

**Using GPS loggers to track the endangered
Blanding's turtle (*Emydoidea Blandingii*) in Nova
Scotia.**

Peter Kydd

Department of Biology, Acadia University, NS



Perspective/Background

- Turtles are at risk worldwide and are particularly vulnerable when undertaking seasonal movements.
- Blanding's turtles show strong site affinities and make regular seasonal movements to and from overwintering sites, nesting sites, and feeding areas.
- Travel routes are likely used by multiple turtles over multiple years.

Objectives/Purpose

- Accurate identification of travel routes has proven challenging.
- Developing new technology could potentially aid in determining the travel routes, home ranges, and habitats used by Blanding's turtles.
- Evaluate the effectiveness of GPS technology in documenting turtle movement patterns.
- Compare the GPS technology to conventional radio telemetry.
- Map travel routes and use data to identify critical habitats.
- Identify previously unknown nesting and overwintering sites, and summering areas.



Questions

- Are GPS loggers a reliable and accurate means of tracking small freshwater turtles?
- Will there be a difference in the sizes of home ranges that are determined by conventional radio tracking and those determined by GPS loggers?
- What are the fine scale travel routes of both males and females during a year, and do they use these routes annually?
- Are these turtles making diurnal and/or nocturnal movements?
- Are the habitat selections, and local movements, dependent on environmental conditions?



GPS Loggers

- GPS unit from Garmin, electronics from Spark fun electronics, and batteries from digi-key.
- Run on two Tadiran 3.6V lithium AA batteries (equivalent to 4 regular AA batteries).
- Total weight with packaging and epoxy ~100g.



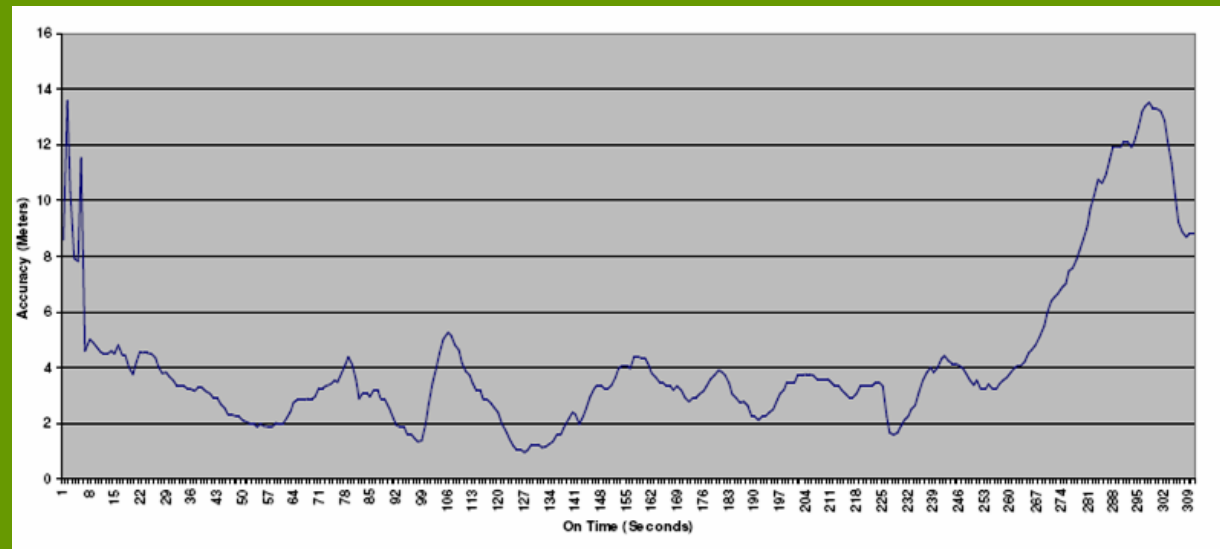
Pre-field Tests

Methods

- Accuracy (on known location point), GPS software configuration, underwater and undercover tests.

Results

- Accuracy (graph)
- Does not work underwater, but will work under dense cover.
- Activate for two minutes at two hour intervals.



Initial Field Trial

Methods

- Conducted on single male in KNPNHS.
- Radio tracking, plastic waterproofing, GPS configuration (2hr intervals), and attachment (5-minute epoxy).

Results

- May 8th – May 18th.
- 37 location points, 3.4 location points per day.





