Solar Regional Mitigation Strategy
Purpose of the Workshop

Presented by:
Jim Gazewood, BLM Utah State Office
Utah Solar Regional Mitigation Strategy Workshop
Cedar City, UT
April 19, 2016

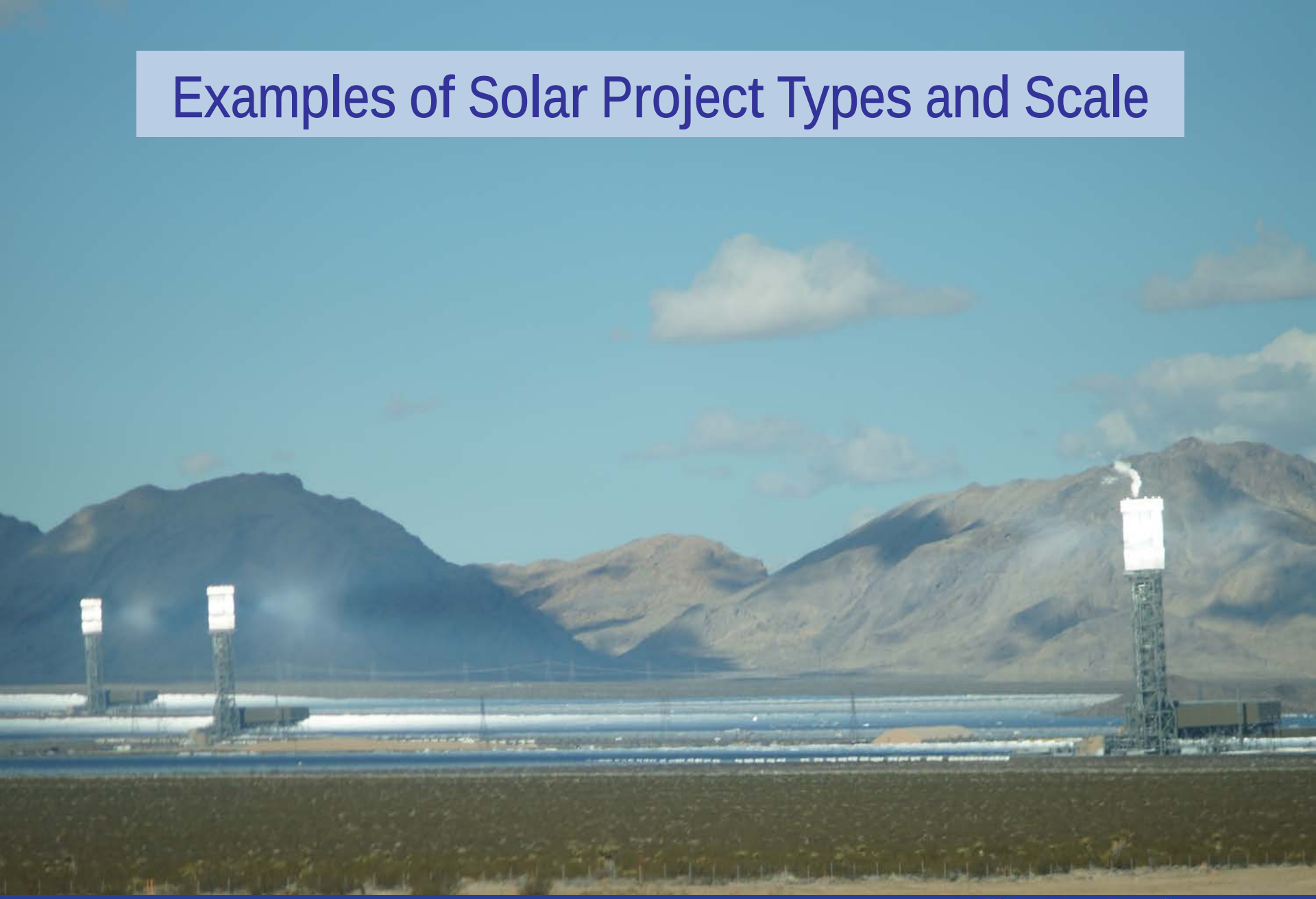
Presentation Outline

- Background:
  - Extent and Scale of BLM Solar Project Approvals
  - BLM's Solar Energy Program
- BLM Utah's Three (3) Designated Solar Energy Zones (SEZs)
- Workshop Purpose: Discuss Regional Compensatory Mitigation
  - What is Regional Compensatory Mitigation?
  - Why is Stakeholder Involvement Critical?
  - Elements of the Utah Solar Regional Mitigation Strategy (SRMS)

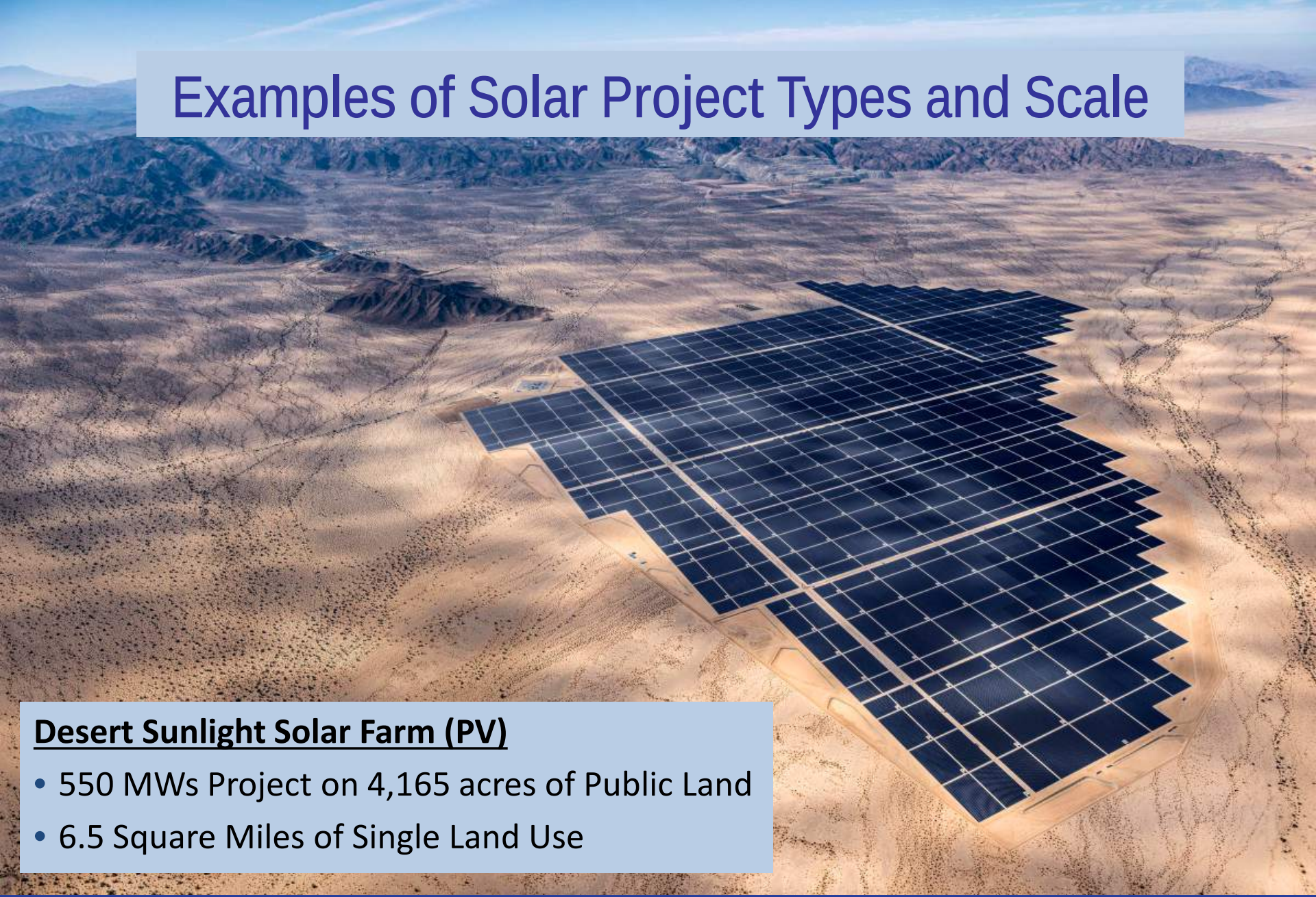
Background: Extent/Scale of Solar Project Approvals

- Since 2009 BLM has approved 40 Projects (10,836 MWs)
  - 32 Photovoltaic (PV) Projects (8,433 MWs)
  - 4 Power Tower Projects (730 MWs)
  - 3 Parabolic Trough Projects (964 MWs)
  - 1 Solar Engine Project (709 MWs)
- Examples of Solar Project Types and Scale

Examples of Solar Project Types and Scale



Examples of Solar Project Types and Scale



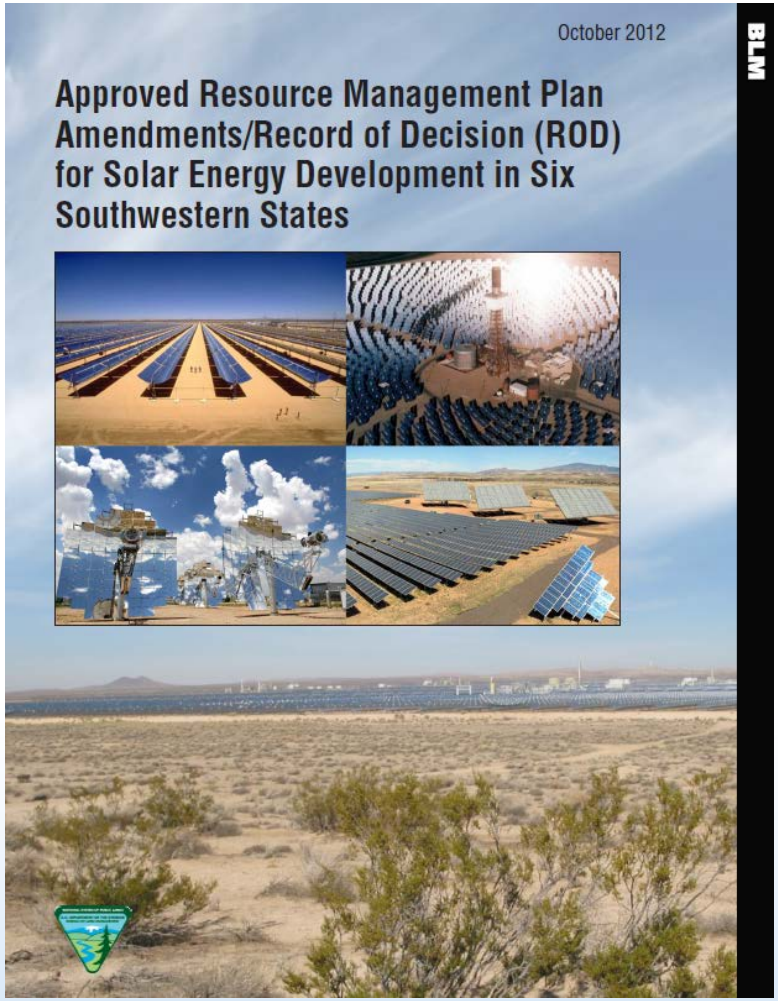
Desert Sunlight Solar Farm (PV)

- 550 MWs Project on 4,165 acres of Public Land
- 6.5 Square Miles of Single Land Use

Background: BLM's Solar Energy Program

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

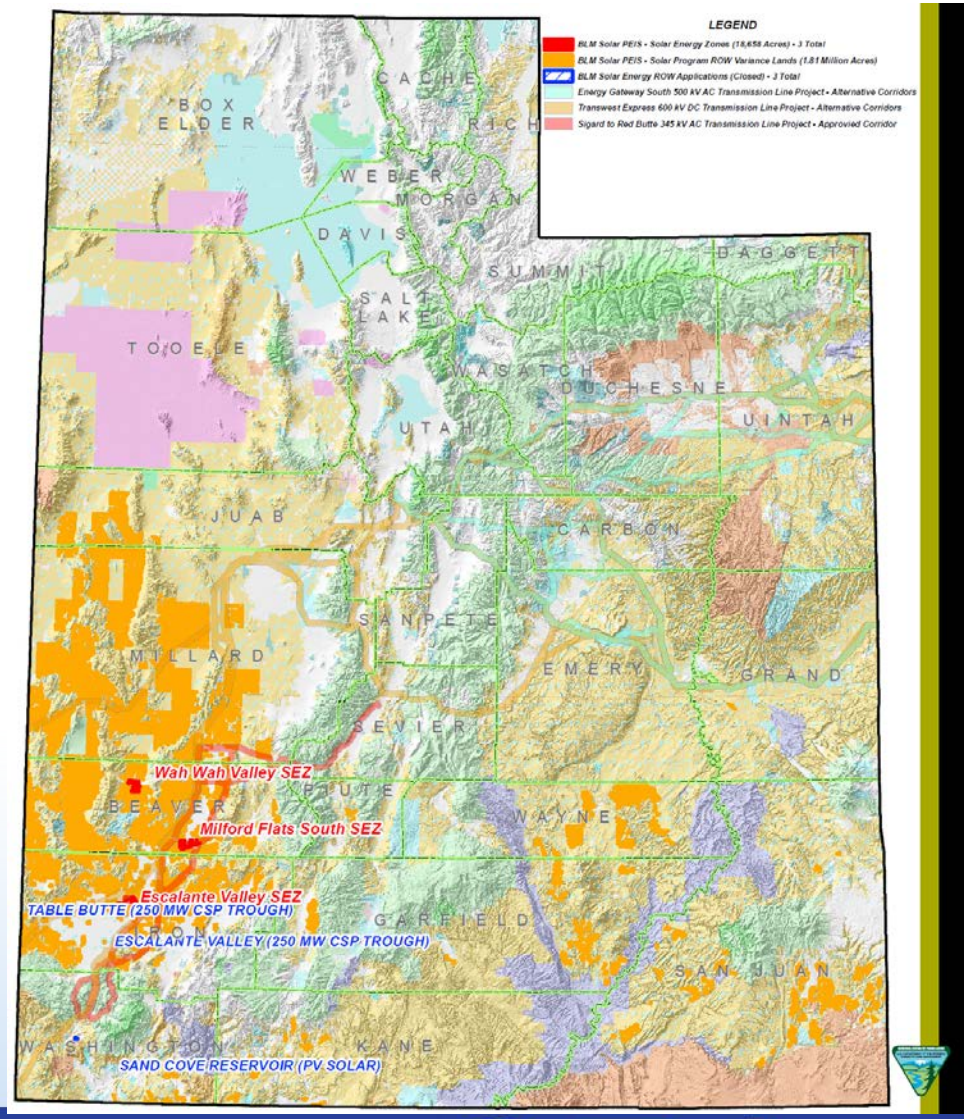
- Six States: **AZ**, **CA**, **CO**, **NM**, **NV**, and **UT**
- Designated 19 Solar Energy Zones within the 6 SW States
- Designated 19 M acres of Solar Variance Lands
- Amended 89 BLM Land Use Plans
- Established Standard Design Features / Development Requirements
- Strengthened BLM Policy, Procedures and Enhanced the Program Implementation
- Initiated BLM Solar Regional Mitigation Strategy starting in NV (Dry Lake SEZ)
- Recently completed strategies in AZ and NV
  - ✓ Ongoing in CO and initiating in UT and NM



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

For BLM Utah Public Lands the Solar PEIS and ROD established:

- **1.8 M acres of solar variance lands**
  - ✓ 177,089 acres of variance lands within the Cedar City Field Office
- **Three (3) SEZs totaling 18,658 acres**
  - ✓ Escalante Valley – 6,533 acres
  - ✓ Milford Flats South – 6,252 acres
  - ✓ Wah Wah Valley – 5,873 acres



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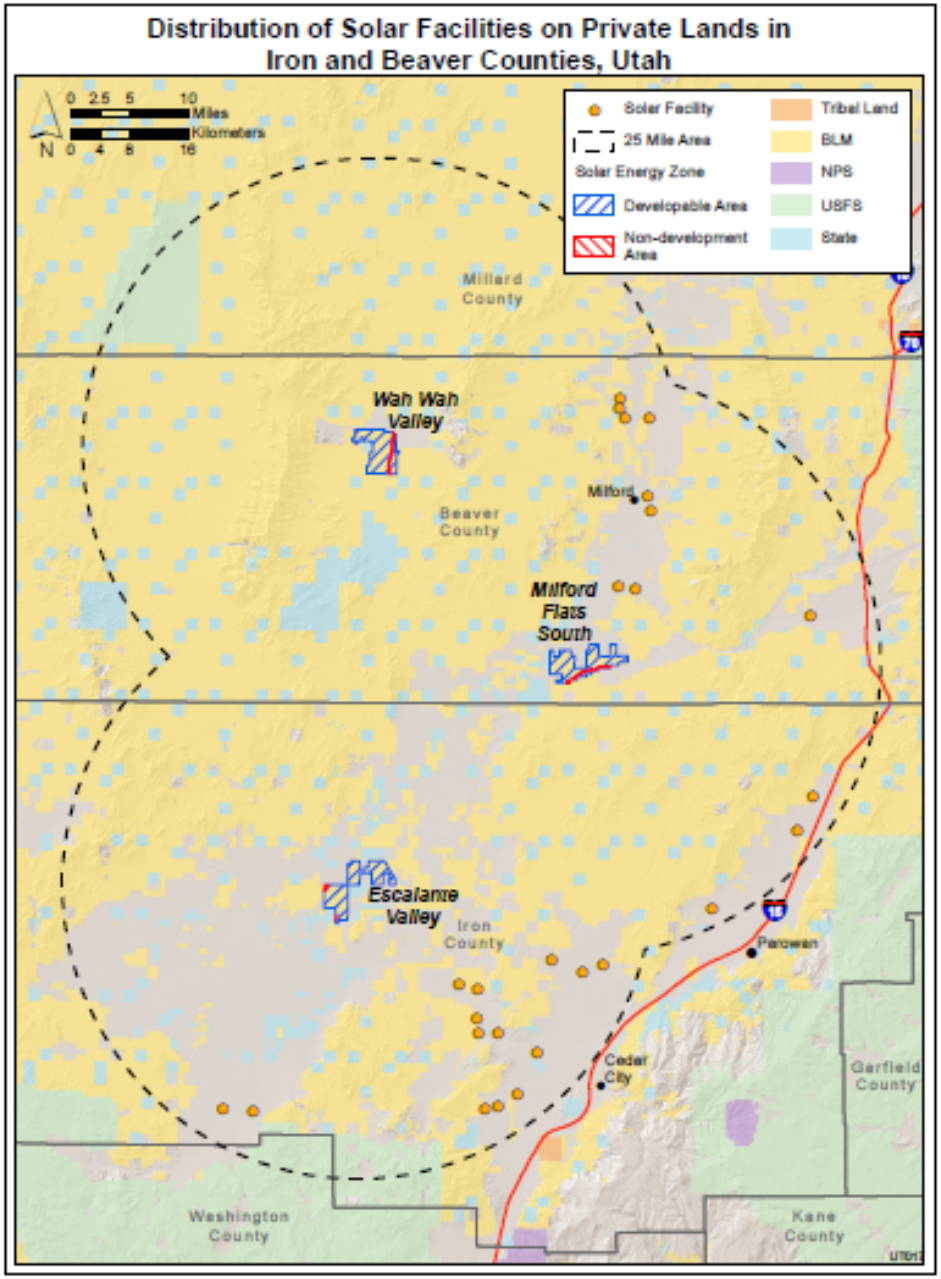
Solar Energy Development Near Utah Solar Energy Zones

Currently no solar facilities on BLM-administered lands.

There are 26 solar PV facilities near the Utah SEZs:

- 8 within 25 mi of Wah Wah Valley SEZ,
- 12 within 25 mi of Milford Flats South SEZ, and
- 14 within 25 mi of Escalante Valley SEZ.



