper     |
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