DRAFT WORK PRODUCT

Borrego Valley Groundwater Basin
Borrego Springs Subbasin

Projects and Management Actions
Project #4
Agricultural Land Fallowing Program

March 29, 2018

Geosyntec consultants

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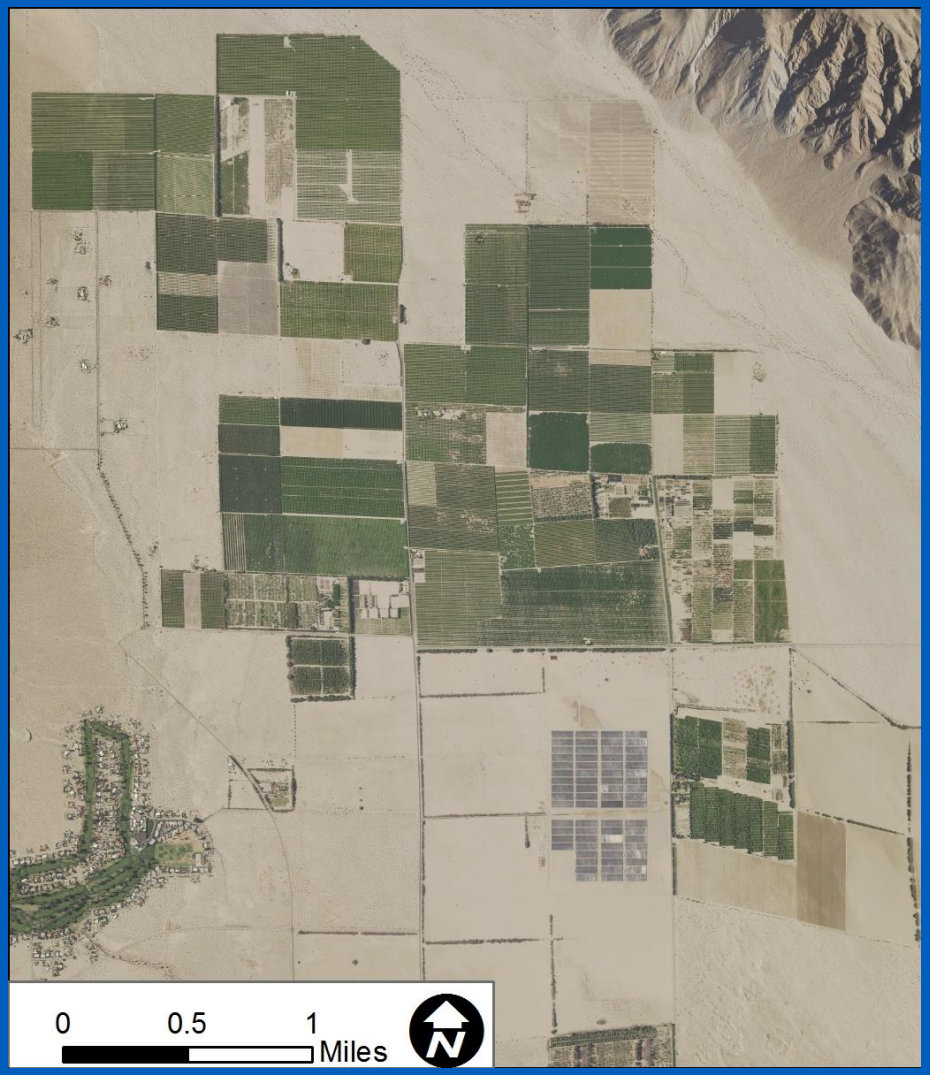
Agricultural Land Fallowing Program



- Fallowing: Conversion of high water use irrigated agricultural to low water use, open space/public lands or development
- Currently there is approximately 3,373 acres of active agricultural land
- Permanent fallowing of agriculture is required to achieve sustainability

