Vessel Surveys and Visual Species-Verification Trials at the Jacksonville Shallow Water Training Range

2025

ANNUAL PROGRESS REPORT

PREPARED BY

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Short-finned pilot whales (*Globicephala macrorhynchus*) and the Research Vessel *Shearwater*. Photograph by Viola Panigada, taken under General Authorization Letter of Confirmation 25471 held by Andrew Read (Duke University).

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Acronyms and Abbreviations

°N	degrees north
°W	degrees west
AFTT	Atlantic Fleet Training and Testing
AUTEC	Atlantic Undersea Test and Evaluation Center
C	catalog size
CFMETR	Canadian Forces Maritime Experimental and Test Ranges
Ggr	*Grampus griseus* (Risso's dolphin)
ID	Identifier
JSWTR	Jacksonville Shallow Water Training Range
km	kilometer(s)
km^2	square kilometer(s)
M	matches
M3R	Marine Mammal Monitoring on Navy Ranges
N/A	not applicable
OBIS-SEAMAP	Ocean Biodiversity Information System Spatial Ecological Analysis of Megavertebrate Populations
OPAREA	Operating Area
photo-ID	photo-identification
PMRF	Pacific Missile Range Facility
R/V	Research Vessel
Sbr	*Steno bredanensis* (rough-toothed dolphin)
Sfr	*Stenella frontalis* (Atlantic spotted dolphin)
SOAR	Southern California Anti-submarine Warfare Range
SPOT	Smart Position and Temperature
Ttr	*Tursiops truncatus* (bottlenose dolphin)
U.S.	United States

1. Introduction

This report describes results from vessel surveys and visual species-verification trials conducted at the Jacksonville Shallow Water Training Range (JSWTR) within the Jacksonville Operating Area (OPAREA) during 2025. This work continues from the original multi-institutional monitoring program intended to provide information on the species composition, population identity, density, and baseline behavior of marine mammals and sea turtles present in United States (U.S.) Navy range complexes along the U.S. Atlantic Coast. This baseline monitoring program began in 2007, with aerial and vessel surveys as well as passive acoustic monitoring within Onslow Bay, North Carolina; it subsequently expanded to include study areas off the coast of Jacksonville, Florida; Cape Hatteras, North Carolina; and Virginia Beach, Virginia. In Onslow Bay, 6 years of monitoring yielded a comprehensive picture of the density, distribution, and abundance of marine mammals and sea turtles as well as provided new insights into residency patterns among pelagic delphinids within this region (Read et al. 2014). Dedicated survey effort within the Onslow Bay site concluded in 2013. Off the coasts of Cape Hatteras and Virginia Beach, more than a decade of surveys and passive acoustic monitoring have also provided information on the complex distribution patterns of the marine mammals and sea turtles within these highly productive areas, as well as their species diversity, and have formed the basis for several more recent focused monitoring projects. Additionally, more than 9 years of baseline monitoring within the Jacksonville OPAREA has provided similar information on the density and distribution of marine mammals and sea turtles (Foley et al. 2019).

Although the original standardized line-transect visual surveys and archival passive acoustic monitoring have been discontinued within the Atlantic Fleet Training and Testing (AFTT) OPAREAs, that foundational work has provided a robust baseline for several ongoing tagging and behavioral response projects (see Atlantic Behavioral Response Study, Mid-Atlantic Offshore Cetacean Monitoring, and Mid-Atlantic Nearshore & Mid-shelf Baleen Whale Monitoring). The JSWTR was installed in 2018, and a dedicated passive acoustic marine mammal monitoring system (Marine Mammal Monitoring on Navy Ranges [M3R]) was integrated in 2019. Small-vessel surveys resumed on JSWTR in 2018 to support development and calibration of detection and classification algorithms for the M3R system through visual species-verification trials. The present report describes vessel monitoring activities, including photo-identification (photo-ID), satellite tagging, biopsy sampling, and visual species verification at the Jacksonville study area in 2025. Photo-ID work for AFTT protected species monitoring at Cape Hatteras is reported separately (Waples and Read 2026).

This past year marked the end of planned vessel surveys and species verification trials conducted at JSWTR, so the present report serves as a final summary of this work.

2. Methods

2.1 Study Area

The study area within the Jacksonville OPAREA is 5,786 square kilometers (km^2), surrounding the JSWTR, which is approximately 1,700 km^2 in area. The study area straddles the continental shelf break, including some of the Blake Plateau, and includes both shelf and pelagic waters (**Figure 1**).

2.2 Data Collection

In February and November 2025, the study team employed visual survey methods to support species-verification trials in conjunction with the M3R system in coordination with the Naval Undersea Warfare Center, Division Newport (see **Section 5**). The study team conducted surveys from the Research Vessel (R/V) *Shearwater* (**Figure 2**) and R/V *Richard T. Barber (***Figure 3***)*.When the M3R team relayed a possible cetacean location (see Jarvis et al. 2014 for M3R methods), the research vessel transited to the provided coordinates, and two observers (one port and one starboard) scanned continuously from the bow of the vessel to 90 degrees abeam on both sides of the trackline. The study team recorded the location, species, and behavior of every cetacean group observed, as well as the location and species identity of all sea turtles. The team collected environmental conditions (weather conditions, Beaufort Sea state, depth, and sea-surface temperature) at each sighting and whenever survey conditions changed. The team logged sighting and environmental data on an iPad tablet linked to a Global Positioning System unit.

The study team examined use of the survey area by individual cetaceans using photo-ID and collected biopsy samples for analysis of population structure. The team obtained digital photographs to confirm species identification at each sighting. Photographs were taken with Canon or Nikon digital single-lens reflex cameras (equipped with 100- to 400-millimeter zoom lenses) in 24-bit color at a resolution of 6,016 × 4,016 pixels and saved them in .jpg format. Remote biopsy-sampling methods were used to collect small skin and blubber samples using a variety of 27- to 68-kilogram pull crossbows, depending on the species and sampling distance. The team collected biopsy samples with a specialized 2.5-centimeter stainless-steel biopsy tip attached to a modified bolt, typically fired from the survey vessel's bow. A Kingman Spyder paintball marker and pre-manufactured oil-based marking pellets (Nelson Paint Company, Kingsford, Michigan) were used to mark a bottlenose dolphin. Biopsy tips and standard 0.68 caliber (0.68-inch/17.3-millimeter diameter) paintballs were discharged between 4 and 30 meters from the animal at a maximum velocity of 86.9 meters per second. This is a typical safe operating velocity for human recreational use (Conn et al. 2007) and biopsy collection from marine mammals using crossbows (Sinclair et al. 2015).

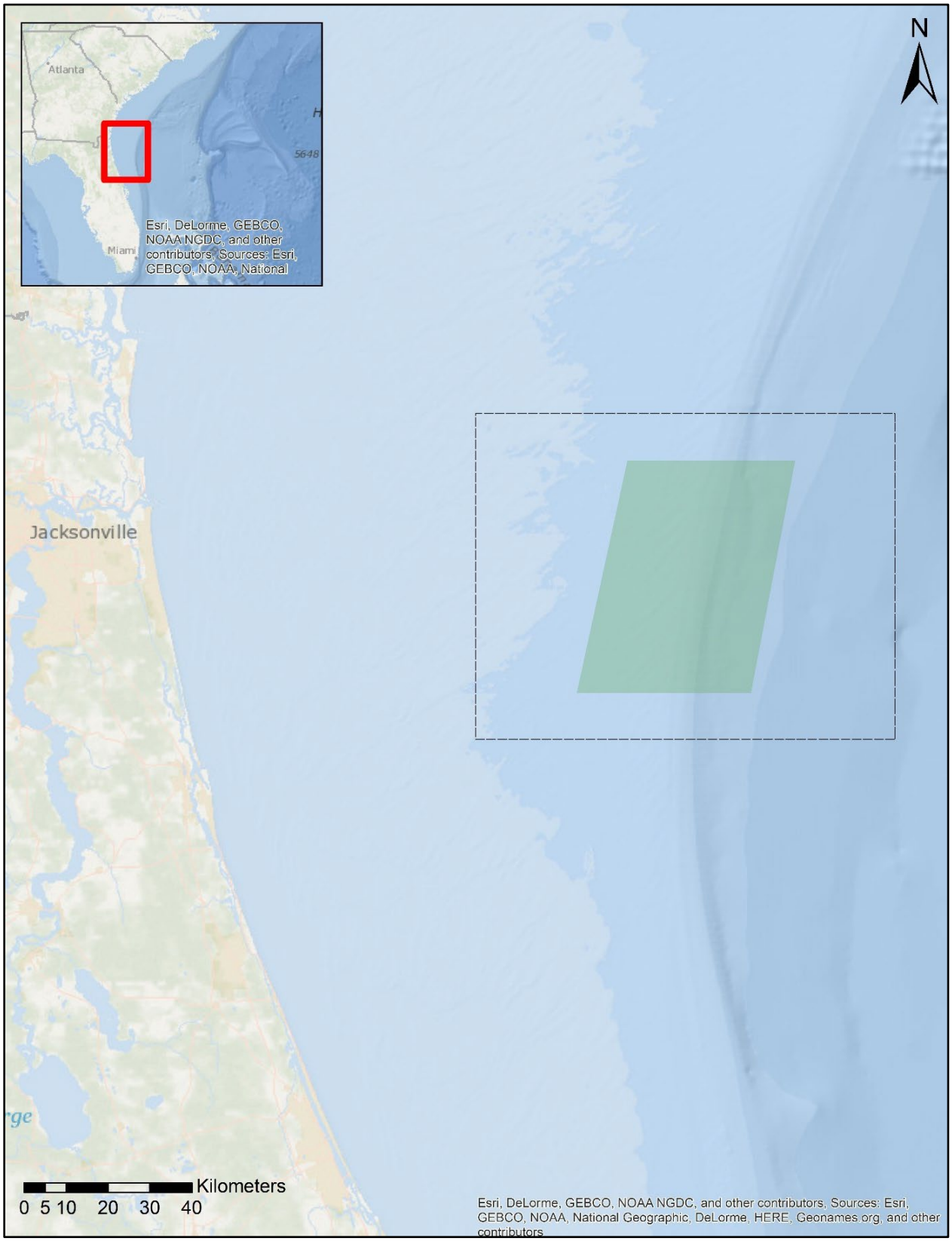

Figure 1. Map of the Jacksonville OPAREA (dashed outline) and the JSWTR site (green shaded box).

Figure 2. The R/V *Shearwater*.

Figure 3. The R/V *Richard T. Barber*.

2.3 Data Analysis

The study team mapped vessel survey effort and sighting data using ArcGIS Pro 3.02 (Esri, Redlands, California). All sighting data collected will be posted on the data archive Ocean Biodiversity Information System Spatial Ecological Analysis of Megavertebrate Populations (OBIS-SEAMAP).

2.4 Data Storage

The study team has archived all acoustic, visual survey, and photographic data on digital media, and backed them up on a Duke University network server.

3. Results

3.1 Vessel Survey Effort

During 2025, the study team conducted 5 days of vessel surveys within the Jacksonville study area and 2 additional days of opportunistic surveys during transits from Beaufort, North Carolina, totaling 528.4 kilometers (km) and 42 hours of survey effort (**Table 1**). The study team conducted these surveys in Beaufort Sea States 0 to 5 and covered the JSWTR site as well as shelf and pelagic waters between Florida and North Carolina (**Figure 4** through **Figure 6)**. The first survey effort was a trip from the R/V Shearwater, departing from and arriving back to Beaufort, NC. The second survey effort during a brief weather window in November was with the smaller R/V Barber, which the team trailered to Jacksonville Florida.

Table 1. Dates, distances, and durations surveyed during vessel surveys within the Jacksonville survey area during 2025.

