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…Saltcedar Beetles in NM…

-The Saga Continues-

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Where Are We Going Today?

Quick Review: ‘Issues with Saltcedar’

Field Work Since Last SWVM Meeting

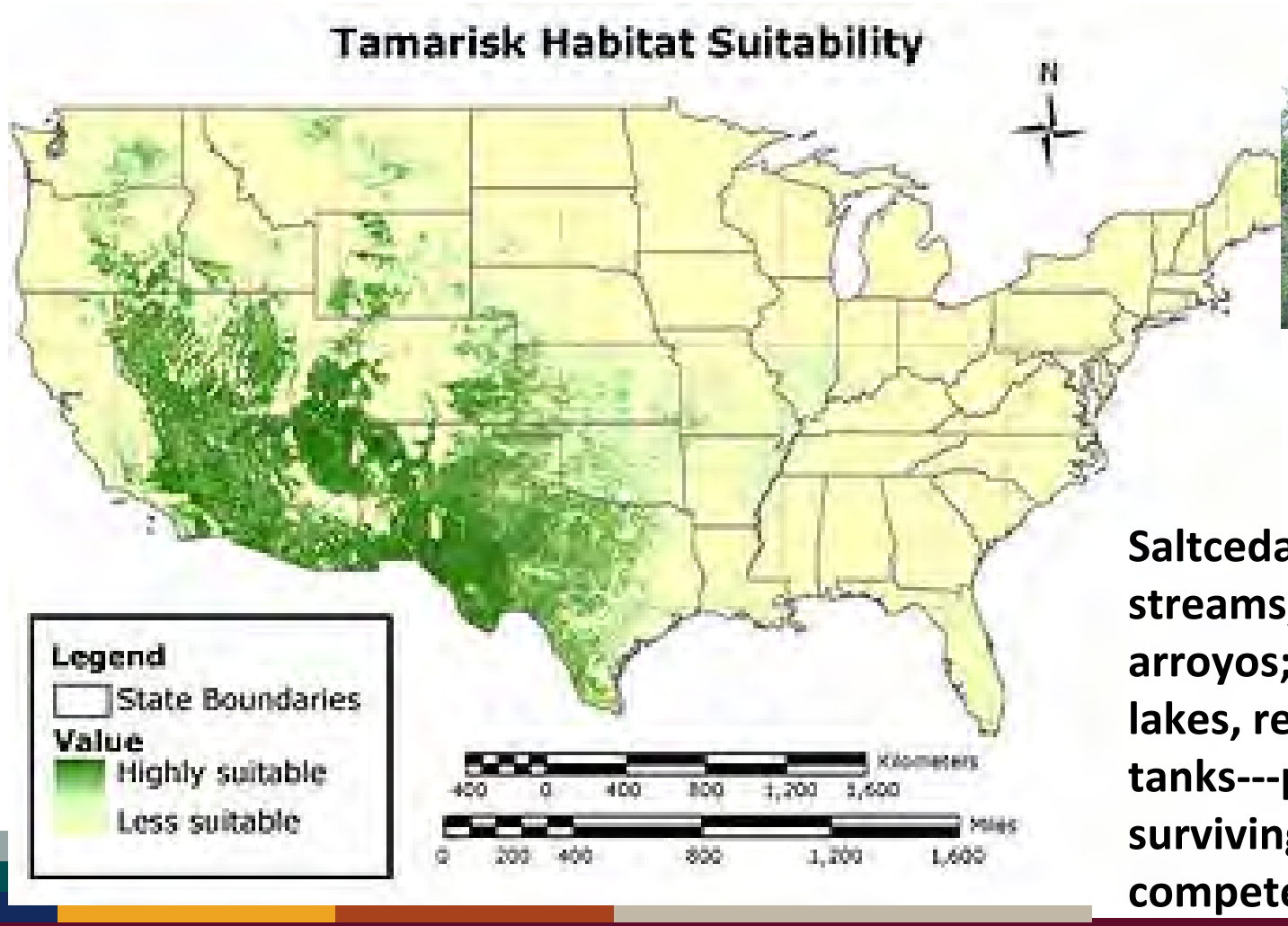
Outreach/Information Activities

How Does It Look for *Diorhabda*?

Is *Diorhabda* in Trouble??? WHAT?

