Kemp's Ridley and Green Sea Turtle Tagging for Availability Bias Analysis

2024/25

ANNUAL PROGRESS REPORT

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Cover Photo Credit:

A satellite tag is deployed on a green turtle (*Chelonia mydas*) as part of the Kemp's ridley and green turtle availability bias study supported by the United States Navy. Photographed by Annessia Michaels (project partner Inwater Research Group) taken under Florida State Marine Turtle Permit 25-125.

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Science ⚓ Stewardship ⚓ Protection

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Acronyms and Abbreviations

ACNWR	Archie Carr National Wildlife Refuge
AOI	Area of Interest
Cm	*Chelonia mydas*
cm	centimeter
Co.	County
CRW	correlated random walk
FL	Florida
g0	availability bias
GA	Georgia
GAM	Generalized Additive Model
h	hour
IRG	Inwater Research Group
IRL	Indian River Lagoon
km	kilometer
Lk	*Lepidochelys kempii*
LMC	Loggerhead Marinelife Center
m	meter
MA	Massachusetts
MD	Maryland
Navy	United States Navy
NC	North Carolina
NSF	National Science Foundation
NY	New York
PI	Principal Investigator
PTT	Platform Transmitter Terminal
REU	Research Experience for Undergraduates
SCL	straight carapace length
SD	Standard Deviation
UCF	University of Central Florida
U.S.	United States

1. Introduction and Background

1.1 Need for Availability Bias Data

Availability bias, or the proportion of time that animals are unavailable to be detected by visual surveys, is a critical component for accurately estimating abundance in density spatial models (Laake et al. 1997), which are used for conservation and environmental compliance purposes. For air-breathing animals at sea, such as sea turtles and marine mammals, the proportion of time spent below the surface can range from 5 to over 90 percent, depending on species, season, and animal behavior (Mansfield 2006, Roberts et al. 2022, DiMatteo et al. 2024). As such, if availability bias estimates are not applied to density spatial models, which rely on visual survey data, abundance may be underestimated by as much as an order of magnitude in some cases, hindering conservation efforts, and significantly underestimating the potential impacts of human activities. Applying robust availability bias estimates to density models should be considered "best available science" and actively pursued for the newer generations of density spatial models being produced.

In the past, availability bias was often applied as a single, static number, the mean proportion of time spent below the surface based on depth profiles of tagged animals or another similar metric (Roberts et al. 2016, Becker et al. 2020). However, animal dive behavior can vary widely by season, habitat, and life stage; more complex treatments that represent animal availability as spatially varying surfaces can be applied to density spatial models. Several frameworks have been implemented for sea turtles, including spatiotemporal regression models (Hatch et al. 2022) and Generalized Additive Models (GAMs) that relate dive behavior to environmental covariates (Roberts et al. 2022), which allow for cautious extrapolation of availability bias estimates into unsampled areas and times.

On the East Coast of the United States (U.S.), four species of sea turtle can commonly be found: loggerhead (*Caretta caretta*), green (*Chelonia mydas*), Kemp's ridley (*Lepidochelys kempii*), and leatherback (*Dermochelys coriacea*), all listed as threatened or endangered under the Endangered Species Act. Loggerhead availability has previously been studied on the East Coast (Hatch et al. 2022), and large databases of animal tag data are extant. Leatherback tagging sponsored by the National Marine Fisheries Service has continued through 2025, with some initial studies of leatherback availability and distribution published from tags that have ceased transmission (Rogers et al. 2024, Rider et al. 2026). The extant leatherback tags are formatted to support availability bias models as well.

Within the same region, a critical gap exists for dive data appropriate for availability bias estimates for Kemp's ridley and green turtles, in part because these species are smaller and difficult to tag with depth recorders, given the size of these tags historically. Recent advances in tag technology, namely smaller tags that still have onboard pressure sensors, have made it possible to tag these species with the necessary hardware and in the numbers required to generate robust availability bias estimates. Previous density spatial models for Kemp's ridley and green turtles on the East Coast (DiMatteo et al. 2024) used availability bias estimates from a nearby region (Roberts et al. 2022). However, environmental relationships and dive behaviors may not be transferable between regions, so this type of extrapolation should only be undertaken if local estimates are not available.

Two years into the project, this study now has the first estimates of availability for these species on the East Coast. However, work remains to limit environmental extrapolation throughout the species' ranges by continuing to prioritize tagging underrepresented species in regions where logistically feasible.

1.2 Approach to Data Collection and Analysis

The study team proposed deploying up to 50 Wildlife Computers satellite-linked telemetry tags per year for 3 years, starting in 2024, split evenly between Kemp's ridley and green sea turtles (or as encounters allow), at several sites along the East Coast, ranging from Florida to Massachusetts. In partnership with several rehabilitation and research groups, the study team aimed to collect and record sea turtle behavioral data in multiple representative environments and times of year.

Target sites were selected to represent both temperate and subtropical habitats and conditions (e.g., Florida and mid-Atlantic year-round habitats, and Northeast/New England seasonal habitats), in case turtle migrations were not fully captured due to tag loss. Tagging is performed by organizations with existing in-water capture, nesting beach, and rehabilitated animal tagging permits and sampling platforms. Year 4, planned to start in 2027, will be the capstone analysis, fitting a GAM, or other appropriate statistical framework, relating environmental covariates to dive behavior. The GAM framework is appealing because it allows the extrapolation of the model into unsampled times/areas, with appropriate caution.

Designing the study from the ground up with availability bias surface models as the end goal allowed the study team to program tags for maximum efficiency and consistency, and with these models in mind. Within other regions, availability bias estimates have been derived from an ad hoc mixture of tag data with different data types collected and duty cycles (DiMatteo et al. 2022), complicating analyses and decreasing confidence in estimates. Tagging at multiple sites along the East Coast will maximize the potential deployments each year, in different habitats. Tags can be reallocated between years to different areas/species as needed to ensure maximum parity between species and habitat sampling as much as is feasible. Tags are programmed to collect both dive histogram data and behavior data (e.g., dive and surface intervals) at appropriate depths for availability bias calculations.

The intended products for this study are availability bias models for Kemp's ridley and green sea turtles, derived from in situ tag data deployed on animals within the Area of Interest, and integratable into existing sea turtle density estimates (e.g., density spatial models). The Area of Interest (AOI; **Figure 1**) roughly represents key areas of the U.S. Navy Atlantic Fleet Training and Testing Study Area, limited to the northward extent of summer strandings of Kemp's ridley turtles, which venture slightly farther north than green turtles (Massachusetts Audubon Society 2024).

Source: [Massachusetts Audubon Society 2024]

Figure 1. The Area of Interest roughly corresponds to the U.S. Navy Atlantic Fleet Training and Testing Study Area East Coast stratum, limited to the northward extent of summer strandings of Kemp's ridley turtles.

The AOI extends just north of Cape Cod, Massachusetts, to the north; the eastern boundary of the U.S. Exclusive Economic Zone to the east; the middle of the Florida Strait to the south, and the U.S. coastline to the west, including several larger embayments such as Chesapeake Bay, Delaware Bay, and Long Island Sound. Data from outside the AOI may be included in the study (e.g., western Florida Keys, Bahamas, Cuba) if environmental conditions could be reasonably expected to match conditions within the AOI.

The availability bias models will, at a minimum, describe the proportion of time animals are expected to be within 2 meters (m) of the surface, a common threshold for where sea turtles are visible to aerial observers in planes, the most common type of survey data incorporated into U.S. Navy (Navy) density estimates. Other thresholds such as 3- and 4-m depth cutoffs, which may be used in the best visibility survey conditions; surface models, which can be useful for shipboard surveys where it is difficult to see into the water column; or modeling surface and dive intervals, which can be used to generate platform specific availability bias estimates, may be explored as time allows. Even if these other versions of availability bias are not modeled as a part of this project, the supporting data are being collected and will be available for future efforts.

The temporal resolution of availability bias predictions will depend, in part, on the amount of data collected but will be at least seasonal to capture major changes in the environment of the waters off the East Coast. If possible, availability bias predictions will be made monthly for each species to match the temporal scale of sea turtle density estimates produced for Navy use. The spatial extent of models may be limited seasonally to match expected animal distribution based on other data streams such as strandings, or to limit environmental extrapolation.

In addition to being directly applicable to existing density spatial models, the tagging data the models are derived from will offer substantial research potential for the broader environmental compliance and scientific community. The tag data can be used to explore two- and three-dimensional home ranges of both species, informing the general ecology of the species, overlapping with Navy ranges and other natural resources, being used in mitigation studies for dredging, pairing with stable isotope studies, and providing an ecological baseline for species behavior within the region, to give several examples.

As the study moves toward the end of the second year of tag deployments and data collection, its seasonal coverage, number of Kemp's ridleys tagged, and geographic coverage are greatly expanded. However, challenges remain. The study's northern partners have faced ongoing permitting issues with the U.S. Fish and Wildlife Service, who have not allowed the attachment of newer, smaller dive tags to the size classes of animals most commonly encountered in northern waters, limiting the study's sampling of mid-Atlantic and northern waters. Two of the study's partner organizations also experienced substantial layoffs toward the end of its second year, including at least one individual with the needed expertise for tagging turtles. Below, in addition to updating tabular summaries of availability bias from last year, the study provides a new analysis of the tag data: exploring the extent of environmental sampling throughout the AOI, including areas where tagged animals have not traveled, in order to make better informed decisions on priorities for the last year of tagging.

2. Methods

2.1 Animal Acquisition

Wildlife Computers SPLASH10 telemetry tags have been deployed on a rolling basis, starting in June 2024 (Year 1), with the most recent deployment having occurred in October 2025. No animals smaller than 30-centimeter (cm) straight carapace length (SCL) have been or will be tagged as this is the smallest size generally considered to be visible from aerial survey platforms, based on discussions with aerial observers. The goal is to deploy tags on a range of turtle sizes to best represent size-based physiological differences in behavior. Field sites for animal acquisition include the Archie Carr National Wildlife Refuge (ACNWR) nesting beach (Melbourne Beach and Brevard County, Florida); Trident Submarine Basin, Port Canaveral, Florida; Indian River Lagoon (IRL) south of Sebastian Inlet (Indian River County, Florida); and Jensen Beach, Florida, nesting beach as well as the St. Lucie Power Plant intake canal.

Project Principal Investigators (PIs) are working with project partners to deploy satellite tags on turtles from rehabilitation entities in Florida, Georgia, North Carolina, Maryland, New York, and Massachusetts, pending confirmation of permit and staff availability with each project partner. At this time, only the University of Central Florida (UCF) and Inwater Research Group (IRG) are tagging wild-caught turtles; all other project partners are tagging rehabilitated turtles (**Table 1**), ideally sourced from New England and mid-Atlantic regions during the winter cold-stun season (December to March of any given year, with anticipated turtle releases from January to May).

2.1.1 Project Partners

The study team currently has six project partners, with a possible seventh being contacted currently, including Co-PI Dr. Kate Mansfield's lab at UCF. One project partner from last year, the National Aquarium in Baltimore, Maryland, is no longer planning to contribute as their sea turtle rehabilitation program has been reduced due to staff cuts. Of these partners, two (UCF and IRG) have field-based programs where turtles are encountered in the wild on their natural nesting beaches or through in-water capture. The remaining five are rehabilitation facilities spanning from Florida to Massachusetts (**Table 1**). The PIs wait until animals are available and permitted for tagging before provisioning tags, minimizing the number of times tags need to be transported and ensuring extra tags can be deployed rapidly as opportunities arise. Note that all turtles in this study will be healthy; a veterinarian will evaluate any rehabilitated turtle prior to tagging and release, and wild caught animals will have a general health evaluation performed.

Table 1. List of past, present, and potential project partners along with sampling location, species tagged, number of tags provided, and deployment period (months).

Project Partner	Location	Target Species	Number of Tags Allocated	Tags Deployed to Date	Turtle Source	Anticipated Deployment Period
UCF	Port Canaveral to Sebastian Inlet, FL	Greens	35	35	Wild caught	Seasonally for adult female greens, year-round for juvenile greens
IRG	St. Lucie Power Plant, Jensen Beach, FL	Kemp's ridleys and greens	9	7	Wild caught	December – May for Kemp's ridleys; year-round opportunistically
Loggerhead Marinelife Center	Juno Beach, FL	Kemp's ridleys	10	3 (3 more pending)	Rehabilitation	December – May (cold stun rehabilitation)
Georgia Sea Turtle Center/Jekyll Island Authority	Jekyll Island, GA	Kemp's ridleys and greens	5	2	Rehabilitation	January – May (cold stun rehabilitation)
National Aquarium	Baltimore, MD	Kemp's ridleys and greens	0	0	N/A	No longer a partner due to staffing changes
New York Marine Animal Rescue[a]	Long Island, NY	Kemp's ridleys and greens	0	0	Rehabilitation	January – May (cold stun rehabilitation)
New England Aquarium*	Boston, MA	Kemp's ridleys	0	0	Rehabilitation	January – May (cold stun rehabilitation)
North Carolina Aquarium on Roanoke Island	Roanoke, NC	Kemp's ridleys	0	0	Rehabilitation	January – May (cold stun rehabilitation)

Key: FL = Florida; GA = Georgia; MA = Massachusetts; MD = Maryland; N/A = not applicable; NC = North Carolina; NY = New York

[a] Pending resolution of permitting issues.

2.2 Tagging Methodology

In Year 2, 40 additional Wildlife Computers SPLASH10 satellite tags were acquired, bringing the total number of tags available for deployments to 100. These are Argos tags with depth sensors and depth profile capabilities. The 40 new tags came in two newly available physical configurations. The previous tags had four “bumpers” or towers in the corners of the tag to protect the antennae, while adding weight and drag to the tags and increased height to the tags’ profiles. The two new configurations are (1) a single bumper protecting the antenna with two smaller bumpers in the opposite, rear corners; and (2) all bumpers removed, reducing weight and drag (**Figures A1-A3**). The study team opted for these new models offered by Wildlife Computers as northern tagging partners noted concerns from the U.S. Fish and Wildlife Service over drag associated with the original four-bumper model, particularly when tagging the smaller size classes that usually strand in mid-Atlantic and northern waters. Only two tags with the new configurations have been deployed to date, with the remainder of Year 2 deployments being the older tag model, so assessing deployment lengths compared to the previous tags is premature.

Regardless of physical configuration, all tags were programmed with the same parameters (**Appendix A**) to maximize data collection for availability bias models. Tag dive-data products allow the study team to calculate the dive statistics required for availability bias modeling, such as percent time below a depth threshold as well as dive and surface intervals. Tags were all tested to ensure they functioned and set to “stand-by” mode in anticipation of deployment. All tags were painted with Trilux 33 anti-foulant prior to tag attachment.

Tags were attached to turtles using a standardized approach that is consistent across all turtles in this study. The anterior portion of the carapace was first cleaned of sediment and algae. Coarse sandpaper was used to scuff up the transmitter attachment site, typically the first and second vertebral scutes, plus the first and second costal scutes on both sides of the vertebral scutes. Transmitters were not placed on the peak of the carapace but along the centerline of the turtle. For both species, transmitters were attached using fiberglass resin and cloth, followed by a steel-reinforced epoxy putty (e.g., JBWeld) per the New England Aquarium protocol outlined by the Wildlife Computers tag attachment epoxy kits sold with their satellite tags. One or two additional coats of an ablative, anti-fouling paint (e.g., Interlux Micron 66, Trilux 33) were applied to the transmitter and attachment site to minimize growth of barnacles and other epibiota, thereby reducing drag and extending transmitter life (see cover photo).

The direct attachment process takes approximately 1.5 to 2 hours or less. For turtles captured in-water, all turtles were ultimately released close to where they were captured and within no more than 3 hours per federal permitting guidelines. Should any of the satellite tagged turtles in this study be recaptured by any project partner, the turtles will not be re-tagged as part of this study to facilitate sampling a wider range of behaviors, as animal dive behavior can vary widely by individual.

All turtle handling and tagging activities followed the respective state and federal protected species permitting guidelines as well as Institutional Animal Care and Use Committee protocols (as required) maintained by each project participant/partner. Relevant permit numbers are in the Acknowledgements section.

2.3 Location Processing

Argos satellite locations, which were collected from the Wildlife Computer SPLASH10 tags used here, have well-documented elliptical errors associated with them (Douglas et al. 2012, CLS 2024). These locations were also collected irregularly in time, due to factors such as dive behavior, satellite coverage, and weather. Irregular collection times and location error together can negatively impact studies involving animal location (Bradshaw et al. 2007).

Methods to moderate Argos location errors and regularize collection times have existed for decades (Austin et al. 2003) and are an important data management tool for studies dependent on animal locations, such as this study. This study uses the R package *animotum* (Jonsen et al. 2020, 2023), which uses Template Model Builder (Auger-Méthé et al. 2017) to rapidly fit correlated random walk (CRW) and movement process models to Argos and Global Positioning System data, accounting for location errors and predicting animal locations at regular (or user specified) time intervals.

For each tag deployment, locations within the first 48 hours post-release were removed to account for changes in animal behavior associated with tagging and release. A CRW model was fitted in *animotum* for each tag, with prediction time steps at 4 h intervals, matching the time intervals at which dive histograms were collected. The maximum speed (vmax) parameter was set to 1.25 m per second in accordance with hardshell turtle data presented in the *animotum* vignettes. Gaps in transmission longer than 5 days were not predicted on the premise the animal could not be reasonably localized over that span.

In addition to matching the dive histogram collection intervals, the 4 h time step is a convenient interval to aggregate dive behavior data. This is based on considerations such as filtering out nighttime dive data (which is not applicable to visual survey data) and localizing animals at a temporal scale where they cannot be expected to move to radically different habitats in that time span.

CRW models were examined to ensure convergence and qualitatively assessed based on model plots and visual examination of predicted locations. Locations on land were moved into the water post-hoc using the R package *pathroutr* (London 2020). The shoreline used to limit locations to water was the National Oceanic and Atmospheric Administration Continually Updated Shoreline Product (National Geodetic Survey 2026), slightly modified for inland waters near Navy installations to better represent the Atlantic Fleet Training and Testing study area.

2.4 Availability Bias Calculations

Two types of dive data were collected by the tags: histogram data, in which depth records were aggregated in 4 h intervals reporting the proportion of the 4 h interval the animal spent in each depth bin, or at the surface; and behavior data, in which dive and surface intervals in seconds were recorded. The depth sensor sampled depth at a frequency of 1 Hertz and recorded depths to the nearest 0.5 m.

Histogram depth bin cut points were 2, 3, 4, 5, 10, 15, 20, 25, 30, 40, 50, 60, and 100 m. The first several bins were defined in 1-m increments to facilitate the calculation of availability bias at several depth thresholds, which would correspond to different viewing conditions during aerial surveys. Percent dry timelines calculated how long the animal was "dry" (i.e., at the surface) in each 4 h block, based on the data from the tag saltwater switch, reported to the nearest 1 percent. The ability to sight sea turtles at depth (and how deep) can vary based on animal size and survey conditions (Fuentes et al. 2015, Barco et al. 2018) and is rarely estimated in situ during surveys. The depth at which sea turtles can be sighted from survey platforms is generally considered to vary from 0 to 4 m, with animals being available to be seen only at the surface in the worst survey conditions, or from shipboard platforms where it is challenging for observers looking across the water to see into the water column.

Dives for the dive behavior data were defined as when the animal descended deeper than 2 m and remained at depth for at least 30 seconds. Tags were programmed to prioritize the transmission of histogram data to ensure at least one data type was collected consistently (see **Appendix A** for a sample report detailing how each tag was programmed). In addition to providing a check for the 2-m histogram availability-bias estimates, behavior data can be used to generate survey platform-specific adjustments of availability.

Dive histograms were associated with interpolated locations based on time, and only histograms in which the majority of the sampling period occurred during daylight hours were retained. Sea turtle behavior can vary significantly between daytime and nighttime (Hochscheid 2014), and surveys used to support sea turtle density spatial models only occur during daylight hours. Availability bias was calculated at 2-, 3-, and 4-m depth thresholds by summing the proportion of time spent in the appropriate bins for each threshold.

For behavior data, dive and surface intervals were linked to the closest location by date and time, and behavior records that could not be matched to a location within 4 hours were removed, as were dive and surface records that were not during daylight hours. For each location with dive and surface intervals associated with it, availability bias was calculated as follows:

sum of all dive times / (sum of all dive times + sum of all surface intervals)

Availability bias was summarized in several ways for surface time, the various depth bins, and behavior data. Availability bias estimates were calculated for individuals; by species; and then by sex, age class (juvenile versus adult), season, and depth class, all of which were segregated by species to account for differences in foraging and dive behavior. Depth classes were defined as shallow (0–10 m), shallow shelf (10–50 m), deep shelf (50–200 m) and deep (>200 m) in order to examine how availability bias may change with available depths.

2.5 Environmental Sampling Assessment

Given the current permitting issues with rehabilitation centers in the mid-Atlantic and Northeast, sampling in those waters has been limited to animals that have migrated north from Florida and Georgia. Despite these geographic limitations, it may be that the environmental conditions in those waters are being sampled by the existing tagging dataset. The study team examined the extent of environmental sampling for nine covariates that are likely candidates for future availability bias models: depth, sea surface temperature, bottom temperature, sea surface height, mixed layer depth, sea surface salinity, net primary productivity, and phytoplankton and zooplankton concentration.

Depth data were sourced from the General Bathymetric Chart of the Oceans (GEBCO Compilation Group 2025). All other covariates were downloaded from the E.U. Copernicus Marine Information Service at a daily temporal scale, and at spatial scales ranging from 1/12 of a degree for physical covariates to 1/4 of a degree for biological covariates. Data ranged from June 2024 to December 2025, from the first deployment to the last data download prior to writing this report and covered a geographic area from Cape Cod south to Cuba, the southernmost extent of tag data to date. Tag data from one Kemp's ridley that traversed the Florida Strait and traveled west to waters offshore of Mississippi before transmissions ceased were partially excluded. This was done on the premise that environmental conditions and animal behavior may be appreciably different west of the Florida Strait.

Interpolated animal locations were used to sample the depth raster or appropriate daily environmental covariate rasters by matching the date of the interpolated location to the date of the raster, extracting the covariate value at that location and time. By performing this operation repeatedly, the sampled range of each environmental covariate was determined. Analyses were segregated by species, as the tagged green and Kemp's ridley turtles traveled to different areas at different times, and likely occupied different ecological niches.

Using the sampled environmental ranges for each species, the study team reclassified environmental rasters into sampled and unsampled areas. For dynamic, daily rasters (all covariates except depth), summing these reclassified rasters together gives a count for each raster cell for how many days of the study period the cell contained a value sampled by the extant tag data. The team also calculated the total proportion of cells that were within the sampled environmental range. The team reclassified and summed daily rasters at several spatial and temporal scales that may prove relevant to future modeling efforts: the whole AOI annually, the continental shelf from Cape Cod to Florida annually, the continental shelf from Cape Cod to Florida during spring and summer, the continental shelf from the Maryland/Delaware border to Florida during fall, and the continental shelf from Cape Hatteras to Florida during winter. The study team performed all raster analysis with the R *raster* package.

3. Results

3.1 Deployments

A total of 47 turtles has been satellite tagged to date (June 2024 to January 2026; **Table 2**). All turtles were released from sites ranging from southern Georgia to the southeastern Florida coast (**Figure 2**). The UCF deployed 35 tags on a mix of wild caught juvenile and adult green turtles ranging in size from 32.3 to 117.3 cm SCL. IRG has deployed seven tags: six Kemp's ridley turtles, all juvenile (50.4-55.6 cm SCL), and one adult male green turtle (85 cm SCL). The Loggerhead Marinelife Center (LMC) deployed three tags on rehabilitated, juvenile Kemp's ridley turtles (32.7 to 64 cm SCL). Jekyll Island Authority deployed two tags on rehabilitated juveniles from Jekyll Island, Georgia, on one Kemp's ridley turtle (38.6 cm SCL) and one green turtle (43.5 cm SCL).

Four of the adult females nesting within the ACNWR and one of the Trident Basin juvenile green turtles were recaptured turtles who had been previously flipper tagged and encountered by the UCF. These animals had not been previously satellite tagged, so they were tagged with satellite transmitters for this project.

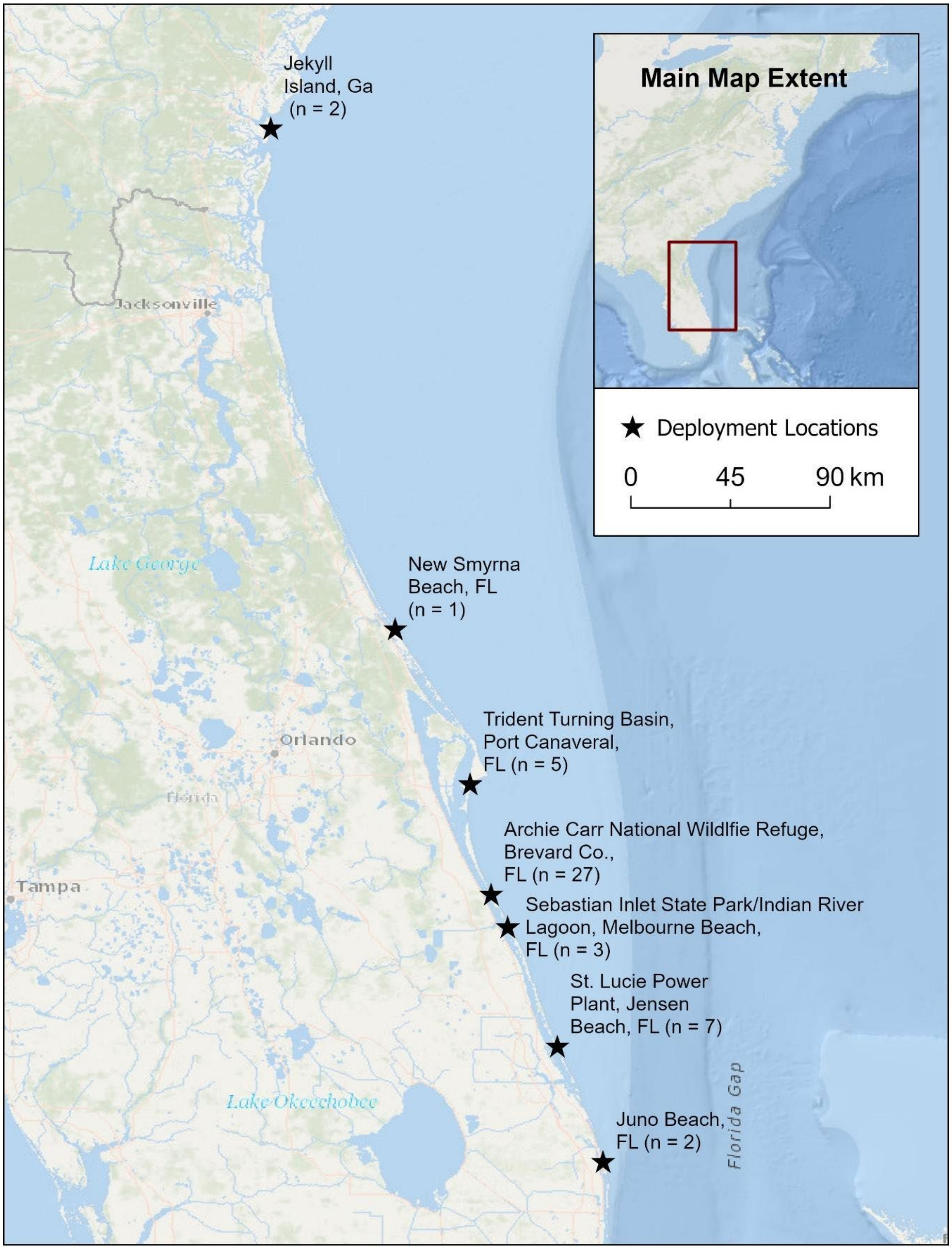

Figure 2. Deployment locations for the release of turtles that were satellite tagged from June 2024 to October 2025.

Table 2. Deployment summaries (tag status current as of 05 January 2026): summary meta-data for each satellite tag deployed.

PTT	Deploying Organization	Date Deployed	Deployment Location	Species	SCL (cm)	Age Class	Sex	Recapture	Name	Status	Days Active
264815	UCF	19-Jun-2024	ACNWR, Brevard Co., FL	Cm	97	Adult	Female	No	Aldunce	Inactive	66
264819	UCF	19-Jun-2024	ACNWR, Brevard Co., FL	Cm	96.2	Adult	Female	No	Blanco	Inactive	44
264822	UCF	19-Jun-2024	ACNWR, Brevard Co., FL	Cm	101.9	Adult	Female	Yes	Kalvin	Inactive	191
264820	UCF	20-Jun-2024	ACNWR, Brevard Co., FL	Cm	97	Adult	Female	Yes	Cheung	Inactive	202
264825	UCF	20-Jun-2024	ACNWR, Brevard Co., FL	Cm	98	Adult	Female	Yes	Dasgupta	Inactive	126
264816	IRG	29-Jun-2024	St. Lucie Power Plant, Jensen Beach, FL	Cm	85	Adult	Male	No	Denton	Inactive	43
264837	UCF	9-Jul-2024	IRL, Melbourne Beach, FL	Cm	53.6	Juvenile	Unknown	No	Diongue	Inactive	25
264818	IRG	20-Jul-2024	St. Lucie Power Plant, Jensen Beach, FL	Lk	55.6	Juvenile	Unknown	No	Dodman	Inactive	62
264827	UCF	21-Jul-2024	ACNWR, Brevard Co., FL	Cm	109.5	Adult	Female	No	Geden	Inactive	201
264834	UCF	21-Jul-2024	ACNWR, Brevard Co., FL	Cm	99.4	Adult	Female	Yes	Garschagen	Inactive	98
264823	UCF	26-Jul-2024	Trident Turning Basin, Port Canaveral, FL	Cm	32.3	Juvenile	Unknown	No	Hayward	Inactive	66
264839	UCF	26-Jul-2024	Trident Turning Basin, Port Canaveral, FL	Cm	39.6	Juvenile	Unknown	No	Jones	Inactive	77
264826	UCF	27-Jul-2024	Trident Turning Basin, Port Canaveral, FL	Cm	40.9	Juvenile	Unknown	Yes	Jotzo	Inactive	40
264831	UCF	27-Jul-2024	Trident Turning Basin, Port Canaveral, FL	Cm	40.5	Juvenile	Unknown	No	Krinner	Inactive	42
264830	UCF	13-Aug-2024	IRL, Melbourne Beach, FL	Cm	45.4	Juvenile	Unknown	No	Lasco	Inactive	42
264851	UCF	5-Sep-2024	IRL, Melbourne Beach, FL	Cm	48.2	Juvenile	Unknown	No	Lee	Inactive	58
264817	IRG	9-Jan-2025	St. Lucie Power Plant, Jensen Beach, FL	Lk	55.4	Juvenile	Unknown	No	Mukherji	Inactive	186
264836	IRG	9-Jan-2025	St. Lucie Power Plant, Jensen Beach, FL	Lk	55	Juvenile	Unknown	No	Meinshausen	Inactive	94
264821	LMC	30-Jan-2025	New Smyrna Beach, FL	Lk	32.7	Juvenile	Unknown	No	Otto	Inactive	143
264824	LMC	30-Jan-2025	Juno Beach, FL	Lk	52	Juvenile	Unknown	No	Revi	Inactive	179
264835	IRG	2-Feb-2025	St. Lucie Power Plant, Jensen Beach, FL	Lk	51.5	Juvenile	Unknown	No	Roy	Inactive	130
264850	IRG	9-Feb-2025	St. Lucie Power Plant, Jensen Beach, FL	Lk	51.1	Juvenile	Unknown	No	Ruane	Inactive	113
264849	IRG	22-Feb-2025	St. Lucie Power Plant, Jensen Beach, FL	Lk	50.4	Juvenile	Unknown	No	Slangen	Inactive	89
264810	UCF	1-Mar-2025	Trident Turning Basin, Port Canaveral, FL	Cm	41	Juvenile	Unknown	No	Sorensson	Inactive	105

PTT	Deploying Organization	Date Deployed	Deployment Location	Species	SCL (cm)	Age Class	Sex	Recapture	Name	Status	Days Active
264828	LMC	22-Apr-2025	Juno Beach, FL	Lk	64	Juvenile	Unknown	No	Melissa	Inactive	61
264840	UCF	25-Jun-2025	ACNWR, Brevard Co., FL	Cm	105.4	Adult	Female	No	Van Vuuren	Inactive	104
264845	UCF	25-Jun-2025	ACNWR, Brevard Co., FL	Cm	101.1	Adult	Female	No	Wei	Active	194
264848	UCF	25-Jun-2025	ACNWR, Brevard Co., FL	Cm	97.7	Adult	Female	No	Thorne	Inactive	95
264813	UCF	25-Jun-2025	ACNWR, Brevard Co., FL	Cm	91.3	Adult	Female	No	Trisos	Inactive	36
264843	UCF	27-Jun-2025	ACNWR, Brevard Co., FL	Cm	102.1	Adult	Female	No	Winkler	Inactive	96
264854	UCF	27-Jun-2025	ACNWR, Brevard Co., FL	Cm	106.1	Adult	Female	No	Vautard	Active	192
264857	UCF	27-Jun-2025	ACNWR, Brevard Co., FL	Cm	94.5	Adult	Female	No	Zommers	Inactive	81
264808	UCF	12-Jul-2025	ACNWR, Brevard Co., FL	Cm	102.1	Adult	Female	No	Gutierrez	Inactive	148
264829	UCF	12-Jul-2025	ACNWR, Brevard Co., FL	Cm	90.6	Adult	Female	No	Gorodetskaya	Inactive	121
264855	UCF	12-Jul-2025	ACNWR, Brevard Co., FL	Cm	95	Adult	Female	No	Narisma	Inactive	66
264805	UCF	12-Jul-2025	ACNWR, Brevard Co., FL	Cm	91.4	Adult	Female	No	Amjad	Inactive	43
264807	UCF	13-Jul-2025	ACNWR, Brevard Co., FL	Cm	101.1	Adult	Female	No	Krakovska	Inactive	66
264861	UCF	13-Jul-2025	ACNWR, Brevard Co., FL	Cm	96.4	Adult	Female	No	Grose	Inactive	147
264863	UCF	13-Jul-2025	ACNWR, Brevard Co., FL	Cm	95.4	Adult	Female	No	Klutze	Inactive	151
264806	UCF	26-Jul-2025	ACNWR, Brevard Co., FL	Cm	97.2	Adult	Female	No	Li	Inactive	63
286944	Jekyll Island Authority	5-Aug-2025	Jekyll Island, GA	Cm	43.5	Juvenile	Unknown	No	Kring-Rowan	Inactive	47
264844	UCF	6-Aug-2025	ACNWR, Brevard Co., FL	Cm	101.5	Adult	Female	No	Duc	Inactive	126
264847	UCF	6-Aug-2025	ACNWR, Brevard Co., FL	Cm	117.3	Adult	Female	No	Mearns	Inactive	65
264859	UCF	6-Aug-2025	ACNWR, Brevard Co., FL	Cm	108	Adult	Female	No	Mernild	Inactive	31
264812	UCF	8-Aug-2025	ACNWR, Brevard Co., FL	Cm	109	Adult	Female	No	Van Den Hurk	Inactive	47
264811	UCF	12-Aug-2025	ACNWR, Brevard Co., FL	Cm	104.1	Adult	Female	No	Yoon	Inactive	141
286949	Jekyll Island Authority	29-Oct-2025	Jekyll Island, GA	Lk	38.6	Juvenile	Unknown	No	Camilloni	Active	68

Key: Cm = *Chelonia mydas*; Co. = County; FL = Florida; GA = Georgia; Lk = *Lepidochelys kempii*; PTT = Platform Transmitter Terminal

3.2 Tag Disposition

In Years 1 and 2, the study team received a total of 100 SPLASH10 tags to distribute among the project partners (60 tags received in Year 1, 40 in Year 2). See **Table 1** for tags distributed to date and **Table 2** for tags deployed to date. **Appendix B** provides tag serial numbers and the current location of all 100 tags.

3.3 Turtle Locations

As of the writing of this report, approximately 60,000 Argos locations were collected from the 47 tags deployed to date, 3 of which are still actively transmitting (**Table 2**). Green turtle locations comprised the majority of locations (82 percent; **Figure 3** compared to Kemp's ridley locations (18 percent; **Figure 4**). This is a substantial improvement over last year, where there were only 700 Kemp's ridley locations from one tag. Ten Kemp's ridley tags have now been deployed, comprising 21 percent of deployments.

The CRW models fitted to each tag converged. The study team examined model fit statistics and plots for each tag and found no indications of poor fit or structural issues with predictions. Approximately 26,000 locations were predicted at 4 h intervals (**Figure 3**), covering the 47 deployments. Fourteen large transmission gaps across nine tags were not interpolated, several of which spanned 2 to 4 weeks. Reasons for these large gaps in transmission could range from antenna fouling, animal behavior, or software/hardware issues, but exact causes are unclear. Maps of Argos locations and predicted locations at 4 h intervals for individual deployments can be found in **Appendix C** (**Figure C-1** through **Figure C-47**).

3.3.1 Green Turtle Movements

Green turtle locations ranged as far north as southern South Carolina, as far south as the northern Cuban coast, as far west as the western Florida Keys, and as far east as the Blake Plateau (**Figure 3**). Two adult female green turtles tagged on the ACNWR migrated north to Georgia waters before looping back south (turtles "Cheung" and "Narisma," Platform Transmitter Terminals [PTTs] 264820 and 264855). A juvenile green turtle released at Jekyll Island, Georgia ("Kring-Rowan," PTT 264944), migrated northward into small embayments in southern South Carolina. Twenty-three green turtles migrated south to the Florida Keys, and one ("Duc," PTT 264844) traveled south to Cuba.

Three adult nesting green turtles from the ACNRW looped offshore, sampling deeper waters off the continental shelf ("Cheung," "Narisma," and "Duc;" PTTs 264820, 264855, and 264844). These deeper locations remain a small proportion of interpolated locations (n= approximately 100; **Table 3**) but are an important step toward sampling the full environment that green turtles use. All other green turtles remained on the continental shelf or in inland waters. Green turtles were tracked during all seasons, although there were far fewer locations during spring and winter (**Table 3**), perhaps due to the bias toward summer tagging of adult nesting females. Overall, the number of locations for green turtles between the 2025 and 2024 study years roughly tripled, greatly increasing the spatial and temporal coverage of tags for this species.