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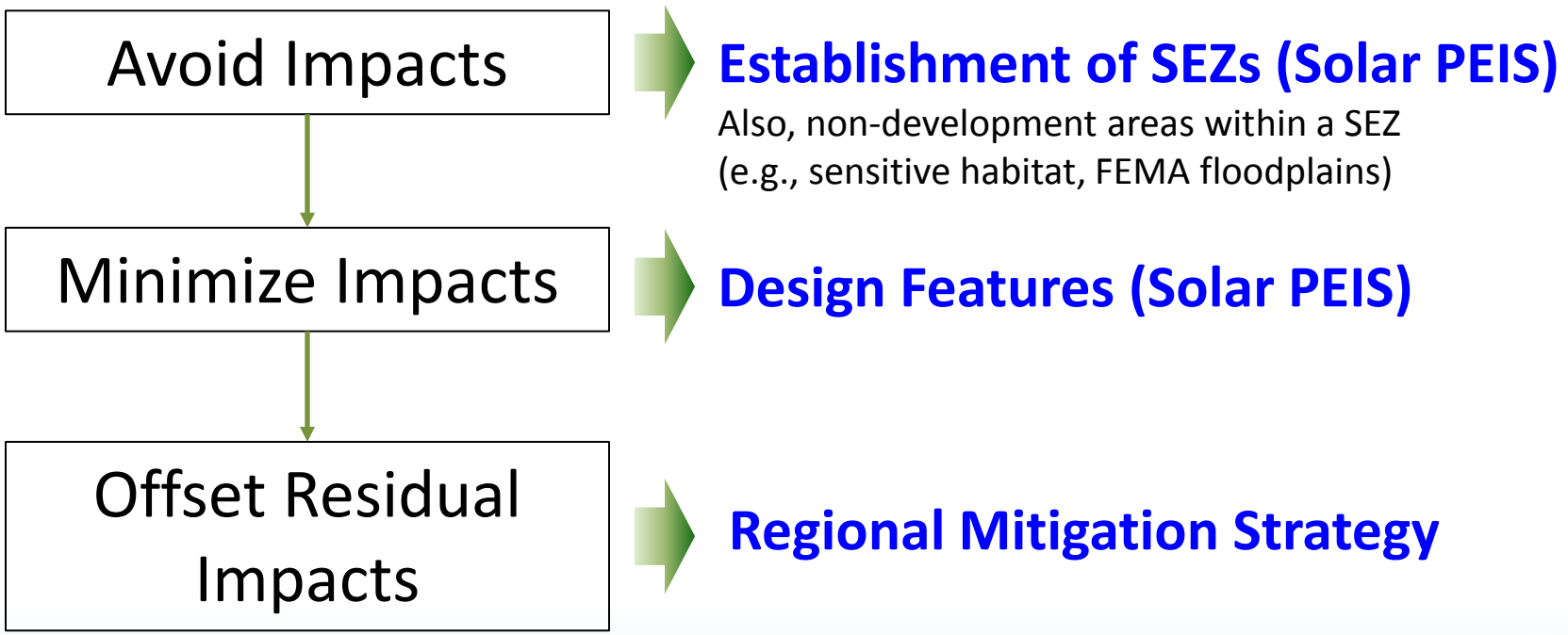
What is Regional Compensatory Mitigation?

- 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 Utah's Solar Energy Zones (SEZs).
  - **Collaborative effort with stakeholders**
- **Purpose of workshop is to identify residual impacts of development in the SEZs that may warrant compensatory mitigation.**

Regional Compensatory Mitigation (Continued)

- Regional mitigation strategy is NOT a binding decision document.
- It is a RECOMMENDATION that will inform future project-specific NEPA analysis.
- To the extent possible, impacts will be AVOIDED 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
  - Others
- BLM-Argonne Team goal is to share, listen, learn, and apply

Photos from Nevada Dry Lake SEZ SRMS Pilot

Elements of Solar Regional Mitigation Strategy (SRMS)

- Identify residual impacts as a result of solar development in the SEZs.
- Identify which residual impacts warrant compensatory mitigation.
  - Based on evaluation of resource status and trends.
  - Informed by conceptual models and spatial models developed for the BLM's Central Basin and Range Rapid Ecoregional Assessment.
- Identify regional mitigation goals and objectives.
- Recommend a compensatory mitigation fee, including basis (e.g., acquisition, preservation, and/or restoration); recommended adjustments, administration, monitoring, and other fee components.
- Recommend mitigation sites, actions, and outcomes that would work to achieve mitigation goals.
- Recommend monitoring and adaptive management approaches to ensure actions achieve desired results.

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❖ **Any General Questions before Starting SRMS Objectives & Process?**

Solar Regional Mitigation Strategy Objectives and Process

Presented by:
Elizabeth Burghard, BLM Cedar City Field Office
Utah Solar Regional Mitigation Strategy Workshop
Cedar City, UT
April 19, 2016

Utility-scale Solar Energy Development

Scatec Solar, Iron County, Utah

Ivanpah Solar Facility, California Mojave Desert

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: Recommended compensatory mitigation amount
- Element 5: Recommend management strategy of 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 Utah SEZs?

Yes

- Soils/Erosion
- Vegetation
- Terrestrial Wildlife
- Migratory Birds
- Special Status Species
- Hydrology – Surface Water
- Cultural
- Native American Concerns

Maybe

- Air Quality
- Invasive/Noxious Weeds
- Hydrology - Groundwater
- Livestock Grazing
- Specially Designated Areas
- Visual Resources

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

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

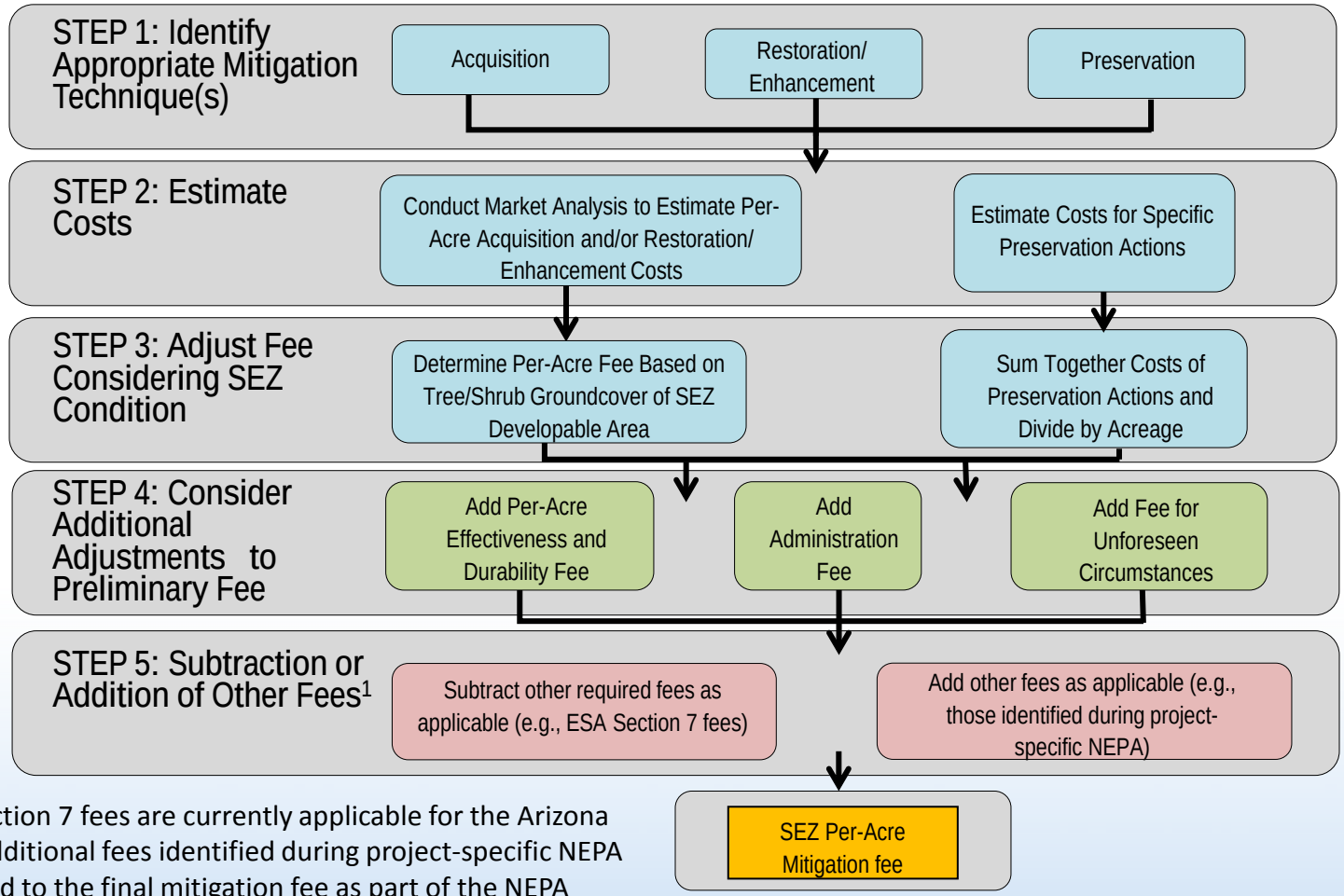
Examples could include:

- Loss of Special Status Species Habitat
- Loss of Ecosystem Services

Element 3: Mitigation Goals & Objectives

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

Element 4: Identify a Method for Calculating Recommended Mitigation Fees



[1]No ESA Section 7 fees are currently applicable for the Arizona SEZs. 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

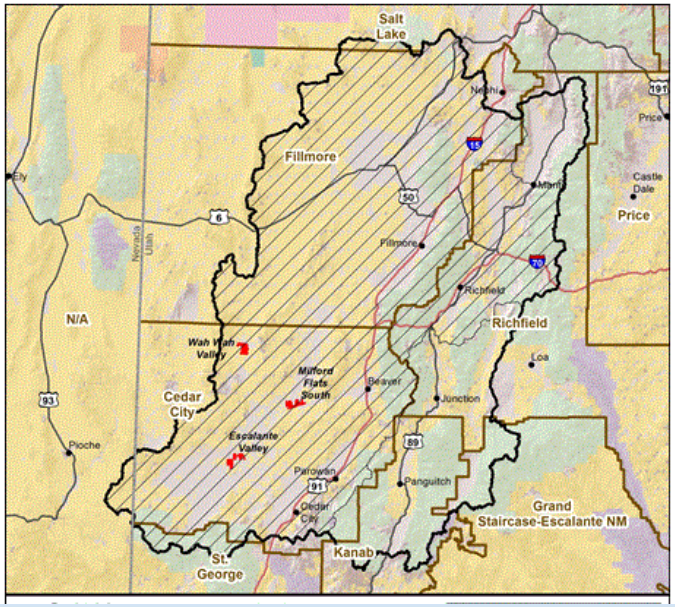
Element 5: Identify & Recommend a Management Structure to Hold & Apply Mitigation Investment Funds

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 Investment Objectives, 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
  - Consistency 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 objectives?
- Is there a change in regional trends?

Adaptive Management

- What if not achieving desired results?

Utah SRMS Process – Schedule for 7 Elements

Overview of Utah Solar Energy Zones

Presented by:
Heidi Hartmann
Argonne National Laboratory

Utah Solar Regional Mitigation Strategy Workshop
Cedar City, UT
April 19, 2016

What is utility-scale solar development?

- Large solar fields – requires from 5-10 acres per megawatt (MW)
- Three main types – photovoltaic (PV), parabolic trough, power tower

Desert Sunlight
550 MW
Photovoltaic
Facility

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

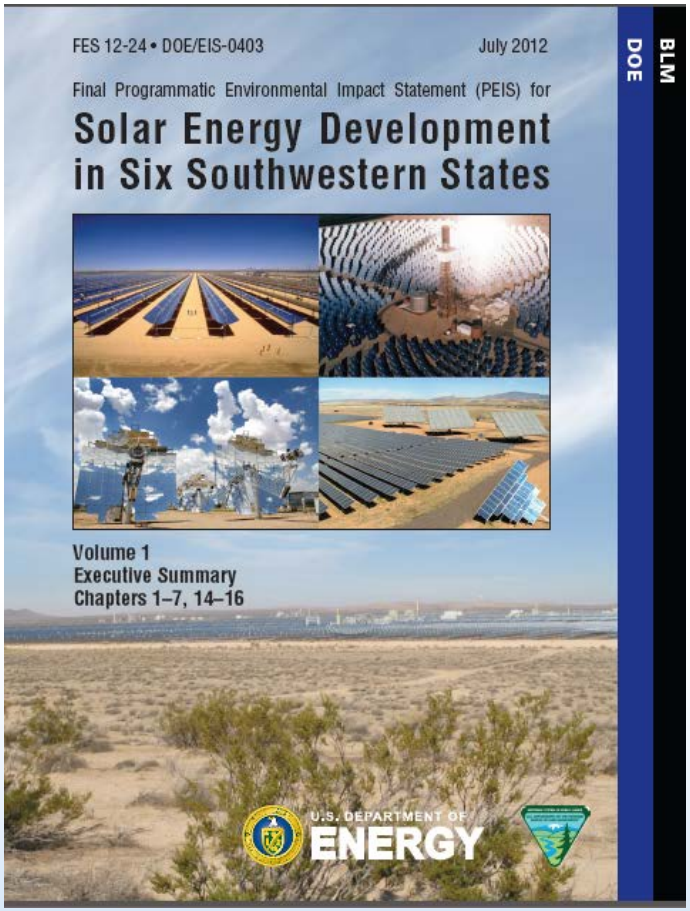
- Three main types – photovoltaic (PV), parabolic trough, power tower

370 MW Ivanpah Power Tower Facility

250 MW Genesis Parabolic Trough Facility

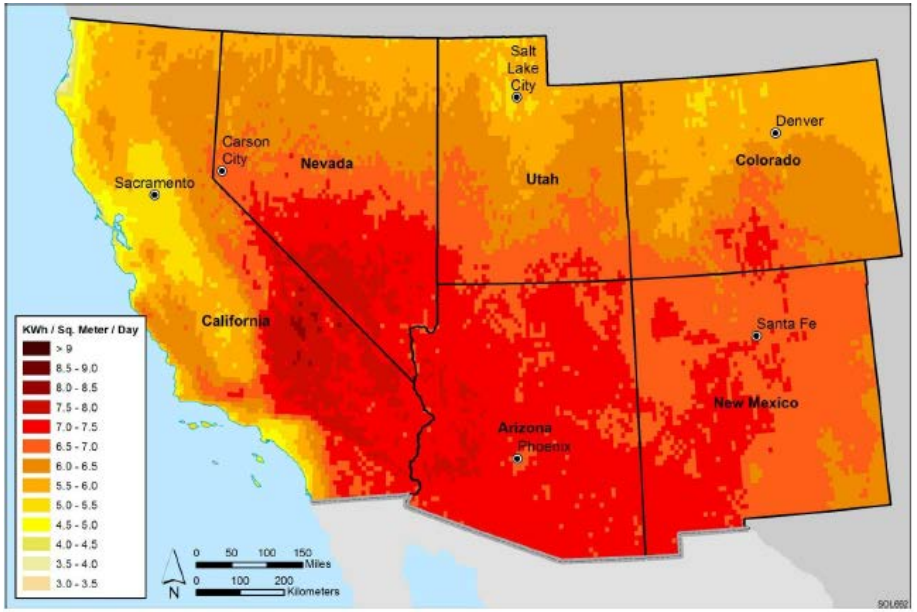
BLM's Solar Energy Program

- Finalized in 2012, included 3 Solar Energy Zones (SEZs) in Utah.
- SEZs defined as "locations well suited for utility-scale production of solar energy, where the BLM will prioritize solar energy and associated transmission infrastructure development."
- Included 250+ design features, required measures or procedures to avoid, minimize, and/or mitigate potential adverse impacts.



Utah Solar Energy Zones

- Three Utah SEZs, all in Cedar City Field Office – areas of high solar radiation and low-slope on BLM-administered lands:
  - Escalante Valley – 6,533 developable acres in Iron County
  - Milford Flats SZ – 6,252 developable acres in Beaver County
  - Wah Wah Valley SEZ – 5,873 developable acres in Beaver County



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

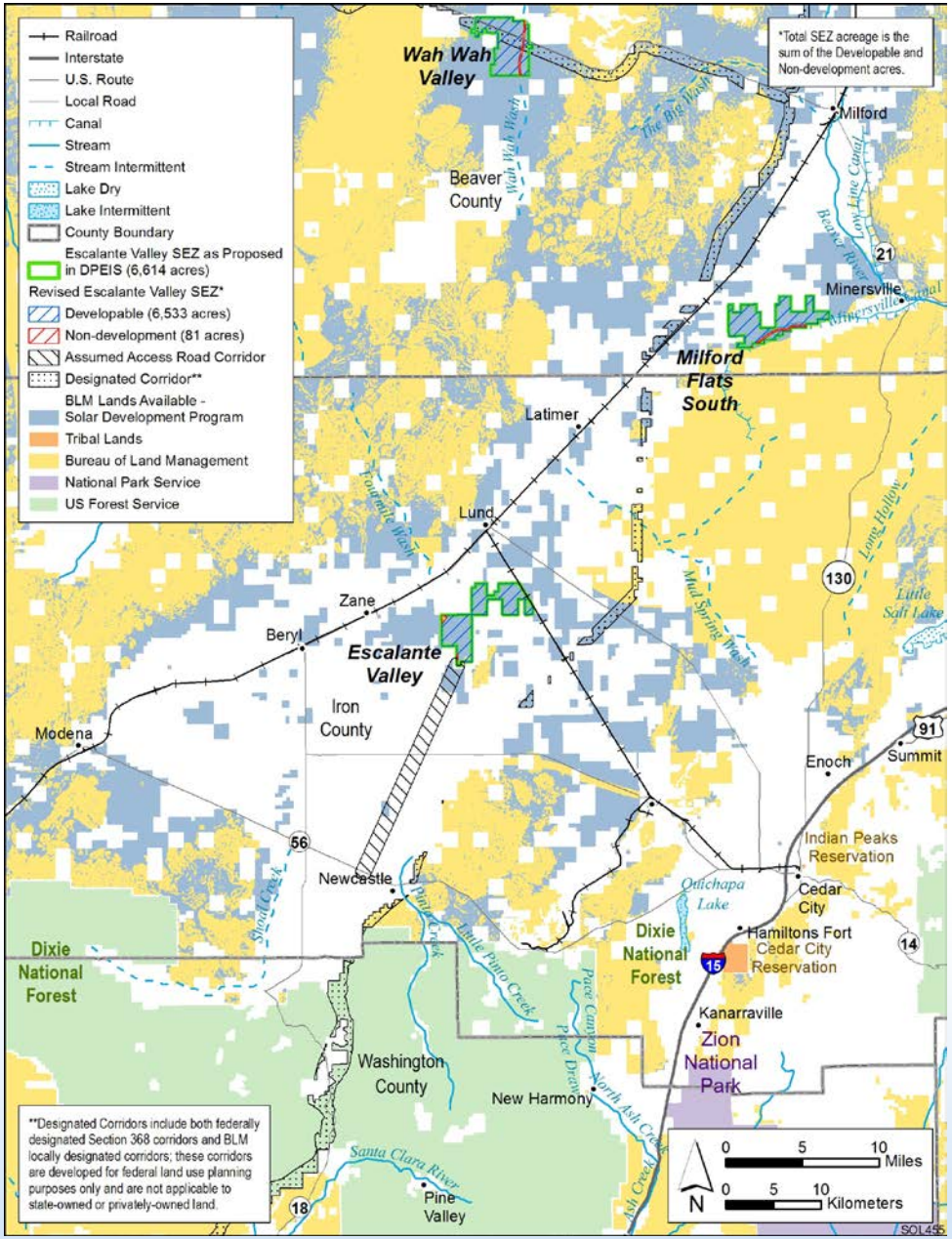
Slope in solar energy zones must be less than 5%

Utah SEZs (cont.)

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

- Regional approach utilizes available baseline condition data for larger areas around SEZs (for example, Rapid Ecoregional Assessment)

Escalante Valley Solar Energy Zone



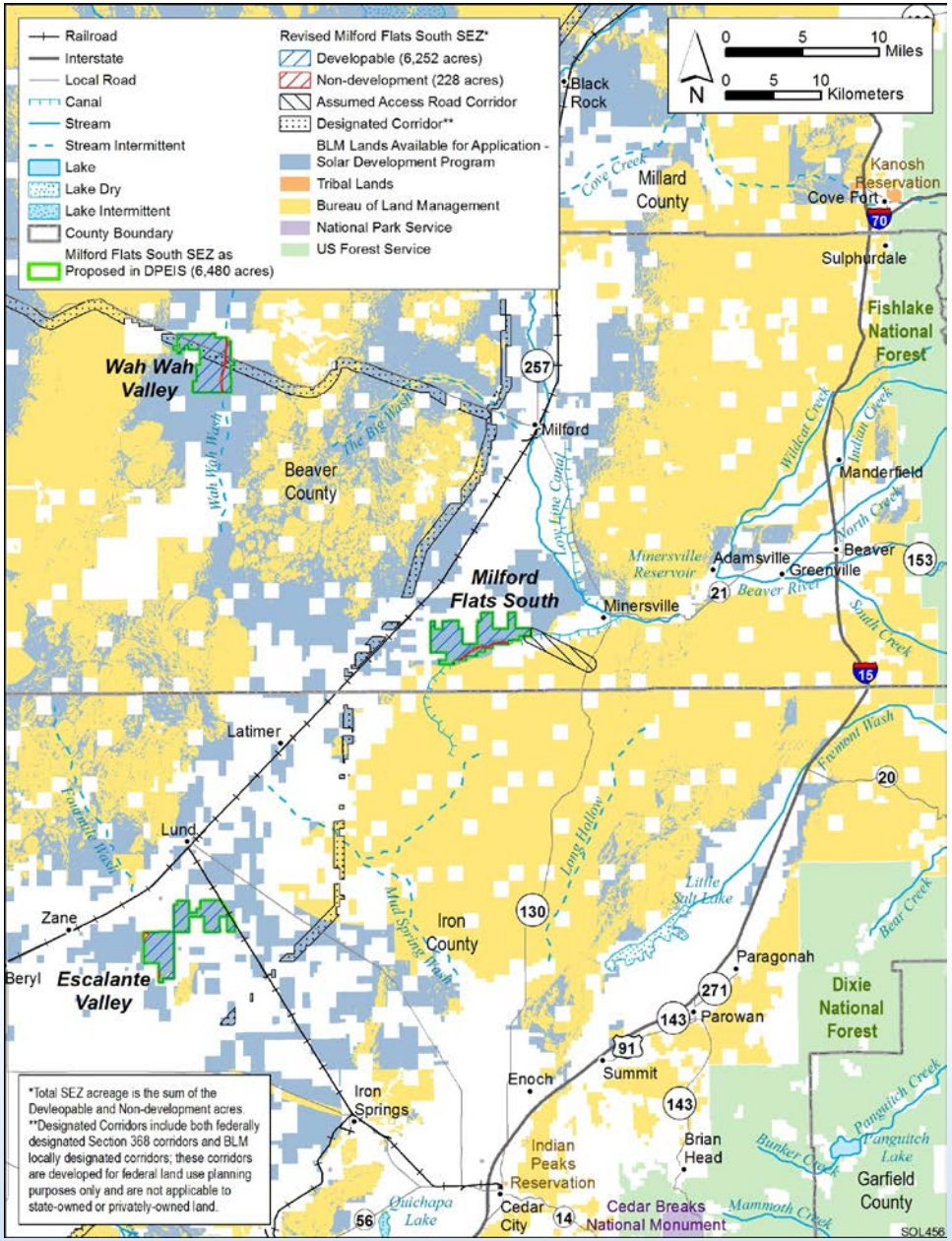
Escalante Valley SEZ

- 6,533 developable acres.
  - Up to 1,045 MW generation capacity.

