

Acoustic Telemetry with Sea Turtles in Virginia

Susan Barco¹, Carter Watterson², Gwen Lockhart¹, Andrew DiMatteo²

¹Virginia Aquarium & Marine Science Center

²Naval Facilities Engineering Command, US Navy



NMFS Research Permit 16134

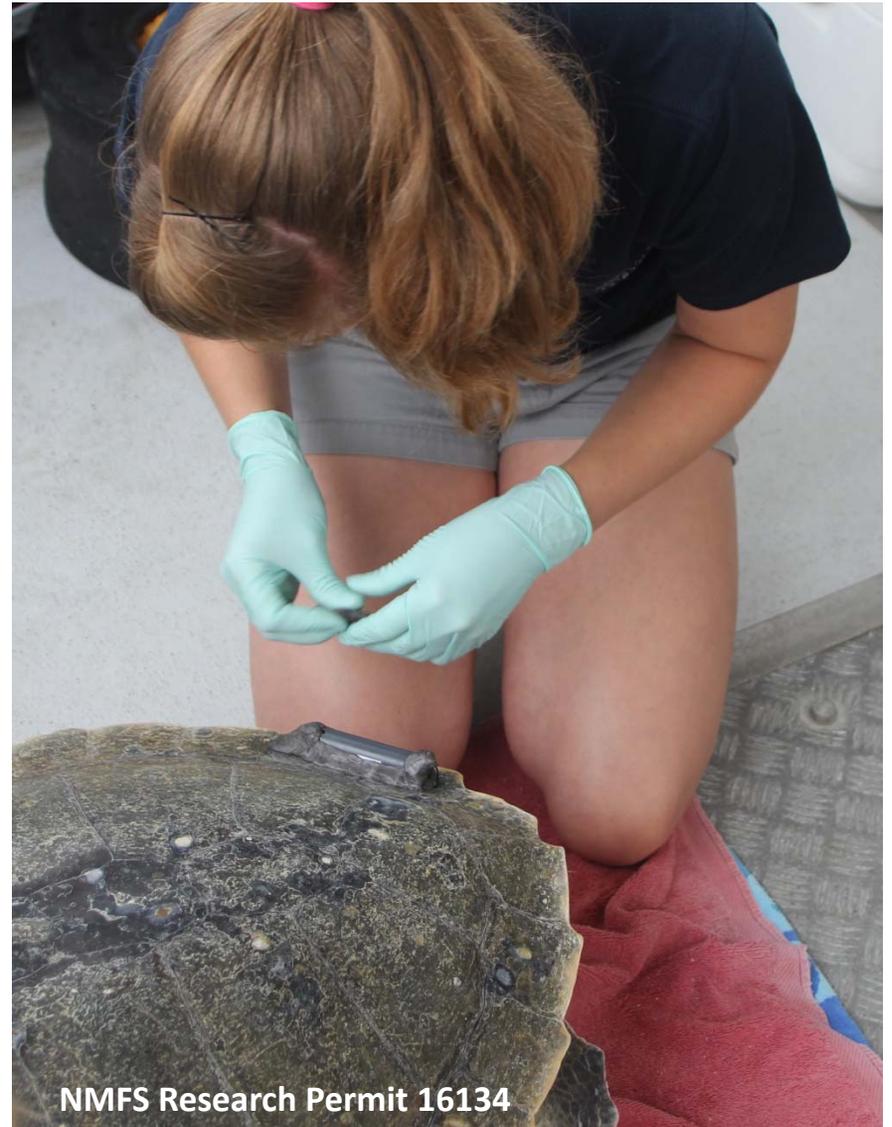
Project goals

- Determine the efficacy of acoustic telemetry for sea turtles in Virginia
- Investigate the fine scale movements of sea turtles in the vicinity of Navy facilities using acoustic telemetry
- Using wild caught, incidentally caught & stranded turtles



Division of labor

- US Navy
 - Maintains array
 - Downloads data
 - Processes data
- Virginia Aquarium
 - Acquires turtles
 - Applies tags
- Joint
 - Data analysis



Tagging effort

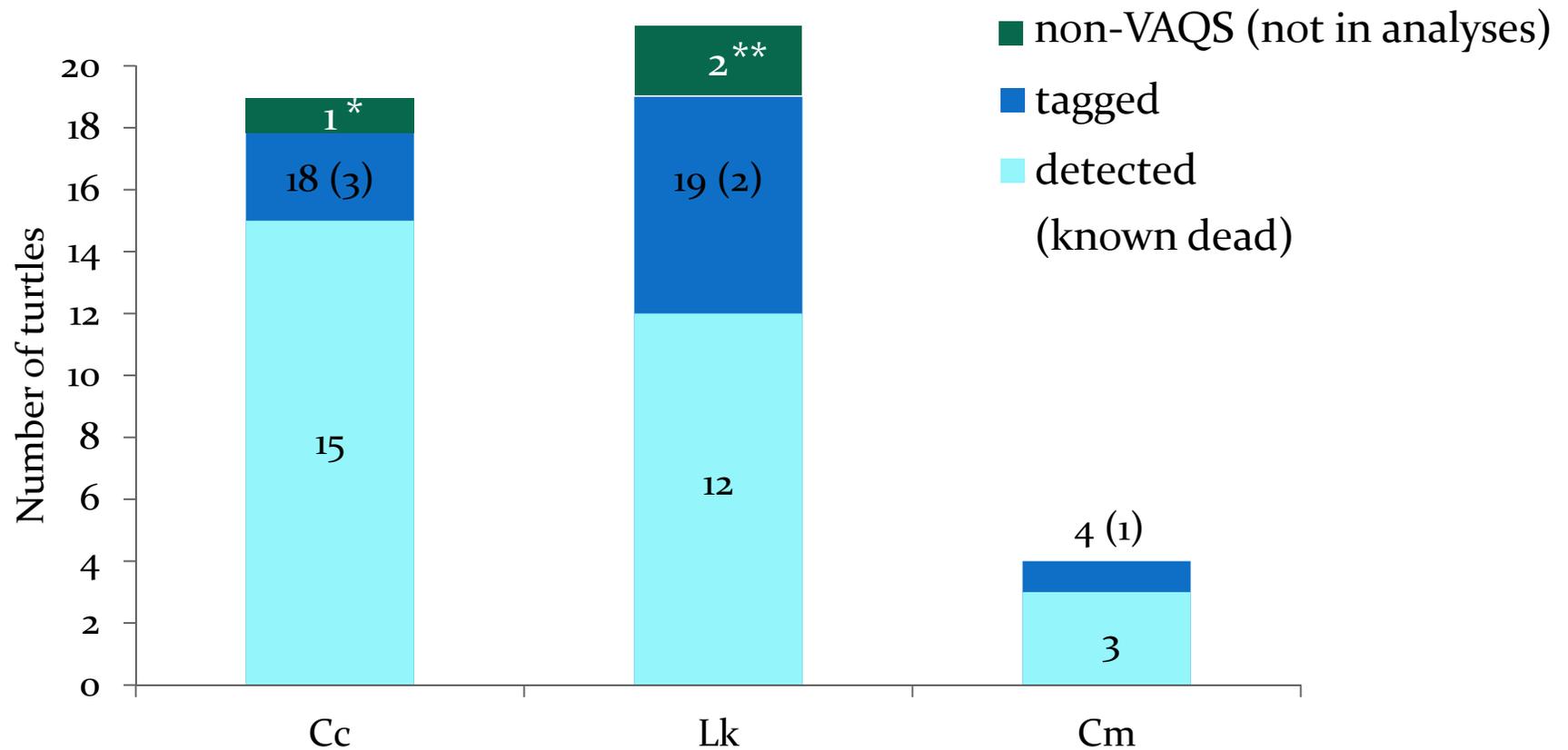
Project
started

- 2013 (n=14)
 - 11 Loggerhead
 - 1 Kemp's ridley
 - 2 Green
- 2014 (n=27)
 - 7 Loggerhead
 - 18 Kemp's ridley
 - 2 Green
- 2015 (n=18)
 - 4 loggerhead
 - 13 Kemp's ridley
 - 1 Green
- Dual tagged (n=13; 2013-2014)

	2013	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
Cc		-	-	-	-	-	1	5	4	1
Lk		-	-	-	-	-	1	-	-	-
Cm		-	-	-	-	2	-	-	-	-
2014										
Cc		-	-	-	4	1	-	1	1	-
Lk		-	-	-	10	3	2	1	2	-
Cm		-	-	-	1	-	1	-	-	-
2015										
Cc		-	-	1	1	2	-	-	-	-
Lk		1	-	3	9	-	-	-	-	-
Cm		1	-	-	-	-	-	-	-	-

