Lophelia II: Habitat Associations of Corals and Megafauna Use of Seafloor Photomosaics

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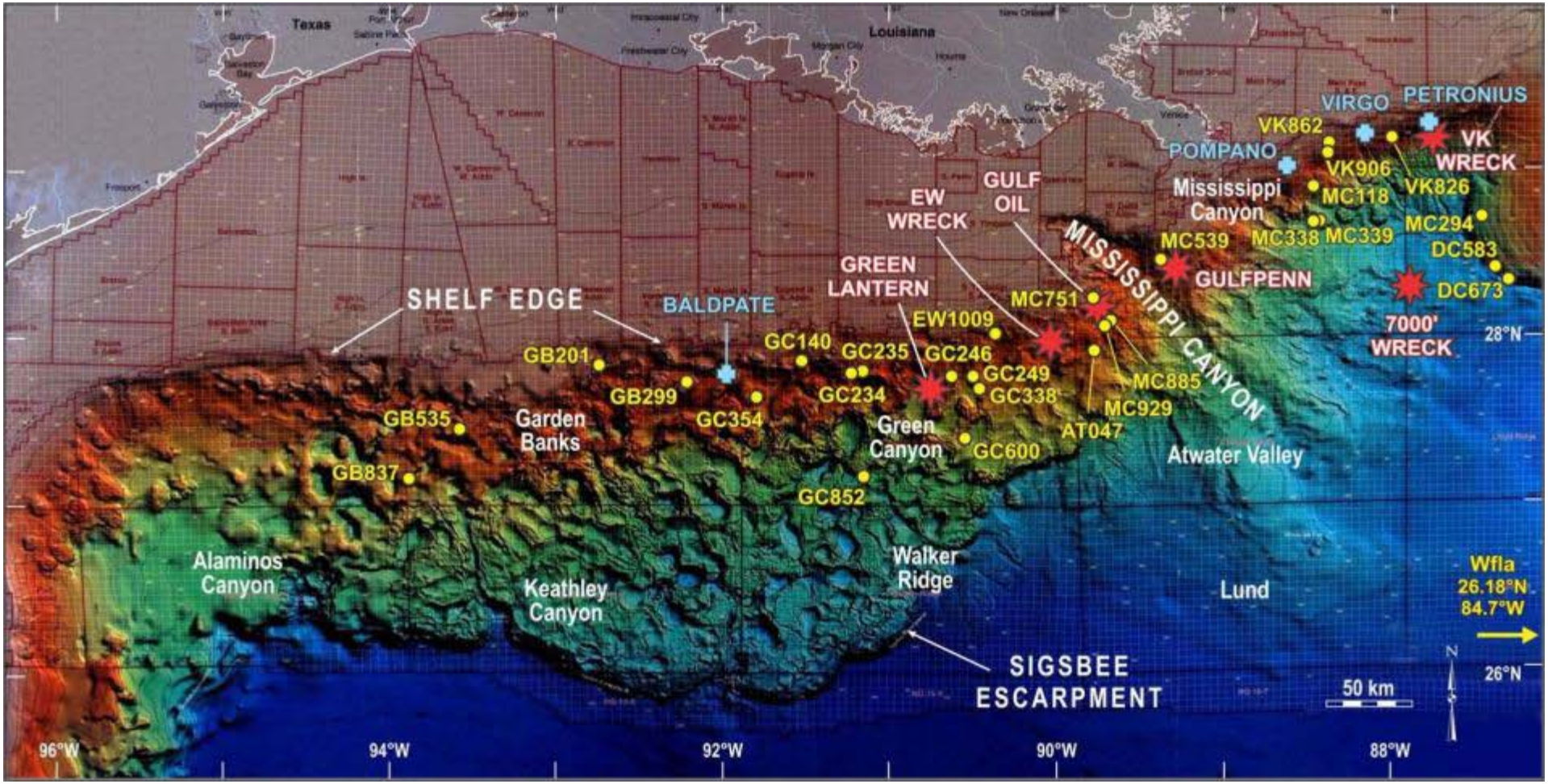
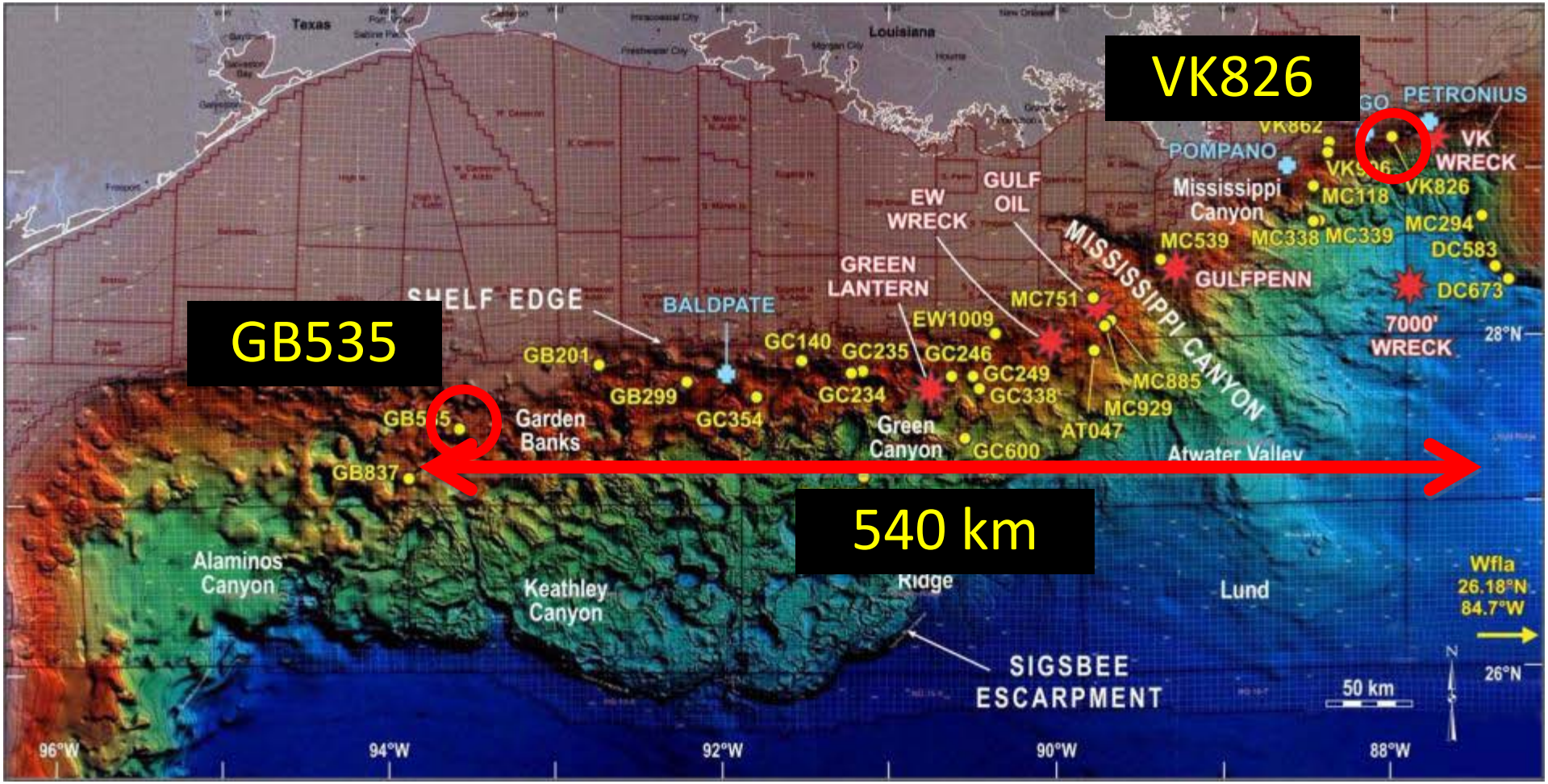
- Progress summary
  - Long-term monitoring stations in Gulf of Mexico
- Track changes in coral communities
  - Megafauna
  - Coral growth
- Use of sea floor photomosaics

