

A wide-angle photograph of the Keeler Dunes in California. The foreground shows a sandy area with some rocks and a small shadow. A large, smooth sand dune rises in the middle ground, casting a long shadow to the left. The background features a range of brown, rocky mountains under a clear blue sky.

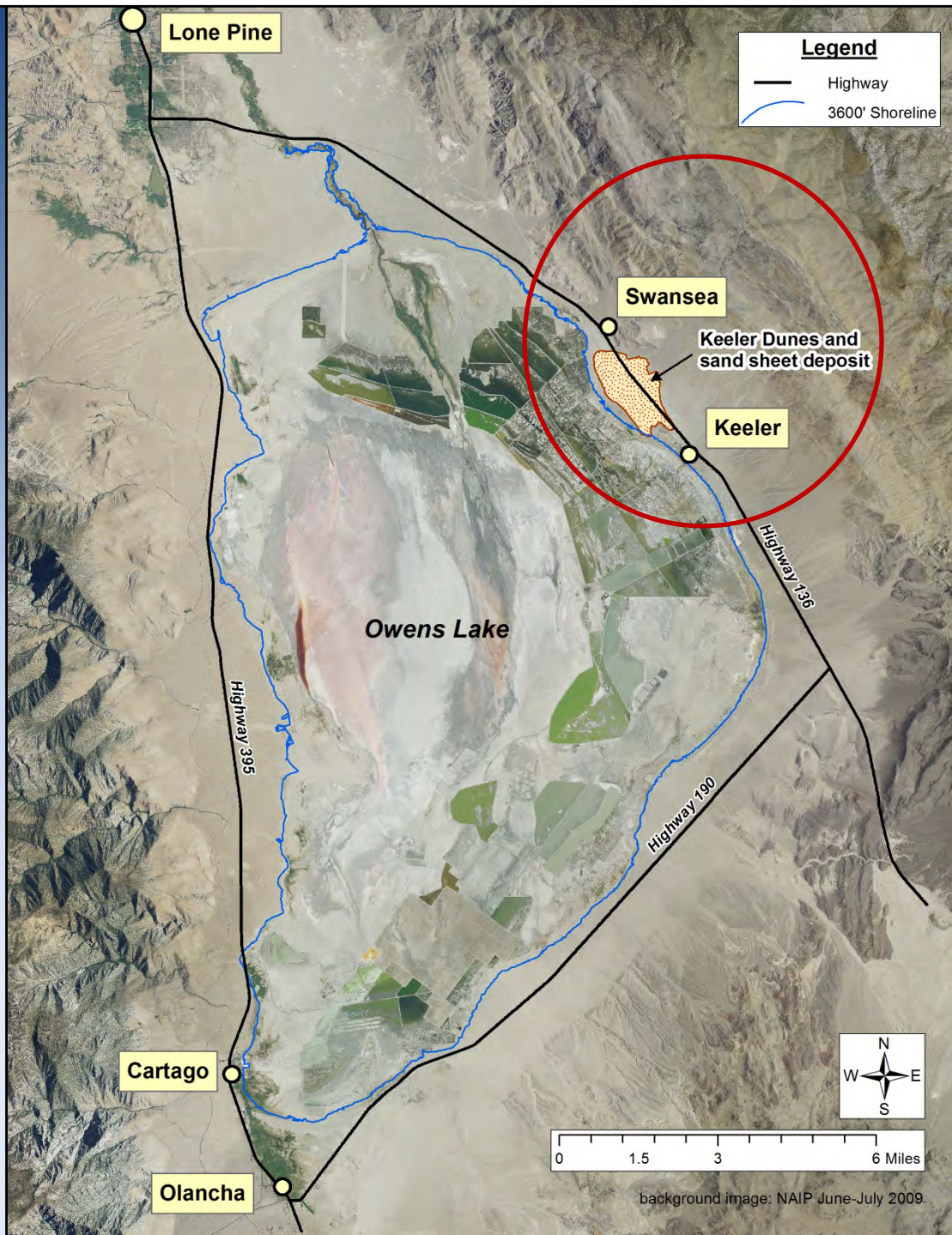
Keeler Dunes Dust Control Project

Great Basin Unified Air Pollution Control District
Bureau of Land Management

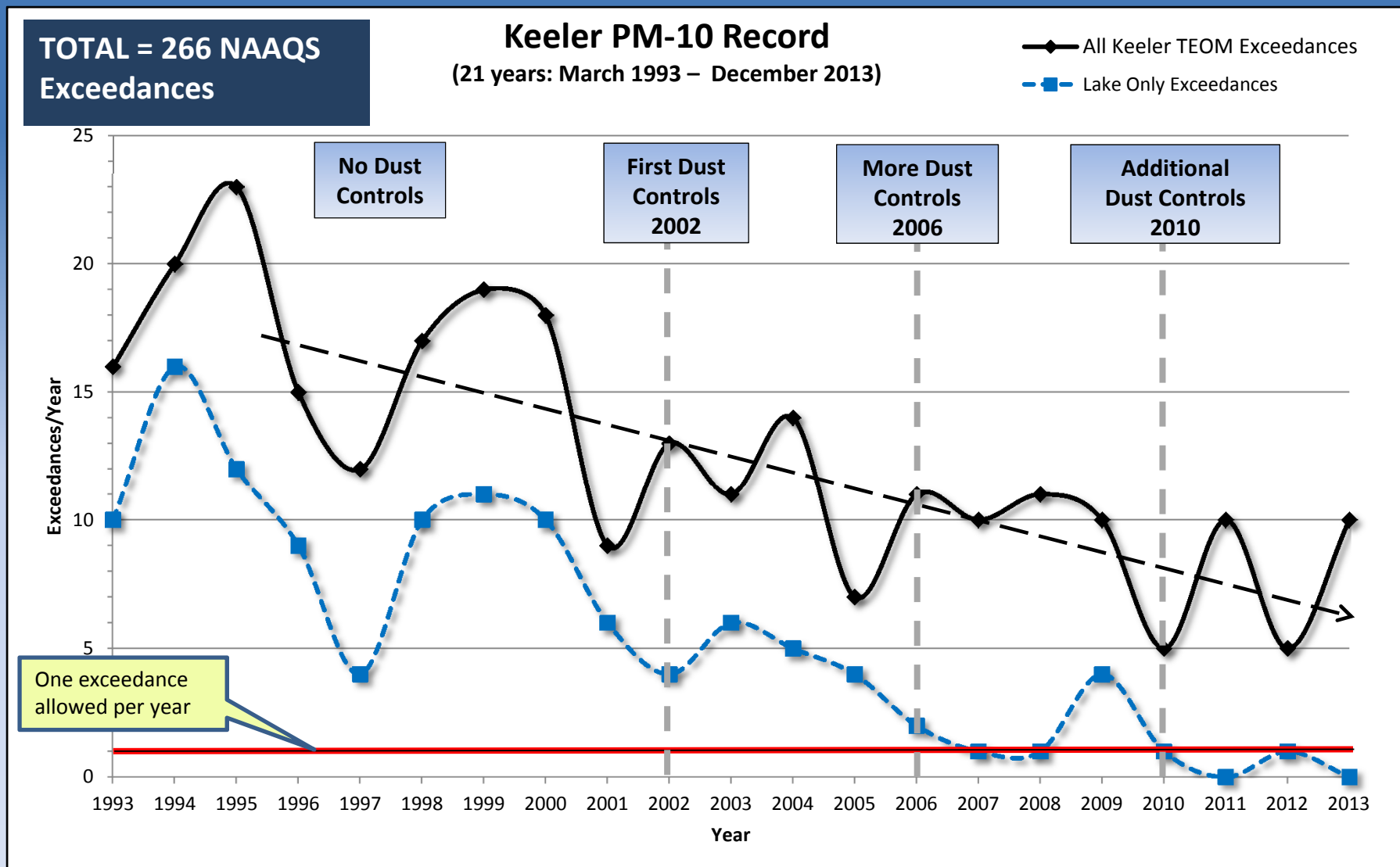
Public Workshop for Draft EIR/EA
April 2014



