

# Welcome San Luis Valley/Taos Plateau Study: Solar Regional Mitigation Strategy











# Potential Impacts of Solar Development on Resources in Colorado Solar Energy Zones

Presented by:

BLM Interdisciplinary Team

Colorado SEZ Solar Regional Mitigation Strategy, BLM  
Public Workshop

Alamosa, Colorado

September 10, 2014



# The Solar PEIS examined impacts and mitigation measures for 20 resource areas:

|   |                                       |                                |  |
|---|---------------------------------------|--------------------------------|--|
| <b>Acoustic Environment</b>                                   | <b>Air Quality and Climate Change</b> | <b>Cultural Resources</b>      | <b>Vegetation and Riparian Areas</b>             |
| <b>Wildlife and Aquatic Biota (including Migratory Birds)</b> | <b>Special Status Species</b>         | <b>Environmental Justice</b>   | <b>Hydrology - Surface Water and Groundwater</b> |
| Lands and Realty  | <b>Rangeland Resources - Grazing</b>  | Military and Civilian Aviation | Minerals   |
| <b>Native American Concerns</b>                               | Paleontology                          | <b>Recreation</b>              | <b>Socioeconomics</b>                            |
| <b>Soils/Erosion</b>  | <b>Specially Designated Areas</b>     | Transportation                 | <b>Visual</b>                                    |

Resources in **bold** considered likely to have or possibly to have unavoidable impacts from solar development for one or more solar energy zone



# SEZ Summary Tables: Impacts and On-Site Mitigation

- Prepared on basis of Solar PEIS impact assessments; assumes full buildout of SEZs (80% of area will be used for solar facilities)
- Include summary of required Solar Program design features (complete list of 250+ in Solar Record of Decision)
- Supplemented by local BLM Interdisciplinary team; they recommended some additional onsite mitigation to be evaluated through project-level NEPA analyses
- Include BLM initial assessment of resources for which solar development in the SEZ would cause residual or unavoidable impacts
- Public comments sought by October 1, 2014

# Acoustic Environment (Noise)

- Construction and operations could cause short-term and long-term noise impacts
  - Closest residences to Antonito Southeast SEZ - about 0.5 mi to the north and west
  - Closest residence to De Tilla Gulch SEZ - about 0.3 mi east
  - Closest residences to Los Mogotes East SEZ - about 0.4 mi to the north and east
- Design Features:
  - Limit hours of daily activities
  - Construct noise barriers
  - Coordinate with nearby residents

# Ecology: Special Status Plant Species

- Habitat loss and loss of individual plants, if present, would occur due to land clearing and grading, fugitive dust, and spread of invasive species
- Species potentially present:
  - Antonito Southeast SEZ: Ripley's milkvetch and rock-loving aletes
  - De Tilla Gulch SEZ and Los Mogotes SEZ: None within the SEZs; rock-loving aletes within 5 miles
- **Design features:** If pre-disturbance surveys identify special status species plants, occupied habitats will be avoided, or other mitigation will be done (for example seed collection, reseeding elsewhere)



