Developing “Local” NASIS Interpretations

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WHY?

• 1. There is no “National” Version of an Interpretation you need

• 2. The “National” version does not seem to fit your local criteria needs
• 1. Think about what exactly the interpretation should do……

• 2. Develop interdisciplinary team

• 3. Research how the interpretation will operate...CRITERIA and CLASS LIMITS
• 4. Read Chapter 16 in the NASIS Getting Started Manual

• 5. Call Bob Nielsen when you get stuck
Specific Irrigation Designs

- Drip
- Sprinkler
- Graded Border
- Level Border (paddy)
- Furrow
Level Border or Paddy Irrigation

- Rice Production in the Central Valley
- Soil properties that may be “bad” for furrow systems may be perfect for Level Border (paddy) system in terms of performance, maintenance and resource conservation
Literature search
The Level Border (paddy) Irrigation interpretation was developed by the Davis, California interpretation staff. The interpretation was developed using input from the Davis, California NRCS - Resource Technology staff (Earth Team volunteer). The interpretation received further technical review from an irrigation specialist on staff at UCDavis.

References:

Hanson, Blaine and Grattan, Stephen R. 1993. Agricultural Salinity and Drainage, University of California Irrigation Program, Univ. Of California, Davis.


IMPORTANT: This draft interpretation is not designed nor intended to be used in a regulatory manner.
CRITERIA

The criteria below is stated in terms of what the 1993 NSSH restrictive features for Irrigation used to be:

Property 1 for permafrost was deleted.

Property 1a uses a crisp limit based on surface textures. The following textures are rated as a limitation: COS, S, FS, VFS, LCOS, LS, COSL, VFSL, FSL, SL and L.

Property 1b was deleted since percent clay is not a limitation.

Property 2 uses a critical slope of 2%. Any slope > 2% is a limitation.

Property 3 for coarse fragments was deleted as coarse fragment content is not a limitation.

Property 4 for ponding was deleted as ponding is not a limitation.

Property 5 was deleted in September 2002 since the soil will be wet during growing season. Property 5 rated wetness in a linear evaluation, at depth < 60 cm (2") with a value of 1 and > 90cm
Depth to bedrock (hard) 75-125cm - M02

Depth to bedrock (soft) 75-125cm - M02

Salinity, EC 4-8, fuzzy, to 100cm - M02

Slopes, <=2, crisp - M02

Flooding, (Freq, VFreq = 1, crisp, growing season) - M02

Sodium, SAR > 5, fuzzy, 5-10, 0-100cm - M02

Great group = *sulf* - M02

Rule Description
Flooding, (Freq, V-Freq = 1, crisp, growing season) - M02

Sodium, SAR > .5, fuzzy .5-10, 0-100cm - M02

Great group = *sulf* - M02

Depth to cemented pan < 100cm - M02

USDA texture, surface = all sands+vfsl, fsl, sl, cosl, l - M02

AWC 4-6" in 0-100cm - M02

Perm (seepage) >= 1.2"/hr 0-150cm - M02
START
NULL NOT RATED
Flooding, \( \geq \) freq in growing season - M02
<table>
<thead>
<tr>
<th>Rating Class</th>
<th>Rating Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Missing flooding data</td>
<td>NOT RATED</td>
</tr>
<tr>
<td>Flooding $\geq$ frequent in growing season</td>
<td>1.0</td>
</tr>
<tr>
<td>Flooding $&lt;$ frequent in growing season</td>
<td>0</td>
</tr>
</tbody>
</table>
Rule Name

NASIS Site: MLRA02_Office

- WLF - Desert Tortoise - MO2
- WMS - Basin or Paddy Irrigation (level border) - MO2
- WMS - Drip or Trickle Irrigation - MO2
- WMS - Embankments, Dikes, and Levees - MO2
- WMS - Furrow Irrigation - MO2
- WMS - Graded Border Irrigation - MO2

Selections: Add Selections | Remove Selections

"MLRA02_Office"; "WMS - Basin or Paddy Irrigation (level border) - MO2"

