

**New England Aquarium
2025 General Protocol on Sea Turtle Treatment**

New England Aquarium Cold-Stun Season Intake Protocol

2025 revision

Our philosophy: We will attempt to treat all turtles as described herein. However, due to the nature of the event, ability to transfer animals to other facilities, staffing deficiencies due to unforeseen circumstances, and caseload, it is acceptable to deviate from this protocol as long as on-site Rescue and AHD staff communicate and agree on a plan. Some areas for streamlining may include elimination of certain radiographs, exams, delayed feeding, etc. During these challenging periods, it is acceptable to prioritize the most critical tasks, and let others become overdue. When resources permit, overdue tasks will be reassessed and completed if still relevant and/or applicable.



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COMMUNICATIONS

Daily operational communications should follow the Incident Command System

Daily operations:

- Identify daily Points of Contact for departments, if not clear.
- Rescue OPS/Clinic Group Supervisor (CGS): contact veterinarian if moribund or deceased turtle(s) are placed in A1 for veterinary assessment.
- Rescue OPS, CGS, meet with AHD staff at 8:15am to establish plan for blood, radiographs, vet exams, treatments, and delegation of vet journal and task review, leaving enough time for afternoon treatments.
- Rescue Operations Section Chief (OPS): contact veterinarian on duty to notify them of incoming patients.
- Prioritize blood sampling to allow ample time for veterinarians to review results.
- Pertinent Rescue ICS roles and AHD staff will meet at 4:15pm each day to debrief on cases of special interest, relevant updates, and any clarifications that are needed. This meeting should not exceed 15 minutes, if more discussion is warranted, a designated time and location will be established.

INTAKE: INITIAL PROCEDURES

TEMPERATURE ZONES DURING INTAKE SEASON:



55°

Day 1: Swimming (Fresh water) will occur in the white tanks (dump and fill).

65°

Day 2: Swimming (salt water or brackish) will occur in white tanks (dump and fill) and blue poly tanks (dump and fill).

72-75°

Day 3 and thereafter: Swimming (Salt water) zone will be in the rrtank1/2 and rrtank3/4.

• **Temperature management:**

- o If a turtle arrives to NEAq with an internal body temp below 55°F, raise to 55°F on Day 1.
- o ICU temperature runs lower than digital readout. As a general rule set the ICU 2-3°F above the desired set point (e.g., set at 58°F to be at 55°F).
 - Example: ICU notation on whiteboard and laminate board: “3:45 pm ICU set at 58°F for a set point of 55°F”.
- o If ICU air is too dry use ICU humidifier attachment (humidity range at least 60-70%)
- o Turtles will be raised 10°F increment each day and should be raised this entire amount at one time by relocation to new temperature zone/swim pool.

• **Initial assessment and therapeutics:**

- o HR will be documented on admission. Turtles with a HR <10 bpm will receive 0.1mg/kg epinephrine IM. After communication with veterinarians and depending on caseload, if needed, epinephrine dose may be rounded to the nearest 0.1 ml for turtles with a body weight between 2-4 kg. If the turtle's weight is outside

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this range, epinephrine dose will be based on the actual weight of the turtle. After turtles are processed at the intake area they are sent to swim area ,or rescue clinic (if staff available) for further evaluation.

- o RR will be documented opportunistically
- o During swim: **triage group** is assigned:
 - Triage turtles into group 1-3 based on activity and responsiveness, etc.
 - o 1.Unresponsive – likely to die
 - o 2: Quiet but responsive (most turtles will be in this group)
 - o 3: Bright, alert, responsive +/- active
- o Bloodwork/fluid plan
 - Turtles selected for initial bloodwork will receive an individual fluid plan based on blood results.
 - Kemp's ridley and green turtles not selected for initial bloodwork will receive general fluid plan:
 - o LRS/2.5% Dextrose SC
 - Small (2kg) =40 ml
 - Medium (3kg) =60 ml
 - Large (4kg) =80 ml
 - o Weights outside the 2-4 kg range: fluid volume to be calculated using actual weight, 2% body weight (20 ml/kg) SC.
 - Loggerhead turtles will not receive fluid therapy unless directed by a veterinarian.