Lophelia II Study Sites

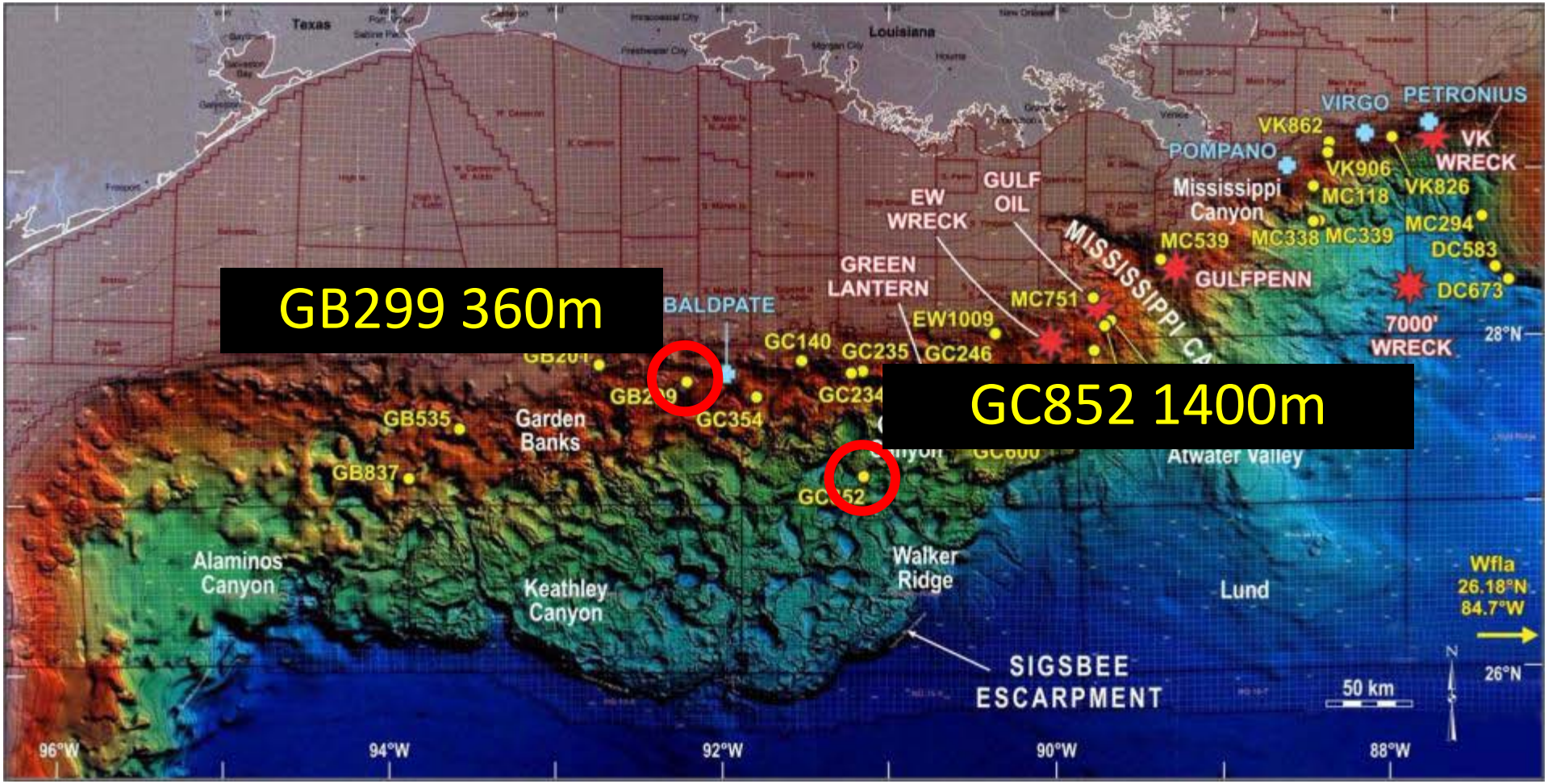


Long-term monitoring stations at 13 sites (lease blocks) between 2009 and 2010

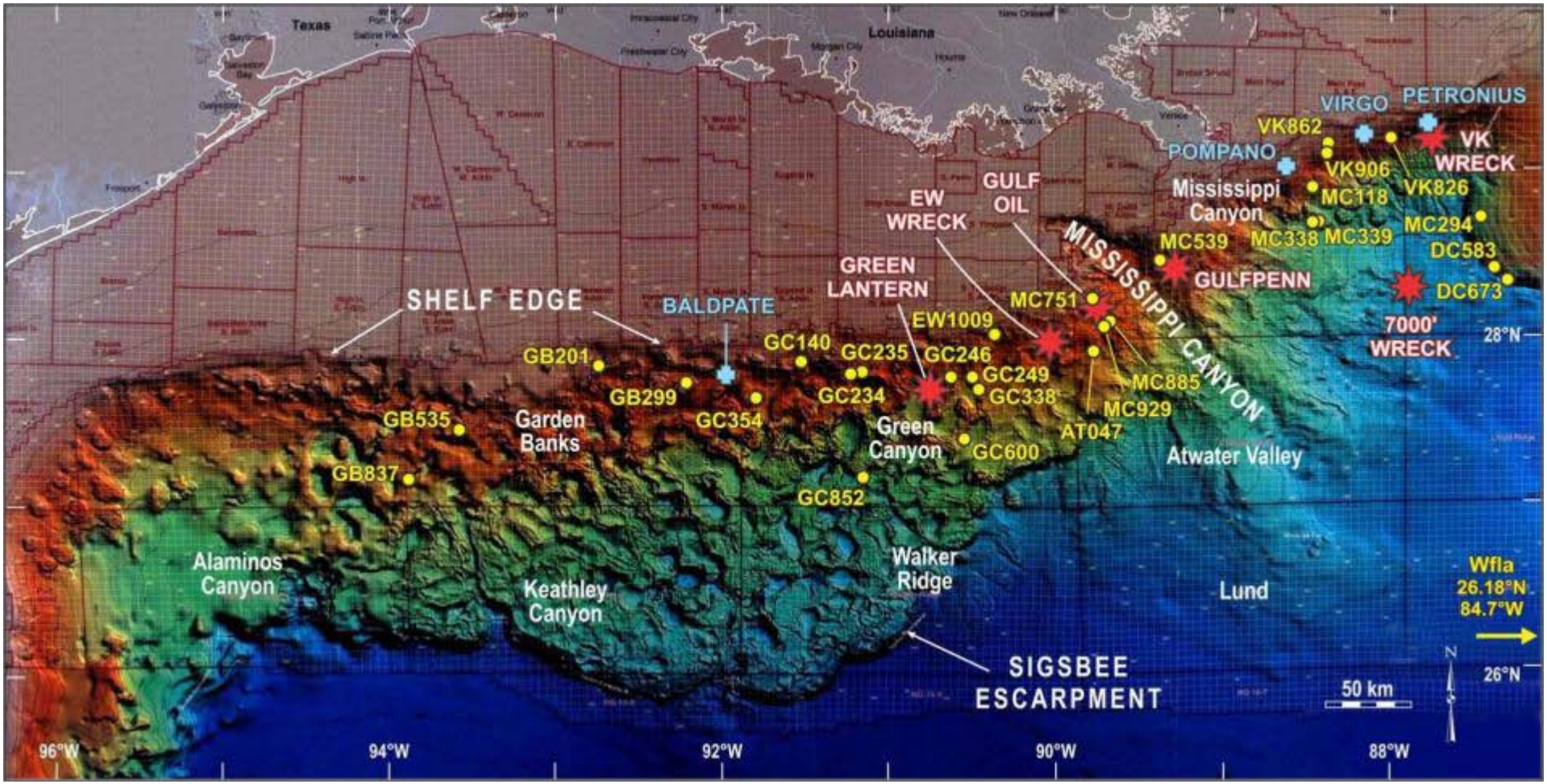
Wide Geographical Range



Variety of Depths