- Located in Iron County in southwestern Utah.
  - BLM Cedar City Field Office.

- 4 mi south and 5 mi from the towns of Lund and Zane, ~15 mi north of State Route 56.
- Borders both state and private lands.
- 345 kV Sigurd to Red Butte transmission line located ~4 mi southeast of SEZ in Section 368 energy corridor (corridor also includes 500 kV DC line and a gas pipeline).
- Old Spanish National Historic Trail 6 mi south of the SEZ and Three Peaks SRMA is about 13 mi southeast of the SEZ.

Milford Flats South Solar Energy Zone



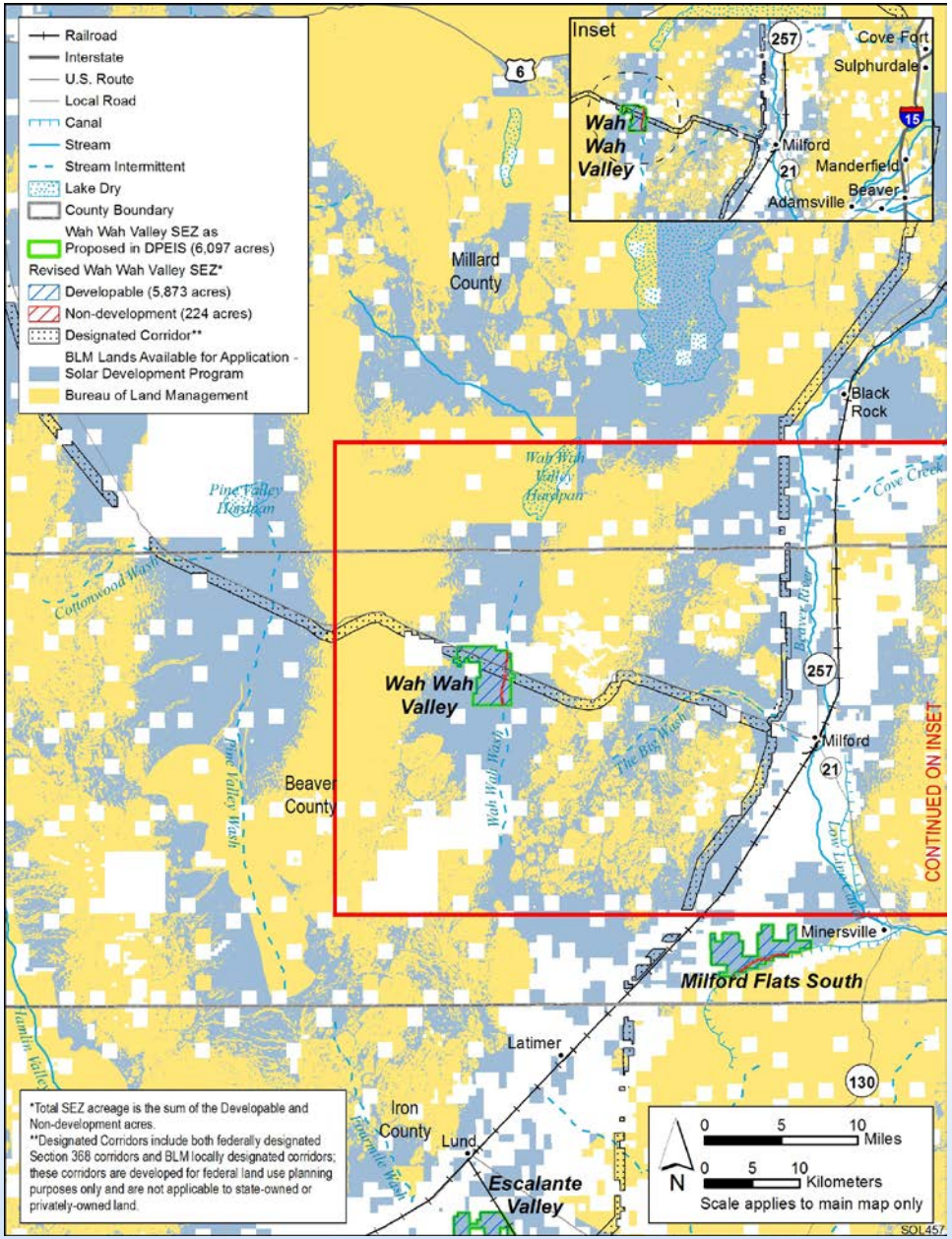
Milford Flats South SEZ

- 6,252 developable acres.
  - Up to 1,000 MW generation capacity.

- Located in Beaver County in southwestern Utah.
  - BLM Cedar City Field Office.

- 5 mi west of Minersville, 13 mi southeast of Milford, 5 mi west of State Route 21/130.
- Bordered by BLM-administered lands to the south, private lands to the north and southeast, and state lands southwest of the SEZ.
- 345-kV Sigurd to Red Butte transmission line located ~2 mi northwest of the SEZ
- Within the SEZ, there are ROWs for two energy pipelines, one transmission line, two roads, and one telecommunications line. Section 368 energy corridor 2 mi (3 km) west of the SEZ.
- 12 mi from the Granite Peak wilderness inventory unit and 25 mi northwest of the Old Spanish National Historic Trail.

Wah Wah Valley Solar Energy Zone



Wah Wah Valley SEZ

- 5,873 developable acres.
  - Up to 940 MW generation capacity.

- Located in Beaver County in southwestern Utah.
  - BLM Cedar City Field Office.

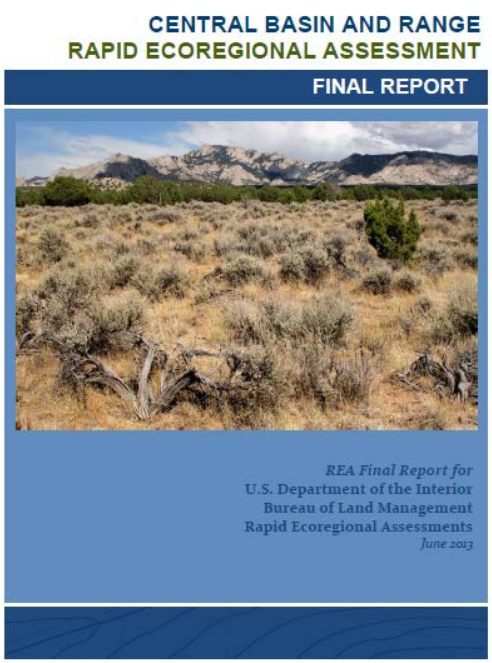
- The SEZ is ~23 mi northwest of Milford, State Route 21 runs through the northern half of the SEZ.
- Bordered by state and private lands.
- 345-kV Sigurd to Red Butte transmission line located ~19 mi east. Within the SEZ, there are ROWs for a state highway and one telecommunications line.
- Section 368 energy corridor passes through SEZ; currently unoccupied.
- 6 mi from the Wah Wah Mountains WSA, 25 mi from the King Top WSA, and southeast of the North Wah Wah wilderness inventory unit.

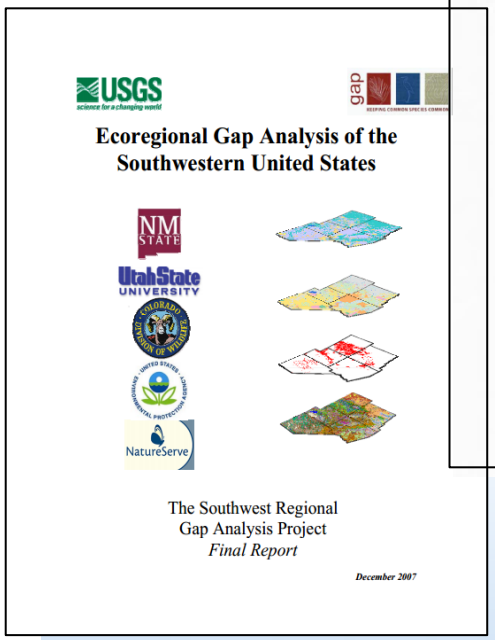
Data Sources and Guidance

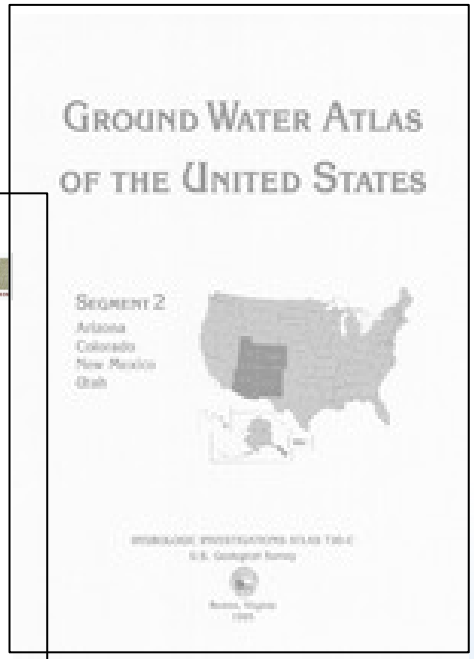
- Analysis of impacts from the Solar PEIS (2012)
- Other SRMSs:
  - RMS for the Dry Lake SEZ - BLM Technical Note 444 (2013)
  - RMS for the Arizona SEZs (2016)
  - Dry Lake Valley North SEZ, Nevada (2016)
  - RMS for the Colorado SEZs (Draft) (2016)
- Mitigation Guidance: BLM Interim Policy - Regional Mitigation Manual 1794; DOI Strategy (2014); Presidential Memorandum on Mitigating Impacts on Natural Resources (2015)

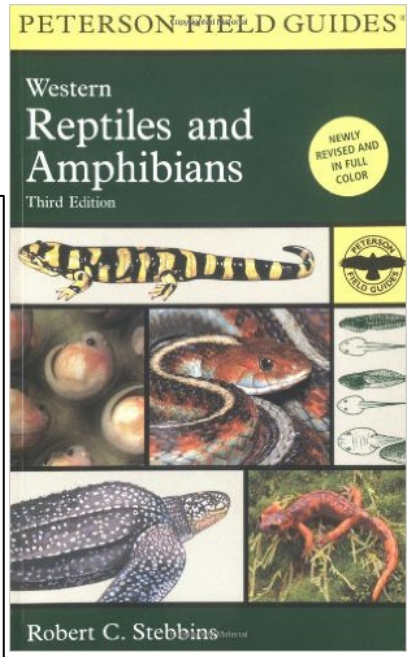
Data Sources and Guidance (cont.)

- Central Basin & Range Rapid Ecoregional Assessment (2013)
- BLM Resource Management Plans
  - Cedar City RMP currently undergoing revision
- Other local studies









Baseline Conditions in the Study Area

- 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

BLM Local Field Office RMPs

The BLM Cedar City Field Office is preparing an EIS for a new Resource Management Plan (RMP) on public lands in Iron and Beaver counties.

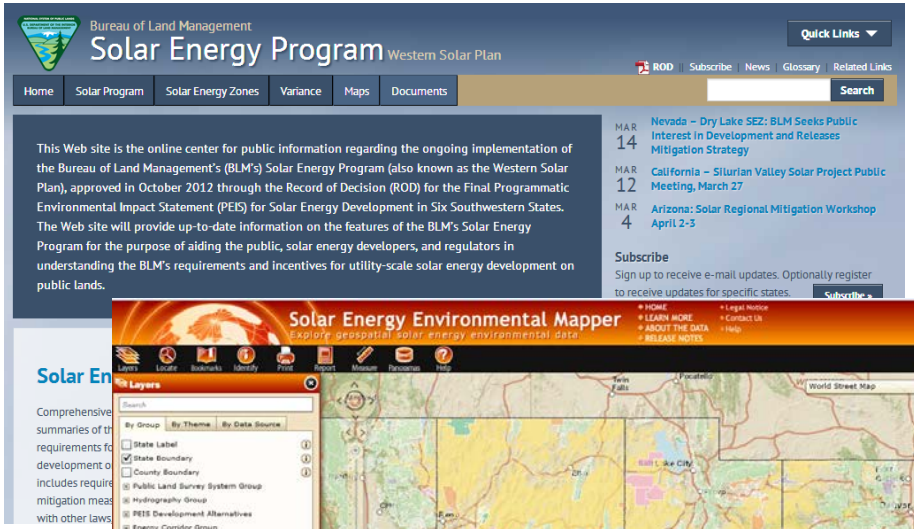
Existing land use plans for the Cedar City Field Office include:

- Pinyon Management Framework Plan (MFP), 1983
- Cedar Beaver Garfield Antimony RMP; 1986

- Considerable change in the area, including:
  - substantial population growth; increased use of public lands for recreational activities
  - increase in renewable energy proposals and projects on private lands
  - new information for many resources, including threatened and endangered species

Useful Websites

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



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

Utah SEZ SRMS Project Website:
http://blmsolar.anl.gov/sez/ut/regional-mitigation/

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

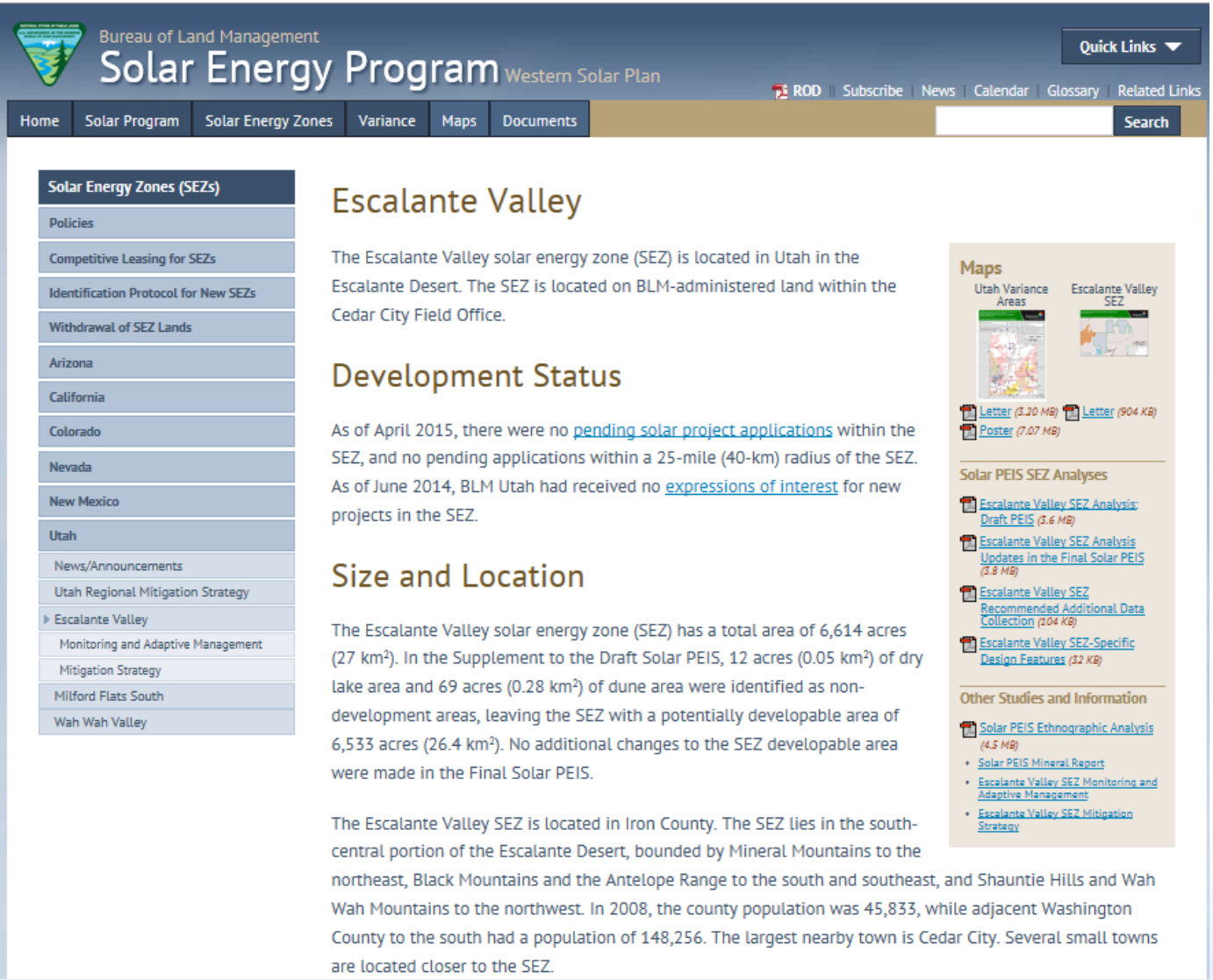
Solar Program Maps

- 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 and subpages for each SEZ.

News items are posted to share updates.



For each SEZ, a webpage provides:

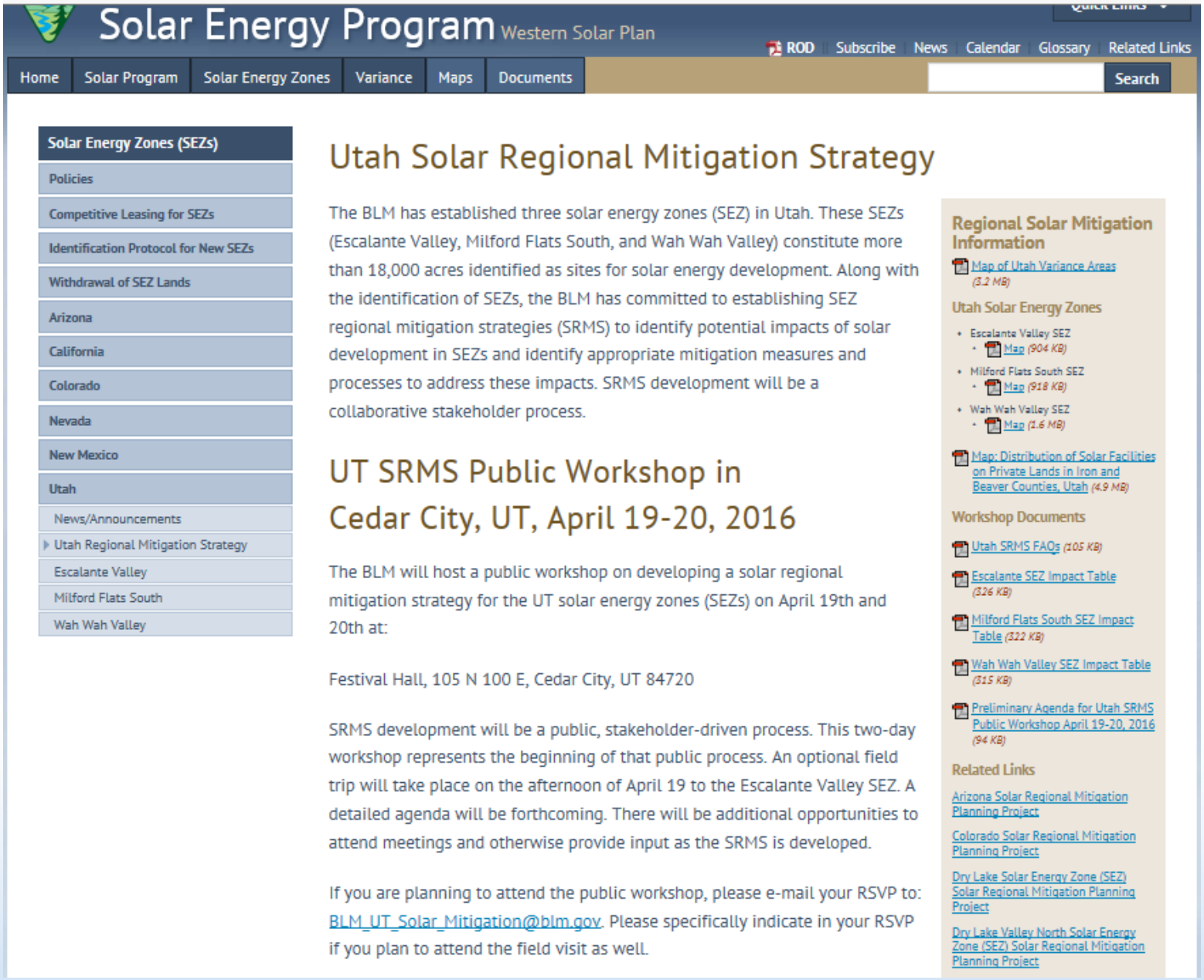
- Development status
- Size and location
- Physical characteristics
- Technical suitability

