



**TECHNOLOGY AND HUSBANDRY
INNOVATIONS TO IMPROVE
OVERWINTERING SUCCESS**



ABOUT ME

Linda Nichols

- Virginia State Permitted Wildlife Rehabilitator
- In-home rehab for 200+ animals per season
- 25 years working in the tech industry
- Virginia Tech Hokie

CHALLENGES WITH NATIVE TURTLE REHAB

- Very specific heating, humidity, lighting and diet requirements
- Providing a natural, yet sanitary environment with no contaminants
- Monitoring animals consistently for changes in behavior/health
- Maintaining environment indoors throughout winter





2024/2025 SEASON IMPROVEMENTS

- Underfloor heating in main area
- Automated misting systems, humidifiers, natural plants
- Overhead and individual compact security cameras
- Automated monitoring via custom-built AI-enabled alert system





```
{
```

```
"turtle_well_being": "good",  
"carapace_up": false,  
"entrapment": false,  
"unusual_inactivity": false,  
"aggressive_interactions": false,  
"eggs_present": false,  
"additional_notes": "Multiple  
turtles are visible in a large,  
well-maintained indoor habitat. The  
environment appears to have a  
diverse setup with basking areas,  
plants, and hiding spots. The  
turtles seem active and are not  
exhibiting signs of distress."
```

```
}
```

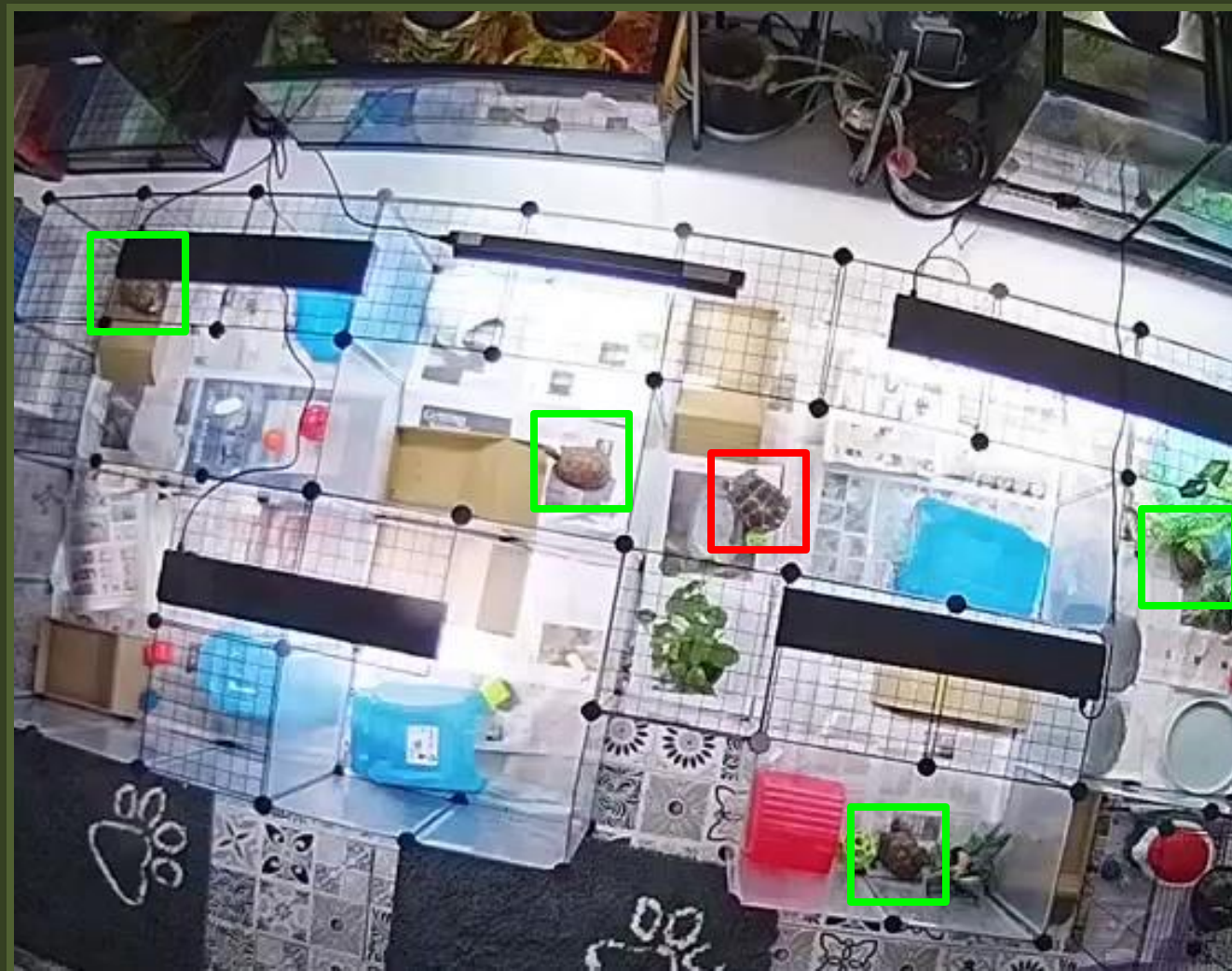
AI-ENABLED ALERT SYSTEM





```
{  
  "turtle_well_being":  
    "distressed",  
    "carapace_up": true,  
    "entrapment": false,  
    "unusual_inactivity": false,  
    "aggressive_interactions": false,  
    "eggs_present": true,  
    "additional_notes": "Multiple  
turtles are visible in a large,  
well-maintained indoor habitat. The  
environment appears to have a  
diverse setup with basking areas,  
plants, and hiding spots. The image  
shows a turtle in a carapace-up  
position. It is difficult to tell  
whether the turtles are showing  
signs of unusual inactivity, which  
can indicate stress or illness."  
}
```