CLINICAL MANAGEMENT

BLOODWORK:

- See Blood Draw SOP
- Notify an AHD staff member prior to collecting blood samples.
- In conjunction with AHD, Rescue staff will run iStat cartridges if needed at select times.
- Nova blood analyzer: run on whole blood directly from the syringe, not plasma.
- Preparing Blood Samples:
 - o Use heparinized syringe (minimal heparin should be visible within syringe)
 - See "Heparinizing syringe for blood draw SOP"
 - o Blood Draw Amounts:
 - NOVA:
 - 0.5 ml whole blood
 - PCV/TS:
 - 0.3 ml whole blood
 - For CBC/chem:
 - 1.5 ml whole blood (0.5 ml for CBC + 1.0 ml spun down for plasma for chemistry)
 - Blood Culture:
 - 0.1-0.3 ml (0.2-0.3 ml preferred)
 - if no other test being performed use non-heparinized syringe
 - Blood Glucose (via glucometer):
 - 0.05 ml whole blood
 - o Label each syringe with the following:
 - Date
 - Time
 - Accession Number (always include species)
 - Body Temperature (temp of internal body, water, or air)
 - Tests being requested
 - Laminated bloodwork sheet will accompany blood syringe to lab
 - Include HR, and triage group number (when triage grouping is in use)
- Reminders:
 - o Bloodwork request should state exactly what is requested, e.g., if NOVA/PCV/TS is required then "NOVA/PCV/TS" needs to be specified in the Subject in the Tracks Task.

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- o Vet treatment plan to be in by 4 pm if to be performed that day.
 - If not received by 4 pm then turtle will receive standard fluid/abx plan.
- o CBC/Chem will be submitted at +/- Day 30 of hospitalization if not otherwise specified.
- Basic schedule for turtle blood sampling:

On Admission: case-by-case basis as determined by OPS & Veterinarians:

- Prioritize group 2
- Draw 0.8 ml of whole blood: run a Nova, Total Solids (TS), and PCV

Subsequent Blood Draws

- To be determined between Rescue staff and veterinary staff
- Easy touch glucometer may be used to obtain blood glucose, at the discretion of a veterinarian

THERAPEUTICS:

- On admission all Kemp's ridley and green turtles will receive:
 - o Oxytetracycline 42 mg/kg SC diluted in their fluid therapy
- Subsequent medications and fluid therapy for Kemp's ridley and green turtles:
 - o On day 2 & 3 administer 2% BW LRS SC unless otherwise specified by veterinarian (rounded volumes are acceptable as above for turtles 2-4 kg).
 - o Oxytetracycline will be given Q6 days diluted in 0.5 % BW LRS or in prescribed SC fluids.
 - o Starting on day 6 Vitamin B complex will be given at 5 mg/kg (thiamine) IM q12d.
 - o Starting on day 12 Vitamin E will be given at 2 IU/kg IM q12d.
 - o Vitamin E Q6 Days do not close out
 - o Vitamin B, and Vitamin E (Q12) days can be discontinued after a turtle is eating consistently
- Case-by-case:
 - o Veterinarians may elect to treat certain loggerhead turtles, if needed. For example: Oxytetracycline 42 mg/kg SC q6d diluted in prescribed fluid therapy or 0.5% BW LRS.
- Reminder:
 - o Prior to administration ensure fluids are as close to the turtle's temperature as possible.
- Switching Injectable to Oral Medications
 - o When a turtle is eating well enough to change from an injectable form of medication to oral form, veterinarians should be notified verbally so that prescriptions can be adjusted. If there is back and forth between PO and injectable meds due to variable appetite, discuss with a veterinarian.
- Drug Storage
 - o Solution bags and blood tubes that have expired should be discarded.
 - o Fluid therapy can be used IV for 7 days after puncture.
 - o Fluid therapy for SC or PO use should be discarded 30 days after puncture.
 - o Opened solutions should be refrigerated and labelled with the date of opening/first puncture.
 - o Use stickers on syringes.
 - o Label with accession number, date drawn, name of drug, concentration, and dose.
 - o Only draw up medications the night before if the caseload is very high.
- Drug Disposal
 - o All medications that have expired should be sent to AHD and labeled as expired.
 - o Solution bags:
 - LRS, NaCl, Dextrose/Sodium chloride mixtures can be disposed of down the drain.
 - Dispose of empty bags in regular trash receptacles or recycle when possible.

RADIOGRAPHS:

- Rescue staff will verbally arrange radiographs with AHD staff. AHD staff will prepare the equipment in advance.
- AHD staff to take radiographs
- Reminders:
 - o Highlight known wounds or handling precautions on diagnostic sheet so that AHD staff is aware.

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- Basic schedule for radiographs:

On admission:

- DV whole body, ensuring that the entire head and all four flippers are visible for all turtles. Multiple DV lung views may be needed for larger turtles. Be sure to include any areas with substantial wounds, swellings, or lameness. AP full body view, only if directed by veterinarian.
- To ensure proper image try and remove as much sand and debris as possible from turtles prior to radiographs.

Two weeks post-admission and subsequently as directed by veterinarian:

- DV, AP, Lat, Flippers as needed.