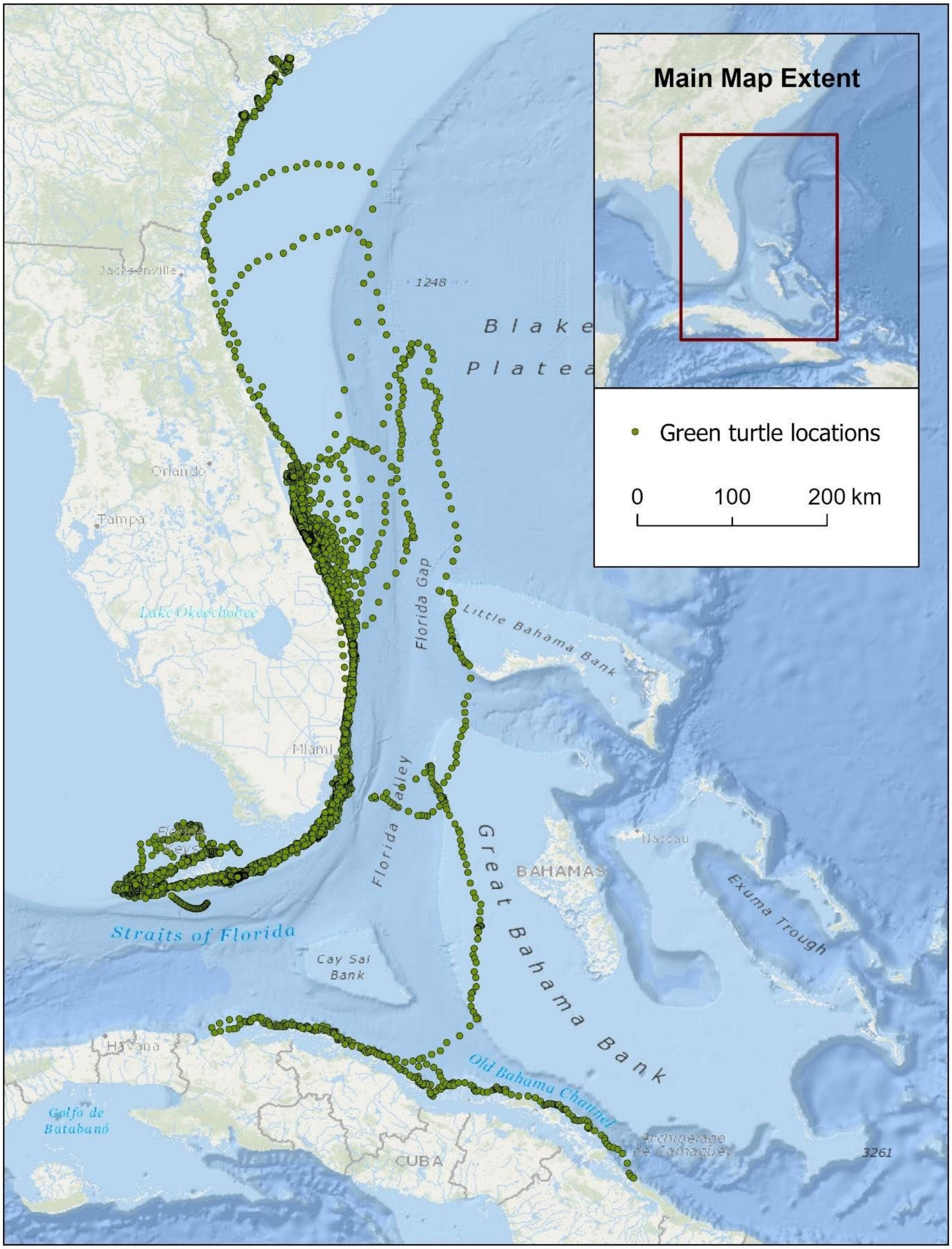

Figure 3. Correlated random walk locations for 37 tagged green turtles.

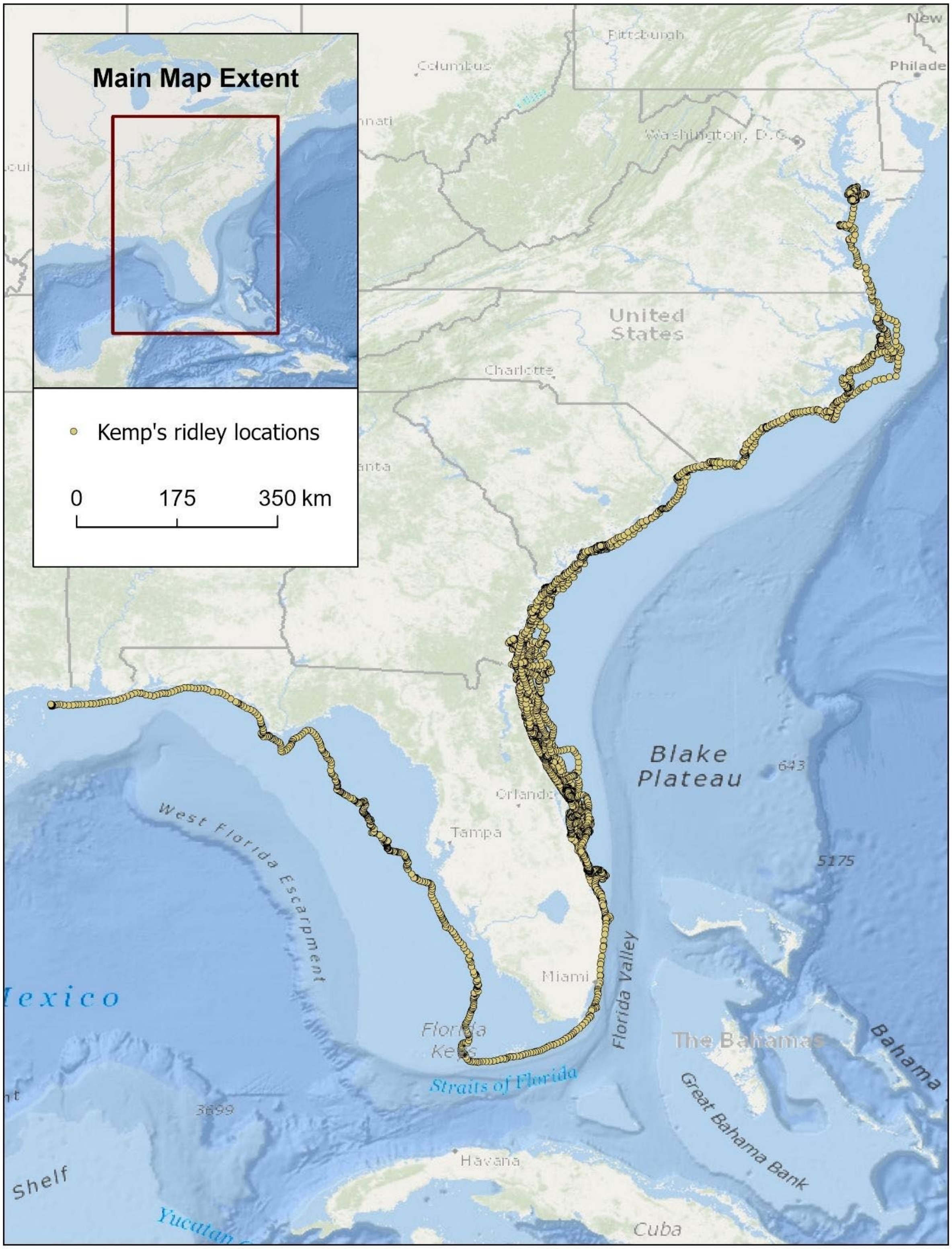

Figure 4. Correlated random walk locations for 10 tagged Kemp's ridley turtles.

Table 3. Availability bias summaries aggregated across several metrics.

Summary	Surface	2-m Histogram	3-m Histogram	4-m Histogram	# Histograms	2-m Behavior	# Behavior Locations
Species							
Chelonia mydas	0.38 (SD ± 0.33)	0.36 (SD ± 0.33)	0.44 (SD ± 0.36)	0.50 (SD ± 0.37)	5,293	0.30 (SD ± 0.29)	5,877
Lepidochelys kempii	0.21 (SD ± 0.28)	0.23 (SD ± 0.28)	0.30 (SD ± 0.33)	0.36 (SD ± 0.37)	2,226	0.23 (SD ± 0.25)	1,862
Sex							
Female (Cm)	0.36 (SD ± 0.32)	0.32 (SD ± 0.31)	0.39 (SD ± 0.33)	0.46 (SD ± 0.35)	4,700	0.30 (SD ± 0.29)	5,530
Male (Cm)	0.09 (SD ± 0.09)	0.07 (SD ± 0.02)	0.10 (SD ± 0.04)	0.16 (SD ± 0.10)	60	0.09 (SD ± 0.05)	105
Unknown (Cm)	0.70 (SD ± 0.29)	0.78 (SD ± 0.26)	0.88 (SD ± 0.23)	0.90 (SD ± 0.22)	533	0.51 (SD ± 0.32)	242
Unknown (Lk)	0.21 (SD ± 0.28)	0.23 (SD ± 0.28)	0.30 (SD ± 0.33)	0.36 (SD ± 0.37)	2,226	0.23 (SD ± 0.25)	1,862
Age Class							
Adult (Cm)	0.35 (SD ± 0.32)	0.32 (SD ± 0.31)	0.39 (SD ± 0.33)	0.45 (SD ± 0.35)	4,760	0.29 (SD ± 0.29)	5,635
Juvenile (Cm)	0.70 (SD ± 0.29)	0.78 (SD ± 0.26)	0.88 (SD ± 0.23)	0.90 (SD ± 0.22)	533	0.51 (SD ± 0.32)	242
Juvenile (Lk)	0.21 (SD ± 0.28)	0.23 (SD ± 0.28)	0.30 (SD ± 0.33)	0.36 (SD ± 0.37)	2,226	0.23 (SD ± 0.25)	1,862
Season							
Winter (Cm)	0.12 (SD ± 0.16)	0.13 (SD ± 0.18)	0.17 (SD ± 0.23)	0.23 (SD ± 0.28)	263	0.11 (SD ± 0.15)	319
Spring (Cm)	0.82 (SD ± 0.27)	0.91 (SD ± 0.19)	0.96 (SD ± 0.17)	0.96 (SD ± 0.17)	63	0.28 (SD ± 0.35)	4
Summer (Cm)	0.49 (SD ± 0.33)	0.48 (SD ± 0.33)	0.56 (SD ± 0.34)	0.62 (SD ± 0.35)	3,024	0.42 (SD ± 0.32)	3,094
Fall (Cm)	0.19 (SD ± 0.21)	0.20 (SD ± 0.24)	0.26 (SD ± 0.28)	0.33 (SD ± 0.31)	1,943	0.18 (SD ± 0.19)	2,460
Winter (Lk)	0.22 (SD ± 0.30)	0.24 (SD ± 0.31)	0.26 (SD ± 0.32)	0.28 (SD ± 0.33)	637	0.29 (SD ± 0.24)	445
Spring (Lk)	0.22 (SD ± 0.28)	0.24 (SD ± 0.29)	0.33 (SD ± 0.34)	0.41 (SD ± 0.37)	1,199	0.22 (SD ± 0.25)	1,050
Summer (Lk)	0.17 (SD ± 0.20)	0.19 (SD ± 0.22)	0.31 (SD ± 0.31)	0.42 (SD ± 0.40)	291	0.23 (SD ± 0.26)	262
Fall (Lk)	0.08 (SD ± 0.12)	0.10 (SD ± 0.14)	0.15 (SD ± 0.20)	0.21 (SD ± 0.27)	99	0.15 (SD ± 0.20)	105
Depth Class							
Shallow (Cm)	0.37 (SD ± 0.33)	0.35 (SD ± 0.34)	0.44 (SD ± 0.37)	0.51 (SD ± 0.38)	3,294	0.27 (SD ± 0.28)	3,688
Shallow shelf (Cm)	0.41 (SD ± 0.32)	0.38 (SD ± 0.32)	0.44 (SD ± 0.33)	0.49 (SD ± 0.34)	1,900	0.35 (SD ± 0.30)	2,070
Deep shelf (Cm)	0.19 (SD ± 0.20)	0.18 (SD ± 0.19)	0.21 (SD ± 0.21)	0.24 (SD ± 0.22)	53	0.18 (SD ± 0.21)	83
Deep (Cm)	0.57 (SD ± 0.31)	0.69 (SD ± 0.28)	0.79 (SD ± 0.25)	0.82 (SD ± 0.24)	46	0.58 (SD ± 0.26)	36
Shallow (Lk)	0.19 (SD ± 0.23)	0.21 (SD ± 0.23)	0.35 (SD ± 0.33)	0.48 (SD ± 0.38)	1,013	0.26 (SD ± 0.26)	902
Shallow shelf (Lk)	0.22 (SD ± 0.31)	0.24 (SD ± 0.32)	0.25 (SD ± 0.32)	0.26 (SD ± 0.32)	1,210	0.20 (SD ± 0.23)	957

Key: Cm = *Chelonia mydas*, Lk = *Lepidochelys kempii*, SD = Standard Deviation

Multiple juvenile green turtles tagged in inland waters, such as the IRL and Trident Basin, did not range outside these areas and remained within very discrete ranges. Despite using a shoreline that is high resolution for the region as a whole, some issues moving locations off land (due to tag location error) were found with these tracks. See **Appendix C**, **Figure C-5** for an example. While these tagging locations were a good source for smaller, juvenile green turtles and/or male individuals, tagging at these locations was discontinued in Year 2. This allowed the study to prioritize turtles from locations that were expected to range farther and consequently better sample spatial locations and environmental conditions throughout the AOI.

3.3.2 Kemp's Ridley Turtle Movements

Kemp's ridley turtle locations (**Figure 4**) ranged from Chesapeake Bay in the north, to the Florida Keys in the south; no Kemp's ridley turtles moved east of the continental shelf, one animal ("Meinshausen," PTT 264836) moved through the Florida Keys and into Mississippi waters before transmissions ceased. Four Kemp's ridleys, all tagged in Florida, migrated north of Georgia, generally hugging the coast. One ended transmission just south of Charleston, South Carolina ("Ruane," PTT 264850). Two ended transmissions in the Pamlico and Albemarle Sounds, one after an almost 1-month-long gap in transmission: "Revi" (PTT 264824), and "Slangen" (PTT 264849). The last moved north into Chesapeake Bay ("Mukherji," PTT 264817), where it ended transmission after 186 days. The remaining five Kemp's ridley turtles did not leave the Georgia/Florida continental shelf.

No Kemp's ridley turtles moved farther than approximately 50 kilometers offshore on the East Coast, limiting sampling of deeper waters (**Table 3**), despite traveling much farther north than green turtles. The turtle that traveled west to Mississippi remained on the west Florida shelf despite being farther offshore at times. Kemp's ridley turtles were tracked in all seasons, though there were fewer locations during fall and summer (**Table 3**), the opposite of green turtles. The study team collected an order of magnitude more data on Kemp's ridley turtles compared to the first annual report (DiMatteo and Mansfield 2025), increasing the number of turtles tagged from 1 to 10.

3.4 Availability Bias

Daytime, 4 h, CRW locations with example-associated dive data (2-m histogram estimates of availability bias) are presented in **Figure 5** for green turtles and **Figure 6** for Kemp's ridley turtles. Locations with dive behavior data associated with them were similar, though with slightly fewer locations as behavior messages were sent at a lower-priority setting compared to histogram data. Note that some minor code updates were made to more accurately assign records to locations. The number of records for turtles that ceased transmission before the compilation of the 2024 annual report may be slightly different than found in this report.

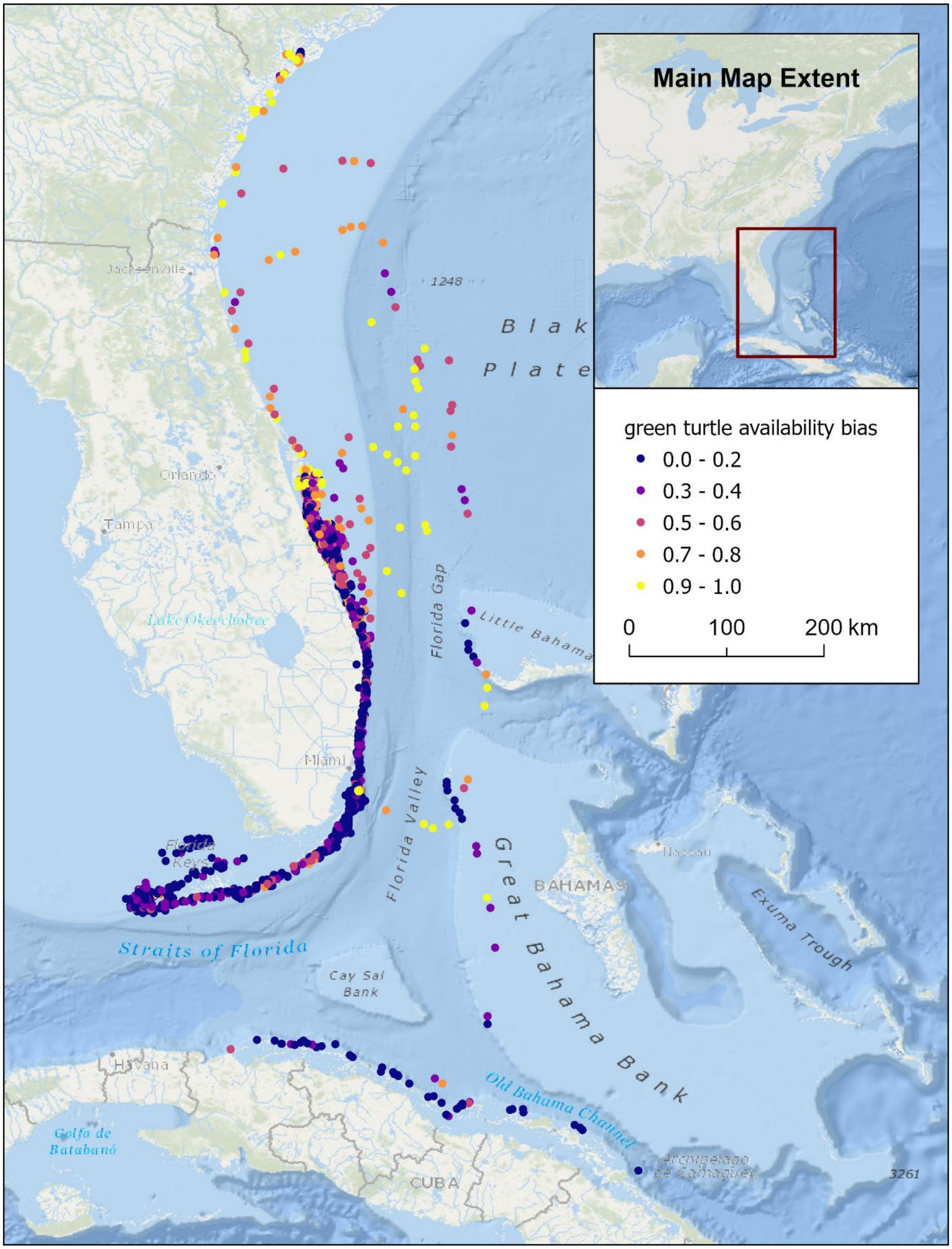

Figure 5. **Interpolated daytime green turtle locations with associated availability bias estimates generated from the proportion of time spent within 2-m of the surface.**

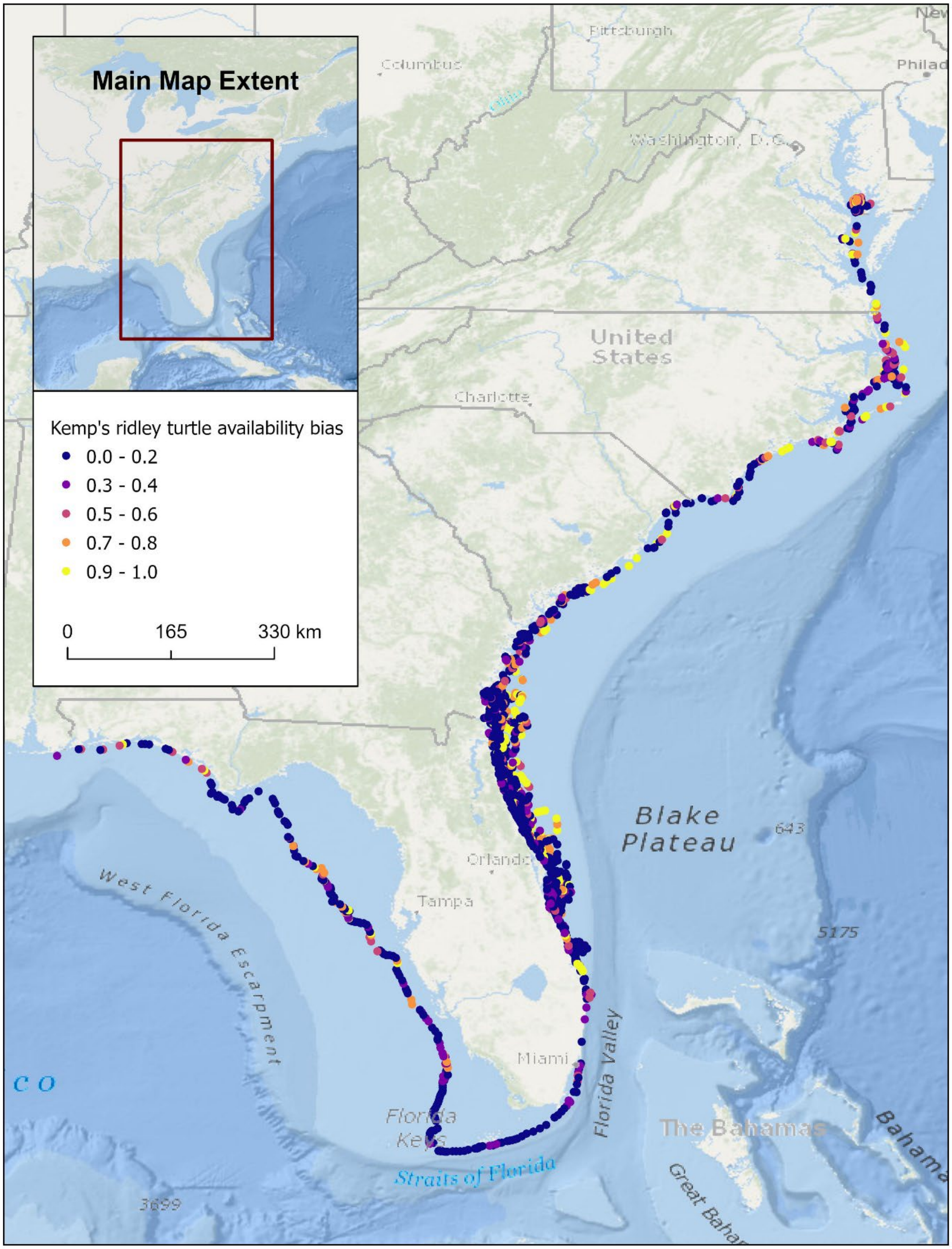

Figure 6. Interpolated daytime Kemp's ridley turtle locations with associated availability bias estimates generated from the proportion of time spent within 2-m of the surface.

3.4.1 Green Turtle Availability Bias Estimates

For adult green turtles that traveled to the Florida Keys (**Figure 5**), availability bias values derived from the 2-m depth bin histogram were generally lower than 0.4, indicating the animals spent most of the time at depth. This is consistent with the Florida Keys being identified as an area having abundant seagrass beds where green turtles are known to forage (Sloan et al. 2022, Welsh and Mansfield 2022).

The availability bias estimates based on the same data for juvenile green turtles in inland waters of the Florida central coast, Georgia, and South Carolina showed animals spending a larger proportion of their time within 2 m of the surface. This may be linked to small juveniles' preference for shallower habitats compared to adults. Mean depth for juveniles was 2.3 m (Standard Deviation [SD] 3.7 m), while mean depth for adults was 22.0 m (SD 76.2 m). This preference for shallower habitat may be influenced by juveniles' reduced dive capacity compared to larger adult turtles (Mansfield 2006). Offshore locations of traveling green turtles also had lower availability bias values, likely indicating turtles were not pausing to forage as they migrated.

The mean surface availability bias estimate for green turtles was similar to the 2-m one, which the study team would expect to be lower for the surface estimate. This may reflect the different sensors used to collect the data (saltwater switch versus pressure sensor). Availability bias generally increased as depth increased for the histograms based on the depth sensor as expected, and the 2-m histogram estimate was similar to the 2-m behavior estimate (**Table 3**). Male green turtle availability bias was lower than female availability bias; however, with so few data from confirmed males, this may be a spurious comparison.

Green turtle availability bias was lower during winter and fall compared to spring and summer, perhaps reflecting lower thermal gains from basking during those seasons with shorter days and cooler temperatures. Green turtle availability was similar in both shelf depth classes. The deeper depth classes offered conflicting information, but the number of samples was low, which may limit our inference in deep depths. Availability bias estimates for individual green turtles varied widely (**Appendix C**, **Table C-1**), stressing the importance of tagging many animals, and accounting for individual variability in future models. In general, availability bias was lower compared to the Year 1's analyses (DiMatteo and Mansfield 2025), possibly reflecting a higher proportion of adults tagged, which were less available than juveniles.

3.4.2 Kemp's Ridley Turtle Availability Bias Estimates

The Kemp's ridley turtles generally spent most of their time below 2-m depth, even while traveling along the East Coast. Limited areas of higher availability bias were found in the few loops to the mid-shelf off the coast of Georgia and Florida, in the sounds of North Carolina, and in Chesapeake Bay (**Figure 6**). The mean surface availability bias estimate for Kemp's ridley turtles was similar to the 2m one, which the study team expected to be lower for the surface estimate. This may reflect the different sensors used to collect the data (saltwater switch versus pressure sensor). Availability generally increased as depth increased for the depth sensor histogram data as expected, and the 2-m histogram estimate was similar to the 2-m behavior estimate (**Table 3**).

No sex or age class comparison was possible for Kemp's ridley turtles because all tagged animals to date are juveniles of indeterminate sex. Seasonal estimates of availability bias were similar during winter, spring, and summer. Fall was lower but had the least number of records, making interpretation of this difference challenging. Availability bias was lower in the shallow shelf depth class than the shallow depth class, which may reflect animals foraging only at very shallow depth (Mansfield 2006). Fewer than 10 records were collected at greater depths, so results for those depth classes are not reported herein. Similar to green turtles, availability bias estimates for individual Kemp's ridley turtles varied widely (**Appendix C**, **Table C-1**). Kemp's ridley turtle availability bias was generally lower than green turtle availability. Exceptions to this comparison occurred when sample numbers were low for a given category, (e.g., male green turtles, winter). The study team opted not to compare estimates to the 2024 study year, given the single turtle tagged and few samples from that year.

3.5 Environmental Sampling Assessment

The environmental sampling assessment only covered the temporal extent of current tag deployments, or roughly 18 months. Figures of seasonal environmental sampling (**Figure 7** through **Figure 15**) are scaled to the maximum number of days available for each season. Seasonal figures and assessments were limited to the continental shelf because this is the primary area where both species are found. **Table 4** provides annual assessments for both the AOI and the continental shelf.

Depth was the only static covariate assessed (**Figure 7**). The study team did not assess depth by season because depth is constant throughout the year and the shelf was well sampled for both species, with 100 percent coverage for green turtles and 91 percent coverage for Kemp's ridley turtles (**Table 4**). Limited areas northeast of Cape Cod were unsampled for Kemp's ridley turtles.

Surface temperature was well sampled by Kemp's ridley turtles, with the total proportion of raster cells sampled ranging from 0.85 to 0.98 by season (**Table 4**, **Figure 8**). Green turtles did not perform as well, likely limited by the lack of northern deployments, with the proportion of the environment sampled ranging from 0.53 to 0.84, summer being the best season for environmental sampling coverage. The opposite was true for bottom temperature sampling, with green turtles having almost complete coverage (**Table 4**, **Figure 9**), likely due to their ranging into deeper waters where bottom temperatures were cooler. Kemp's ridley sampling of bottom temperatures was near complete during winter and in waters south of the Outer Banks, with less coverage in deeper shelf waters from the mid-Atlantic northward.

Salinity was completely sampled on the continental shelf for Kemp's ridley turtles (**Table 4**, **Figure 10**) and close to complete across the AOI (proportion of environment sampled = 0.9), likely reflecting their proclivity to enter brackish waters and embayments. Salinity was poorly sampled for green turtles north of the Outer Banks, ranging from 0.53 to 0.8 during non-winter months. No green turtles traveled northward to major northern embayments such as Chesapeake Bay, Delaware Bay, or Long Island Sound, which are major freshwater outflows with complex gradients and stratified layers of salinity.

Mixed layer depth, net primary productivity, and phytoplankton concentration were very well sampled for most seasons and both species (**Table 4**, **Figure 11** through **Figure 13**), with the sampled proportion of environment over 0.9 across the entire AOI. The exception was green turtles for phytoplankton concentration during spring (0.84) and green turtles on the bigger embayments north of Cape Hatteras. Zooplankton concentration was nearly completely sampled by Kemp's ridley turtles during all seasons and across the AOI, and during summer and fall by green turtles (**Table 4**, **Figure 14**). However, zooplankton concentration was poorly sampled by green turtles during winter and spring north of Georgia, and in major embayments, perhaps reflecting the bias toward summer deployments on adult females for that species, which did not range north of Georgia. Despite a few limited areas/seasons with lower than average sampling, the environmental space of productivity covariates was generally well sampled by the extant tag dataset.

Sea surface height was another well sampled covariate by both species, except within areas off the continental shelf (**Table 4**, **Figure 15**). Mean proportion of the environment sampled across all covariates for the AOI for green turtles was 0.79. Seasonal shelf coverage ranged from 0.88 (spring) to 0.92 (winter). Mean proportional coverage across all covariates for the AOI for Kemp's ridley turtles was 0.74. Seasonal shelf coverage ranged from 0.94 (summer) to 0.97 (winter). Kemp's ridley turtles generally had better environmental sampling coverage, driven by the turtles that migrated farther north than any of the green turtles. Despite some seasonal and species differences in environmental space sampling, coverage for both species was extensive.

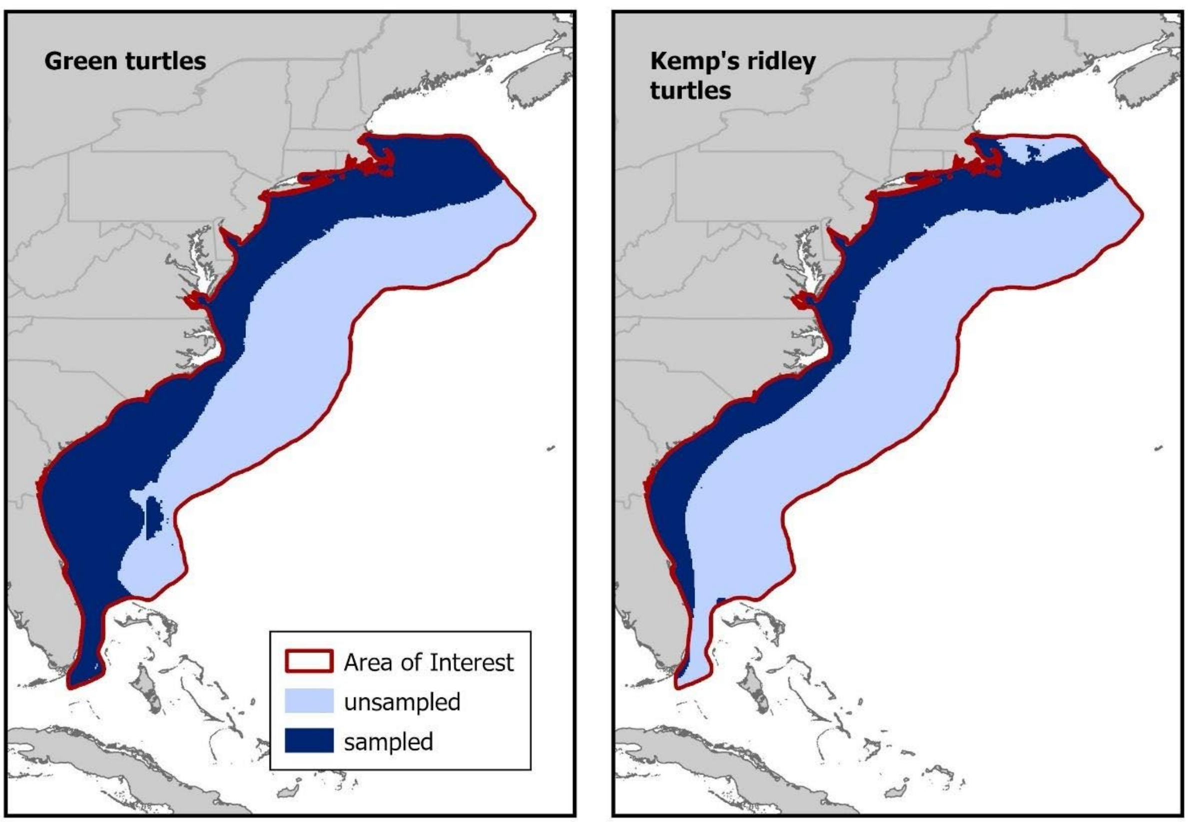

Figure 7. Sampled versus unsampled areas of depth for extant tag data, segregated by sea turtle species.

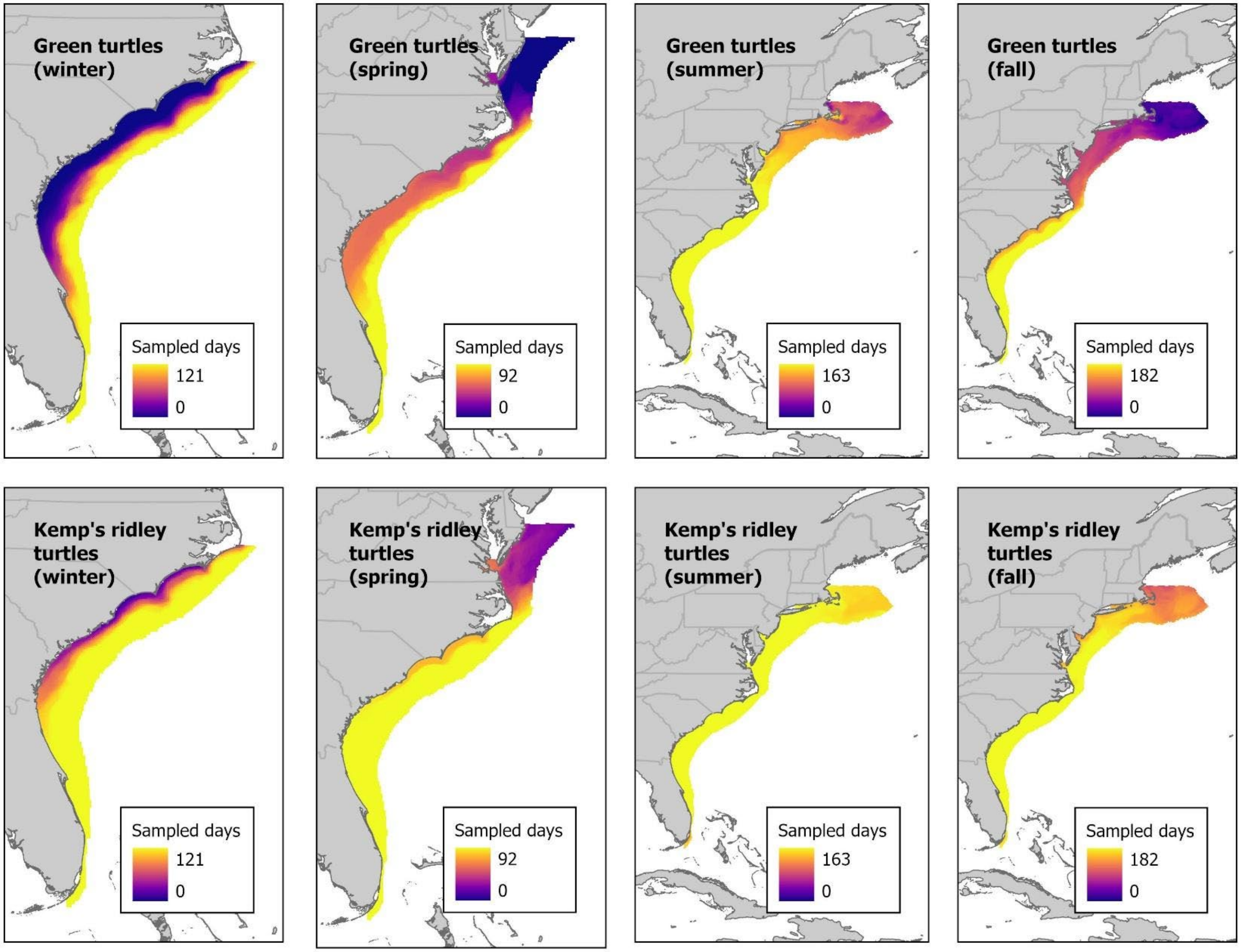

Figure 8. The number of days that surface temperature was sampled by the extant tag data, segregated by species and season, and limited to the expected shelf distribution of animals.

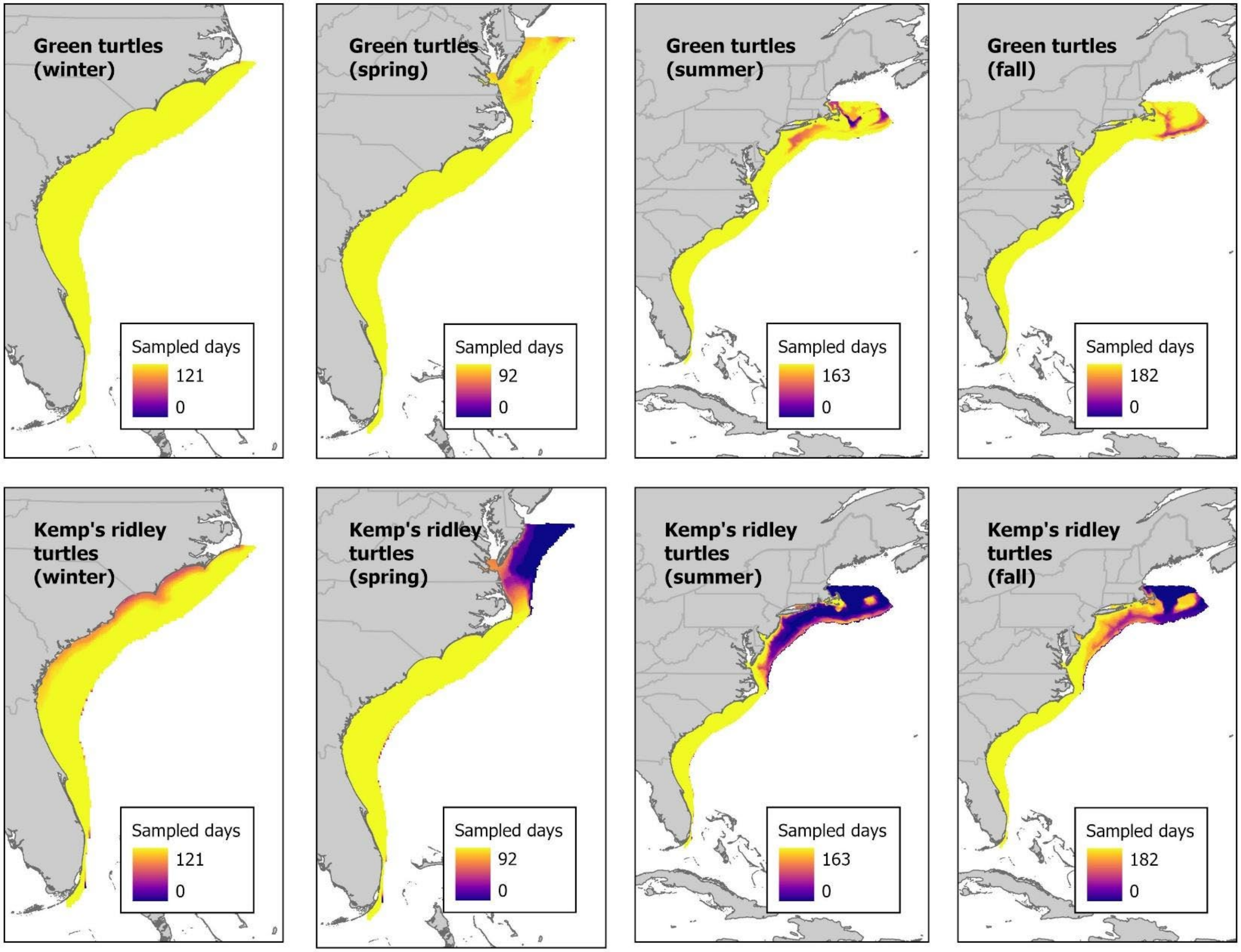

Figure 9. The number of days that bottom temperature was sampled by the extant tag data, segregated by species and season, and limited to the expected shelf distribution of animals.

