Vegetation Recovery and Pollinator Utilization of Clark County Riparian Restoration Sites

Riparian Plant-Pollinator Ecology
Phase 2

Desert Conservation Program

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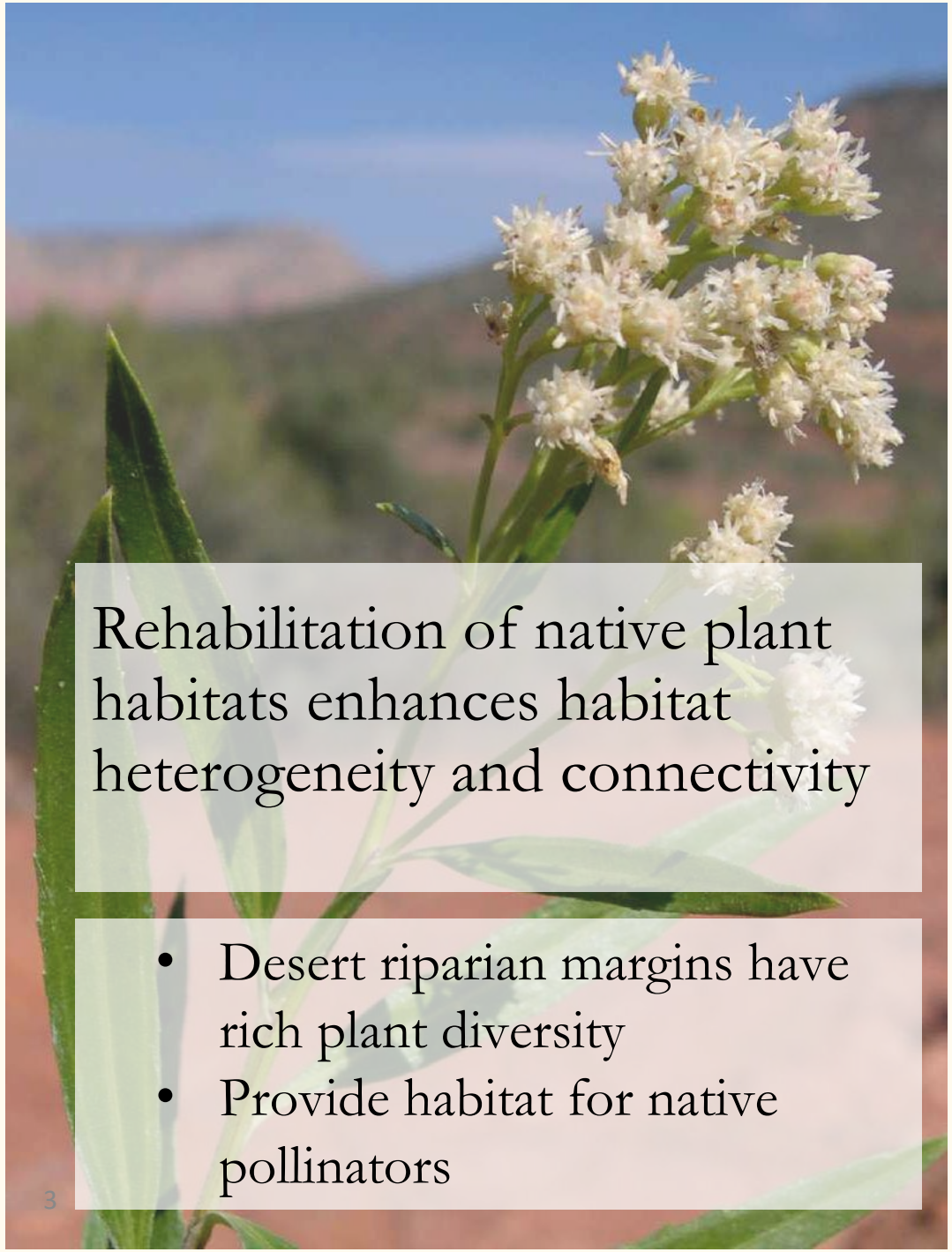
Project goals

- Evaluate the success and sustainability of current management practices, as they pertain to riparian plant and pollinator communities, and
- Determine if there are opportunities for improvement.

Management Practices

- Tamarisk removal
- Strategically located native plantings
- Planting a variety of overstory and understory species
- Fencing



Rehabilitation of native plant habitats enhances habitat heterogeneity and connectivity

- Desert riparian margins have rich plant diversity
- Provide habitat for native pollinators

Determining plant-pollinator systems within the riparian areas in Clark County can guide how to improve restoration activities and riparian function.

Are plants and native patches self-sustaining?

