Riverside East Long-Term Monitoring Strategy (LTMS) and Adaptive Management Pilot Webinar

Instructions for the webinar meeting:

1. URL is: https://bluejeans.com/663121813/9803
2. Meeting ID: 663121813
3. Participant Passcode: 9803
4. Users should load bluejeans before the webinar.
5. Choose the "Don't Send Only Receive" option after logging into the webinar
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Call-In Instructions:

- ***The dial-in number for the webinar is: 1-888-850-4523; Passcode 876166***
- ***Please mute phone and computer***
- ***Group discussion and Q&A periods will be included after each presentation***
- ***Enter questions using the chat feature (icon located upper right under the red phone)***

AGENDA

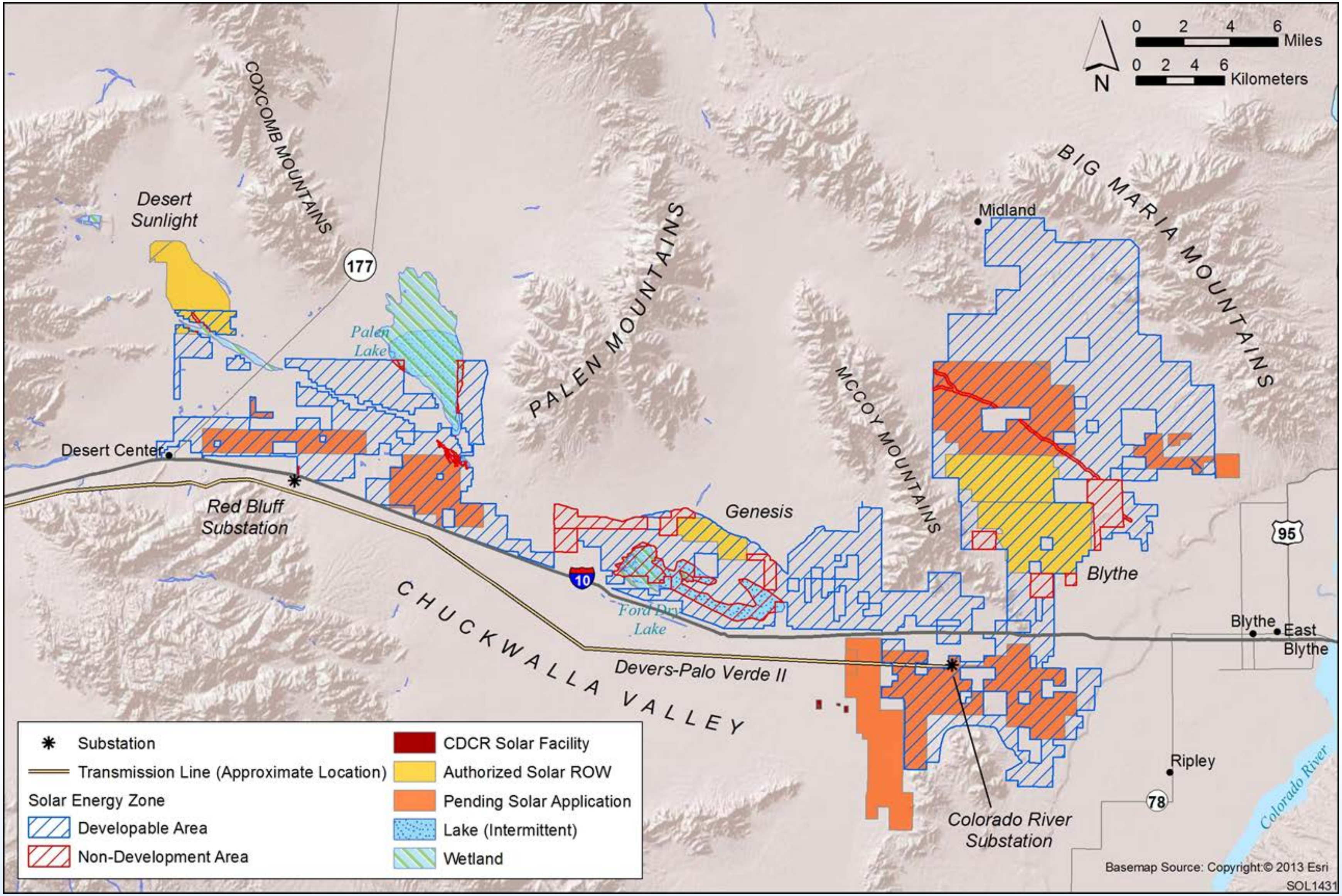
- 9:00- Introduction and background
- 9:25- Development of indicators
- 10:00- Monitoring strategy outline
- 10:45- Next steps

Introduction

BACKGROUND

Solar PEIS identified Solar Energy Zones (SEZs) on public lands where the BLM will emphasize solar development.

- Utility-scale solar is relatively new as are potential impacts
- Shortcoming**:** Project-specific monitoring does not address cumulative impacts and does not encompass areas outside of project boundaries.
- Solution: The BLM will characterize potential regional or landscape-scale resource impacts through a long-term adaptive monitoring strategy (LTMS) for all SEZs.



