



Texas Sea Turtle Stranding and Cold Stunning Procedures



Sea Turtle Stranding and Salvage

A stranded sea turtle is one that is found washed ashore or floating, alive or dead. Sea turtles strand in inshore and offshore areas throughout Texas for a variety of reasons. They are also occasionally captured incidentally by commercial and recreational fishing activities, fisheries research sampling, dredging, and power plant entrainment. All observed or reported strandings and incidental captures should be thoroughly documented on a Sea Turtle Stranding and Salvage Network (STSSN) stranding report (Appendix A). Detailed instructions for completing STSSN stranding reports are listed in Appendix B. Mail or fax stranding reports to Dr. Donna Shaver (Texas STSSN Coordinator) within 24 hours and mail original forms to:

Dr. Donna Shaver, Padre Island National Seashore
P.O. Box 181300, Corpus Christi, TX 78480-1300
Telephone: (361) 949-8173, ext. 226, Fax: (361) 949-9134

Always wear the appropriate protective equipment when handling stranded sea turtles (particularly gloves), take care not to injure your back while lifting heavy turtles, and follow the provided procedures to process stranded sea turtles appropriately.

Live Stranded Sea Turtles

Most live turtles found stranded on the beach are injured, ill, or entangled and must be transported to a rehabilitation facility that meets all conditions detailed in *Care and Maintenance Requirements* (see *Standard Permit Conditions for Care and Maintenance of Captive Sea Turtles*). Some lethargic or inactive turtles may be mistakenly assumed dead. Check for signs of life by watching for breathing or lightly pinching the turtle's neck or flipper and look for a response. Live stranded turtles should be transported to a rehabilitation facility with a copy of the completed stranding report. During beach and highway transport, turtles should be kept moist and at temperatures between 60°F (15.5°C) and 70°F (21°C) during the winter, and between 70°F (21°C) and 80°F (27°C) during the summer, avoiding both drastic changes in temperature and temperature extremes such as those caused by direct sunlight or too much air conditioning. Do not transport turtles in water, as they could drown.

Turtles found entangled or caught on hook and line may have minimal to no injuries, or may be severely injured. All must be documented on a stranding form, and the type of fishing gear should be noted. If a turtle is loosely entangled or lightly foul hooked by an angler, and has no other injuries or apparent illness, the turtle may be released back into the water after the removal of the items and documentation. Healthy, releasable turtles should be able to crawl to the water on their own. If the turtle is found too debilitated to be safely returned to the water, it should be transported to a rehabilitation facility following documentation and fishing gear removal. If the turtle is injured, deeply foul-hooked, hooked in the mouth, or has swallowed a hook, the turtle must be taken to a facility where the hook can be safely removed by a veterinarian or rehabilitation specialist and the turtle can be X-rayed for additional hooks. Fishing line attached to an ingested hook should be cut so that 6 to 8 inches remain outside of the turtle's mouth to aid in hook removal. All retrieved fishing gear should be provided to the STSSN Texas Coordinator.

If a turtle is considered healthy enough to release and has a straight carapace length (SCL) greater than 30 cm, it should receive a PIT tag prior to release. See PIT tag scanning and application instructions in the Texas Sea Turtle Nesting and Stranding Manual (Appendix C).

Proper sea turtle handling techniques are vital to ensure the safety of the animal and the responder. Fractures have been detected in the humerus bones of recovered sea turtles possibly a result of improper handling techniques (i.e. grasping turtles by their flippers or allowing turtles to flap their flippers vigorously). Smaller turtles should be handled by grasping the outer edges of the carapace (Fig. 1) and supported by the head, neck, and flippers whenever possible (Fig. 2). Larger animals should be handled by at least two individuals, each grasping an anterior and posterior portion of the carapace (Fig. 3).



Fig. 1. Proper handling technique grasping the outer edges of the carapace.



Fig. 2. Proper handling technique supporting the head, neck, and flippers.



Fig. 3. Proper large turtle handling technique with two individuals.

Dead Stranded Sea Turtles

A STSSN stranding report must be completed for all stranded sea turtles regardless of condition. Photographs should be taken of the carapace (Fig. 4.), plastron (Fig. 5.), and any injuries (Fig. 6 & 7). Include all areas of the turtle's body, and ensure photos are clear and focused. After measuring the carapace, checking for tags, and recording all required data on the form, the turtle should either be salvaged, disposed of behind the dunes (erase any drag marks), or buried on the beach at the base of the dunes. Always salvage all tagged turtles (those with metal tags, PIT tags, living tags, coded wire tags, or satellite transmitters). Contact the local stranding coordinator for the most current information on what additional turtles need to be salvaged. All salvaged turtles should be placed in a plastic bag with a copy of the stranding form enclosed in a sealed freezer bag. The outside of the bag should be marked with the stranding ID number comprised of the year, month, day, person's initials, and number by day along with the species code from the stranding form (e.g. 20130212AFA02 - LK). If a turtle is not being salvaged and is left on the beach, mark the carcass clearly with spray paint or biodegradable flagging tape to prevent the turtle from being reported multiple times.

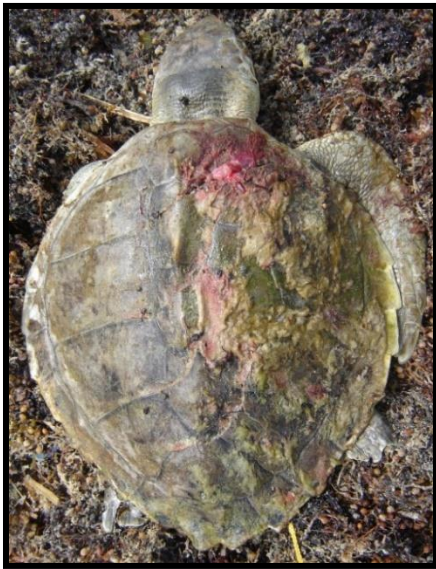
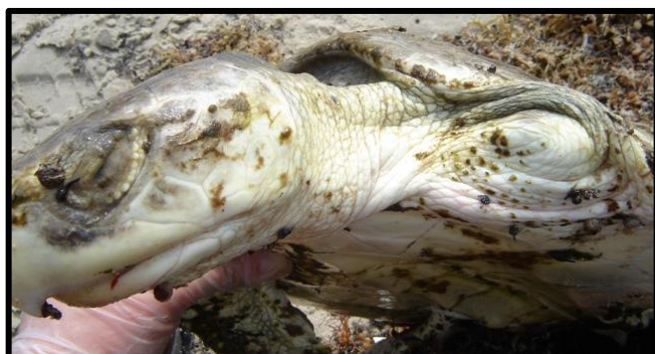


Fig. 4. Correct photographic documentation of a stranded turtle's carapace.



Fig. 5. Correct photographic documentation of a stranded turtle's plastron.



Figs. 6 & 7. Correct photographic documentation of a stranded turtle's injuries

Procedure for Cold Stunning Events in Texas

All observed or reported cold stunned sea turtles should be thoroughly documented on a Sea Turtle Stranding and Salvage Network (STSSN) stranding report (Appendix A). Detailed instructions for completing STSSN stranding reports are listed in Appendix B. Mail or fax stranding reports to Dr. Donna Shaver (Texas STSSN Coordinator) within 24 hours and mail original forms to:

Dr. Donna Shaver, Padre Island National Seashore
Box 181300, Corpus Christi, TX 78480-1300
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Hypothermic Sea Turtles

Sea turtles become susceptible to hypothermia when there is a sudden shift in weather patterns and water temperatures quickly drop below 50°F (10°C), between November and March. Hypothermic or cold stunned sea turtles lose their ability to swim and dive and often exhibit no signs of life. Although a few cold stunned turtles may be found on Gulf beaches, most are found inshore. They may be found floating on the water's surface, completely submerged in shallow water, or onshore. Live animals need to be rescued quickly before they are injured or die from predation, exposure, or boat strikes. During the winter, many sea turtles may be affected by hypothermia and strand simultaneously, and cold stunning may occur for days, weeks, or months at a time.

Receiving Reports of Cold Stunned Sea Turtles

Prior to November, area coordinators and their staff should increase efforts to distribute contact information for reporting cold stunned sea turtles. The following numbers should be made available to the public:

- North Padre and Upper Laguna Madre areas call: (361) 949-8173, Ext. 226
- North Padre and Upper Laguna Madre After Hours call: (361) 876-8462
- Other areas in Texas: call 1-866-887-8535

When receiving a report of a cold stunned sea turtle, it is important to obtain information from the observer regarding the date and time of observation, location of sighting, the number of turtles, the condition of the turtle(s), and the accessibility of the turtle(s). Be sure to record the contact information of the observer in the event the connection is lost, or additional information is required later. Before deploying additional responders to the site, determine if there is a responder nearby in the field that can assist with recovery, or if the individual who reported the turtle can be deputized to transport it to the holding facility. This will ensure maximum efficiency of rescue operations.

The Texas STSSN Coordinator must be contacted as soon as a hypothermic sea turtle is found. This information is important so that other area coordinators on the Texas coast can be contacted immediately and organized searches can be initiated.

Preparation

Beginning in November, area coordinators should begin monitoring the forecast for days where water temperatures are expected to drop below 50°F (10°C). Area coordinators should monitor daily changes in water temperature (see Appendix D) when severe weather conditions are forecasted, and their staff should have the ability to measure local water temperatures manually if remote monitoring is unavailable.

Contact information for local and state-wide agency partners and individuals including veterinarians, rehabilitation facilities, law enforcement, Texas Parks and Wildlife Department (TPWD), United States Fish and Wildlife Service (USFWS), and community volunteers should be updated beginning in November. Ensure there are individuals able to answer calls and respond to reports of stranded turtles “after hours” and on weekends. Rehabilitation facilities (see Rehabilitation Facilities section) and holding facilities (see Holding Facilities section) should be contacted to obtain an updated report of capacity and available resources. See Appendix E for locations of Texas rehabilitation facilities equipped to care for cold stunned sea turtles, as well as TPWD hatchery locations which may be used for temporary holding and/or initial assessment under a veterinarian’s supervision when other local facilities do not exist or are at capacity. Area coordinators should identify agencies and facilities that will have access to, or companies that will provide, large box trucks or vans for transport of turtles. Turtles will potentially need to be transported from holding facilities, to rehabilitation facilities, and to release sites. Area coordinators should identify available freezer storage for sea turtle carcasses at all rehabilitation and holding facilities, and develop contingency plans in the event of reaching freezer capacities. Note that cold stunned carcasses should not be retained at the expense of non-cold stunned turtle carcasses. Coordinators should identify individuals permitted and capable of conducting necropsies.

