NOAA Technical Memorandum NMFS-SEFSC-589

SOUTHEAST FISHERIES SCIENCE CENTER SEA TURTLE OBSERVER MANUAL

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June 2009 document

Updated January 2011

Cover Photo: Measuring curved carapace length (NMFS/SEFSC photo).

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PDF version available at http://www.sefsc.noaa.gov/seaturtletechmemos.jsp.
Updates will be provided periodically at this location.

Minor revisions were made to this document in early February 2010. The revisions were to clarify the response to condition evaluation for turtles not coded “alive”. The original document stated to mark each line with a check mark to indicate a positive reflex/responsiveness and a ‘0’ for no response. This updated document asks for a ‘Y’ for positive response and an ‘N’ for no response. Language was also added to further describe ‘alive’, unresponsive and comatose relative to the reflex tests being conducted to better suit the needs of the observer.

These minor changes only affect pages 3 (Figure 1b), 6 and 16.

Additional minor revisions were made to this document in November 2010. The revisions were to better document the scenario where a turtle encounters the gear but does not get entangled nor hooked (“holding the bait”). The second update was to allow for experimental fishing (eg. hook timer or “weak hook” study) to be designated on the form and subsequently in the database.

These minor changes only affect pages 2 (Figure 1a), 4 and 8.

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This manual has evolved through several versions. Program coordinators, fishery observers and biologists have assisted in adapting this document for use in multiple fisheries. We sincerely thank the contributors of this and earlier versions: Myrto Argyropoulou, Larry Beerkircher, Carrie Horton, and Dennis Lee. We thank Jeanette Wyneken for her assistance distinguishing internal hooking locations. For their help in defining criteria for the condition of comatose and discussions leading to a standardized evaluation for turtles not coded as “alive” we thank Craig Harms, Joseph Flanagan, Charlie Innis, Tom Jackson, Elliot Jacobson, Molly Lutcavage, Paul Richards, Thierry Work, and Jeanette Wyneken. For the use of the olive ridley carapace and plastron diagrams, Figure 2, we thank Henri A. Reichart and Stanny Handigman.

SEFSC SEA TURTLE OBSERVER MANUAL

INTRODUCTION

The Sea Turtle Life History Form, version 01/2011 (Figure 1), is used to record biological data, including the number, species, size and condition of sea turtles incidentally captured in a fishery. Other data collected, such as tagging information and biopsy samples, may provide information regarding the movements and preferred habitats of the various populations of sea turtles. These data collected by observers and fishery biologists are critical to the development of conservation and recovery strategies for these marine reptiles. This document provides instruction to complete the Sea Turtle Life History Form, as well as a reference for conducting the permitted activities according to SEFSC approved protocols. Since this document originated as a training manual for NMFS fishery observers, much of the language is directed to observers, although the manual can also be used by NMFS fishery biologists conducting research in which turtles could be incidentally encountered.

Two supplementary documents providing valuable reference resources can be accessed at: http://www.sefsc.noaa.gov/seaturtletechmemos.jsp. The Sea Turtle Research Techniques Manual, NOAA Technical Memorandum NMFS-SEFSC-579, provides comprehensive training on topics including species identification, handling, resuscitation, oral cavity anatomy, morphometrics, marking, electronic tags, and biopsy sampling. NMFS/SEFSC researchers and fishery observers must follow these protocols to ensure compliance with permit requirements. The Careful Release Protocols for Sea Turtle Release with Minimal Injury, NOAA Technical Memorandum NMFS-SEFSC-580, describes the equipment and techniques for removing fishing gear from incidentally captured turtles and provides guidance for when hook removal should be attempted.

The Endangered Species Act of 1973 prohibits harassing, harming, pursuing, hunting, shooting, wounding, killing, trapping, capturing or collecting any listed threatened or endangered species. Authorization to “take” (defined as any of the actions listed in the previous sentence) a listed threatened or endangered species must be granted under the provisions of the ESA. Only authorized personnel may conduct the procedures described in this manual while working with listed threatened or endangered sea turtles. When conducting research, authorized personnel must carry all relevant permits and authorization letters and follow all terms and conditions, including reporting requirements, as outlined in the permit(s). The activities described here are conducted under the authority of these NMFS Permit Numbers: 1552 (Observer Programs), 1570 (Gear Research), or 1571 (Resource Assessment Cruises). Additional tasks covered under the authority of NMFS Permit No. 1551 (Directed Research), such as attaching satellite tags, oxytetracycline marking, detailed data collection or blood collection, may be requested in the future and are described in NOAA Technical Memorandum NMFS-SEFSC-579. Biopsy samples or salvaged parts/carcasses are imported from the high seas under the authority of USFWS CITES 09US045532/9. The SEFSC permits, letters of designation, and permit reports can be accessed at: http://www.sefsc.noaa.gov/seaturtlepermits.jsp.

Figure 1a. Sea Turtle Life History Form, version 01/2011.

SEA TURTLE LIFE HISTORY FORM

01/2011

CAPTURE INFORMATION

TRIP ☐☐☐☐☐☐ YEAR 20☐☐ MONTH☐☐ DAY☐☐

SET/HAUL/TOW ☐☐☐ SPECIMEN NUMBER BY TRIP ☐☐☐ EXPERIMENTAL Y / N?
(if Y, note project name in comments)

GEAR TYPE: ☐Longline ☐Gill Net _____ ☐Trawl_____ (note time in comments)
GEAR DEPTH: ☐Surface ☐Midwater ☐Bottom ☐ Other _____

TIME (24 hr) ☐☐☐☐ WATER TEMP (°F) ☐☐.☐

LATITUDE☐☐deg☐☐.☐min N / S LONGITUDE☐☐☐deg☐☐.☐min E / W

Did turtle slide out/escape from gear? Y / N Was turtle brought on board? Y / N

IDENTIFICATION (see back) Number of Photos Taken? ☐☐
SPECIES: ☐Leatherback ☐Loggerhead ☐Kemp's ridley ☐Green ☐Hawksbill ☐Olive ridley
☐Unidentified Hardshell ☐Unknown

CONDITION OF TURTLE AT CAPTURE ☐ Injured ☐ Uninjured ☐ Unknown
(Please check injury status above as well as condition below; complete condition evaluation on p. 2 for any not coded "alive")
☐Previously dead ☐Fresh dead/comatose/unresponsive Attempted resuscitation? Y / N
☐Alive ☐Unknown (describe) ☐Other (describe)

IF GEAR IS A FORM OF HOOK AND LINE, COMPLETE THIS SECTION, AS APPLICABLE:
HOOK TYPE ☐ "J" ☐ Circle ☐other (describe) _____ SIZE ☐☐/0
MANUFACTURER/STYLE NO. _____ DEGREE OFFSET ☐☐°
BAIT ☐Squid ☐Mackerel ☐Sardine ☐Unknown☐Other (describe)_____SIZE_____
Caught on hook timer? Y / N If yes, fill in time elapsed ☐☐ ☐☐
Was light stick on hook? Y / N / U / Not Applicable If No, number of gangions to next light stick☐☐
Light stick type (circle) : Chemical / LED
Light stick color (circle)? White, Pink, Blue, Green, Black, Red, Yellow, Purple, Other, Unknown
Number of gangions to next float ☐☐

HOOK LOCATION (See Appendix in manual for descriptive figures)
(circle specific location; check box if specifics are not known; annotate drawing on reverse to indicate location as needed):
☐ Not Hooked ☐ Not Known if Hooked ☐Hooked, but location totally Unknown ☐Holding bait/hook

Internal: ☐ Unknown, internal
☐ Swallowed (Esophagus) Hook visible? Visible to insertion point / Partial hook / Not visible
☐ Beak/ Mouth (Circle one) Jaw Location (Check one) ☐upper ☐lower ☐side (mouth only)
Check one for mouth: ☐ tongue ☐ glottis ☐ roof of mouth ☐ jaw joint ☐other (describe)

External: ☐Unknown, external ☐Beak/Head/Neck ☐Carapace/Plastron
☐Front Flipper/Shoulder/Armpit ☐Rear Flipper/Groin/Tail

Was hook removed from this animal? Y / N / Unknown / Not Applicable

Was animal entangled in gear? At capture? Y / N / Unknown At Release? Y / N / Unknown
How much gear (linear feet) was left on turtle when released? ☐☐☐.☐ ft. (estimated/measured)

Figure 1b. Sea Turtle Life History Form, version 01/2011 continued.

