USING INCUBATION AND HEADSTARTING AS CONSERVATION TOOLS FOR NOVA SCOTIA'S ENDANGERED BLANDING'S TURTLE, (*Emydoidea blandingii*)

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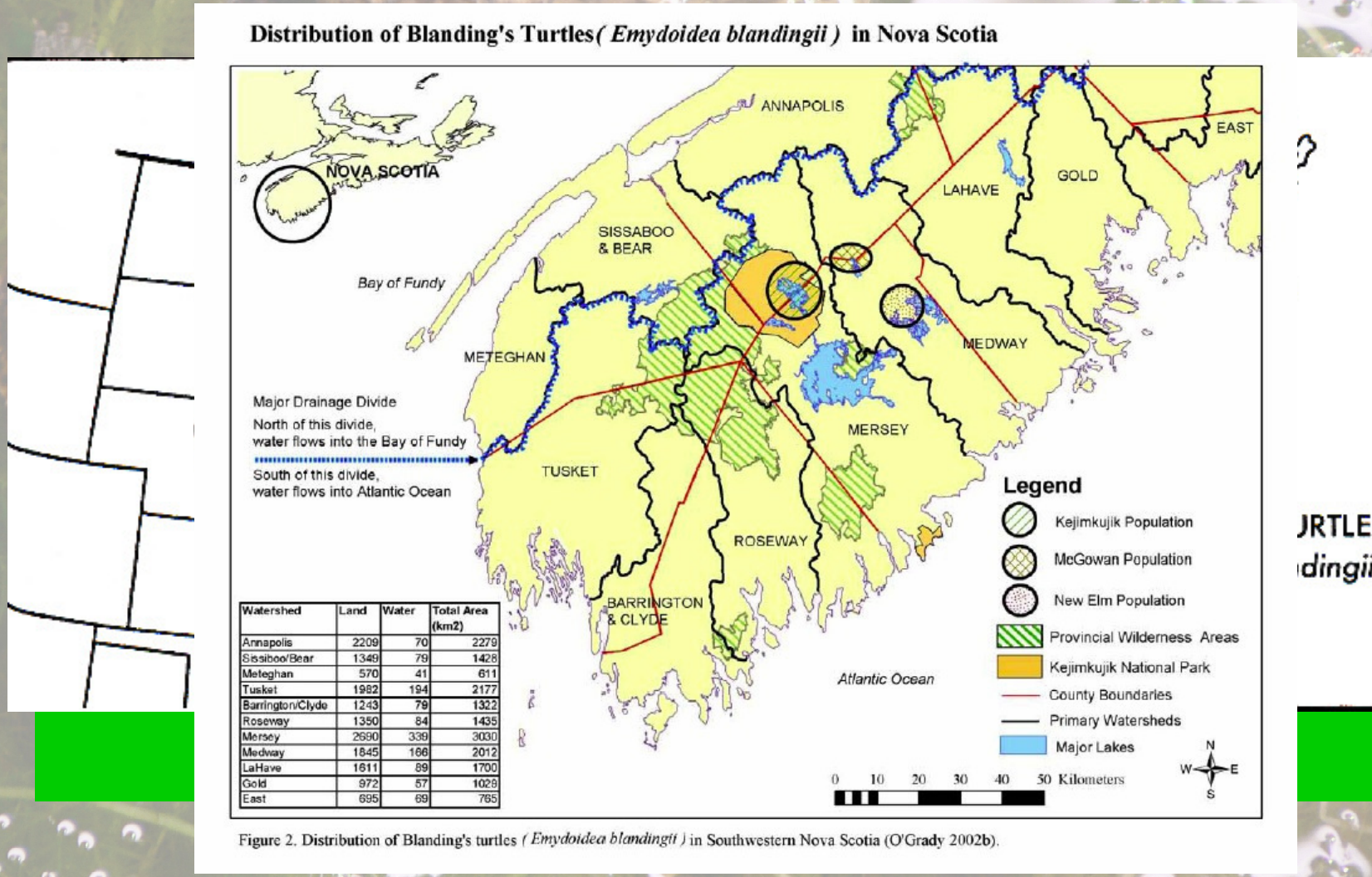
Blanding's turtle in NS