- Source of turtles
 - 7 wild
 - 47 stranded in VA
 - 5 stranded elsewhere

2013 & 2014 Turtles detected

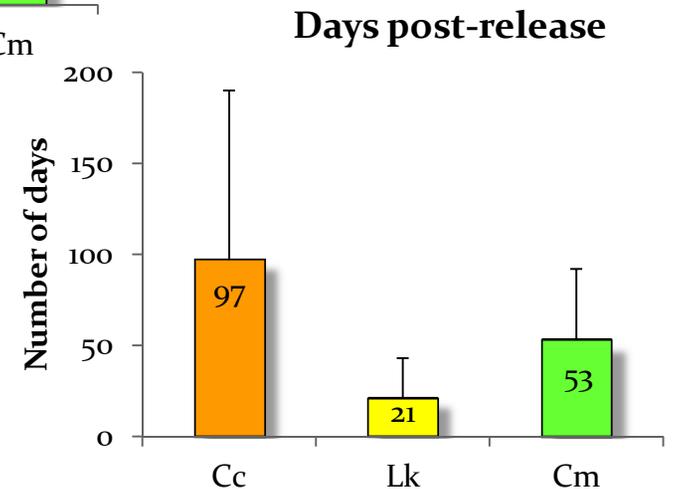
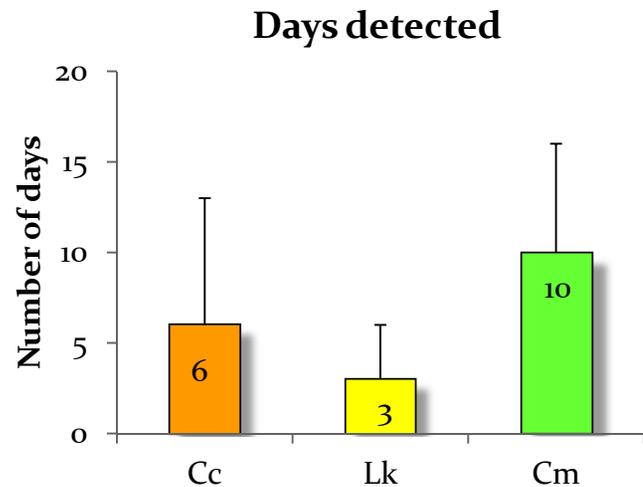
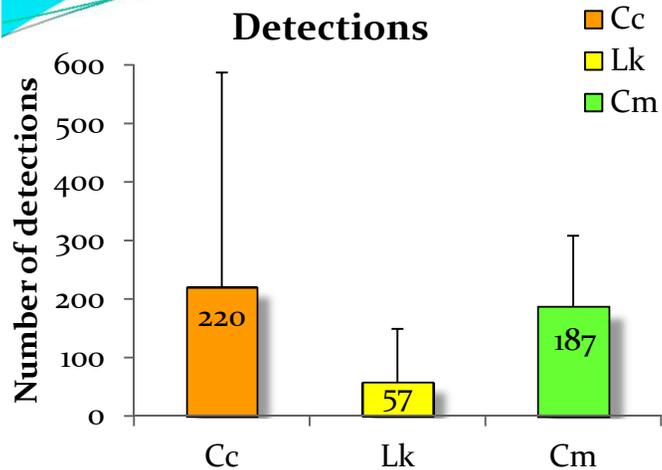


*NOAA Beaufort Lab-Joanne Braun-McNeill

**Riverhead Foundation-Kim Durham

Per turtle statistics

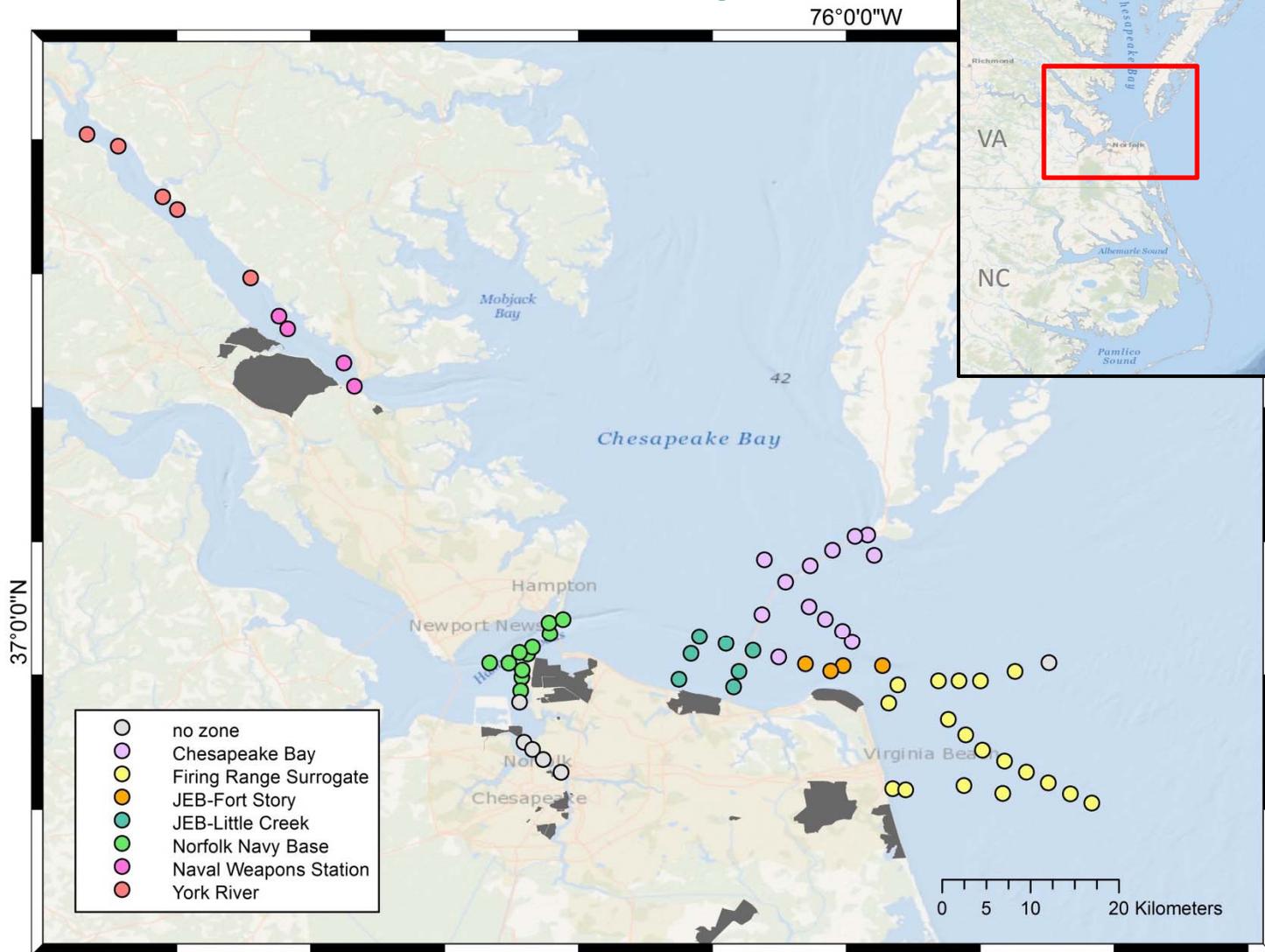
(Dataset=detected turtles; Numbers = means, error bars = +1 SD)



