

# Mitigation: Use of Plant Materials



The Plant Materials Program  
Heather Dial  
Tucson Plant Materials Center Manager

# Overview

- The Plant Materials Program
  - History
  - What we do
  - Releases
- Historical and Present Studies
  - Red Rock Trials
  - Bonita Trial
  - Pecan Orchard Trial
- Future Work
- Summary



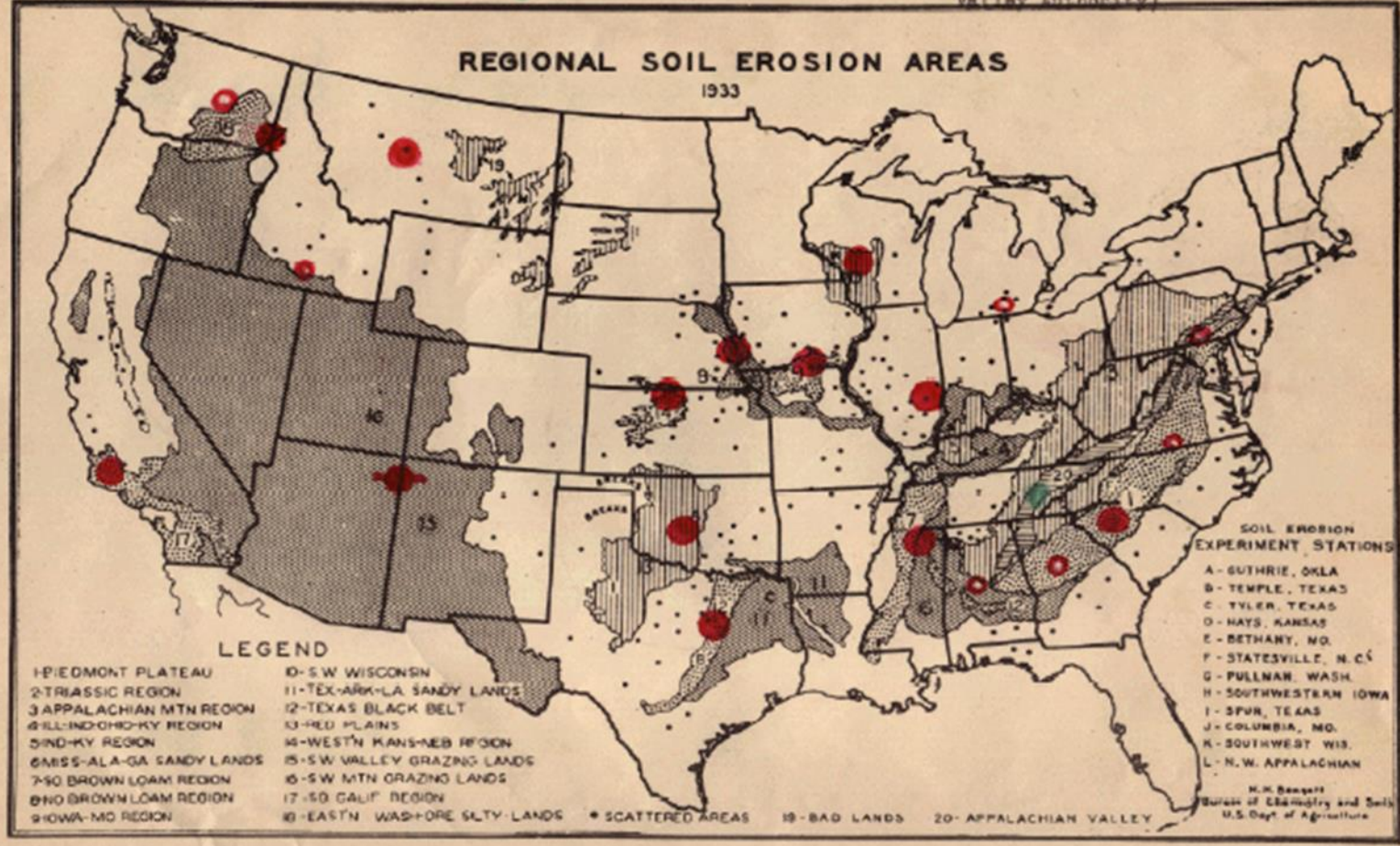
Tentative Location of Erosion Control Areas