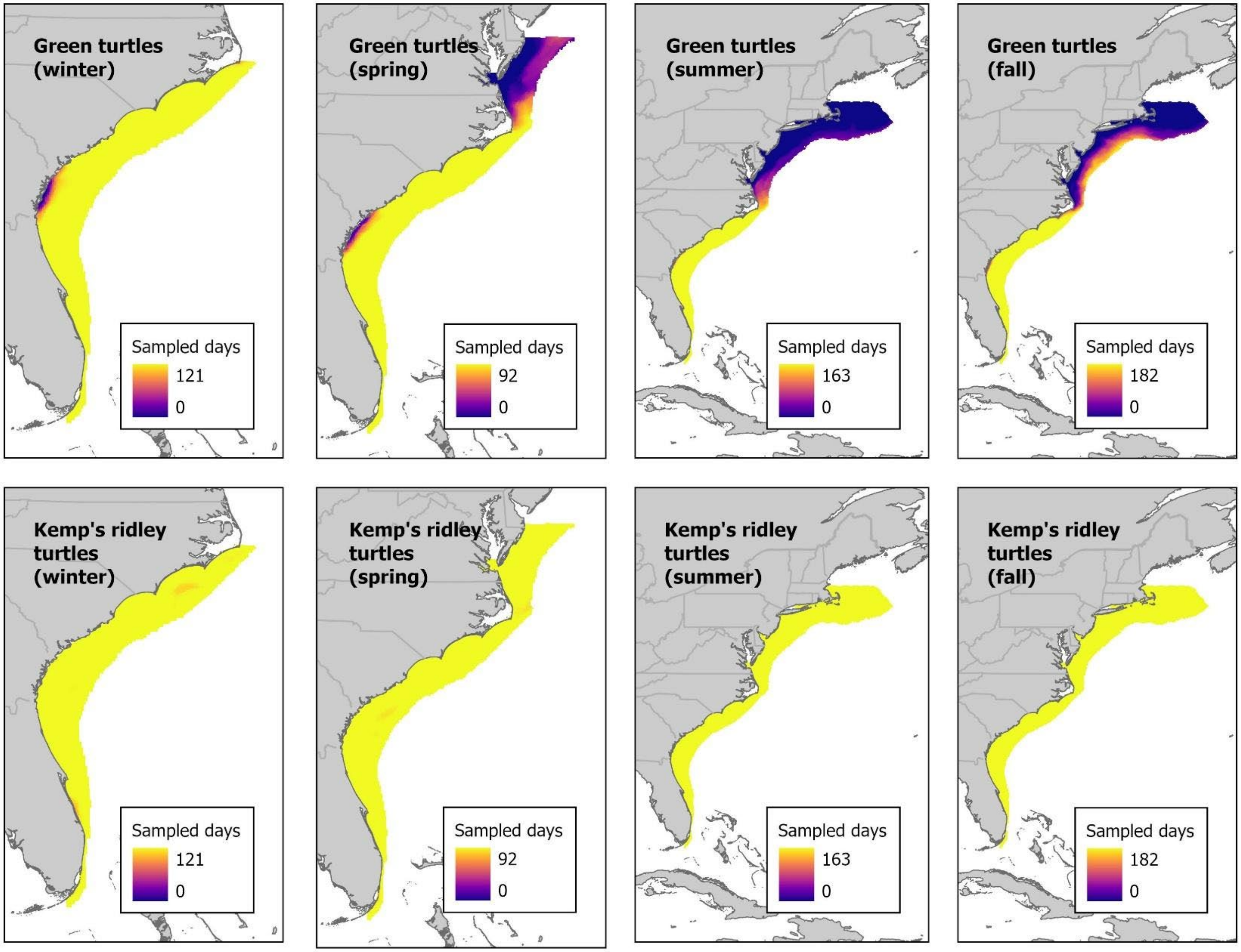

Figure 10. The number of days that salinity was sampled by the extant tag data, segregated by species and season, and limited to the expected shelf distribution of animals.

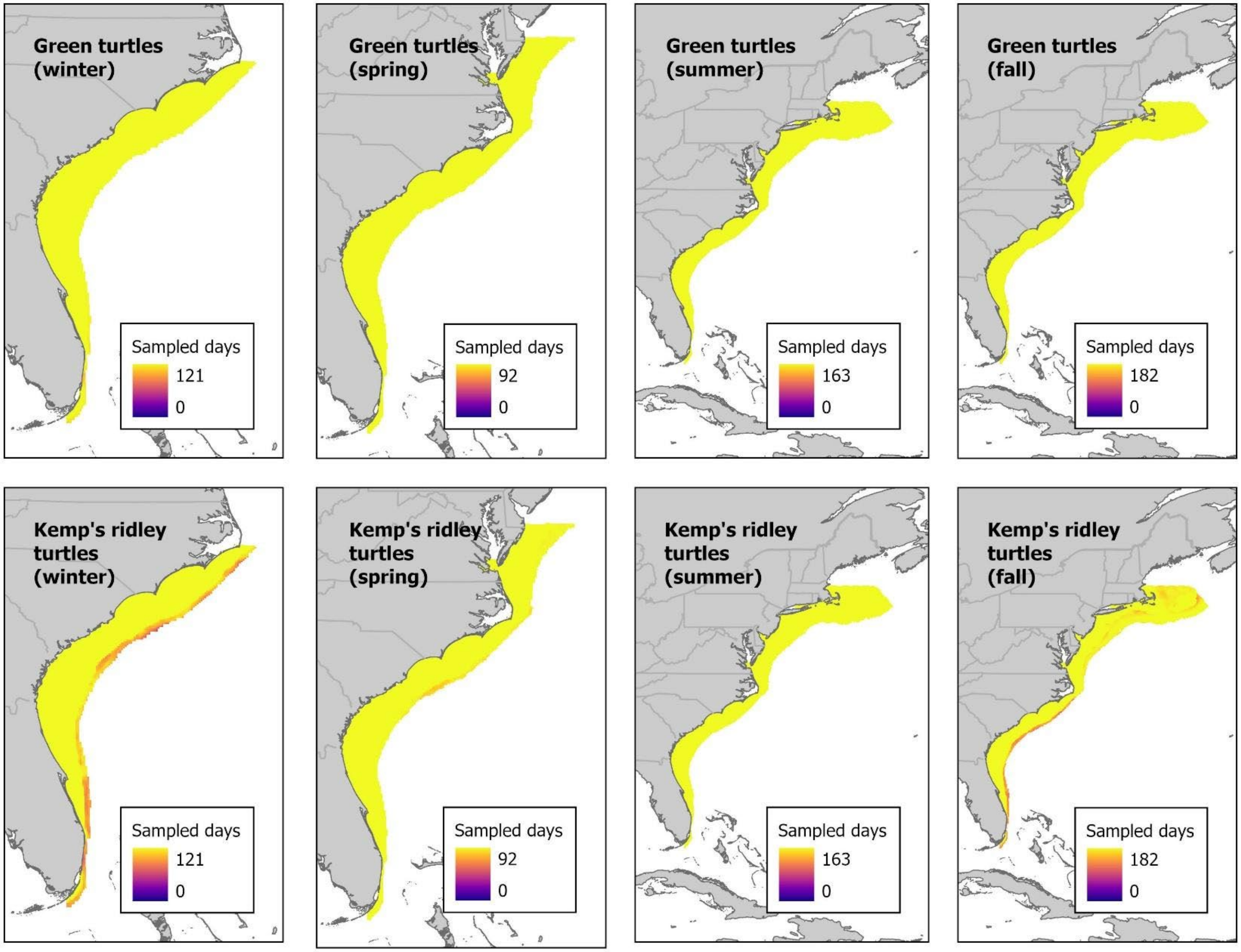

Figure 11. The number of days that mixed layer depth was sampled by the extant tag data, segregated by species and season, and limited to the expected shelf distribution of animals.

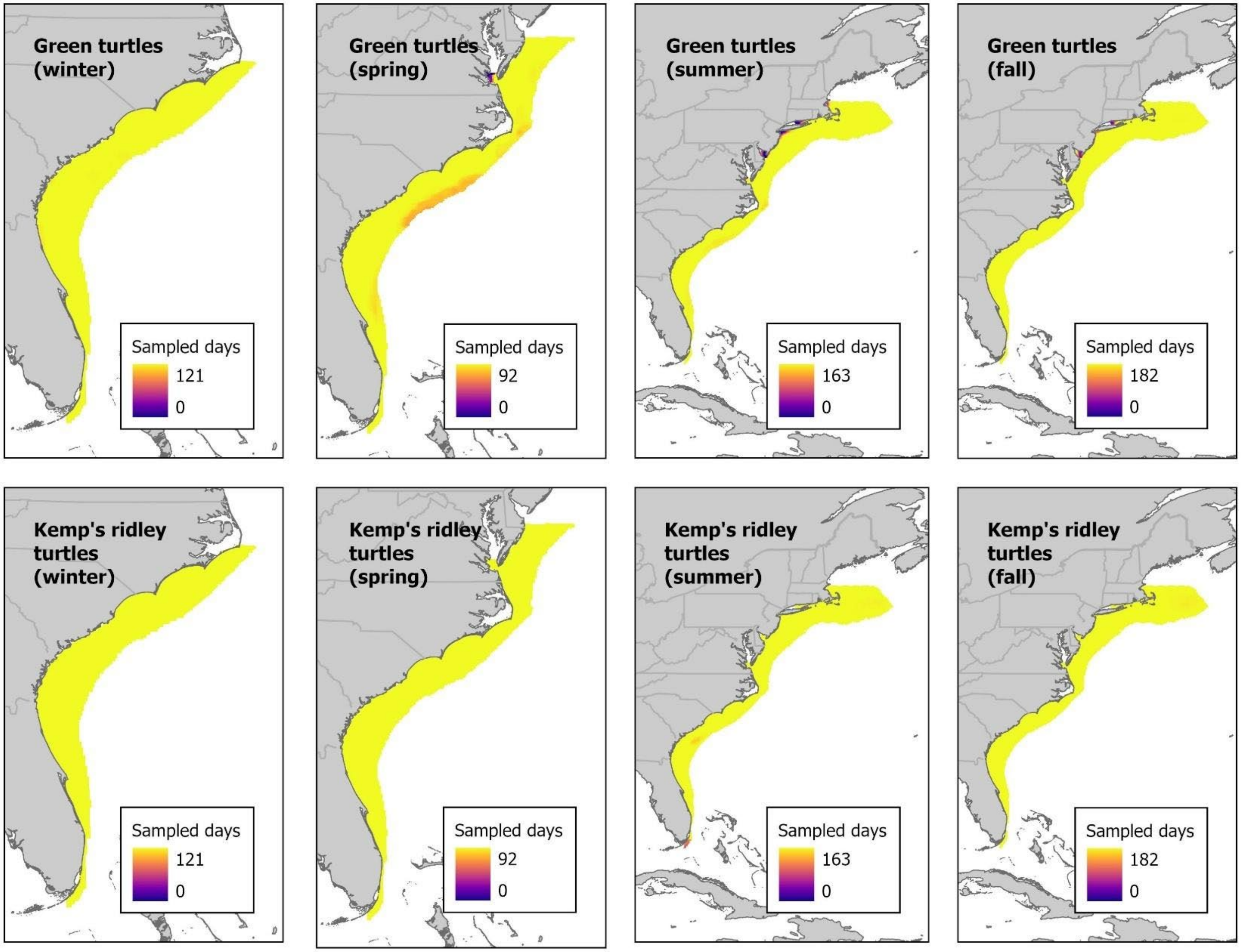

Figure 12. The number of days that net primary productivity was sampled by the extant tag data, segregated by species and season, and limited to the expected shelf distribution of animals.

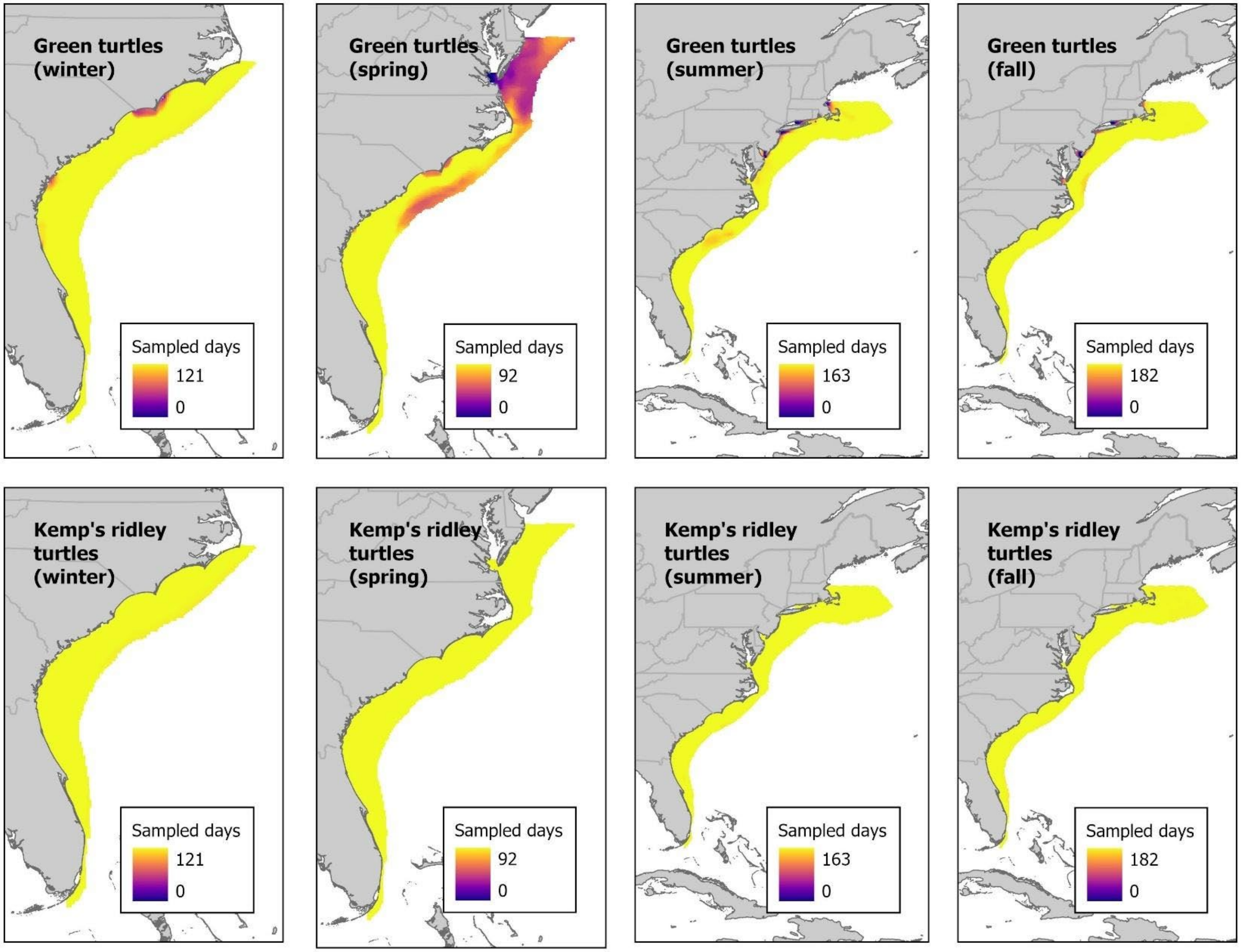

Figure 13. The number of days that phytoplankton concentration was sampled by the extant tag data, segregated by species and season, and limited to the expected shelf distribution of animals.

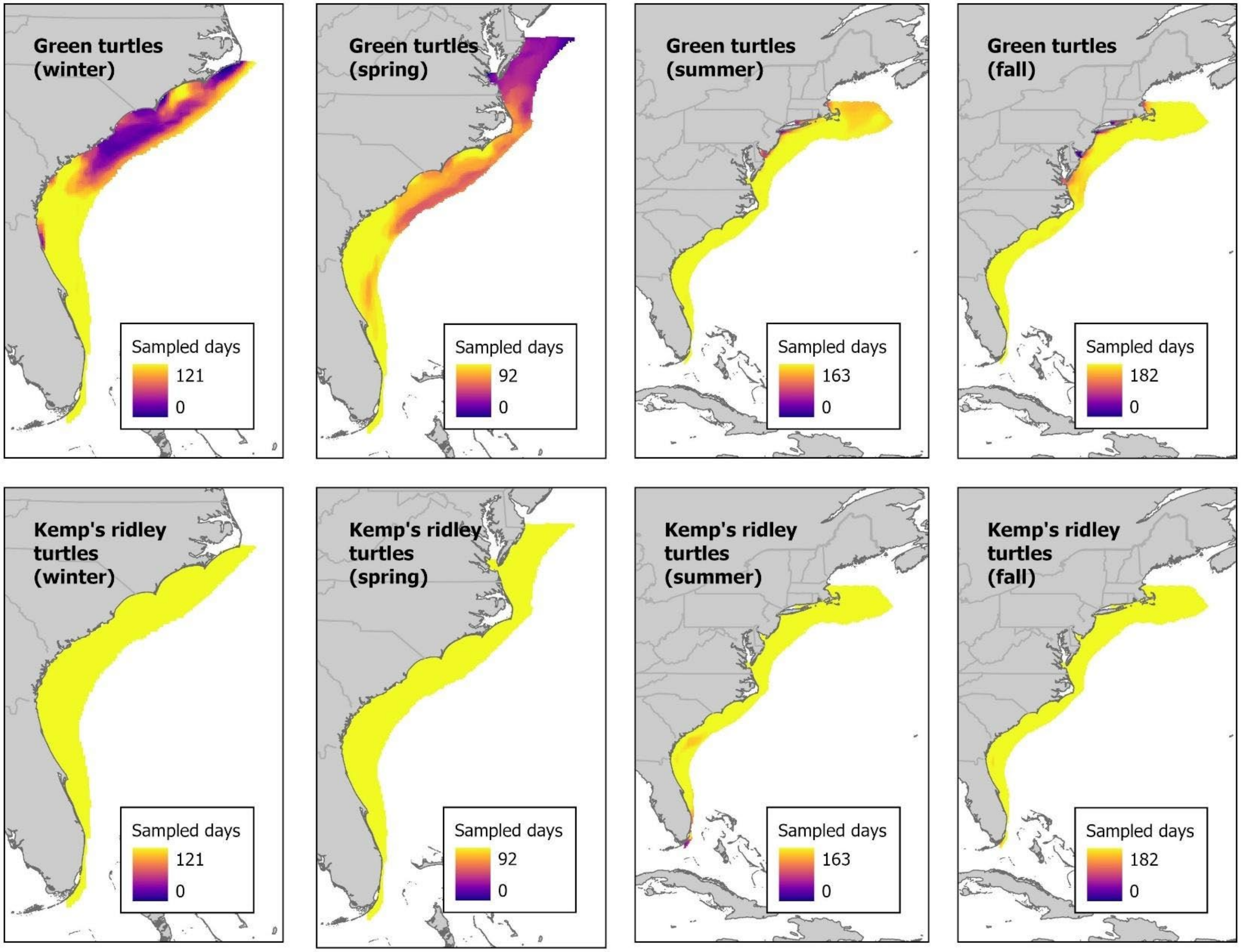

Figure 14. The number of days that zooplankton concentration was sampled by the extant tag data, segregated by species and season, and limited to the expected shelf distribution of animals.

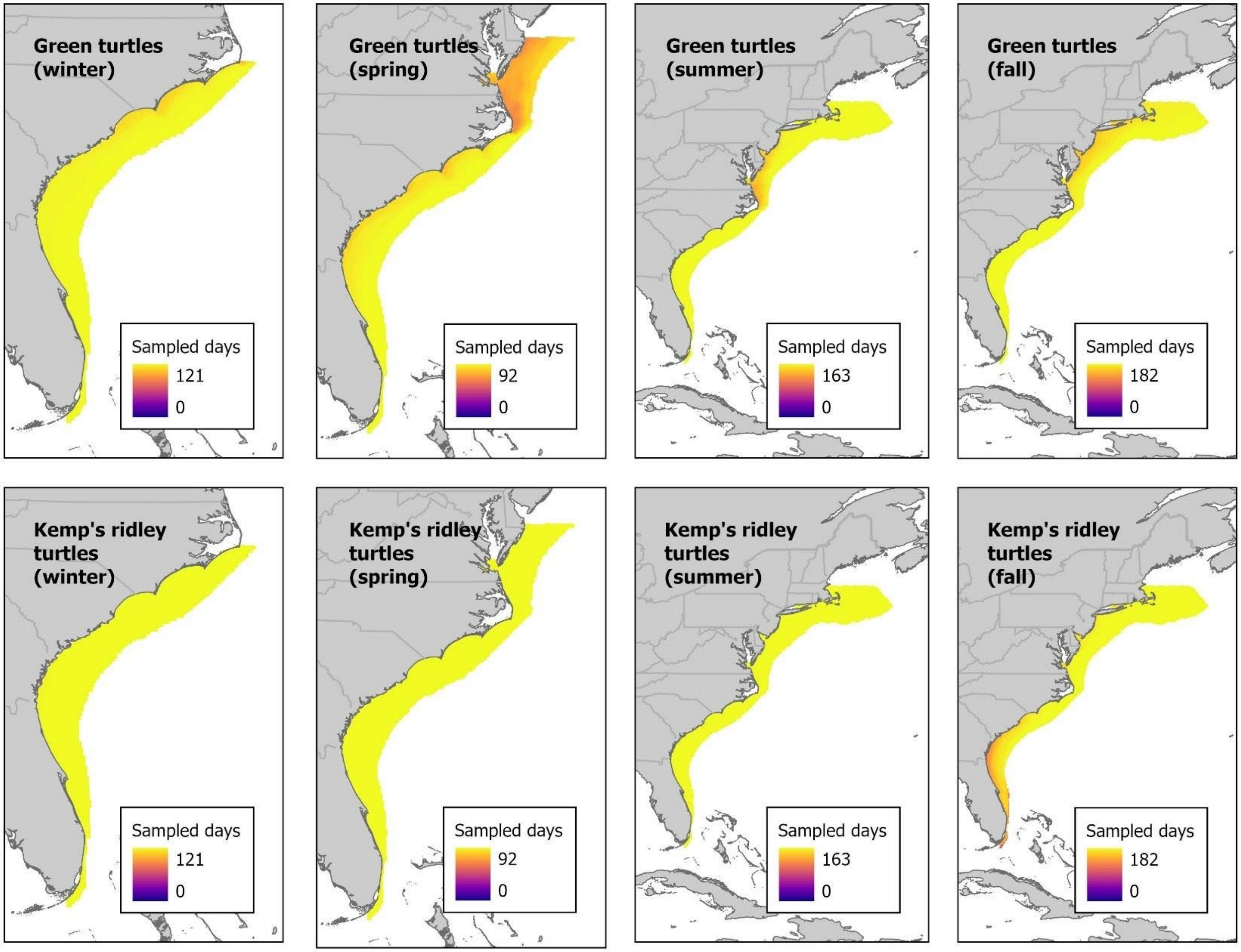

Figure 15. The number of days that sea surface height was sampled by the extant tag data, segregated by species and season, and limited to the expected shelf distribution of animals.

Table 4. Proportion of the environment sampled by extant tag data.

Covariate	Green Turtles						Kemp's Ridley Turtles					
	AOI (annual)	Shelf (annual)	Winter (shelf only)	Spring (shelf only)	Summer (shelf only)	Fall (shelf only)	AOI (annual)	Shelf (annual)	Winter (shelf only)	Spring (shelf only)	Summer (shelf only)	Fall (shelf only)
Depth	0.5	1	1	1	1	1	0.31	0.91	0.96	0.91	0.91	0.97
Surface temperature	0.75	0.53	0.53	0.62	0.84	0.58	0.87	0.74	0.87	0.85	0.98	0.9
Bottom temperature	0.48	0.91	1	0.99	0.95	0.97	0.23	0.6	0.96	0.82	0.6	0.76
Salinity	0.79	0.48	0.98	0.8	0.43	0.5	0.9	1	1	1	1	1
Mixed layer depth	0.94	1	1	1	1	1	0.83	0.95	0.97	1	1	0.98
Net primary productivity	0.99	0.99	1	0.98	0.98	0.99	0.99	1	1	1	1	1
Phytoplankton concentration	0.91	0.91	0.99	0.84	0.97	0.98	0.93	1	1	1	1	1
Zooplankton concentration	0.91	0.84	0.79	0.77	0.97	0.96	0.95	1	1	1	0.99	1
Sea surface height	0.86	0.96	0.99	0.95	0.99	0.98	0.61	0.99	1	1	1	0.97
Averages	0.79	0.85	0.92	0.88	0.9	0.89	0.74	0.91	0.97	0.95	0.94	0.95

4. Discussion

Building on Year 1 deployments, Year 2 moved the study toward providing robust, defensible availability bias models for green and Kemp's ridley sea turtles on the East Coast. The current study results should be interpreted with caution, given the relatively small number of deployments to date, particularly for Kemp's ridley turtles (*n*=10 deployments), which limits the available information both spatially and temporally.

Collecting 18 months of data and expanding the analysis, compared to 6 months when the 2024 annual report (DiMatteo and Mansfield 2025) was written, reinforced several findings. Availability bias generally increased as the depth threshold at which animals were assumed to be able to be seen increased. This is to be expected as more of the water column is considered to be visible. The availability bias estimates from the 2-m depth histograms and dive behavior were similar.

For green turtles, availability is different by age class (**Table 3**). Though few new juveniles were tagged in Year 2 (**Appendix C**, **Table C-1**), the additional tags reinforced this dichotomy, with overall availability bias estimates being lower during Year 2 as the proportion of adult green turtles being tagged increased relative to juveniles. Adult turtles have increased dive capacity relative to juveniles, which may account for this. Smaller juvenile green turtles captured and released in inland waters often did not range far from their release locations. During Year 2, tagging of these individuals was suspended to prioritize animals that would range farther and better sample the available environment in the AOI. However, given the difference in the depths occupied by juvenile and adult green turtles, it would be interesting to tag subadult animals in a range of sizes to determine at what size this transition occurs.

With 10 tags deployed, Kemp's ridley turtle availability bias estimates can begin to be examined. While Kemp's ridley turtle estimates were generally lower than green turtles, this may be driven by only juveniles and subadults having been tagged to date. The lack of Kemp's ridley turtle data in deeper waters limited the study's ability to discern depth-driven differences in availability; however, this may be an artifact of their behavior and tendency to remain closer to shore, and their preference for benthic prey (Mansfield 2006, Byles 1988). **Section 4.1** contains more discussion on how this study's estimates compare to other regions.

For both species, locations were limited during one or more seasons (**Table 3**), making comparisons challenging. Increasing seasonal coverage should remain a priority. That said, the environmental sampling assessment provided valuable insights into the current environmental space traversed by the extant tag dataset. Most covariates were well sampled in most seasons and areas with a few limited exceptions. This gives the study team confidence that spatial models could be cautiously extrapolated into physically unsampled areas, with the possible exception of areas off the shelf, which were generally less well sampled because few turtles ranged off the continental shelf and those that did spent little time in off-shelf waters.

While the full AOI is the current domain of the density spatial models the availability bias models will support, both Kemp's ridley and green turtles are mostly found on the continental shelf on the East Coast once they have recruited to neritic foraging areas. These neritic foragers are generally of a size large enough to be seen by aerial observers. Limiting future spatial models to the continental shelf may be advisable, and static averages could be used off the shelf, possibly stratified monthly or seasonally. Spatial models would still cover both species' core distribution in the AOI, which is the continental shelf, limited to the northward extent during some seasons.

Sea surface temperature was the worst sampled covariate, with bottom temperature for green turtles being the second worst (**Table 4**). This may be problematic; sea turtles are ectotherms, and their ability to maintain body temperatures is strongly influenced by their environment (Spotila et al. 1997, Spotila and Standora 1985). In cooler temperatures, sea turtles may spend more time at the surface basking to regain lost body heat, directly impacting availability (Mansfield 2006, Keinath et al. 1995, Nelson 1996). Priority should be given to tagging animals in areas and seasons where both species will encounter a wider range of temperatures.

Several other caveats exist for the environmental sampling assessment. First, the study team assessed univariate covariate sampling only, not multivariate. Animals may react differently to unique combinations of covariates. Assessing multivariate space should be considered a medium-term priority for assessing environmental space sampling. Second, the study team only assessed the roughly 18-month span of extant tagging data, which might not fully capture interannual variability in the East Coast environment. Additional years of covariates, potentially covering the span of data intended to be used in density spatial models, should be assessed to gain a deeper understanding of the habitat sampled in East Coast habitats.

4.1 Comparison to Other Availability Bias Estimates

Availability bias for green turtles has been examined within other regions. Thomson et al. (2013) found that green turtles had extended dive times during winter in Shark Bay, Western Australia, and abundance would be underestimated during winter and overestimated during summer if uniform availability was assumed. They did not report an average measure of availability.

Fuentes et al. (2015) reported availability bias estimates of approximately 0.05 for adult and subadult green turtles in the Torres Strait, located between northern Australia and Papua New Guinea. Roberts et al. (2022) found that green turtles tagged in the Gulf of Mexico spent approximately 19 percent of their time at the surface, with the surface defined as depths of 0 to 2 m. Higher availability was associated with the spring season, shallow depths, warmer than average sea surface temperatures, and stronger temperature fronts. These data, though not the associated model, were used as a proxy for availability for East Coast green turtles in DiMatteo et al. (2024) as the closest and best available substitute.

In general, the study team's preliminary estimates of green turtle availability bias are higher than other published estimates, even with another tagging cohort included; however, this could be due to a number of reasons, including available habitat, differences in environment, and age classes tagged. This highlights the need for species- and region-specific availability bias estimates. Additionally, ocean temperatures are rising globally, which may be impacting animal dive behavior (Venegas et al. 2023, Marcos et al. 2025). Discerning the drivers for differences in availability bias between regions remains an understudied facet of sea turtle (and other taxa) ecology given the paucity of data from different regions. This dataset will be a valuable resource supporting these efforts in the future.

Roberts et al. (2022) also estimated availability bias for Kemp's ridley turtles tagged in the Gulf of Mexico. They estimated an average availability bias of 0.18 from 63 tagged animals, and found Kemp's ridley turtles occupied a broader environmental niche compared to green and loggerhead turtles within the same region. No other estimates of Kemp's ridley turtles' availability bias exist in the literature. This is unsurprising given that the global distribution of Kemp's ridley turtles is limited to the waters of the eastern United States and Mexico, and to some extent the offshore waters of the North Atlantic for developing animals younger than 2 to 3 years old (Putman et al. 2013, Wallace et al. 2023). The Roberts et al. (2022) estimates were previously used as a proxy for East Coast availability in DiMatteo et al. (2024). The Roberts et al. (2022) estimates overlap with this study's estimates for Kemp's ridley turtles when accounting for variability but given this study's lower number of turtles tagged, this apparent concurrence should be interpreted cautiously.

4.2 Plans for Future Deployments

This study's northern tagging partners continue to not be able to tag animals for this project. Because of this, the study's ability to deploy the planned number of tags has been hindered. To date, 47 of 100 available tags have been deployed, 37 on green turtles and 10 on Kemp's ridley turtles, which falls short of not just the study's tagging goal but also its goal of species parity. Because Kemp's ridley turtles nest only rarely on the East Coast, the study is reliant on in-water captures or stranding for this species, as opposed to green turtles, which nest extensively in Florida and to a lesser extent northward through the mid-Atlantic.

To combat the disparity between green and Kemp's ridley turtle tagging, the study team has worked with partners that have successfully acquired and released Kemp's ridley turtles to increase their permitted number of tags allowed to be deployed and ensured they have ample tags on hand (**Appendix B**). The LMC currently has 2 Kemp's ridley turtle tagging candidates in-house, and the study team expects IRG to tag 5 to 10 this winter/spring. Despite these measures, the study team does not anticipate being able to reach parity in tagging these two species over the next year. However, the results of the environmental sampling assessment were encouraging for Kemp's ridley turtles despite the low number of animals tagged. This was due, in large part, to several animals traveling northward, as far as Chesapeake Bay. It should be noted that these tags also represent some of the only track data for Kemp's ridley turtles within this region. Despite this encouraging improvement, individual animal dive behavior is highly variable, so the study team will continue efforts to tag more Kemp's ridley turtles.

During 2026, the study will provide up to 10 tags to the New York Marine Animal Rescue Center if permitting issues are resolved and animals are available. The North Carolina Aquarium at Roanoke will be provided with tags pending a data sharing agreement and available animals. Georgia Sea Turtle Center, IRG, and LMC partners are located within driving distance to UCF and can be provisioned with additional tags as needed. Tag distributions may be modified somewhat depending upon the upcoming cold stun season, which generally runs from November-March each year, and the distribution of cold-stunned animals to rehabilitation centers along the East Coast

For Year 3 of tagging, the study team's recommendations are as follows:

1. Purchase fewer tags in 2026. With northern tagging partners unlikely to resolve permitting issues quickly, the study's ability to deploy many tags in a year is limited unless things change with the northern partners.
2. Provide as many tags as possible to project partners, within their permitting limits, who have successfully deployed tags and explore new partner options as opportunity presents.
3. Prioritize Kemp's ridley turtle deployments.
4. Prioritize juvenile green turtles that may travel north (e.g., northern cold-stun transports) and larger juveniles or subadults (more than 55 cm SCL)
5. Seasons with limited data (spring for green turtles, fall for Kemp's ridley turtles) should be prioritized; however, the study is limited to encounters that are more common during winter/spring due to migratory movements for wild captures and seasonal cold-stunning events
6. Continue to tag adult female green turtles from ACNWR since this is the most reliable source of green turtles for the study area. The study will aim for 10 to 20 tag deployments in 2026; however, it is expected to be a low green turtle nesting year, so this goal may be revised.
7. Any tags not deployed during Year 3 should still be deployed during Year 4 if funding allows. Even if they cannot be incorporated into the first generation of availability bias models, they will be valuable for future iterations and general research.

4.3 Future Analyses and Uses

For the remainder of Year 2, the study team will continue to update the existing analyses as transmissions complete and more deployments occur. Currently, LMC has two Kemp's ridley turtles and one larger juvenile green turtle (57-cm SCL) in-house that are good candidates for tagging. Late winter and early spring are also when IRG tends to capture Kemp's ridley turtles. Additionally, the environmental sampling assessment code base will be reviewed and potentially expanded to produce additional summary statistics, multivariate space analyses, and more years of environmental rasters.

Future analyses include: (1) moving from a CRW model to a movement persistence or Hidden Markov model approach, which could allow inference on whether and how dive behavior changes with animal behavioral state, though this has proven inconclusive within other regions (DiMatteo et al. unpublished data from the Mediterranean Sea); (2) expanding the scope of the environmental sampling assessment; and (3) beginning to fit exploratory models to data to guide future modeling decisions and better understand the relationship of availability bias to environmental factors.

For any nesting adult green turtle satellite tagged by UCF, Dr. Simona Ceriani of the Florida Fish and Wildlife Commission has UCF collecting skin, egg, and scute samples for a statewide foraging ecology and stable isotope analysis. Track data from these turtles will be shared with Dr. Ceriani to inform isoscape models for green turtles nesting in the western North Atlantic. Aside from Dr. Ceriani, no collaborators have made the study team aware of planned or active analyses using these data.

Data from tags deployed by UCF will be used as a training tool for a summer National Science Foundation (NSF) Research Experience for Undergraduates (REU) student working with Co-PI Dr. Mansfield's laboratory (the UCF Biology REU program is pending renewal from the NSF). These data will help the NSF REU student learn basic animal movement analyses and mapping techniques. Pending UCF's graduate admissions decisions, Dr. Mansfield may also have an incoming Masters student interested in turtle movement data incorporating stable isotope (foraging ecology) to better predict ontogenetic or life-stage specific shifts in behavior and habitat use. The study team anticipates that as more tags are deployed and deployments finish, more collaborators will begin to use the data.

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Appendix A. Sample Tag Programming Report and Tag Configurations

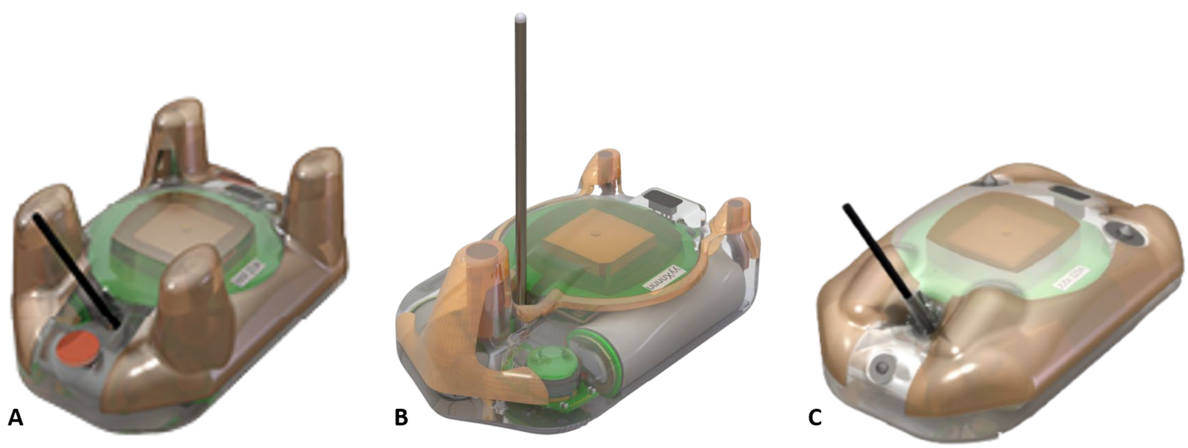
Host Settings	
MK10Host version	1.27.0002
User Name	Ka333757
Time And Date Settings	
PC Date (UTC)	12 Jun 2024 at 19:09:11
Tag Date	12 Jun 2024 at 19:09:10
PC UTC offset	4 hours
General Settings	
Tag's Serial Number	24A0493
Password	MK10
User's Identifier	...
Argos Ptt number	264805 (82BE15F Hex) Uplink / LUT id: 8367:95
Repetition Intervals	15s (at-sea); 88s (haulout)
Number of Argos transmissions	397
Tagware version	1.27c
Hardware version	10.5
Battery Configuration	2 x AA
Battery Capacity (from manufacturer's datasheet)	4000mAh
Battery is not classified as dangerous goods	
Deploy from Standby on Depth Change?	Yes
Owner	Wildlife Computers 8310 154th Ave NE, Suite 150 Redmond, WA 98052 USA +1-425-881-3048
Bytes of archive data collected	0
Bytes of histogram and profile data collected	0
Data to Archive Settings	
Depth	1 second
Internal Temperature	never
External Temperature	1 second
Depth Sensor Temperature	never
Light Level	never
Battery Voltage	never
Wet/Dry	1 second
Wet/Dry Threshold	Dynamic (initial value = 80)
Sampling Mode	Wet or Dry
Automatic Correction of Depth Transducer Drift	Using first dry reading
Data to Transmit Settings	
Histogram Selection	
Histogram Data sampling interval	1 seconds
Dive Maximum Depth (m), 14 bins	2; 5; 10; 15; 20; 25; 30; 35; 40; 50; 60; 70; 80; >80
Dive Duration, 14 bins	3 mins ; 5 mins ; 10 mins ; 20 mins ; 30 mins ; 40 mins ; 60 mins ; 80 mins ; 100 mins ; 120 mins ; 180 mins ; 240 mins ; 273 mins 2secs; >273 mins 2secs
Time-at-Temperature (C), 14 bins	8; 10; 12; 14; 16; 18; 20; 22; 24; 26; 28; 30; 32; >32

Time-at-Depth (m), 14 bins	2; 3; 4; 5; 10; 15; 20; 25; 30; 40; 50; 60; 100; >100
20-min time-line	disabled
Hourly % time-line (low resolution)	disabled
Hourly % time-line (high resolution)	enabled
Dry/Deep/Neither time-lines	Disabled
PAT-style depth-temperature profiles	disabled
Deepest-depth-temperature profiles	disabled
Light-level locations	disabled
Histogram Collection	
Hours of data summarized in each histogram	4
Histograms start at GMT	00:00
Do not create new Histogram-style messages if a tag is continuously dry throughout a Histogram collection period	is disabled
Time-Series Messages	
Generation of time-series messages	is disabled
Dive & Timeline Definition	
Depth reading to determine start and end of dive	2m
Ignore dives shallower than	2m
Ignore dives shorter than	1m
Depth threshold for timelines	2m
Behavior Messages	
Generation of behavior messages	is enabled
Stomach Temperature Messages	
Generation of stomach temperature messages	is disabled
Haulout Definition	
A minute is "dry" if Wet/Dry sensor is dry for any ***value*** seconds in a minute	30
Enter haulout state after ***value*** consecutive dry minutes	10
Exit haulout state if wet for any ***value*** seconds in a minute	30
Transmission Control	
Transmit data collected over these last days	7
Pause transmissions if haulout exceeds	never pause
Transmit every eighth day if transmissions are paused	is enabled
Collection days	
January	1 - 31
February	1 - 29
March	1 - 31
April	1 - 30
May	1 - 31
June	1 - 30
July	1 - 31
August	1 - 31
September	1 - 30
October	1 - 31

November	1 - 30
December	1 - 31
Relative transmit Priorities	
Histogram, Profiles, Time-lines, Stomach Temperature	high (3 transmission(s))
Fastloc and Light-level Locations	none (0 transmission(s))
Behavior and Time-Series	med (2 transmission(s))
Status	Every 20 transmissions
When to Transmit Settings	
Initially transmit for these hours regardless of settings below	24
Transmit hours	0 - 23
Transmit days	
January	1 - 31
February	1 - 29
March	1 - 31
April	1 - 30
May	1 - 31
June	1 - 30
July	1 - 31
August	1 - 31
September	1 - 30
October	1 - 31
November	1 - 30
December	1 - 31
Daily Transmit Allowance	
January	500 [Accumulate, Optimize for battery life]
February	500 [Accumulate, Optimize for battery life]
March	500 [Accumulate, Optimize for battery life]
April	500 [Accumulate, Optimize for battery life]
May	500 [Accumulate, Optimize for battery life]
June	500 [Accumulate, Optimize for battery life]
July	500 [Accumulate, Optimize for battery life]
August	500 [Accumulate, Optimize for battery life]
September	500 [Accumulate, Optimize for battery life]
October	500 [Accumulate, Optimize for battery life]
November	500 [Accumulate, Optimize for battery life]
December	500 [Accumulate, Optimize for battery life]
Channel Settings	
Depth	Channel: 0; Range: -40m to 1000m; Resolution: 0.5m; ADaddress: 02; Settling Delay: 1.5ms
Correction factors	0.0e0, 1.0, 3.0 1.155e-10, 3.863e-7, 0.9392, 1.289 0.0e0, 0.0e0, 1.0, 0.0
Errors	None
Compensation factors	7.643e-9, -3.297e-5, 0.0735, -52.97
Errors	None
Internal Temperature	Channel: 1; Range: -40C to 60C; Resolution: 0.05C; ADaddress: 04; Settling Delay: 0.5ms
Correction factors	9.466e-8, 0.0002, 0.001 9.137e-7, -1.313e-4, 1.0014, -0.245

	0.0e0, 0.0e0, 1.0, 0.0
Errors	None
External Temperature	Channel: 2; Range: -40C to 60C; Resolution: 0.05C; ADaddress: 03; Settling Delay: 0.5ms
Correction factors	8.767e-8, 0.0002, 0.001 2.921e-6, -2.179e-4, 1.0048, -0.18 0.0e0, 0.0e0, 1.0, 0.0
Errors	None
Depth Sensor Temperature	Channel: 3; Range: -40C to 60C; Resolution: 0.05C; ADaddress: 05; Settling Delay: 0.5ms
Correction factors	1.62e-7, 0.0003, 0.001 4.157e-6, -2.264e-4, 1.004, 0.036 0.0e0, 0.0e0, 1.0, 0.0
Errors	None
Light Level	Channel: 4; Range: 0 to 256; Resolution: 0.25; ADaddress: 12; Settling Delay: 3.5ms
Compensation factors	0.0e0, 0.0e0, 0.0, 0.
Errors	None
Battery Voltage	Channel: 14; Range: 0V to 5V; Resolution: 0.0048V; ADaddress: 13; Settling Delay: 1.5ms
Wet/Dry	Channel: 15; Range: 0 to 255; Resolution: 1; ADaddress: 21; Settling Delay: 1.5ms

Tag configurations: In Year 1, the study team solely used Wildlife Computers SPLASH 10 351C tags, which have small "towers" in each of the top corners of the tags (**Figure A-1, A**). This was the only SPLASH 10 tag configuration available for purchase in Year 1. In Year 2, Wildlife Computers had two additional SPLASH 10 tag configurations available for purchase including 427C which has three towers, one in front of the antenna and two smaller towers in the trailing corners, and 297S which has no towers and a flatter, lighter tag profile (**Figure A-1, B, C**). In Year 2, the study team opted to purchase 427C and 297S tags to reduce tag drag, weight, and profile, following best tagging practices. The Year 2 tags also better met some permitting criteria for smaller turtles (approximately 30 to 35–centimeter carapace length).



