Biological Restoration of Fallowed Lands in Borrego Valley, California

Task 3: Dust Control Treatment Study Design

Task 4: Draft Retired Farmland Rehabilitation Strategies

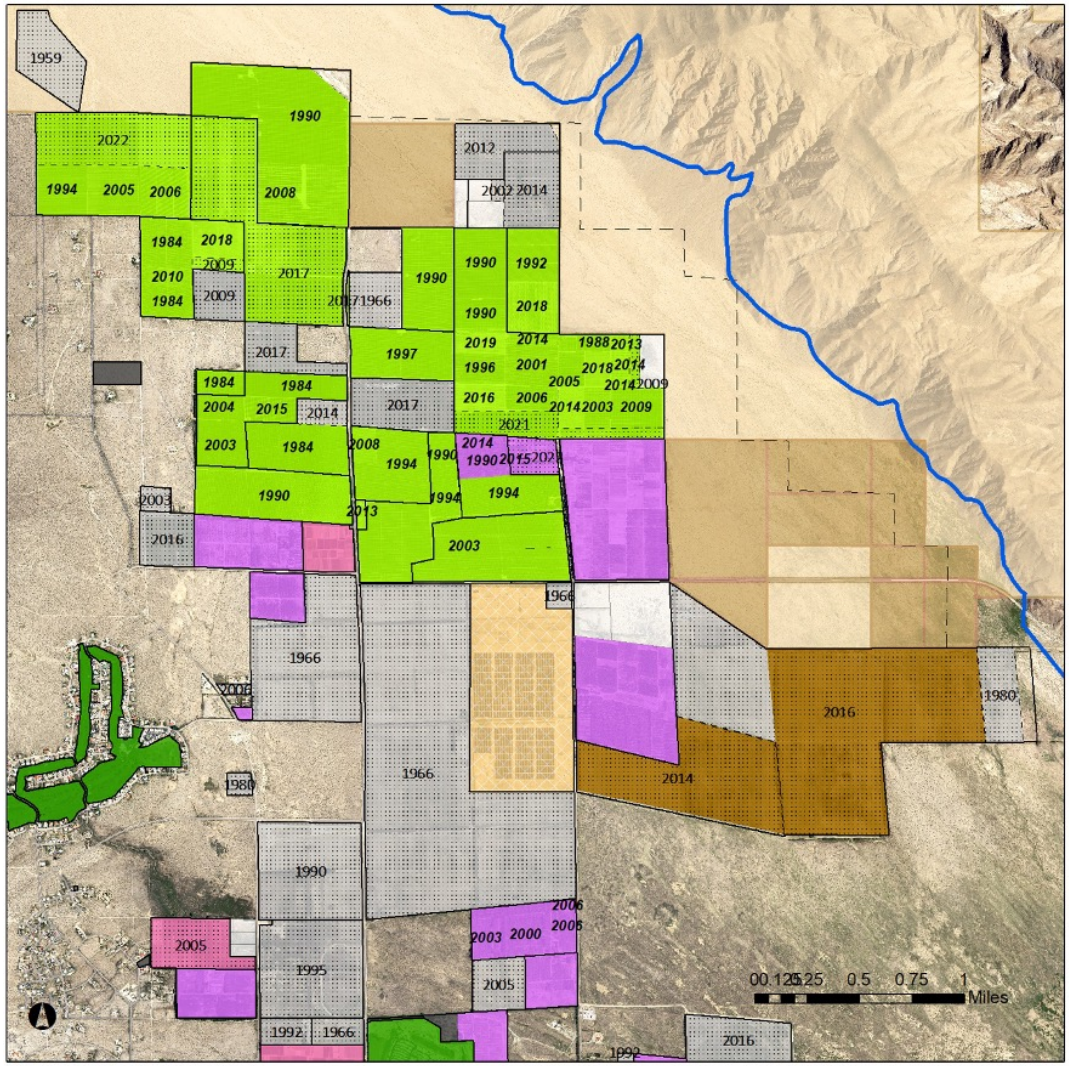
Field Trip to BWD Property

Presentation to the Borrego Springs Watermaster

Environmental Working Group

Presented by Travis Brooks, November 20, 2024

LAND IQ



Crop Type (2021)	Acres
Citrus	1,622
Dates	76
Flowers, Nursery and Christmas Trees	571
Young Perennials[1]	27

