New Mexico Solar Regional Mitigation Strategy Background and Purpose for the Workshop

Presented by:
Konnie Wescott and Heidi Hartmann
Argonne National Laboratory

New Mexico Solar Regional Mitigation Strategy Workshop
Las Cruces, NM
May 3, 2016

Presentation Outline

- Background:
  - What is utility-scale solar development?
  - Extent and scale of BLM solar project approvals
  - BLM's Solar Energy Program

- Workshop Purpose: Discuss Regional Compensatory Mitigation
  - What is regional compensatory mitigation?
  - Why is stakeholder involvement critical?

- Sources of Information

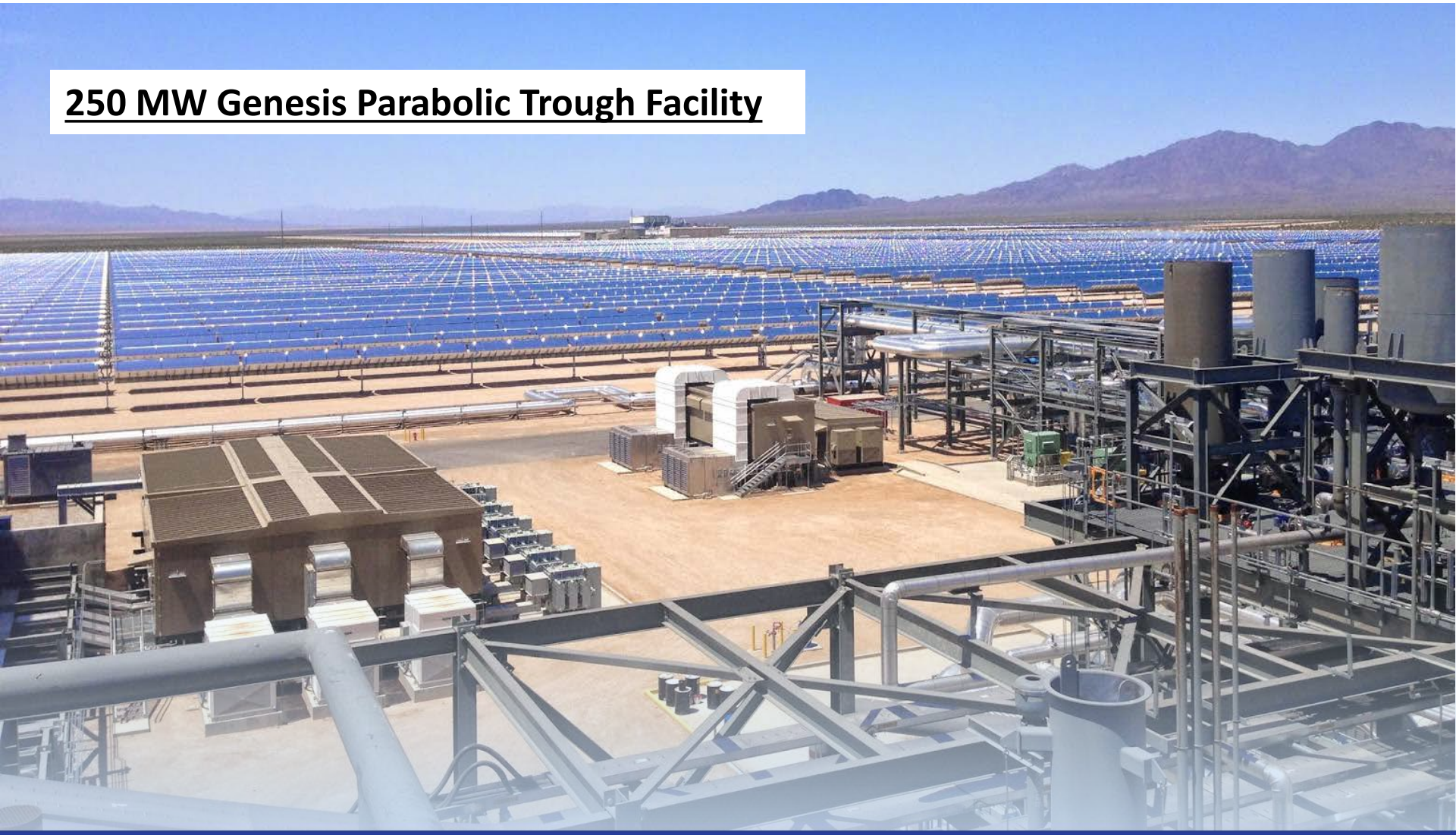
What is utility-scale solar development?

- Large solar fields – 20+ megawatt (MW); requires from 5-10 acres per MW
- Three main technologies – 1) photovoltaic (PV), 2) parabolic trough, and 3) power tower

Desert Sunlight Solar Farm (PV)

- 550-MW project on 4,165 acres of public land
- 6.5 square miles of single land use

What is utility-scale solar development? (cont.)



What is utility-scale solar development? (cont.)

Ivanpah Solar Energy Generation Station (SEGS)

- 3 Concentrating Solar Power Towers (370 MW)
- $2.8B project on 3,472 acres (5.5 mi^2) of public land

Background: Extent/Scale of Solar Project Approvals

- Since 2009 BLM has approved 40 projects (some subsequently terminated by developers)
  - 32 Photovoltaic (PV) Projects (8,433MWs)
  - 4 Power Tower Projects (730 MWs)
  - 3 Parabolic Trough Projects (964 MWs)
  - 1 Solar Dish Engine Project (terminated)

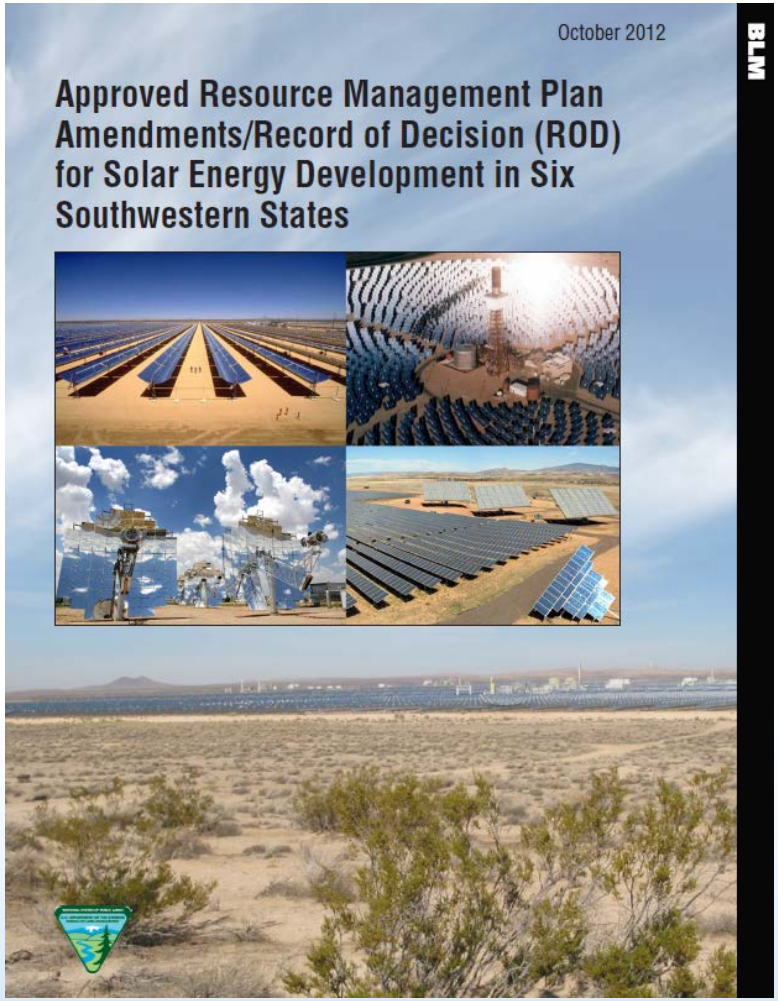
Background: BLM's Solar Energy Program

In 2012, BLM and DOE completed a Solar Development PEIS and ROD:

- Six States: **AZ, CA, CO, NM, NV**, and **UT**
- Identified 17 Solar Energy Zones
- Identified 19M Acres of Variance Lands
- Amended 89 BLM Land Use Plans
- Established Standard Design Features / Development Requirements
- Strengthened BLM Policy, Procedures and Enhanced the Program Implementation
- Identified a planning process to address impacts not addressed by Design Features (avoidance and minimization measures)

Post ROD BLM:

- Initiated BLM Solar Regional Mitigation Strategy starting in NV (Dry Lake SEZ)
  - Recently completed strategies in AZ and NV
  - Ongoing in CO and starting in UT and NM



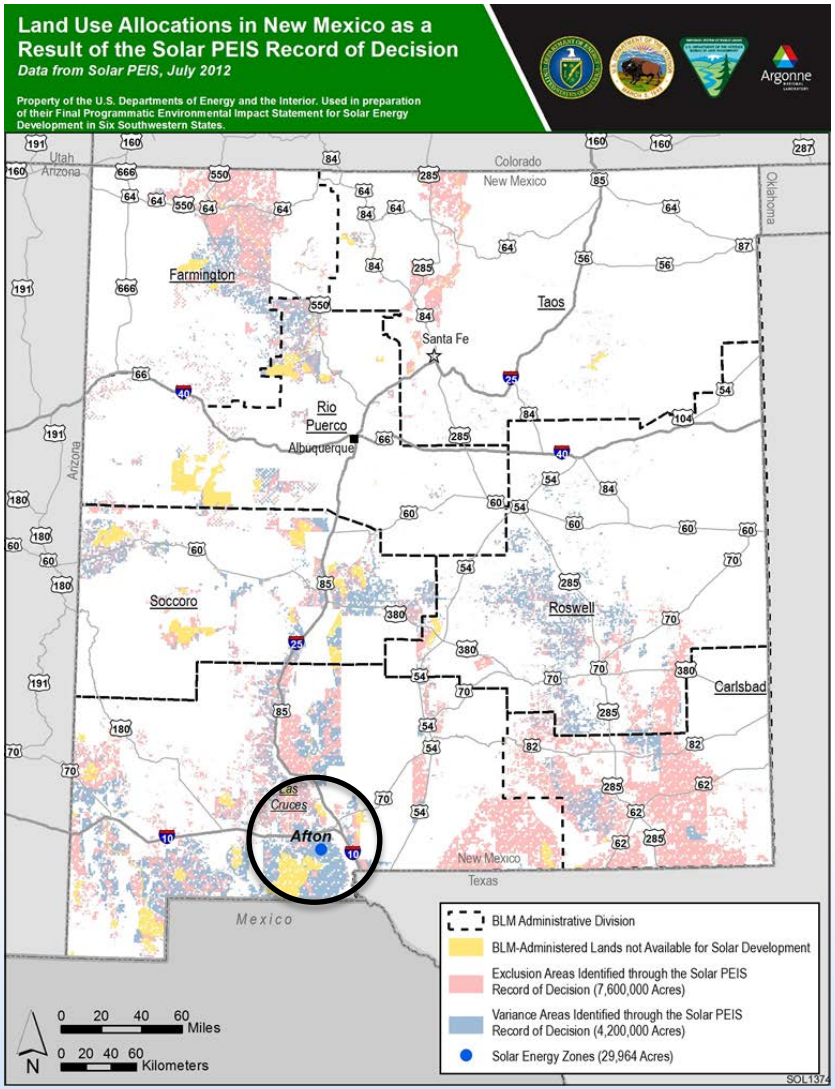
Background: BLM's Solar Energy Program (cont'd)

For BLM New Mexico public lands the Solar PEIS and ROD established:

4.2 M acres of solar variance lands

- 1.4 M acres within the Las Cruces District Office

Afton SEZ: 29,964 acres (121 km^2)



What is Regional Compensatory Mitigation?

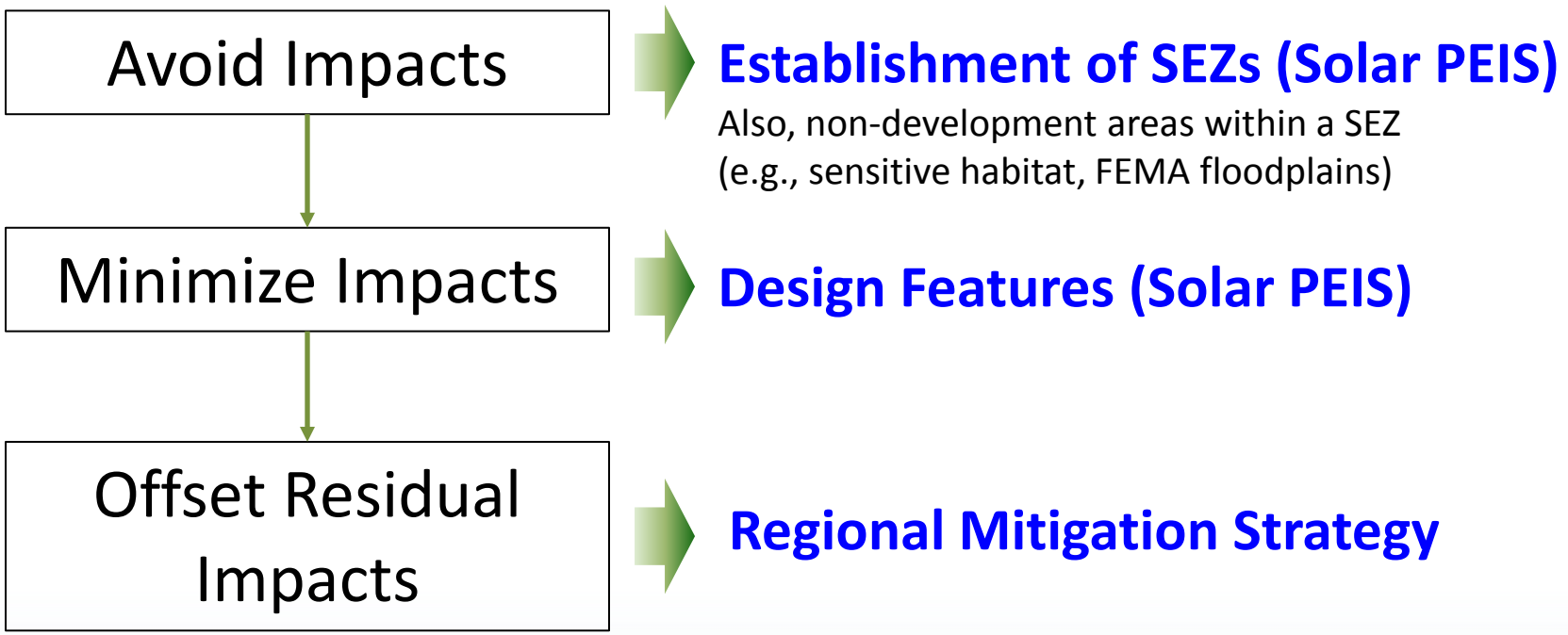
- A landscape-level approach for addressing residual/unavoidable impacts
- Commitment made in BLM's Solar Energy Program
- Workshop is first step in the development of a regional mitigation strategy for the Afton Solar Energy Zone
  - **Collaborative effort with stakeholders**
- **Purpose of this workshop:**
  - **identify residual impacts of solar development in the SEZ**
  - **walk stakeholders through next steps in the process for determining if compensatory mitigation is warranted**

What is a Regional Compensatory Mitigation Strategy?

- It is a RECOMMENDATION that will inform future project-specific NEPA analysis

- To the extent possible, impacts will be AVOIDED and/or MINIMIZED ONSITE

BLM Mitigation Hierarchy: Focusing our Discussion



Why is Stakeholder Involvement Critical?

- Our aim is to reach multiple stakeholders
  - Federal and state agencies
  - County government
  - Local public
  - Conservation organizations
  - Tribes
  - Solar industry
  - Public land users
  - Others
- BLM-Argonne Team goal is to share, listen, learn, and apply

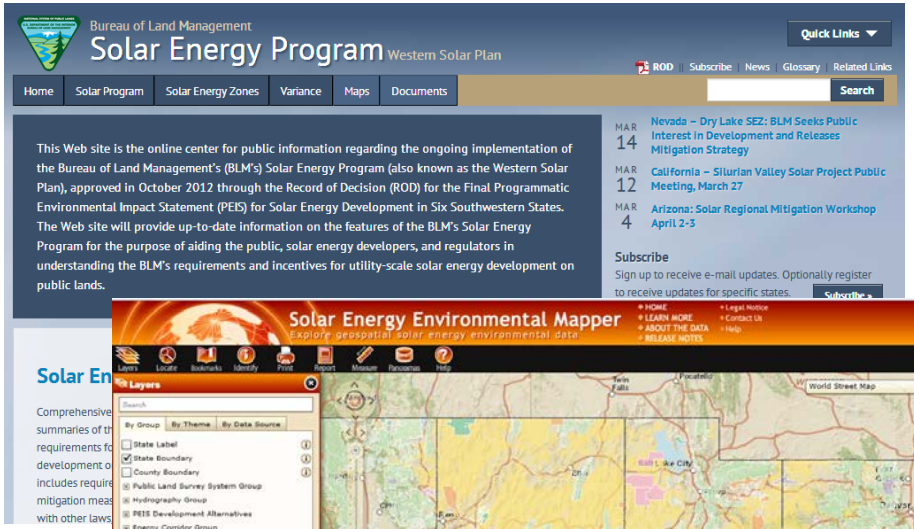
Photos from Nevada Dry Lake SEZ SRMS Pilot

Useful Websites

BLM Solar Program Website: **http://blmsolar.anl.gov**

Solar Mapper: **http://solarmapper.anl.gov**

New Mexico SEZ SRMS Project Website: **http://www.blm.gov/nm/st/en/prog/energy/alternatives/afton_sez.html**



BLM Solar Program Website: http://blmsolar.anl.gov

Online resource sharing information about BLM's program implementation

Solar Energy Program

- Authorization Policies
- Design Features
- Exclusions
- Laws, Orders, and Regulations
- Forms and Templates
- Pending Solar Applications
- Application Processing Flowchart

Solar Energy Zones (SEZs)

- Policies
- Competitive Leasing for SEZs
- Identification Protocol for New SEZs
- Withdrawal of SEZ Lands
- Arizona
- California
- Colorado
- Nevada
- New Mexico
- Utah

