



HEAD- STARTING

as a Conservation Tool



Head-Starting Rare Turtles

Plymouth (Northern) Redbelly Cooters

Blanding's Turtle

Chicken Turtle

Spotted Turtle

Eastern Box Turtle

Snapping Turtle

11
Species

Chinese Box Turtle

Wood Turtle

Eastern Painted Turtle

Common Map Turtle

Diamondback Terrapin

2,147 released head-starts released to date.

Head-Starting Rare Turtles

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Our Partners



MASSWILDLIFE



Savannah River Ecology Laboratory
UNIVERSITY OF GEORGIA

TSA



oxbow
ASSOCIATES, INC.





Head-Starting Rare Turtles

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Topic Outline

I. Define & Explain Head-Starting

II. History of Head-Starting

III. Criticism & Concerns

IV. (Our) Head-Starting Process

V. Value of Good ol' Natural History

I. Define & Explain

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Head-Starting: (verb) raising young animals in captivity until they have passed the most vulnerable stages of life (me, just now).

There is no single, accepted definition or process.

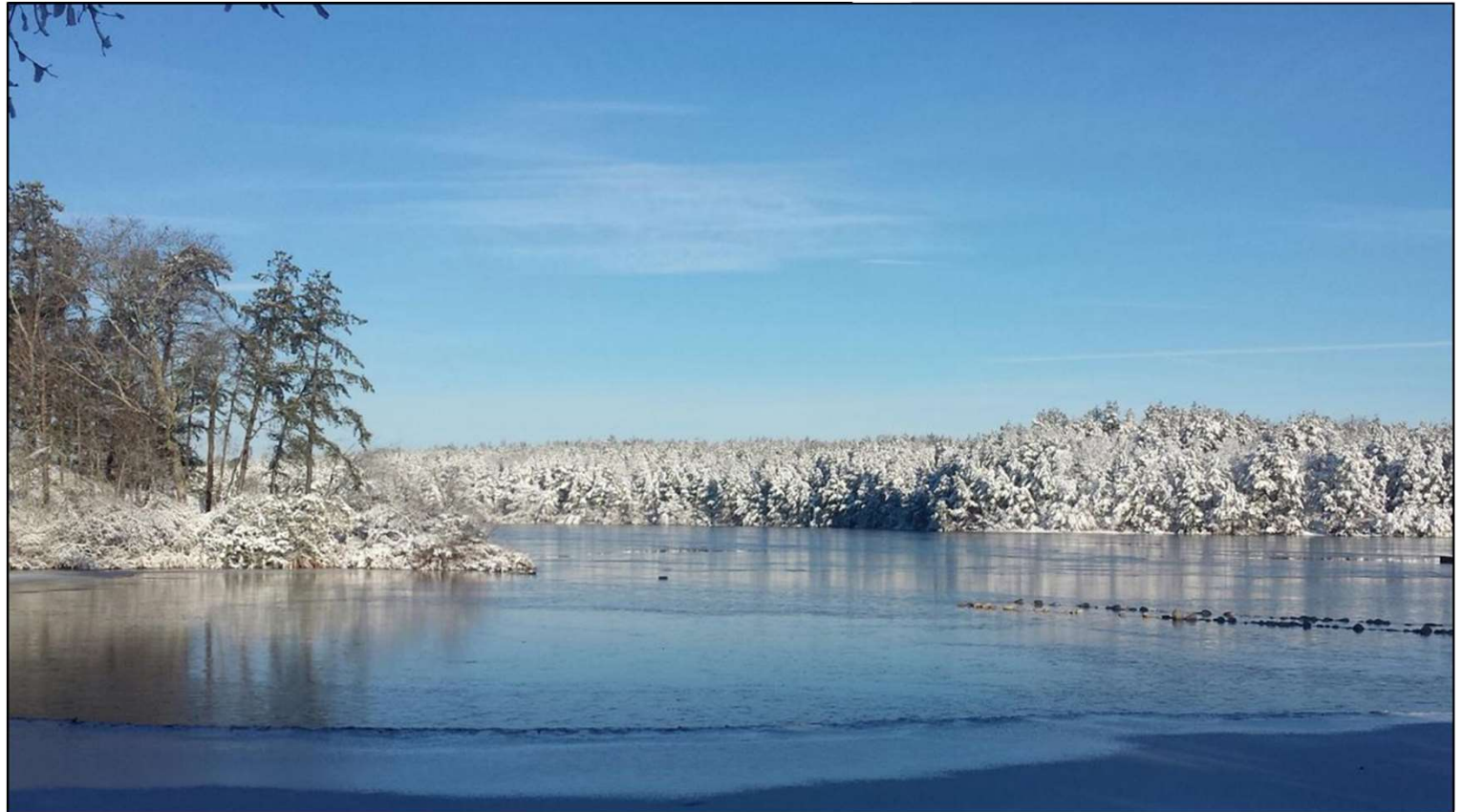




I. Define & Explain

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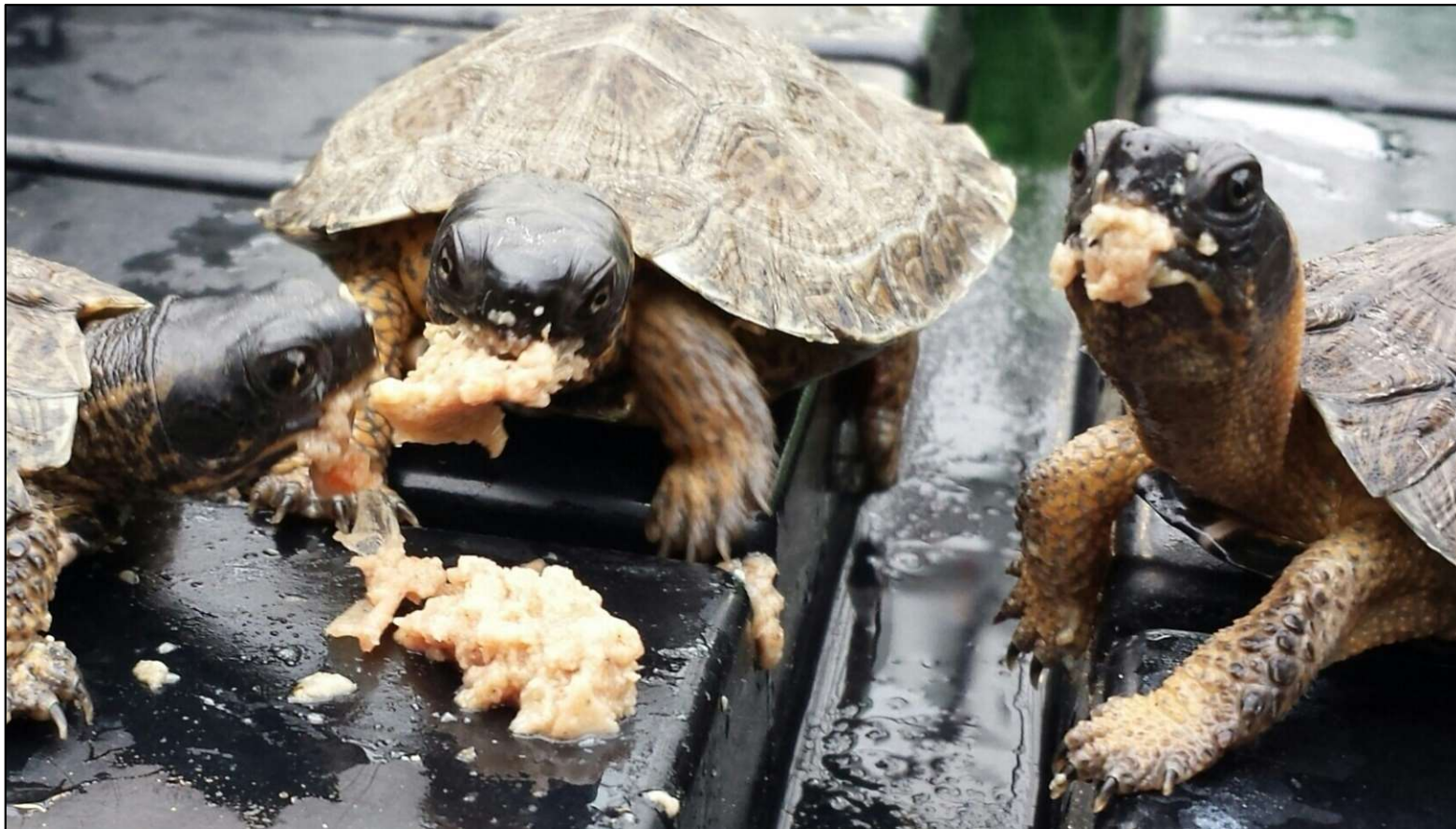
Create illusion of extended summer by manipulating temperatures and photoperiod ...



