

Can we develop our energy resources in a way that is sustainable for our wild ungulate populations?



Habitat requirements of mule deer and elk

- Share the same habitat
- Grazing versus browsing



Habitat requirements

Summer range

- High elevation
- Between spring green-up and first heavy snowfall



Habitat requirements

Winter range



- Lower elevation
- From first heavy snowfall to spring green-up



Habitat requirements

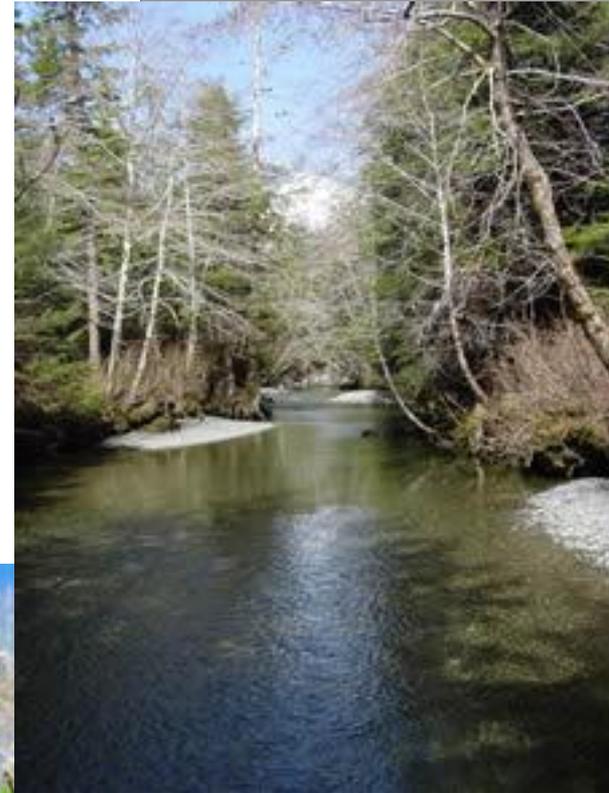
Transitional range

- Mid-elevation
- Shoulder season



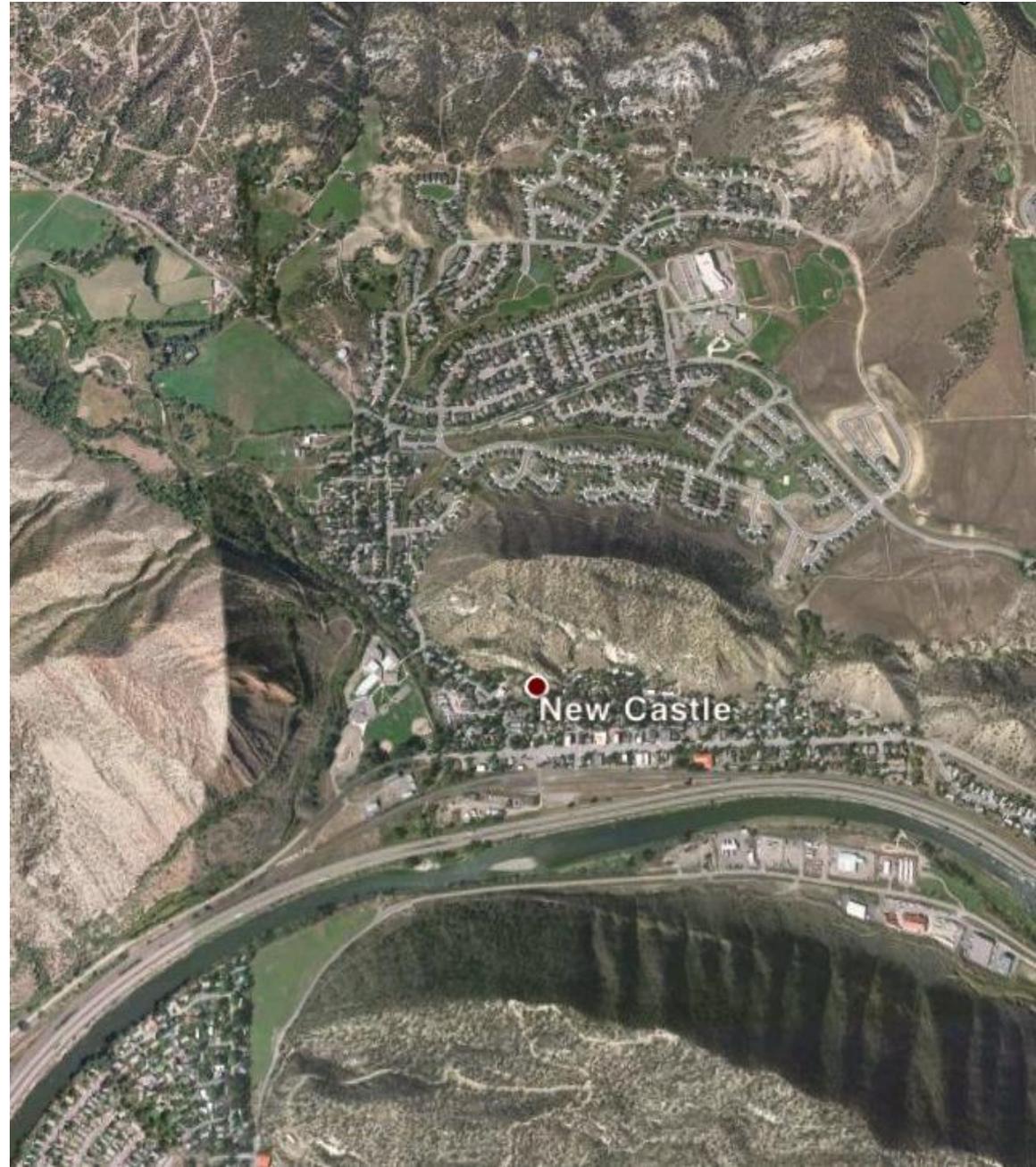
Habitat requirements

Production areas



Impacts to big game habitat

- Housing developments
- Invasive species
- Livestock overgrazing
- Fire suppression
- Climate issues
- Energy development



