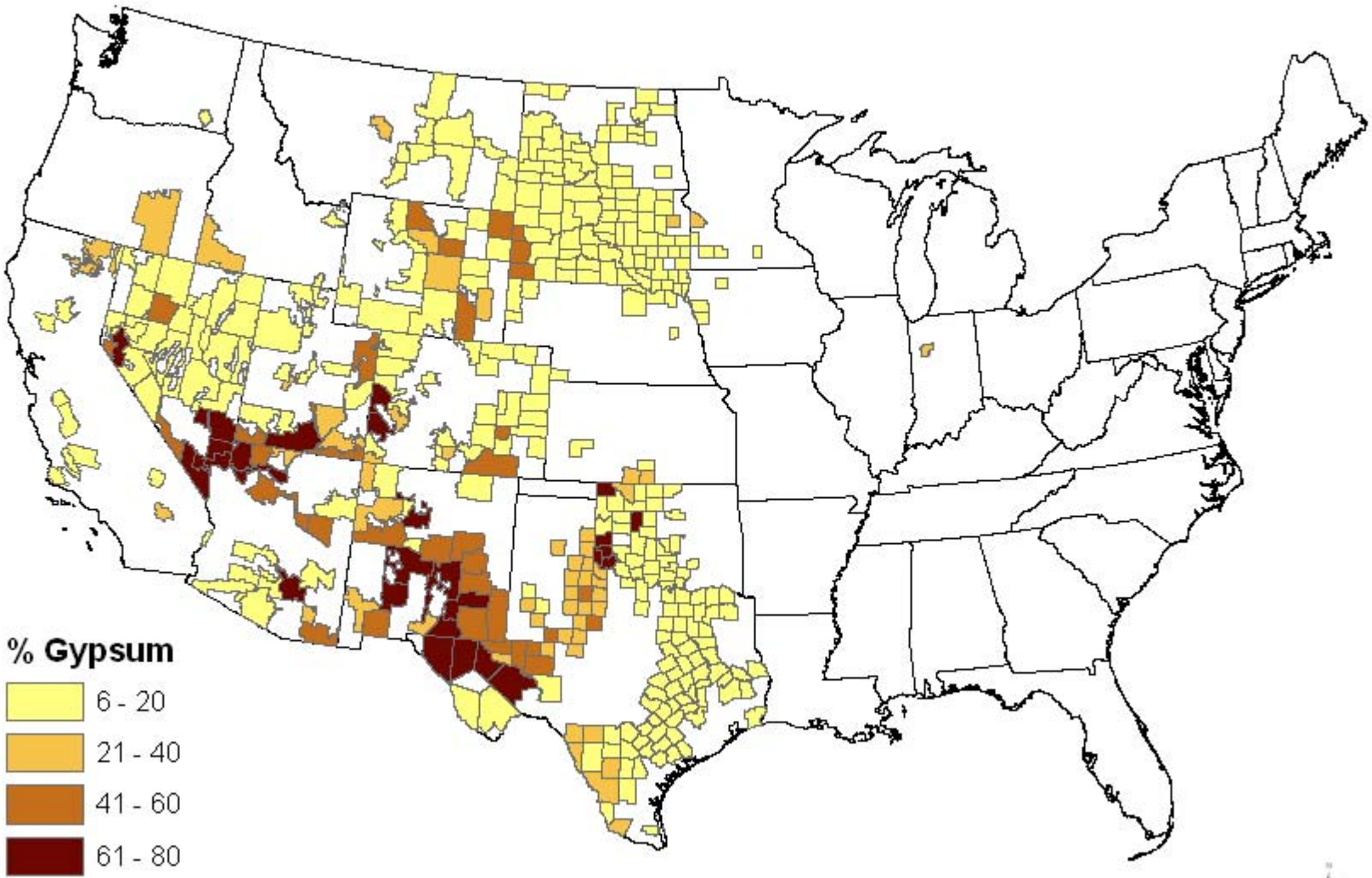
National Gypsum Study Task Force Update 2008

Purpose:

Meet rapidly emerging needs concerning forms, distribution, and behavior of gypseous soils