Biological Restoration of Fallowed Lands Project

Borrego Springs Groundwater Subbasin

- Borrego Springs Groundwater Subbasin

Land Use with BPA

- Citrus
- Palms
- Nursery, Herbs
- Golf Course Resort
- Other Water Use

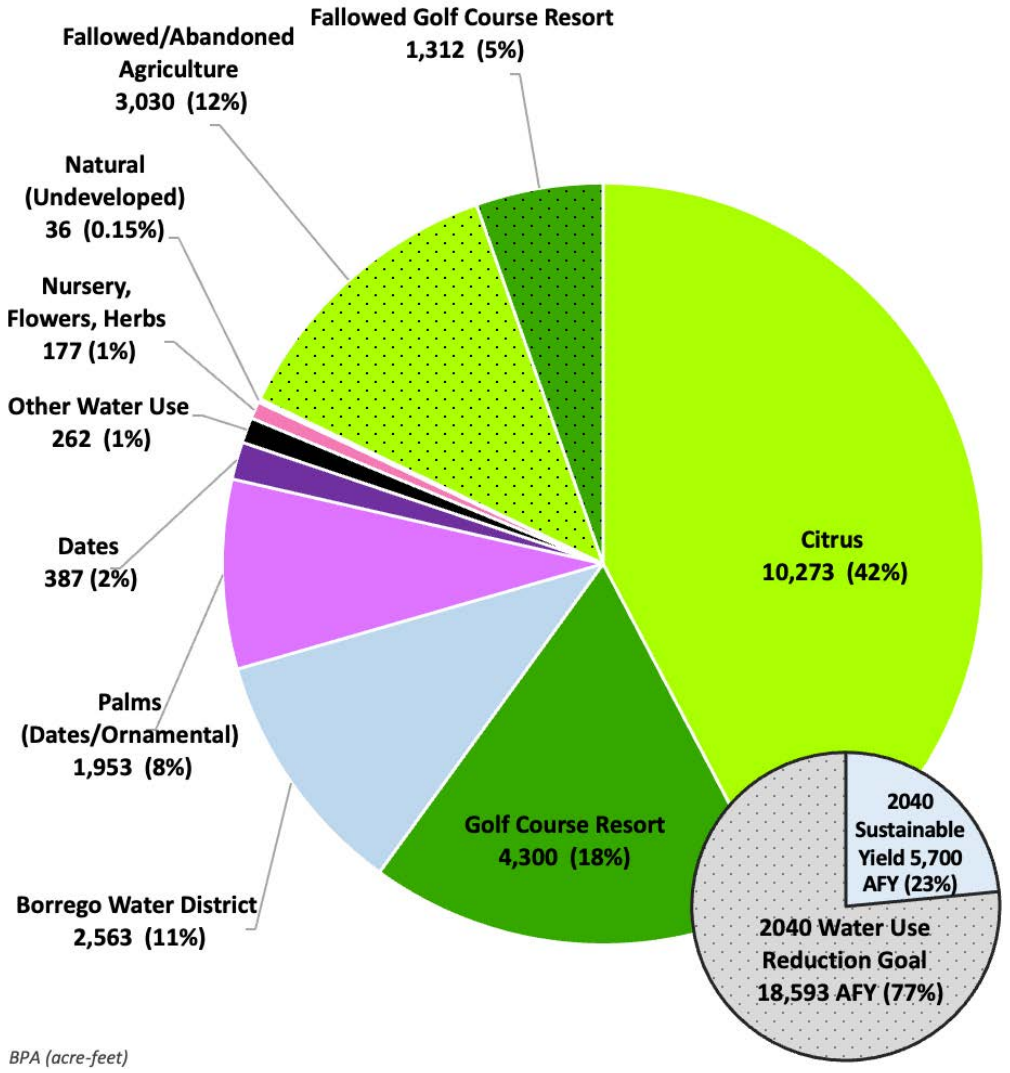
Fallowed and Abandoned Land with BPA (Year of Fallowing Labeled)

- Fallowed/Abandoned Citrus
- Fallowed/Abandoned Palms
- Fallowed/Abandoned Nursery, Herbs
- Fallowed/Abandoned Crops
- Fallowed/Abandoned Potato
- Fallowed Golf Course

Land Use without BPA

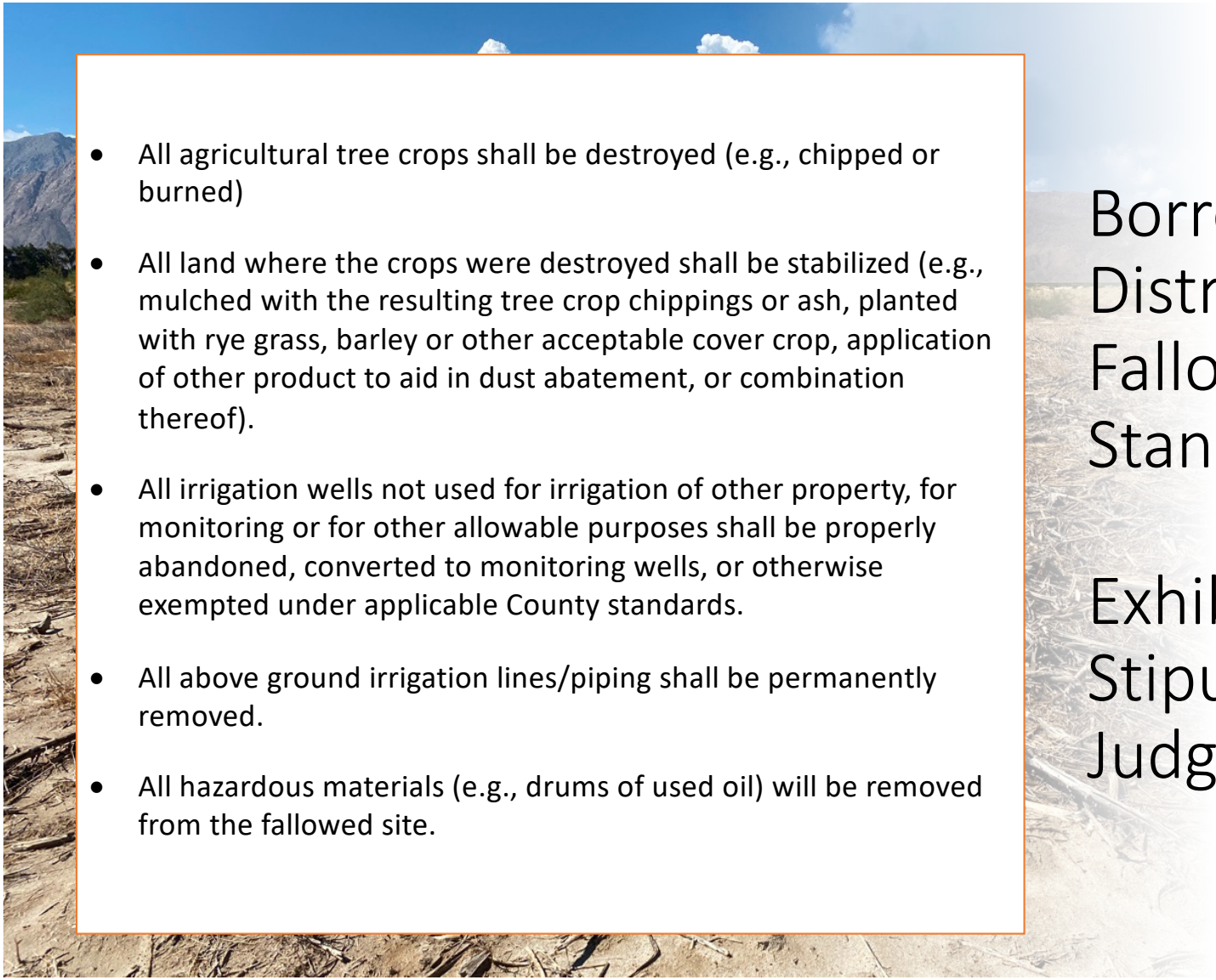
- Disturbed or Cleared (Not Cultivated)
- Fallowed
- Solar Energy Project
- Borrego Water District
- Anza-Borrego State Park
- Anza-Borrego Foundation Property