Quick Review of the Saltcedar Situation

Saltcedar is on these
<u>Noxious Weed Lists</u>
WA
OR
CA
ID
NV
MT
WY
UT
CO
NM
ND
SD
NE
TX
AlbertaSaskatchewan



Saltcedar is present along our streams, rivers, ditches & arroyos; it rings our ponds, lakes, reservoirs, & livestock tanks---plus roadsides---surviving anywhere it can compete for water.

MODIS Satellite Data, Graphic by JT Morisette, courtesy NASA

Commonly Used Control Tactics for Saltcedar & Other Brush

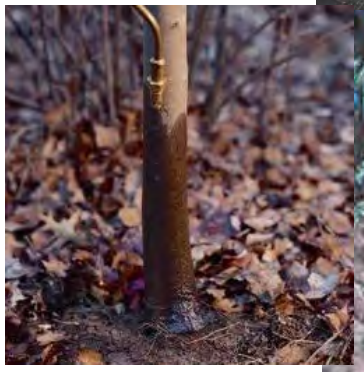
Fire

This is IPM, But Missing One Potential Tool?

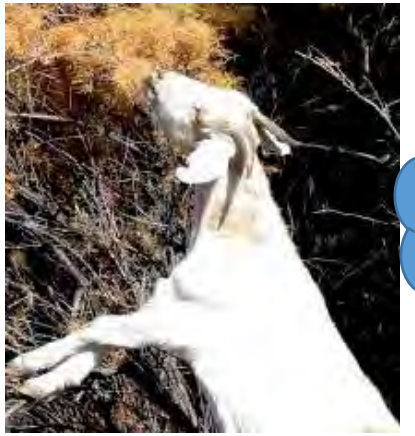
Combination

Bulldozing, Root Plowing, Mowing

Flooding



Herbicide



Goats

Any Insects Feeding on Saltcedar? Results?
(Leafhopper, Scale & Weevil are Foreign Origin; Not Hurting It)

Opsius stactogalus – leafhopper

Coniatus splendidulus - weevil

Amphicerus spp. – twig beetle

Chionaspis etrusca – armored scale

Diorhabda Became Top Biocontrol Candidate!

For years, each *Diorhabda* species was given multiple host specificity tests
It's Saltcedar or Death for them! Very promising as biocontrol!
First limited release permits were issued in 2001-03

Crete-*elongata*

Larger-*carinata*

Fukang/Northern
-carinulata-

4 Top candidates
For biocontrol

Tunisian-*sublineata*

Another Management Tool!

*Multi-year Project→Dr. Jack DeLoach, (USDA-ARS, Temple, TX) went to saltcedar homelands---case of 'Classical Biological Control'

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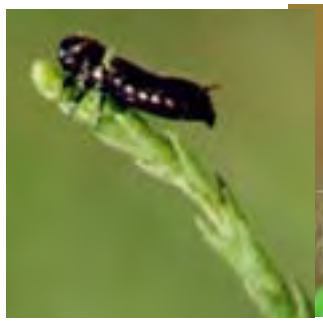
Basic *Diorhabda* Life Cycle

NPS, Dinosaur NatMon 2009



NMSU News

NatParkServ-DinosaurNatMon

3 larval instars, 12-14 days of feeding

NPS, Dinosaur NatMon 2009

Life Cycle in Summer abt. 4 weeks
5-7 generations/year in NM?

NPS, Dinosaur NatMon 2009

Pupae may be 'bare' or inside a litter-covered 'cocoon'