BIOLOGICAL INFORMATION

Estimated carapace length (notch-to-tip straight line): ☐☐.☐ ft (needed only if turtle is not boated & measured)

DIMENSIONS (cm)	Curved (measuring tape) Standard Measurements	Straight Line (calipers) Standard Measurements	Straight Line (calipers)
Carapace Length	☐☐☐.☐ notch-to-tip	☐☐☐.☐ notch-to-tip	☐☐☐.☐ notch-to-notch
Carapace Width	☐☐☐.☐	☐☐☐.☐	

TAGS (identify address on each tag in the comments section)

Flipper Tag Number	Metal (1) or Plastic (2)	Position (Flipper) LF, RF, LR, RR	Already Present (1) or Applied by Observer (2)	Were Tags Removed?
☐☐☐☐☐☐	☐	☐☐	☐	Y / N
☐☐☐☐☐☐	☐	☐☐	☐	Y / N
☐☐☐☐☐☐	☐	☐☐	☐	Y / N
☐☐☐☐☐☐	☐	☐☐	☐	Y / N

PIT Tag
☐☐☐☐☐☐☐☐☐☐ ☐☐ ☐ Scanned? Y / N

Living Tag (describe)_____ Other Tags (describe) _____

(Put PIT tag label here)

BIOPSY SAMPLES TAKEN? Y (itemize below) / N / Unsuccessful

RELEASE INFORMATION

LATITUDE ☐☐deg☐☐.☐min N / S LONGITUDE ☐☐☐deg☐☐.☐min E / W

TIME (24 hr) ☐☐☐☐ WATER TEMP (°F) ☐☐.☐

DATE, if different from capture: YEAR 20☐☐ MONTH☐☐ DAY☐☐

FINAL DISPOSITION

☐Discarded Dead/Comatose/Unresponsive Carcass Marked? Y / N

☐Salvaged Carcass/Parts ☐Released Alive ☐Taken to Holding Facility ☐Unknown (explain)

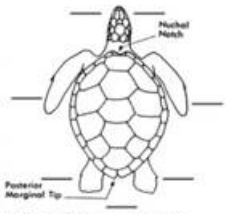
ADDITIONAL COMMENTS (list all biological samples collected; describe/sketch anomalies):

_____

_____

_____

_____



IDENTIFICATION CRITERIA

Number of:

Left Lateral Scutes	☐	Overlapping Scutes?	Y / N / U
Right Lateral Scutes	☐	Inframarginal Pores?	Y / N / U
Vertebral Scutes	☐	1 Pair Prefrontal Scales?	Y / N / U
L. Inframarginal Scutes	☐	Lacks Bony Shell?	Y / N
R. Inframarginal Scutes	☐	Does Nuchal Scute Touch 1st Lateral Scute?	Y / N / U

CONDITION EVALUATION FOR TURTLES NOT CODED "ALIVE"

Mark each line on diagram above with a 'Y' to indicate positive reflex/response, and 'N' for no response.

Rigor Mortis	Y / N / U
Rotting Flesh	Y / N / U
Foul Smell	Y / N / U

Dorsal Coloration ☐Black ☐ Orange/Red-Brown ☐Brown ☐Gray-Green ☐ Other_____

GENERAL INSTRUCTIONS

Complete one Sea Turtle Life History Form for each turtle brought aboard or released alongside the vessel. Try to photograph all turtles, including those hooked or entangled sea turtles that are not brought aboard due to their large size or for safety reasons. These photographs will be used to confirm species identification and document the gear interaction. Record tag data if tags are present and take biological samples if requested. Note that the amount of writing required when completing the Form has been minimized by offering options to circle the answer or to check a box, although some boxes require a written response.

Handle turtles in accordance with Chapter 2 of the Sea Turtle Research Techniques Manual. Turtles should be processed and returned to the water as soon as possible unless they have been resuscitated. Observers may need to put the turtle safely aside and process it later in order to continue other observer duties. However, if the animal has gear attached, the gear should be removed immediately by the vessel crew at their discretion, as the severity of the injury can increase with prolonged exposure.

CAPTURE INFORMATION

Trip Number: Record the unique number assigned by the Observer Program Coordinator or project's Principal Investigator.

Year, Month, Day: Record the year, month, and day the animal was captured.

Set / Haul / Tow: Record the set, haul, or tow number of the trip.

Specimen Number: Record a three digit consecutive number. The turtle specimen number on each trip begins with 001 and continues sequentially. Turtle specimen numbers are kept separate from all other specimen numbers for other species groups.

Experimental Y / N? If the trip is experimental (hook timer or "weak hook" study, etc.), then please circle Y and then write the project name in the comments. Circle N for normal fishing operations.

Gear Type: Specify which gear is being fished. If the gear type is Gill Net or Trawl, please write in the specific type <u>and</u> note the soak or tow time. If the gear is not listed, write in the gear type.

Gear Depth: Specify whether the gear was being fished at the surface, midwater, or on the bottom. If gear depth is something other than the listed depths, select other (describe).

Time: Record the time of day (24 hr clock) when the turtle was brought alongside the vessel. If your project uses a different time system than local 24 hr military time, such as GMT or military time in hundredths of an hour, please note this beside the time so that it can be converted.

Water Temperature: Record the water temperature at the location where the turtle was brought alongside the vessel.

Latitude: Record the degrees and minutes of latitude at the time of the actual recovery of the animal. Circle N or S for north or south of the equator.

Longitude: Record the degrees and minutes of longitude at the time of the actual recovery of the animal. Circle E or W for east or west of the prime meridian.

Did turtle slide out/escape from gear? Circle Y for Yes or N for No. If the turtle had to be cut loose from the gear, then the correct answer is No.

Was turtle brought on board? Circle Y for Yes or N for No.

Identification (see Chapter 1 of the Sea Turtle Research Techniques Manual)

Species: Check the appropriate box that corresponds to the species of the captured turtle. If you are unable to identify the species with certainty, try to take photographs as described below and record the species on the data sheet as "unknown". With experience, sea turtles seen close-up generally become easier to identify. See back of data sheet for identification criteria and Chapter 1 for more information.

Number of Photos Taken? Photograph every turtle, and record the number of photos taken. There are two purposes of the photographs: (1) confirm species identification and (2) document the gear interaction. These pictures will assist in understanding how the turtle interacted with the gear for post hooking mortality assessments and provide information for reducing the interactions in the future. For easily identified turtles, take one picture to confirm identification. For those with questionable identification, take at least 3 pictures showing dorsal, ventral, and frontal views. In addition to the identification photographs, take a photo showing the gear interaction. Try to photograph the top of the head of leatherbacks to record the "pink spot" and white markings for photo-id.

For the first picture of every turtle, distinguish each new specimen from the previous turtle specimen. Suggested examples include a label such as a dive slate with trip # and specimen # or indicate the specimen number by using the appropriate number of fingers in the field of view. The latter is particularly helpful for turtles not brought on board. Note that most disposable cameras need a minimum distance of at least 4 ft from the subject to take clear pictures (depth of field); otherwise the picture will be out of focus.

Condition of Turtle at Capture

Check the appropriate box that best corresponds to the turtle's condition when it was recovered and record specific notes about any injury to the turtle.

Specify the turtle's injury status as **Injured**, **Uninjured**, or **Unknown,** as described below, by checking the appropriate box:

> **Injured:** The turtle is injured. All hooked turtles are injured. Describe in detail how the turtle is hooked on the back of the form. Any fresh lesion constitutes an injury.
>
> **Uninjured:** The turtle apparently is not injured (e.g., net captures or entangled), and there are no fresh lesions.
>
> **Unknown:** The observer cannot determine if the turtle is injured. This may happen when an animal is not boated, and the observer did not get a good view of the animal.

Specify the turtle's condition at capture by checking one of the following and by circling the specific category when it can be determined:

Previously Dead "Dead before interaction": The turtle died prior to and not as a result of the observed fishing interaction.

> Note: A **previously dead** turtle will usually have rotting tissue around the eyes and vents, and it may be bloated and foul smelling. It also may have sloughing scutes and scales. However, it may not smell, but may have rigor mortis.

Fresh dead/comatose/unresponsive: At times it is difficult to make the distinction whether a turtle is dead, comatose or unresponsive, particularly in the field with a lack of specialized monitoring equipment. When encountering a turtle that appears unresponsive, test the turtle's response to stimuli and detail findings on the diagram near the comments section on the form. To test eye reflexes, check for a blink response by gently touching the corner of the eye or eyelid. Pinch both front and rear flippers and the tail to check for response. See Condition Evaluation for Turtles Not Coded "Alive" on page 16 and fill in every blank (using a 'Y' for positive response, and 'N' for no response) on the turtle diagram on the back of the data sheet. A lack of bilateral response (reflexes on both sides) for any of these tests may indicate the need for resuscitation. A fully conscious (coded as 'alive') turtle has all bilateral reflexes and has a central (e.g., brain) recognition of the stimulus. An unresponsive turtle will not have full bilateral responses (some but not all lines around diagram will have 'Y' marked). A comatose turtle will have lost all reflexes (all of the lines around diagram will have 'N' marked). This category includes the following scenarios:

Fresh Dead "Dead because of interaction"**:** The turtle died as a result of the current (observed) fishing operation. The carcass may show signs that it had been alive during the interaction (e.g., multiple wrap entanglement in line or netting, or internal hooking). The carcass may or may not have rigor mortis and may begin to smell. Extended soak times, over several days, may influence the condition, and the carcass may be moderately to severely decomposed when retrieved. Selecting this field indicates that the turtle was assuredly alive when captured in the gear, regardless of the time elapsed before being observed.

Comatose/Unresponsive: Select this category if the turtle is comatose/unresponsive and if there is any indication of life but not obvious directed movements or breaths.

Attempted resuscitation? Circle Y for Yes or N for No to indicate whether the vessel crew attempted resuscitation on a fresh dead/comatose/unresponsive turtle. To be coded as Y for Yes, this must be an active resuscitation attempt, where the Sea Turtle Resuscitation Guidelines (66 FR 67495, December 31, 2001) are followed. The turtle's hindquarters must be elevated at least six inches (15 – 30 degrees) for a period of 4 up to 24 hours, while the turtle is kept moist and in the shade at a temperature similar to water temperature at capture. Periodically, rock the turtle gently left to right and right to left by holding the outer edge of the carapace and lifting one side about 3 inches, then alternate to the other side. If a turtle is simply placed on a tire or on deck without elevation, this is not an active resuscitation attempt, and the correct code is N for No. See further resuscitation instructions in Chapter 3 of the Sea Turtle Research Techniques Manual. Note in the comments section the time it took for the turtle to respond and how long the turtle was kept on deck before release. If resuscitation was not attempted, please describe the circumstances in the comments section.