Date	Beaufort Sea State	Distance Surveyed (km)	Survey Time (hours:minutes)	At-Sea Time (hours:minutes)	Platform
2-Feb-25	—	—	—	7:36	R/V *Shearwater*
3-Feb-25	2–4	—	—	24:00	R/V *Shearwater*
4-Feb-25	3–4	120.4	10:10	24:00	R/V *Shearwater*
5-Feb-25	0–2	105.6	10:16	24:00	R/V *Shearwater*
6-Feb-25	3–5	87.0	9:35	24:00	R/V *Shearwater*
7-Feb-25	—	—	—	9:37	R/V *Shearwater*
20-Nov-25	3–4	54.5	4:54	10:16	R/V *Richard T. Barber*
21-Nov-25	2–4	160.9	6:44	11:08	R/V *Richard T. Barber*

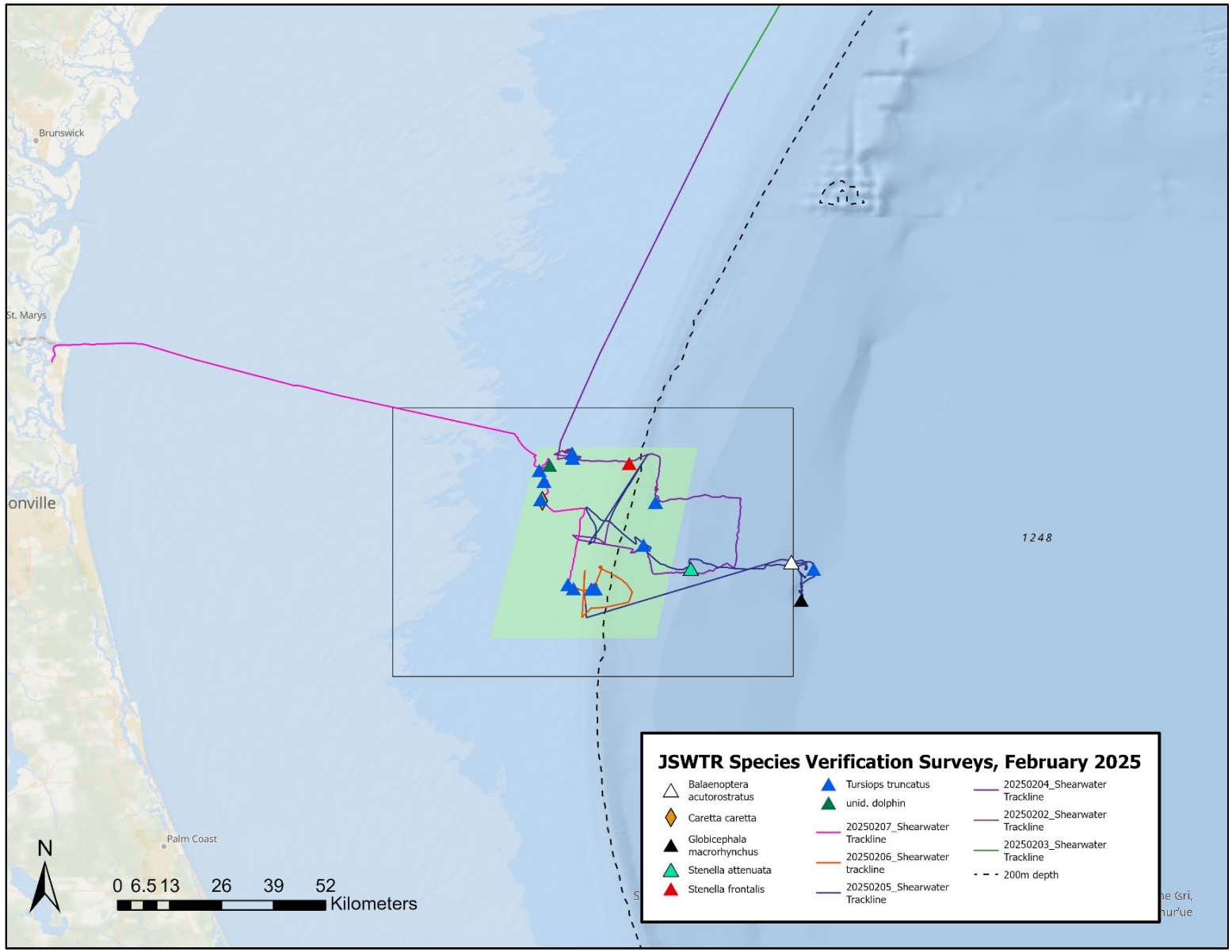

Figure 4. Vessel survey effort conducted by the R/V *Shearwater* for February 2025 within the Jacksonville survey area.

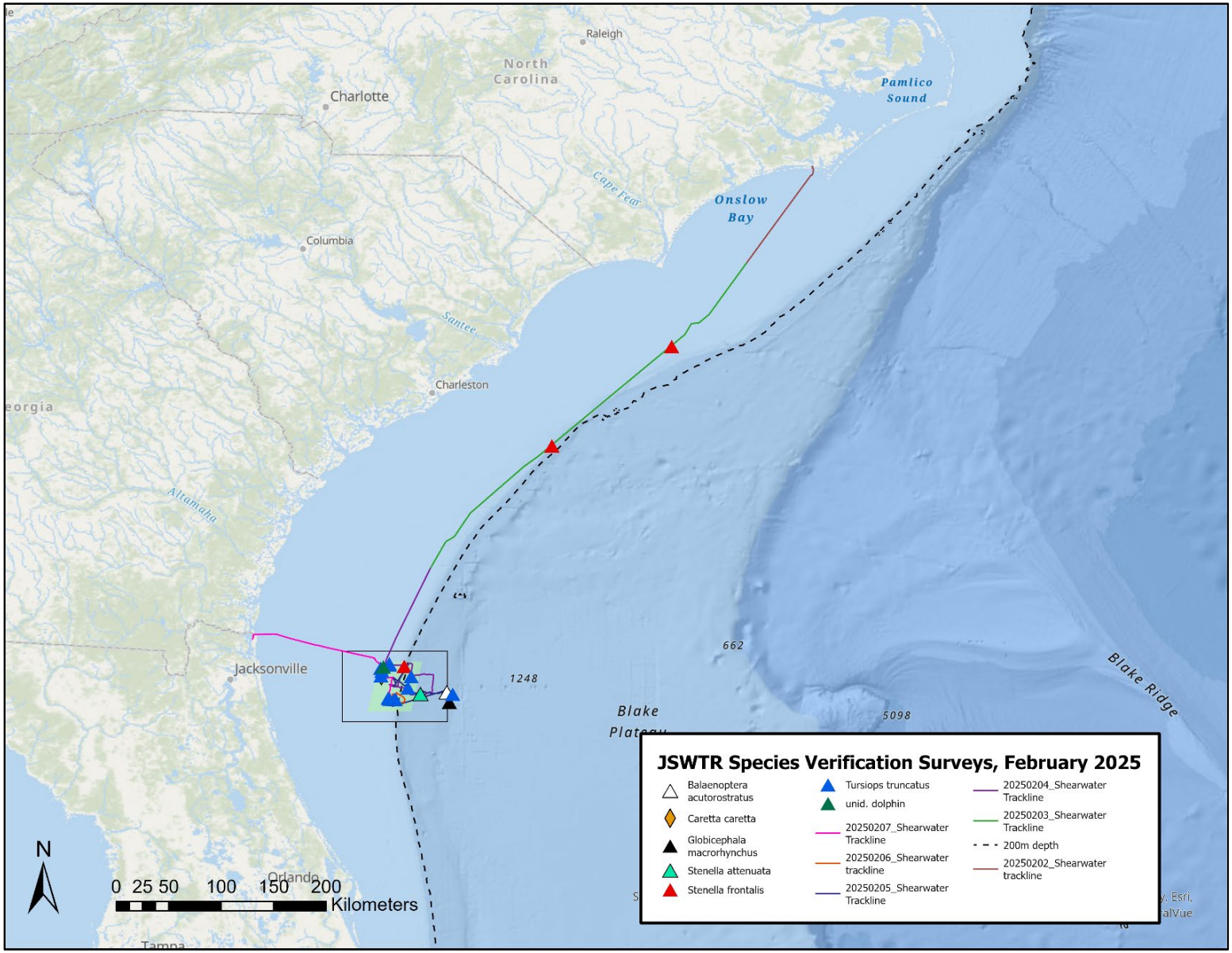

Figure 5. Vessel survey effort conducted by the R/V *Shearwater* for February 2025 during transits and surveys.

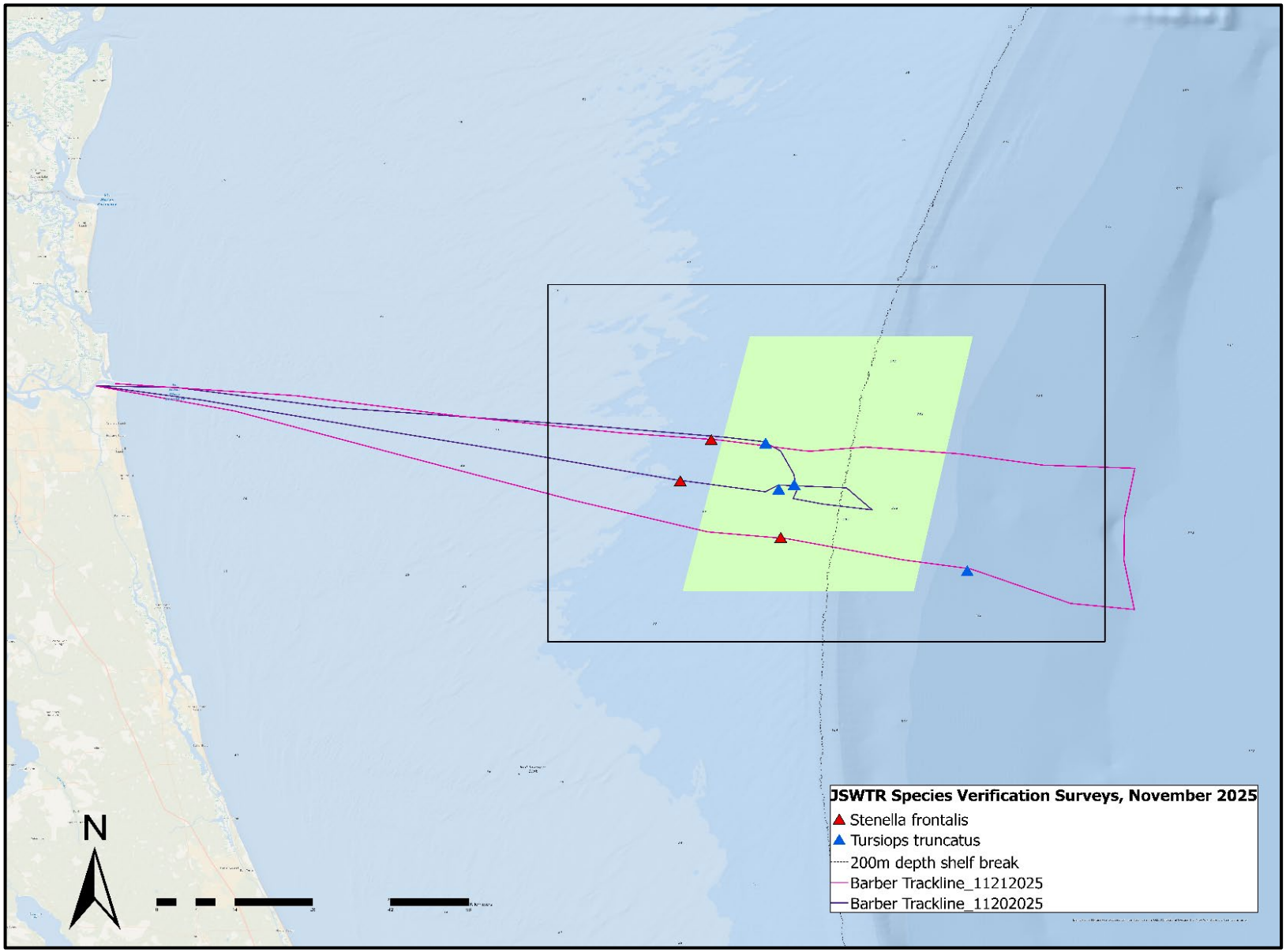

Figure 6. Vessel survey effort conducted by the R/V *Barber* for November 2025.

3.2 Marine Mammal and Sea Turtle Sightings

The study team recorded 26 cetacean sightings during vessel surveys (**Table 2** and **Table 3**). Atlantic spotted (*Stenella frontalis*; *n*=11) and bottlenose (*Tursiops truncatus*; *n*=9) dolphins dominated the marine mammal fauna. The team also observed a single group of short-finned pilot whales (*Globicephala macrorhynchus*) and a group of three minke whales (*Balaenoptera acutorostrata*) as well as a loggerhead sea turtle (*Carreta caretta*) during 2025 (**Table 4**).

3.3 Distributions and Habitat Associations of Cetaceans

The distribution of marine mammal sightings from North Carolina to Florida and within the Jacksonville survey area is similar to previous years (**Figure 7**)**.** As in most previous years, Atlantic spotted dolphins were restricted to shallow shelf waters, while bottlenose dolphins were observed in both the shallow shelf waters and offshore of the continental shelf break. The study team also observed minke whales and short-finned pilot whales offshore of the shelf break; the minke whales were sighted on the edge of the defined Jacksonville OPAREA, while the short-finned pilot whales were just outside of it (**Figure 7**). This was the second time observing minke whales during Jacksonville vessel surveys, the prior time being in 2023. All other minke whales observed on or near JSWTR were observed during previous AFTT aerial surveys during winter. The group of three included a mother and calf pair as well as a presumed adult male escort.