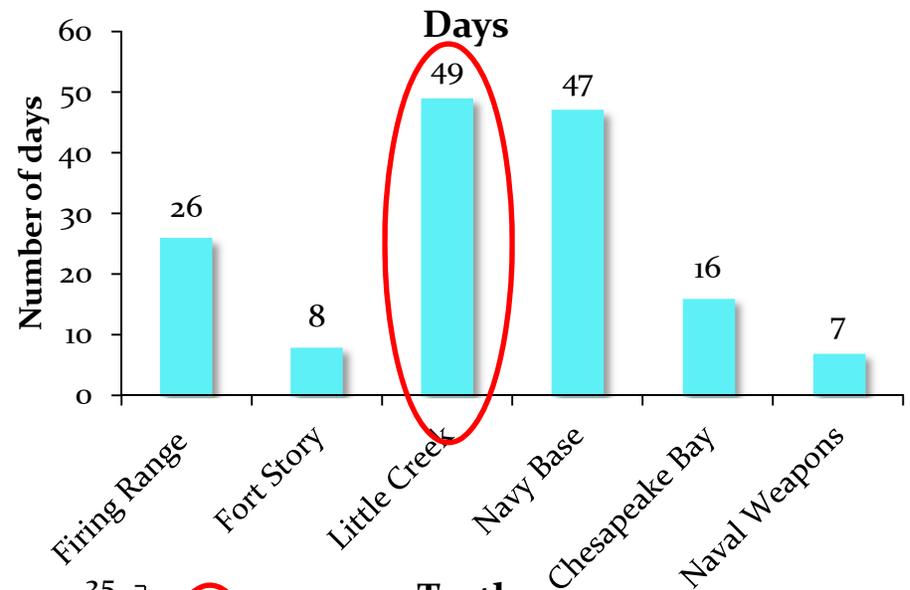
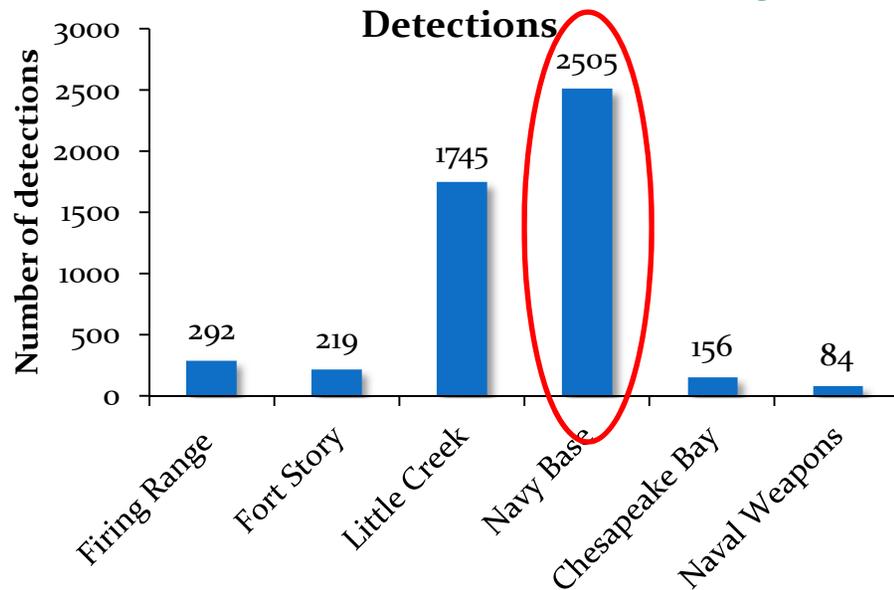
Detected Turtles

- 15 Loggerhead
- 12 Kemp's ridley
- 3 Green
- ↑ detections 1,516
- ↑ days detected 27
- ↑ post-release detection 265 days

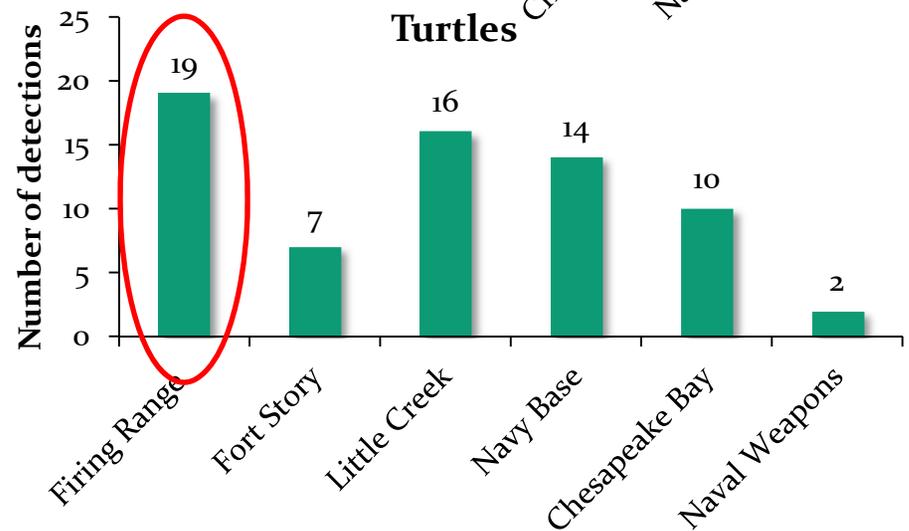
Zones within array



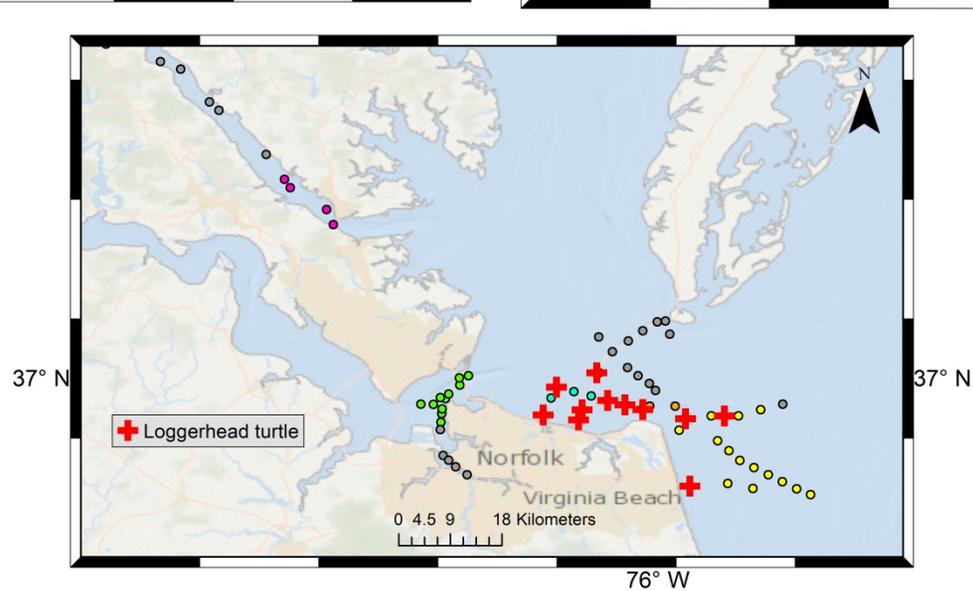
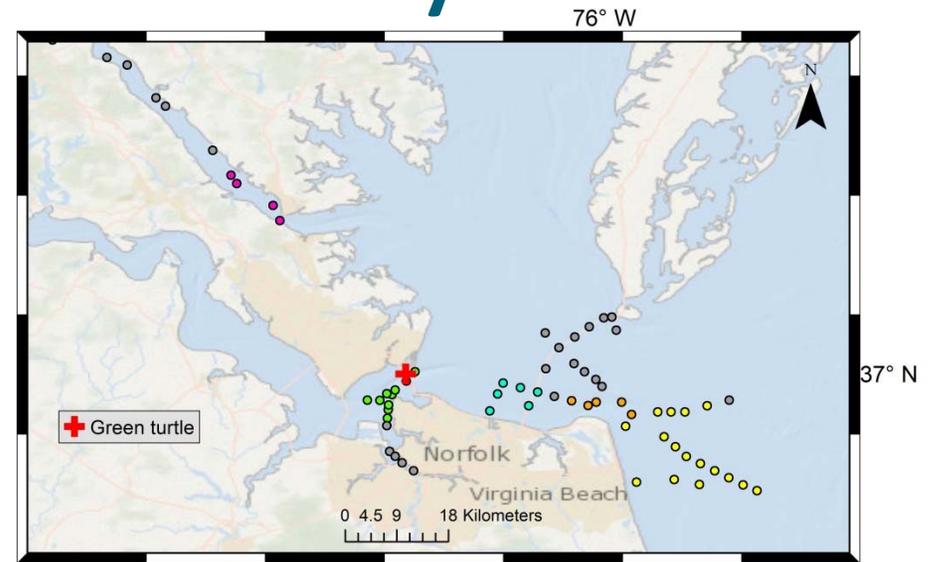
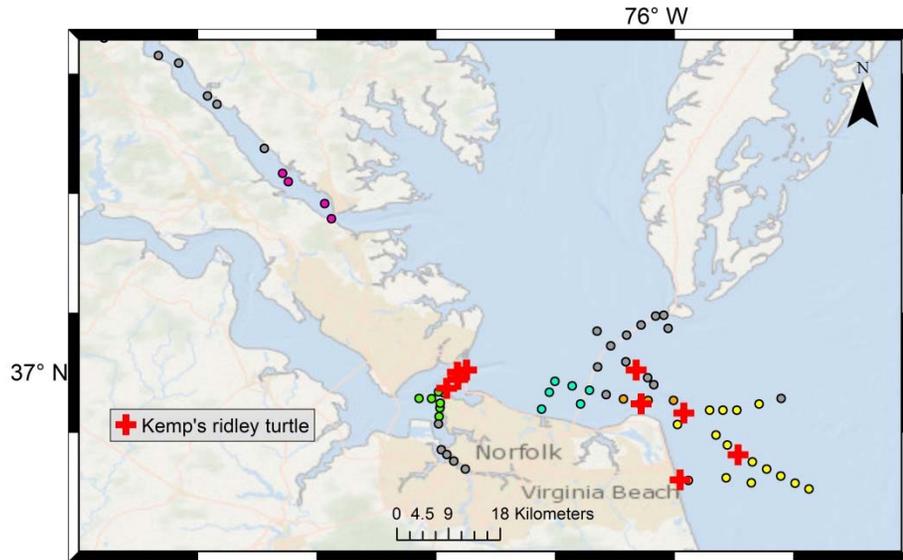
Detections by Zone



