Interpretations: From Training to Application

Revising Regional Interpretations based on customer feedback
July 21, 2015

Our Florida Committee Members:
Status of the Gopher Tortoise

- Threatened species
- Declining populations throughout its range
- In Florida, gopher tortoises must be relocated before clearing or development takes place
- More than 80 percent of their habitat is privately owned.
- USFWS identifies “priority soils”
- Keystone species

**USDA-NRCS programs:** Longleaf Pine Initiative (LLPI) and Working Lands for Wildlife (WLFW)

Relationship of sites to the National Interpretation rating

Charlotte, DeSoto, and Hardee Counties
Field documented gopher tortoise burrows

Land use and ecosystem matrices
Excessively drained soils (above) and poorly drained soils (below)

Onsite gopher tortoise burrows with an apron of spodic horizon material
With almost 20,000 data points from various agencies and partners

Next step, data analysis:

- Join burrow locations to SSURGO (soils)
- Evaluate data statewide

19,905 burrows

- Excessively: No water table, low AWC
- Well: 122 to 200 cm
- Moderately well: 76 to 122 cm
- Somewhat poorly: 42 to 76 cm
- Poorly: 25 to 42 cm
- Very poorly: 0 to 25 cm
But we acknowledged that there are differences between north and south Florida, due to various reasons:

- Investigative bias due to distribution of public lands
- Distribution of drainage classes
- Distribution of parent materials
- Climatic differences (mostly temperature and seasonality of precipitation)
- Topographical differences
- Hydrology differences
- Land use pressures and patterns
Why is temperature regime important?

- Thermoregulation requirements
- Burrow depths
- Seasonal vs. year-round foraging
- Different forage species present

Soil Temperature Regimes:

**Thermic:** Cooler, larger temperature fluctuations (59 – 71.6 deg F at 20”)

**Hyperthermic:** Warmer, narrow temperature fluctuations (>71.6 F at 20”)

Legend:

- Other than Poorly drained
- Poorly drained

Survey Area: State of Florida
Survey Area Version: 10/1/2014; fully certified
Orthomagery: None
Map Created: 10/22/2014
Rick Robbins, (Phone: 352.338.6556)
USDA-NRCS, Gainesville
Sources:
Soils: Statewide SSURGO
Tortoise: FNAI, USFSW, FWC
Thermic temperature regime – Burrow distribution

6,670 burrows

**Burrow Distribution:**
- Excessively – 52.4%
- Somewhat excessively – 0.8%
- Well – 2.4%
- Moderately well – 24.5%
- Somewhat poorly – 13.9%
- Poorly – 5.4%
- Very poorly – 0.5%
Hyperthermic temperature regime – Burrow distribution

12,797 burrows

Excessively – 21.3%
Somewhat excessively – Not present
Well – 2.8%
Moderately well – 19.3%
Somewhat poorly – 10.4%
Poorly – 45.3%
Very poorly – 0.8%
Data comparison

Statewide burrow distribution by drainage class:

- 1. Excessively drained
- 2. Somewhat excessively drained
- 3. Well drained
- 4. Moderately well drained
- 5. Somewhat poorly drained
- 6. Poorly drained
- 7. Very poorly drained

Thermic temperature regime - Burrow distribution:

- # of burrows: 3498
- Drainage classes:
  - Excessively drained: 55
  - Somewhat excessively drained: 159
  - Well drained: 930
  - Moderately well drained: 362
  - Poorly drained: 35

Hyperthermic temperature regime - Burrow distribution:

- # of burrows: 2808
- Drainage classes:
  - Excessively drained: 0
  - Somewhat excessively drained: 374
  - Well drained: 2554
  - Moderately well drained: 1376
  - Poorly drained: 110
Review of National Interpretation for Gopher Tortoise Habitat Suitability
START

AND

(NSSC Pangaea) Tortoise Habitat Soil Diggability Index

(NSSC Pangaea) Depth to Restrictive Layer < 200 cm (80 in) (Suitability)

(NSSC Pangaea) Fragments > 4.76 mm 0-200 cm (Suitability)

(NSSC Pangaea) Tortoise Habitat Ponding Rating (Suitability)

(NSSC Pangaea) Water Table 50-200 cm (Suitability)

(NSSC Pangaea) Tortoise Habitat Slope 15-35% (Suitability)

(NSSC Pangaea) Flooding Frequency Rating (Suitability)
Restrictive layers such as plinthic zones, fragipan, or spodic horizons are thought to adversely affect the potential depth of excavation by burrowing species. The layers may be too dense for the species to excavate or it may be the perched water over this layer. Shallow depth to a restrictive layer limits the depth of habitat. Depth to restrictive feature must be synchronized with the depth to the restrictive feature horizon shown in the horizon table.

