Screwbean Mesquite Stand Health on DCP Properties & Beyond

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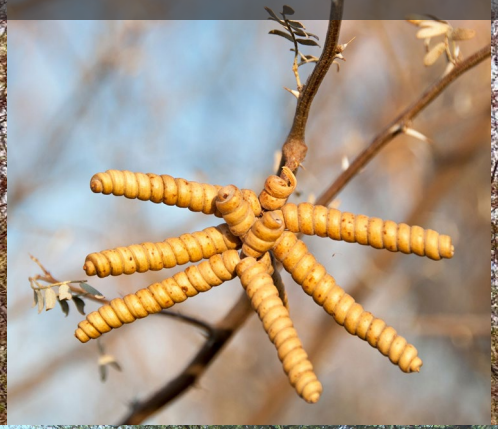
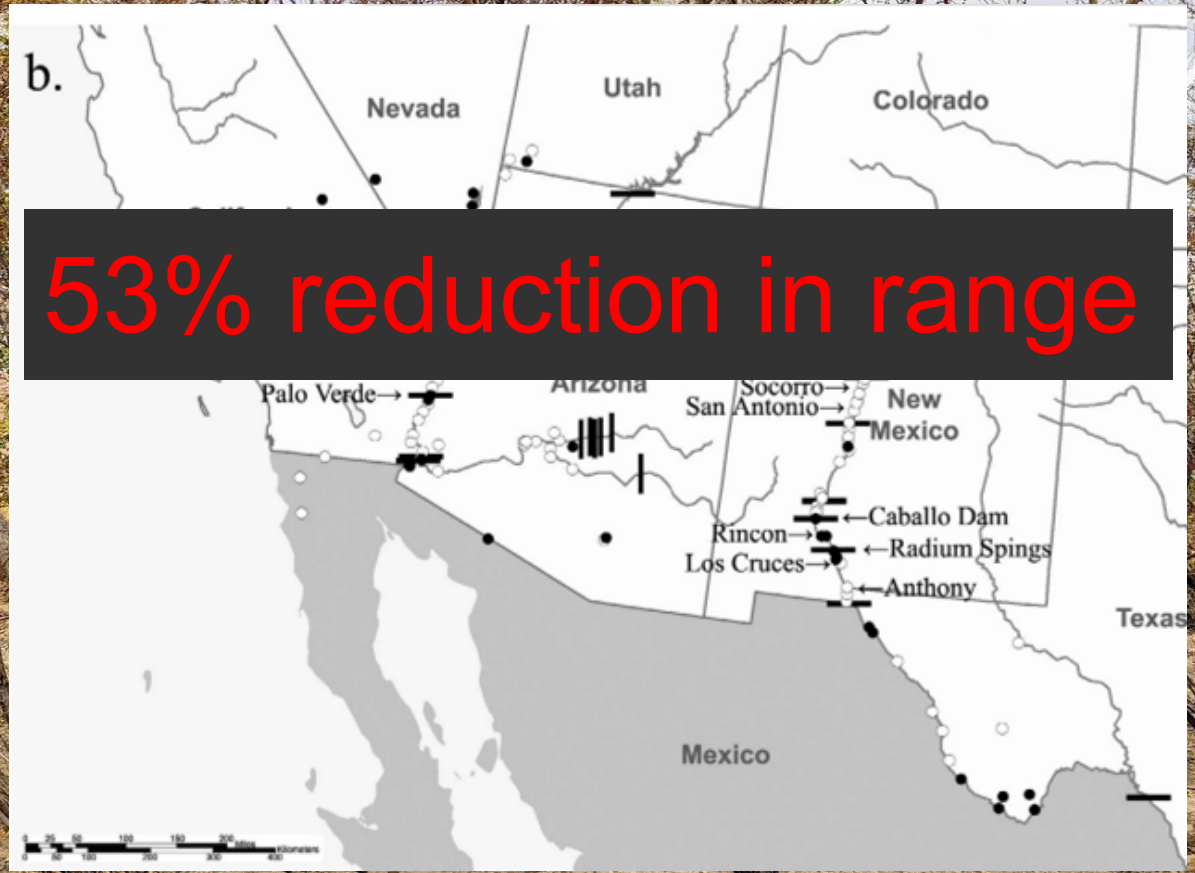
desert conservation PROGRAM