Alive: The turtle is alive if it makes directed movements, such as attempting to crawl or bite, and while breathing the carapace raises and lowers. The turtle may be injured, uninjured or unknown as previously described.

Unknown (describe): The turtle was not closely observed, and the condition is unknown. Explain in the comments section on back of form.

Other (describe)**:** The condition does not fit any category described above. Explain in the comments section on back of form.

If gear is a form of hook and line, complete this section, as applicable:

Hook Type: Check "J" or Circle. If hook type is neither, select Other (describe).

Hook Size: Write in size of hook, (e.g., 9/0, 18/0).

Manufacturer/Style No. Write in the manufacturer and style number (e.g., Mustad #39968D).

Degree Offset: Write in the degree offset of hook (e.g., 0°, 5°, 10°).

Bait: Check Squid, Mackerel, Sardine, Unknown or Other (describe) to specify bait type.

Size: Write in the bait size. *If two baits involved, include both sizes. See examples below*. Using values recorded on the haul log for each bait kind, first calculate an individual bait weight (box weight/bait number) and round to nearest hundredth of a pound. Then, convert to grams (1 lb = approximately 450 grams) multiplying by 450.

-Squid: 200lbs/400 baits = 0.50 lbs each 0.50 X 450 = 225 grams, record as 225 grams
-Mackerel: 300 lbs/ 400 baits = 0.75 lbs each 0.75 X 450 = 337.5 grams, record as 338 grams
-Sardines: 60 lbs/400 baits = 0.15 lbs each 0.15 X 450 = 67.5 grams, record as 68 grams

Caught on hook timer? Circle Y for Yes or N for No. If Yes, fill in time elapsed in the space provided.
Was there a light stick on the hook? Circle Y for Yes, N for No, U for Unknown or Not Applicable.

Gangions to next light stick: If answer above was no, record the number of gangions to the **next** light stick (not necessarily nearest).

Light stick type (circle): Chemical or LED. If applicable, circle Chemical for glow sticks or circle LED for a light-emitting-diode requiring an electric current or battery.

Light stick color (circle): If applicable, circle the color of the light stick or write it in if not listed.

Number of gangions to next float: Record number of gangions to the **next** float (not necessarily nearest).

Hook location (See Appendix)

For hooked turtles, circle the specific location if it can be determined. If specific location cannot be determined, note the general location of the hook by checking the appropriate code box. Describe the hook and its location in the comments section. Note if there is more than one hook involved.

Specify if the animal is **Not Hooked (entanglement only)**, **Not Known if Hooked**, **Hooked, but location totally Unknown, or Holding bait/hook** (where there is no evidence of hooking or entanglement, and it appears that the turtle "spit out" the bait or hook) and record details in the comments section. Otherwise follow the directions below for **Internal** or **External** hooks.

Internal Hook Location (check general location and circle the specific location, if known).

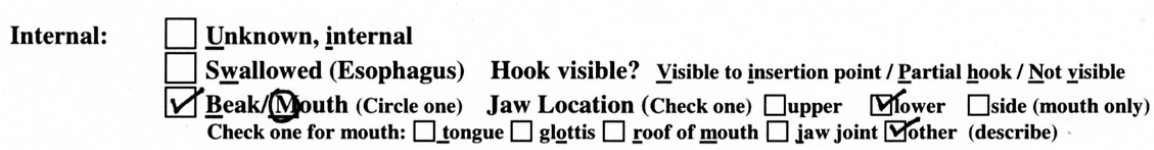
Unknown, internal: The animal has been hooked internally, but the specific location cannot be determined. This may be the case when an animal cannot be observed closely.

Swallowed (esophagus): The turtle has "swallowed" the hook. The barb of the hook is lodged in the esophagus, as indicated by the presence of papillae, or the hook may be deeper. Part of the eye or shank may be visible in the open mouth. See description of the oral cavity in Chapter 4 of the Sea Turtle Research Techniques Manual.

> **Swallowed Hook Visible?:** Circle the extent to which the hook is visible, choosing from: **visible to insertion point**, **partially visible**, or **not visible**.

Beak/Mouth: The turtle is hooked in the beak internally or the mouth. Circle whether hook is in the **beak** (the hard, keratinized parts of the upper and lower jaw in hardshell turtles) or the **mouth** (soft tissue parts). Hook usually is easily visible, except those lodged in the back of the mouth. Describe hook and location in the comments section. See description of oral cavity in Chapter 4 of the Sea Turtle Research Techniques Manual and Careful Release Protocols for further detail.

> **Jaw location**: Specify the location of the hook in the jaw: **upper**, **lower**, or **side** (mouth only) by checking the appropriate box. Check specific location as it applies if hooked in mouth (**tongue**, **glottis**, **roof of mouth**, or **jaw joint**). Check **other,** if the specific locations listed do not apply. Example: If the turtle was hooked in the lower jaw but was not hooked in the tongue or glottis, check the **beak/mouth** box, circle **mouth**, check **lower** jaw and check **other**. Be as specific as possible, use comments section if necessary.


Internal: ☐ Unknown, internal
☐ Swallowed (Esophagus) Hook visible? Visible to insertion point / Partial hook / Not visible
☑ Beak/Mouth (Circle one) Jaw Location (Check one) ☐upper ☑lower ☐side (mouth only)
Check one for mouth: ☐ tongue ☐ glottis ☐ roof of mouth ☐ jaw joint ☑other (describe)

External Hook Location (check general location and circle the specific location, if known).

Unknown, external: The animal has been hooked externally, but the specific location cannot be determined. This may be the case when an animal cannot be observed closely.

Beak/Head/Neck: The turtle is hooked in the neck or head, including the external beak area. Describe location in comments section.

Carapace/Plastron: The turtle is hooked in its carapace or plastron. Describe location in the comments section.

Front Flipper/Shoulder/Armpit: The turtle is hooked in its front limbs, armpits (trailing edge or ventral), or shoulders (leading edge). Describe which side (right or left) is involved in the comments section.

Rear Flipper/Groin/Tail: The turtle is hooked in its rear limbs, groin, or tail. Describe which side (right or left) is involved in the comments section.

Was hook removed from this animal? Circle Y for Yes, N for No, Unknown, or Not Applicable. If animal is 'Not Hooked' then choose Not Applicable. If animal is 'Not Known If Hooked', determine whether the hook was retrieved and answer Yes, No, or Unknown accordingly (even though it is not positive that the hook penetrated the animal).

All gear types complete this section, as applicable.

Was animal entangled in gear at capture? Circle Y for Yes, N for No, or Unknown.

At release? Circle Y for Yes, N for No, and U for Unknown.

How much gear (linear feet) was left on turtle when released? Estimate or measure the amount of gear line left on turtle when released. For hook and line fisheries, this is the measurement of line from the eye of the hook, including crimp, left on the turtle. For lengths less than one foot, record the decimal fraction remaining. Record a zero if all line is removed.

BIOLOGICAL INFORMATION

Dimensions (see Chapter 5 of the Sea Turtle Research Techniques Manual)

For turtles that cannot be brought onboard, estimate its carapace length in feet.

Estimated Carapace Length (ft): Estimate length of the turtle if not brought onboard the vessel.

For boated turtles, take the carapace measurements in centimeters, to the nearest 0.1 cm, using a tape measure (curved) and using calipers (straight). Standard measurements are described below and illustrated in Figure 2. Measurements over-the-curve (curved) follow the curvature of the carapace. If barnacles, injury, or abnormality affect these measurements, record the details on the back of the form. Nearly all leatherbacks encountered will be too large for the calipers, but straight measurements should be taken if possible. Note: there is no straight notch to notch measurement due to leatherbacks morphology.

For detailed description and landmarks of the following measurements reference Chapter 5 of the Sea Turtle Research Techniques Manual and/or see Figure 2

Carapace Length, curved, notch-to-tip (standard): Record the distance between the center of the nuchal scute and the end of the longest postcentral scute, following the curvature of the dorsal center line. On leatherbacks the measurement is taken alongside (not over the top) of the vertebral (center) ridge.

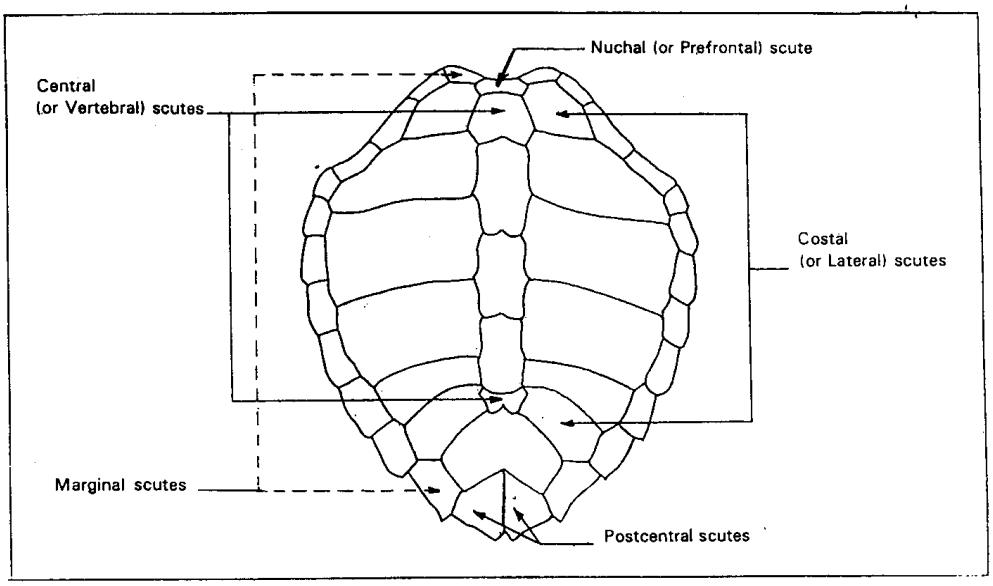
Carapace Length, straight, notch-to-tip (standard): Record the distance between the center of the nuchal scute and the end of the longest postcentral scute.