Long-term monitoring and adaptive management strategy piloted in Riverside East SEZ

RIVERSIDE EAST LONG TERM MONITORING STRATEGY

- Transparent process with public engagement
- Lessons from this process to inform future solar monitoring strategies elsewhere
- Monitoring strategy should:
  - Be regional in scale, rather than project-by project
  - Inform status and trend of key resources and ecological processes
  - Leverage existing BLM/partner data collection
  - Provide timely information to inform future decisions
  - Be consistent with the BLM AIM Strategy

RIVERSIDE EAST LONG TERM MONITORING STRATEGY

Adaptive Management

- Information will feed back into decision-making process
  - Future siting decisions
  - Future mitigation decisions
  - Future best management practices and design features
  - Establish resource management trigger thresholds to initiate additional studies
- Future adjustments to monitoring objectives if needed

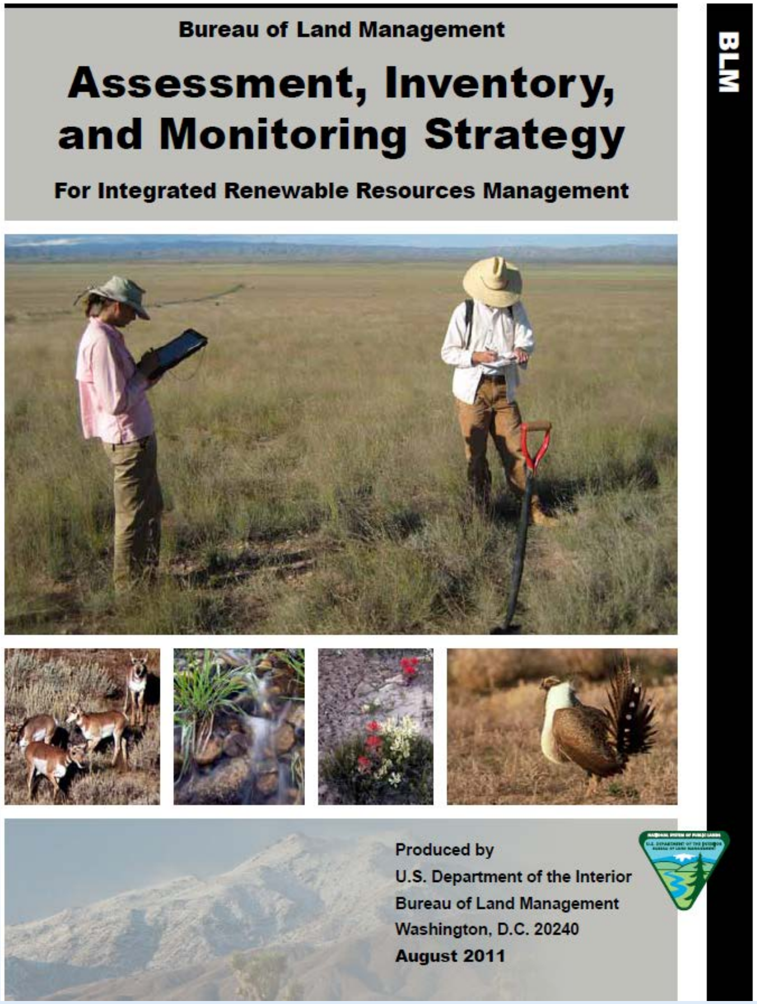
RIVERSIDE EAST LONG TERM MONITORING STRATEGY

- Prioritization is key
  - Can’t monitor everything all the time
  - Long-term funding may be variable
- Should complement existing monitoring
  - Not duplicate project-specific compliance monitoring

BLM ASSESSMENT, INVENTORY AND MONITORING PROGRAM

Goals of the BLM AIM Strategy:

- report on the status and trends of public lands at multiple scales of inquiry
- report on the effectiveness of management actions
- provide the information necessary to implement adaptive management
- AIM data currently being collected at the Riverside East SEZ



PUBLIC ENGAGEMENT TO DATE

- Public workshop, December 2013
  - Discussion of key resources, potential solar impacts, and suggested management questions and monitoring objectives
- Public webinar, May 2014
  - Criteria for screening monitoring objectives, monitoring indicators, and LTMS outline

Questions?

