

REHABILITATION OF A STARVING WESTERN LONG-NECKED TURTLE
(Chelodina oblonga)

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Turtle 17 A Case Study

History:

16/9/11 Several severely emaciated (cachexic*) oblong turtles, were found at the water's edge of Blue gum Lake, Mt Pleasant (a suburb south of the Swan River in Perth Western Australia). This lake was completely dry for several months over summer and now had filled with winter rains but there is very little food for turtles. The turtles were caught and taken to Riseley Vet Centre. During triage, some were euthanased due to advanced septicaemia. Turtle 17 was borderline, this is his story.

***Cachectic /cachexia**
any general reduction in vitality and strength of body and mind resulting from a debilitating chronic disease

Body Score scale: 1 cachectic * 2 thin 3 average 4 good 5 obese

BLUE GUM LAKE TURTLES (Chelodina oblonga)
WEIGHT vs CARAPACE LENGTH

MALES CARAPACE LENGTH (cm) using Callipers	WEIGHT Grams	FEMALES CARAPACE LENGTH (cm) using Callipers	WEIGHT Grams
12.00		12.00	279.17
12.50		12.50	307.12
13.00		13.00	335.07
13.50		13.50	363.02
14.00		14.00	390.97
14.50		14.50	418.92
15.00	446.87	15.00	420.00
15.50	474.82	15.50	465.41
16.00	502.76	16.00	510.82
16.50	530.71	16.50	556.23
17.00	558.66	17.00	601.64
17.50	586.61	17.50	647.05
18.00	614.56	18.00	692.45

18.50	642.51	18.50	737.86
19.00	670.46	19.00	783.27
19.50	698.41	19.50	828.68
20.00	726.36	20.00	874.09
20.50	754.31	20.50	919.50
21.00	782.26	21.00	964.91
21.50			1010.32
22.00			1055.73
22.50			1101.14
23.00			1146.55
23.50			1191.96
24.00			1237.36

WAWRC 25.03.11

After data from Jacqueline Giles

NOTE:

These figures relate to turtles from Blue Gum Lake, Mt Pleasant WA.

Figures will vary for turtles from different lakes where conditions may be more favourable.

The difference in the carapace length whether taken with vernier callipers or a tape measure is minimal in the Blue Gum turtles– usually about 1cm less if taken with a tape measure.

If using a tape measure, reduce your carapace measurements accordingly.

Triage/Assessment/ Viability at Preferred Body Temperature at PBT (26 - 28°C)

Date: 16 September 2011
Species: Oblong turtle *Chelodina oblonga*
Found: Blue Gum Lake, Mt Pleasant WA
ID: Turtle 17 (2 silver dots)
Sex: Male
Shell
Carapace: Length 16.5cm
Plastron: Several red blemishes and ridges on the scutes?
Body: Dehydrated.
Body Weight: 370g (30% underweight)
Target weight: 530g (see Blue Gum Lake Turtles weight vs Carapace chart)
Body Score: Poor 1 out of 5 (Marked starvation)
Eyes: Sunken, clear
Mouth: Clear, pale mucous membranes
Responses: Depressed
Appetite: Not eating at PBT
Buoyancy: Abnormal , unable to dive – (See *Floaters*)
Trauma: No major wounds

Diagnosis: Starvation with immune suppression and possible septicaemia

Starvation

In the absence of food, once the gut contents are digested, the body will mobilise fat stores to meet metabolic demands. The brain requires glucose constantly so muscle tissue is then broken down.

Turtles have a low metabolic rate and modest needs and can last for extremely long periods without food. However, eventually reserves run out, organs fail to function, fluid balance cannot be maintained and the immune system crashes as there are not enough resources to make white blood cells. With defences down, microbes take over the body. Turtles can be decomposing internally due to septicaemia and yet still cling to life. Euthanasia is the best treatment for these cases.

Viability: 50/50 If this turtle was admitted earlier in the year when 80 were taken into care, he would have been euthanased. However, there was room available and the decision was made to try rehabilitation for Turtle 17

A plan was made for Treatment, Rehabilitation and Release with Reassessments along the way.