Second Trial – Nesting Females

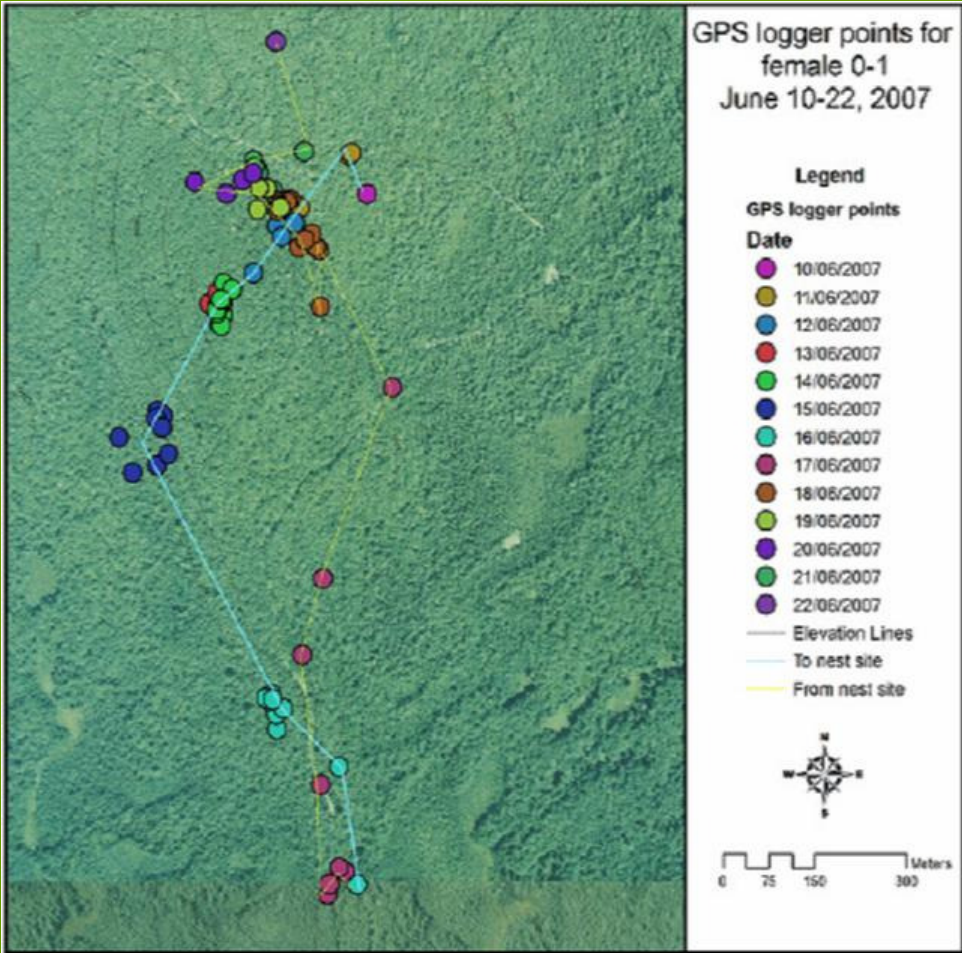
Methods

- 8 females in KNP NHS, McGowan, Barren Meadow.
- Frequent radio tracking, plastic waterproofing, GPS configuration (2hr intervals), and GPS attachment (5-minute epoxy).

Results

- Averaged 4.9 location points per day.
- Ranged from 110 location points in 13 days to 8 location points in 3 days.
- 3 potential nest sites, 2 new summering grounds, and 5 previously undocumented travel routes.
- Failed waterproofing, GPSs ruined, but not data.

Second Trial – Nesting Females



Map produced by: Jeffie McNeil

Third Trial

Methods

- 7 turtles, 11 GPS loggers deployed.
- Vinyl waterproofing, GPS configuration (2 and 4hr intervals) GPS attachment (5-minute epoxy).

Results

- Roughly 2 location points per day.
- Ranging from 5 points in 10 days to 45 points in 12 days.
- Detachment of small portions of keratin on three turtles after multiple GPSs.



Fourth Trial

Methods

- 7 turtles, 11 GPS loggers deployed.
- Vinyl waterproofing, GPS configuration (4hr intervals), and mesh pocket attachment (minimal 5-minute epoxy).

Results

- Roughly 1 location point per day.
- Ranging from 25 location points in 12 days to 1 location point in 1 day.
- Waterproofing and attachment successful!!



Conclusions

- First year an overall success.
- Solved most problems.
- Definitely a viable option for tracking small freshwater turtles.
- Will be able to answer questions related to home ranges, travel routes, and movement patterns this upcoming field season.



Future Work

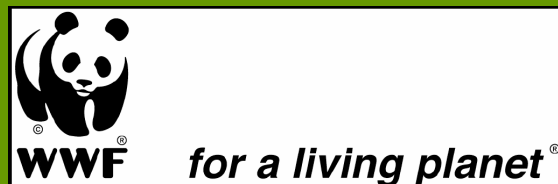
- Upcoming field season 12 GPSs deployed for duration (April-November). Determine home ranges, travel routes.
- Compare seasonal movements with weather data to determine if weather triggers the movements.
- Data and the analysis could eventually be used to help characterize and protect critical habitat.
- GPS loggers could be used on many species of small freshwater turtles, as well as numerous other animals, throughout the world.





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Questions or Comments