Screwbean Mesquite (*Strombocarpa pubescens*)

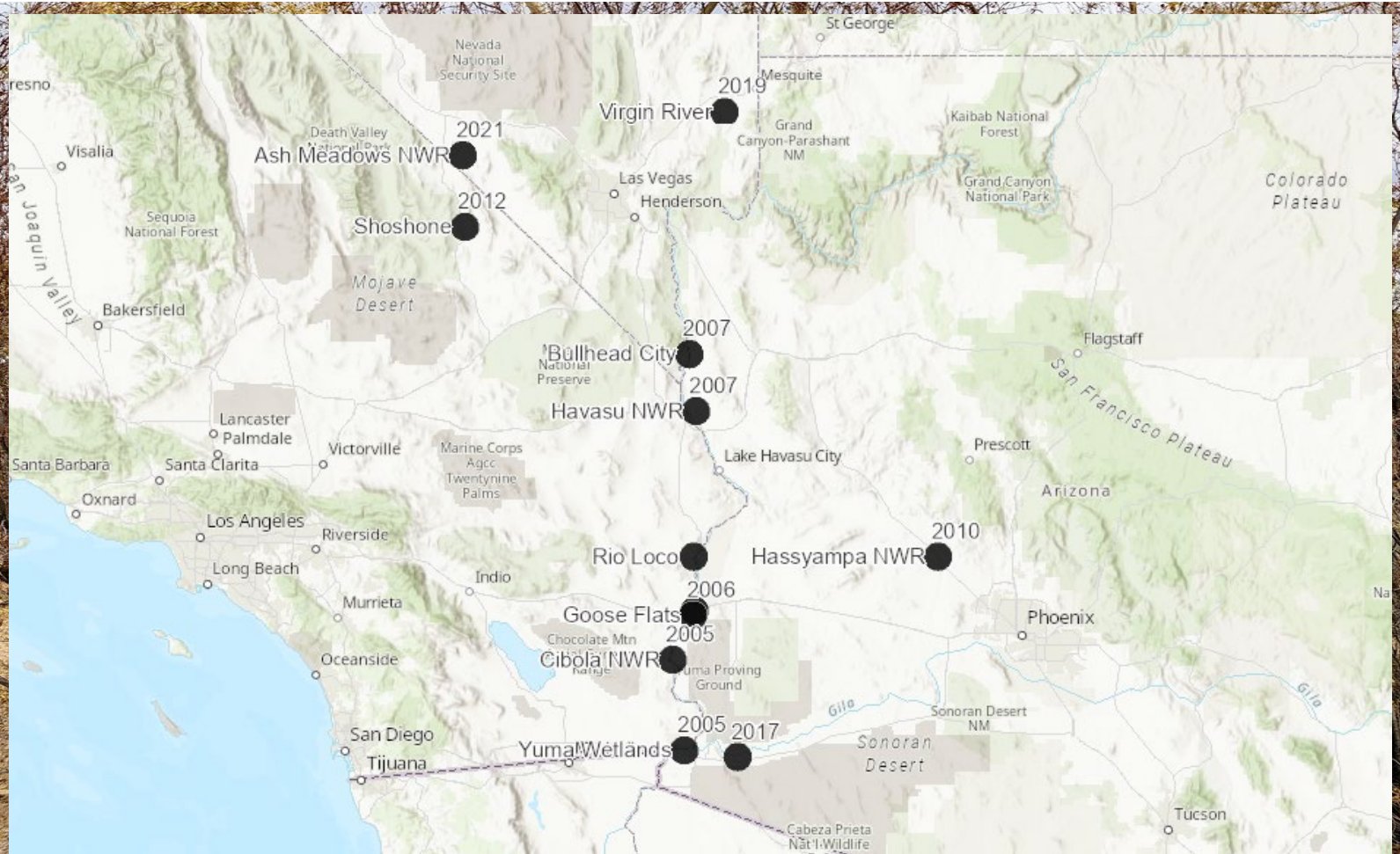


- Riparian tree up to 30 ft. tall
- Extensive “Bosques” described in 19th century
- Cover, nesting habitat and forage for wildlife
- Culturally important for many tribes