Development of Indicators
(2014 – 2015)

RIVERSIDE EAST LONG TERM MONITORING STRATEGY

- Management questions and goals
- Monitoring objectives
- Indicators
- Sampling framework and data collection
- Cost

DEVELOPMENT OF LONG-TERM MONITORING STRATEGY

Example of Management Questions and Management Goals

Physical Resources–Hydrology

Management Questions	Management Goals
• Do solar facilities significantly alter off-site surface water flow?	• Maintain off-site surface water flow volumes and patterns in ephemeral, intermittent, and perennial water bodies within the watershed.
• Is solar-related groundwater withdrawal affecting surface water hydrology?	• Maintain the hydrology of seeps and springs, groundwater-dependent streams, and wet playas within the watershed.
• Is/are the groundwater basin(s) in overdraft? If so, to what degree?	• Minimize degree of divergence from the natural, pre-development balance of the groundwater supply (recharge/discharge)

MONITORING OBJECTIVES, INDICATORS, AND SAMPLING METHODS

Monitoring Objective

- Example-Detect temporal changes in groundwater levels.
- ultimate goal to develop quantitative objectives
- desired precision of statistical change detection for the monitoring indicator
- threshold magnitude of change in the indicator that triggers more detailed investigation

MONITORING OBJECTIVES, INDICATORS, AND SAMPLING METHODS

Monitoring Indicator

= a characteristic of a system that is used as an index of an attribute that is too difficult or expensive to measure directly

Method

= technique for measuring an indicator

STRATEGY FOR SAMPLING DESIGN AND DATA ANALYSIS

Incorporate existing baseline and ongoing monitoring data whenever possible.

Adopt the Before-After Control-Impact (BACI) design

- collect indicator data at impact sites and at multiple control sites
- collect indicator data before development and after development

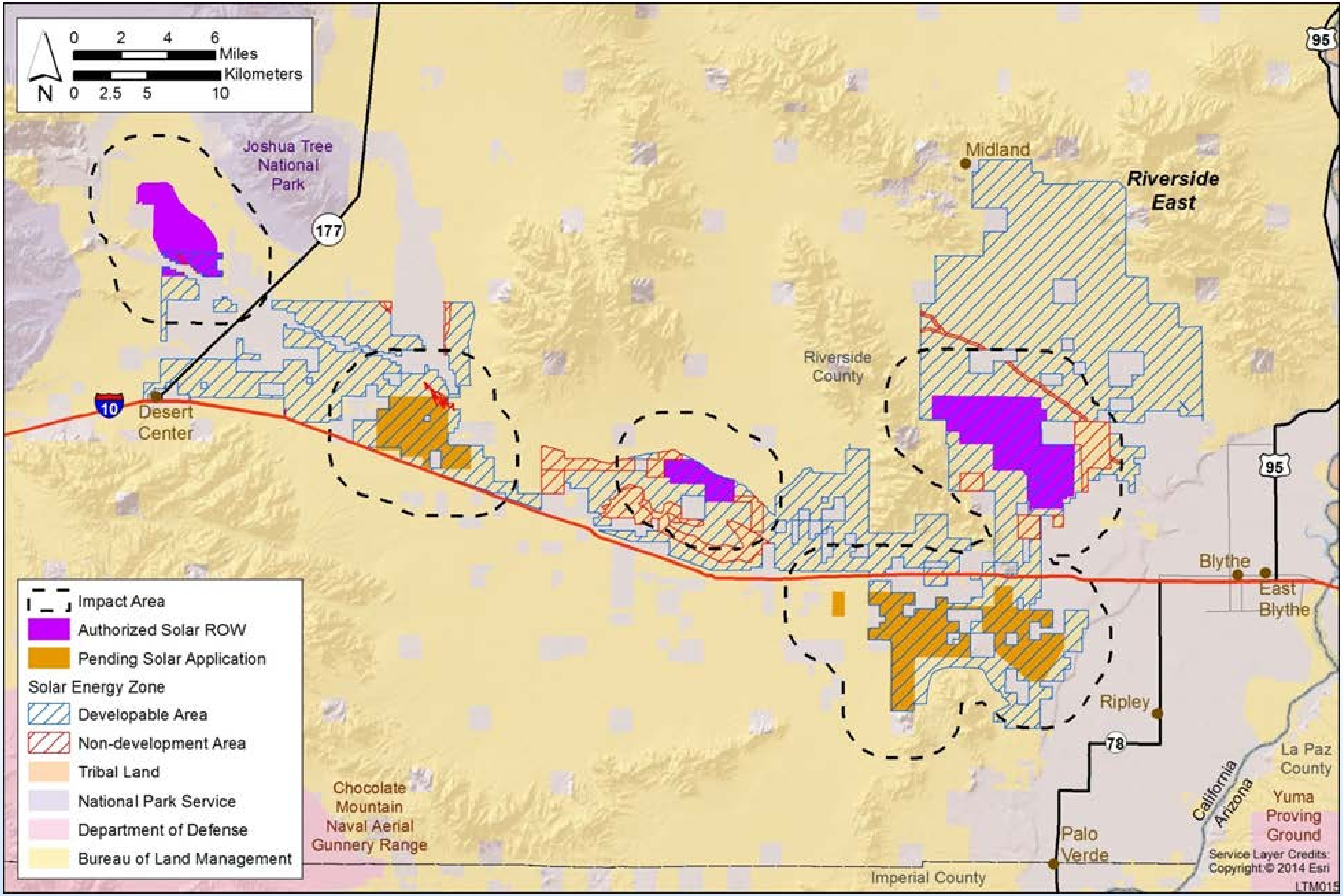
SAMPLING DESIGN AND DATA ANALYSIS

Three broad impact strata:

1) Solar buffer stratum consists of a 2-mi (3-km) buffer around existing and planned solar developments
   = the area of indirect effects that is feasible to monitor;
2) Outside-buffer stratum
   = remainder of the SEZ where impacts are uncertain, and
3) Reference stratum
   = remote sites not expected to be affected by solar development

Additional sampling stratification may be necessary to examine solar development impacts on specific soil and vegetation communities of high interest or value.