Impacts from energy development

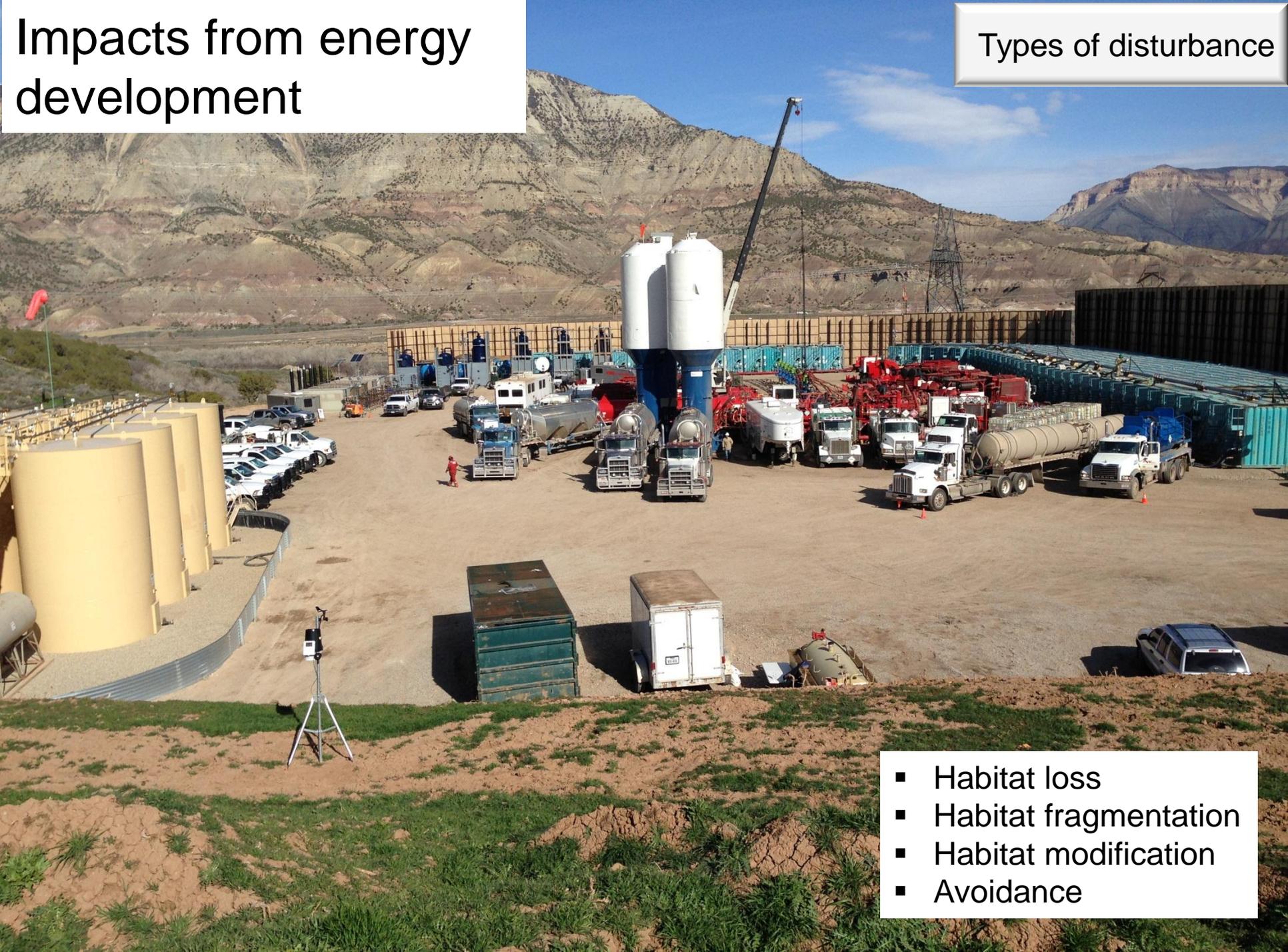
Phases of development



- Construction, drilling, and completion
- Production and maintenance
- Abandonment and final reclamation

