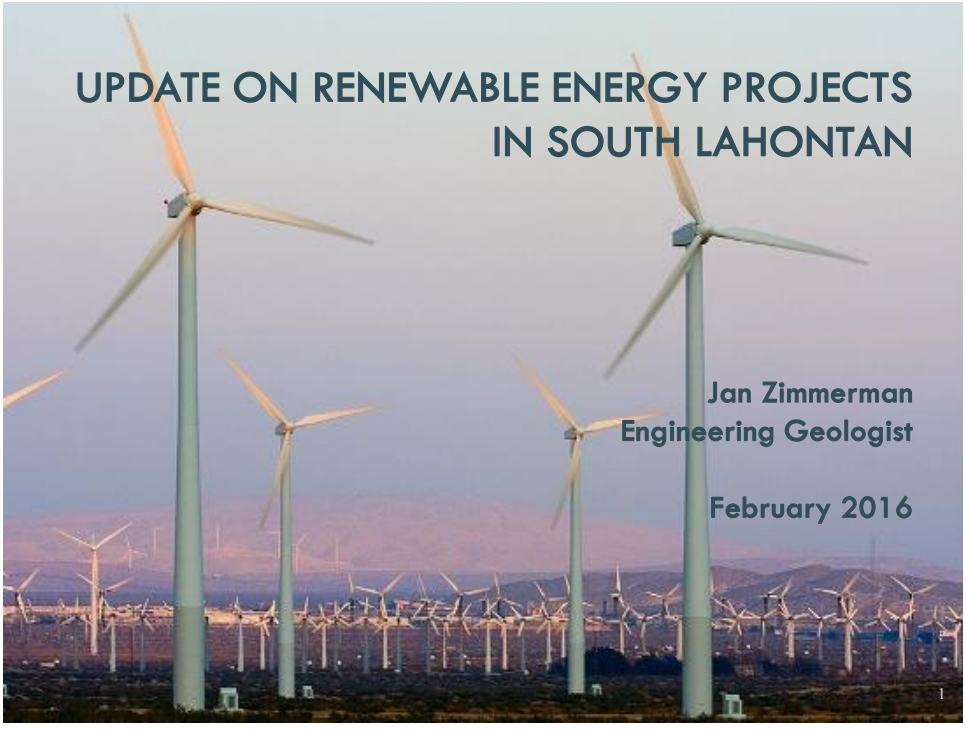
Item 6 LATE ADDITION

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
LAHONTAN REGION

MEETING OF FEBRUARY 10 AND 11, 2016
APPLE VALLEY

UPDATE ON RENEWABLE ENERGY PROJECTS IN SOUTHERN LAHONTAN

Please insert the Power Point presentation behind Item 6 green sheet.



Outline

- Renewable energy development: solar thermal, wind, and photovoltaic
- Potential water quality impacts
- Regulatory tools and permitting statistics
- Challenges and lessons learned


Alta Wind – Before


Alta Wind – After

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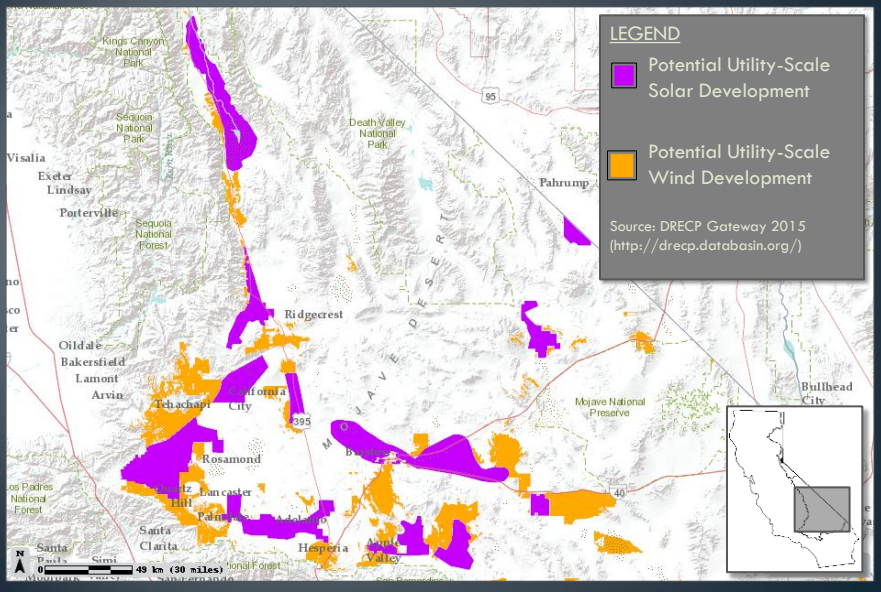
Development Areas