# Special Status Animal Species in Colorado SEZs



Mexican Free-Tailed Bat



Burrowing Owl



Golden Eagle



Ferruginous Hawk



Swift Fox



Gunnison's Prairie Dog



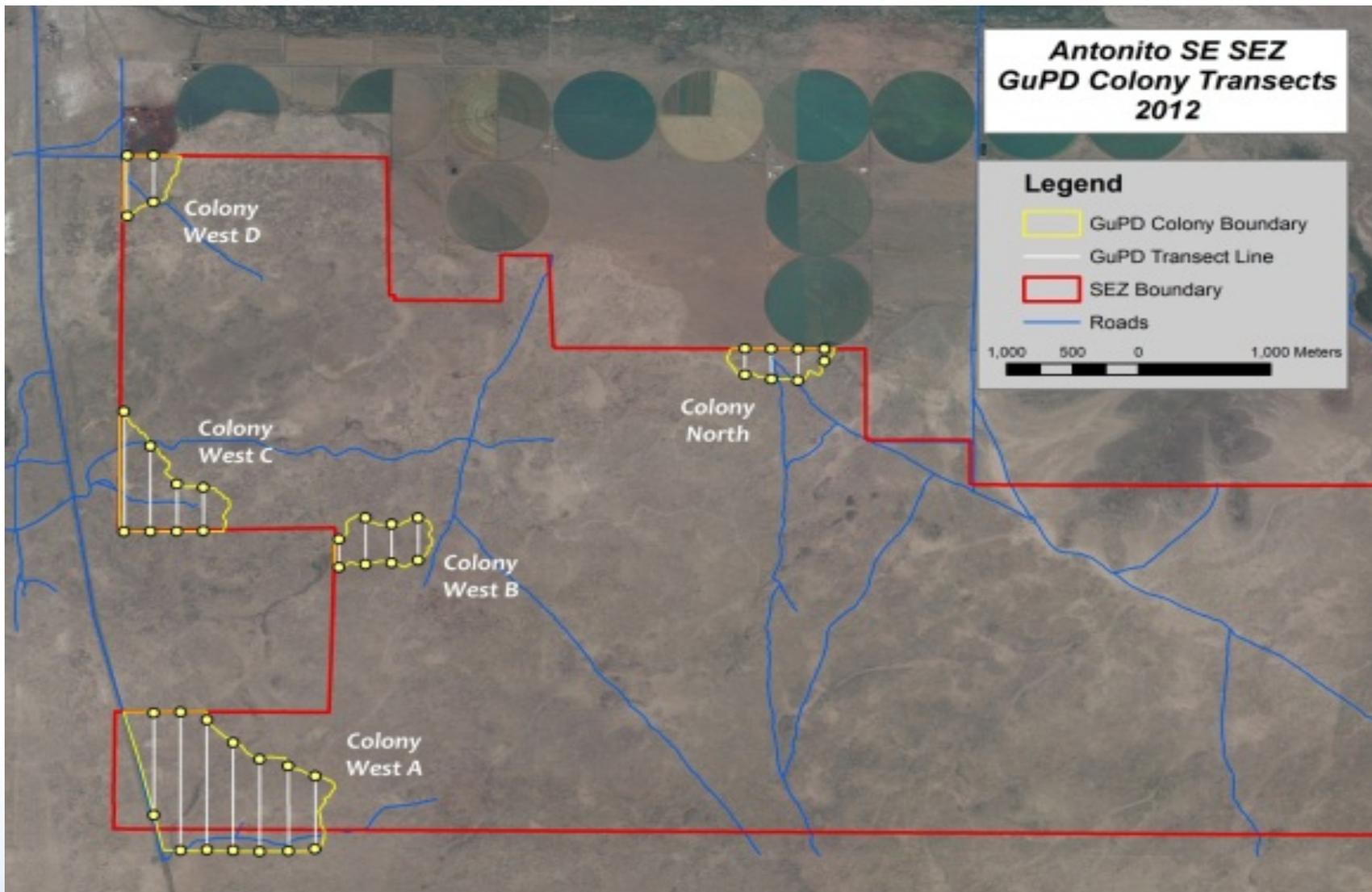
Pronghorn



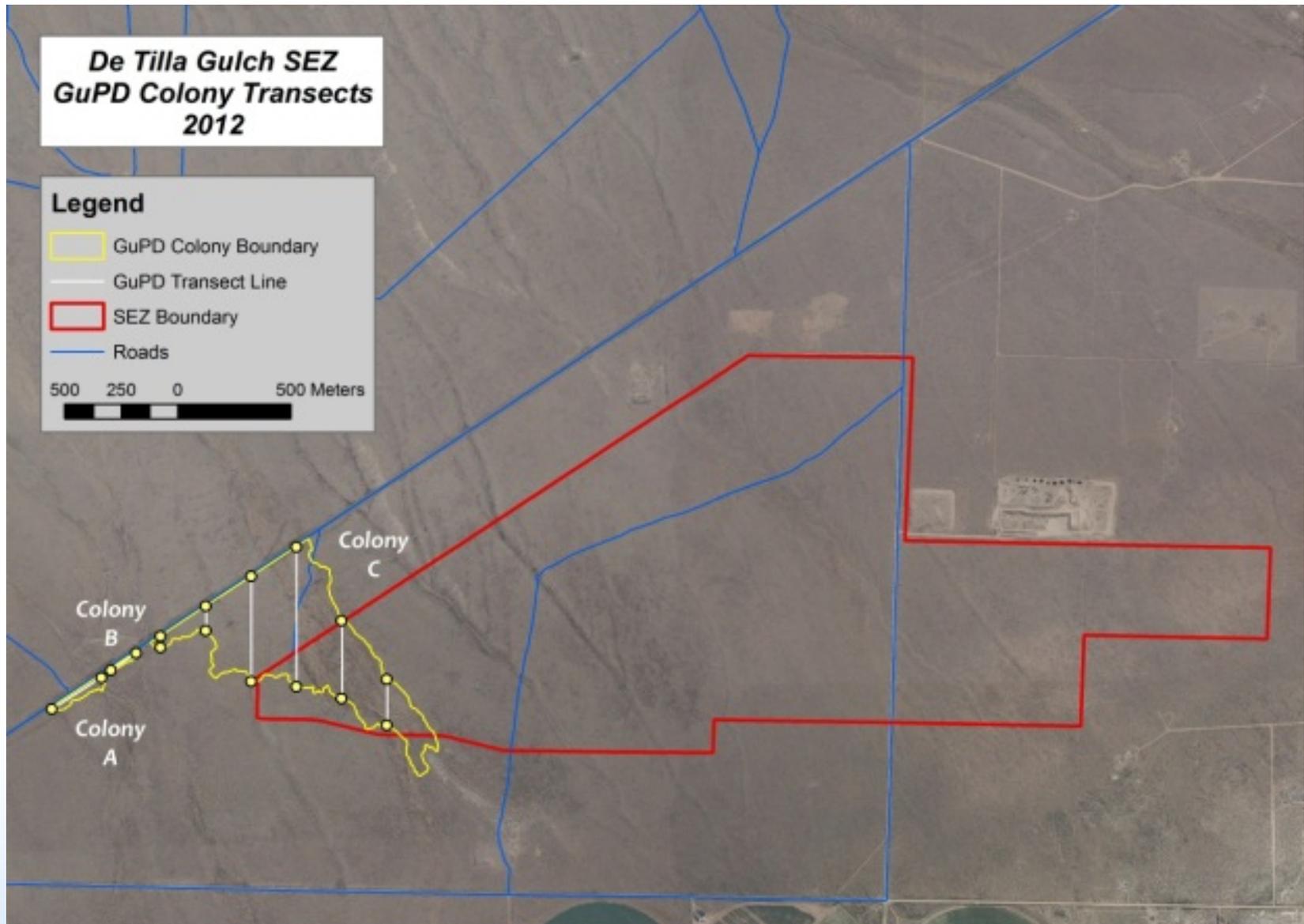
Mountain Plover

# Ecology: Special Status Animal Species

- Impacts due to:
  - Loss of habitat and connectivity
  - Possible behavior/breeding disturbance and mortality due to construction and operation activities, including ground disturbance, noise, lighting, dust, spills, ephemeral stream loss
  - Similar indirect impacts outside of the SEZ from new roads and transmission lines and increased traffic
- **Design features:** include avoiding, when practicable, construction during winter when big game species are present, wetlands, washes and ephemeral drainages



Gunnison Prairie Dog Colonies – Antonito Southeast SEZ Survey. Source: BLM 2012.



Gunnison Prairie Dog Colonies – De Tilla Gulch SEZ Survey. Source: BLM 2012.



# Ecology: Migratory Birds



**Ferruginous Hawk**

**Sand Hill Cranes at Monte Vista**



**White Faced Ibis**

**Mountain Plover**

Impacts due to:

- 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 night sky impacts and effects to migration routes/behavior.

**Design features:**

- No development of power towers
- Avoid wetlands, washes, and ephemeral drainages to extent practicable
- Other tall structures should be located to avoid known flight paths

# Ecology: Vegetation and Riparian Areas

- Characteristic vegetation includes:
  - Antonito Southeast SEZ: big sagebrush, winterfat, western wheatgrass, green needlegrass)
  - Los Mogotes East SEZ: Shadscale, fourwing saltbush, greasewood
  - De Tilla Gulch SEZ: Western wheatgrass, green needlegrass, blue gramma, needle-and-thread
- Sensitive habitats include wetlands, riparian areas, and ephemeral washes
- Potential Impacts: weed infestations, loss of vegetation cover, adverse impacts from dust deposition

## Design Features:

- Control spread of invasive/noxious plant species
- Early coordination and compliance with regulations.