I. Define & Explain

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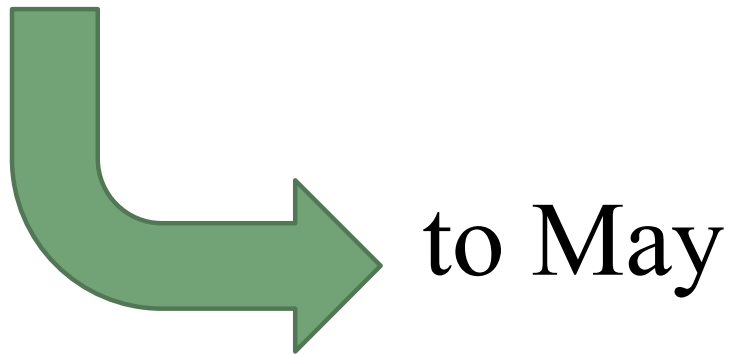
...in order to keep (i.e., trick) ectotherms metabolically active and (hopefully) growing.



I. Define & Explain

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From September



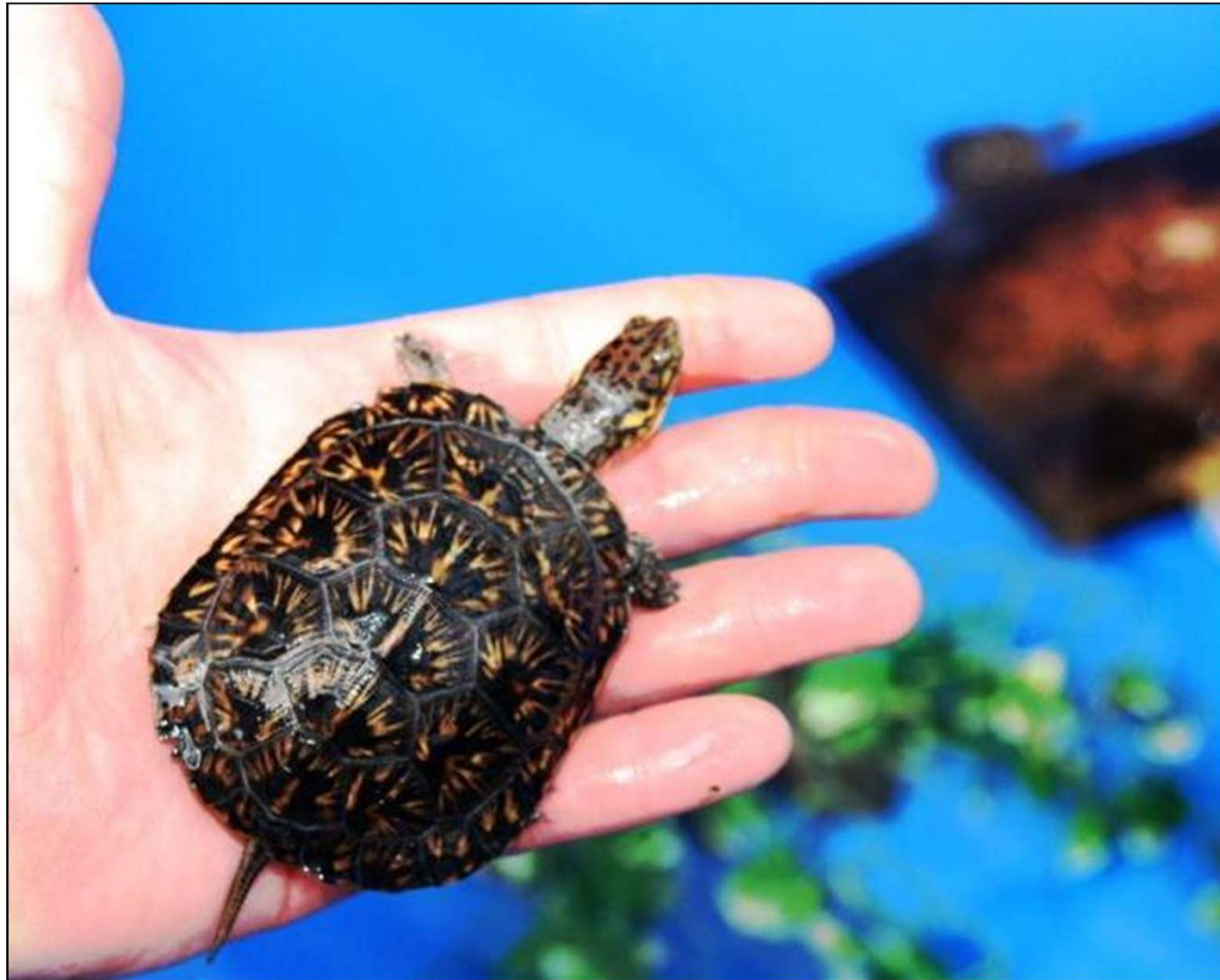
to May



I. Define & Explain

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Increasing
size increases
survivorship.



II. History of Head-Starting

10

Term
“head-starting”
often
credited to
Archie Carr.

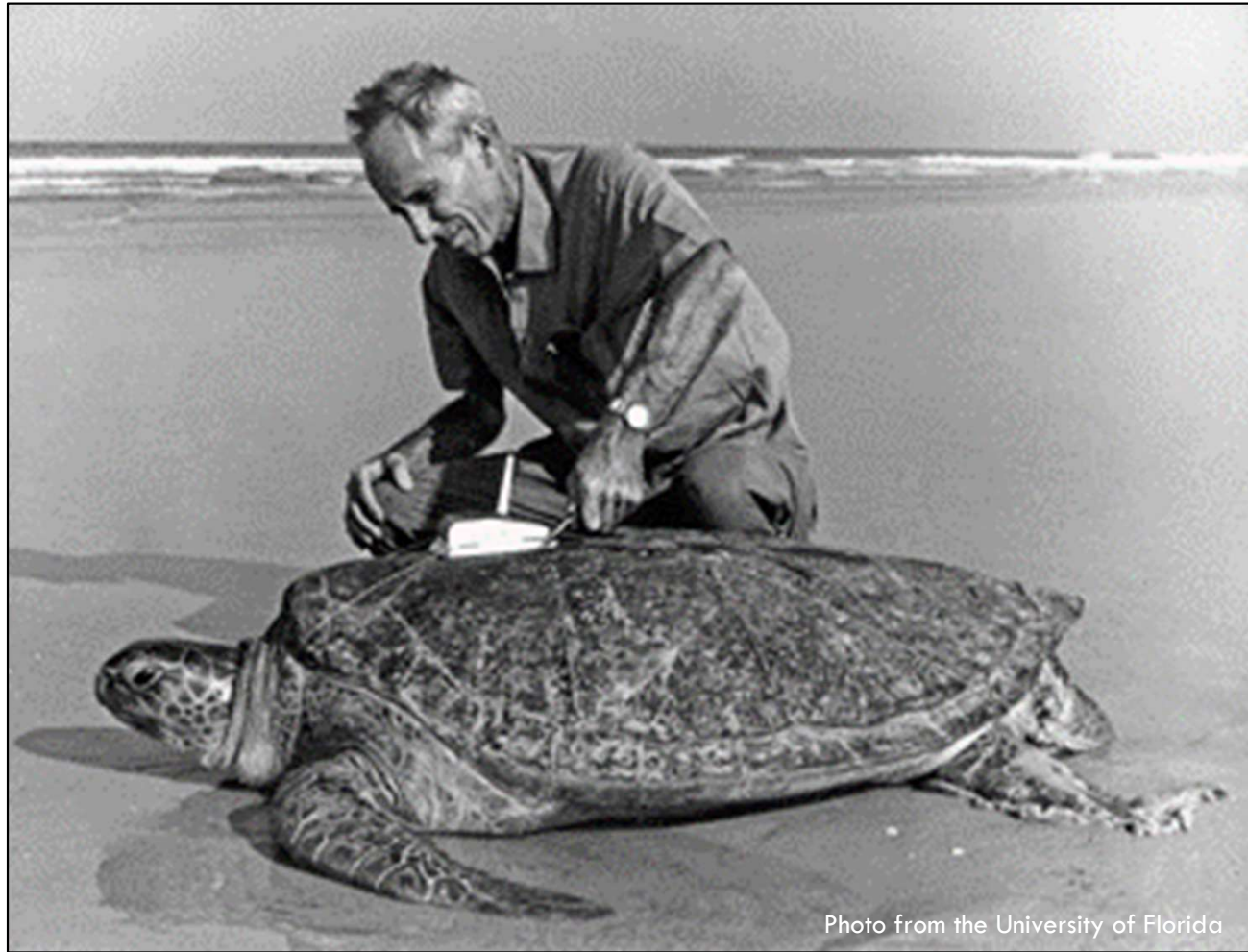


Photo from the University of Florida

II. History of Head-Starting

11

First official head-start program began in 1978.