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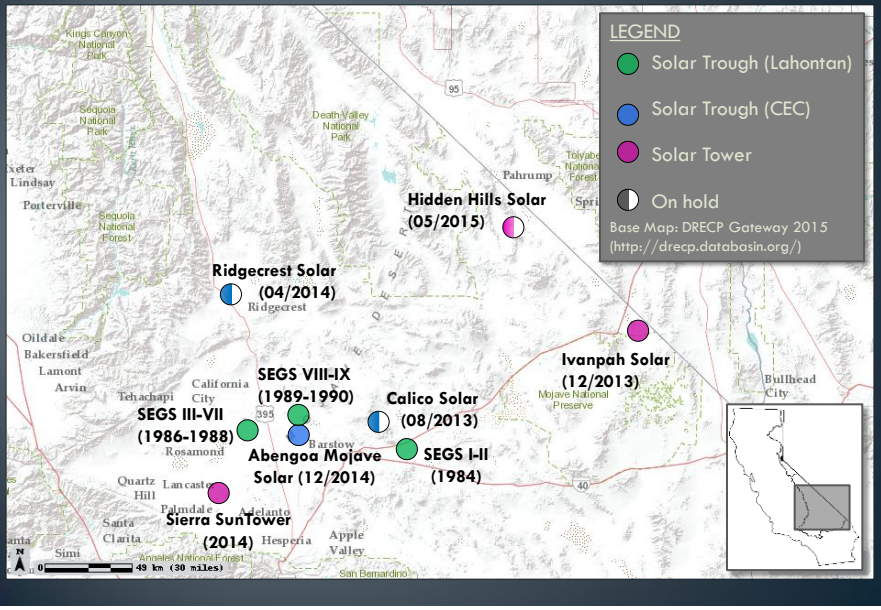
Solar Thermal Power Projects



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Solar Thermal Trough

- Heat transfer fluids → steam turbine → electric generator
  - Wet-cooled technology
- Disturbed footprint is majority of total project area
  - Mass grading and soil compaction
- Water quality concerns
  - storm water, cooling tower wastewater, spills/leaks, habitat
- Surface impoundments
  - Title 27 WDRs <50 MW
  - CEC certification >50 MW

SEGS VIII-IX

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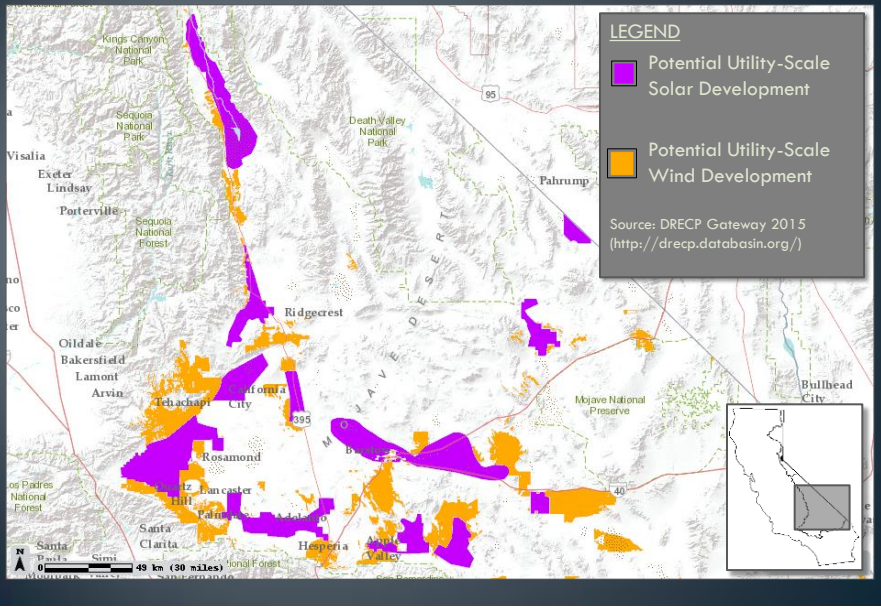
Development Areas