TWO-MILE SOLAR BUFFER STRATUM

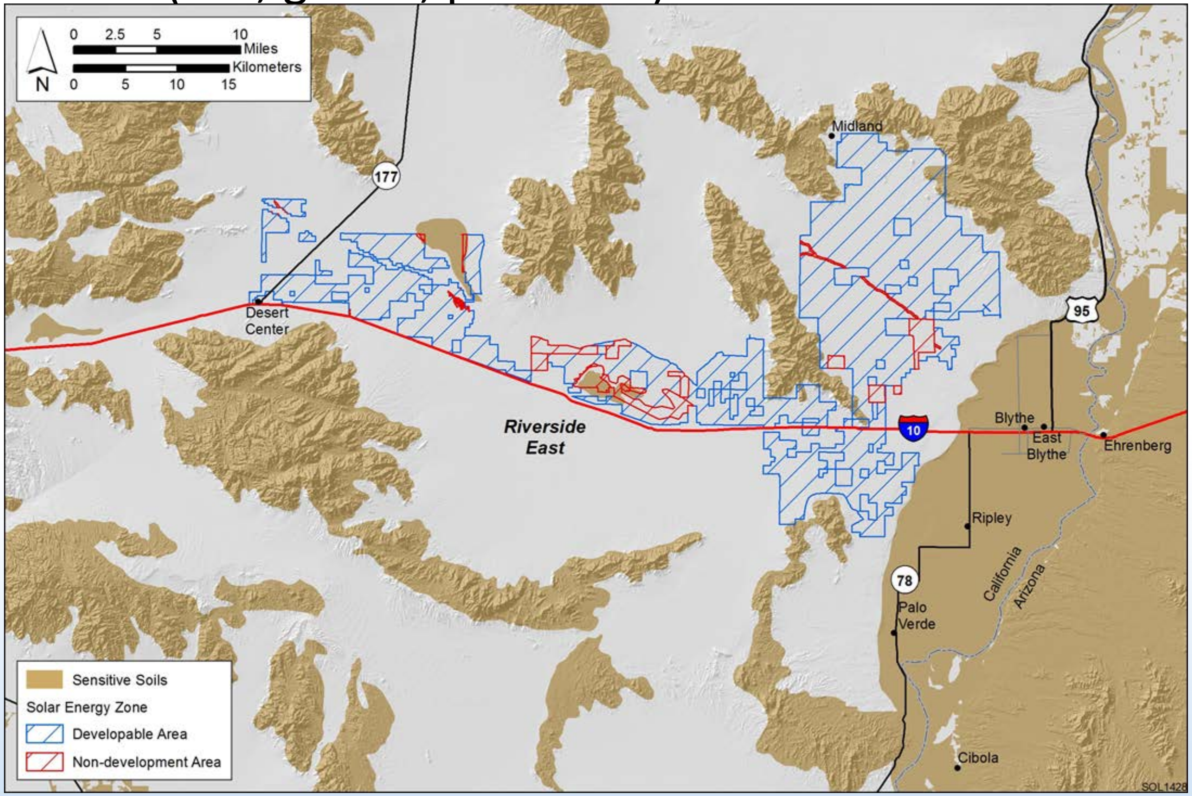


PHYSICAL RESOURCES INDICATORS: SOIL EROSION

Objective: Detect temporal changes of management significance in soil erosion/accretion relative to control areas.

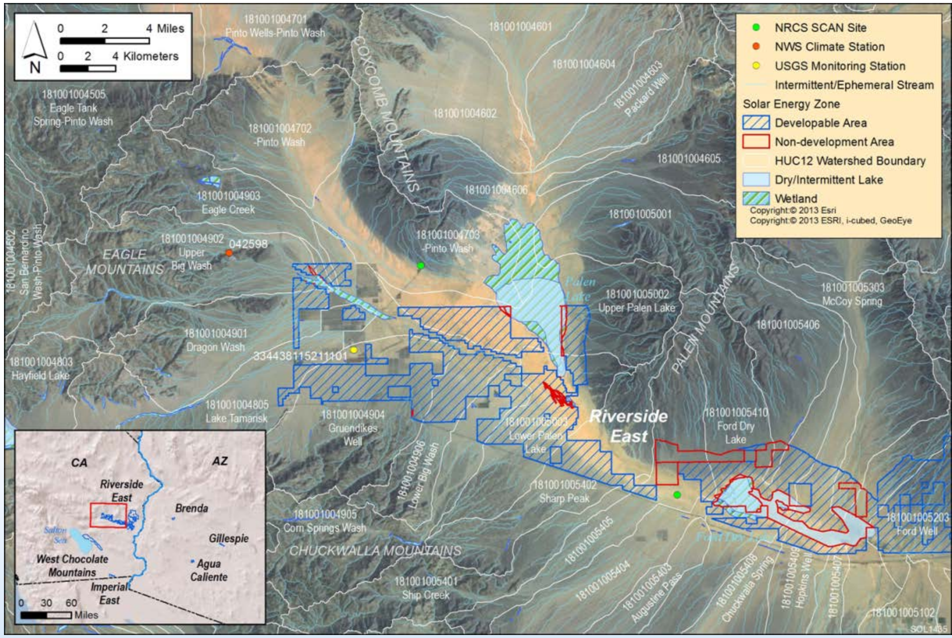
Indicators: Soil aggregate stability; texture, infiltration; depth