Location of the Keeler Dunes



Keeler PM10 Trends

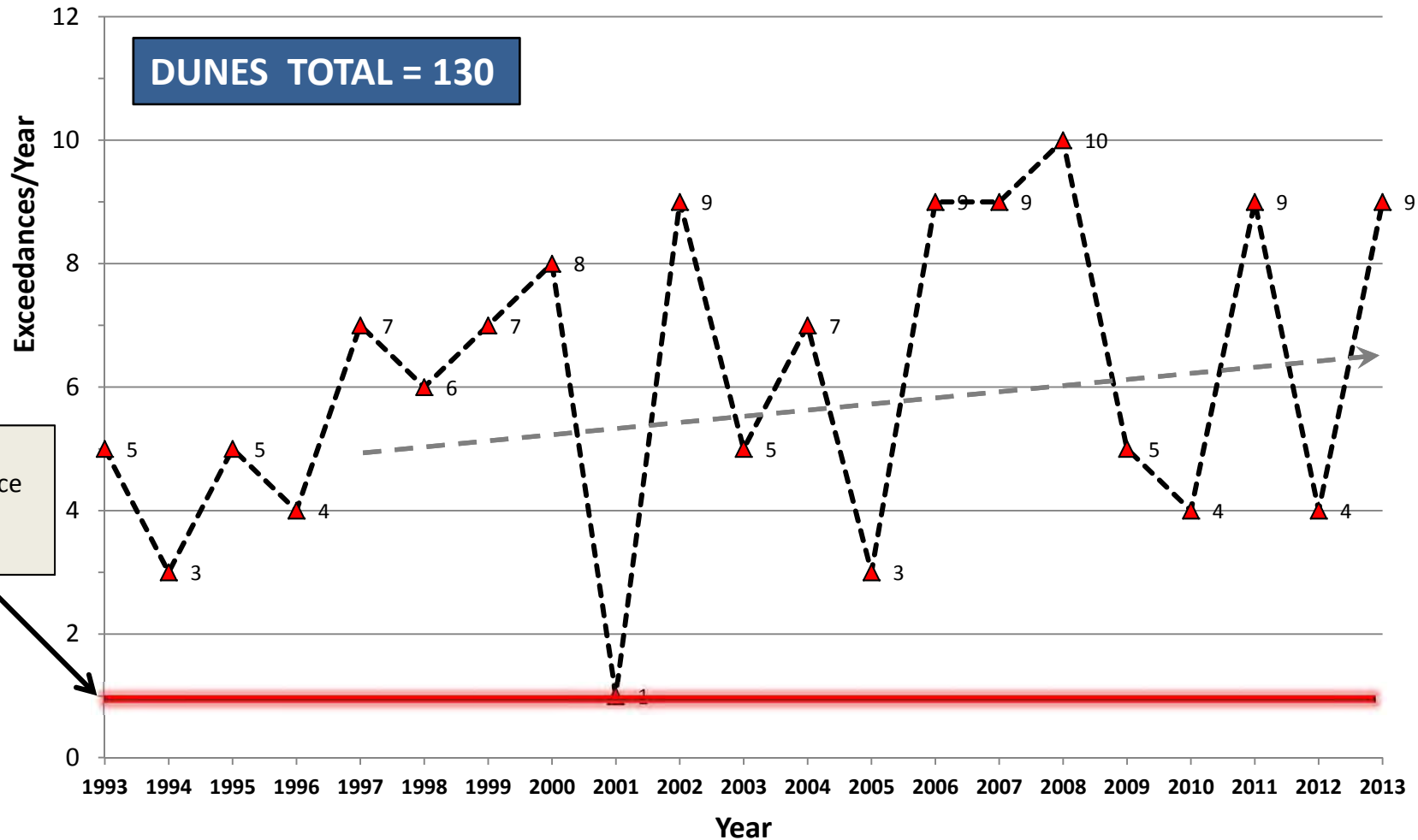


- Number of exceedances of Federal PM₁₀ standard more than allowed by CAA
- Dust emissions directly impact local residents and workers
- Dust impacts public safety on State Highway 136

Keeler Dunes Federal PM10 Exceedances

PM-10 From the Keeler Dunes

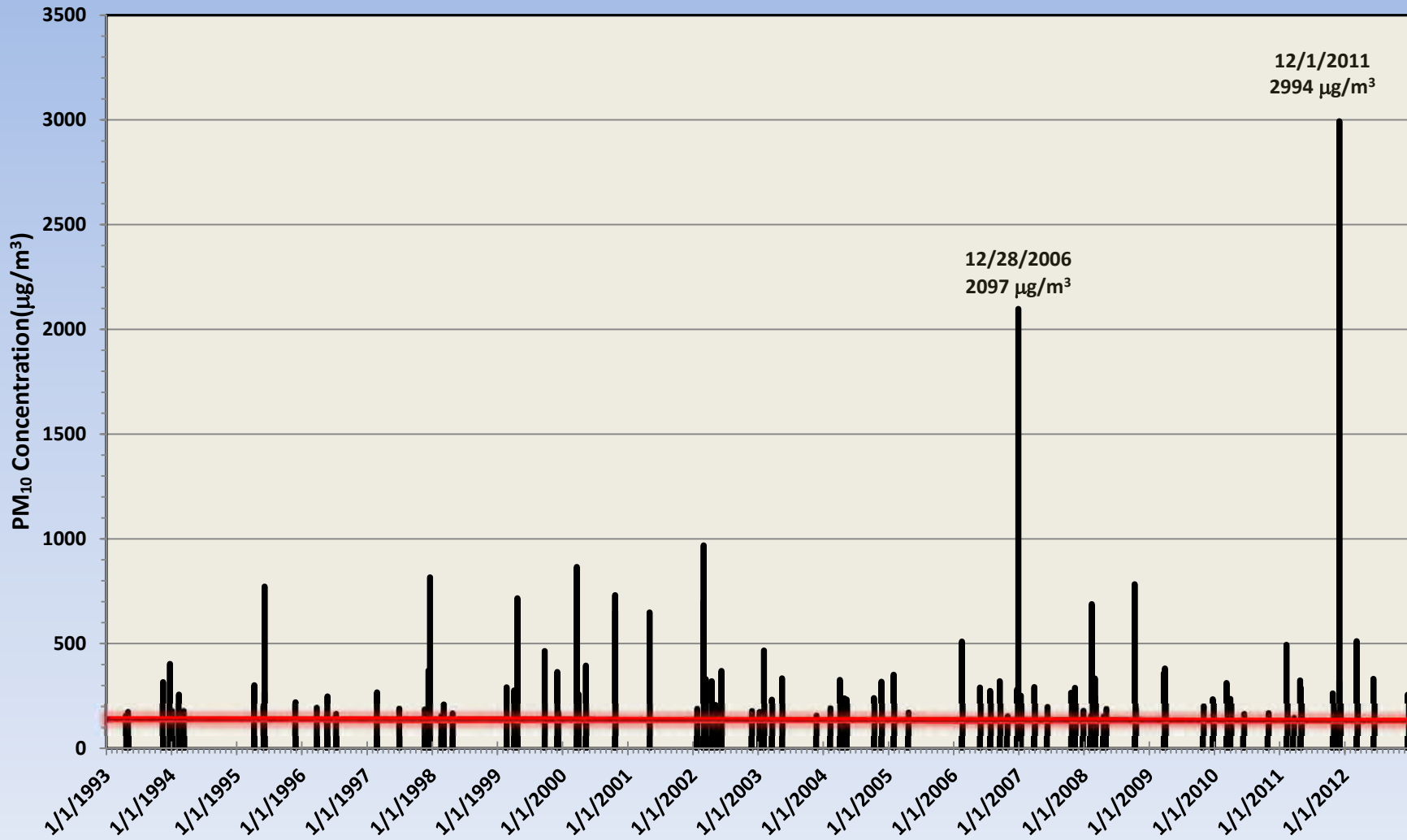
March 11, 1993 - December 31, 2013



One exceedance allowed per year

- PM₁₀ emissions from Keeler Dunes cause an average of 6 violations of health standard per year
- Number of exceedances is increasing with time as dunes move closer to Keeler

PM₁₀ Concentrations from the Keeler Dunes (1993-2012) (only values >150 µg/m³ 24-hour standard)



Graph of the PM₁₀ concentrations from the Keeler Dunes for exceedance days, measured at the Keeler Monitoring station from 1993 to 2012.

WHY CONTROL THE KEELER DUNES?

- PM_{10} emissions cause violations of health standards
- Emissions directly impact local residents and workers
- Public safety impacts on highway traffic

Dolomite C1

Tue, Mar 23, 2010 7:20:08 AM

(Image from Dolomite1 dust camera with view across Keeler Dunes)

View from Keeler toward dunes – February 20, 2013

Dusty Day

PM₁₀ concentrations

Hourly = 1,400 $\mu\text{g}/\text{m}^3$

24-hour = 526 $\mu\text{g}/\text{m}^3$

Health Alerts

Stage 1 $\geq 400 \mu\text{g}/\text{m}^3$ per hour

Stage 2 $\geq 800 \mu\text{g}/\text{m}^3$ per hour



View from Keeler toward dunes – March 4, 2013

Clear Day



TIG Results August 2010 - April 2011

Emissive Frequency

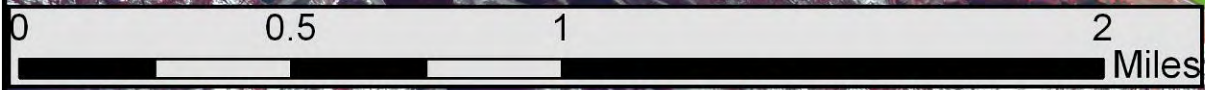
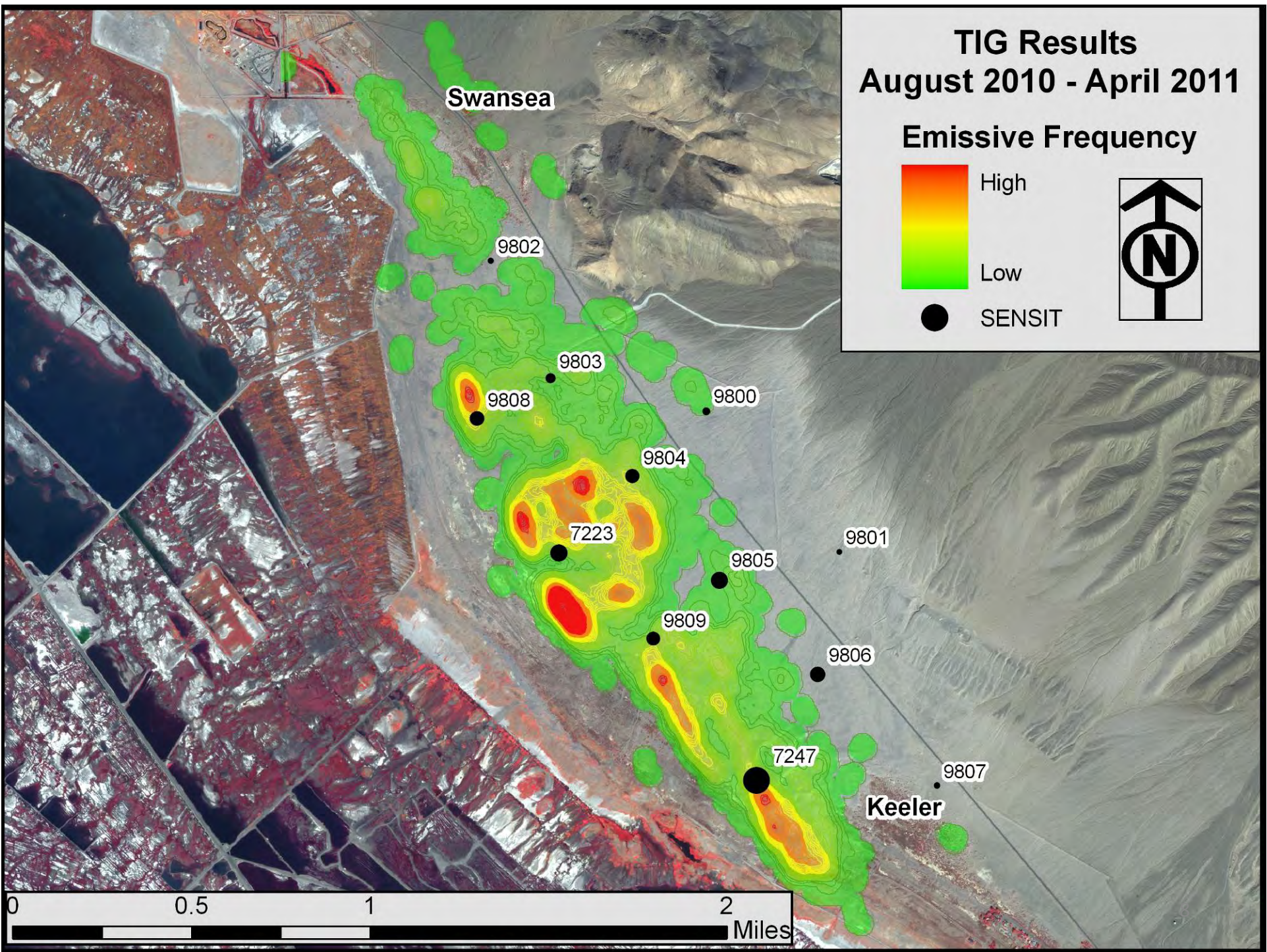