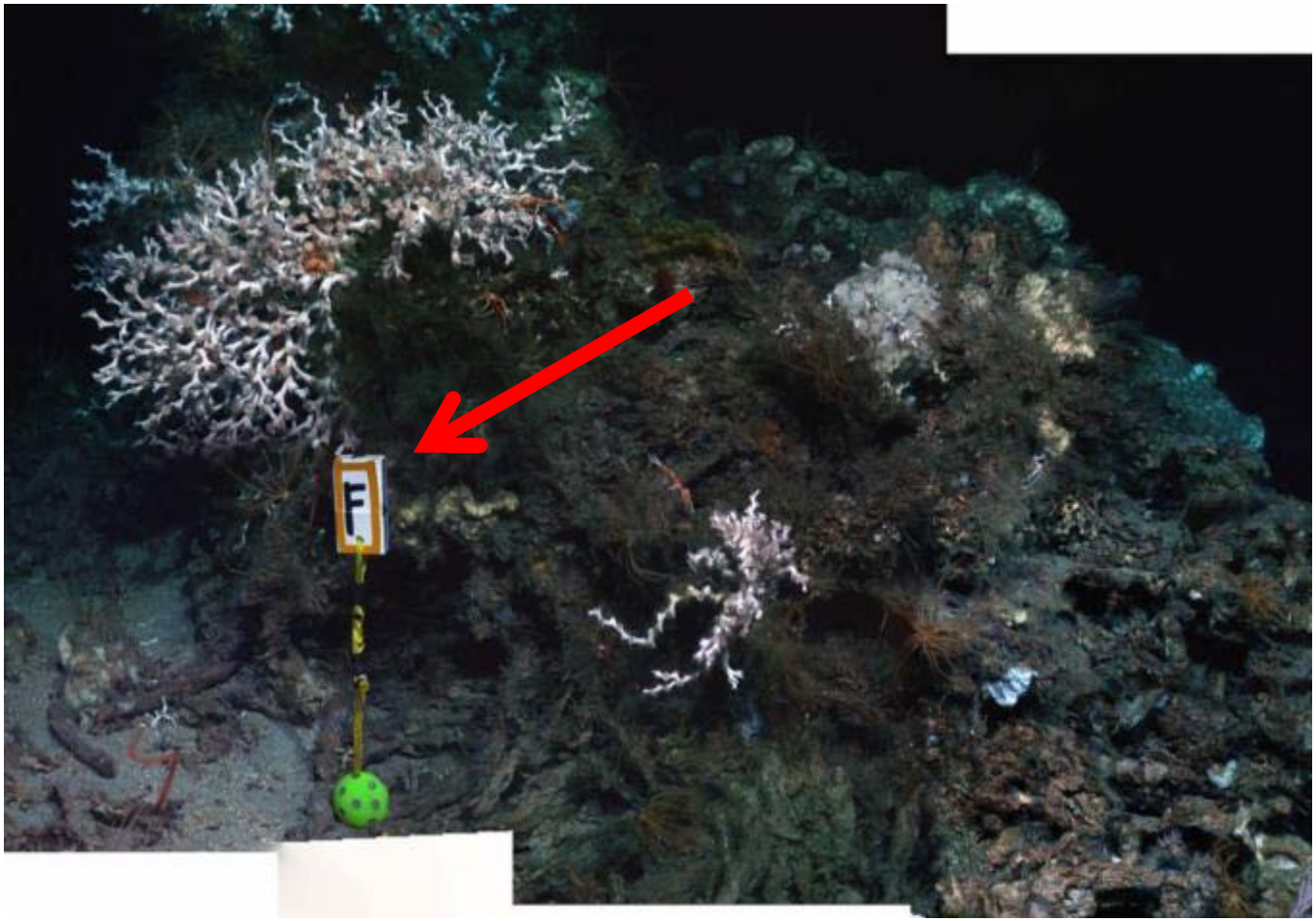


Representative Coverage

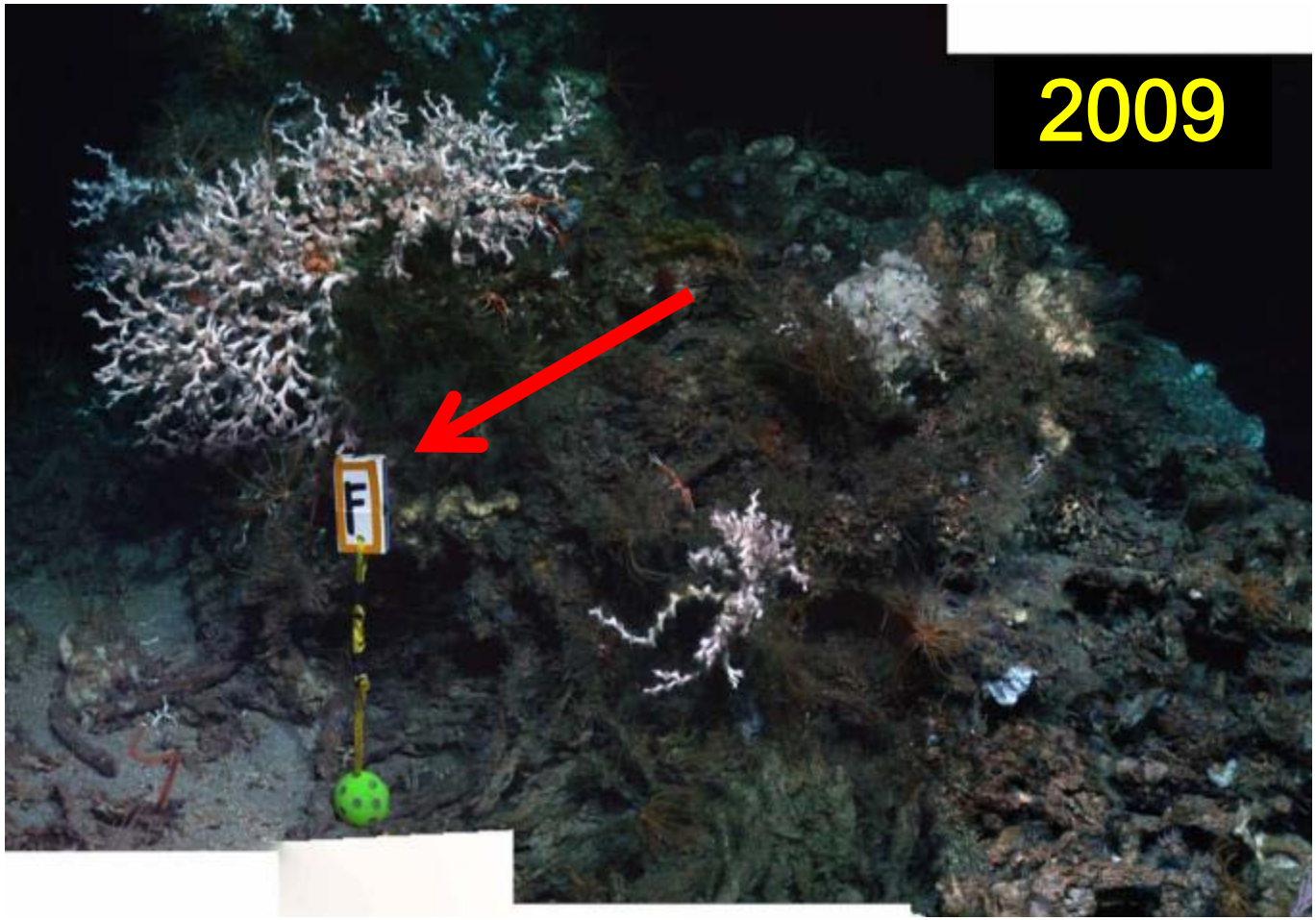


Set up long-term monitoring stations for future visits

Physical Markers

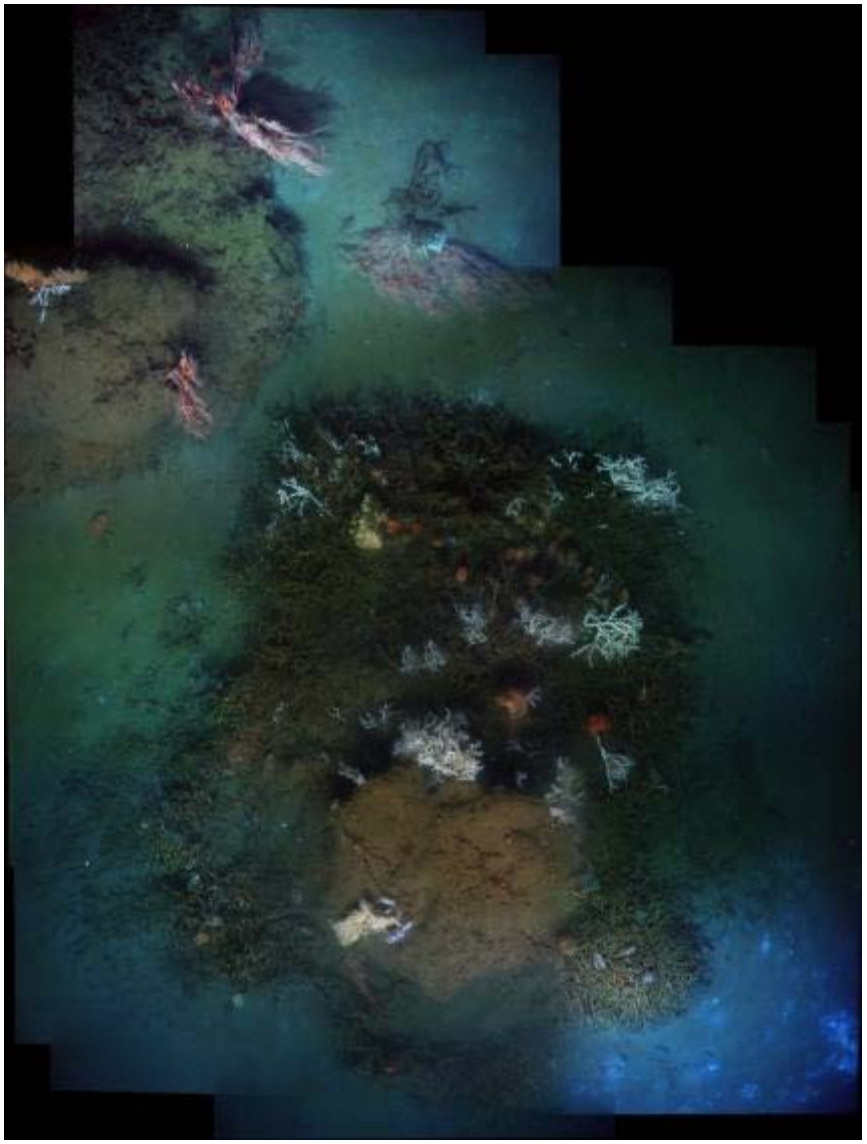