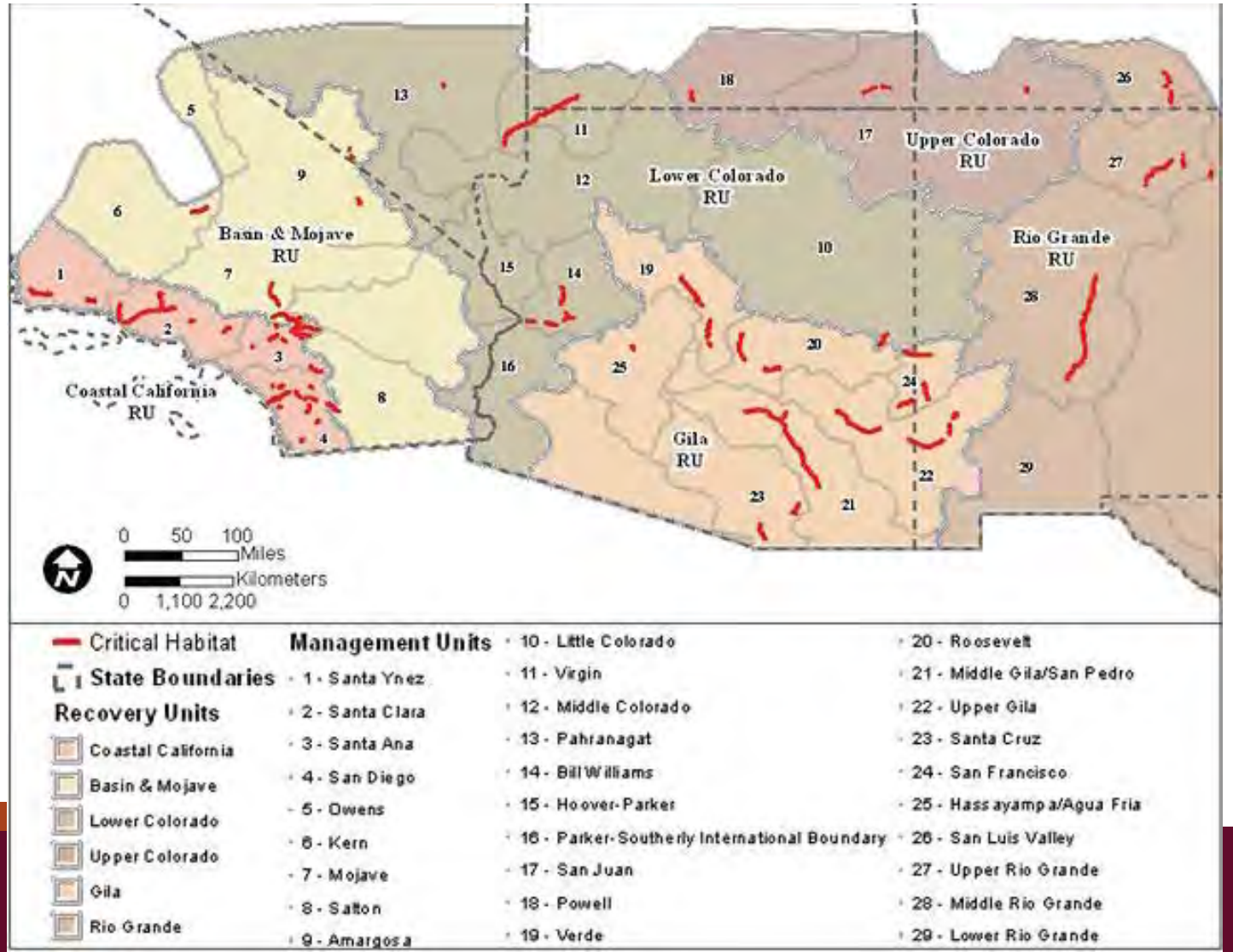
Adult: lives 2-4 weeks
Disperses, reproduces