High

Low



SENSIT

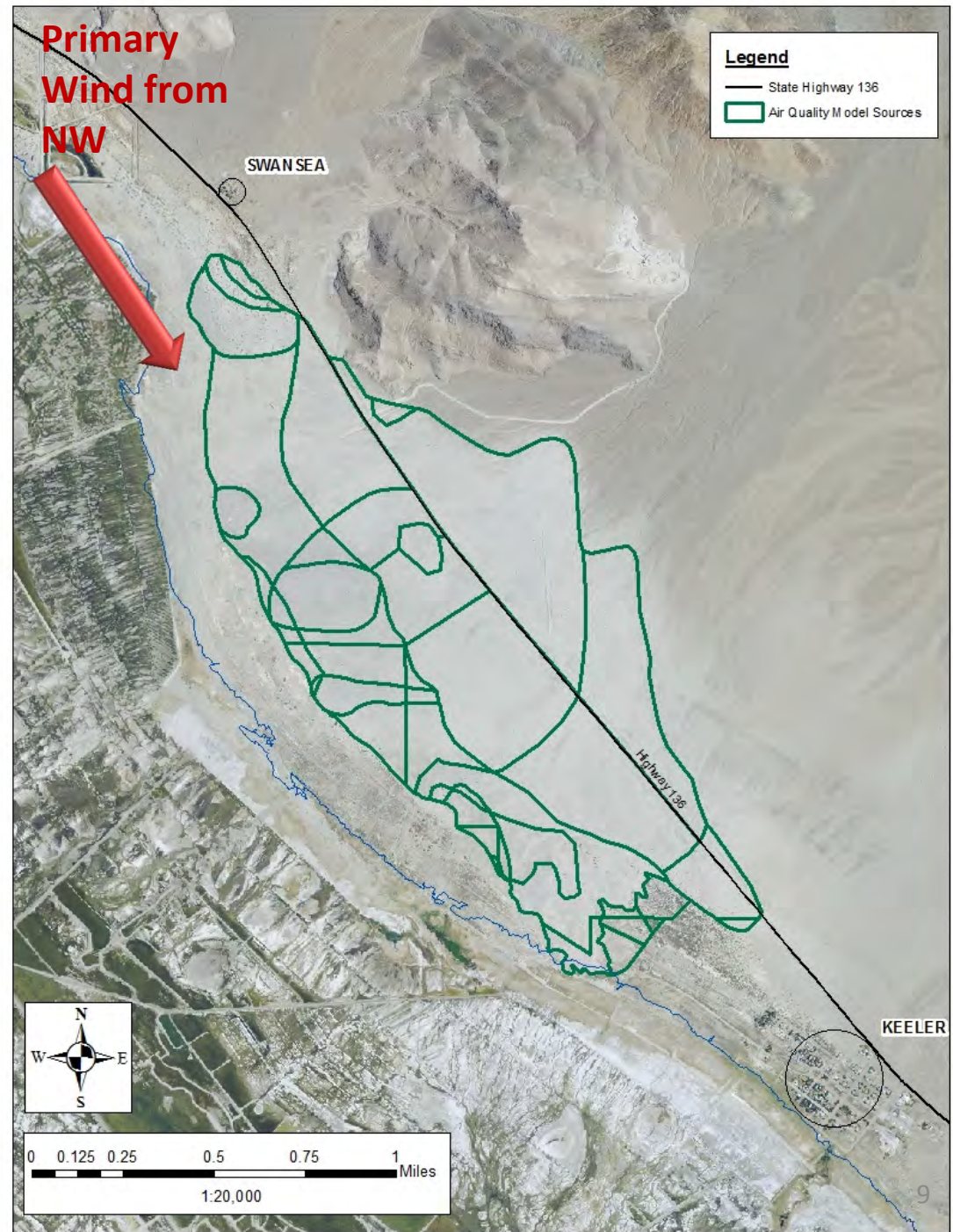


Keeler Dunes Focused Air Quality Model

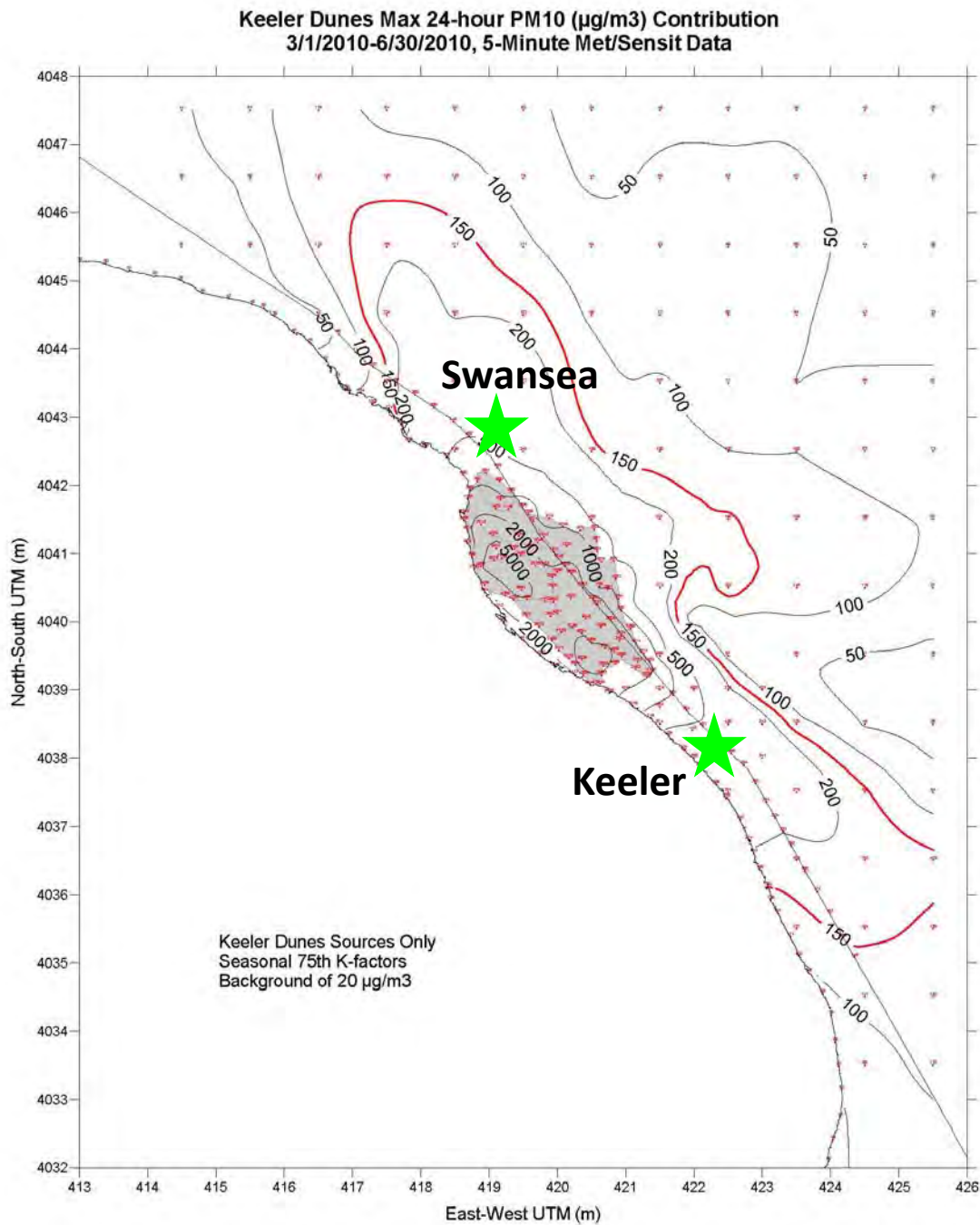
45 source areas based on:

- Surface condition
- Land ownership
- Cultural resource areas

- Primary wind direction affecting Keeler = 326 degrees azimuth (North 34° West)