Method: AIM methods; qualitative photography and visual observations of signs of erosion (rills, gullies, pedestals)



PHYSICAL RESOURCES INDICATORS: STREAM EROSION

Objective: Detect temporal changes of management significance in stream channel location and morphology relative to control areas
Indicators: Stream channel depth, width, and location
Method: Ground-based or aerial photography to assess changes in channel morphology metrics at solar impact and reference areas



PHYSICAL RESOURCES INDICATORS: DUST

Objective: Detect temporal changes of management significance in soil erosion/accretion relative to control areas

Indicators: Dust

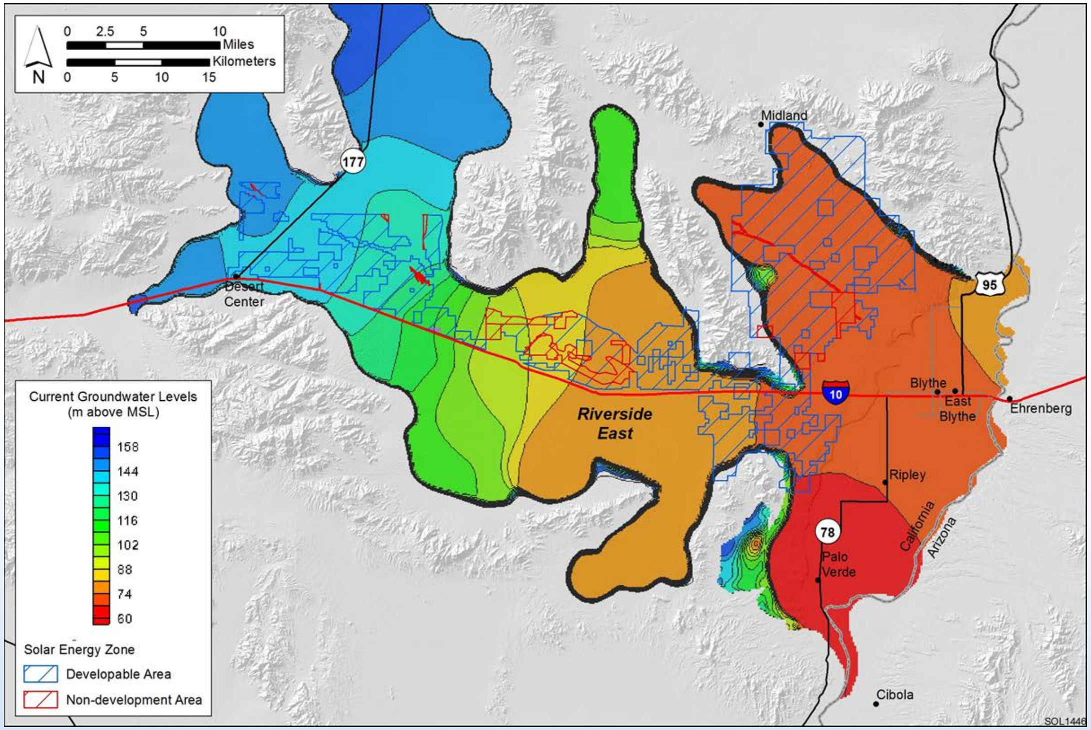
Method: Particulate matter (PM) monitoring

PHYSICAL RESOURCES INDICATORS: GROUNDWATER SURFACE ELEVATION

Objective: Detect temporal changes of management significance in groundwater surface elevations and spatial patterns.

Indicators: Groundwater elevation

Method: Well monitoring using electronic probe or programmable data-loggers; Evaluation of levels at monitoring wells through time