Variance Areas

- Variance Process
- Variance Applications

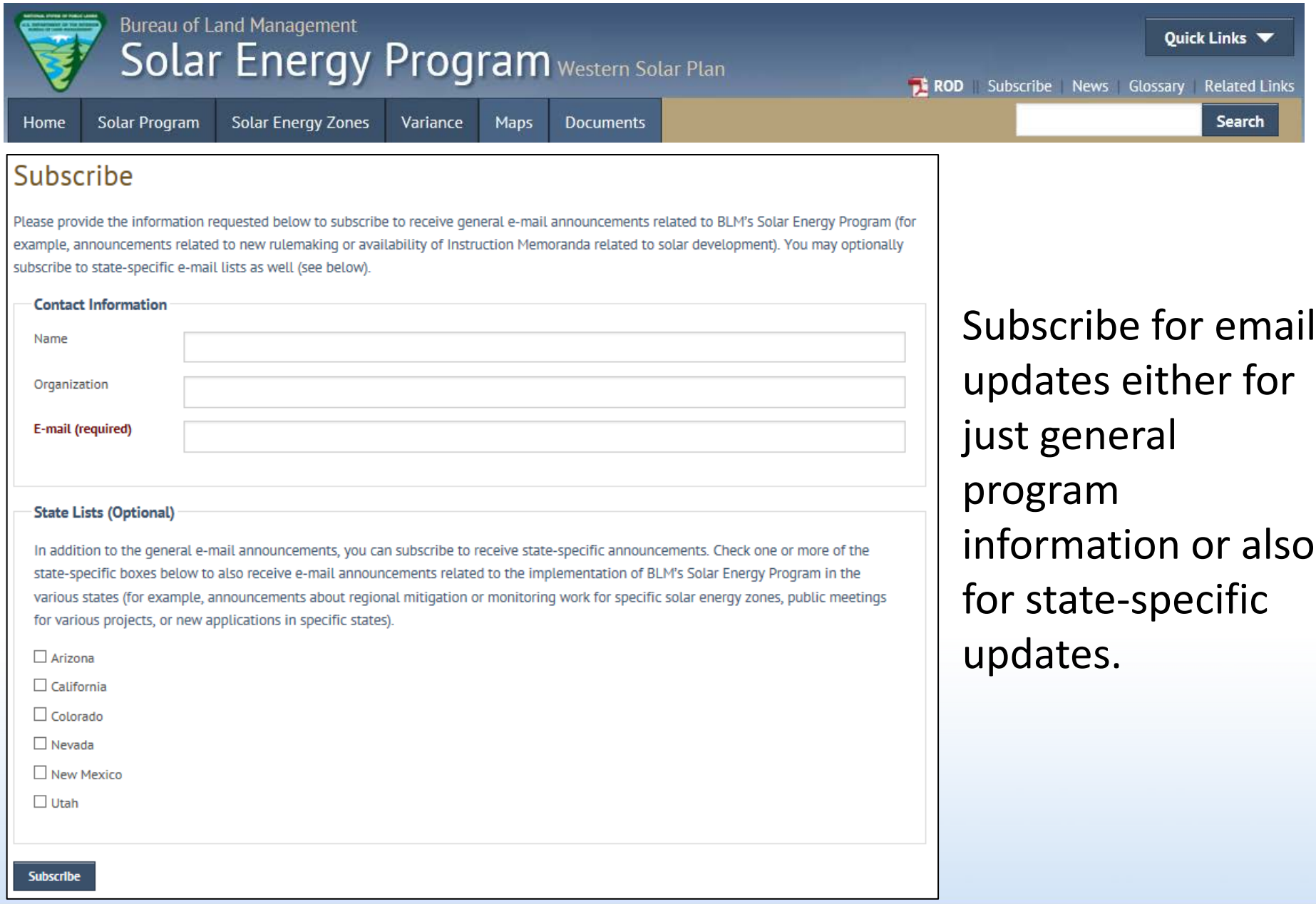
Solar Program Maps

- Solar Program-Related Maps
- ArcReader GIS Application
- GIS Shape Files

Menus for each major page direct you to relevant information.

There is a page dedicated to each state with a subpage for each SEZ.
News items are posted to share updates

- For each SEZ, a webpage provides:
  - Development status
  - Size and location
  - Physical characteristics
  - Technical suitability
- Maps
- Links to relevant sections in Solar PEIS
- Subpages dedicated to
  - Minerals report
  - Monitoring and adaptive management strategies



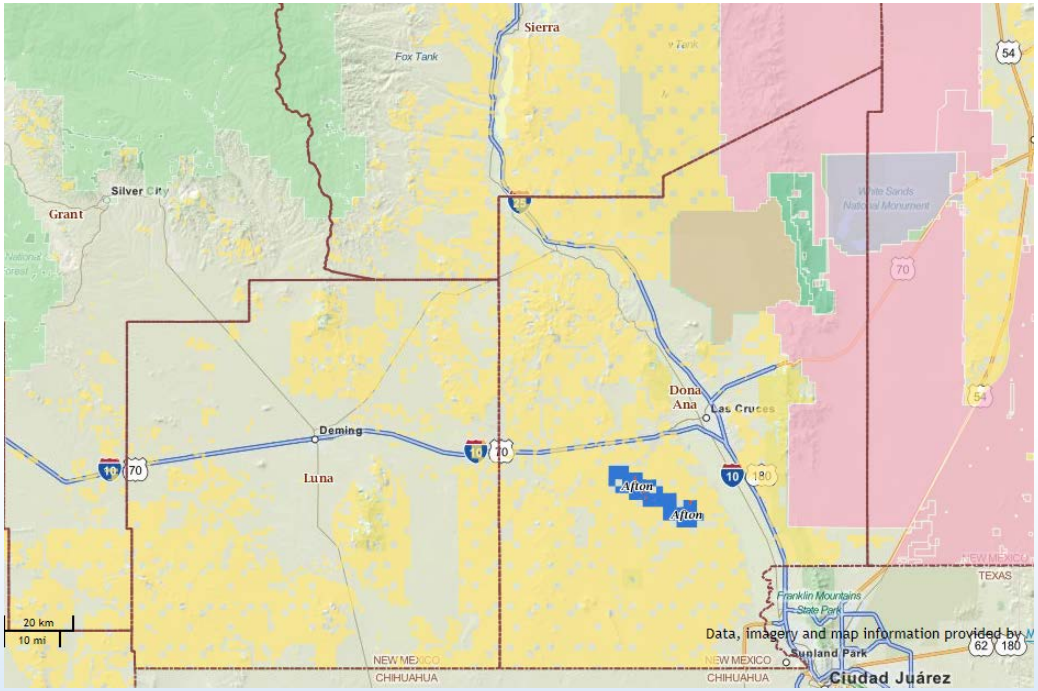
Subscribe for email updates either for just general program information or also for state-specific updates.

Solar Energy Environmental Mapper: *– An Interactive, Web-Based Tool Providing Access to Spatial Data Relevant to BLM's Solar Energy Program*

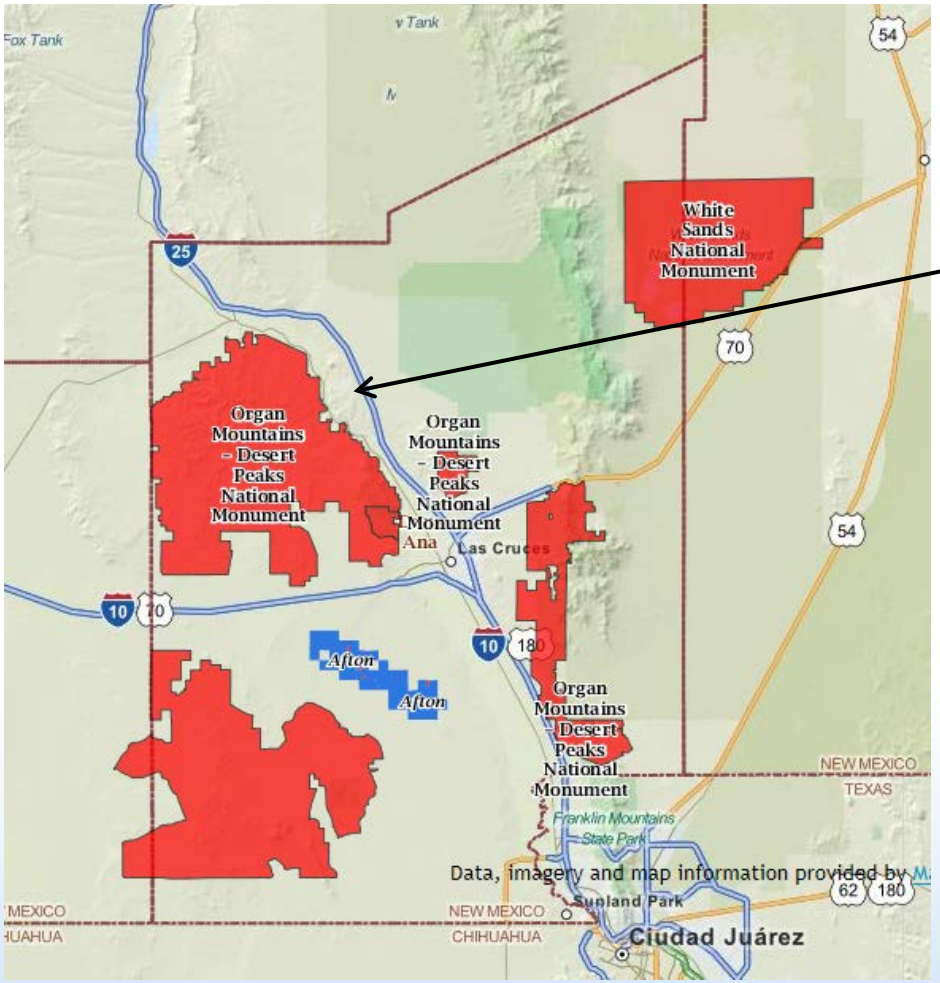
Available at **http://solarmapper.anl.gov**

- Siting information on utility-scale solar projects in six southwestern states.

Data Layers Include Surface Management, Protected Resources, and Program Designations (for example, variance areas and solar exclusions



BLM Solar Program Designations and Surface Management



Metadata and summary information are available for each data layer.

Info

Name	Value
National Monument	
Organ Mountains - Desert Peaks National Monu	
OGC FID	210
Surface Management Agency Abbreviation	
Name	Organ Mountains - Desert Peaks National Monument
Source	16
Edit Date	1/19/2016
County Boundary	
Dona Ana	
County	Dona Ana
State	New Mexico
State FIPS Code	35
County FIPS Code	013
5 Digit FIPS Code	35013
Square Miles	3814.62005
Acreage	2441570.48719086

QUESTIONS?

Solar Regional Mitigation Strategy Process

Presented by:
Bill Werner, BLM Arizona State Office
New Mexico Solar Regional Mitigation Strategy Workshop
Las Cruces, NM
May 3, 2016

Progression of Mitigation for Solar Energy Zone Development

- Solar Programmatic EIS ROD
  - Established Solar Energy Zones (SEZs) and Variance Areas
  - Identified impact Avoidance and Minimization Measures (Design Features)
  - Identified a process to address impacts not addressed by Avoidance and minimization measures
- **Solar Regional Mitigation Strategy (by Solar Energy Zone)**
  - **planning process to address impacts not addressed by Avoidance and Minimization measures**
- Pre-Auction National Environmental Policy Act Analysis
  - Decision on per acre fee
  - Decision on parcels to be auctioned
- Project Level National Environmental Policy Act Analysis (after BLM receives and application)
  - Identifies impacts of project based on project specific facts
  - Applies Design Features
  - Identifies actions and sites for compensation of residual impacts
  - Authorizes project

SRMS Process

- Element 1: Identify residual adverse impacts
- Element 2: Identify residual adverse impacts warranting compensatory mitigation
- Element 3: Identify regional mitigation goals
- Element 4: Recommend compensatory mitigation amount
- Element 5: Recommend management strategy for compensatory mitigation funds
- Element 6: Recommend potential compensatory mitigation actions and locations
- Element 7: Recommend regional effectiveness monitoring and adaptive management

Element 1: What are the potential residual impacts on the Afton SEZ? Examples Include:

Yes

- Vegetation
- Terrestrial Wildlife/Aquatic Biota
- Migratory Birds
- Special Status Animal Species
- Specially Designated Areas
- Visual Resources
- Livestock grazing

Maybe

- Xero-Riparian Areas
- Invasive/Noxious Weeds
- Special Status Plant Species
- Tribal Concerns
- Soils/Erosion

Element 2: What are the potential residual impacts that warrant regional compensatory mitigation?

Summer 2016 stakeholder webinar to review and discuss residual impacts that may warrant regional compensatory mitigation

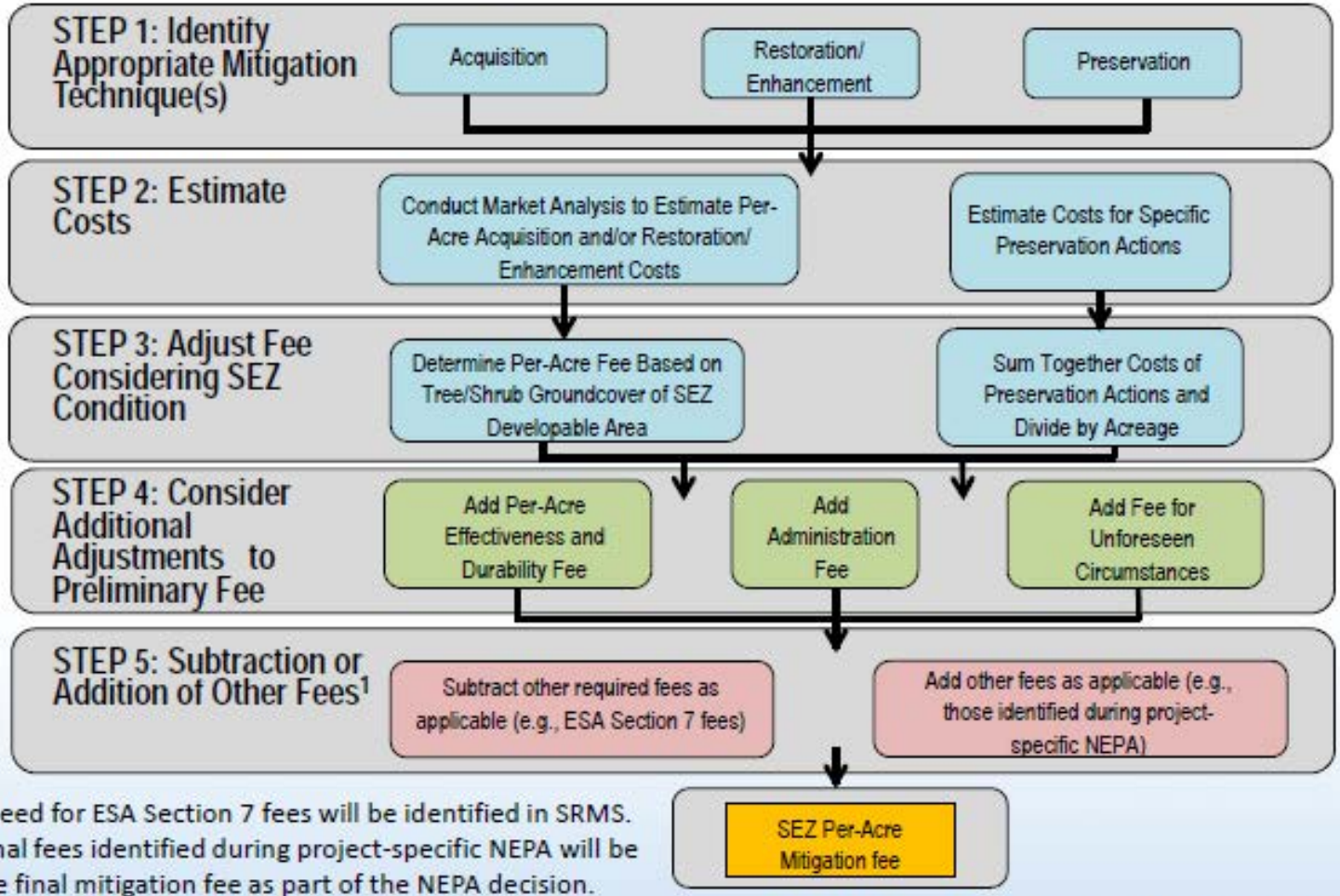
Examples could include:

- Loss of Special Status Species Habitat
- Loss of Ecosystem Services (from loss of vegetation, wildlife, etc.)

Element 3: Mitigation Goals

- Summer 2016 stakeholder webinar to discuss regional mitigation goals
- Review of regional goals considered in resource management planning efforts
- Review of regional goals in other relevant planning documents in the area

Element 4: Identify a Method for Calculating Recommended Mitigation Fees



[1]Potential need for ESA Section 7 fees will be identified in SRMS. Any additional fees identified during project-specific NEPA will be added to the final mitigation fee as part of the NEPA decision.

Example from Arizona SRMS

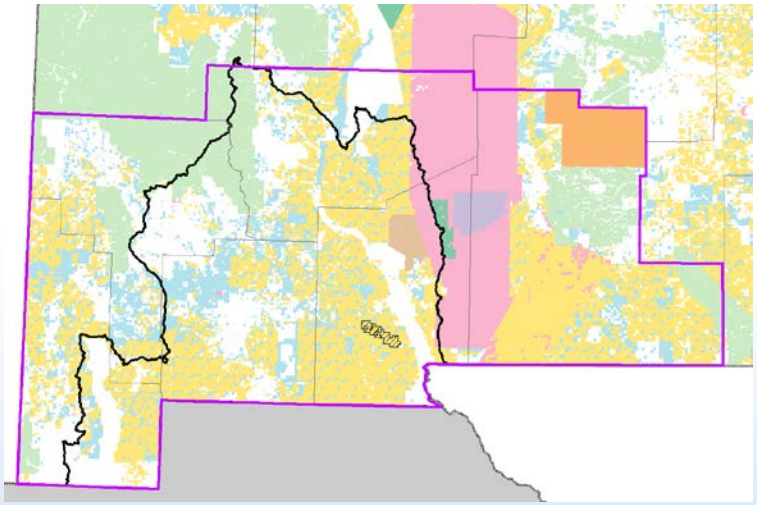
Element 5: Identify & Recommend a Management Structure to Hold & Apply Mitigation Funds

BLM will select management options consistent with:

- the BLM's interim regional mitigation policy, draft Manual Section 1794, issued June 13, 2013 and
- DOI's Departmental Manual Part 600 DM 6 Landscape-Scale Mitigation Policy (DOI 2015), issued October 23, 2015.