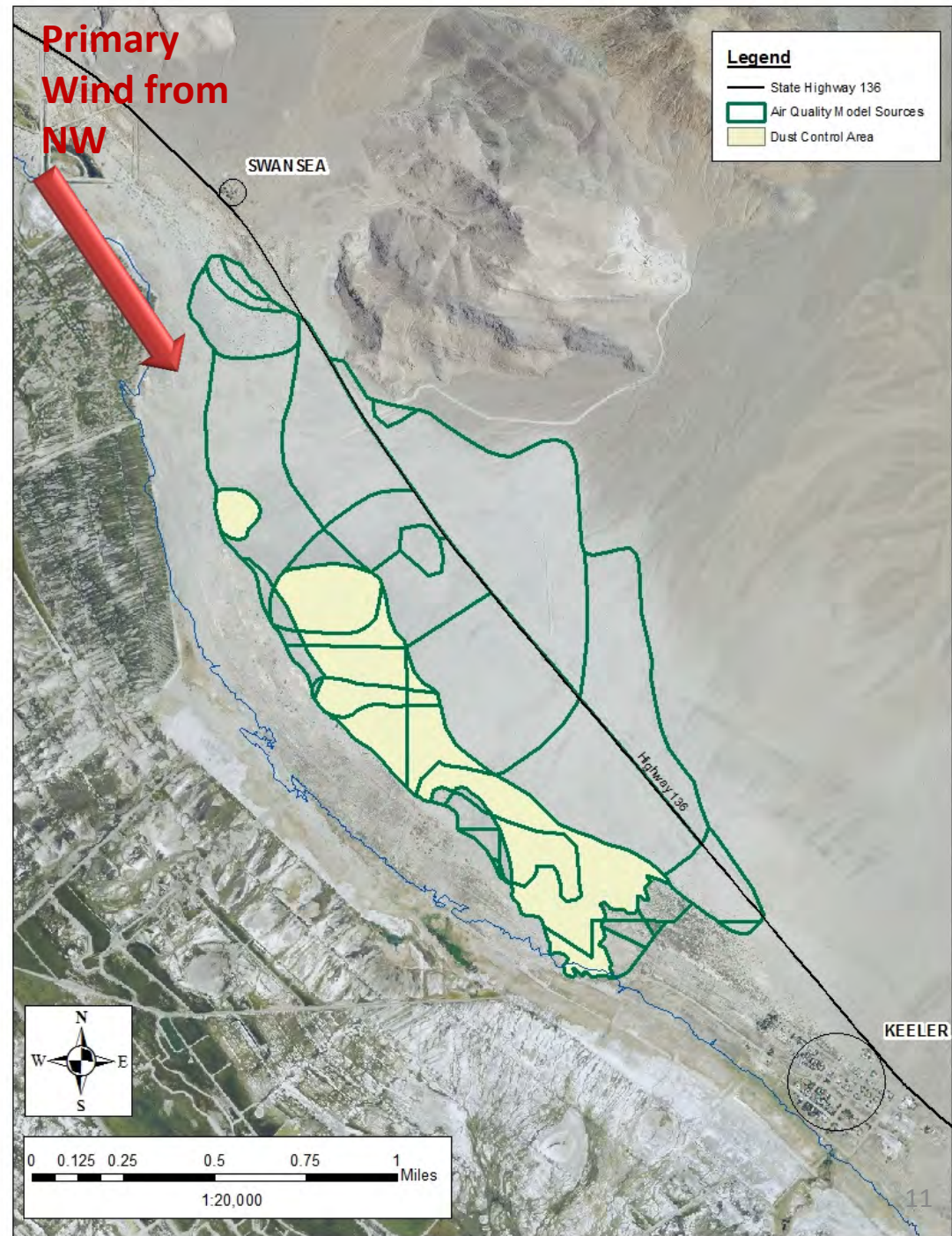


Air Quality Model Results (Spring 2009)



Keeler Dunes Dust Control Area

Only the most active areas that directly affect Keeler included in the dust control project.



Project Goals

Air Quality Goals


- Lower PM10 emissions from dunes
- Attain PM10 standard in Keeler and Swansea

Other Goals

- Low impact control measure - No 'Brute Force' measures
- Preservation of natural resources
- Natural appearing and aesthetically pleasing
- Self sustaining on long term basis
- Minimal impact to existing natural resources

Dust Control Methods Eliminated for Keeler Dunes

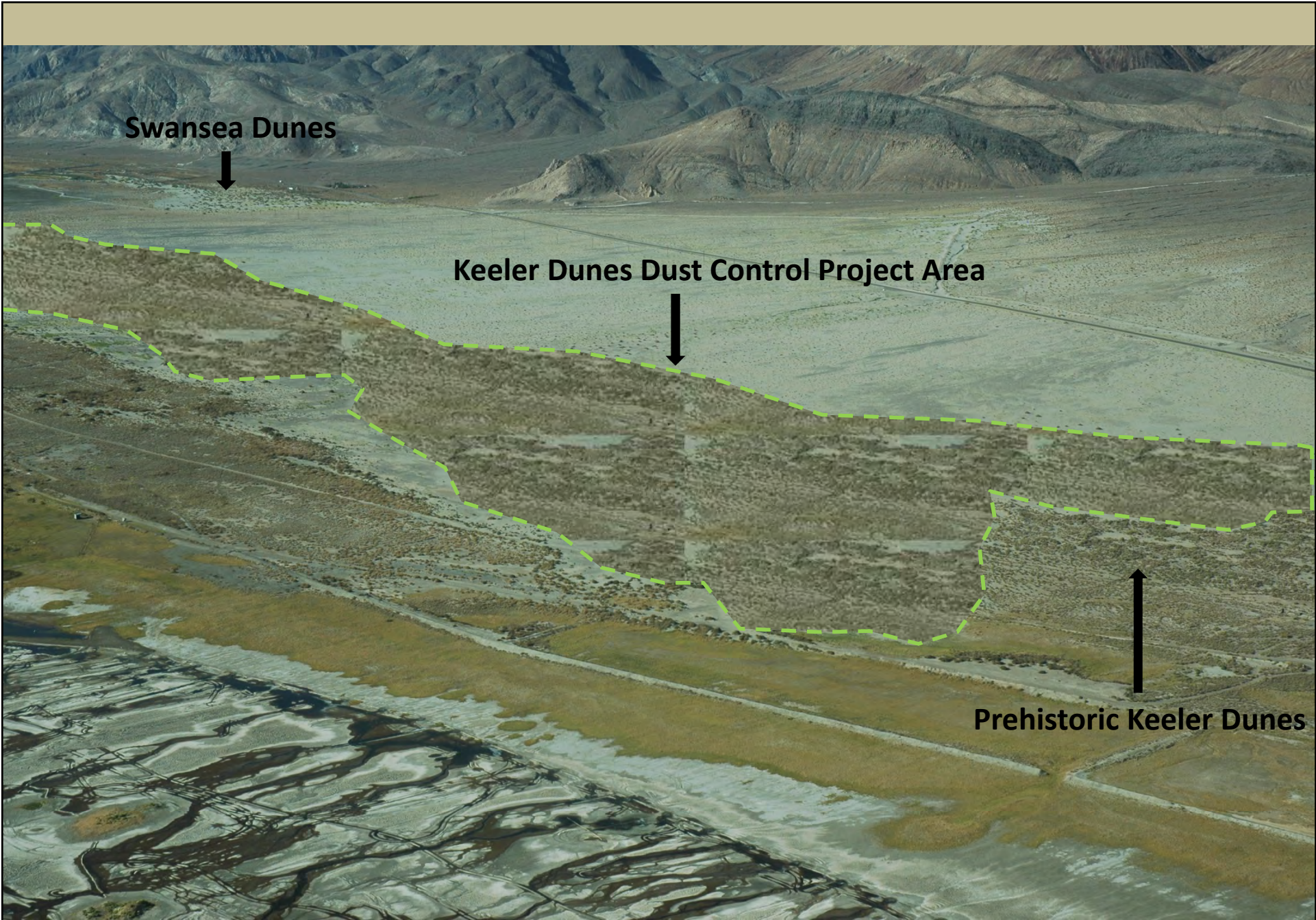
MEASURES NOT CONSIDERED

- Dune Removal
 - Owens Lake Gravel Blanket
 - Owens Lake Shallow Flooding
 - Owens Lake Managed Vegetation
 - Chemical Stabilizers
- 

Appearance of control area will not be like
Owens Lake!

Keeler Dunes Dust Control Measure

1. Vegetation project with the goal of establishing a stable dune environment.
2. Use straw bales as temporary roughness elements to control surface while plants mature.
3. As plants mature the dust control mechanism will be transferred from the bales to the plants.



Swansea Dunes



Keeler Dunes Dust Control Project Area



Prehistoric Keeler Dunes



A large stack of straw bales, viewed from a low angle, filling most of the frame. The straw is golden-brown and appears dense and textured. The text "STRAW BALE DEMONSTRATION PROJECT" is overlaid in white, bold, sans-serif font across the middle of the image. In the background, a clear blue sky and a body of water are visible on the left side.