Images sourced from www.wildlifecomputers.com product pages.
Figure A-1. Wildlife Computers SPLASH 10 tag configurations (A) 351C, (B) 427C, and (C) 297S.

Appendix B. Disposition of All Extant Tags

Table B-1. Disposition of all extant tags.

PTT	Serial #	Tag Model	Status	Holding Organization	Point of Contact
264805	24A0493	351C	Deployed	University of Central Florida	K. Mansfield
264806	24A0495	351C	Deployed	University of Central Florida	K. Mansfield
264807	24A0506	351C	Deployed	University of Central Florida	K. Mansfield
264808	24A0507	351C	Deployed	University of Central Florida	K. Mansfield
264809	24A0518	351C	Distributed	Inwater Research Group	R. Welsh
264810	24A0519	351C	Deployed	University of Central Florida	K. Mansfield
264811	24A0508	351C	Deployed	University of Central Florida	K. Mansfield
264812	24A0531	351C	Deployed	University of Central Florida	K. Mansfield
264813	24A0541	351C	Deployed	University of Central Florida	K. Mansfield
264814	24A0545	351C	Distributed	Georgia Sea Turtle Center/Jekyll Island Authority	W. Hicks
264815	24A0831	351C	Deployed	University of Central Florida	K. Mansfield
264816	24A0489	351C	Deployed	Inwater Research Group	R. Welsh
264817	24A0490	351C	Deployed	Inwater Research Group	R. Welsh
264818	24A0491	351C	Deployed	Inwater Research Group	R. Welsh
264819	24A0494	351C	Deployed	University of Central Florida	K. Mansfield
264820	24A0526	351C	Deployed	University of Central Florida	K. Mansfield
264821	24A0527	351C	Deployed	Loggerhead Marinelife Center	J. Perrault/ S. Hirsch
264822	24A0528	351C	Deployed	University of Central Florida	K. Mansfield
264823	24A0529	351C	Deployed	University of Central Florida	K. Mansfield
264824	24A0530	351C	Deployed	Loggerhead Marinelife Center	J. Perrault/ S. Hirsch
264825	24A0532	351C	Deployed	University of Central Florida	K. Mansfield
264826	24A0533	351C	Deployed	University of Central Florida	K. Mansfield
264827	24A0534	351C	Deployed	University of Central Florida	K. Mansfield
264828	24A0535	351C	Deployed	Loggerhead Marinelife Center	J. Perrault/ S. Hirsch
264829	24A0536	351C	Deployed	University of Central Florida	K. Mansfield
264830	24A0537	351C	Deployed	University of Central Florida	K. Mansfield
264831	24A0538	351C	Deployed	University of Central Florida	K. Mansfield
264832	24A0539	351C	Distributed	Loggerhead Marinelife Center	J. Perrault/ S. Hirsch
264833	24A0540	351C	Distributed	Loggerhead Marinelife Center	J. Perrault/ S. Hirsch
264834	24A0544	351C	Deployed	University of Central Florida	K. Mansfield
264835	24A0542	351C	Deployed	Inwater Research Group	R. Welsh
264836	24A0543	351C	Deployed	Inwater Research Group	R. Welsh
264837	24A0546	351C	Deployed	University of Central Florida	K. Mansfield
264838	24A0547	351C	Distributed	Loggerhead Marinelife Center	J. Perrault/ S. Hirsch
264839	24A0548	351C	Deployed	University of Central Florida	K. Mansfield
264840	24A0557	351C	Deployed	University of Central Florida	K. Mansfield
264841	24A0558	351C	Awaiting distribution	University of Central Florida	K. Mansfield
264842	24A0559	351C	Awaiting distribution	University of Central Florida	K. Mansfield
264843	24A0560	351C	Deployed	University of Central Florida	K. Mansfield
264844	24A0561	351C	Deployed	University of Central Florida	K. Mansfield

PTT	Serial #	Tag Model	Status	Holding Organization	Point of Contact
264845	24A0562	351C	Deployed	University of Central Florida	K. Mansfield
264846	24A0563	351C	Awaiting distribution	University of Central Florida	K. Mansfield
264847	24A0564	351C	Deployed	University of Central Florida	K. Mansfield
264848	24A0565	351C	Deployed	University of Central Florida	K. Mansfield
264849	24A0566	351C	Deployed	Inwater Research Group	R. Welsh
264850	24A0567	351C	Deployed	Inwater Research Group	R. Welsh
264851	24A0568	351C	Deployed	University of Central Florida	K. Mansfield
264852	24A0569	351C	Awaiting distribution	University of Central Florida	K. Mansfield
264853	24A0571	351C	Awaiting distribution	University of Central Florida	K. Mansfield
264854	24A0579	351C	Deployed	University of Central Florida	K. Mansfield
264855	24A0580	351C	Deployed	University of Central Florida	K. Mansfield
264856	24A0581	351C	Awaiting distribution	University of Central Florida	K. Mansfield
264857	24A0582	351C	Deployed	University of Central Florida	K. Mansfield
264858	24A0583	351C	Awaiting distribution	University of Central Florida	K. Mansfield
264859	24A0677	351C	Deployed	University of Central Florida	K. Mansfield
264860	24A0680	351C	Awaiting distribution	University of Central Florida	K. Mansfield
264861	24A0681	351C	Deployed	University of Central Florida	K. Mansfield
264862	24A0707	351C	Distributed	Georgia Sea Turtle Center/Jekyll Island Authority	W. Hicks
264863	24A0708	351C	Deployed	University of Central Florida	K. Mansfield
264864	24A0735	351C	Distributed	Inwater Research Group	R. Welsh
286932	24A0978	297S	Awaiting distribution	University of Central Florida	K. Mansfield
286933	24A1428	297S	Awaiting distribution	University of Central Florida	K. Mansfield
286934	24A1429	297S	Awaiting distribution	University of Central Florida	K. Mansfield
286935	24A1433	297S	Awaiting distribution	University of Central Florida	K. Mansfield
286936	24A1434	297S	Awaiting distribution	University of Central Florida	K. Mansfield
286937	24A1435	297S	Awaiting distribution	University of Central Florida	K. Mansfield
286938	24A1436	297S	Awaiting distribution	University of Central Florida	K. Mansfield
286939	24A1437	297S	Distributed	Loggerhead Marinelife Center	J. Perrault
286940	24A1460	297S	Awaiting distribution	University of Central Florida	K. Mansfield
286941	24A1464	297S	Awaiting distribution	University of Central Florida	K. Mansfield
286942	24A1525	297S	Awaiting distribution	University of Central Florida	K. Mansfield
286943	24A1526	297S	Awaiting distribution	University of Central Florida	K. Mansfield
286944	241A527	297S	Deployed	Georgia Sea Turtle Center/Jekyll Island Authority	W. Hicks
286945	24A1528	297S	Awaiting distribution	University of Central Florida	K. Mansfield

PTT	Serial #	Tag Model	Status	Holding Organization	Point of Contact
286946	25A1529	297S	Awaiting distribution	University of Central Florida	K. Mansfield
286947	241A531	297S	Awaiting distribution	University of Central Florida	K. Mansfield
286948	24A1532	297S	Distributed	Loggerhead Marinelife Center	J. Perrault
286949	241A533	297S	Deployed	Georgia Sea Turtle Center/Jekyll Island Authority	W. Hicks
286950	24A1534	297S	Distributed	Georgia Sea Turtle Center/Jekyll Island Authority	W. Hicks
286951	24A1535	297S	Awaiting distribution	University of Central Florida	K. Mansfield
286952	25A0198	427C	Awaiting distribution	University of Central Florida	K. Mansfield
286953	25A0241	427C	Distributed	Loggerhead Marinelife Center	J. Perrault
286954	25A0242	427C	Awaiting distribution	University of Central Florida	K. Mansfield
286955	25A0243	427C	Awaiting distribution	University of Central Florida	K. Mansfield
286956	25A0244	427C	Awaiting distribution	University of Central Florida	K. Mansfield
286957	25A0245	427C	Awaiting distribution	University of Central Florida	K. Mansfield
286958	25A0246	427C	Awaiting distribution	University of Central Florida	K. Mansfield
286959	25A0247	427C	Awaiting distribution	University of Central Florida	K. Mansfield
286960	25A0248	427C	Awaiting distribution	University of Central Florida	K. Mansfield
286961	24A0249	427C	Awaiting distribution	University of Central Florida	K. Mansfield
286962	25A0250	427C	Awaiting distribution	University of Central Florida	K. Mansfield
286963	25A0252	427C	Awaiting distribution	University of Central Florida	K. Mansfield
286964	25A0254	427C	Awaiting distribution	University of Central Florida	K. Mansfield
286965	25A0256	427C	Awaiting distribution	University of Central Florida	K. Mansfield
286966	25A0259	427C	Awaiting distribution	University of Central Florida	K. Mansfield
286967	25A0260	427C	Distributed	Loggerhead Marinelife Center	J. Perrault
286968	25A0261	427C	Awaiting distribution	University of Central Florida	K. Mansfield
286969	25A0262	427C	Awaiting distribution	University of Central Florida	K. Mansfield
286970	25A0263	427C	Awaiting distribution	University of Central Florida	K. Mansfield
286971	25A0264	427C	Awaiting distribution	University of Central Florida	K. Mansfield

Key: PTT = Platform Transmitter Terminal

Appendix C. Tables and Figures for Individual Tags

Table C-1. Individual availability bias estimates.

PTT Turtle ID	Species	Surface	2-m Histogram	3-m Histogram	4-m Histogram	# Histograms	2-m Behavior	# Behavior Locations
Green Turtles								
264805	Cm	0.45 SD ± 0.32)	0.50 SD ± 0.32)	0.53 SD ± 0.32)	0.55 SD ± 0.32)	82	0.45 SD ± 0.30)	79
264806	Cm	0.19 SD ± 0.17)	0.17 SD ± 0.14)	0.22 SD ± 0.18)	0.25 SD ± 0.21)	95	0.21 SD ± 0.17)	149
264807	Cm	0.45 SD ± 0.30)	0.42 SD ± 0.30)	0.49 SD ± 0.31)	0.55 SD ± 0.30)	130	0.41 SD ± 0.30)	147
264808	Cm	0.28 SD ± 0.27)	0.32 SD ± 0.31)	0.35 SD ± 0.32)	0.37 SD ± 0.33)	127	0.33 SD ± 0.30)	151
264810	Cm	0.82 SD ± 0.27)	0.91 SD ± 0.19)	0.96 SD ± 0.17)	0.96 SD ± 0.17)	63	0.28 SD ± 0.35)	4
264811	Cm	0.10 SD ± 0.09)	0.13 SD ± 0.19)	0.17 SD ± 0.19)	0.23 SD ± 0.22)	83	0.13 SD ± 0.12)	174
264812	Cm	0.16 SD ± 0.15)	0.25 SD ± 0.17)	0.37 SD ± 0.22)	0.43 SD ± 0.26)	42	0.29 SD ± 0.20)	63
264813	Cm	0.74 SD ± 0.34)	0.72 SD ± 0.34)	0.76 SD ± 0.34)	0.78 SD ± 0.34)	76	0.47 SD ± 0.34)	50
264815	Cm	0.40 SD ± 0.29)	0.39 SD ± 0.30)	0.51 SD ± 0.33)	0.61 SD ± 0.33)	121	0.40 SD ± 0.31)	142
264816	Cm	0.09 SD ± 0.09)	0.07 SD ± 0.02)	0.10 SD ± 0.04)	0.16 SD ± 0.10)	60	0.09 SD ± 0.05)	105
264819	Cm	0.62 SD ± 0.23)	0.59 SD ± 0.24)	0.70 SD ± 0.24)	0.76 SD ± 0.24)	90	0.62 SD ± 0.27)	94
264820	Cm	0.29 SD ± 0.28)	0.25 SD ± 0.26)	0.33 SD ± 0.30)	0.45 SD ± 0.32)	427	0.28 SD ± 0.29)	473
264822	Cm	0.34 SD ± 0.31)	0.29 SD ± 0.29)	0.37 SD ± 0.34)	0.41 SD ± 0.35)	408	0.29 SD ± 0.29)	463
264823	Cm	0.78 SD ± 0.30)	0.87 SD ± 0.24)	0.91 SD ± 0.23)	0.91 SD ± 0.23)	63	0.47 SD ± 0.33)	16
264825	Cm	0.35 SD ± 0.30)	0.36 SD ± 0.32)	0.44 SD ± 0.34)	0.56 SD ± 0.36)	263	0.34 SD ± 0.32)	288
264826	Cm	0.54 SD ± 0.27)	0.65 SD ± 0.26)	0.77 SD ± 0.26)	0.82 SD ± 0.26)	44	0.55 SD ± 0.35)	45
264827	Cm	0.22 SD ± 0.26)	0.20 SD ± 0.25)	0.24 SD ± 0.27)	0.29 SD ± 0.30)	379	0.19 SD ± 0.25)	398
264829	Cm	0.28 SD ± 0.27)	0.23 SD ± 0.26)	0.27 SD ± 0.29)	0.32 SD ± 0.34)	188	0.23 SD ± 0.26)	243
264830	Cm	0.72 SD ± 0.21)	0.73 SD ± 0.19)	0.96 SD ± 0.06)	1.00 SD ± 0.01)	68	0.51 SD ± 0.28)	18
264831	Cm	0.64 SD ± 0.31)	0.65 SD ± 0.27)	0.74 SD ± 0.26)	0.78 SD ± 0.26)	78	0.58 SD ± 0.30)	63
264834	Cm	0.52 SD ± 0.34)	0.47 SD ± 0.34)	0.52 SD ± 0.35)	0.57 SD ± 0.35)	165	0.45 SD ± 0.30)	119
264837	Cm	0.84 SD ± 0.14)	0.87 SD ± 0.13)	1.00 SD ± 0.00)	1.00 SD ± 0.00)	42	0.81 SD ± 0.15)	5
264839	Cm	0.63 SD ± 0.32)	0.70 SD ± 0.31)	0.81 SD ± 0.30)	0.86 SD ± 0.28)	83	0.42 SD ± 0.31)	49
264840	Cm	0.57 SD ± 0.30)	0.58 SD ± 0.32)	0.66 SD ± 0.31)	0.74 SD ± 0.27)	95	0.54 SD ± 0.31)	79
264843	Cm	0.41 SD ± 0.33)	0.38 SD ± 0.31)	0.47 SD ± 0.33)	0.53 SD ± 0.35)	198	0.29 SD ± 0.27)	175
264844	Cm	0.34 SD ± 0.31)	0.33 SD ± 0.30)	0.41 SD ± 0.32)	0.49 SD ± 0.33)	156	0.29 SD ± 0.25)	209
264845	Cm	0.22 SD ± 0.29)	0.17 SD ± 0.24)	0.25 SD ± 0.30)	0.34 SD ± 0.37)	213	0.17 SD ± 0.23)	319
264847	Cm	0.17 SD ± 0.18)	0.17 SD ± 0.13)	0.21 SD ± 0.17)	0.24 SD ± 0.19)	91	0.20 SD ± 0.18)	109
264848	Cm	0.38 SD ± 0.30)	0.35 SD ± 0.30)	0.52 SD ± 0.35)	0.63 SD ± 0.38)	154	0.40 SD ± 0.30)	206
264851	Cm	0.74 SD ± 0.27)	0.89 SD ± 0.13)	0.98 SD ± 0.06)	1.00 SD ± 0.01)	52	0.62 SD ± 0.32)	5

PTT Turtle ID	Species	Surface	2-m Histogram	3-m Histogram	4-m Histogram	# Histograms	2-m Behavior	# Behavior Locations
264854	Cm	0.43 SD ± 0.34)	0.40 SD ± 0.33)	0.50 SD ± 0.35)	0.57 SD ± 0.34)	309	0.34 SD ± 0.30)	415
264855	Cm	0.57 SD ± 0.30)	0.54 SD ± 0.30)	0.62 SD ± 0.30)	0.68 SD ± 0.28)	133	0.51 SD ± 0.31)	153
264857	Cm	0.39 SD ± 0.33)	0.39 SD ± 0.34)	0.50 SD ± 0.33)	0.63 SD ± 0.33)	143	0.32 SD ± 0.29)	140
264859	Cm	0.14 SD ± 0.10)	0.11 SD ± 0.07)	0.15 SD ± 0.11)	0.19 SD ± 0.15)	39	0.13 SD ± 0.09)	69
264861	Cm	0.28 SD ± 0.27)	0.25 SD ± 0.24)	0.29 SD ± 0.27)	0.33 SD ± 0.28)	277	0.27 SD ± 0.26)	339
264863	Cm	0.26 SD ± 0.27)	0.23 SD ± 0.25)	0.25 SD ± 0.26)	0.26 SD ± 0.27)	216	0.20 SD ± 0.21)	284
286944	Cm	0.73 SD ± 0.32)	0.80 SD ± 0.25)	0.83 SD ± 0.25)	0.85 SD ± 0.24)	40	0.45 SD ± 0.32)	37
Kemp's Ridley Turtles								
264817	Lk	0.28 SD ± 0.32)	0.30 SD ± 0.33)	0.31 SD ± 0.34)	0.33 SD ± 0.34)	498	0.21 SD ± 0.26)	352
264818	Lk	0.05 SD ± 0.07)	0.06 SD ± 0.07)	0.07 SD ± 0.09)	0.07 SD ± 0.10)	126	0.06 SD ± 0.08)	132
264821	Lk	0.54 SD ± 0.40)	0.56 SD ± 0.41)	0.58 SD ± 0.39)	0.65 SD ± 0.36)	147	0.34 SD ± 0.34)	80
264824	Lk	0.18 SD ± 0.23)	0.19 SD ± 0.23)	0.42 SD ± 0.36)	0.57 SD ± 0.44)	322	0.23 SD ± 0.25)	269
264828	Lk	0.07 SD ± 0.09)	0.11 SD ± 0.15)	0.15 SD ± 0.21)	0.20 SD ± 0.26)	80	0.13 SD ± 0.18)	89
264835	Lk	0.13 SD ± 0.21)	0.14 SD ± 0.20)	0.18 SD ± 0.24)	0.24 SD ± 0.29)	195	0.12 SD ± 0.14)	157
264836	Lk	0.19 SD ± 0.23)	0.22 SD ± 0.25)	0.25 SD ± 0.26)	0.29 SD ± 0.29)	345	0.41 SD ± 0.18)	286
264849	Lk	0.21 SD ± 0.26)	0.25 SD ± 0.28)	0.37 SD ± 0.38)	0.43 SD ± 0.41)	184	0.23 SD ± 0.29)	157
264850	Lk	0.16 SD ± 0.19)	0.18 SD ± 0.20)	0.28 SD ± 0.28)	0.39 SD ± 0.33)	239	0.23 SD ± 0.25)	243
286949	Lk	0.08 SD ± 0.13)	0.11 SD ± 0.15)	0.16 SD ± 0.22)	0.22 SD ± 0.28)	90	0.16 SD ± 0.20)	97

Key: Cm = *Chelonia mydas*; ID = Identification; Lk = *Lepidochelys kempii*; m = meter(s); PTT = Platform Transmitter Terminal; SD = Standard Deviation

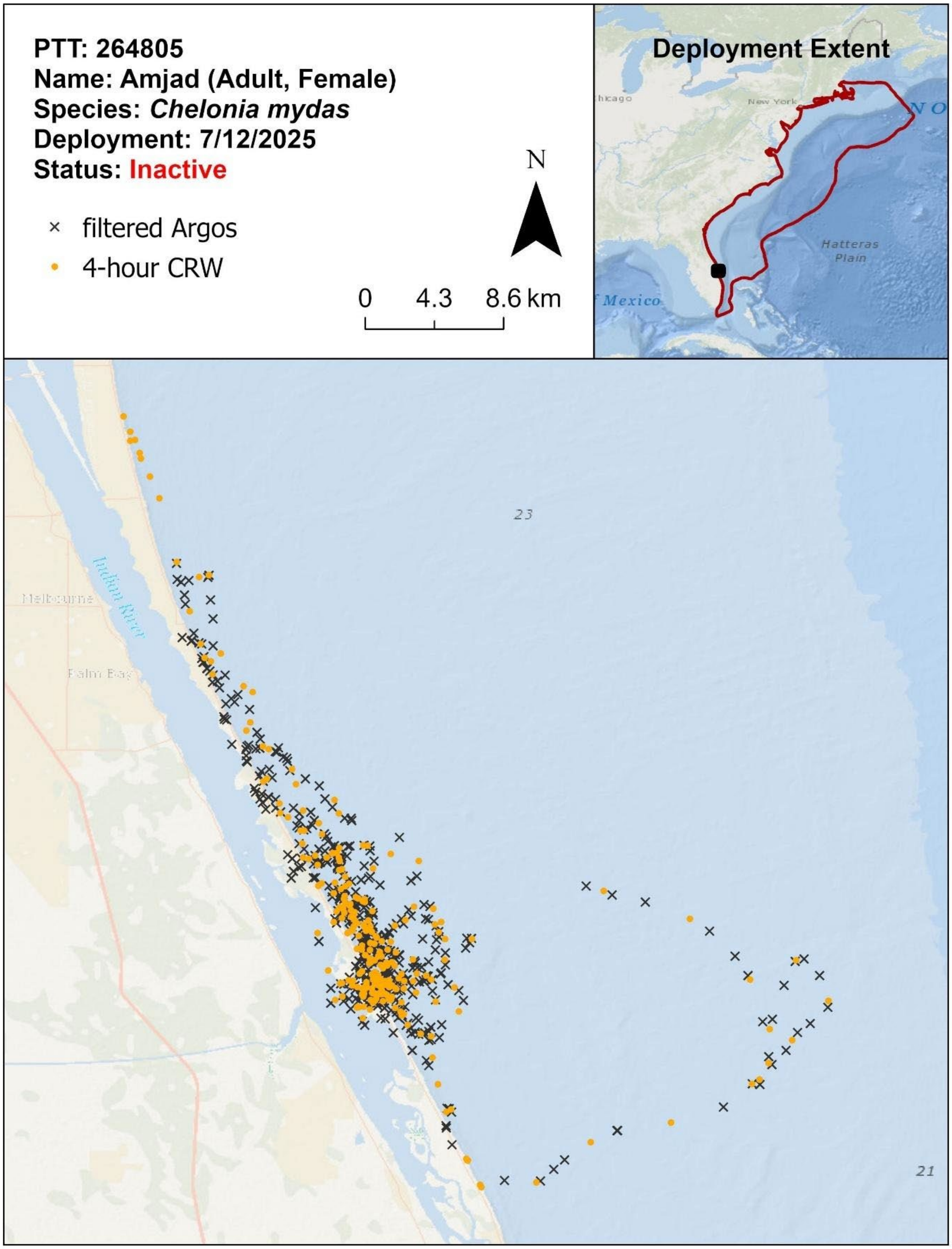


Figure C-1. Argos and 4 h correlated random walk (CRW) locations for Platform Transmitter Terminal (PTT) 264805.

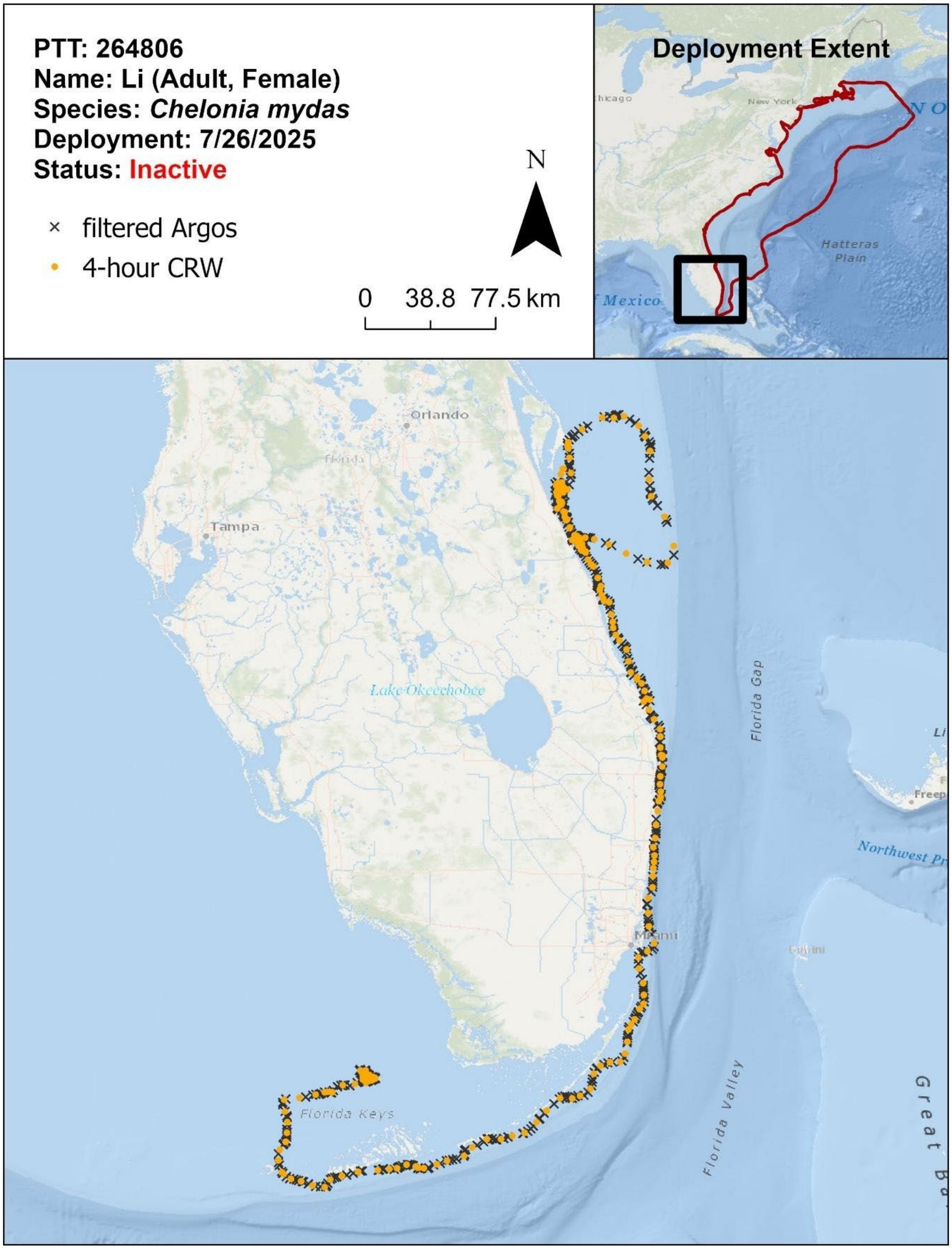


Figure C-2. Argos and 4 h CRW locations for PTT 264806.

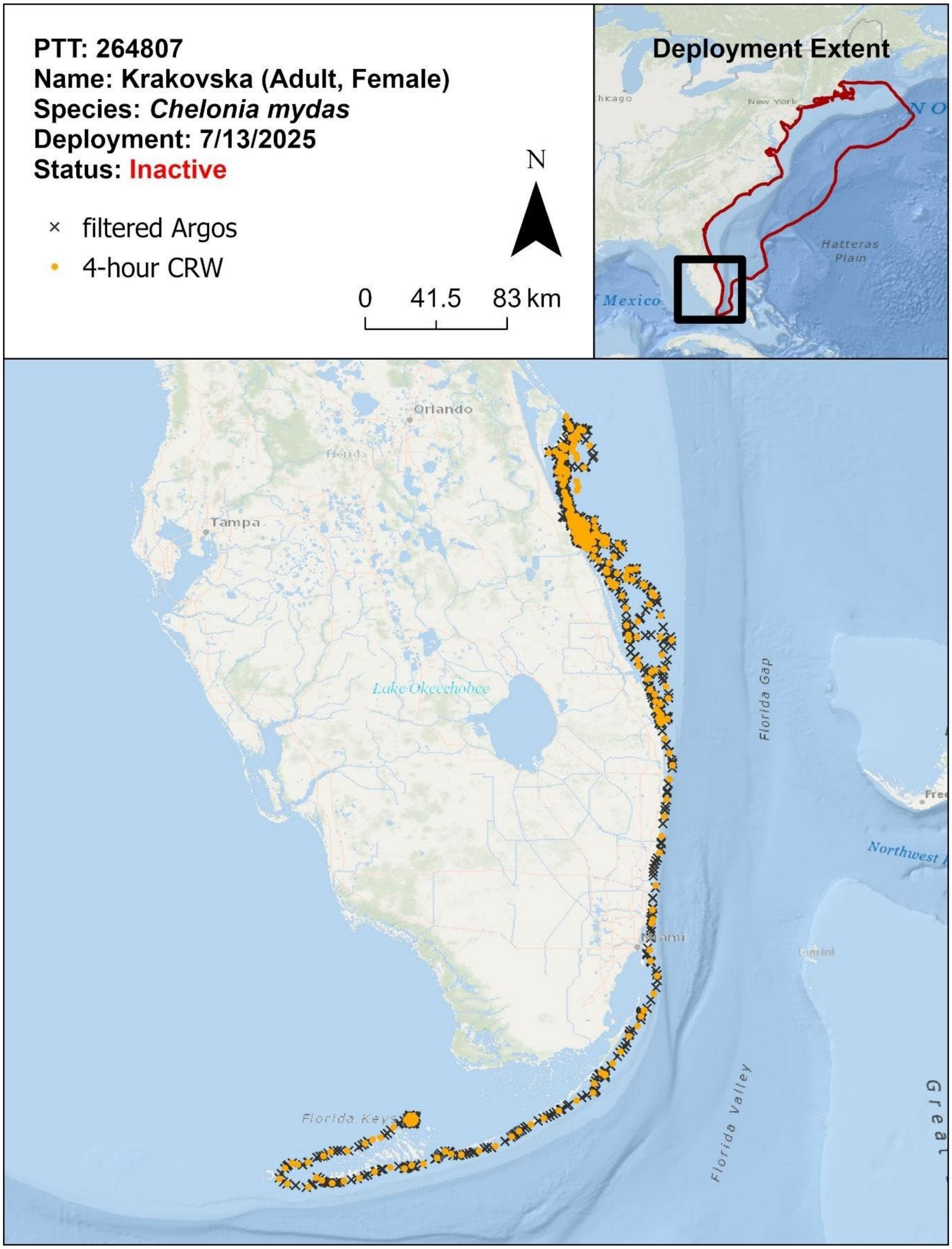


Figure C-3. Argos and 4 h CRW locations for PTT 264807.

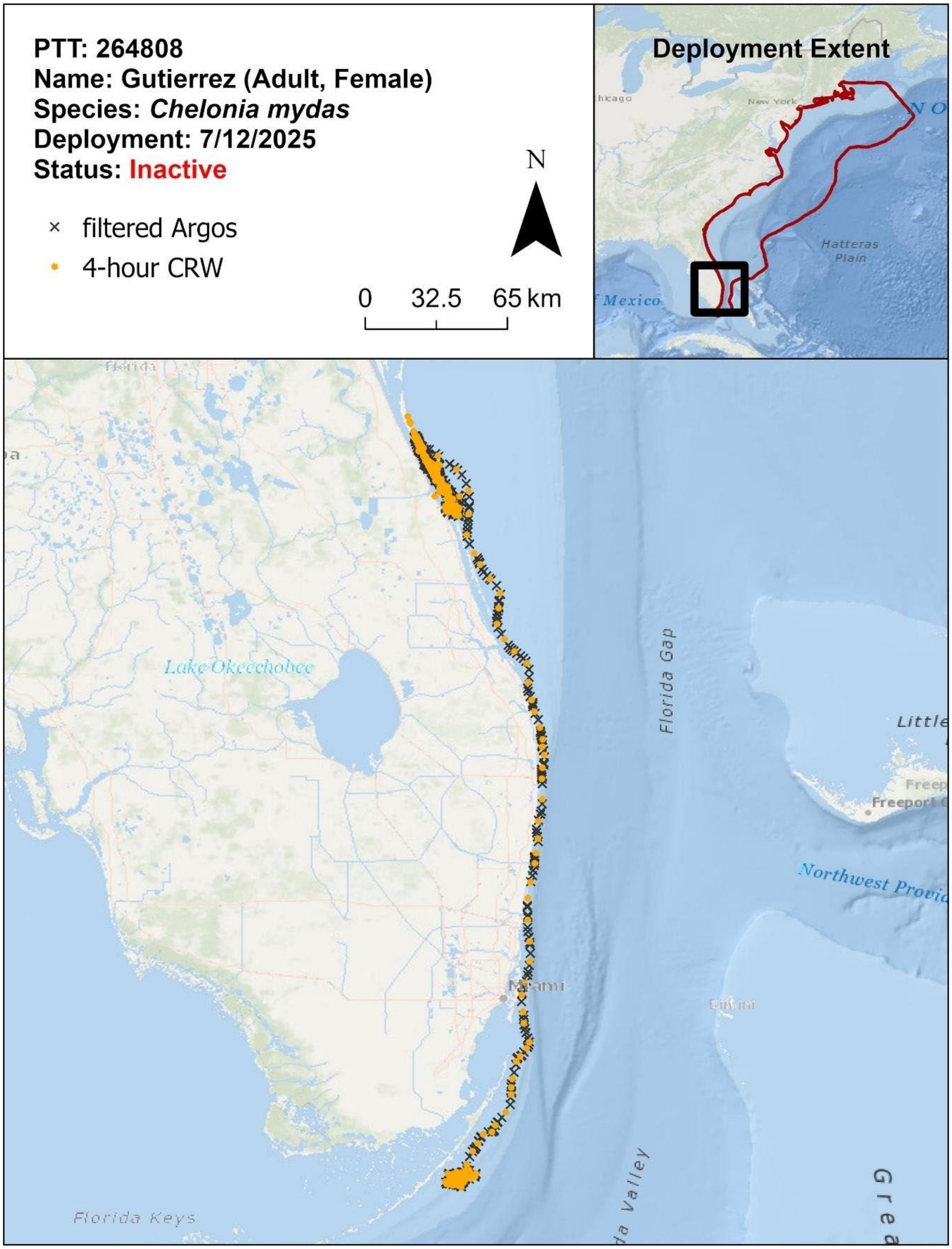


Figure C-4. Argos and 4 h CRW locations for PTT 264808.