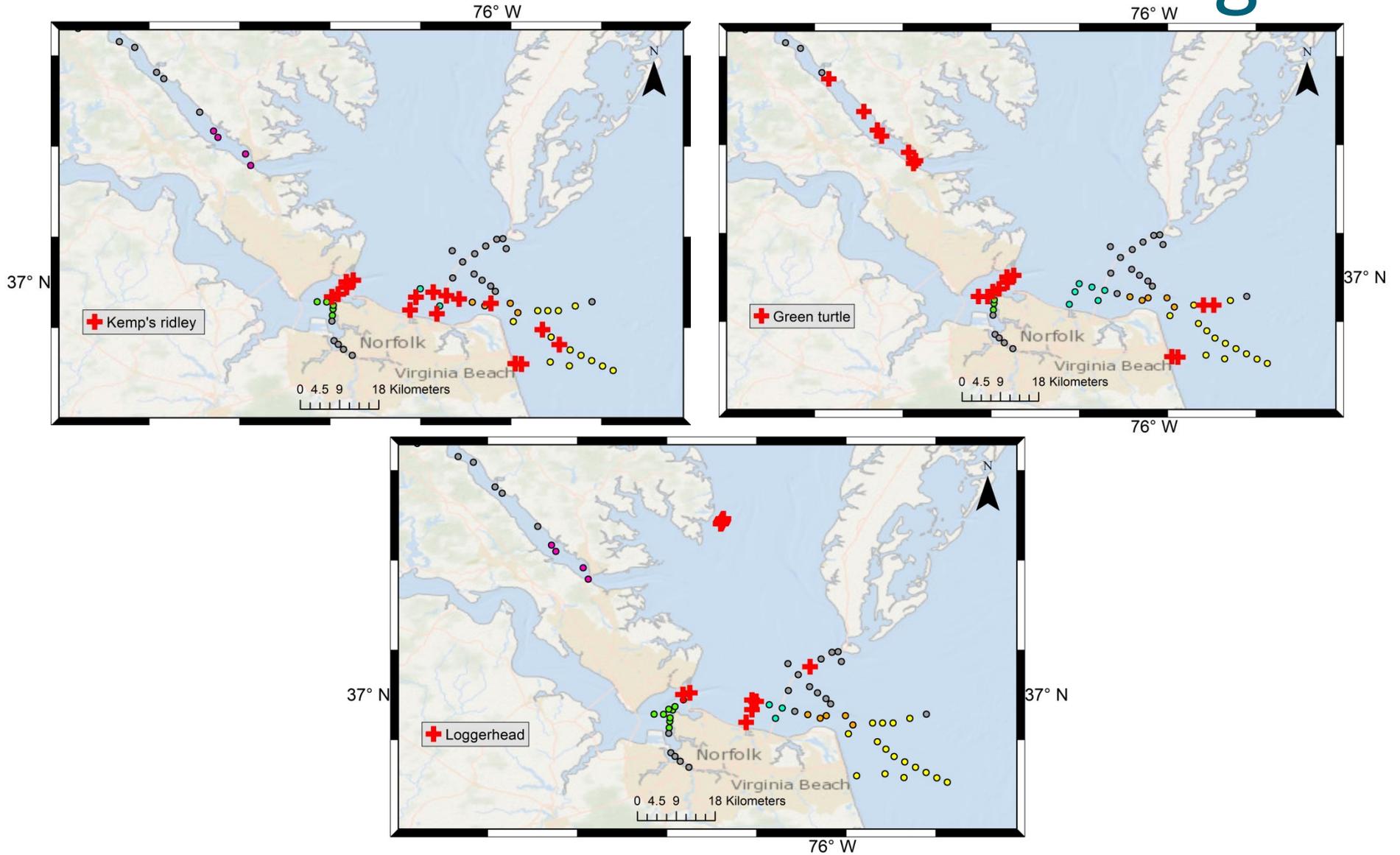
- ↑ detections @ Norfolk Navy Base
- ↑ turtle days @ Little Creek
- ↑ turtles @ Firing Range Surrogate