STRAW BALE DEMONSTRATION PROJECT

Test Site Location

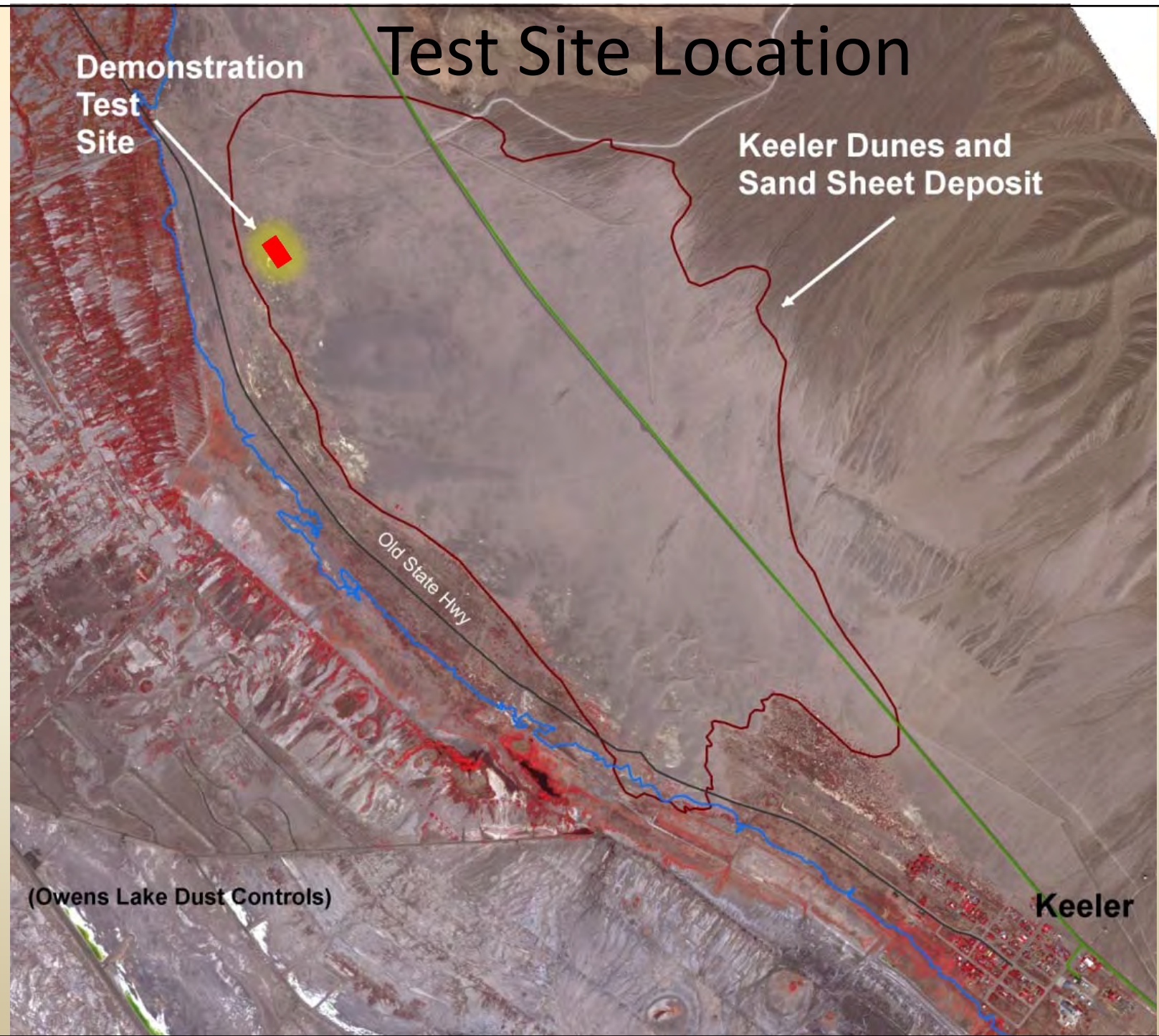
Demonstration
Test
Site

Keeler Dunes and
Sand Sheet Deposit

Old State Hwy

(Owens Lake Dust Controls)

Keeler

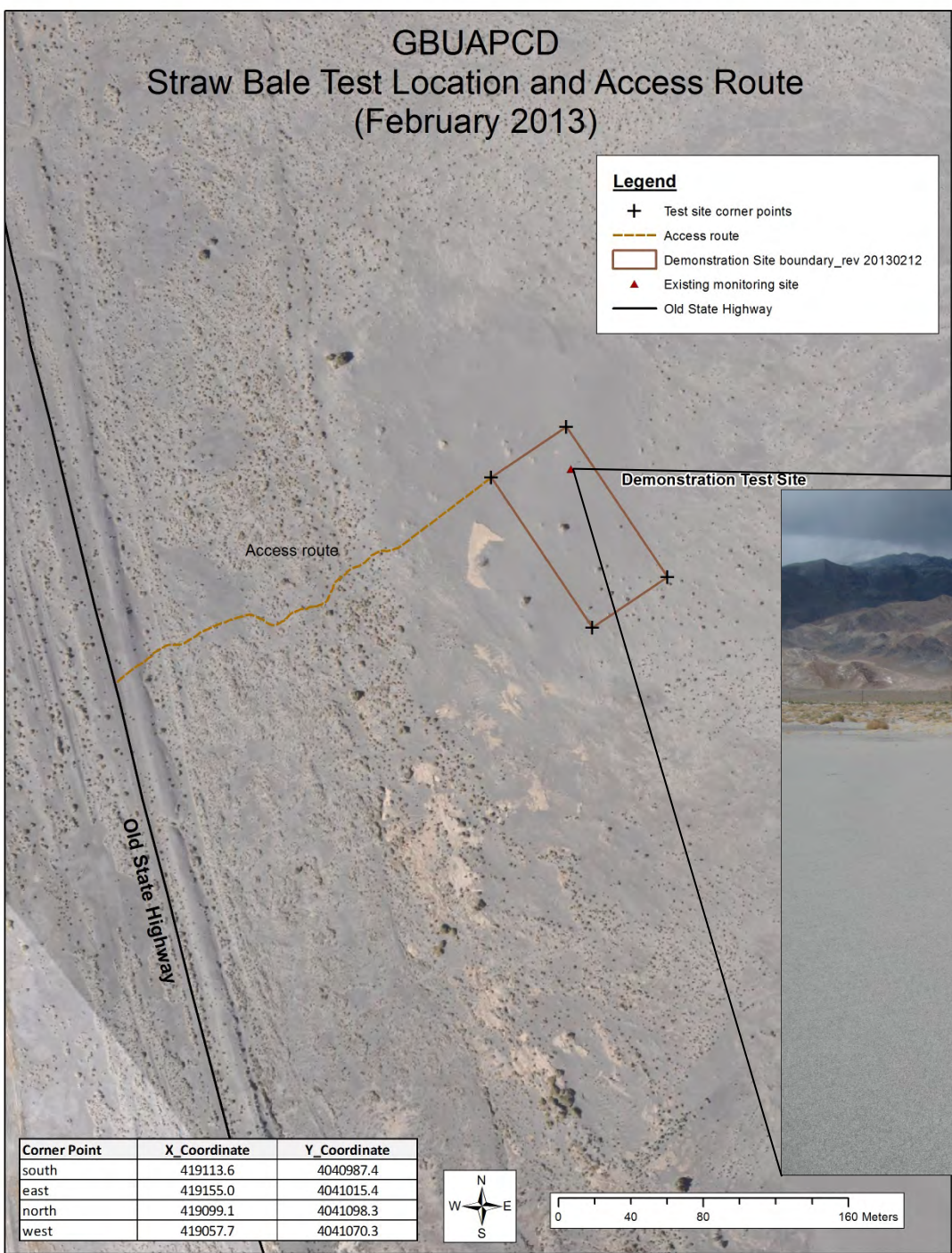


GBUAPCD
 Straw Bale Test Location and Access Route
 (February 2013)

Legend

- + Test site corner points
- Access route
- Demonstration Site boundary_rev 20130212
- ▲ Existing monitoring site
- Old State Highway

Pre-Project Test Site Condition and Site Access



Pre-project ground view to north from site 9808

Straw Delivery May 22, 2013



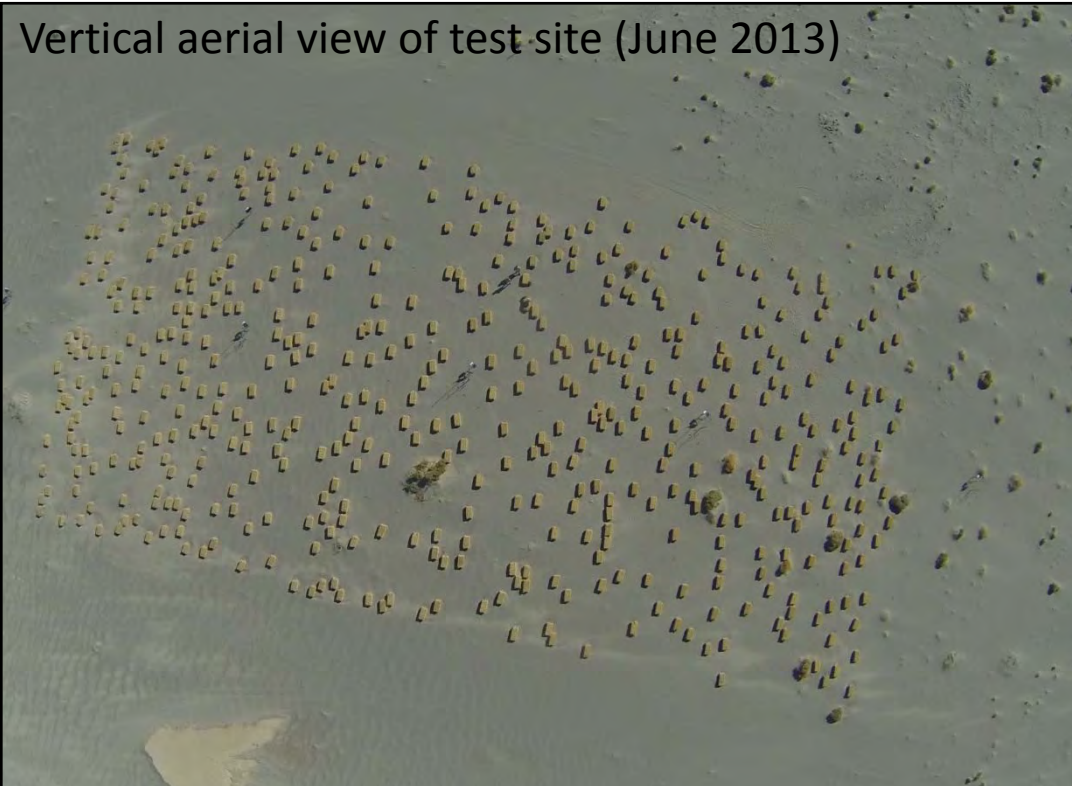
Two Straw Shipments

1st – May 22, 2013 (336 bales)