Element 6: Evaluate & Recommend Appropriate Mitigation Actions and Locations

- Summer 2016 webinar to request stakeholder recommendations for actions and/or locations for regional mitigation
- Fall 2016 workshop to review recommended candidate mitigation actions and locations



SRMS study region (black line) within the LCDO

- Criteria for ranking alternative locations
  - Same region and state
  - Opportunities to achieve mitigation goals
  - Resource emphasis consistent with Resource Management Plan
  - Potential for durability of mitigation investment
  - Actions are 'additive'

Element 7: Develop Mitigation Monitoring and Adaptive Management Plan

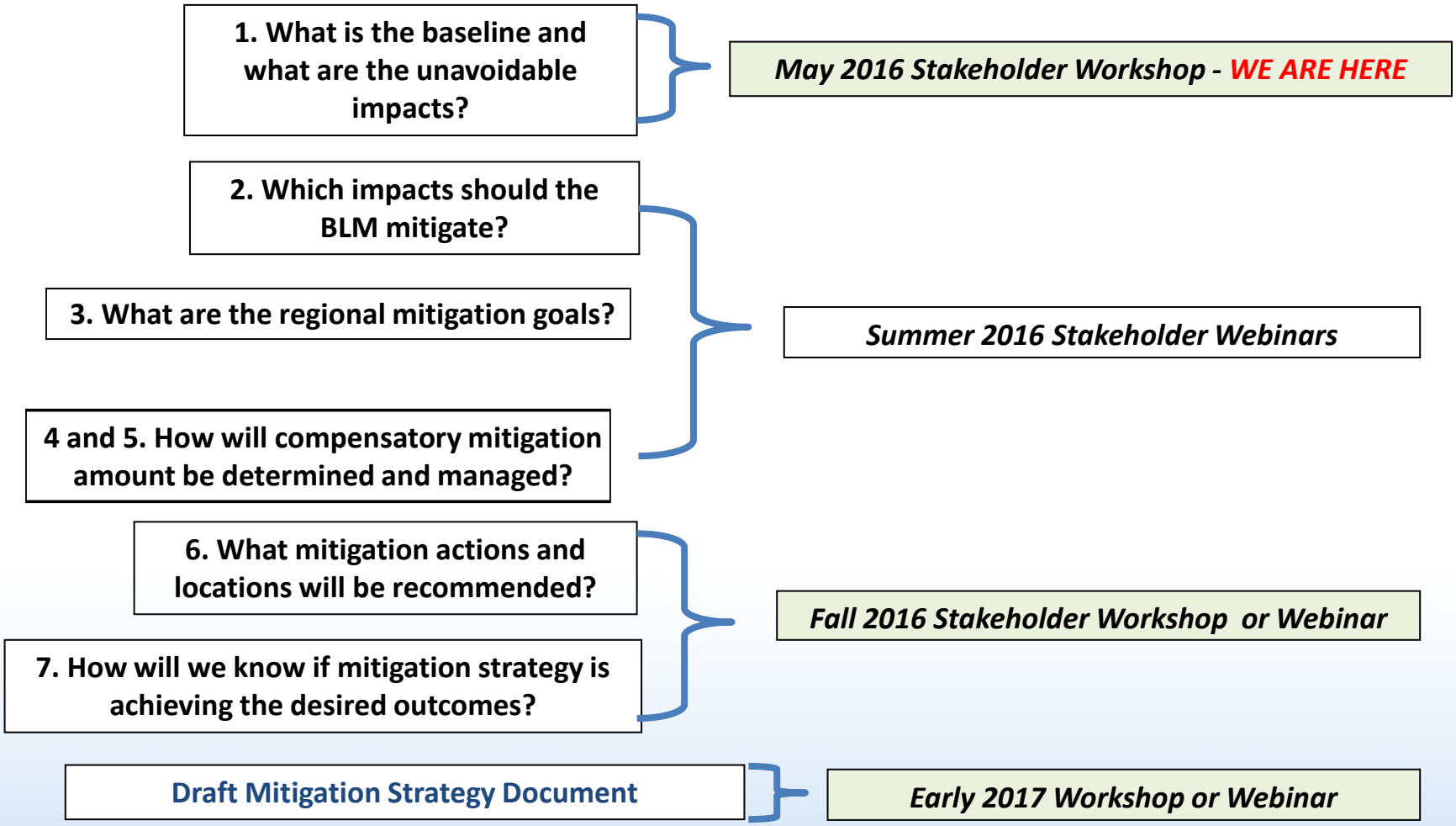
Monitoring & Assessment

- How do actual impacts compare to projected impacts?
  - Are design features effective?
- Do regional mitigation actions achieve the desired outcomes?
- Is there a change in regional trends?

Adaptive Management

- What if not achieving desired results?

SRMS Process – Schedule for 7 Elements



Overview of Afton Solar Energy Zone

Presented by:

Jennifer Montoya, BLM Las Cruces District Office

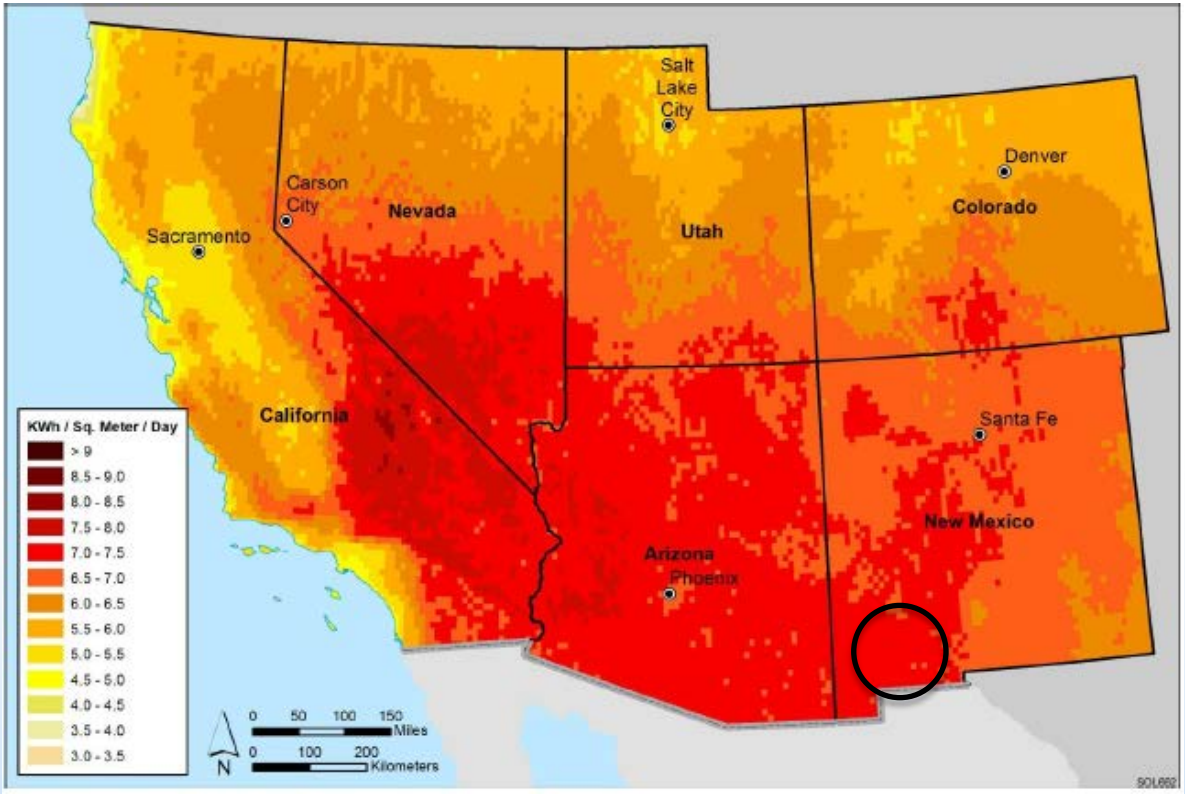
New Mexico Solar Regional Mitigation Strategy Workshop

Las Cruces, NM

May 3, 2016

Afton Solar Energy Zone (SEZ)

- In an area of high solar radiation and low-slope on BLM-administered lands
  - 29,964 developable acres in Doña Ana County



Solar Insolation Levels in 6 SoutSolarhwestern States. (Note: must be >6.5 in SEZs)

Slope in solar energy zones must be less than 5%

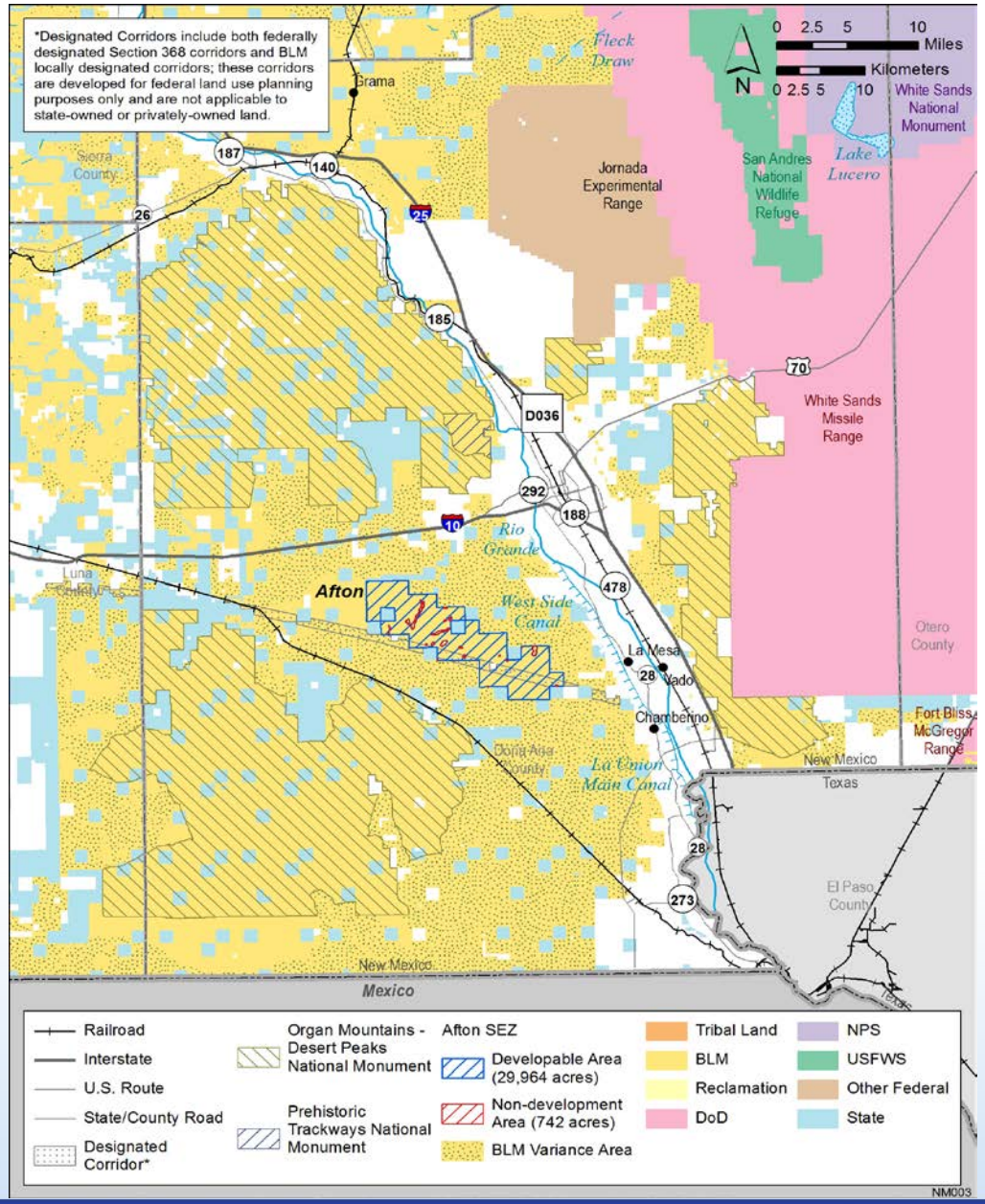
Afton Solar Energy Zone (SEZ)

- BLM's Solar Program committed to development of regional mitigation strategies for all SEZs

- Regional approach uses baseline condition data for larger area around an SEZ

South of the SEZ-
Aden Crater and the West Potrillos

Afton Solar Energy Zone



Afton SEZ

Panoramic view of the Afton SEZ from the northern boundary facing east toward Organ Mountains

Panoramic view of the Afton SEZ from Little Mountain Facing West

Solar Energy Development Near the Afton SEZ

Las Cruces Centennial Solar Farm in Las Cruces is approximately 3 miles north of the Afton SEZ

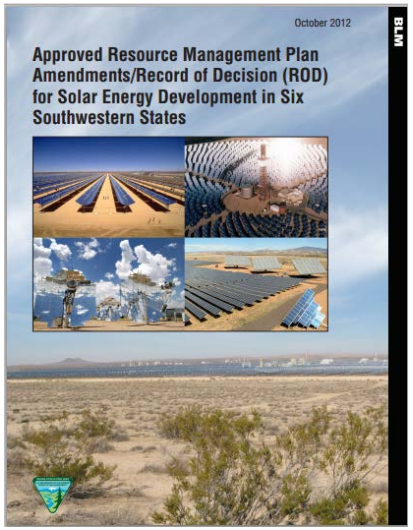
- 12 MW
- 140 acres

Example of Solar Energy Development on BLM Lands

Desert Sunlight

- 550 MW
- 4000 acres

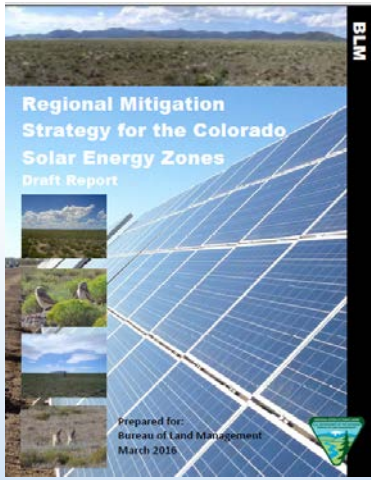
Data Sources and Guidance



- The BLM Solar Programmatic EIS (2012)

- Other SRMSs:
  - Dry Lake SEZ, Nevada - BLM Technical Note 444 (2013)
  - Arizona SEZs (2016)
  - Colorado SEZs (Draft) (2016)

- BLM Interim Policy - Regional Mitigation Manual 1794;
- DOI Strategy for Mitigation (2014);
- Presidential Memorandum on Mitigating Impacts on Natural Resources (2015)



Baseline Conditions in the Region

- Regional baseline conditions will be compared to conditions expected after solar development
- Baseline data facilitate evaluation of regional mitigation needs
- Collected from local, state, and federal sources, both public and private
- Public is invited to suggest additional data sources

Recent Changes in the Las Cruces District Office

Considerable change in the area since the 2012 BLM Solar PEIS, including:

- Designation of a large new National Monument.
- New information for many resources in the SEZ, such as surveys of a sensitive cactus.
- Improved vegetation maps.
- New proposed activities, such as the Southline Transmission Project.
- Dozens of utility scale solar farms have been built in the desert southwest that we can learn lessons from.

Potential Impacts of Solar Development in the Afton Solar Energy Zone

Presented by:
BLM Interdisciplinary Team, Las Cruces District Office
and Argonne National Laboratory

New Mexico Solar Regional Mitigation Strategy Workshop
Las Cruces, NM
May 3, 2016

20+ resource areas were evaluated in the Solar PEIS:

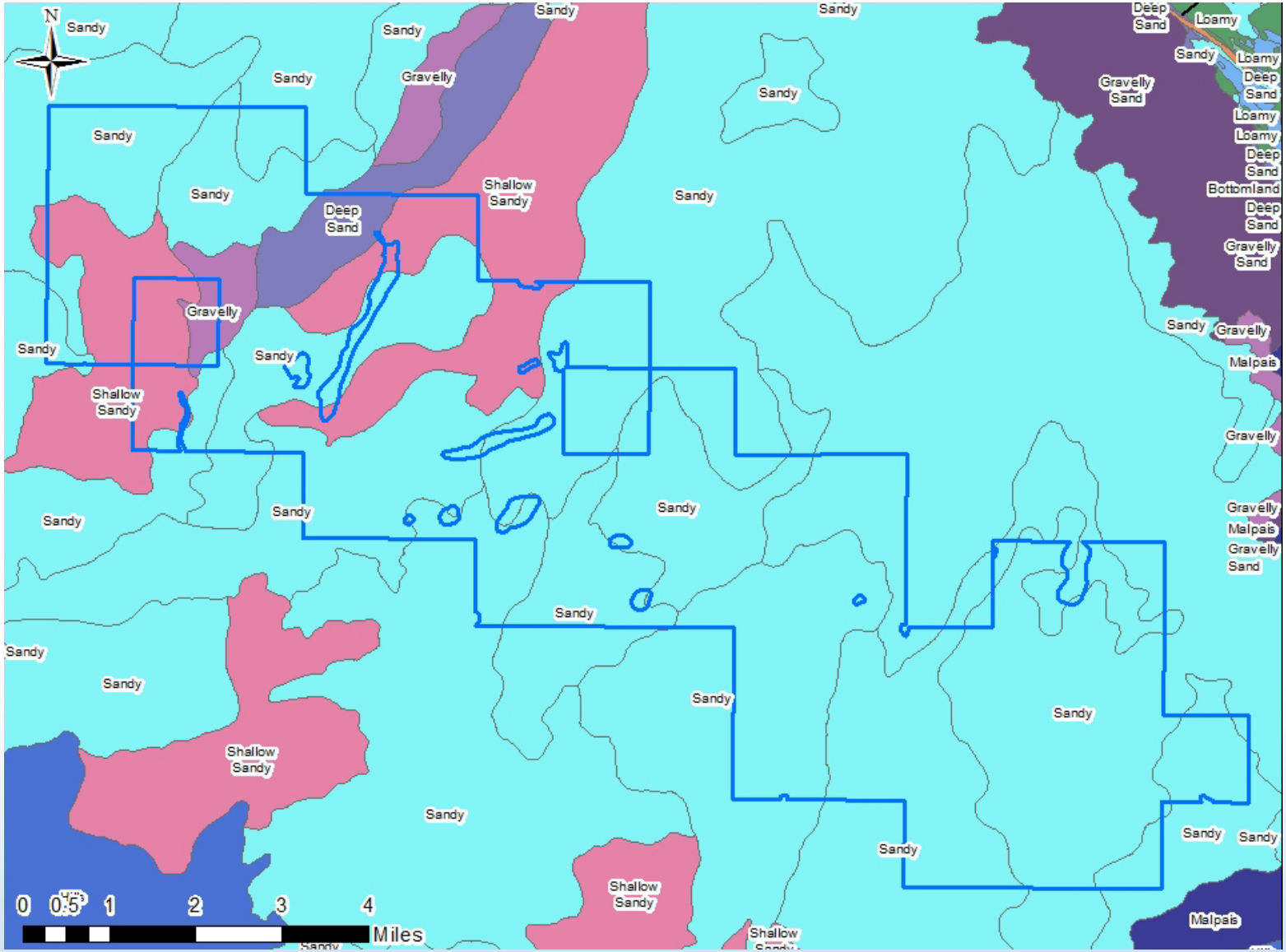
Acoustics	Air Quality and Climate Change	Cultural	Vegetation and Xero-Riparian Areas
Terrestrial Wildlife and Aquatic Biota	Migratory Birds	Special Status Species	Invasive and Noxious Weeds
Lands and Realty	Rangeland Resources - Grazing and Wild Horses	Minerals	Military and Civilian Aviation
Hydrology: Surface and Groundwater	Paleontology	Public Access and Recreation	Socioeconomics
Environmental Justice	Soils/Erosion	Tribal Concerns	Transportation
Specially Designated Areas/Lands with Wilderness Characteristics	Visual		