Impacts from energy development

Types of disturbance



- Habitat loss
- Habitat fragmentation
- Habitat modification
- Avoidance

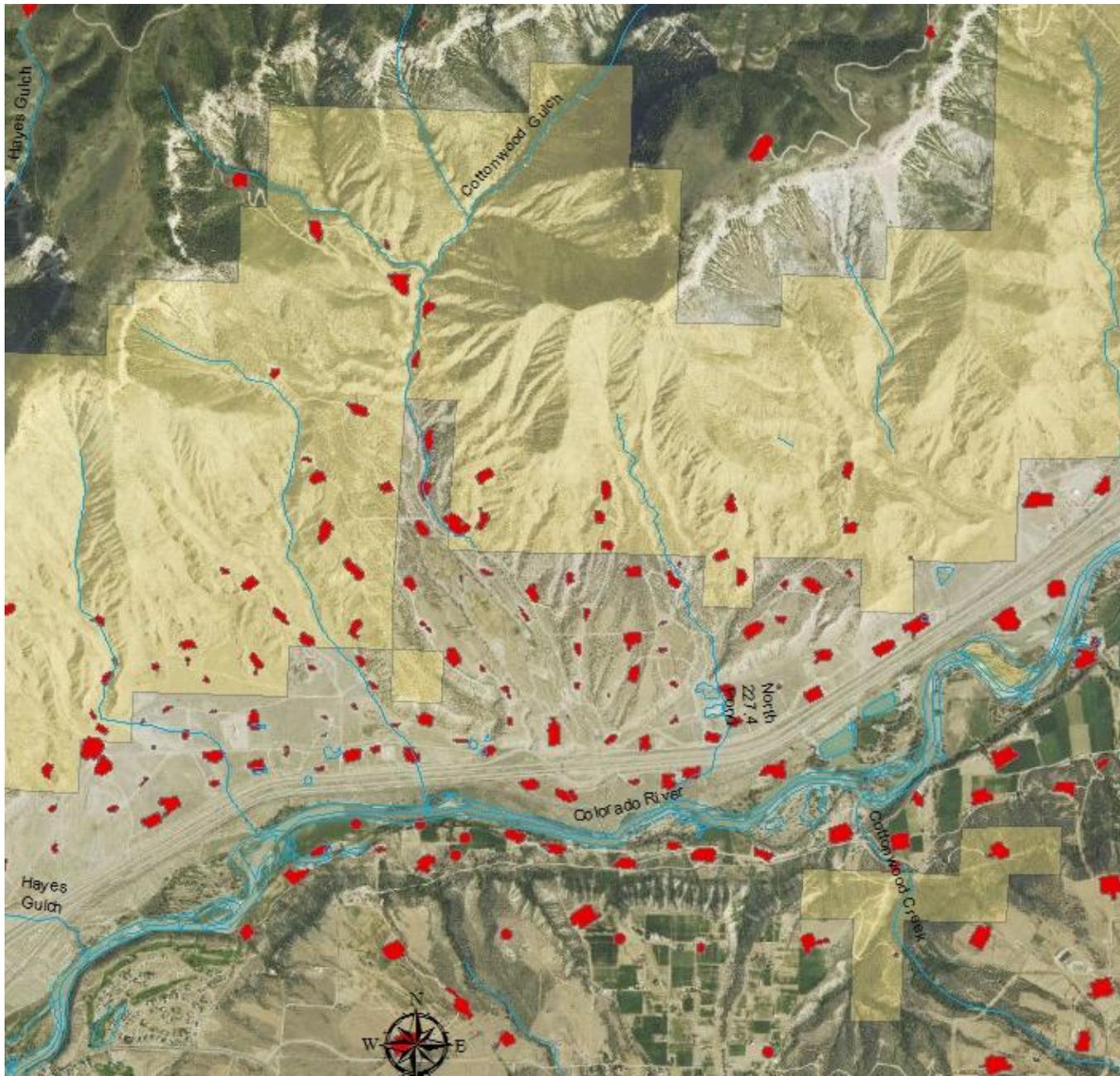
Impacts from energy development

Habitat loss

- Roads
- Pads
- Pits



Surface disturbance



Impacts from energy development



- Roads
- Pads
- Pipelines

Impacts from energy development

Habitat modification

- Weeds
- Transmission lines
- Pipelines
- Reclaimed areas



Impacts from energy development

- Human presence
- Noise
- Truck traffic



Impacts from energy development

Can ungulates acclimate?