Riparian Habitat along Conejos River  
on BLM's Simpson Property



Blanca Wetlands. Source:  
BLM

# Vegetation:

## Inter-Mountain Basins Semi-Desert Shrub Steppe



Characteristic vegetation of all 3 Colorado SEZs

# Ecology: Terrestrial Wildlife

- Species that may occur within the SEZs:
  - >10 amphibian and reptile species
  - Big game includes pronghorn, black bear, bighorn sheep, cougar, elk, and muledeer
- Potential impacts associated with direct mortality, habitat loss/alteration, and loss of corridors

## Design features:

- Minimize disruptions during lambing/calving/fawning season
- Control use of motorized vehicles
- Use engineering controls for minimizing impact to wetlands, dry wash, riparian habitats
- Augment, reintroduce, or translocate individuals from areas of direct effects



**Mule Deer**



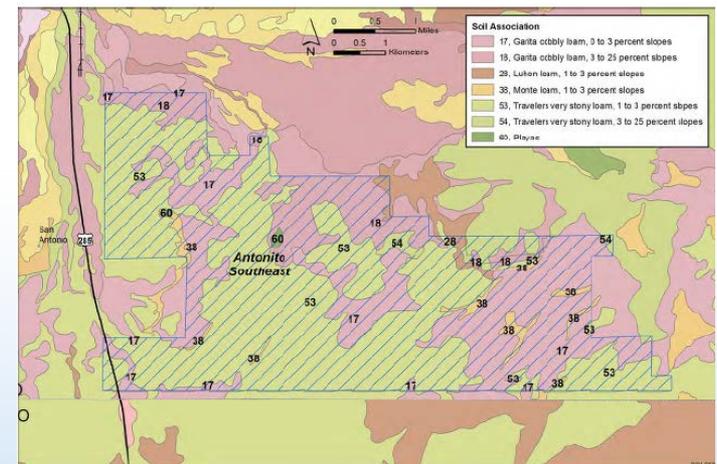
**Bighorn Sheep**



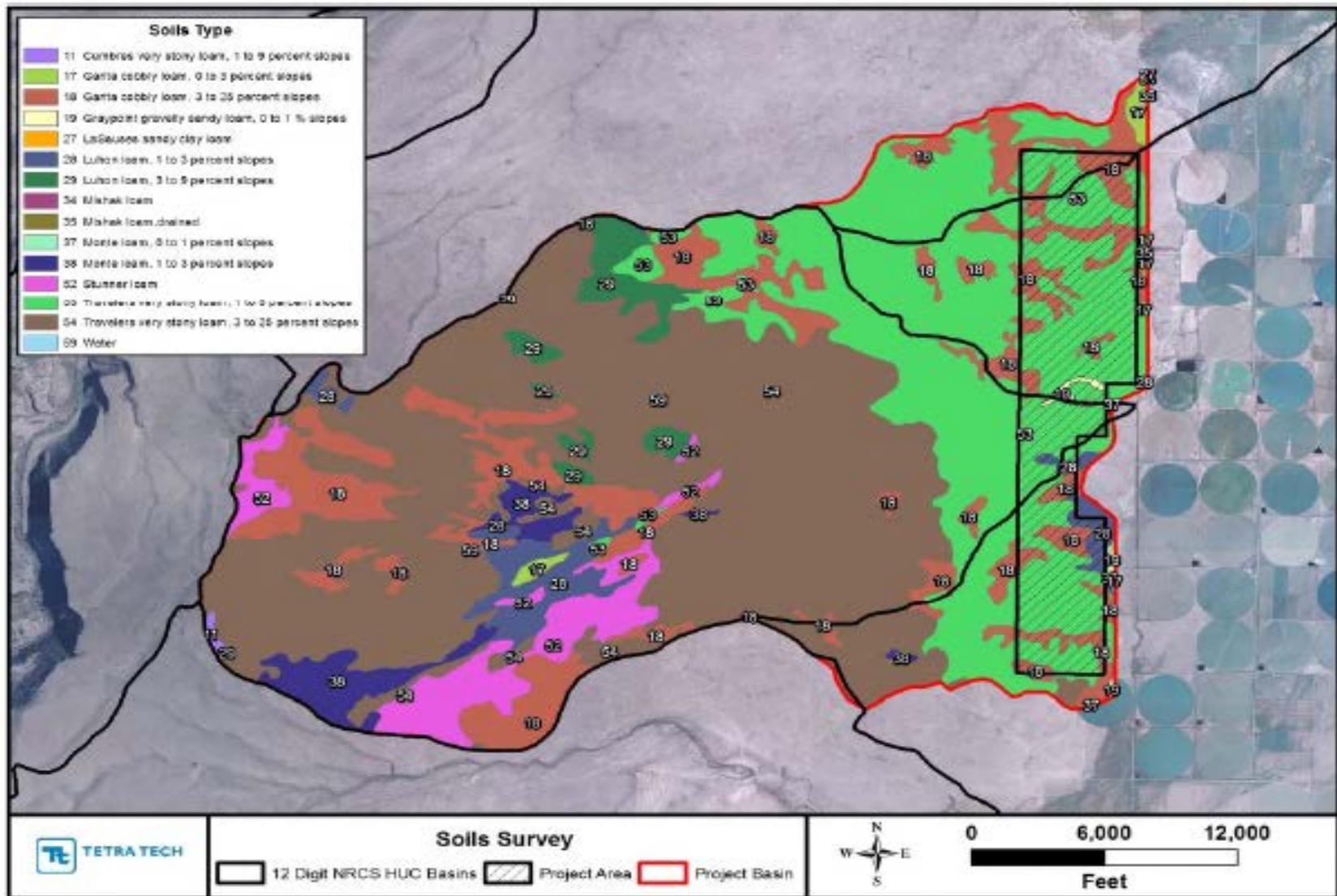
**Elk**

# Soils/Erosion

- Soils within the SEZs are predominantly very stony loams and cobbly loams (Antonito Southeast and Los Mogotes SEZs), or gravelly to gravelly sandy loams (De Tilla Gulch SEZ)
- Ground disturbance would be the greatest impact on soil resources
- Impacts: soil compaction; soil horizon mixing; soil erosion and deposition by wind, water, and surface runoff; sedimentation; possibly soil contamination
- **Design Features:**
  - Avoid, minimize, and/or mitigate potential impacts and geologic hazards, including measures to avoid erosion and stabilize disturbed areas.



Soil Map for the Antonito Southeast SEZ. Source: Solar PEIS 2012



Soil series, texture, and slopes in Los Mogotes East Solar Energy Zone and contributing drainage. Source: Tetrattech 2014.

# Air Quality and Climate Change

- Decreased air quality Fugitive dust (particulate matter) and equipment exhaust emissions generated during construction and operations:
  - Solar PEIS modeling showed that high dust concentrations should be limited to the immediate areas surrounding the SEZ boundary and decrease quickly with distance
  - Possible cumulative impacts are of concern; study ongoing
- Generation of fugitive dust may result in exposure to respirable particulates and/or microbes (possible 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
- **Design Features:**
  - Dust suppression measures will be implemented during all phases of development