Soils/ Erosion

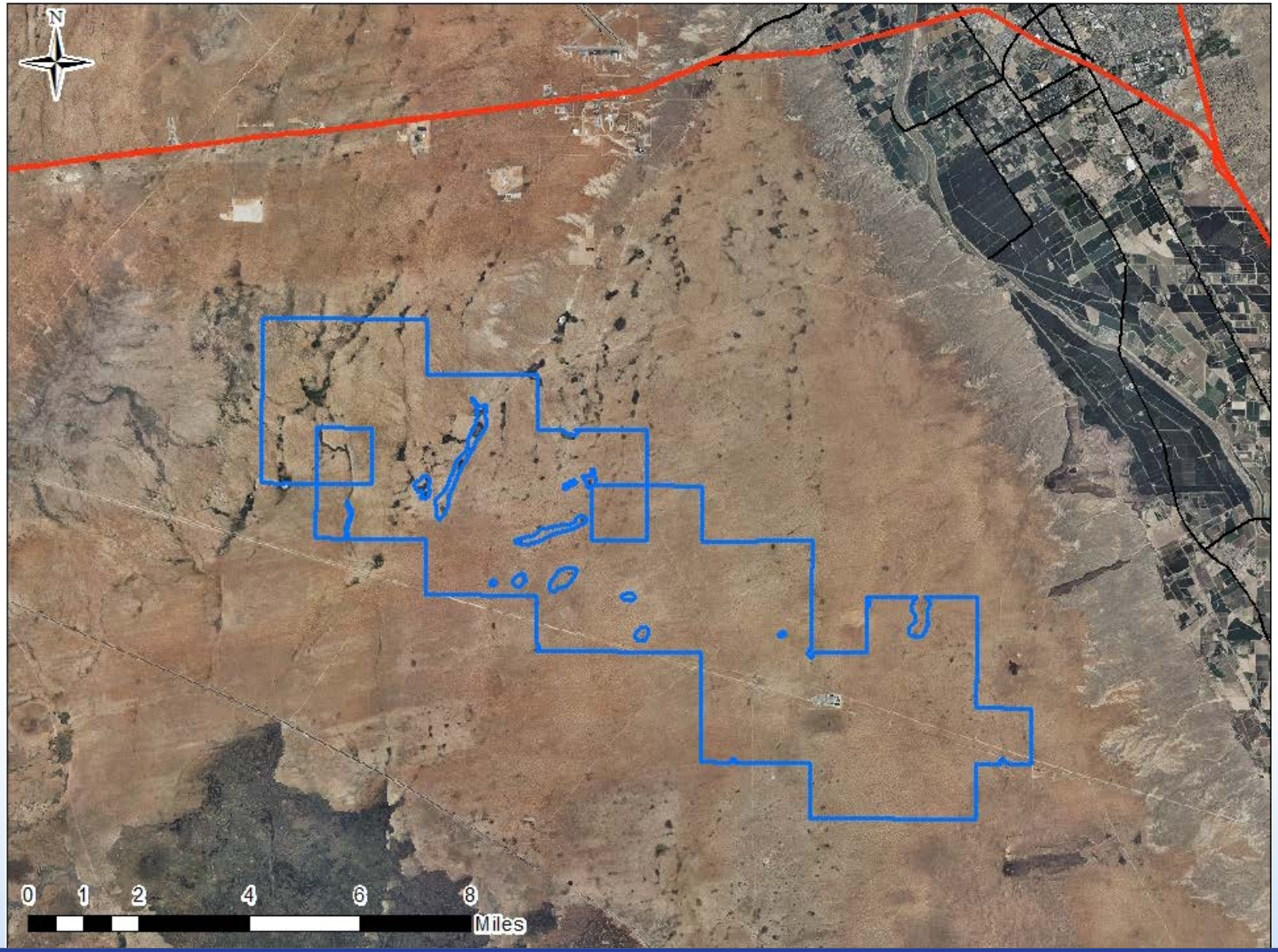
- Soils within the SEZ are predominantly loamy fine sand and fine sand.
- Surface disturbance would be the greatest impact on soil resources.
- Potential impacts: compaction, erosion, and possibly contamination.

Soils and fugitive dust in the Chihuahua Desert

Soils: ecological sites



Soils: ecological sites



Soils/ Erosion

- Programmatic Design Features:
  - Avoid and/or mitigate potential impacts by minimizing erosion and stabilizing disturbed areas.
  - Prepare storm water Pollution Prevention Plans that control site drainage, erosion, and sedimentation related to storm water runoff.
- Additional Possible Measures:
  - Re-vegetation of the SEZ with native vegetation to increase soil stability as a plan of development feature to further minimize the amount of grading and surface disturbance and promote reduced dust emissions and PM levels.
  - Construction crews will be educated to stay on designated roads.

Vegetation

- The vegetation of the SEZ is primarily mesquite shrubland.
- Height of the mesquite, development of coppice dunes, and diversity of other vegetation vary depending on soils.
- Small xero-riparian areas have dense mesquite thickets and/or tobosa and vine mesquite grassland.

Vegetation

- Mesquite coppice dunes on relatively deep sand.

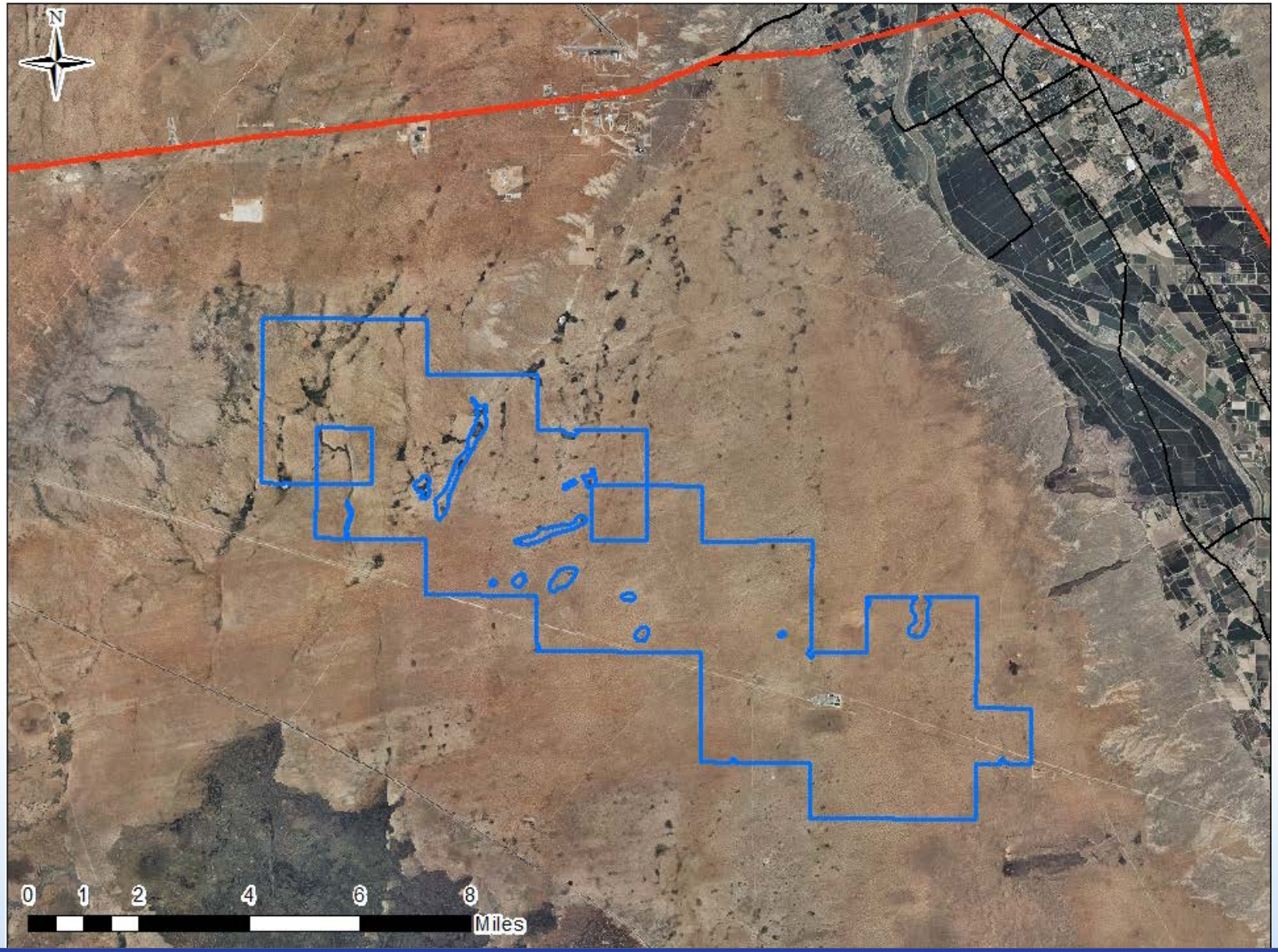
Vegetation

- Low-growing mesquite where surface sand has been lost.

Vegetation

- Xero-riparian areas (aerial).

Vegetation



Vegetation

- Potential Impacts:
  - current vegetation will be lost within developed portions of the SEZ
  - invasive species & noxious weeds may establish and spread beyond the SEZ
  - changes in hydrology or dust deposition may have effects beyond the SEZ

- Programmatic Design Features:
  - xero-riparian and playa plant communities within the SEZ will be avoided to the extent practicable, and any impacts minimized and mitigated in consultation with appropriate agencies.
  - weed management plans will be implemented for all solar developments

Special Status Plant Species

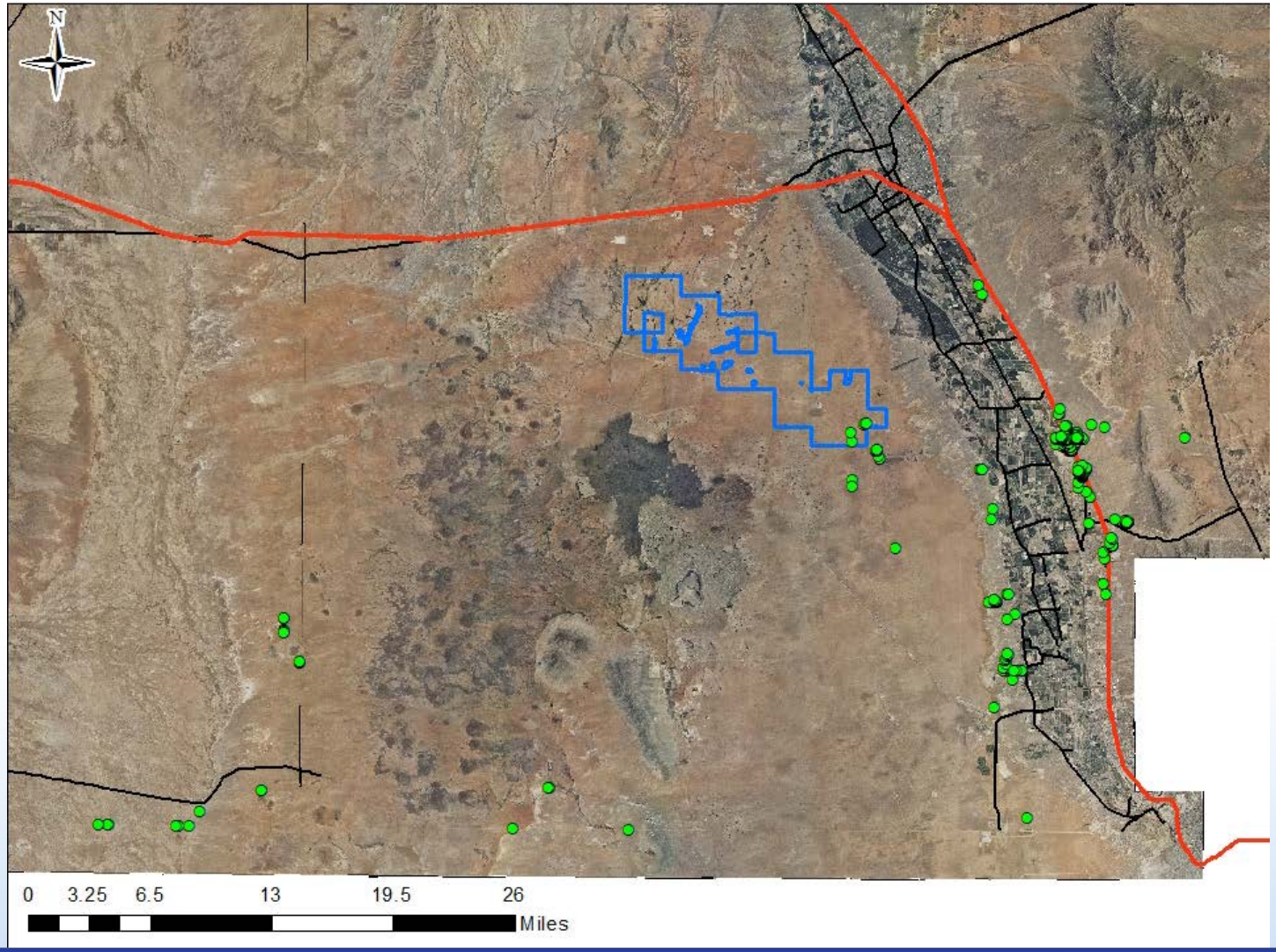
- Sand pricklypear (*Opuntia arenaria*) is the only special status plant reported to occur in, or with potential habitat in, the SEZ.

Special Status Plant Species

- Sand pricklypear (*Opuntia arenaria*).

Special Status Plant Species

- Sand pricklypear (*Opuntia arenaria*), distribution.



Special Status Plant Species

- Potential Impacts:
  - sand pricklypear populations within the SEZ could be destroyed
  - changes in hydrology or dust deposition may affect sand pricklypear habitat beyond the SEZ

- Programmatic Design Features:
  - surveys for sand pricklypear will be conducted prior to ground disturbance, and any populations found will be avoided if possible

Terrestrial Wildlife & Aquatic Biota

Species that may be impacted by SEZ development:

- Loss of habitat and connectivity for several species of amphibians, reptiles, raptors, mammals, bats, and invertebrates.
- Game species occurring within the SEZ include mule deer, quail, and dove.
- Potential impacts associated with direct mortality, and habitat loss/alteration.

Mule deer

SEZ-specific Design Features:

- Impacts on potentially sensitive or unique habitats such as dry washes, xero-riparian, and playas, will be avoided, minimized, or mitigated.

Migratory Birds

- Loss of habitat and connectivity (linkages).
- Potential for water birds to be attracted to solar fields (because they look like water) and collide with solar panels.
- Potential for heat flux effects - burning of wings in the solar radiation field (power towers only).
- Potential for night sky impacts and effects to migration routes/behavior.

Loggerhead shrike

Photo credit: US Fish & Wildlife Service

Horned lark

Photo credit: National Park Service

Special Status Species

Programmatic Design Features:

- Compliance with the Bald & Golden Eagle Protection Act will be ensured and Eagle Take Guidance will be followed (if necessary).
- Compliance with BLM Special Status Species Manual 6840.
- Based on data from required pre-disturbance surveys, disturbance to suitable habitats will be avoided to the extent practicable.

Western Burrowing Owl

Photo Credit: Rick Scott

Rangeland Resources

Livestock and Grazing Allotments

- Black Mesa,
- Home Ranch,
- West La Mesa,
- Little Black Mountain,
- Aden Hills, and
- La Mesa

Lands and Realty

- Solar PEIS assumes 80% of the SEZs would be developed to account for non-developable areas not yet identified.
  - Afton SEZ could support a total generation of up to 4,794 MW of electricity.
- Rights of way, including roads crossing the SEZ could be impacted and may need to be rerouted.
- Additional roads for access is anticipated in order to accommodate increased traffic for construction, operation and maintenance of intended solar development. Public access may be restricted.
- The southern portion of the Afton SEZ overlaps a designated Section 368 energy corridor.
  - There is an existing 345kV line in the corridor.
  - This existing corridor will be used primarily for the siting of transmission lines and other infrastructure.

- Programmatic Design Features:
  - Early consultation with BLM will be done to identify conflicts.

Military & Civilian Aviation

- No military training routes or special use airspace are located above the SEZ.

- The Las Cruces International Airport is more than 5 miles (8 km) north of the SEZ.

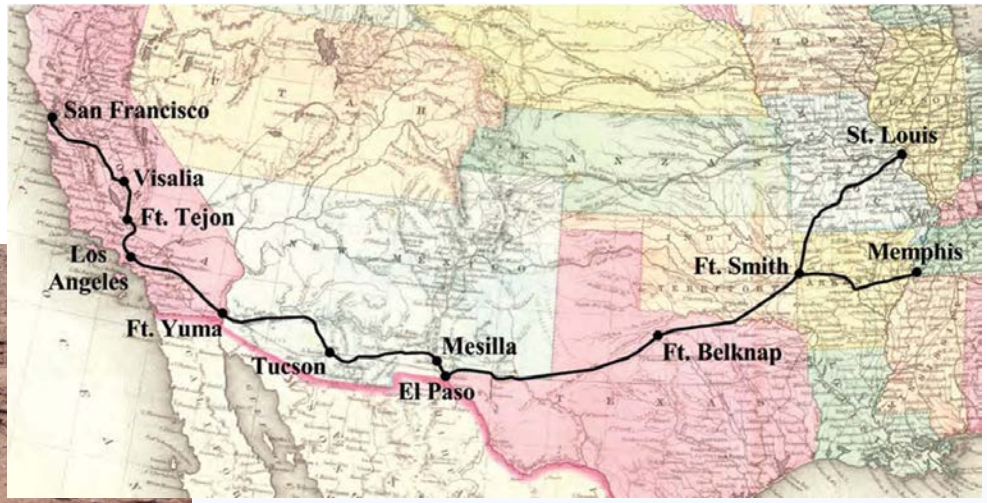
Minerals (Fluids, Solids, and Geothermal)

- There are no locatable mining claims within the SEZ.
- The SEZ has been withdrawn from mineral entry for a period of 20 years.
- There are two mining operations adjacent to the eastern boundary of the SEZ.

Cultural and Paleontological Resources

- Direct and indirect impacts on prehistoric and historic sites could occur, but additional inventory is needed in the SEZ.
- Potential for impacts on paleontological resources is relatively unknown; further investigation is needed.