AI-ENABLED ALERT SYSTEM





Twilio

Yesterday

This business uses a secure service from Meta to manage this chat. Tap to learn more.

A turtle event has been detected at: 2025-07-20 03:57:42

Turtle Well Being: distressed

Carapace Up: True

Entrapment: True

Unusual Inactivity: True

Aggressive Interactions: False

Eggs Present: False

Additional Notes: The turtle appears to be flipped on its back (carapace-up) and is potentially entrapped by the surrounding structures within the habitat.

This position is dangerous for the turtle as it cannot easily right itself and may lead to exhaustion, stress, or even suffocation. The turtle seems inactive, which could indicate distress or inability to move.

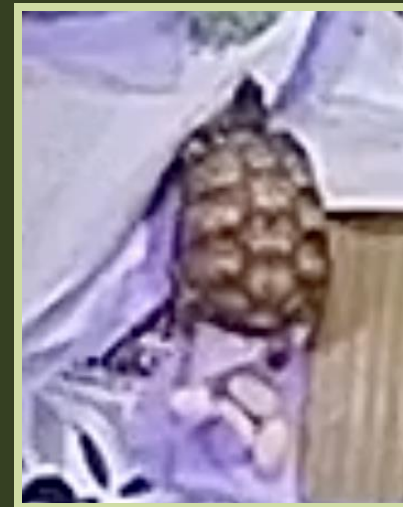
Immediate intervention is needed to assist the turtle and ensure its safety.

11:57 PM

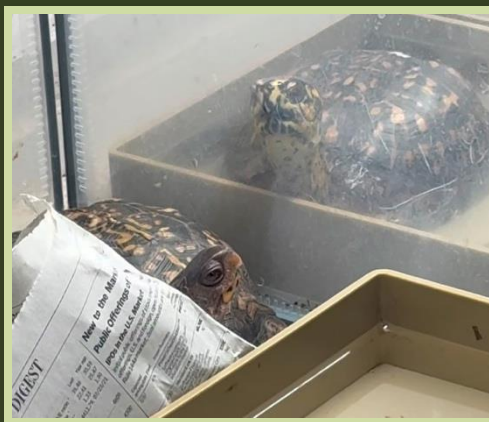
AI-ENABLED ALERT SYSTEM



Laying eggs



Aggression



Carapace-up positioning

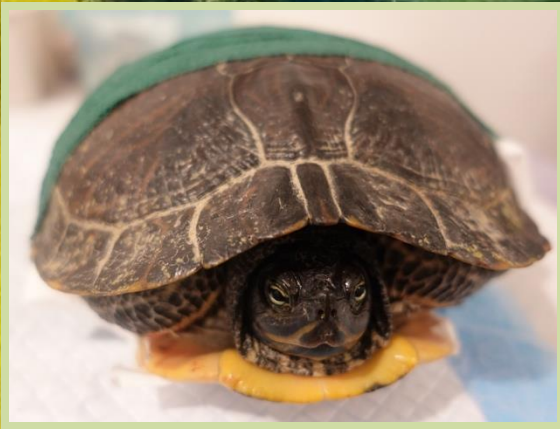
Entrapment





WHAT'S NEXT?

- Alerts for more patient species
- More alerts for different behaviors
- More cameras added to the rehab areas – including outdoors
- Sound identification, e.g., frog calls



THANK YOU

Linda Nichols

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