Precise Navigation by *Jason II*



Precise Navigation by *Jason II*

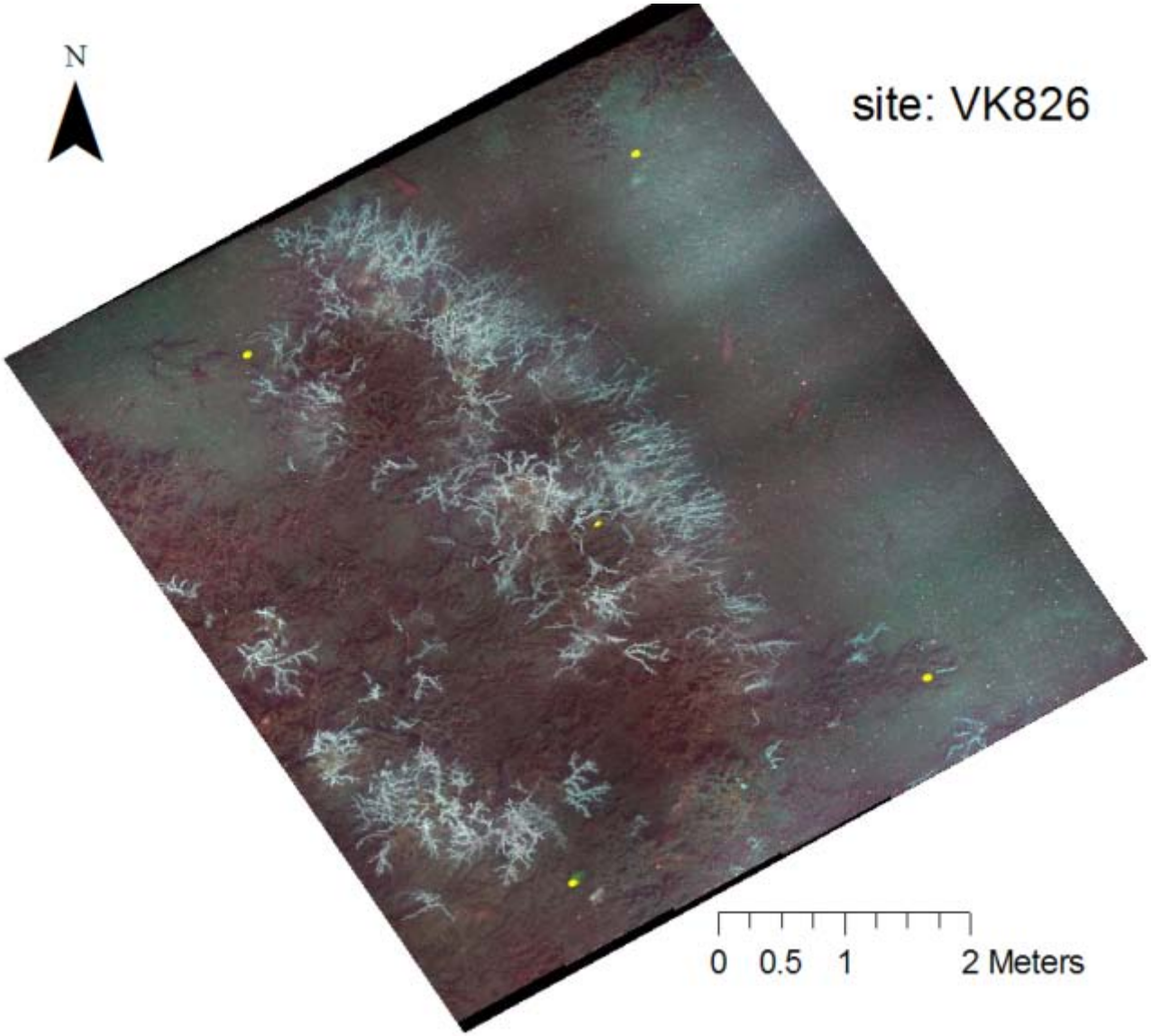
Coral Community Mosaics



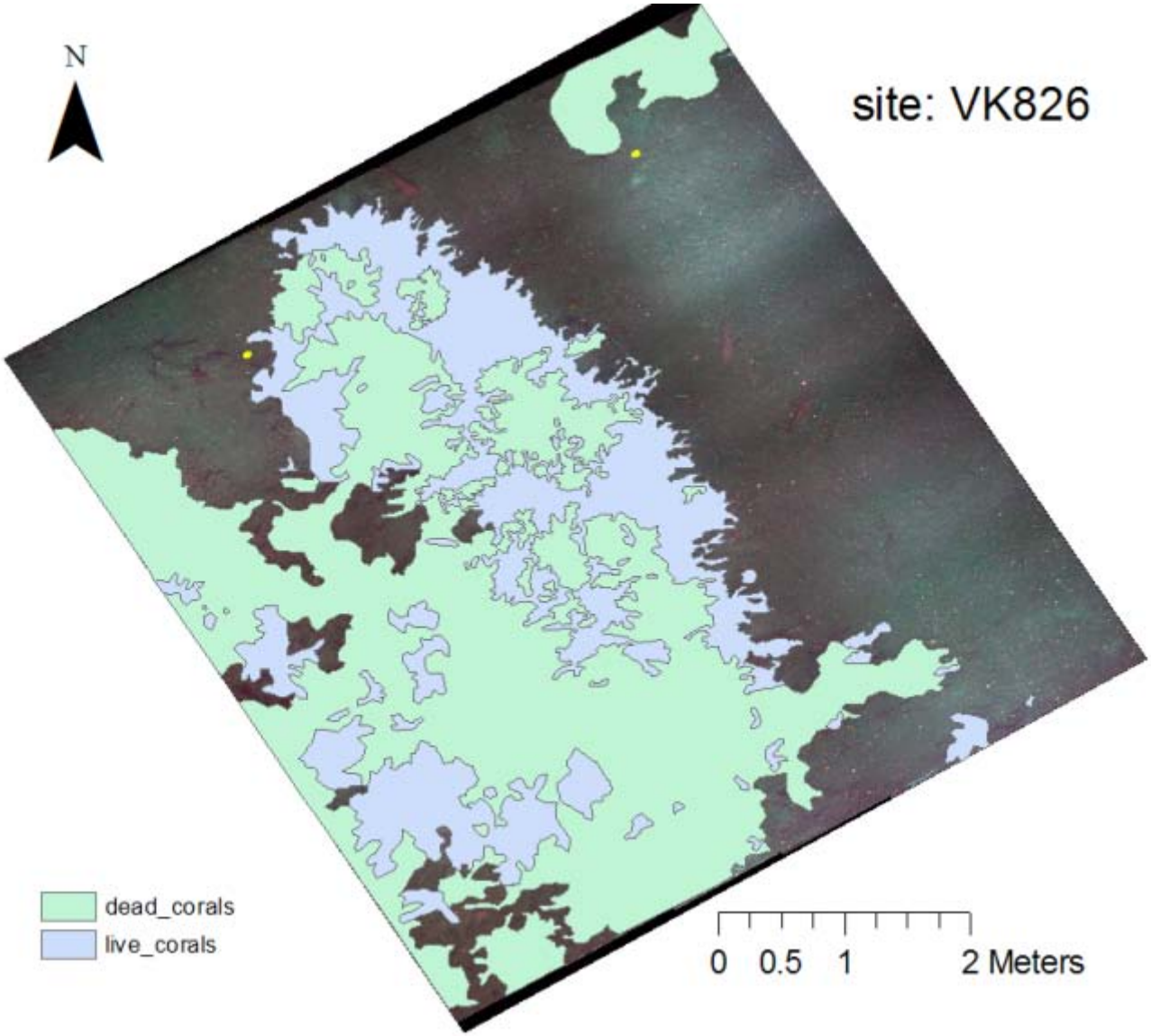
Stitch sequential down-looking photos into mosaic