2022 Land Use for Parcels with BPA Water Rights



Borrego Water District Minimum Fallowing Standards

Exhibit 3 of Stipulated Judgement



- All agricultural tree crops shall be destroyed (e.g., chipped or burned)
- All land where the crops were destroyed shall be stabilized (e.g., mulched with the resulting tree crop chippings or ash, planted with rye grass, barley or other acceptable cover crop, application of other product to aid in dust abatement, or combination thereof).
- All irrigation wells not used for irrigation of other property, for monitoring or for other allowable purposes shall be properly abandoned, converted to monitoring wells, or otherwise exempted under applicable County standards.
- All above ground irrigation lines/piping shall be permanently removed.
- All hazardous materials (e.g., drums of used oil) will be removed from the fallowed site.

Borrego Water District Minimum Fallowing Standards

Exhibit 3 of Stipulated Judgement


Anza-Borrego State Park
W. Bauer Citrus Farm (BWD)
Block 1
Block 2
Di Giorgio Rd
ABF Proprty
T2 Borrego Site
Block 3
Bauer Family Citrus Farm (BWD)
Block 4
0
125
250
500
750
1,000
Feet
Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community


Anza-Borrego State Park
W. Bauer Citrus Farm (BWD)
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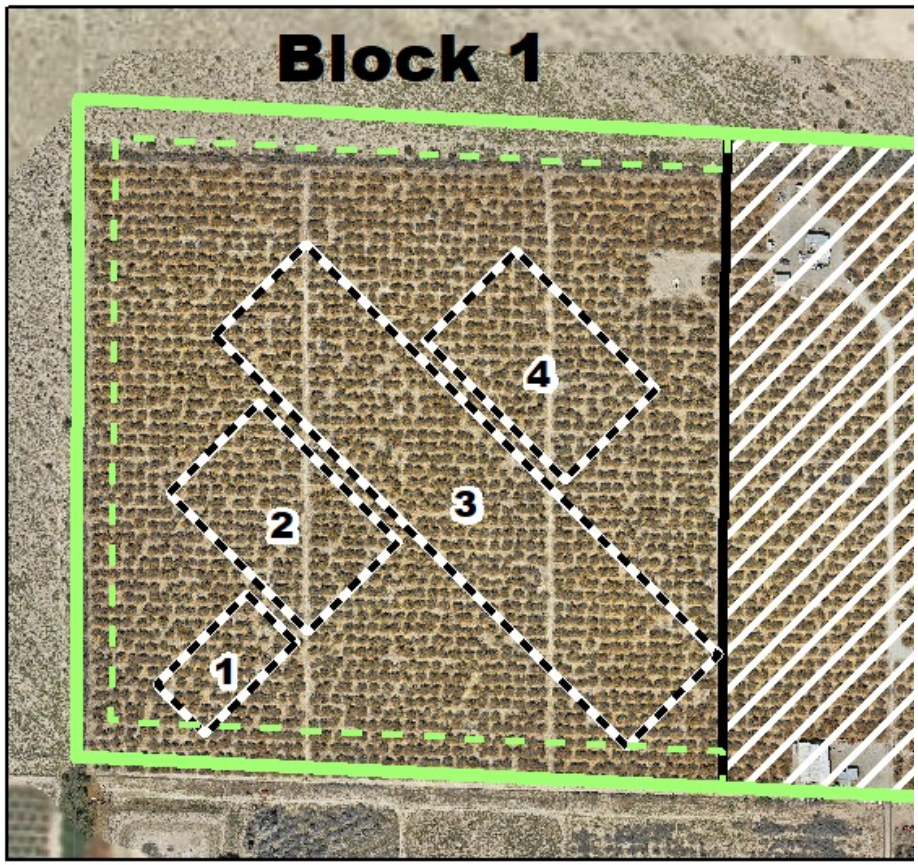
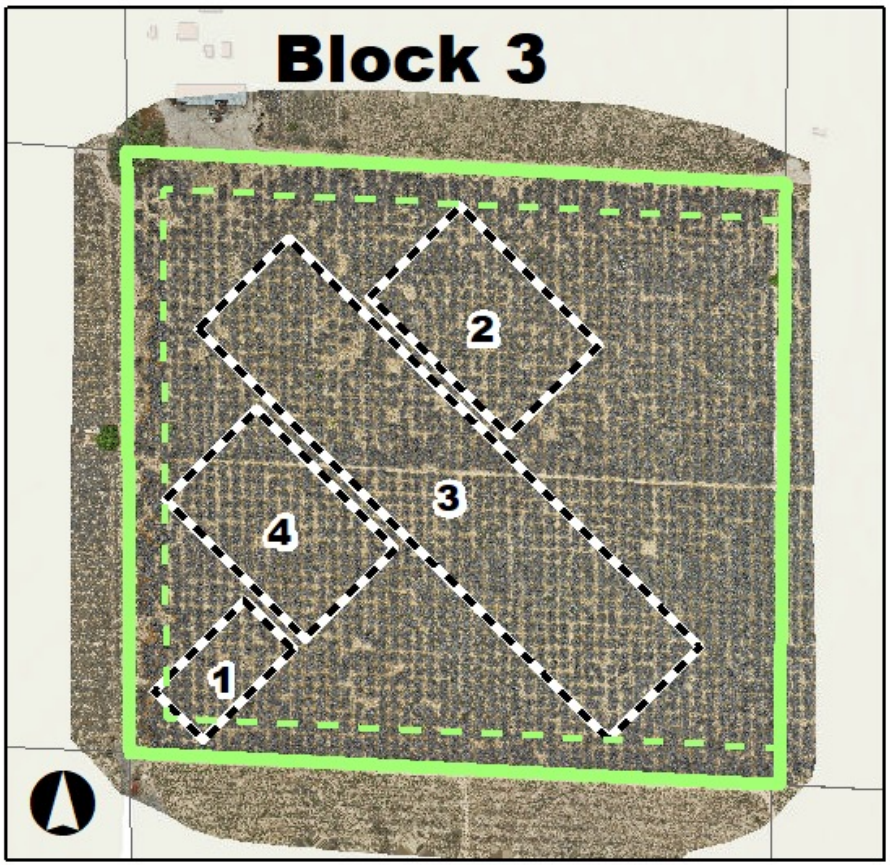
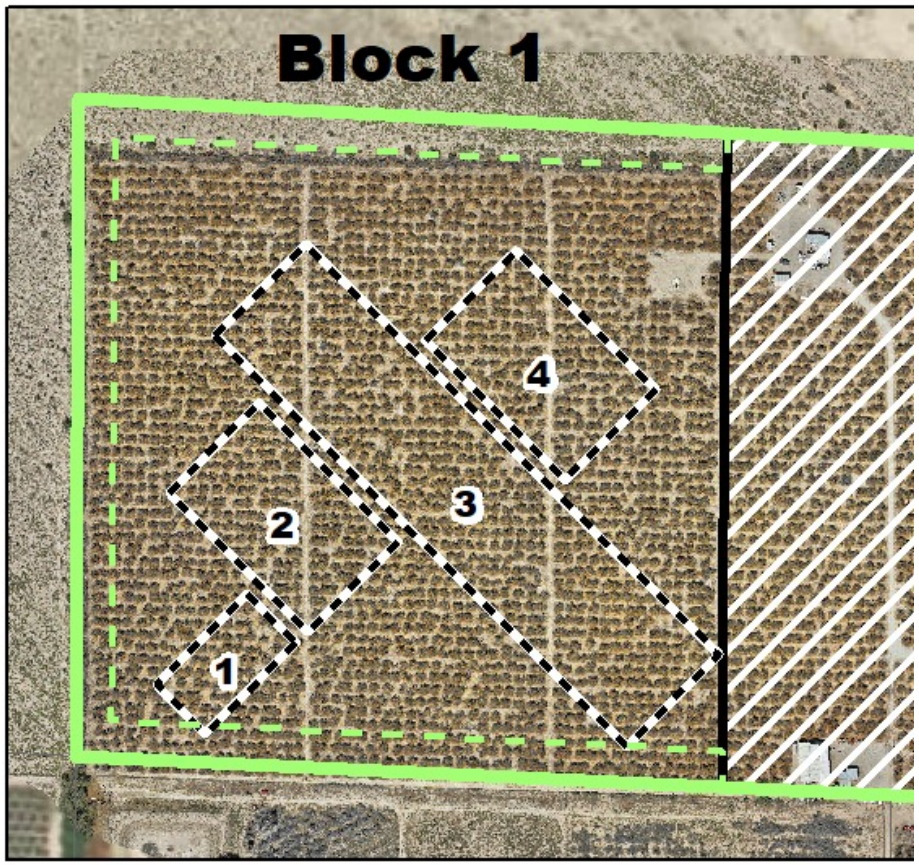

Block 1
4
2
3
1

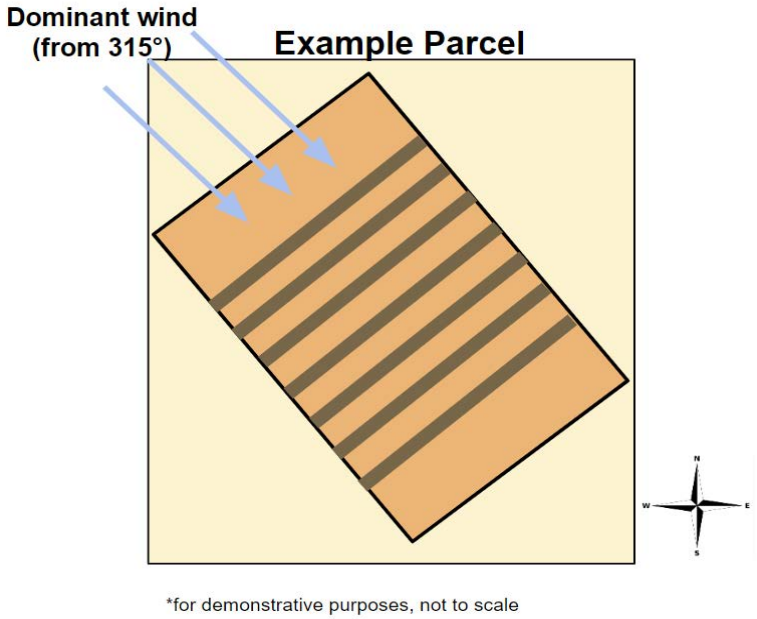

Block 3
2
4
3
1



- **Treatment 1** – Rows of mulch (chipped orchard trees) rows that represent the Judgment minimum fallowing standard practice
- **Treatment 2** - Felled orchard trees scattered throughout the site to emulate desert shrubs
- **Treatment 3** - Constructed tree fences using felled orchard trees
- **Treatment 4** - Temporary sand fences