WOUND CARE:

- Treatment:
 - o Includes debridement of easily sloughed necrotic tissue when present.
 - o Clean with dilute Betadine or Nolvasan (dilute 8 ml in 1L sterile water). Triple antibiotic ointment and silvadene may be applied topically on a case-by-case basis.
 - Please use silvadene sparingly. A thin coat is enough to treat the wound. Copious amounts of silvadene can easily be removed and possibly have a detrimental effect on good bacteria that inhabit our LSS.
 - o Lesions should be treated on a case-by-case basis depending upon severity and handling frequency
 - o Wound care will be performed when the animal is removed from the water or during routine exams and treatments.
 - o If wounds are severe at BFF shoulder/proximal flipper, then turtle should not receive a flipper band.
- Photos:
 - Photos will be taken of significant wounds/injuries at a regular interval and uploaded to Tracks Entity Media
 - Label pictures with date and turtle's accession.

Exams:

Exams will be performed every three days unless otherwise specified.

- o Exams can be dismissed on non-treatment days when in active in-take season

DIET

SOLID FOOD:

- Food will be offered at least 3 days per week once the turtle has been hospitalized for 7 days. As resources allow, food may be offered once the turtle is at 75 degrees and swimming in pool for 24 hours continuously.
- Initial feeding does not include hard parts, e.g. shells, bones, beaks, etc.
- Veterinarians will notify Rescue staff by e-mail or through Teams if there are any dietary restrictions for individual turtles.
- Fillets
 - Head & tail removed from fish. Slice longitudinally along spine, feeding only skin and muscle (no bones).
- Steaks
 - Head & tail removed from fish. Cut slices ¼ to ½ inch in width.
- Squid
 - De-pen by pinching the top of the pen at the front of the mantle and gently pull out. The beak is located under the arms and can be popped out by pinching the head. The head is cut off and the mantle is sliced ½ to 1 inch.
- Greens
 - During rehabilitation of green turtles, offer dark leafy green vegetables as an alternative diet source as animals approach food limits.
- Turtle Gel may be offered on a case- by- case basis.

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TUBE FEEDING:

- If a turtle continues to be anorexic, tube feeding of fish gruel may be offered. Decisions to tube feed will be made between veterinarians and Rescue staff.

FOOD LIMITS:

- Initial feeding
 - 0.5%BW of food offered (no hard parts)
 - Once the turtle is consuming food regularly, to gradually increase volume to a maximum of 2% BW of food.
- Hard Parts vs. No Hard Parts
 - Turtles will not be offered hard parts until certain criteria are met:
 - If Rescue staff observes the turtle defecating normally then hard parts may be offered
- Hard parts may be offered after the turtle's second round of radiographs, and if there are no feeding restrictions ordered by the veterinarians. Veterinarians may request increasing or decreasing food limits according to body condition, nutritional and health status of an individual animal – these requests to be discussed between AHD and Rescue staff.

VITAMINS:

- All turtles receive the following vitamins (doses indicated in Tracks)
 - **Vitamin B COMPLEX:** 5 mg B1/kg IM Q12D until eating
 - **Vitamin E:** 2 IU/kg IM Q12D until eating
 - **Calcium Carbonate:** 25 mg/kg of turtle weight PO SID
 - **Sea Tabs BTFS PO SID:** turtles will receive at least ¼ tab per day. If food intake is greater than 125 g, increase by ¼ tab for each additional 125 g of food, rounding off for practicality. E.g. turtle eating 250 g food gets ½ tab; turtle eating 375 g food gets ¾ tab; turtle eating 500 g food gets one tab; etc. These targets are based on the Vit E and Vit B1 content of Sea Tabs and recommended intake of those vitamins per mass of food.

ENVIRONMENT

- **ENVIRONMENTAL QUALITY:** Water samples from each tank should be brought to the AHD lab as soon as possible each morning (8:30 AM at the latest).
- Samples will be brought down in Nalgene bottles which are supplied by Environmental Quality.

Quincy RR tank testing schedule

Tank	Salinity [ppt]	pH	NH ₃ [ppm]	NO ₂ ⁻ [mg/L]	NO ₃ ⁻ [mg/L]	Br ₂ [mg/L]	Total Coliforms [mpn]	E. coli [mpn]
	{28 - 35}	{7.8-8.3}	{<1.00}	{1.000}		{<0.21}	{<1000}	{<1000}
RR1/2	Tue/Thu/Sat	Daily	Tue/Thu/Sat	Tue	Tue	Daily	At least monthly	At least monthly
RR3/4	Tue/Thu/Sat	Daily	Tue/Thu/Sat	Tue	Tue	Daily	At least monthly	At least monthly

Bacteria samples of all tanks will be tested at least monthly during turtle season. Samples that are high will be retested as soon as possible. Additional testing will depend on biomass and food input changes, bromine readings, veterinary concerns and will be decided on by the Director of Environmental Quality, in consultation with the veterinarians.