2014 surveys compared to herbarium records (1900s)



Progression of die-off in screwbean mesquite (link)



Possible causes for declines

- Tamarisk
  - lowered water table
  - salinization of soils
- Human development
- Damming & channelization of rivers
- Drought

Disease

- Studies in 2007 & 2016 along Colorado River of AZ
  - “Mysterious malady”
  - Rapid progression
  - Trees less than ~6 years old unaffected
  - Near complete mortality along LCR
  - Causing most dieback/mortality

→ From 2005 to 2020 progressed south to north

Our Previous Monitoring/Surveys

- Exploratory surveys in 2021: 21 sites in AZ, NV & NM
- Intensive Monitoring 2022
  - 7 sites in NV & CA
  - 20-60 trees per site
  - Visited every 6 weeks

Branch Canker (*Neoscytalidium dimidiatum*)

- Isolation and molecular ID (with U of Arizona)
- Inoculation of naive trees → reisolated
- Identified at sites from Virgin River to Ash Meadows (5 sites)

Disease Symptoms

- Red, oozing cracked bark
- Cankers
- Leaf yellowing
- Branches killed in weeks to months

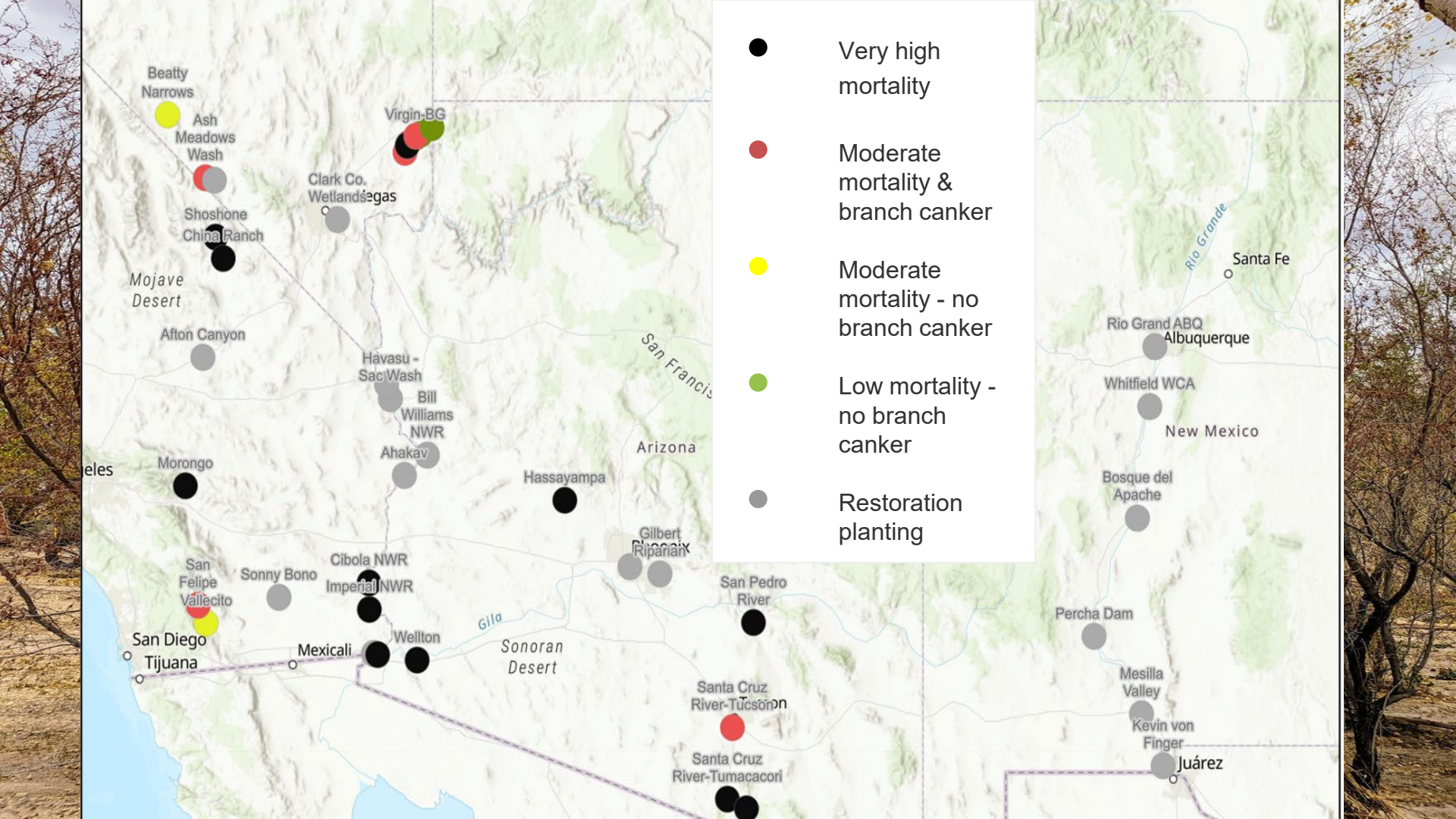






N. dimidiatum