Scale from ROV laser points in images

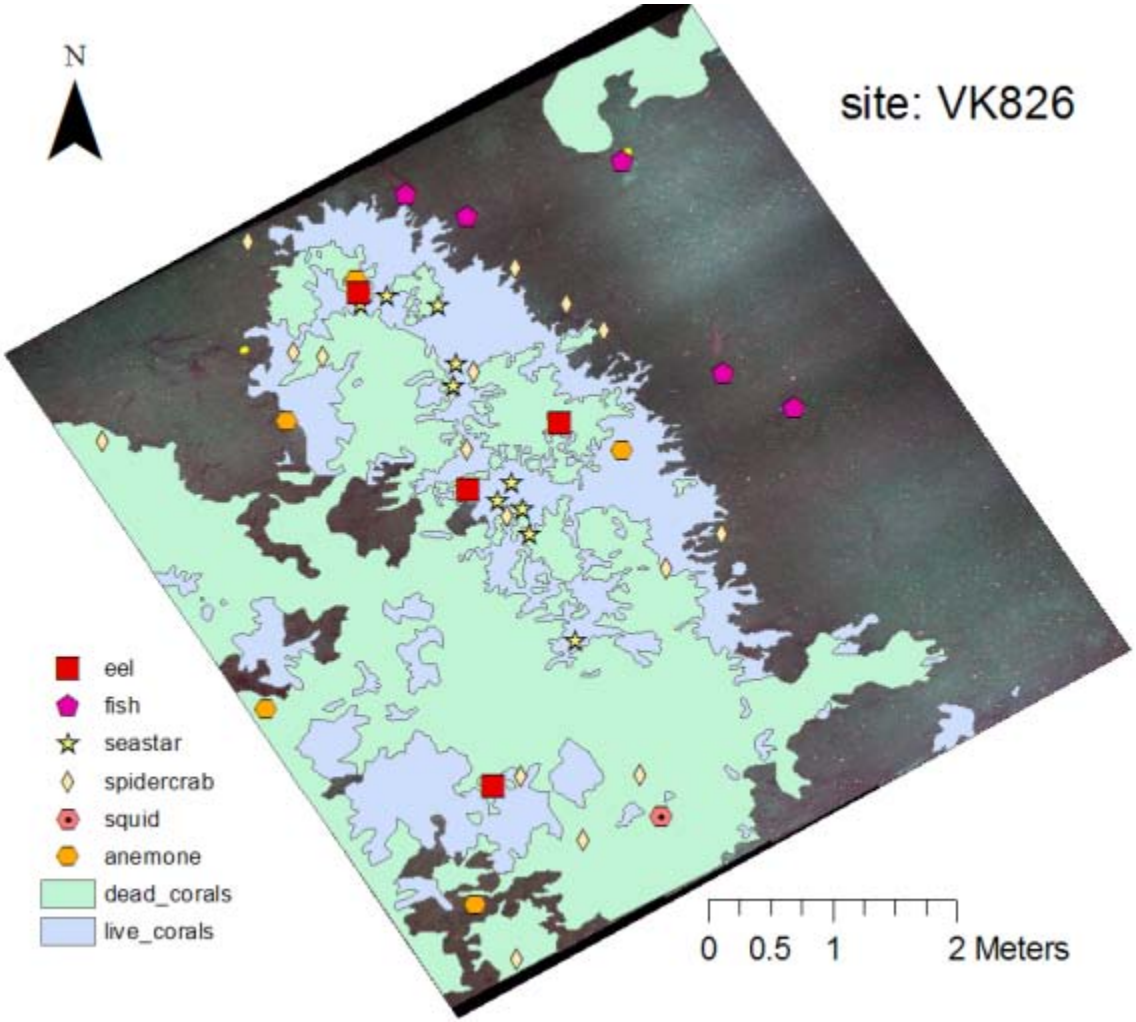
Georeferenced in GIS



Community Composition



Community Composition



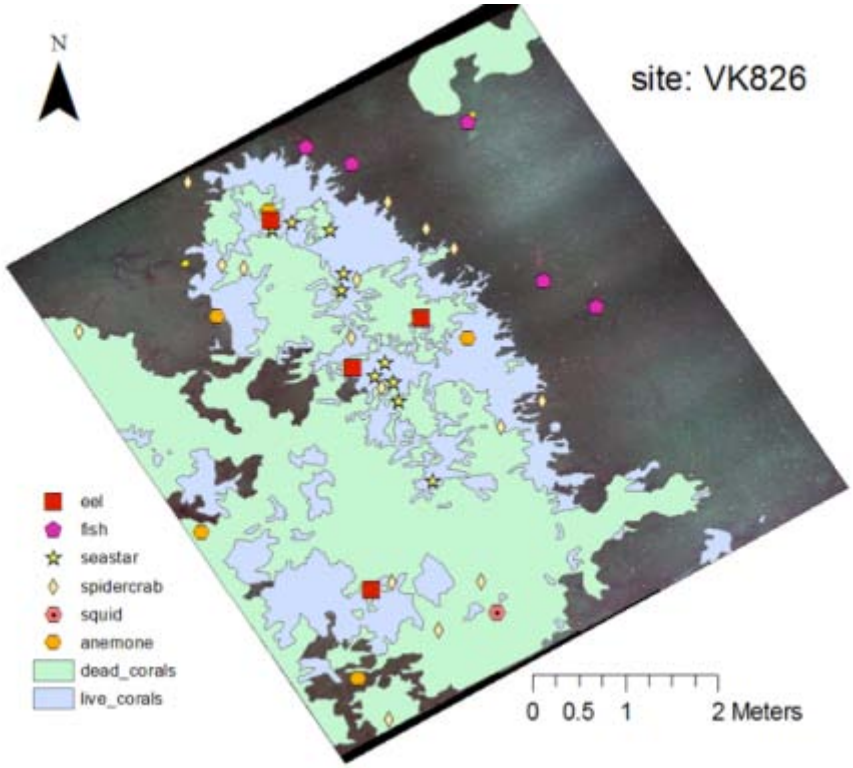
- Occurrence across habitats
- Fidelity of associations

2009 Summary

Imaged coral communities at 16 stations

Completed 15 mosaics

- Georeferenced 11 mosaics
- Digitized 4 mosaics



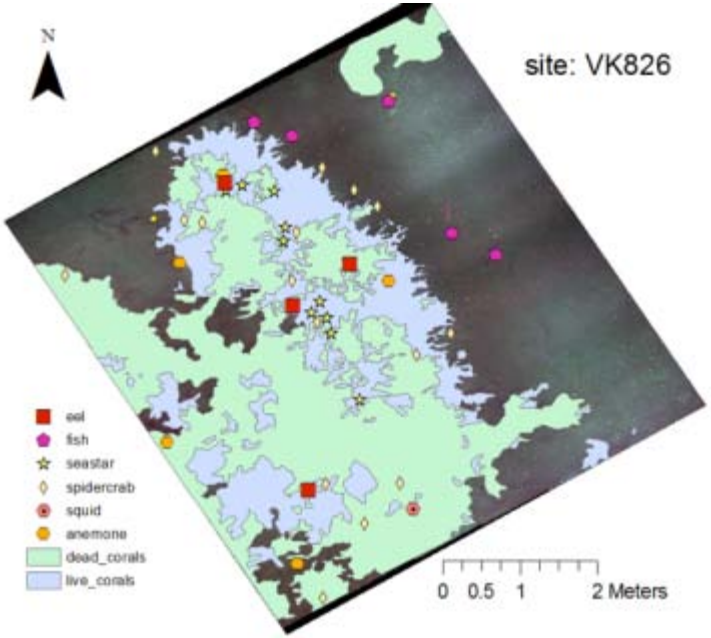
2010 Summary

Revisited and imaged 14 stations from 2009

Set up and imaged at 13 new stations

Mosaics complete for all 29 stations visited 2009–2010

- 2010 georeferencing in progress



Coral Growth in Mosaics

Growth and death over time

Track individual corals for new polyps and branching

September 2009

VK826

October 2010

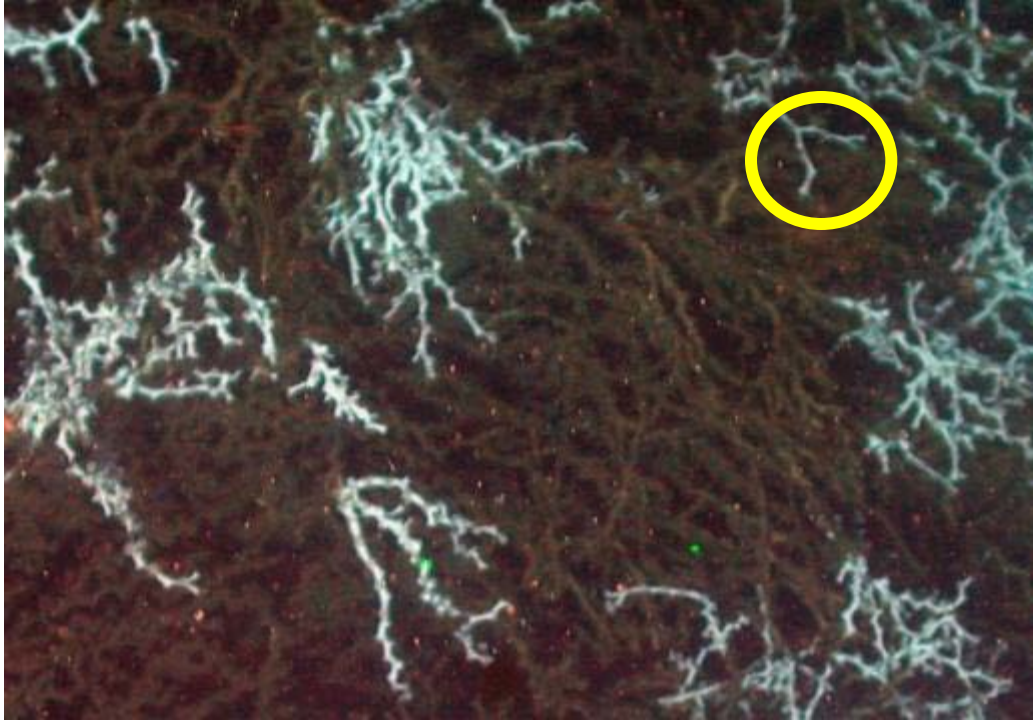
depth: 463 m

29.1648 N
88.0115 W

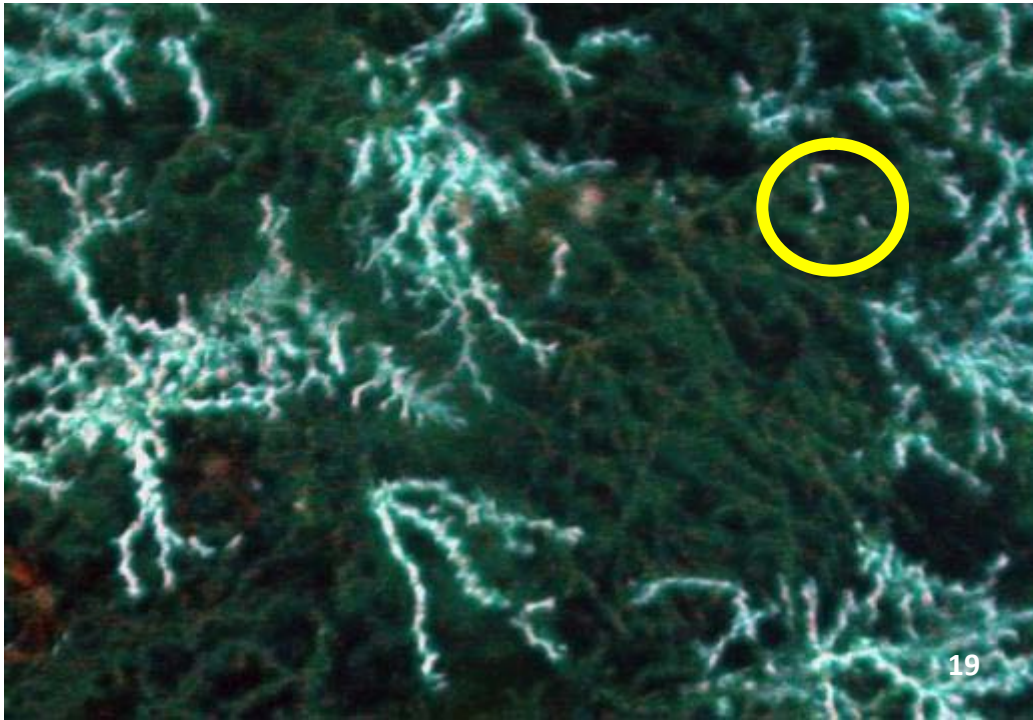
1 meter

Coral Death?