Reporting Depth 5

Print RV (Low and High) □
Print Least/Most Restrictive □
Print Fuzzy Rating Values □
Maximum Non-Zero Reasons (0=All Reasons) 5

Name of Report test of Paddy Irrigation

Apply Cancel Help
10/03/2002

test of Paddy Irrigation
Butte Area, California: Detailed Soil Map Legend

<table>
<thead>
<tr>
<th>Map symbol and soil name</th>
<th>WMS - Basin or Paddy Irrigation (level border) - MG2</th>
</tr>
</thead>
<tbody>
<tr>
<td>104: Bosquejo, clay---</td>
<td>0.000 No limitations</td>
</tr>
<tr>
<td></td>
<td>0.000 AMC &gt; 6” to 40”</td>
</tr>
<tr>
<td></td>
<td>0.000 No sandy or loamy surface textures</td>
</tr>
<tr>
<td></td>
<td>0.000 SAR &lt; 0.5 to 40” depth</td>
</tr>
<tr>
<td></td>
<td>0.000 No sulfnic horizons</td>
</tr>
<tr>
<td></td>
<td>0.000 Flooding &lt; frequent in growing season</td>
</tr>
<tr>
<td></td>
<td>0.000 Permeability &lt; 1.2”/hr</td>
</tr>
<tr>
<td></td>
<td>0.000 Depth to bedrock (hard) &gt;= 40”</td>
</tr>
<tr>
<td></td>
<td>0.000 Bedrock (soft) &gt;= 40” depth</td>
</tr>
<tr>
<td></td>
<td>0.000 EC &lt; 8 mhioms/cm</td>
</tr>
<tr>
<td></td>
<td>0.000 Depth to pan &gt;40”</td>
</tr>
<tr>
<td></td>
<td>0.000 Slopes &lt;= 2%</td>
</tr>
</tbody>
</table>

ALL VALUES ARE ROUNDED.
10/03/2002

Test of Paddy Irrigation
Colusa County, California: Details

<table>
<thead>
<tr>
<th>Map symbol and soil name</th>
<th>WMS - Basin or Paddy Irrigation (level border) - MD2</th>
</tr>
</thead>
<tbody>
<tr>
<td>110: Hustabel, sandy loam</td>
<td>1,000 Limitations</td>
</tr>
<tr>
<td></td>
<td>1,000 Permeability $\geq$ 1.2&quot;/hr</td>
</tr>
<tr>
<td></td>
<td>0.645 SAR from 0.5 - 10 to 40&quot; depth</td>
</tr>
<tr>
<td></td>
<td>0.570 AWC from 2 - 6&quot;</td>
</tr>
<tr>
<td></td>
<td>0.000 No sandy or loamy surface textures</td>
</tr>
<tr>
<td></td>
<td>0.000 No sulfurous horizons</td>
</tr>
<tr>
<td></td>
<td>0.000 Flooding $&lt;$ frequent in growing season</td>
</tr>
<tr>
<td></td>
<td>0.000 Depth to bedrock (hard) $\geq$ 40&quot;</td>
</tr>
<tr>
<td></td>
<td>0.000 Bedrock (soft) $\geq$ 40&quot; depth</td>
</tr>
<tr>
<td></td>
<td>0.000 EC $&lt;$ 8 mmhos/cm</td>
</tr>
<tr>
<td></td>
<td>0.000 Depth to pan $&gt;$ 40&quot;</td>
</tr>
<tr>
<td></td>
<td>0.000 Slopes $\leq$ 2%</td>
</tr>
</tbody>
</table>

All values are rounded.
Other Irrigation Designs...
For example... Drip and Trickle

Comparison of three new Interpretations
Colusa County, California: Detailed Soil Map Legend