Sustainable development

- Planning
- Implementation
- Mitigation
- Reclamation

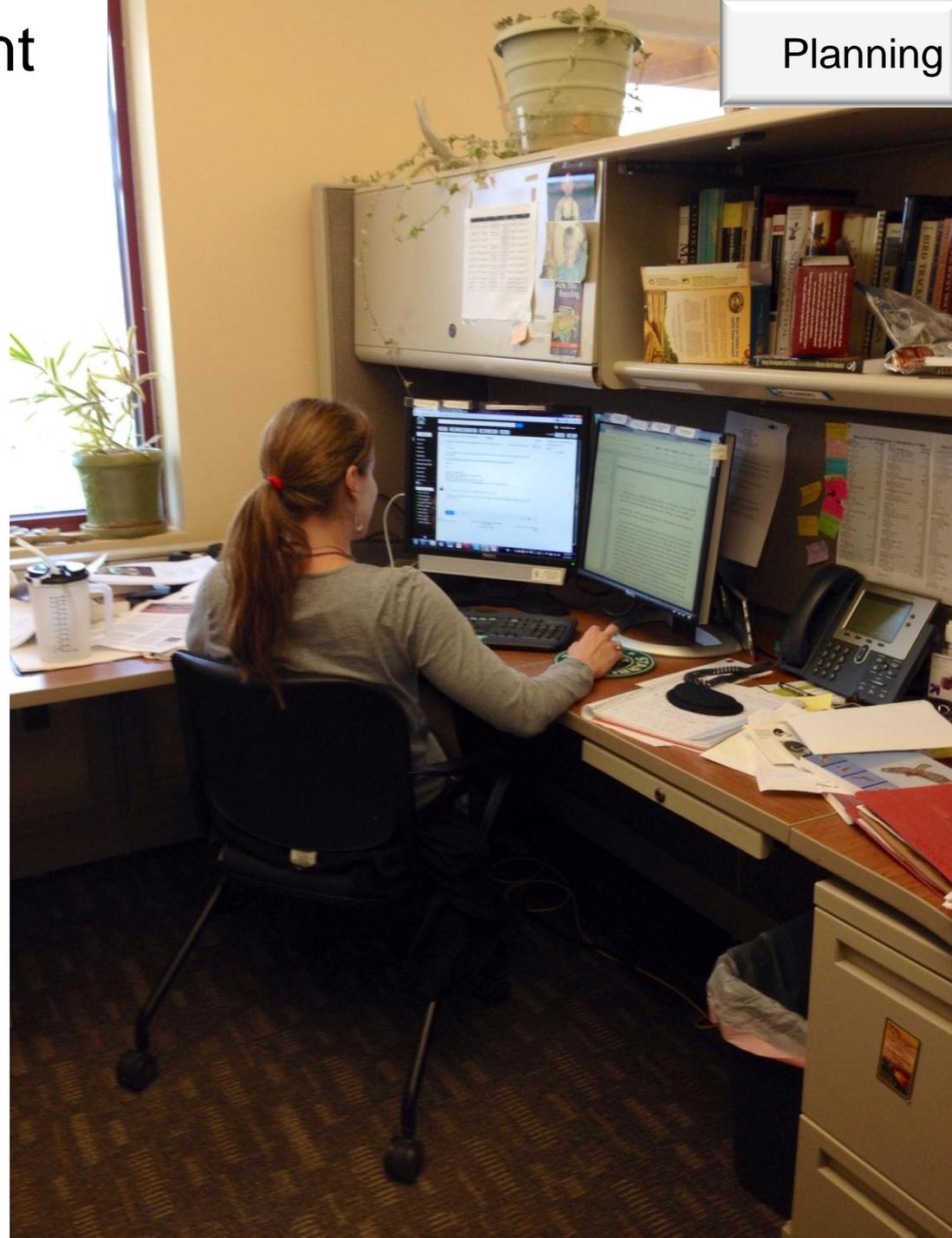


Considerations for wild ungulates



Sustainable development begins in the office

