Variation in nest temperatures of the American Alligator found on the Kennedy Space Center / Merritt Island National Wildlife Refuge

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56,656 ha or 140,000 acres
32,374 ha (80,000 acres) land
24,281 ha (60,000 acres) water
WHY ARE NESTING TEMPERATURES IMPORTANT?

- **Temperature Sexual determination**
  - FEMALES 29 deg C  50/50 31.5 deg C  MALES 34 deg C

- **Recruitment / Population structure**

- **Sea level rise / Global warming**

- **Provide information for long term management decisions**

MINWR
NASA
CNS
Other agencies
OBJECTIVES

- IMPLANT 3 THERMISTERS IN EGG CAVITY NEXT TO THE EGGS, RECORDING DEPTH, LOCATION AND TIME
- PUT A THERMISTER IN THE AIR NEXT TO THE NEST
- PULL EGGS FOR STAGING
- THERMISTERS SET TO LOG EVERY 5 MINUTES
- RECORD TIME WHEN THEY ARE PICKED UP
MICROBIAL ACTION

SHADE

VEGETATION COLOR

RAIN

COMPOST TYPE (VEGETATION)
THERMISTER NESTS THAT DID NOT HATCH
2010 - 2015

- DEPREDATED: 5
- DEAD NEST: 10
- UNKNOWN: 2
DMS 4 THERMISTORS 2015

TEMPERATURE (°C)

MONTH

06/29/2015
07/13/2015
07/27/2015
08/10/2015
08/24/2015
09/07/2015

TOP THERMISTOR 26cm
MIDDLE THERMISTOR 36cm
BOTTOM THERMISTOR 53cm
AVERAGE TEMPERATURE DURING TSD

YEAR

TEMPERATURE °C


AMBIENT AIR THERMISTER
TOP THERMISTER
MIDDLE THERMISTER
BOTTOM THERMISTER
DAY AND TIME OF HATCHING
2010 - 2014
WILD NEST TEMPERATURE RESULTS

- 58 Nests with temperature data loggers
- 41 Nests hatched (71%)
- Average temperature in the alligator nests at TSD was 31.8 deg. C. indicating our recruitment here is close to 50/50
- Range between the three different depth temperatures at sexual determination was only .27 deg. C
- Rain had a big influence on the alligator nests dropping the temperature up to eight deg. C.
- Highest temperature recorded was 78.5 deg C (173 deg F). Was a thermistor on the ground after hatching. Yes the swamp is HOT!
Overall summary

- High nesting success on KSC/MINWR
- TSD temperatures close to 50;50 for male to female ratio
Publications


Heather J Hamlin1,2,*, Russell H Lowers3,*, Satomi Kohno1,10, Naoko Mitsui-Watanabe4, Haruna Amano5,6, Akihiko Hara5, Yasuhiko Ohta7, Shinichi Miyagawa8,9, Taisen Iguchi8,9 and Louis J Guillette Jr. 2014 The reproductive hormone cycle of adult female American alligators from a barrier island population. Reproduction (2014) 147 855–863


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ANY QUESTIONS?