<table>
<thead>
<tr>
<th>Map symbol and soil name</th>
<th>WMS - Basin or Paddy Irrigation (level border) - MD2</th>
<th>WMS - Drip or Trickle Irrigation - MD2</th>
<th>WMS - Sprinkler Irrigation - MD2</th>
</tr>
</thead>
<tbody>
<tr>
<td>11O: Hustabel, sandy loam</td>
<td>1,000 Limitations 1,000 Permeability &gt;= 1.2&quot;/hr 0.645 SAR from 0.5 - 10 to 40&quot; depth 0.570 AWC from 2 - 6&quot; 0.000 No sandy or loamy surface textures 0.000 No sulfuric horizons 0.000 Flooding &lt; frequent in growing season 0.000 Depth to bedrock (hard) &gt;= 40&quot; 0.000 Bedrock (soft) &gt;= 40&quot; depth 0.000 EC &lt; 8 mmmhos/cm 0.000 Depth to pan &gt;= 40&quot; 0.000 Slopes &lt; = 2%</td>
<td>0.645 Moderate limitations 0.645 SAR from 0.5 - 10 to 40&quot; depth 0.000 No sulfuric horizons 0.000 Permeability &gt;= 2&quot;/hr OR smectitic mineralogy 0.000 Not ponded 0.000 Flooding &lt; frequent in growing season 0.000 Wetness &gt;= 2&quot; depth 0.000 Bedrock depth &gt; 20&quot; 0.000 Wetness &gt;= 2&quot; depth (perched) 0.000 EC &lt; 8 mmmhos/cm 0.000 Depth to pan &gt;= 40&quot;</td>
<td>0.645 Moderate limitations 0.645 SAR from 0.5 - 10 to 40&quot; depth 0.570 AWC from 2 - 6&quot; 0.000 No loess, loamy or ls in surface 0.000 Permeability &gt;= 2&quot;/hr OR smectitic mineralogy 0.000 Not ponded 0.000 Flooding &lt; frequent in growing season 0.000 If wet, wetness &gt; 90cm during growing season 0.000 Depth to bedrock (hard) &gt;= 40&quot; 0.000 Bedrock (soft) &gt;= 40&quot; depth 0.000 EC &lt; 8 mmmhos/cm 0.000 Depth to pan &gt;= 40&quot; 0.000 WEC &gt; 2 0.000 Fragments (&lt;3&quot;) &lt;= 25% 0.000 Slopes &lt; 6% 0.000 No sulfuriic horizons 0.000 Surface clay &lt; 60% 0.000 Surface K-factor &lt;= .32</td>
</tr>
</tbody>
</table>
California Prime farmland soil

- Very deep, fine-loamy Pachic Argixeroll
## Interpretation Result...

**Test of new Irrigation Interpretations**  
**Butte Area, California: Detailed Soil Map Legend**

<table>
<thead>
<tr>
<th>Map symbol and soil name</th>
<th>WMS - Drip or Trickle Irrigation - M02</th>
<th>WMS - Furrow Irrigation - M02</th>
<th>WMS - Sprinkler Irrigation - M02</th>
</tr>
</thead>
</table>
| 445; Chico, loam         | 0,000 No limitations  
0,000 No sulfuric horizons  
0,000 SAR < 0.5 to 40" depth  
0,000 Permeability > = 2"/hr OR smectitic mineralogy  
0,000 Not ponded  
0,000 Flooding < frequent in growing season  
0,000 Wetness > = 2" depth  
0,000 Bedrock depth > 20"  
0,000 Wetness > = 2" depth (perched)  
0,000 EC < 8 mmhos/cm  
0,000 Depth to pan > = .40" | 0,000 No limitations **  
0,000 No sandy textures in surface  
0,000 SAR < 0.5 to 40" depth  
0,000 Slight seepage problem  
0,000 Permeability < 6"/hr or #200 20-30%  
0,000 Permeability < 6"/hr above 60"  
0,000 Passing #200 < 20% or > 30%  
0,000 Permeability < 6"/hr or #200 > 30%  
0,000 Depth to bedrock (hard) > = 40"  
0,000 Bedrock (soft) > = 40" depth  
0,000 EC < 8 mmhos/cm  
0,000 Depth to pan > 40" | 0,000 No limitations **  
0,000 No loams, ccs, s or ls in surface  
0,000 SAR < 0.5 to 40" depth  
0,000 Permeability > = 2"/hr OR smectitic mineralogy  
0,000 Not ponded  
0,000 Flooding < frequent in growing season  
0,000 If wet, wetness > 90cm during growing season **  
0,000 Depth to bedrock (hard) > = 40"  
0,000 WEG > 2  
0,000 Fragments (≤ 3") < = 25% | 0,000 AWC > 6" to 40"  
0,000 Slopes < 6%  
0,000 No sulfuric horizons  
0,000 Surface clay < 60% |
MO2 Interpretation Efforts

