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

Presented by:
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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.)

250 MW Genesis Parabolic Trough Facility
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 mi²) 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 (8,433 MWs)
  - 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 km²)
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

- Avoid Impacts
  - Establishment of SEZs (Solar PEIS)
    - Also, non-development areas within a SEZ (e.g., sensitive habitat, FEMA floodplains)
- Minimize Impacts
  - Design Features (Solar PEIS)
- Offset Residual Impacts
  - Regional Mitigation Strategy
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](http://blmsolar.anl.gov)


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

Online resource sharing information about BLM’s program implementation
Menus for each major page direct you to relevant information.
New Mexico

One solar energy zone (SEZ) was identified in New Mexico through the Record of Decision (ROD) for the Solar PEIS: the Afton SEZ.

As of April 2015, there were no pending applications or approved projects in New Mexico.

Additional SEZ information and maps for the Afton SEZ are available on the SEZ-specific Web page for Afton.

Solar Regional Mitigation Strategy

In the Solar PEIS, the BLM committed to establishing a solar regional mitigation strategy (SRMS) for each SEZ. These regional mitigation strategies are expected to simplify and improve the mitigation process for future solar projects in SEZs.

The BLM is developing a solar regional mitigation strategy for the Afton SEZ in New Mexico. Extensive information on the Utah Solar Regional Mitigation Strategy is available on the project website, at:


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.
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:

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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. Identify appropriate mitigation technique(s)
   - Acquisition
   - Restoration/Enhancement
   - Preservation

2. Estimate costs
   - Conduct market analysis to estimate per-acre acquisition and/or restoration/enhancement costs
   - Estimate costs for specific preservation actions

3. Adjust fee considering SEZ condition
   - Determine per-acre fee based on tree/shrub groundcover of SEZ developable area
   - Sum together costs of preservation actions and divide by acreage

4. Consider additional adjustments to preliminary fee
   - Add per-acre effectiveness and durability fee
   - Add administration fee
   - Add fee for unforeseen circumstances

5. Subtraction or addition of other fees
   - Subtract other required fees as applicable (e.g., ESA Section 7 fees)
   - Add other fees as applicable (e.g., those identified during project-specific NEPA)

SEZ Per-Acre Mitigation fee

Example from Arizona SRMS

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.
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
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

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

1. What is the baseline and what are the unavoidable impacts?  
   May 2016 Stakeholder Workshop - WE ARE HERE

2. Which impacts should the BLM mitigate?  

3. What are the regional mitigation goals?  
   Summer 2016 Stakeholder Webinars

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

6. What mitigation actions and locations will be recommended?  
   Fall 2016 Stakeholder Workshop or Webinar

7. How will we know if mitigation strategy is achieving the desired outcomes?  
   Draft Mitigation Strategy Document

Draft Mitigation Strategy Document

Early 2017 Workshop or Webinar
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 Southern Western 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:

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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: 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.

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

Golden Eagle
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.
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

Mount Riley WSA

Organ Mountains/Desert Peaks National Monument
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

Red outlined areas are intermittent stream, dry lake areas, and floodplains not suitable for development.
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 groundwater 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
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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**

1. **Avoid Impacts**
   - Establishment of SEZs (Solar PEIS)
   - Also, non-development areas within a SEZ—e.g., sensitive habitat, FEMA floodplains

2. **Minimize Impacts**
   - Design Features (Solar PEIS)

3. **Offset Residual Impacts**
   - Regional Mitigation Strategy
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
  – **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:

  - Assessing the Degree of Impacts
  - Determining which Resources Warrant Compensatory Mitigation
  - Assisting in Development of Mitigation Goals & Objectives
  - Evaluating Mitigation Actions & Locations
  - Calculating the Recommended Mitigation Fee
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

![Map of Current Landscape Intactness](image_url)
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/](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 all of the potential impacts of solar development

Identify the residual impacts (those remaining after avoidance and minimization measures)
**Evaluate the potential impacts of solar development**

**Identify the resources with residual impacts**

<table>
<thead>
<tr>
<th>Resource/Issue</th>
<th>Afton Solar Energy Zone Impacts¹</th>
<th>On-site Mitigation²</th>
<th>Residual Adverse Impacts³</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Ecology:</strong> Terrestrial Wildlife and Aquatic Biota</td>
<td>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.</td>
<td>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 URL under Avoidance column.</td>
<td>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.</td>
</tr>
<tr>
<td></td>
<td>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.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>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.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>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).</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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

Evaluate all of the impacts of solar development

Identify the potential residual adverse impacts

Identify the residual impacts that warrant compensatory mitigation

Next step in the process
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

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

3. What mitigation actions and locations will be recommended?
   - Summer 2016 Stakeholder Webinars

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

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.