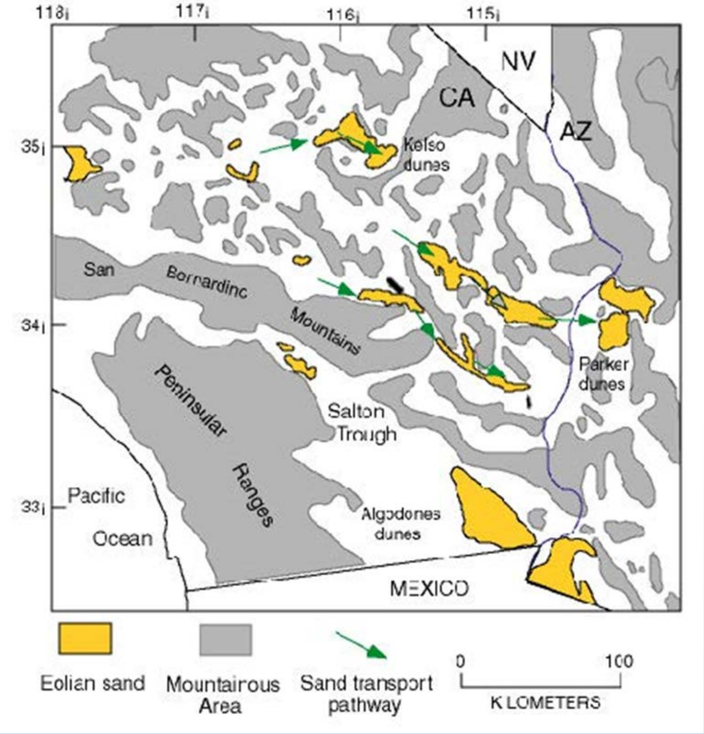


PHYSICAL RESOURCES INDICATORS: DESERT PAVEMENT AND SAND DUNES

Objective: Detect temporal changes of management significance in the cover and integrity of desert pavement and sand dunes relative to control areas.

Indicators: Desert pavement cover and integrity, dune cover, location, and sand transport rates.

Method: Quantify using remote sensing



BIOLOGICAL RESOURCES INDICATORS: BIOLOGICAL SOIL CRUST

Objective: Detect temporal changes of management significance in the cover of biological soil crust relative to control areas.

Indicators: Biological soil crust (BSC) cover

Method: Quantify cover of biological soil crusts using remote sensing and image analysis

BIOLOGICAL RESOURCES INDICATORS: VEGETATION COVER

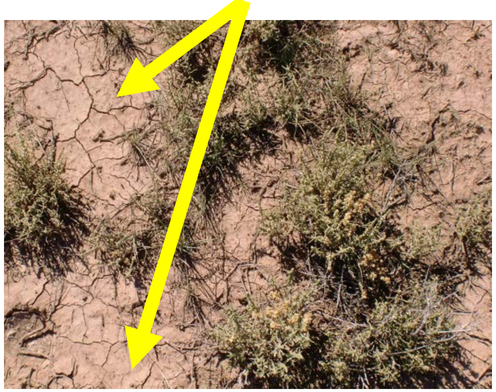
Objective: Detect temporal changes of management significance in rare and high-priority vegetation communities relative to control areas

Indicators: Vegetation cover

Method: Quantify cover of vegetation, using remote sensing and image analysis

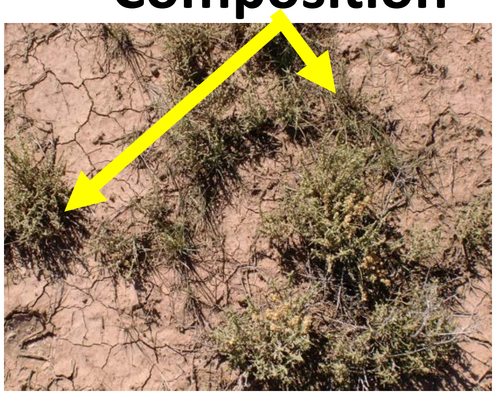
Objective: Detect temporal changes of management significance in AIM core indicators relative to control areas

Bare Ground



Example: 35% Bare Ground Cover

Vegetation Composition



Example: 10% Grass Cover; 20% Shrub Cover

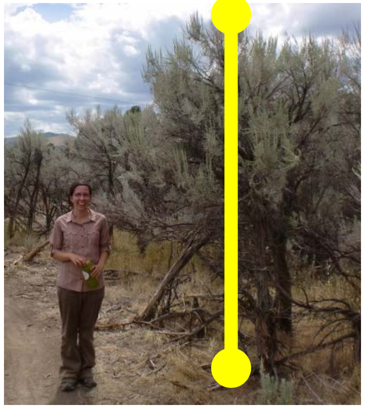
Plant Species of Mgmt. Concern

Example: Special Status Species is present

Nonnative Invasive Species

Example: 10% Cover of nonnative invasive species

Vegetation Height



Example: Sagebrush is 180 cm tall

Canopy Gaps

Example: 20% Cover of Canopy Gaps >20 cm

Methods: How to Measure Core Indicators

Line Point Intercept…

Bare Ground

Vegetation Composition

Plants of Mgmt. Concern

Nonnative Invasive Spp.

…with Height

Height

Gap Intercept

Canopy Gaps

BIOLOGICAL RESOURCES INDICATORS: WILDLIFE AND SPECIAL STATUS SPECIES

Objectives: Detect temporal changes of management significance in wildlife and special status indicator species relative to control areas.