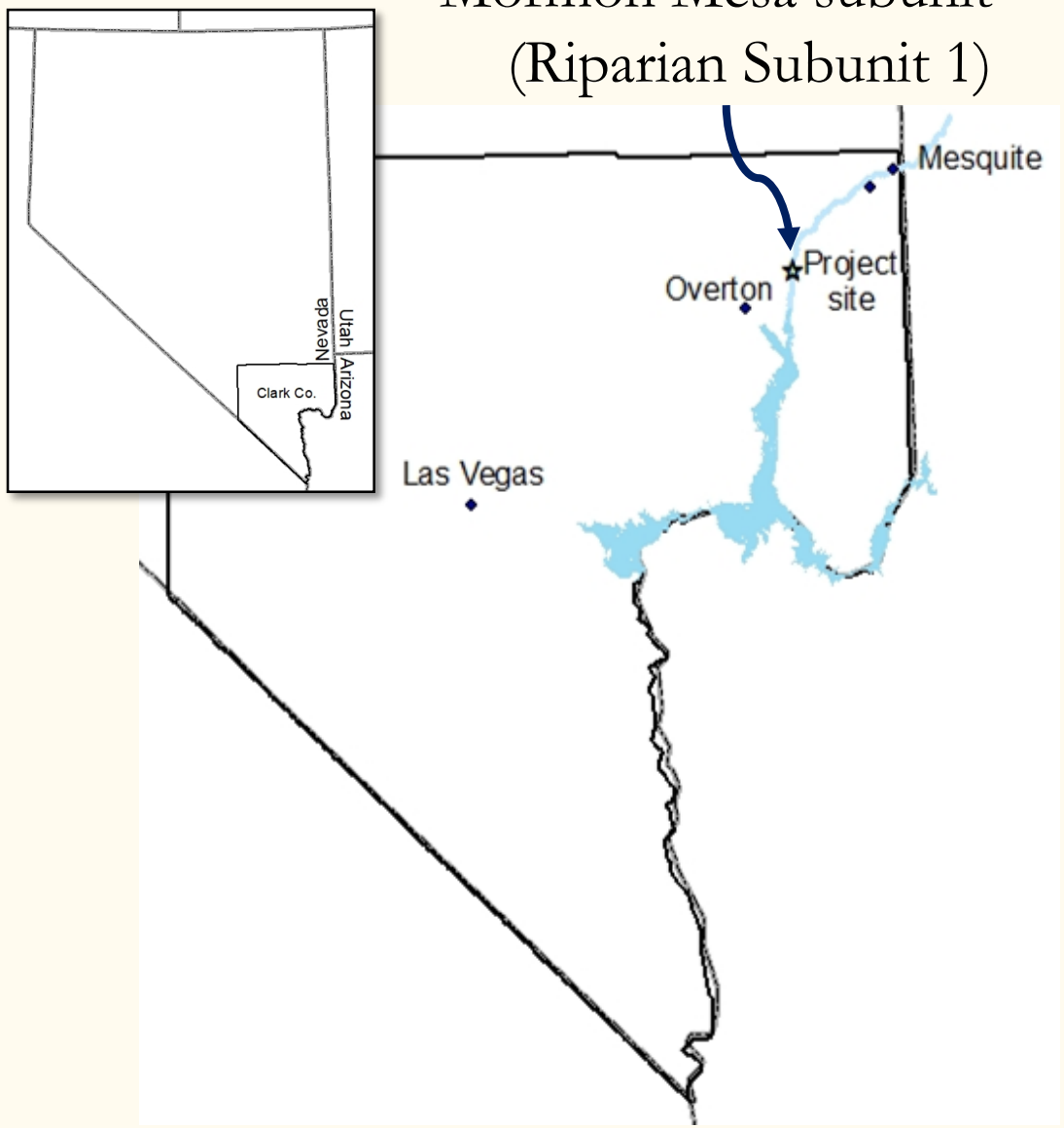
Influenced by pollinator presence/absence and behavior.

Where is pollination lacking?

Could lead to improved restoration efforts, enhancing pollinator corridors and habitat connectivity.

Project location

Mormon Mesa subunit
(Riparian Subunit 1)