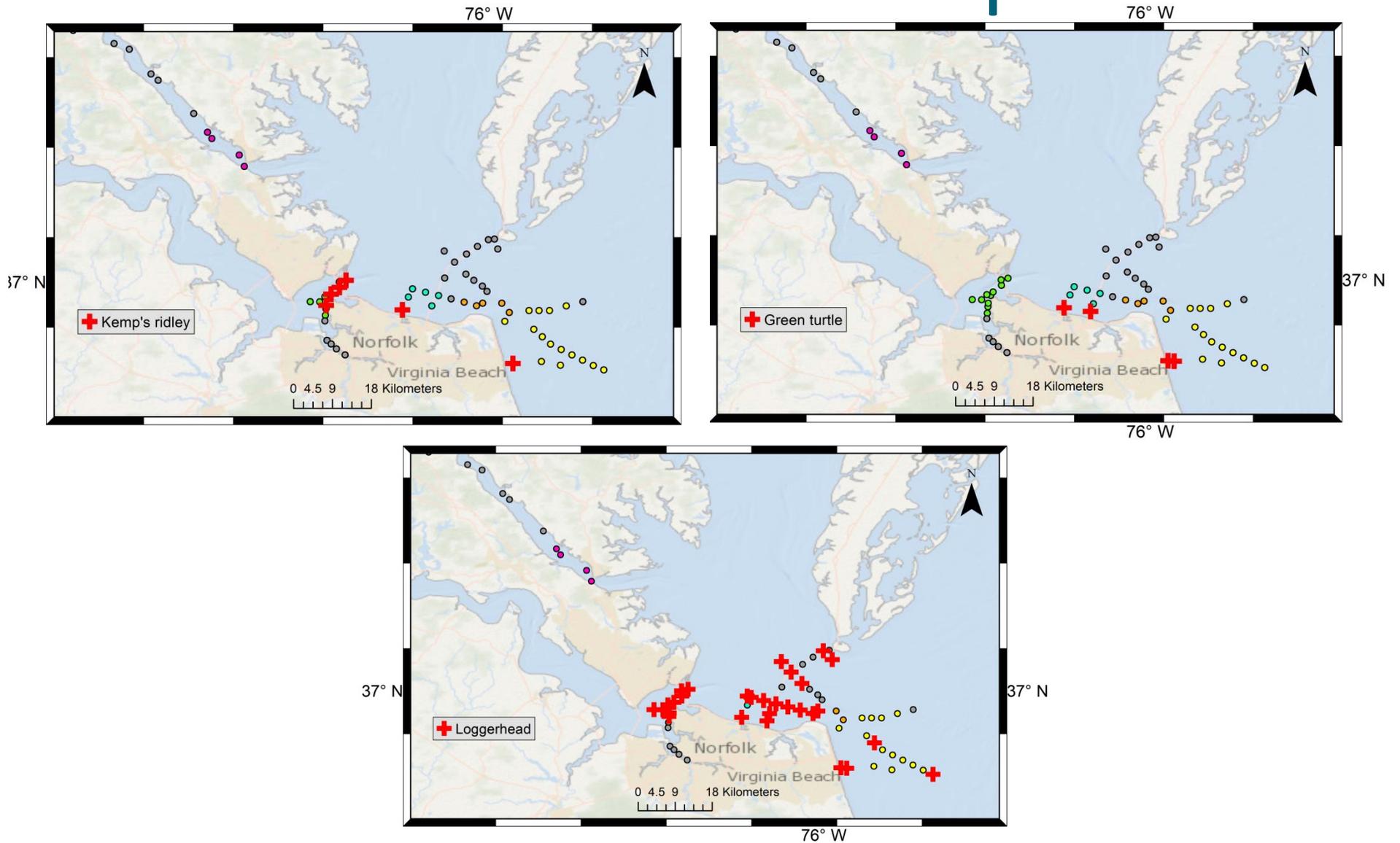
Seasonal detections-May & Jun



Seasonal detections-Jul & Aug



Seasonal detections-Sep & Oct



Movement patterns

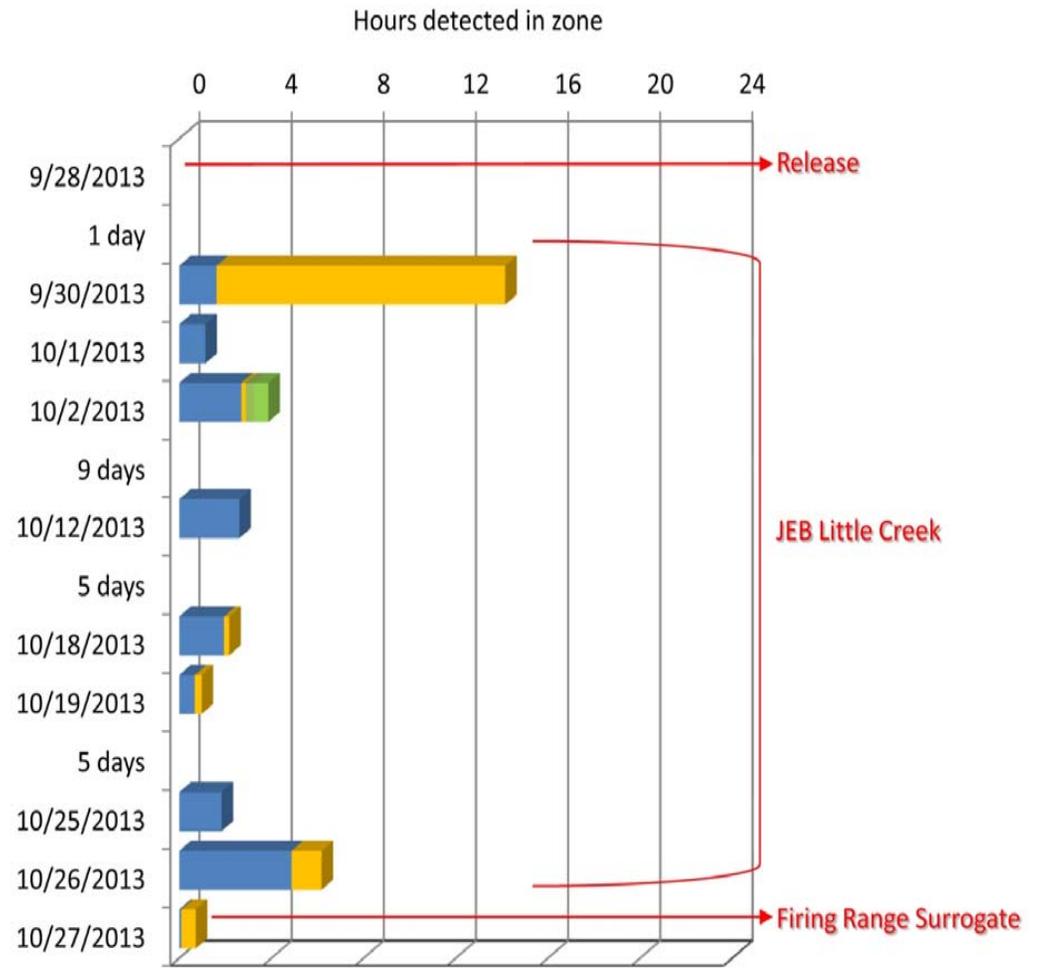
- High use >200 detections & ≥ 10 days
 - 3 Loggerhead
 - 1 Kemp's ridley
 - 1 Green
- >1 season
 - 1 Loggerhead
- Tag failure/dual tags
 - acoustic failure
 - satellite failure



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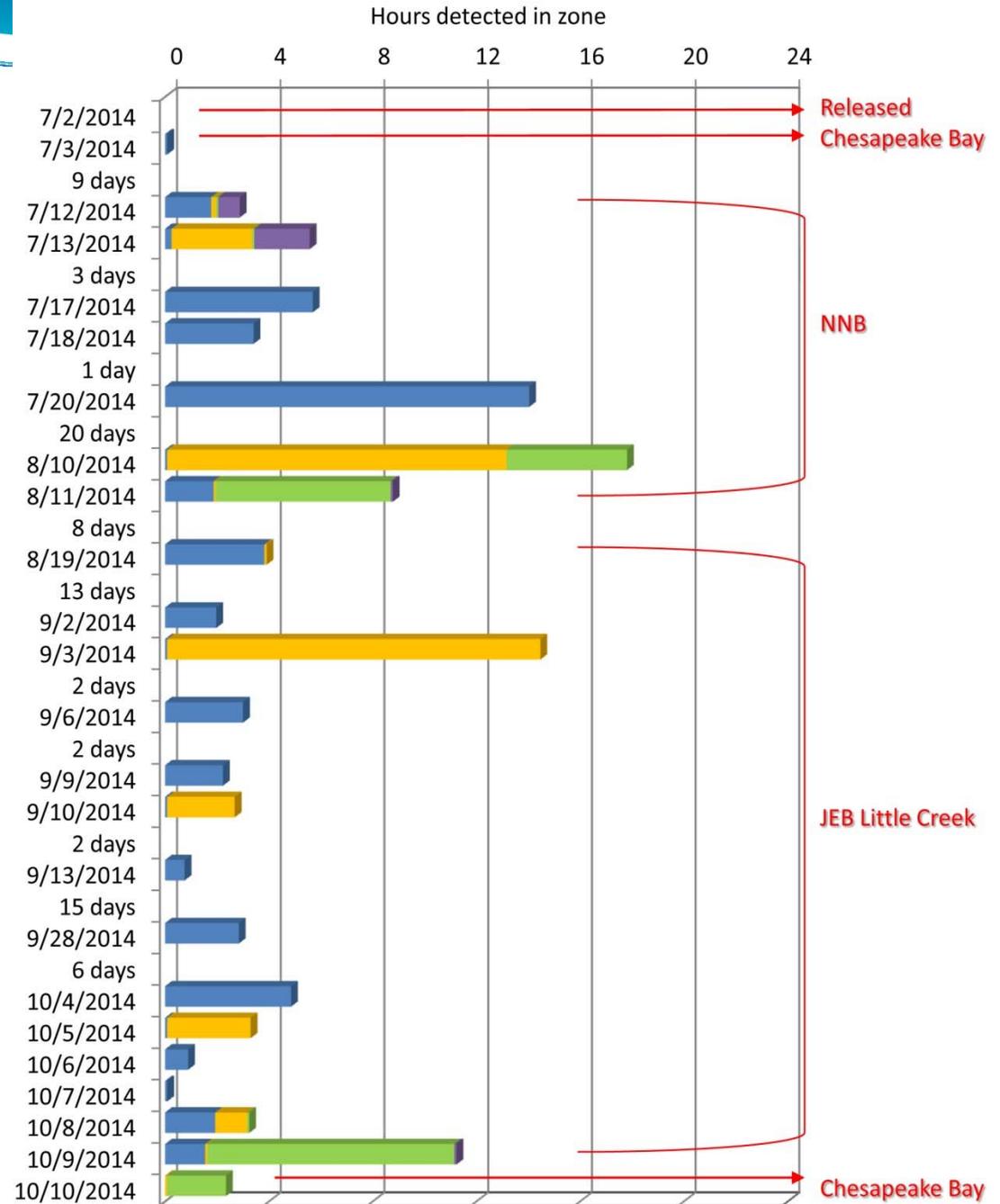
Movement patterns

- Duration
 - Detections with ≤ 60 min interval
 - 1 detection = 5 min
- Each bar = 1 day
- Each color = 1 duration
- Days with 0 detections



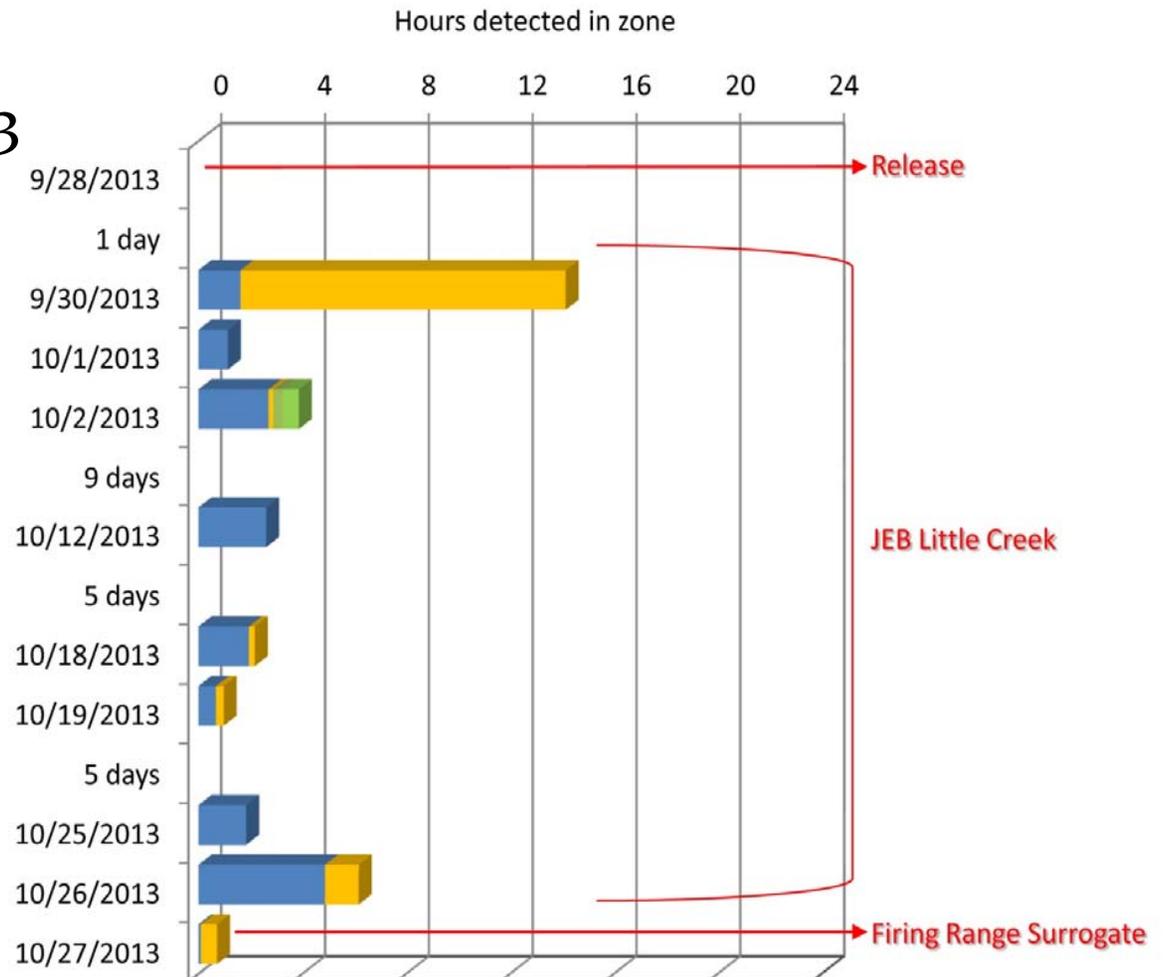
VAQS20142111 – Darth Vader

- Caught @ pier 6/17/14
released in ocean 7/2/14
- 1,516 detections
- 27 days
- 100 days post-release

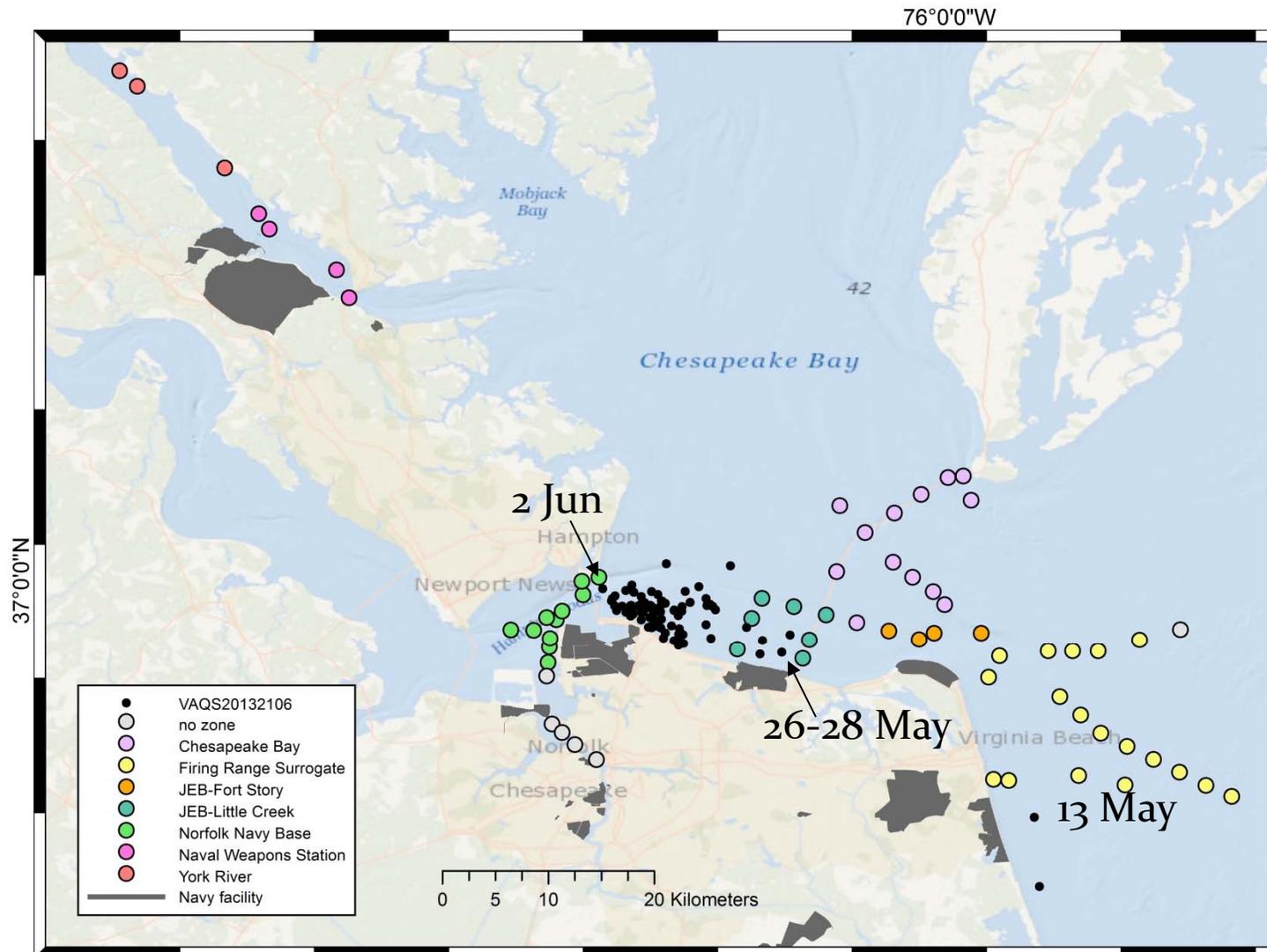


VAQS20132106 – St. Louis

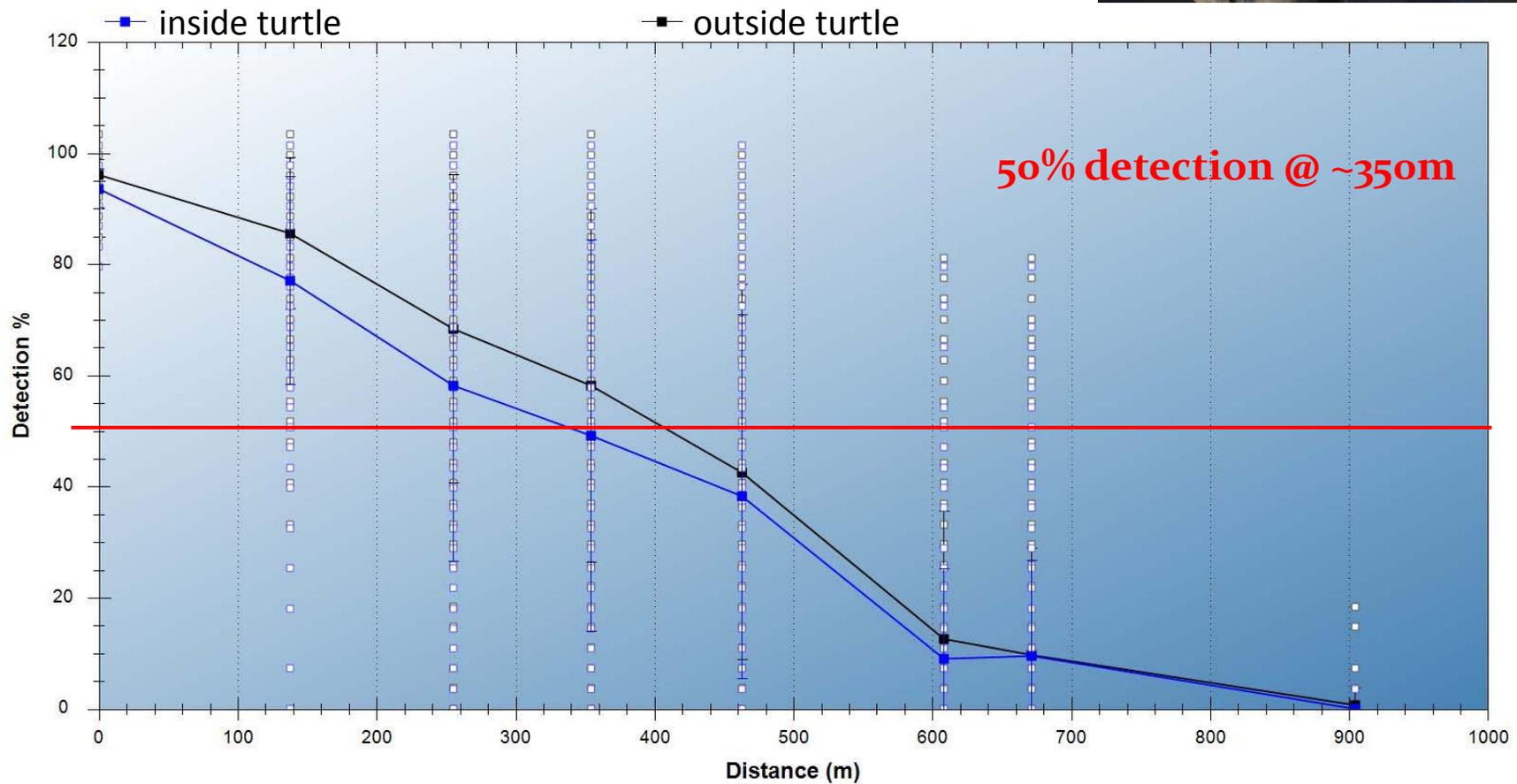
- Caught @ pier 8/3/13, released @ FLSP 9/9/13
- 393 detections
- 10 days
- 29 days post-release
- Habituated to pier?
- Acoustic tag failure