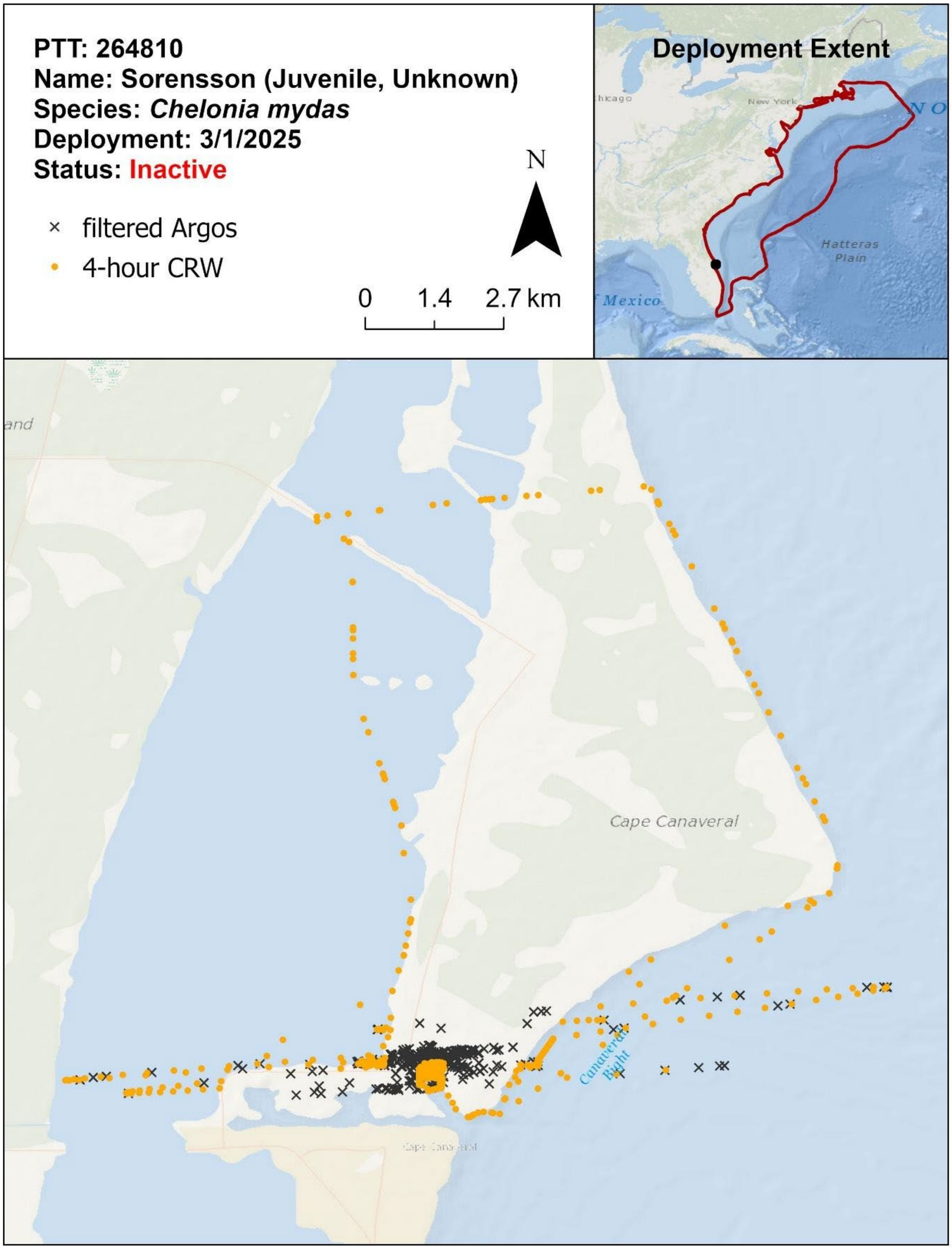


Figure C-5. Argos and 4 h CRW locations for PTT 264810.

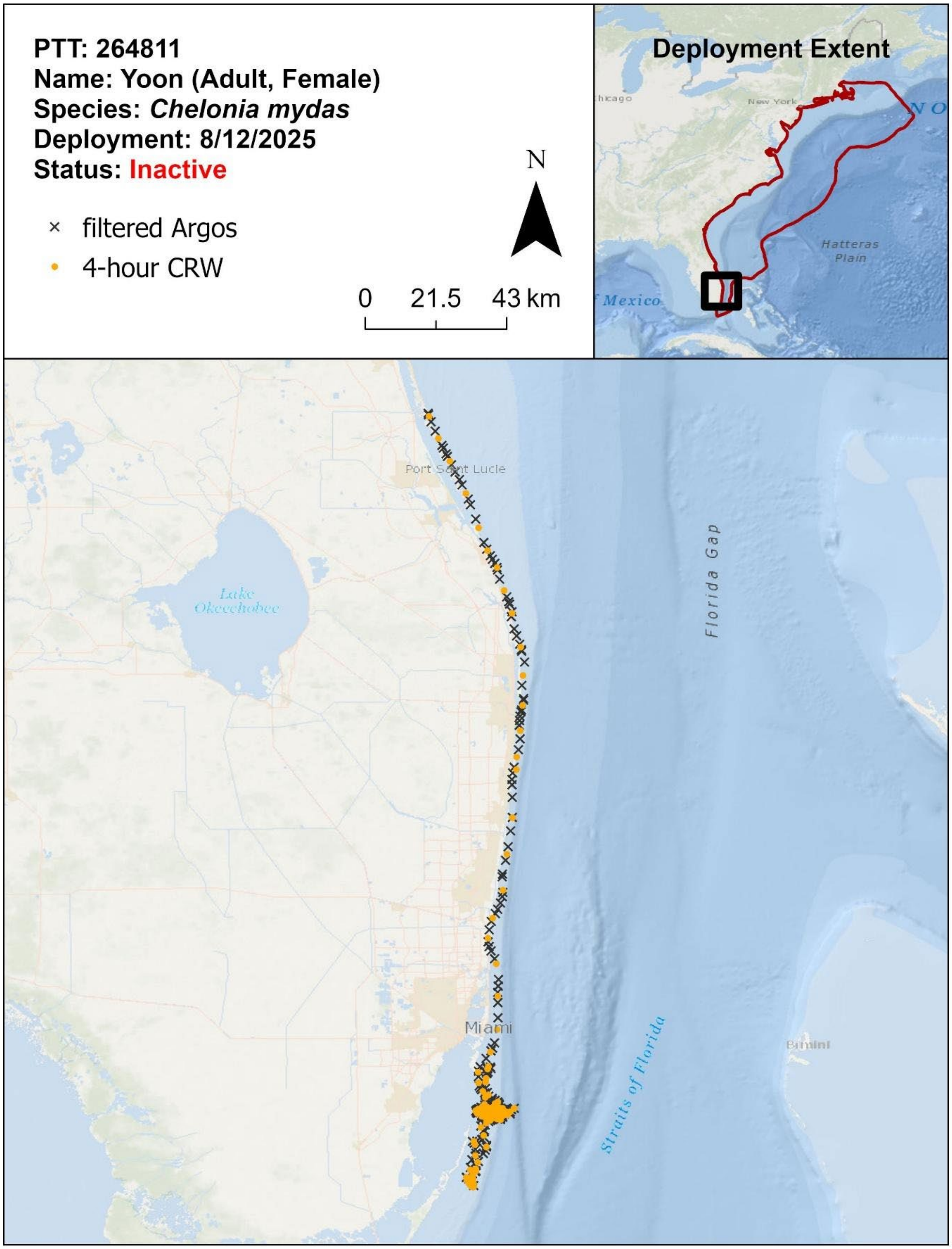


Figure C-6. Argos and 4 h CRW locations for PTT 264811.

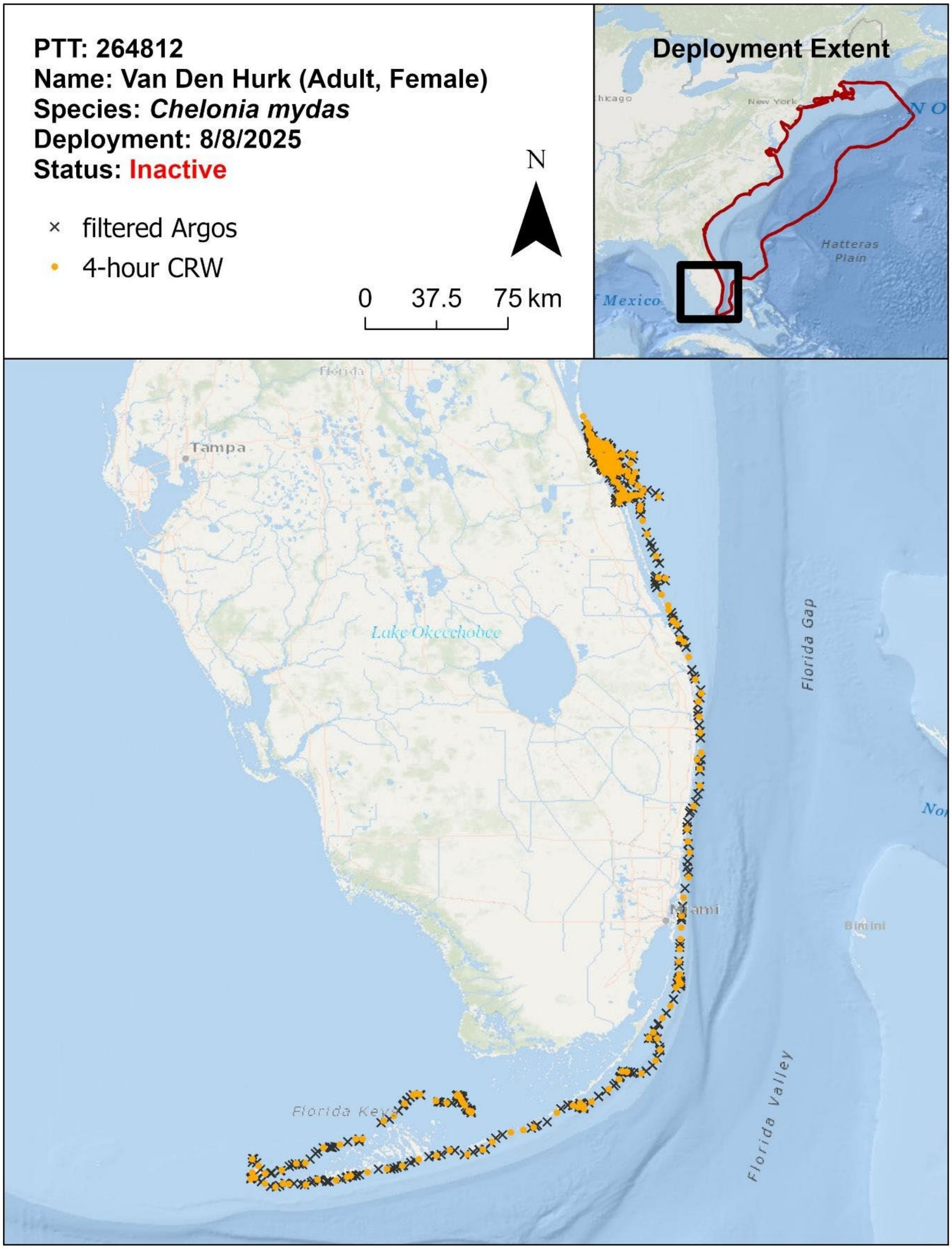


Figure C-7. Argos and 4 h CRW locations for PTT 264812.

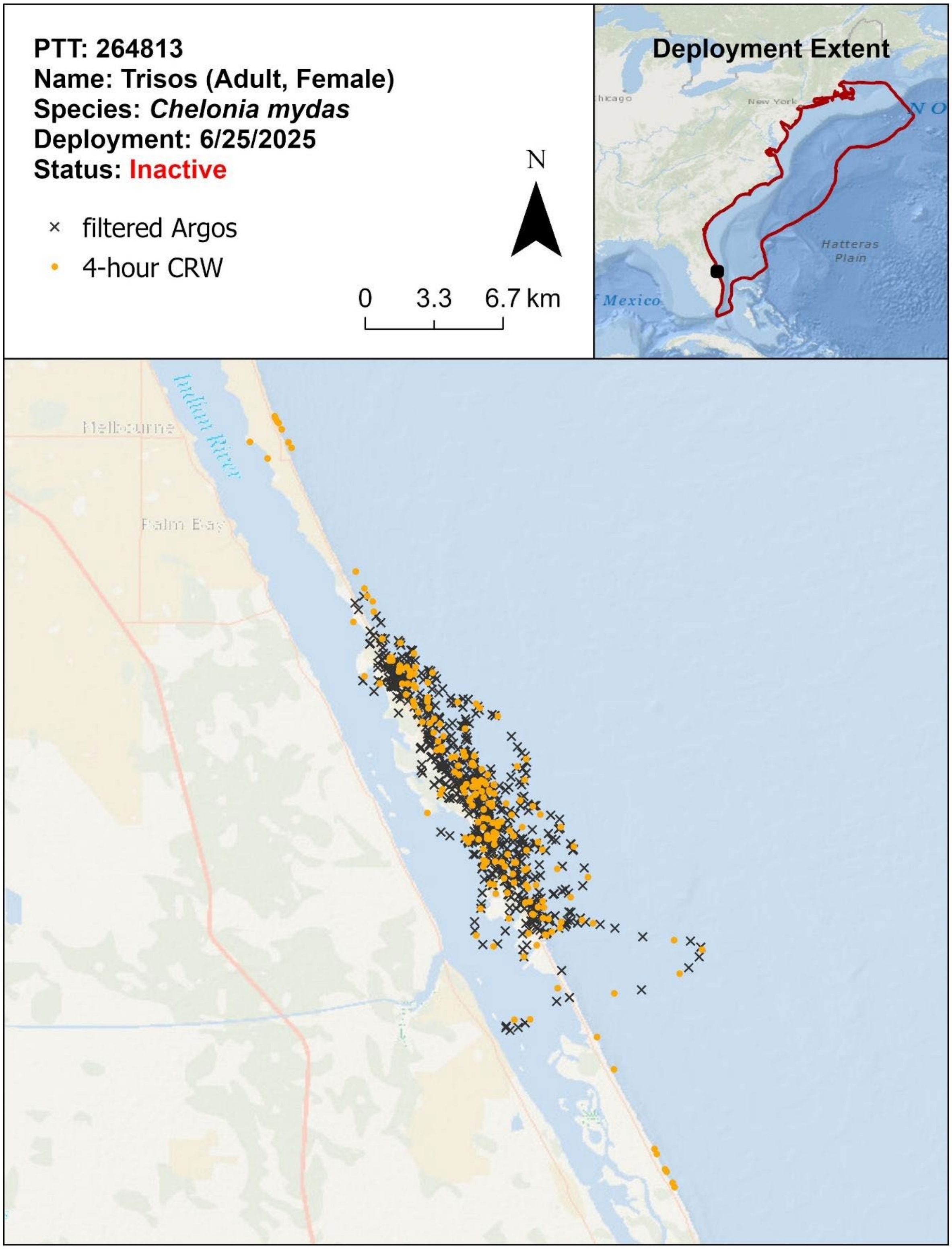


Figure C-8. Argos and 4 h CRW locations for PTT 264813.

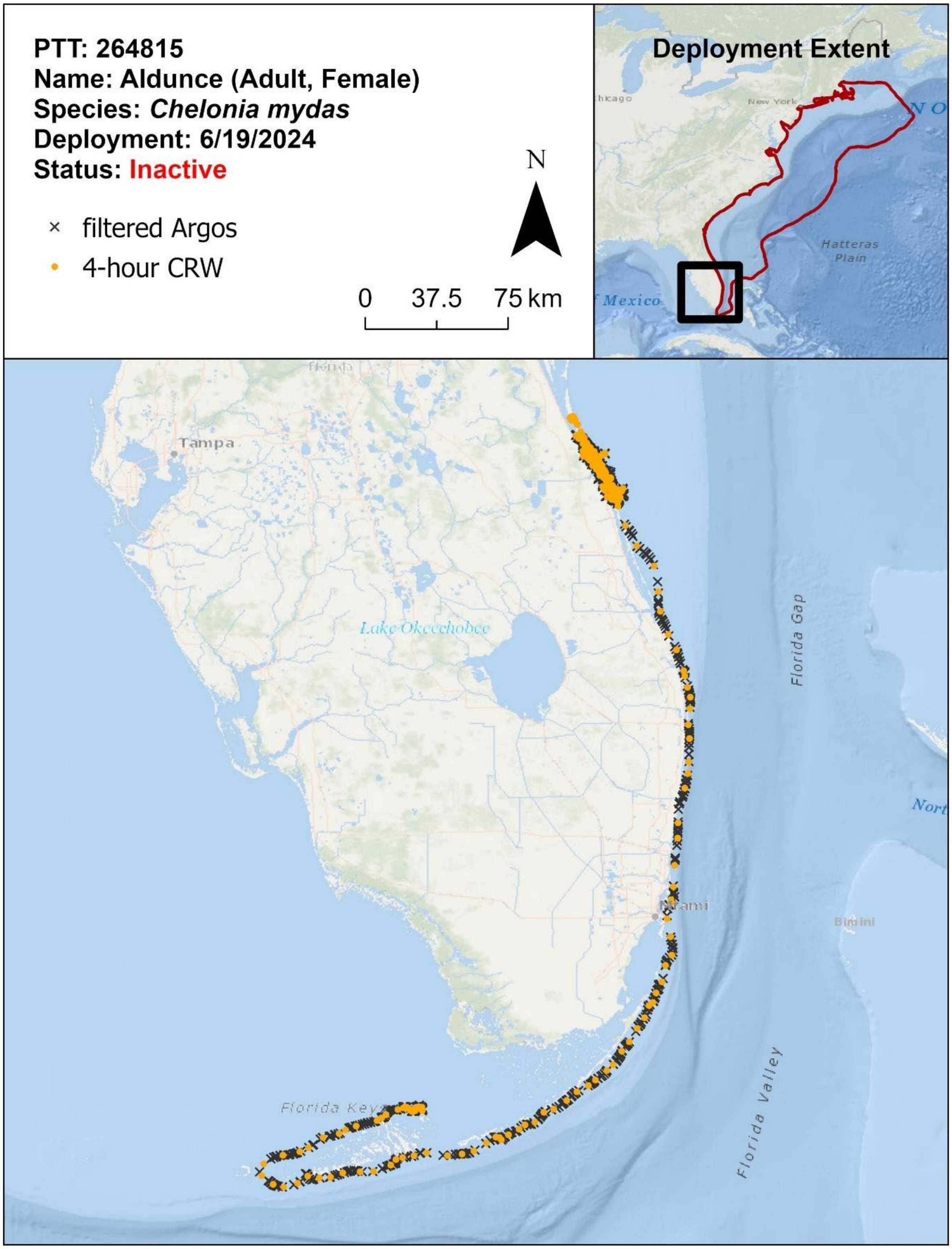


Figure C-9. Argos and 4 h CRW locations for PTT 264815.

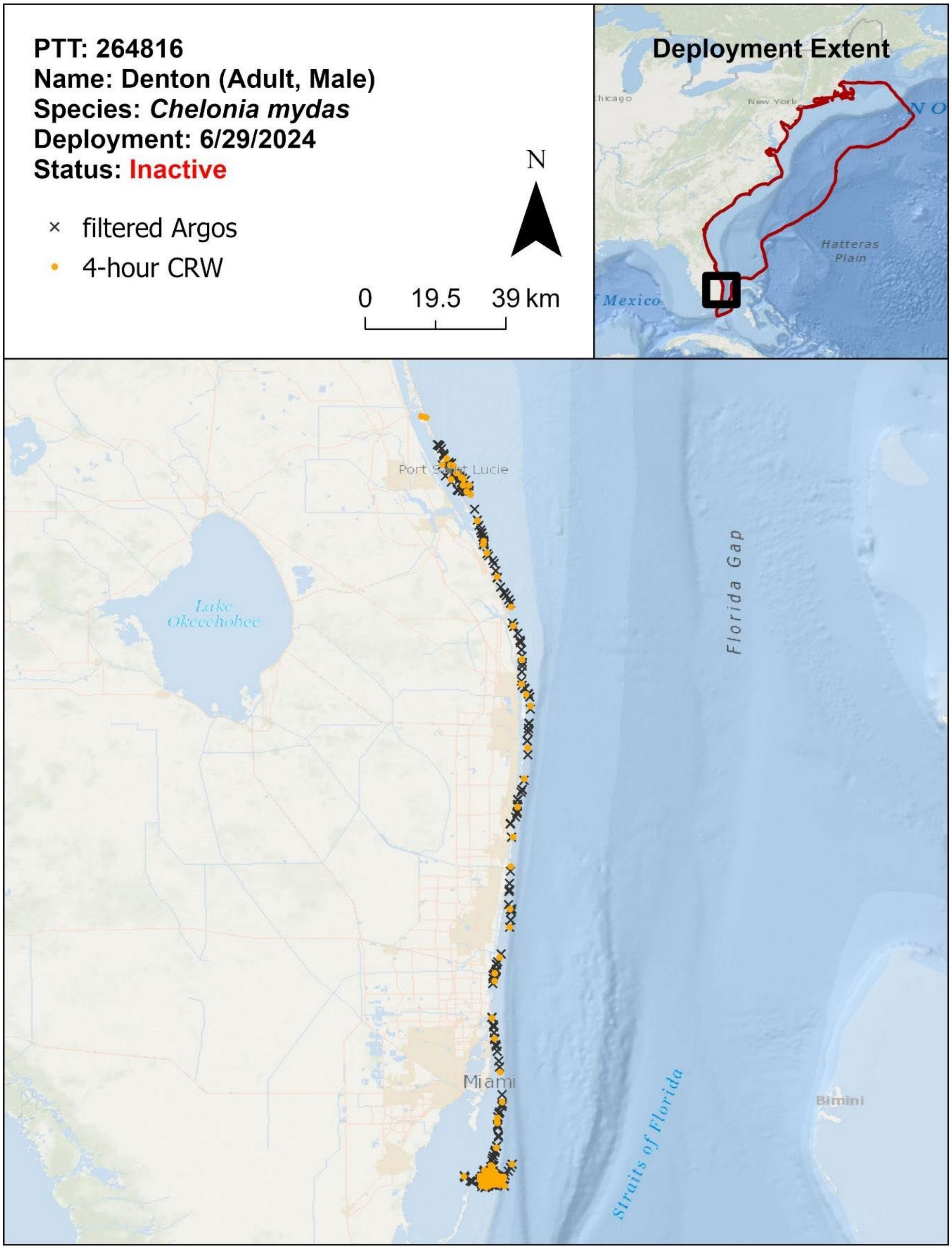


Figure C-10.Argos and 4 h CRW locations for PTT 264816.

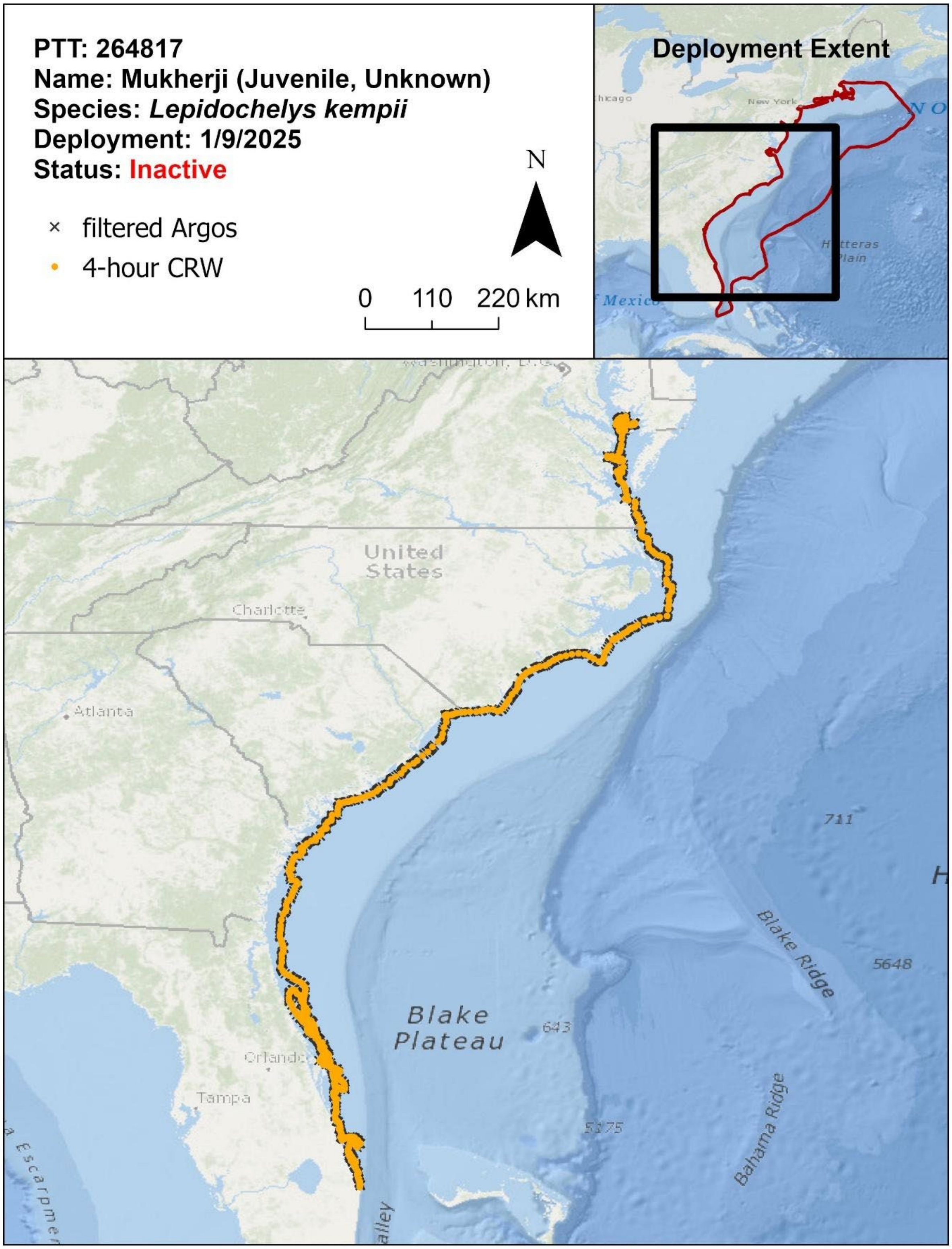


Figure C-11.Argos and 4 h CRW locations for PTT 264817.

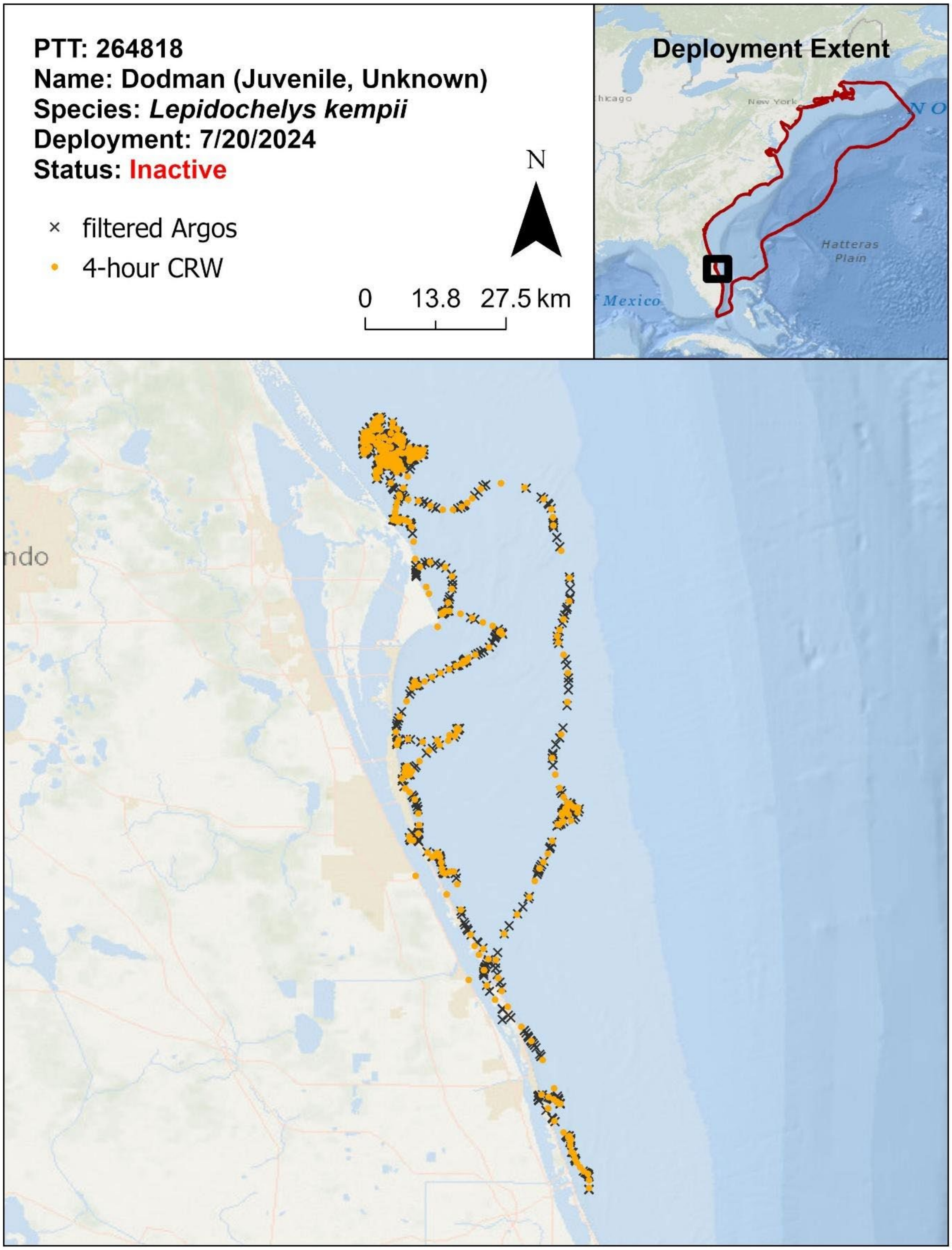


Figure C-12.Argos and 4 h CRW locations for PTT 264818.

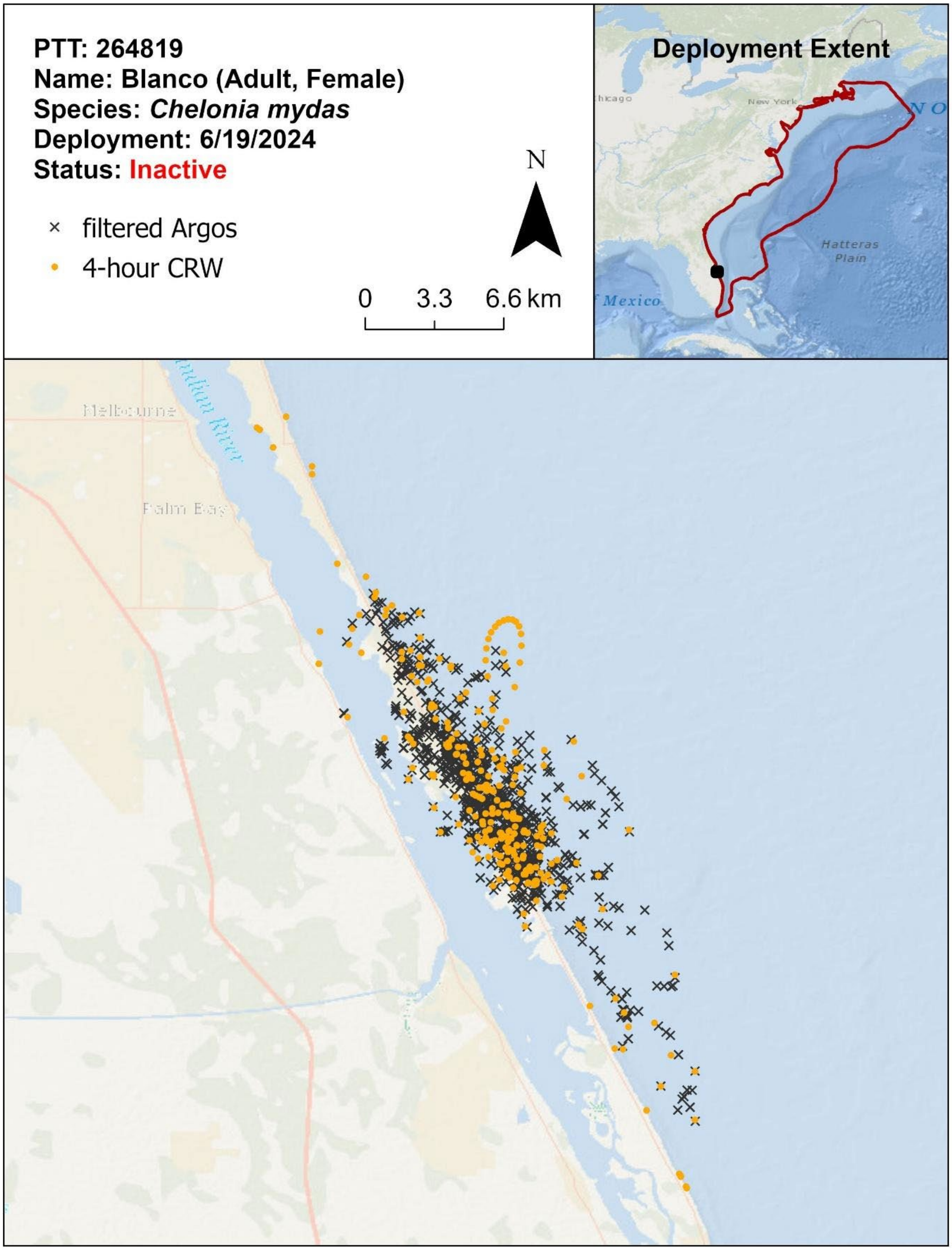


Figure C-13.Argos and 4 h CRW locations for PTT 264819.

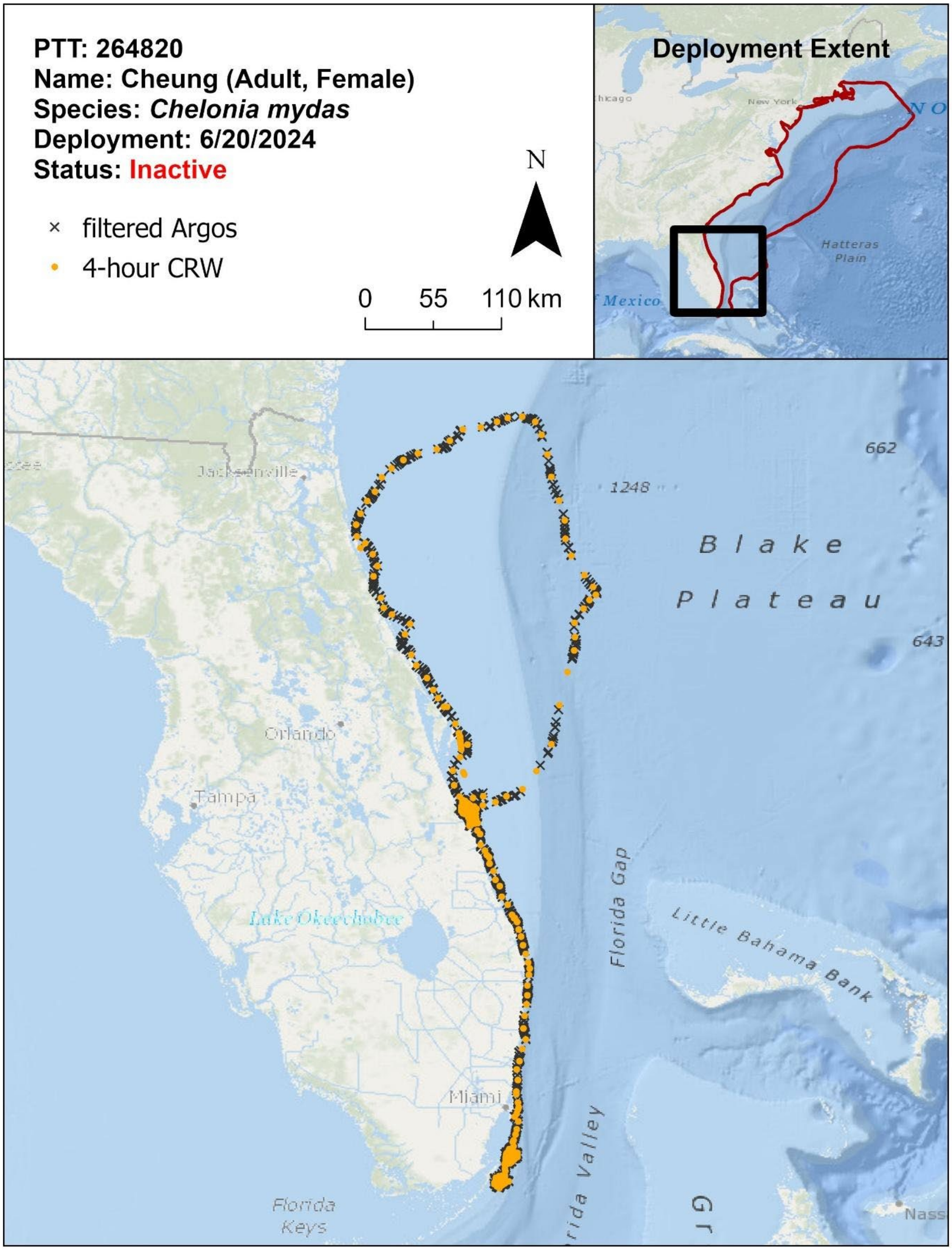


Figure C-14.Argos and 4 h CRW locations for PTT 264820.

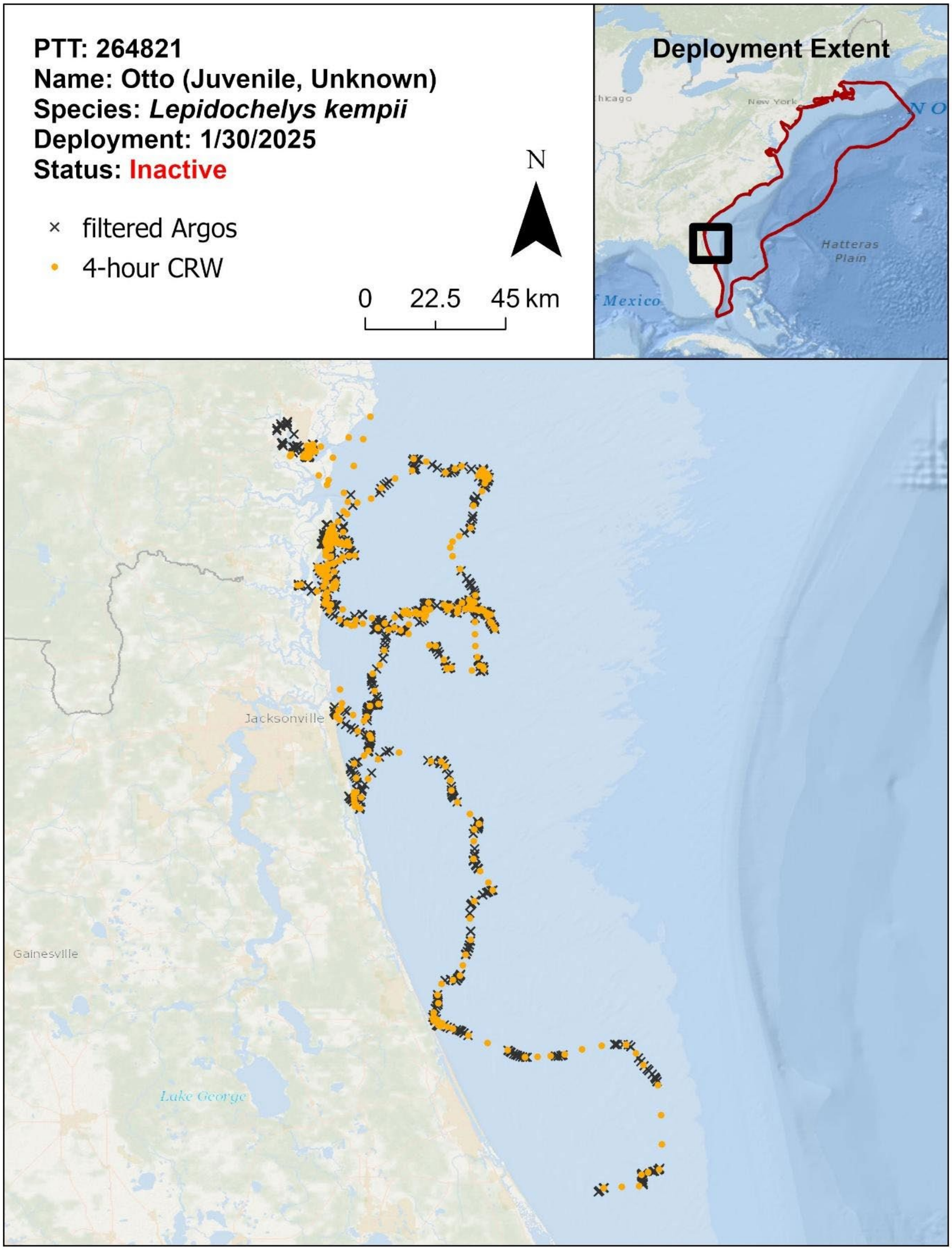


Figure C-15.Argos and 4 h CRW locations for PTT 264821.