Carapace Length, straight, notch-to-notch (minimal): Record the distance between the center of the nuchal scute and the notch between the two postcentral scutes.

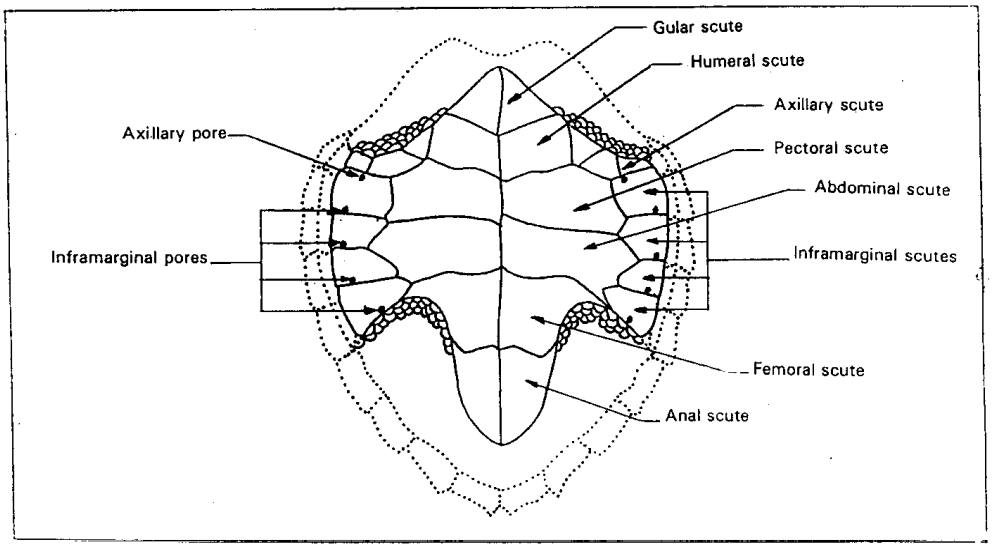
Carapace Width, curved: Record the maximum distance between the lateral edges of the carapace, measured over the curvature of the shell, perpendicular to the centerline of the carapace, at the widest point. On leatherbacks the width is measured from side ridge to side ridge at the widest point.

Carapace Width, straight: Record the maximum distance between the lateral edges of the carapace, perpendicular to the centerline of the carapace. Note: this measurement may be taken at a different place on the carapace than when measured over the curve with a tape measure.

Figure 2. Carapace and plastron illustrating the commonly used morphological names and their locations. (Diagram originally appeared in Reichart 1993.)



Carapace of an olive ridley turtle (Lepidochelys olivacea)
(Surinam specimen, scaled drawing by S. Handigman)



Plastron of an olive ridley turtle (Lepidochelys olivacea)
(Surinam specimen, scaled drawing by S. Handigman)

Tags

Look for existing tags. Figure 3 shows examples of tag types and position locations. Metal or plastic tags may be found externally on any of the four flippers. If no rear metal flipper tags are present, apply 2 inconel tags, one to each rear flipper. Living tags may be found externally on any of the lateral scutes, mainly on Kemp's ridley turtles. They are created by surgically removing a small piece of the plastron and implanting it in the carapace, creating a light spot on the carapace. In addition, there may be two types of internal tags (wire and PIT) placed in the shoulders or flippers. Due to additional equipment requirements, wire tagging is not covered in this manual. A PIT (Passive Integrated Transponder) tag is a glass encapsulated microchip carrying a unique code that is inserted into soft tissue If no PIT tag is present, you will apply one (location varies by species). Generally, all turtles over 30 cm straight carapace length (SCL) should be flipper and PIT tagged if not already carrying tags. Turtles less than 20 cm SCL should only get a PIT tag. For turtles measuring between 20-30 cm SCL, the observer should use their best judgment to determine if flipper tagging is appropriate. See the detailed tag application instructions in Chapter 6 of the Sea Turtle Research Techniques Manual.

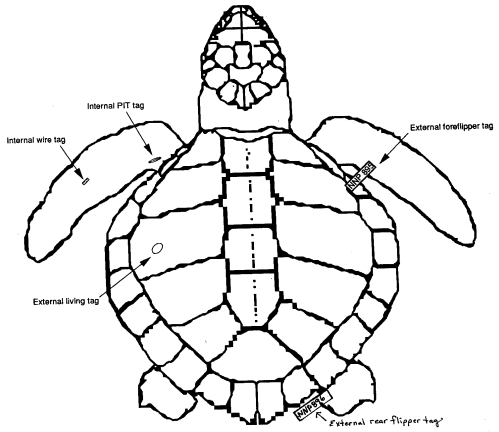
Flipper Tag Number: Record the number of the tag that is already present or that is being applied. If the tag is already present, record the return address of the tag in the comments section. If no tags are on the turtle and none are applied, leave blank.

Tag Type: Metal [1] or Plastic [2]: Identify the type of tag appearing on or to be applied to the turtle. If no tags are on the turtle and none are being applied, leave blank.

Position: The tag may be on any of the four flippers. Observers should apply two tags, one to each rear flipper, if none already are present at that location. Record the location of the tag. If no tags are on the turtle and none are being applied, leave blank.

Figure 3. Examples of typical external inconel flipper tags, living tags, and internal PIT tag position locations.

Left Front Flipper [LF]
Right Front Flipper [RF]
Left Rear Flipper [LR]
Right Rear Flipper [RR]



Already Present [1] or Applied by Observer [2]: Specify whether the tag was already present or whether it is being applied by the observer. If no tags are on the turtle and none are being applied, leave blank.

Were Tags Removed?: Circle Y for Yes or N for No to indicate if tags are removed. Any tags present prior to bringing the turtle onboard that are getting hard to read or about to fall off should be removed and, if taken from the rear flippers, replaced with new ones. The removed tags should be collected and provided to the Program Coordinator upon your return. If existing tags are in good condition, leave them in place. If tags were not removed from the turtle, leave blank.

PIT Tag: Scan the 4 flippers and the shoulder and "armpit" area with the PIT tag scanner. If a tag is found, record the hexadecimal code (generally 10 characters, rarely 9 or 15 characters; rarely an AVID encrypted tag with a 16 character alphanumeric code may be encountered). When no PIT tag is present in either of the front flippers, inject one, record the PIT tag number and attach the PIT tag sticker to the data sheet. See detailed instructions for PIT tag application and preferred placement location by species in Chapter 6 of the Sea Turtle Research Techniques Manual. Record the position of any existing PIT tag or the position where one is applied (example: LF, RF) and note whether the tag was already present or applied at this capture. If no PIT tags are on the turtle and none are applied, leave blank.

Scanned? Circle Y for Yes or N for No, indicating whether you scanned the flipper, shoulder, and armpit areas with a PIT tag scanner prior to and after application.

Living Tag: Specify whether any living tags are present. Record details, including position, in the comments section and photograph the mark. See Figure 3 for an example of a living tag position; here it is located in the 3rd left lateral scute.

Other Tags: When other types of tags, such as satellite tags, are present or are applied, record the tag number if it has one. Record details, including position, in the comments section and photograph the tag.

Biopsy Samples

Biopsy Samples Taken? Biopsy samples for genetic analysis should be taken from all turtles (see Chapter 8 in the Sea Turtle Research Techniques Manual). Were samples taken? Circle Y for Yes, N for No or Unsuccessful for an unsuccessful attempt. List all samples taken in the comments section**. If you are importing biopsy samples from the high seas (outside the U.S. EEZ), you must have a copy of the CITES permit and complete a USFWS 3-177 form listing all samples imported for that trip.** See page 20 for instructions for filling out a USFWS Form 3-177.

Release Information

Record the location (latitude and longitude) where the animal was released, release time and water temperature at that location. If the entire animal was returned to shore (salvaged or taken to holding facility), leave blank.

Latitude: Record the degrees and minutes of latitude at the time of the actual release of the animal. Circle N or S for north or south of the equator.

Longitude: Record the degrees and minutes of longitude at the time of the actual release of the animal. Circle E or W for east or west of the prime meridian.

Time: Record the time of day (24 hr clock) when the turtle was released.

Water Temperature: Record the water temperature at the location where the turtle was released.

Date: Record the year, month, and day the turtle was released if different from capture date.

Final Disposition

Record the final disposition (fate) of the turtle by checking the appropriate box:

Discarded Dead/Unresponsive Carcass: In some cases, a turtle may have shown signs of life while onboard, but if it is dead or unresponsive at release, it belongs in this category.

Marked? Circle Y for Yes or N for No. All carcasses returned to sea should be spray painted, tagged, or otherwise marked.