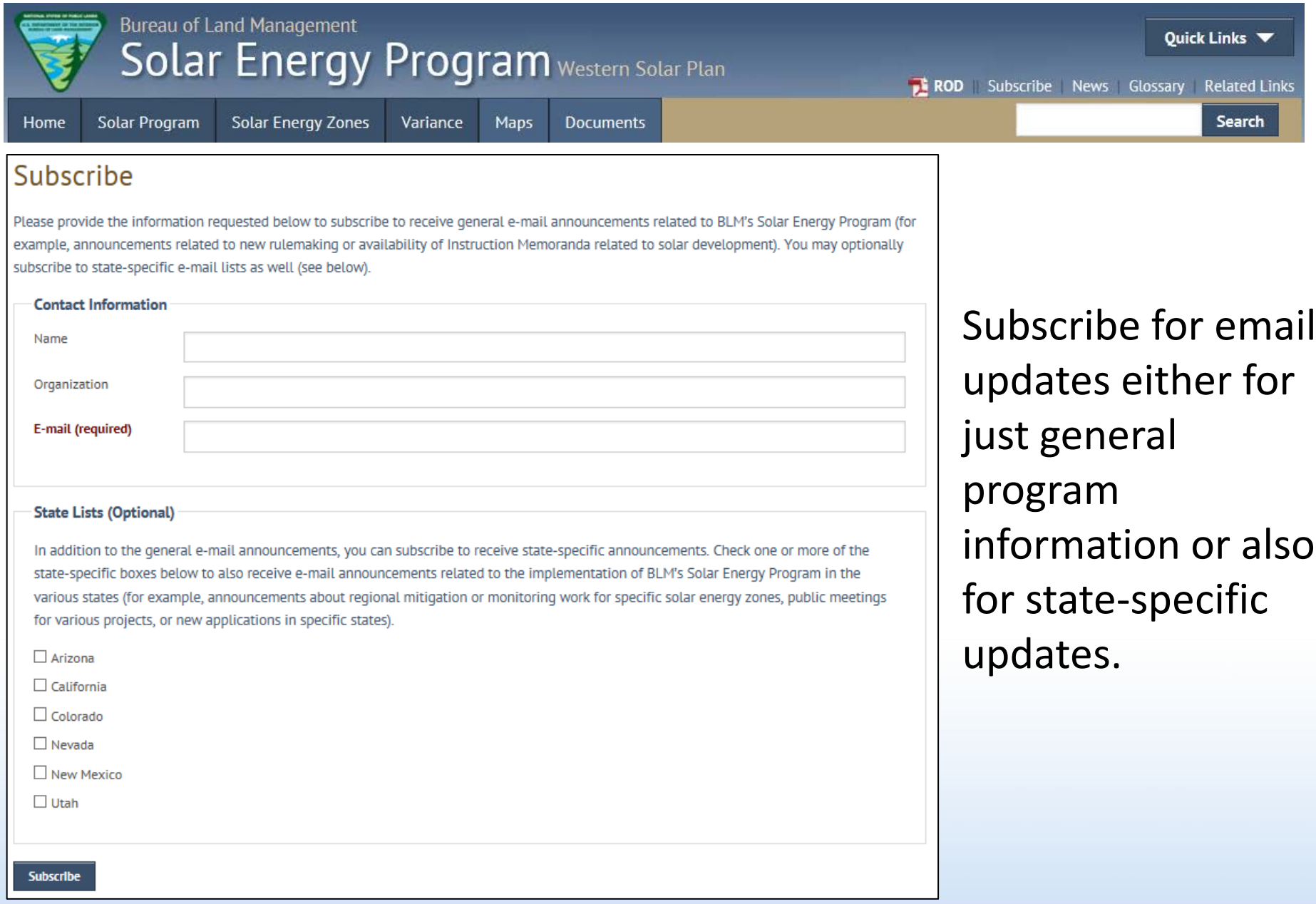
Maps

Links to relevant sections in Solar PEIS

Subpages dedicated to

- Minerals report
- Monitoring and adaptive management strategies


Solar Energy Program Western Solar Plan
ROD Subscribe News Calendar Glossary Related Links
Home Solar Program Solar Energy Zones Variance Maps Documents
Search
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
News/Announcements
Utah Regional Mitigation Strategy
Escalante Valley
Milford Flats South
Wah Wah Valley
Utah Solar Regional Mitigation Strategy
The BLM has established three solar energy zones (SEZ) in Utah. These SEZs (Escalante Valley, Milford Flats South, and Wah Wah Valley) constitute more than 18,000 acres identified as sites for solar energy development. Along with the identification of SEZs, the BLM has committed to establishing SEZ regional mitigation strategies (SRMS) to identify potential impacts of solar development in SEZs and identify appropriate mitigation measures and processes to address these impacts. SRMS development will be a collaborative stakeholder process.
UT SRMS Public Workshop in Cedar City, UT, April 19-20, 2016
The BLM will host a public workshop on developing a solar regional mitigation strategy for the UT solar energy zones (SEZs) on April 19th and 20th at:
Festival Hall, 105 N 100 E, Cedar City, UT 84720
SRMS development will be a public, stakeholder-driven process. This two-day workshop represents the beginning of that public process. An optional field trip will take place on the afternoon of April 19 to the Escalante Valley SEZ. A detailed agenda will be forthcoming. There will be additional opportunities to attend meetings and otherwise provide input as the SRMS is developed.
If you are planning to attend the public workshop, please e-mail your RSVP to: BLM_UT_Solar_Mitigation@blm.gov. Please specifically indicate in your RSVP if you plan to attend the field visit as well.
Regional Solar Mitigation Information
Map of Utah Variance Areas (3.2 MB)
Utah Solar Energy Zones
Escalante Valley SEZ
Map (904 KB)
Milford Flats South SEZ
Map (918 KB)
Wah Wah Valley SEZ
Map (1.6 MB)
Map: Distribution of Solar Facilities on Private Lands in Iron and Beaver Counties, Utah (4.9 MB)
Workshop Documents
Utah SRMS FAQs (105 KB)
Escalante SEZ Impact Table (326 KB)
Milford Flats South SEZ Impact Table (322 KB)
Wah Wah Valley SEZ Impact Table (315 KB)
Preliminary Agenda for Utah SRMS Public Workshop April 19-20, 2016 (94 KB)
Related Links
Arizona Solar Regional Mitigation Planning Project
Colorado Solar Regional Mitigation Planning Project
Dry Lake Solar Energy Zone (SEZ) Solar Regional Mitigation Planning Project
Dry Lake Valley North Solar Energy Zone (SEZ) Solar Regional Mitigation Planning Project



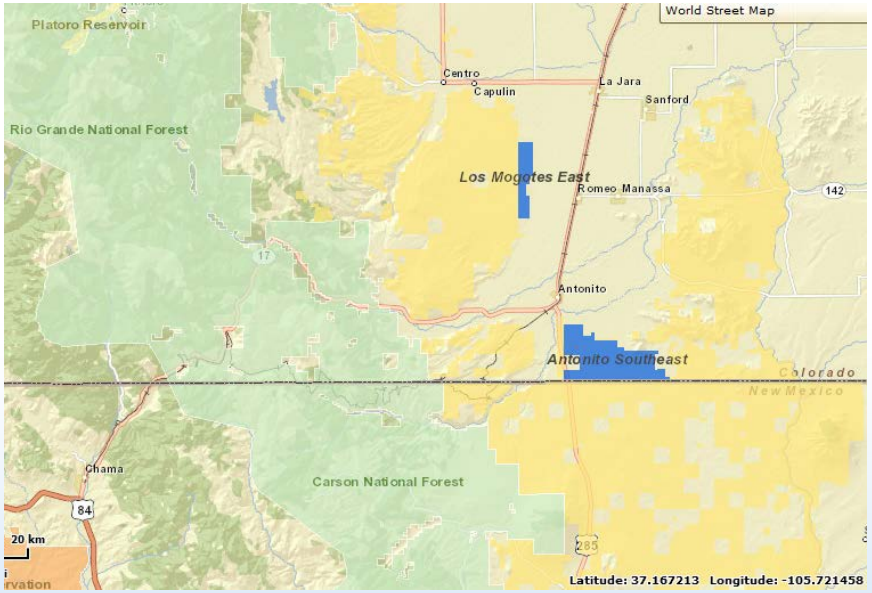
Subscribe for email updates either for just general program information or also for state-specific updates.

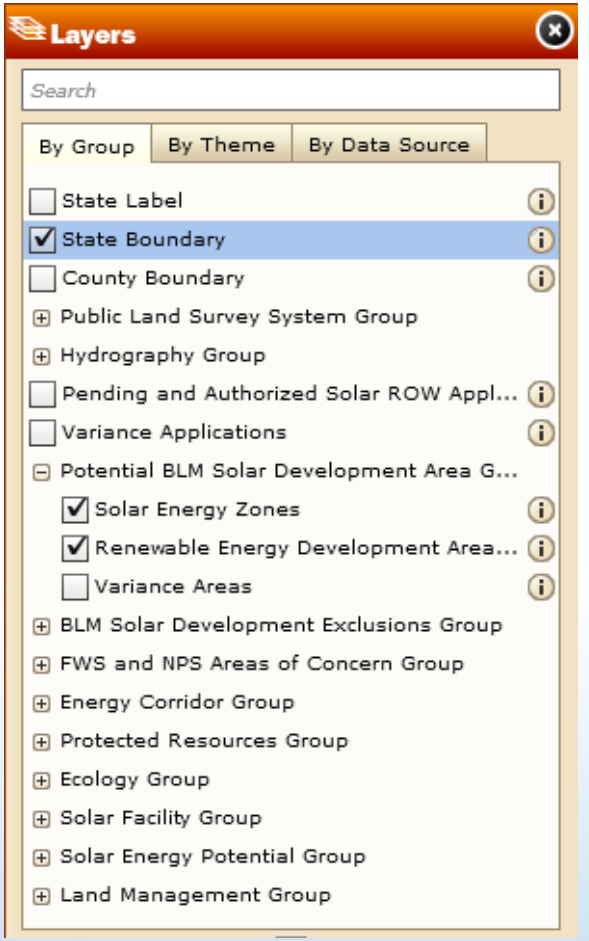
Solar Energy Environmental Mapper: *– An Interactive, Web-Based Tool Providing Access to Spatial Data Relevant to BLM's Solar Energy Program*

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

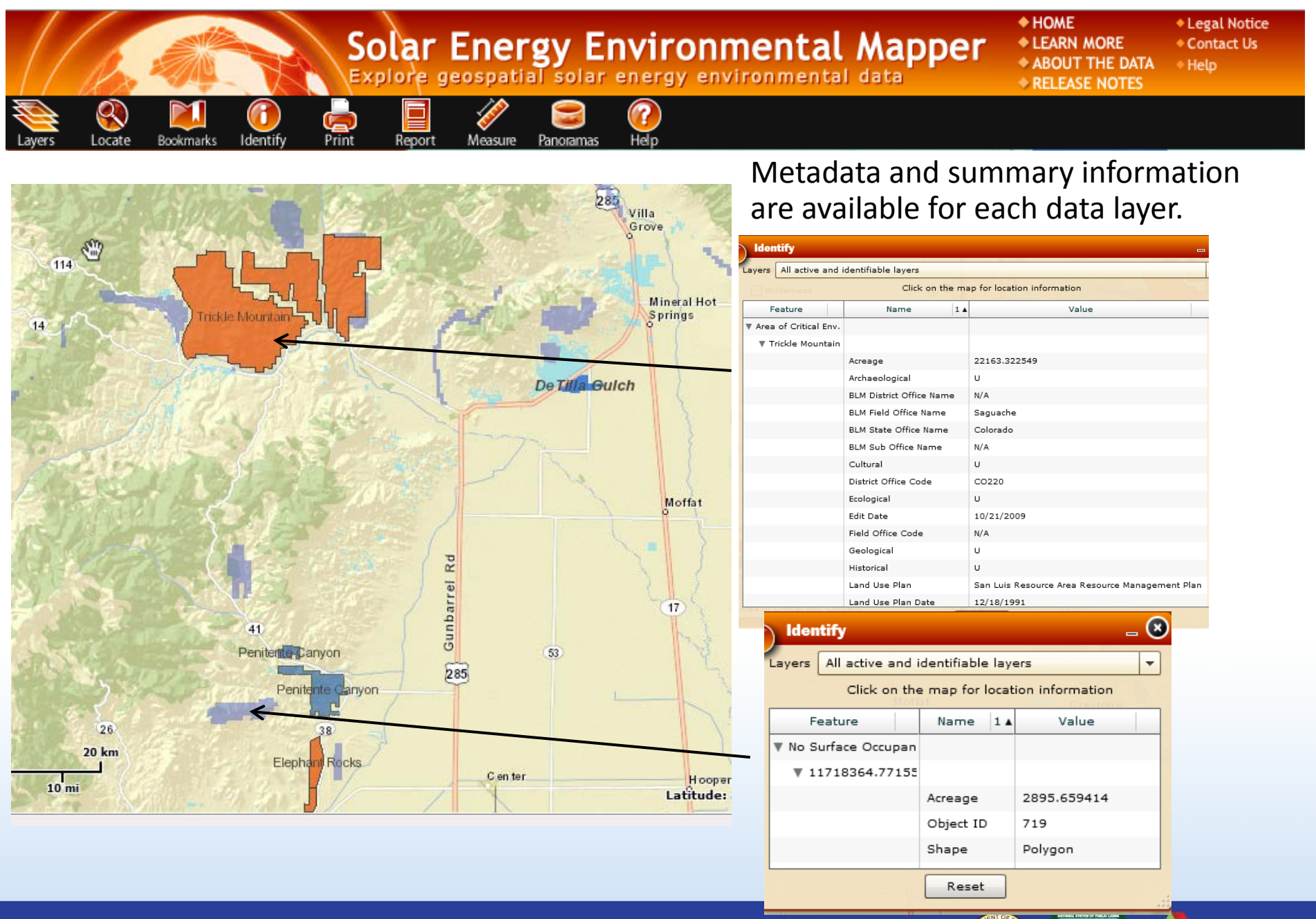
- Siting information on utility-scale solar projects in six southwestern states.

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.

Potential Impacts of Solar Development in Utah Solar Energy Zones

Presented by:
BLM Interdisciplinary Team, Cedar City Field Office and
Argonne National Laboratory

Utah Solar Regional Mitigation Strategy Workshop
Cedar City, UT
April 19, 2016

The Solar PEIS examined 20 resource areas:

Lands and Realty	Geology and Soils	Air Quality and Climate	Acoustic Environment
Specially Designated Areas/ Wilderness Characteristics	Mineral Resources	Visual Resources	Socioeconomics
Recreation	Vegetation	Paleontology	Environmental Justice
Rangeland Resources	Wildlife	Cultural Resources	Transportation
Military and Civilian Aviation	Special Status Species	Native American Concerns	Cumulative Impacts

Soils

- Soils within the SEZs are predominantly silt loams (Escalante Valley & Milford Flats South SEZs), and silty clay loams, fine sandy loams, and sandy clay loams (Wah Wah Valley SEZ).
- Surface disturbance would be the greatest impact on soil resources.
- Soil impacts: removal, compaction, erosion, and possibly contamination.

Red Hills Renewable Energy Park, Scatec Solar, Iron County, Utah

Soils

- Mitigation:
  - Avoid, and/or mitigate potential impacts by minimizing erosion and stabilizing disturbed areas
  - Reclaim and re-vegetate disturbed areas as soon as possible
  - Maximize the use of existing roads and other disturbed areas
  - Contain and report contaminant spills immediately, and remove any contaminated soil

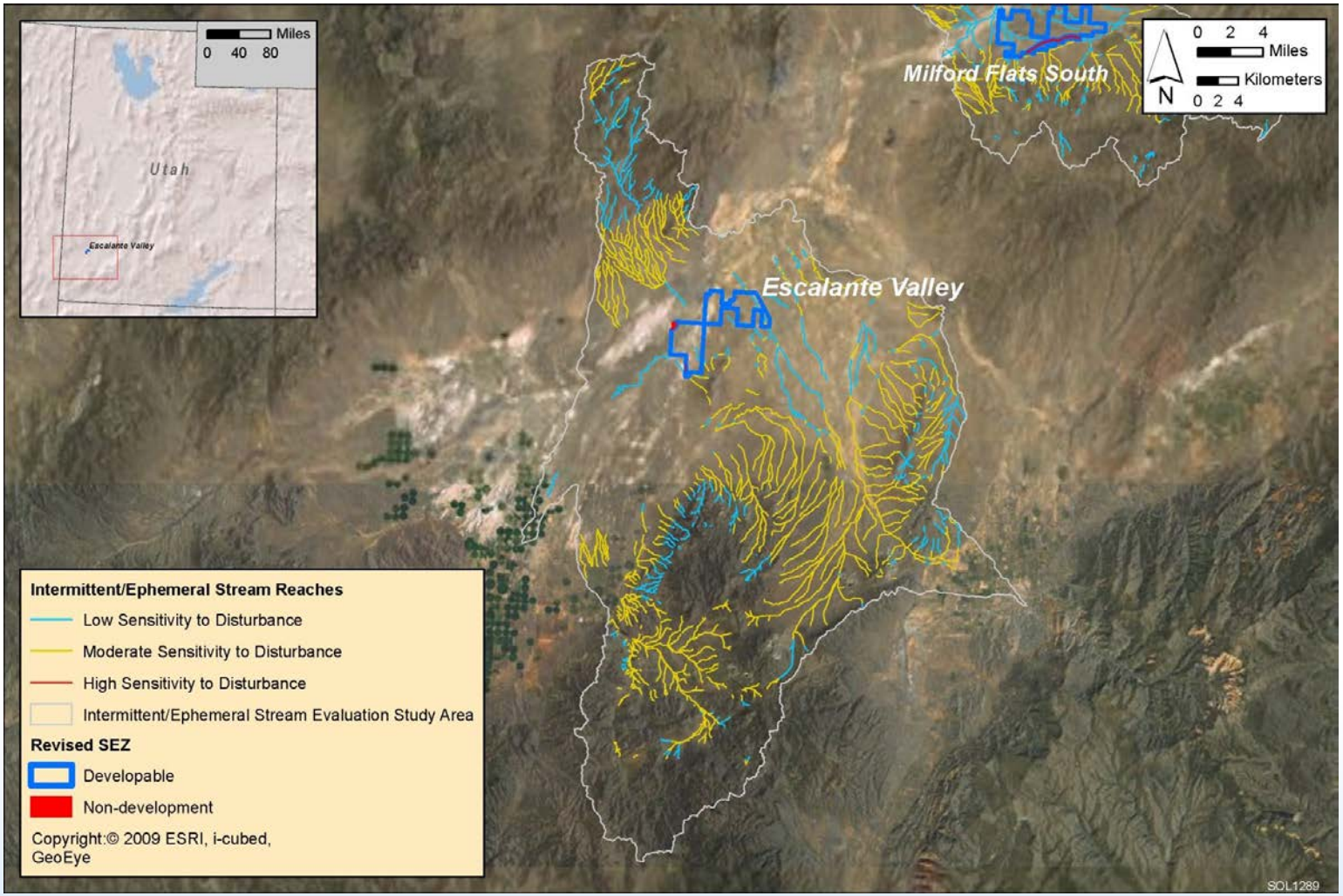
Red Hills Renewable Energy Park, Scatec Solar, Iron County, Utah

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.
- Generation of fugitive dust may increase exposure to particulates (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.

- Mitigation:
  - Dust suppression measures will be implemented during all phases of development.
  - Disturbed areas will be reclaimed and re-vegetated as soon as possible.

Hydrology: Surface Water



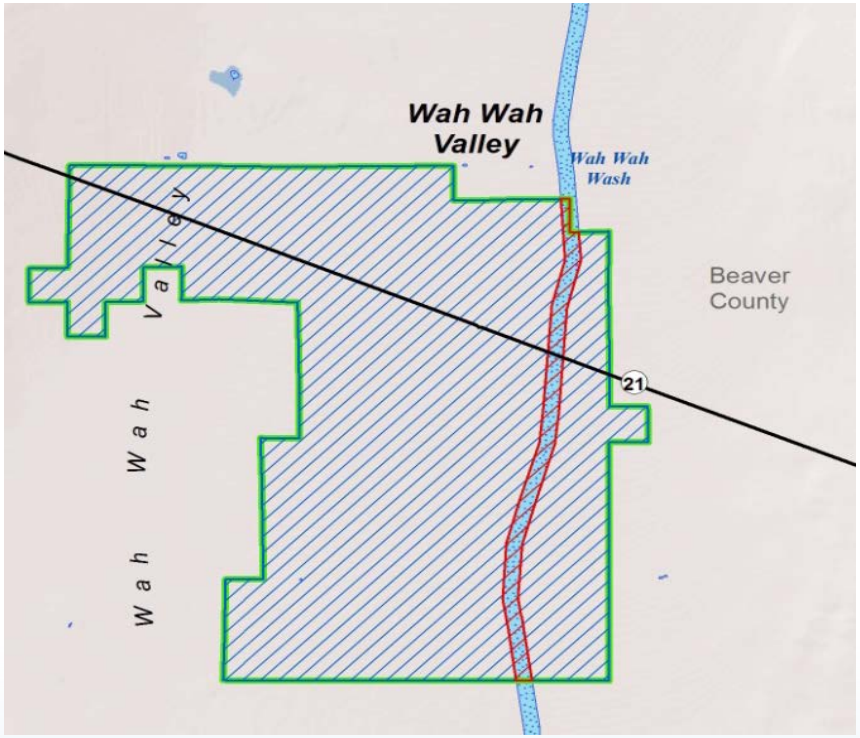
Intermittent/Ephemeral Stream Channel Sensitivity to Surface Disturbances in the Vicinity of the Escalante Valley SEZ (Source: Solar PEIS)

Hydrology: Surface Water

All intermittent/ephemeral channels within the SEZs were classified as having low sensitivity to disturbance, with the exception of one channel in the Wah Wah SEZ having moderate sensitivity.