But There's a Problem:
SW Willow Flycatcher, An Endangered Species

It nests along several rivers in the Southwest; willows replaced by saltcedars

Concern: beetles defoliate saltcedar during nesting season; populations crash

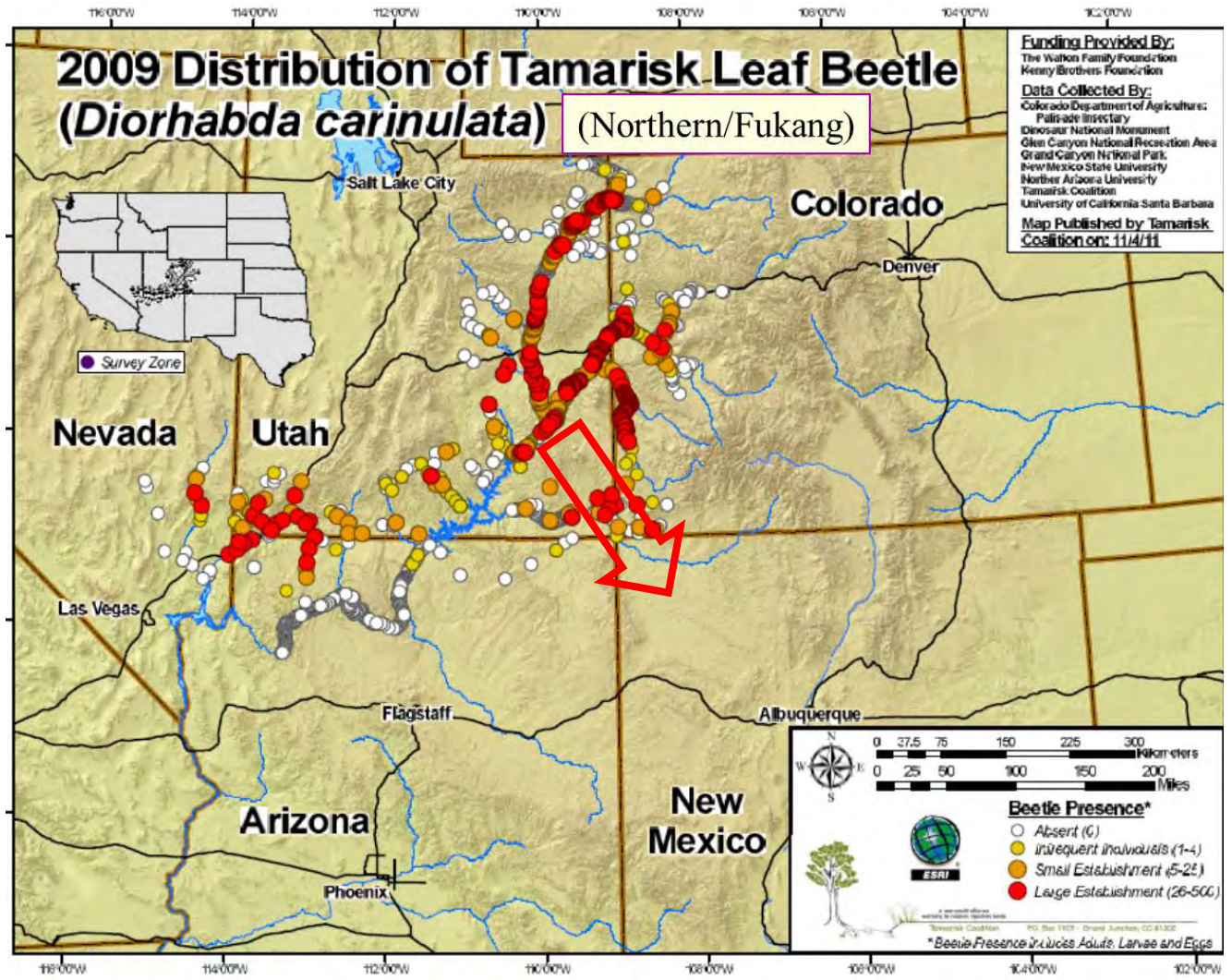
Critical Habitat is Designated by USF&WS



2009: Beetles Established in the Four Corners & Moving!