- Opportunistic
  - Spores enter wounds
  - Thermophilic
  - Affects many woody and non-woody species
    - E.g. Walnut, Citrus, Pines, Eucalyptus
- Emerging global pathogen
  - Climate-driven → hot, dry conditions causing bark cracking?
- Evidence of local adaptation
  - increased aggressiveness for new species
    - E.g. dragonfruit in the Phillippines


Very high mortality
Moderate mortality & branch canker
Moderate mortality - no branch canker
Low mortality - no branch canker
Restoration planting
Beatty Narrows
Ash Meadows Wash
Virgin-BG
Clark Co. Wetlands
Shoshone
China Ranch
Mojave Desert
Afton Canyon
Havasu - Sac Wash
Bill Williams NWR
Ahakav
Morongo
Hassayampa
Arizona
San Francis
Gilbert Riparian
San Felipe
Vallecito
Sonny Bono
Cibola NWR
Imperial NWR
San Diego
Tijuana
Mexicali
Wellton
Gila
Sonoran Desert
San Pedro River
Santa Cruz River-Tucson
Santa Cruz River-Tumacacori
Rio Grande
Santa Fe
Rio Grand ABQ
Albuquerque
Whitfield WCA
New Mexico
Bosque del Apache
Percha Dam
Mesilla Valley
Kevin von Finger
Juárez

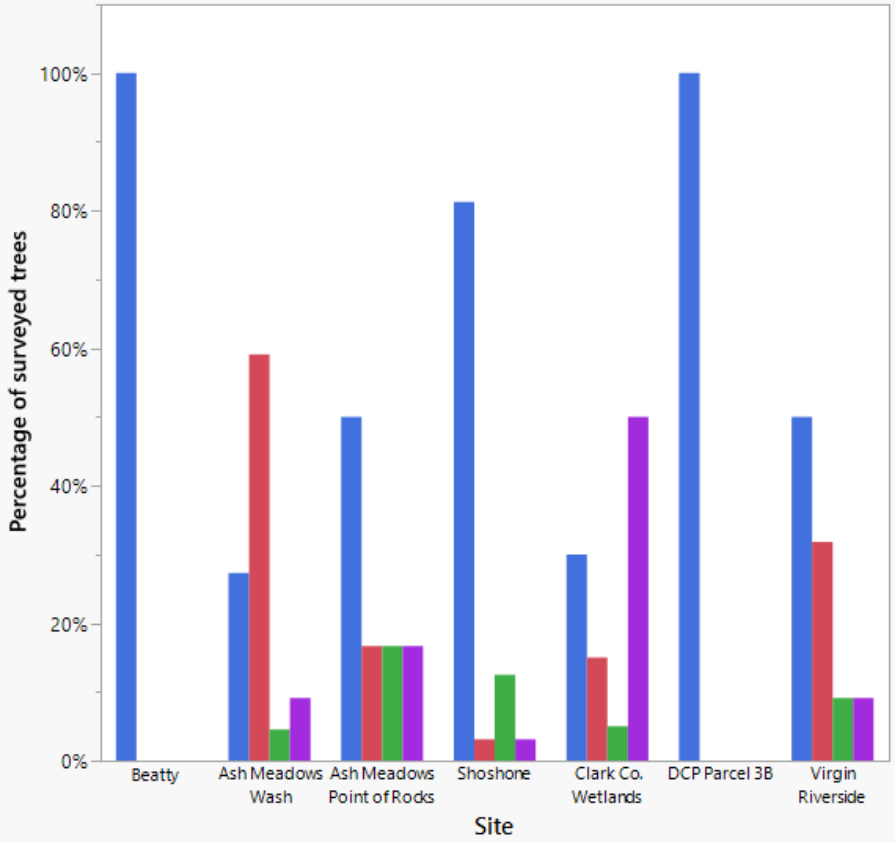
Main Findings (2021-2022)