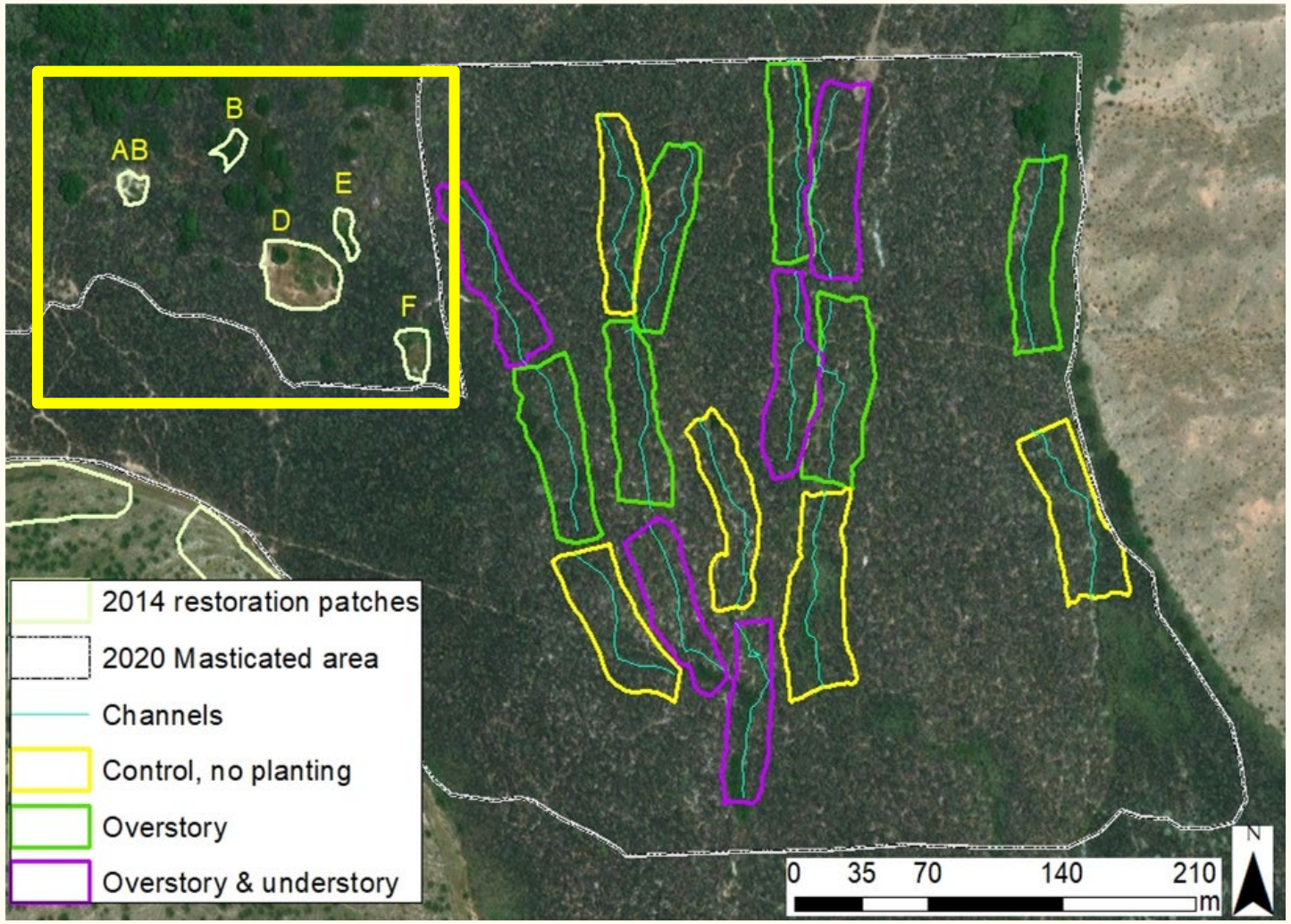
Project objectives

1. Determine if there is a sufficient presence of nectar, forage, and host plants to support pollinators throughout the year.
2. Observe how revegetating with or without understory plants after clearing tamarisk monocultures influences the resulting plant and pollinator communities.
3. Determine if native riparian willows species are pollinated by wind, animals, or a combination of both.

Activities

(1) Inventory and monitor native plant restoration patches installed in **2014** and in **2020/2021** throughout the growing season to identify vegetation structural and plant phenological stages to determine the availability of pollinator resources.