3.4 Biopsy Sampling, Paintball Marking, and Genetic Analyses

The study team collected three biopsy samples within the Jacksonville survey area during 2025. One sample was from a bottlenose dolphin, one was from an Atlantic spotted dolphin, and the third was from a minke whale (**Table 5**, **Figure 8**). This was the first minke whale biopsy sample collected within the Jacksonville study area, and polymerase chain reaction analysis confirmed the individual as a male. The team archived voucher specimens of these samples at the Duke University Marine Laboratory in Beaufort, North Carolina. Additionally, one bottlenose dolphin was marked with a paintball (**Table 5**).

3.5 Satellite Tagging

During February 2025, the survey team coordinated with Jessica Aschettino, HDR Inc., to deploy satellite tags. Three Low-Impact Minimally Percutaneous Electronic Transmitter SPLASH tags (GmTag229-231) and one Smart Position and Temperature (SPOT) tag (GmTag232) were deployed in a group of eight short-finned pilot whales (**Table 6**, **Figure 8**). An additional SPOT tag (GmTag233) was deployed in a nearby subgroup of approximately 24 animals, consisting of smaller adults and several mothers with large calves (**Table 6**, **Figure 8**). All of these tagged whales moved southward shortly after tagging (**Figure 9** through **Figure 13**). GmTag229 through 232 appear to have traveled together west of the Bahamas and through the Straits of Florida. They moved as far south as Cay Sal Bank, then started to return northward before transmission ended. GmTag233 had the longest transmission period, lasting from 5 February to 13 April. Upon reaching Bahamian waters, GmTag233 traveled southward to the eastern side of Great Abaco Island, then cut southwestward between Long and Crooked Islands toward Cuba, before staying within the Old Bahama Channel off northeastern Cuba until transmission ended on 13 April (**Figure 13**).

Table 2. Cetacean sightings from vessel surveys within and in transit to the Jacksonville study area during 2025.

Date	Time (local)	Latitude (°N)	Longitude (°E)	Species	Common Name	Group Size	Biopsy Samples	Photo-ID Images
3-Feb-25	6:46:00	33.18370	77.88166	*Stenella frontalis*	Atlantic spotted dolphin	10	0	0
3-Feb-25	12:58:00	32.33324	78.90632	*Stenella frontalis*	Atlantic spotted dolphin	8	0	0
4-Feb-25	9:29:00	30.46848	80.29824	*Tursiops truncatus*	Bottlenose dolphin	6	0	0
4-Feb-25	9:50:00	30.45750	80.29722	*Tursiops truncatus*	Bottlenose dolphin	6	0	6
4-Feb-25	10:51:00	30.44524	80.16994	*Stenella frontalis*	Atlantic spotted dolphin	10	0	91
4-Feb-25	12:55:00	30.35822	80.11098	*Tursiops truncatus*	Bottlenose dolphin	2	0	26
4-Feb-25	16:56:00	30.26177	80.13815	*Tursiops truncatus*	Bottlenose dolphin	3	ZTS-25-003	130
5-Feb-25	10:30:00	30.20830	80.03163	*Stenella attenuata*	Pantropical spotted dolphin	3	ZTS-25-004	180
5-Feb-25	12:31:00	30.20734	79.75586	*Tursiops truncatus*	Bottlenose dolphin	40	0	68
5-Feb-25	13:23:00	30.13784	79.78375	*Globicephala macrorhynchus*	Short-finned pilot whale	32	0	957
5-Feb-25	17:43:00	30.22340	79.80578	*Balaenoptera acutorostrata*	Minke whale	3	ZTS-24-005	428
6-Feb-25	9:57:00	30.16371	80.24635	*Tursiops truncatus*	Bottlenose dolphin	3	0	29
6-Feb-25	10:25:00	30.16302	80.25545	*Tursiops truncatus*	Bottlenose dolphin	8	0	124
6-Feb-25	10:56:00	30.16410	80.29525	*Tursiops truncatus*	Bottlenose dolphin	2	0	13
6-Feb-25	11:55:00	30.17343	80.30762	*Tursiops truncatus*	Bottlenose dolphin	2	0	0
6-Feb-25	13:55:00	30.35895	80.36509	*Caretta caretta*	Loggerhead sea turtle	1	0	0
6-Feb-25	14:16:00	30.36435	80.36893	*Tursiops truncatus*	Bottlenose dolphin	9	0	168
6-Feb-25	15:08:00	30.40507	80.36125	*Tursiops truncatus*	Bottlenose dolphin	2	0	0
6-Feb-25	16:07:00	30.44140	80.34910	Unidentified dolphin	N/A	2	0	0
6-Feb-25	16:48:00	30.42957	80.37201	*Tursiops truncatus*	Bottlenose dolphin	5	0	53
20-Nov-25	9:19:00	30.30112	80.34948	*Tursiops truncatus*	Bottlenose dolphin	6	0	54
20-Nov-25	10:35:00	30.23097	80.30326	*Tursiops truncatus*	Bottlenose dolphin	21	0	349
20-Nov-25	13:30:00	30.22318	80.32815	*Tursiops truncatus*	Bottlenose dolphin	4	0	3
20-Nov-25	14:11:00	30.23681	80.48707	*Stenella frontalis*	Atlantic spotted dolphin	7	0	30
21-Nov-25	8:38:00	30.14118	80.32496	*Stenella frontalis*	Atlantic spotted dolphin	7	0	104
21-Nov-25	9:47:00	30.08533	80.02398	*Tursiops truncatus*	Bottlenose dolphin	2	0	26
21-Nov-25	15:28:00	30.30654	80.43716	*Stenella frontalis*	Atlantic spotted dolphin	7	0	99
3-Feb-25	6:46:00	33.18370	77.88166	*Stenella frontalis*	Atlantic spotted dolphin	10	0	0

Key: °N = degrees north; °W = degrees west; N/A = not applicable

Table 3. Cetacean sightings by species from vessel surveys within the Jacksonville study area during 2025.

Species	Sightings 2025
Stenella frontalis	4
Tursiops truncatus	16
Stenella attenuata	1
Globicephala macrorhynchus	1
Balaenoptera acutorostrata	1
Total	**27**

Table 4. Sea turtle sightings from vessel surveys within the Jacksonville study area during 2025.

Date	Time (local)	Latitude (°N)	Longitude (°W)	Species	Common Name	Group Size
6-Feb-2025	13:55:00	30.35895	80.36509	*Caretta caretta*	Loggerhead sea turtle	1

Key: °N = degrees north; °W = degrees west

Table 5. Biopsy samples collected and paintball marking effort within the Jacksonville study area during 2025.

Date	Time (local)	Latitude (°N)	Longitude (°W)	Species	Sample ID
4-Feb-25	16:56:00	30.26177	80.13815	*Tursiops truncatus*	ZTS-25-003
4-Feb-25	16:56:00	30.26177	80.13815	*Tursiops truncatus*	Red/Yellow
5-Feb-25	10:30:00	30.20830	80.03163	*Stenella attenuata*	ZTS-25-004
5-Feb-25	17:43:00	30.22340	79.80578	*Balaenoptera acutorostrata*	ZTS-24-005

Key: °N = degrees north; °W = degrees west

Table 6. Satellite tags deployed within the Jacksonville survey area during 2025.

Date	Time (local)	Latitude (°N)	Longitude (°W)	Species	Tag #
5-Feb-25	14:02:00	30.15198	79.7828	*Globicephala macrorhynchus*	GmTag229
5-Feb-25	14:09:00	30.15186	79.7856	*Globicephala macrorhynchus*	GmTag230
5-Feb-25	14:22:00	30.15553	79.7885	*Globicephala macrorhynchus*	GmTag231
5-Feb-25	14:44:00	30.16435	79.7827	*Globicephala macrorhynchus*	GmTag232
5-Feb-25	15:56:00	30.18694	79.7758	*Globicephala macrorhynchus*	GmTag233

Notes: °N = degrees north; °W = degrees west

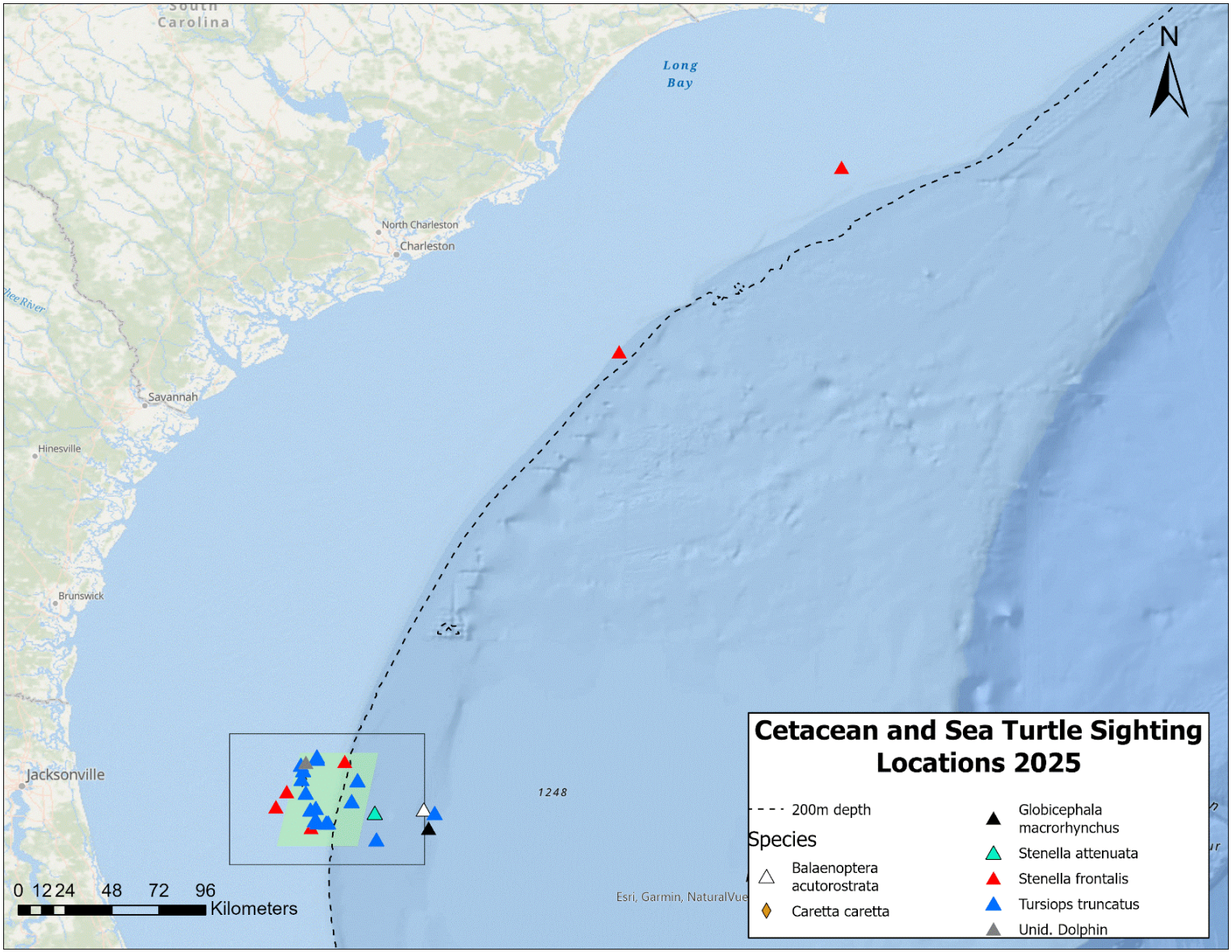

Figure 7. Distribution of all cetacean and sea turtle sightings during vessel surveys in 2025. Dashed line represents the 200-meter isobath.