Wildlife Indicator Species : Black-tailed gnatcatcher, loggerhead shrike, verdin, and kit fox



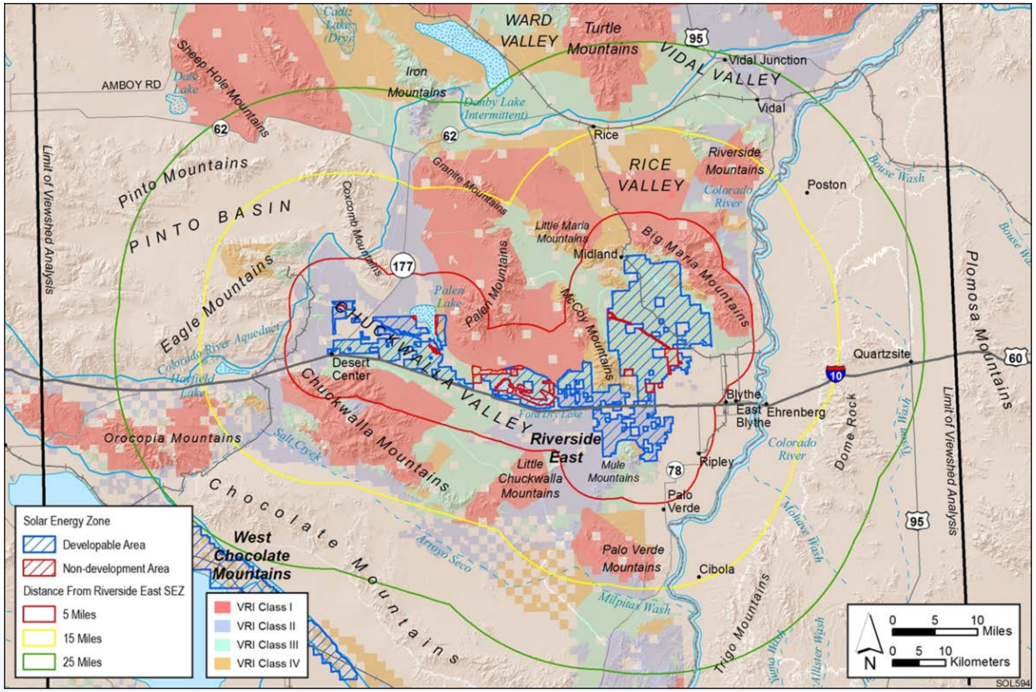
Special Status Indicator Species: desert tortoise, Mojave fringe-toed lizard, burro deer, and bighorn sheep

Method: Habitat monitoring using AIM and remote sensing methods; direct species monitoring methods differs by species (point counts; aerial surveys).


BIOLOGICAL RESOURCES INDICATORS: INVASIVE SPECIES

Objective: Detect invasive wildlife species within the SEZ.
Indicators: Raven and coyote abundance
Method: Methods for coyote abundance not specified; point count surveys for raven abundance

SOCIOCULTURAL RESOURCE INDICATORS: VISUAL RESOURCES



Objective: Detect temporal changes in VRI factors, VRI class, and visual contrast for Visually Sensitive Areas that include solar facilities within their viewsheds.

Indicators: Visual contrast at VSAs, VRI factors, and VRI class

Method: Field assessment, using the BLM Visual Contrast Rating (VCR) process at each key observation point (KOP) within a VSA; Determine changes from 2011 baseline inventory VRI class determined from the VRI factor ratings using BLM VRI handbook.

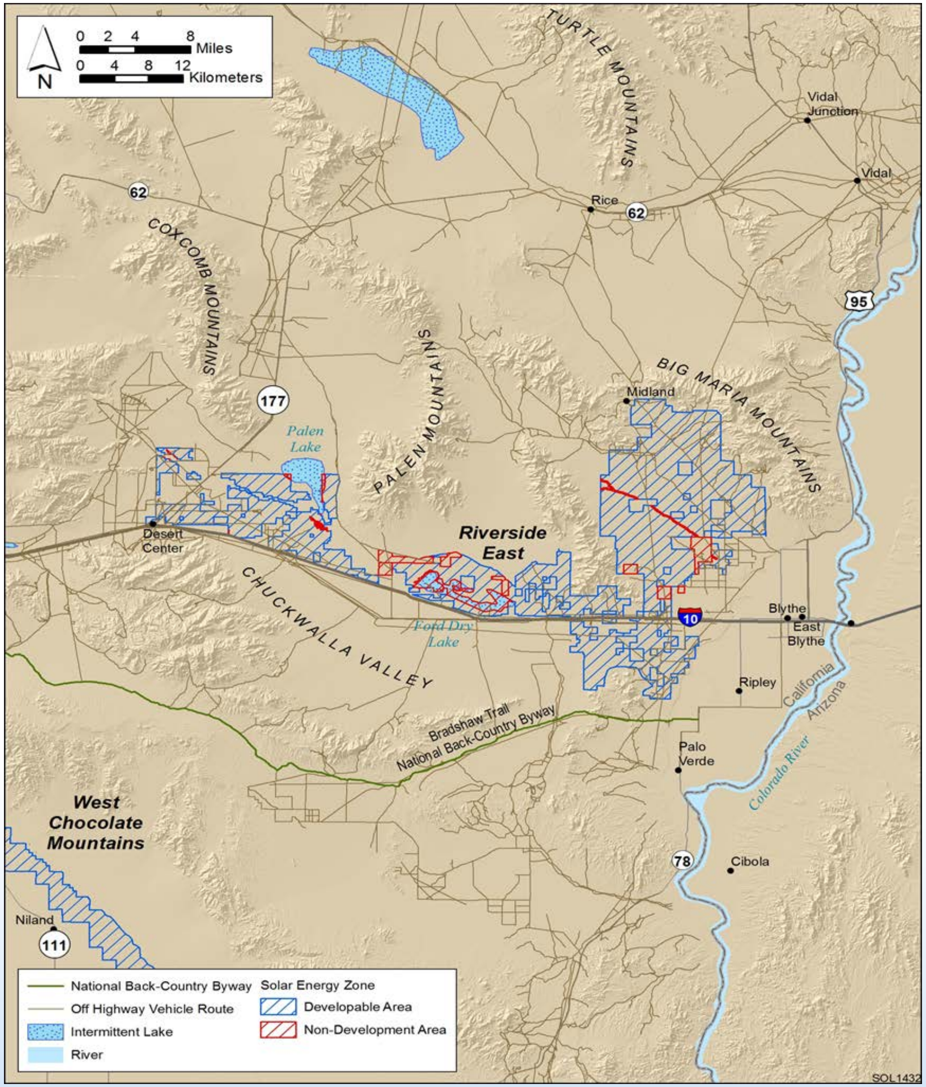
SOCIOCULTURAL RESOURCE INDICATORS: VISUAL RESOURCES