2014 Restoration 2020/2021 Restoration



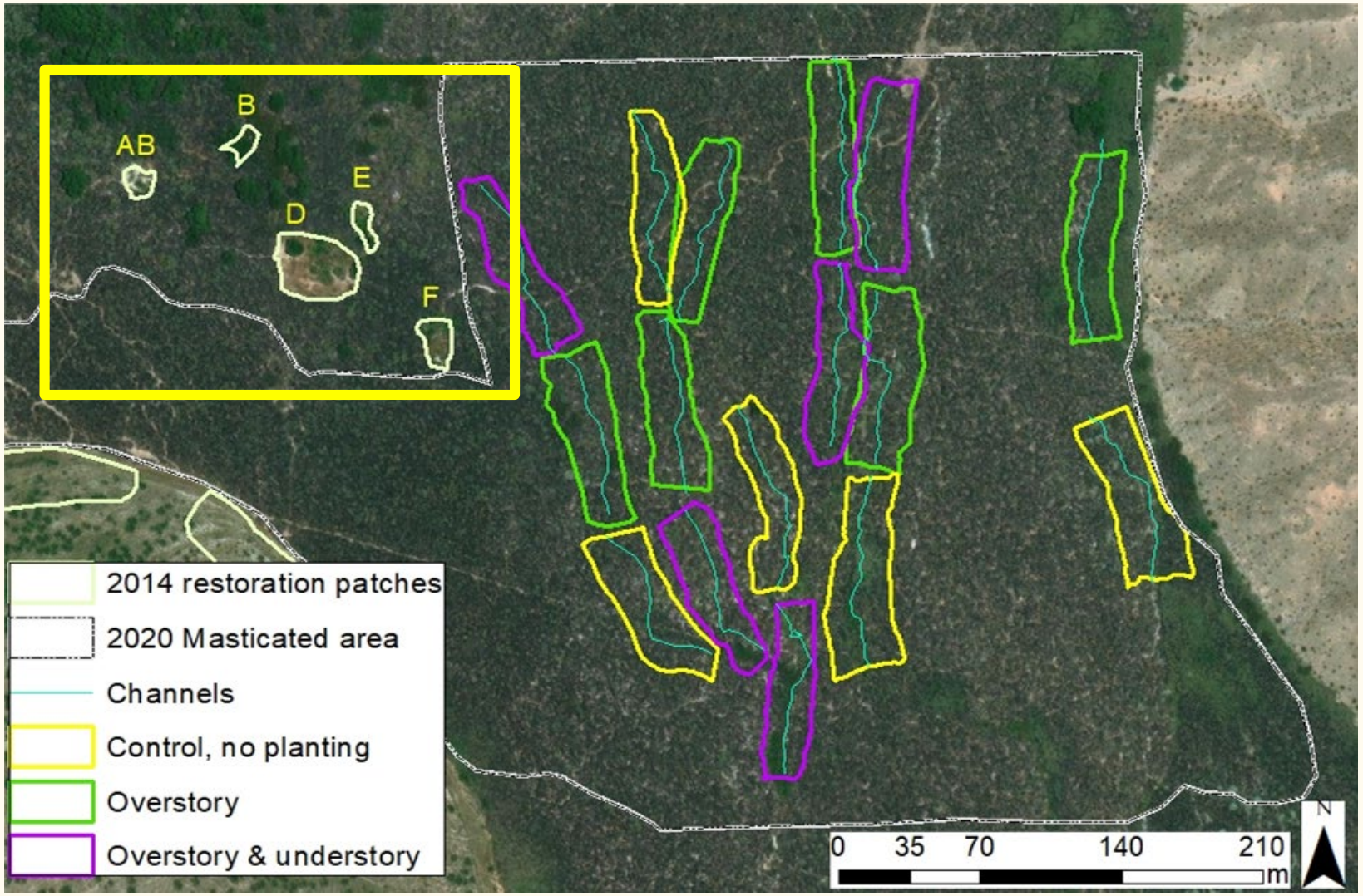
Mormon Mesa subunit
(Riparian Subunit 1)

Activities

(2) Conduct invertebrate utilization surveys (sweep netting; timed observations) throughout the growing season to determine use by pollinators of plants and patches.

(3) Assess soil conditions in the 2020/2021 restoration sites; monitor field soil moisture at multiple depths to assess water access to new outplants.

2014 Restoration 2020/2021 Restoration



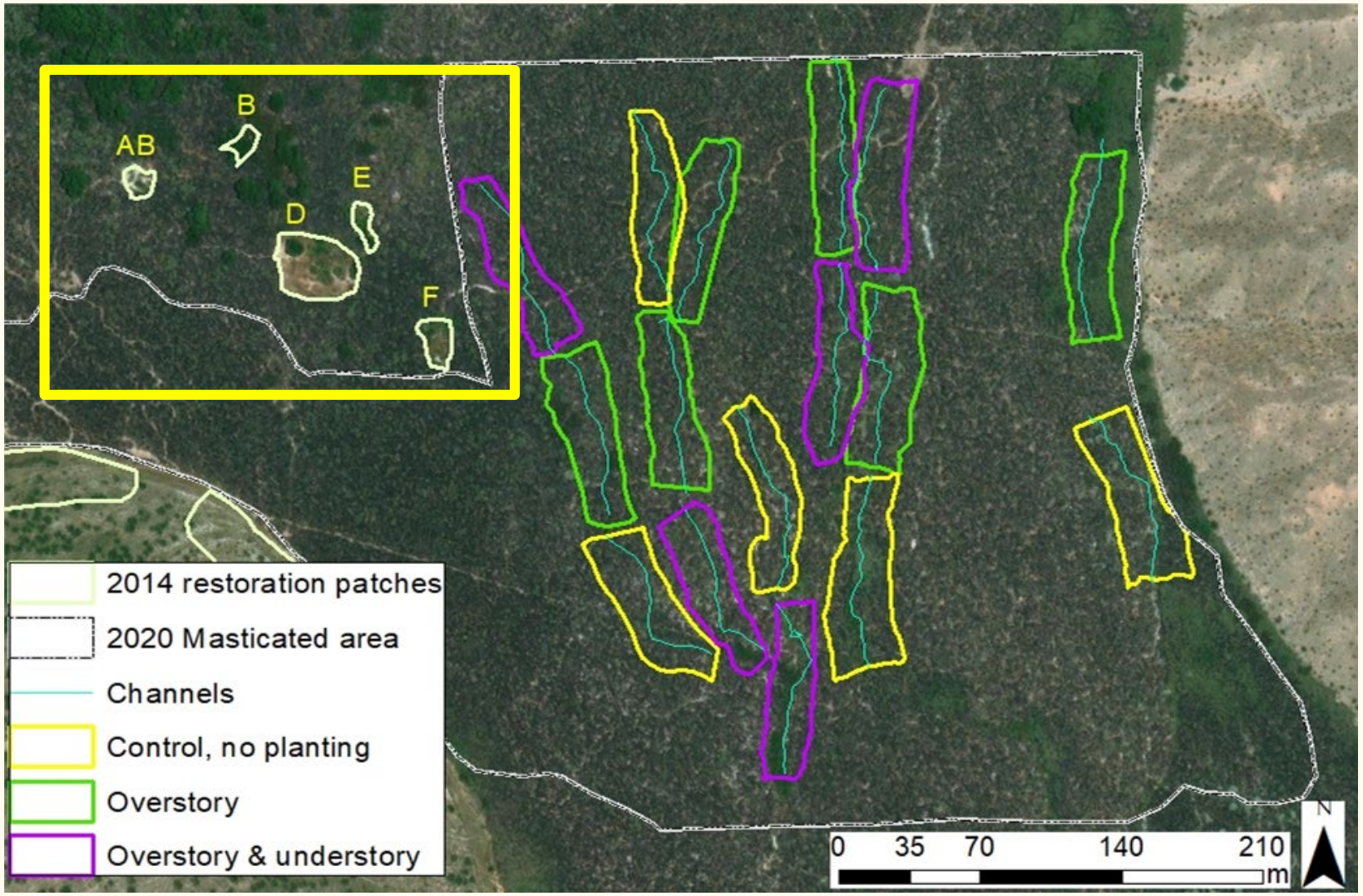
Mormon Mesa subunit
(Riparian Subunit 1)