Salvaged Carcass/Parts (other than biopsy, explain): Indicate whether the carcass or parts of the carcass were salvaged and make notes in the comments section describing where the samples were taken. Indicate in the comments what part/s or sample/s were salvaged if applicable. **A current CITES permit is required to return with animals or parts taken on the high seas (outside the U.S. EEZ).**

Released Alive

Taken to Holding Facility

Unknown (explain)

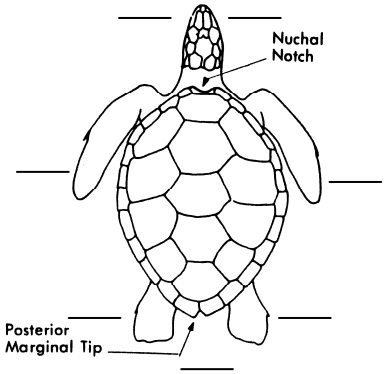
Additional Comments

Use this area to record any comments. Annotate the drawing to indicate any anomalies, location of living tags, etc. Also, be sure to list all biological samples collected. If resuscitation was attempted on the turtle, please record all details in this section (such as length of time resuscitation was attempted, method(s) used, etc.). If the sea turtle was cut free from the gear, disentangled, or a hook was removed, record the equipment used to perform the action. Monitor and record the turtle's behavior and swimming abilities upon release.

Condition Evaluation for Turtles Not Coded "Alive": When encountering a turtle that appears unresponsive, test the turtles' response to stimuli and detail findings on the lines around the turtle diagram, see Figure 4. Write a 'Y' for Yes to indicate a positive reflex/responsiveness, and 'N' for No response. Mark all 7 lines.

To check for a response, stimulate each of the general areas marked with lines on the diagram. To test eye reflexes, check for a blink response by lightly touching the skin around each eye. Position yourself to see both eyes at the same time to determine if the response was bilateral. Firmly pinch each flipper (both front and rear) and tail to check for a response If there is a positive response, note whether or not it was limited to the stimulated area only or if it evoked a larger response (describe).

Figure 4. Condition evaluation diagram, used to indicate reflex test results for turtles not coded alive.



Rigor Mortis? Circle Y for Yes, N for No, and U for Unknown.

Rotting Flesh? Circle Y for Yes, N for No, and U for Unknown.

Foul Smell? Circle Y for Yes, N for No, and U for Unknown.

Identification Criteria (See Chapter 1 of the Sea Turtle Research Techniques Manual and Figure 2 for reference.)

Number of Left Lateral Scutes: Count and record the number of lateral (costal) scutes on the left side of the carapace.

Number of Right Lateral Scutes: Count and record the number of lateral (costal) scutes on the right side of the carapace.

Number of Vertebral Scutes: Count and record the number of scutes on the midline of the carapace.

Number of Left Inframarginal Scutes: Count and record the number of scutes on the turtle's left side of the plastron. The inframarginal scutes are those which are in contact with both the marginal carapace and plastron scutes.

Number of Right Inframarginal Scutes: Count and record the number of scutes on the turtle's right side of the plastron. The inframarginal scutes are those which are in contact with both the marginal carapace and plastron scutes.

Overlapping Scutes?: Are there overlapping scutes on the carapace? Circle Y for Yes, N for No, or U for Unknown.

Inframarginal Pores?: Are there pores located within the inframarginal scutes? Circle Y for Yes, N for No, or U for Unknown.

1 Pair of Prefrontal Scales?: Does the turtle have one pair of prefrontal scales? Circle Y for Yes, N for No, or U for Unknown.

Lacks Bony Shell?: Does the turtle lack a bony shell? Circle Y for Yes or N for No.

Nuchal scute: Does the nuchal scute touch the first lateral scute? Circle Y for Yes, N for No, or U for Unknown.

Dorsal Coloration: What is the dorsal coloration of the turtle? Check the most appropriate box choosing from **black**, **orange/red-brown**, **gray-green** or **other**. If **other** is selected, thoroughly describe the dorsal coloration.

VESSEL CAPTAIN, CREW AND OBSERVER RESPONSIBILITIES

Vessel Captain and Crew Responsibilities

The vessel captain and crew's responsibilities are outlined in the Careful Release Protocols for Sea Turtle Release with Minimal Injury, NOAA Technical Memorandum NMFS-SEFSC-580. The animal's safety, gear removal, and decisions whether a turtle is to be boated or resuscitated are the responsibility of the vessel's captain and crew.

Observer & Vessel Captain and Crew Responsibilities

All parties should minimize any possible injury to the animal while on deck, either by the animal bumping into objects on board or by objects falling on the animal due to boat movement. In addition, all parties are responsible for keeping the turtle moist and in the shade, and maintaining an acceptable body temperature. Moisture can be preserved by either covering the animal's body with a wet towel or by applying petroleum jelly on its skin and carapace. The animal's body temperature should not fall below 60° F and should be maintained similar to the water temperature of the capture and release locations.

Observer Responsibilities

The observer is to observe normal fishing operations and complete a Sea Turtle Life History Form for every sea turtle interacting with fishing gear. The observer is responsible for collecting and recording the biological data on the sea turtles (measuring, tagging, biopsying, etc). Crew assistance may be requested to complete these tasks. The animals' behaviors and swimming and diving abilities should be monitored after the release and noted on the form. The observer may educate the crew on known ways to dehook, disentangle, or use mouth openers and gags on an animal but are not to actually participate. On certain trips during experiments, the observer is also responsible for sending daily e-mails to the turtle coordinator relaying data on effort and protected species interactions. The observer will be made aware of such responsibilities if required.

SPECIMEN COLLECTION REQUIREMENTS

If possible, **retain** dead sea turtles after processing for return to port. Consider the size of the sea turtle, and whether freezer space is available. Consider, also, species and size and sampling priorities. These priorities will be given to you by the observer/fishery coordinator. If animals were taken on the high seas (outside the U.S. EEZ), you must have a CITES permit and a completed USFWS 3-177 form (see page 20 for instructions) to import the animal back to the United States.

If a sea turtle comes aboard dead and will be brought back to port:

- Leave all existing tags in place.
- Take three photographs; dorsal, ventral, and frontal views, in addition to gear interaction photograph.
- Complete Sea Turtle Life History Form and apply a single flipper tag, if one is not present.

Double bag and chill or freeze all retained samples. Each sample is to be individually tagged and labeled. The label is to be completed using only a “test scoring” pencil (#2). The label is to have the following information: trip number, specimen number, species, and sample identification (e.g., humerus). If many samples are collected from the same animal and placed into a common plastic bag, ensure that each part is properly tagged and labeled. Label the plastic bag with a large tag clearly stating its contents.

If you are importing a carcass from the high seas, notify the observer coordinator that you are returning to port when the date of docking is known, with no less than 48 hours notice.

MATERIALS FOR COLLECTING GENETIC TISSUE SAMPLES AND LABELING INSTRUCTIONS

* scotch tape to protect writing on the vials
* pencil to write on label
* waterproof label, 1/4" x 4"
* permanent marker to label the vials
* screw-cap vial of saturated NaCl, wrapped in Parafilm®
* piece of Parafilm® to wrap the cap of the vial after sample is taken
* latex gloves
* plastic board, ~6" x 4"
* 10% povidone-iodine solution
* alcohol swabs
* 4 - 6 mm biopsy punch - sterile, disposable, for boated turtles
* vial with sterile stainless steel corer for turtles not boated
* Whirl-pak® to return / store sample vial

Most observer programs or research projects should include two types of biopsy kits in each sampling case: one for turtles not boated and one for turtles brought onboard. The one for turtles not boated can be distinguished by the presence of two types of vials: one for the storage of the dry, sterile corer and one that contains a preservative into which the corer is placed once a sample is taken. The kits for turtles that are boated contain one type of vial and also contain sterile individually wrapped biopsy punches.

Use the pencil to write trip number, specimen number, species id, and carapace length (SCL_{n-t}) on the waterproof paper label and place it in the vial. Label the outside of the vial using the permanent marker with trip number, specimen number, species id, and carapace length (SCL_{n-t}). Apply a piece of clear tape over what you have written on the vial to protect the writing from being erased or smeared by accidental leakage or friction. If a PIT tag was applied to the turtle, it is helpful to place one of the adhesive PIT tag ID labels to the vial in addition to the written information and secure with clear tape. Wrap Parafilm® around the outside of the vial cap by stretching it as you wrap. Do not place Parafilm® between the top of the vial and cap before sealing, and do not use clear tape around the outside of the vial cap. Place the vial within a labeled Whirl-pak® and close.

Submit the vial with your datasheets. Be sure to indicate on your datasheet that a biopsy sample was taken. If you are importing biopsy samples from the high seas (outside the U.S. EEZ), you must have a copy of the CITES permit and complete a USFWS 3-177 form (see instructions on page 20), listing all samples imported for that trip.

INSTRUCTIONS FOR FILLING OUT USFWS FORM 3-177 (Declaration of Importation or Exportation of Fish or Wildlife)

If you are importing a biopsy sample from a live or dead turtle, a carcass or samples/parts from a carcass from the high seas (outside the U.S. EEZ), you must fill out a USFWS Form 3-177 (See provided example, Figure 5) and return it with your biopsy sample vials. If you are unsure whether your samples were collected on the high seas, fill out a form and submit it. One form will suffice for each trip, summarizing the number of samples collected by species. Observers will need to fill in the following blocks:

1. Insert date of import (when the samples come into port).
4. Leave blank
6. Leave blank
7. Fill in FedEx if applicable
8. Fill in the FedEx Air Way Bill if applicable
11. Number of cartons containing wildlife- probably 1
12. Leave blank unless importing a carcass, describe container.

16a. Scientific name (reference TM-579, Chapter 1)
16b. Common name

If you are importing samples from more than one species under one trip, just list the scientific and common name on different lines, and the number of samples per species in box 19a.