Ended
in
1988.



II. History of Head-Starting

12

First official head-start program in the Northeast began in 1984.



Still
going
today.



II. History of Head-Starting

13

Head-starting has been used for many species since, mostly herps and a few fishes.



Photo from National Geographic

... and
MANY
turtles.



II. History of Head-Starting

14

Eastern Spadefoot Head-Start





III. Criticisms & Concerns

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1. Head-starts will be anatomically or physiologically abnormal (because of the accelerated growth).
2. Head-starts will try to “home” to the head-start facility.
3. Head-starts won’t know how to survive in the wild.
4. “Half-way technology” and doesn’t address the root causes.

(Nearly) All are valid concerns.

III. Criticisms & Concerns

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1. Head-starts will be anatomically or physiologically abnormal.

Need
proper
lighting,
diet,
space and
attitude.



Not

III. Criticisms & Concerns

17

2. Head-starts will try to return to the head-start facility.



Nesting sites are ephemeral, except ocean beaches.

III. Criticisms & Concerns

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3. Head-starts won't know how to survive in the wild.

REALLY?

This is an
issue for
species who's
young learn
from parents.



... not our understanding of turtle biology.

III. Criticisms & Concerns



III. Criticisms & Concerns

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4. “Half-way technology” that doesn’t address the root causes.



Head-starting only addresses predation.



THIS WAS NEVER THE PROBLEM!

III. Criticisms & Concerns

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Head-starting is only a treatment of a symptom.

Any “cure” must address: Consumption Market



Introduced Species/Disease

Subsidized Nest Predators

Illegal Pet Trade

Road Mortality

Habitat Loss

Don't hold your breath.

III. Criticisms & Concerns

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Photo from Uni. of Michigan.

Head-starting is more like emergency care.

Addressing root causes is like long-term wellness.



Photo from Swirlster.com.

III. Criticisms & Concerns

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Wildlife will need management in an extremely altered habitat.

Active management and “offensive conservation”.



III. Criticisms & Concerns

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...but data is required to determine if it can actually increase recruitment (1981).

Fair enough Dr. P.
Let's see.

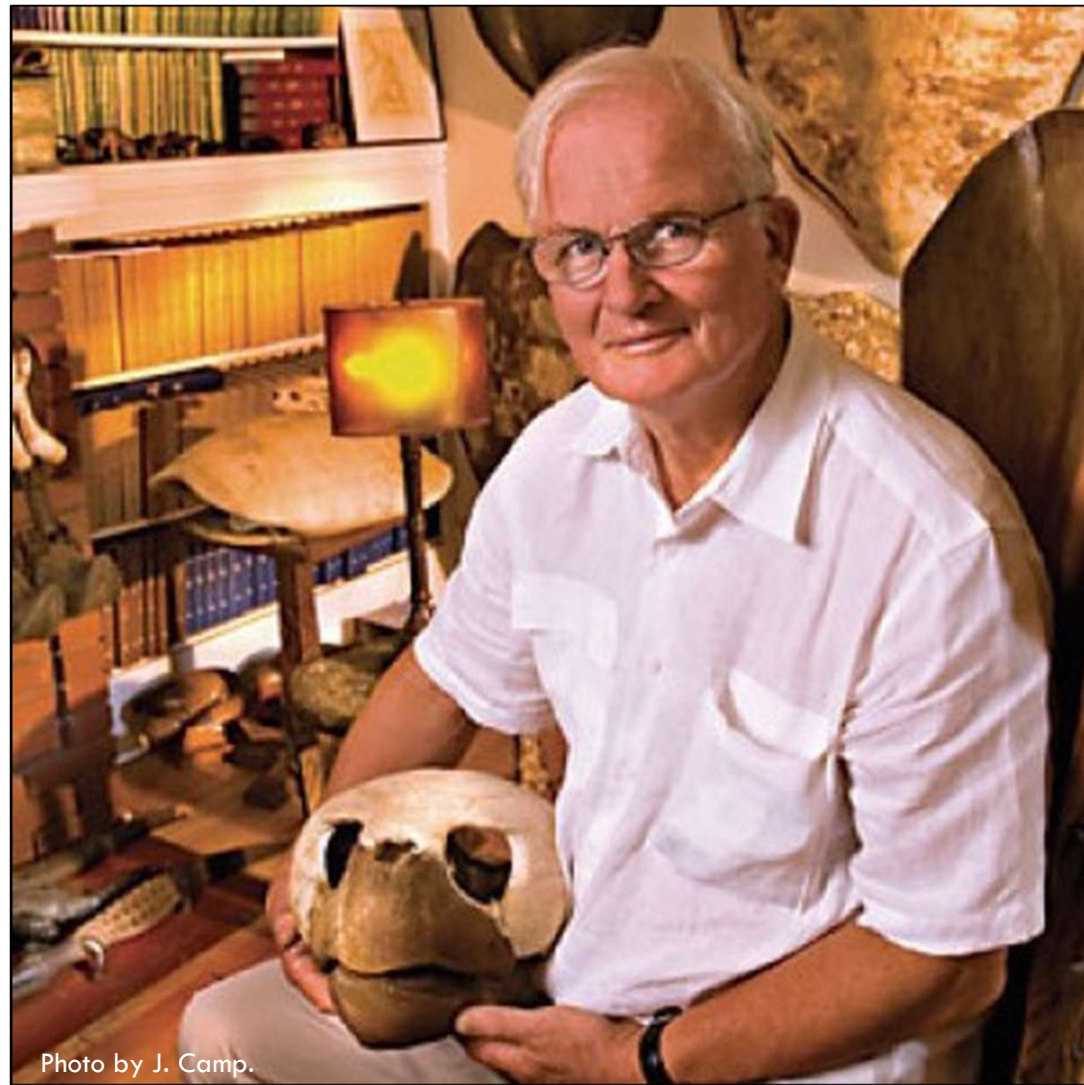


Photo by J. Camp.



IV. Head-Starting Process

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We began our work in 2009 with Blanding's Turtles



...and so many mistakes.



IV. Head-Starting Process

26

200 head-starts this year.

96.02% cumulative survival rate.

2,147 total head-starts released since 2009.



IV. Head-Starting Process

27

All of our animals are from *in situ* incubation.

Ex situ
incubation
may
allow
manipulation
of sex
ratios
...for most species.





IV. Head-Starting Process

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Nest
Protection

This is a
COMMITMENT!



IV. Head-Starting Process

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Must check every morning as hatching date approaches.



IV. Head-Starting Process

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Could release them right now and likely improve population recruitment.