Watershed	Land	Water	Total Area (km2)
Annapolis	2209	70	2279
Sissiboo/Bear	1349	79	1428
Meteghan	570	41	611
Tusket	1982	194	2177
Barrington/Clyde	1243	79	1322
Roseway	1350	84	1435
Mersey	2690	339	3030
Medway	1845	166	2012
LaHave	1611	89	1700
Gold	972	57	1028
East	695	69	765

Figure 2. Distribution of Blanding's turtles (*Emydoidea blandingii*) in Southwestern Nova Scotia (O'Grady 2002b).

Population Viability Analysis

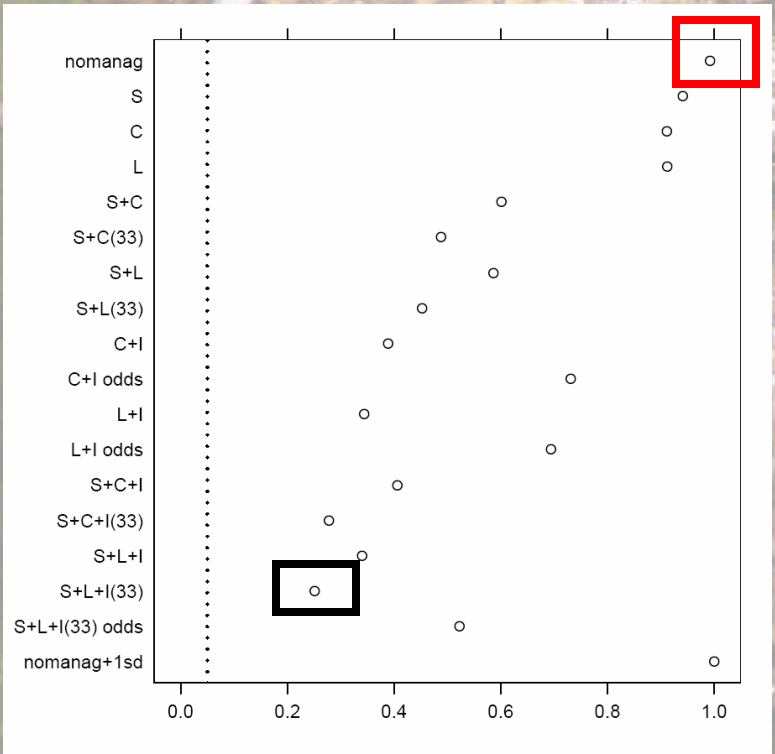
- Measure extinction probabilities
  - Demographic parameters, population size, random variation
- 4 management regimes were modeled within the PVA by (Herman et al., 2004)

Management regimes

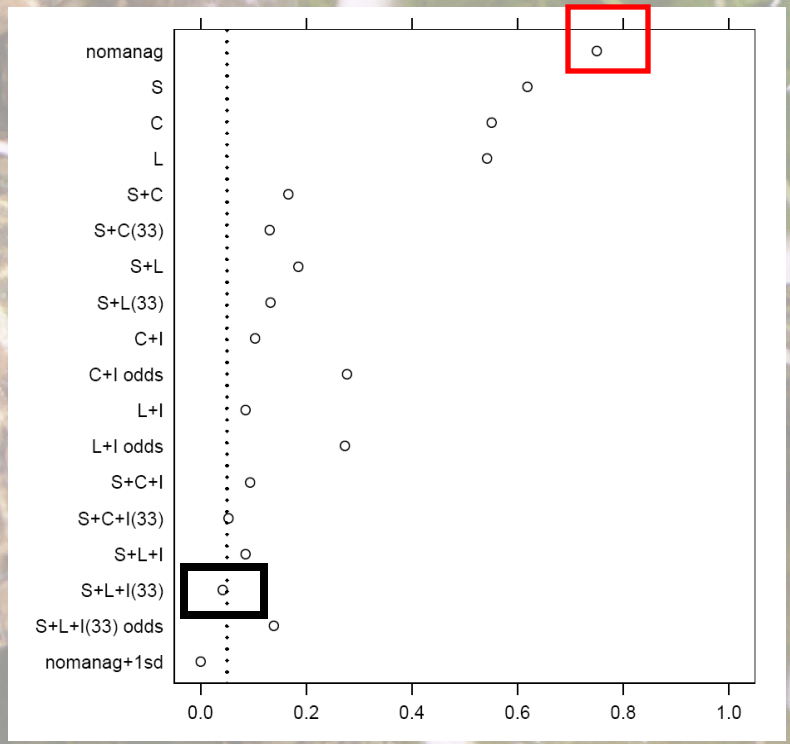
- Screening Nests, Incubating eggs and Captive Laboratory rearing “Head-start Programs” (Conservative 1 yr/Liberal 2 yr)