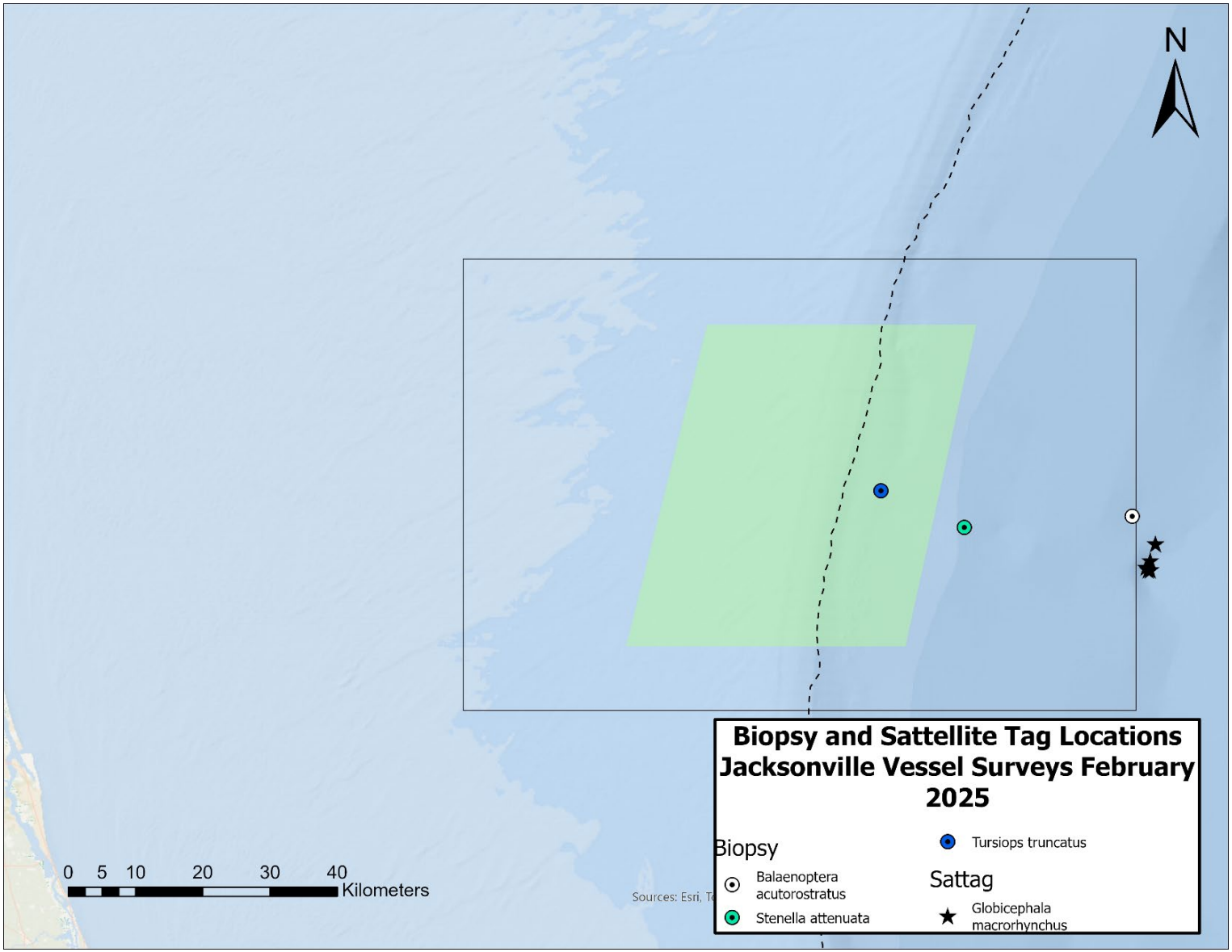

Figure 8. Locations of biopsy samples collected and satellite tags deployed within the Jacksonville survey area in 2025. Dashed line represents the 200-meter isobath.

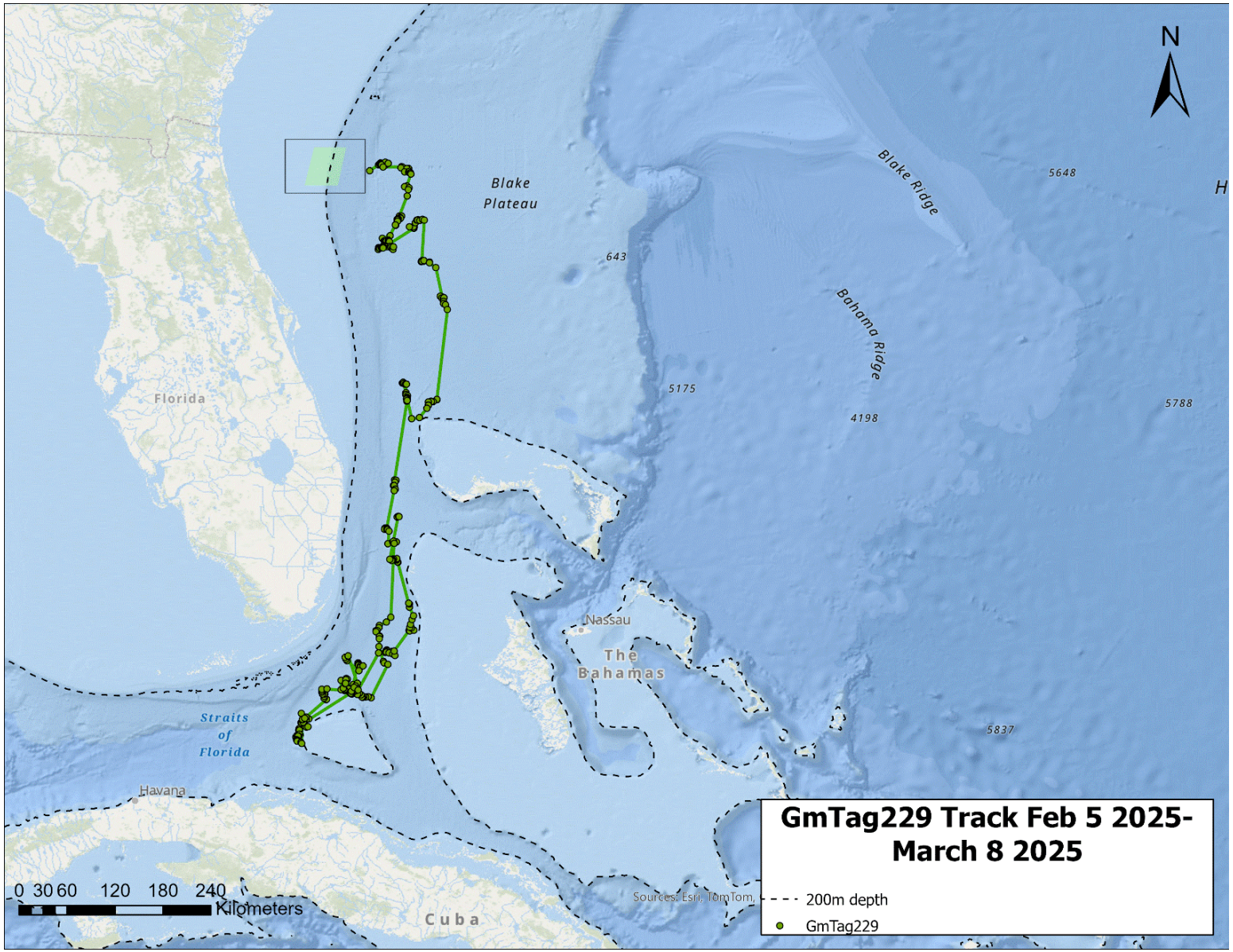

Figure 9. All Argos positions of GmTag229; last transmission was on 8 March 2025.

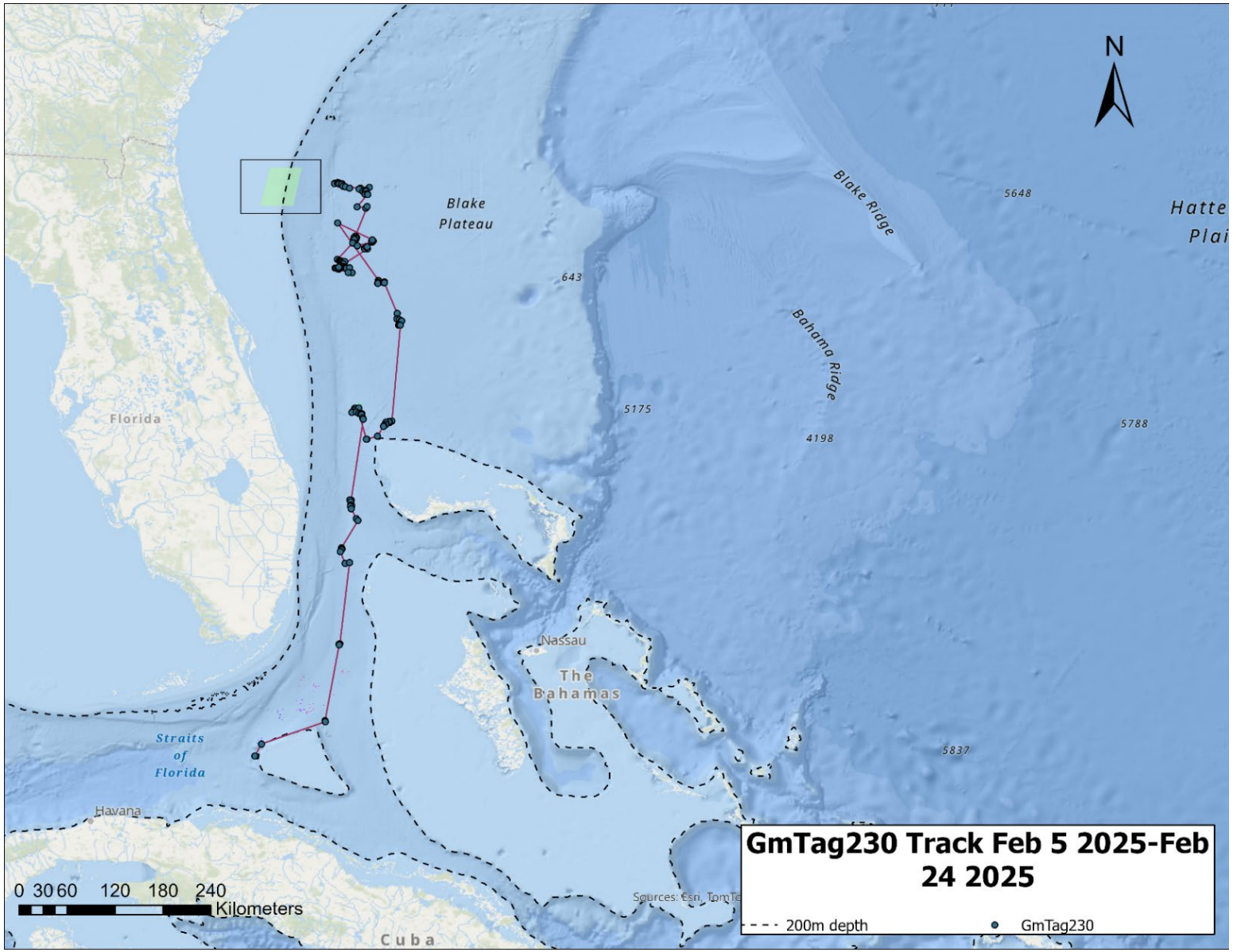

Figure 10. All Argos positions of GmTag230; last transmission was on 24 February 2025.

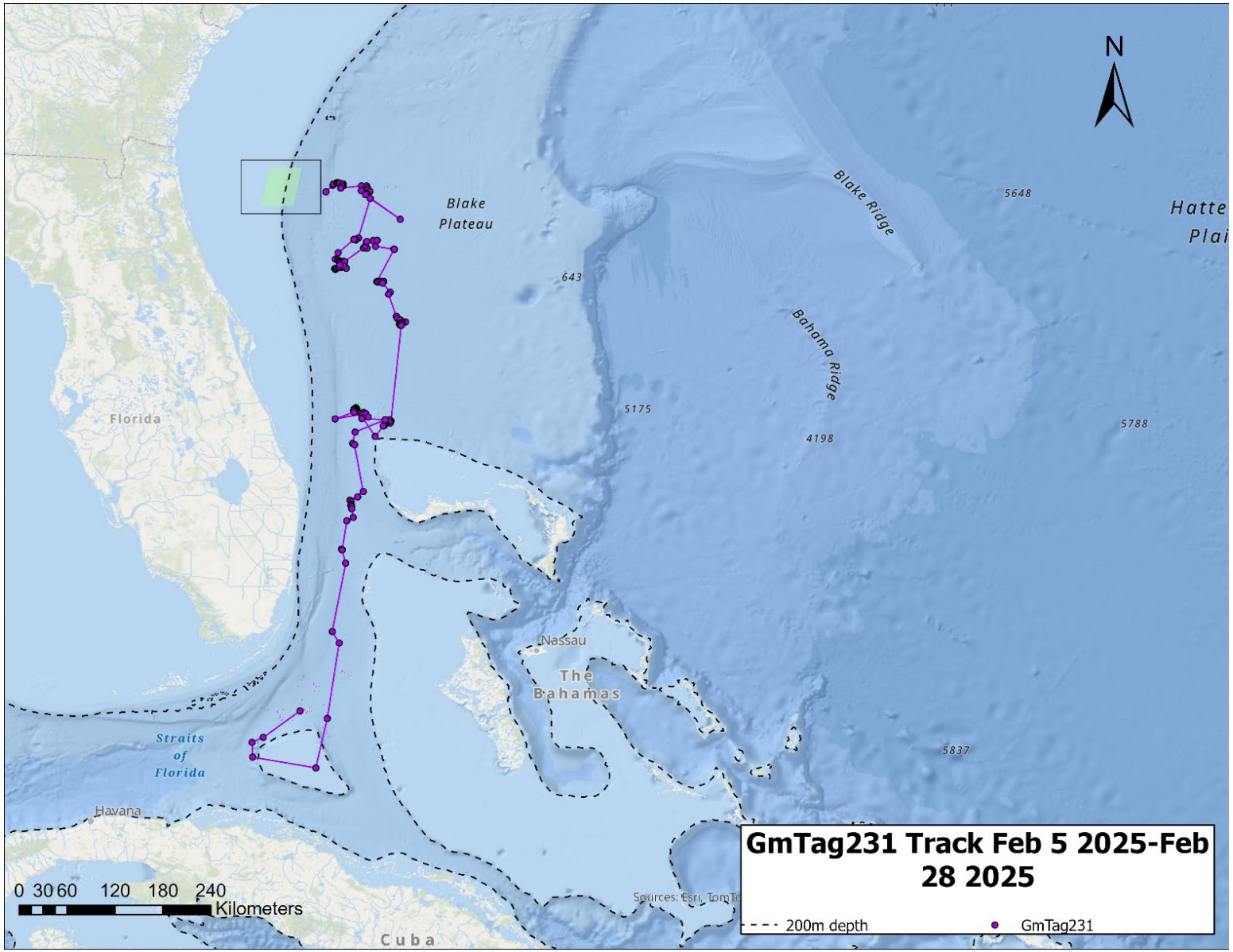

Figure 11. All Argos positions of GmTag231; last transmission was on 28 February 2025.

