

**New England Aquarium
2012 General Protocol on Sea Turtle Treatment**

VETERINARIANS:

CONSULTS:

- Contact the veterinarian on duty when turtles are coming in.
- Veterinarian on duty: fluid plan and diagnostics.
- Meet w/ veterinarian in AM to go over blood results & get fluid plans so enough time is allotted for PM treatments.

EXAMS:

- Contact the veterinarian on duty and coordinate a time for turtle exams.
 - o Vet emails w/ diagnostic results will be printed and placed in a binder that is kept in the rehab clinic at the end of the counter with the sink.
 - o Update case histories w/ diagnostic results & exam notes once a week. Once updated the vet note binder will be cleared out.

BLOOD:

DIAGNOSTICS: [Basic schedule for turtle blood sampling]

- Could be altered on a case-by-case basis depending on the individual animal.
- Nova: run all on whole blood directly from the syringe, NOT on plasma.

On Admission:

- Draw 3.0 ml of whole blood: run a Nova, Total Solids (T.S.), and PCV, then Archive the remaining plasma into two cryotubes if able (0.5ml minimum preferred in each; if less than 1ml of plasma put full sample into one cryotube).

Once turtle has reached 70 degrees

- Draw 3.0 ml of whole blood and run a CBC/Chem and Nova, and archive (two cryotubes if possible).

2 weeks from first CBC/Chem:

- Draw 3.0 ml of whole blood and run a CBC/Chem and Nova, and archive (two cryotubes if possible).

Second Month in Rehab Onward:

- Every turtle should have a CBC/Chem, NOVA and archive (two cryotubes if possible) once per month unless otherwise specified by vet.

Reminders:

- Two weeks after discontinuing antibiotics repeat a CBC.
- Before a turtle is to be transported or released, draw a final Archive, CBC/Chem, +/- Nova, unless blood was drawn within the past 4 weeks or otherwise specified by vet.
- Any additional blood that is taken for banking or additional studies should be noted on the Sea Turtle Diagnostic Form.

Preparing Blood Samples:

- Use **heparinized syringe**, consistency of amount drawn is a priority. (No heparin should be visible within syringe)
- Blood Draw Amounts:

<u>Test</u>	<u>Whole Blood</u>	<u>Plasma</u>
CBC/PCV/Smears	0.3 ml	
Chemistries	1.0 ml	0.5 ml
Nova	0.5 ml	
Archive	1.5 ml	1.0 ml
Blood Culture	1.0 ml	
Total	4.3 ml	1.5 ml

Daily NOVA runs:

0.5 ml whole blood

For cbc/chem only:

1.3 ml whole blood:

0.3 ml for CBC

1.0 ml spun down for plasma for chemistry

Blood Culture:

1.0 ml whole blood (If no other test being performed use unheparinized syringe)

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- Label the syringe with the following:
 - Date
 - Time
 - NEST Number
 - Case Number
 - Body Temperature (temp of water or air)
 - Test being requested

Notify AHD “in person” morning of blood that needs preparation or analysis.

- Some results are affected if the sample is not processed immediately
- If this is not possible – refrigerate the sample to slow the process down.
- Record the sample information in a spot specified by AHD (white board to be hung up)

NOVA Samples:

- Blood values will be downloaded to excel format from Nova blood analyzer
- PCV and TS will be added to excel sheet
- Excel sheet will be saved to “Turtle NOVA results” folder on Melbourne/All Users ASAP after am blood samples are run
- Turtles getting blood draws in PM will have values stored and be called in to vet on call
 - o PM samples will be downloaded with AM blood values of following day.

BANKING:

- One box will be set up in the Rescue Freezer for all blood going to –80 Freezer (labeled Archive).
- Kerry McNally will transport blood to –80 Freezer once/week and log in manually.