PVA Risk of Extinction graphs of an extended array of management regimes at 2 different threshold options

Threshold = 50 Individuals



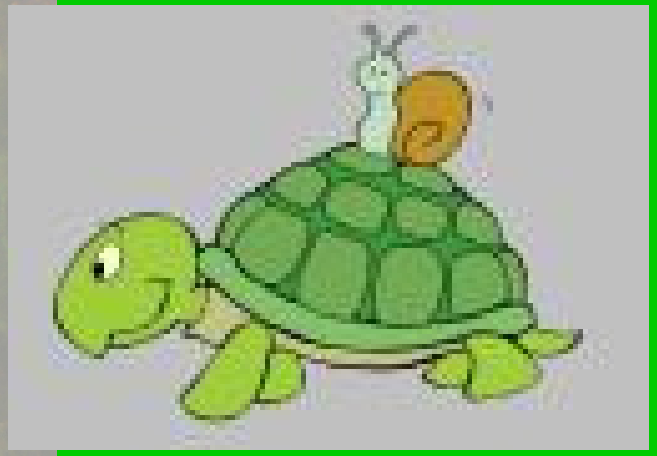
Threshold = 5 Individuals



Past (Conservative 1 yr.) vs. Present (Liberal 2 yr.) Incubation and Head-Starting

PAST - wild hatchlings head-started over one winter

PRESENT – eggs incubated and head-started for two years



Past head-start ventures

-Thermal gradient created with heat lamp

-basking and hiding spots provided

-UVB Repti-Glo* lighting

-live food sources – high protein


J
KNP 1,3-9,11 July 13


J
July 13/05

Thoughts/Concerns

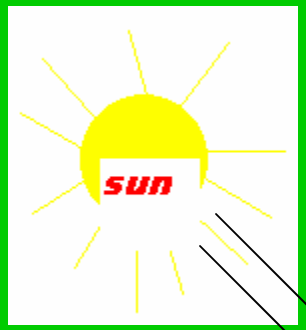
- The long term dietary, internal development and morphological effects of accelerated growth not yet known.
- SO…. Do the benefits of accelerated growth counter balance the potential long term health issues associated with captive turtles?