Area coordinators should procure and ready supplies for cold stunning, which begins in November. Primary response facilities that serve as hubs for cold stunning events should have equipment for surveyors and for processing sea turtles. Supplies for surveyors include but are not limited to: boats, vehicles, waders, life vests, medical equipment, radios, satellite phones, GPS units, cameras, biodegradable flagging tape, and event bands for sea turtles. Boats and vehicles should be well maintained and serviced so they are available to deploy immediately during a cold stunning event. Supplies for processing include but are not limited to: high speed copy machine, disposable gloves (various sizes), straight length calipers, soft measuring tape, PIT tag scanners, PIT tag applicators, PIT tags, alcohol/iodine swabs, cameras, towels, small stackable totes, medium and large tubs, wagons, plastic kiddie pools, and biodegradable flagging tape.

Prior to a cold stunning event, a universal system of identifying recovered sea turtles should be established for all participating agencies. Every observed and recovered sea turtle should be given a stranding ID number comprised of the year, month, day, person’s initials, and number by day, along with the species code from the stranding form (e.g. 20130212AFA02 - CM). Note that the turtle number by day is specific to the observer and is not the total of all strandings located by multiple observers in a single day. Stranding identification numbers may be applied directly to the sea turtle’s cleaned and dried carapace using a permanent marker, or may be inscribed on an event band or biodegradable flagging tape and applied to the turtle’s front left flipper. If the

turtle displays evidence of fibropapilloma (see Fibropapilloma section), write “FP” on the event band, flagging tape, or carapace. Contact the Texas STSSN Coordinator for event bands.

When the forecast is indicative of cold stunning conditions, area coordinators should schedule an appropriate number of response personnel, based on the estimated duration and severity of weather, to aid with the upcoming event. Area coordinators should directly assign their staff and volunteers roles of surveyor, transporter, processor, or overseer.

- **Surveyors** are individuals responsible for locating and retrieving stranded sea turtles in the field via boat, vehicle, or foot surveys.
- **Transporters** are individuals with vehicles responsible for collecting recovered sea turtles from boat surveyors at a designated meeting point, and safely transporting the turtles to the holding facility.
- **Processors** are individuals stationed at the holding facility who systematically document each recovered sea turtle via measurements, tagging, and photos.
- **Overseers** are individuals responsible for monitoring rescue and recovery operations. Overseers assign tasks to volunteers, aid processors, and coordinate transfers of fully documented turtles from holding facilities to rehabilitation facilities.

Survey routes and critical search areas should be identified prior to the event and clearly defined via map or written directions. Areas where cold stunned turtles are known to aggregate should be searched each day of the cold stunning event. Depending on the area, searches may be done by boat, vehicle, foot, or a combination of these. Meeting points easily accessible by both vehicles and boats should be designated as central locations for transfer of recovered sea turtles from survey boats to holding facilities. Area coordinators should strive to have multiple boats and vehicles available for moderate and severe cold stunning events. A daily plan of operation should be discussed with all boat operators prior to deployment. The recovery plan should aim for maximum sea turtle recovery while minimizing exposure of recovered turtles to the elements. If surveying long shorelines with no accessibility other than boat, it is desirable to periodically transfer recovered turtles between primary and secondary vessels, allowing primary surveyors to continue their route. Area coordinators should also encourage aerial surveys, by aircraft or drone, where permitted and funding allows.

Searches

Once hypothermic sea turtles are found in an area or the water temperature drops below 50°F (10°C), organized searches should be initiated, and should continue throughout the duration of the event. Area coordinators will work directly with their staff and volunteers to assign search zones, communicate rescue and transport logistics, and provide reporting procedures. Area coordinators will contact the Texas STSSN Coordinator directly with updates by phone or email, reporting, in real time, the number of live and dead turtles found and the locations. Surveyors should cover an area as thoroughly as time allows, and during subsequent days surveyors should proceed directly to areas that were not searched previously in order to minimize turtle fatalities. Surveys should not cease until observations of cold stunned sea turtles have ceased.

Remember that the safety of surveyors and recovery personnel is the priority. Additionally, as searches often occur in uninhabited areas, efforts should be made to preserve the state of natural resources while surveying. Before initiating recovery of hypothermic and stranded sea turtles, review the forecasted weather conditions and assess any potential environmental hazards. Surveyors should be knowledgeable about navigation in boggy and muddy terrain. Discuss safety protocols with search personnel, ensure all participants have appropriate safety gear, and be mindful of individual fitness and capability when organizing teams.

Turtles should be collected if they are on the shoreline or water's edge or if they are in the water floating and cannot dive. Hypothermic turtles must be removed from the mud and the water and placed on a boat deck or transported to the shoreline in order to be fully examined. Ideally, all sea turtles should be recovered from the field; however, if space in rescue boats and vehicles is restricted, prioritize rescue of live turtles over dead. Turtles that are unresponsive but do not display rigor mortis may possibly be alive, and should be retrieved for rehabilitation. Turtles that are obviously dead (i.e. are in rigor mortis, bloated or skin is detaching) do not have to be recovered if space is limited on the boat, but they must be documented on a stranding form in the field, marked with biodegradable flagging tape or spray paint, and photos should be taken of the GPS location and of the turtle. Place the carcass behind a dune or vegetation to avoid duplicate counting. Contact the local stranding coordinator for the most current information on what turtles need to be salvaged. Boat surveyors should carry a triage kit containing gauze sponges, gauze bandages, alcohol wipes, waterproof adhesive tape, medical scissors, and a hemostatic agent, with them in the event that a live injured sea turtle is discovered. Immediate medical attention in the field, such as reducing blood loss by dressing wounds, increases the chance of survival for cold stunned sea turtles, especially when there is a lengthy transport to the rehabilitation center.

Always wear gloves when handling cold stunned sea turtles, and to prevent injury, use proper lifting techniques and request assistance when handling large sea turtles (over 50 cm or more, if needed). Boogie boards or other flotation devices may also be used to transport stranded sea turtles. Mark the turtle with an identifier or an event band, and record location (including GPS) so that the remainder of the stranding form for that turtle can later be completed. Once personnel have surveyed the search area:

1. Protect the animal(s) from the weather by covering with dry towels, tarps, or blankets, especially when traveling by boat. Transport on a padded surface when available.
2. Immediately transport the live hypothermic animal(s) to a designated facility or meeting point for retrieval by other personnel. Surveyors must convey the location of recovered turtles to the individual responsible for transport.
3. Ensure local area coordinators have been contacted and updated with all relevant stranding information.

Once on land, hypothermic sea turtles recovered should be transported to a designated holding facility using an enclosed vehicle. Do not attempt to warm hypothermic turtles using a direct heat source during transport. Sea turtles must be warmed gradually over many hours

Holding Facilities

Holding facilities should be identified prior to the onset of an event. These facilities serve as processing and triage sites for all sea turtles recovered, and should adhere to all applicable permit requirements (see *Standard Permit Conditions for Care and Maintenance of Captive Sea Turtles*). The Padre Island National Seashore (PAIS) Sea Turtle Science and Recovery Laboratory is the central receiving facility for cold stunned sea turtles reported from North Padre Island and the Upper Laguna Madre. Turtles found elsewhere in the Texas Coastal Bend or processed at the PAIS Sea Turtle Laboratory are taken to the ARK, Texas State Aquarium, or Texas Sealife Center. *Sea Turtle, Inc.* is the central receiving facility for cold stunned sea turtles reported from South Padre Island, Boca Chica Beach, and the lower Laguna Madre. The NOAA-Fisheries Galveston Laboratory is the primary receiving facility for cold stunned sea turtles reported from the upper Texas coast.



Fig. 8. Cold stunned turtle with unique stranding ID number.

Hypothermic sea turtles that do not exhibit signs of life but are intact and show no signs of rigor mortis should be held for a minimum of eight hours in an area protected from weather and predators to determine if the animal is alive. Turtles should be transported to designated temporary holding facilities to enable stabilization and documentation. Upon arrival at the holding facility, all turtles should be examined by a trained biologist for evidence for Fibropapilloma. Turtles exhibiting signs of the growths must be segregated (see Fibropapilloma section below).

Trained personnel should work in pairs to systematically process each turtle that is brought to the holding facility. If cold stunning events are very large, upon approval and concurrence from the National Coordinator and Texas Coordinator of the STSSN, specified documentation and tagging procedures may be reduced if time spent to document rescued turtles jeopardizes their survival. For example, it may be decided to only obtain straight line measurements rather than both curved and straight line.

Pairings of trained personnel should consist of a recorder and a tagger. The recorder is responsible for completing the STSSN stranding form and taking photos of the turtle's stranding identification number (Fig. 8), carapace, plastron, and completed stranding form. With approval by the Texas Coordinator of the STSSN, turtles can be documented on the cold stun event turtle data form (Appendix F) instead of the original STSSN stranding form if large numbers of cold stunned turtles are being found (more than 100 per day). The



Fig. 9. Data collection at a holding facility.

tagger is responsible for measuring the turtle and marking each turtle with a PIT tag in the front left flipper prior to transport to a rehabilitation facility. The recorder should note the PIT tag number on the completed stranding form. Tagging will allow precise tracking and accountability of turtle location in accordance with sea turtle handling permit requirements. To facilitate identification of turtles received at a holding facility, each turtle should retain the event band labeled with its stranding identification number, and should have the sticker displaying the applied PIT tag serial number placed on its carapace, prior to transport to a rehabilitation facility. Facilities completing the original STSSN stranding form for each turtle must retain the original and should provide a copy that will travel with the turtle to the rehabilitation facility. As stated above, original copies must be mailed or faxed to the Texas STSSN Coordinator within 24 hours. Holding facilities should maintain a spreadsheet updated daily with the number of sea turtles given to each rehabilitation facility, and how many additional turtles those facilities can accommodate as the cold stunning event continues.

General guidelines for holding facilities:

- Restrict access to holding facilities: only permitted personnel should be allowed near hypothermic animals which are easily stressed in the presence of loud noises, excessive foot traffic, and bright lights (i.e. camera flash).
- All data for the stranding form should be collected and finalized prior to arrival of each turtle at a rehabilitation facility (Fig. 9).
- Animals held out of water should be kept on padding (i.e. mats or towels) to prevent any further decrease in core body temperature or plastron scraping.
- Avoid covering hypothermic turtles with towels or blankets; covers will insulate the animal and create a barrier from warm room temperatures. Room temperatures should remain between 60°F (15.5°C) and 70°F (21°C).



Fig. 10. Sea turtles held in small pools.

Rehabilitation Facilities

Cold stunned sea turtles that have been stabilized and fully documented will be transferred from temporary holding facilities to rehabilitation facilities. Rehabilitation facilities serve as the primary location for the recovery of cold stunned sea turtles, and are responsible for medically determining when those sea turtles are cleared for release. Rehabilitation facilities must meet all conditions detailed in *Care and Maintenance Requirements* (see *Standard Permit Conditions for Care and Maintenance of Captive Sea Turtles*).