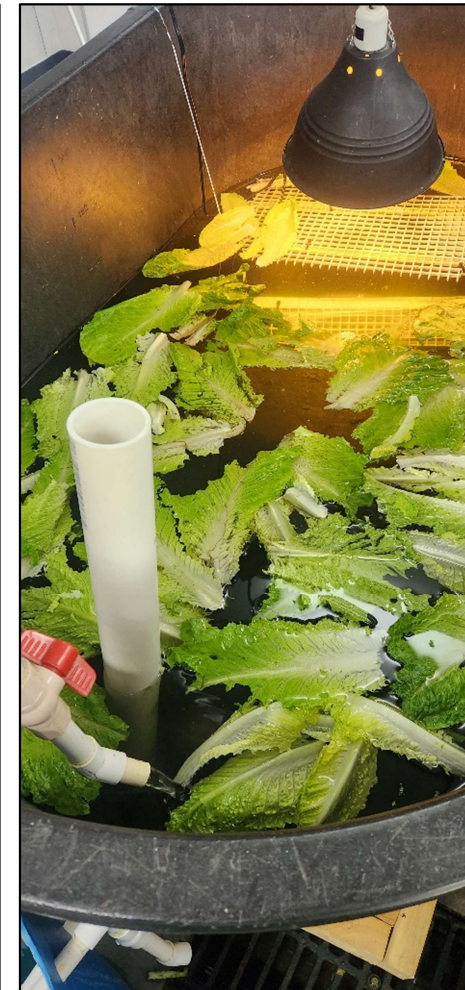
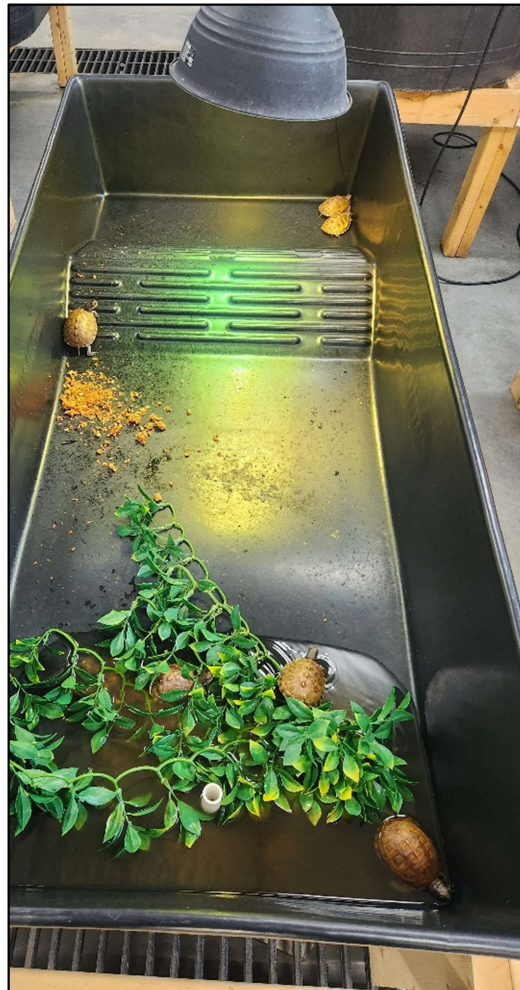
That's called "direct release".



IV. Head-Starting Process

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Species Appropriate Housing



IV. Head-Starting Process

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Keep it simple – very simple.



IV. Head-Starting Process

33

“Full Spectrum” Lighting & Photoperiod Control.



IV. Head-Starting Process

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Diets

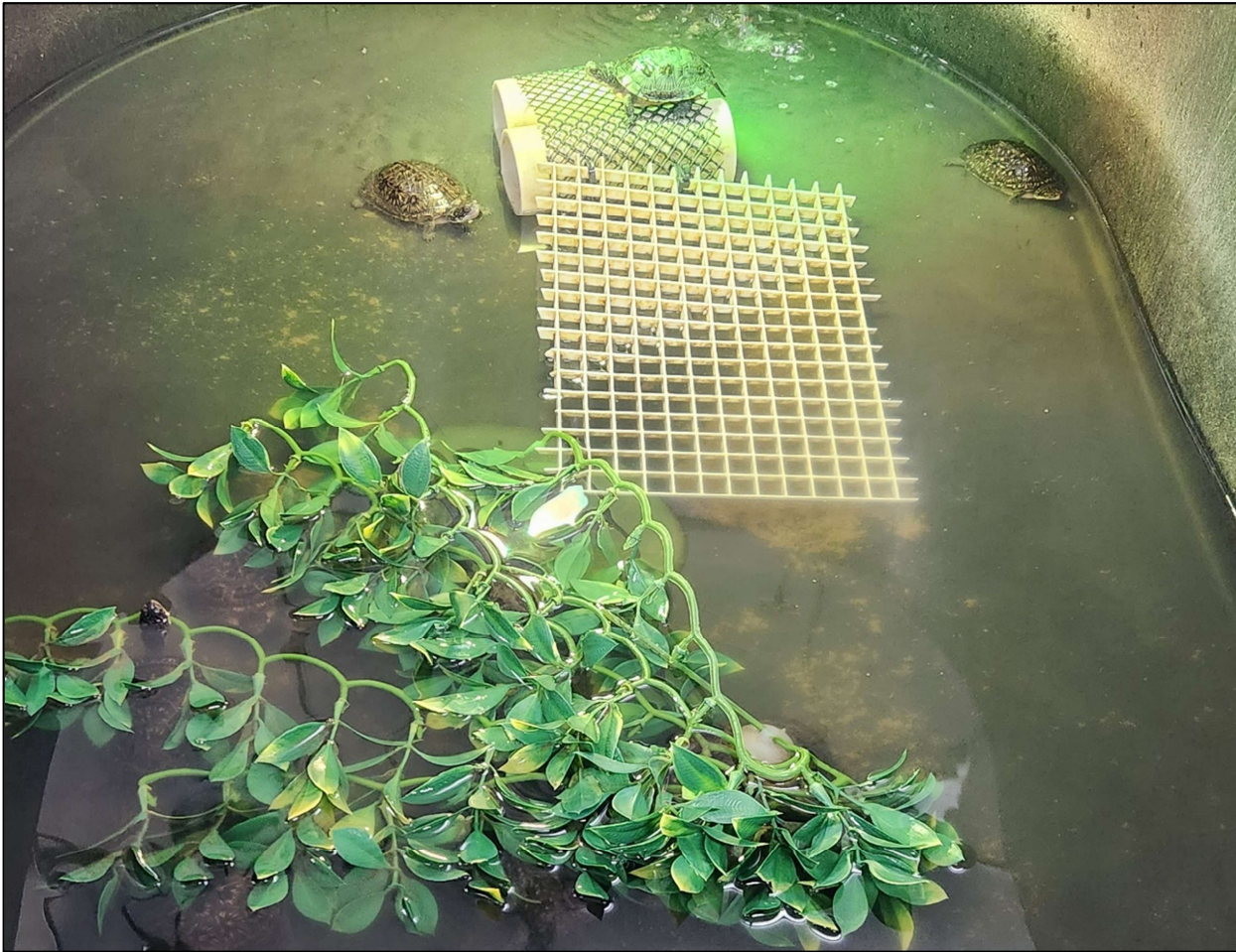


Herbivores are difficult!

IV. Head-Starting Process

35

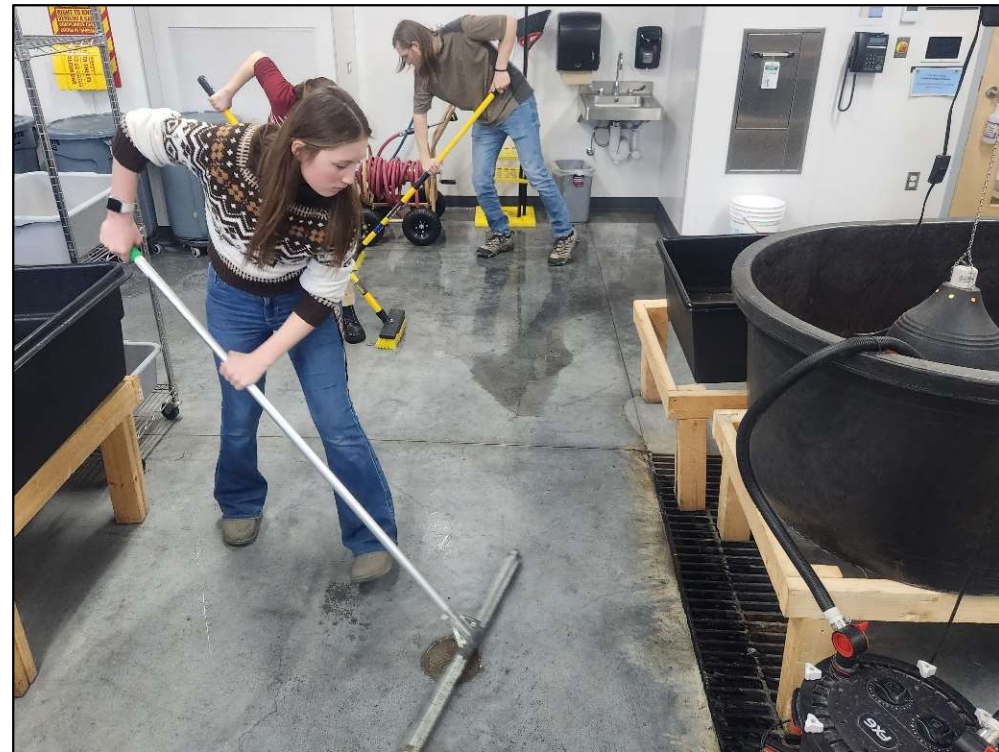
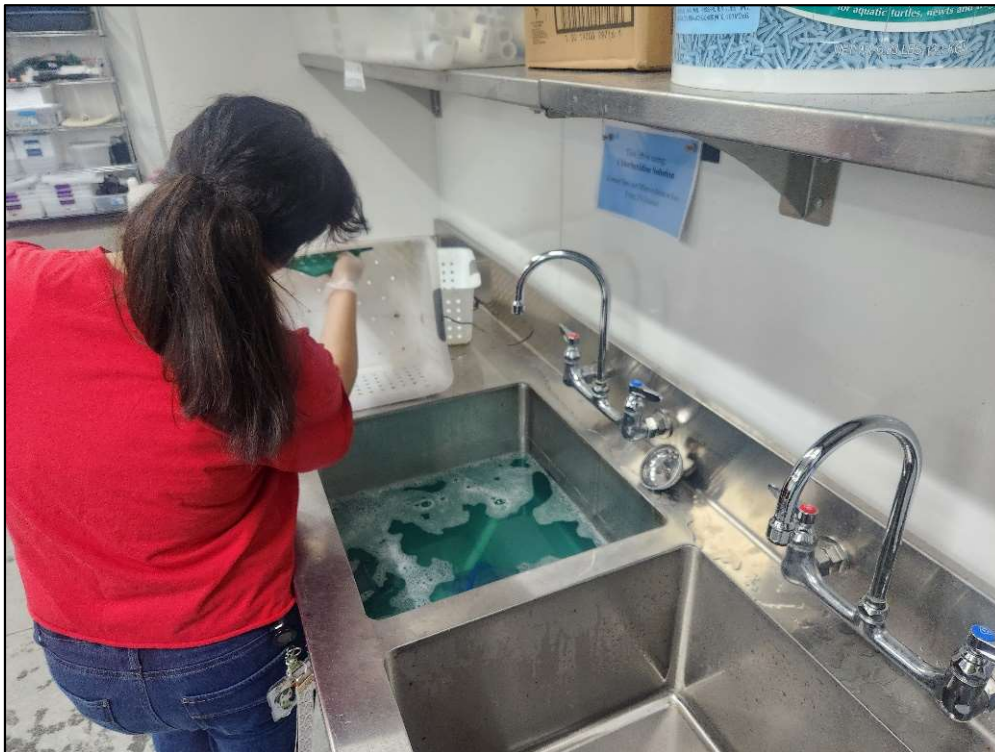
Filtration & Cleaning