Soil Survey Areas with Maximum Gypsum Content > 5 %



Albers Equal Area Projection

0 162.5 325 650 975 Miles

NRCS Natural Resources Conservation Service

NSSC 11/2007 Source: Soil Data Mart

Working Groups

Morphology/Classification

- ***Nelson Rolong, Tom Reedy***

Laboratory Methods and Analyses

- ***Richard Ferguson, Curtis Monger***

Interpretations

- ***Juan Herrero, Cathy Seybold***

Soil Geomorphology

- ***Lynn Loomis, Phil Schoeneberger***

Gypseous Soils Task Force Update 2008

- **Project Co-chairs**

  Susan Casby-Horton, NRCS, Temple
  Thomas Reinsch, NRCS, NSSC

Morphology/Classification 2007

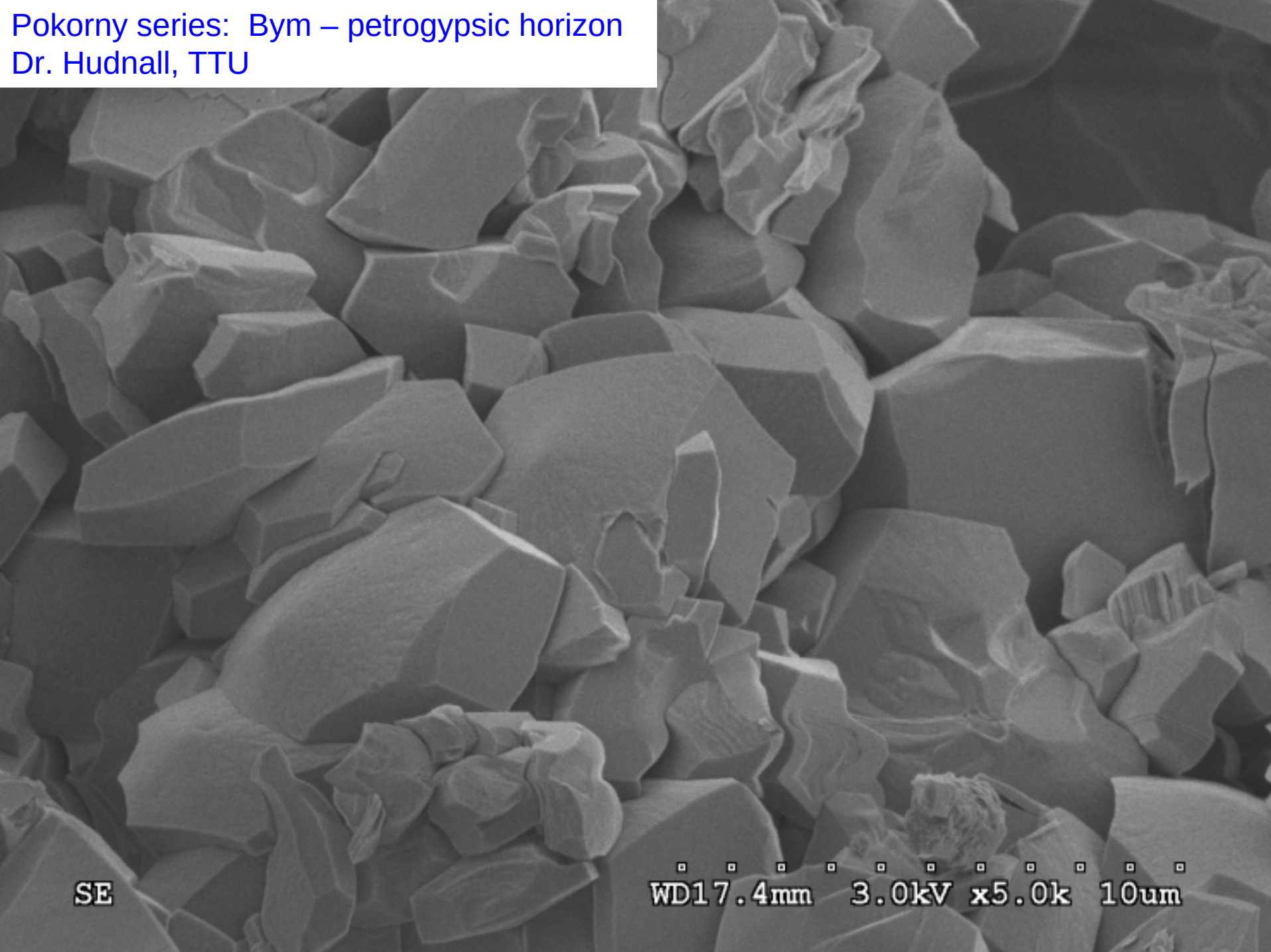
- **Drafted 14 work items and made assignments**
  - ✓ **Munsell color page development**
  - ✓ **Texture and textural modifiers**
  - ✓ **Terms used in lieu of texture**

Coarse gypsum material
40
60

Morphology/Classification 2007

- **Drafted 14 work items and made assignments**
  - ✓ **Munsell color page development**
  - ✓ **Texture and textural modifiers**
  - ✓ **Terms used in lieu of texture**
  - ✓ **Naming conventions for gypsum forms**
  - ✓ **Cementation class a misnomer**