Some non-development areas have identified based on surface water features:

- Escalante Valley SEZ:
  - Two playa features on the western edge of the SEZ
  - The Dick Palmer Wash along the eastern side of the SEZ has a significant floodplain that will need to be avoided
- Milford Flats South SEZ:
  - Minersville Canal
- Wah Wah Valley SEZ:
  - Wah Wah Wash



Hydrology: Surface Water

Mitigation:

- Intermittent/ephemeral streams and floodplains will be avoided.

- Coordination and permitting with the Utah Division of Water Rights will be required for any proposed alterations to surface water features.

- More detailed analysis may result in the identification of other non-development areas.

Hydrology: Groundwater

- Water rights are allocated by the Utah Division of Water Rights (Utah DWR).
- Water rights are fully-appropriated in the Escalante Valley and Milford Flats South SEZ water management basins, and no new groundwater diversions are allowed because of land subsidence and declining water levels.
- Solar projects requiring groundwater pumping would need to apply for water right transfers, which are considered by the Utah DWR on a case-by-case basis.
- Water rights applications can be protested by any individual or organization.
- To get applications approved and avoid protests, solar developers needing water should be prepared to acquire (purchase) fully-utilized and senior water rights.

Mitigation:

- The UT DWR should evaluate all solar project water rights applications to achieve (at minimum) a net-neutral effect on the water budgets.
- Area stakeholders should watch for new water rights applications.
- Groundwater models should be refined to better predict the impacts from water withdrawal.
- Water monitoring efforts should be expanded to increase impacts detection capabilities

Vegetation

- Characteristic vegetation includes: greasewood, sagebrush, winterfat, and shadscale saltbrush.
- Sensitive habitats include: sand dune, dry wash, ephemeral dry washes, and playa habitats.
- Potential Impacts: weed infestations, loss of vegetation cover, and adverse impacts from dust deposition.

Design Features:

- All playa, dry wash, and sand dune habitats, and sand transport areas be avoided to the extent practicable

Greasewood

Winterfat

Shadscale

Sagebrush

Rangeland Resources

Livestock Grazing

- The Escalante Valley SEZ includes 6,533 acres of in the Butte Allotment. There are a total of two grazing permits within the Butte Allotment.
- The Milford Flats South SEZ is 6,252 acres in size and encompasses portions of three grazing allotments (Minersville #4, Minersville #5, Minersville #6). There are a total of nine grazing permits within the three grazing allotments.
- The Wah Wah Valley SEZ includes up to approximately 5,720 acres of the Wah Wah Lawson grazing allotment. There is one grazing permit on the Wah Wah Lawson Allotment.

Wild Horses and Burros

No Herd Management Areas close to the SEZs.

Photo Credit: BLM

Lands and Realty

- Solar PEIS assumes 80% of the SEZs would be developed to account for non-developable areas not yet identified.
  - the three SEZs could support a total generation of up to 2,522 MW of electricity
- No military conflicts.
- No mining claims within the SEZs.
- Roads and trails crossing the SEZs could be impacted and may need to be rerouted.
- Increased traffic and increased access to previously remote areas could change the overall character of the landscape.

- Design Features:
  - Priority consideration should be given to utilizing existing roads to provide construction and operational access to the SEZ.
  - Improvements to local roads to accommodate additional traffic should be considered.

Acoustic Environment

- Construction and operations could cause short-term and long-term noise impacts.
  - Closest residences to Escalante valley SEZ - about 1.1 mi northwest.
  - Closest residence to Milford Flats South SEZ - about 1.1 mi southeast.
  - Closest residences to Wah Wah Valley SEZ - less than 100 ft from the northern SEZ boundary.

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

Terrestrial Wildlife, Big Game, & Non-Migratory Birds

- Loss of habitat and connectivity for several species of amphibians, reptiles, raptors, mammals, bats, and invertebrates.
- Year-long crucial pronghorn habitat exists throughout all three SEZs.

Pronghorn

Design Features:

- The steps outlined in the Utah Field Office Guidelines for Raptor Protection from Human and Land Use Disturbances should be followed.
- The fencing around the solar energy development should not block the free movement of mammals, particularly big game species.
- Wetlands, washes, and riparian areas identified during site-specific surveys will be avoided to the extent practicable. (Escalante Valley SEZ only)
- The inter-mountain basins big sagebrush shrubland cover type, which is the only identified suitable land cover for the elk and sagebrush vole in the SEZ, should be avoided. (Wah Wah Valley SEZ only)

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 tower).
- Potential for night sky impacts and effects to migration routes/behavior.


Ferruginous Hawk


Brewers Sparrow

Special Status Species

Photo Credit: Rick Scott

Special Status Species (cont.)

- Design Features:
  - Required monitoring plans and Endangered Species Act consultation with U.S. Fish & Wildlife Service (USFWS).
  - Conduct pre-disturbance surveys for all identified species with suitable habitat in the SEZ.
  - Avoid occupied and sensitive habitats.
  - Follow Bald and Golden Eagle Protection Act take guidance.
  - Follow Migratory Bird Treaty Act and BLM Sensitive Species Manual 6840.
  - Consultation with the USFWS and the Utah Division of Wildlife Resources (UDWR) will be conducted to address the potential for impacts on the Utah prairie dog.
  - Coordination with the USFWS and the UDWR will be conducted to address the potential for impacts on the greater sage-grouse.

Public Access & Recreation

- Escalante Valley – The area may be used by local residents for general outdoor recreation.
- Milford Flats South - The area offers little potential for recreational use due to topography.
- Wah Wah Valley – The area may be used by local residents for general outdoor recreation, such as hunting.
- Development on the SEZs would eliminate future recreation activities from developed areas.

Specially Designated Areas

- Potential Impacts:
  - Escalante Valley SEZ – May be visible from Old Spanish National Historic Trail, Cedar Breaks National Monument and the Greater Three Peaks Special Recreation Management Area.
  - Milford Flats South SEZ – The Old Spanish National Historic Trail is within 25 miles of the SEZ.
  - Wah Wah Valley SEZ – Two Wilderness Study Areas, Wah Wah Mountains and King Top, are about 6 and 25 mi (10 and 40 km), respectively, from the nearest boundary of the SEZ.

- Design Features:
  - Protection of existing values will be evaluated during the environmental analysis for solar energy projects.

Specially Designated Areas

Wah Wah Mountain Wilderness Study Area, Beaver County, Utah

Visual Resources

- Scenic quality of the SEZs is low.
  - Cumulative impacts when several projects are visible from one location, or in succession as viewers move through the landscape, may make the area less visually appealing.


Escalante Valley Solar Energy Zone


Milford Flats South Solar Energy Zone


Wah Wah Valley Solar Energy Zone

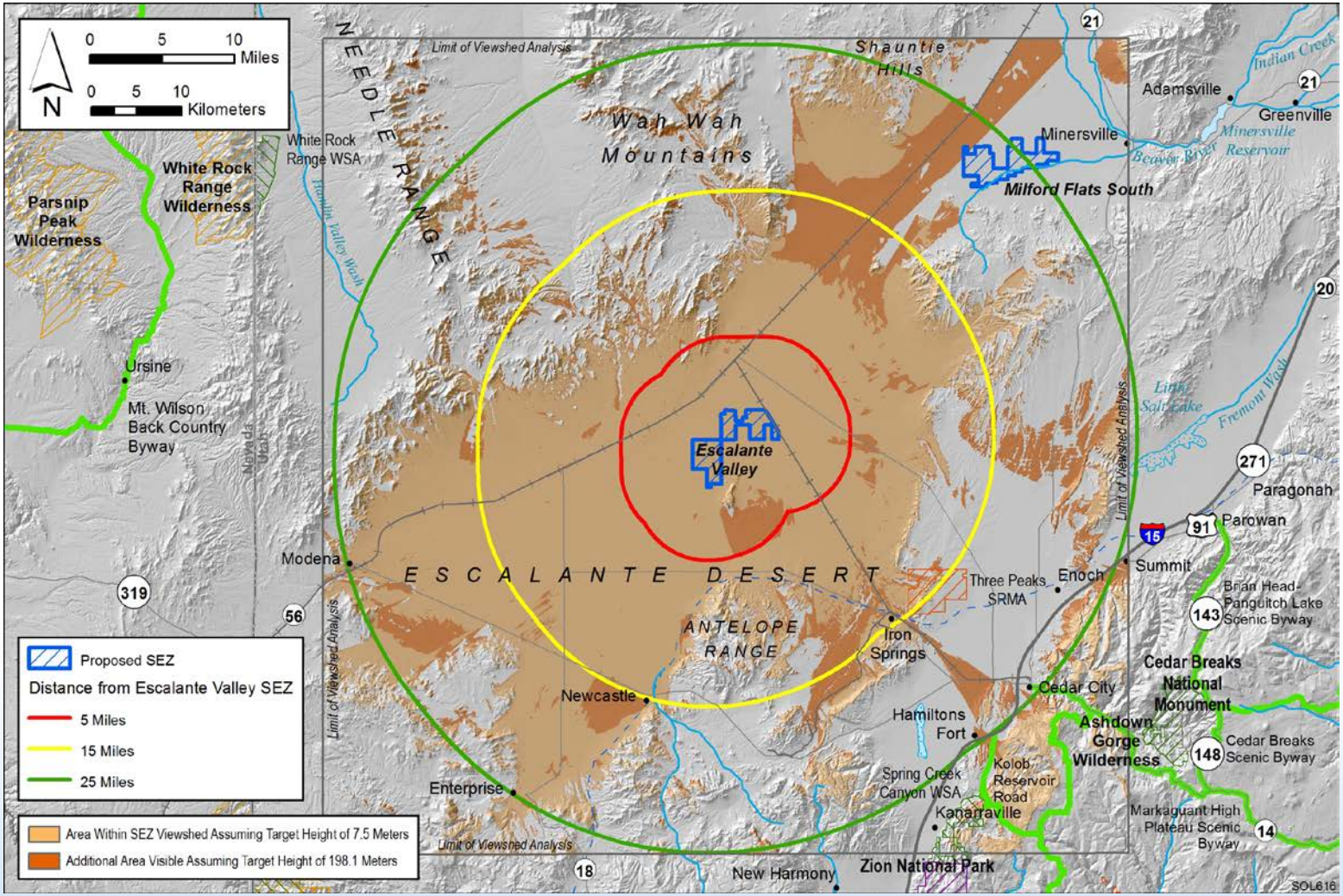
Visual Resources (cont.)

- 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.

Iron Springs Solar Field
Approximately 1.5 miles away, mid day

Visual Resources (cont.)

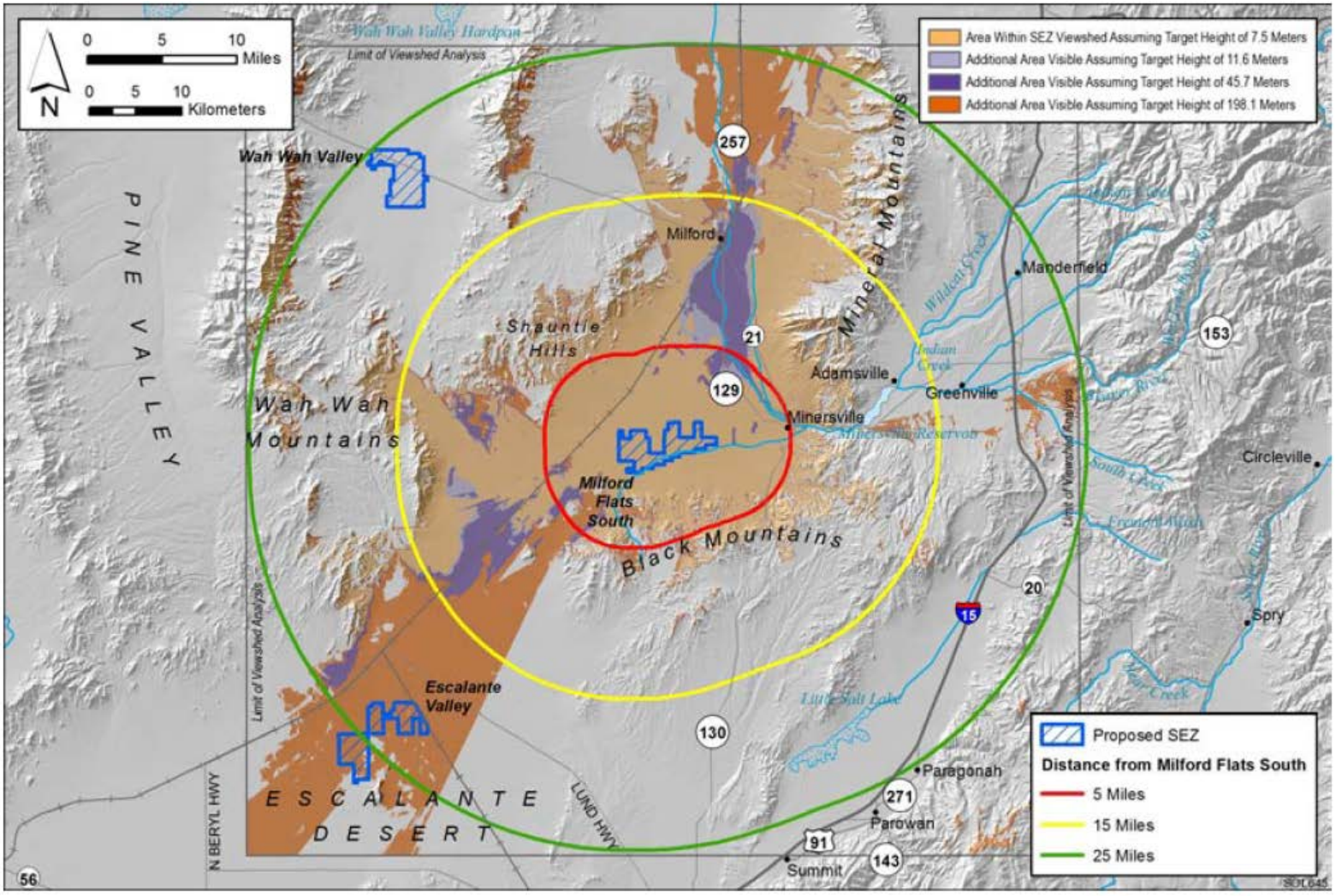
Example Viewshed Analysis – Escalante Valley SEZ



Source: Solar PEIS

Visual Resources (cont.)

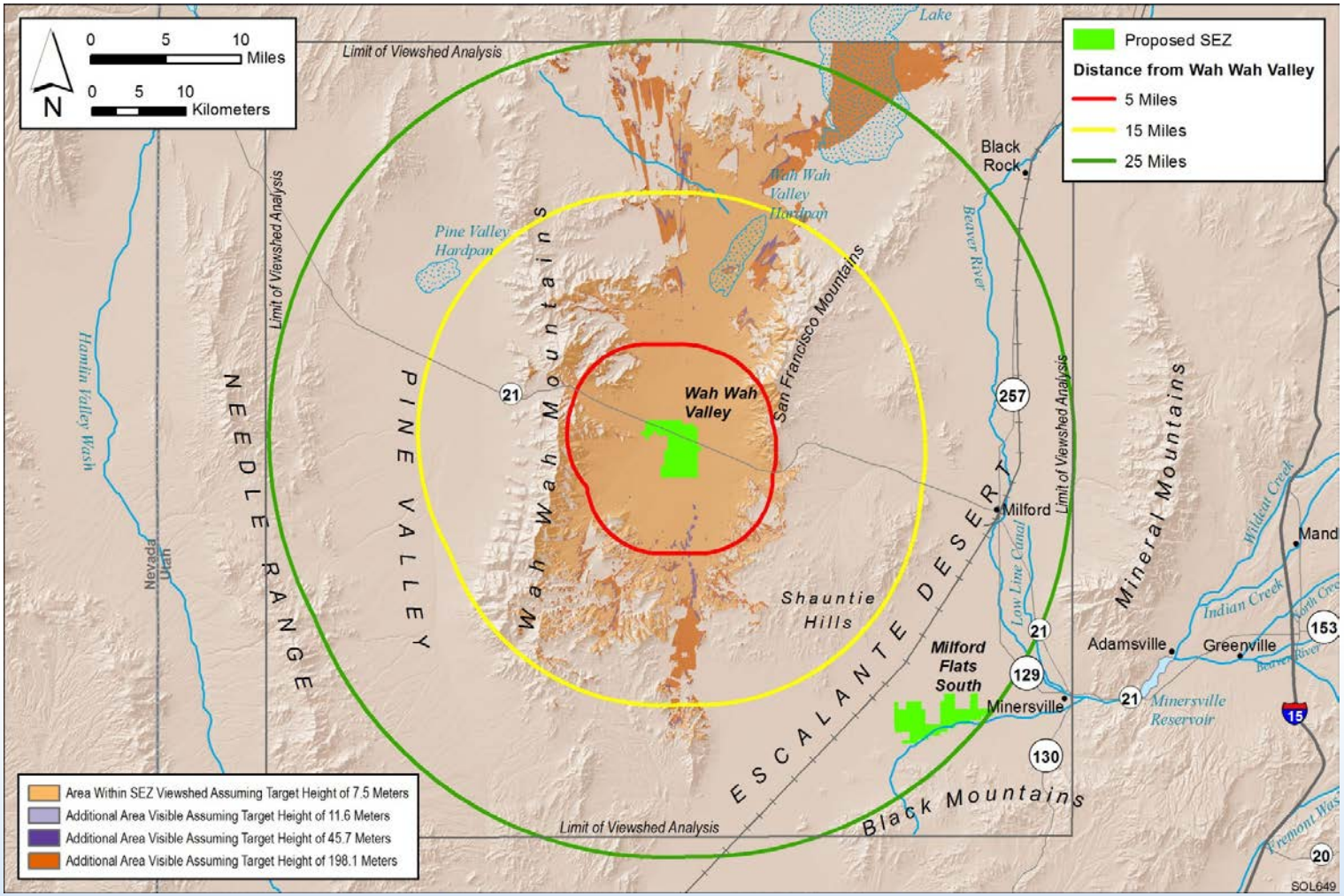
Example Viewshed Analysis – Milford Flats SEZ



Source: Solar PEIS

Visual Resources (cont.)

Example Viewshed Analysis – Wah Wah Valley SEZ

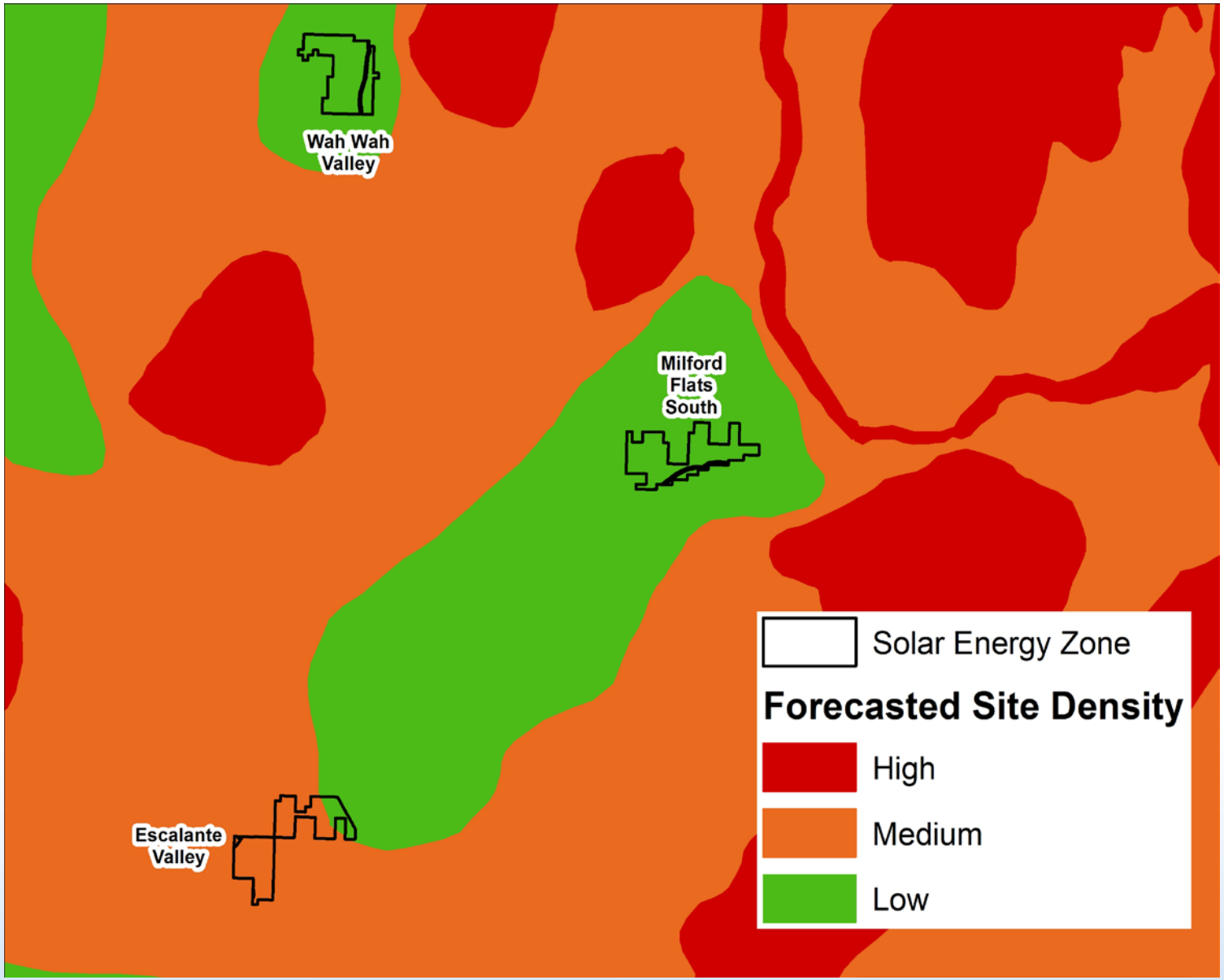


Source: Solar PEIS

Cultural and Paleontological Resources

- Direct and indirect impacts on prehistoric and historic sites could occur.
- Potential for impacts on paleontological resources is low.