- Major Demonstrational Areas
- Minor Demonstrational Areas (there may be more of these)
- Navajo Reservation Area
- Possible Tennessee Valley area (would be financed by Tenn. Valley Authority)

U. S. DEPARTMENT OF AGRICULTURE

**REGIONAL SOIL EROSION AREAS**

1933



**LEGEND**

- 1-PIEDMONT PLATEAU
- 2-TRIASSIC REGION
- 3-APPALACHIAN MTN REGION
- 4-ILL-IND-OHO-KY REGION
- 5-IND-KY REGION
- 6-MISS-ALA-GA SANDY LANDS
- 7-90 BROWN LOAM REGION
- 8-NO BROWN LOAM REGION
- 9-IOWA-MO REGION
- 10-S-W WISCONSIN
- 11-TEX-ARK-LA SANDY LANDS
- 12-TEXAS BLACK BELT
- 13-MID PLAINS
- 14-WESTN KANS-NEB REGION
- 15-S-W VALLEY GRAZING LANDS
- 16-S-W MTN GRAZING LANDS
- 17-SO CALIF REGION
- 18-EASTN WASH-ORE SILTY LANDS

**SOIL EROSION EXPERIMENT STATIONS**

- A - GUTHRIE, OKLA
- B - TEMPLE, TEXAS
- C - TYLER, TEXAS
- D - HAYS, KANSAS
- E - BETHANY, MO.
- F - STATESVILLE, N. C.
- G - PULLMAN, WASH.
- H - SOUTHWESTERN IOWA
- I - SPUR, TEXAS
- J - COLUMBIA, MO.
- K - SOUTHWEST WIS.
- L - N.W. APPALACHIAN

\* SCATTERED AREAS 19-BAD LANDS 20- APPALACHIAN VALLEY

H. K. Beeson  
Bureau of Geography and Soils  
U.S. Dept. of Agriculture

*“Nursery production in this region with its attendant problems, is peculiar in that one is dealing primarily **with range revegetation and restoration** rather than with farm erosion control. The complexity of the situation is further enhanced by reason of the low rainfall, temperature extremes, and wide range of vegetation types which prevail in this section and which of necessity is reflected in the composition of propagation materials and general nursery practices as well as field applications.”*

*Dr. F.J. Crider, 1934 Tucson Plant Materials Center Technical Report*



# Production Versus Observational Phase

*“Plants must be chosen, in the first place, especially for their known or potential erosion control values.” Dr. F.J. Crider, 1936 Field Memorandum #SCN-4*



*“What plant can possibly be more important in the Southwest than blue grama?”  
Leslie N. Gooding, 1939 Annual Report for the Field*


# Tucson Plant Materials Center Mission

- Assemble, test and **release** native plant material for conservation use in the Sonoran, Chihuahuan, and Mojave Deserts
- Encourage the commercial increase of conservation species
- **Develop and transfer plant science technology to address conservation problems**

United States Department of Agriculture  
Natural Resources Conservation Service  
Plant Materials Program

**Salttillo Origin Germplasm cane bluestem**  
*Bothriochloa barbinodis* (Lag.) Herter

A Conservation Plant Release by USDA NRCS Tucson Plant Materials Center, Tucson, Arizona



**Advanced Strain Trial at the PMC.** Salttillo Origin Germplasm cane bluestem was selected as the top performer in this trial based upon its superior vigor, forage production, and tolerance to drought and cold.

**Conservation Uses**  
Salttillo Origin Germplasm cane bluestem may be used as an erosion control plant on rangelands and critical areas such as abandoned cropland and road cuts. It also has beneficial qualities in terms of diet and cover for wildlife species including pronghorn antelope, mule deer, desert cottontail, white-throated woodrat, javalina, and scaled quail.