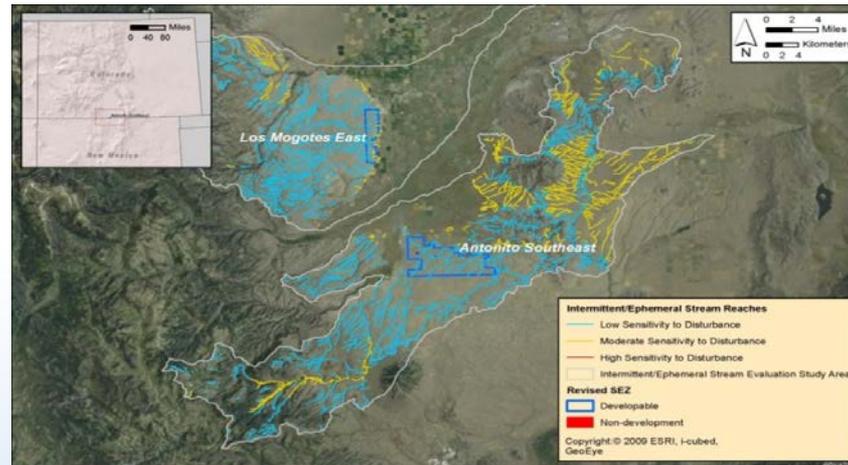


Dust storm: San Luis Valley,  
Colorado

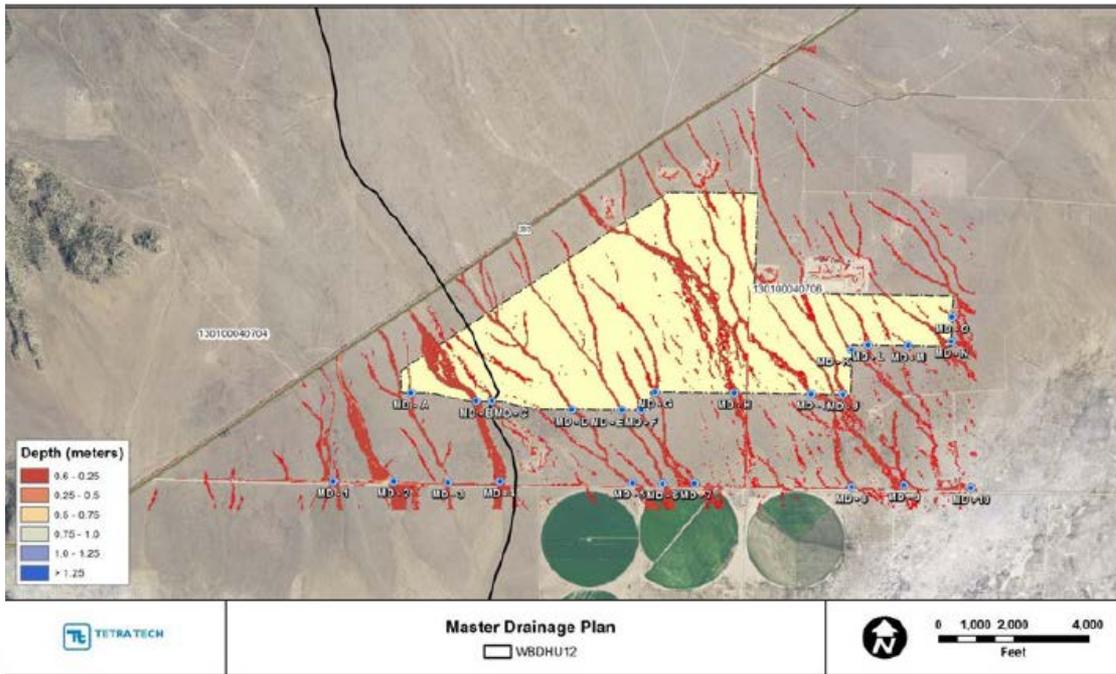
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# Surface Water Hydrology

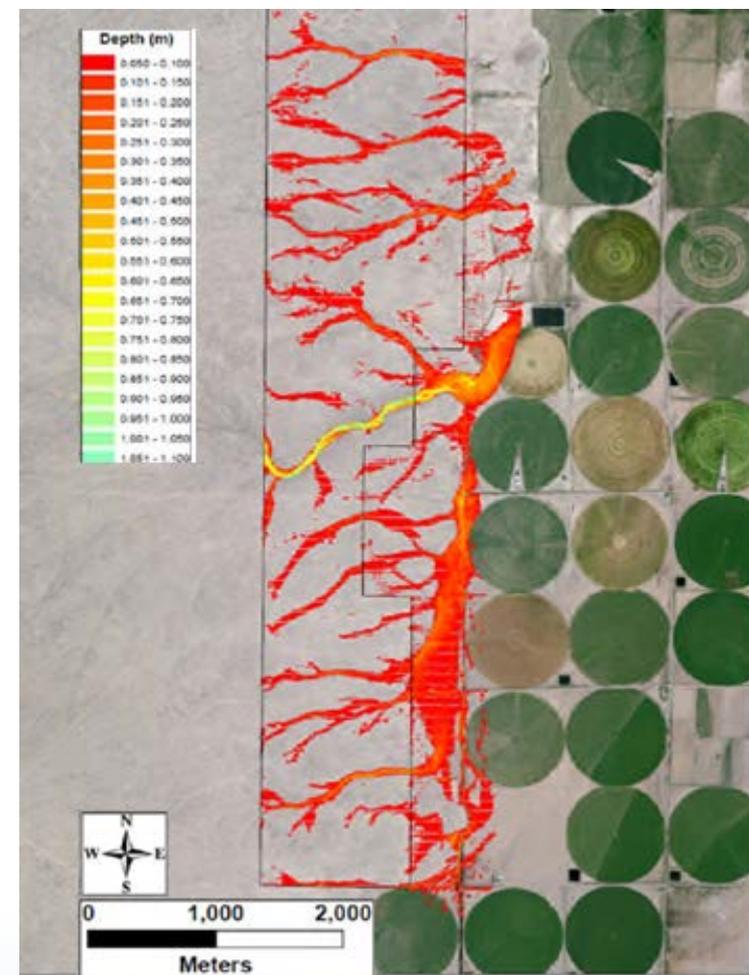
- Antonito Southeast SEZ contains a small lake and surrounding wetlands (17 acres); there are no other perennial surface water features in the SEZs
- In general, ephemeral drainages have low or moderate potential for water erosion
- **Design features:** specify developing vegetation plan to minimize disturbance to ephemeral washes and dry lakebeds. Also will avoid drainages and/or provide detention or retention facilities