- Implementation of LUP
- Environmental Assessments
- Conditions of Approval



Project Design

Planning

Get on the ground

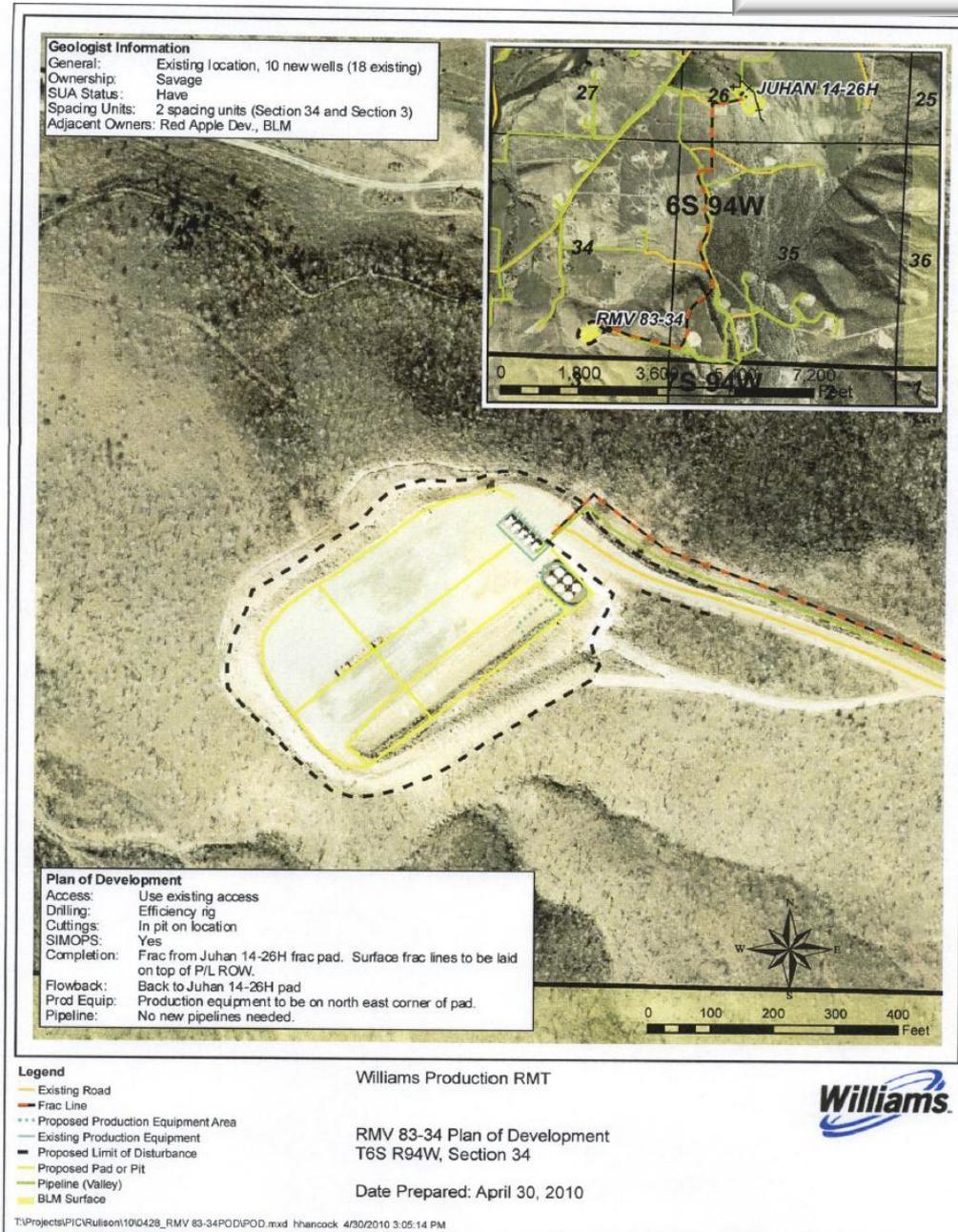