USF&WS denied release permits for NM after 2006

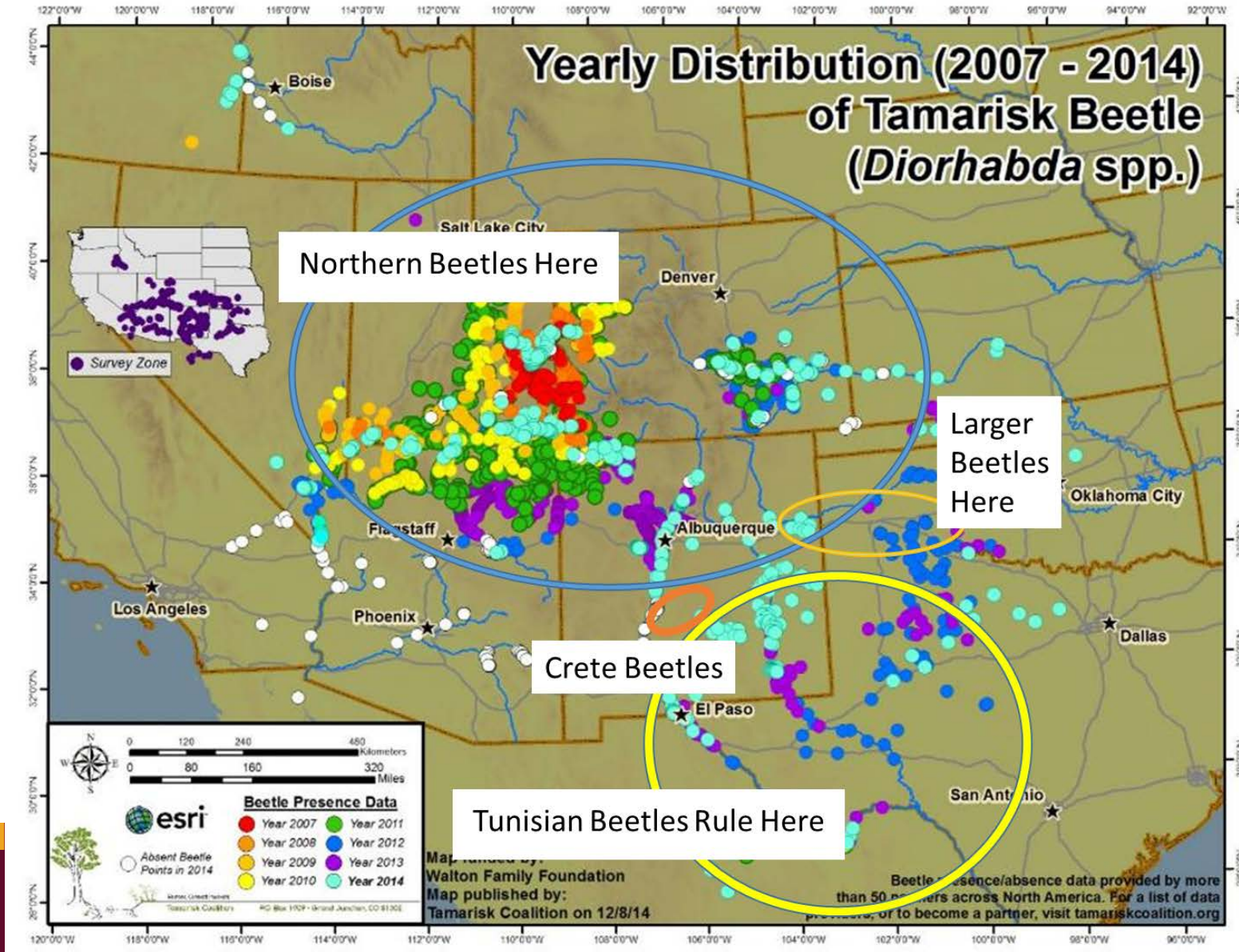
But beetles kept dispersing, entering Four Corners by 2009...



Texas Had Robust Beetle Release Program For 3 *Diorhabda* species. All Found NM!

Beetle Monitoring 2014

NM is the FIRST STATE In the US to Have all FOUR SCBs!



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The Latest Map (Incomplete)

Beetles are moving WEST!
Finding scattered stands of saltcedar!