Surface Water Features in the Hydrologic Basin that includes the Antonito Southeast SEZ. Source: BLM 2012 – Solar PEIS.



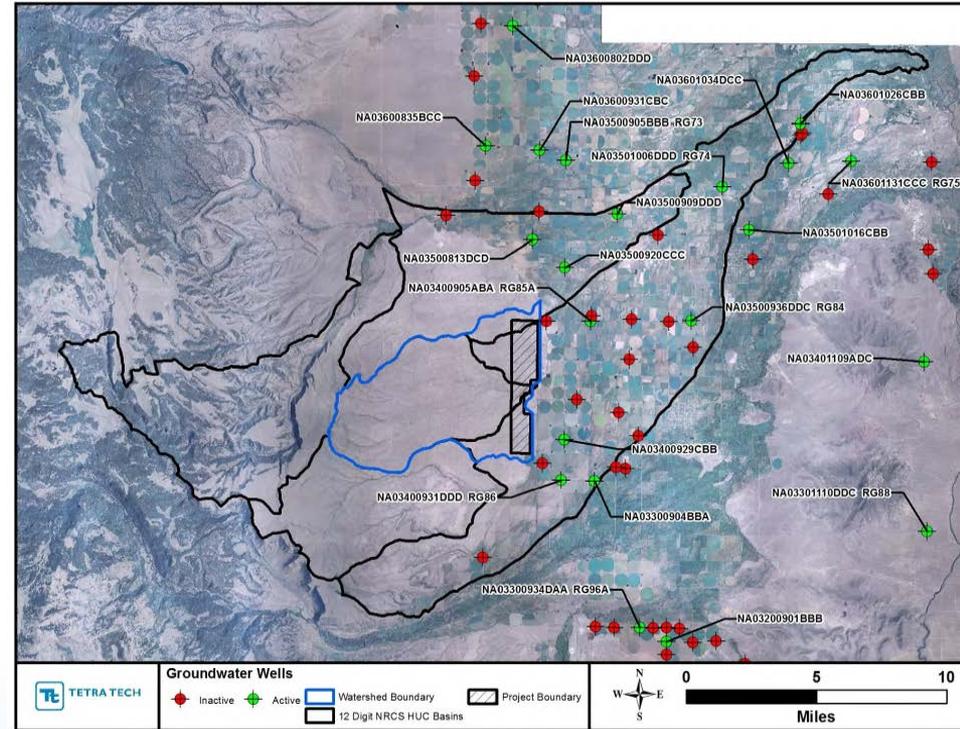
Dry wash ephemeral drainage and maximum 24-hour rainfall flow depths (m) for 100-yr flood event – De Tilla Gulch SEZ. Source: Tetrattech 2014.



Dry wash ephemeral drainage and maximum 24-hour rainfall flow depths (m) for 100-yr flood event – Los Mogotes East EZ. Source: Tetrattech 2013.