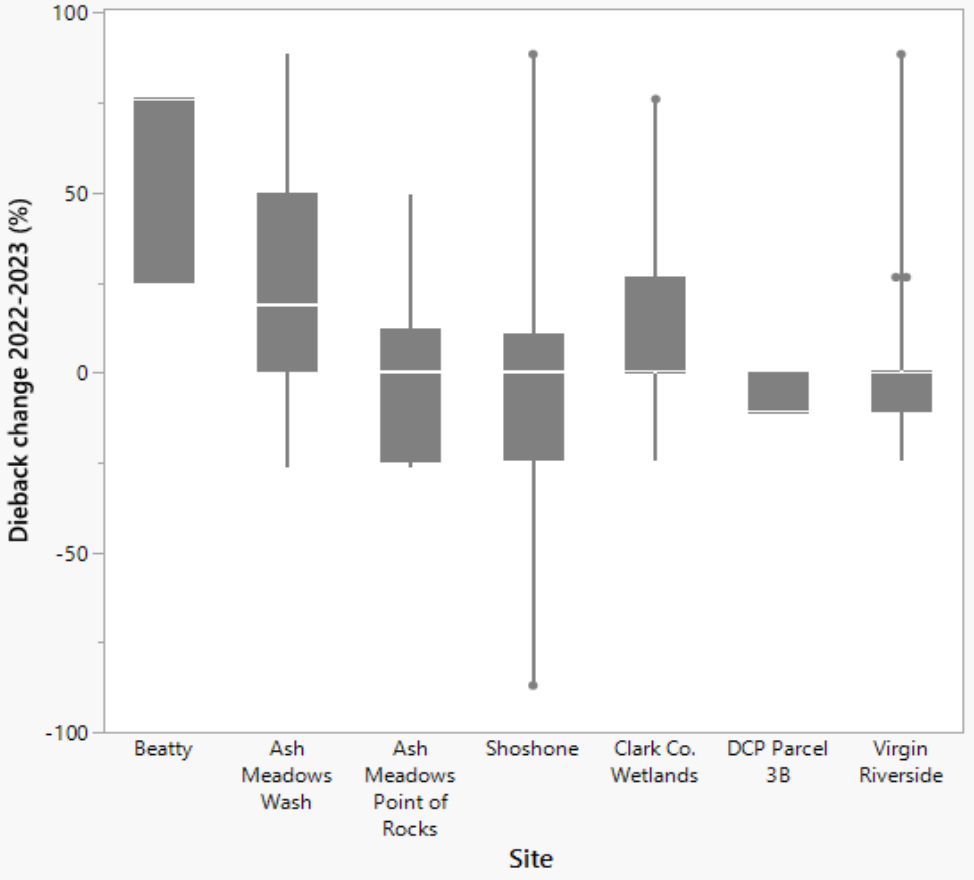
- Dieback strongly associated with branch canker for most sites
- Dieback progressed on average 10-20% through 2022
  - Even higher for diseased trees – 10-40%
- Probably not drought-driven
  - Ash Meadows NWR only (n=17)
- Younger trees less affected
- Boring beetles associated with disease

Flat-headed borers (*Chrysobothris octocola*)

2023 Ongoing Monitoring

- Same 7 sites as 2022
  - Revisited the same trees
- Visited once September-November


Disease status change
no disease
diseased
acquired
lost
100%
80%
60%
40%
20%
0%
Percentage of surveyed trees
Beatty
Ash Meadows Wash
Ash Meadows Point of Rocks
Shoshone
Clark Co. Wetlands
DCP Parcel 3B
Virgin Riverside
Site