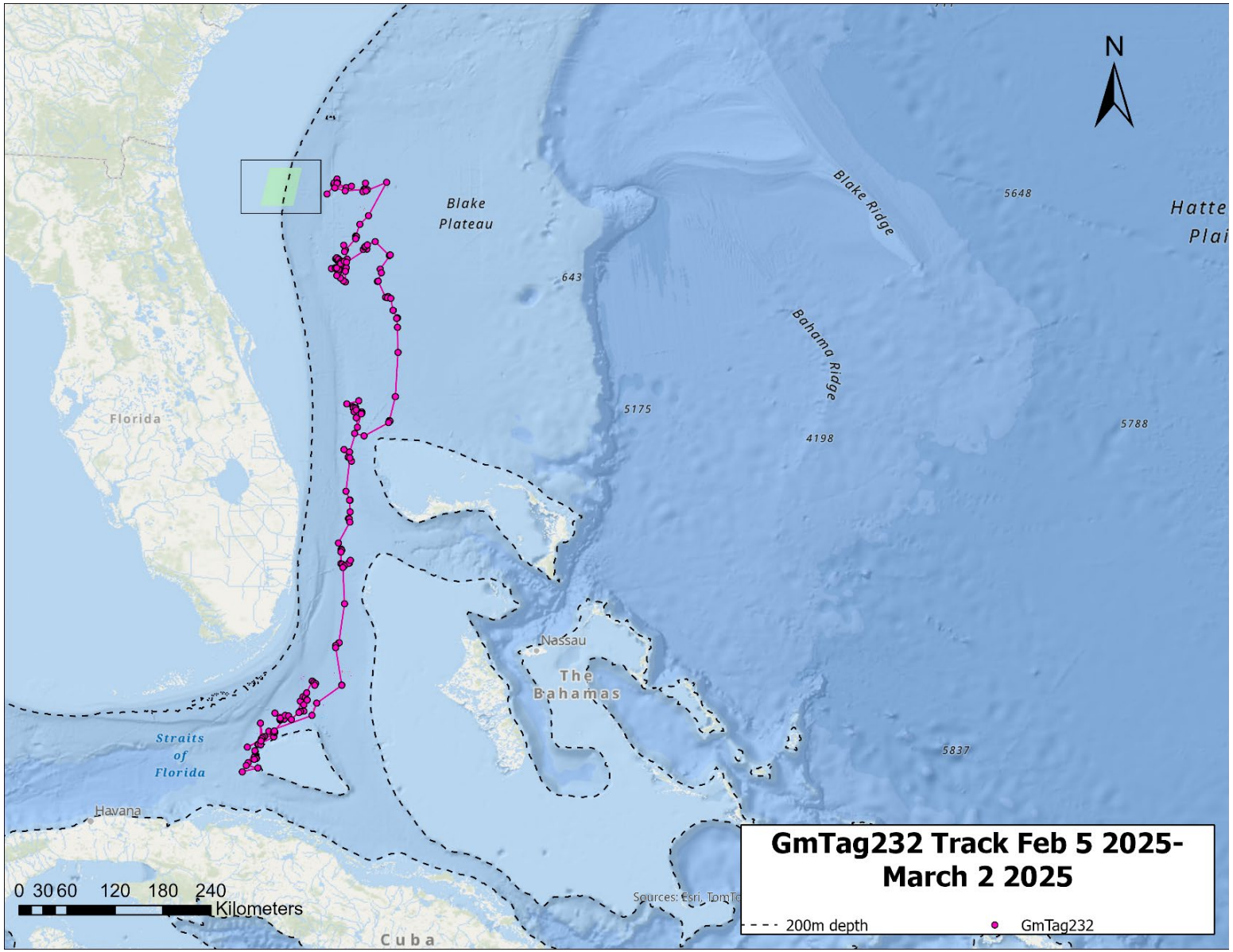

Figure 12. All Argos positions of GmTag232; last transmission was on 2 March 2025.

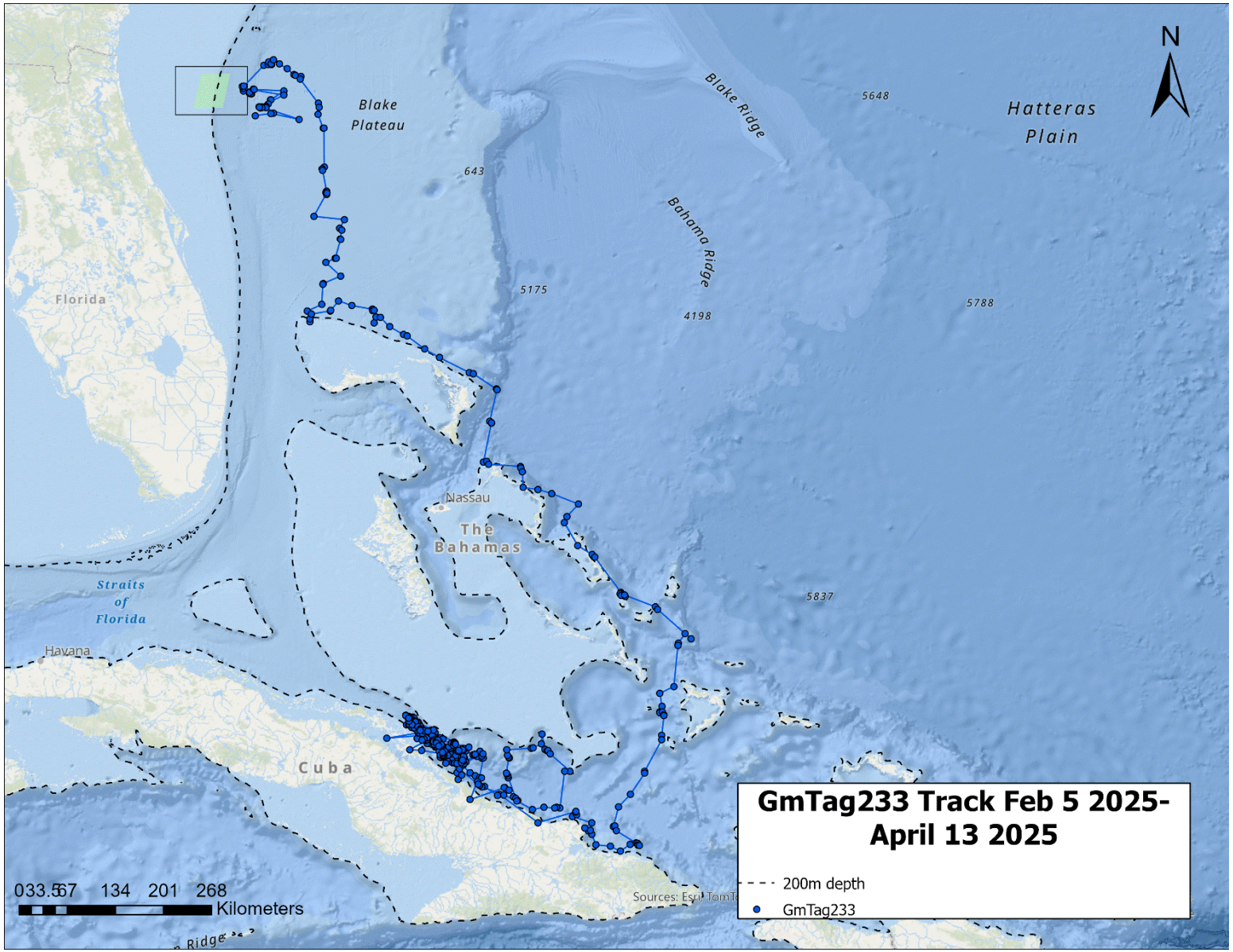

Figure 13. All Argos positions of GmTag233; last transmission was on 13 April 2025.

3.6 Photographic Effort

The study team collected 2,938 digital images of cetaceans for species confirmation and individual identification during 2025. The team coded and graded all images for distinctiveness and photographic quality. Photo-ID analysis identified the following new individuals: 26 bottlenose dolphins, 9 Atlantic spotted dolphins, 1 pantropical spotted dolphin (*Stenella attenuata*), 15 short-finned pilot whales, and 2 minke whales. These individuals have been added to the existing catalogs; no matches to any of the catalogs were identified. (**Table 7**).

Table 7. Summary of photographs taken of animals within the Jacksonville survey area during 2025, with photo-ID catalog sizes and total numbers of catalog matches to date.

Species	Common Name	2025 Images	Catalog Size	Matches to Date
Globicephala macrorhynchus	Short-finned pilot whale	957	67	0
Grampus griseus	Risso's dolphin	0	73	1
Stenella frontalis	Atlantic spotted dolphin	324	310	29
Tursiops truncatus	Bottlenose dolphin	1,049	259	34
Steno bredanensis	Rough-toothed dolphin	0	85	11
Pseudorca crassidens	False killer whale	0	15	0
Stenella attenuata	Pantropical spotted dolphin	180	1	0
Balaenoptera acutorostrata	Common minke whale	428	2	0

A new catalog was created for minke whales to include the two adult individuals identified in February 2025. A new catalog was also created for a single pantropical spotted dolphin identified during the same survey. No re-sightings were identified this year, but **Table 8** provides a detailed summary of re-sightings observed to date, which are shown on **Figure 14**.

Table 8. Photo-ID matches of delphinids observed within the Jacksonville survey area.