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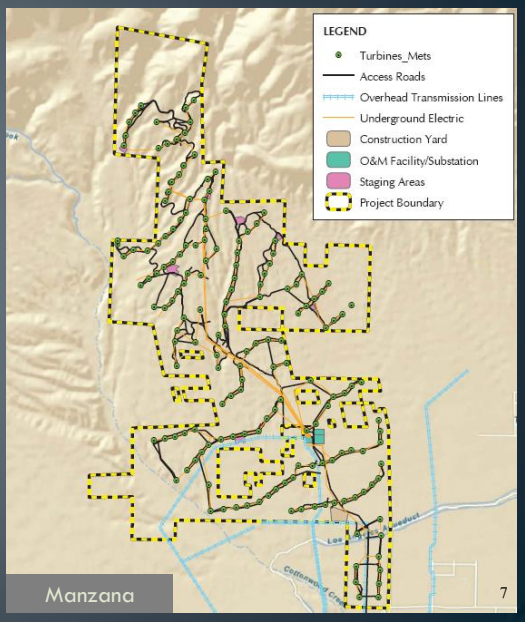
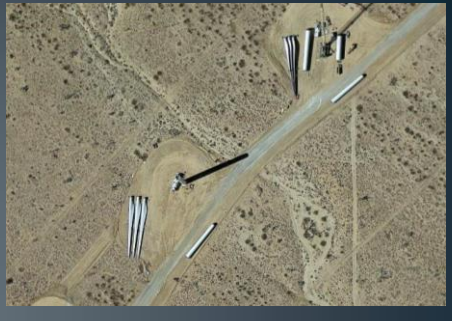
Wind Projects

- Disturbed footprint is a fraction of total project area
  - Manzana Wind Project
    Project area =7000 acres
    Disturbed area = 418 acres
- Wind turbine generators
- Road network
- Utilities

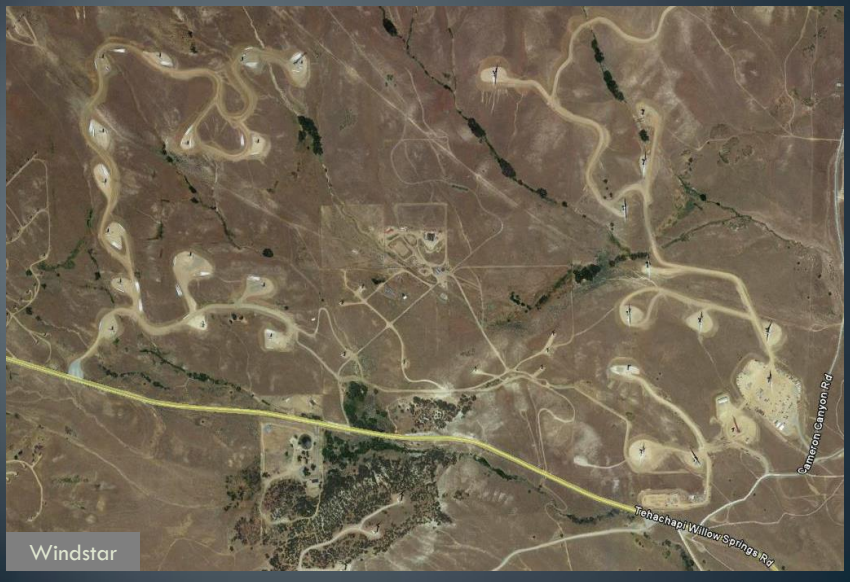


Wind Turbines

- Micro-sited for performance
- Turbine pad (150-foot diameter)
- Up to 500 feet in height from blade tip to base
- A single 1.5MW turbine can power 500 homes per year