2nd – June 4, 2013 (168 bales)

TOTAL = 504 bales

Vertical aerial view of test site (June 2013)



Straw Bale Demonstration Project

View of test site from Dust Camera (May 2013)



Oblique aerial view of test site (May 2013)



Native Shrub Plant Propagation

Plants are being propagated for the large-scale project at the Antelope Valley Resource Conservation District nursery in Lancaster, CA



Hand watering by ATV



Straw Bale Demonstration Project

Plants and hand watering



Plants after first few months



Planting on site in October 2013

Initial Pre-Planting Watering under bale



Planting Native Shrubs

At each Bale

- 3 plants
- 1 watering tube



Hand Watering System



Proposed Irrigation Schedule – 3 years:

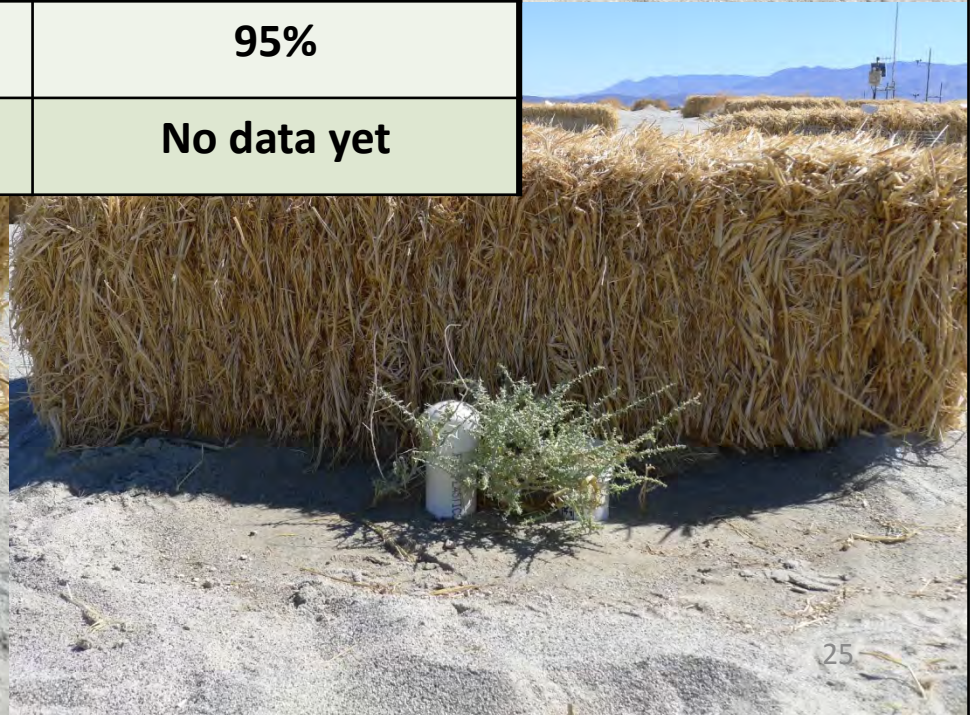
- 1) Initial Pre-planting watering
- 2) Supplemental Spring Irrigation
- 3) Supplemental Fall Irrigation

Plant Establishment Results

(as of March 2014)



Planting Date	Plant Survivorship
May 2013	70%
October 2013	95%
March 2014	No data yet



Proposed Project and Action Alternatives

(Alternatives analyzed in Draft EIR and EA)

Alternatives listed in the order of development

<u>Alternative</u>	<u>Project Size</u>	<u>Irrigation Method</u>	<u>Water Source</u>
Proposed Project	194	Hand watering	Fault Test Well
Alternative 1	214	Hand watering	Fault Test Well
Alternative 2	197	Hand watering	Fault Test Well
Alternative 3	194	Temporary irrigation system from west	Fault Test Well
Alternative 4	194	Temporary irrigation system from east	Fault Test Well
Alternative 5	194	Temporary irrigation system from KCSD	KCSD Well

5 Project Elements Common to all Alternatives

1) Straw Bales

certified weed free rice straw

2) Plants

5 species of native shrubs

3) Water

about 10 acre-feet needed over 3 years in 7 irrigation events

4) Staging Areas

4 Staging areas: 3 on Old State Highway, 1 on Gravel Haul Road

5) Access Route

No developed roads. Access trail along designated path.

Project Elements Common to all Alternatives - #1

1) Straw Bales – certified weed free rice straw

<u>Alternative</u>	<u>Number of Bales</u>
<i>Proposed Project, Alternatives 3, 4, and 5</i> <i>194 Acres</i>	123,185
<i>Alternative 1</i> <i>214 Acres</i>	126,654
<i>Alternative 2</i> <i>197 Acres</i>	129,905

Project Elements Common to all Alternatives - #2

2) Plants – 5 species of native shrubs

<u>Species (Abbreviation)</u>	<u>Common Name</u>
1. <i>Atriplex polycarpa</i> (ATPO)	Cattle spinach, cattle saltbush
2. <i>Atriplex confertifolia</i> (ATCO)	Shadscale saltbush
3. <i>Atriplex parryi</i> (ATPA)	Parry’s saltbush
4. <i>Suaeda moquinii</i> (SUMO)	Inkweed, Mojave seablite
5. <i>Sarcobatus vermiculatus</i> (SAVE)	Greasewood

<u>Alternative</u>	<u>Number of Plants</u>
Proposed Project, Alternatives 3, 4, and 5 194 Acres	369,555
Alternative 1 214 Acres	379,962
Alternative 2 197 Acres	389,715

Project Elements Common to all Alternatives - #3

3) **Water** – about 10 acre-feet needed over 3 years in 7 irrigation events.

<u>Water use by year (for Proposed Project)</u>	<u>Gallons per Bale</u>	<u>Gallons</u>	<u>Acre-Feet</u>
Year 1 (Fall 2014 - Fall 2015)			
• Before and at time of planting	8	985,480	3.02
• Spring 2015	3	369,555	1.13
• Fall 2015	3	369,555	1.13
Year 2 (2016) - spring and fall			
• Spring	3	369,555	1.13
• Fall	3	369,555	1.13
Year 3 (2017) – spring and fall			
• Spring	3	369,555	1.13
• Fall	3	369,555	1.13
TOTAL		3,202,120	9.83

Project Elements Common to all Alternatives - #4

4) **Staging Areas** – four temporary areas with 3 along the Old State Highway and 1 along Gravel Haul Road.

<u>Staging Areas</u>	<u>Dimensions</u>
Staging Area 1: <i>Old State Highway</i>	50' x 300'
Staging Area 2: <i>Old State Highway</i>	200' x 400'
Staging Area 3: <i>Old State Highway</i>	150' x 300'
Staging Area 4: <i>Gravel Haul Road</i>	10' x 200'
TOTAL SIZE (acres)	3.2 acres

- Staging areas will be restored at end of project

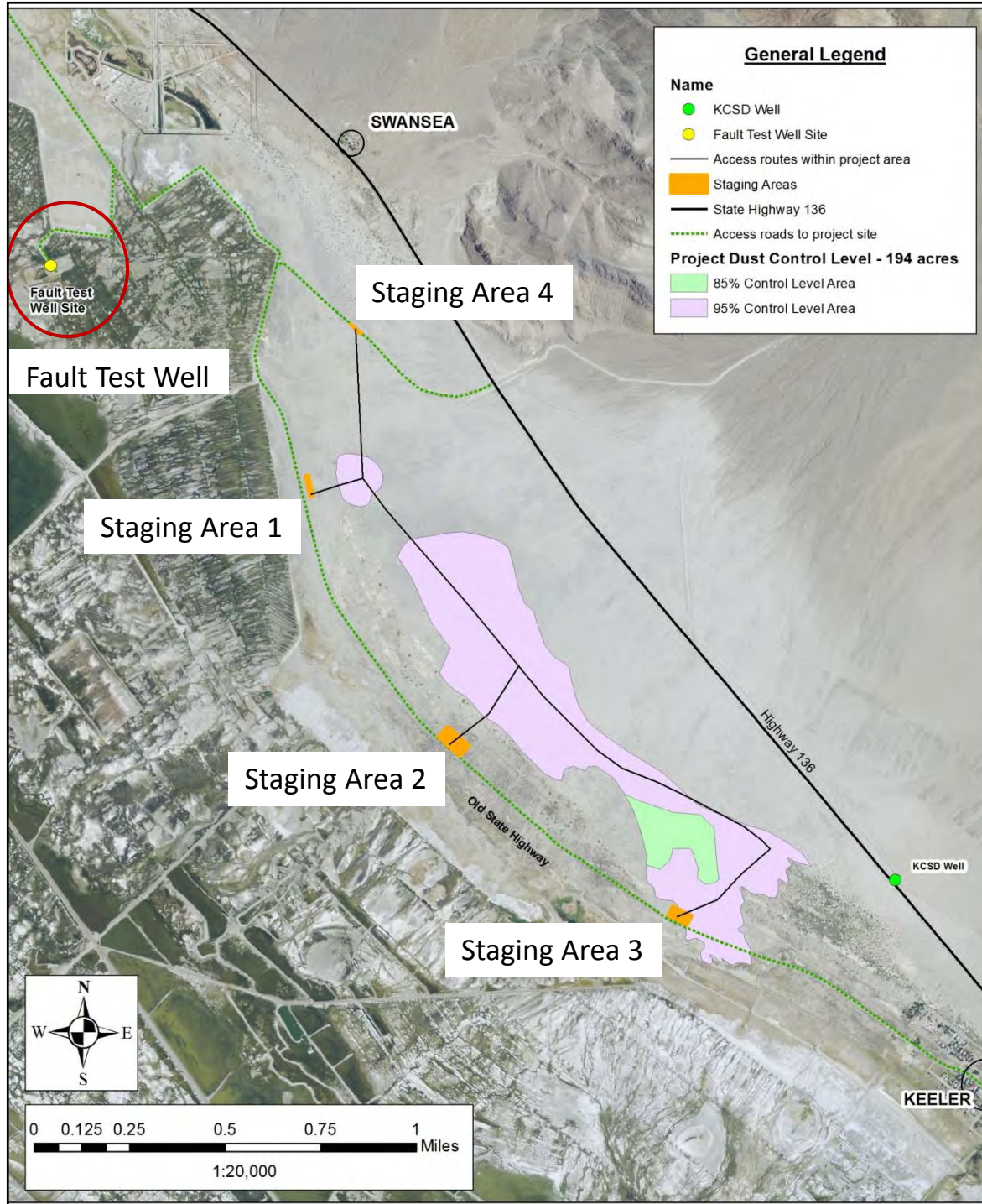
Project Elements Common to all Alternatives - #5