New Finds/Sutherland & Beck, et al.------

←August

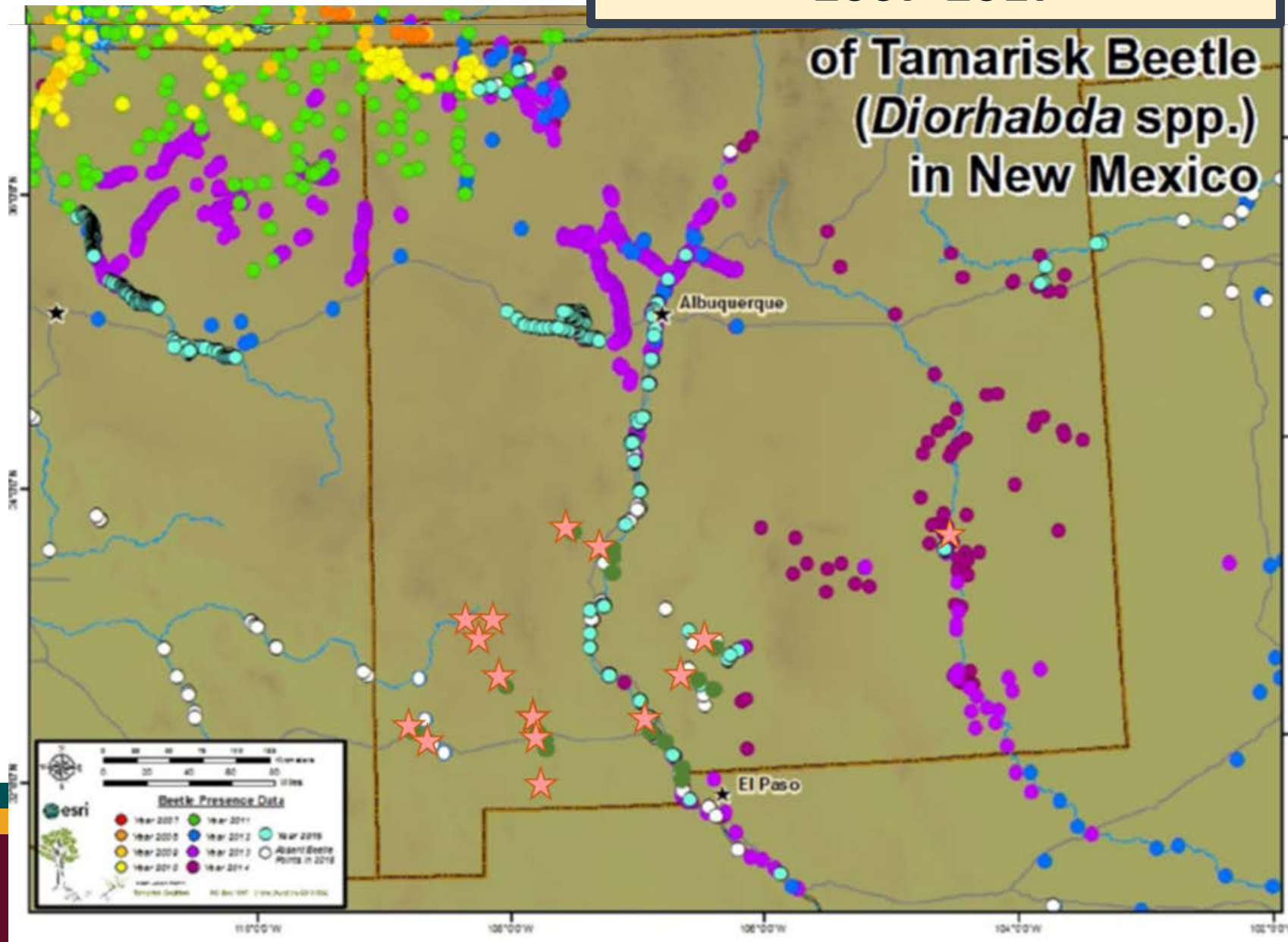
- ---Sierra Co., near Winston (Boone)
- ---Sierra Co., Elephant Butte (Boone)
- ---Otero Co., NE Tularosa (Gordon)
- ---Otero Co., Holloman AFB (w/Mike Freehling, Gordon)
- ---Dona Ana Co., N&S Las Cruces
- ---Luna Co., Deming (Blandford)
- ---Luna Co., Columbus (Vitanza*)
- ---Luna/Dona Ana, hiway from Columbus to EPTX-Vitanza

←October

- ---Grant Co., Hiways 180/61 (Pope)
- ---*Hidalgo Co., W. Lordsburg (Levi Jamison—surveys AZ, NM & UT)

- --- Otero, Tularosa Creek, '16, '17
- --- Hidalgo Co., Exits 24, 29 on I-10, '16, '17
- --- Grant Co., Bayard, '17, San Juan, '17
- --- Las Cruces, NMSU campus, '17

2007-2017



Outreach & Program Information Provided

SW Veg. Management & Noxious Weed Short Course, both annually

Sept. 5 Presentation for the NM Legislative Committee on Water & Natural Resources, Silver City

Oct. 12 Presentation for the International Boundary and Water Commission, Las Cruces