Project Design

Use existing roads, pads, and pipelines

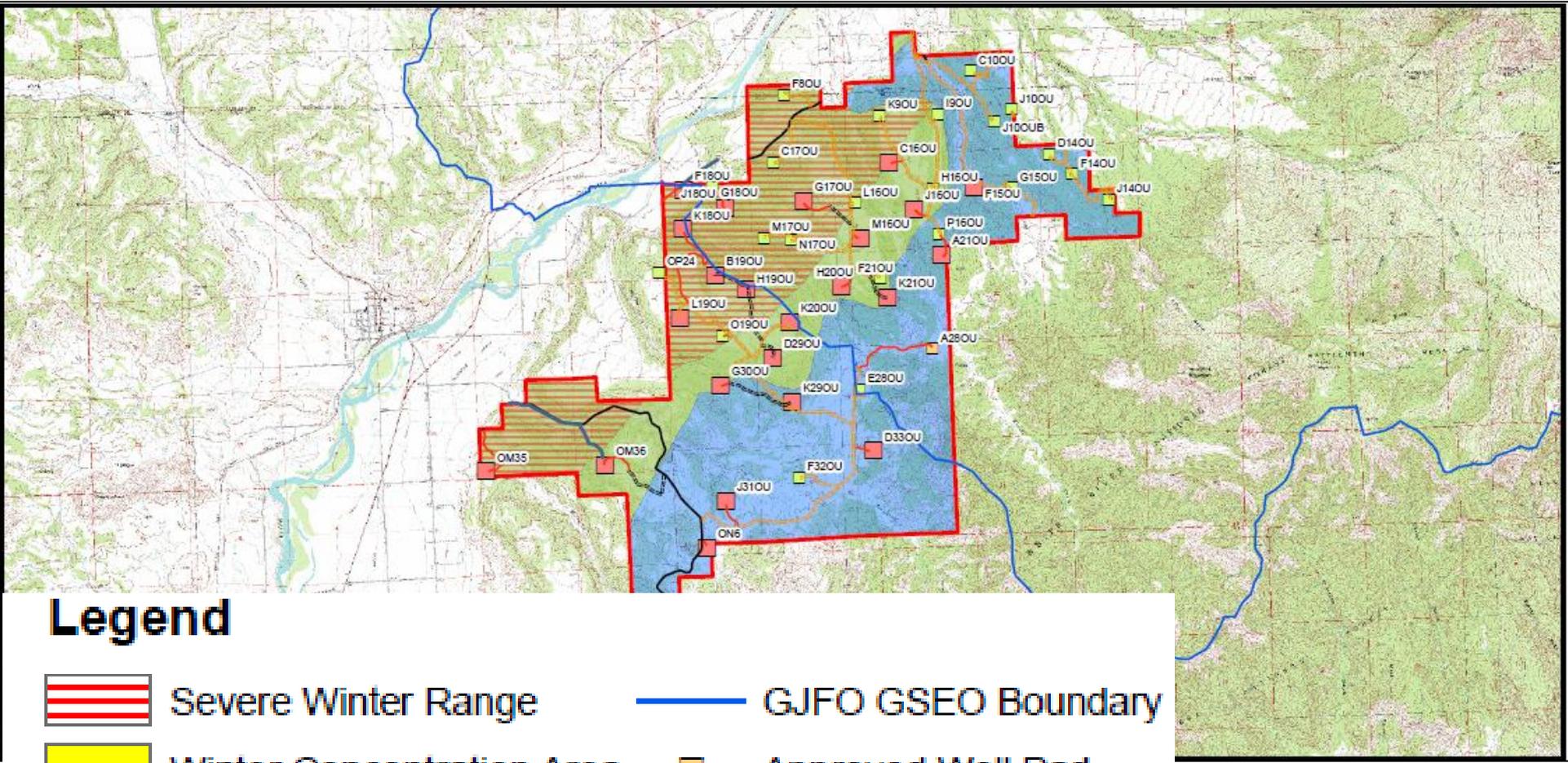
General: Existing location
 Ownership: Private
 SUA: Yes
 Spacing units: 2 spacing units