WOUNDS:

TREATMENT:

- Includes debridement of necrotic tissue when present.
- Clean with dilute Betadine or Nolvasan (dilute 5ml in sterile water). Triple antibiotic ointment and Silvadene may be applied topically on a case-by-case basis.
- Lesions should be treated on a case-by-case basis depending upon severity and frequency of when the animal will be removed from the water.
- If carapace of turtle has wound(s) or is heavily covered (>75%) by epibionts than turtle should receive a flipper-band unless contraindicated.

WEIGHT AND LENGTHS

Animals will be weighed at all clinical exams or at least once per week. Straight carapace length (notch to tip) and straight carapace width will be measured monthly (ideally by the same individual).

RADIOGRAPHS / PHARMACEUTICALS:

RADIOGRAPHS:

- Radiographs should be arranged verbally w/ AHD staff. They will prepare the equipment in advance.
- Sedation may be used in some cases to ensure accurate radiographs (only vets will administer).
- AHD staff to take radiographs.

Once at 70 Degrees

- DV, AP, and 4 Flippers

Third Week:

- DV, AP, Flippers as needed.

Fifth Week:

- DV, AP, Flippers as needed.

Monthly (unless otherwise specified by Veterinarian):

- DV, AP, Flippers as needed.

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Reminders:

- Radiograph flippers and any wounds, swellings or lameness issues.
- Highlight known wounds on diagnostic sheet.

MEDICATION:

All Turtles: Doses indicated on individual treatment sheets when they are increased to 70⁰ F

- **Ceftazidime** [antibiotic] (280 mg/ml) 22 mg/kg IM ETD
For 21 days or case by case
Please notify vets after 21 days for a complete reassessment.

Case-by-Case:

- **Other antimicrobials will be determined on a case-by-case basis.**
 - **See Sea Turtle Formulary 2012 for list of medications**
- **Anti-parasitic:**
May be considered on a case-by-case basis.

Switching medication:

- **Injectable to Oral**
When rescue staff change from an injectable form of medication to oral AHD should be notified by e-mail. If there is back and forth between PO and inj. due to inappetance AHD should be notified of that as well.

DRUG STORAGE:

- Solution bags and blood tubes that have expired **should be discarded.**
- Solutions containing sugars should only be used for **three days** after opening.
- Solutions without sugars should only be used for **seven days** after opening.
- All solutions should be refrigerated.
- Labeling of syringes:
 - o Use stickers on syringes.
 - o Label with NEST number, Date, Name of Drug and Dose.
- Only draw up medications the night before if the number of turtles exceeds a reasonable number.

DRUG DISPOSAL:

- All medications that have expired should be sent to AHD.
- Solution bags:
 - o LRS, NaCl, Normasol, Dextrose/Sodium Chloride mixtures can be disposed of down the drain
 - o Dispose of bags in regular trash receptacles or recycle when possible

DIET:

FLUID THERAPY:

- **IV or SQ** given at between 0.5% -2.0 % body weight initially depending on the condition of the animal.
- Type of Fluid
 - o RRS (1 part LRS to 2 parts 2.5%Dex/0.45%NaCl)
 - o LRS
 - o 0.9% NaCl
 - o 2.5% Dextrose/0.45% NaCl
 - o Normosol
- Warm Fluids before administering as close to the turtle's temperature as possible.

SOLID FOOD:

Only start offering food once turtle is at 70 degrees and swimming in pool for 24 hours straight
Initial feeding does not include any hard parts i.e. shells, bones, beaks, etc.

If a turtle has a full GI on radiographs animal should be cleared by a second set of radiographs before starting steaks. For turtles with clear GI on initial radiograph and turtle has been witnessed defecating the turtle can start getting steaks of fish.

- o Fillets

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- Head & tail removed from fish. Slice longitudinally along spine, removing skin and muscle (no bones)
- o Steaks
 - Head & tail removed from fish. Cut slices ¼ to ½ inch in width.
- o 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.
- o Greens
 - During rehabilitation of Green sea turtles, begin offering dark leafy green vegetables as an alternative diet source as animals approach food limits.
- o Turtle Gel may be offered on a case- by- case basis.