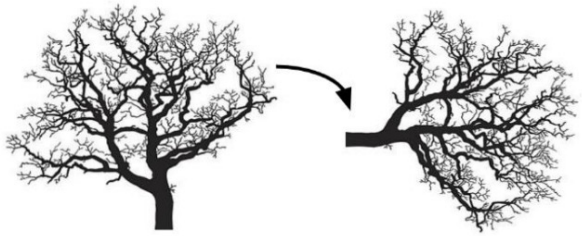
Photo Credit: Borrego Sun

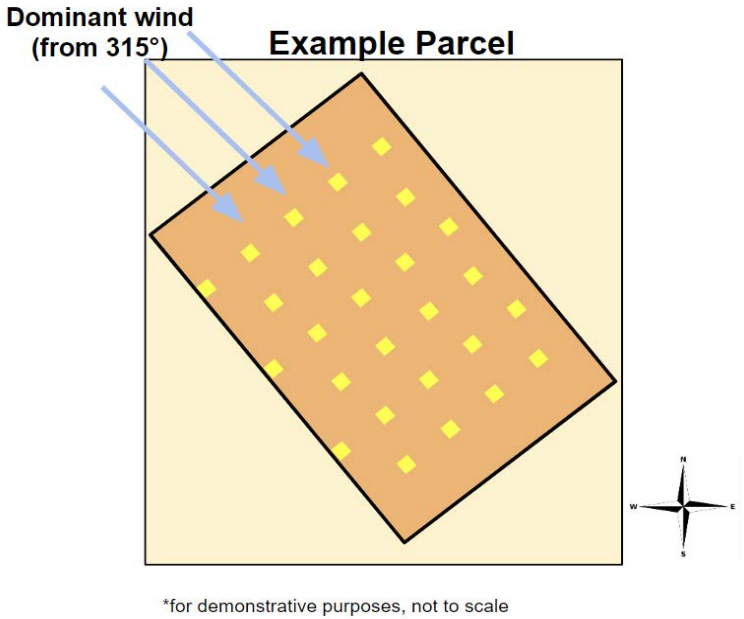
Mulch Strips



*for demonstrative purposes, not to scale

Scattered Trees





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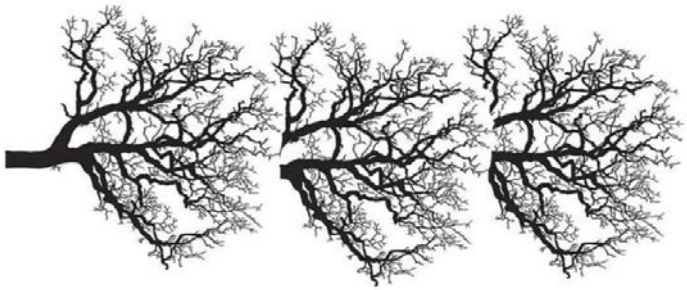
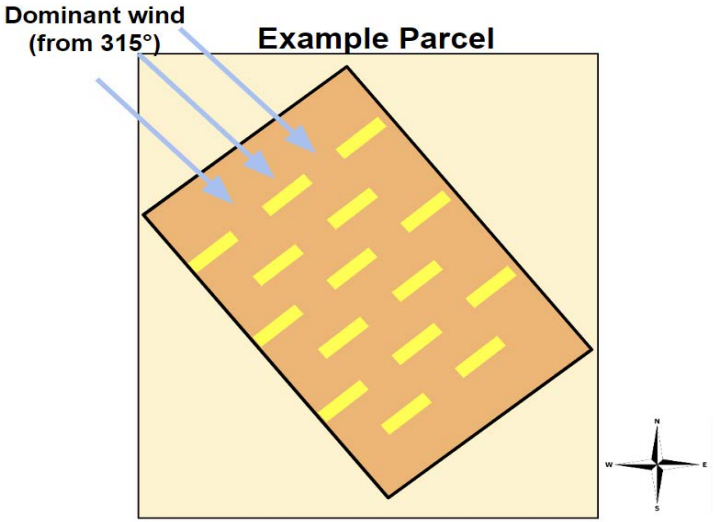
Tree Fence





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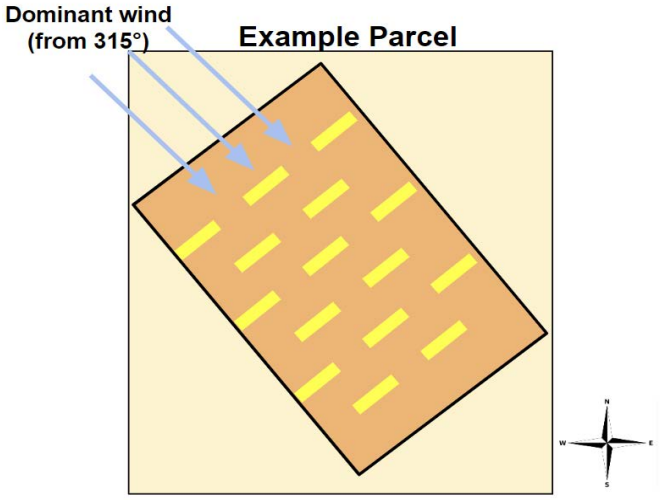
Temporary Sand Fence