General guidelines for rehabilitation facilities:

- Turtles should be warmed as gradually as possible.
- Once turtles appear responsive, they should be placed into a holding tank with water and monitored to make sure they are able to swim and breathe. If this is not possible, small pools may be used; however, do not keep turtles out of water longer than 5 days (Fig. 10).
- Animals held out of water for an extended period of time may require application of water-based eye lubricant to prevent their eyes from drying.
- Ideally, body temperature should be measured (via cloaca or infrared thermometer) from at least a subset of incoming turtles to ensure holding tank water temperature is within 5 degrees of turtle body temperature.
- Holding tank water temperature should be adjusted to and maintained between 60°F (15.5°C) and 65°F (18°C). Prior to release, tank temperatures should be adjusted to release site temperatures in order to acclimate the turtles. If no tank filtration is available, water should be changed daily.
- Disinfect areas where animals have been maintained out of water to prevent transmission of disease to healthy animals.
- An updated inventory of animals held at rehabilitation facilities should be maintained. Transfers and deaths should be documented and reported to the STSSN Coordinator.
- Rehabilitation facilities will coordinate with the Texas STSSN Coordinator and permitting authorities to determine when and where to release turtles. Turtles should be released as soon as they are medically cleared and weather permits, which is typically within one to two weeks after a cold stunning event. Turtles will be released into Gulf of Mexico surf waters as soon as those waters are 54°F (12°C) or warmer, with a forecast of warming temperatures. Releases should be held away from passes to inshore waters to deter turtles from quickly self-repatriating to inshore waters where they could become cold stunned again that winter. Long-term holding is not advisable for otherwise healthy turtles, and rehabilitation tank space needs to be cleared for more seriously injured turtles and turtles found during subsequent hypothermic events. Consult with the Texas STSSN Coordinator for additional recommendations and information prior to release of turtles.

Fibropapilloma

Green turtles were first documented with fibropapillomatosis along the Texas coast in 2010. Fibropapillomas emerge as “cauliflower textured warts” thought to be caused by a herpes virus (Fig. 11). These growths, or tumors, may affect all “soft” portions of a turtle’s body. Tumors primarily grow on the skin, but can also appear on the carapace and plastron, inside the mouth, on the eyes, and on internal organs.

All animals exhibiting signs of fibropapilloma tumors (FP) should be quarantined to specific tanks and/or holding areas. These areas should receive restricted access and all possible measures should be in place (i.e. foot bath upon exit, tools such as calipers and nets marked for FP use only) in order to prevent any possible transmission. Note that some rehabilitation facilities do not admit FP turtles for care, and FP turtles will need to be transferred to other rehabilitation facilities that are equipped to accommodate FP turtles. A complete evaluation of tumor quantity, location, and surface texture, using the ordinal scale methodology, should be documented using the Fibropapillomatosis section on the STSSN stranding form (see Appendix A and Appendix G).

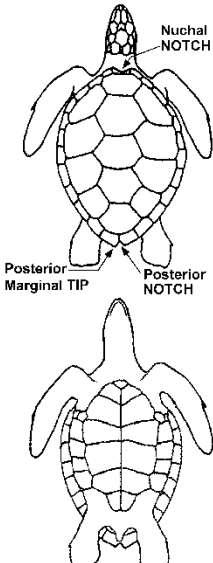
Thoroughly photograph the ventral and dorsal views of FP turtles and collect close up shots of the head and eyes. Ideally, separate crews and tools will be used to document FP versus non-FP turtles. If this is not possible, when processing turtles with FP, personnel should change gloves and clean tools in a diluted chlorine solution between processing of animals.



Fig. 11. Fibropapilloma tumor on the eye of a green turtle.

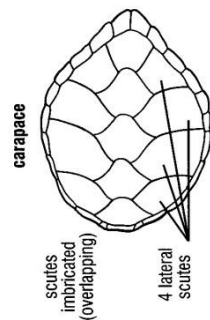
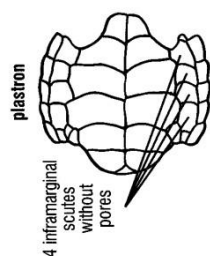
APPENDIX A: STSSN Stranding Report Form

SEA TURTLE STRANDING AND SALVAGE NETWORK – STRANDING REPORT

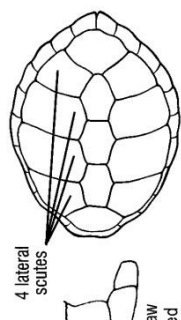
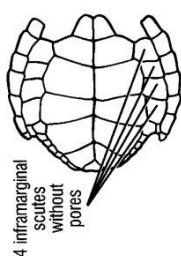
OBSERVER'S NAME / ADDRESS / PHONE First _____ M.I. _____ Last _____ Affiliation _____ Address _____ Area code/Phone number _____		STRANDING DATE: Year 20____ Month ____ Day ____ Turtle number by day ____ <i>State coordinator must be notified within 24 hrs; this was done by</i> <input type="checkbox"/> phone (361)949-8173 x226 <input type="checkbox"/> email <input type="checkbox"/> fax (361)949-9134	
SPECIES: (check one) <input type="checkbox"/> CC = Loggerhead <input type="checkbox"/> CM = Green <input type="checkbox"/> DC = Leatherback <input type="checkbox"/> EI = Hawksbill <input type="checkbox"/> LK = Kemp's Ridley <input type="checkbox"/> LO = Olive Ridley <input type="checkbox"/> UN = Unidentified Check Unidentified if not positive. Do Not Guess. Carcass necropsied? <input type="checkbox"/> Yes <input type="checkbox"/> No Photos taken? <input type="checkbox"/> Yes <input type="checkbox"/> No Species verified by state coordinator? <input type="checkbox"/> Yes <input type="checkbox"/> No		STRANDING LOCATION: <input type="checkbox"/> Offshore (Atlantic or Gulf beach) <input type="checkbox"/> Inshore (bay, river, sound, inlet, etc) State _____ County _____ Descriptive location (be specific) _____ Latitude _____ Longitude _____	
SEX: <input type="checkbox"/> Undetermined <input type="checkbox"/> Female <input type="checkbox"/> Male Does tail extend beyond carapace? <input type="checkbox"/> Yes; how far? _____ cm / in <input type="checkbox"/> No How was sex determined? <input type="checkbox"/> Necropsy <input type="checkbox"/> Tail length (adult only)		CONDITION: (check one) <input type="checkbox"/> 0 = Alive <input type="checkbox"/> 1 = Fresh dead <input type="checkbox"/> 2 = Moderately decomposed <input type="checkbox"/> 3 = Severely decomposed <input type="checkbox"/> 4 = Dried carcass <input type="checkbox"/> 5 = Skeleton, bones only	
SEX: <input type="checkbox"/> Undetermined <input type="checkbox"/> Female <input type="checkbox"/> Male Does tail extend beyond carapace? <input type="checkbox"/> Yes; how far? _____ cm / in <input type="checkbox"/> No How was sex determined? <input type="checkbox"/> Necropsy <input type="checkbox"/> Tail length (adult only)		FINAL DISPOSITION: (check) <input type="checkbox"/> 1 = Left on beach where found; painted? <input type="checkbox"/> Yes* <input type="checkbox"/> No(5) <input type="checkbox"/> 2 = Buried: <input type="checkbox"/> on beach / <input type="checkbox"/> off beach; carcass painted before buried? <input type="checkbox"/> Yes* <input type="checkbox"/> No <input type="checkbox"/> 3 = Salvaged: <input type="checkbox"/> all / <input type="checkbox"/> part(s), what/why? _____ <input type="checkbox"/> 4 = Pulled up on beach/dune; painted? <input type="checkbox"/> Yes* <input type="checkbox"/> No <input type="checkbox"/> 6 = Alive, released <input type="checkbox"/> 7 = Alive, taken to rehab. facility, where? _____ <input type="checkbox"/> 8 = Left floating, not recovered; painted? <input type="checkbox"/> Yes* <input type="checkbox"/> No <input type="checkbox"/> 9 = Disposition unknown, explain _____ <i>*If painted, what color?</i> _____	
TAGS: Contact state coordinator before disposing of any tagged animal!! Checked for flipper tags? <input type="checkbox"/> Yes <input type="checkbox"/> No Check all 4 flippers. If found, record tag number(s) / tag location / return address _____ PIT tag scan? <input type="checkbox"/> Yes <input type="checkbox"/> No If found, record number / tag location _____ Coded wire tag scan? <input type="checkbox"/> Yes <input type="checkbox"/> No If positive response, record location (flipper) _____ Checked for living tag? <input type="checkbox"/> Yes <input type="checkbox"/> No If found, record location (scute number & side) _____		CARAPACE MEASUREMENTS: (see drawing) Using Calipers Circle unit Straight length (NOTCH-TIP) _____ cm/in Minimum length (NOTCH-NOTCH) _____ cm/in Straight width (Widest Point) _____ cm/in Using non-metal measuring tape Circle unit Curved length (NOTCH-TIP) _____ cm/in Minimum length (NOTCH-NOTCH) _____ cm/in Curved width (Widest Point) _____ cm/in Weight <input type="checkbox"/> actual / <input type="checkbox"/> est. Circle unit _____ kg / lb	
Fibropapillomatosis? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Unk. FP Grade: ____/3 <input type="checkbox"/> Papillary <input type="checkbox"/> Smooth Tumor(s) Involve Eyes? <input type="checkbox"/> Left <input type="checkbox"/> Right <input type="checkbox"/> No		Mark wounds / abnormalities on diagrams at left and describe below (note tar or oil, gear or debris entanglement, propeller damage, epibiota, papillomas, emaciation, etc.). Please note if no wounds / abnormalities are found. _____ _____ _____ _____ _____	
		<div style="border: 1px solid black; padding: 5px;"> For Administrative Use Only State ID: _____ </div>	

SEA TURTLE STRANDING AND SALVAGE NETWORK – STRANDING REPORT
(BACK OF FORM)

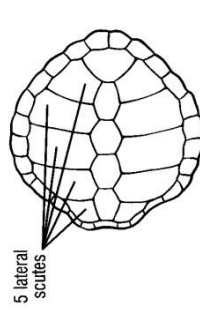
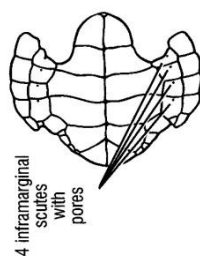
SPECIES IDENTIFICATION



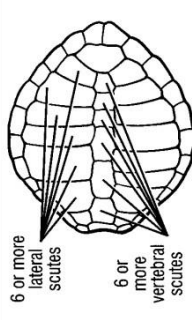
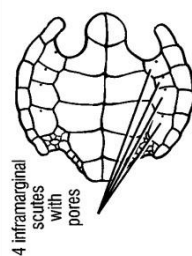
Hawksbill - *Eretmochelys imbricata*



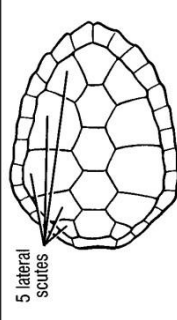
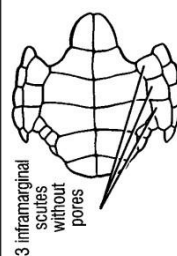
Green turtle - *Chelonia mydas*



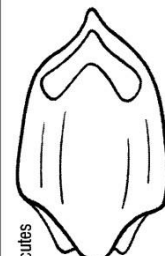
Kemp's ridley - *Lepidochelys kempii*



Olive ridley - *Lepidochelys olivacea*



Loggerhead - *Caretta caretta*



Leatherback - *Dermochelys coriacea*

Please use an envelope and mail original form to:

DR. DONNA SHAVER

TEXAS STSSN COORDINATOR

PADRE ISLAND NATIONAL SEASHORE

P.O. BOX 181300

CORPUS CHRISTI, TX 78480-1300

APPENDIX B: Instructions for Completing STSSN Stranding Report Form

OBSERVER'S NAME/ADDRESS/PHONE: This is the person who handled the turtle in the field. Provide an address and phone number where you can be reached in the event we need to contact you for clarification of the reported data.