IV. Head-Starting Process

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TURTLES ARE FILTHY!



IV. Head-Starting Process

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Growth Monitoring



Individual
Identification
Required



IV. Head-Starting Process

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Growth Monitoring

Individuals will grow at different rates.

May have to move animals around over time.



IV. Head-Starting Process

Growth Monitoring



Change (%)					
Turtle	2/10/2011	2/17/2011	3/3/2011	3/10/2011	3/18/2011
62	15.18%	10.47%	15.29%	15.65%	5.96%
63	9.52%	15.53%	10.22%	5.85%	15.21%
64	NA	NA	NA	NA	NA
65	6.02%	6.82%	13.30%	8.45%	16.45%
66	12.57%	6.38%	16.00%	13.36%	10.65%
67	17.33%	14.35%	16.61%	7.59%	15.00%
68	5.70%	6.59%	14.04%	5.42%	11.68%
69	4.07%	0.78%	26.36%	2.45%	10.18%
70	3.48%	5.88%	13.10%	9.47%	11.22%
71	14.04%	3.08%	20.15%	7.14%	7.25%
72	15.49%	10.73%	21.45%	0.57%	10.48%
73	20.83%	10.06%	18.28%	6.18%	2.70%
74	2.59%	9.24%	10.00%	9.79%	11.46%
75	11.76%	14.47%	7.28%	12.86%	8.23%
76	7.63%	11.35%	14.65%	8.89%	13.78%
Mean	10.44%	8.98%	15.48%	8.12%	10.73%

IV. Head-Starting Process

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Growth Monitoring

Tracking growth allows problems to be addressed early.

All for survival of the fittest BUT NOT IN HERE.





IV. Head-Starting Process

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Head-starting
selection
is not
NATURAL
selection.