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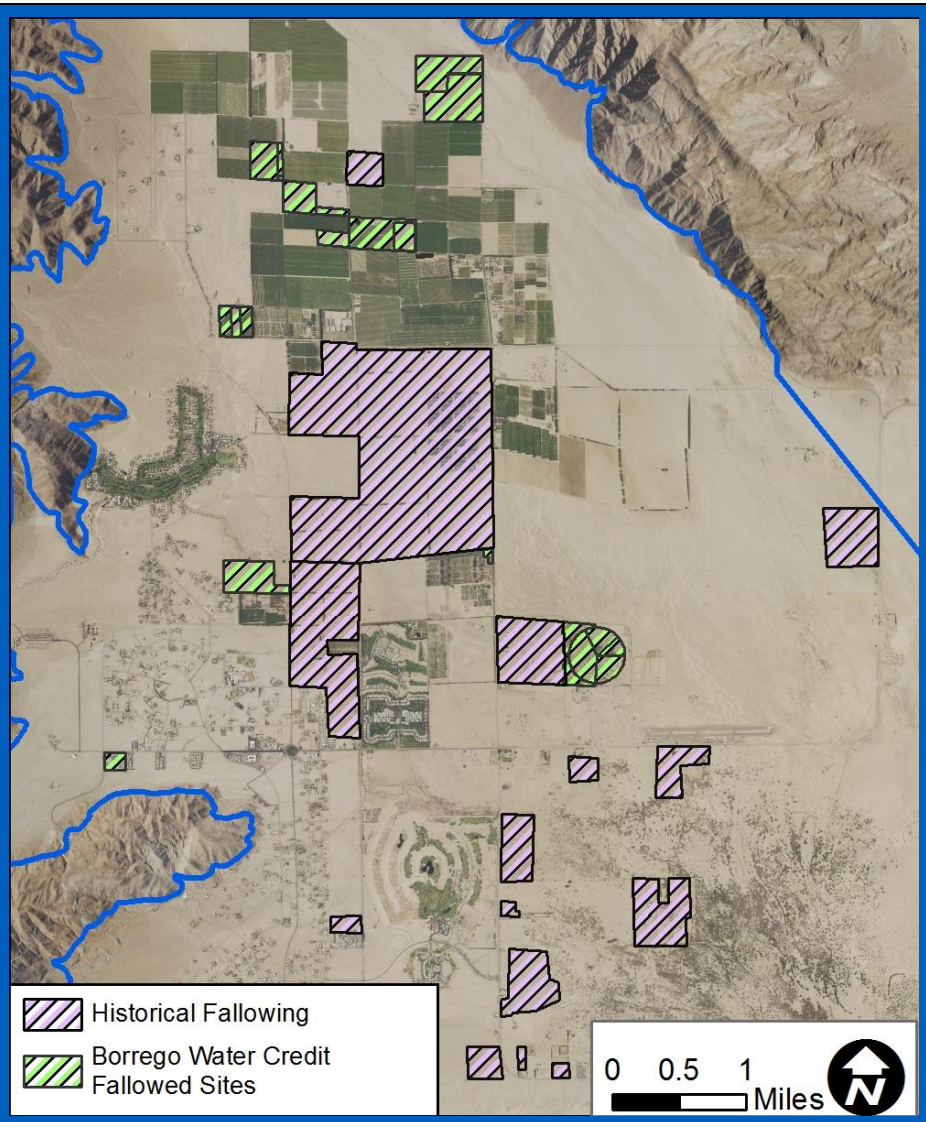
Recent and Historical Fallowing



- Approximately 2,483 acres historically fallowed
- Approximately 560 acres recently fallowed as part of the water credits program
- Currently approximately 3,373 acres of active agriculture
- Fallowing has been occurring for decades