STRANDING DATE: This is the date that the stranded turtle was first reported. If you did not investigate until later date, note that in the remarks section at the bottom of the form. "Turtle Number by Day" is used to keep track of more than one turtle investigated on a single day by the same person. Your first turtle of the day is 01, the second turtle you handle that same day is 02, etc. Notify the Texas STSSN Coordinator within 24 hours of any strandings documented and check the box describing how the coordinator was notified.

SPECIES: Use the species identification key on the back of the form to positively determine species. If you are not positive of the species identification, check "Unidentified". Do not guess. Check boxes to indicate if photos were taken and if the Texas STSSN Coordinator verified the species. The Texas STSSN Coordinator may verify species based on photos taken and submitted with the stranding report form.

SEX AND CATEGORIZING ADULTS: Check appropriate box(es). Sea turtles cannot be sexed externally until they are mature adults. If the turtle is not adult-sized and the turtle has not been necropsied, check the "Immature/Undetermined" box. Some males may begin to mature at slightly smaller sizes than those listed above and tail length would be documented if it is being used to externally sex a turtle.

Adult sizes for sea turtles, smallest to largest:

Kemp's ridley: $SCL \geq 60$ cm

Hawksbill: $SCL \geq 70$ cm

Green: $SCL \geq 83$ cm

Loggerhead: $SCL \geq 92$ cm

Leatherback: $CCL \geq 130$ cm

STRANDING LOCATION: Check "offshore" if the turtle was found on an ocean beach or "inshore" if the turtle was in a bay, river, sound, inlet, etc. Give a detailed descriptive location of the stranding using a reference point that can be found on a NOAA navigation chart. Local names or landmarks not found on most charts do not help pinpoint a location. Note the name of the island, beach and beach mile markers. Good reference points also include inlets, fishing piers, light houses, water tanks, etc. Latitude/Longitude - if you have a GPS unit or are familiar with latitudes and longitudes and have a navigation chart, include the latitude and longitude of the stranding location in a decimal degree format (DD.DDDD°). If you cannot provide accurate latitudes and longitudes, leave this space blank. It then becomes even more important to provide a location description that can be located on a map.

CONDITION: Check the box that best describes the condition at the time of stranding. If the turtle seems intermediate between two stages of decomposition, pick the one that fits best. Fresh dead turtles should have no foul smell. Moderately decomposed turtles smell bad, but skin and scutes are intact or are only beginning to peel and internal organs are still distinguishable. Severely decomposed turtles smell very bad with scutes lifting or gone, skin beginning to peel or

liquefy, and individual organs hard to identify. Dried carcasses are leathery with internal organs completely decomposed.

FINAL DISPOSITION: Check the box(es) next to the number that best describes what was done with the stranded animal after it was documented on the beach. Provide additional information regarding any salvaged specimens. For live turtles, record the name of the rehabilitation facility the turtle was brought to.

TAGS: Contact the Texas STSSN Coordinator before disposing of any tagged animal!!

- Metal flipper tags - check all flippers on all species and record information; also note if tag scars are present.
- PIT tags - scan front flippers and shoulder areas of all species (see PIT tag scanning protocol in the Texas Sea Turtle Nesting and Stranding Manual for specific scanning instructions).
- Coded wire tag - tags have been placed in front flipper region of some head-started Kemp's ridleys (see coded wire tag scanning protocol in the Texas Sea Turtle Nesting and Stranding Manual for specific scanning instructions) and the rear flippers of some wild stock Kemp's ridley hatchlings released in Mexico during the 1990s. All flippers and associated shoulder and "armpit" areas of all Kemp's ridleys should be salvaged for later scanning if a magnetometer is not available.
- Living tags - check all Kemp's ridley and green turtles for light-colored areas on the dark carapace. Living tags are tissue transplants of the plastron onto the carapace which grow with the turtle and were used to mark some head-started turtles in varying age groups. If you suspect a living tag is present, the entire carcass should be salvaged. In most cases, Kemp's ridleys with living tags were also marked with external flipper tags, PIT tags, and coded wire tags. The Cayman Turtle Farm and Xcaret Eco Archaeological Theme Park have also used living tags on some green turtles to distinguish ages and a few of these turtles have been documented by the STSSN. These turtles may or may not have external flipper tags or tag scars.

CARAPACE MEASUREMENTS: Use calipers to obtain straight measurements and a flexible, non-metal measuring tape to obtain curved measurements. Measurement points are noted on drawings on the left side of the form. Circle the units of measurement (centimeters preferred).

FIBROPAPILLOMATOSIS SECTION: Check the appropriate box to identify whether the turtle has Fibropapillomatosis. If you are not positively able to determine, check "unknown". Do not guess. Grade the Fibropapilloma tumor load on a scale of 1-3, with 3 being the heaviest tumor load. If the load appears to be between two grades, assign the larger score (i.e. load is between 2 and 3, assign a grade of 3). If ANY of the tumors have ANY degree of papillary texture, check the papillary box. Identify whether the tumor(s) involve the eyes and check the appropriate box.

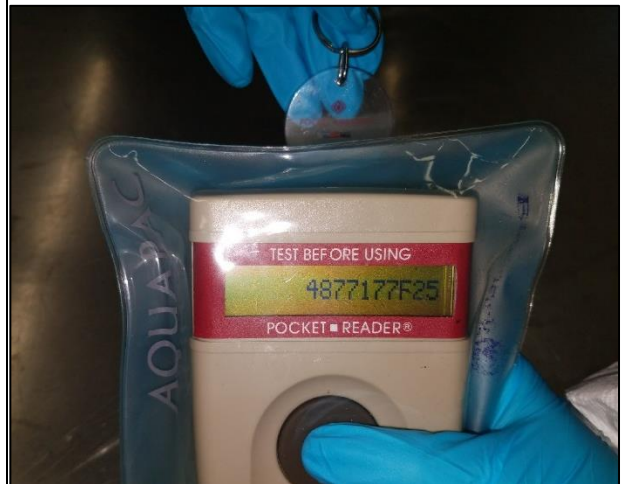
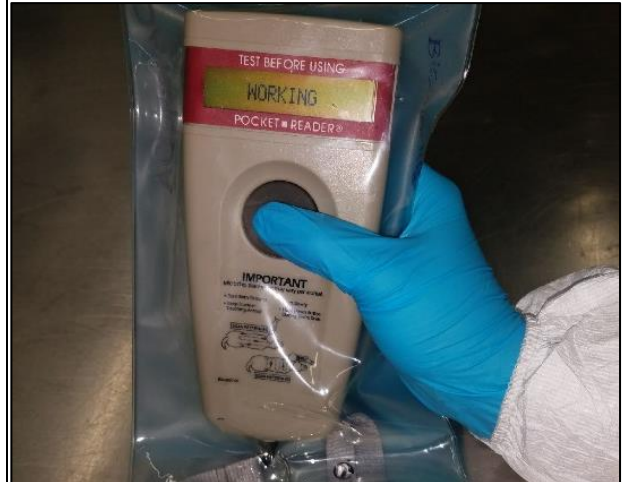
REMARKS SECTION: Mark any wounds/abnormalities on the diagrams on the left side of the form and describe in detail. Use objective statements and observations. Assumptions of potential cause or diagnosis cannot be verified and therefore should not be used. Always note anything unusual about a stranding event.

APPENDIX C: PIT Tag Scanning Procedures

- Check all stranded sea turtles for PIT tags.
- Most PIT tag readers are NOT WATERPROOF and must be kept in a sealed plastic bag at all times during use.
- Always have spare batteries and a screw driver to remove the battery cover.

TESTING THE PIT TAG READER:

- Before each use, scan a sample tag to verify the PIT tag reader is on and functioning properly. The sample tag is typically encased in plastic or resin and attached to a key ring that is provided with each reader.
- Press and release the button to turn the PIT tag reader on.
- **Press and hold** the button continuously to search for a PIT tag.
- The screen should display “searching” or “working” when functioning properly.
- Pass the reading surface, the upper half of the backside of the reader, over the sample tag at a distance of 1-2”.
- The reader will beep and display the PIT tag ID code on the screen when the PIT tag is detected.
- Release the button and then press it again to clear the PIT tag number from the screen.
- Reader will display “No ID Found” or equivalent language.



WHERE TO SCAN FOR PIT TAGS:

- Project personnel should scan **ALL AREAS** of the turtle where a PIT tag may have been inserted - dorsal and ventral side of all flippers, including the triceps and pectoral muscles, the neck, and along the inframarginal region of the plastron.



HOW TO SEARCH FOR A PIT TAG:

- While holding the button on the reader, place it directly on the skin of the turtle. **Slowly** move the reader over the entire area to be scanned in a circular or s-like motion.
- On leatherbacks, you may have to use more pressure on the reader against the skin.
- Use the entire reading surface, the upper half of the backside of the reader, when searching for a PIT tag.
- While scanning the area, tilt the scanner at various angles to improve your chances of detecting a tag. Scan all areas multiple times.
- If a PIT tag is detected, record the identification code exactly as it appears on the scanner display, including any hyphens or periods. Be especially careful with letters and numbers that are easily confused, such as the letter O and the number Ø.
- Immediately notify your state coordinator if a PIT tag is detected and do not dispose of the carcass until given permission to do so since valuable information may be obtained from a tagged individual.
- The state coordinator will contact the Cooperative Marine Turtle Tagging Program at the University of Florida to find out the history of the tagged turtle.



- Continue to scan all areas even if a PIT tag is located, in rare cases, a turtle could have more than one tag.
- If no PIT tag is detected, the reader will display “No ID found” or equivalent language.