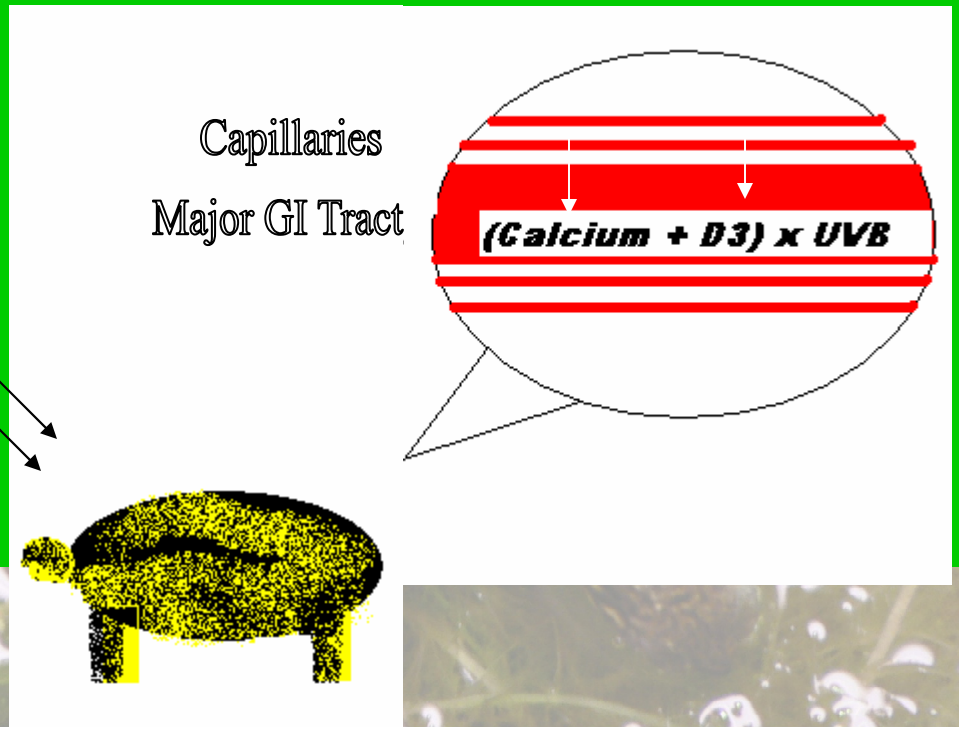
Health concerns in captive turtles

- Ca:P ratios, 3 or 2:1
- Excessive protein, Omnivorous animals
- Vitamin A, Beta-carotene
- Vitamin B or Thiamine
- Vitamin E
- *Most important - Metabolic Bone Disease* - Vitamin D3/Calcium

Metabolic Bone Disease: An interplay of UVB, Calcium and Vitamin D3

- Calcium binds to vitamin D3 and the bound pair is transported from the major intestinal tract to the capillaries – all three are essential or else the animal begins to eat away at its own skeletal system to gain the correct amount of calcium within the blood stream