ID[a]	Year[b]														
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2021	2022	2023	2024	2025
Ttr 1-017	—	—	—	—	—	—	—	—	—	—	X[m]	—	—	—	—
Ttr 1-018	—	—	—	—	—	—	—	—	—	—	X[m]	—	—	—	—
Ttr 1-023	—	—	—	—	—	—	—	—	—	—	X[m]			X	—
Ttr 6-007	—	—	—	—	X	—	—	—	X	—	—	—	—	—	—
Ttr 6-010[c]	—	—	—	X	X	—	—	—	—	—	—	—	—	—	—
Ttr 6-029	—	—	—	—	—	—	—	X	—	—	—	X	—	—	—
Ttr 6-036[c]	—	—	—	X	X	—	—	—	—	—	—		—	—	—
Ttr 6-037[c]	—	—	—	—	X	—	—	—	X	—	—	—	—	—	—
Ttr 6-038[c]	—	—	—	—	X	—	—	—	X	—	—	—	—	—	—
Ttr 6-043	—	—	—	—	—	—	—	—	—	—	X	X	X	—	—
Ttr 6-047	—	—	—	—	—	—	—	—	—	—	X[m]	—	—	—	—
Ttr 6-048	—	—	—	—	—	—	—	—	—	—	X[m]	—	—	—	—
Ttr 6-050	—	—	—	—	—	—	—	—	—	—	X[m]	—	—	—	—
Ttr 6-051	—	—	—	—	—	—	—	—	—	—	X[m]	—	—	—	—
Ttr 7-010	—	—	—	X	—	—	—	—	—	—	—	X	—	—	—
Ttr 7-022[c]	—	—	—	—	—	—	X	—	X	—	—	—	—	—	—
Ttr 7-030[c]	—	—	—	—	—	—	X[y]	—	X	—	—	—	—	—	—
Ttr 7-031[c]	—	—	—	—	—	—	X	—	X	—	—	—	—	—	—
Ttr 7-042	—	—	—	—	—	—	—	—	—	—	X[m]	—	—	—	—
Ttr 7-043	—	—	—	—	—	—	—	—	—	—	X[m]	—	—	—	—
Ttr 7-047	—	—	—	—	—	—	—	—	—	—	X[m]	—	—	—	—
Ttr 7-051	—	—	—	—	—	—	—	—	—	—	—	X[m]	—	—	—
Ttr 7-053	—	—	—	—	—	—	—	—	—	—	—	X[m]	—	—	—
Ttr 7-060	—	—	—	—	—	—	—	—	—	—	—	—	X[b]	—	—
Ttr 8-018	—	—	—	—	—	—	—	—	—	—	X[m]	—	—	—	—
Ttr 8-034	—	—	—	—	—	—	—	—	—	—	—	—	X[b]		—
Ttr 9-025	—	—	—	—	—	—	—	—	—	—	X[m]	—	—	—	—
Ttr 9-028	—	—	—	—	—	—	—	—	—	—		X[m]	—	—	—
Ttr DU 1-001	—	—	—	—	—	—	—	—	—	—	X[m]	—	—	—	—
Ttr DU 7-028	—	—	—	—	—	—	—	—	—	—	X[m]	—	—	—	—
Ttr DU 8-011	—	—	—	—	—	—	—	—	—	—	X[m]	—	—	—	—
Sfr 1-008	—	—	—	—	—	X	—	—	—	—	X	—	—	—	—

ID[a]	Year[b]														
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2021	2022	2023	2024	2025
Sfr 1-022	—	—	—	—	—	—	—	—	—	—	X	X	—	—	—
Sfr 2-002	—	X	—	—	—	—	—	—	X	—	—	—	—	—	—
Sfr 2-006	—	—	—	X	—	—	—	X	—	—	—	—	—	—	—
Sfr 3-001	—	X	X	—	—	—	—	—	—	—	—	—	—	—	—
Sfr 6-024[c]	—	—	—	—	—	—	—	X	X	—	—	—	—	—	—
Sfr 6-006[c]	—	—	—	—	—	X	—	—	X[m]	—	—	—	—	—	—
Sfr 6-010	—	X	—	—	—	—	—	—	X	—	—	—	—	—	—
Sfr 6-025	—	—	—	—	—	—	—	X	—	—	—	—	—	X	—
Sfr 7-008[c]	—	—	—	—	X	—	—	X	X	—	—	—	—	—	—
Sfr 7-010	—	—	—	—	X	—	—	—	X	—	—	—	—	—	—
Sfr 7-013[c]	—	—	—	—	—	X	—	—	X[m]	—	—	—	—	—	—
Sfr 7-014[c]	—	—	—	—	—	X	—	—	X[m]	—	—	—	—	—	—
Sfr 7-015	—	—	—	—	—	X	—	—	X	—	—	—	—	—	—
Sfr 7-035[c]	—	—	—	—	—	—	—	X	X	—	—	—	—	—	—
Sfr 7-040	—	—	—	—	—	—	—	—	—	—	X	X	—	—	—
Sfr 7-049	—	—	—	—	—	—	—	—	—	—	X	—	—	X	—
Sfr 8-005	—	—	X[m]	—	—	—	—	—	—	—	—	—	—	—	—
Sfr 8-027	—	—	—	—	—	X	—	—	—	—	X	—	—	—	—
Sfr 8-037[c]	—	—	—	—	—	—	—	—	X[y]	—	—	—	—	—	—
Sfr 8-038[c]	—	—	—	—	—	—	—	—	X[m]	—	—	—	—	—	—
Sfr 8-052	—	—	—	—	—	—	—	—	—	—	X[m]	—	—	—	—
Sfr 9-011[c]	—	—	—	—	X	—	—	—	X	—	—	—	—	—	—
Sfr 9-037[c]	—	—	—	—	—	—	—	—	X[m]	—	—	—	—	—	—
Sfr 9-040[c]	—	—	—	—	—	—	—	X	X	—	—	—	—	—	—
Sfr DU 1-003[c]	—	—	—	—	—	—	—	—	X[m]	—	—	—	—	—	—
Sfr DU 6-010[c]	—	—	—	—	—	—	—	—	X[m]	—	—	—	—	—	—
Sfr DU 7-008[c]	—	—	—	—	—	—	—	—	X[m]	—	—	—	—	—	—
Sfr DU 8-014[c]	—	—	—	—	—	—	—	—	X[y]	—	—	—	—	—	—
Sbr 1-001	—	—	—	—	—	—	—	X[m]	—	—	—	—	—	—	—
Sbr 1-002	—	—	—	—	—	—	—	X[m]	—	—	—	—	—	—	—
Sbr 6-001	—	—	—	—	—	—	—	X[m]	—	—	—	—	—	—	—
Sbr 6-002	—	—	—	—	—	—	—	X[m]	—	—	—	—	—	—	—
Sbr 7-001	—	—	—	—	—	—	—	X[m]	—	—	—	—	—	—	—
Sbr 7-002	—	—	—	—	—	—	—	X[m]	—	—	—	—	—	—	—

ID[a]	Year[b]														
	2009	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2021**	**2022**	**2023**	**2024**	**2025**
Sbr 7-003	—	—	—	—	—	—	—	X^m	—	—	—	—	—	—	—
Sbr 7-004	—	—	—	—	—	—	—	X^m	—	—	—	—	—	—	—
Sbr 7-007	—	—	—	—	—	—	—	X	—	—	X	—	—	—	—
Sbr 7-019	—	—	—	—	—	—	—	—	X	—	X	—	—	—	—
Sbr 7-029	—	—	—	—	—	—	—	—	—	—	X	—	X	—	—
Ggr 1-013	—	—	—	—	—	—	—	—	X	—	X	—	—	—	—

[a] Ggr = *Grampus griseus* (Risso's dolphin); ID = Identifier; Sbr = *Steno bredanensis* (rough-toothed dolphin); Sfr = *Stenella frontalis* (Atlantic spotted dolphin); Ttr = *Tursiops truncatus* (bottlenose dolphin)

[b] X = Observed together in multiple sightings; X^m = re-sighted within same month; X^y = re-sighted within same year

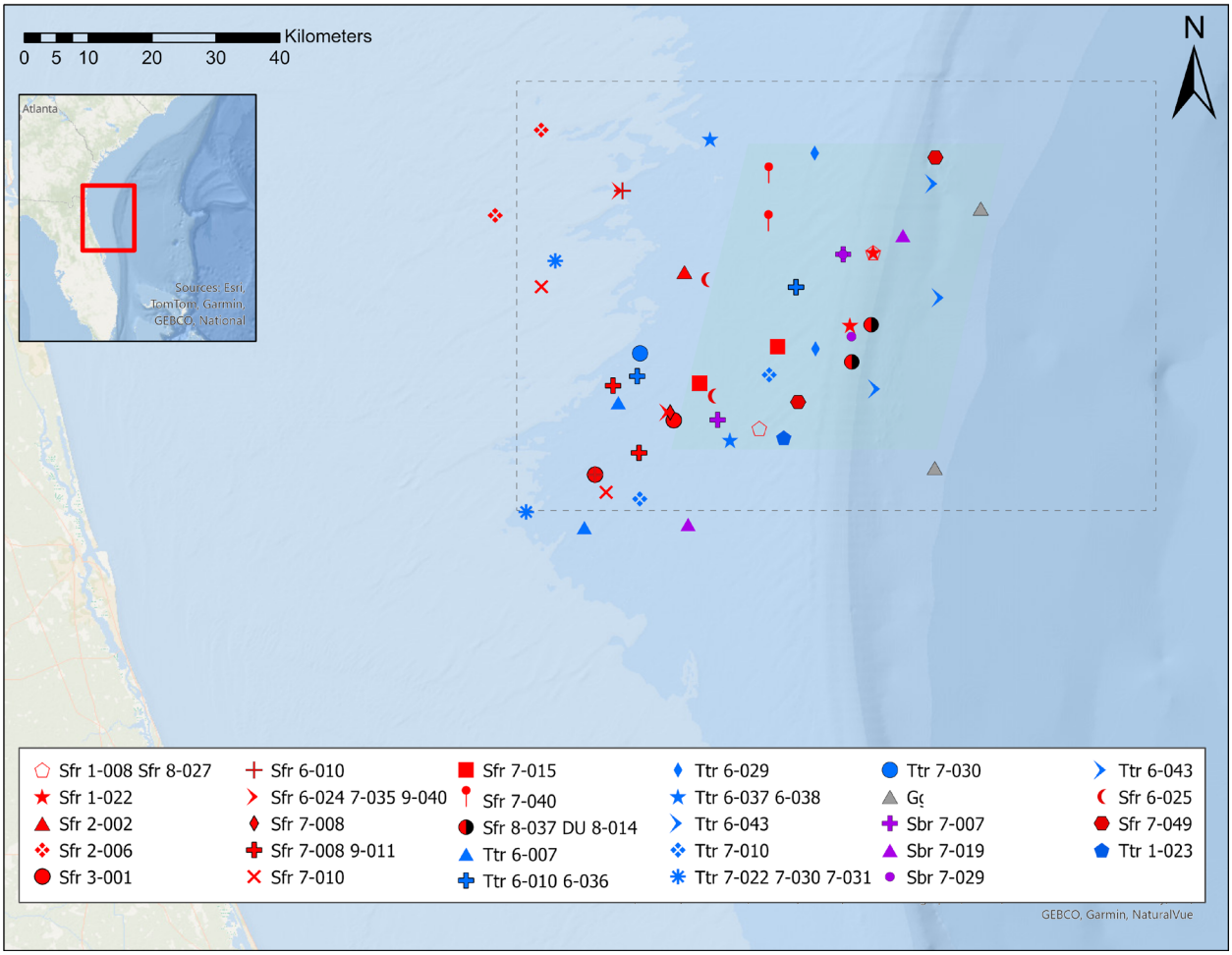

Figure 14. Locations of photo-matched delphinids within the Jacksonville survey area to date, excluding same- or next-day re-sightings.

4. Project Summary: 2009–2025

Since the beginning of vessel-based visual monitoring within the Jacksonville study area in 2009 to the final survey in November 2025, 17,308 km have been surveyed (**Table 9**, **Figure 15**). The team has made 510 cetacean sightings (**Table 10**) and 295 sea turtle sightings (**Table 11**), collected 145 biopsy samples **(Table 12**, **Figure 16**) and deployed 16 satellite tags (**Table 13**, **Figure 16**). Additionally, photo-ID catalogs have been created and annually maintained for eight cetacean species (**Table 14**). Datasets from all aerial and vessel sightings to date can also be viewed on OBIS-SEAMAP (Kristan 2026).

Table 9. Vessel survey effort from July 2009 through December 2025 within the Jacksonville survey area.

Effort	2009–2010	2011	2012	2013	2014	2015	2016	2017	2018	2021	2022	2023	2024	2025	Total
Survey Hours	127.1	20.9	58.6	58.7	66.8	44.2	130.7	66.1	15.3	123.6	78.3	69.8	30.08	**42**	**932.18**
Survey Distance (km)	2,074	346	937	1,022	1,227	858	2,136	1,424	315	3,942	475	1,481	542.56	**528**	**17,308**

Table 10. Cetacean sightings by species from July 2009 through December 2025 during vessel surveys within the Jacksonville survey area.

Species	Sightings													
	2009–2010	2011	2012	2013	2014	2015	2016	2017	2018	2021	2022	2023	2024	2025
Balaenoptera acutorostrata	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Eubalaena glacialis	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Globicephala macrorhynchus	3	0	0	0	0	0	5	0	1	0	0	0	0	1
Grampus griseus	2	0	0	1	1	1	0	2	0	3	0	0	0	0
Pseudorca crassidens	0	0	0	0	0	0	0	0	0	0	0	1	0	0
Stenella attenuata	0	0	0	0	0	0	2	0	0	0	0	0	0	1
Stenella frontalis	35	6	14	9	20	10	10	18	4	41	8	19	11	6
Steno bredanensis	0	0	0	0	0	0	2	1	0	2	0	1	2	0
Tursiops truncatus	19	6	23	15	18	10	18	16	0	38	21	15	9	16
Tursiops/Stenella mix	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Unidentified delphinid	13	0	4	3	4	0	5	0	0	1	5	3	0	1
Total	**72**	**12**	**41**	**28**	**45**	**21**	**42**	**37**	**5**	**85**	**34**	**40**	**22**	**26**

Table 11. Identified sea turtle sightings by species from July 2009 through December 2025 during vessel surveys within the Jacksonville survey area.