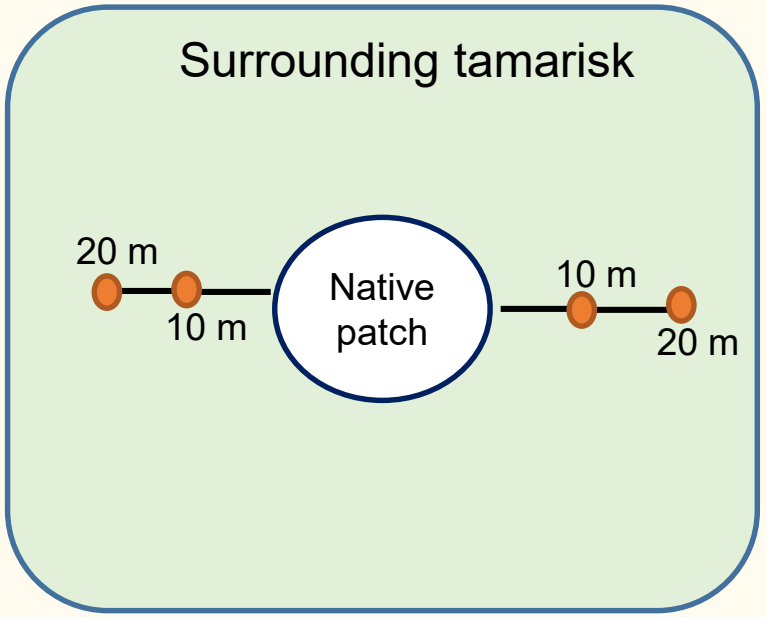
2014 restoration patches

- Variable sized patches cleared 82–1,014 m^2 (886–10,921 ft^2)
- Mix of riparian species, variable species per patch
  - Velvet ash (*Fraxinus velutina*) – Tree
  - Cottonwood (*Populus fremontii*) – Tree
  - Gooddling's Willow (*Salix gooddingii*) – Tree
  - Coyote or sandbar willow (*Salix exigua*) – Shrub to tree
  - Seep willow (*Baccharis salicifolia*) - Shrub
  - Yerba mansa (*Anemopsis californica*) – Rhizomatous and stoloniferous forb
  - Common spike-rush (*Eleocharis palustris*) – Rhizomatous rush, mat-forming
  - Mexican rush (*Juncus balticus* var. *mexicanus*) – Rhizomatous rush, arising singly or several clumps

May 2020 established 0.01-ha circular plots within each patch to measure **vegetation** (cover, woody perennial density & height), **seed banks** (emergence), and **seed rain**.