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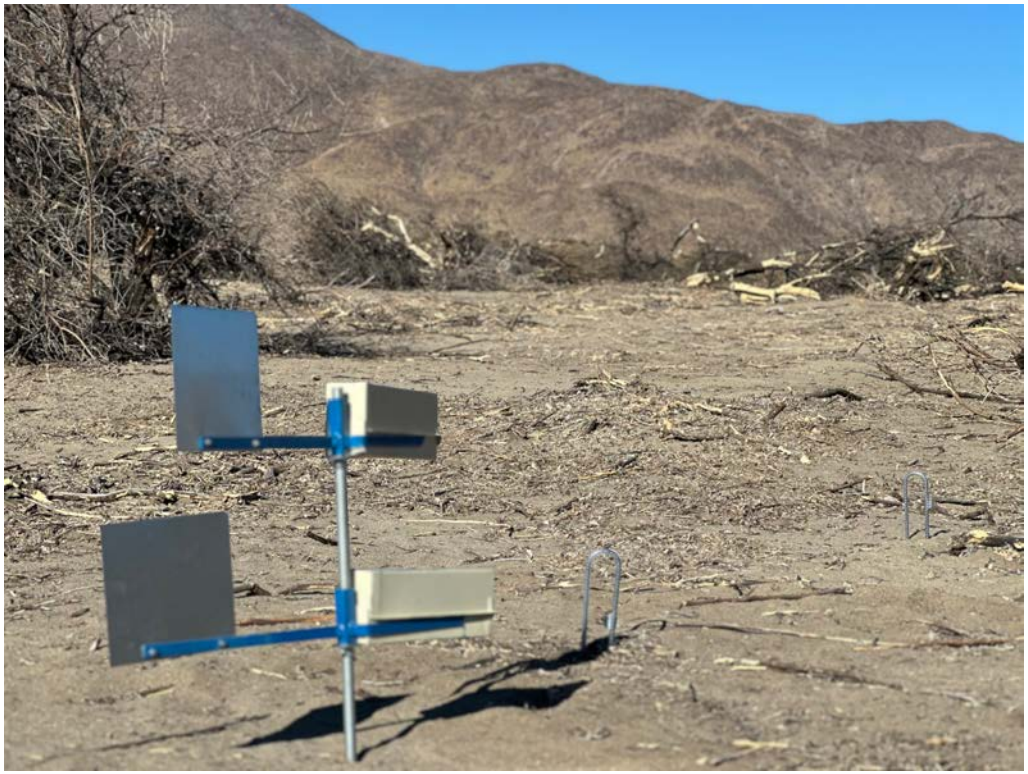
Dust Monitoring Equipment

Erosion Pins

- Distance from top to soil surface measured over time to indicate erosion or deposition

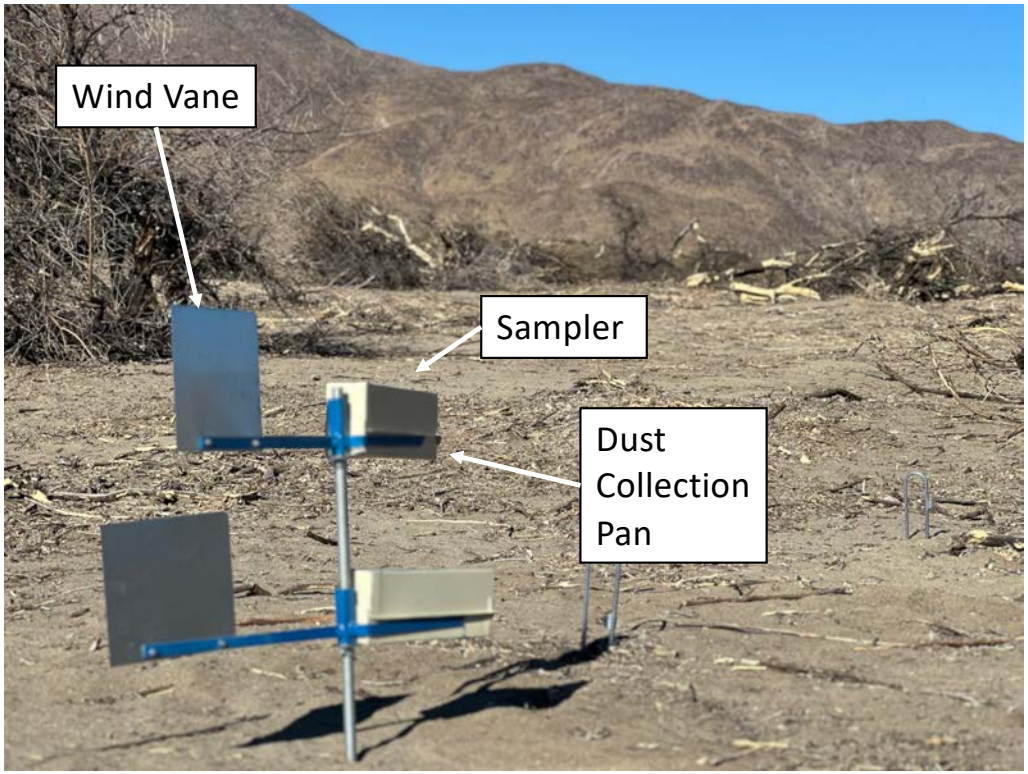
Dust Monitoring Equipment



Big Spring Number Eight (BSNE) Dust Collector

- Swivel 360°
- Collection at 2 Heights (20 cm; 50 cm)