Photo Credits: Konnie Wescott



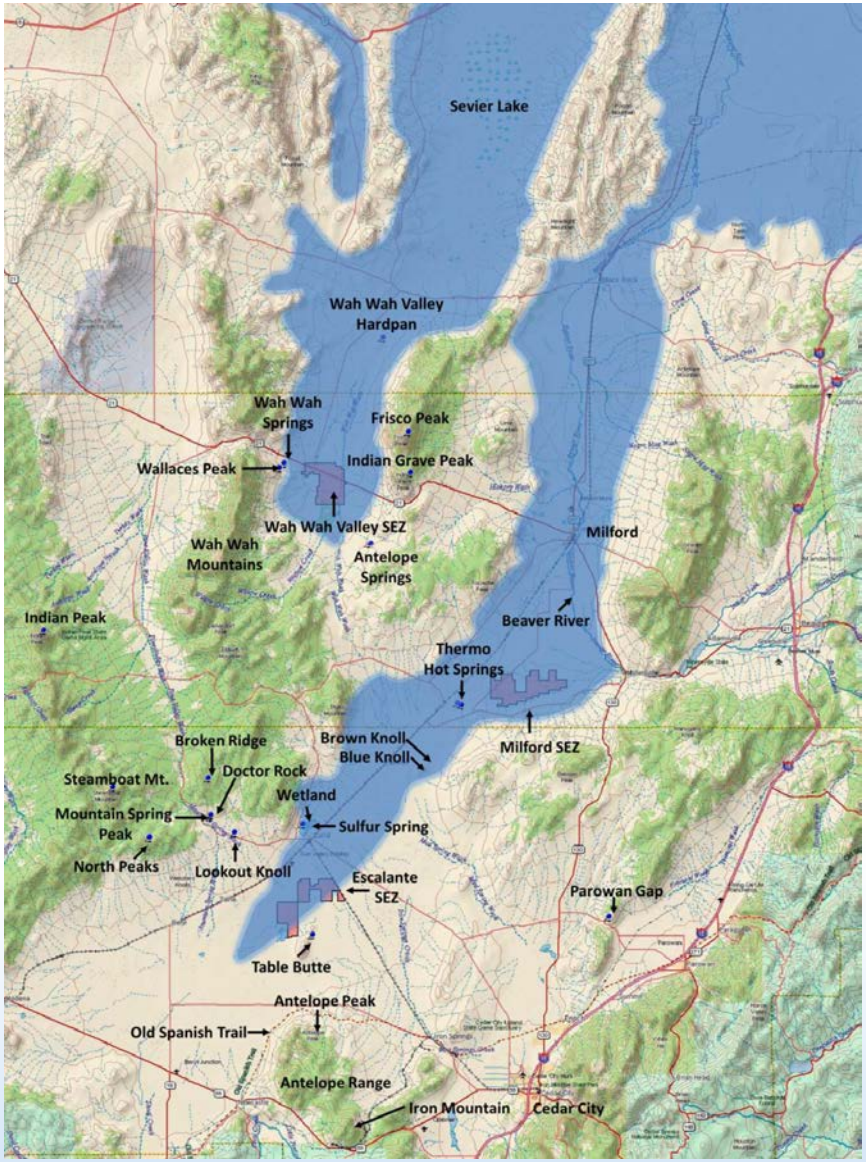
- Cultural Resources Surveys
- Sites
- Historic Trails
- Density Areas
- Cultural Landscape Assessment

Cultural Resources

- Design Features :
  - BLM will consult with Utah State Historic Preservation Office and affected tribes early in project planning.
  - Additional inventory is needed (Class II or Class III).
  - BLM Authorized Officer will be notified immediately upon the unexpected discovery of cultural materials and work will be halted.
  - Significant resources clustered in specific areas which retain sufficient integrity will be avoided.
  - Will follow National Solar Programmatic Agreement to address mitigation of eligible cultural resources.

Native American Concerns

- Potential impacts on resources of concern in three major categories:
  - Spiritual and culturally important landscapes;
  - Prehistoric and historic archaeological sites; and
  - Local resources, such as vegetation, wildlife, and hydrological systems of traditional importance.



(Source: University of Arizona and SWCA 2011)

Native American Concerns (cont.)

Design Features:

- BLM will consult with tribes and comply with National Historic Preservation Act.
- Known human burial sites and petroglyphs and pictographs will be avoided.
- Springs and other water sources that are or may be sacred or culturally important will be avoided.
- Culturally important plant and wildlife species will be avoided to the extent practicable.

Socioeconomics

- Potential impacts (positive and negative):
  - Creation of up to about 1,600 construction jobs and about 220 operations jobs for each SEZ; additional indirect jobs.
  - Adverse impacts could occur due to the need for services for new workers and their families during construction and operation (e.g., housing, police).
    - The in-migration of workers and their families from development of all three SEZs could increase the combined ROI population by up to 1.4%.

Environmental Justice

- In the 2010 Census, there were seven low-income block groups identified within Iron County.
- No disproportionate adverse impacts related to solar energy development in the SEZ have been identified on those populations.
- If project-specific EJ impacts are identified, then impacts must be minimized.

Mitigation Hierarchy and Unavoidable Impacts

Presented by:
Heidi Hartmann
Argonne National Laboratory

Utah Solar Regional Mitigation Strategy Workshop
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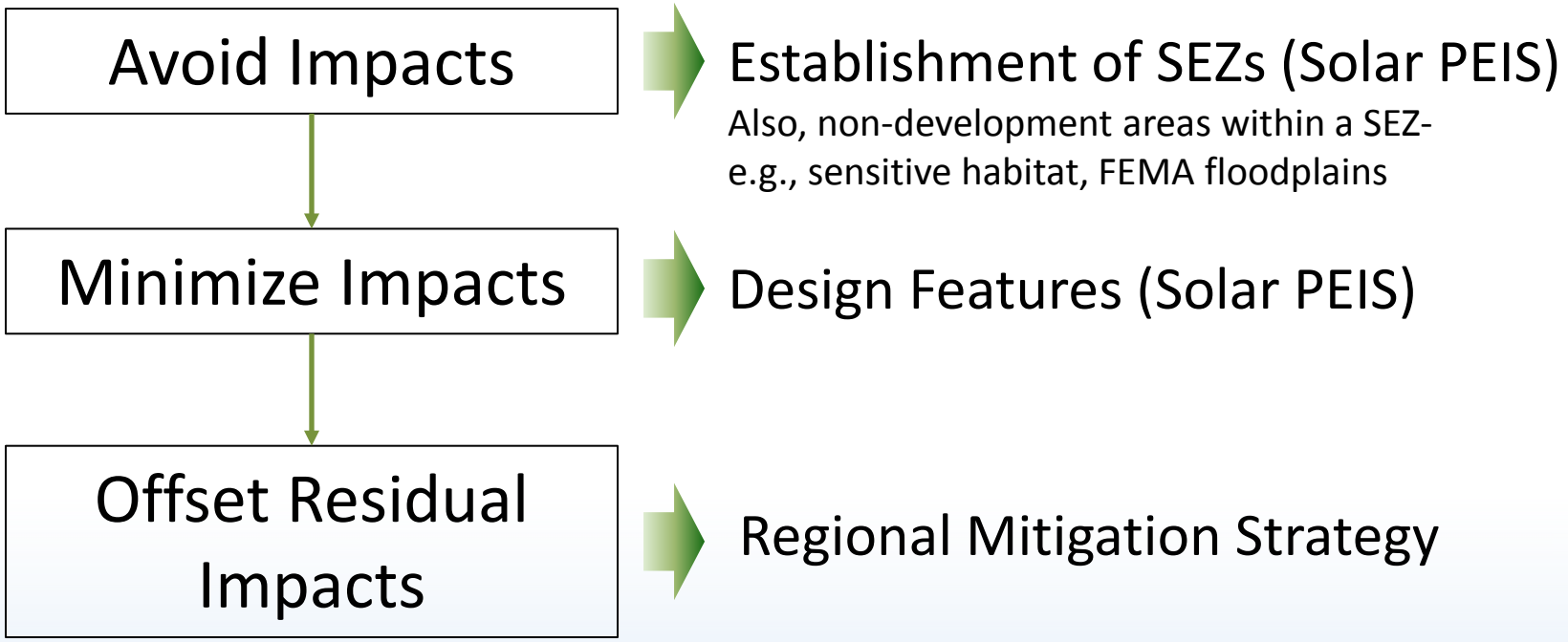
Mitigation Hierarchy

- ***Avoid***
  - Identify exclusion and non-developable areas
  - Apply avoidance measures (for example, wetlands)
- ***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

Mitigation Hierarchy: BLM's Solar Program



Refine Avoidance Areas

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

- Based on refined developable area, specialists estimate the type, acreage and/or quantity of the residual impacts

Residual Impacts

- *Residual Impacts are:*

  impacts that cannot be avoided or minimized

***Goal of Regional Mitigation Strategy**:*

For residual impacts, the BLM will consider the implementation of measures to offset (or compensate for) impacts, with the goal of ensuring viability of resources over time.

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

Presented by:
Lee Walston, Ecologist
Argonne National Laboratory

Utah Solar Regional Mitigation Strategy Workshop
Cedar City, UT
April 20, 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:

Assessing the Degree of Impacts

Determining which Resources Warrant Compensatory Mitigation

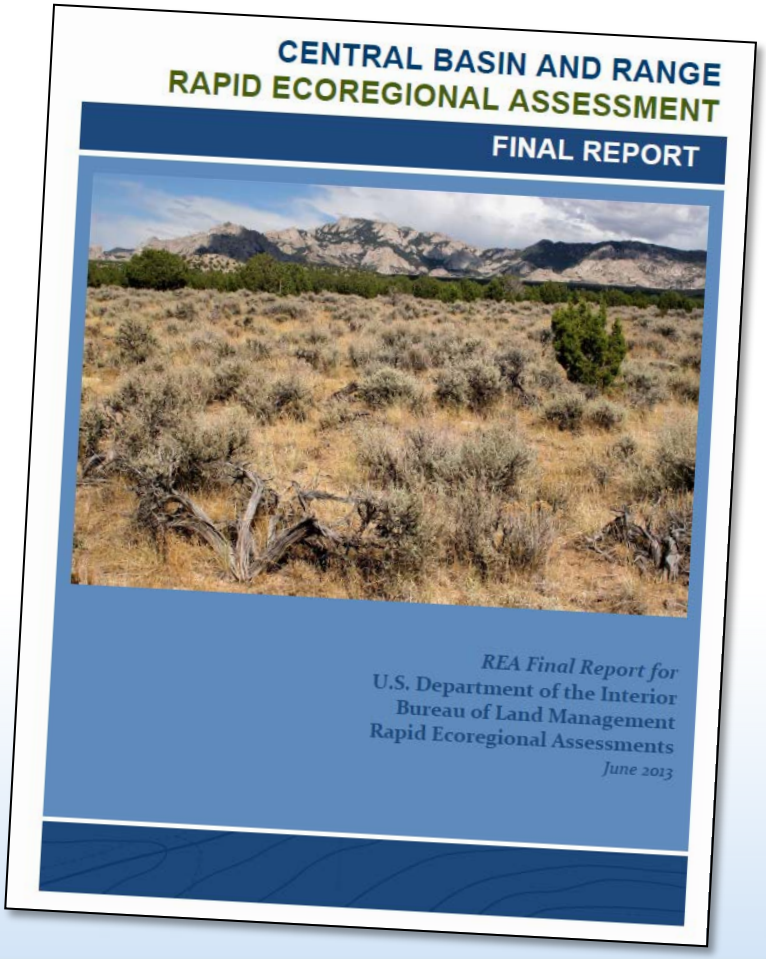
Assisting in Development of Mitigation Goals & Objectives

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:

Central Basin & Range REA:
Broad-scale evaluation of regional condition & trends for natural resources in the 138,000 mi^2 ecoregion.

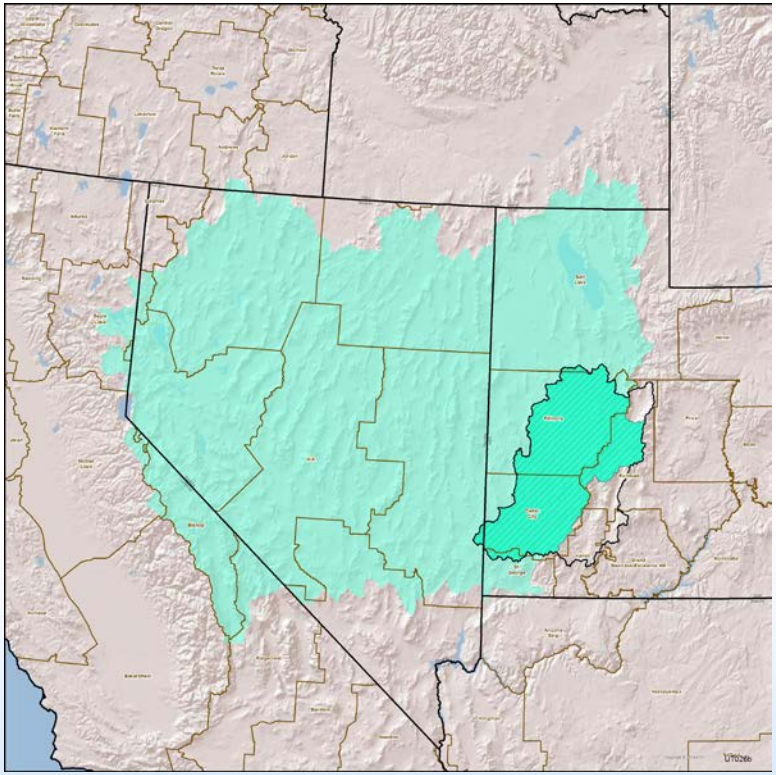
- Ecological landscape condition

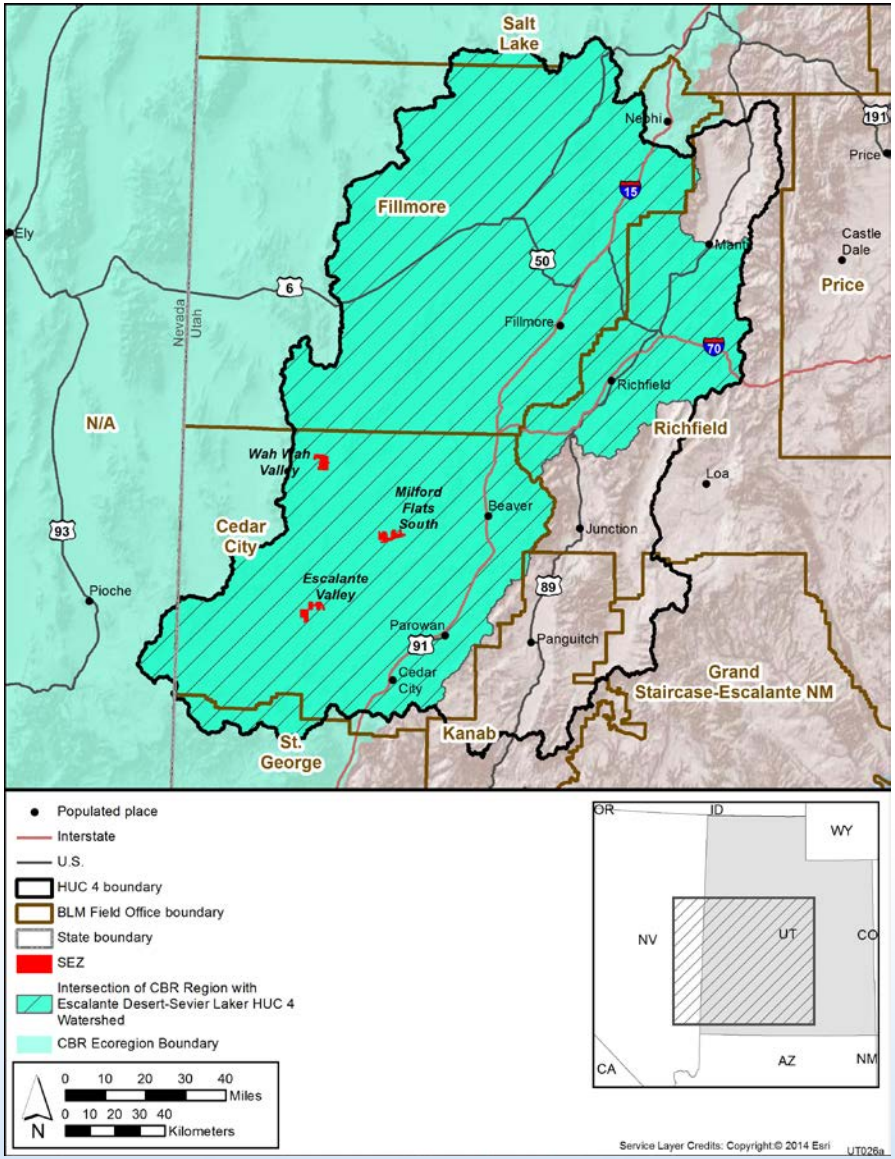
Other landscape data:

- LANDFIRE
- CHAT

Regional Context

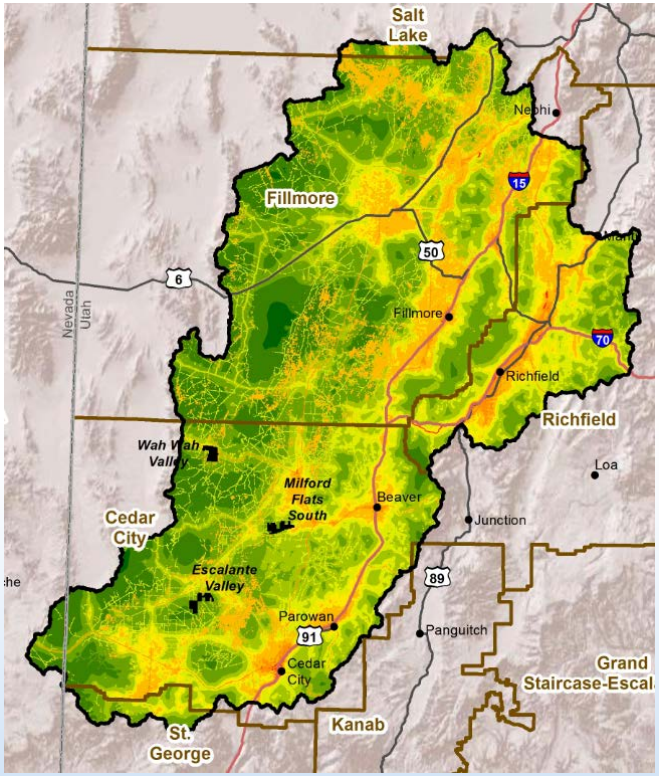
- HUC 4 Watershed within the Central Basin and Range (CBR) Ecoregion





Landscape Condition

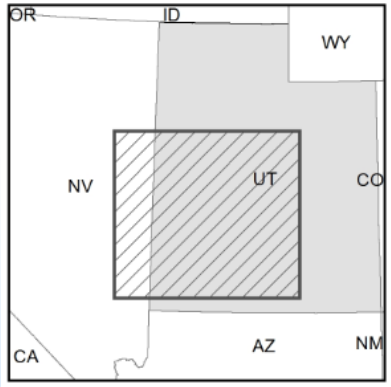
- General indicator of ecological condition based on the intensity of and proximity to human development
  - Human development spatial data inputs
  - Parameters: intensity score, distance decay function