Wind Road Network



Windstar

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PV Solar Projects

- Disturbed footprint is majority of total project area
  - Catalina Solar Project
  - Project area = 900 acres
  - Disturbed area = 770 acres
- Many projects avoid major streams
- Mass-grading and soil compaction vs. maintaining topography and vegetation

Catalina

Catalina

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Utilities Collection and Distribution

New and upgraded substations

New and upgraded transmission lines

Access roads (new and maintained)

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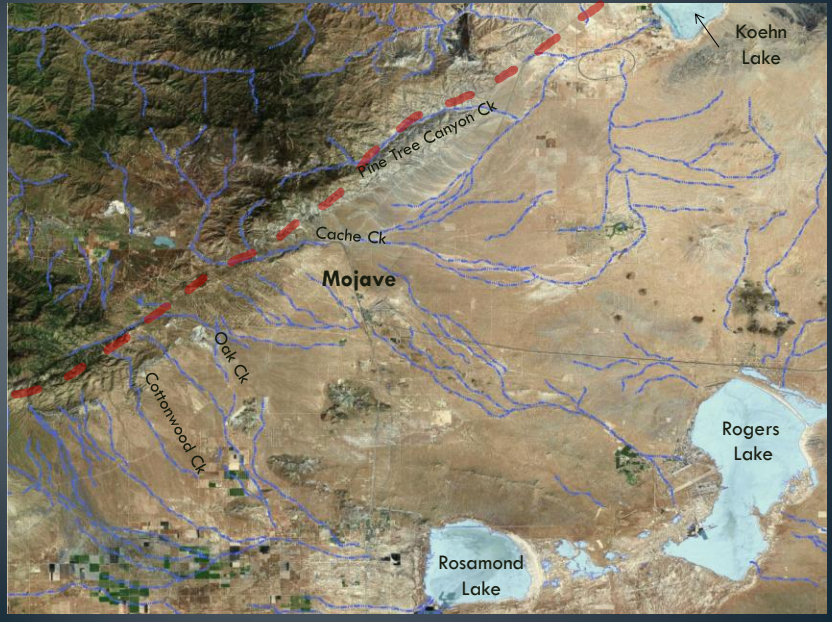
Resources



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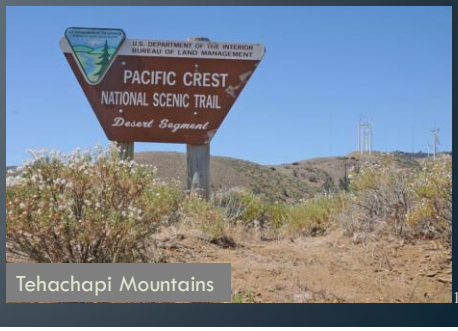
Beneficial Uses

- Groundwater recharge (GWR)
- Freshwater replenishment (FRSH)
- Water Recreation
  - contact REC-1
  - noncontact REC-2

Oak Creek



Tehachapi Mountains

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Beneficial Uses (cont.)