September 2009



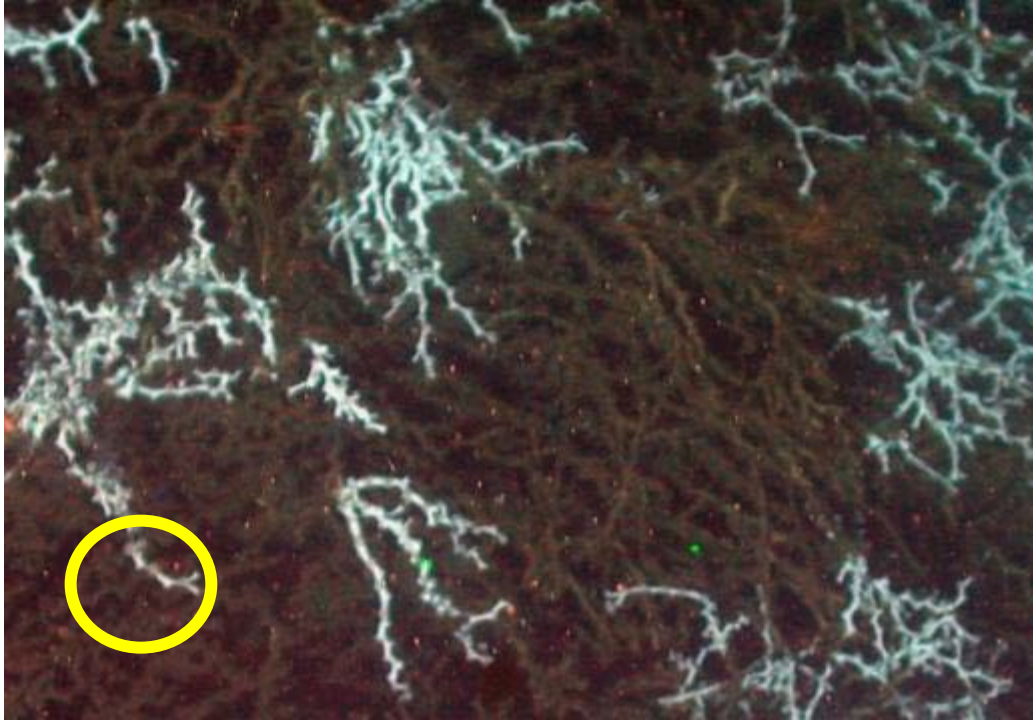
October 2010



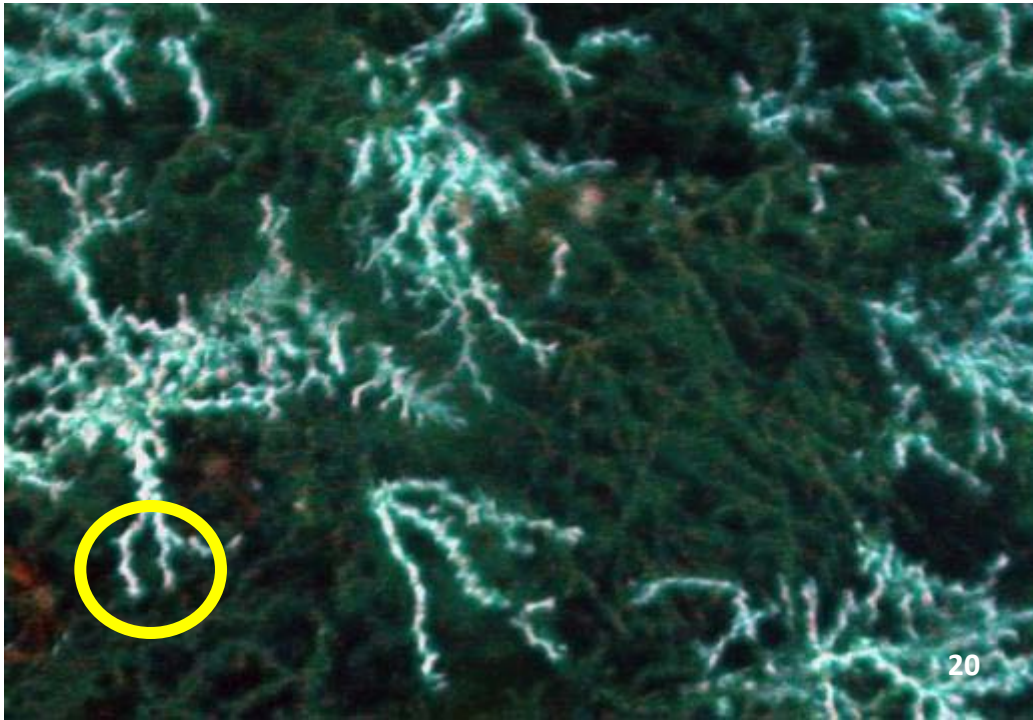
30 cm

Growth Spurt?