***Keeping excess food waste and fecal matter out of the tanks is important for maintaining water quality**

ENRICHMENT:

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- Sarah DiCarlo will supervise the turtle enrichment program.
- New enrichment items to be approved by Veterinarians following established NEAq protocols.
- During active intake period, do not introduce hide-a-ways to tanks unless otherwise discussed between Rescue/AHD staff.
- Provide additional enrichment such as hide-a-ways, lettuce trays, and fake kelp.

TAGGING

- Prior to release:
 - Inconel tags will be placed in both hind limbs of turtle whose SCL ≥ 30 cm, unless there is a clinical concern. See Inconel Tag SOP.
 - A PIT tag will be placed in the left triceps muscle. The right triceps may be used on a case-by-case basis. See PIT Tag SOP.
 - Some turtles may need to be sedated for tagging.
 - Lidocaine/ Prilocaine Cream 2.5% / 2.5% will be applied to the site and will have a contact time of no less than 5mins prior to tagging.
 - Turtles may receive satellite and/or acoustic tags if permitted for specific research projects.

TRANSPORT

- All transport/release decisions will be e-mailed to rescue@neaq.org and AHD@neaq.org.
- If turtles receive fluids the *night before* transport, Lk's and Cm's will receive 2% BW LRS fluids and Cc's will receive 0.5% BW LRS, unless otherwise specified by veterinarians.
- If turtles receive fluids the *day of* transport, Lk's and Cm's will receive 1% BW LRS fluids and Cc's will receive 0.5% BW LRS, unless otherwise specified by veterinarians.

RELEASE

- In-state turtle releases do not need fluids unless we foresee an issue with a timely arrival to beach.
- Out-of-state releases follow the transport schedule as described above.

NECROPSY / SAMPLES

DEAD TURTLES:

- Any questionable turtle should receive a cardiac ultrasound exam prior to being moved to the necropsy room.
- Any turtle that dies should be given a **Time of Death** (T.O.D.) by the veterinarian on duty by recording time in mortality wizard.

DEATH STATUS:

- Dead-on-arrival (DOA): This implies that the turtle is dead (i.e. cannot be resuscitated because it is DEAD) when it enters our facility. In many cases this is clear (rigor mortis and no heart activity with echo). If a turtle arrives with detectable cardiac activity, but has no cloacal, palpebral, *or* corneal reflex, no voluntary respiration, and no meaningful response to treatment, and dies within several days or less, it will be classified as DOA. For such cases, we are assuming that the turtle was dead on admission but had residual cardiac activity.
- Mortality natural: This implies that the turtle was not dead when it arrived to us, and that it later died in our care (even if "later" is on the same day as admission). In many cases, it is clear that a turtle is alive (e.g. voluntary breathing, voluntary movement). We will define a turtle as being alive if it has detectable cardiac activity, and any

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detectable reflex response (indicating at least some neurologic function). If this turtle later dies without euthanasia, it is considered “mortality natural”.

- Mortality euthanasia: This implies that we used a euthanasia method to end the life of a turtle that was alive. This category will not be used for turtles that are defined as DOA above, but for which pentobarbital, potassium chloride or other methods are used to end cardiac function.
 - The veterinarian on duty is ultimately responsible for categorizing the case for purposes of the medical record. If there is disagreement over the category, the final determination will be made by Dr. Joblon after discussion with the involved staff. In most cases, the category is clear, and it is expected that these guidelines will be used for only a small percentage of cases.

NECROPSY:

- Inform veterinarians of necropsies to be performed.
- Prioritize and Sample Collection:
 - Cc's
 - Cm's
 - Turtles that have been clinically treated for ≥ 1 week.
 - Turtles that have been euthanized.
 - Turtles at veterinary discretion.
- All dead turtles moved to the necropsy room should be labeled with a tyvek tag secured around a front flipper prior to placing in the carcass freezer.
 - Tag should be labeled with Accession # and date of death.
 - Log all carcasses on the turtle carcass inventory sheet posted on the inside of the necropsy door.
- Contact vet w/ interesting findings @ the time of necropsy.
- Ridleys should receive full gross necropsy however histo will not be collected unless unusual lesions are found. Please see veterinarian on duty, Adam or Linda with lesion questions (Hybrids should be treated as Ridley's).
- Additional species-specific sampling request are posted in the necropsy lab.