Dust Monitoring Equipment



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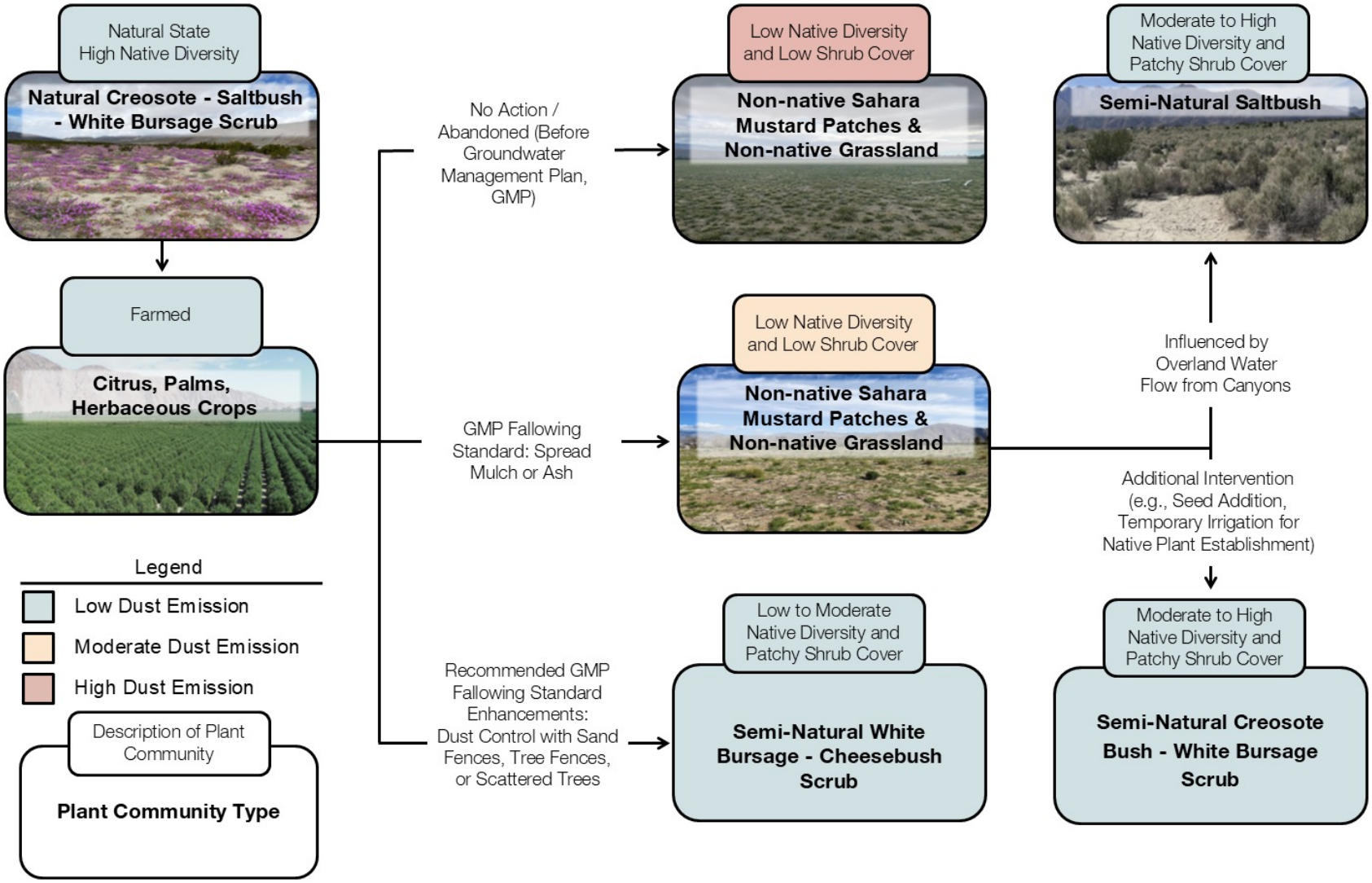
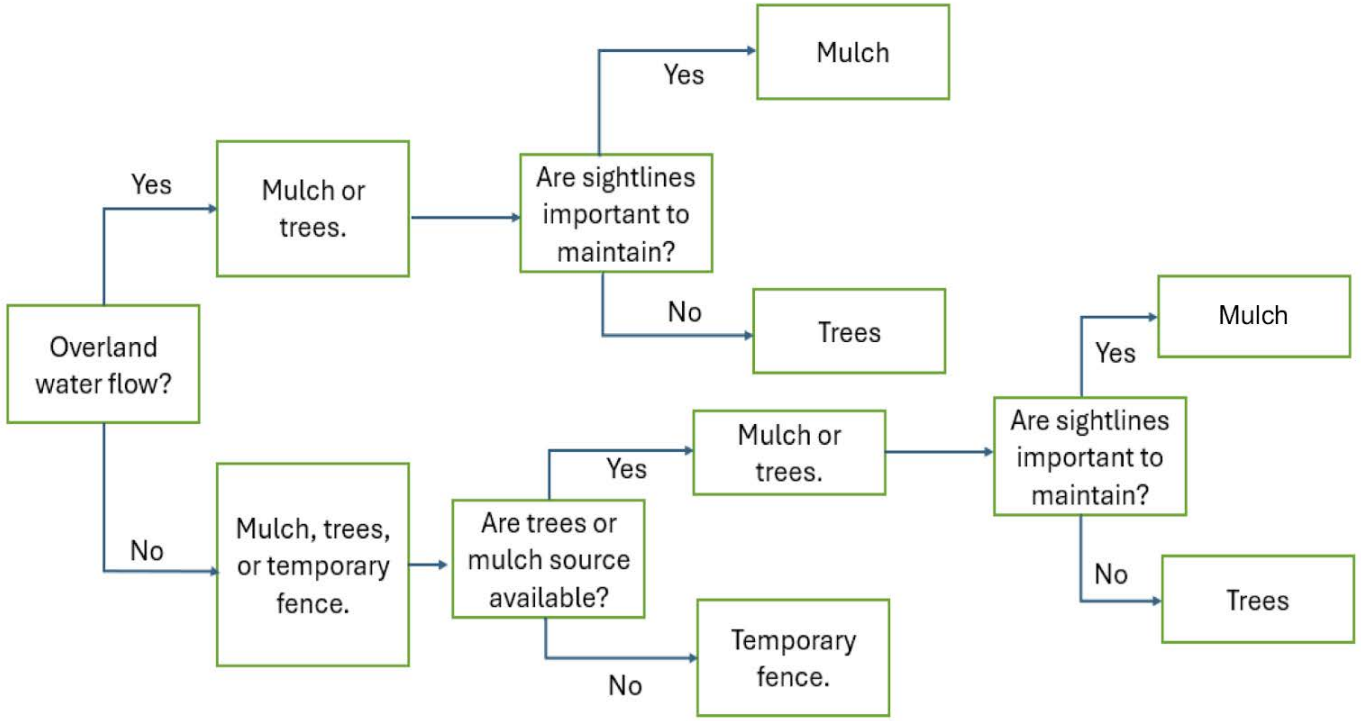