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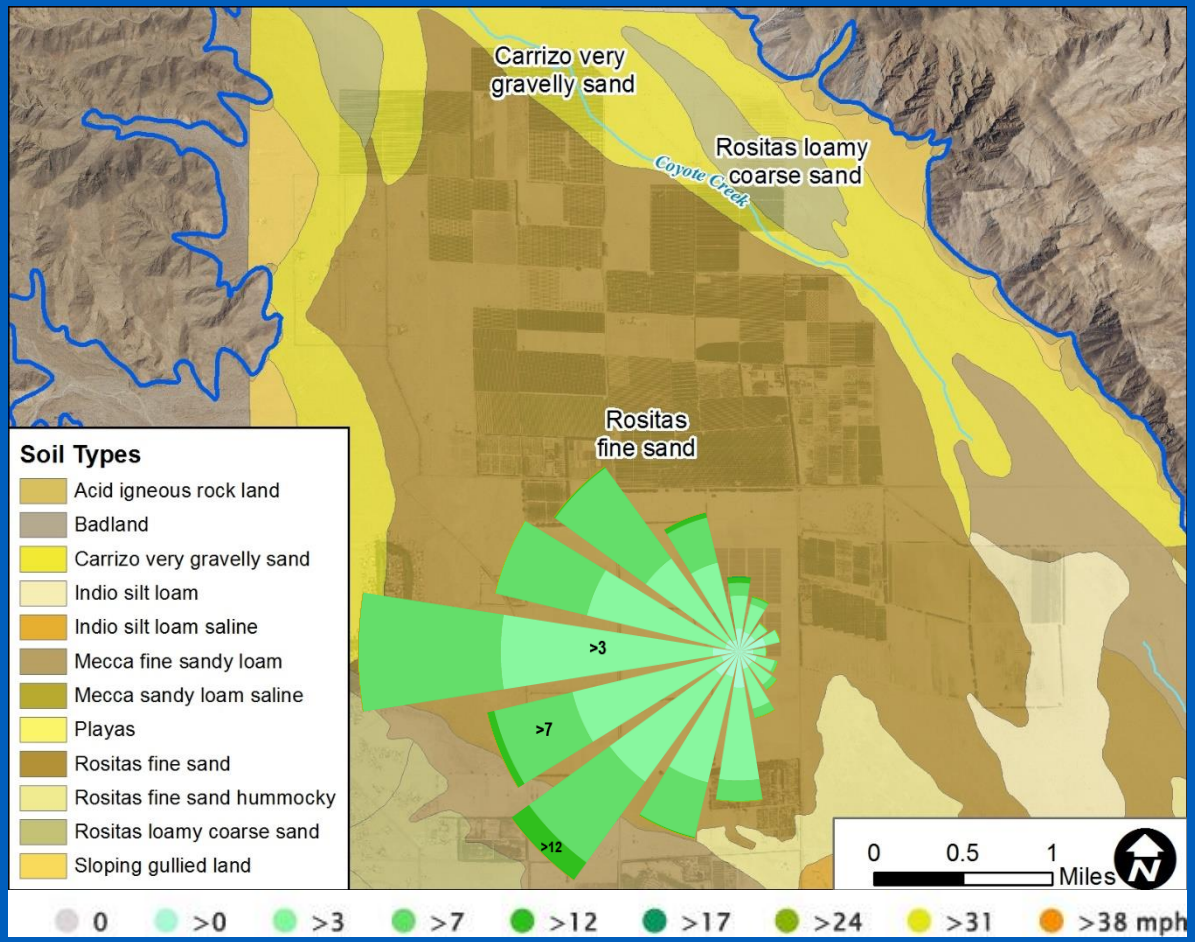
DRAFT WORK PRODUCT; Historical Fallowing based on USGS 1959 land use shapefile (USGS 2015)

Conditions to Determine Fallowing Approach



WORKING DRAFT PRODUCT; Wind rose diagram from meteoblue station located 33.26N 116.38W (To be updated with additional data as part of future fallowing plan)

- **Risk of airborne emissions varies by site condition**
  - **Soil texture**
  - **Landscape position**
  - **Ground cover**
  - **Wind**
  - **Historical use**