**Area of Adaptation and Use**  
The identified range of adaptation of Salttillo Origin Germplasm cane bluestem is Major Land Resource Area

## TECHNICAL NOTES

U S Department of Agriculture

Natural Resources Conservation Service

TN – Plant Materials – 6-1- Arizona

November 2005

### Use of Non-Dormant Cottonwood Poles for Riparian Revegetation

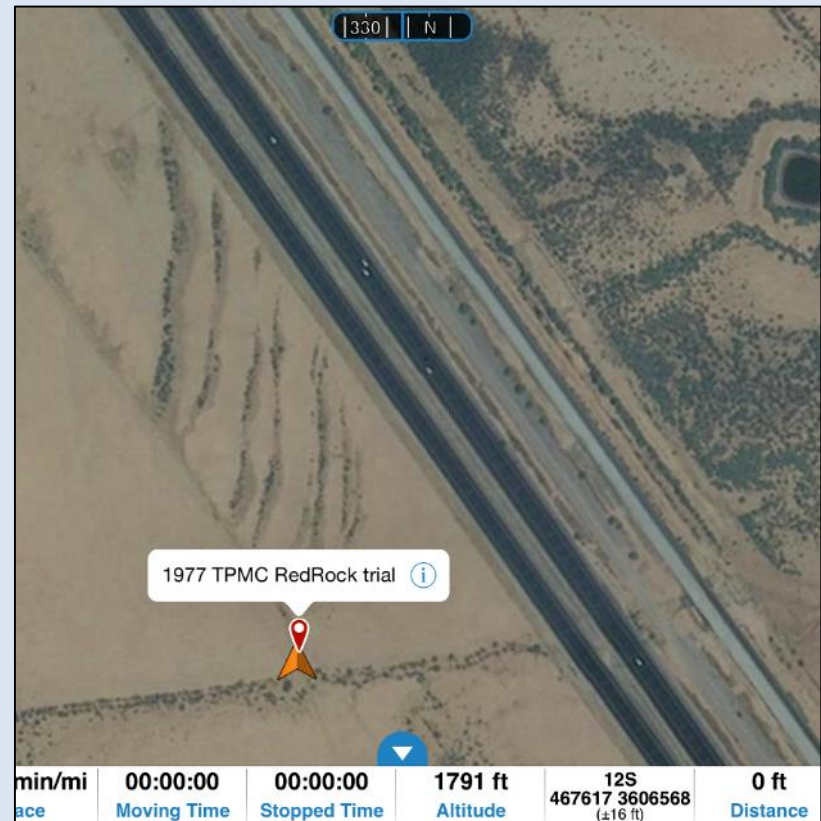
*Abstract*

*The use of dormant poles for planting cottonwoods and willows is an established practice. However, in southern Arizona there is a narrow window of opportunity to plant dormant poles before they break dormancy. The objective of this study is to evaluate the survival and growth rates of non-dormant poles planted at three different dates. Planting dates were October 1991, November 1991, and July 1992. Planting stock included native Fremont cottonwood (Populus fremontii Wats.) and a hybrid black cottonwood (Populus nigra L.). Two diameter classes were evaluated, poles (>0.5 inches) and whips (<0.25 inches). Survival, over all treatments, was greater for the hybrid stock (86%) compared to*

# Studies

## Red Rock Trials/I-10 Work

- Collaborative work
- Objective was to control blowing dust causing multiple accidents along Interstates 8 and 10
- Two separate trials
  - 1977
    - 20 acre abandoned field
    - Two seeding mixtures & 11 cultural techniques
  - 1979
    - 34 acre abandoned field
    - One seeding mix & 2 cultural techniques