Species	Sightings													
	2009–2010	2011	2012	2013	2014	2015	2016	2017	2018	2021	2022	2023	2024	2025
Caretta caretta	49	23	41	33	31	22	23	24	0	7	3	6	2	1
Dermochelys coriacea	5	7	4	1	3	2	4	2	0	0	0	0	0	0
Lepidochelys kempii	1	0	1	0	0	0	0	0	0	0	0	0	0	0
Total	**55**	**30**	**46**	**34**	**34**	**24**	**27**	**26**	**0**	**7**	**3**	**6**	**2**	**1**

Table 12. Biopsy samples collected from July 2009 through December 2025 during vessel surveys within the Jacksonville survey area.

Species	2009–2010	2011	2012	2013	2014	2015	2016	2017	2018	2021	2022	2023	2024	2025	Total
Globicephala macrorhynchus	0	0	0	0	0	0	5	0	1	0	0	0	0	0	**6**
Grampus griseus	0	0	0	1	2	0	0	0	0	0	0	0	0	0	**3**
Pseudorca crassidens	0	0	0	0	0	0	0	0	0	0	0	3	0	0	**3**
Stenella attenuata	0	0	0	0	0	0	1	0	0	0	0	0	0	1	**2**
Stenella frontalis	0	0	19	6	19	3	7	8	0	1	0	0	0	0	**63**
Steno bredanensis	0	0	0	0	0	0	4	2	0	0	0	0	1	0	**7**
Tursiops truncatus	0	0	12	5	10	5	5	2	0	12	5	1	2	1	**60**
Balaenoptera acutorostrata	0	0	0	0	0	0	0	0	0	0	0	0	0	1	**1**
Total	**0**	**0**	**31**	**12**	**31**	**8**	**22**	**12**	**1**	**13**	**5**	**4**	**3**	**3**	**145**

Table 13. Satellite tags deployed in the Jacksonville survey area from July 2009 through December 2025 during surveys within the Jacksonville survey area.

Date	Latitude (°N)	Longitude (°W)	Species	Tag #
1-June-2016	30.22385	-79.82004	*Globicephala macrorhynchus*	GmTag162
1-June-2016	30.22762	-79.81328	*Globicephala macrorhynchus*	GmTag163
1-June-2016	30.28289	-80.43805	*Stenella frontalis*	SfTag001
2-June-2016	30.24696	-79.72234	*Globicephala macrorhynchus*	GmTag164
2-June-2016	30.25456	-79.72902	*Globicephala macrorhynchus*	GmTag165
9-Nov-2018	30.21846	-80.09124	*Globicephala macrorhynchus*	GmTag222
9-Nov-2018	30.12015	-80.09819	*Globicephala macrorhynchus*	GmTag219
9-Nov-2018	30.20570	-80.09564	*Globicephala macrorhynchus*	GmTag221
9-Nov-2018	30.14643	-80.10386	*Globicephala macrorhynchus*	GmTag220
16-April-2021	30.32591	-80.23934	*Steno bredanensis*	SbrTag001_DUML
17-April-2021	30.34246	-80.19141	*Steno bredanensis*	SbrTag002_DUML
5-Feb-2025	30.15198	-79.78280	*Globicephala macrorhynchus*	GmTag229
5-Feb-2025	30.15186	-79.78560	*Globicephala macrorhynchus*	GmTag230
5-Feb-2025	30.15553	-79.78850	*Globicephala macrorhynchus*	GmTag231
5-Feb-2025	30.16435	-79.78270	*Globicephala macrorhynchus*	GmTag232
5-Feb-2025	30.18694	-79.77580	*Globicephala macrorhynchus*	GmTag233

Notes: °N = degrees north; °W = degrees west

Table 14. Photo-ID catalog sizes and total matches to date from vessel surveys within the Jacksonville survey area from 2009 through 2025.

Species	2009–2010		2011		2012		2013		2014		2015		2016		2017		2018		2021		2022		2023		2024		2025	
	C	M	C	M	C	M	C	M	C	M	C	M	C	M	C	M	C	M	C	M	C	M	C	M	C	M	C	M
G. macrorhynchus	0	0	0	0	0	0	12	0	12	0	12	0	29	0	29	0	52	0	52	0	52	0	52	0	52	0	67	0
G. griseus	1	0	1	0	1	0	7	0	22	0	36	1	36	1	56	1	56	1	73	1	73	1	73	1	73	1	73	1
S. frontalis	21	0	36	0	58	2	74	2	109	2	117	2	153	3	199	20	204	22	257	25	266	27	285	27	301	29	310	29
T. truncatus	19	0	25	0	43	0	53	2	80	2	102	2	113	2	131	8	131	8	186	14	221	20	233	23	251	24	277	24
S. bredanensis	0	0	0	0	0	0	0	0	0	0	0	0	43	0	54	8	54	8	78	11	78	11	85	12	90	12	90	12
P. crassidens	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	15	0	15	0	15	0
S. attenuata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
B. acutorostrata	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0

Note: No surveys occurred during 2019–2020.

Key: C=catalog size; M=matches

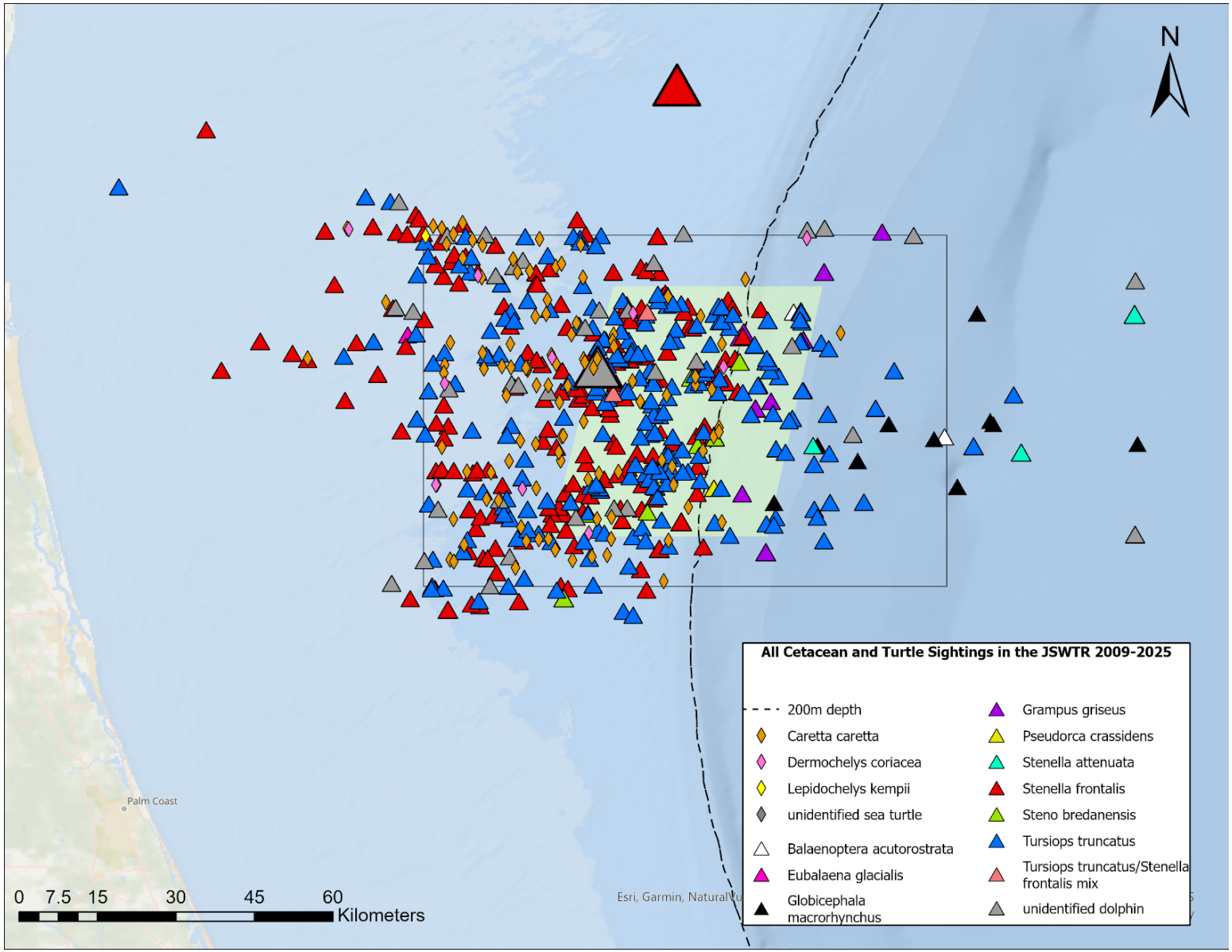

Figure 15. Distribution of all cetacean and sea turtle sightings within and near the JSWTR during vessel surveys from 2009 through 2025. Dashed line represents the 200-meter isobath; larger symbols indicate larger groups.

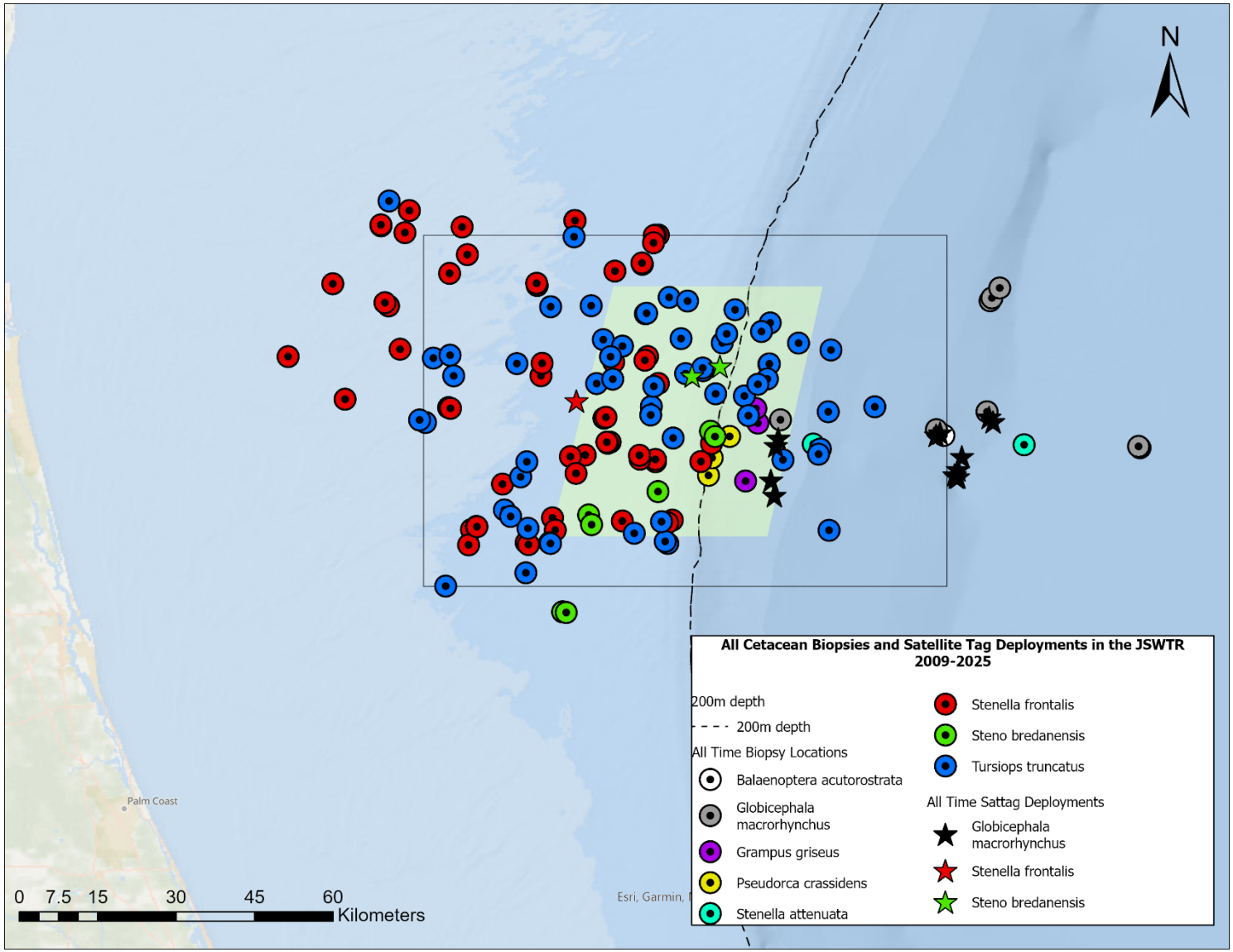

Figure 16. Locations of all biopsy samples and satellite tag deployments achieved during vessel surveys from 2009 through 2025. Dashed line represents the 200-meter isobath.