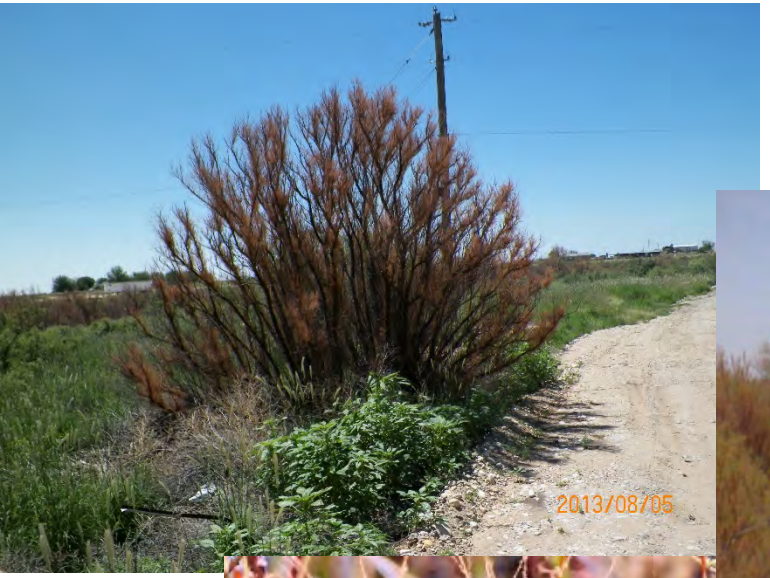
Master Gardeners, Pesticide App. Trainings, Displays, etc.

Most Interesting Comments?

Why don't they eat/kill all of those saltcedars instead of skipping some?

These beetles---they're free? (as in….'no cost?'…)

What Do Saltcedar Beetles Actually Do to Saltcedar?



Adults detect SC, females lay their eggs, larvae & adults defoliate SC repeatedly, finally exhausting saltcedar reserves → kill some SC & suppress other SCs. Sprouting seeds & regrowth will be severely suppressed (ideally).

Impacts of Outreach and Information Programs???
('See Something, Say Something?'

From 2017 Noxious Weed Short Course---
2 contacts, 2 more locations confirmed for *Diorhabda* in NM

1) **Mauro Herrera, NRCS, Lordsburg---Exits 29(new) & 24(adults)**

2) **Bethany Davidson, USFS Summer Employee---Bayard area**

So---What's the Outlook for *Diorhabda*?

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Caballo & Lower Rio Grande of NM---'Beetle Factory?'

2015-now: Every saltcedar in this stand…..

Photos: Leslie Beck, NMSU

This was early August, 2015; we continue to be amazed….wow…..

'Panning for Beetles'

They're Still Doing This!

Caballo Reservoir, Sierra Co., 2015……Same tree…….

Objective: SC beetle forages repeatedly, weakening SC, allowing more desirable (with luck & planning) plants to re-establish

August 5, 2015---

And again, September 8, 2015

Leslie Beck photos, NMSU

Outlook is Very Good for Dispersal

- **Expectations? Killer beetle? 'Lava spread'?**

- **Route to Farmington→Noxious Weeds**
  - **1-25 to ABQ/I-40**
  - **I-40-west bound to Thoreau**
  - **Thoreau to Farmington, Hiway 371**

- **'Survey at 75mph'---patches of orange**
  - **Look; 'ground truth'**
  - **Slow start→ 'July bloom'**
  - **Grazing, mobile**

Here They Come!!!---2018? 2019?

Beetles continue westward into Arizona!

North---beyond Holbrook, Winslow

South---check Duncan, 70W to Safford & beyond
---check Wilcox, west to Tucson

Yes, They Thrive Despite Predators

Zelus sp., the Assassin Bug

Neivamyrmex sp., an army ant

Various Jumping Spiders, Salticidae

Wait A Minute Here! What's Up With This??

Reported from Ysleta Pueblo, near Veguita, Los Lunas in late September, early October, 2017

Globs of tan beetles on SALTBUSH!

'They're KILLING it!'

But are they *Diorhabda*???

Saltcedar = Tamarisk = *Tamarix chinensis et al.*
Family Tamaricaceae

Ornamental
Soil stabilizer
Wind Break

--But—

Competitive
Invasive exotic
'Salting' soil
Dense stands
Not wildlife friendly
Flammable
Phreatophyte (30-200gal/day?)