September 2009



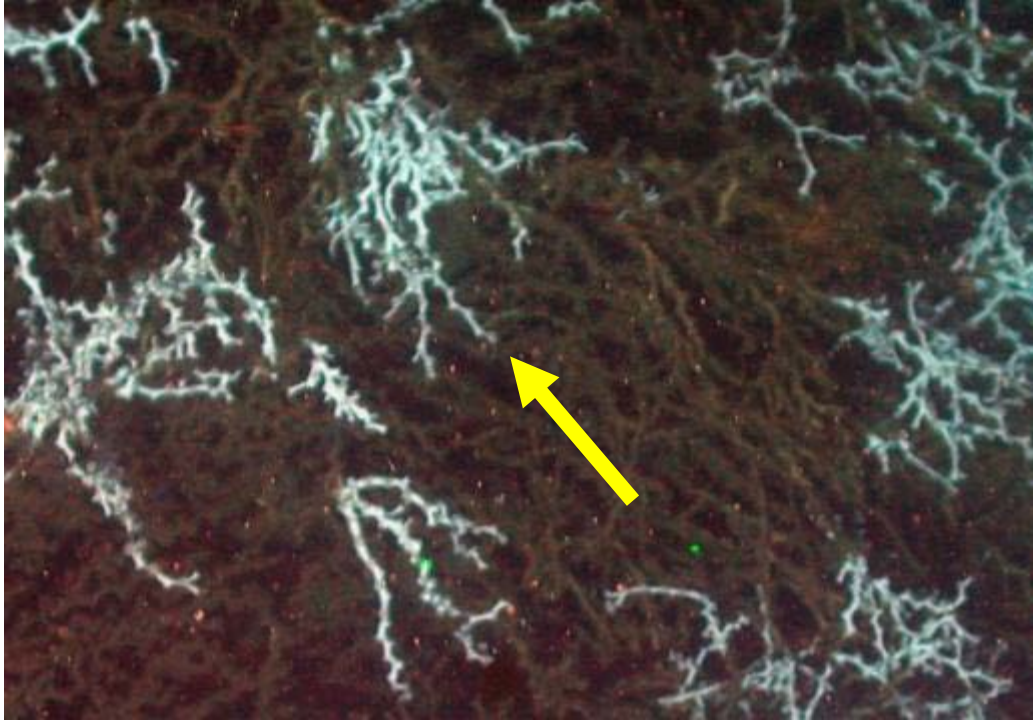
October 2010



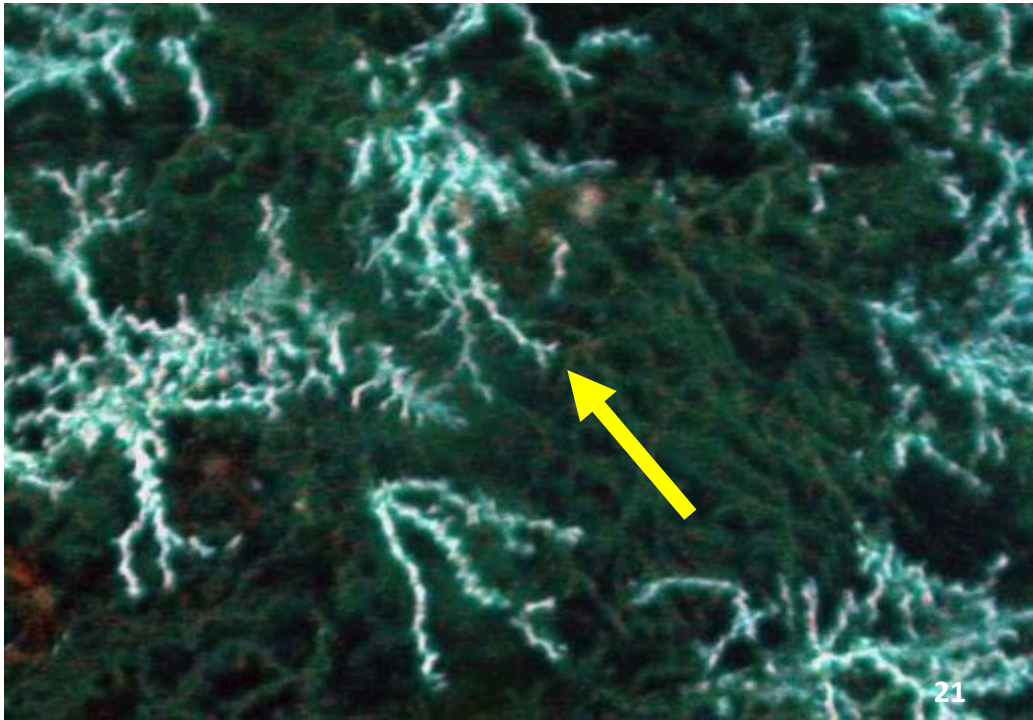
30 cm

New Polyps

September 2009



October 2010



30 cm

Coral Growth in Mosaics

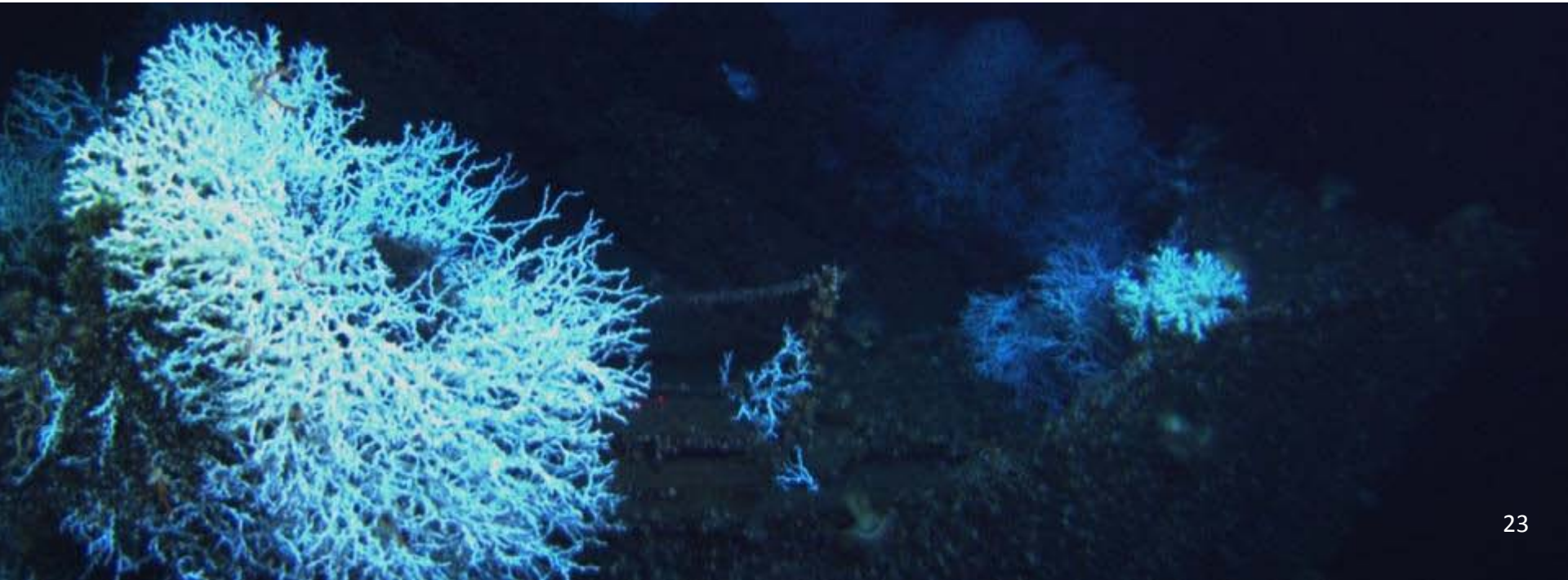
Challenging to measure over one year

- Signal to noise ratio

Long-term observations critical

Coral Growth on Wrecks

Obtain *conservative* growth rate of *Lophelia pertusa* by measuring images of communities on shipwrecks