100
50
0
-50
-100
Dieback change 2022-2023 (%)
Beatty
Ash Meadows Wash
Ash Meadows Point of Rocks
Shoshone
Clark Co. Wetlands
DCP Parcel 3B
Virgin Riverside
Site

DCP Parcel Visits

- 17 parcels
  - visited in June 2023
  - Qualitative assessment
- 10 transects established in 2025
  - at large stands in 9 DCP parcels
  - revisit monitoring possible

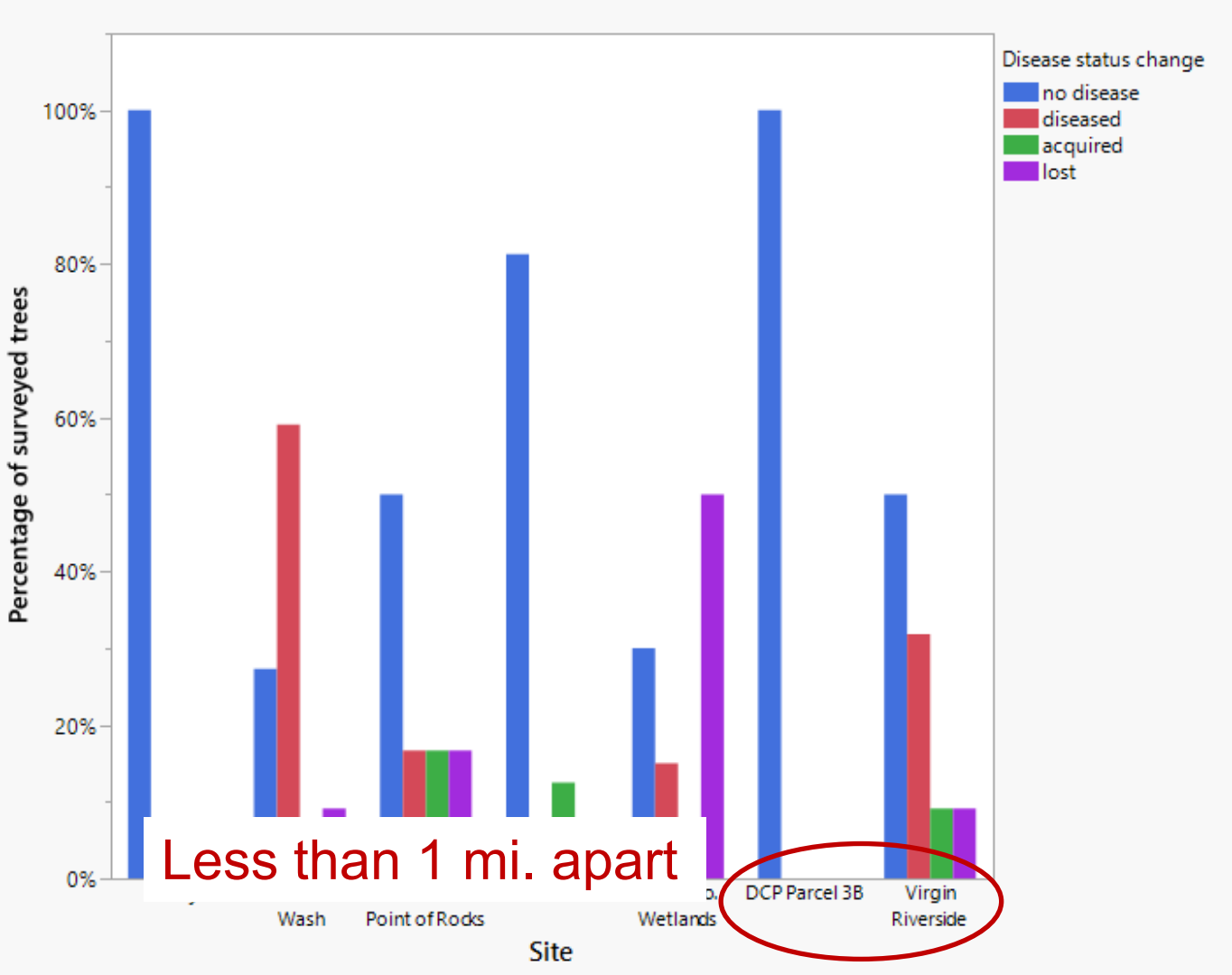
DCP 2025 Survey Results

- Disease and dieback were low for upstream sites
  - Disease is present but causing little dieback/mortality
- Stands at Mormon Mesa (closer to Lake Mead) are less healthy
  - Avg. 30-60% dieback per tree
  - 50-100% of trees show disease