Natural State
High Native Diversity
Natural Creosote - Saltbush - White Bursage Scrub
Farmed
Citrus, Palms, Herbaceous Crops
No Action / Abandoned (Before Groundwater Management Plan, GMP)
Low Native Diversity and Low Shrub Cover
Non-native Sahara Mustard Patches & Non-native Grassland
Moderate to High Native Diversity and Patchy Shrub Cover
Semi-Natural Saltbush
GMP Fallowing Standard: Spread Mulch or Ash
Low Native Diversity and Low Shrub Cover
Non-native Sahara Mustard Patches & Non-native Grassland
Influenced by Overland Water Flow from Canyons
Additional Intervention (e.g., Seed Addition, Temporary Irrigation for Native Plant Establishment)
Recommended GMP Fallowing Standard Enhancements: Dust Control with Sand Fences, Tree Fences, or Scattered Trees
Low to Moderate Native Diversity and Patchy Shrub Cover
Semi-Natural White Bursage - Cheesebush Scrub
Moderate to High Native Diversity and Patchy Shrub Cover
Semi-Natural Creosote Bush - White Bursage Scrub
Legend
Low Dust Emission
Moderate Dust Emission
High Dust Emission
Description of Plant Community
Plant Community Type

Fallowing Strategy Selection Criteria for Site Suitability



Site Suitability Decision Tree - Optimizes Dust Control Effectiveness and Biological Benefits

Strategy	Dust control effectiveness	Time & Effort to Install/Implement	Cost	Visibility and Permanence	Biological Benefits
Mulch – current fallowing standard	Lower - Indicated by Task 3 results	Moderate– requires specialized equipment and highest time commitment to grind individual trees and spread mulch to specifications.	Moderate - cost of equipment, labor and fuel to chip and spread mulch.	Lower - least visible and takes the least time to break down.	Lower – comparatively, mulch does not provide as much habitat/wildlife shelter and potential for microsite development to recruit plants as sand fences.
Tree sand fence	Higher - Indicated by Task 3 results	Higher – requires specialized equipment to cut and move trees to specifications.	Lower – cost of equipment, labor and fuel to cut and move trees.	Higher - most visible and takes the most time to break down.	Higher – provides the most habitat/wildlife shelter and potential for microsite development to recruit plants as sand fences, given certain specifications for tree density and porosity.
Scattered tree sand fence	Higher - Indicated by Task 3 results	Higher - requires specialized equipment to cut and move trees to specifications.	Lower – cost of equipment, labor and fuel to cut and move trees.	Higher - most visible and takes the most time to break down.	Higher - provides the most habitat/wildlife shelter and potential for microsite development to recruit plants as sand fences, given certain specifications for tree density, and porosity. May provide higher benefit than tree sand fence.
Temporary sand fence (on fallowed orchard)	Higher - Indicated by Task 3 results	Moderate – requires specialized equipment to cut and move trees for chipping, followed by installation of sand fence.	Higher - cost of equipment, labor and fuel cut, move and chip trees, then cost of materials and installation of sand fence..	Moderate - visible (taller than mulch but shorter than trees) and can be removed after 5 to 15 years.	Moderate - provides moderate habitat/wildlife shelter and potential for microsite development to recruit plants as sand fences.
Temporary sand fence (on non-orchard field; no trees available)	Higher - Indicated by Task 3 results	Lower – does not require specialized equipment to install.	Moderate – cost of materials and labor to install sand fence.	Moderate - visible (taller than mulch but shorter than trees) and can be removed after 5 to 15 years.	Moderate - provides moderate habitat/wildlife shelter and potential for microsite development to recruit plants as sand fences.


DEERE

Method	Fell Trees with Chainsaw and Stump Grinder	Chip Trees with Tub Grinder	Chip Trees In-Place with Drum Mulcher	Move Trees with Tractor	Temporary Sand Fence Materials and Installation	Subsidized Cost to Chip Trees & Transport to Desert View CoGen Plant	Average Total Cost by Acre
Chip in place (leaves rootball) with a drum mulcher attachment on tractor	NA	NA	$2,000	NA	NA	NA	**$2,000**
Cut trees at base (leaves rootball) with heavy equipment, transport for chipping to tub grinder onsite and spread mulch	$500	$2,000	NA	NA	NA	NA	**$2,500**
Chip in place and sell half of trees to CoGen	$500	NA	$2,000	NA	NA	$700	**$1,600**
Cut and mulch trees but sell half to to CoGen	$500	$2,000	NA	NA	NA	$700	**$1,850**
Scattered Trees (approximately one quarter of trees used; three quarters sold to CoGen)	$500	NA	NA	$1,000	NA	$700	**$1,275**
Tree fences (approximately one third of trees used; two thirds sold to CoGen)	$500	NA	NA	$1,000	NA	$700	**$1,300**
Tree fence using all trees, when feasible	$500	NA	NA	$1,000	NA	NA	**$1,500**
Remove trees and install temporary sand fence	$500	NA	NA	NA	$3,000	$700	**$4,200**
Temporary sand fence (no tree removal)	NA	NA	NA	NA	$3,000	NA	**$3,000**