- What we have implemented so far......
MO2 Custom Rating classes...

- Allow testing of database and interpretation by soil scientists and give users more information

- Example on next slide............
Comparison of Rating Classes

Comparison of NSSC and MD2 Rating Classes
Butte Area, California: Detailed Soil Map Legend

<table>
<thead>
<tr>
<th>Map symbol and soil name</th>
<th>ENG - Dwellings With Basements</th>
<th>ENG - Dwellings With Basements - MD2</th>
</tr>
</thead>
<tbody>
<tr>
<td>109:</td>
<td></td>
<td>1,000 Very limited</td>
</tr>
<tr>
<td>Bosquejo, clay loam</td>
<td>1,000 Flooding</td>
<td>1,000 Severe</td>
</tr>
<tr>
<td></td>
<td>0.500 Shrink-swell</td>
<td>0.500 Shrink-swell (LEP 3-6)</td>
</tr>
<tr>
<td></td>
<td>0.352 Depth to saturated zone</td>
<td>0.352 Wetness from 2.5&quot; to 6&quot; depth</td>
</tr>
<tr>
<td></td>
<td>0.000 No permafrost depth</td>
<td>0.000 Pan (thin) &gt; 40&quot; depth</td>
</tr>
<tr>
<td></td>
<td>limitation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.000 No slope limitation</td>
<td>0.000 Slopes &lt; 8%</td>
</tr>
<tr>
<td></td>
<td>0.000 No ponding limitation</td>
<td>0.000 Not ponded</td>
</tr>
<tr>
<td></td>
<td>0.000 No subsidence limitation</td>
<td>0.000 No subsidence</td>
</tr>
<tr>
<td></td>
<td>0.000 No organic matter</td>
<td>0.000 Bottom layer not PT, OL, DH</td>
</tr>
<tr>
<td></td>
<td>limitation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.000 No bedrock depth</td>
<td>0.000 Bedrock (hard) &gt; 60&quot; depth</td>
</tr>
<tr>
<td></td>
<td>limitation</td>
<td>0.000 Bedrock (soft) &gt; 40&quot; depth</td>
</tr>
<tr>
<td></td>
<td>0.000 No large stone limitation</td>
<td>0.000 Fragments (&gt;3&quot;) &lt;25%</td>
</tr>
<tr>
<td></td>
<td>0.000 No thick cemented pan</td>
<td>0.000 Pan (thick) &gt; 60&quot; depth</td>
</tr>
<tr>
<td></td>
<td>depth limitation</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.000 No thin cemented pan</td>
<td></td>
</tr>
<tr>
<td></td>
<td>depth limitation</td>
<td></td>
</tr>
</tbody>
</table>
Custom interpretations for Hawaii

- Puddling soils, flash flooding, liquefaction, dustiness, and high lime requirement for Andisols

- Interpretations use medial, ashy, hydrous modifiers, OH-T Unified classes, in lieu of textures and soil classification
MO2 Interpretations

- PWM that uses the same key words as the rating classes

- Updated PWM Glossary with words and abbreviations used in rating classes
- Custom “rules file” so local interpretations can be used in SDV
MO2 Interpretations

- Use maps to check criteria and rating classes
- Example: Removed wetness during growing season for paddy irrigation
MO2 Interpretations

- Rule descriptions that display criteria in the SDV
MO2 Interpretations

- Manuscript report footnotes with criteria summary
- Abbreviations defined
Contact Information

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• 530-792-5636