PROPER STORAGE OF EQUIPMENT:

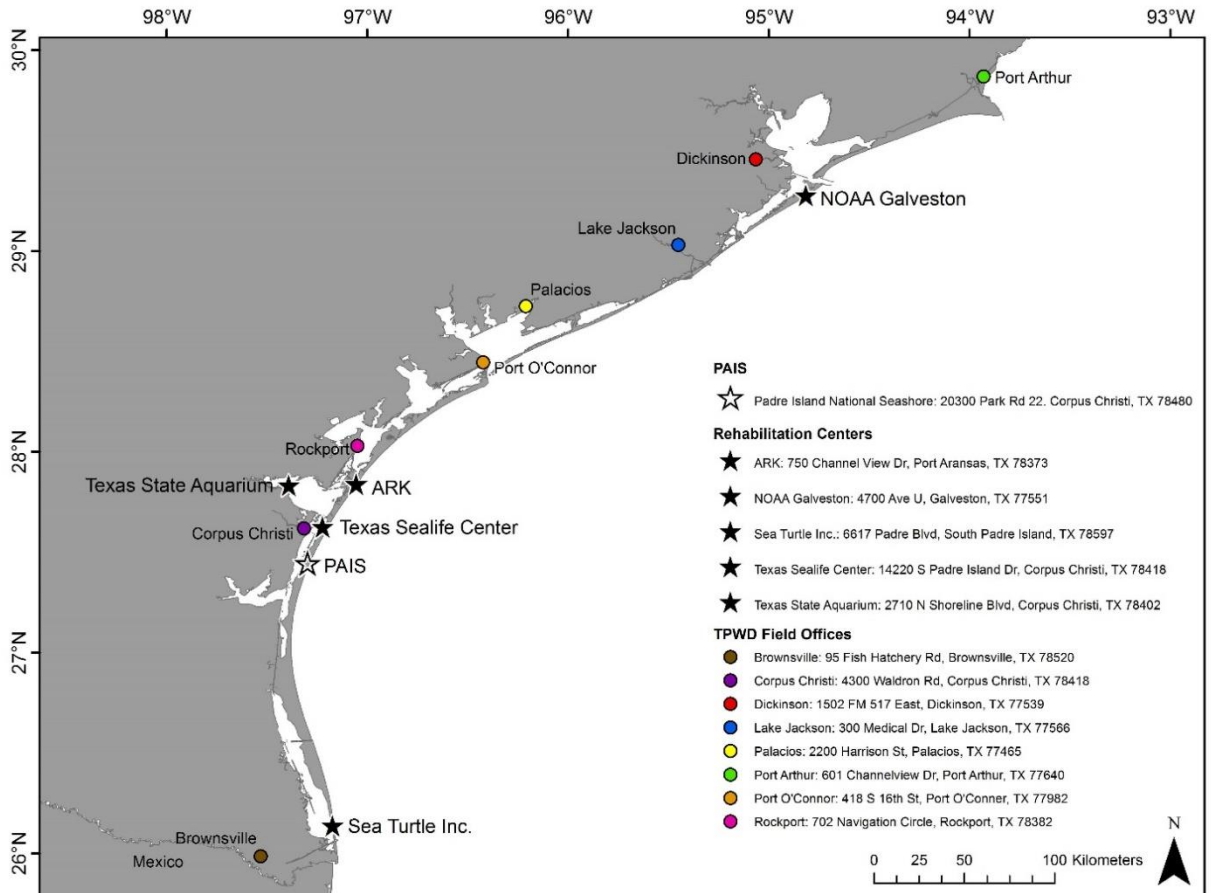
- If using a waterproof bag on the reader, thoroughly clean and disinfect after each use – use warm water and a non-detergent soap. Avoid detergents or chemical solvents on dry bags as they can compromise the water shedding properties and can cause the coating to delaminate.
- Enzyme-based cleansers may be used to remove odors from the bag.
- Store the reader in a dry environment and not in a plastic bag. Condensation will cause permanent, non-warranty covered damage to the circuitry in the reader. If batteries are present, remove during storage.

Credit: Lyndsey Howell, NOAA

APPENDIX D: Websites Reporting Real-Time Water Temperatures

- NOAA National Centers for Environmental Information: Water Temperature Table of the Western Gulf of Mexico
<https://www.nodc.noaa.gov/dsdt/cwtg/wgof.html>
- NOAA Tides and Currents – Physical Oceanographic Real-Time System (PORTS)
<https://www.co-ops.nos.noaa.gov/ports/index.shtml?port=hg>
- Texas Coastal Ocean Observation Network (TCOON): Map of Active National Ocean Service (NOS) Stations in Texas
<http://www.cbi.tamucc.edu/TCOON/>

APPENDIX E: Map of Texas Rehabilitation Facilities



GREEN TURTLE COLD STUNNING DATA COLLECTION FORM (BATCHED)*

OBSERVER'S NAME / ADDRESS / PHONE First _____ M.I. _____ Last _____ Affiliation _____ Address _____ Area code/Phone number _____	STRANDING DATE: Year 20__ Month __ Day __ <hr/> <i>State coordinator must be notified within 24 hrs; this was done by: <input type="checkbox"/> phone (361)949-8173 x226 <input type="checkbox"/> email <input type="checkbox"/> fax (361)949-9134</i>
---	---

County _____

Descriptive location (be specific) _____

Color of ID Band (circle one) Red Orange Yellow Green Blue Pink

 White Lavender Teal B/W Checkered Other ID: _____

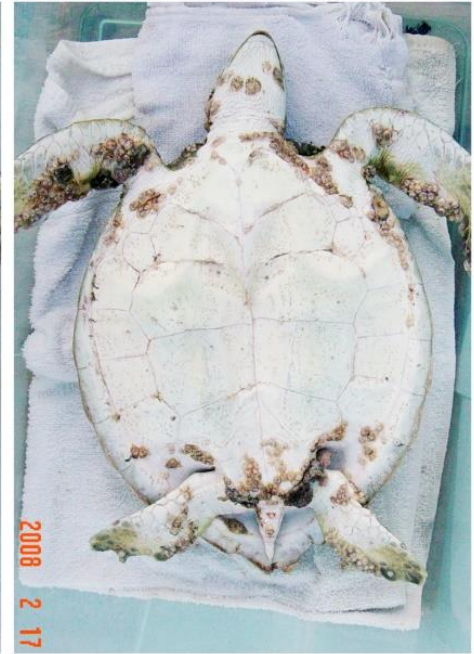
Number alive:
(No FP) # _____
(FP) # _____
Number dead:
(No FP) # _____
(FP) # _____
Total # _____

SCL: _____cm	SCL: _____cm	SCL: _____cm	SCL: _____cm
SCL: _____cm	SCL: _____cm	SCL: _____cm	SCL: _____cm
SCL: _____cm	SCL: _____cm	SCL: _____cm	SCL: _____cm
SCL: _____cm	SCL: _____cm	SCL: _____cm	SCL: _____cm
SCL: _____cm	SCL: _____cm	SCL: _____cm	SCL: _____cm

Found alive, taken to rehab # _____
 Name of Facility(s) (also note any subsequent transfers): _____

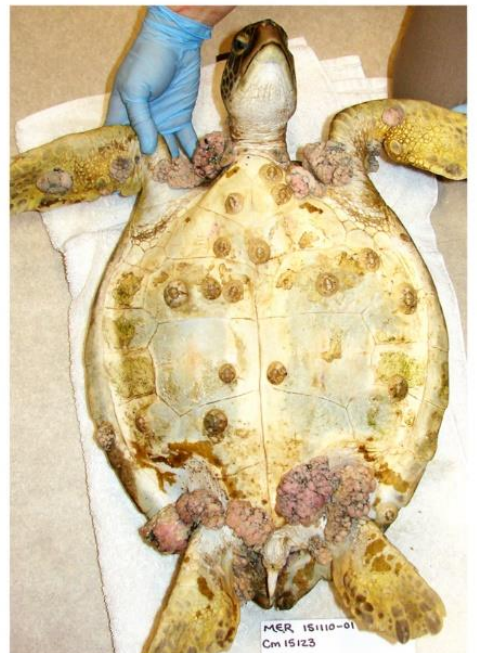
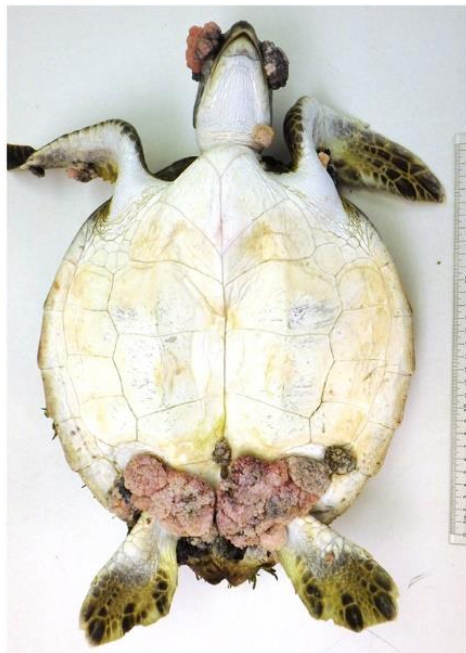
 Found alive, but died prior to transport to rehab # _____
 Disposition of Carcasses: _____

APPENDIX G: Grades for FP Documentation Form



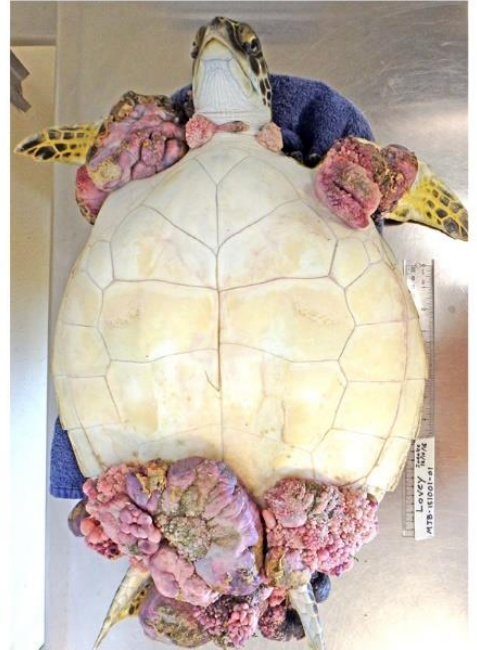
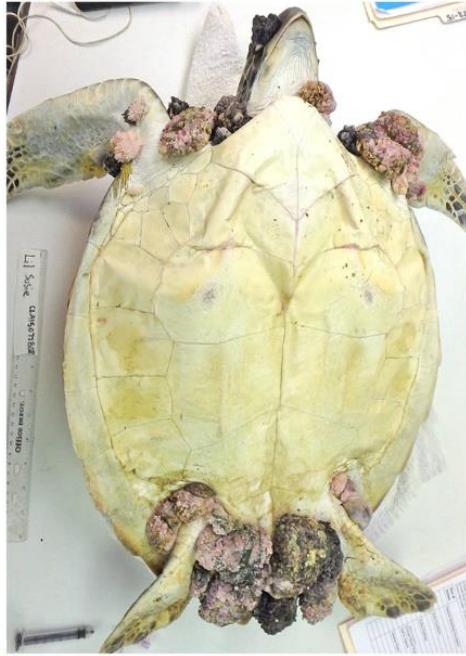
Grade 1:

Credit: Dr. Brian Stacy, NOAA



Grade 2:

Credit: Dr. Brian Stacy, NOAA



Grade 3:
Credit: Dr. Brian Stacy, NOAA



United States Department of the Interior

FISH AND WILDLIFE SERVICE

STANDARD PERMIT CONDITIONS FOR CARE AND MAINTENANCE OF CAPTIVE SEA TURTLES

February 13, 2013

The following conditions must be met for all species of sea turtles held in captivity in the United States under the authority of a U.S. Fish and Wildlife Service (Service) permit issued in accordance with section 10(a)(1)(A) of the Endangered Species Act of 1973, as amended.