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Site Stabilization

- **Site Stabilization: Short-term/temporary approach that stabilizes land surface and avoids blight of dead tree stands.**
  - **Cutting and chipping orchard trees and spreading over the surface**
    - **Cost estimate: $1,000-$10,000 per acre[1]**
  - **Removing trees and applying a bonded fiber matrix to stabilize soils**
    - **Cost estimate: $10,000-$15,000 per acre[1]**

1. Preliminary cost estimates based fallowed land in Borrego Springs and similar projects.

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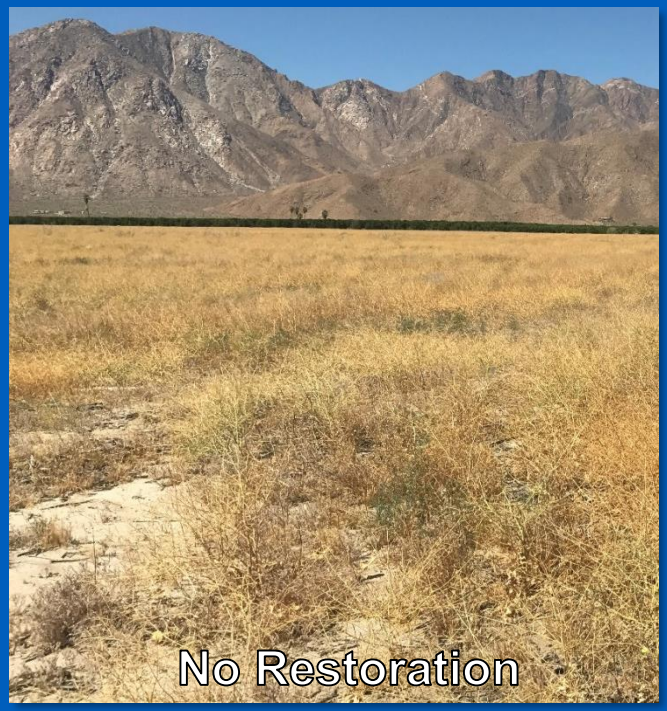
Tree Removal Methods

- **Mulching: Cutting and chipping trees to spread across site for soil stabilization**
  - Cover soil surface and reduces dust emissions
  - Acts as mulch and conserves water
  - Reduces weed growth



1. Mulching best management practice (BMP) will be developed to standardize requirements.

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Desert Restoration Challenges

- **Desert Environment Restoration**
  - Highly unpredictable weather
  - Low precipitation
  - Excessive heat and drought
  - Remote site locations

- **Highly Disturbed Agricultural Lands Restoration**
  - Soil compaction
  - Hydrological modifications
  - Weed infestation
  - Soil quality degradation
  - Potential Pesticide contamination

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Active and Passive Restoration

Active Restoration

- Full and relatively rapid conversion to natural habitat (State parks, open space trails, etc.)
- Includes:
  - Horizontal/vertical mulch
  - Supplemental seeding and/or planting
  - Maintenance and monitoring
  - Remedial actions and goals
- **Cons:** Labor intensive and expensive
- **Pro:** Shorter timeframe (as little as five years)
- Cost estimate: $10,000-$50,000 per acre

Passive Restoration

- Gradual conversion to natural habitat
- Includes:
  - Tree removal
  - Site contouring
  - Soil decompaction
  - Native seed collection and application
- **Con:** Longer timeframe (many years to decades) in a desert environment
- **Pro:** Less labor intensive and expensive than active restoration
- Cost estimate: $5,000-$25,000 per acre.

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Additional Fallowing Considerations

- Preliminary Environmental Site Assessment
- Pesticide Sampling of Soils (screening level)
- Groundwater quality sampling of wells (nitrate)
- Removal of infrastructure and equipment
- Removal of Well Equipment
- Proper Abandonment of Wells

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Recommendation

- **Approach to fallowing will be site specific and will consider the following:**
  - **Future land use (low water use Ag, open space, public land, development, etc.)**
  - **Probability of restoration success**
  - **Proximity to natural open space**
  - **Potential environmental conditions (e.g. airborne emissions)**

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