Treatment Plan

Supportive care, medication, re-hydration fluids & nutrition but if no real improvement in 1 week, consider euthanasia. Home care for 1:1 closer monitoring and to reduce noise stress

- Re-hydration:
 - o soak in warm (PBT) Hartman's solution to relieve any constipation or blockage in the lower Gastro-Intestinal
 - o by mouth (PO) with a flexible tube inserted into the oesophagus (see below)
 - o Sub cutaneously by injection of Hartman's solution +/- glucose. Injection sites are under the loose skin in front of the back legs
- Medications
 - o Antibiotics – *Fortum*© (antibiotic of choice for turtles)
I/M injections every 72 hours at 20mg/Kg body weight for 8 doses (4 weeks) to address flotation problem often caused by respiratory infection or gas-producing bacteria in the coelom cavity..
 - o *Metacam for Cats* ©(0.5mg/ml) dosed orally at 0.2mg/Kg daily for pain if needed
- Nutrition –

DO NOT FEED A TURTLE WITH GUT STASIS

Gut Stasis – People assume that because turtles live in water, they drink a lot. This is not always true. They expel water when hunting and eating but once they stop eating they dehydrate. Water is absorbed from the gut contents and faeces become dry and rock hard and the gut shuts down – this is stasis, stagnation of the flow of any fluids in the body, including the intestinal contents proximal to a blockage. If you feed a stasis patient the new food will build up behind the blockage and eventually the animal will die.

Treatment

- *Rehydrate*

- *Get the gut working (electrolytes??)*
- *Faecal exam to identify gut parasites - treat with Praziquantel within 72 hours*
- *X ray to determine if there is a blockage/obstruction in the gut*
- *Nourish the patient, ONLY after the gut starts working and faeces are passed*

From Lesley Baird Broome WA

Lesley worked with marine turtles but the above also applies to oblong turtles. The author has seen rock hard faecal plugs in the lower GI tract on post mortem examination of emaciated oblong turtles.

Oblong turtles are Carnivores and can only eat when their mouth is in water.

- Diet – Fish (whitebait , pilchards, mulies), crustaceans & prawns, soaked for 1 hour in water to remove salt. Keep heads on as the brain is good nutrition and favoured by turtles.
- To replace vitamin B lost in the freezing process, mouth pack mulies with *Wombaroo*® *Reptile Supplement* mix in the end of a straw. Force the fish's mouth open and insert the RSM loaded straw. Tap, then remove the straw and close the fish's mouth

Tube feeding

It takes 4-5 days for food to pass through the gut when the turtle is healthy and warm. Tube feeding should only be done after a minimum of 4 days of rehydration. The fluids contain energy and electrolytes that balance the body enabling the gut to flush any old material and absorb small amounts of food.

- Mix a fish slurry with 12% *Reptile supplement* mix and warm water
- Make a 20cm plastic feeding tube cut on a 45° angle with a flame-softened end.
- Have someone restrain the turtle in a towel and hold the neck behind the head.
- Use a soft, thin plastic card to gently open the mouth
Extreme care must be taken to prevent jawbone and gum injuries
- Pass a well lubricated feeding tube down the oesophagus.
- Syringe 5 – 7 ml of the warm slurry into the oesophagus
- Hold the head up after the tube has been removed, until the turtle swallows.

Assist feeding – Hold a fish (whole or a piece) with tongs, chopsticks or forceps in front of the turtle's face. Wiggle it head on until the turtle strikes

Self feeding - Turtles must feed in water. Put turtle in small feeding tub with enough water to cover and enough room to manipulate the meal.

Supplements – *Wombaroo*® *Reptile Supplement* mix at 12% of food given

Frequency – Daily for debilitated turtles, every other day as body condition Improves

Amount - Start with small pieces of chopped fish per meal and increase to whole fish as appetite improves and stools are being passed

Fortunately, oblong turtles are great feeders and appetite quickly returns

- Re-Assessment in 1 week - return to vet if problems arise sooner

Rehabilitation Plan

Mark ID dots on top of carapace with coloured nail polish and record

Stress reduction

Research has shown that Oblong turtles use echo location to find their prey in the cloudy, silty water that allows them to sneak up on their prey and hide from terrestrial predators.

Also turtles have excellent hearing so reduce noise stress by locating the rehab area away from vehicles and household activities. A laundry may seem a logical place to put a tub of water but in fact the washing machine and constant traffic in and out are very noisy compared to a peaceful lake

A 200L black poly tub with smooth non-abrasive surfaces, easy to clean and disinfect, made of food grade material is used to house the turtle outside. Half fill with 80 – 100L.

Housing needs

- Good ventilation
- The enclosure sides should be made of smooth material, not mesh as turtles can climb and wire mesh can damage the head and snout
- Substrates – soft, cushioning material to prevent pressure sores on weight bearing parts of the body. Turtles usually sit on soft, silky mud or *hang* weightlessly in the water using buoyancy control
- Light – Natural sunlight is best where possible. On cold days where air temperatures are below PBT, use an indoor set-up with an *Exo terra* © *Reptiglow* 5.0 UVB 13W daylight compact globe for normal photoperiods (10 -14 hours/day)
- Heat – Water temperature should be at the high end of the PBT at one end of the tub An *Aqua One* © 100W aquarium heater, set to 26°C positioned at one end of the tub to provide a heat gradient with cooler areas available for behavioural adjustments to inner body temperature.
- Basking platform – a children's step-up can be used to allow the turtle to dry out completely to reduce fungal growth on the skin. Provide access to dry area that is practical for debilitated animals eg ramp. On cold days where air temperatures are below PBT, use an indoor set-up with a *Reptapet* © 40 – 60W infra red globe suspended 30cm above the basking platform so that the temperature is 26-28°C. On hot days when the air temperature is above PBT, turtles will stay submerged to escape the heat. House the turtle indoors to enable it to bask long enough to dry out completely.
- Hides in both the water and land/basking areas, for emotional security
- Security screen on top of tub to prevent predation by rats, foxes, cats, dogs, ravens and also to prevent the turtle from escaping
- Water depth 15cm - theoretically the water depth is the turtle's circumference, to provide space to turn around and right itself but confining a sick turtle to a smaller area will conserve its energy in stage 1 of rehabilitation.

Water quality

- Rainwater from a tank. Tap water (in Perth) will not harm the turtle but chlorine in the water will disable the biological filter, stand for 24 hours to disperse chlorine.
- pH 7.4 (test daily at 4pm with an *API* © High-end pH tester kit)
- Monitor nitrogenous wastes with an *API* © Ammonia NH₃/NH₄⁺ test kit

- Filtration- **JAD**© 7.5W submersible filter was used to remove waste, faecal solids were removed with a net when possible. But it takes weeks to establish the bio-filter bacterial colony that removes nitrogenous wastes so till then, water needs to be changed daily
- Oxyshell © water conditioner, available in supermarkets and pet shops, can be put in the water to improve oxygen content

OH &S

Turtles have Salmonella on their skin. Wash hands after handling and always wash dishes etc for turtle use, in a dedicated sink – NOT the kitchen sink.
 Very old and very young and immune-compromised people should not work with reptiles.

Hygiene is paramount when caring for sick animals. People carry *Staph aureus* on their skin so wash your hands or wear latex gloves when handling turtles with open wounds. Hospital grade disinfectants are used to decontaminate equipment after thorough washing with warm soapy water

Even though turtles come from ponds teeming with microbes, we are unable to duplicate this equilibrium of pathogenic versus good bacteria which protects the turtle from infections.

Bioactive substrates Vs Clean water

- *Water itself may be considered as a specialised substrate for some reptiles*
- *However, tap water is often a poor substitute for the naturally occurring acidic bacteria-laden water from which many of our freshwater reptiles are derived.*
- *Tap water is also not usable for brackish or saltwater reptiles.*
- *Aquatic reptiles placed in cages where water is available frequently spend a great deal of time in that medium, which is to be expected.*
- *However, these reptiles often have skin lesions develop under these circumstances, most likely because the neutral tap water contaminated with reptile faeces forms a suitable medium for many of the bacteria and fungi that may be opportunistic pathogens.*
- *Combined with the fact that the water is often devoid of the bacteria milieu found in the reptiles natural habitat, and often not in the appropriate temperature range, these animals succumb to superficial infections, which ultimately may result in sepsis.*
- *The warm acidic bacteria-laden water found in many natural situations is believed to form a bioactive substrate, which interferes with the growth of pathogens on many of those animals that have evolved to live there.*

J.V. Rossi DVM, MA (from Reptile Surgery & Medicine 2nd Edition by Mader)

Husbandry

- Daily Routine for Turtle 17
 - Thaw frozen fish in fresh water for 1 hour
 - Weigh turtle every 3 days and record
 - Examine body, plastron and carapace and record findings
 - Put the turtle in a small feeding tub (45L) half filled with warm water at 26°C and maintained with an aquarium heater

- Drop in fish, whole or in pieces (record number given)
- Observe if the turtle is floating/defecating/eating fish – record findings
- Meanwhile, in the in large tub, turn off aquarium heater and wait for 15 minutes before emptying the water
- Check maximum/minimum thermometer and record overnight temperatures
- Remove heater and furnishings, empty water from tub, clean then scald all surfaces of the tub with boiling water.
- Clean furnishings and swab with 0.05% *Chlorhexadine*© solution. Stand for 5 minutes then rinse with clean water
- Refill tub to 30cm and add 1 jug of boiling water
- Check water temperature with probe of indoor/outdoor thermometer
- Reinstall aquarium heater, set to 28°C and turn on only when fully submerged
- Replace furnishings, hides etc
- Place turtle in the water when water temperature is above 22°C
- Cover tub with wire mesh and cover this with ½ - 1/3 shade-cloth, secure with clamps

Turtle Weight Fluctuations due to Buoyancy mechanism

Turtles possess two accessory bladders which branch off the cloacae, called *Cloaca/ Bursa*.

Buoyancy is regulated by taking fluid in or out of these and the urinary bladder as well as the lungs inflating or deflating.

When you pick up a turtle it will often void its bladder and/or cloacal bursa. Therefore body weight can go up or down 10% within a few minutes, causing the carer great anxiety.

Weigh the turtle every 3 days and don't be alarmed if there is quite a fluctuation.

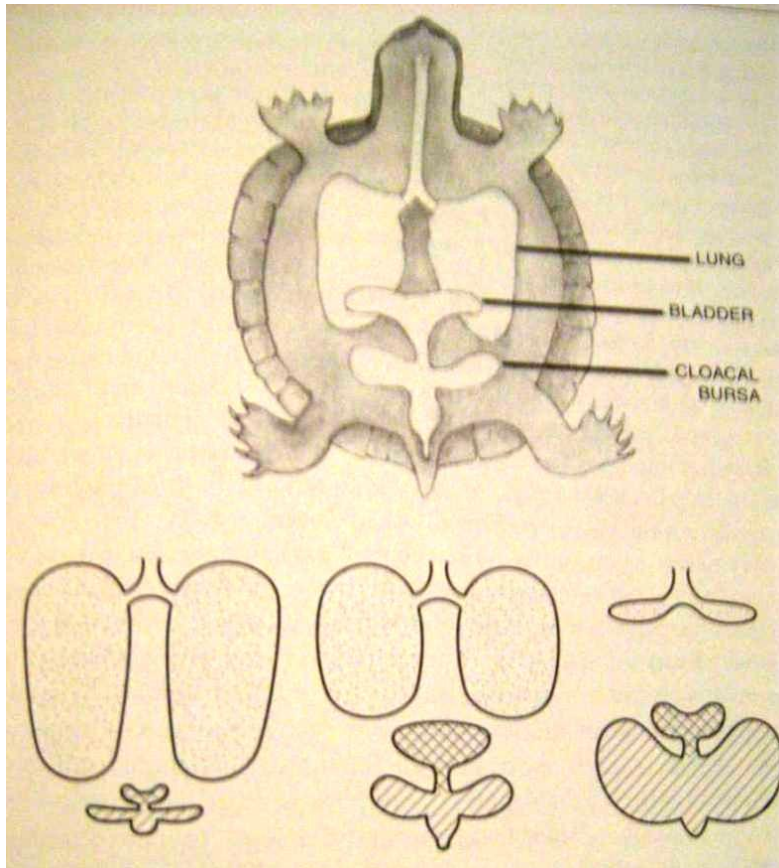
Look for the trend.

(See Turtle 17 weight chart)

Floaters

Floaters are turtles that cannot regulate buoyancy (see above). This is a complex condition and can be caused by pneumonia, pneumocoelom and/or gastro-intestinal tract obstruction that prevents the bladders from emptying or taking in water.

Supportive care for floaters includes systemic antibiotics (usually Fortum), B vitamins, fluids (if not eating) and coelomic taps (a veterinary procedure)



Buoyancy Control From *Life in a Shell* by Donald Jackson

16/11/11 VET REQUEST: Clean and debride infected plastron

Assess viability

Turtle # 17 484g

History: Adult male, rescued 16/09/11 from Blue gum Lake Mt Pleasant. Emaciated and lethargic, red patches on limbs and plastron. Old, healed puncture wound on carapace.

Weight 370g Carapace length= 16.5cm Target weight = 530g

Taken to Riseley St Vet clinic 17/09/11

Dx: Starvation, possible septicaemia

Tx: Fortum 20mg/kg every 3 days (total 8 injections, last injection given 9/10/11)

23/09/11 Transferred to home care, plastron photographed weekly.

13/11/11 **Small lesion observed on plastron**, treated with 0.5% Betadine BID and dry docked for 1 hour afterwards

14/11/11 Weight 484g

15/11/11 Large area in centre of Plastron lifted with pus underneath.

Husbandry: Kept in outdoor 200L tub ½ filled with fresh water daily. Basking platform Pond covered with wire mesh and 1/3 covered with shade cloth. Aquarium heater (100W) set at 26- 28°C at one end.

Thermometer probe in between warm and cool zones. Calcium block

Diet is 1x pilchard (~20g) daily, packed with *Reptile Supplement* pellet 3x /week

Varied diet with occasional shrimp, mulies, sliced liver and prawns.

Weighed every 3rd day. Plastron and carapace checked daily

Vet Exam: Removed cover of pus-filled cavity and flushed.
Left remaining scabs for protection of sensitive tissue beneath.
X ray taken.

Tx Plan: Continue twice daily *Betadine*®. Recommence *Fortum*® injections every 3rd day for 7 weeks. Revisit in 4 weeks, unless problems arise

Re-Assessment

So much for plans

60 days after coming into care all was progressing well. Plans were being made for the turtle's release. BUT, during the weekly photographing of the plastron a **yellow line** was observed along the centre which began to lift up to reveal a deep cavity of pus underneath.

This turned out to be a deep infection, probably from earlier predation that had left a healed puncture wound on the carapace and a strange shaped deficit on the plastron that were not thought to be significant on admission. The turtle was often observed sitting on top of the aquarium heater (which had a cover to prevent burns) probably because such an infection would cause great discomfort and the heat was soothing.

Also the pattern on the plastron was consistent with bony plates and not scute pattern. It appears that the scutes had not healed properly from the original injury which left a large area of bone exposed to infection. Not much has been written about turtle healing so it is no surprise that such a serious condition was not diagnosed by 4 vets who had examined this turtle so far.

An X ray was taken to determine if any other injuries had gone undetected. Suture lines between the Bony plates can be misinterpreted as fractures as they look very similar but fortunately, there were no other injuries.

The wound was surgically debrided to remove the hard pus. Reptiles and birds don't have the enzyme that liquefies pus so it cannot simply drain, it has to be physically removed. The wound was cleaned and now had to stay dry and clean but turtles need to be in water to perform bodily functions. The compromise is – **Dry-docking**

When threatened, turtles dive into the water so they suffer stress if kept out of water for too long. Also, they can only eat with their head submerged as their tongue is not flexible enough to lap from a dish. Instead they suck prey into their mouths or squirt water from their mouth to disperse fish, then strike rapidly with toothless jaws. The Oblong turtle has the fastest strike speed of all the long-necked turtle species in Australia.

Dry-dock Housing

A simple dry-dock set-up is made so that the turtle can eat and sleep with its head in water but the injured part of its body is dry.

The dry-dock tub has a false floor that has holes drilled for drainage and a recessed water dish.

This also provides the humidity needed to reduce cutaneous fluid loss.

Heat and light are provided as previously mentioned and once or twice a day the turtle has a waterproof dressing fitted over the wound dressing and is put into a large tub of warm water to exercise, drink, urinate, defecate and relax.

Wound care

The aim is to keep the wound surface clean but allow the scute (skin) epithelial cells to spread across and seal the wound.

Routine:

Flush twice daily with either dilute Betadine 0.5% solution or Chlorhexadine 0.05% This can be done with a 25gauge needle attached to a 10ml syringe or by soaking the plastron in a shallow tub. Make the solution warm to reduce *shock* to the wound, air dry, then dress the wound:-

Primary dressing: Topical *Flamazine*© applied with a gloved hand.

Secondary dressings: *Melolin*© non-adhesive dressing will provide some padding.

Cover this with *Fixomull*©

When the turtle has its daily session in water, waterproof with a layer of *Tegaderm*© or equivalent.