VAQS20132106 – May-Jun 2014 ARGOS & GPS

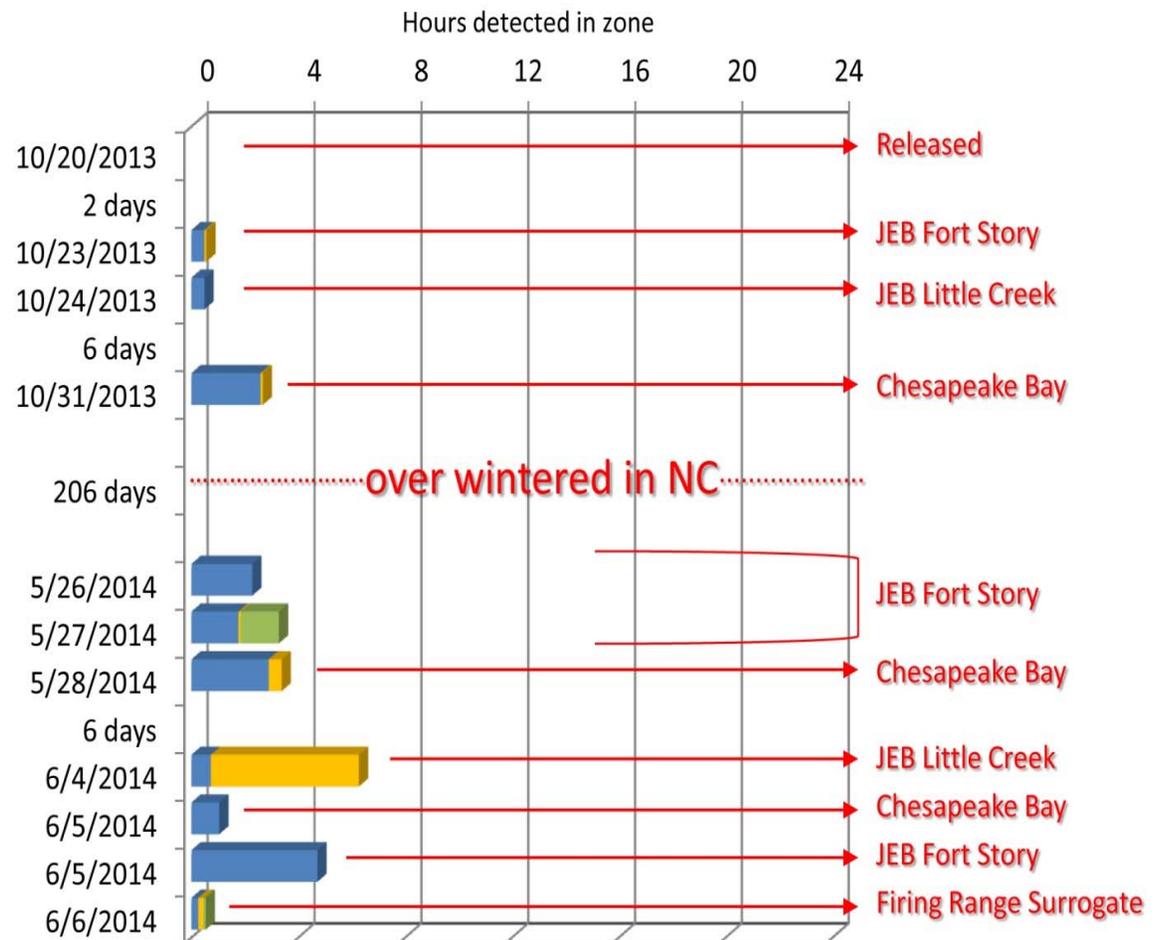


Range study

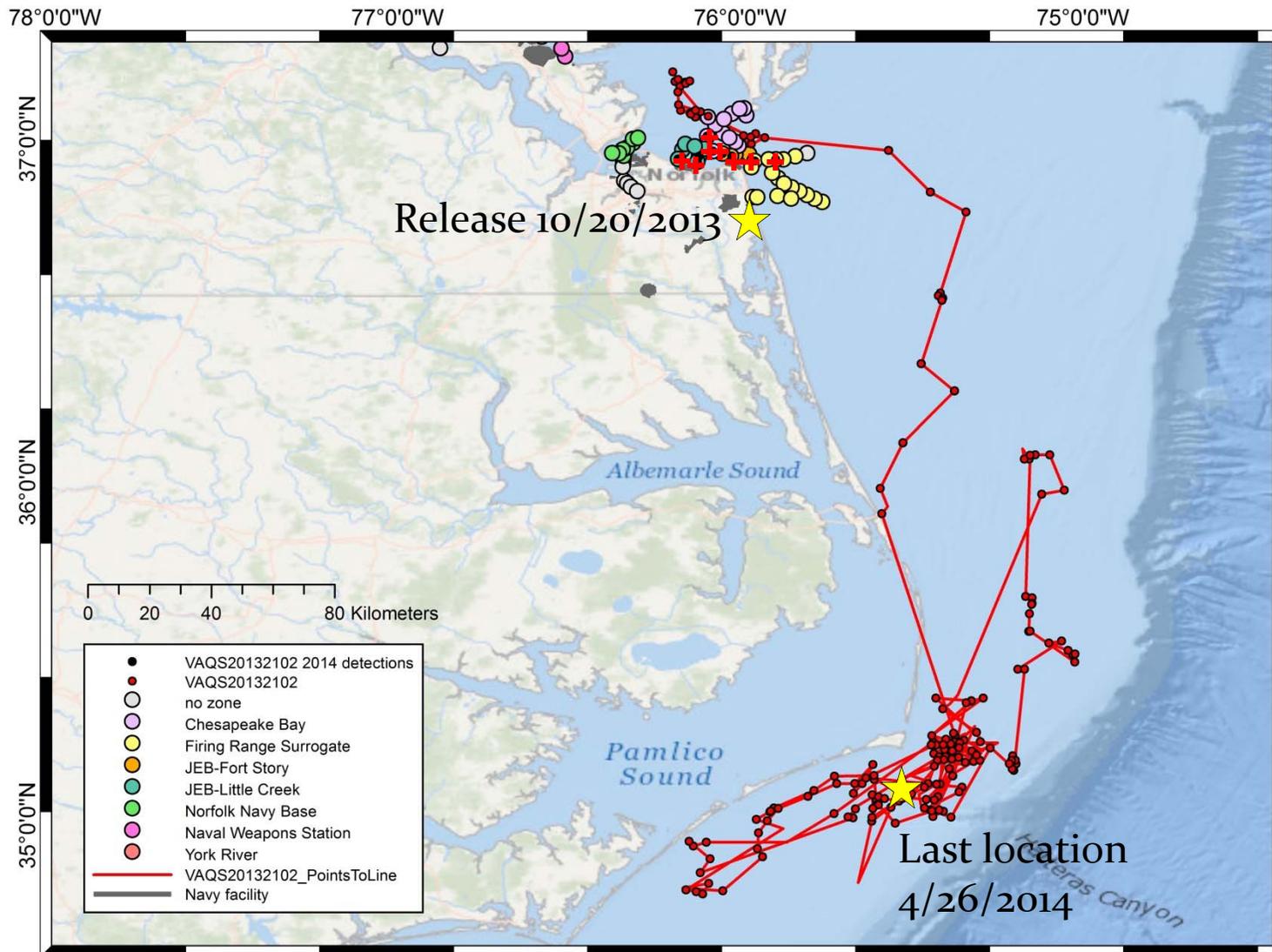


VAQS20132102 – Findlay

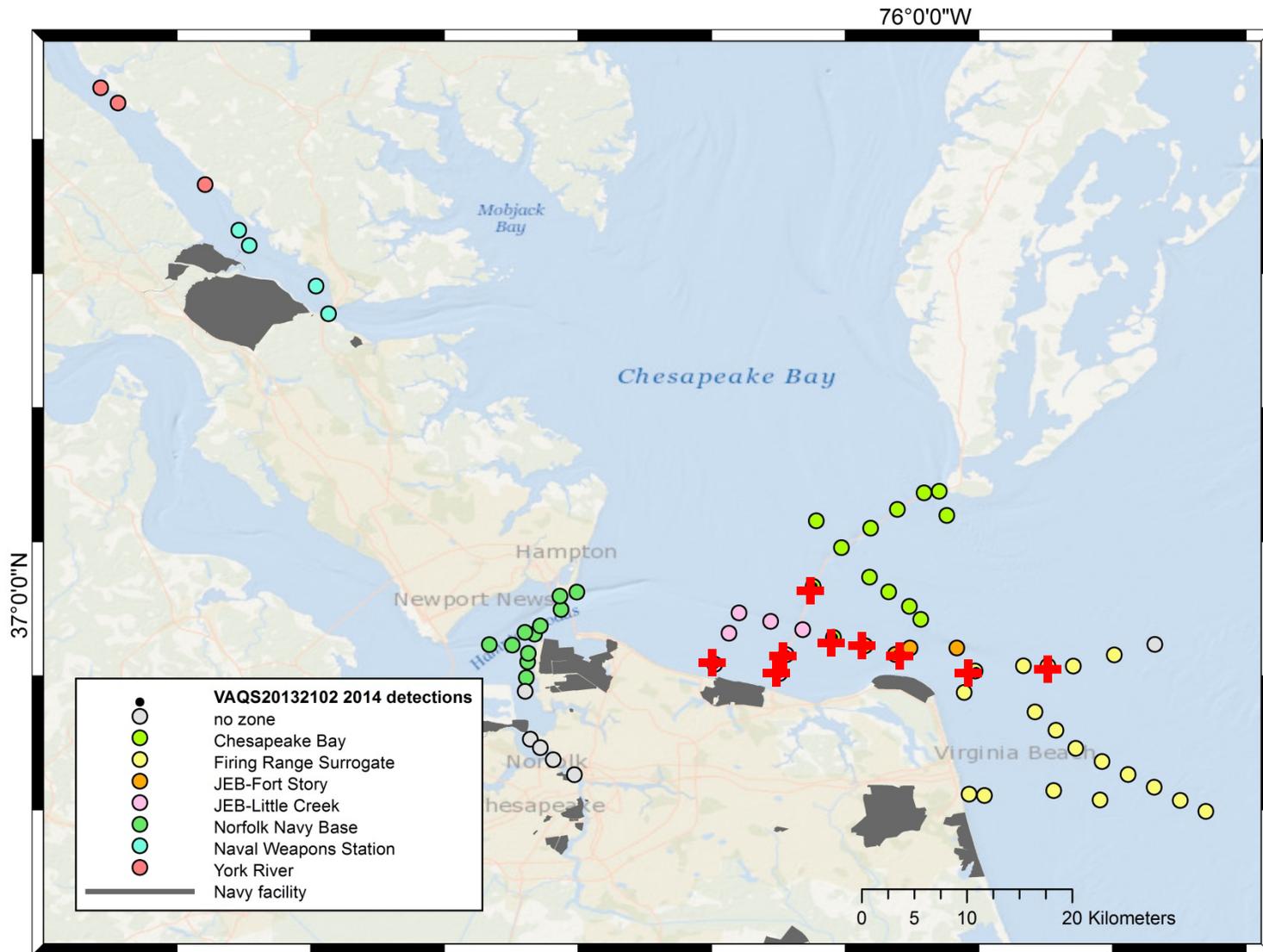
- Caught @ pier 7/30/13, released ocean 10/20/13
- 301 detections
- 9 days
- 230 days post-release
- Satellite tag 188 days



VAQS20132102 – Findlay satellite track

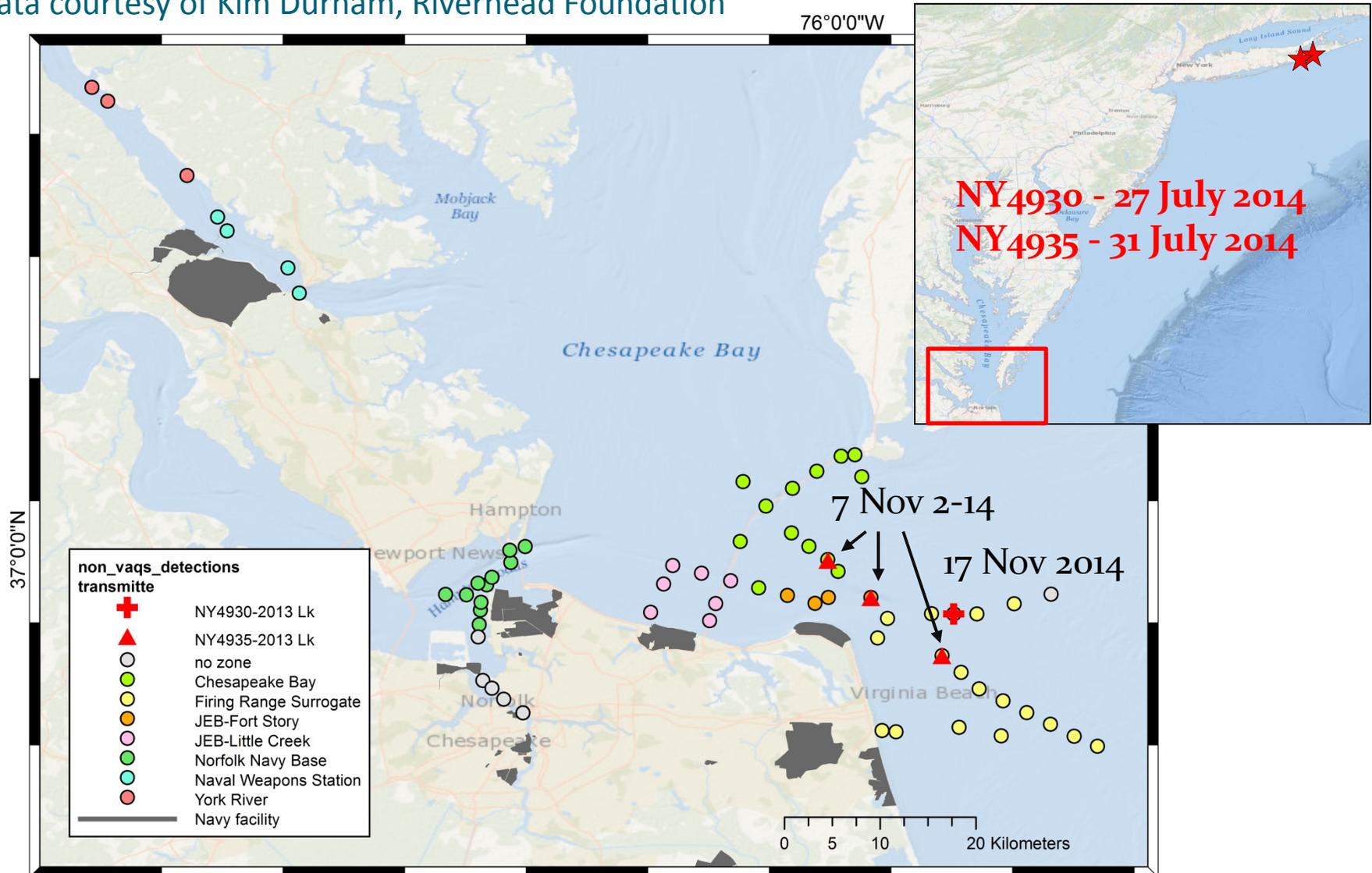


VAQS20132102 – Findlay



NY4930-2013 & NY4935-2013 – Lk 35.6 & 31.9cm SCL-NT

Data courtesy of Kim Durham, Riverhead Foundation



Summary

- Acoustic telemetry viable means of assessing sea presence in military zones
- Preliminary results
 - Loggerhead and Kemp's ridleys forage in the Navy Base zone in summer
 - Loggerheads may forage in the Little Creek zone in summer & fall, but this may be due in part to pier habituation
 - Firing Range Surrogate & Fort Story probably not foraging areas
 - Naval Weapons Station zone may be important for green turtles (n=1)
- Dual tagging providing valuable information on tag failure



turtle

Questions?