Conditions are also included for the transport, rehabilitation, and disposition of sea turtles.

The individual/institution to whom a Service permit has been issued must notify the appropriate Service Field Office or Regional Office (<http://www.fws.gov/endangered/regions/index.html>) that issued the permit in writing of any inability to meet or maintain these conditions within 60 days. This notification must include a description of all shortcomings and emergency provisions, back-up systems, and filtration if not previously submitted. *Failure to do so maybe considered a violation of the Service permit.*

TYPES OF CAPTIVE MAINTENANCE

Education

Depending upon the display capabilities of a facility and proper justification (specific benefit to the conservation of the species in the wild), threatened loggerhead turtles (*Caretta caretta*) and/or threatened green turtles (*Chelonia mydas*) may be displayed for educational purposes by a facility that is primarily educational in nature. Education facilities include those open to the general public at least 5 days a week and receive no less than an average of 100 visitors per week. Public encounters (e.g., feeding, touching, swimming, etc.) with turtles is not allowed.

Note: Limited interactive programs may be permitted if specifically reviewed and approved by the Service.

Educational Display of Captive Turtles:

1. Turtles on display must be accompanied by interpretive signage or other interactive methods of communications such as live lectures, displays, and self-guided audio tours. These displays must include the following: species identification, protection status under the Endangered Species Act, general life history, and current conservation issues (e.g., incidental capture in fisheries, boat strikes, ingestion of debris, ocean dumping, loss of nesting beaches, loss of developmental habitats and adult foraging grounds, beachfront lighting, etc.).
2. For any rehabilitating turtle proposed for public display, the veterinarian responsible for the care of the animal must deem that the turtle is stable and the additional stress associated with public display will not affect the turtle's health. The release of the turtle must not be delayed or expedited to facilitate the public display.
3. It is the responsibility of the individual/institution to which a permit is issued to ensure that their facility has the necessary tank space to accommodate the sea turtles until it is ready for release. Turtles

obtained as hatchlings should not need to be moved to another facility because of inadequate tank space.

4. Any facility holding sea turtles for educational display must also meet all conditions that follow under *Care and Maintenance Requirements*.

Educational Tours of Captive Turtles:

1. Tours must only be conducted during hours when the turtles would normally be exposed to light. The light exposure can be modified for seasonal photoperiods but must have consecutive hours of darkness as found in the natural environment during that period.
2. Educational topics must include species identification, protection status under the Endangered Species Act, general life history, and current conservation issues (e.g., incidental capture in fisheries, boat strikes, ingestion of debris, ocean dumping, loss of nesting beaches, loss of developmental habitats and adult foraging grounds, beachfront lighting, etc.).
3. Each tour must have at least one staff/volunteer present at the time of the tour for every 15 guests. More staff/volunteers may be needed as appropriate to ensure guests are not in contact with the tank or medical equipment.
4. Visitors must be given clear instructions to minimize disturbance and stress to turtles, including no touching of turtles or their tanks, minimal noise, and no flash photography.
5. Tanks must be half covered or have a hiding spot for turtles to decrease stress from tours.
6. The following information must be included in the annual report – number of tours; number of people, dates, and times of the tours; medical condition of each turtle involved in the tours; and the release date of the turtles.

Additional Requirements for Educational Tours of Rehabilitating Turtles:

Educational tours and the display of rehabilitating animals are not authorized for turtles in critical care. The veterinarian responsible for the care of a turtle must deem that the turtle is stable and that the tours will not affect the turtle's health. The release of the turtle must not be delayed to facilitate the tours. To conduct tours, facilities must meet the following conditions:

1. The timing of the tour must not interfere with the treatment and care of the turtle.
2. Tours may be conducted while a turtle is in treatment if the veterinarian responsible for the care of the turtle approves, and guests are kept at a far enough distance from the turtle and staff working with the turtle so as to minimize the potential for additional stress and not interfere with treatment.

Research

Unless a specific exception is granted because of research conditions, anyone holding turtles for scientific research must follow all conditions listed below under *Care and Maintenance Requirements*. The release of rehabilitated turtles must not be delayed to obtain permits or to facilitate a research project unless authorized in a Service permit.

Rehabilitation

Any facility holding sea turtles for rehabilitation must meet all conditions listed below under *Care and Maintenance Requirements*. All facilities conducting rehabilitation must obtain a Service and/or State permit for euthanasia or have access to a veterinarian that has a Service and/or State permit for euthanasia. Note: Euthanasia of endangered turtles may only be authorized by the Service.

Transport:

1. Sea turtles must be transported in a climate-controlled environment, protected from extremes of heat and cold, and kept moist. In general, the best range of temperatures for transport is between 21°C and 27°C (70°F and 80°F; see additional conditions for cold-stunned turtles below). If a turtle is transported at temperatures greater than or equal to 23.9°C (75°F), it must be cooled by keeping a wet towel on the carapace and by periodically applying water. Water and wet towels must not be used when transporting turtles at temperatures less than 23.9°C (75°F) or at any time they are exposed to an air-conditioned environment (exception: open wounds must be kept moist with clean freshwater regardless of temperature). At temperatures less than 23.9°C (75°F), juvenile turtles (less than 30 cm straight carapace length) may be kept from drying out during transport by applying a thin layer of a water-based, water soluble, non-petroleum lubricant (e.g., K-Y Jelly) to the carapace and all the soft tissues (except the eyes and any open wounds). Larger turtles (≥ 30 cm straight carapace length) do not need a lubricant because they are less likely to dry out due to their low surface to volume ratio: use of a lubricant should be avoided to minimize handling injuries. If transport is longer than 45 minutes, ophthalmic gel may be used to maintain moisture in the turtle's eyes to avoid eye damage.
2. During transport, housing, and/or subsequent treatment, cold-stunned turtles must be exposed to gradually rising air and water temperatures over many days, and not exposed to temperatures that would thermally shock them.
3. Turtles must be placed in closed containers with sufficient holes for adequate ventilation during transport. Turtles must not be transported in water. The containers housing turtles during transport must be padded and must not contain any material that could be accidentally ingested. Hatchlings (sea turtles with a straight carapace length ≤ 4 cm) must be transported in a container with moist sand. Post-hatchlings (sea turtles with a straight carapace length > 4 cm and ≤ 6 cm for all species except leatherbacks) must be transported in a container with a damp towel or cloth at the bottom of the container. The containers must be secured during transport so they do not slide around or tip over. The Service permit must accompany turtles during transport.

CARE AND MAINTENANCE REQUIREMENTS

Facility Construction

Tank Size Requirements:

Holding tank sizes for turtles must be based upon the size of the largest specimen in the tank as described below. Use straight carapace measurements to determine the appropriate tank size.

Note: For a long-term, non-releasable turtle, the facility must have a tank or tanks of sufficient size to accommodate the turtle through all life stages. If a facility cannot hold the non-releasable turtle as it grows, it must provide the following information to the Service: (a) a letter from another facility that has agreed to permanently hold the turtle once it reaches a size that the facility can no longer accommodate, (b) a description

of how the turtle will be transported to the other facility, and
(c) tank size(s) of the facility where the turtle will be transported and remain.

1. Hatchlings and post-hatchlings (up to 6 centimeters straight carapace length) – for one hatchling, a tank or sub-section of a tank with a surface area of at least five times the shell length by two times the shell straight carapace width of the turtle plus a minimum water depth of 1 foot. The minimum tank width must be no less than two times the shell width. Hatchlings must be housed separately.
2. Turtles greater than 6 centimeters and up to 50 centimeters straight carapace length – for one turtle, a tank with a surface area of at least seven times the shell length by two times the shell straight carapace width of the turtle plus a minimum water depth of 2½ feet. For each additional turtle, increase the original surface area by 50%. The minimum tank width must be no less than two times the shell(s) width (i.e., for multiple turtles, the sum of the shell straight carapace widths must be multiplied by two to determine the minimum tank width).
3. Turtles greater than 50 centimeters and up to 65 centimeters straight carapace length – for one turtle, a tank with a surface area of at least seven times the shell length by two times the shell width of the turtle plus a minimum water depth of 3 feet. For each additional turtle, increase the original surface area by 50%. The minimum tank width must be no less than two times the shell(s) straight carapace width (i.e., for multiple turtles, the sum of the shell straight carapace widths must be multiplied by two to determine the minimum tank width).
4. Turtles with a straight carapace length greater than 65 centimeters – for one turtle, a tank with a surface area of at least nine times the shell length by two times the shell straight carapace width of the turtle plus a minimum water depth of 4 feet. For each additional turtle, increase the original surface area by 100%. The minimum tank width must be no less than two times the shell(s) width (i.e., for multiple turtles, the sum of the shell straight carapace widths must be multiplied by two to determine the minimum tank width).

Exceptions:

- a. Sick or injured turtles may be held in a smaller isolation tank if determined by a veterinarian to facilitate treatments. Any turtles held for this purpose must be protected from desiccation and moved to an appropriate tank as soon as health allows.
- b. If necessary, healthy turtles may be held in a tank with dimensions less than those required for no more than 1 week every 3 months. The tank must be large enough to allow complete submergence and unimpeded turning.
- c. If necessary, hatchlings or post-hatchlings being held short term (to allow time to arrange safe release to the wild) may be held in a tank with dimensions less than those required above. They must be separated if aggression is observed between the hatchlings.

Tank Condition Requirements:

1. The inside surfaces of any holding tank must be non-abrasive, free of burrs or projections that could cause harm to turtles, and free of toxic heavy metals and organics, such as lead or copper paints. Any tank with painted surfaces must be free of biological hazardous material and must not be actively chipping or flaking. The tank must also be free of anything small enough to allow turtles access to bite or swallow. Use of non-finished concrete tanks must be avoided.