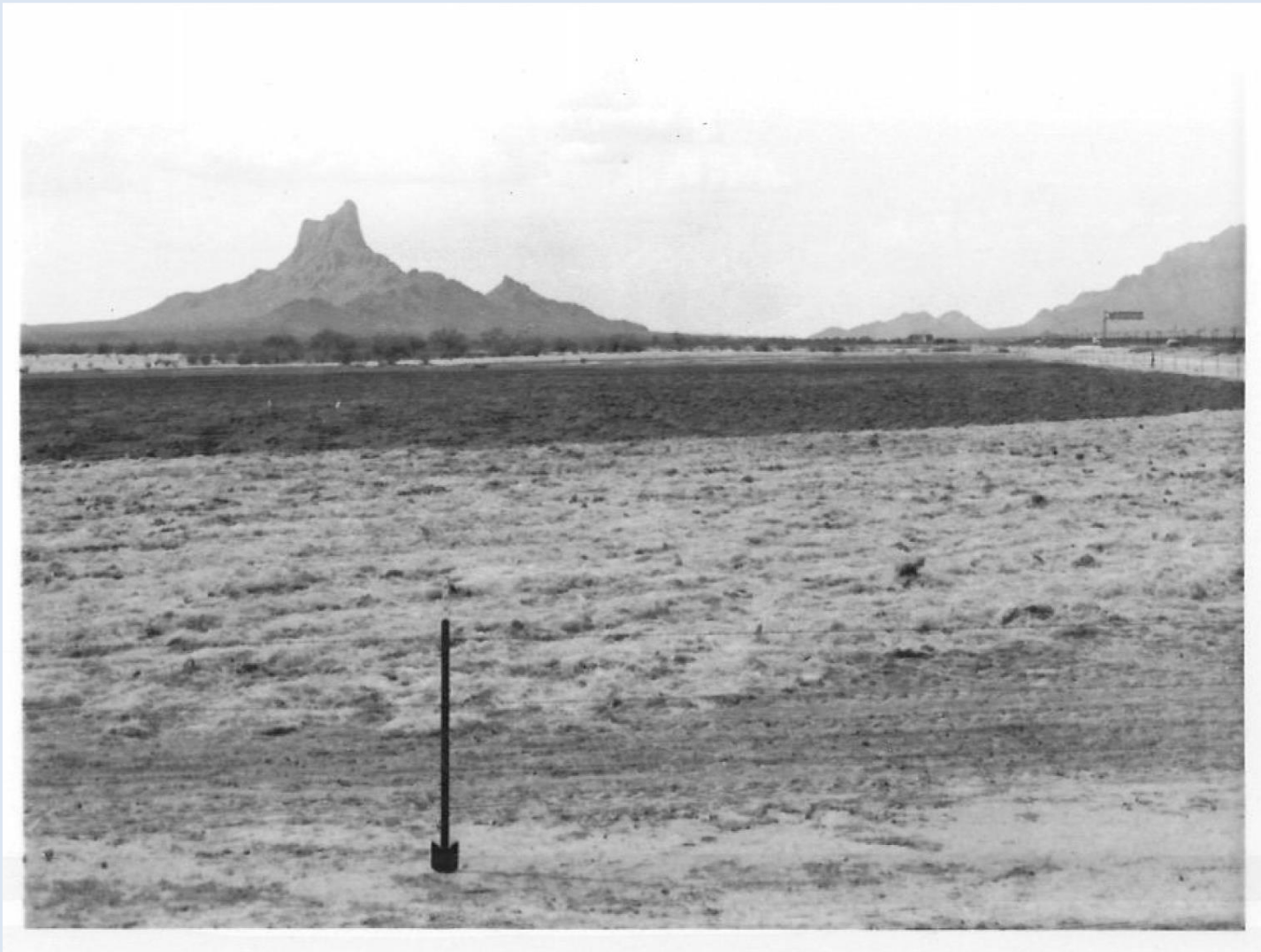


# 1977 Trial

- Entire area was fenced
- Cultural treatments used included pitting, land imprinting, mulching, listing, ripping
- Some successful establishment of seeded species
- Best results were from contour-furrowed and drill seeded plots
- Results were used to develop 1979 study plan