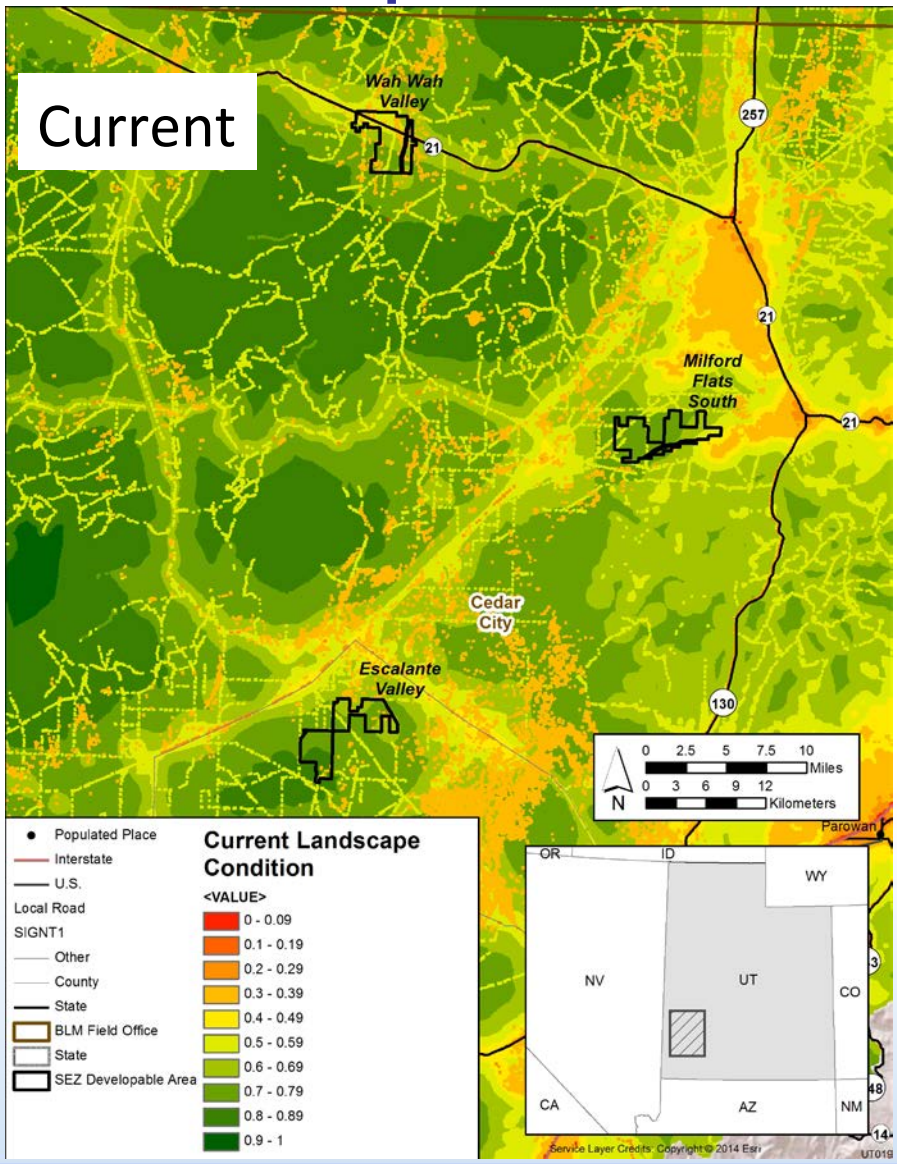
Current Landscape Condition

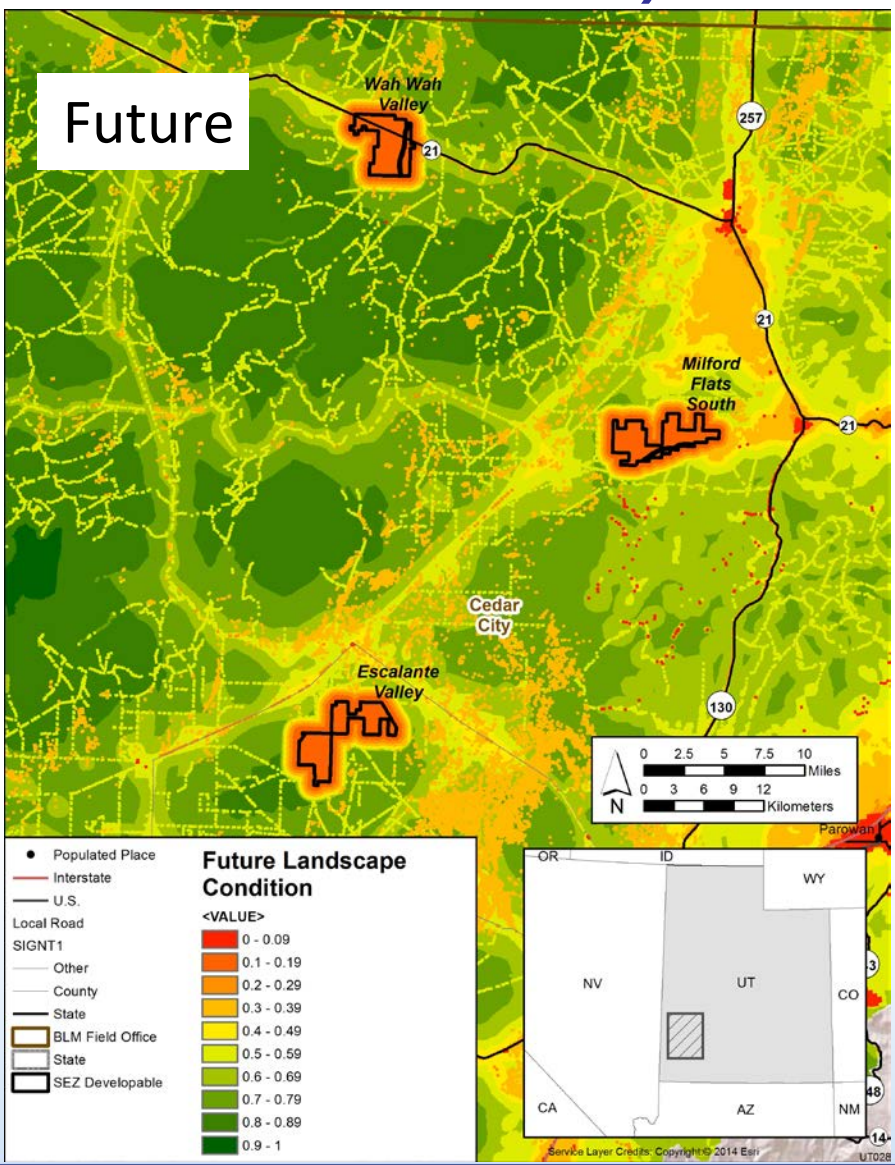
<VALUE>

- 0-0.09
- 0.10-0.19
- 0.20-0.29
- 0.30-0.39
- 0.40-0.49
- 0.50-0.59
- 0.60-0.69
- 0.70-0.79
- 0.80-0.89
- 0.90-1.00



Landscape Condition (Current vs Future)

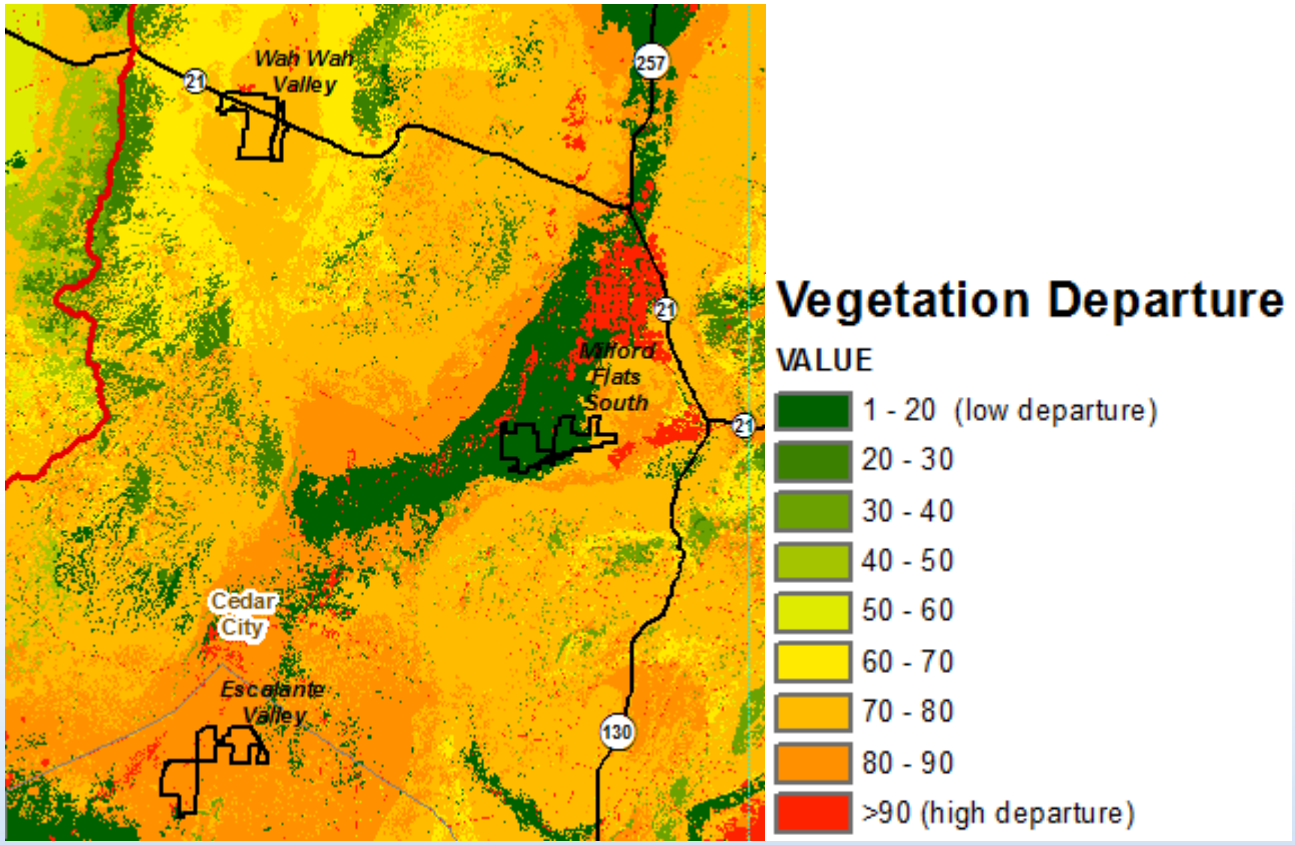




UT021

Vegetation Status: Departure from Historic

LANDFIRE Vegetation Departure (VDEP) indicates how different current vegetation on a landscape is from estimated historical conditions. VDEP is based on changes to species composition, structural stage, and canopy closure.



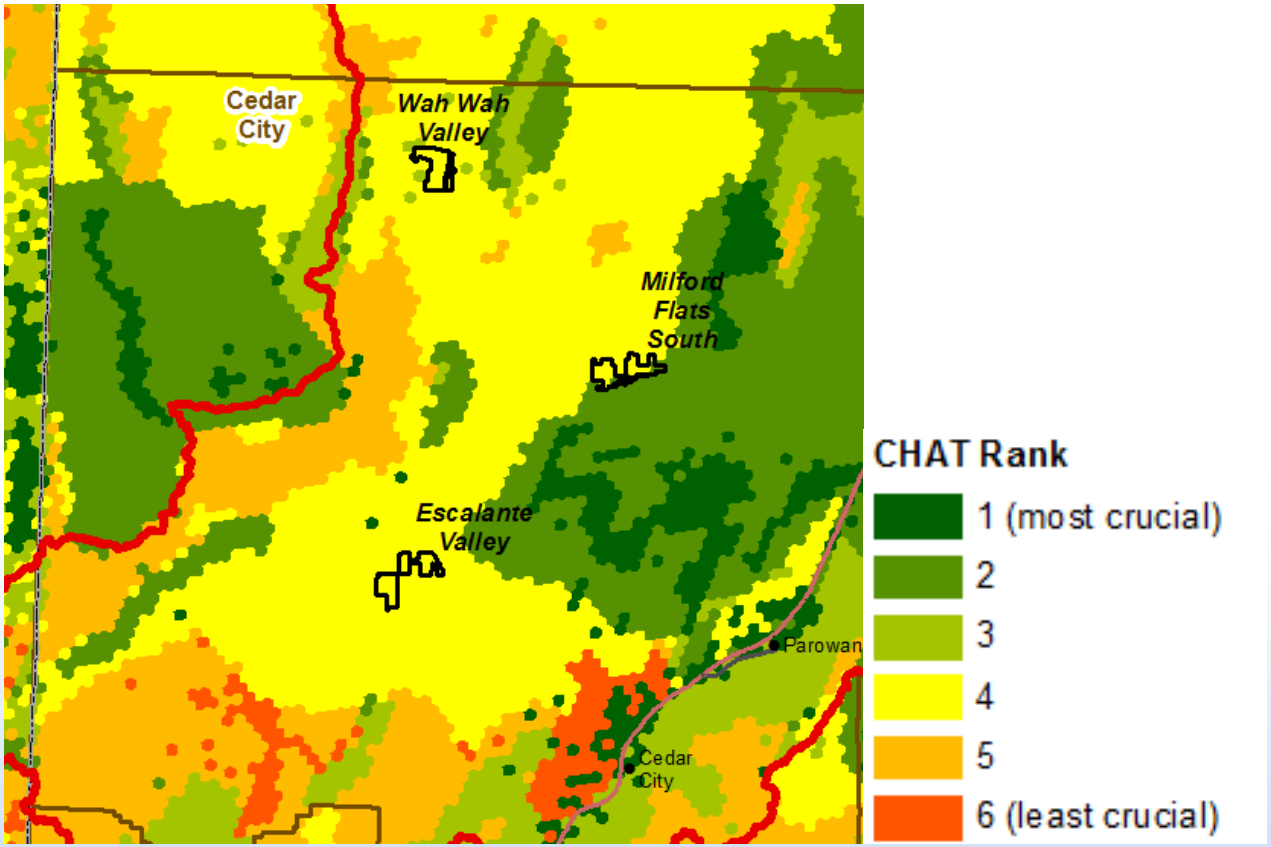
Escalante Valley: *Moderately high departure*

Milford Flats South: *Low departure*

Wah Wah Valley: *Moderate departure*

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.).



All 3 SEZs in areas of moderate rank.

Milford Flats South SEZ is adjacent to high crucial habitat.

Cultural Heritage Values and Risk Assessment

Presented by:
Jamie Palmer, Archaeologist
BLM Cedar City Field Office

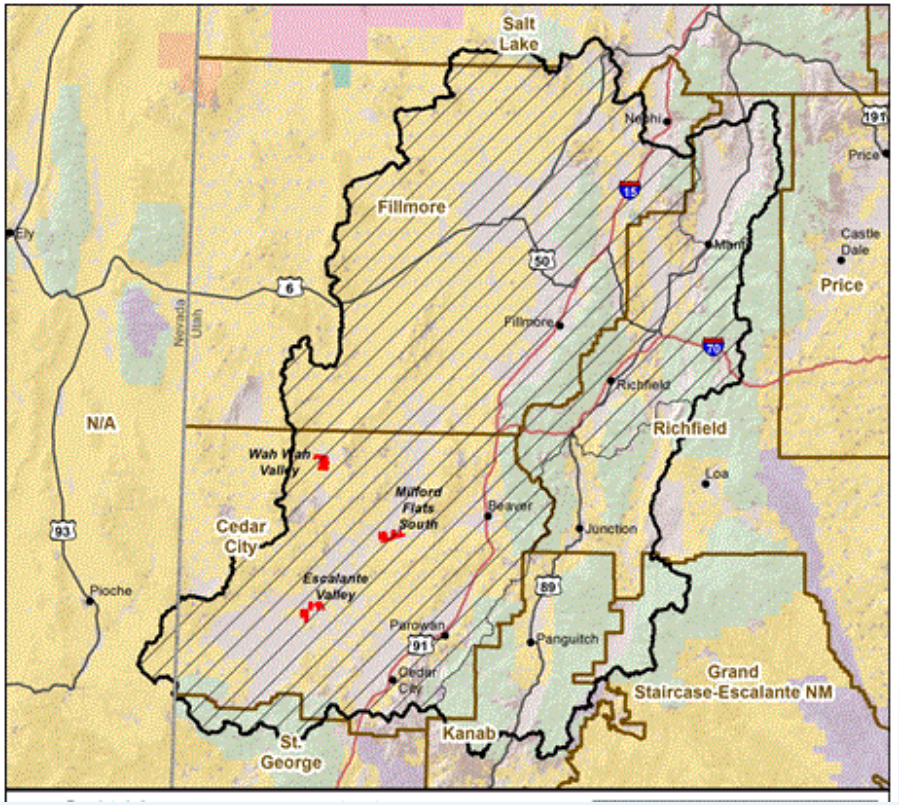
Utah Solar Regional Mitigation Strategy Workshop
Cedar City, UT
April 20, 2016

Goals of the Landscape-Scale Cultural Heritage Values and Risk Assessment

- Synthesize existing cultural information at regional landscape scale, including digitized spatial data and narrative data
- Identify sensitivity areas
- Identify baseline condition, long-term trends, vulnerabilities, and risks
- Incorporate current regional research design and research questions
- Evaluate resources based on their significance, condition, ability to answer research questions, stakeholder interest, and potential risk from change agents
- Identify regional mitigation options

Proposed Study Area

- HUC 4 Watershed
- Within the Central Basin and Range Ecoregion
- Approximately 10 million acres
- Does area capture natural landscape features and other environmental variables that tend to define cultural movement and land use?



Potential Cultural Conservation Elements

- Broad enough not to identify specific sensitive or confidential resource locations

- When combined with each other, show broad areas of known cultural value. May aid in the identification of potential avoidance areas (if in or near potential development areas), as well as potential candidate locations for regional mitigation addressing cultural landscape impacts

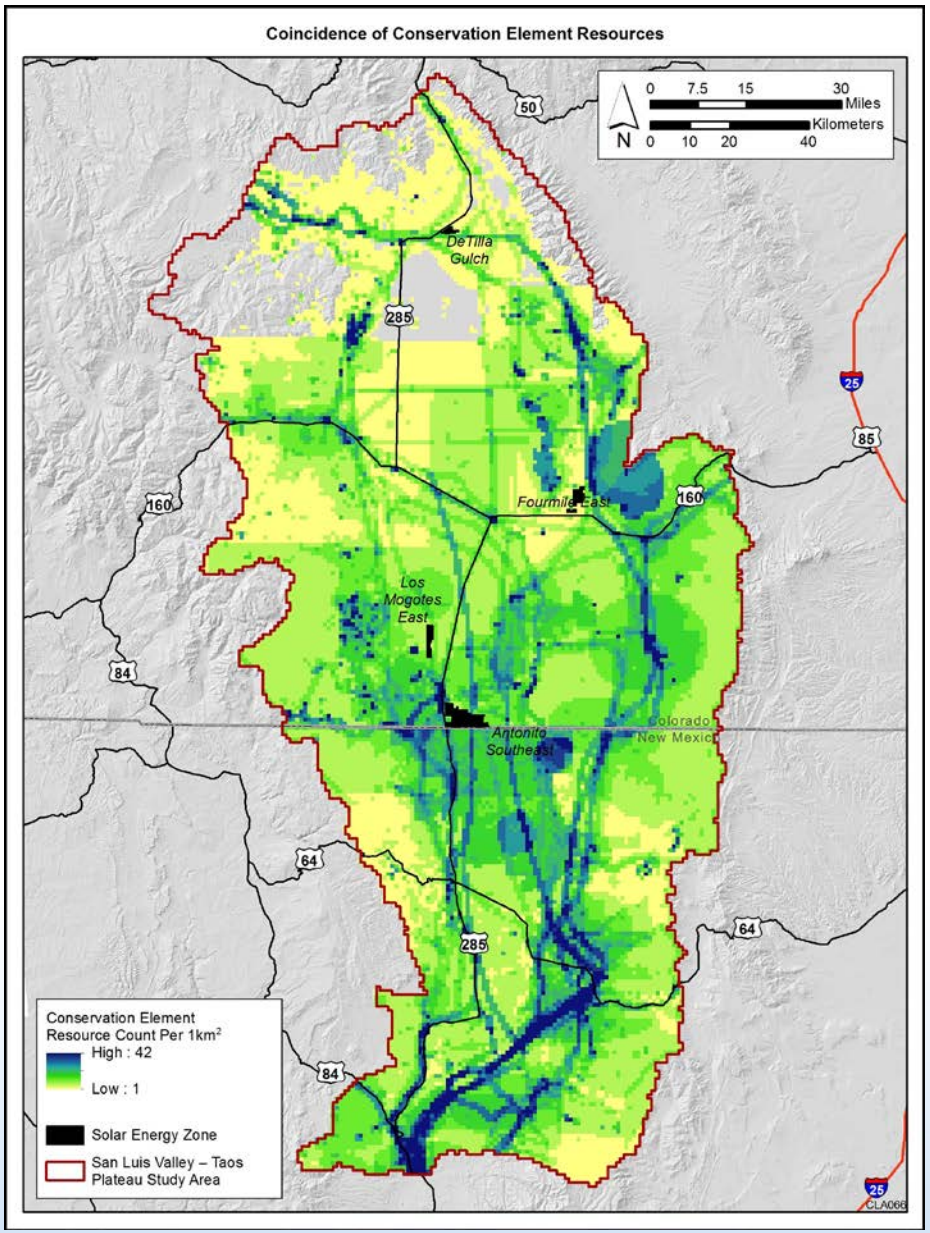
- Preliminary identification of 6 potential Cultural Conservation Elements.