- Plan of Development
- Access: Use existing
- Drilling: Efficiency rig
- Cuttings: In pit on location
- SIMOPS: yes
- Completion: Remote frac with flowback
- Pipeline: Use existing

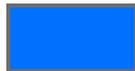


Project Design

Master Development Plans & Clustered Plan of Development



Legend

- | | | | |
|--|---------------------------|---|--------------------|
|  | Severe Winter Range |  | GJFO GSEO Boundary |
|  | Winter Concentration Area |  | Approved Well Pad |
|  | Winter Range |  | Existing Well Pad |
|  | OMDP Boundary |  | Proposed Well Pad |

Project design: Best Management Practices (BMPs)

- Timing
- Carpooling
- Prohibit pets
- Prohibit firearms
- Natural gas drilling rigs
- Pipelines
- Bore pipelines under creeks
- Remote completions
- Recycled water for completions
- Remote monitoring
- Construct well pads prior to onset of winter

Sustainable development

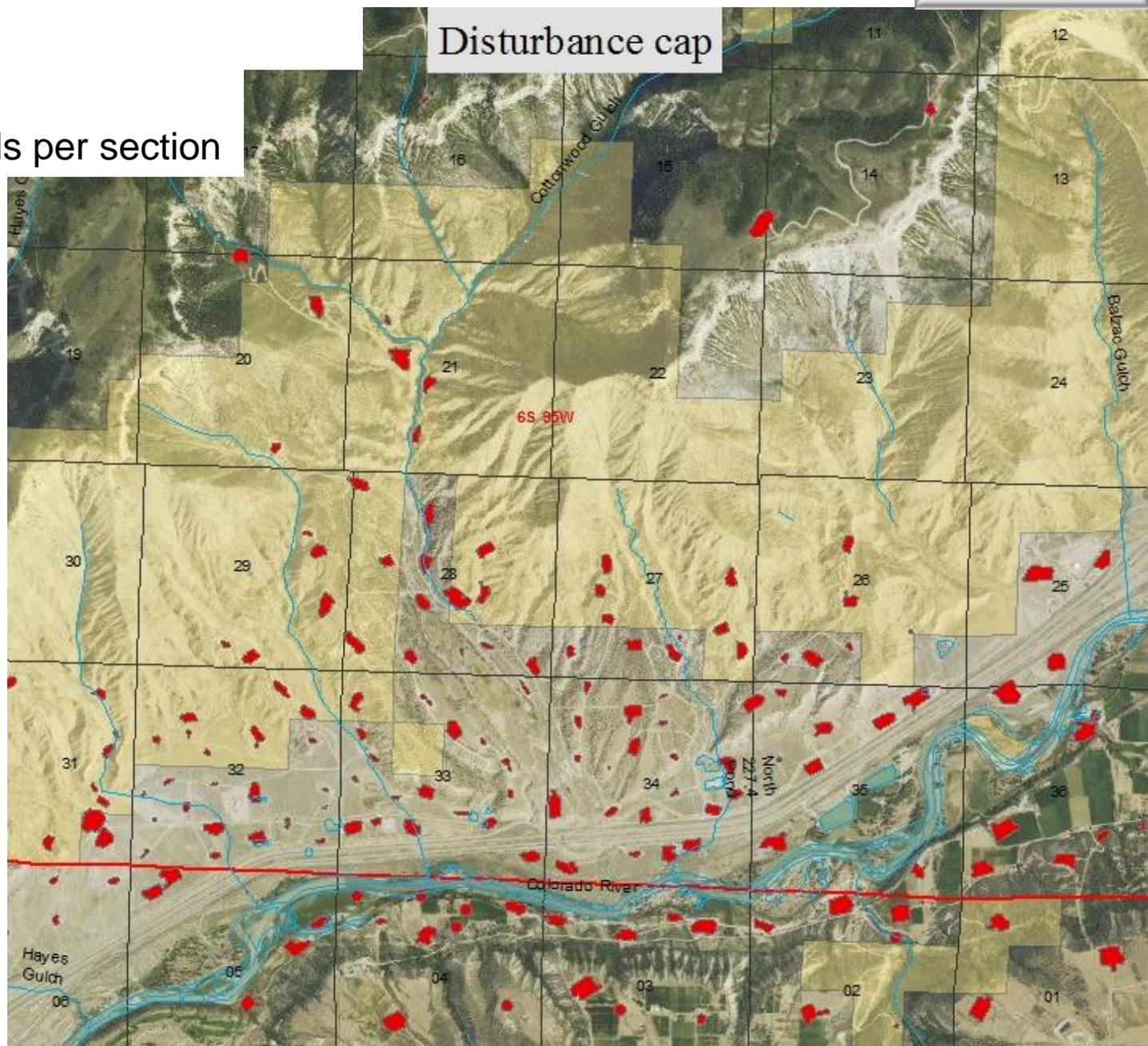