5. Marine Mammal Monitoring on Navy Ranges (M3R) JSWTR Species Verification Trials from 2021 to 2025

The following text and tables are excerpted from Dolan et al. (2026).

> *The Marine Mammal Monitoring on Navy Ranges (M3R) program began in 2000, with the development of a system to use the bottom-mounted hydrophones of the U.S. Navy's test and training ranges to detect, classify, localize, and monitor marine mammals in real time by listening for their vocalizations (Jarvis, et al. 2014). Each of the ranges has 100 to 200-plus widely spaced bottom-mounted hydrophones, and the systems consist of rack-mounted computer nodes and monitoring displays connected with Gigabit networks. The M3R system is currently installed at the Atlantic Undersea Test and Evaluation Center (AUTEC), Southern California Anti-submarine Warfare Range (SOAR), Pacific Missile Range Facility (PMRF), the Jacksonville Shallow Water Training Range (JSWTR), and Canadian Forces Maritime Experimental and Test Ranges (CFMETR) Nanoose Range.*
>
> *The M3R system runs nearly continuously year-round on each of these ranges when no range activities would preclude its operation. Detection, classification, and localization reports are stored to binary archive files, and periodic broadband recordings are collected simultaneously from all hydrophones for later playback and analysis. These data are used for collaborative studies on marine mammal behavior, distribution, abundance, foraging, habitat use, understanding the effects of U.S. Navy activities and the long-term health of the populations, as well as for the development of detection, classification, localization, and density estimation algorithms.*
>
> *JSWTR has approximately 200 currently active hydrophones mounted at depths ranging from 38 to 353 meters over a span of 2,000 km^2, making it the largest M3R system to date. In contrast to the AUTEC, PMRF, and SOAR deep-water ranges on which the M3R system is deployed, JSWTR is a shallow-water range that is likely to have different species present than those typically found on the deep-water ranges.*
>
> *Between 2021 and 2025 M3R personnel completed eleven species verification trials in collaboration with Duke University and HDR Inc. During the field trials M3R personnel used the M3R passive acoustic monitoring displays to find species of interest and direct the on-water team to the locations of the animals. Communication was maintained using satellite texts. Upon finding the animals, Duke University and HDR Inc. crew members verified the species; collected behavioral and environmental data, photographs for their photo-ID catalogs, and biopsy samples; and placed satellite tags on individuals. The focal species for these efforts were:*

- *Short-finned pilot whales (Globicephala macrorhynchus)*
- *False killer whales (Pseudorca crassidens)*
- *Bottlenose dolphins (Tursiops truncatus)*
- *Atlantic spotted dolphins (Stenella frontalis)*
- *Risso's dolphin (Grampus griseus)*
- *Rough-toothed dolphins (Steno bredanensis)*

*Over the course of these eleven trials all focal species were acoustically detected on range, and all except one (the short-finned pilot whales) were visually verified by the on-water team (**Table 15**). In addition to these species, minke whales (Balaenoptera acutorostrata) were visually verified on one occasion. Analyzed recordings from this encounter revealed potentially novel combinations of known call types (Carroll, et al., 2026, under review). The most common animal identified to species were bottlenose dolphins, with 89 groups acoustically detected, 58 of which were directed, with 57 groups visually verified. Acoustic detections are considered 'directed' if the M3R team provided a position for the on-water team and they decided to go to the location. The next most common were Atlantic spotted dolphins, with 37 acoustic detections, 34 directed, and 35 groups visually verified. Snapping shrimp were persistently present during all trials but not explicitly monitored. There were also 651 acoustic detections of unidentified dolphins over the course of the eleven trials. Table 2 shows the species detected and visually verified during each verification trial.*

Each acoustic detection represents either a single animal or a group of animals; however, note that each detection is not necessarily a new individual or a new group, as the same animal or group could be detected more than once over the course of the day. Additionally, individuals may move between groups.

Table 15 All species acoustically detected, directed, and visually verified by M3R, Duke and HDR Inc. during JSWTR species verification trials from 2020–2025.

Species			# Acoustic Detections	# Acoustic Detections Directed	# Acoustic Detections Visually Verified
ID	Common Name	Scientific Name			
Tt	Bottlenose dolphin	*Tursiops truncatus*	89	58	57
Sf	Atlantic spotted dolphin	*Stenella frontalis*	37	34	35
Gg	Risso's dolphin	*Grampus griseus*	12	4	2
Sb	Rough-toothed dolphin	*Steno bredanensis*	5	5	5
Pc	False killer whale	*Pseudorca crassidens*	6	1	1
Sc	Striped dolphin	*Stenella coeruleoalba*	1	0	0
Gm	Short-finned pilot whale	*Globicephala macrorhynchus*	20	2	0
Pm	Sperm whale	*Physeter macrocephalus*	1	0	0
Z	possible Ziphius sp.	Ziphius sp.	2	0	0
Ba	Minke whale	*Balaenoptera acutorostrata*	4	1	1
LF unk	Unknown low frequency	Unknown low frequency	11	2	0
UD	Unidentified dolphin	Delphinidae sp.	651	49	0

Table 16. Eleven species verification trials were conducted by M3R, Duke University and HDR Inc. at JSWTR between 2021 and 2025. The species acoustically detected, directed, and visually verified for each trial are indicated below.

Field Test Dates	Species			# Acoustic Detections	# Acoustic Detections Directed	# Acoustic Detections Visually Verified
	ID	Common Name	Scientific Name			
April 9-17, 2021	*Tt*	Bottlenose dolphin	*Tursiops truncatus*	7	5	5
April 9-17, 2021	*Sf*	Atlantic spotted dolphin	*Stenella frontalis*	6	6	6
April 9-17, 2021	*Sb*	Rough-toothed dolphin	*Steno bredanensis*	2	2	2
April 9-17, 2021	Z	possible Ziphius sp.	Ziphius sp.	2	0	0
April 9-17, 2021	LF unk	Unknown low frequency	Unknown low frequency	2	2	0
April 9-17, 2021	UD	Unidentified dolphin	Delphinidae sp.	44	4	0
May 22-24, 2021	*Tt*	Bottlenose dolphin	*Tursiops truncatus*	10	10	10
May 22-24, 2021	*Sf*	Atlantic spotted dolphin	*Stenella frontalis*	7	7	7
May 22-24, 2021	*Gg*	Risso's dolphin	*Grampus griseus*	2	2	2
May 22-24, 2021	UD	Unidentified dolphin	Delphinidae sp.	64	2	0
December 7-9, 2021	*Tt*	Bottlenose dolphin	*Tursiops truncatus*	3	3	3
December 7-9, 2021	*Sf*	Atlantic spotted dolphin	*Stenella frontalis*	2	2	2
December 7-9, 2021	LF unk	Unknown low frequency	Unknown low frequency	2	0	0
December 7-9, 2021	UD	Unidentified dolphin	Delphinidae sp.	18	2	0
May 14-18, 2022	*Tt*	Bottlenose dolphin	*Tursiops truncatus*	8	4	3
May 14-18, 2022	*Sf*	Atlantic spotted dolphin	*Stenella frontalis*	1	1	1
May 14-18, 2022	Ud	Unidentified dolphin	Delphinidae sp.	31	8	0
December 13-14, 2022	*Tt*	Bottlenose dolphin	*Tursiops truncatus*	8	8	8
December 13-14, 2022	*Sf*	Atlantic spotted dolphin	*Stenella frontalis*	1	1	1
December 13-14, 2022	UD	Unidentified dolphin	Delphinidae sp.	52	8	0
March 3-6, 2023	*Tt*	Bottlenose dolphin	*Tursiops truncatus*	18	9	9
March 3-6, 2023	*Sf*	Atlantic spotted dolphin	*Stenella frontalis*	4	4	4
March 3-6, 2023	*Gg*	Risso's dolphin	*Grampus griseus*	6	2	0
March 3-6, 2023	*Sb*	Rough-toothed dolphin	*Steno bredanensis*	1	1	1
March 3-6, 2023	*Pc*	False killer whales	*Pseudorca crassidens*	2	1	1
March 3-6, 2023	*Ba*	Minke whale	*Balaenoptera acutorostrata*	2	1	1

Field Test Dates	Species			# Acoustic Detections	# Acoustic Detections Directed	# Acoustic Detections Visually Verified
	ID	Common Name	Scientific Name			
March 3-6, 2023	LF unk	Unknown low frequency	Unknown low frequency	4	0	0
March 3-6, 2023	UD	Unidentified dolphin	Delphinidae sp.	68	4	0
October 29-30,2023	*Tt*	Bottlenose dolphin	*Tursiops truncatus*	3	0	0
October 29-30,2023	*Sf*	Atlantic spotted dolphin	*Stenella frontalis*	4	4	4
October 29-30,2023	UD	Unidentified dolphin	Delphinidae sp.	20	3	0
December 2-8, 2023	*Tt*	Bottlenose dolphin	*Tursiops truncatus*	4	4	4
December 2-8, 2023	*Sf*	Atlantic spotted dolphin	*Stenella frontalis*	2	2	2
December 2-8, 2023	*Gm*	Short-finned pilot whale	*Globicephala macrorhynchus*	18	2	0
December 2-8, 2023	LF unk	Unknown low frequency	Unknown low frequency	1	0	0
December 2-8, 2023	UD	Unidentified dolphin	Delphinidae sp.	122	9	0
May 8-12, 2024	*Tt*	Bottlenose dolphin	*Tursiops truncatus*	9	5	5
May 8-12, 2024	*Sf*	Atlantic spotted dolphin	*Stenella frontalis*	6	6	6
May 8-12, 2024	*Gg*	Risso's dolphin	*Grampus griseus*	4	0	0
May 8-12, 2024	*Sb*	Rough-toothed dolphin	*Steno bredanensis*	2	2	2
May 8-12, 2024	*Pc*	False killer whale	*Pseudorca crassidens*	3	0	0
May 8-12, 2024	*Sc*	Striped dolphin	*Stenella coeruleoalba*	1	0	0
May 8-12, 2024	*Gm*	Short-finned pilot whale	*Globicephala macrorhynchus*	2	0	0
May 8-12, 2024	*Pm*	Sperm whale	*Physeter macrocephalus*	1	0	0
May 8-12, 2024	LF unk	Unknown low frequency	Unknown low frequency	2	0	0
May 8-12, 2024	UD	Unidentified dolphin	Delphinidae sp.	95	4	0
February 3-7, 2025	*Tt*	Bottlenose dolphin	*Tursiops truncatus*	16	8	8
February 3-7, 2025	*Sf*	Atlantic spotted dolphin	*Stenella frontalis*	3	0	1
February 3-7, 2025	*Ba*	Minke whale	*Balaenoptera acutorostrata*	2	0	0
February 3-7, 2025	UD	Unidentified dolphin	Delphinidae sp.	82	4	0
November 19-22, 2025	*Tt*	Bottlenose dolphin	*Tursiops truncatus*	3	2	2
November 19-22, 2025	*Sf*	Atlantic spotted dolphin	*Stenella frontalis*	1	1	1
November 19-22, 2025	*Pc*	False killer whale	*Pseudorca crassidens*	1	0	0
November 19-22, 2025	UD	Unidentified dolphin	Delphinidae sp.	55	1	0

The combined Duke University, HDR Inc., and M3R species verification trials occurred between 2021 and 2025 on JSWTR. ***Table 17*** *indicates the number of the total sightings per species that were directed from acoustic detections for those species both acoustically detected and sighted between 2021 and 2025. Also indicated are the total number of sightings between 2009 and 2025. A portion of the sightings for all species except pilot whales had been directed from acoustic detections during this time period. Though pilot whales were acoustically detected twenty times and directed twice, and there was one sighting of pilot whales, none were from acoustic direction. For the other species, between 41 and 100% of the sightings were from acoustic directions, with the only sighting of a false killer whale being acoustically directed in March of 2023.*

Table 17. Number of sightings directed from acoustic detections compared with total number of sightings from 2021-2025 for species that were acoustically detected.

Species			Total # Sightings 2009-2025	Total # Sightings 2021-2025	# Directed Sightings Visually Verified 2021-2025
ID	Common Name	Scientific Name			
Tt	Bottlenose dolphin	*Tursiops truncatus*	224	99	57
Sf	Atlantic spotted dolphin	*Stenella frontalis*	211	85	35
Gg	Risso's dolphin	*Grampus griseus*	10	3	2
Sb	Rough-toothed dolphin	*Steno bredanensis*	8	5	5
Gm	Short-finned pilot whale	*Globicephala macrorhynchus*	10	1	0
Pc	False killer whale	*Pseudorca crassidens*	1	1	1
Ba	Minke whale	*Balaenoptera acutorostrata*	2	2	1

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