→ Stand furthest south: 60% mortality (observable)

Conclusions

- Disease is associated with dieback but no strong progression of disease 2022-2025
  - Ash Meadows NWR is an exception
- Site matters


Disease status change
no disease
diseased
acquired
lost
Percentage of surveyed trees
100%
80%
60%
40%
20%
0%
Less than 1 mi. apart
Wash
Point of Rocks
Wetlands
DCP Parcel 3B
Virgin Riverside
Site

Conclusions

- Site matters
  - Is disturbance important?
  - Natural flood regimes, burn history
- Why decreased disease and dieback in 2023?
  - Probably not temperature: July 2023 & 2024 *hotter* than 2022

Mitigation Pilot Studies - Coppicing

- 17 trees cut
  - Range of dieback: 0-95%
- 71% resprout rate
- Likelihood of resprouting and growth rate after resprout *independent* of pre-existing dieback
- Potential to “reset” highly diseased stands

Mitigation Pilot Studies - Burning

- “Accidental” low-intensity burns at CC Wetlands Park
  - Unburned, 3 & 9 year-old burns
- Most trees resprouted
- Dieback and disease incidence lowest at 3-y.o. burn
- 9 years post-burn, dieback intermediate/disease high
- Could be useful as a “reset”
  - Managing intensity would be important

Screwbean Provenance Garden

- 525 seedlings planted March 2025 on DCP property
  - 55 mother trees, 24 populations (NV, AZ, CA, NM, UT)
- Low survival (~28%)
- Can we identify disease-resistant/resilient lineages?
  - Still should have decent replication
  - Disease often not a problem until ~ year 7

Herbivore Deterrence Project

Herbivore Deterrents

- Plantskydd
  - Fear-inducing: blood-based
  - Effective against some wildlife
- Trico-pro
  - Taste and smell: Sheep fat-based
  - Effective against large herbivores

→ Neither has been tested against cattle

Project Design

- 3 treatment levels
  - Plantskydd, Trico Pro, control
- 20 plots each (planted April 2024)
  - Planted at 5 DCP parcels
  - 25 plants per plot (1,500 total)
  - 21 upland (e.g. honey mesquite, saltbush, saltgrass)
  - 39 riparian (e.g. coyote willow, velvet ash, rush)
  - Identical species composition/layout

Project Design

- Deterrent applied upon planting
- Reapplication
  - Plantskydd: monthly
  - Trico Pro: biannually

Data Collection

- Plots visited monthly May-October 2024
- Plants scored for degree of grazing damage
- Pellet counts
- Cameras installed at some plots
  - To confirm presence/absence of cattle

Results - 2024

- Plant survival through October
  - Control: 34%
  - Trico Pro: 26%
  - Plantskydd: 37%

Results - 2024

- Plantskydd: better seedling condition for some species
  - honey mesquite, saltgrass
  - worse for willows, however
- At high grazing pressure (# of pellets), effect disappears
- Trico Pro not effective
  - high reapplication interval, though

Project Extension – August 2025

- Plantkydd reapplied every 6 weeks
- Trico Pro every 3 months
- Includes wild plants (all 3 treatment levels)
  - E.g. seepwillow, wolfberry

Acknowledgements

- The Nature Conservancy
- USFWS
- Clark County Wetlands
- Clark County - DCP
- NV Division of Forestry
- NV Dept of Wildlife
- City of Mesquite

Help with regional Screwbean Mesquite monitoring!

https://arcg.is/eKGGe

→ be sure to enable location ←

Send feedback to:
jacob.cowan@ecoculture.us

Help with regional Screwbean Mesquite monitoring!

https://www.inaturalist.org/projects/tracking-the-screwbean-mesquite-die-off