5) Access Route – temporary access route into and within the project area for ATV travel.

<u>Access Route</u>	<u>Length</u>
Total Length	13,478 ft/2.5 miles

- No grading – route will use existing grade without modification
- No supplemental materials such as gravel or asphalt
- Sited to minimize impacts to vegetation and other resources
- Access route will be restored at end of project

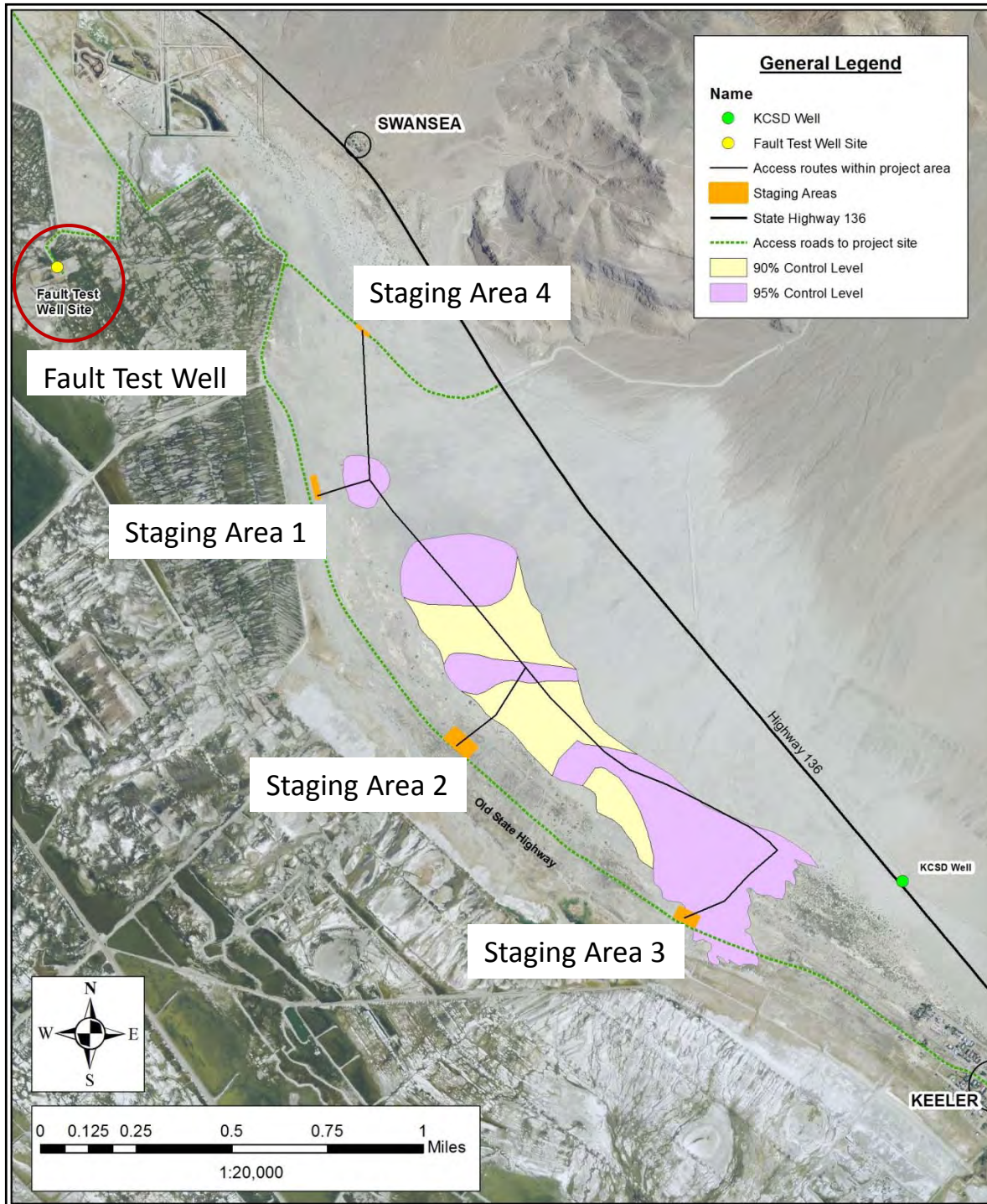
Keeler Dunes Project



194 acre project extent with
2 Dust Control Levels
95% = 177 acres
85% = 17 acres

Water delivered to project with
water trucks from the Fault
Test Well to the staging areas
along the Old State Highway.

Hand watering of all plants
with water hauled in on ATV
trailers.



Alternative 1

214 acre project extent with
 2 Dust Control Levels
 95 % = 140 acres
 90 % = 74 acres

Water delivered to project with
 water trucks from the Fault
 Test Well to the staging areas
 along the Old State Highway.

Hand watering of all plants
 with water hauled in on ATV
 trailers.

Alternative 2

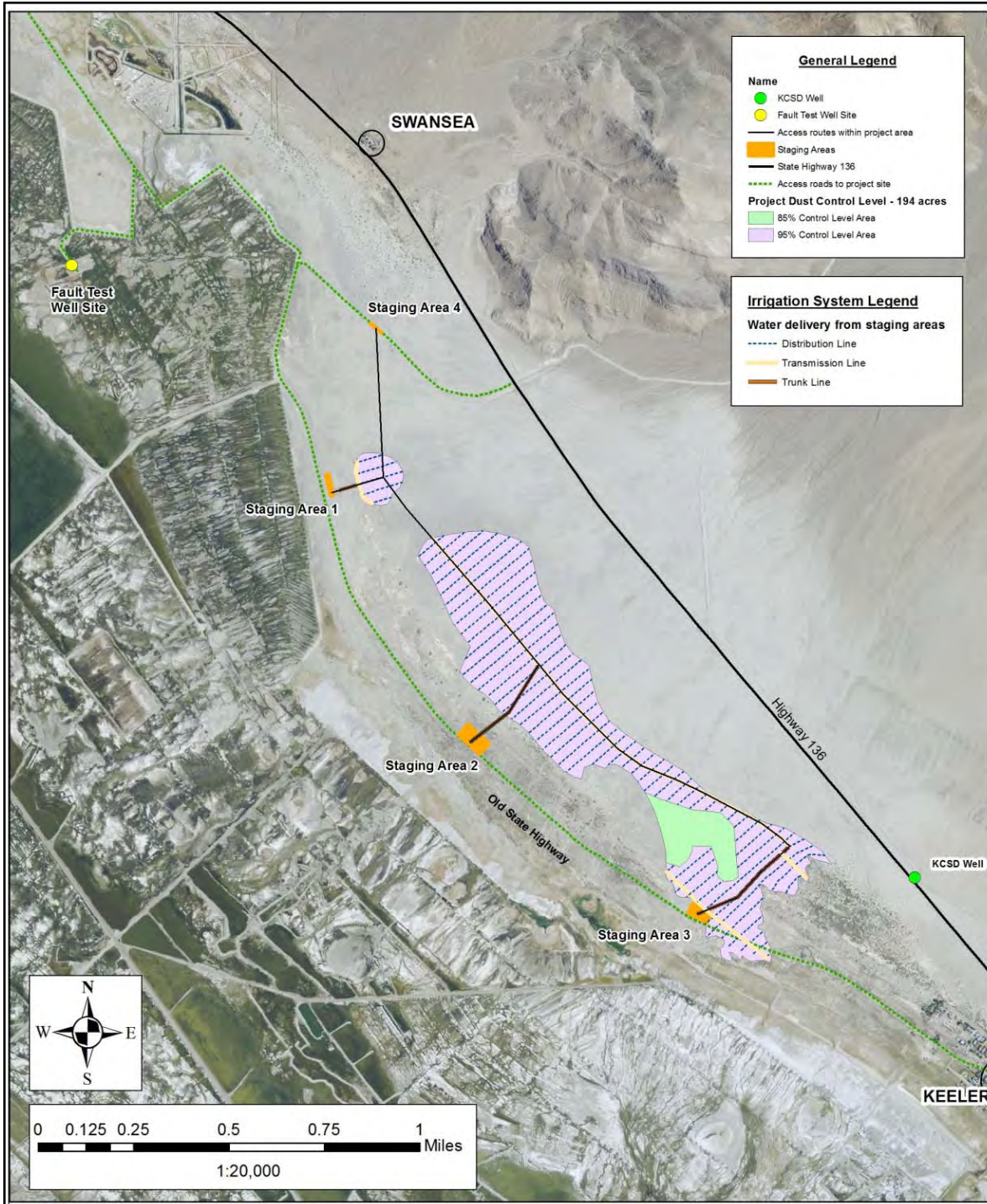
197 acre project extent with
2 Dust Control Levels
95 % = 170 acres
90 % = 27 acres

Water delivered to project with
water trucks from the Fault
Test Well to the staging areas
along the Old State Highway.