18a. SPE for biopsy samples and BOD for whole carcass
19a. Fill in Quantity, number of samples per species (unit NO is already filled in)
20. Country of origin- generally “High Seas”
21. Please sign and date the form

See the following example to aid in the completion of the form. Please return this form with your biopsy samples to your project coordinator or Principal Investigator. If you have any questions, please feel free to contact Lesley Stokes at (305) 361-4228 or Lesley.Stokes@noaa.gov.

Figure 5. Example of USFWS FORM 3-177 (Declaration of Importation or Exportation of Fish or Wildlife.

USFWS Form 3-177
(Revised 12/06)
O.M.B. No. 1018-0012
Expiration Date: 12/31/2009

U.S. FISH AND WILDLIFE SERVICE
DECLARATION FOR IMPORTATION OR EXPORTATION OF FISH OR WILDLIFE

Page ___ of ___

1. Date of Import/Export: (mm/dd/yyyy)
2. Import/Export License Number: N/A
3. Indicate One: ☑ Import ☐ Export
4. Port of Clearance: MI
5. Purpose Code: S
6. Customs Document Number (s)
7. Name of Carrier: Federal Express
8. Air Waybill or Bill of Lading Number: Master: House:
9. Transportation Code: A
   N/A License # ____ State or Province ____
10. Bonded Location for Inspection: Not Applicable
11. Number of Cartons Containing Wildlife:
12. Markings on Cartons Containing Wildlife: NA

13a. (Indicate One) (Complete name/U.S. address/telephone number/e-mail address)
☑ U.S. Importer
☐ U.S. Exporter
Dep. Comm., NOAA, Natl. Mar. Fish. Serv.
Southeast Fisheries Science Center
75 Virginia Beach Drive
Miami, FL 33149 USA
Type Address Here
13b. Identifier Number: ____ ID Type: ____

14a. (Indicate One) (Complete name/foreign address/telephone number/e-mail address)
☐ Foreign Importer
☐ Foreign Exporter
Not Applicable
Type Address Here
14b. Country Code -- --
14c. Identifier Number: ____ ID Type: ____

15a. Customs Broker, Shipping Agent or Freight Forwarder:
(Complete business name/address/telephone and fax number/e-mail address)
Not Applicable
Type Address Here
15b. Identifier Number: ____ ID Type: ____
15c. Contact Name: ____

Species Code (Official Use Only)	16a. Scientific Name / 16b. Common Name	17a. Foreign CITES Permit Number / 17b. U.S. CITES Permit Number	18a. Description Code / 18b. Source Code	19a. Quantity/Unit / 19b. Total Monetary Value	20. Country of Species Origin Code (ISO Code)	21. Venomous Live Wildlife Indicator ☑ (Check if yes)
		Not Applicable / 09US045532/9	SPE / W	/NO / $0.00	ZZ	☐
						☐
						☐
						☐

Knowingly making a false statement in a Declaration for Importation or Exportation of Fish or Wildlife may subject the declarant to the penalty provided by 18 U.S.C. 1001 and 16 U.S.C. 3372(d)

22. I certify under penalty of perjury that the information furnished is true and correct:
Signature ____ Date ____
Type or Print Name ____

For Official Use Only
Action/Comments:

Wildlife Declared: Yes No

Wildlife Inspected:
None / Partial / Full

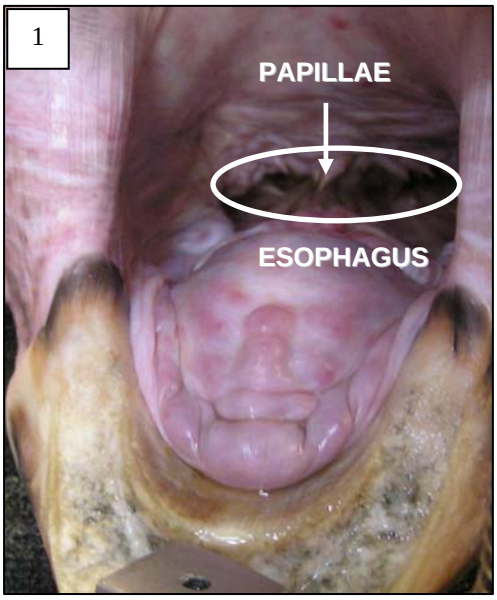
See Reverse Side of this Form for Privacy Act Notice

APPENDIX

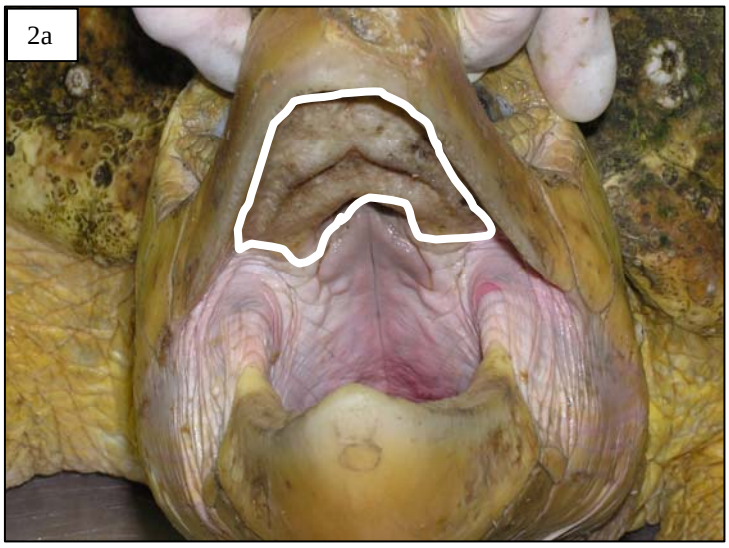
Hook Locations

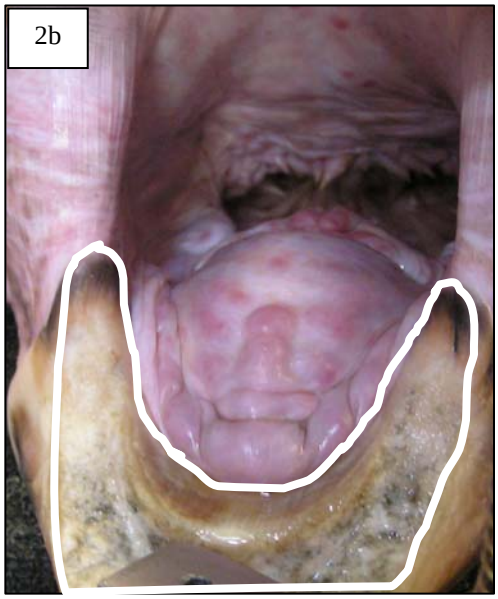
Internal:

1) Swallowed = inside the esophagus, the entrance marked by the presence of papillae. Indicate whether hook is visible to insertion point, partially visible, or not visible.



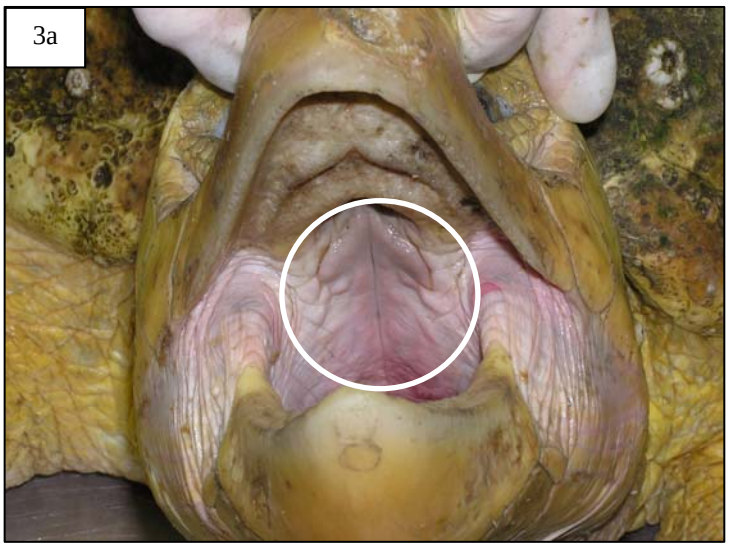
2) Internal Beak (hard keratinized rhampotheca- hardshell turtles only)
a) Upper or b) Lower