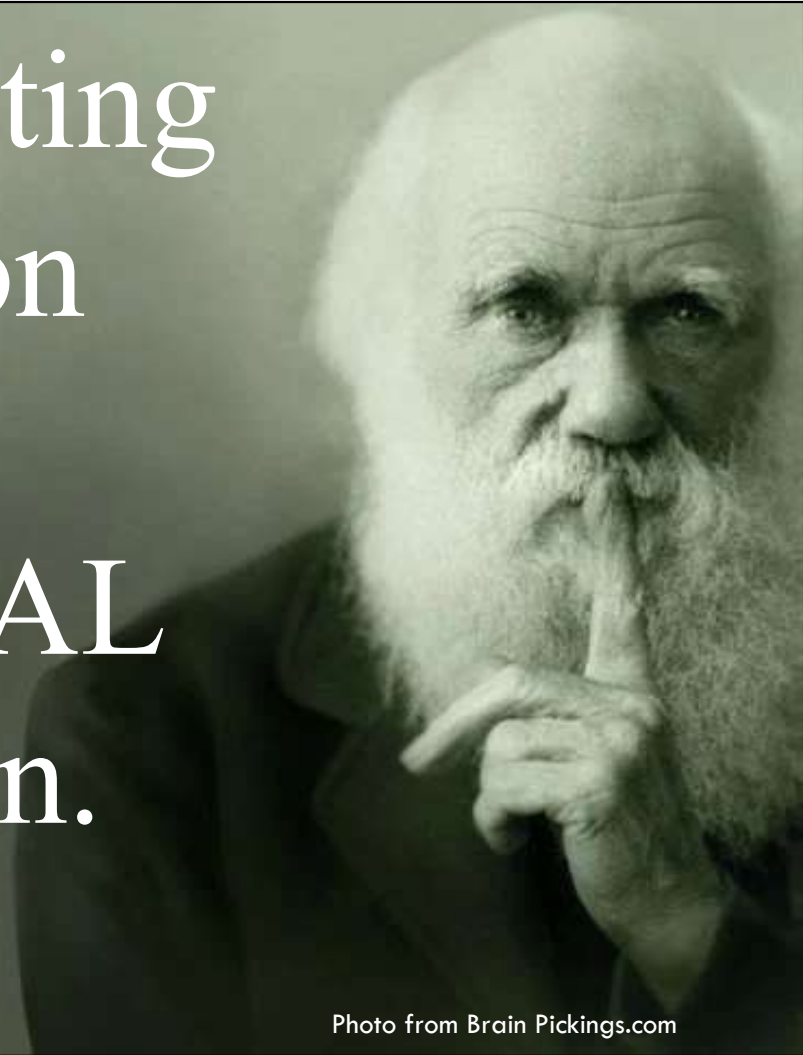


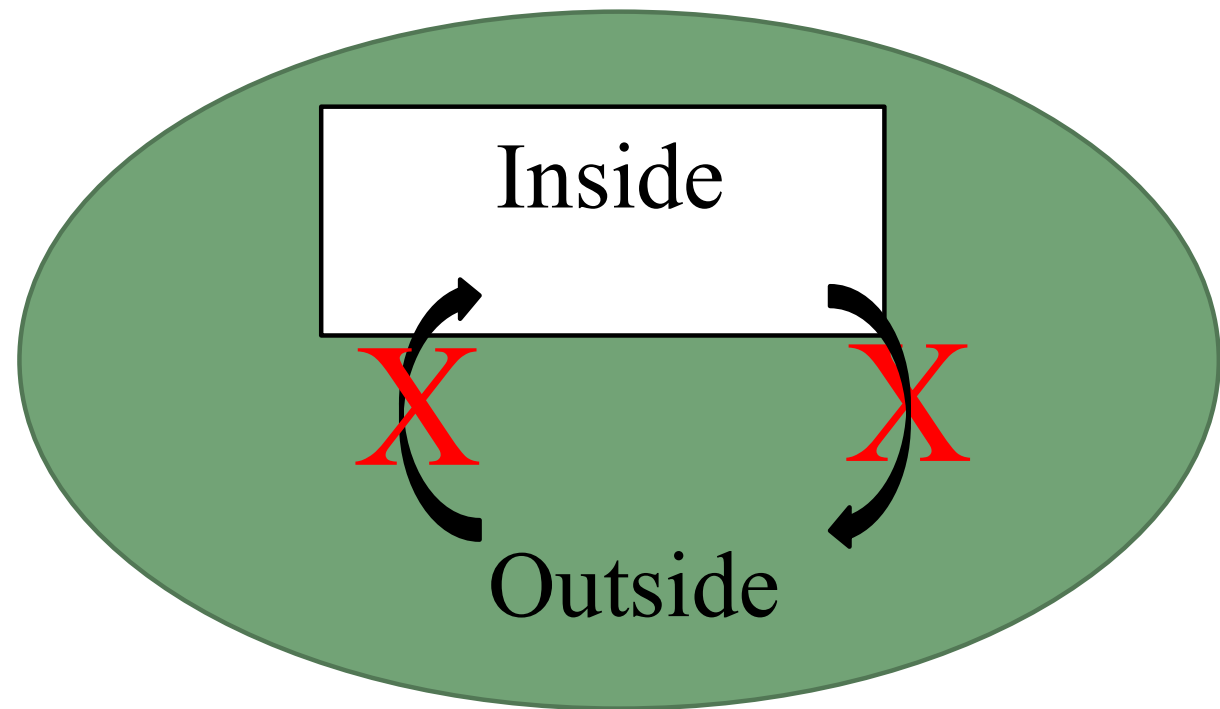
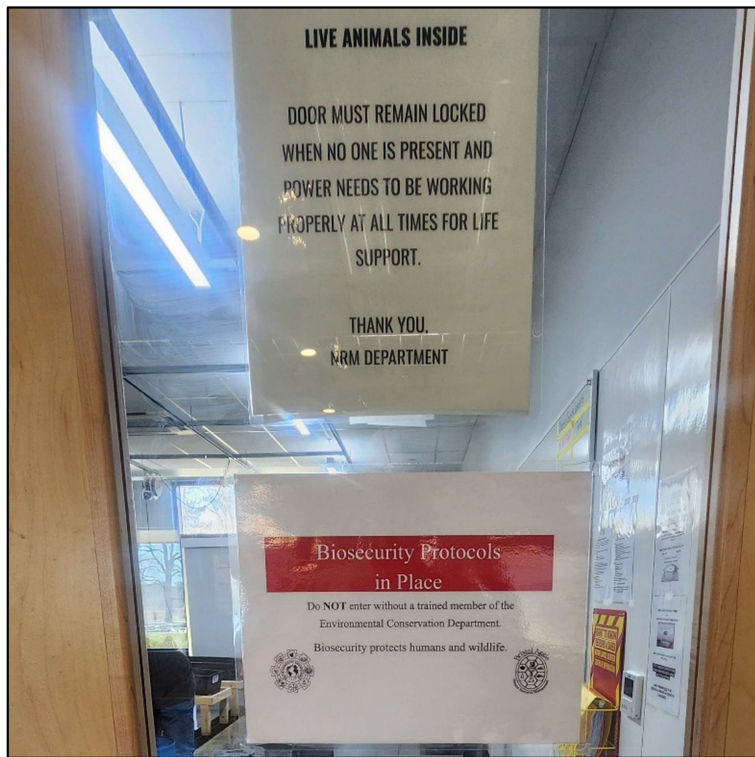
Photo from Brain Pickings.com

IV. Head-Starting Process

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Biosecurity

Procedures implemented to reduce the probability of introducing disease to a naive population.



IV. Head-Starting Process

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Biosecurity



IV. Head-Starting Process

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Biosecurity



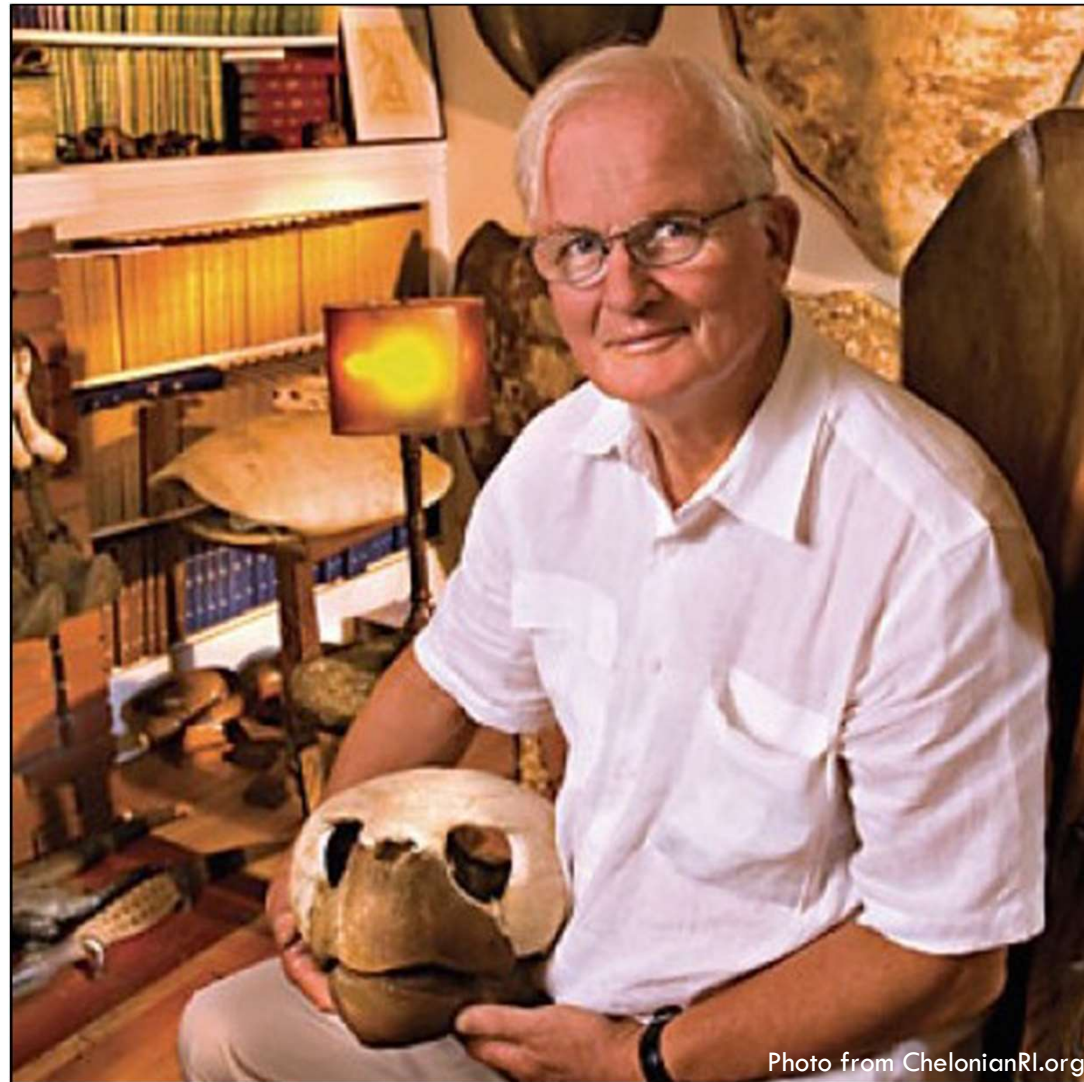
Not merely procedures.
Really, it's a way of thinking.

IV. Head-Starting Process

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Let's get to the data!

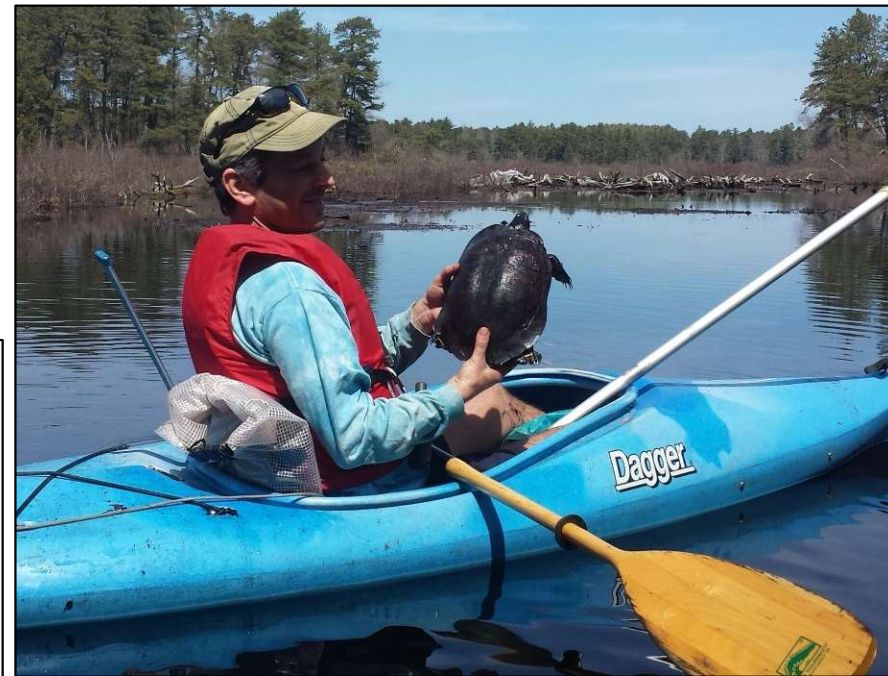
Post-Release
Monitoring



IV. Head-Starting Process

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Post-Release Monitoring



Only way to assess efficacy.