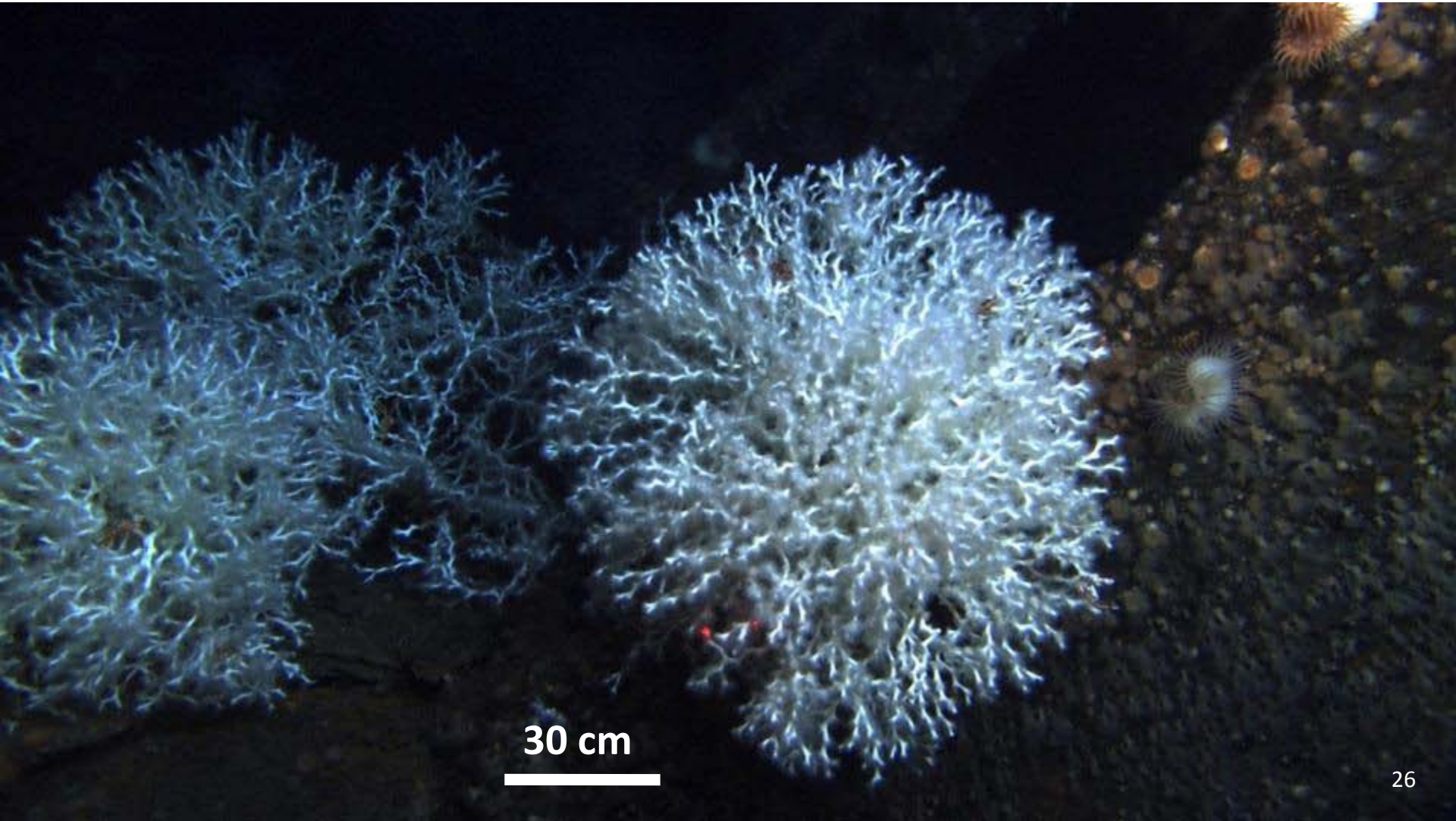


Coral Measurements

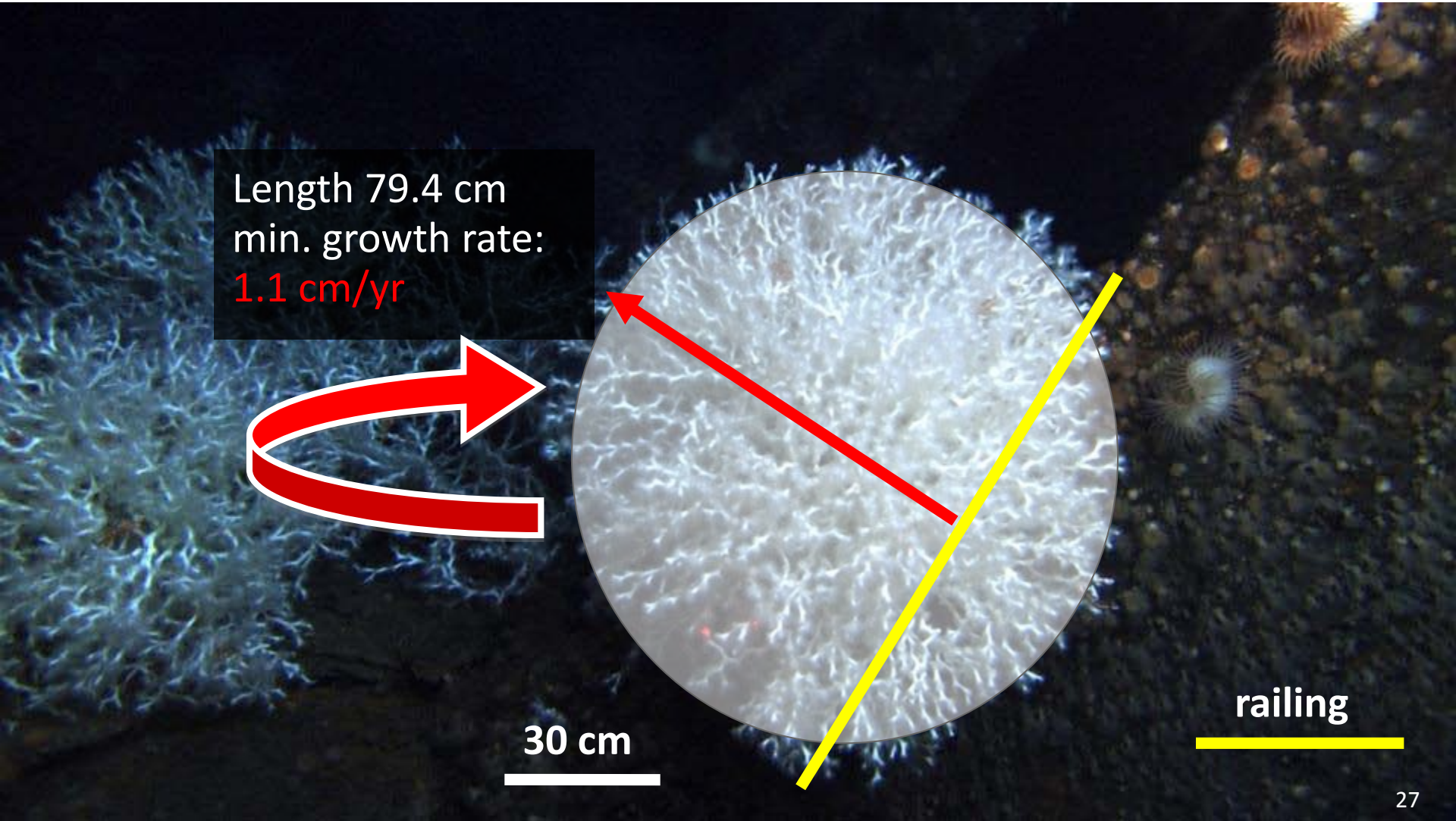
Minimum growth rate based on maximum coral distance to attachment and age of shipwreck

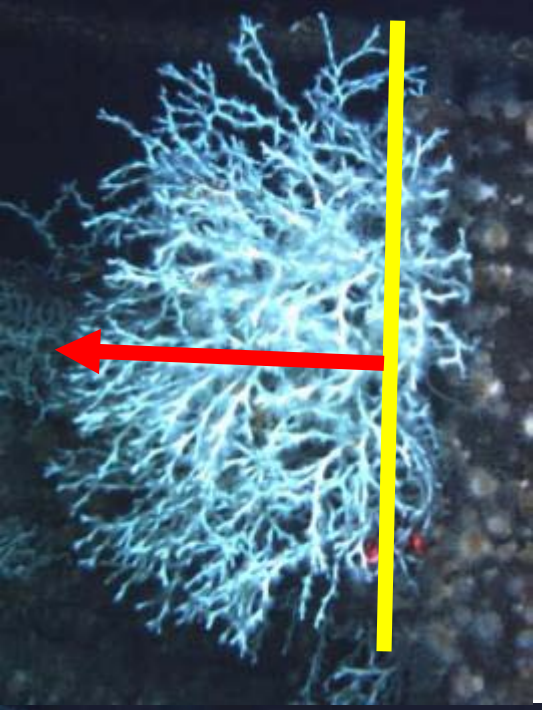
- *Green Lantern*, sunk 1906: 104 years
- *GulfPenn*, sunk 1942: 68 years
- *GulfOil*, sunk 1942: 68 years

Gulf Oil Wreck Measurements



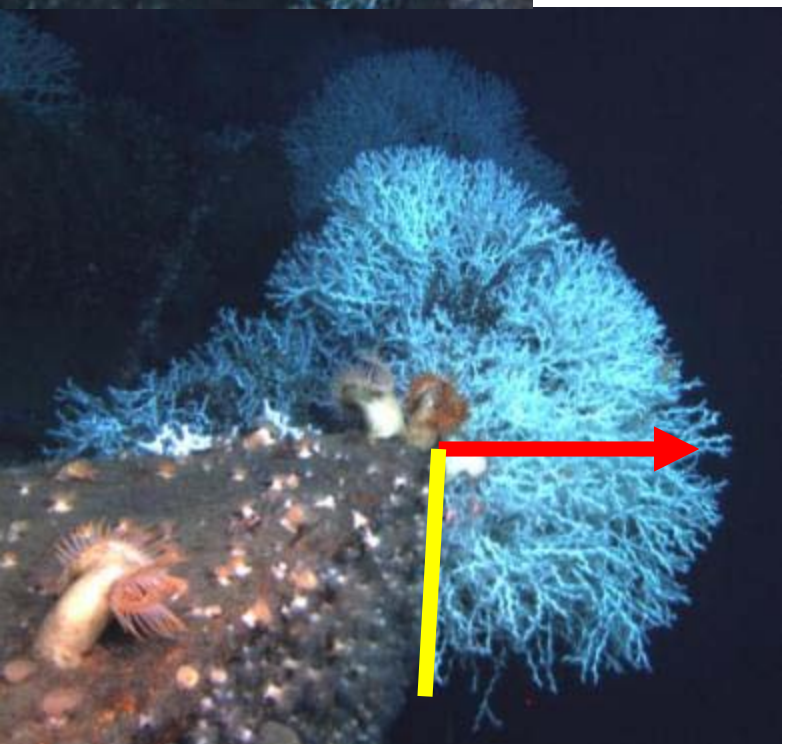
Gulf Oil Wreck Measurements

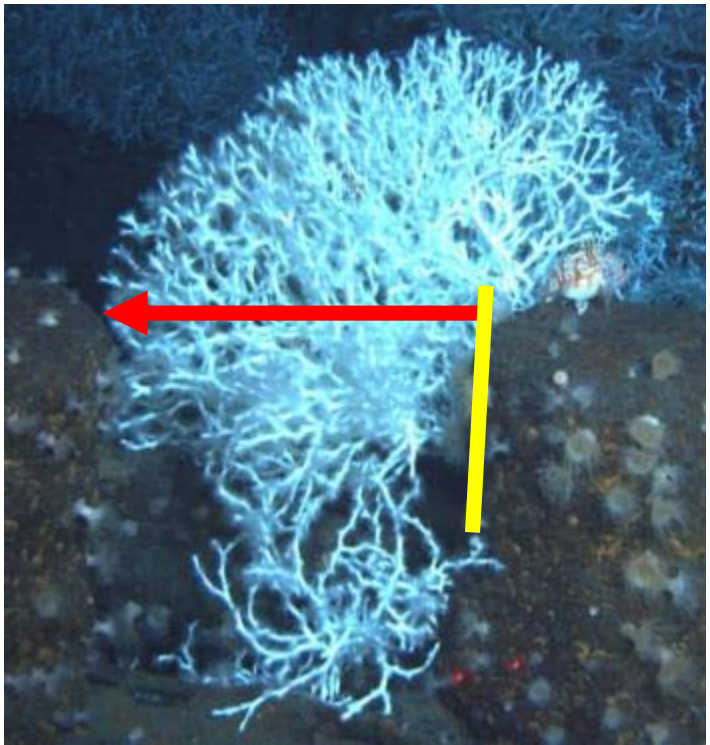




Wreck (year visited)	# of colonies imaged
Green Lantern (2009)	3
GulfPenn (2009)	13
GulfOil (2010)	8

total 24





Coral Growth Rates

Wreck	Coral colony	Min. growth rate (cm/yr)
Green Lantern	1	0.51
	2	0.54
GulfPenn	1	0.59
	2	0.88
	3	1.18
	4	1.18
	5	1.32
	6	1.62
	7	2.21
GulfOil	1	1.36
	2	1.45
	3	0.64
	4	1.15
	5	1.10
	6	2.03
	7	1.08
	8	1.46

Coral Growth Rates

Range from 0.51–2.21 cm/yr

Very conservative estimate

- Assume corals settled at time of ship wreck
- Only used images with clear attachment points
- Linear colony extension instead of coral branching

Non-intrusive, *in-situ* growth measurements

Reefs, wrecks, and rigs