Photo Credit: Konnie Wescott



Butterfield Overland Mail Route (westerncoversociety.org)

Cultural and Paleontological Resources

- Programmatic Design Features :
  - Consultation will be conducted early in project planning.
  - At the project level, BLM will be notified immediately upon the unexpected discovery of cultural materials or fossils, and work will be halted.
- SEZ-specific Design Features
  - Design features for reducing potential visual impacts on trails, National Historic Landmarks, and National Register-listed historic properties will also reduce impacts on these cultural resources.
  - Avoidance of the eastern edge of the SEZ may be warranted if a paleontological survey results in findings similar to those known south of the SEZ.

Tribal Concerns

Potential impacts on resources of concern in two major categories:

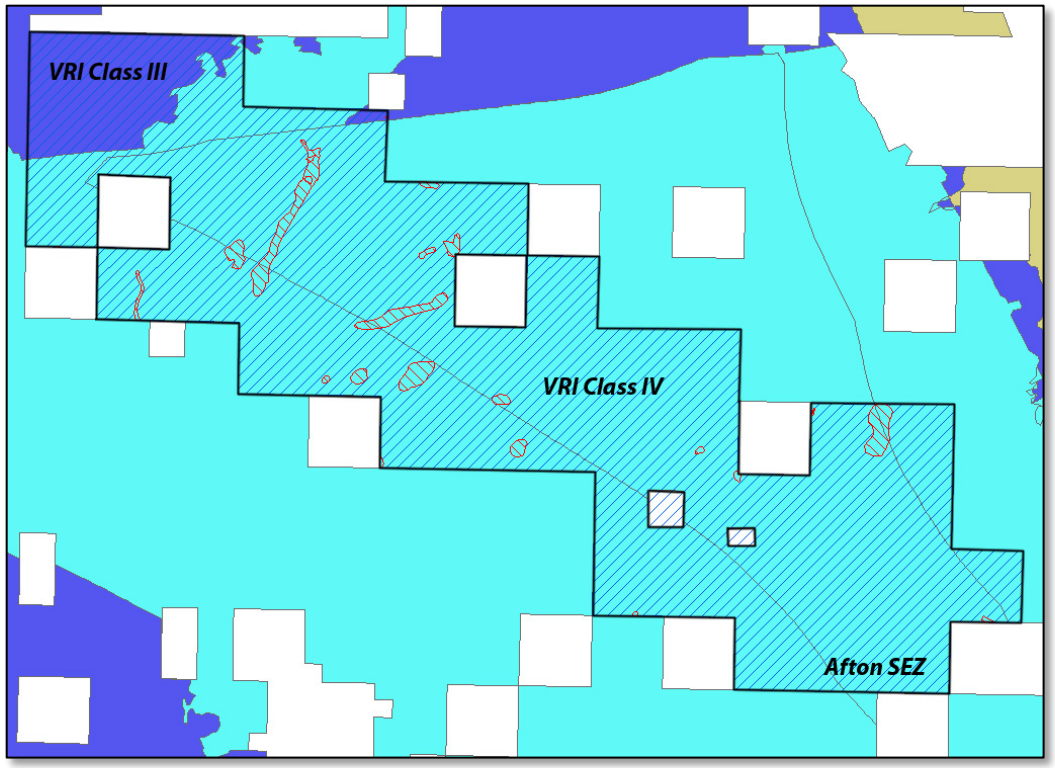
- Impacts on the landscape.
- Impacts on discrete localized resources (cultural and natural).

Programmatic Design Features :

- Known human burial sites and rock art will be avoided. Where there is a reasonable probability of encountering undetected human remains and associated funerary objects by a solar project, the BLM will conduct government-to government consultation with tribes before the project is authorized.
- Culturally important plant and wildlife species and visual intrusion on sacred sites will be avoided to the extent practicable.

Visual Resources

The Visual Resource Inventory (VRI) value for most of the SEZ is VRI Class IV, indicating low relative visual values. The far northwestern portion of the SEZ is VRI Class III, indicating moderate relative visual values.



Afton SEZ Visual Resource Inventory Values

Visual Impacts of Solar Technologies

Solar visual characteristics…

- Large facility size
- Angular, regular geometry
- Highly reflective surfaces
- Lighting at night

…cause a variety of contrasts:

- Bright reflections and glare
- Dynamic color variation
- Plumes (depending on technology)
- Light pollution

Solar visual contrasts:

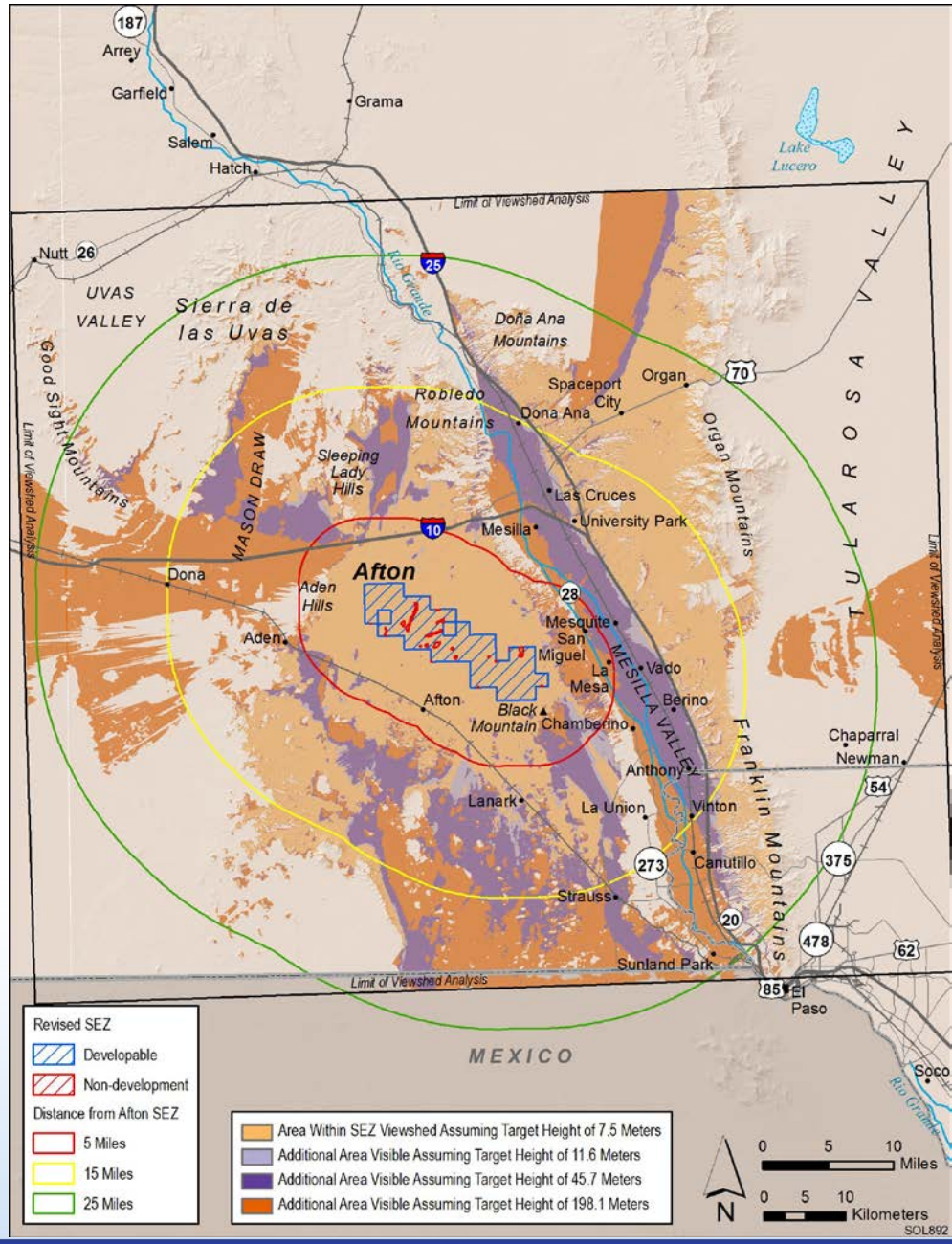
- Vary greatly by technology
- May be visible for very long distances
- Often more apparent from elevated viewpoints

Visual Resources (cont.)

Potential moderate to strong visual contrasts for:

- Organ Mountains/Desert Peaks Nat. Monument
- Prehistoric Trackways Nat. Monument
- Aden Lava Flow WSA
- Organ Mountains WSA
- Organ Needles WSA
- Peña Blanca WSA
- Robledo Mountains WSA and ACEC
- West Potrillo Mountains/Mt. Riley WSA
- Aden Hills SRMA
- Organ/Franklin Mountains SRMA and ACEC
- Kilbourne Hole National Natural Landmark.

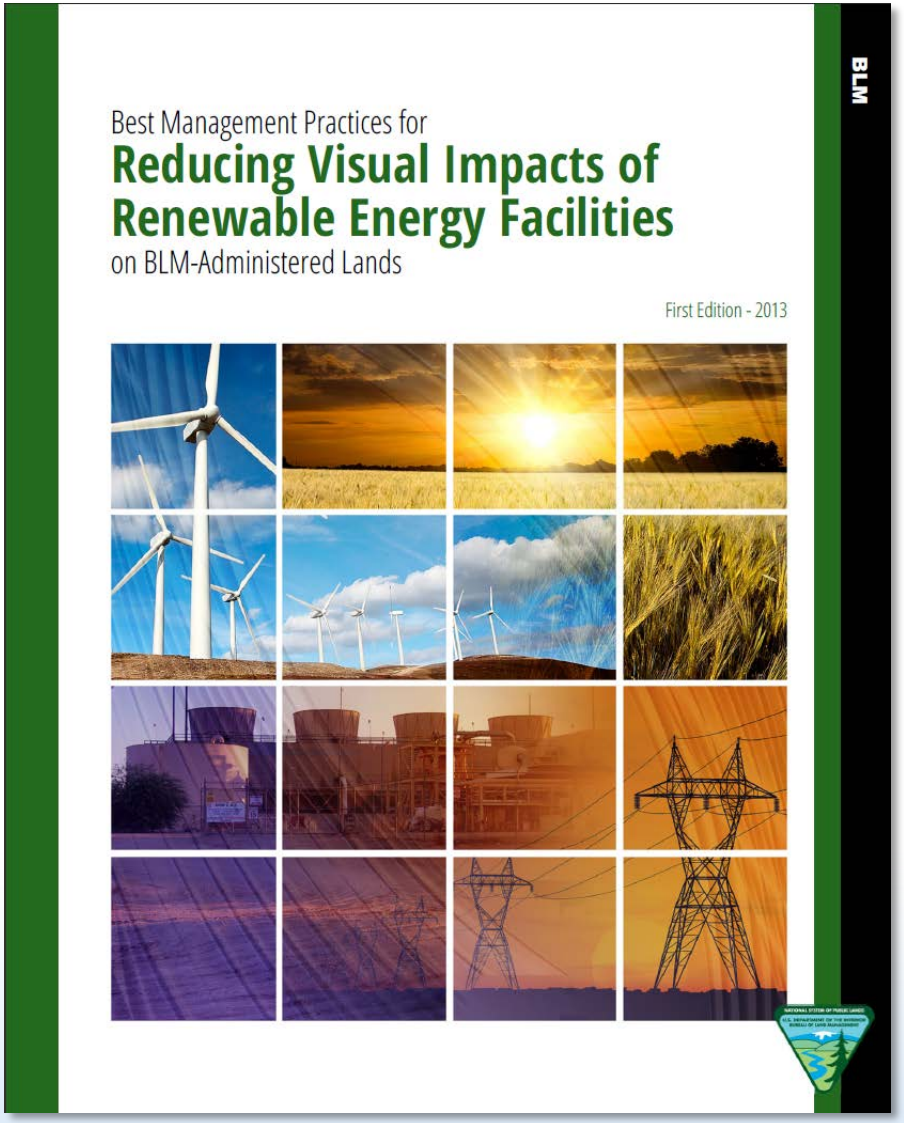
Also locations on or along I-25, I-10, U.S. 70, N.M. 404, the communities of La Mesa and East Las Cruces, Magdalena Peak, and two privately owned ranches near the SEZ.



Visual Resources (cont.)

Programmatic Design Features:

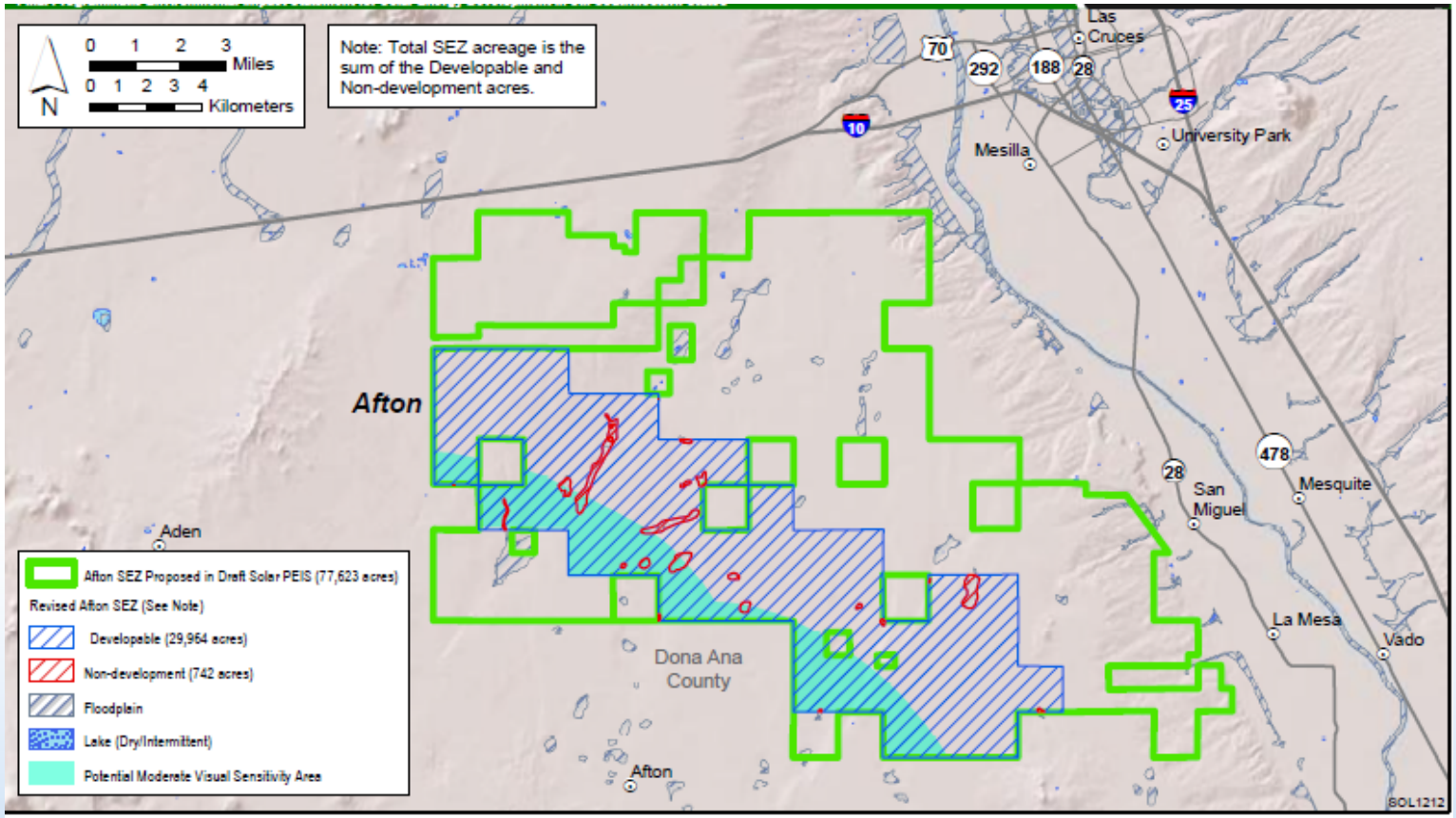
- Consultation with BLM early in project planning; compliance with terms and conditions.
- Design and siting of solar facilities to minimize glint and glare, night-sky effects, and visual dominance.



Visual Resources (cont.)

SEZ-specific Design Features

- Special visual impact mitigation should be considered for solar development on lands in the SEZ visible from and within 5 mi (8 km) of the Aden Lava Flow WSA.

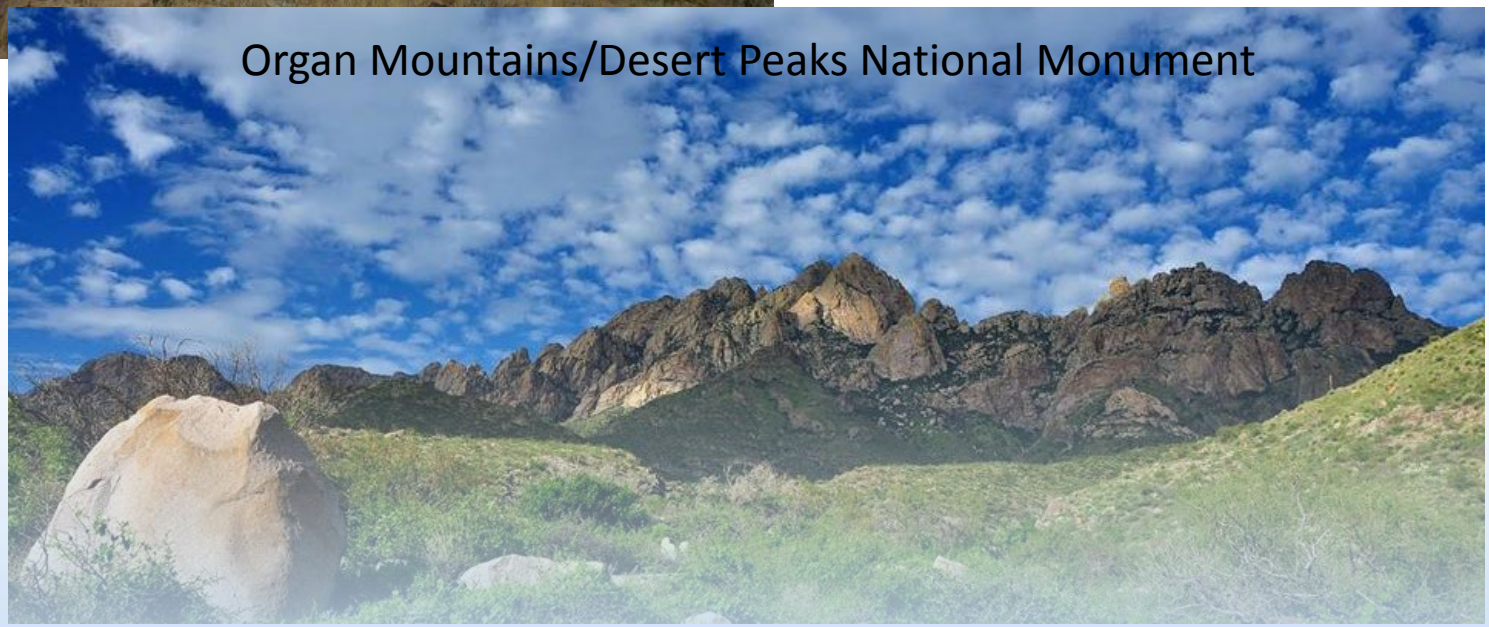


Specially Designated Areas

- Potential Impacts: visual and night sky impacts, reduced recreation use, fragmentation of biologically linked areas, and loss of public access.
  - There are 17 specially designated areas (SDAs) within 25 miles of the SEZ that could be impacted by solar development.
  - There are no lands with wilderness characteristics in or around the SEZ.