Pokorny series: Bym – petrogypsic horizon
Dr. Hudnall, TTU



Morphology/Classification 2007

- **Drafted 14 work items and made assignments**
  - ✓ **Munsell color page development**
  - ✓ **Texture and textural modifiers**
  - ✓ **Terms used in lieu of texture**
  - ✓ **Naming conventions for gypsum forms**
  - ✓ **Cementation class**
  - ✓ **Geogenic vs. pedogenic discussion**
  - ✓ **Horizon nomenclature**
  - ✓ **Surface morphology / crusts**

Biological and chemical soil crusts

Morphology/Classification 2008

- **Morphology proposals**
  - ✓ **prototype for Munsell color**

- **Soil Taxonomy proposals**

MUNSELL HIGH VALUE WHITE PAGE

N	7.5YR	7.5YR	10YR	10YR	2.5Y	2.5Y
	ACTUAL 7.33YR 9.15/1.81 M	ACTUAL 7.33YR 9.26/0.85 M	ACTUAL 0.18Y 9.23/1.84 M	ACTUAL 0.29Y 9.31/0.90 M	ACTUAL 2.57Y 9.33/1.78 M	ACTUAL 2.3Y 9.40/0.92 M
9.5/	9.5/2	9.5/1	9.5/2	9.5/1	9.5/2	9.5/1
9/	9/2	9/1	9/2	9/1	9/2	9/1
8.5/	8.5/2	8.5/1	8.5/2	8.5/1	8.5/2	8.5/1
8/	8/2	8/1	8/2	8/1	8/2	8/1

Morphology/Classification 2008

- **Morphology proposals**
  - ✓ **prototype for Munsell color**
  - ✓ **kind, shape, location of gypsum concentrations**
  - ✓ **terms to use in lieu of texture**
  - ✓ **nomenclature (y vs. yy)**

- **Soil Taxonomy proposals**
  - ✓ **substitute classes**
  - ✓ **mineralogy classes**

Laboratory Methods and Analyses 2007

- **Developing/refining Interlab techniques**
  - ✓ **Cation Exchange Capacity**
  - ✓ **Calcium Carbonate Equivalent**
  - ✓ **Gypsum (acetone)**
  - ✓ **Gypsum (differential loss of water - Herrero)**
  - ✓ **Equivalent Gypsum Content (Elrashidi)**
  - ✓ **1/3 Bar and 15 Bar Water Retention**
- **Needed new analyses**
  - ✓ **Particle Size Distribution Analysis**
  - ✓ **Water content and Bulk density**

Laboratory Methods and Analyses 2007

- **Methods testing**
  - ✓ **Equivalent Gypsum Content by SO_4^{2-} chromatography**
  - ✓ **Estimating Gypsum using combustion analysis (S)**
  - ✓ **XRD to quantify gypsum in soil**
  - ✓ **Investigating alternative media/means to determine Particle Size Distribution**
  - ✓ **Investigating saturated calcium sulfate solution as alternative wetting media for water content and bulk density measurements**

Laboratory Methods and Analyses 2008

- **Complete inter-lab data comparison**

- **Outcomes of comparison study**
  - ✓ **Estimate inter-laboratory reproducibility where methods are identical.**
  - ✓ **Evaluate mutual bias between SSL and dissimilar methods**

- **Continue work on PSDA**

Interpretations 2007

- **Drafted a new interp: unsurfaced roads**
- **Most interpretations have been updated with new subrules for**
  - ✓ **Dust**
  - ✓ **Piping**
  - ✓ **Subsidence (due to gypsum dissolution)**

Subsidence

- Interpretive model assumes differential subsidence and the dissolution of all of the gypsum in the profile

- If predicted subsidence is:

Less than 3cm	not limited;
3 to 18cm	somewhat limited;
Greater than 18cm	severely limited

Interpretations 2007

- **Drafted a new interp: unsurfaced roads**
- **Most interpretations have been updated with new subrules for**
  - ✓ **Dust**
  - ✓ **Piping**
  - ✓ **Subsidence (due to gypsum dissolution)**
- **Modified interps for soils with $\geq$ 40 % gypsum**
- **Prelim. testing w/in the Interp. Workgroup**

Interpretations 2008

- **Complete the first draft of all the standard national interpretations**
- **Some testing of the modified interpretations by the end of the year**

Geomorphology 2007

- **Worked with field staff on the ground**
- **Initial models of gypsum morphologies in hypergypsic soils**
- **Evaluated proposed geomorphic and related morphology concepts with gypsum occurrence**
- **Ksat measured in 6 hypergypsic soils (apparent field texture)**
- **Exploring inference models to pre-map arid, gypsum-rich areas (Loomis)**

Geomorphology 2008

- **Research activities:**
  - ✓ **Pursuing an “apparent field texture” method for dry particle size evaluation in the field.**
  - ✓ **Expand identification of gypsum types**
  - ✓ **Continued field investigations and evaluation**
  - ✓ **Prepare for 2008 ASA field tour on gypsum and related soluble salts**

questions?