Hand watering of all plants
with water hauled in on ATV
trailers.



Alternative 3

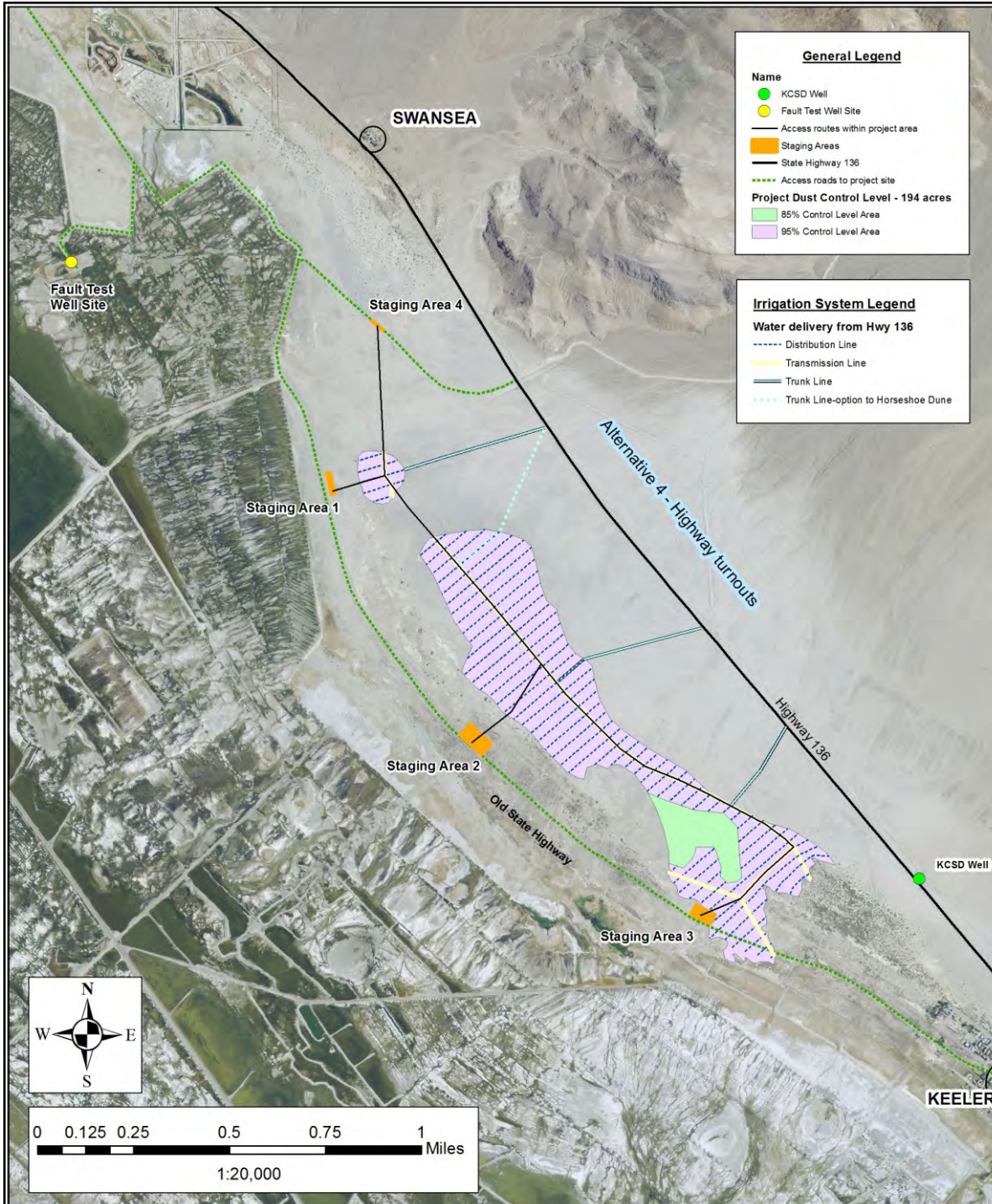


194 acre extent with 2 control levels.

Irrigation of plants in 95% control area through implementation of a temporary above ground system supplied with water from Fault Test well.

Irrigation of plants in 85% control area by hand watering.

Water delivered to project from water trucks at the staging areas along the Old State Highway.



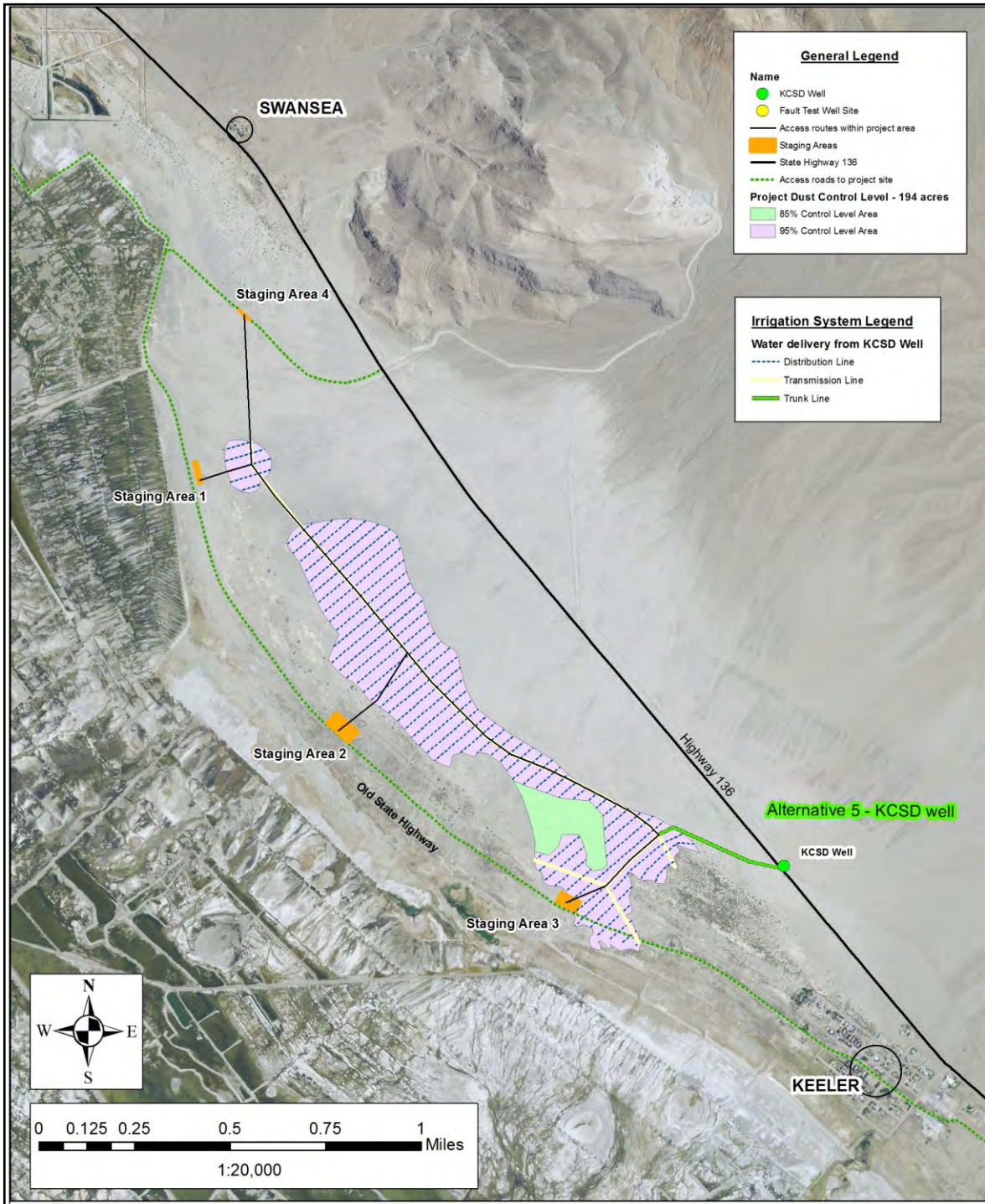
Alternative 4

194 acre extent with 2 control levels.

Irrigation of plants in 95% control area through implementation of a temporary above ground system supplied with water from Fault Test well.

Irrigation of plants in 85% control area by hand watering.

Water delivered to project from water trucks at turnouts along State Highway 136.



Alternative 5

194 acre extent with 2 control levels.

Irrigation of plants in 95% control area through implementation of a temporary above ground system supplied with water from Fault Test well.

Irrigation of plants in 85% control area by hand watering.

Water delivered to project from pipeline connected to KCSD well.

Comparison of Irrigation Alternatives

Alternative	Irrigation Method	Total Travel	Days/Irrigation (crew of 10) Initial Irrigation	Days/Irrigation (crew of 10) Supplemental Irrigation
Proposed Project	Hand watering	21,000 miles	15 weeks	10 weeks
Alternative 1	Hand watering	21,000+ miles	15+ weeks	10+ weeks
Alternative 2	Hand watering	21,000+ miles	15+ weeks	10+ weeks
Alternative 3	Temporary irrigation system from Old State Highway	4,500 miles	8 weeks	5 weeks
Alternative 4	Temporary irrigation system from turnouts on Hwy 136	4,500 miles	8 weeks	5 weeks
Alternative 5	Temporary irrigation system from KCSD	4,500 miles	8 weeks	5 weeks



Questions?