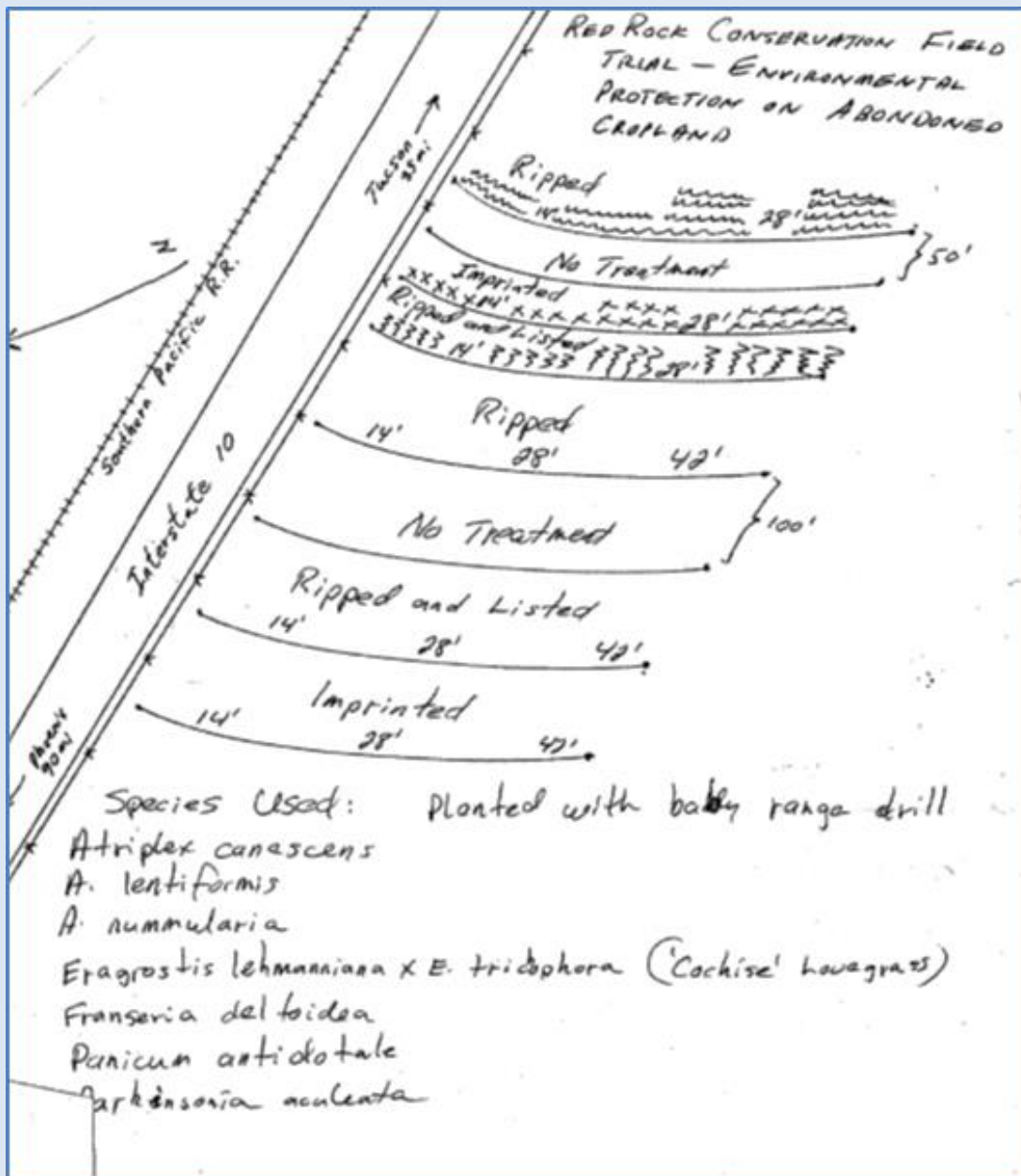




# 1979 Trial

- One of the problems from the 1977 trial was water infiltration
- Constructed contour borders at 50' and 100' wide
- Between each border varying widths were contour furrowed, ripped or left as a check and then drill seeded
- A portion between each border was left as a watershed area to provide extra moisture for the seeded area
- Average slope of the field between borders was 1.5%