Food Limits:

After turtles GI have initially been cleared they can be fed ad libitum (no restriction)

If a turtle requires calorie restriction (as directed by Veterinarian or Rescue staff):

Using minimum energy cost (MEC) formula to determine the caloric intake of each sea turtle.

$$MEC = K(W_{kg}^{0.75})$$

Where K is a taxonomically based constant dependent upon average core body temperature. In reptiles at preferred temp K=10

Degree of illness will determine a maintenance energy variable (Factor) to be multiplied by the MEC.

MF Group	Factor
Sleep or cage rest	1.25
Limited Activity	1.5
Limited activity of young growing animal or moderately injured adult	2
Severely injured adult	3

Example: 5kg turtle with carapace injury

$$MEC = 10(5^{0.75})$$

Factor = 2

turtle needs 66.87Kcal/day

Herring and capelin Kcals can be obtained from Mammals Dept. other feed items have kcals listed on the packaging.

MEC calculations and factors came from the Tufts Wildlife Clinic Student Handbook. Article: Finding the Dietetic Needs of Captive Native Wildlife and Zoo Animals by Allometric Scaling

VITAMINS:

All Turtles: All turtles receive the following vitamins and doses indicated on their individual treatment sheets.

- **Vitamin B COMPLEX** (5mg B1/kg of sea turtle)
 - o Injectable IM Q6 or 7D until eating
- **Multivitamin** (25 mg of B1/kg fish fed)
 - o Sea Tabs SID.
- **Calcium Carbonate** (25mg/kg of turtle weight)
 - o SID

ENVIRONMENT:

WATER QUALITY: [Environmental Quality Lab will perform]

Water samples from each tank to be brought to AHD as soon as possible each am.

Samples will be brought down in Nalgene bottles which are supplied by water quality.

Quincy RR tank testing schedule

	pH	NH3	Salinity	NO2	NO3	Br2
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RR24	Daily	Daily	Daily	Tue	Monthly	T/F
RR15	Daily	Daily	Daily	Tue	Monthly	T/F
RRISO1	Daily	Daily	Daily	Tue	Monthly	X
RRISO2	Daily	Daily	Daily	Tue	Monthly	X
RRISO3	Daily	Daily	Daily	Tue	Monthly	X
RR1200	Daily	Daily	Daily	Tue	Monthly	X

Additionally, bacteria samples of all tanks will be tested weekly during turtle season. Samples that are high will be retested.

ENRICHMENT:

- Once animals are eating well introduce hide-a-ways to tanks.
- Make every effort to provide additional enrichment such as hide-a-ways, lettuce trays, and fake kelp

TEMPERATURE:

- ICU: If a turtle arrives to NEAq with an internal body temp below 55°F, it needs to be raised to 55°F as soon as possible.
- ICU sometimes runs lower than digital readout. As a general rule set the ICU 2-3°F above where you want the ICU temp to actually be (set at 63°F to be at 60°F).
- Turtles should be raised approximately 5°F increments each day, and should be raised this entire amount at one time.
- Please write down temperature adjustments on the treatment chart.
 - Example: “3:45 pm ICU set at 65°F, turtle should be at 65°F”
 - If ICU air too dry use ICU humidifier attachment to increase humidity.

NECROPSY / SAMPLES:

DEAD TURTLES:

- Any questionable turtle will have a cardiac ultrasound exam prior to being removed to the necropsy room.

NECROPSY

- Inform veterinarians of necropsies to be performed. (Prioritize Cm's and Cc's)
- Contact vet w/ interesting findings @ the time of necropsy.
- Ridleys should receive full gross necropsy however histo will not be evaluated unless unusual lesions are found. Please see Charlie, Julie, or Connie with lesion questions (Hybrids should be treated as Ridley's).
- Greens and loggerheads will receive full gross necropsy and histo will be submitted.
- Samples can be frozen in whirl packs

Research: