



Freshwater Turtle Research

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Types of Turtles in Australia



Turtle Life Cycle

Nearshore foraging areas
(immature and adult turtles)

Adults
migrate to
breeding areas

Pelagic Nursery Stage
(5 - 20 years in the
open ocean)

After laying a final
clutch of eggs, females
also return to the
foraging areas

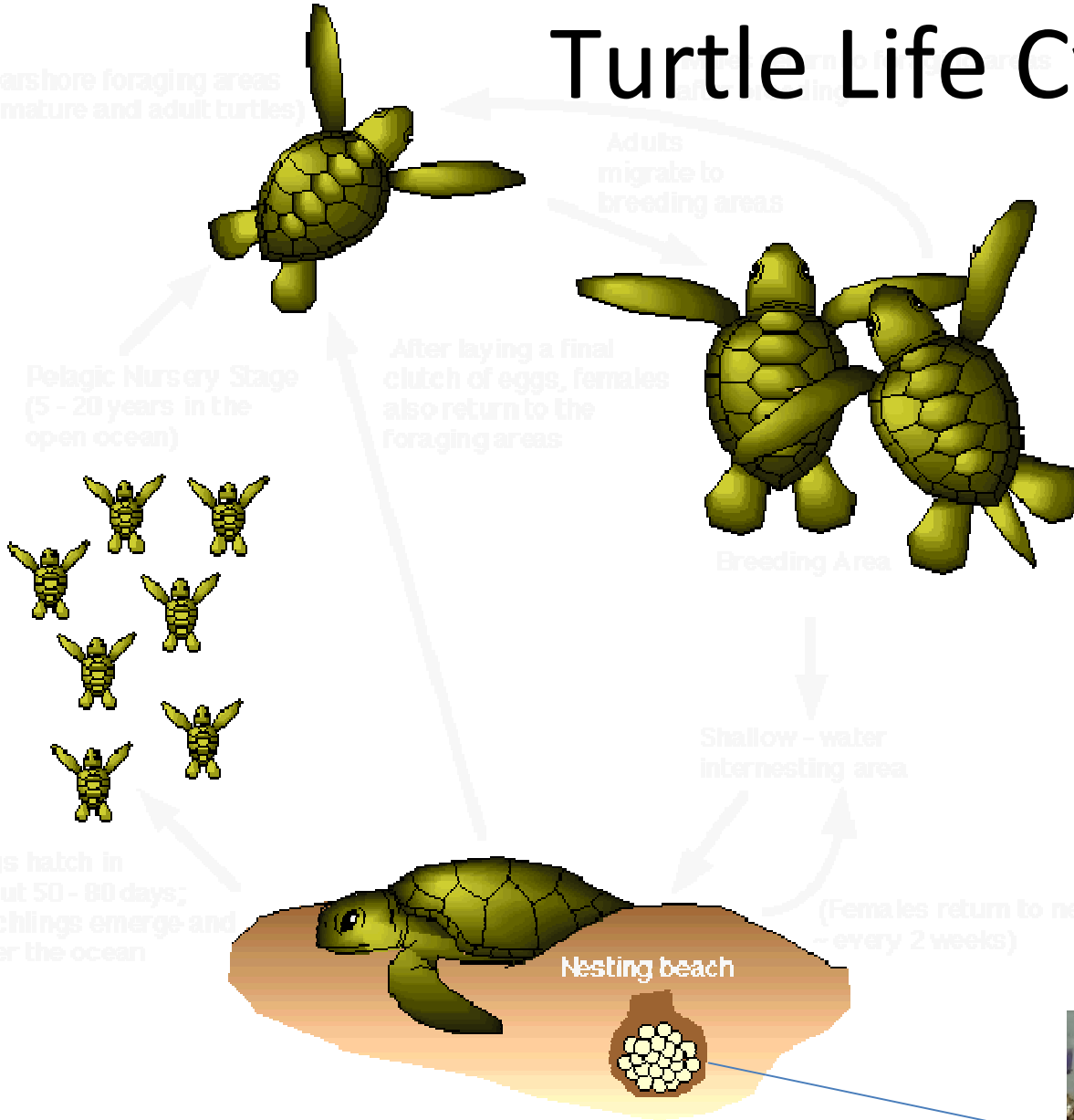
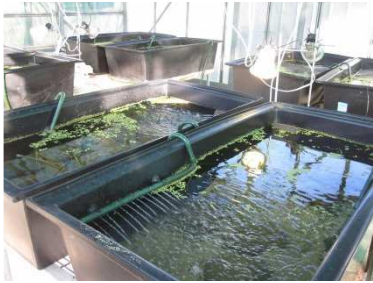
Breeding Area

Shallow-water
internesting area

(Females return to nest
every 2 weeks)

Nesting beach

Eggs hatch in
about 50-80 days;
younglings emerge and
return to the ocean



Incubation and Heart Rate Monitoring

- Turtle eggs are very easy to incubate and make a very good life history stage of an animal for experimentation and student training.
- Turtles are highly fecund (large sample sizes), respond well to oxytocin and over 90% of turtle eggs are killed by predators each year.
- Adapted existing technology to monitor heart rates throughout incubation.
- Major findings- Embryos communicate within a nest (Mcglashan et al. 2012). Embryos have circadian rhythms despite no light or temperature changes (Loudon et al. 2013).



Integrative and Comparative Biology
SYMPOSIUM

Metabolic Circadian Rhythms in Embryonic Turtles
 Peter Ray Loudon, Peter John Sapping, Bruce Swanson and Karel Halach
 Peter Ray Loudon, Peter John Sapping, Bruce Swanson and Karel Halach, *Journal of Experimental Biology*, 2013, 216, 1001-1006. doi:10.1242/jeb.121001

Embryonic communication in the nest: metabolic responses of reptilian embryos to developmental rates of siblings
 Joanna E. Mcglashan, Rocky John Swanson and John M. Cole

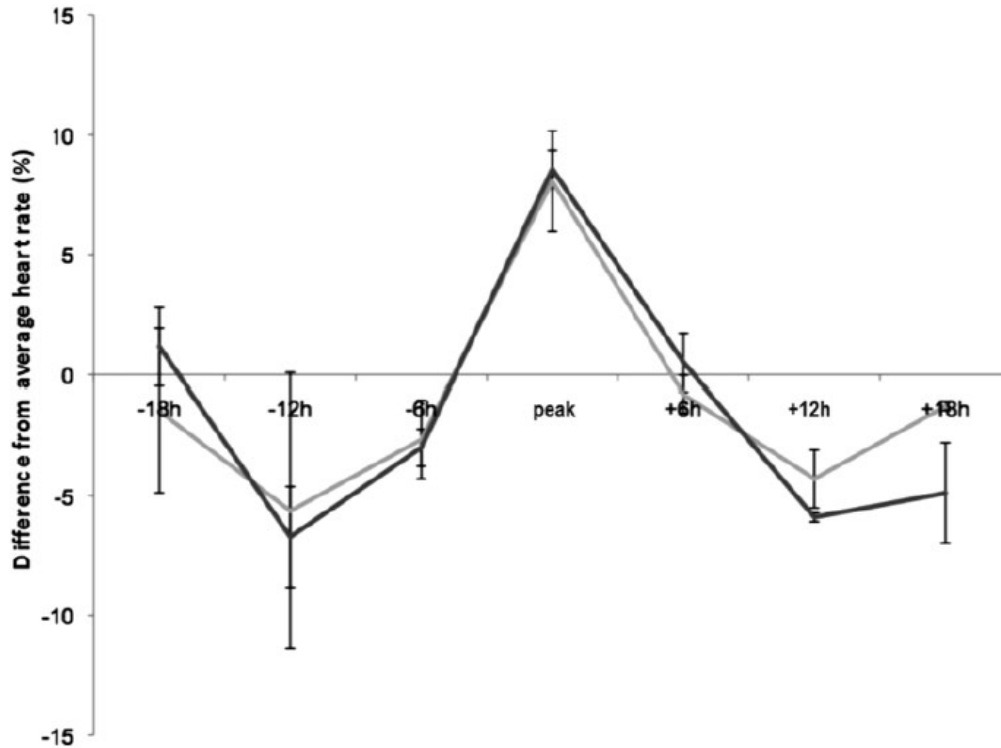
Introduction
 Embryonic communication in the nest is a form of parental care that allows parents to adjust the care they provide to their offspring based on the needs of the offspring. In this study, we investigated the metabolic responses of reptilian embryos to the developmental rates of their siblings in the nest. We found that embryos in the nest of a single parent (solitary) showed a higher metabolic rate than embryos in the nest of a double parent (social). This suggests that embryos in the nest of a single parent are more dependent on their parents for resources than embryos in the nest of a double parent. We also found that embryos in the nest of a single parent showed a higher metabolic rate than embryos in the nest of a double parent. This suggests that embryos in the nest of a single parent are more dependent on their parents for resources than embryos in the nest of a double parent.

Journal of Zoology
 Embryonic heart rate and hatching behavior of a solitary nesting turtle

Abstract
 The heart rate of embryos in the nest of a solitary nesting turtle was monitored throughout incubation. The heart rate of embryos in the nest of a solitary nesting turtle was found to be higher than the heart rate of embryos in the nest of a double nesting turtle. This suggests that embryos in the nest of a solitary nesting turtle are more dependent on their parents for resources than embryos in the nest of a double nesting turtle. We also found that embryos in the nest of a solitary nesting turtle showed a higher metabolic rate than embryos in the nest of a double nesting turtle. This suggests that embryos in the nest of a solitary nesting turtle are more dependent on their parents for resources than embryos in the nest of a double nesting turtle.



Incubation and Heart Rate



- Major findings- Embryos communicate within a nest (Mcglashan et al. 2012). Embryos have circadian rhythms despite no light or temperature changes (Loudon et al. 2013).



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Metabolic Circadian Rhythms in Embryonic Turtles
Peter Ray Loudon, Peter de la Serna, Ryan Steinmetz, and Kelli Holcomb

Embryonic communication in the nest: metabolic responses of reptilian embryos to developmental rates of siblings
Joanna A. Mcglashan, Rebecca Sawyer, and John M. Côté

Embryonic heart rate and hatching behavior of a solitary nesting turtle
K. J. Sawyer



Hatchling Turtle Husbandry



- We initially housed turtles in standard aquaria. UV lights, fed white bait, plants and frozen mixes.

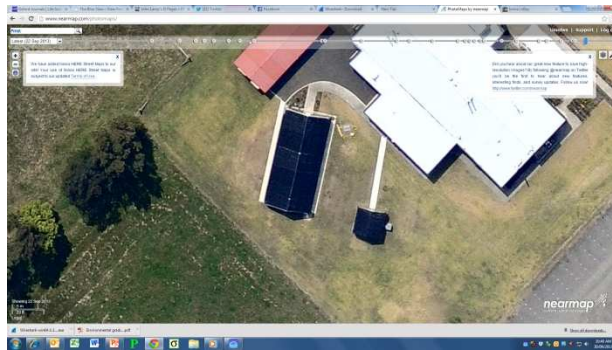


- After 3-4 months we started to see some issues
 - Cuts and sores on feet and thighs.
 - Soft carapaces.



Establishment of Glasshouse Facilities

- Ponds with regular drying periods
- Separate feeding areas
- Top up of water only after a month of establishment
- Indoor areas primarily used isolation
- Issues- Temperature fluctuations and security.



Re-Developing the Indoor Area

- We wanted to recreate similar conditions inside so that we had the option to control the environment for different projects.
- Issues- OH&S (Water and Electricity). Air Flow (Respiratory Infections common if air flow is not enough- Very humid)



Lessons Learned and Next Steps

Must Do's

- Separate feeding areas
- Regular drying
- Good air flow to reduce humidity

Important

- UV lights
- Plants
- Prepare water as if you are establishing an aquarium at home.

Next

- Establishing outdoor ponds for keeping larger turtles. Current facilities and ponds good for 3-5yos.