IV. Head-Starting Process

Post-Release Monitoring

Cohort	Blanding's Turtles # of Head-starts Released (# of Head-starts Recaptured)	% of Head-starts recaptured	# of Direct-releases Released (# of Direct-releases Recaptured)	% of Direct- releases recaptured
2006	7 (0)	0	0 (N/A)	N/A
2007	22 (6)	27%	25 (0)	0
2008	31 (22)	71%	34 (5)	15%
2009	47 (31)	66%	21 (0)	0
2010	54 (26)	48%	0 (N/A)	N/A
2011	91 (50)	55%	94 (12)	13%
2012	120 (18)	15%	154 (6)	4%
2013	68 (4)	6%	73 (0)	0
Total	440 (157)	36%	401 (23)	6%

IV. Head-Starting Process

Post-Release Monitoring

Increased
 Sponsorship



Direct-Release and Head-started Hatchlings Released

**recaptures from trapping 1 week (July 2011) and 1 week (July 2012)*

YEAR	Direct Release Hatchlings	Head-Started Hatchlings
2006	--	7
2007	25	22 (1)
2008	34 (1)	32 (5)
2009	21	47 (5)
2010	--	57 (1)
2011	94 (1)	64 (1)
TOTAL	174 (2)	229 (13)

Congdon life history data: 26% hatchling yr Sx, 72% juvenile Sx (*3)

2008: 32 hatchlings x .26 x .72 x .72 x .72 = 3.1 turtles predicted

IV. Head-Starting Process



Photo by K. Buhlmann

Slug Guts

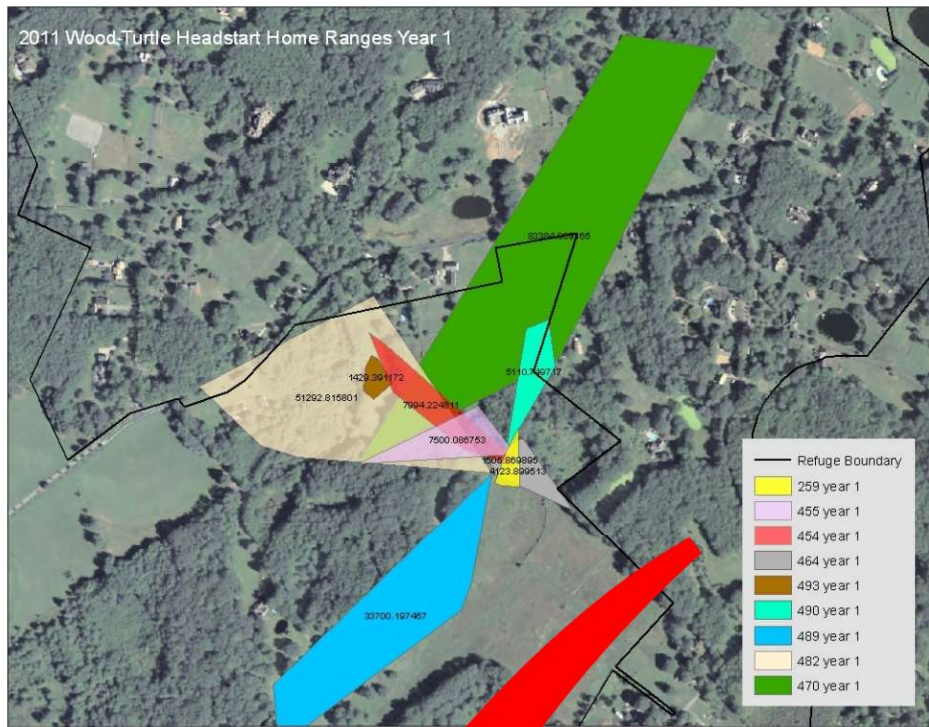
Many of our released wood turtle head-starts are observed eating natural diets.

Acting
Naturally

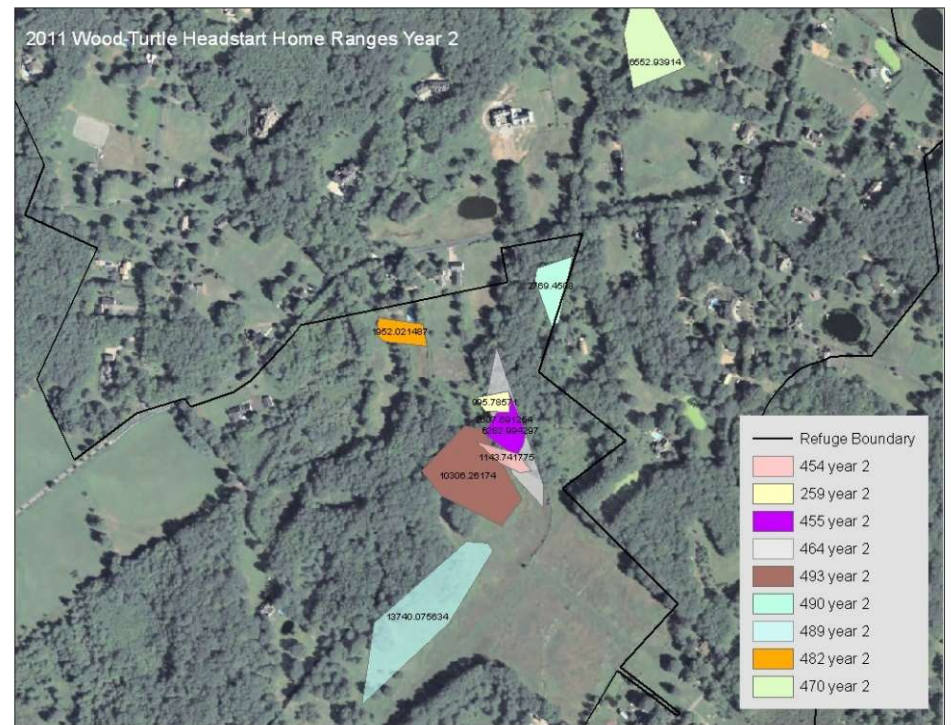


IV. Head-Starting Process

Post-Release Monitoring



Site Fidelity



IV. Head-Starting Process

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Post-Release Monitoring

Head-Start 472
Mating with
(adult) Female 12

He is six
years old in
this photograph.



Photo from C. Osborn

IV. Head-Starting Process

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Reproductive Success



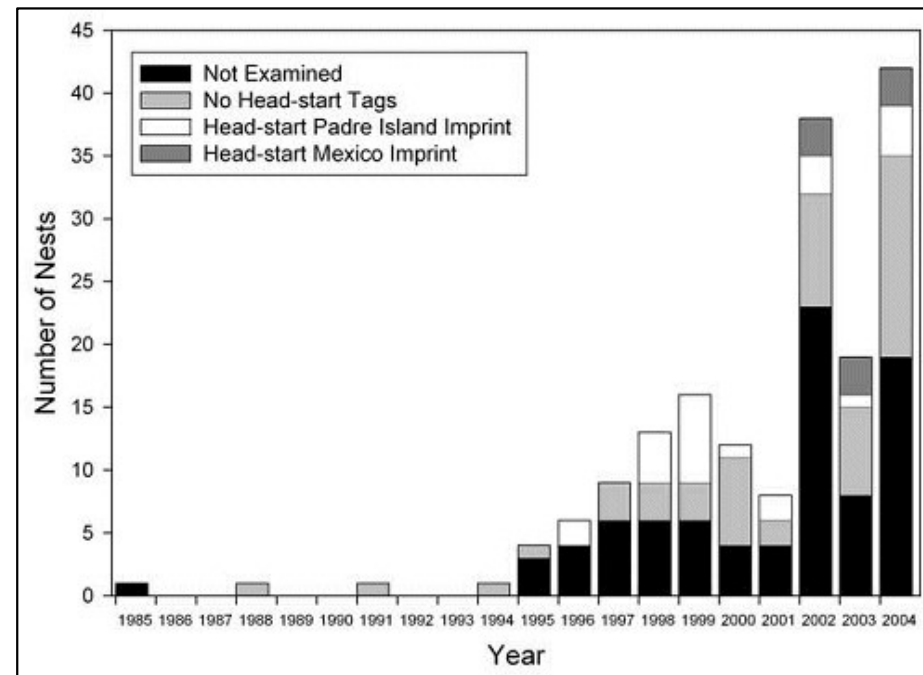
IV. Head-Starting Process

Post-Release Monitoring



Established new nesting beach in the US.