Once the wound is sealed, ie scutes have grown over the bony plates, cease dressings and return the turtle to the larger tub to gain muscle mass through exercise.

Pain Relief Our job is to relieve pain and suffering so any surgery, wounds or fractures will require pain relief. All animals heal faster, eat and sleep better thus reducing time in care if they are not in pain. Time is the enemy of rehabilitation as wild animals suffer from stress related complications the longer they are in captivity.

Records - Accurate records are a great resource for the future See Record sheets

- Observations – stools, eating, active/not active, basking (how long?) and weight.
- Photos taken at weekly intervals to be reviewed to determine if the plan worked
- X rays can be photographed with the vet's permission
- Pathology test results can be photocopied for your own records

7/01/12 VET REQUEST: Recheck plastron

Turtle # 17 538g Bright & Alert

Vet Exam: Examined plastron, removed scabs. Wound is clean and healing well. Continue dressings for 1 week.

Continue *Fortum* for 3 weeks.

26/01/12 Pre-Release Assessment

Turtle # 17 520g

Very active, plastron healed with new scutes grown over Bone. Ceased medication, ready to go.

Release Plan

Before a turtle is released it must :

- Be self feeding with good body score
- Have a good menace response and be alert at PBT
- Have no injuries or abnormalities that would impede normal behaviour

Turtles should be released where they come from where possible. If not, the W.A. Department of Environment and Conservation (DEC) require that all turtles from the Swan coastal plain are to be released there and not into the Darling Range Hills.

Water bodies must be healthy and have enough food supply to support resident and newly released turtles. The presence of turtles and carnivorous water birds indicates that turtle food is available

The carrying capacity of both the permanent and temporary wetlands may well exceed the carrying capacity of the lakes alone during drought cycles.

Wetland conditions can be monitored on *Nearmaps*© on line, and followed up with on-site assessments before release.

Discussion

Although Turtle 17 was successfully rehabilitated and released, it is doubtful if this case would have gone ahead if it was admitted several months earlier as one of the 80 turtles rescued from Blue Gum Lake. There are several factors that influence the outcome.

- Euthanasia threshold in a mass rescue of wildlife
 - When the capacity to care is exceeded and standards of care risk being compromised, the euthanasia threshold will need to be lowered
- Sexual Bias.
 - Future rescues may have to take the ecological value of the males into consideration. Survival of the species may involve an adult male die-off
 - Females have larger bodies and are able to survive longer than males due to greater fat stores.
 - Females can store sperm and then lay fertile eggs when conditions improve.
 - Older females lay more eggs
- Carrying capacity of lakes
 - When rains and water run-off refill dry lakes, food is in short supply. Adult females are strong enough to bring down a swamphen
 - Hatchlings can survive when adult turtle food is scarce as they feed on mosquito larvae for 12 - 24 months thus playing a vital role in mosquito control in wetlands (1 female mosquito lays 100 – 500eggs)
- Diagnostic tests
 - Blood: PCV, Total protein, Biochemistry indicate which turtles are in end stage organ failure making triage more humane

- X rays for eggs, fractures, obstructions, fish hooks, abscesses
- Faecal examination for parasites
- Antibiotic therapy
- Increase the length of Antibiotic course for predation infections to 8 weeks
- Long-term care is not ideal but as turtles have a slow metabolism, wounds take longer to heal. Stress reduction is a vital consideration for these cases

Conclusion:

After 136 days in care, Turtle 17 was released into a beautiful wetland in the Canning River system, south of Perth.

This case has provided much insight into how turtles heal and the ups and downs have improved the way we now care for Oblong turtles