# 1979 Trial

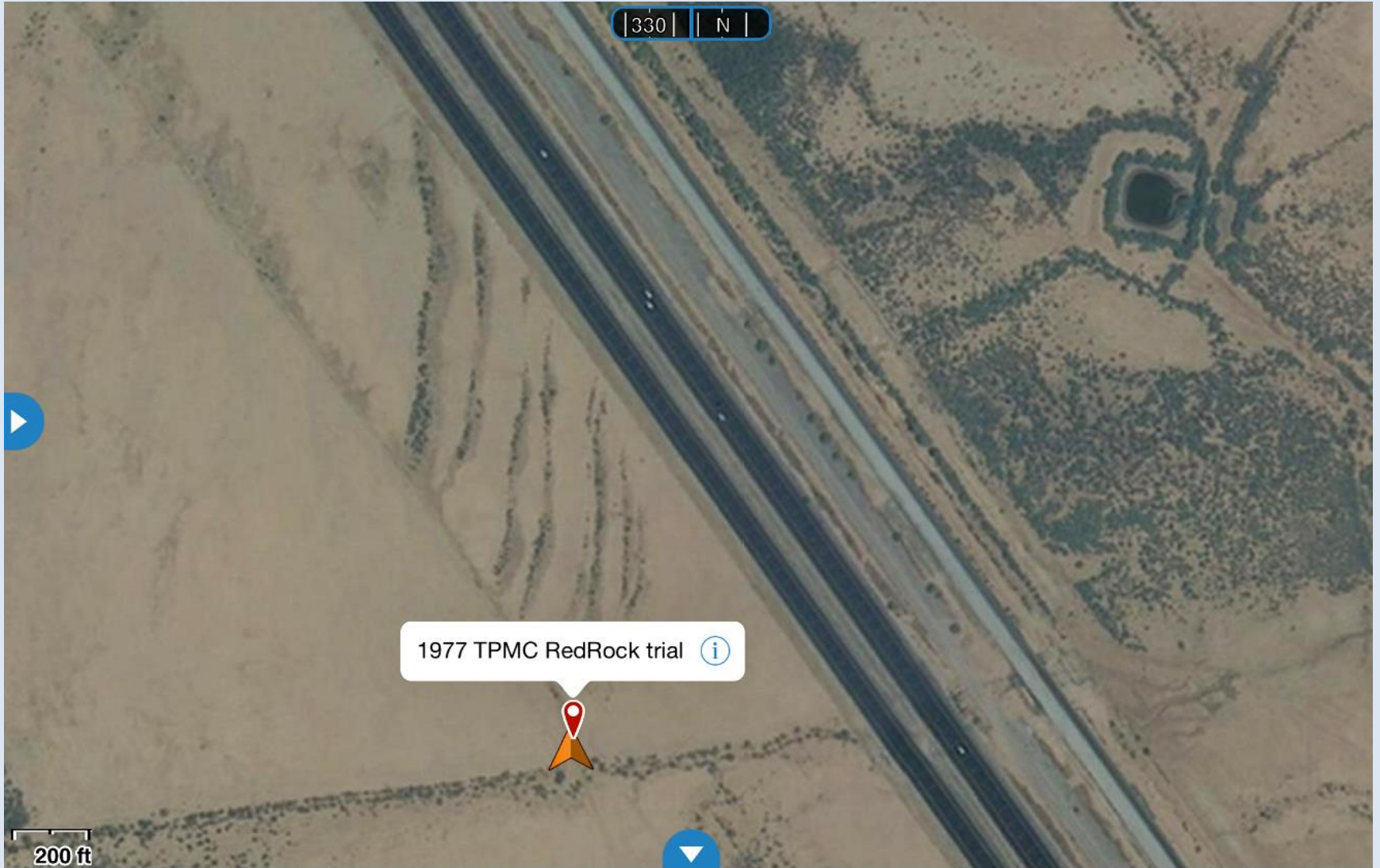
- The techniques worked and are still working today
- Present day vegetation on the berms consists of velvet mesquite, wolfberry, fourwing saltbush and annual forbs and grasses
- Of these, only fourwing saltbush was seeded



# 1979 Trial

- After 6 years of evaluation of the trial, a “prescription” for planting abandoned cropland was developed
- Further trials were conducted in various areas along I-10 but none with the success of the Red Rock Trials
- Collaboration was key





1977 TPMC RedRock trial ⓘ

200 ft

Press and hold to set stats	0:00 min/mi Pace	00:00:00 Moving Time	00:00:00 Stopped Time	1791 ft Altitude	12S 467617 3606568 (±16 ft)	0 ft Distance	12S 467617 3606568 (±16 ft)
-----------------------------	---------------------	-------------------------	--------------------------	---------------------	-----------------------------------	------------------	-----------------------------------

# Bonita Trials

- Collaborative work on an sparsely vegetated area
- Five releases were drill seeded at two seeding rates
- Objective was to determine adaptation of releases, proper seeding rates
- Many failed plantings have been conducted using “common” seed without consideration of genetic origin