# Hydrology: Groundwater

- If projects use groundwater, then lower groundwater elevations will impact connected surface waters and other users in the basins
- Possibility of impacts to groundwater quality due to accidental spills of chemicals
- **Design features:** Specify that groundwater use must be offset through purchase and retirement of water rights. Augmentation/compensation is required by the State of Colorado



Wells in the vicinity of the Los Mogotes East SEZ.  
Source: Tetratech 2014

# Cultural Resources & Native American Concerns

Applies to all Colorado SEZs



# Cultural Resources

- Impacts could include disturbance to eligible archaeological sites if present within the SEZs
- Erosion caused by modified hydrologic patterns could increase accessibility to sites outside of the SEZs
- Resources and landscapes important for Hispano heritage could be effected, both through visual and auditory impacts
- **Design Features:** Significant cultural resources clustered in areas that retain sufficient integrity will be avoided; coordination with the Cumbres and Toltec Scenic Railroad Commission and Old Spanish Trail Association is recommended



# Native American Concerns

- Visual and auditory impacts on traditional cultural landscapes, and destruction of or disturbance to traditionally important plants and wildlife habitat
- Erosion caused by modified hydrologic patterns could increase accessibility to cultural sites outside of the SEZs
- For Antonito Southeast SEZ, a portion of the Picuris Trail could be impacted
- **Design features:**
  - Consultation with Native American governments regarding on-site mitigation will continue
  - Springs and other culturally important water sources and culturally important plant and animal species will be avoided to extent practicable
  - Visual intrusions on sacred sites will be avoided to extent practicable



# Recreation

- SEZ lands support limited OHV use, camping, and hunting
  - OHV routes currently open within the SEZs could be closed or rerouted
  - Only a small impact to pronghorn hunting is likely – small amount of habitat within the SEZs
  - Development on the SEZs would eliminate future recreation activities from developed areas.
- Indirect effects on viewsheds of recreational areas outside the SEZs are possible. Areas possibly affected include:
  - Great Sand Dunes National Park and Preserve
  - Old Spanish National Historic Trail
  - Los Caminos Antiguos and proposed Cochetopa Scenic Byway
  - Sangre de Cristo Mountains
  - National wildlife refuges and designated wilderness areas
- **Design features:** include consideration of potential impacts on tourism and consultation with local community leaders



Camping in San Luis Valley

# Visual Resources

- Scenic quality of the SEZs is mixed, 40% of Antonito Southeast SEZ has moderate visual quality (VRI Class III), while all of De Tilla Gulch and Los Mogotes SEZs have moderate visual quality
- Moderate to strong visual impacts may occur in many specially designated areas near the SEZs (field verification ongoing)

Alamosa solar facility



# Visual Resources - Design Features

- No development of power tower facilities
- Site and design facilities to minimize glint and glare and unnecessary lighting
- Assess degree of impact at key observation points (for example scenic overlooks, trails, campgrounds); avoid siting within viewshed of the KOPs
- Where facilities cannot be sited outside the viewshed of KOPs, maximize distance from the KOPs



Fenced Sun Edison Solar Facility, Vegetation Undisturbed



Glare from Solar One Trough Facility near Las Vegas NV

# Specially Designated Areas (SDAs)

- SDAs near the SEZs include wilderness areas, wildlife refuges, areas of critical environmental concern, special recreation management areas, national trails, and others
- Impacts could include:
  - Adverse visual effects on viewsheds
  - Reduced recreational use
  - Fragmentation of biologically-linked areas
  - Loss of public access
- Design Features:
  - Initiate early consultation with Sangre de Cristo NHA management

*South San Juan Wilderness Area*



*Rio Grande Natural Area*



# Livestock Grazing

- Portions of allotments would be lost on all three SEZs – estimate loss of 575 animal unit months (AUMs) on Antonito Southeast SEZ and 188 AUMs on Los Mogotes East SEZ.
- Permittees would be reimbursed for value of range improvements; however, this would not completely cover their economic loss.
- Permittees would lose the ability to sell the allotments.
- County and BLM would lose some revenue (minor impact).



Photo Credit: BLM

## Design Features:

- Consider options to avoid, minimize, and/or mitigate adverse impacts such as relocation of range improvements and fencing, access to water.

# Socioeconomics

Applies to all Colorado SEZs

- Positive impacts to local economy as a result of expenditures of wages and salaries and the collection of state sales and income taxes.
- Construction and operations jobs would be created (least for PV; most for parabolic trough facilities)
- Loss of livestock grazing could result in the future loss of jobs and a decline in grazing fees payable to the BLM and the county.



Source: <http://www.energy.ca.gov/tour/ivanpah/>