Acknowledgements

Dianne Hunter and her band of Lake Watchers for rescuing 100 turtles in 2011

Dr Tim Oldfield & staff, Wattle Grove Vet Hospital

Riseley Vet Centre, Myaree

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Elizabeth McCartney

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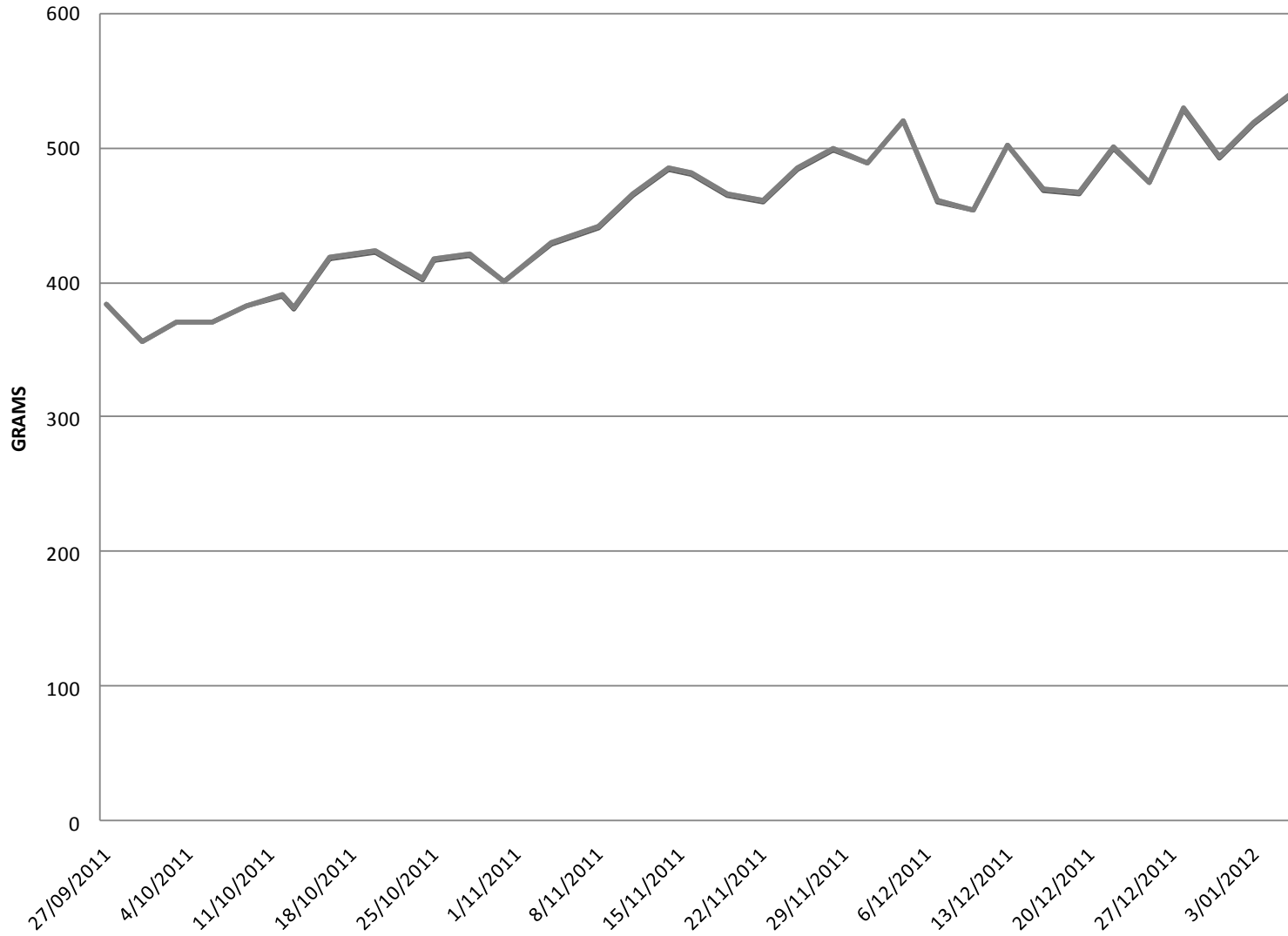
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Let's Talk Turtle by Peter Buckley NWRC 2004

RUTH HAIGHT: Ruth has worked with animals all her life on dairy farms, in research labs, vet nursing and wildlife rehabilitation. From dogs, cows and cats to possums and quendas and on to bobtails and turtles there has always been a passion for understanding the nature and biology of living things often discovered while headlong into dead things.

TURTLE 17 WEIGHT



- Did not eat T/F
- Ate 0 0
- weight(g) 426 372

TURTLE REHABILITATION PLAN

ADMISSION NUMBER

IDENTIFICATION & TARGET WEIGHT

VET APPOINTMENT

FEEDING

TUBE / SELF FEEDING

DRYDOCK TIME

SWIMMING TIME

BASKING/SUNLIGHT TIME

WATER CHANGES

WEEKLY PHOTO

TURTLE INJURY LOCATION CHART

Note: Drawings Diagrammatic Only, Not To Scale