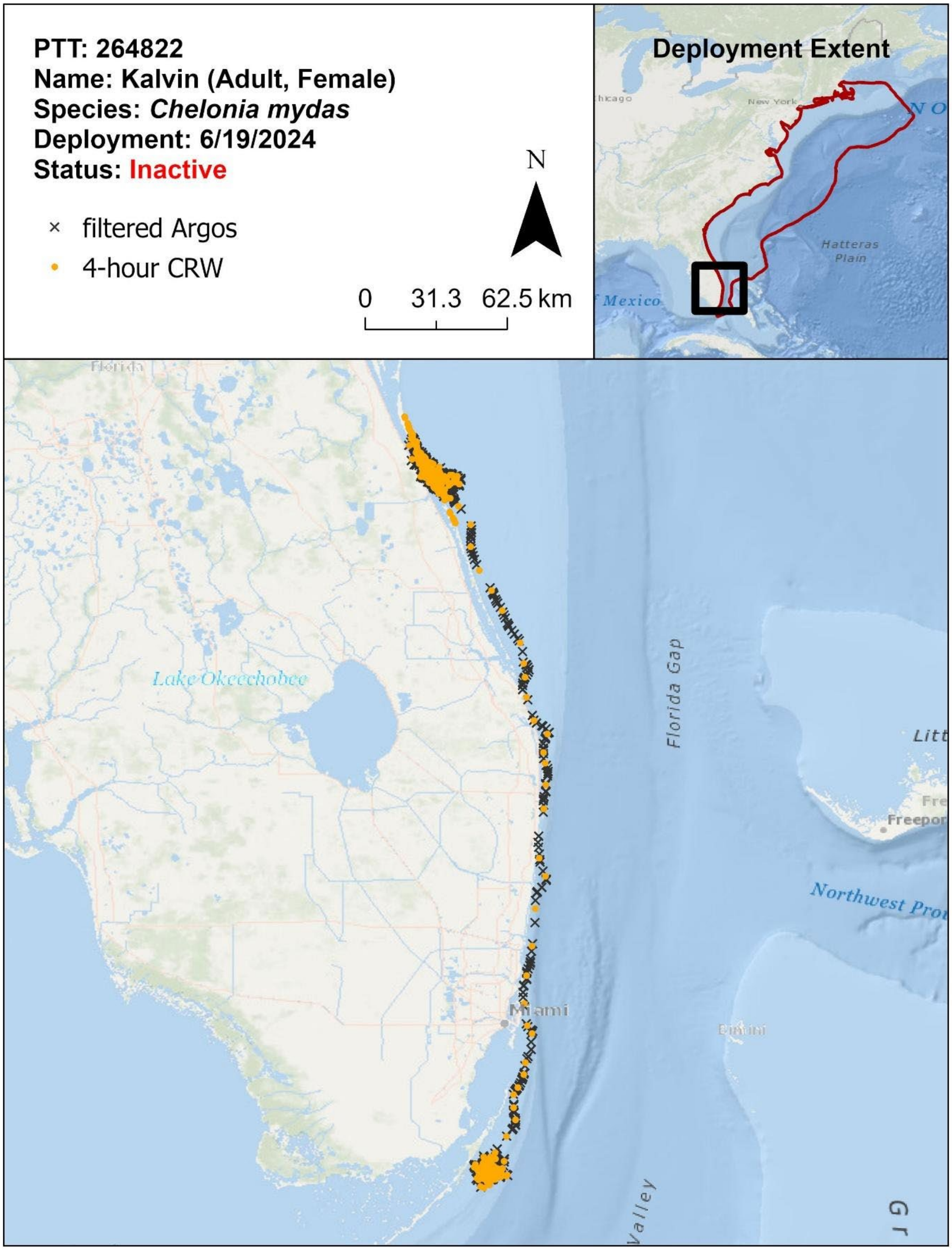


Figure C-16.Argos and 4 h CRW locations for PTT 264822.

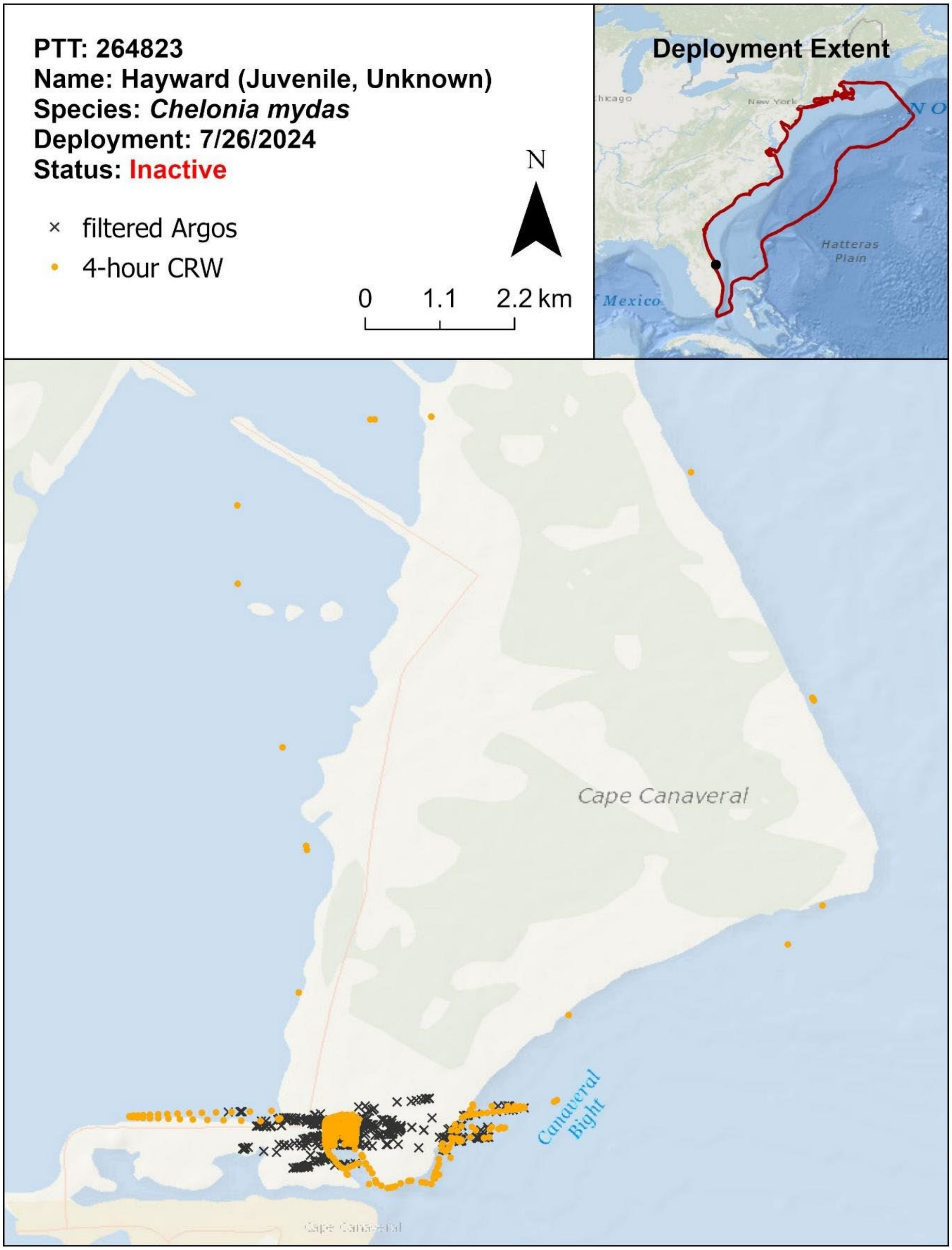


Figure C-17.Argos and 4 h CRW locations for PTT 264823.

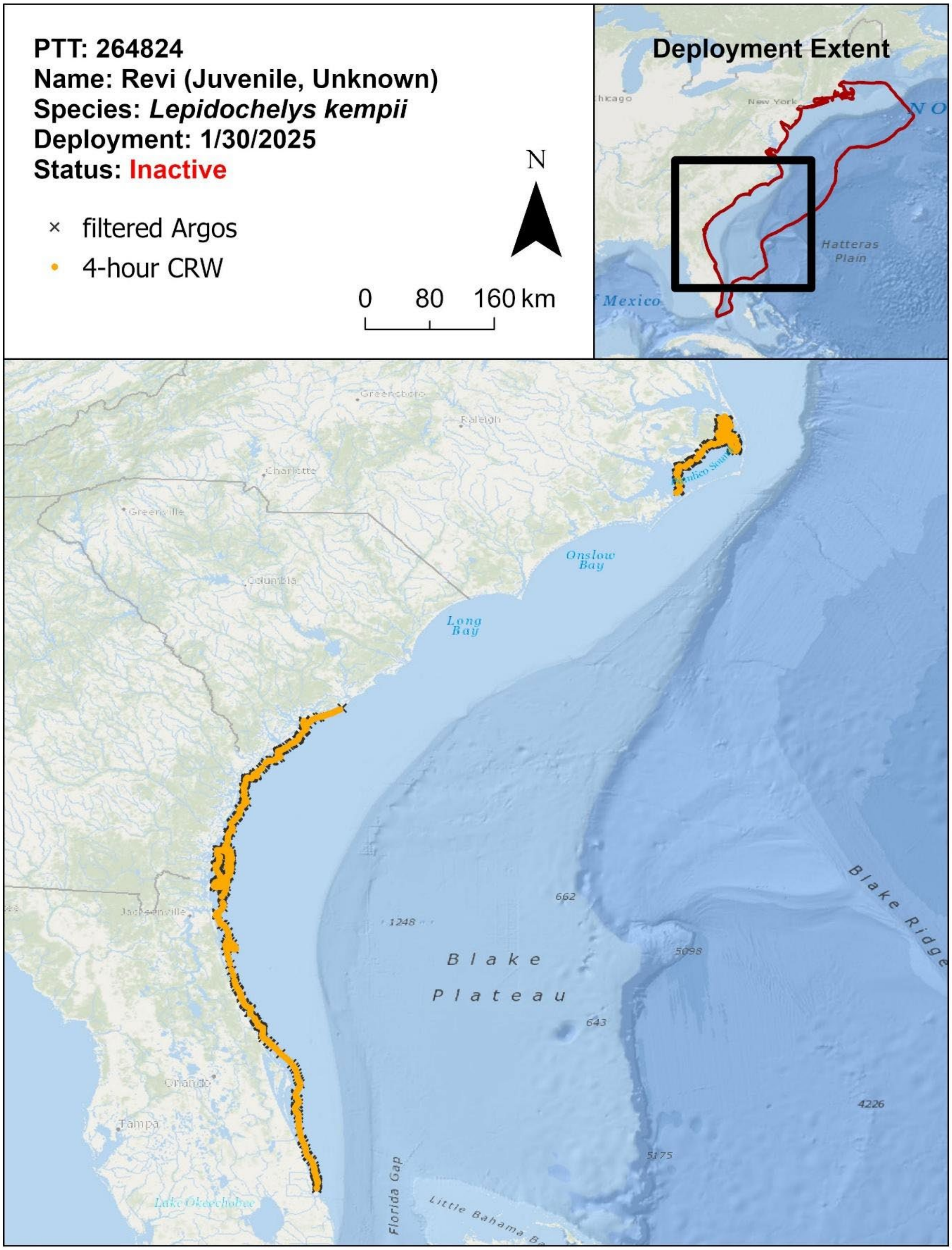


Figure C-18.Argos and 4 h CRW locations for PTT 264824.

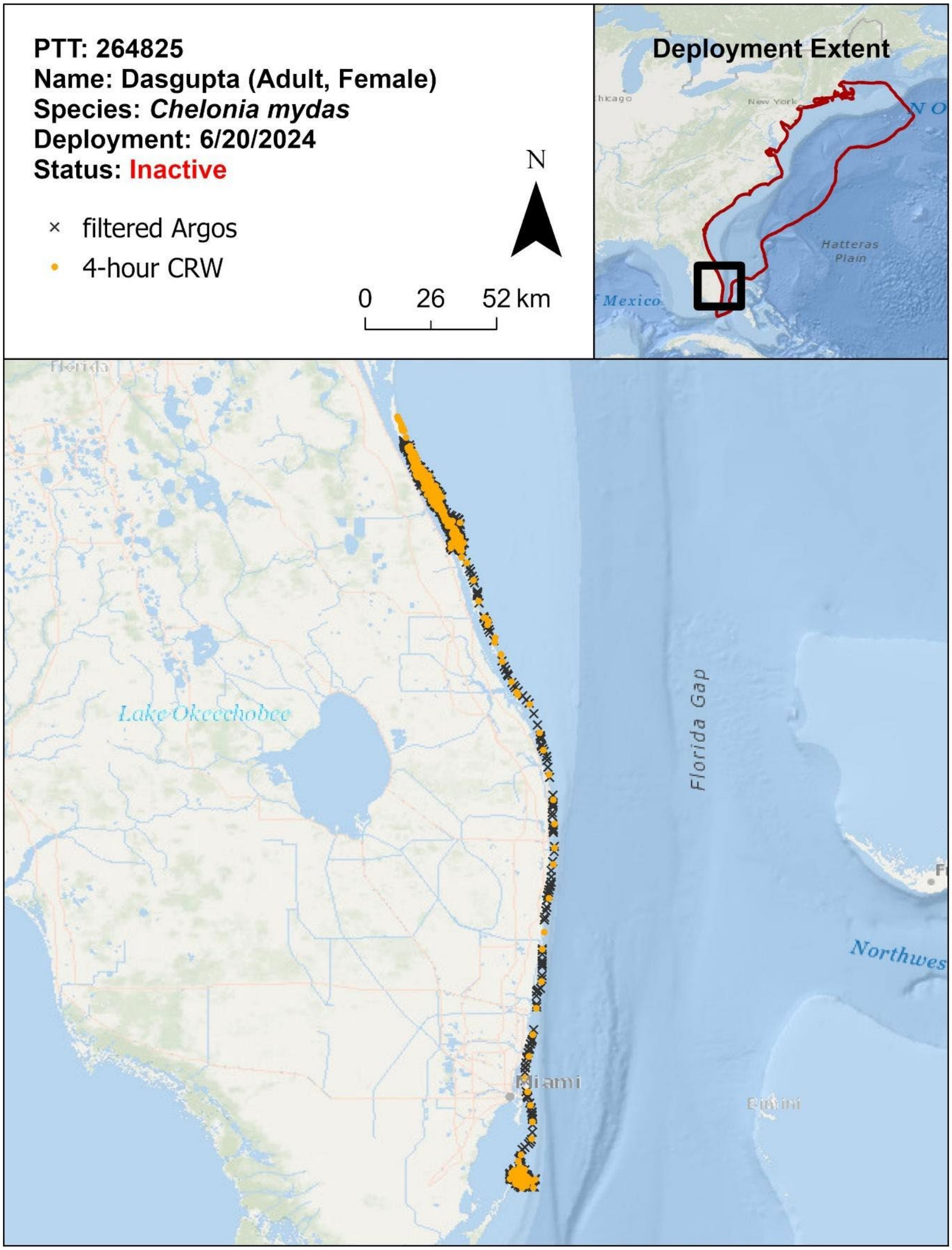


Figure C-19.Argos and 4 h CRW locations for PTT 264825.

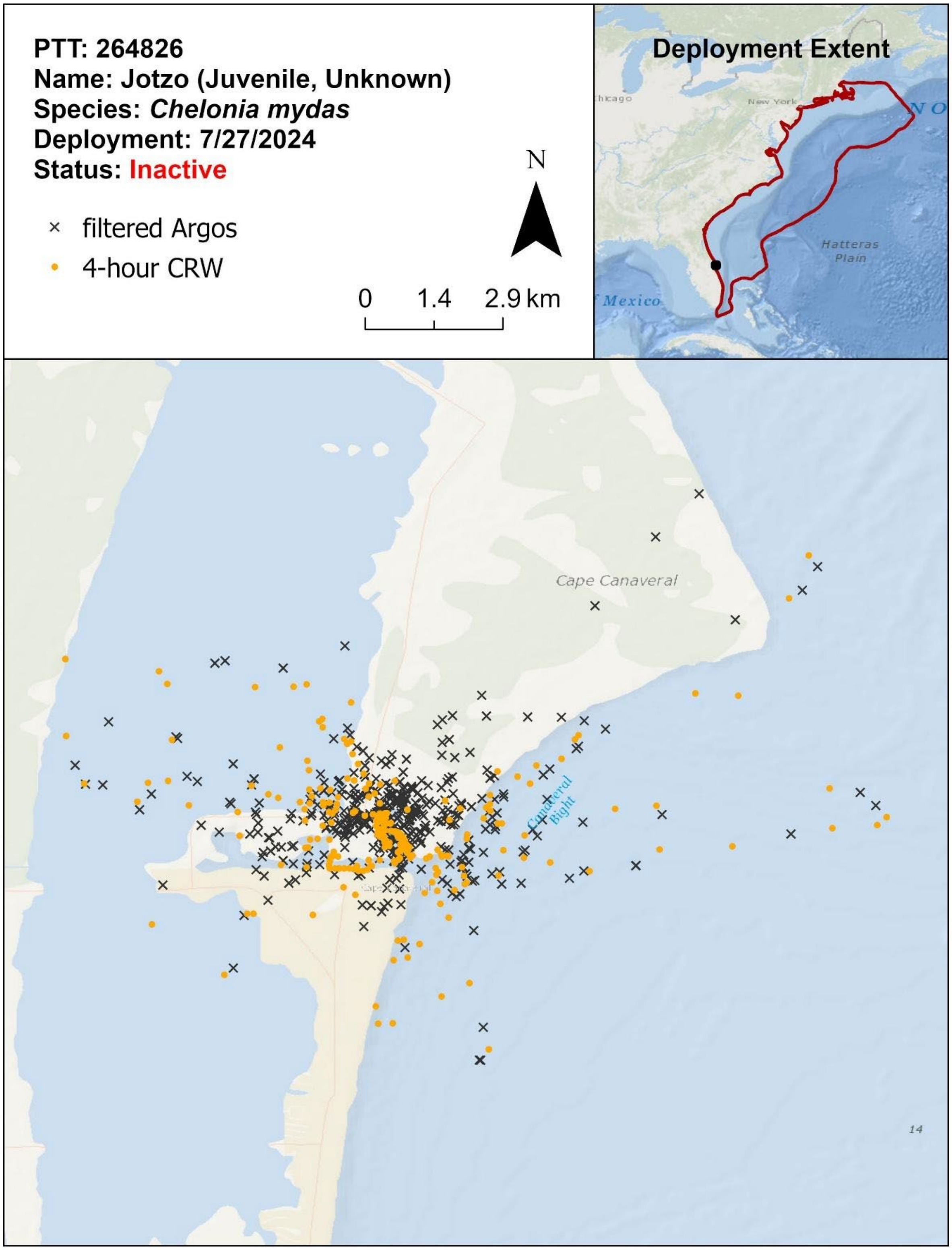


Figure C-20.Argos and 4 h CRW locations for PTT 264826.

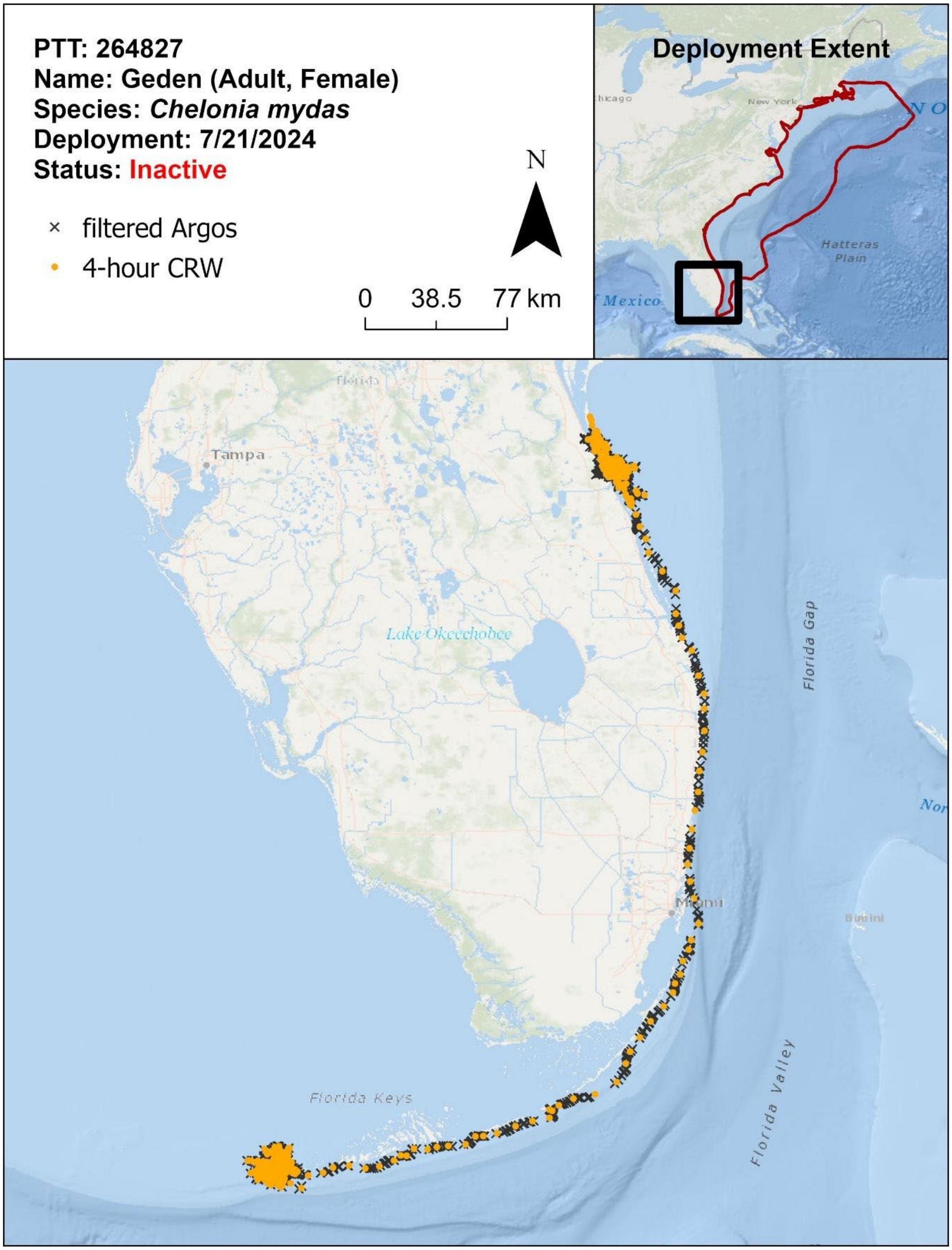


Figure C-21.Argos and 4 h CRW locations for PTT 264827.

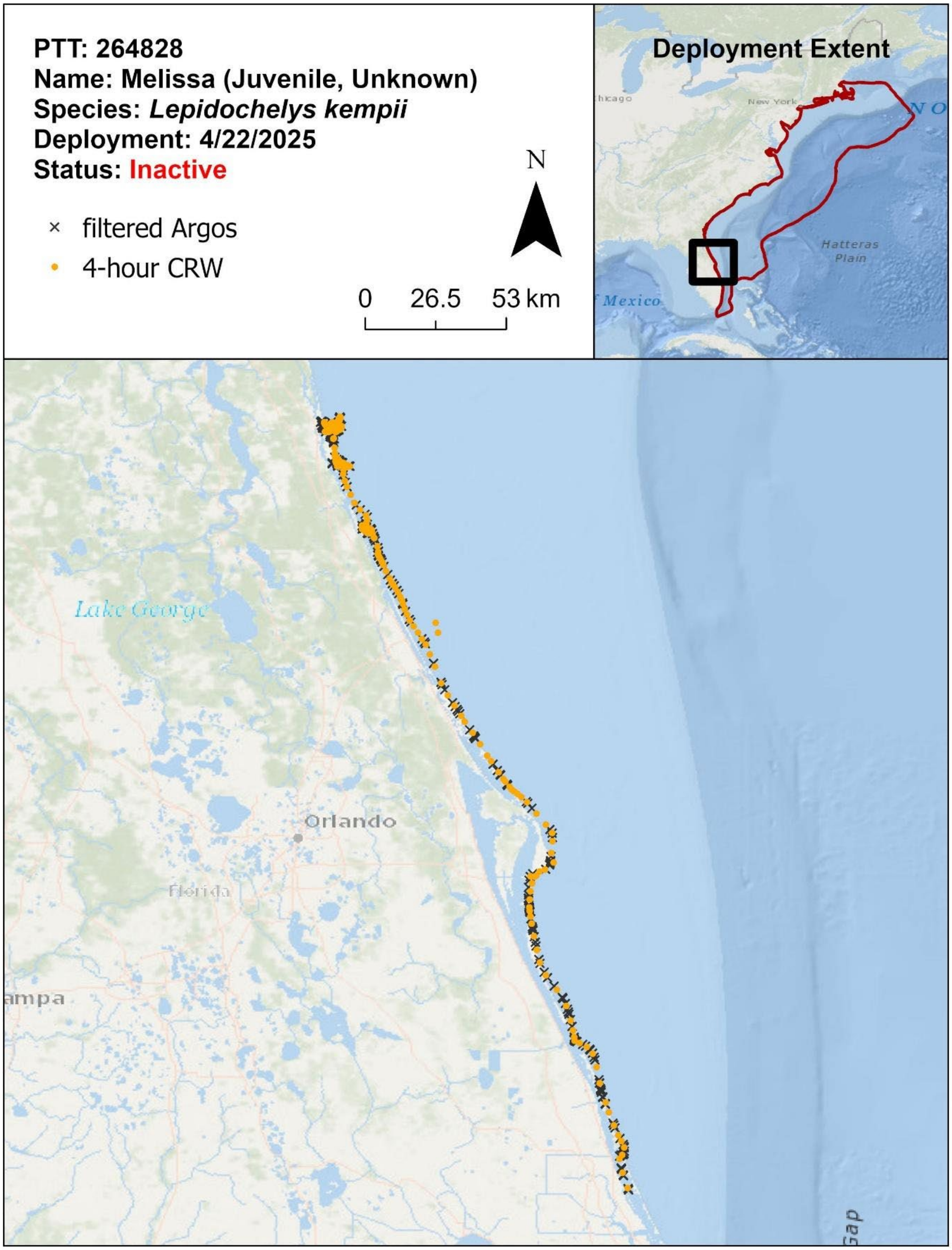


Figure C-22.Argos and 4 h CRW locations for PTT 264828.

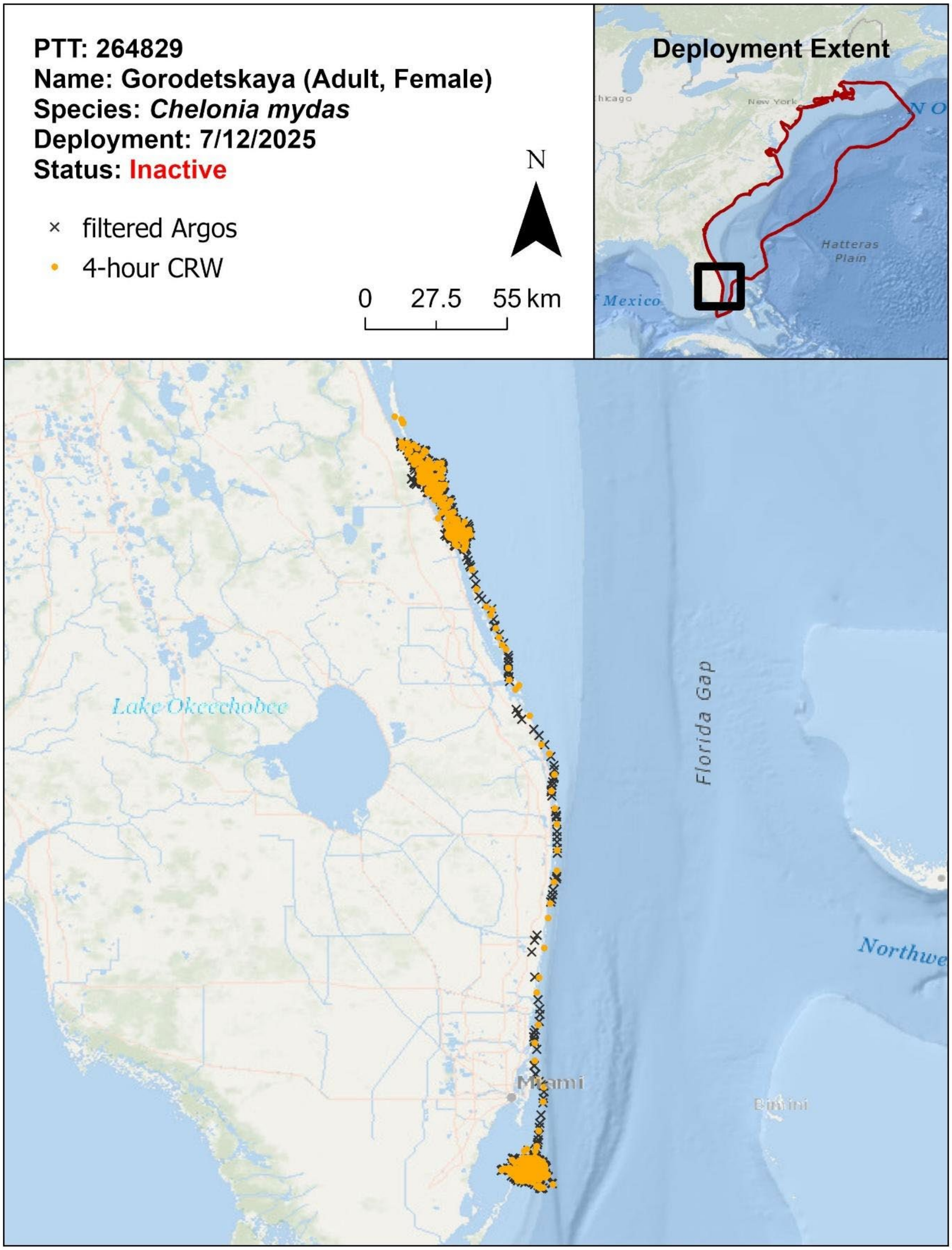


Figure C-23.Argos and 4 h CRW locations for PTT 264829.

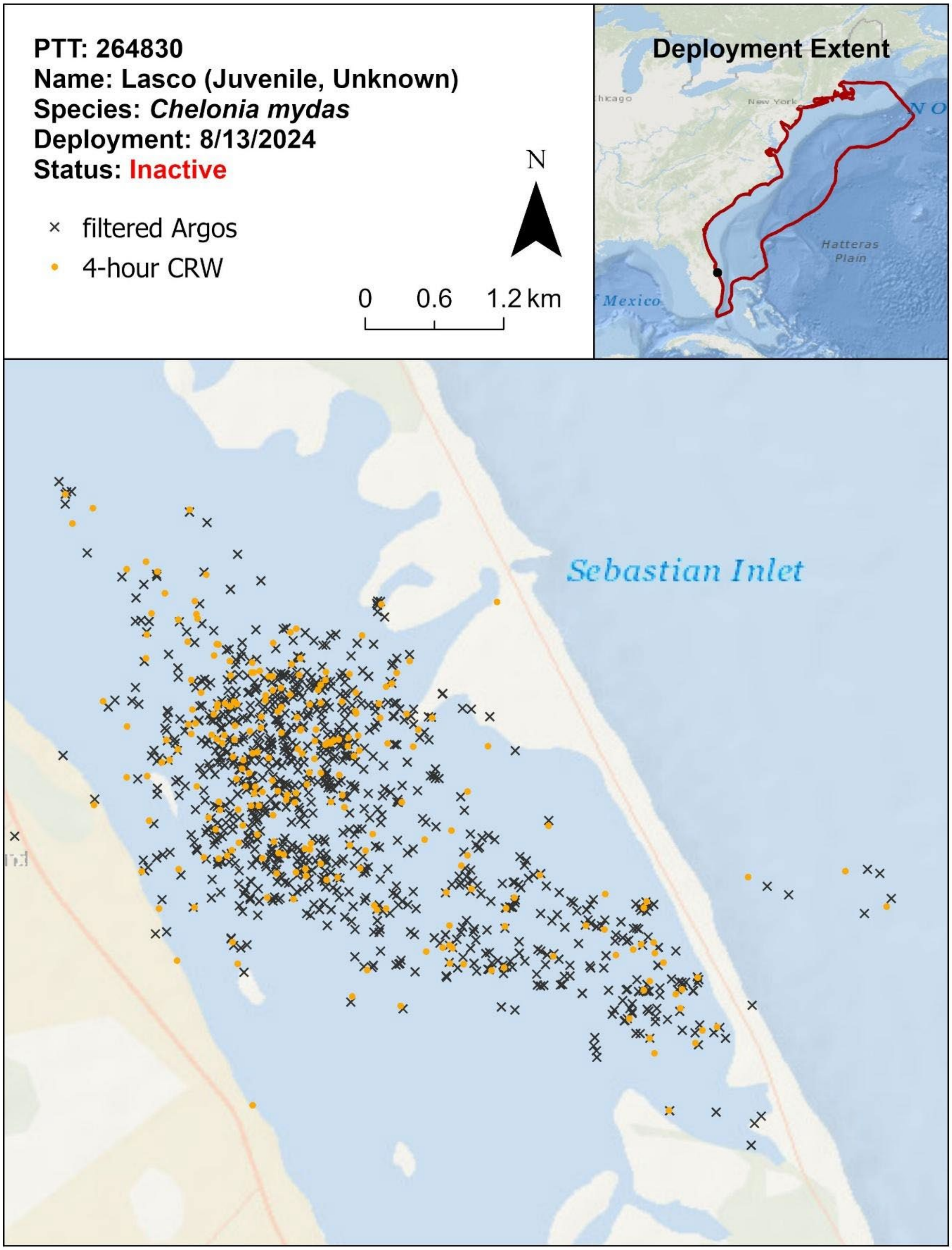


Figure C-24. Argos and 4 h CRW locations for PTT 264830.

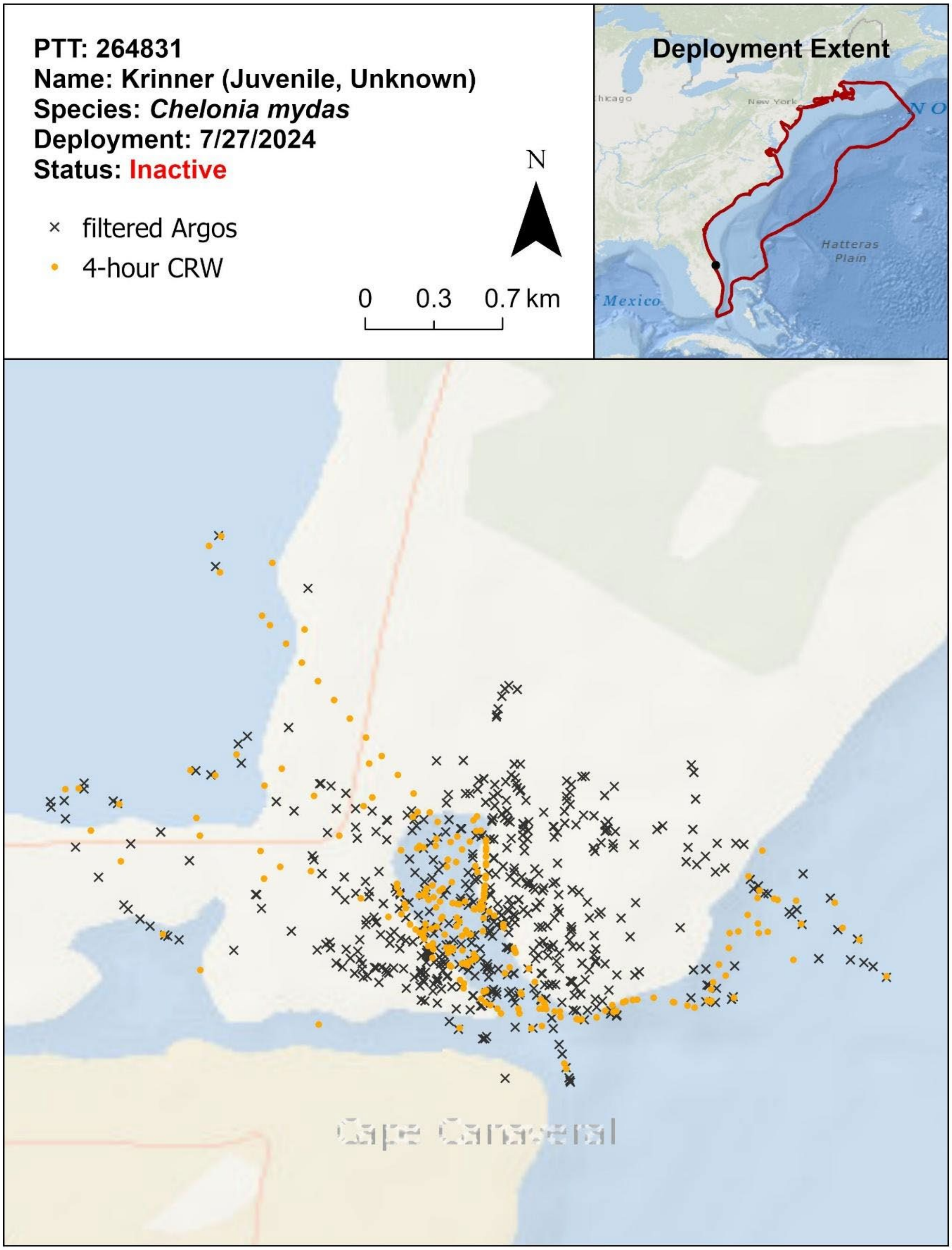


Figure C-25.Argos and 4 h CRW locations for PTT 264831.

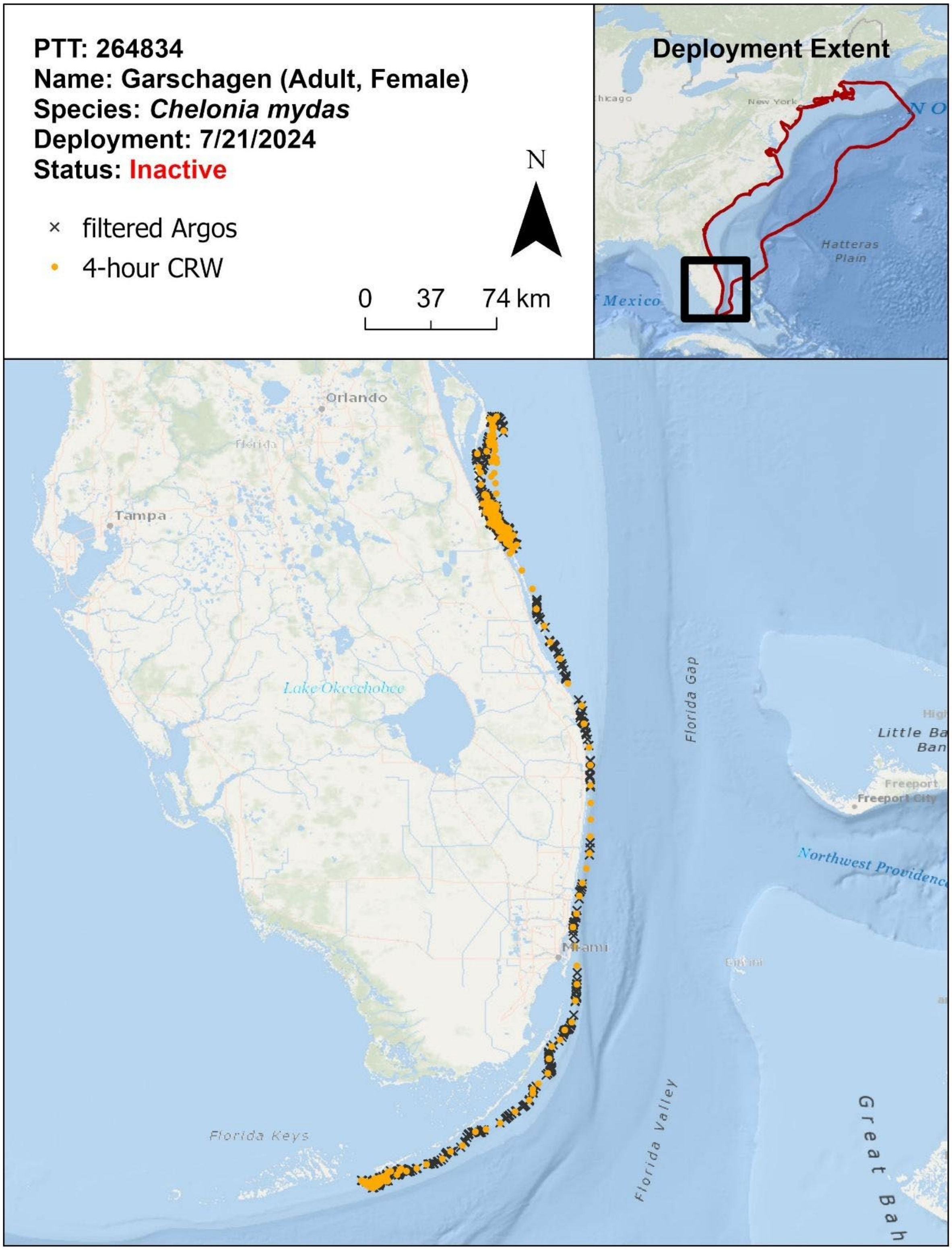


Figure C-26.Argos and 4 h CRW locations for PTT 264834.