Property used: DEPTH TO FIRST RESTRICTIVE LAYER (Modality - representative value)

Restrictive limits:
- Not suited: < 50cm
- Somewhat suited: >= 50 to < 200cm
- Well suited: >= 200cm

Null depth is assigned to the Well Suited class.

Spodic will be modified to “orstein”, as a spodic horizon is not limiting. Otherwise, sub-rule is accurate.
So, how does the Florida specific water table sub-rule compare to the National Interpretation?

Rating values

Spatial representation
A seasonal high water table can affect burrowing species by restricting burrowing, and possibly cause drowning when the water table returns. Caving or tunnel collapse may be a problem, especially during the rising and falling of the water table depths between seasons of year. Perched or apparent water tables can increase drowning of species during wet periods especially during inactive times.

Property used: DEPTH TO HIGH WATER TABLE MINIMUM (Modality - representative value)

**Restrictive limits:**

- Not suited  < 50 cm
- Somewhat suited  >= 50 to < 200 cm
- Well suited  >= 200 cm

Null depth to high water table is assigned to the well suited class.

Sub-rule requires modification for Florida (and possibly southeast Georgia)
A seasonal high water table can affect burrowing species by restricting burrowing, and possibly cause drowning when the water table returns. Caving or tunnel collapse may be a problem, especially during the rising and falling of the water table depths between seasons of year. Perched or apparent water tables can increase drowning of species during wet periods especially during inactive times.

Property used: DEPTH TO HIGH WATER TABLE MINIMUM (Modality - representative value)

**Restrictive limits:**

- Not suited: <25 cm
- Somewhat suited: >=25 to <200 cm
- Well suited: >=200 cm

Null depth to high water table is assigned to the well suited class.

Since maintaining high humidity and a water source within burrows is important, we should explore narrowing the Somewhat suited upper limit of 200 cm.
A collective catena of south Florida soils

Moderately suited: Astatula, St. Lucie, Paola
Less suited: Daytona, Duette
Marginal: Pomello

Unsuited: Satellite, Immokalee, Myakka, Placid
A seasonal high water table can affect burrowing species by restricting burrowing, and possibly cause drowning when the water table returns. Caving or tunnel collapse may be a problem, especially during the rising and falling of the water table depths between seasons of year. Perched or apparent water tables can increase drowning of species during wet periods especially during inactive times.

Property used: DEPTH TO HIGH WATER TABLE MINIMUM (Modality - representative value)

**Restrictive limits:**

- Not suited  \(< 25 \text{ cm}\)
- Somewhat suited  \(\geq 25 \text{ to } < 200 \text{ cm}\)
- Well suited  \(\geq 200 \text{ cm}\)

Null depth to high water table is assigned to the well suited class.
Somewhat poorly drained soil with water table at 24 inches - Scrubby flatwoods

<table>
<thead>
<tr>
<th>Interpretation</th>
<th>Series</th>
<th>top of SHWT (RV in cm)</th>
<th>Sub-rule Name</th>
<th>Low RV Rating</th>
<th>High RV Rating</th>
<th>High High Rating</th>
<th>Null Data</th>
<th>Default Data</th>
<th>Inconsistent Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>FL Interp</td>
<td>Pomello</td>
<td>61</td>
<td>GT_Gopher Tortoise Habitat Suitability (FL)</td>
<td>Less suitable (0.428)</td>
<td>Less suitable (0.428)</td>
<td>Less suitable (0.549)</td>
<td>FALSE</td>
<td>FALSE</td>
<td>FALSE</td>
</tr>
<tr>
<td>Reg.Interp</td>
<td>Pomello</td>
<td>61</td>
<td>Gopher Tortoise Habitat Suitability</td>
<td>Marginal (0.227)</td>
<td>Marginal (0.227)</td>
<td>Marginal (0.227)</td>
<td>FALSE</td>
<td>FALSE</td>
<td>FALSE</td>
</tr>
</tbody>
</table>