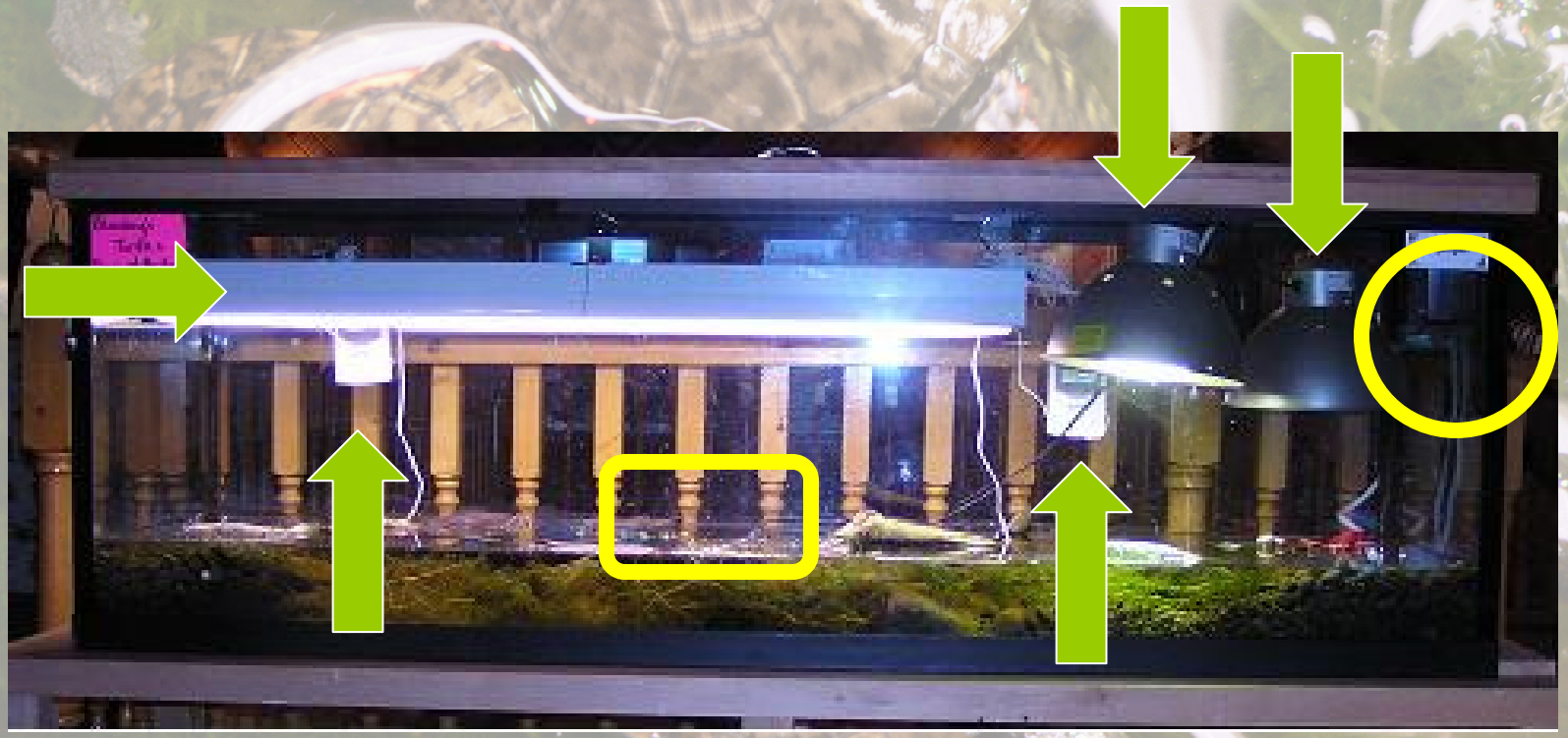




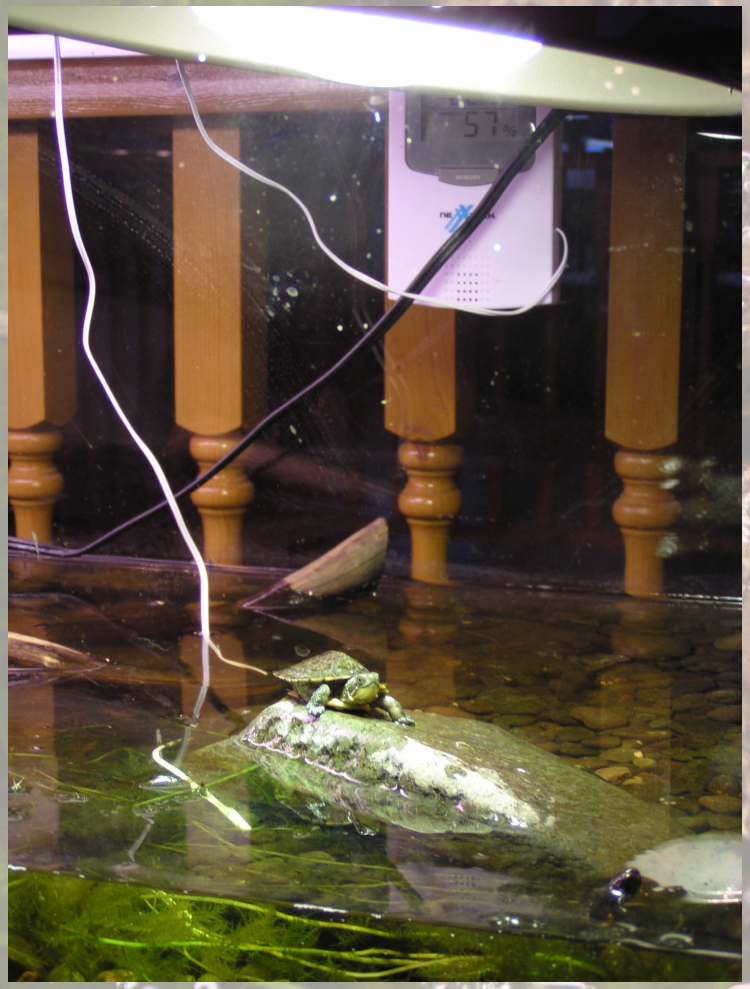
Tackling Health Issues

- Using UVB … vg. during peak basking tim… Repti-Glo* bulbs emit max o…
- Westron's … ood Lamp emits100-2…
- Toronto Zo… formula along with live fo… ns, etc.
- Feeding fr… e times per week
- High volum… ystems