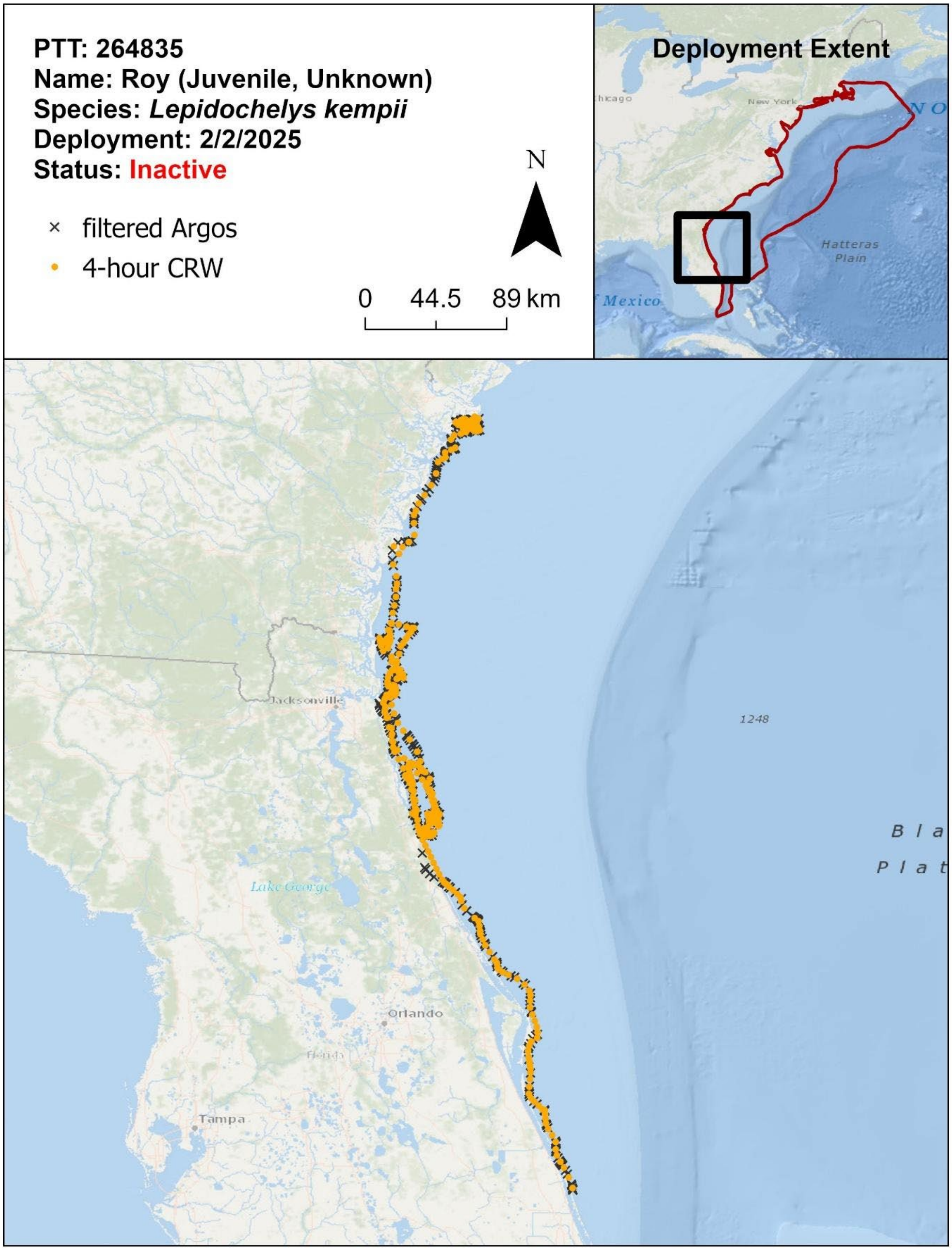


Figure C-27.Argos and 4 h CRW locations for PTT 264835.

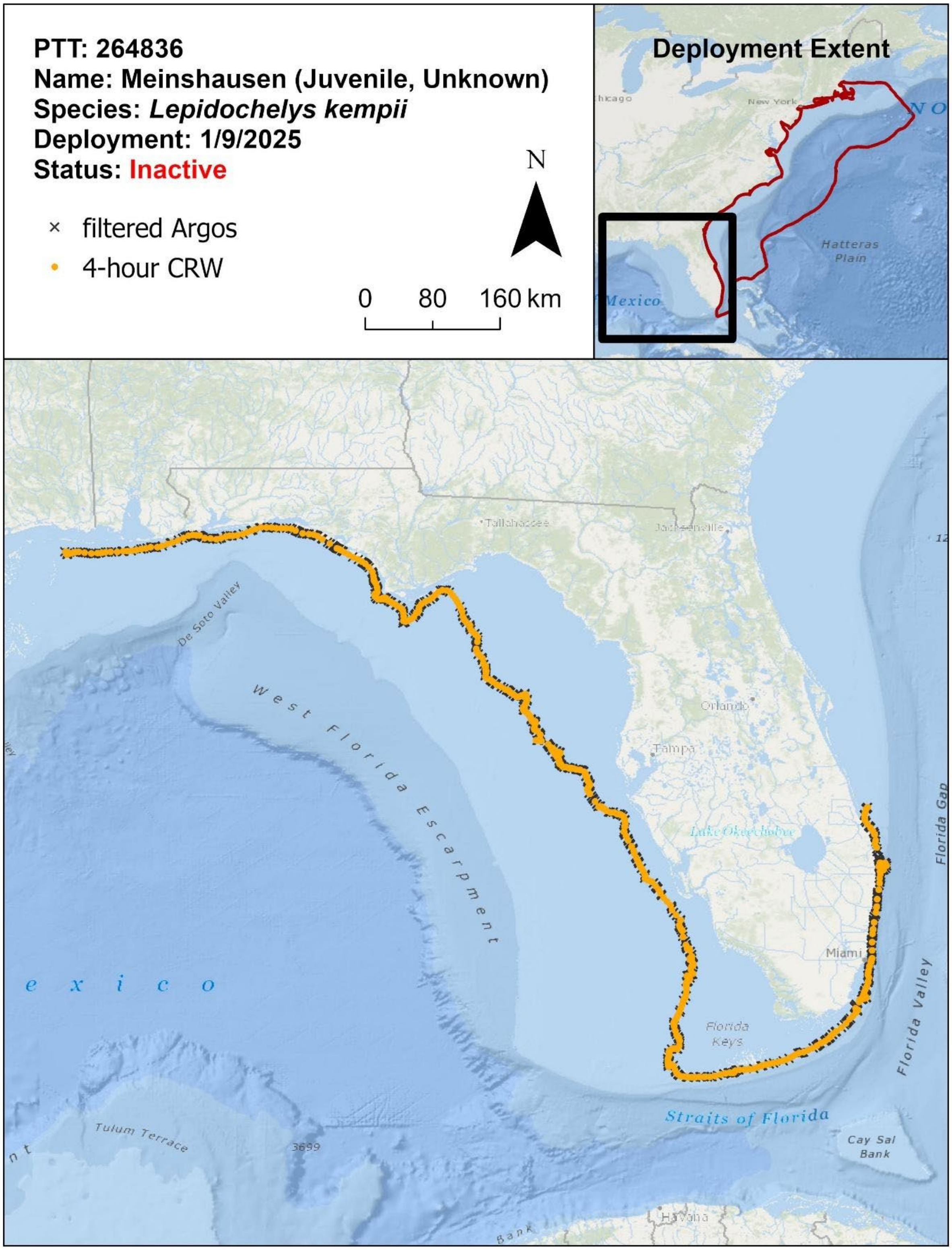


Figure C-28. **Argos and 4 h CRW locations for PTT 264836.**

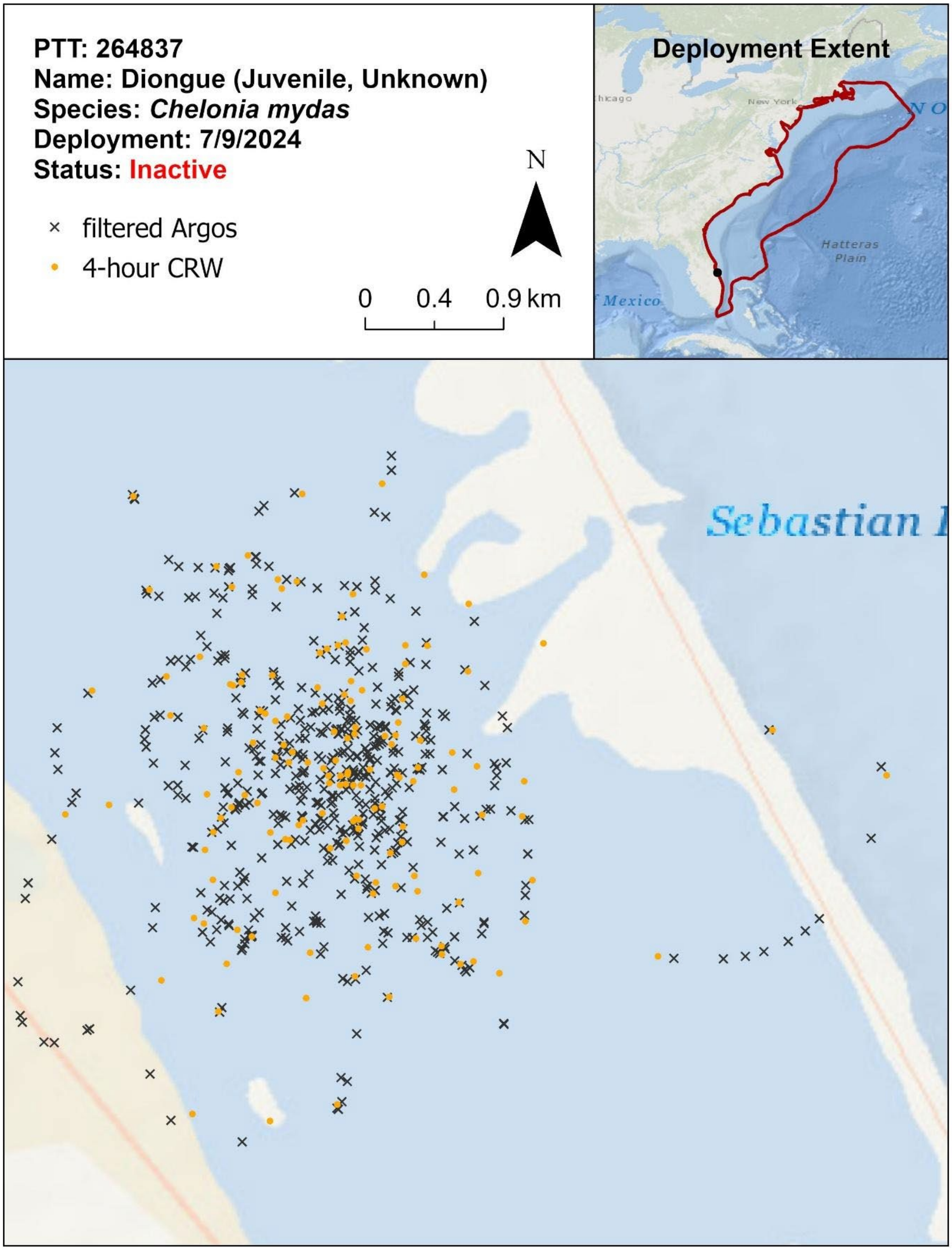


Figure C-29. Argos and 4 h CRW locations for PTT 264837.

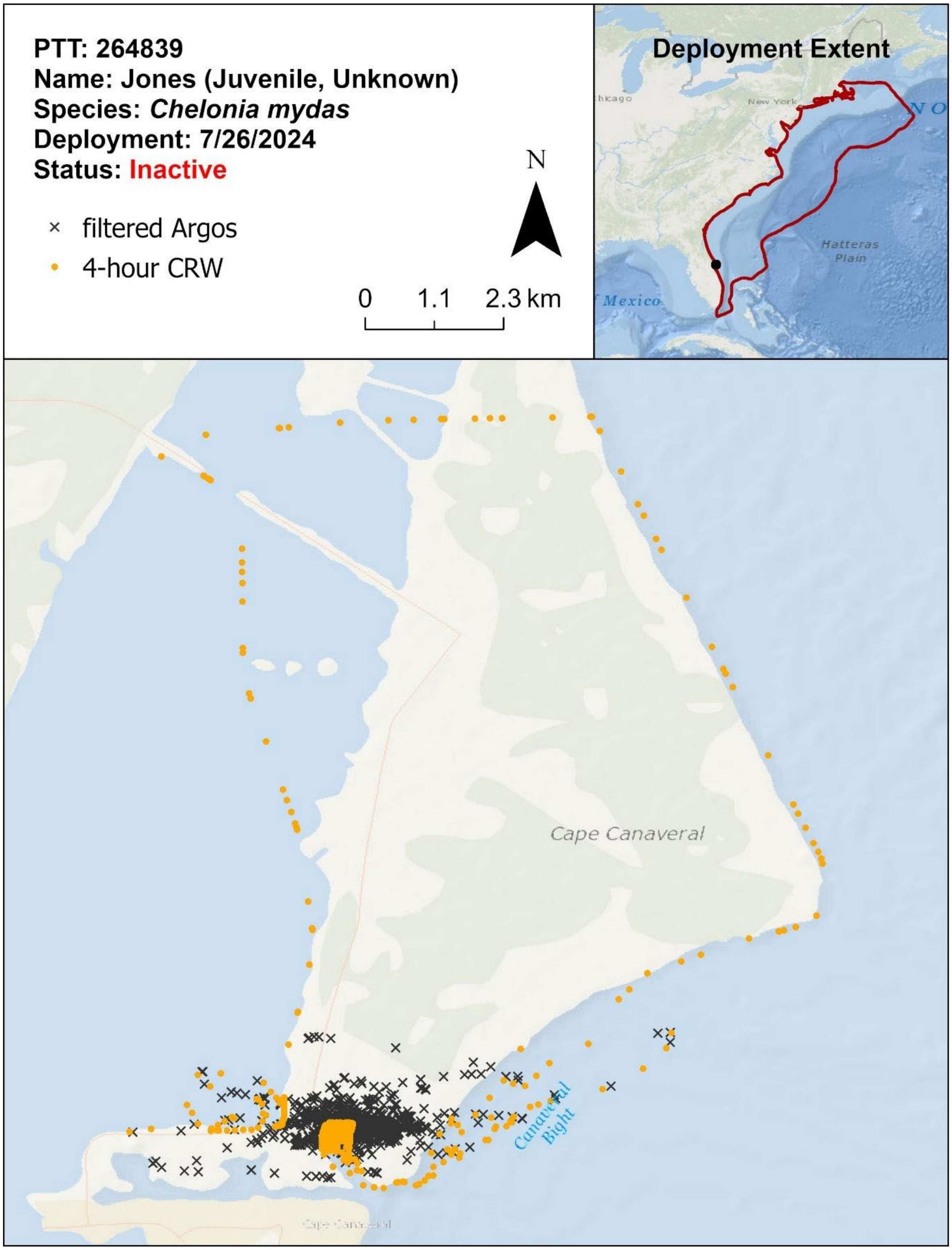


Figure C-30.Argos and 4 h CRW locations for PTT 264839.

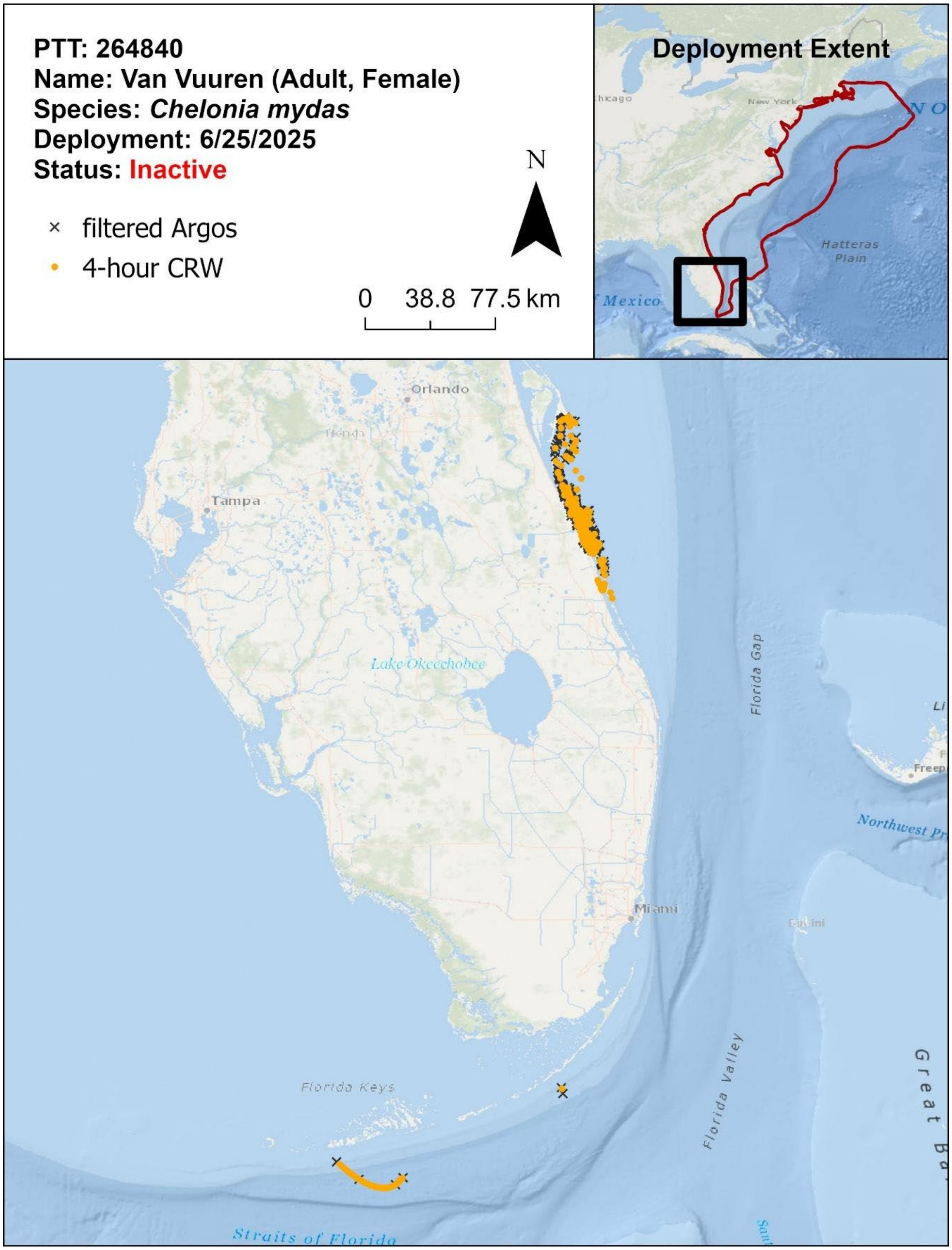


Figure C-31.Argos and 4 h CRW locations for PTT 264840.

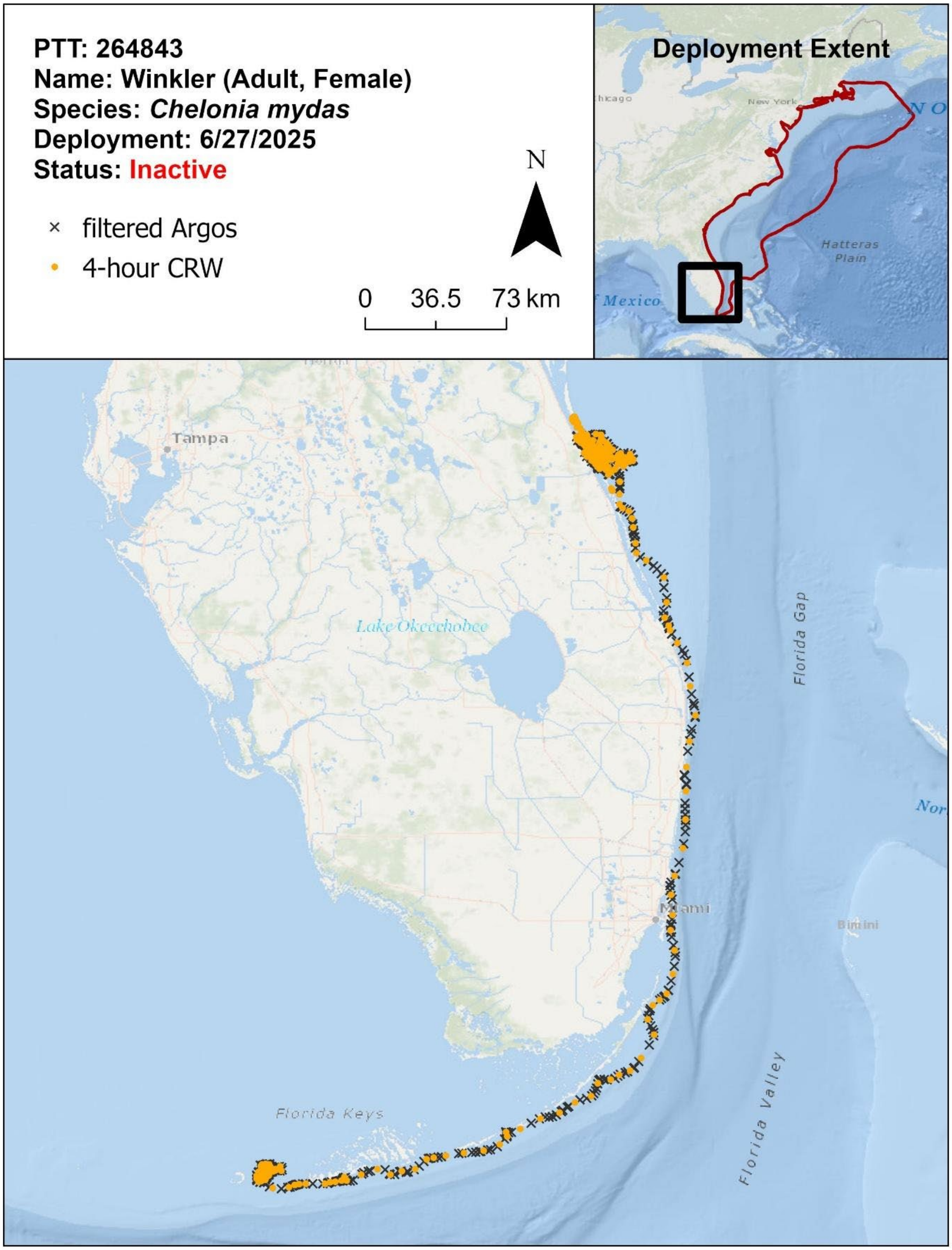


Figure C-32.Argos and 4 h CRW locations for PTT 264843.

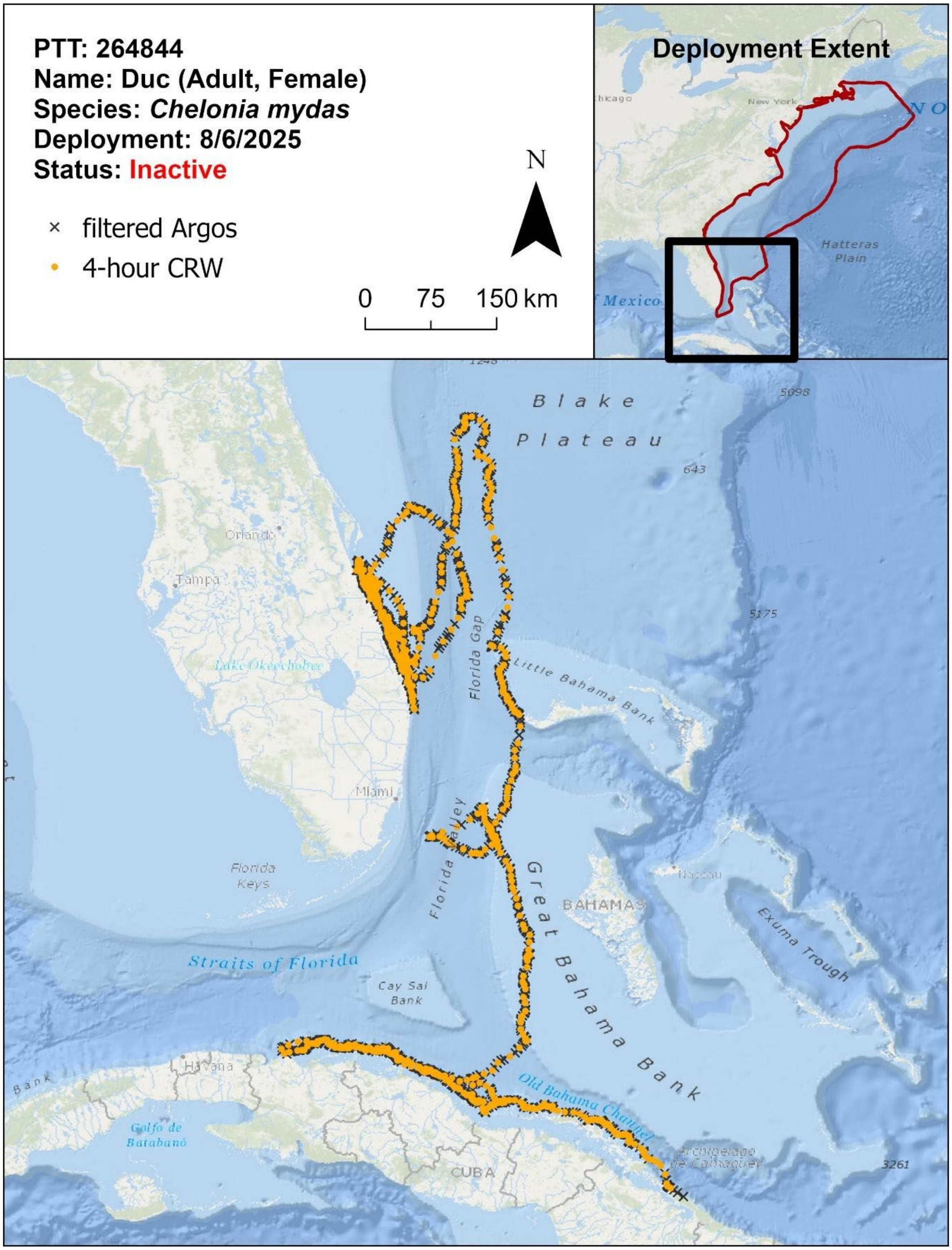


Figure C-33.Argos and 4 h CRW locations for PTT 264844.

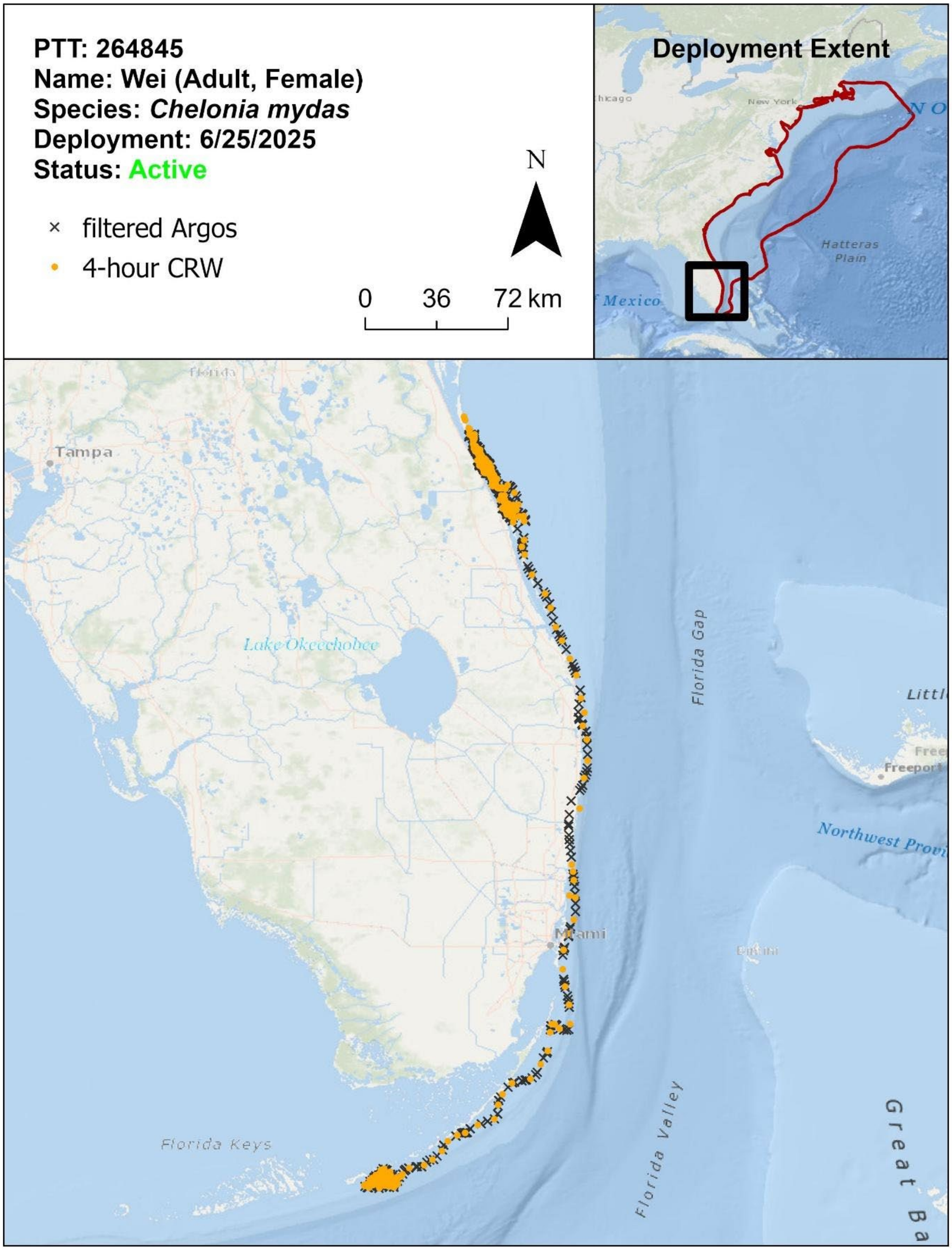


Figure C-34.Argos and 4 h CRW locations for PTT 264845.

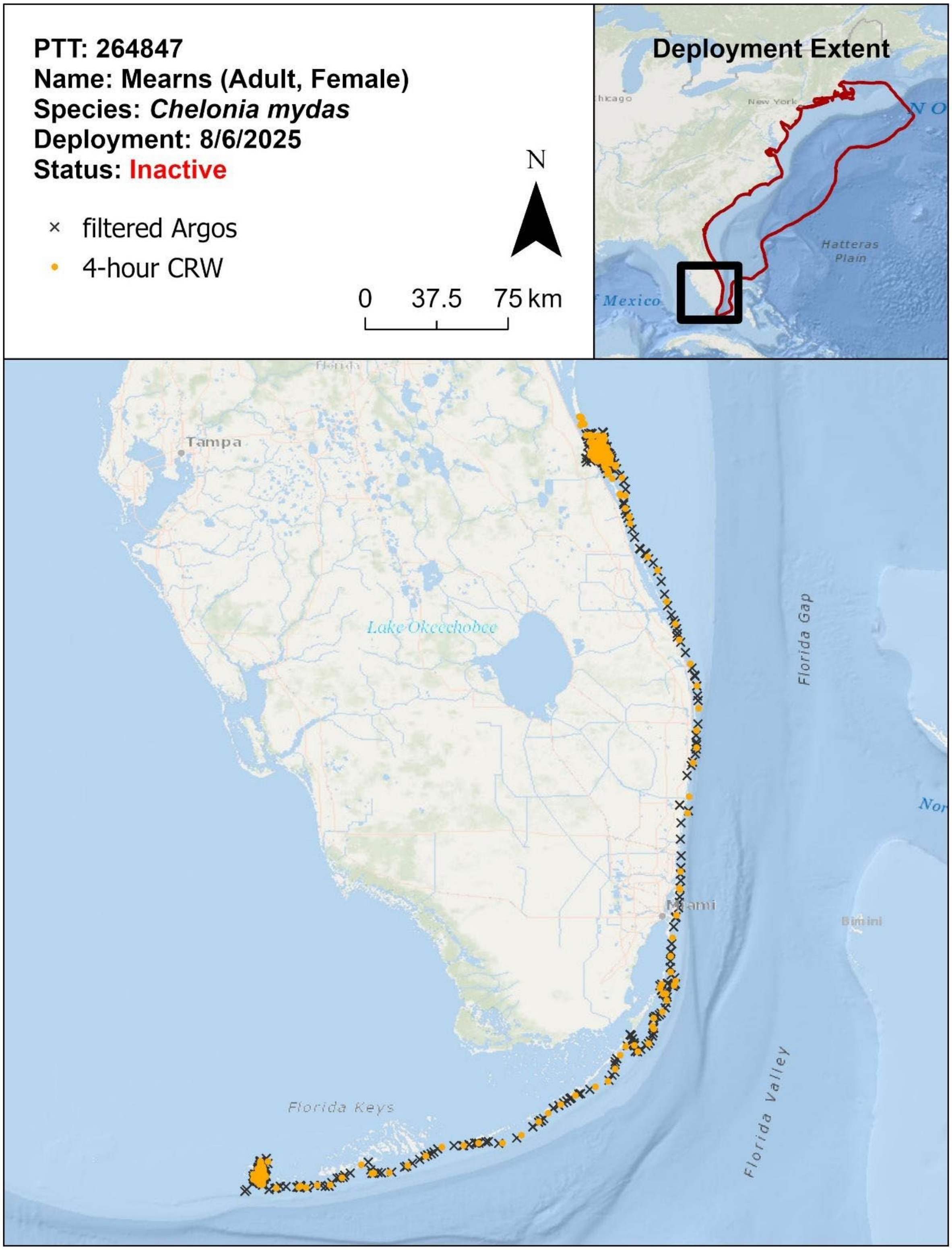


Figure C-35.Argos and 4 h CRW locations for PTT 264847.

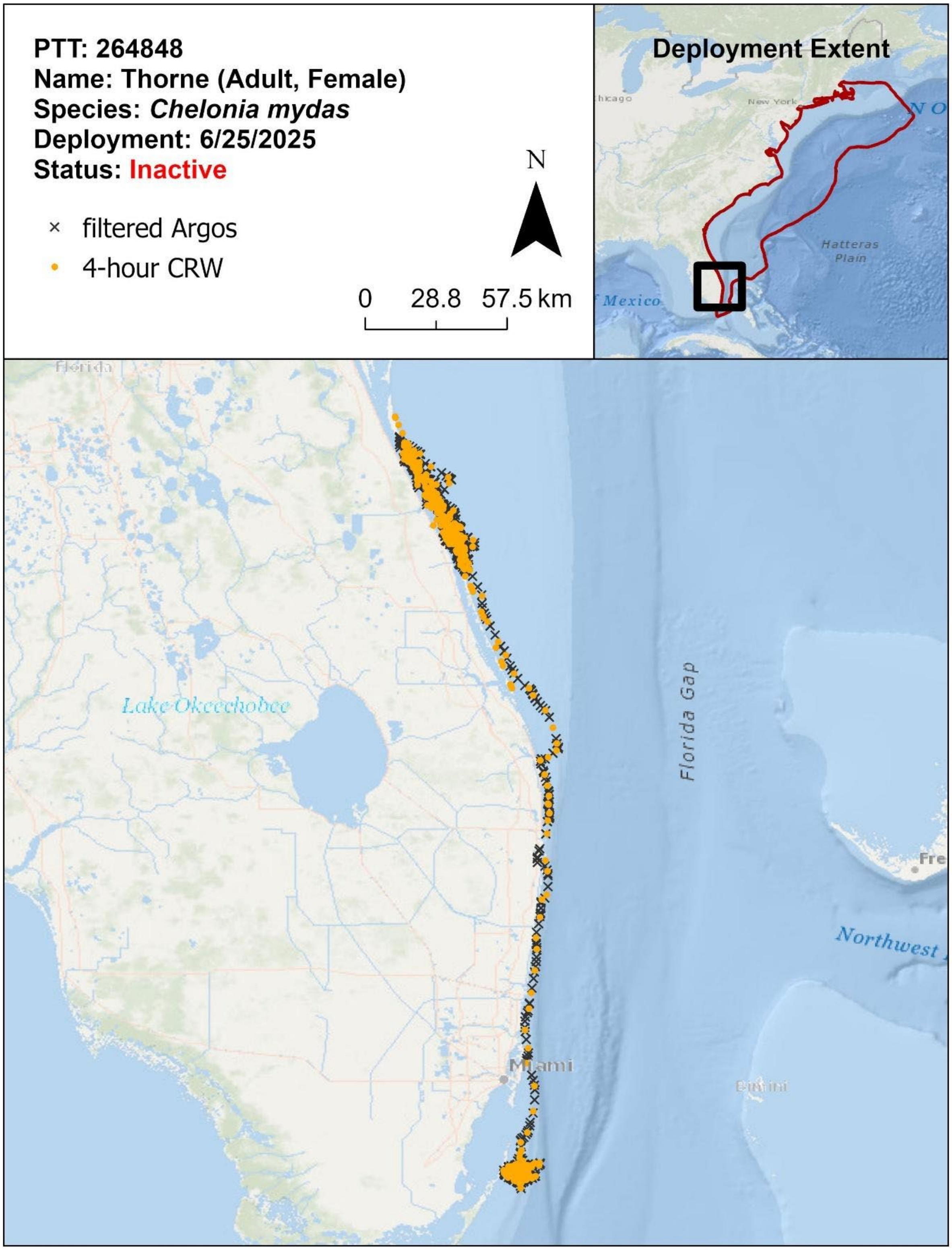


Figure C-36.Argos and 4 h CRW locations for PTT 264848.