Steve Dewey, UT State Univ, Bugwood.org

Tom Huette, USDA-FS, Bugwood.org

Introduced into US in early 1800s & western US in late 1800s-early 1900s

Seemed like a good idea at the time?…

Tom Huette, USDA-FS, Bugwood.org

John M. Randall, The Nature Conservancy, Bugwood.org

Escaped cultivation by 1920s in the west

As droughts intensified & fortunes were lost, saltcedar was vilified….

SALTBUSH is not SALTCEDAR!

***Atriplex canescens et al.* = 4-wing Saltbush**

These are Family Chenopodiaceae (or Amaranthaceae, if you prefer)

Rangeland forb, edible for wildlife, livestock

What Records Do I Have of Insects on *Atriplex*?

Four-wing Saltbush---Saltbush Gall Midge (Fly)
Cecidomyiidae: *Asphondylia solidagensis*

Four-wing Saltbush---Ensign Scales
Orthezidae: *Orthezia* prob. *anna*

Related to ‘soft scales;’ mouth parts are piercing-sucking; mobile

Produces honeydew; white ‘dreadlocks’ are wax strands

Fourwing Saltbush---Wax Scales
Ceroplastes prob. *sinensis*

Stevensonintermountainseed.com

US Natl Coll Scale Insects Photos bugwood.org

Where Did I Find a Clue About a Saltbush Beetle?

Coleoptera
Chrysomelidae
Monoxia obesula
(native to US Midwest, 'invasive in Europe)

1mm

Hosts: *Atriplex, Chenopodium*)

Bulletin of Insectology **69** *(1): 159-160, 2016*
ISSN 1721-8861

A second Palaearctic record of *Monoxia obesula* (Coleoptera Chrysomelidae Galerucinae)

David MIFSUD
Institute of Earth Systems, Division of Rural Sciences and Food Technology, University of Malta, Msida, Malta

Abstract

Monoxia obesula Blake is here recorded for the first time from Malta. This constitutes the second record for the Palaearctic Region, as the species was previously found in Sardinia (Italy) in 2013. In Malta, *M. obesula* was found on *Chenopodium album*, which represents a new host-plant record for this beetle.

So---Where/what is Malta?

Malta, Gozo & Comino are 3 islands comprising the Maltese Archipelago. These 3 = Country of Malta---between Sicily and Libya.

These Are *Monoxia* spp., Coleoptera, Chrysomelidae
3.5-4mm long each; larvae are leaf miners?; eat flowers, seed
NMSU Collection has 5 spp. like some of these

***Monoxia* sp. on sagebrush**

***brisleyi* (CA)**

***sordida* (TX)**

***angularis* (CA)**

sp. (TX)

Known hosts include Chenopodiaceae, some Asteraceae---but don't kill hosts

This sp. from BC, Canada has faint stripes

Lingering Opinions Surround Beetles…..

- Confusion: KILLING CEDAR trees! (wrong plant)
- Mis-ID: Will ‘disease’ on saltcedars attack my crops?
- Disappointment: saltcedars AREN’T DEAD YET!
- Suspicion: When saltcedar’s gone, WHAT ELSE WILL THEY EAT?
- Disgust: so MANY little icky little bugs…
- Horror: they’re SWARMING!
- Fear: FIRE! FLOODS!!
- Legality?: SPRAY ‘EM ALL!

In the Long Run, Southwestern Willow Flycatcher

Empidonax traillii extimus, **insect eater; nests in willows hanging over water**

USFWS listed it 'Endangered' since 1995; 'Critical Habitat' (Elephant Butte)**

Concern---*Diorhabda* will defoliate saltcedar during flycatcher nesting season; NO PERMITS FOR BEETLE RELEASE IN NM SINCE 2006-2007

IRONY!! Endangered Species is forced to survive on an Exotic, Invasive NOXIOUS weed

In the Long Run-What Could Replace Saltcedar?
These---& MORE---Are Invasive, Exotic Species, Too

Russian Olive

Whitetop

Russian knapweed

Dalmatian Toadflax

Leafy spurge

Plenty More!

Enter: Tamarisk Coalition---Community projects to replace saltcedar with desirable native species

And So It Goes For Now....

Let's See What Happens Next