2. A holding tank must not contain any non-food items that may be ingested by a turtle or any items that would obstruct a turtle's ability to surface either to breathe or to float.
3. A holding tank must not contain entangling materials. Rock ledges or other habitat- mimicking items in the tank are encouraged to allow turtles to rest. However, these items must be constructed or placed in a manner that ensures a turtle cannot become tightly wedged or trapped underwater. Sea turtles must demonstrate the ability to maneuver safely around all tank items. Enrichment objects especially for resident/non-releasable turtles must be used for the quality of life and prevention of conditioning/pacing behavior. A tank must be designed to ensure the turtle stays within the tank at all times unless removed by facility personnel.
4. A holding tank must use railings/barriers to prevent the public from reaching into the tanks. If it is determined that public presence causes unnecessary stress, turtles must not be accessible to the public.
5. The drains or intakes of a holding tank must be constructed or securely shielded to prevent accidental entrapment. Inflows and drains must be placed to ensure appropriate water turnover and flow rates throughout all areas of the tank.
6. To help prevent the water temperature from becoming too warm (> 30°C/86°F), any outdoor holding tank must be at least 30% shaded. If water is recirculated, shading must be increased to at least 50% shaded.

Lighting

1. All the tanks in which sea turtles are housed must have enough lighting (sunlight and/or artificial lighting) to allow for easy viewing of the animals in all areas of the tank.
2. If artificial lighting is used as a primary light source, regular veterinary evaluation must address any lighting and/or dietary supplement needs based on clinical assessment and best available medical/husbandry information. Good quality full spectrum bulbs (UVA/UVB) (wavelength of UVB -280 nm to 320 nm) must be used to promote general health and avoid potential metabolic problems. If "diffusers" are used, care must be taken to ensure appropriate full spectrum exposure.
3. The photoperiod of captive sea turtles must be similar to a natural photoperiod and mimic the summer and winter season daylight hours. Tanks must not be artificially illuminated to provide a photoperiod of more than 14 hours per 24-hour period to represent the natural seasonal photoperiods.
4. Dark/shaded areas must be provided to allow turtles a choice. Artificial light must not be excessive so as to cause sensitivity.
5. Lights above the top of the tank must have shield guards to prevent accidental breakage.

Water Quality

Good water quality is essential to the health of sea turtles in captivity. Facilities must have written procedures for monitoring and maintaining water quality in all enclosures. At a minimum the following specific parameters must be met:

1. The salinity must be maintained between 20 ppt and 35 ppt. If necessary, sea turtles may be maintained

in more or less saline water for up to 24 hours per week. Sick or injured sea turtles may be kept at salinities below 20 ppt or above 35 ppt as prescribed by a veterinarian.

2. Water pH must be maintained between 7.2 and 8.5.
3. Water temperature must be maintained between 20°C and 30°C (68°F and 86°F). High and low extremes may induce disease (particularly fungal), injury, or even death and must be avoided. However, rehabilitation of cold-stunned turtles may require that turtles be placed in waters below 20°C (68°F) to allow them to warm gradually.
4. Chlorine can be used to treat the water to reduce bacterial and algae growth, but levels must be kept below 1.0 part per million (ppm). Chlorine levels greater than 1.0 ppm may cause irritation to turtle eyes. No other chemical may be used to treat water in a tank housing sea turtles if the chemical is not safely ingestible by turtles at the dilution that would be needed for effective treatment.
5. Coliform bacteria must not exceed 1,000 MPN (most probable number) per 100 ml of water. Steps must be taken to prevent the conditions in which coliform bacteria proliferate. Testing for coliforms is a simple, cheap, preventative/proactive measure; it is recommended testing be conducted monthly on all systems. The steps to prevent coliform proliferation include adequate filtration (removing suspended material and larger pieces of feces and leftover food) and the use of an appropriate sanitizing chemical such as chlorine, or a high turnover rate with fresh, uncontaminated seawater. The Service reserves the right to request total coliform counts monthly or more frequently if conditions warrant it.
6. If ozone is used for water treatment, the oxidation-reduction potential must be monitored and maintained below 400 millivolts (mV) if possible to reduce the potential for irritation.
7. The water must be clear enough to allow easy viewing of sea turtles in any part of the tank to assess health and activity.
8. Facilities holding turtles for rehabilitation must have tanks that maintain water quality by filtration or flow through. Tanks that require complete or near complete water changes as the sole means of maintaining water quality, such that the water level is dropped to the point where the turtle is sitting on the tank floor (“dump and fill”), may only be used for rehabilitation on a “temporary” (defined as an event where the turtle is expected to be medically cleared and ready for release within a 45-day period) or on an “emergency” (defined as an acute mass stranding event or an equipment-related failure at the facility such as power outages) basis as these conditions are not acceptable for long-term rehabilitation due to the additional stress caused by frequent maintenance.

The ultimate goal for a rehabilitating turtle is a return to and survival in the wild. The additional husbandry needs for a rehabilitating turtle in a “dump and fill” tank may unnecessarily acclimate a turtle to captivity. Therefore, if a turtle held in a “dump and fill” tank is not medically cleared within 45 days; the facility must contact the Service on a case- by-case basis to determine the appropriate course of action for the turtle.

9. Facilities that use “dump and fill” tanks for rehabilitation on a “temporary” or “emergency” basis must:

Ensure there are available tanks nearby so that a turtle can be quickly moved to a clean tank while the dirty tank is dumped, cleaned, and filled. This prevents the turtle from being out of the water for very long and reduces handling;

- a. Remove food that is uneaten. If food must be left unattended, it is recommended that the uneaten food be removed within an hour unless it is live prey; and
 - b. Evaluate the turtle skin and shell daily for any abnormalities or worsening of the turtle's condition.
10. Facilities that are expected to hold turtles longer than 45 days with preexisting "dump and fill" tanks for rehabilitating turtles must contact the Service for additional husbandry conditions to reduce stress to the animals during water changes, as well as provide a projected timeline (not to exceed 1 year) for the retrofit of these tanks.
11. Any flow-through seawater system must be maintained to facilitate sufficient turnover of seawater. At a minimum, any flow-through system must have a filtration system on intake. For closed or semi-open systems, filtration must be incorporated into the system to ensure appropriate water quality of recirculated water. Filtration and flow through systems must be able to maintain the minimum water quality parameters.
12. The facility must have the ability to (1) monitor and operate within the parameters described in this document, (2) correct any situation in which the parameters are not met, and (3) properly care for the sea turtles while corrective measures are being taken.
13. Water disposal must be in accordance with all applicable local, State, and Federal laws.
14. Treatment or pre-filtration of fresh seawater is recommended to remove infectious cercariae (parasitic larva of a trematode worm).
15. Facilities that make sea water must ensure that the appropriate variety of salt (without anticaking agents) is used to make and maintain the water quality standards for marine life.

Water Quantity

1. Any facility housing sea turtles must have the ability to provide adequate water quantity under normal and emergency conditions to allow complete submergence and unimpeded turning. In an emergency, sea turtles may be kept out of water for a maximum of 4 hours per week. During this time, they must be kept moist and protected from sun, heat, temperature extremes, and physical damage. This situation should occur only very rarely, if ever. Treatment of seriously ill or injured sea turtles may require they be out of water for more than 4 hours per week (e.g., during anesthesia, when administering fluids, or to ensure they do not drown if too weak to surface to breathe).

If sea turtle tanks are regularly drained and cleaned, adequate holding tanks must be available to house the turtles safely during this time.

Food and Feeding

1. Without exception, the food fed to sea turtles must always be of human quality or comparable quality of food that is reflective of their diet in the wild. Food must either be fresh, flash frozen and glazed, or frozen in some other manner that ensures the quality of the food. Any frozen food must be completely thawed in cool air, preferably, or cool water, prior to feeding and used entirely or discarded. Under no circumstances may food be refrozen. If the quality of the food is questionable, it cannot be used as food for sea turtles. This does not prohibit commercially prepared diets (e.g., dry, pelletized, floating or

sinking formations), but they must be fresh or stored frozen to maintain nutritional value and to prevent deterioration or microbial growth.

Reasonable efforts must be made by the holding facility to develop proper diets for sea turtles. Feeding of oily or fatty fish can lead to obesity and cause fatty degeneration of the liver in sea turtles and must be minimized. Also, the quantity of food must be rigidly controlled so turtles do not become obese. It is the responsibility of the holding facility to ensure and justify the adequacy of its feeding regimen for each species and size class.

Turtles must be weighed and measured monthly (4-6 times a year for non-releaseable turtles) to ensure they are not overfed. See Whitaker and Krum (1999) for additional information on feeding recommendations.

2. Hand feeding of turtles that will eventually be released is prohibited except when absolutely necessary for rehabilitation. In the latter case, the turtle must be allowed to feed on its own as soon as possible. The use of bottom feeders or other tools mimicking the natural feeding environment is encouraged.
3. Food for groups must be broadcast around the tank to avoid competition and possible injury. Special precautions and vigilant oversight are required when using broadcast feeding for large numbers of turtles.
4. Prior to release, turtles of species that routinely feed on live prey in the wild must be provided with and observed capturing live food prior to release to ensure sufficient foraging capabilities. Live prey that is an immediate host for parasites such as snails must be avoided.

Behavior and Intermixing

1. Some species of sea turtles, especially loggerheads and Kemp's ridleys, may be very aggressive toward their own and other species, particularly while feeding. Whenever the situation dictates that sea turtles be placed together, they must be closely observed until it is established that they display no aggressive behavior that might result in injury or death. Turtles must be separated at the first sign of aggression. Tank dividers can be used. Small sea turtles must not be housed with larger turtles, especially of another species, as larger animals can injure or kill smaller animals.
2. Male and female adult turtles must be separated to prevent captive breeding. The approximately adult sizes are as follows: loggerhead turtle straight carapace length ≥ 80 cm, green turtle straight carapace length ≥ 83 cm, Kemp's Ridley turtle (*Lepidochelys kempii*) straight carapace length ≥ 58 cm, hawksbill turtle straight carapace length ≥ 71 cm.
3. Turtles on exhibit may be housed with other species that are present in their natural environment. The other species housed with a turtle must be reviewed and approved by the Service. NOTE: In some cases, the permanent injury of a turtle or the size of a turtle may restrict the species that will be authorized for inclusion in the exhibit with a turtle.

Intermixing of Wild and Captive Stock:

1. Existing captive sea turtles must not be exposed to seawater in which newly wild-caught or live-stranded sea turtles are kept without an adequate period of quarantine to prevent disease or parasite transmission. The quarantine period must be at least 60 days.
2. Rehabilitation facilities must provide separate tanks or a tank with a separation for long-term and

temporary captive turtles, not only in the physical plant but in seawater maintenance and treatment systems. This will prevent injury due to aggressive behaviors, or sickness or death through transfer of pathogens or parasites.

3. If a female deposits eggs in an exhibit or shows signs of stress in an attempt to leave the exhibit, the facility must contact the Service that issued the permit under which the turtle is being held within 24 hours to discuss the best course of action for the eggs and/or female.

Fibropapillomatosis:

Fibropapillomatosis (FP) is an infectious disease and the preponderance of scientific evidence supports that a herpesvirus is the causative agent. The high incidence of FP in green turtles in Florida waters is of special concern. Turtles with FP must be isolated from turtles that are not known to have the disease. FP growths are highly vascular when large and appear to be extremely sensitive due to the presence of nerve bundles, especially around the eyes. Facilities that admit turtles with FP must have the capacity for strict biosecurity, including disinfection of equipment, separate water handling systems, and education of staff and caregivers on biosecurity measures. Only experienced veterinary personnel should be treating these individuals.