# Bonita Trials

- One particular release and seeding rate outperformed the rest
- Data gained can be used to develop a “prescription” similar to that developed from Red Rock work





# Pecan Orchard Trials

- Contacted by U of A professor regarding new pecan orchards and potential for trials
- Coordinated site visit and developed study plan to test various releases in between orchard rows
- Orchard acreage is on the rise in Arizona and this particular orchard is near I-10

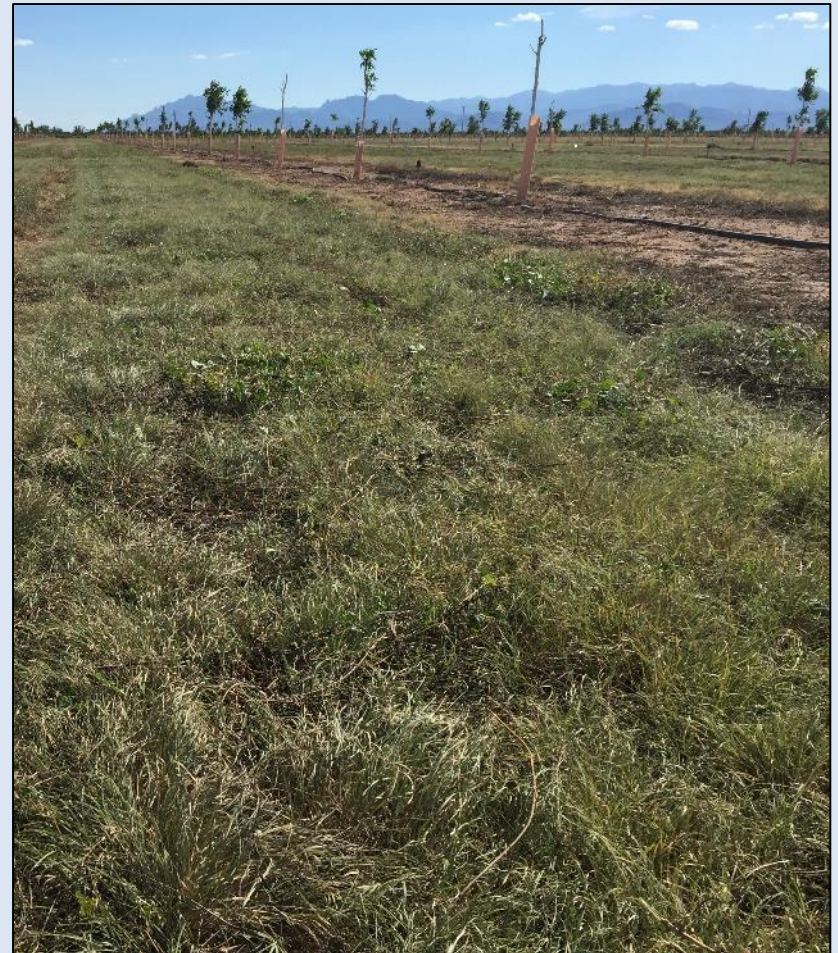


# Pecan Orchard Trials

- Finding a native commercially available species that can exist in the understory of pecan orchards could provide soil coverage for thousands of acres in Southern Arizona
- Replicated trial was installed in 2015
- Preliminary results indicate that two species have established, and are providing cover despite weed competition