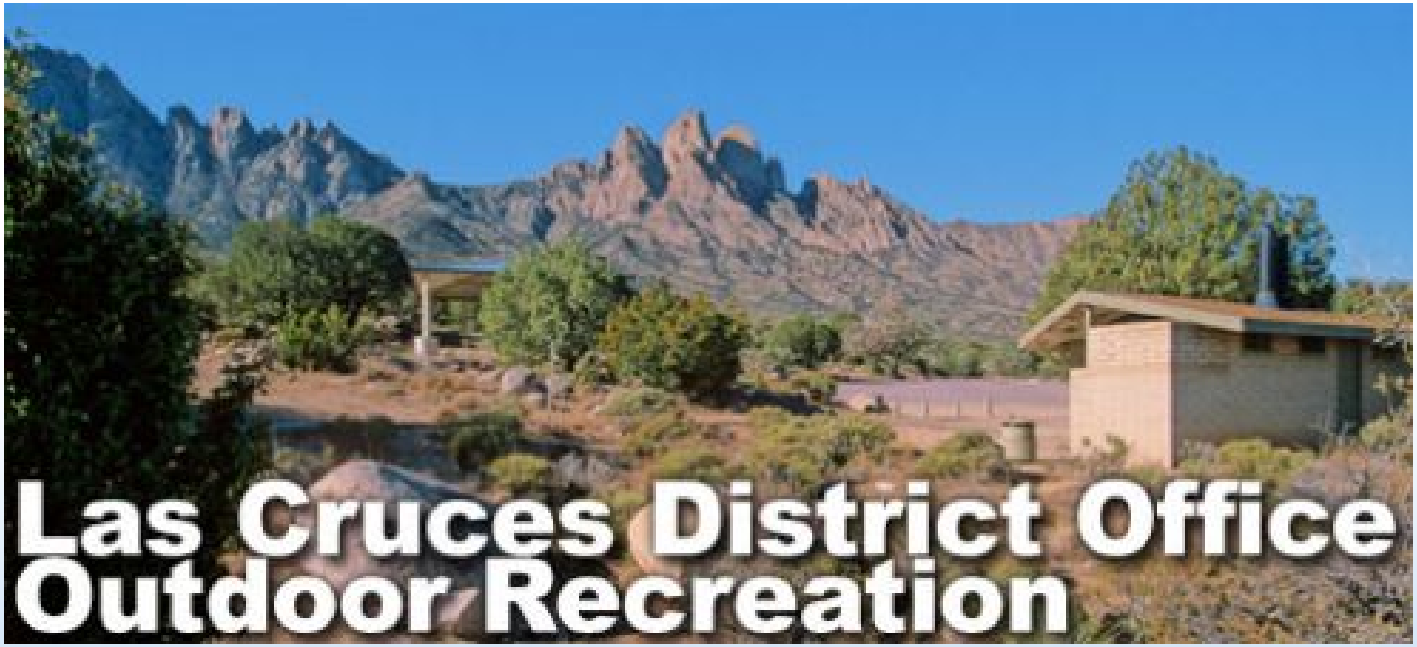
- Programmatic Design Features:
  - The SEZ-specific design features for visual resources will be adopted, as they would provide some protection for visual related impacts on the Aden Lava Flow WSA and the Organ Mountains-Desert Peaks National Monument.

Specially Designated Areas



Public Access & Recreation

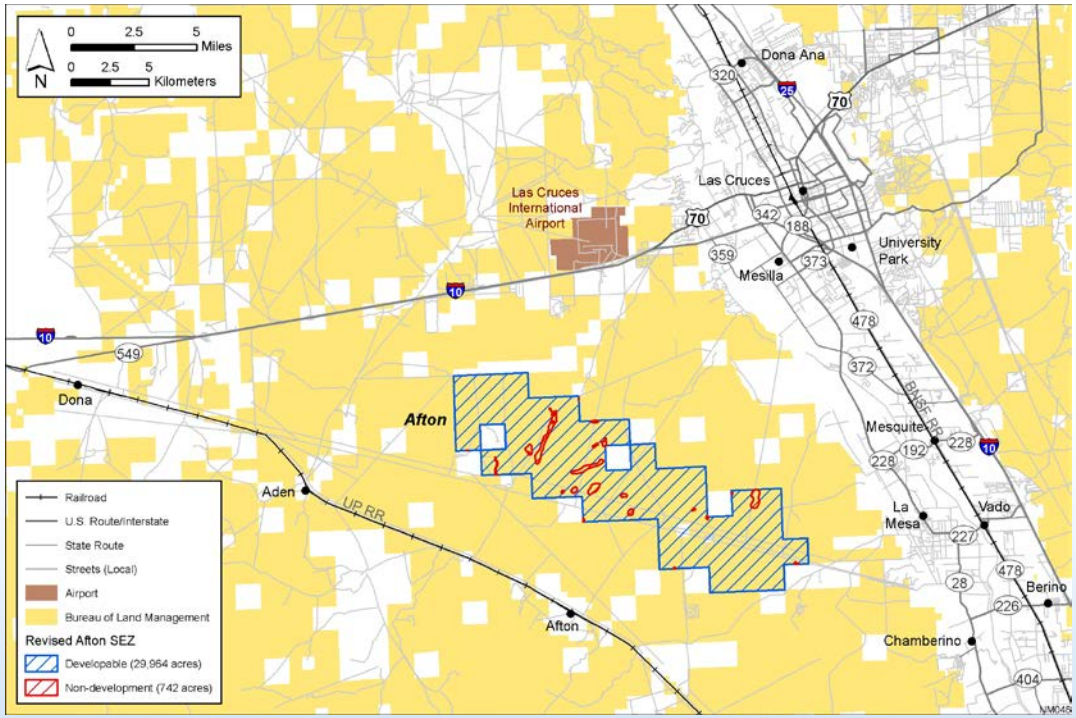
- SEZ lands support limited backcountry driving, OHV use, hiking/walking, birdwatching, and small game hunting.
- Development on the SEZ would eliminate future recreation activities from developed areas.



Transportation

- Primary impacts at the SEZ would be from worker traffic.
  - The volume of traffic on I-10 could represent an increase in traffic of about 24% percent during construction.

- Programmatic Design Features:
  - Improvements to local roads to accommodate additional traffic will be considered.



Local Transportation Network Serving the Afton SEZ (Source: Draft Solar PEIS)

Socioeconomics

- Potential impacts:
  - Construction and operations job creation (creation of up to 3,488 construction jobs and 1,044 operations jobs); additional indirect jobs.
  - Availability of housing for construction workers; possible strain on community services.
  - Six grazing allotments could be affected.

Environmental Justice

- There is a minority population within 50 miles of the SEZ.
- If project-specific EJ impacts are identified, then impacts must be minimized.

Acoustic Environment

- Construction and operations could cause short-term and long-term noise impacts.

- Programmatic Design Features:
  - Limit hours of daily activities,
  - Construct noise barriers, and
  - Coordinate with nearby residents.

Air Quality and Climate Change

- Fugitive dust and equipment exhaust emissions during construction could result in exceedance of Ambient Air Quality Standards (AAQS) for particulate matter (PM) at SEZ boundaries.
  - 24-hour PM10 and 24-hour and annual PM2.5 concentrations
  - High PM10 concentrations would be limited, however, to the immediate areas surrounding the SEZ boundary and would decrease quickly with distance.
- Generation of fugitive dust may result in exposure to respirable particulates and/or microbes (human health impacts).
- Possible climate change impact through loss of carbon storage capacity of the soil.
- Positive impact: Solar power generation reduces demand for energy from fossil fuels, and thereby reduces greenhouse gas emissions
- Programmatic Design Features:
  - Dust suppression measures will be implemented during all phases of development.

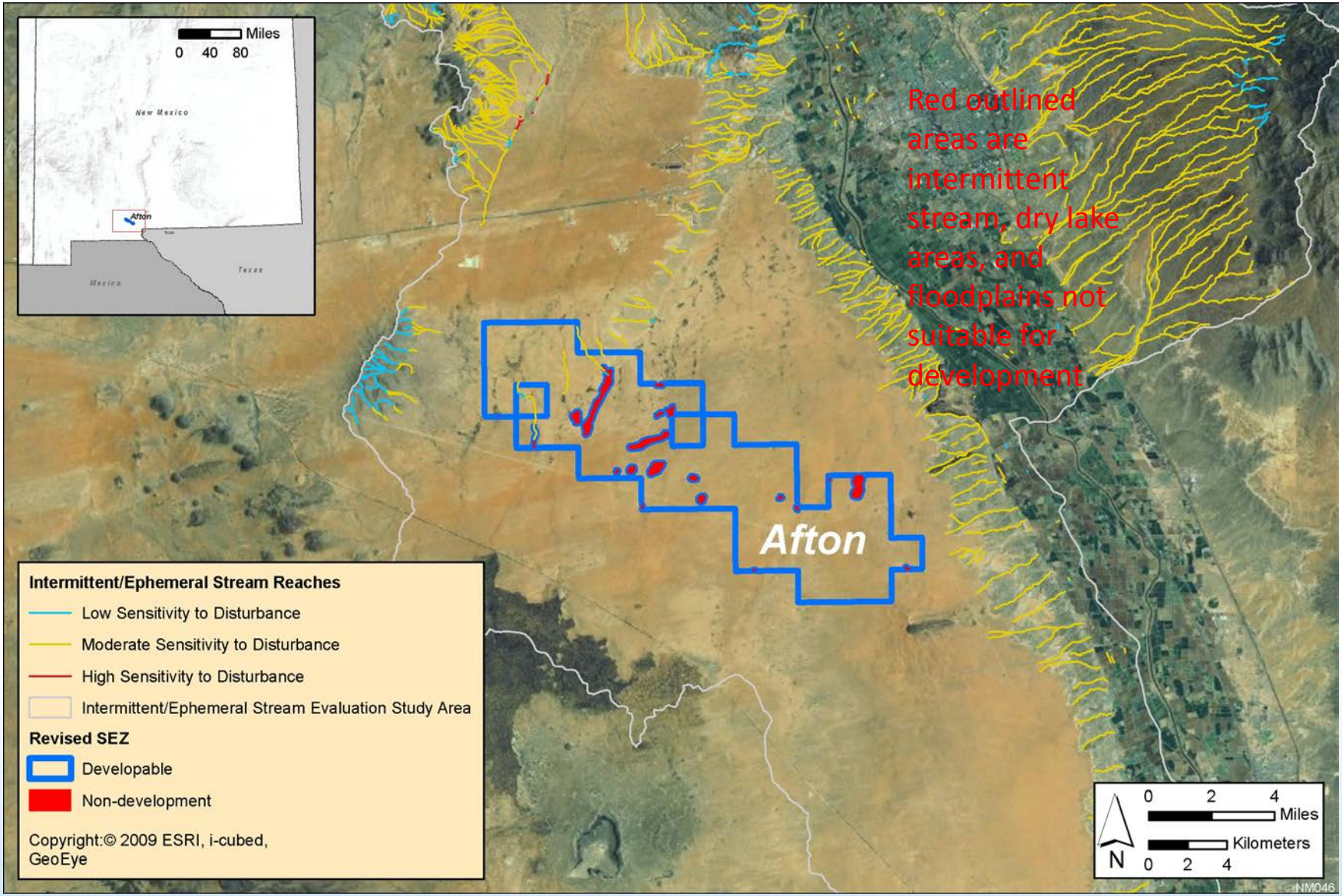
Hydrology: Surface Water

- The SEZ is within the Lower Rio Grande Basin.
- Two ephemeral channels within the SEZ were classified with moderate sensitivity to land disturbance.

Programmatic Design Features:

- A storm water Pollution Prevention Plan that controls site drainage, erosion, and sedimentation related to storm water runoff will be prepared.

Hydrology: Surface Water



Hydrology: Water Quality and Groundwater Availability

- Groundwater in the Afton SEZ is in the Rio Grande Groundwater Basin.

- If projects use groundwater, then lower groundwater elevations will impact connected surface waters and other users in the basin.

SEZ-specific Design Features:

- Groundwater analyses suggest that full build-out of dry-cooled and wet-cooled technologies is not feasible.

- Implementation of design features and ground water conservation practices will avoid or minimize impacts to groundwater resources.

Mitigation Hierarchy and Unavoidable Impacts

Presented by:
Konnie Wescott
Argonne National Laboratory

New Mexico Regional Mitigation Strategy Workshop
Las Cruces, NM
May 3, 2016

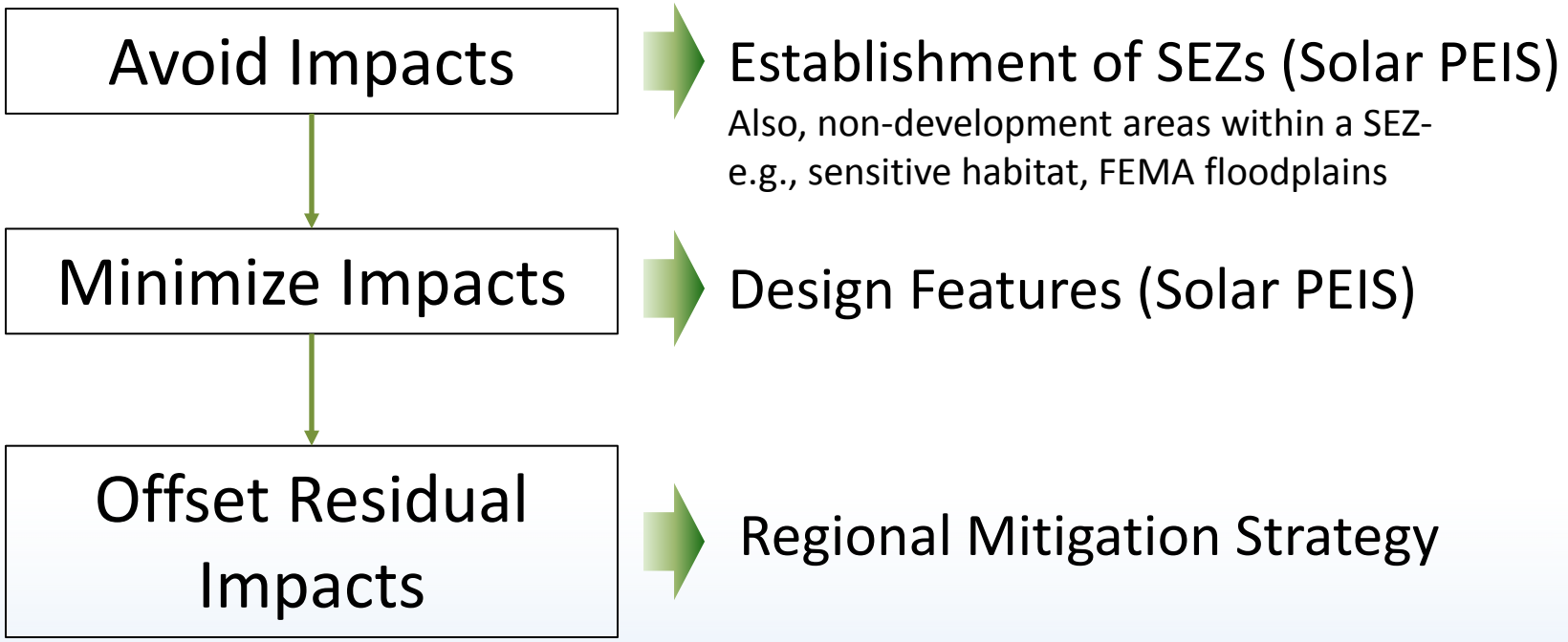
Mitigation Hierarchy

- ***Avoid***
  - Identify exclusion and non-developable areas
  - Apply avoidance measures (for example, sand pricklypear)
- ***Minimize***
  - Apply minimization measures (for example, timing of construction activities)
  - Must follow applicable laws and regulations
  - Adopt monitoring and adaptive management
- ***Offset***
  - Compensate for residual or unavoidable impacts ***after*** avoiding and minimizing

Refine Non-Development Areas

- Local BLM resource specialists may refine the SEZ developable areas based on:
  - existing rights-of-way and Section 368 corridor
  - washes/ephemeral streams/floodplain areas
  - any other potential land-use conflicts with resource values that might be avoided by restricting development within the SEZ

Mitigation Hierarchy: BLM's Solar Program



Discussion Topics

1. Please review the resource area impact assessments for the SEZ, and provide comments or questions about the assessment for each resource.

2. Think about avoidance and minimization measures (on-site mitigation; see impact table and design features) that can eliminate or reduce impacts. Which resource impacts would remain after those measures are taken? Provide your thoughts on whether solar development would result in residual impacts for each resource (yes, no, or maybe).

3. Are there additional existing and relevant data, studies, or models that should be used in developing the SRMS for the Afton SEZ (see list of preliminary data sources)?