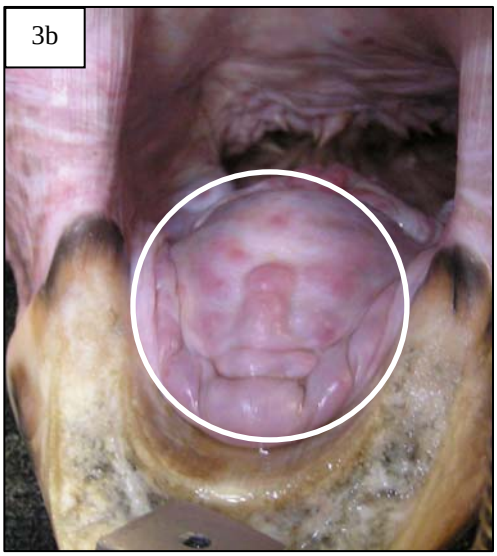


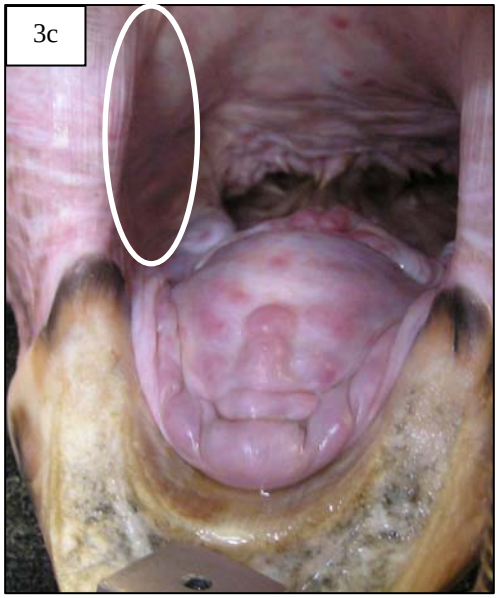


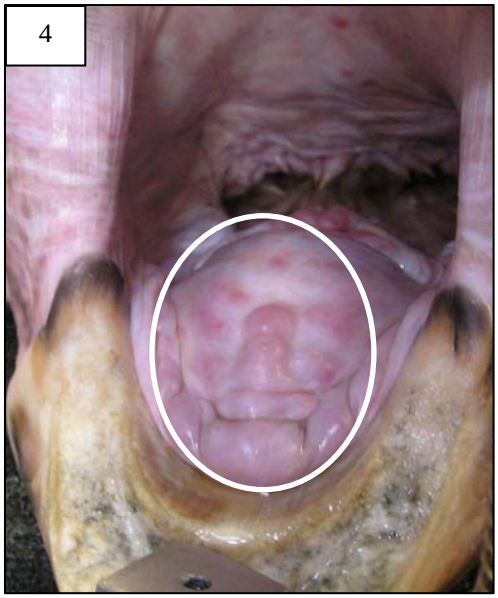
3) Mouth
a) Upper (should generally be coded as roof of mouth)
b) Lower (may be tongue, glottis, or other if under or beside the tongue)
c) Side (could be jaw joint or other)

4) Tongue

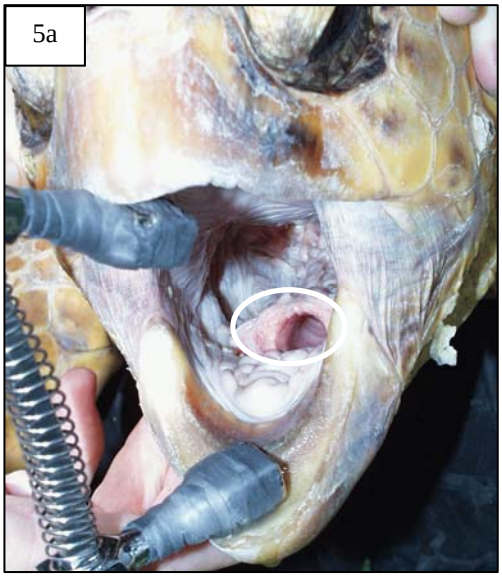


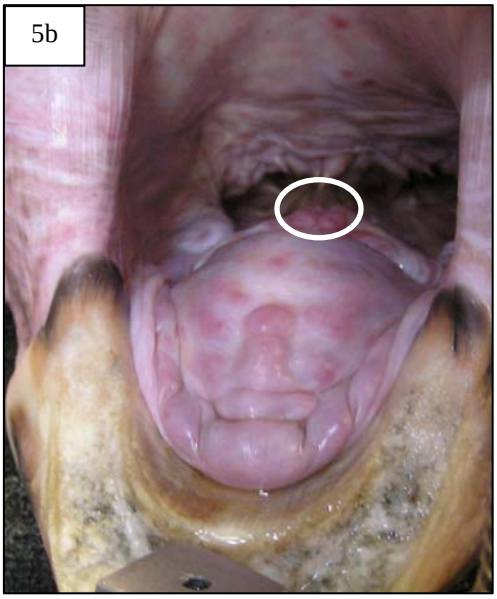






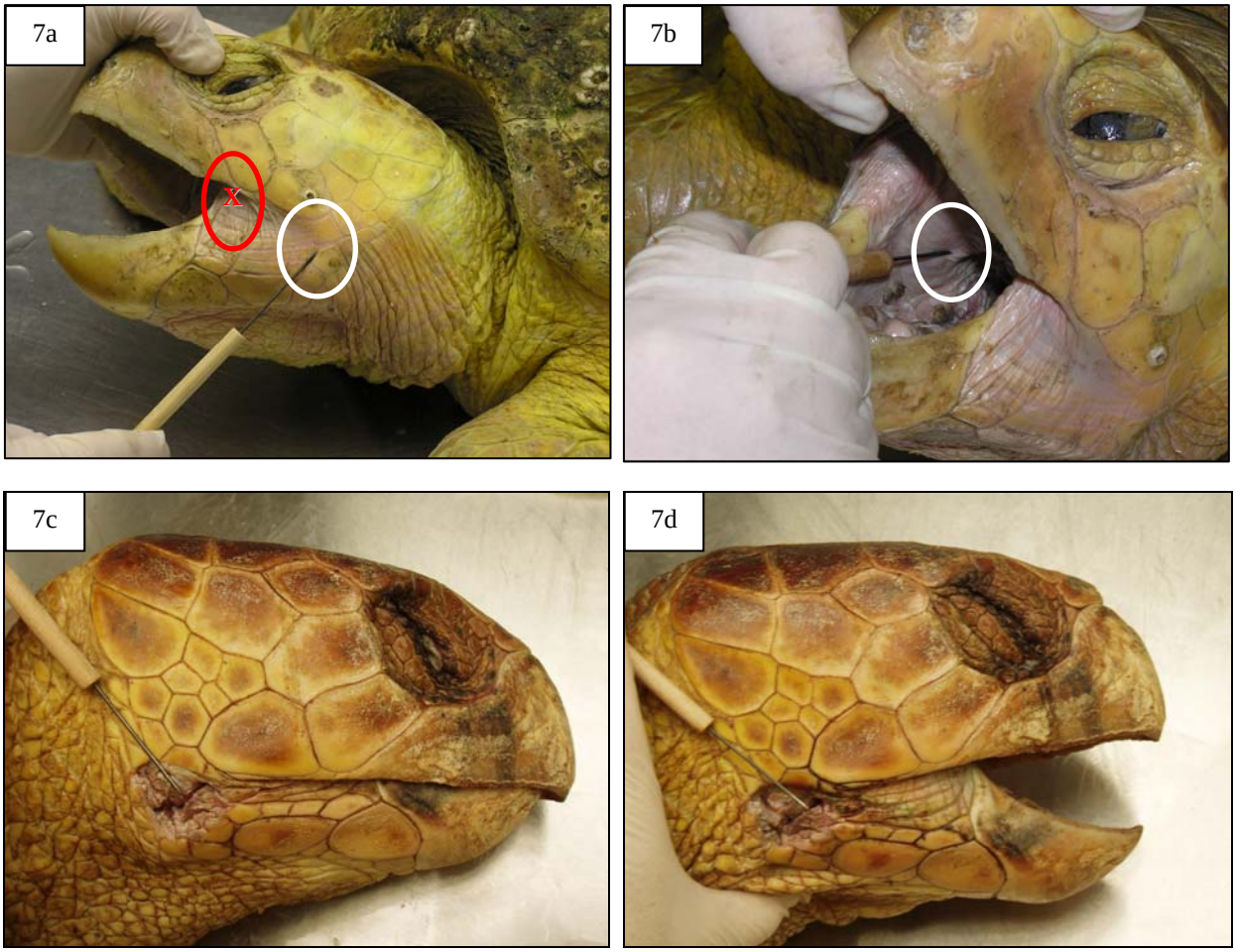
5) Glottis a) Open b) Closed





6) Roof of Mouth

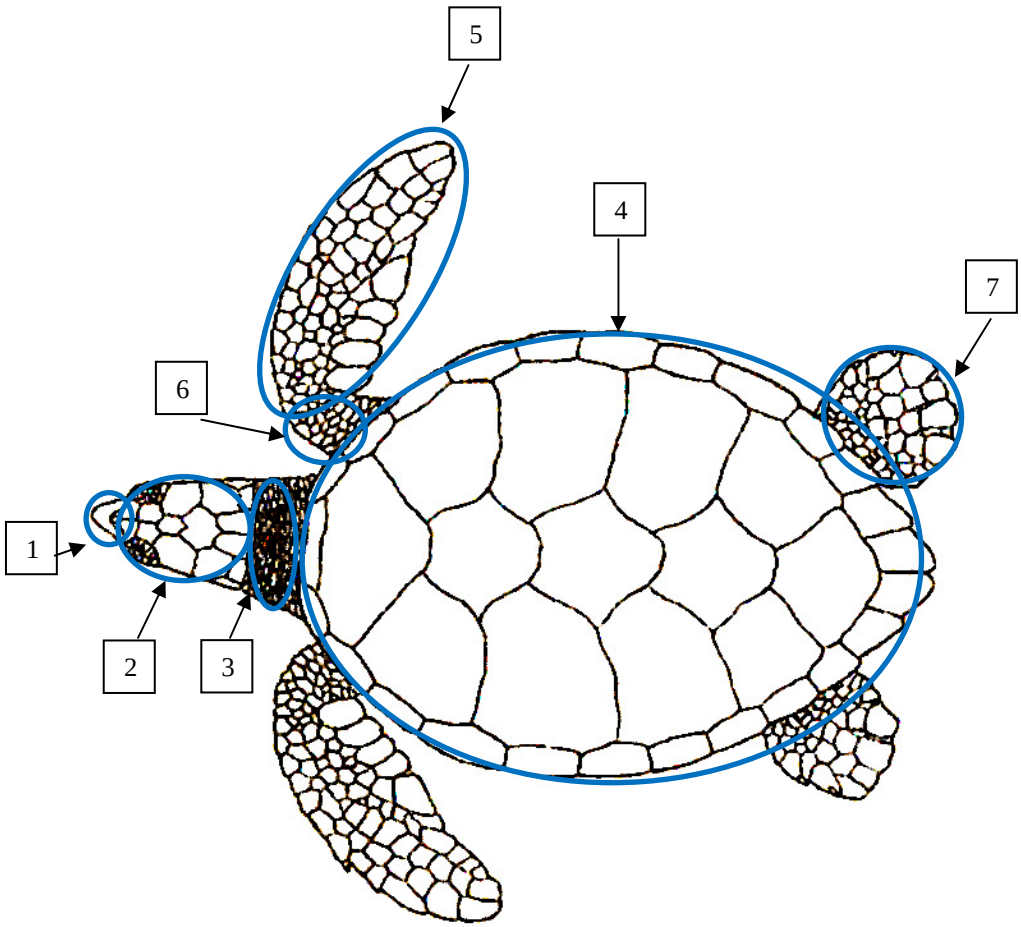
7) Jaw Joint a) external, b) internal, c) dissection depicting jaw joint with jaws closed, and d) dissection with jaws open. Note: this is **not** the corner of the mouth, depicted in Figure 7a by the **red** circle (which shows the "corner of the mouth"). To understand the difference, locate your own jaw joint (just in front of the ear) and notice its position relative to the corner of your mouth (where upper and lower lips meet).