2014 Restoration 2020/2021 Restoration





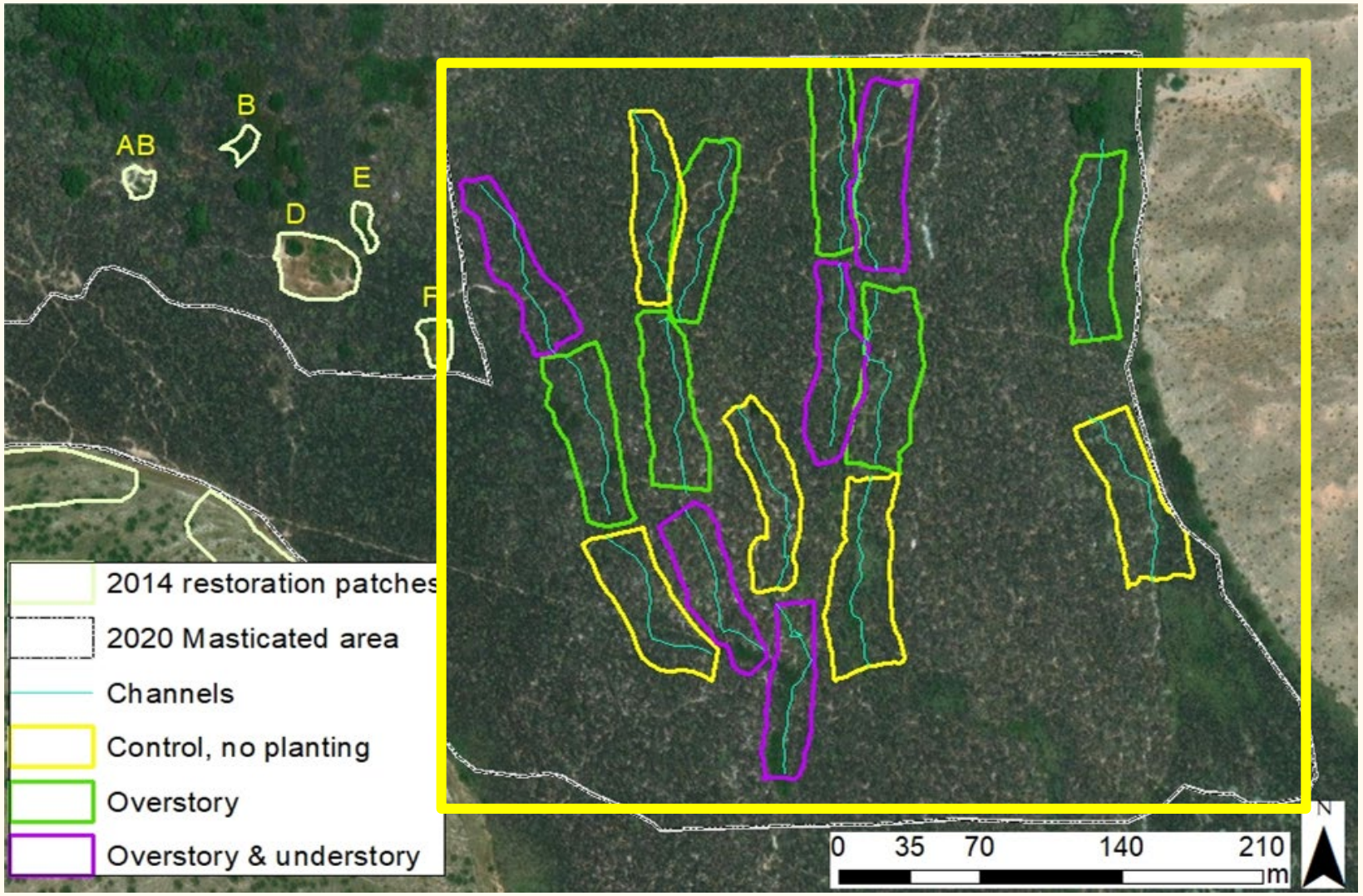
Mormon Mesa subunit (Riparian Subunit 1)

2014 restoration patches

Plots established 10 m and 20 m into tamarisk monocultures for comparison.

2014 Restoration

2020/2021 Restoration



Mormon Mesa subunit
(Riparian Subunit 1)