Increasing numbers of breeding head-start “alumni.”



V. Value of Natural History

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Blanding's Turtle

...or Species Idiosyncrasies

Horribly picky eaters!

Will change color.

Grow like rocks.



V. Value of Natural History

55

Redbelly Cooters

Extremely low
mortality.

Grow fast!

Lots of food.

Lots of waste.

And herbivores are difficult.



V. Value of Natural History

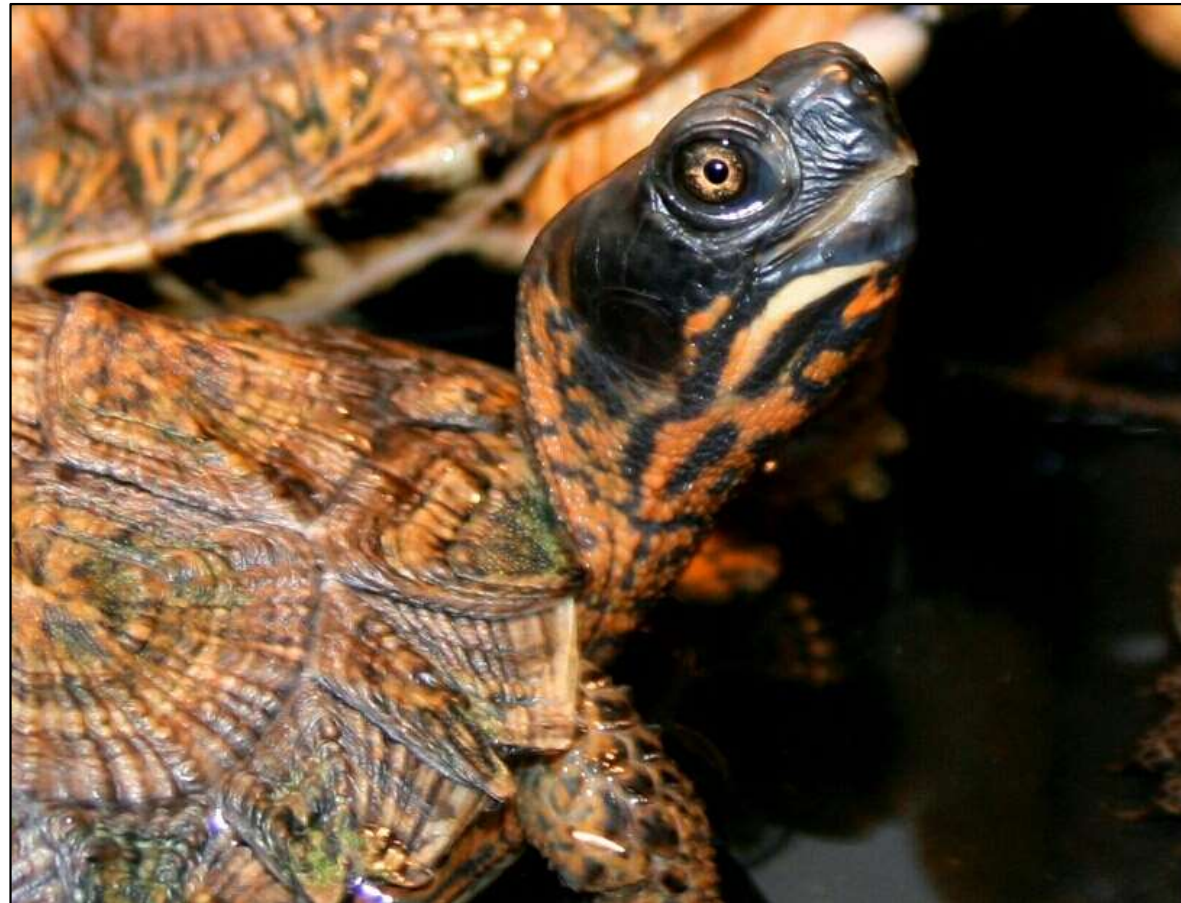
56

Wood Turtle

Easy feeders.

Very messy!

Climb like monkeys.



V. Value of Natural History

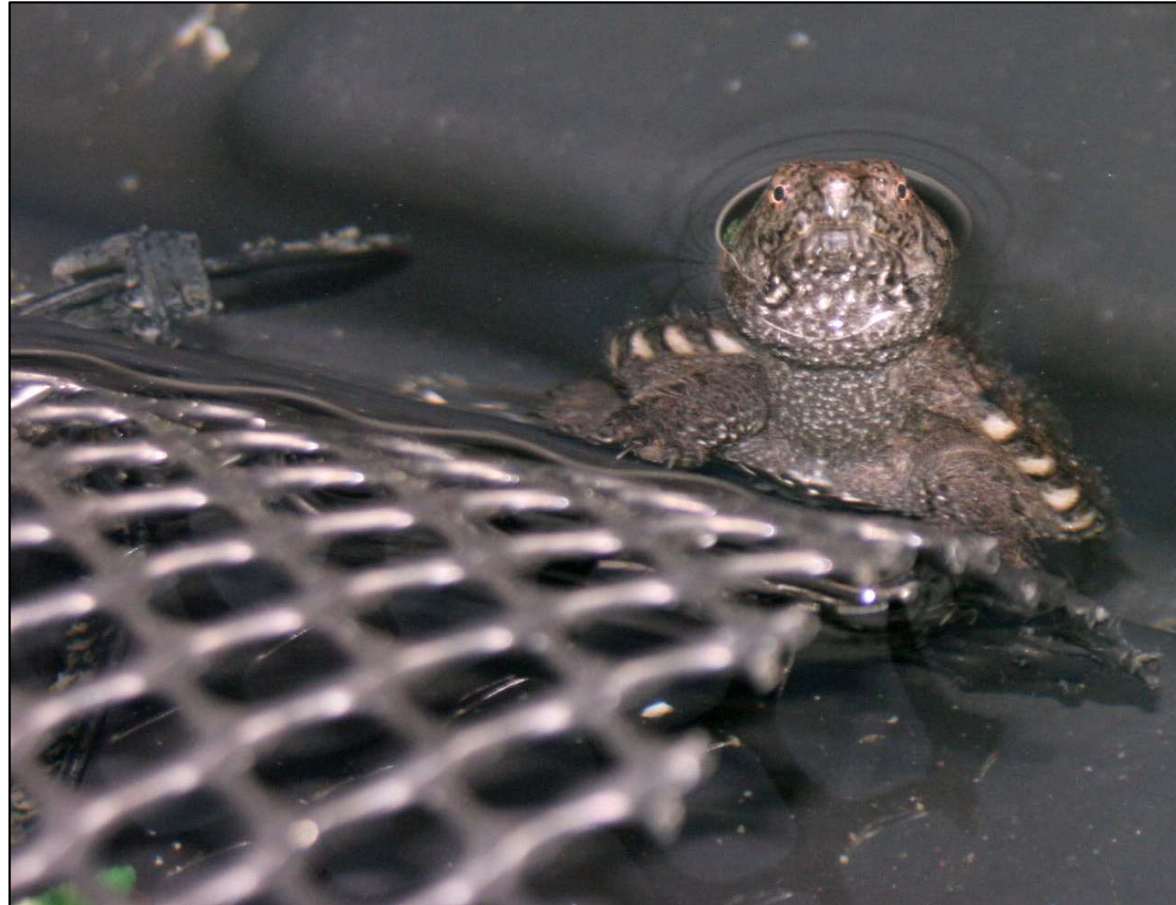
57

Snapping Turtle

Take a long time to begin feeding.

Really tough on tank mates.

Best kept singly.



V. Value of Natural History

58

Diamondback Terrapin

VERY small at hatching.

Complex natural history.

Eat a LOT!

Some salt may improve growth rate.



V. Value of Natural History

59

Eastern Box Turtle

Need lots of cover.

May need coaxing to
start eating.

Can grow too fast.

Horrible little monsters!





Questions?

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