BLM's Landscape Scale Approach in Regional Mitigation: Ecoregional Condition and Trends

Presented by:
Lee Walston
Argonne National Laboratory

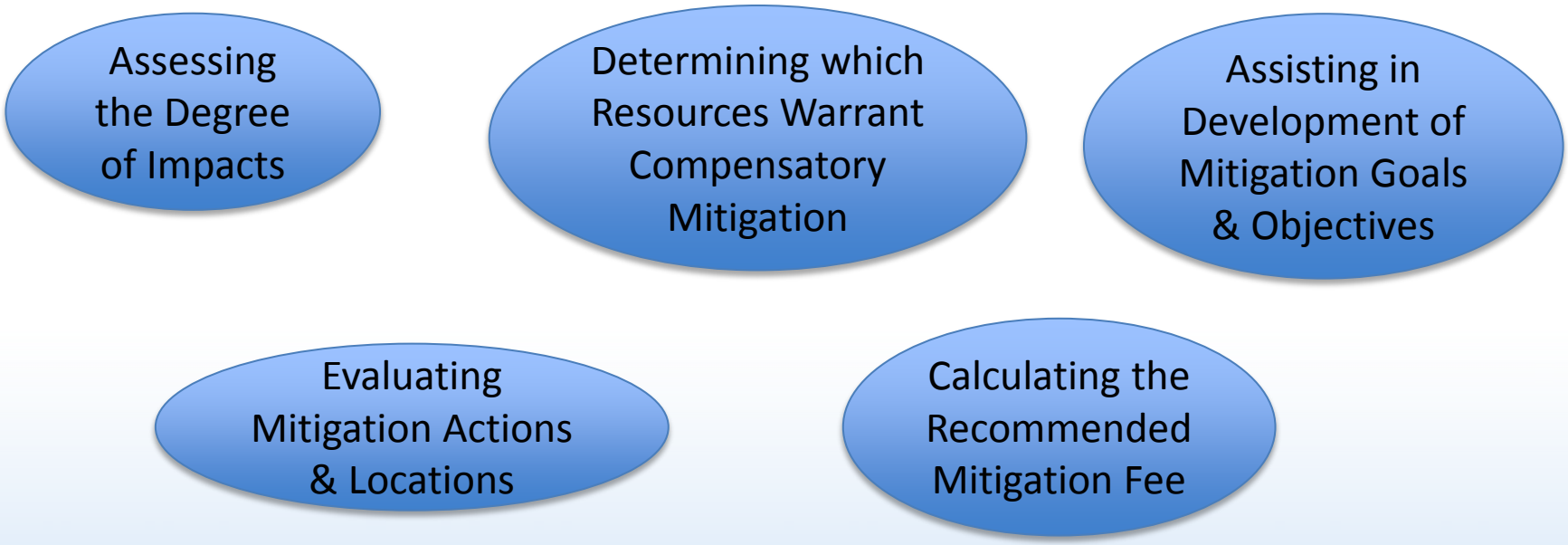
New Mexico Regional Mitigation Strategy Workshop
Las Cruces, NM
May 3, 2016

BLM Landscape Approach & SRMSs

- The SRMS is a landscape approach to managing public lands
- What is BLM's landscape approach?
  - BLM's Landscape Approach is a framework for incorporating climate change, cumulative impacts, and other broad-scale environmental pressures/stressors into decisions by shifting focus *from project-by-project decisions to landscape-scale decisions.*
- Related Guidance and Policy
  - BLM Draft Procedural Guidance for SRMSs (2014)
  - DOI Mitigation Policy (2015)
  - BLM Interim Policy- Regional Mitigation Manual 1794

BLM Landscape Approach & SRMSs

- Landscape-scale information on ecosystem condition & trends is useful for the following regional mitigation activities:



How Do We Assess Condition & Trends?

- Sources of Landscape Data & Information
  - BLM Rapid Ecoregional Assessments (REAs)
  - Climate change assessments
  - State-led efforts (SWAP, CHAT)
  - Other assessments (e.g., TNC)

- Examples
  - Draft landscape intactness modeling approach for the SRMS study region
  - Crucial Habitat Assessment Tool (CHAT)
  - Climate change

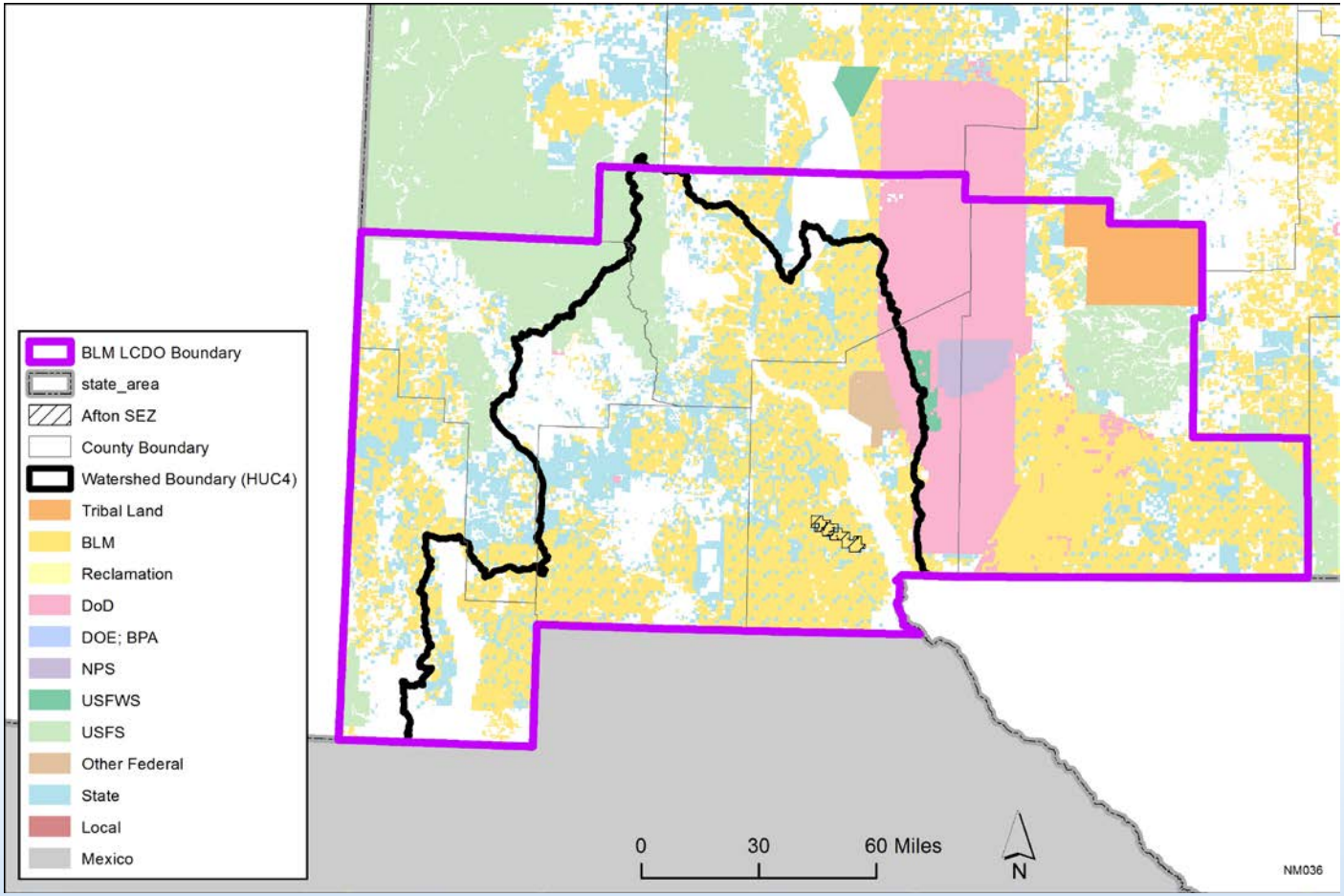
Regional Context

- SRMS Study Area (black line)

HUC 4 Watershed within the Chihuahua Desert Ecoregion (in New Mexico)

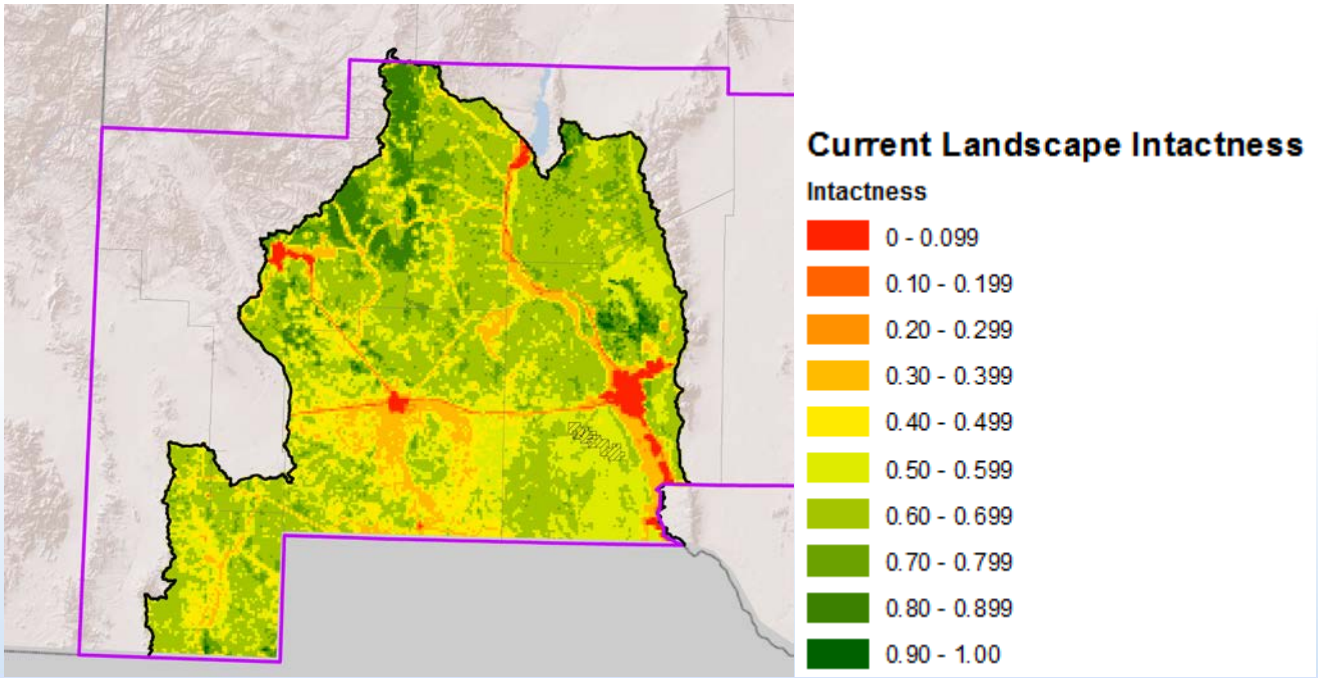
7 million acres

(2.8 million BLM acres)

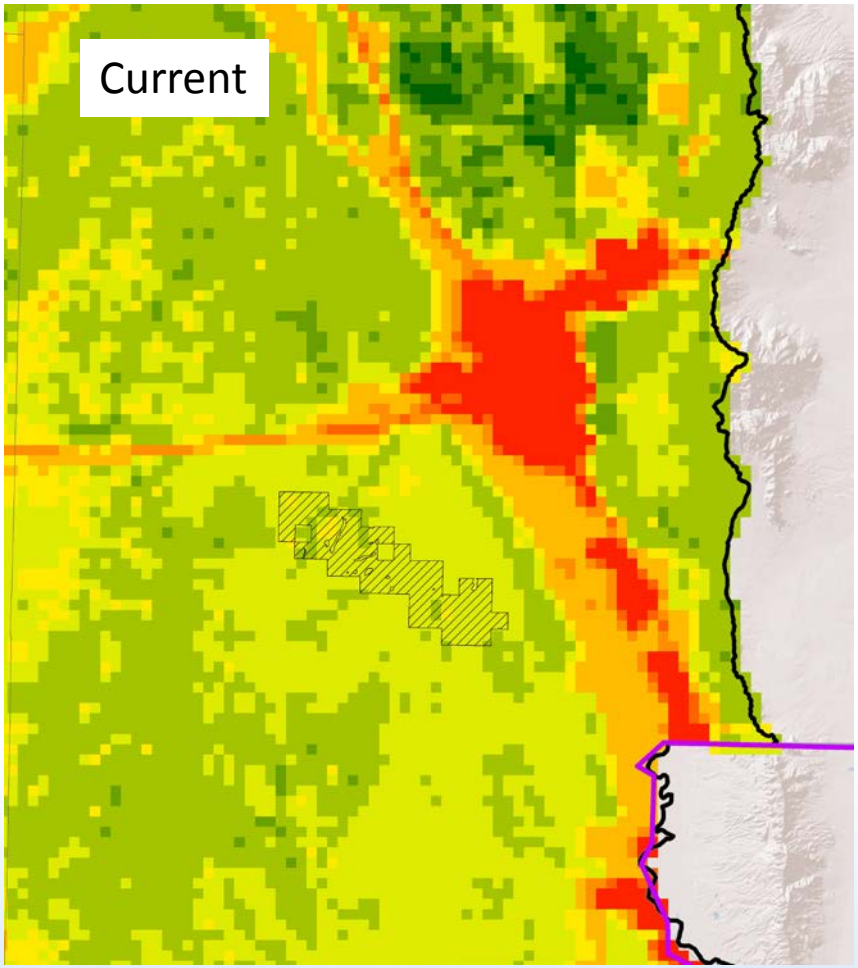


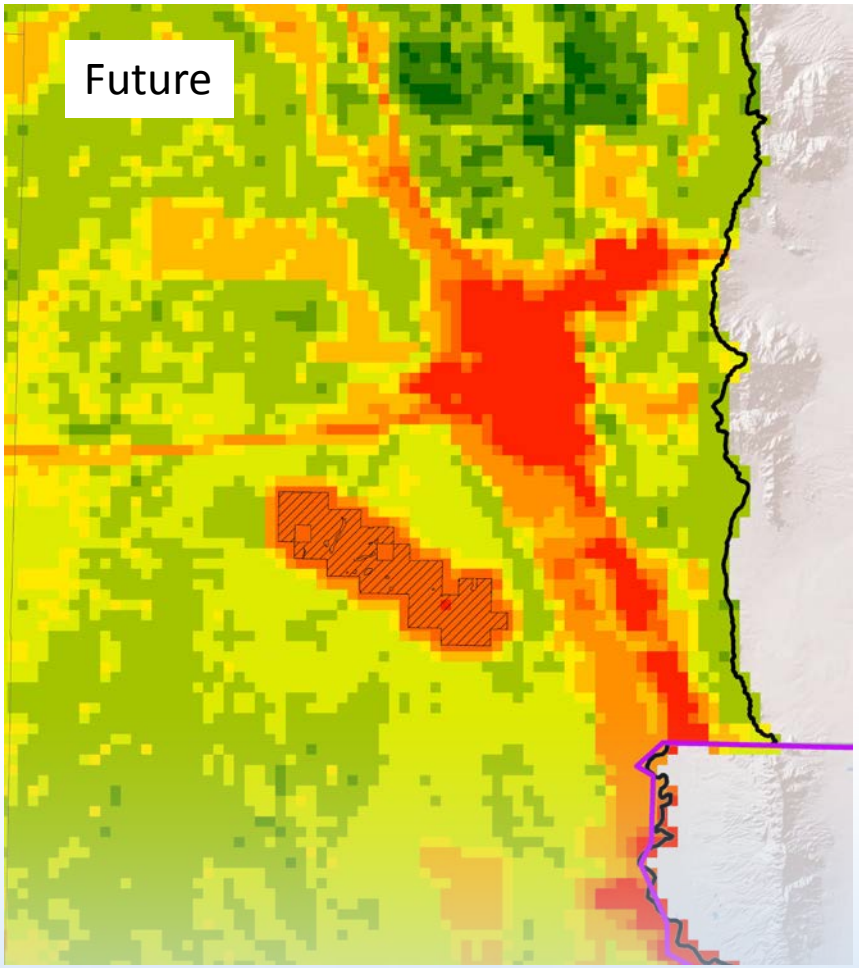
Draft Landscape Intactness Model Approach

- General indicator of naturalness based on the intensity of and proximity to human development
  - Builds on existing peer-reviewed literature
  - Human development spatial data inputs
  - Parameters: intensity score, distance decay function



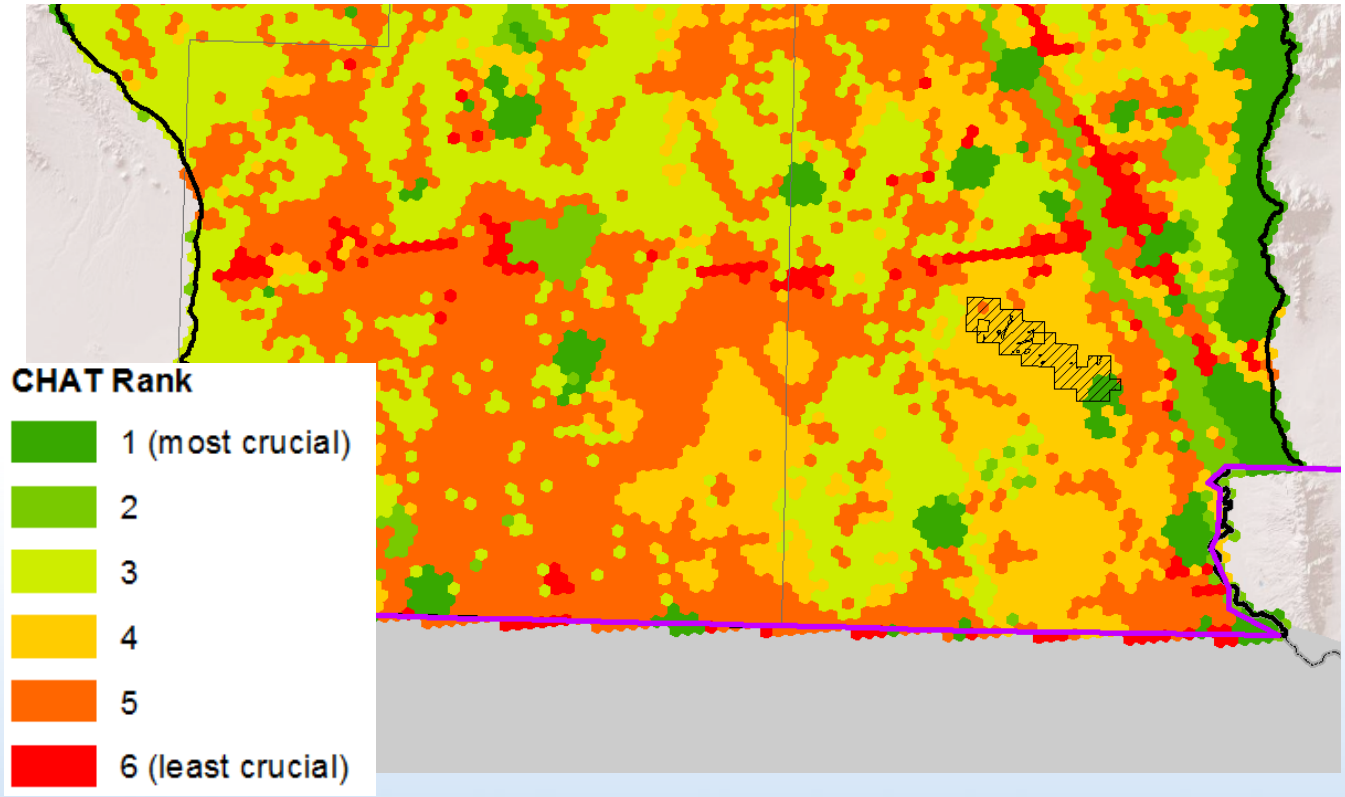
Landscape Intactness (Current vs Future)





CHAT: Crucial Habitat Assessment Tool

Developed by the Western Association of Fish and Wildlife Agencies as an aggregated measure of crucial habitat for species of interest to state fish and wildlife management agencies. Habitat was ranked (1-6) on the basis of several criteria (e.g., habitat for SOC, connectivity, etc.).