8) Other = Any area not otherwise described here. For example, “mouth, lower, other” might be below the tongue in the soft tissue. “Mouth, side, other” could be the “corner of the mouth,” in the soft tissue connecting the jaws in front of the jaw joint. Describe in further detail in comments if possible.

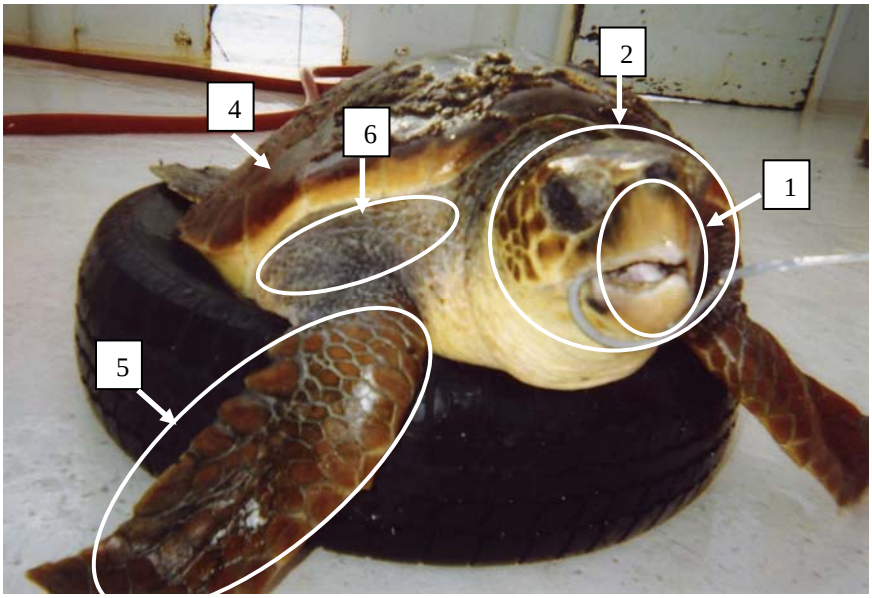
External hardshell:

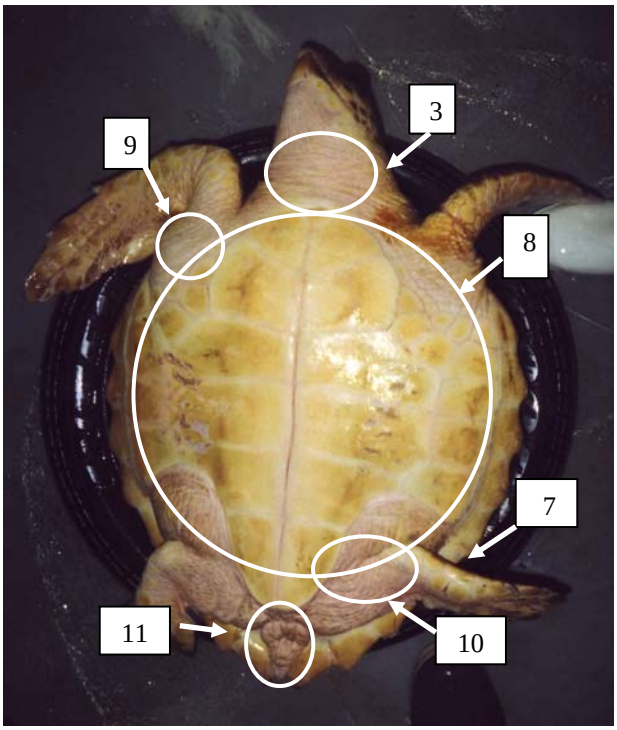
1) Beak
2) Head
3) Neck
4) Carapace
5) Front Flipper
6) Shoulder
7) Rear Flipper



External hardshell:

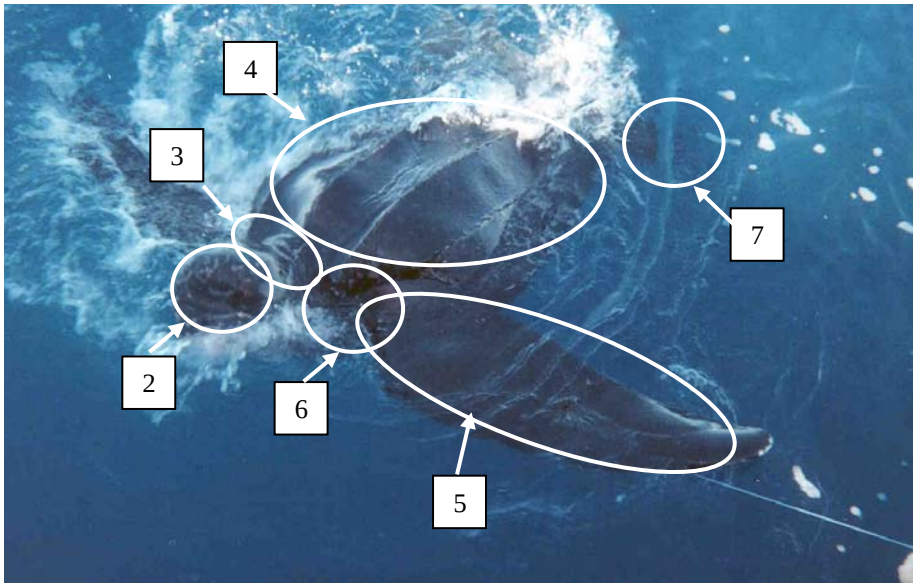
1) Beak (hard keratinized rhampotheca, either upper or lower, never side)
2) Head
3) Neck (dorsal and ventral surface)
4) Carapace
5) Front Flipper
6) Shoulder
7) Rear Flipper
8) Plastron
9) Armpit (ventral side and trailing edge of front flipper)
10) Groin
11) Tail

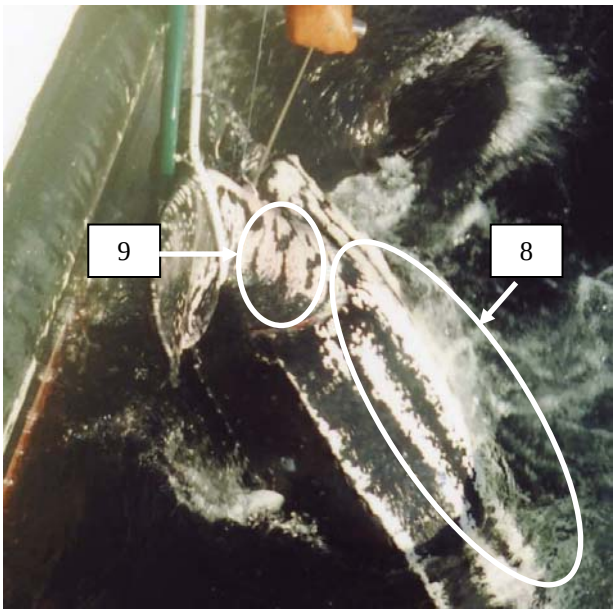




External Leatherback:

1) Beak (Leatherbacks do not have rhampotheca and should never be coded as hooked in the beak)
2) Head
3) Neck (dorsal and ventral)
4) Carapace
5) Front Flipper
6) Shoulder (dorsal surface and leading edge between front flipper and neck)
7) Rear Flipper
8) Plastron
9) Armpit (ventral surface and trailing edge between front flipper and plastron) and trailing edge of front flipper)
10) Groin
11) Tail





REFERENCES

National Marine Fisheries Service Southeast Fisheries Science Center. 2008. Sea Turtle Research Techniques Manual. NOAA Technical Memorandum NMFS-SEFSC-579, 92 p.

National Marine Fisheries Service Southeast Fisheries Science Center. 2008. Careful release protocols for sea turtle release with minimal injury. NOAA Technical Memorandum NMFS-SEFSC-580, 130 pp.

Reichart, H.A. 1993. Synopsis of biological data on the olive ridley sea turtle, *Lepidochelys olivacea* (Eschscholtz, 1829), in the western Atlantic. NOAA Technical Memorandum NMFS-SEFSC-336, 78pp.