- Habitat
  - wildlife (WILD)
  - warm and cold (WARM/COLD)
  - rare (RARE)
- Water quality enhancement (WQE)
- Flood peak attenuation and storage (FLD)

Desert tortoise

Emergent wetlands

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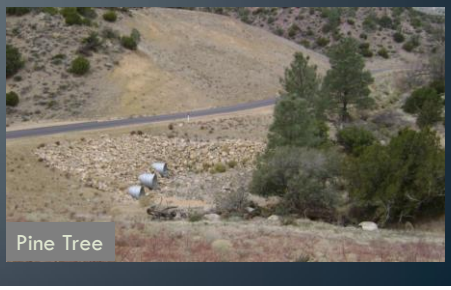
Water Quality Concerns

- Stream infill/disturbance
- Loss of wetland area or functional value
- Loss of habitat and recreational uses
- Hydromodification and reduced flood attenuation
- Storm water runoff and increased soil loss

Windstar



Pine Tree

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Regulatory Tool Box

- Avoid, Minimize, Mitigate
- Federal Clean Water Act
  - Section 401, Water Quality Certification
  - Section 402, NPDES Storm Water Requirements
- Porter Cologne Water Quality Control Act
  - Individual Dredge and Fill WDRs
  - General Permit R6T-2003-0004 allows for minor streambed alteration and includes storm water BMP requirements
  - Individual Storm Water Permit
- Basin Plan establishes our "Wetland Policy"
  - No net loss of wetland acreage or function and value

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Mitigation Approach

- Preserve, enhance, and/or restore to compensate for permanent impacts to surface waters
  - protect in perpetuity
  - monitoring and reporting
- All temporary impact areas are restored
- Prefer mitigation to be within same watershed as Project
  - lack of formal mitigation banks and in-lieu fee programs
  - resource conservation districts have limited resources
- Coordinate with CA Fish & Wildlife
- Mitigation ratios determined using US Army Corps guidance

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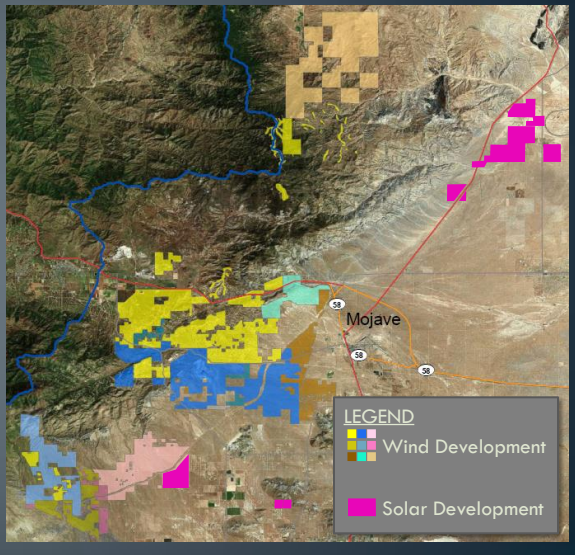
Permitting Statistics

- 14 wind projects permitted since 2006
  - 70,500 acres
  - 3,100 MW
  - Impacts to waters
    - permanent = 44 acres
    - temporary = 135 acres
- 11 PV solar projects permitted since 2012
  - 8,230 acres
  - 1,100 MW
  - Impacts to waters
    - permanent = 143 acres
    - temporary = 48 acres



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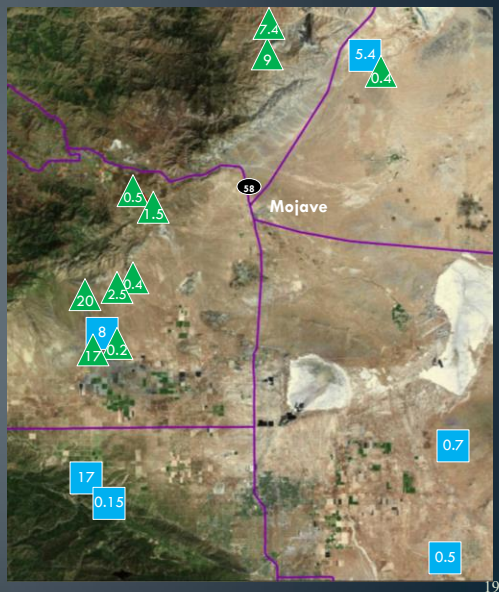
Mitigation Highlights