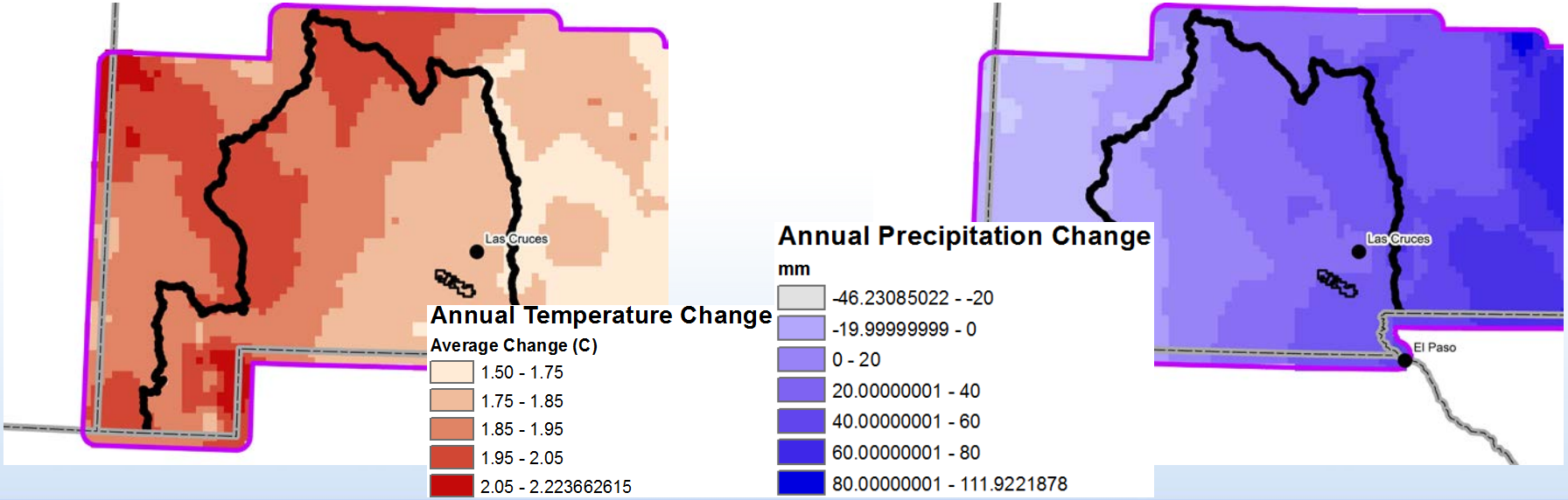
The Afton SEZ is characterized as having a moderately low crucial habitat rank.

Climate Change

Air Temperature and Precipitation data available from the National Center for Atmospheric Research (NCAR) http://gisclimatechange.ucar.edu/. Annual mean data were downloaded for the time periods using the AR4 A1B modeling scenarios:

Current: 2006-2015 Future: 2056-2065

The average annual temperature and precipitation for each 10-year period was calculated and differences between the future and current values were determined.



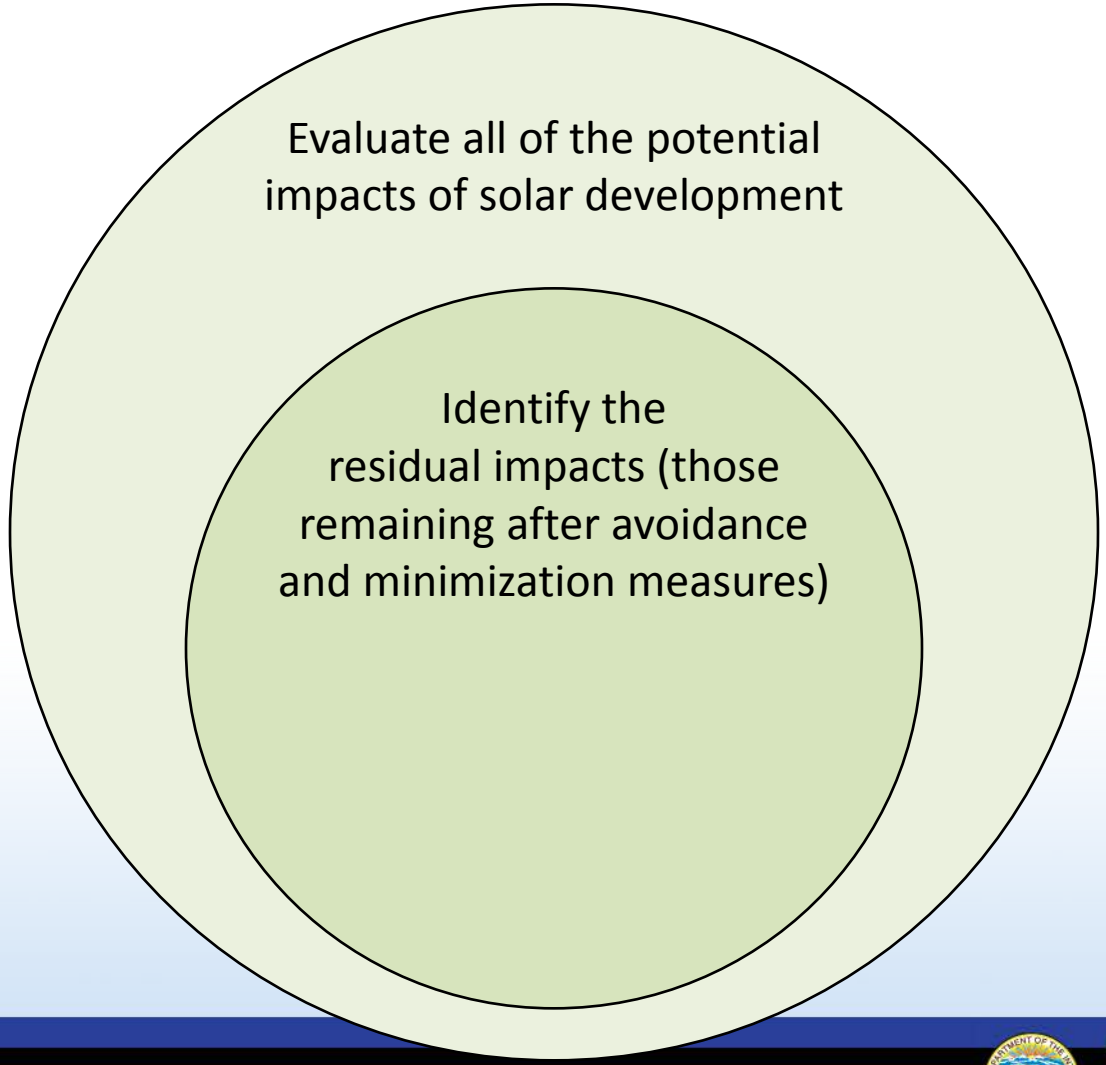
QUESTIONS?

How to Identify Residual Impacts Warranting Regional Compensatory Mitigation

Presented by:
Heidi Hartmann
Argonne National Laboratory

New Mexico Regional Mitigation Strategy Workshop
Las Cruces, NM
May 3, 2016

Methodology for Identifying the Residual Impacts of Solar Development



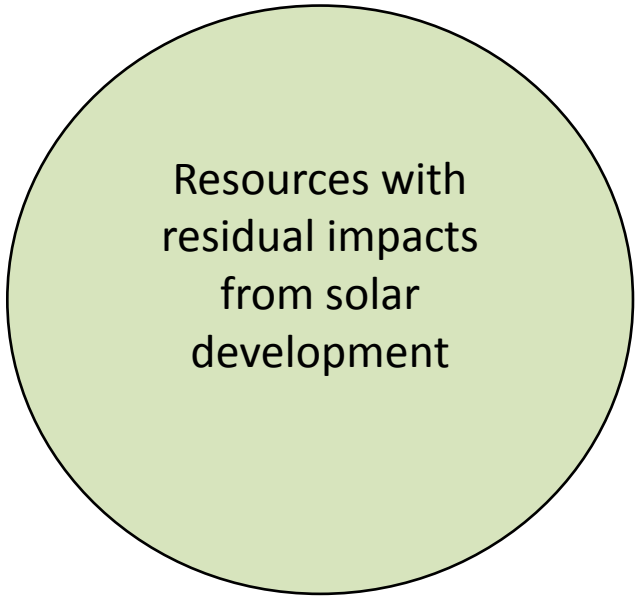
Evaluate the potential impacts of solar development

Identify the resources with residual impacts

Resource/Issue	Afton Solar Energy Zone Impacts[1]	On-site Mitigation[2]		Residual Adverse Impacts?[3]
		Avoidance	Minimization	
Ecology: Terrestrial Wildlife and Aquatic Biota Section 12.1.11	**Direct:** Loss of habitat and connectivity for several species of amphibians, reptiles, mammals, bats, and invertebrates. Game species occurring within the SEZ include mule deer, quail, and dove. Ground disturbance, fugitive dust generated by project activities, lighting, vegetation clearing, spread of invasive species, accidental spills, harassment, and impacts on ephemeral washes could impact wildlife within the SEZ. Impacts from noise on wildlife could occur, especially on bat species, if the SEZ is located near any bat roosts. Other species that may be impacted include reptiles, upland game birds (e.g. quail), small mammals, and mule deer. **Indirect:** Outside the SEZ, impacts could occur from habitat loss or modification, increased human presence in the area, surface runoff, dust, noise, lighting, or accidental spills. **Cumulative:** Cumulative effects on some species could rise to a level of moderate, given the large acreages potentially disturbed and depending on the type, number, and location of other developments in the region. **Data Gaps:** Impacts on terrestrial wildlife from construction noise would have to be considered on a project-specific basis for some species (e.g., bats).	Impacts on wash, riparian, playa, rock outcrop, and wetland habitats, which may provide more unique habitats for some species, should be avoided, minimized, or mitigated. Wetlands, washes, and riparian areas identified during site-specific surveys will be avoided to the extent practicable. See programmatic design features at http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Ecological_Resources.pdf	See programmatic design features at URL under Avoidance column.	Yes. Development of the Afton SEZ will likely impact up to 29,964 acres of wildlife habitat. Level of site grading and disturbance to native vegetation would be the primary driver of residual impact to functional habitat for full build-out of SEZ. Little can be done onsite to mitigate the loss of up to 29,964 acres of general wildlife habitat.

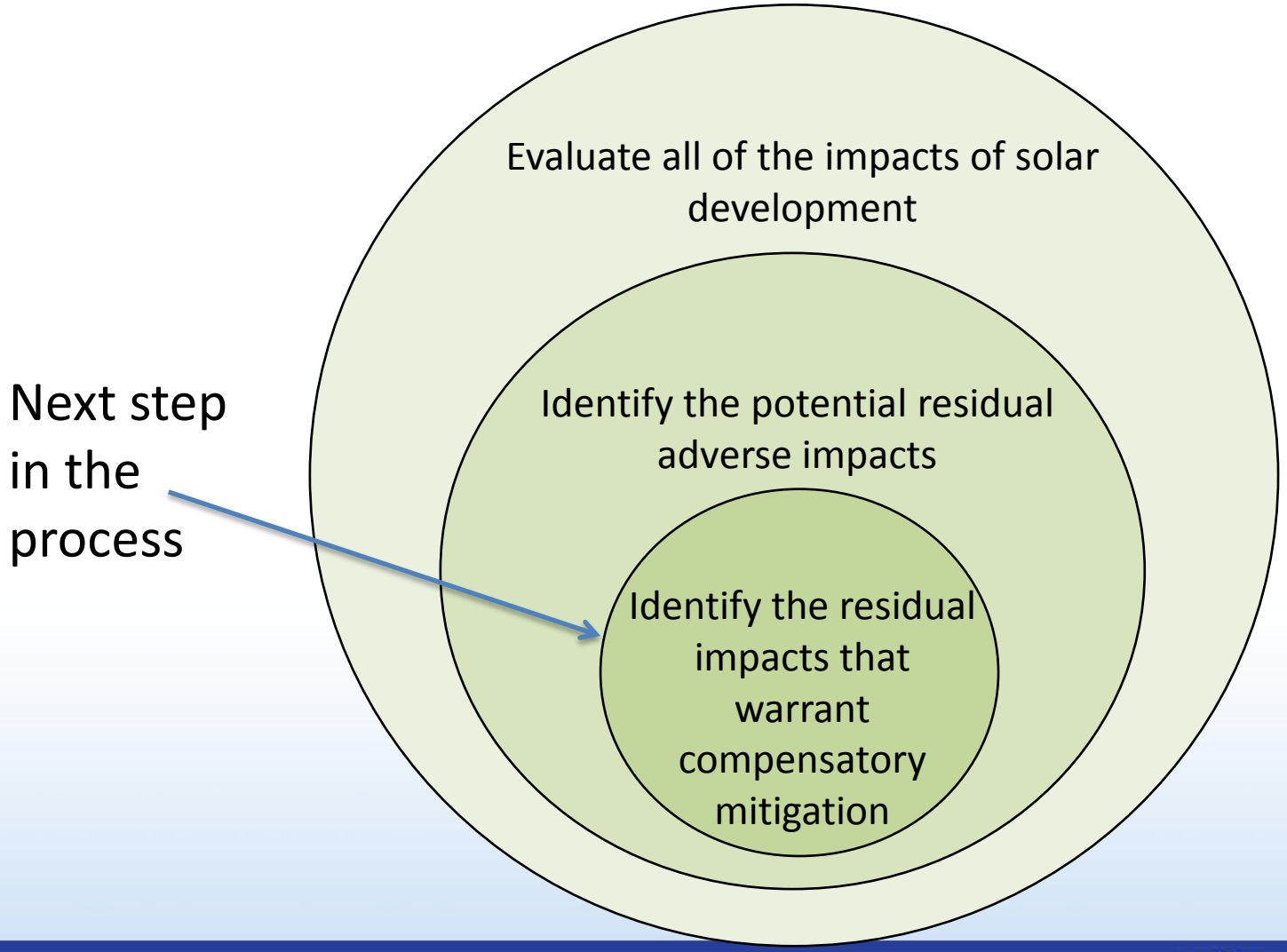
Impacts Warranting Mitigation Starting Point: Residual Adverse Impacts (Examples)

- Vegetation
- Terrestrial Wildlife/Aquatic Biota
- Migratory Birds
- Animal Special Status Species
- Specially Designated Areas
- Visual Resources
- Grazing



- Maybes:
  - Xero-Riparian Areas
  - Invasive and Noxious Weeds
  - Plant Special Status Species
  - Tribal Concerns
  - Soils/Erosion

Methodology for Identifying the Impacts that Warrant Regional Compensatory Mitigation



SEZ Impacts Warranting Regional Compensatory Mitigation - Determining BLM Draft Recommendations

- *Purpose:*
  - Develop rationale for SEZ impacts that warrant compensatory mitigation, based on significance of the resource in the region and landscape-scale evaluation
  - Prepare Regional Mitigation Rationale tables

- Review with Stakeholders
  - Receive input

SEZ Impacts Warranting Compensatory Mitigation - Assessment Approach

- *Assumptions:*
  - *Solar PEIS 80% SEZ full-build Scenario (20-years)*
  - *Photovoltaic, Concentrating Solar Trough or Power Tower*

- *Reference SEZ impact table summaries, other studies, baseline data, reports, field knowledge*

SEZ Impacts Warranting Compensatory Mitigation - Assessment Approach (continued)

- *Evaluate regional conditions using regional data, models, statistics*
  - *What are regional conditions and trends for natural resources impacted by the SEZ?*
  - *How has and will human development and other factors influence conditions and trends?*
- *IDT will evaluate trend data to answer these questions.*

SEZ Impacts Warranting Compensatory Mitigation - Assessment Approach (continued)

IDT will answer a series of six questions covering 26 resource/issue categories:

- Are there residual or unavoidable adverse impacts? (IDT will incorporate stakeholder comments)
- How certain is it that the residual impacts will occur?
- How significant/important are the residual impacts onsite? (Consider regional goals)
- How significant are the residual impacts of developing the SEZ in the region? (Consider regional trends on scarcity and sensitivity)
- What is the role in the ecosystem or cultural systems?
- Other considerations?

Answers to these six questions answer the big question for each resource:

- **Would residual impacts warrant regional mitigation?**

Example Worksheet for Impacts Warranting Mitigation

Afton Solar Energy Zone Resource/ Issue	Residual or Unavoidable Impact?	How certain is it that the residual impacts will occur?	How significant are the residual impacts onsite?	How significant are the residual impacts of developing the Afton SEZ in the region?	Role in the ecosystem?	Other Considerations	Are potential residual impacts likely to warrant regional mitigation?
Air Quality	Maybe				Human Element		
Cultural	Yes				Human Element		
Ecology – Vegetation Terrestrial Wildlife Migratory Birds Animal Special Status Species	Yes				Basic Component		
Ecology – Invasive and Noxious Weeds	Maybe				Basic Component		
Hydrology – Surface Water	Yes				Basic Component		
Hydrology – Groundwater	Maybe				Basic Component		
Livestock Grazing	Maybe				Human Element		
Native American Concerns	Yes				Human Element		
Recreation	Maybe				Human Element		
Soils/Erosion	Yes				Basic Component		
Specially Designated Areas	Maybe				Human Element		
Visual	Maybe				Human Element		

New Mexico Solar Regional Mitigation Strategy
Next Steps

Presented by:

Jennifer Montoya, BLM Las Cruces District Office

New Mexico Solar Regional Mitigation Strategy Workshop

Las Cruces, NM

May 3, 2016

Stakeholders

- How to engage most effectively and attract participation of a diverse set of stakeholders?
  - Industry
  - Tribes
  - Other agencies with regulatory authority (Federal, State, Local)
  - Users of public lands
  - Scientists with relevant expertise (academia, USGS, conservation groups)

Future Stakeholder Engagement

- Workshops?
- Webinars?

- One or two webinars tentatively planned for Summer 2016 to consider:
  - Which resource impacts warrant compensatory mitigation (Element 2)?
  - What are the regional goals and objectives tied to those impacted resources (Element 3)?
  - How will the compensatory mitigation amount be determined and managed (Elements 4 and 5)?

SRMS Process – Schedule for 7 Elements

1. What is the baseline and what are the residual or unavoidable impacts?

May 2016 Stakeholder Workshop - WE ARE HERE

2. Which impacts should the BLM mitigate?

What are the regional mitigation goals?

4 and 5. How will compensatory mitigation amount be determined and managed?

Summer 2016 Stakeholder Webinars

6. What mitigation actions and locations will be recommended?

7. How will we know if mitigation strategy is achieving the desired outcomes?

Fall 2016 Stakeholder Workshop or Webinar

Draft Mitigation Strategy Document

Early 2017 Workshop or Webinar

Request for Comments

- BLM and Argonne will incorporate stakeholder input and any new data to our initial assessment of residual/unavoidable impacts (**Impact Tables and Discussion Group Forms**).

- Additional feedback through the workshop **Evaluation Form**.

- Please submit your comments by turning in the forms or sending them via e-mail to lwalston@anl.gov by **May 31, 2016.**