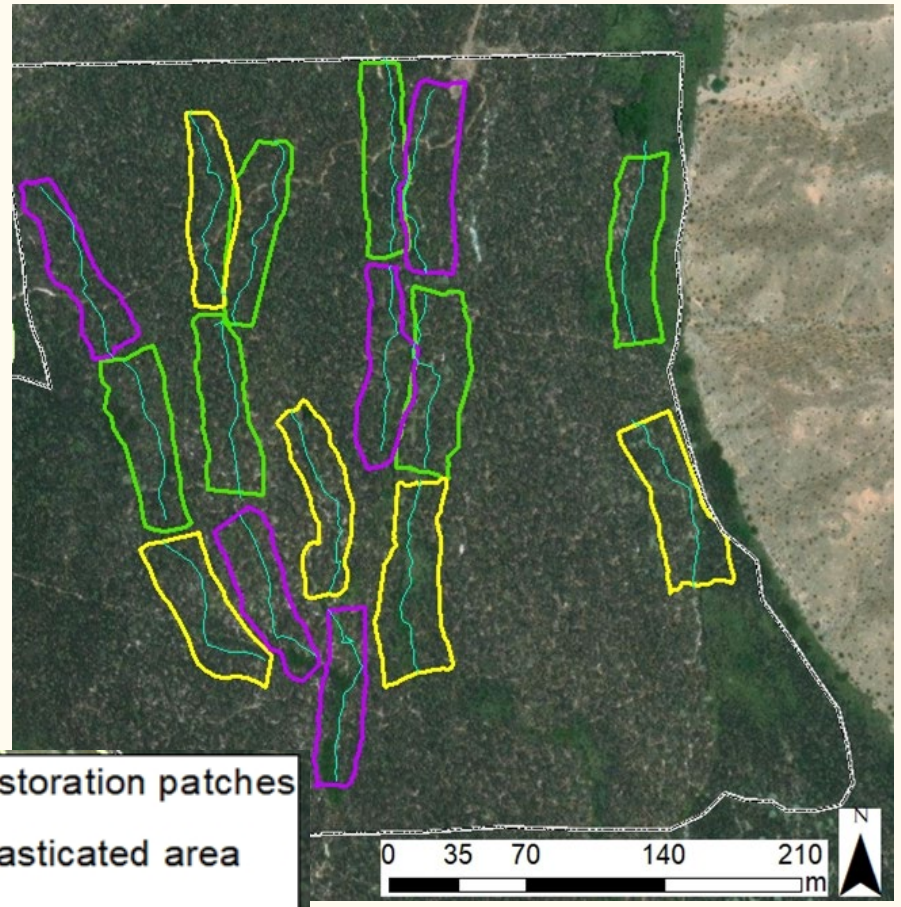
2021 Restoration patches in masticated section of property

Clark Co. DCP

Fall 2020, tamarisk monoculture masticated

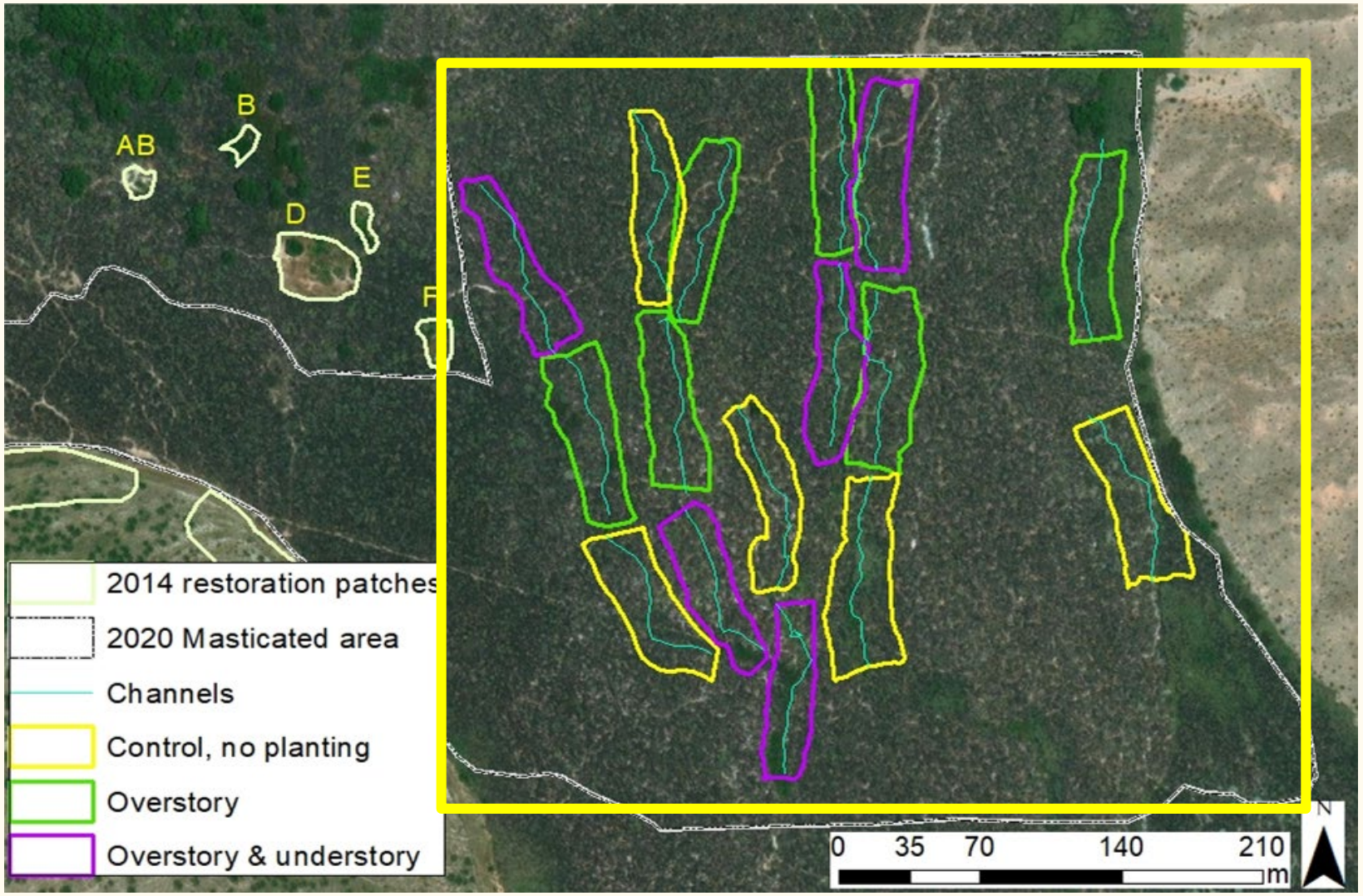
January 2021, 12 experimental treatment sites along 6 channels