- 14 Wind and 11 PV projects permitted
  - Permanent impacts = 187 ac
  - Temporary impacts = 183 ac
- Enhance and preserve over 586 acres of desert wash
  - 20 59 ac mitigated onsite
  - 0.7 527 ac mitigated offsite
    - AVC (1.2 ac)
    - MDRCD (18+ ac)
    - Wildlands (384 ac)
    - Cuddeback/Kramer (90 ac)
- Restore 183 acres of temporary impacts onsite



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Challenges

- Education/outreach
- Waters of the State
- Beneficial uses
- Avoid and minimize
- Mitigation

Oak Creek – typical

Oak Creek – 2 days following a rain event

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Challenges (cont.)

- Regulatory tools are limited
- El Nino and climate change
  - Short term vs. long term implications

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Extreme Weather Events

- October 2015, Antelope Valley experienced a 1000-year precipitation event
  - Event thought to have "reset" the surface hydrology in the valley and foothill areas
  - No way to design for1000 year event, most design to pass 100 year event without damage to structure
  - Impacts to crossings and mitigation areas
    - emergency repairs
    - resets the clock for meeting success criteria?

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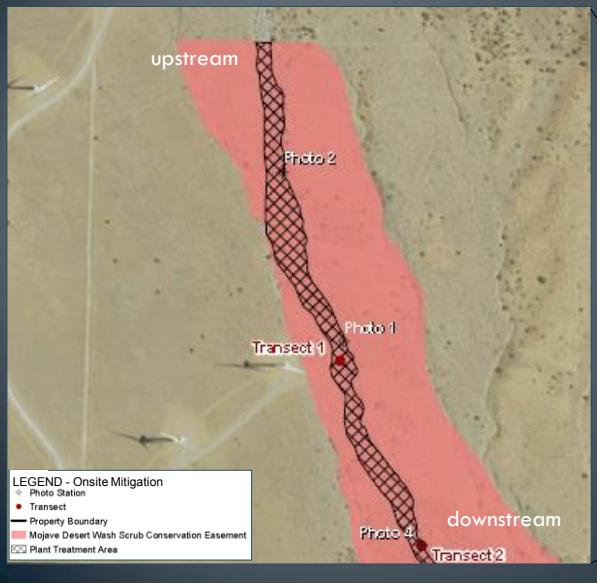
Manzana Wind Project



Mitigation Requirement

Onsite preservation and enhancement of 20 acres of ephemeral stream and adjacent buffer

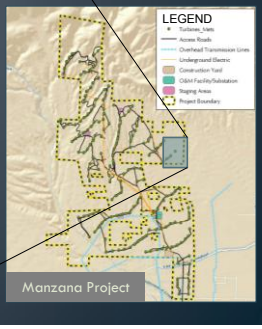


Photo Point #1
Manzana Wind Project

October 2014

October 2015

November 2015

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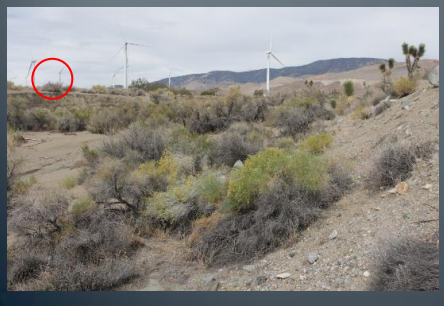
Photo Point #1
Manzana Wind Project

October 2014

October 2015



November 2015

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Photo Point #2
Manzana Wind Project

October 2014

October 2015

November 2015

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Lessons Learned

- Participate in the planning stage - CEQA
- Pre-application site inspections
- Mitigation is increasingly challenging
  - Need for creative tools to focus combined mitigation efforts
- Coordinate closely with other agency staff
- Adaptive management to account for El Nino and climate change, but some things can't be prepared for

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Summary

- Renewable energy development heavily focused in the Antelope/Fremont watersheds
- Our permitting strategy remains effective and protective of water quality, but regulatory tools could be improved
- Challenges and lessons learned strengthen our program

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