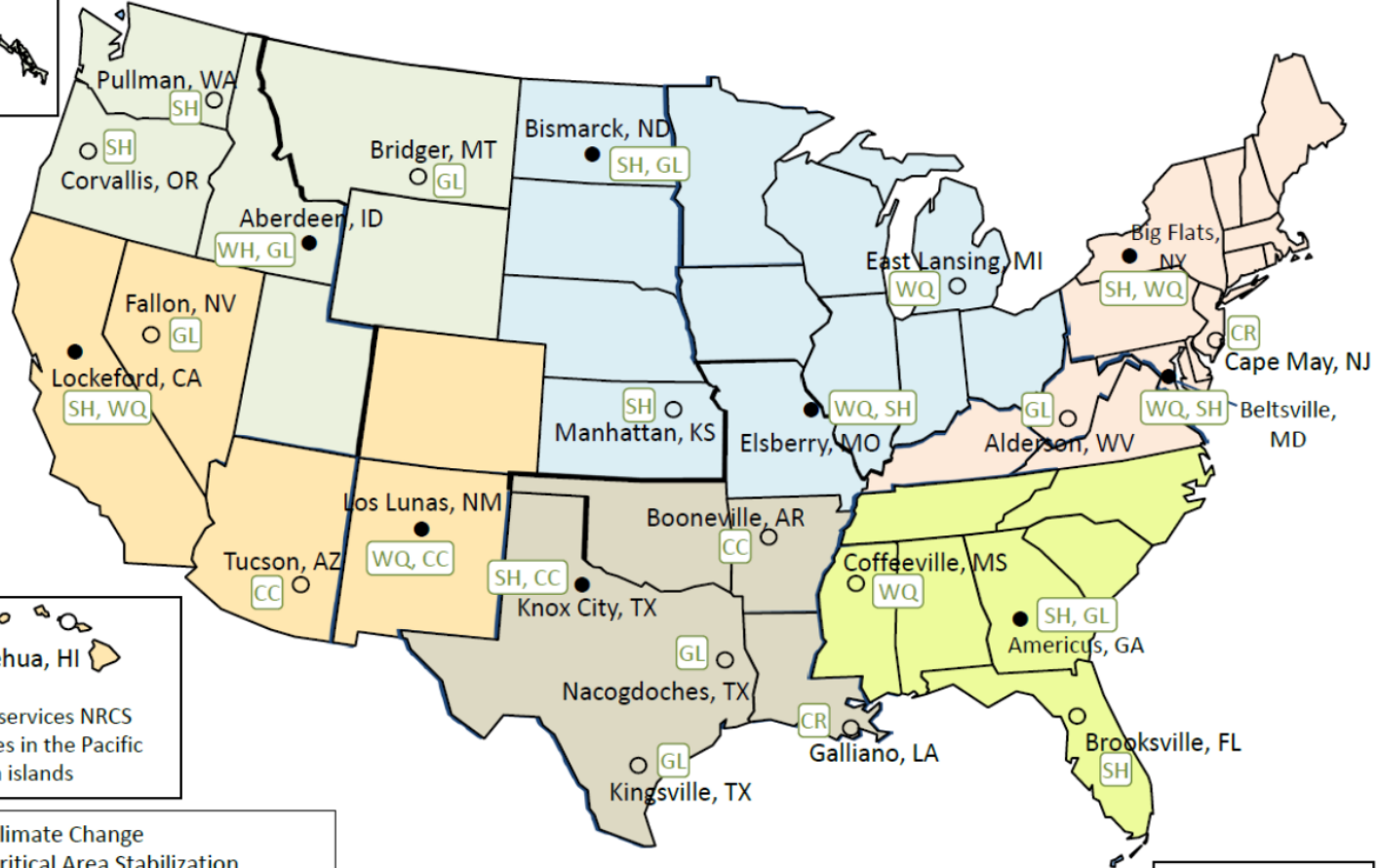
# Pecan Orchard Trials



# Future Work

- Further large scale collaborative work like that done at Red Rock to refine and further develop “prescriptions” for reduction of wind erosion
- Potential for study in collaboration with Pima County and others on land similar to that of the Red Rock site
- Further observational studies of plants that exhibit erosion control potential and have commercial production value
- More regional collaboration with other Southwestern PMCs to define range of applicability of “prescriptions”

# Study Areas for PMCs



Hoolehua, HI  
 Also services NRCS offices in the Pacific Basin islands

CC – Climate Change  
 CR – Critical Area Stabilization  
 GL – Grazing Land Health  
 SH – Soil Health  
 WQ – Water Quality  
 WH – Wildlife habitat

● Tier A PMC operated by NRCS (4-5 FTE)  
 ○ Tier B PMC operated by NRCS (2-3 FTE)



# Summary

- The Plant Materials Program
  - History
  - What we do
  - Releases
- Historical and Present Studies
  - Red Rock Trials/I-10 work
  - Bonita Trials
  - Pecan Orchard Trials
- Future Work



# Questions?