New Husbandry equipment/Set-up: UVB lamp, heat lamp, thermostat, plant bulb, thermometers and filtration system



Turtles frequently utilize UVB bulbs



Over-wintering Regime

1. April to end of September -
   - 14 hours daylight/10 hours night (Hot period)
   - Basking spot 32
   - full UVB time period
2. October to end November -
   - 12 day/12night (warm period)
   - Basking spot 25
   - full UVB time period
3. Beginning of December -
   - 10 day/14 night (initial cooling)
   - Basking spot 12
   - half of UVB period

4. Mid December to mid January-
   - overwintering/cooling
   - Whole tank 5 degrees
   - no basking spot
   - no UVB
5. Mid January to end of January
   - 10 day/14 night (exiting cooling)
   - basking spot 12
   - half of UVB period
6. February to end of March
   - 12 day/12 night(warm period)
   - full UVB period

Initial Incubation Trial

- 4 still-air incubators
- 1:1 ratio of water to vermiculite in weight was added (Gutzke, 1987)
- Tops left open and small holes in the bottom (no over-saturation)
- Packard and Packard (1982), Blanding's incubation temp. regime 26.5 °C (males) – 32 °C (females), our temperatures 27.5 and 31
- Weight measured each week and missing weight added in water
- Humidity, not water potential of substrate, was measured initially

Results

- 4/39 hatched eggs – 10% success rate
- 1 hatchling from McGowan, 3 from Keji
- All from lower temp. incubator
- Too dry? Too much water loss? 32 °C too high?

Incubation Trial 2

- Differences:
  - Still-air and forced- air incubators
  - Sealed containers
  - Avg. temp. of 28.5 °C, half way between 26.5 °C (males) – 32 °C (females)
  - Packard (1982) water potential of substrate -150 KPa and -375 KPa – maintained with tensiometer

Results of Trial 2

Forced-air = 46.5%

Still-air = 50%

Hatchling Photographs

McGowan= 18/26~69%

Kejimkujik= 10/32~31%

Total=28/58= **49%**

Current head-starts

- Incubated hatchling's are being housed along with wild hatchling's (from McGowan and Keji. Supbcomplexes) to observe the effect of incubation on growth dynamics

Incubation and Turtle Conservation

- Current literature shows that ideal incubation environment can:
  - enhances survivorship
  - enhances metabolism
  - Increase growth rates
  - Incubated hatchling's select warmer temperatures
  - Produce bigger hatchling's

Preliminary Results

	Acadia University (n=20)	**Oaklawn Farm Zoo (n=14)**	**All turtles (n=34)**
McGowan turtles	55.49 g (34.0 g – 81.2g)	Avg. 42.65 g (18.33g-63.11 g)	Avg. 49.07
Keji turtles	48.16 g (21.4 g to 71.7 g)	Avg. 39.86 g (16.42g 63.21g)	Avg. 44.05
Incubated turtles	Avg. 59.62 g	Avg. 35.01 g	Avg. 47.3
Wild turtles (	Avg. 36.03 g	Avg. 44.7 g	Avg. 39.6

With the Keji turtles reared at Acadia, all 5 of the smallest turtles are wild:

Wild: range 22.4- 46.3g (n=5)

Incubated: range 54.7 – 71.7g (n=5)

Thoughts…Cont'd

- Invasive measures are frowned upon by many researchers in NS
- SO…

  Could we enhance survivorship without head-starting (incubation alone), avoid health risks, reduce effort and costs associated with recovery and cheer up the NS skeptics?

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