Objective: Detect temporal changes in skyglow, light spill, and light clutter.

Indicators: Nighttime Illumination (night sky)

Method: Estimation of limiting magnitude by star counts using Bortle scale or night sky meters; measuring brightness using charge-coupled device (CCD) images from an automated camera system

SOCIOCULTURAL RESOURCE INDICATORS: RECREATION AND TRAFFIC



Objective: Detect temporal changes of management significance in permit requests and visitation for long-term visitor use areas.

Indicators: Number of requested and issued use permits for the LTVA

Method: Midland LTVA data for the previous season should be collected after April 15 and prior to September 15 annually. Data currently collected by BLM.

SOCIOCULTURAL RESOURCE INDICATORS: RECREATION AND TRAFFIC

Objectives: Detect temporal changes of management significance in traffic within and near the SEZ.

Indicators: Traffic amount and distribution

Method: Calculate percentage change in traffic counts (data from the California DOT) and off-highway vehicle (OHV) traffic within the SEZ

SOCIOCULTURAL RESOURCE INDICATORS: CULTURAL RESOURCES AND PALEONOTOLOGY

Objectives: Detect temporal changes in number of impacts and contextual integrity of cultural and paleontological resource sites within the SEZ relative to control areas.

Indicators: Number of reported impacts on sites and areas of Native American concern

Method: Site stewards; monitoring of vehicles, footprints, tire and animal tracks, trash, spent ammunition, targets, fire pits/rings, camping; ground disturbance; incident reports from law enforcement officers, tribal representatives, and general public using photo documentation and a written record of impacts.

RIVERSIDE EAST LTMS COST

Long term funding for monitoring may be variable.

- BLM has already begun collecting priority baseline data, and will likely have funding available for additional baseline data
- Project developers will be responsible to monitor compliance with the terms of the authorization and the impact of ongoing operations
- BLM will seek additional resources from partner agencies and non-governmental organizations
- All future projects will be asked to contribute funding for LTMS which will fund resource monitoring across the entire SEZ.

RIVERSIDE EAST LTMS COST

Because of uncertainty in long-term funding, the LTMS:

- Relies on existing data collection efforts when appropriate
- Recommends the validation and use of remote sensing techniques when cost-effective
- Emphasizes pooling resources for monitoring, maximizing partnerships, and sharing data

RIVERSIDE EAST LTMS COST

Because of uncertainty in long-term funding, the LTMS:

- Prioritizes monitoring indicators based on:
  - Relevance for management
  - Level of public concern
  - Cost effectiveness

Applying funding to the higher-priority monitoring indicators first

Higher and Lower Priority Monitoring Indicators

Priority	Indicator (s)
Priority	**Physical Resource Indicators**
Higher	Soil aggregate stability, texture, infiltration, depth
Higher	Groundwater elevation
Higher	Particulate matter monitoring
Higher	Dune location and sand transport rates
	Biological Resources Indicators
Higher	AIM core indicators -Bare ground; Vegetation composition; plant species of mgmt. concern; nonnative invasive species; vegetation height; canopy gaps
	Sociocultural Resources
Lower	Visual Contrast at VSAs
Lower	Nighttime illumination (night sky)
Lower	VRI factors and VRI class
Lower	Number of long-term and short-term passes issued; number of visits and visitor days
Lower	Traffic amount and distribution
Lower	Number of reported impacts on paleontological resources

Questions?

Next Steps

Riverside East Monitoring and Adaptive Management Pilot

Next Steps:

- Please send comments to lfox@anl.gov
- Deadline: November 30,2015
- Revision for the final LTMS based on public comments