Potential Cultural Conservation Elements

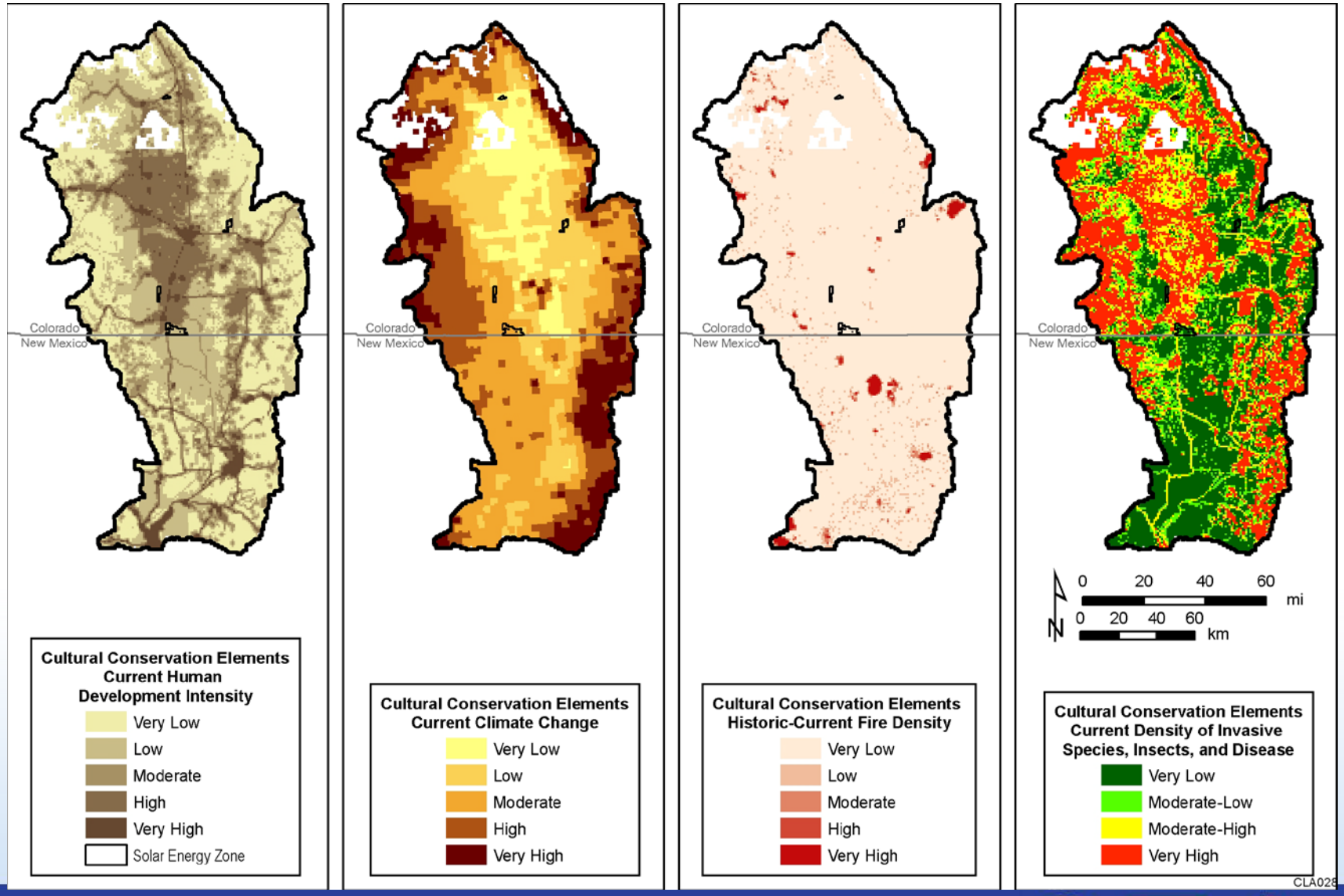
- Places of Traditional Cultural Importance
- Traditional Resource Collection Areas
- Trails, Passes, and Travel Corridors
- Mormon Land Use and Settlement Patterns
- Known Eligible Prehistoric Sites
- Known Eligible Historic Sites and Structures

Cultural Resources of Concern Models (CO/NM example)

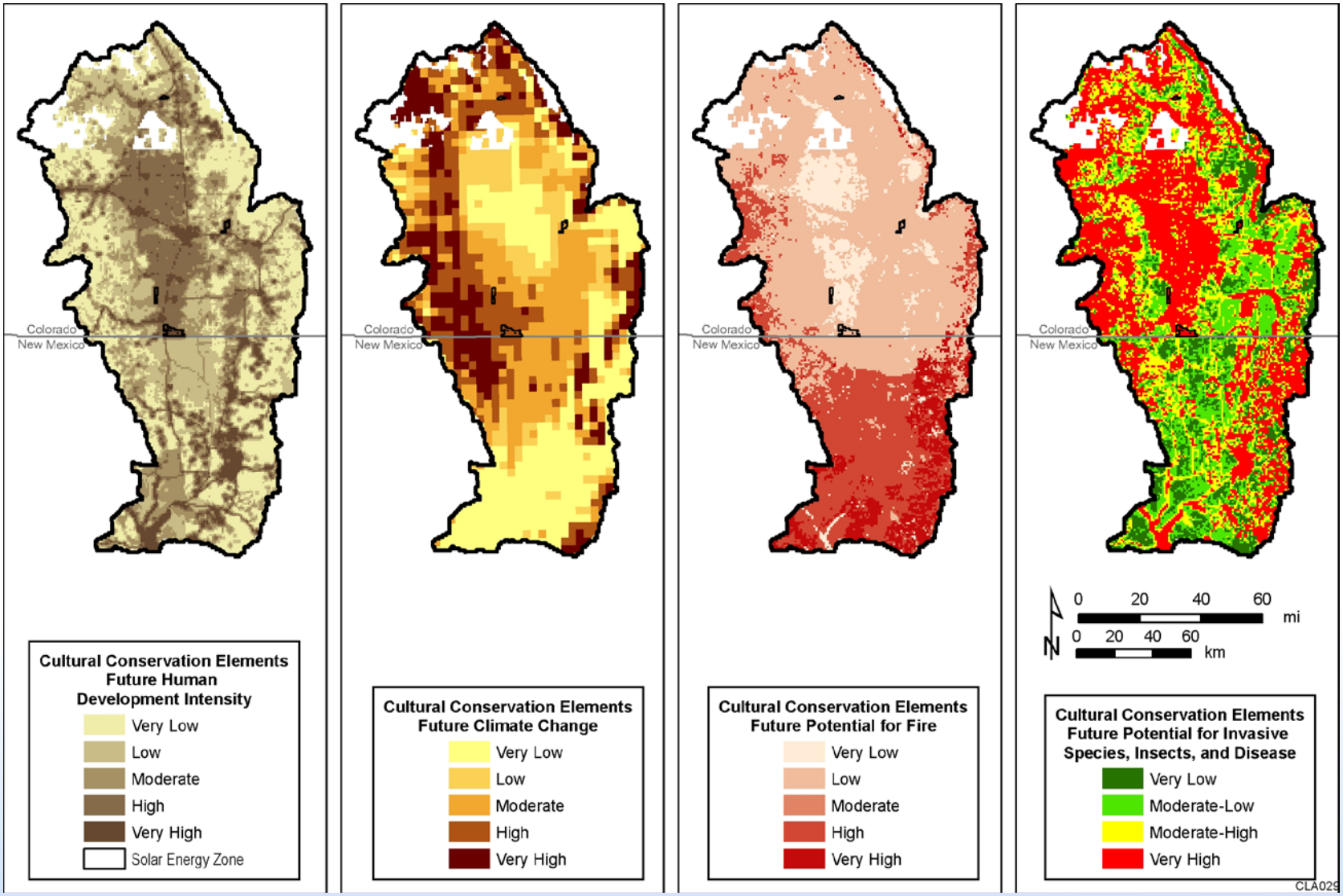
- Coincidence - characterizes the cultural value of an area by the number of known resources per 1 km^2 unit
- Priority Scoring - Individual resources are evaluated for their contribution to one of four categories:
  - Importance to stakeholders,
  - Integrity,
  - Condition, and
  - Ability to answer important research questions.



Change Agents – Current Condition (CO/NM example)



Change Agents – Future Trends (CO/NM example)



What's Next

- Webinar to introduce the concept of the cultural landscape assessment to interested parties
- Workshop to discuss scope, data sources available, partnerships, and path forward
- Develop timeline for completion of draft assessment
- IF YOU ARE INTERESTED IN PARTICIPATING IN AND/OR CONTRIBUTING TO THE CULTURAL ASSESSMENT, PLEASE CONTACT BLM AT BLM_UT_Solar_Mitigation@blm.gov

How to Identify Residual Impacts Warranting Regional Compensatory Mitigation

Presented by:
Heidi Hartmann
Argonne National Laboratory

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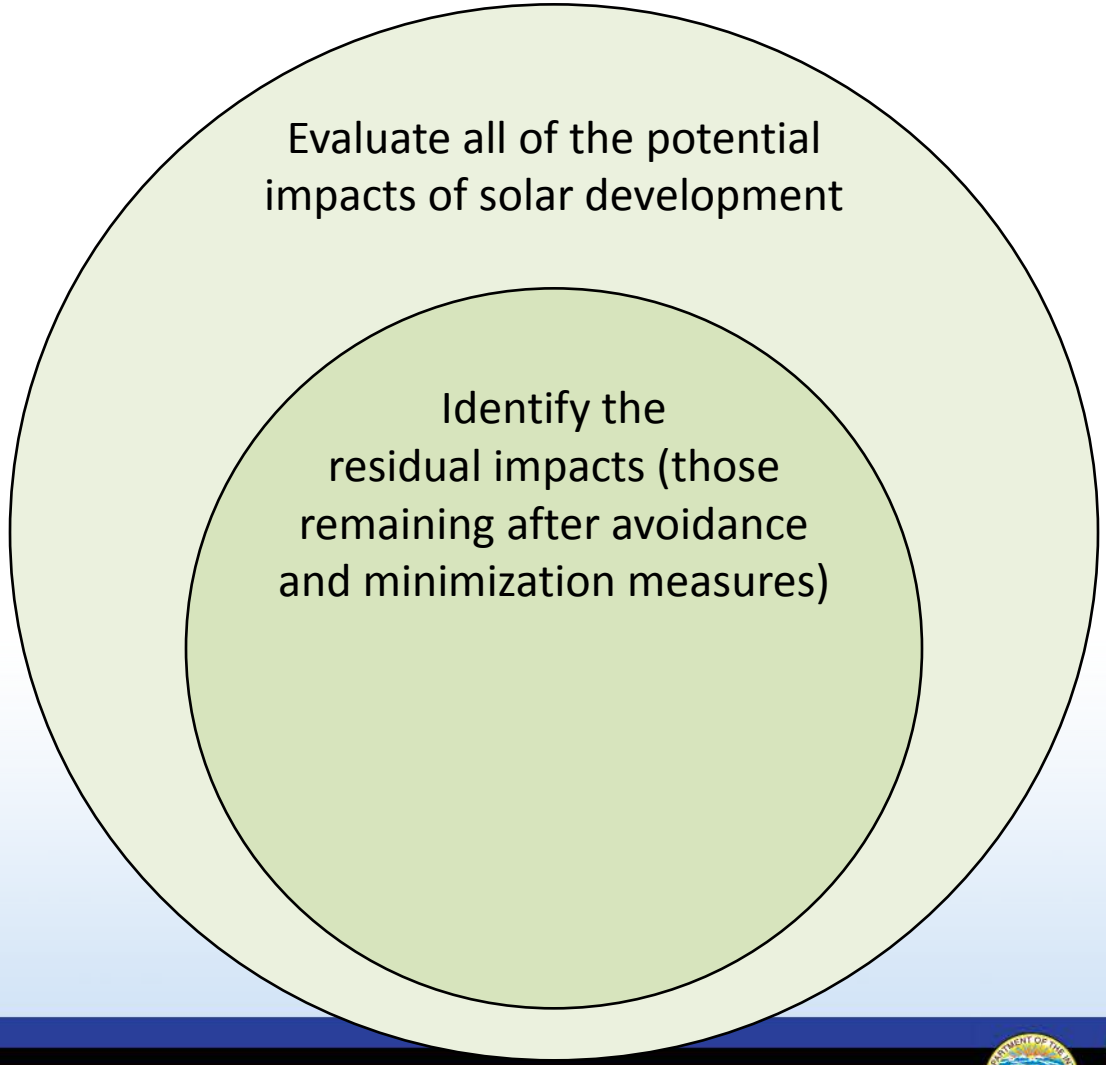
Methodology for Identifying the Residual Impacts of Solar Development



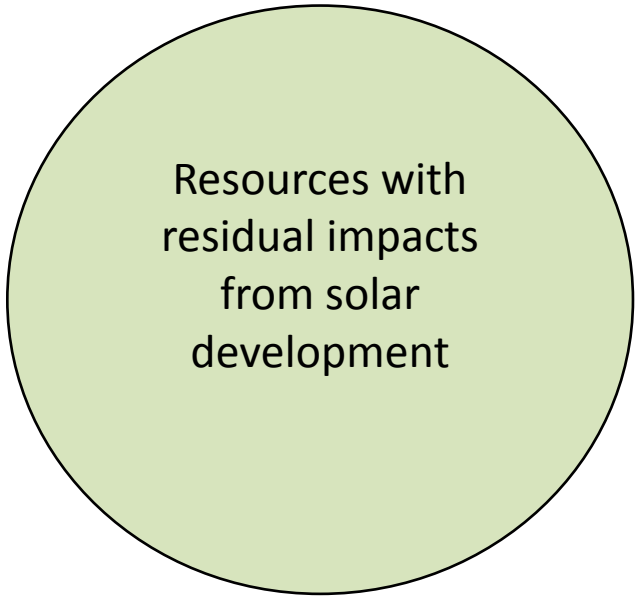
Evaluate the potential impacts of solar development

Identify the resources with residual impacts

Resource/Issue[1]	Escalante Valley Solar Energy Zone Impacts[2]	On-site Mitigation[3]		Residual Adverse Impacts?[4]
		Avoidance	Minimization	
Acoustics Section 13.1.15[5]	**Direct:** Activities during construction and/or operation of solar facilities with thermal energy storage could cause noise levels exceeding background but below the EPA guideline of 55 dBA at the nearest residence (about 1.1 mi [1.8 km] to the northwest of the SEZ). **Indirect:** No specially designated areas are located within 5 mi (8 km) of the SEZ; therefore, construction noise from the SEZ would not adversely affect any specially designated areas. **Cumulative[6]**: If multiple facilities were to be constructed close to the SEZ, residents nearby could be affected by the cumulative noise generated, particularly during construction and/or at night when the noise is more discernible due to relatively low background levels. **Data Gaps[7]**: Refined modeling would be warranted along with background noise measurements during project-specific assessments.	Solar facilities must be located far enough away from residences, or include engineering and/or operational methods such that county, state, and/or federal regulations for noise are not exceeded. See programmatic design features at http://blmsolar.anl.gov/documents/docs/peis/programmatic-design-features/Noise.pdf	Programmatic design features state that methods considered may include limiting the hours of daily activities, constructing noise barriers if needed and practicable, and coordinating with nearby residents. See other programmatic design features at URL under Avoidance column.	No (assuming use of technology and engineering controls). Generally impacts from solar development are expected to be temporary, localized, and readily mitigated onsite.

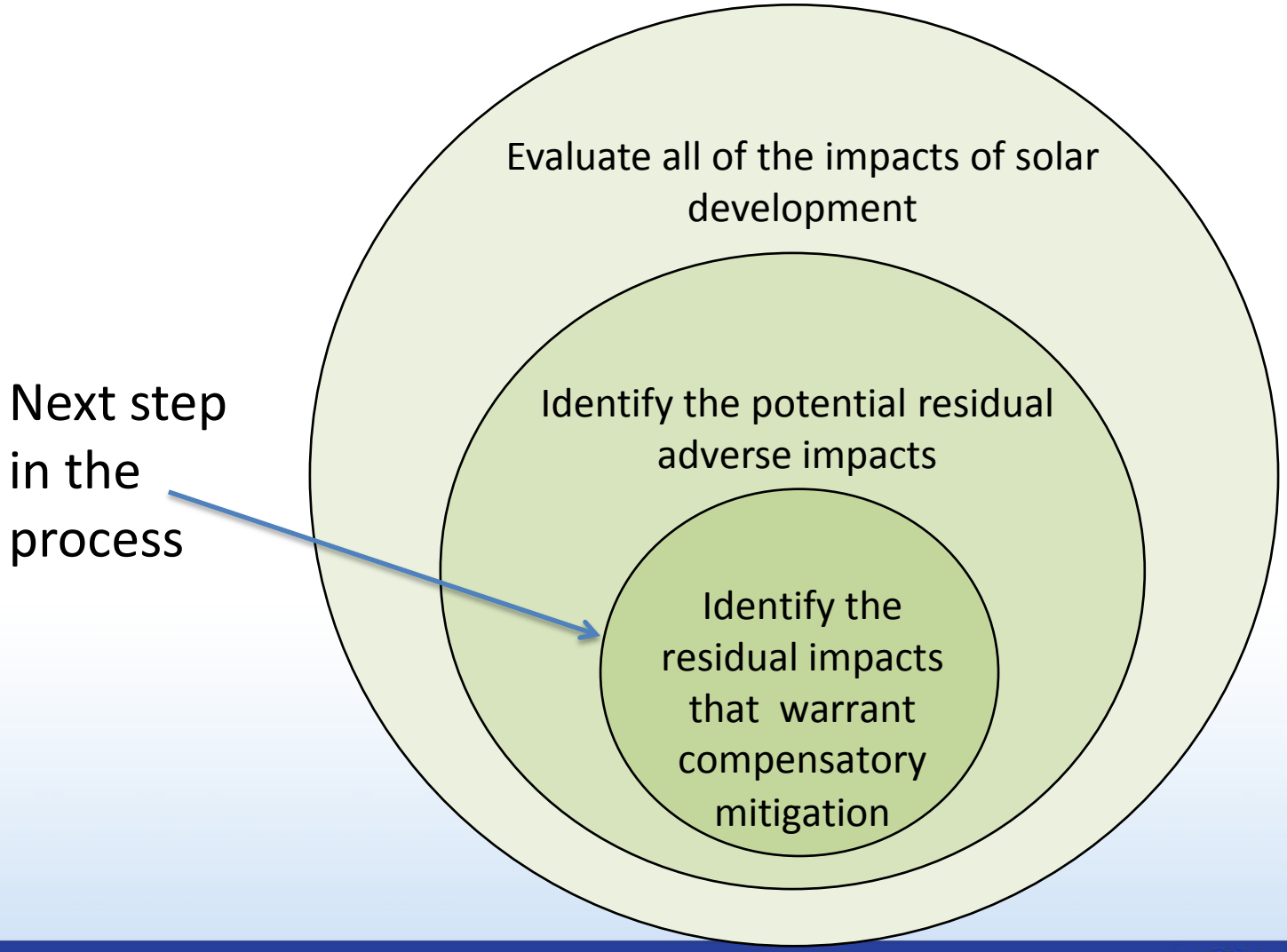
Impacts Warranting Mitigation Starting Point: Residual Adverse Impacts (from impact tables - draft)

- Cultural
- Vegetation
- Terrestrial Wildlife
- Migratory Birds
- Animal Special Status Species
- Hydrology – Surface Water
- Native American Concerns
- Soils/Erosion



- Maybes:
  - Air Quality
  - Invasive and Noxious Weeds
  - Hydrology – Groundwater
  - Livestock Grazing
  - Recreation
  - Specially Designated Areas
  - Visual

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*

- *Referenced 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 and cultural resources impacted by the SEZs?*
  - *How has and will human development 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.* ***Six*** *questions are:*
  - **Are there Residual or Unavoidable Adverse Impacts? (draft done; 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?**

Importance and Trend Criteria

- Addresses regional aspect

- Per Draft BLM Mitigation Policy considers:
  - The relative importance placed on the resource in the land use plan
  - The rarity, legal status, or state or national policy status of the resource
  - The sensitivity (or resilience) of the resource in the face of change and impact

Example Worksheet for Impacts Warranting Mitigation

Escalante Valley 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 Escalante Valley SEZ in the region (Central Basin and Range Ecoregion)?	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		

Resources/Issues with no residual impacts: Acoustics, Climate Change, Riparian Areas, Lands & Realty, Minerals, Paleontological, Socioeconomics, Transportation, Wild Horses & Burros.

Utah Solar Regional Mitigation Strategy
Next Steps

Presented by:

Elizabeth Burghard, BLM Cedar City Field Office

Utah Solar Regional Mitigation Strategy Workshop

Cedar City, UT

April 20, 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)?

Utah SRMS Process – Schedule for 7 Elements

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

2. Which impacts should the BLM mitigate?

April 2016 Stakeholder Workshop - WE ARE HERE

3. What are the regional mitigation goals & objectives?

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 2

Draft Mitigation Strategy Document

Early 2017 Webinar or Workshop

Request for Comments

- BLM and Argonne will incorporate stakeholder input and any new data to our initial assessment of residual/unavoidable impacts (**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 BLM_UT_Solar_Mitigation@blm.gov by

May 20, 2016.