Somewhat poorly drained soil with water table at 18 inches - Scrubby flatwoods

<table>
<thead>
<tr>
<th>Interpretation</th>
<th>Series</th>
<th>top of SHWT (RV in cm)</th>
<th>Sub-rule Name</th>
<th>Low RV Rating</th>
<th>High RV Rating</th>
<th>High High Rating</th>
<th>Null Data</th>
<th>Default Data</th>
<th>Inconsistent Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>FL Interp</td>
<td>Satellite</td>
<td>46</td>
<td>GT_Gopher Tortoise Habitat Suitability (FL)</td>
<td>Marginal (0.201)</td>
<td>Marginal (0.201)</td>
<td>Less suitable (0.549)</td>
<td>FALSE</td>
<td>FALSE</td>
<td>FALSE</td>
</tr>
<tr>
<td>Reg.Interp</td>
<td>Satellite</td>
<td>46</td>
<td>Gopher Tortoise Habitat Suitability</td>
<td>Unsuitable (0)</td>
<td>Unsuitable (0)</td>
<td>Unsuitable (0)</td>
<td>FALSE</td>
<td>FALSE</td>
<td>FALSE</td>
</tr>
</tbody>
</table>

Poorly drained soil with water table at 10 inches - Mesic flatwoods

<table>
<thead>
<tr>
<th>Interpretation</th>
<th>Series</th>
<th>top of SHWT (RV in cm)</th>
<th>Sub-rule Name</th>
<th>Low RV Rating</th>
<th>High RV Rating</th>
<th>High High Rating</th>
<th>Null Data</th>
<th>Default Data</th>
<th>Inconsistent Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>FL Interp</td>
<td>Myakka</td>
<td>31</td>
<td>GT_Gopher Tortoise Habitat Suitability (FL)</td>
<td>Marginal (0.112)</td>
<td>Marginal (0.112)</td>
<td>Marginal (0.201)</td>
<td>FALSE</td>
<td>FALSE</td>
<td>FALSE</td>
</tr>
<tr>
<td>Reg.Interp</td>
<td>Myakka</td>
<td>31</td>
<td>Gopher Tortoise Habitat Suitability</td>
<td>Unsuitable (0)</td>
<td>Unsuitable (0)</td>
<td>Unsuitable (0)</td>
<td>FALSE</td>
<td>FALSE</td>
<td>FALSE</td>
</tr>
</tbody>
</table>

Poorly drained soil with water table at the surface during some period - Hydric flatwoods, Slough, Freshwater marsh

<table>
<thead>
<tr>
<th>Interpretation</th>
<th>Series</th>
<th>top of SHWT (RV in cm)</th>
<th>Sub-rule Name</th>
<th>Low RV Rating</th>
<th>High RV Rating</th>
<th>High High Rating</th>
<th>Null Data</th>
<th>Default Data</th>
<th>Inconsistent Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>FL Interp</td>
<td>Placid, dep</td>
<td>0 (ponded)</td>
<td>GT_Gopher Tortoise Habitat Suitability (FL)</td>
<td>Unsuitable (0)</td>
<td>Unsuitable (0)</td>
<td>Unsuitable (0)</td>
<td>FALSE</td>
<td>FALSE</td>
<td>FALSE</td>
</tr>
<tr>
<td>Reg.Interp</td>
<td>Placid, dep</td>
<td>0 (ponded)</td>
<td>Gopher Tortoise Habitat Suitability</td>
<td>Unsuitable (0)</td>
<td>Unsuitable (0)</td>
<td>Unsuitable (0)</td>
<td>FALSE</td>
<td>FALSE</td>
<td>FALSE</td>
</tr>
</tbody>
</table>
### Corresponding Property
- **Property**: Depth to High Water Table Minimum

### Evaluation
- **Evaluation**: Linear
- **Low Value**: 50
- **High Value**: 200

### Membership Graph
- **X Value**: 0, 25, 76, 203
- **Y Value**: 0, 0.1, 1, 1

- **Membership Value**: 0.000 to 1.000
- **GT_ Depth to High Water Table Minimum**: 0 to 220,000
• Developed an MLRA sub-rule, evaluation and property for the region to exclude regions outside the range or combination of both
  • At the component level, accesses the Map Unit Overlap Table data
  • Returns 0 for MLRA’s outside of the Tortoise’s range
  • Returns different values for each of the MLRA’s as illustrated below
Further refinements

- **Evaluate the Diggability Index**
  - Using SSURGO-burrow evaluation

- **Change Rating Class values for suitability**
  - Currently highly suited is limited to 1.00 value.
  - Explore values of 0.90 to 1.00 = highly suited.

- **Consider a productivity sub-rule for biomass (forage) generation**

- **USFWS and FWC should identify Priority Soils based on MLRA’s.**

- **USDA-NRCS will provide an addendum to the USFWS publication based on actual data.**