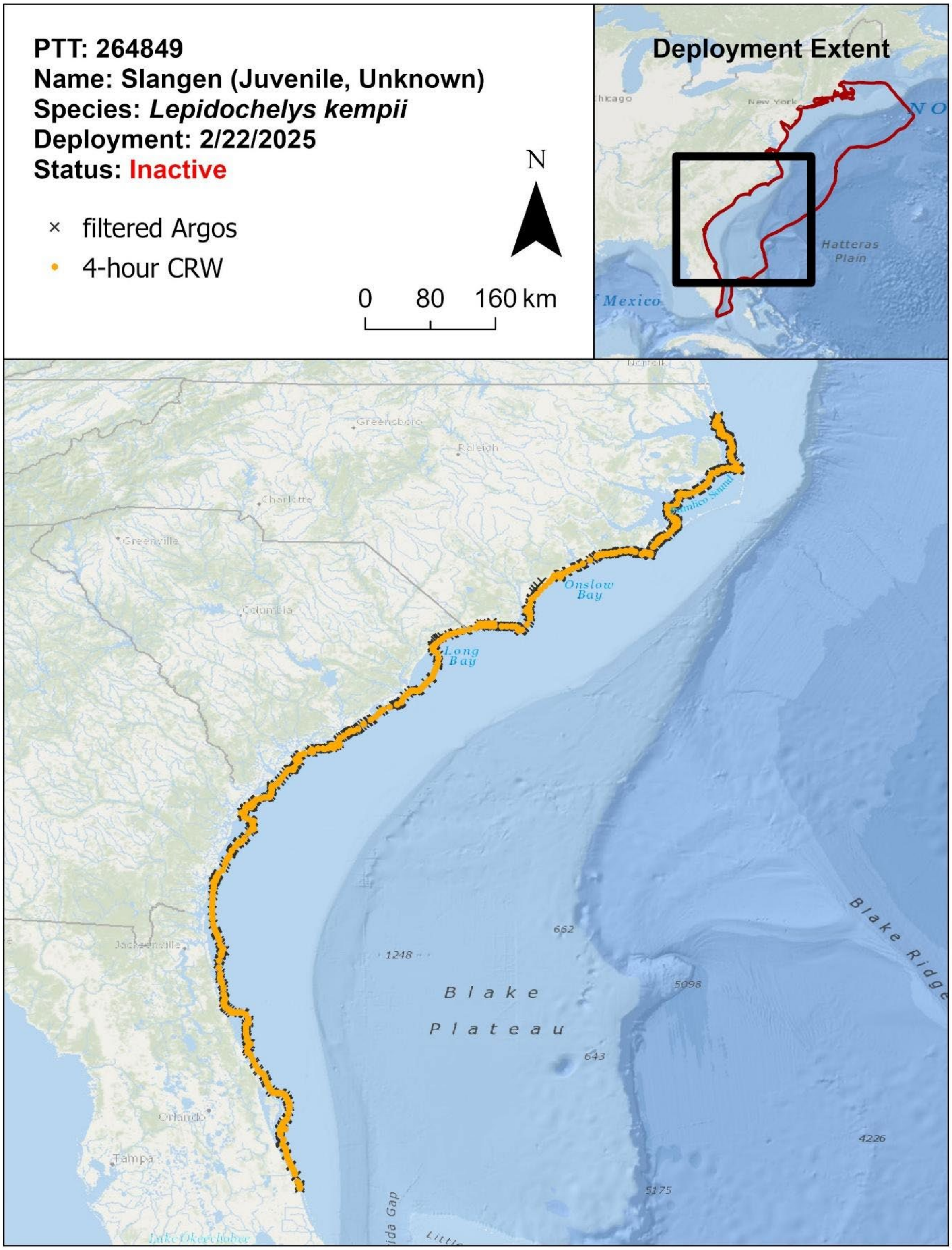


Figure C-37.Argos and 4 h CRW locations for PTT 264849.

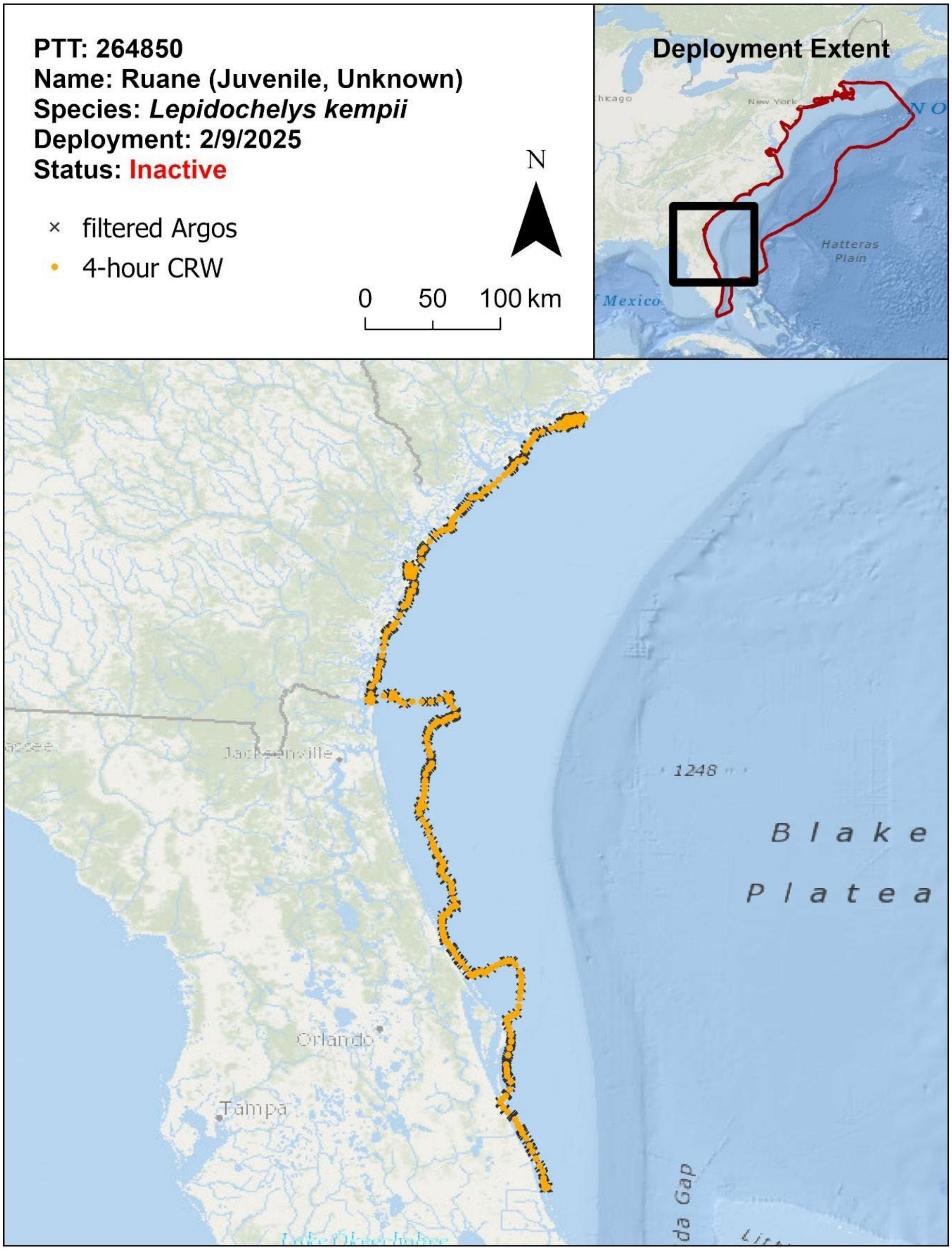


Figure C-38.Argos and 4 h CRW locations for PTT 264850.

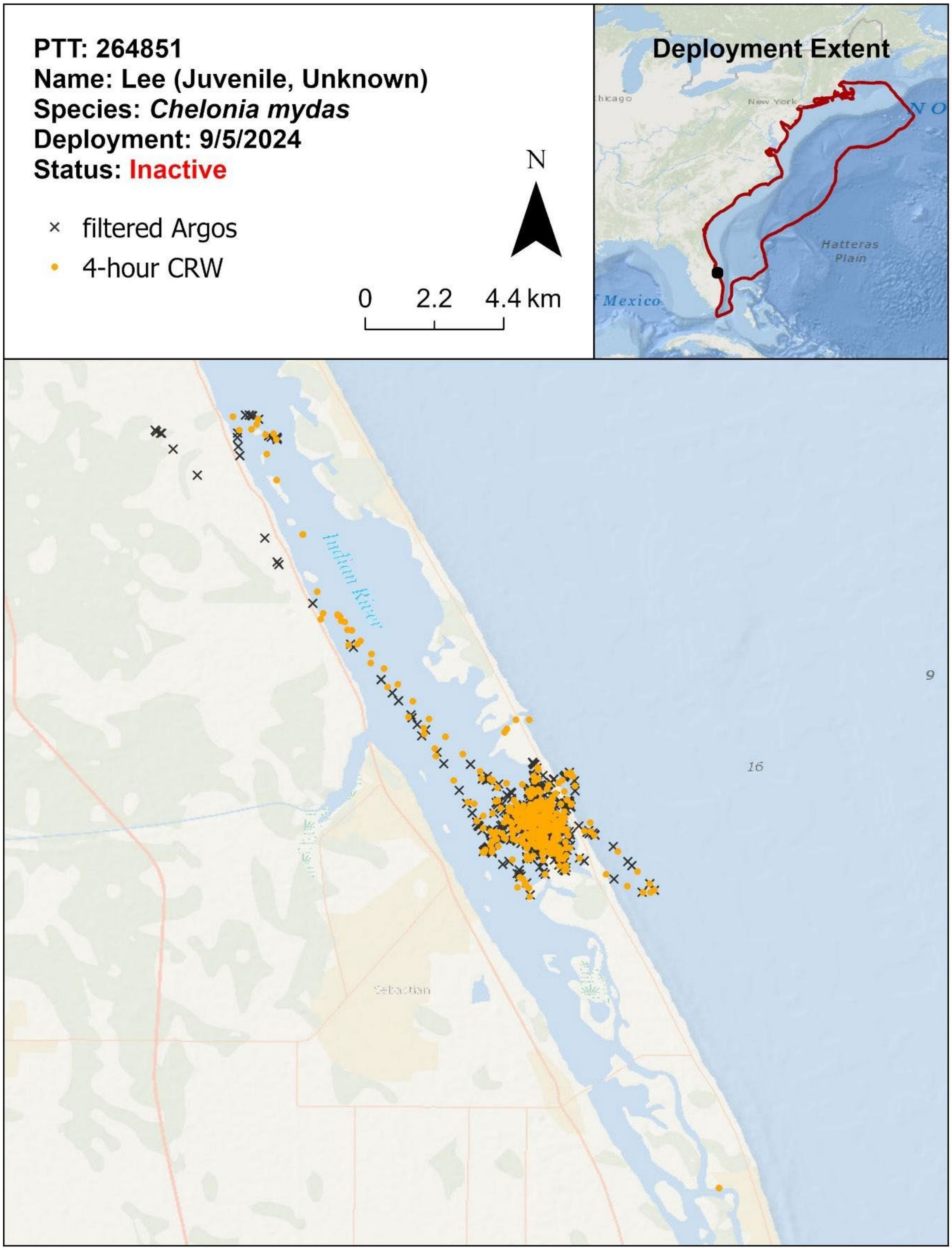


Figure C-39.Argos and 4 h CRW locations for PTT 264851.

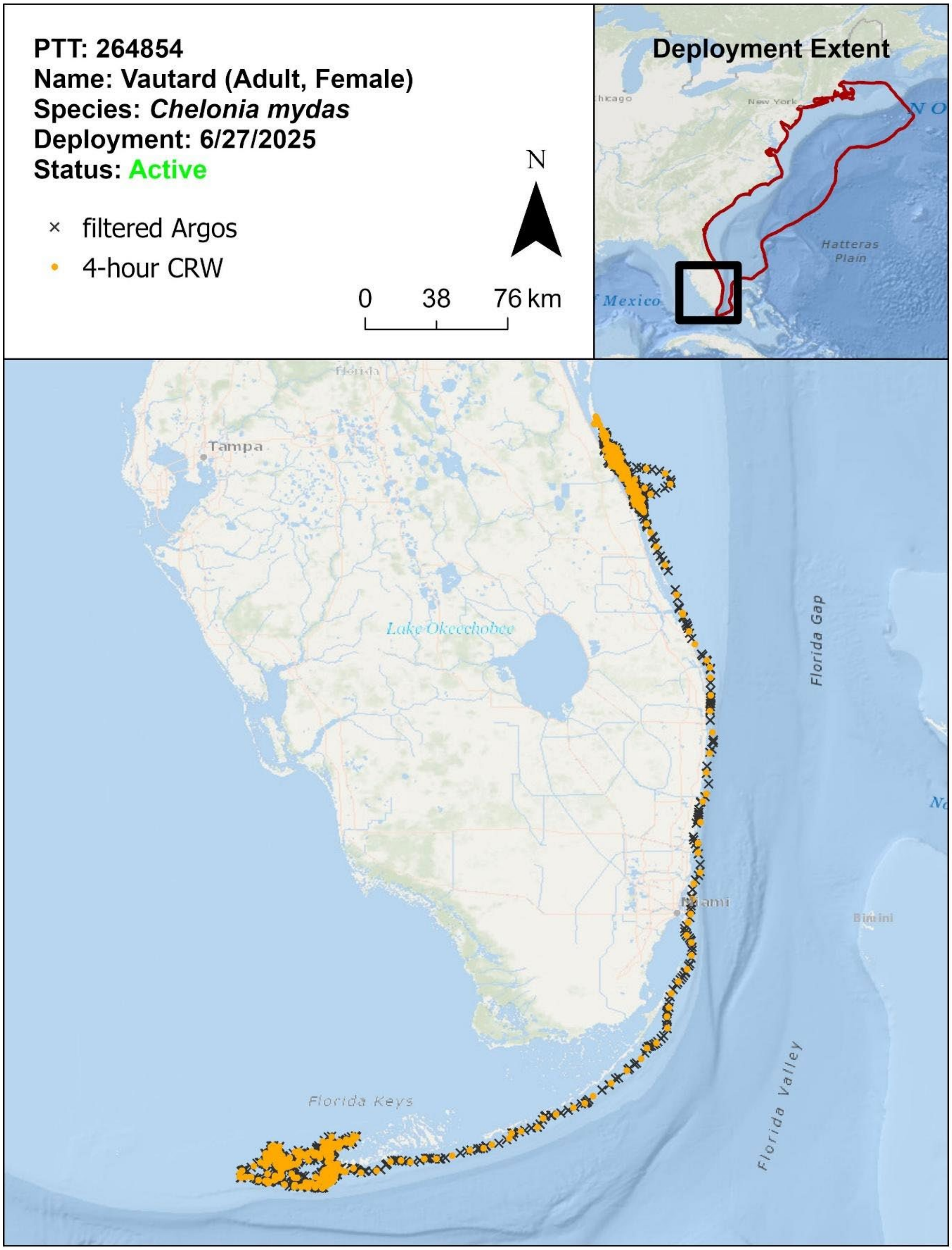


Figure C-40.Argos and 4 h CRW locations for PTT 264854.

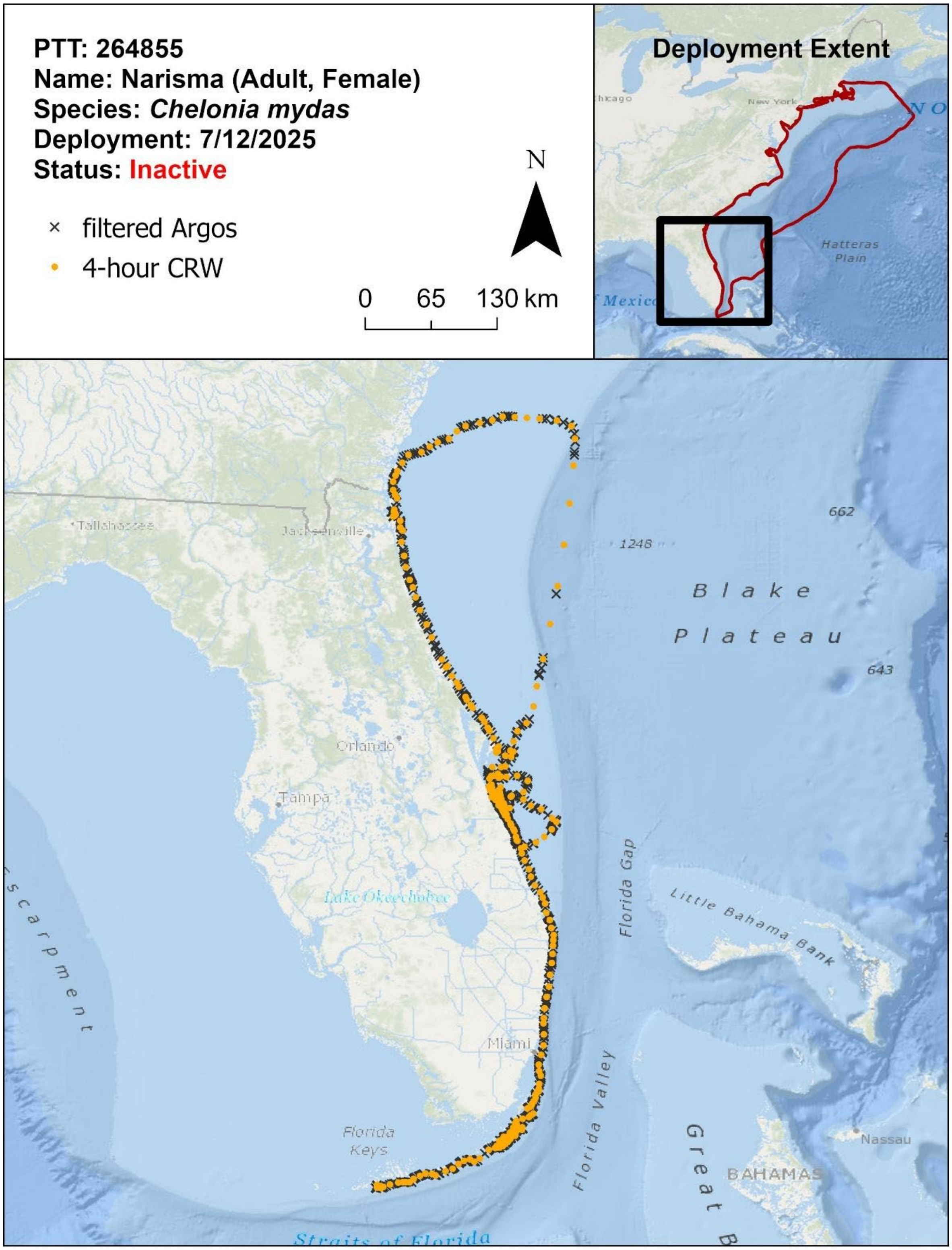


Figure C-41.Argos and 4 h CRW locations for PTT 264855.

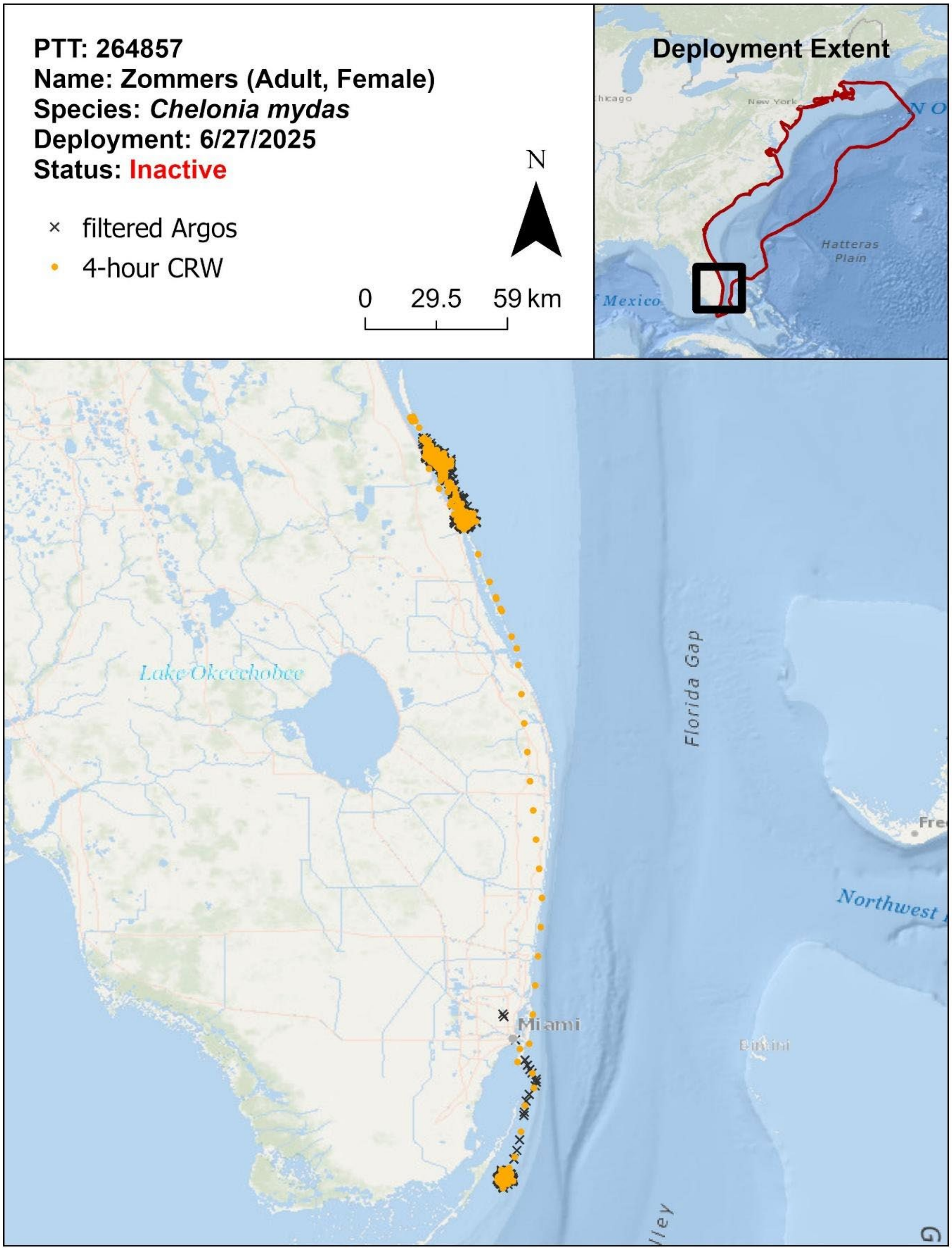


Figure C-42.Argos and 4 h CRW locations for PTT 264857.

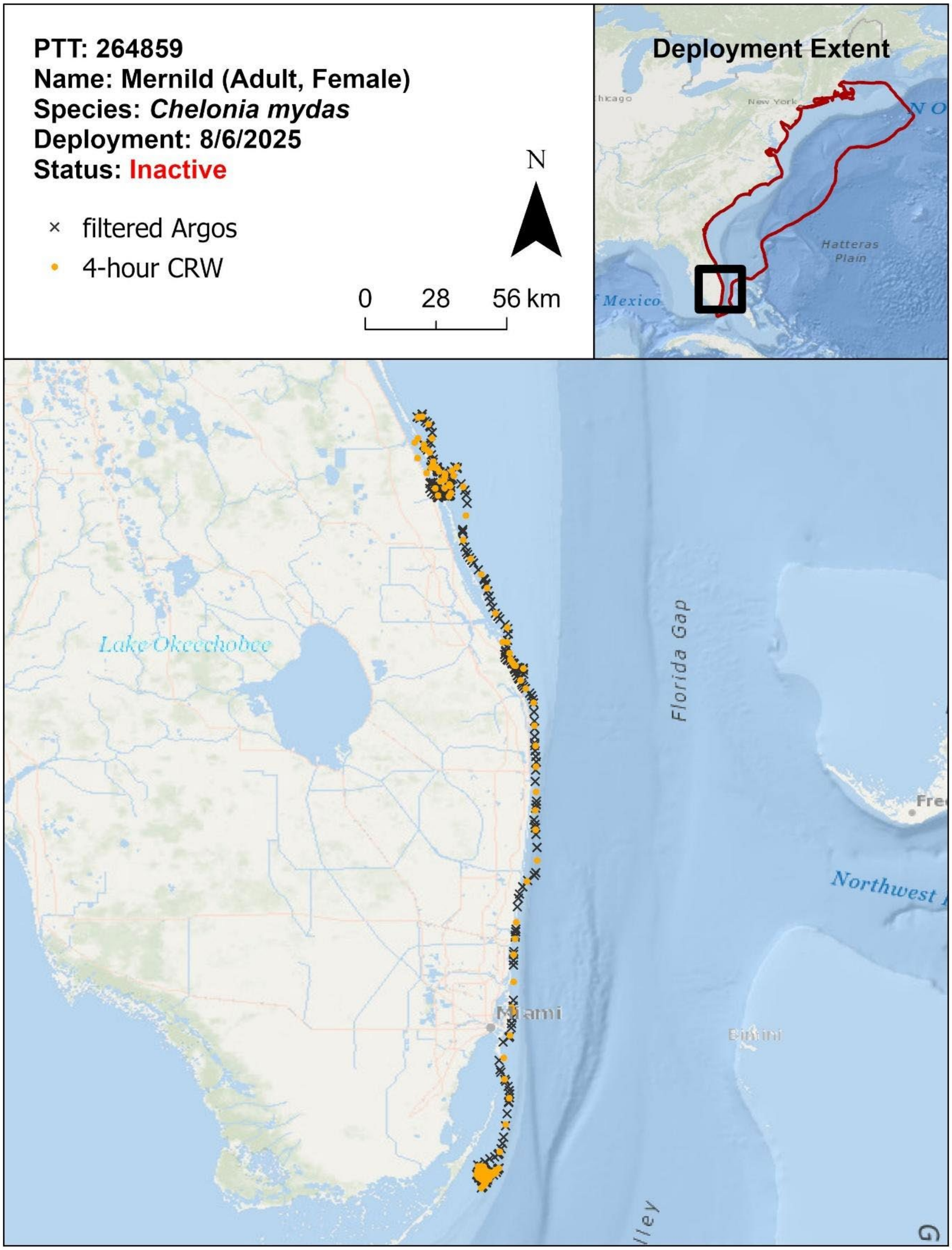


Figure C-43.Argos and 4 h CRW locations for PTT 264859.

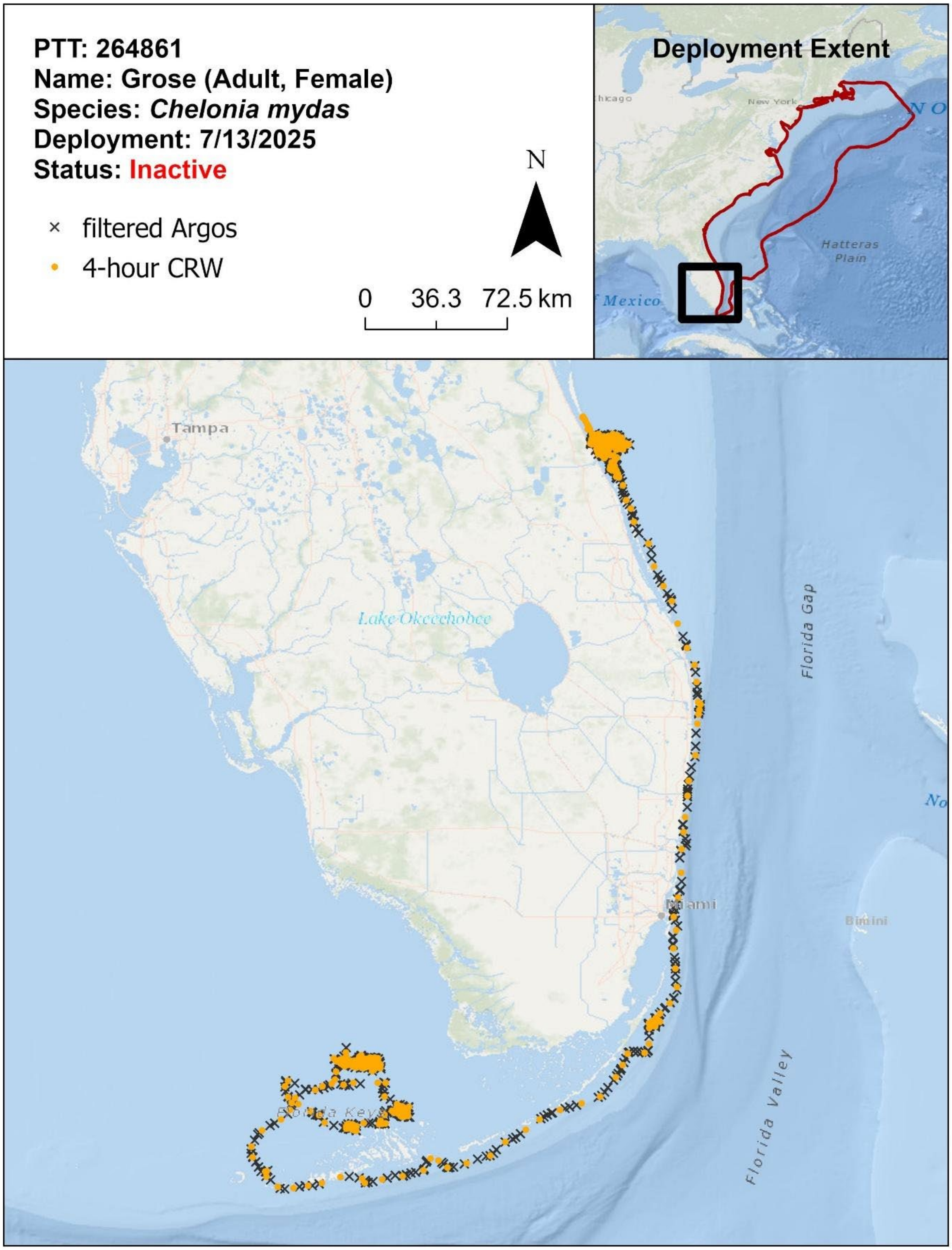


Figure C-44.Argos and 4 h CRW locations for PTT 264861.

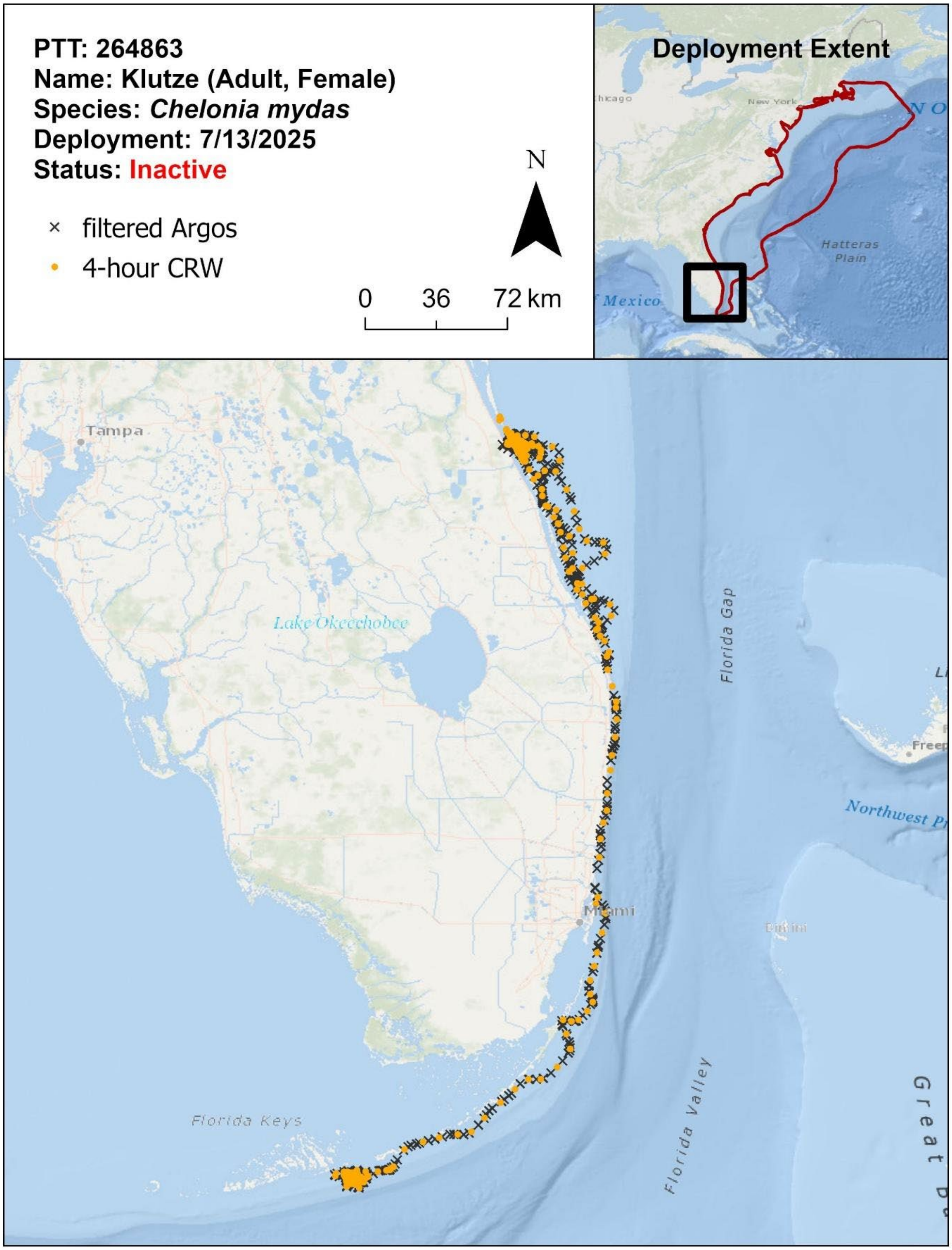


Figure C-45.Argos and 4 h CRW locations for PTT 264863.

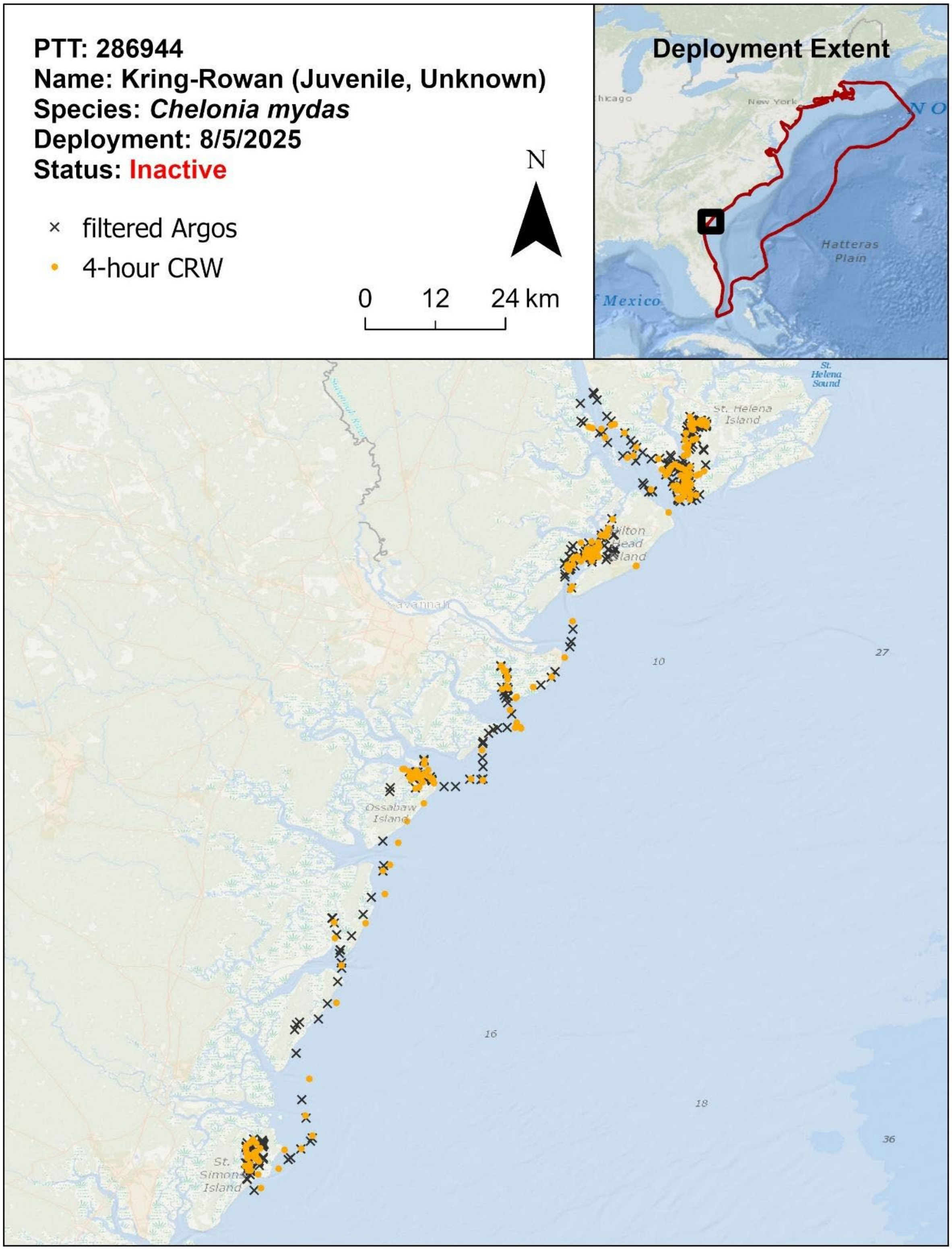


Figure C-46. Argos and 4 h CRW locations for PTT 264944.

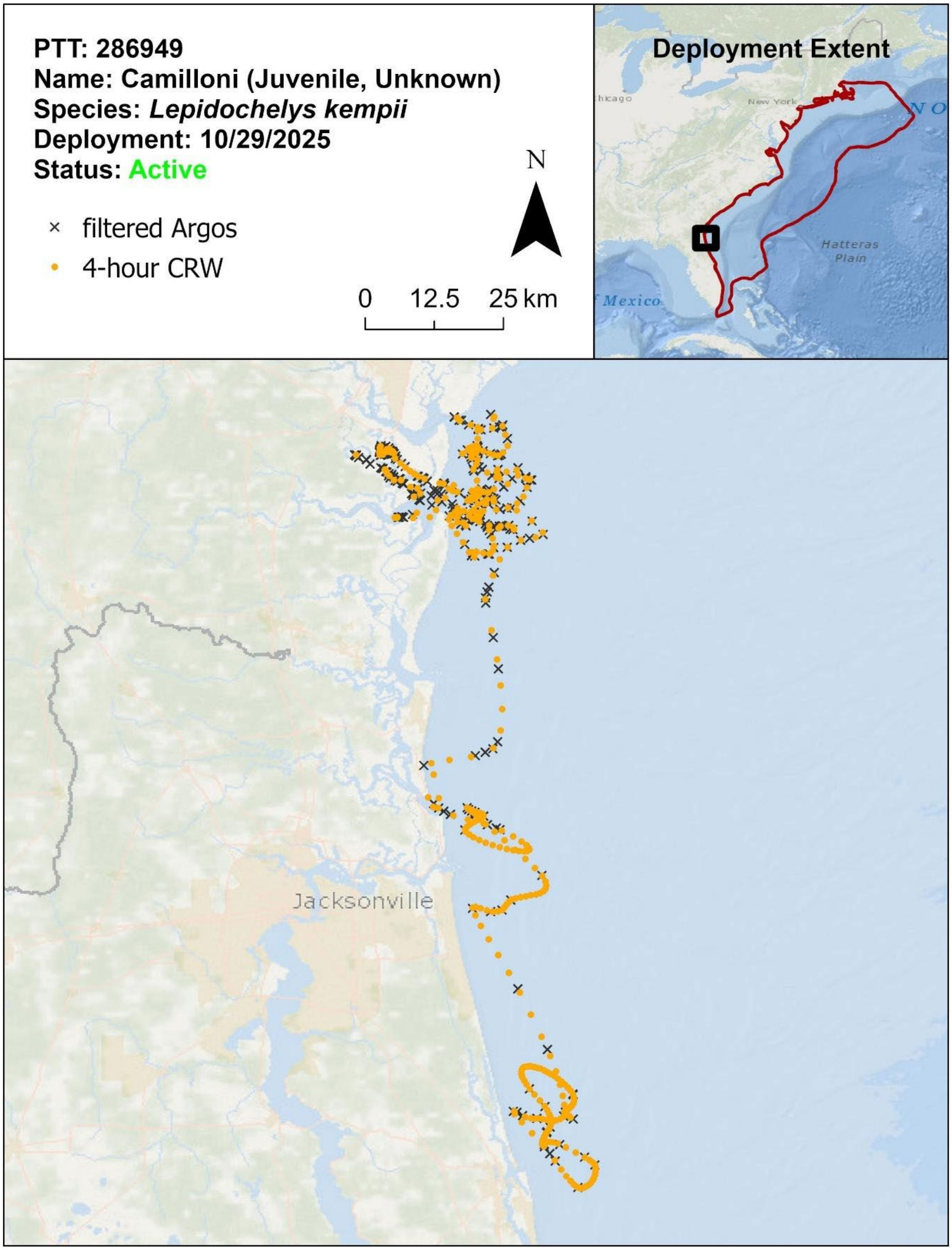


Figure C-47.Argos and 4 h CRW locations for PTT 264949.