Veterinary Care

Any facilities holding sea turtles in captivity must have access to a veterinarian who:

1. Has an active veterinary license in the United States (means a person who has graduated from a veterinary school accredited by the American Veterinary Medical Association Council on Education, or has a certificate issued by the American Veterinary Graduates Association's Education Commission for Foreign Veterinary Graduates).
2. Will be on-call 24-hours a day or identify at least one backup veterinarian or have a contingency plan for when the attending veterinarian is not available.
3. Has documented 1-year clinical experience working with sea turtles and clear demonstration of clinical proficiency or have a written consulting agreement with an experienced sea turtle veterinarian, which assures availability of consultation when needed.
4. Has access to a list of veterinarians with experience working with sea turtles to contact for assistance.

A properly permitted facility may receive for treatment or rehabilitation any sea turtle that is sick or injured. Upon receiving a sick or injured sea turtle, the attending veterinarian is to examine the turtle within 24 hours. If this is not possible, the Service must be contacted to make alternative arrangements, which could include consulting an approved veterinarian at a remote location.

The diagnosis of disease, surgical intervention, and the prescription of medications must be carried out only by a qualified veterinarian. Measures must be taken to preserve the health of captive sea turtles and to prevent injury or spread of disease. Injured or diseased sea turtles must receive appropriate medical care under the supervision of a qualified veterinarian in a method that prevents cross-contamination to other animals. Injured or diseased animals should be physically separated with their own clean seawater source, and all reasonable efforts made to avoid cross-contamination to unaffected animals.

Health records must be kept for each animal. These should include all examination and clinical data, as well as an assessment of the findings. For guidance on veterinary care, see Leong *et al.* (1989), Campbell (1996),

and Whitaker and Krum (1999).

Biological Samples for Diagnostics and Health Assessments of Turtles Associated with a Law Enforcement Case or Litigation

1. Samples must remain in the legal custody of the facility holding the Service permit.
2. Only samples specifically taken for diagnostic tests may be sent to laboratories to assist in health assessments.
3. The transfer of biological samples from the facility to any location or individual other than those identified in the facility's permit requires written approval from the Service.
4. Sea turtles may be transported off-site for specific tests such as Magnetic Resonance Imaging (MRI) or Computed Tomography (CT) scans to assist diagnosis for health assessments provided it is a test prescribed by the qualified veterinarian treating the turtle, and the laboratory is listed in the facility's permit.

Euthanasia

All facilities conducting rehabilitation must obtain a Service and/or State permit for euthanasia or have access to a veterinarian that has a Service and/or State permit for euthanasia. Euthanasia is authorized only if, in the judgment of a veterinarian, a turtle's recuperation is unlikely, if an illness or injury is terminal or untreatable, if an illness is communicable and likely to pose a threat to wild populations or captive turtles, or if a turtle's wounds would preclude survival in the wild or a self-maintaining life in captivity. Note: Euthanasia of endangered turtles may only be authorized by the Service.

Release

The final determination of an individual's fitness for survival in the wild will be made with input from the facility's veterinarian, animal care personnel, and other persons with sea turtle expertise, as necessary. The attending veterinarian must perform a hands-on physical examination of the turtle prior to the release determination. The attending veterinarian must review the turtle's complete history including all stranding information, last treatment, and diagnostic test results. When a facility's veterinarian has determined that the turtle has recovered sufficiently from its illness or injury and is ready for release, the principal permit holder, or a designee, must contact the Service that issued the permit under which the turtle is being held within 24 hours to discuss the appropriate time and site for the release. The site for release must be determined based on the latest scientific information on turtle movements and regional knowledge. ***Failure to notify the permitting agency of the releasable status of a turtle or the unnecessary retention of turtles in captivity following medical clearance may be considered a violation of the Service permit and could result in the permit being suspended. Unless there are additional complications, turtles are expected to be released within 2 weeks of medical clearance.***

Non-releasable Turtles: Non-releasable turtles are defined as turtles (bycaught, stranded, or congenitally deformed) that have been rehabilitated, but which have permanent handicapping injuries or defects that preclude their potential survival in the wild. Many injuries, when healed, will not hamper a turtle's existence in the wild. For example, the loss of a flipper does not prevent a turtle from being able to survive in the wild. Flipper damage is not an unusual occurrence and is often documented in nesting turtles on the beach. Examples of conditions that result in declaration of non-releasable status include blindness in both eyes, loss

of more than 75% of three or four flippers, or abnormal buoyancy that prevents normal foraging behavior.

Release of Cold-stunned Turtles: The criteria for determining whether turtles that were cold stunned **with no other medical conditions** can be released must be based on behavior and activity of the turtle. If a turtle is alert, swimming strongly, not on medication(s), and otherwise

behaving normally, it must be released as soon as possible in the vicinity of where it was found cold stunned. The ideal release water temperature is approximately 18°C (65°F) and above; however, circumstances may necessitate a release at a lower water temperature. Turtles have been reported to cold stun in water that is approximately 10°C (50°F) (Schwartz 1976). If a turtle has been cleared for release, but the water temperatures in the capture location are still too low, the Service must be contacted to coordinate the release timing and location. Prior to release, turtles must be held in water temperatures that are gradually adjusted to mimic those found in the natural environment so the turtle does not have a shock response upon entering a cooler or warmer natural water temperature.

Release of FP Turtles: Turtles with FP can be released when a facility's veterinarian has determined that the turtle has recovered sufficiently from its illness or injury and is ready for release. The principal permit holder, or a designee, must contact the Service that issued the permit under which the turtle is being held within 24 hours to discuss the appropriate timing and site for the release. The site for release must be determined based on the latest scientific information on turtle movements and regional knowledge regarding prevalence of FP.

All sea turtles must be measured and weighed prior to release following the protocols listed at http://accstr.ufl.edu/cmttp_tag_&_measure_protocols.html. The release protocol or procedure and the release location must be approved in advance by the Service.

External Flipper Tags and Passive Integrated Transponder (PIT) Tags: Flipper and PIT tags must be inserted prior to release only under the following conditions:

1. The turtle is size appropriate for receiving a flipper and/or PIT tag.
2. Tagging does not delay the release of the turtle.
3. The turtle is tagged by animal care staff that has demonstrated tagging expertise and is specifically permitted by the Service to conduct this activity.
4. The turtle is tagged following the protocols listed at http://accstr.ufl.edu/cmttp_tag_&_measure_protocols.html.

Satellite Transmitters: An investigator or facility wanting to attach a satellite transmitter to a sea turtle due for release must first obtain a modification to their Service permit. Each request must be reviewed on a case-by-case basis by the Service. These requests can be submitted prior to obtaining the turtles with appropriate parameters to support the proposal as described below.

The release of a turtle must not be delayed to obtain permits or to facilitate the attachment of a satellite transmitter. Failure to obtain a Service permit modification is considered a violation of the original Service permit.

The following information must be included with satellite transmitter permit application submissions:

1. A letter from the veterinarian caring for the turtle stating that the attachment of the satellite transmitter will not compromise the health of the turtle and its' survival in the wild.

2. A proposal that identifies the benefit to the conservation of the species in the wild including specific Recovery Actions identified in the species' Recovery Plan.
3. A compilation of information for all satellite tagged rehabilitated turtles already released by the facility within the State waters for the species proposed to be tagged. Include the identification of the turtles, date(s) released, information obtained from the previous tagging event(s), and information needs/gaps expected to be gained from the proposed tagging.
4. The species, size, and weight of the turtle that is being proposed for satellite tagging.
5. The size and weight of the transmitter proposed for the turtle.
6. The method of attachment.
7. Information about the individual who will be performing the attachment, including their contact information and a history of their sea turtle transmitter attachment experience.

NOTE: This information will be used to evaluate the benefit to the conservation of the species in the wild with respect to the additional energy cost to that specific animal as a result of the drag of the transmitter.

Necropsy and Disposal of Carcasses

1. Necropsies must be performed on any turtles that die at a captive facility. Necropsies must be performed by or in consultation with a veterinarian, veterinary diagnostic clinic, qualified pathologist of a college or university, or qualified State/Federal resources agency staff. For guidance on conducting necropsies, see Wolke and George (1981), Rainey (1994), and Wyneken (2001).
2. The following documents must be sent to the Service that issued the permit(s):
 - a. The Sea Turtle Stranding and Salvage Network - Gross Necropsy report (<http://www.seaturtle.org/groups/ncwrc/STSSN.necropsy.pdf>), and
 - b. A copy of any necropsy report that includes the results of pathological, histological, microbiological, virological, and parasitological studies.

Following necropsy, the carcass of any sea turtle that dies while in the custody of a Service or State permitted/authorized facility must be completely destroyed (in accordance with State and local laws) or, subject to the approval of the Service, be offered to a museum, university, or other educational or research facility. Under NO circumstances may a dead sea turtle, or any part thereof,

be salvaged for any purpose other than Service or State-approved education and/or research activities.

Conclusion

Inspection:

In order to ensure that facilities holding live sea turtles for rehabilitation, education, and/or research are maintaining the requirements for care and maintenance, and are in compliance with all applicable laws, rules, and guidelines, all facilities are subject to inspection at any time by Service or State personnel. Facilities may be asked to provide a current coliform bacteria count and water quality data upon inspection. Facilities will be provided with a copy of the report generated from the inspection. If the facility does not

meet the requirements of their permit, which include the above *Care and Maintenance Requirements*, it will be considered a violation of the Service permit and could result in the permit being suspended.

Reporting:

Quarterly reports (Quarterly Report: Appendix A) of the number and species of sea turtles taken to a permitted rehabilitation facility for treatment, and their diagnosis must be emailed to the Service at seaturtle@fws.gov. Information must be emailed on the following dates (April 15, July 15, and October 15) each year.

In addition, an annual report must be submitted no later than January 30 of each year and must include the following:

- i. A January through December summary of the number and species of sea turtles taken to the permitted rehabilitation facility for treatment, their diagnosis and current disposition (including those that died, were transferred, or were released).
- ii. An account of euthanized specimens along with a description of the circumstances of their capture and reasons for euthanasia.
- iii. Evaluations of all non-releasable (resident) turtles (Non-Releasable Turtle Report: Appendix B) and current information regarding the care of the turtles including the size and weight.
- iv. A list of veterinarians and animal care staff that worked under the Service permit along with a summary of their sea turtle experience.
- v. A summary of the number and species of sea turtles in the facility that was collected prior to listing under the Endangered Species Act. Include information confirming that adult male and adult female turtles are maintained separately.

For Service permits, annual reports must be submitted to the office of the Service's National Sea Turtle Coordinator, 7915 Baymeadows Way, Suite 200, Jacksonville, Florida 32256-7517.

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