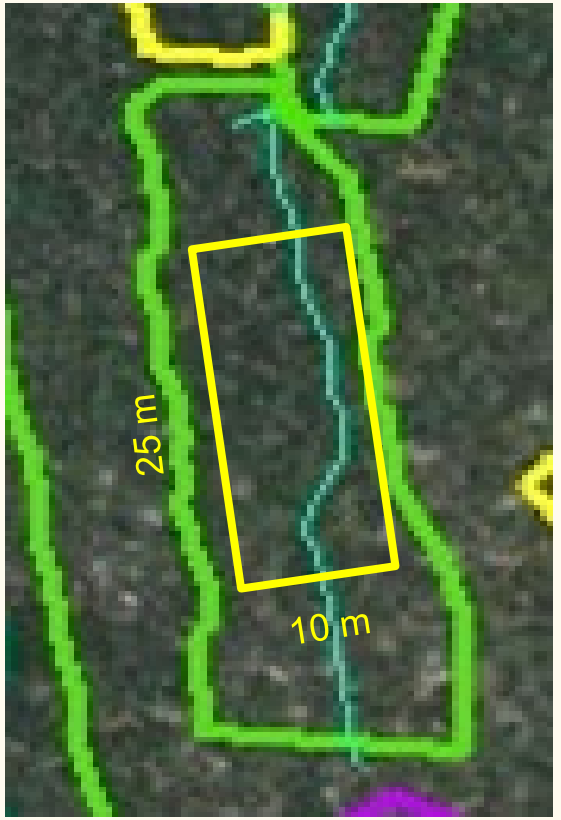
- Cottonwood (potted)
- Goodding's willow (potted, cuttings)
- Velvet ash (potted)
- Coyote willow (potted, cuttings)
- Seep willow (potted)
- Yerba mansa (potted)
- Cooper's rush *(potted)*
- Spike-rush (potted)



2014 Restoration

2020/2021 Restoration





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Accomplishments

- Re-surveyed in the 2014 restoration patch 0.01-ha monitoring plots (April 2022)
- Installed and measured new 10 m × 25 m plots in the 2021 restoration patches (May 2022)
- Conducted soil sampling in the 2021 restoration patches to assess pH and electric conductivity and to monitor field soil moisture conditions at three depths, 0–5 cm, 10–15 cm, and 35–40 cm during the growing season (May, July 2022)
- Conducted sweep netting among the 2014 and 2021 restoration patches (May, July 2022)
- Monitored flowering of willows in both sets of restoration patches (April, May, June, July 2022)

2020

2022

Very few willows flowering and with few flowers

Results – 2014 restoration patches

- Spring 2020 vegetation surveys/seedbank and seed rain assessments:
  - plants filled in cleared areas (mostly natives)
  - native species contributed to propagule banks
- Tamarisk was a barrier to native propagules

Results – 2014 restoration patches

Spring 2022 surveys:

- Drought
- Herbivory

Reduced native plant cover compared to previous survey.

- Fewer species flowering
- Herbaceous species browsed and trampled.

Results - 2021 restoration plots

- Low plant survival
- Few native re-sprouts
- Colonization by some non-native species

Results - 2021 restoration plots

But some *pros* so far:

- Some colonization by native plants
  - e.g., Arrow weed (*Pluchea sericea*)
- Little tamarisk re-sprouting
- Invertebrate utilization, although limited (patch differences not detected)

Ongoing/future activities

Ongoing activities:

- Monitoring phenology
- Conducting patch-wide invertebrate sweeps
- Conducting invertebrate utilization of flowering plants
- Identifying invertebrate species

Future planned activities

- Re-survey the 2014 and 2021 restoration patches in late September 2022
- Conduct pollinator utilization surveys in late September 2022
- Obtain a third set of soil moisture samples at late September 2022
- Continue to monitor phenology of willows

Abella Conservation Ecology Lab

Restoration ecology and applied conservation science research

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Thank you Clark Co. DCP for the opportunity to provide research experience to our UNLV undergrads and early careers!

The Conservation Ecology Laboratory at the University of Nevada Las Vegas conducts **restoration ecology** and **applied conservation science** research informing conservation and management, often in direct collaboration with resource managers and other scientists. Our goals including developing and implementing research to understand the factors that affect the recovery of ecosystems after human-caused disturbances. We design and test restoration techniques that range in cost, resource use, and effort to inform conservation and land management.