Implementation

Construct, drill, and complete during less impactful times



Establish a disturbance cap

- Percentage
- Number of well pads per section



Calculating impacts:

Create a mitigation metric



Sources of funding for mitigation projects

- Exceeding the Disturbance Cap
- Timing Limitation Exceptions
- CDPHE – Supplemental Environmental Projects (SEP) Program
- Other Matching Funds (HPP, RMEF, etc.)



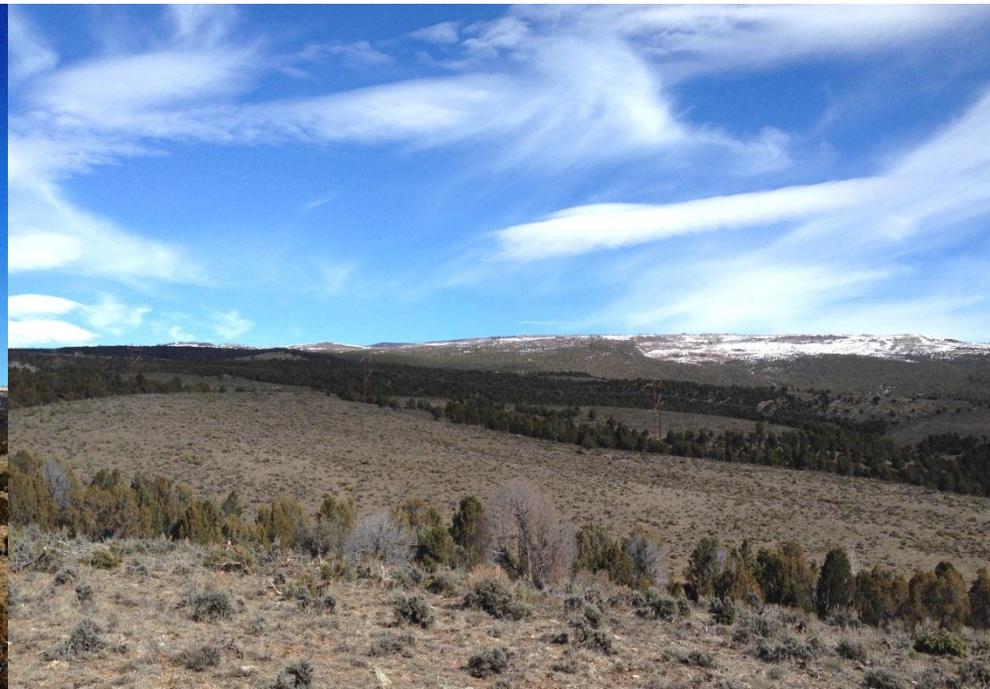
Implementation methods for energy related mitigation projects

- Operator can work in conjunction with BLM and CPW to identify and implement projects
- BLM can Implement Projects



Identify Types of Mitigation

- Vegetation manipulation
- Water developments
- Fence removal
- Prescribed fire
- Noxious weed treatments/Tamarisk removal
- Grazing Deferral or Grazing with Wildlife in Mind



Vegetation Treatments: PJ removal



Vegetation Treatments: Oakbrush thinning



Prescribed Fire



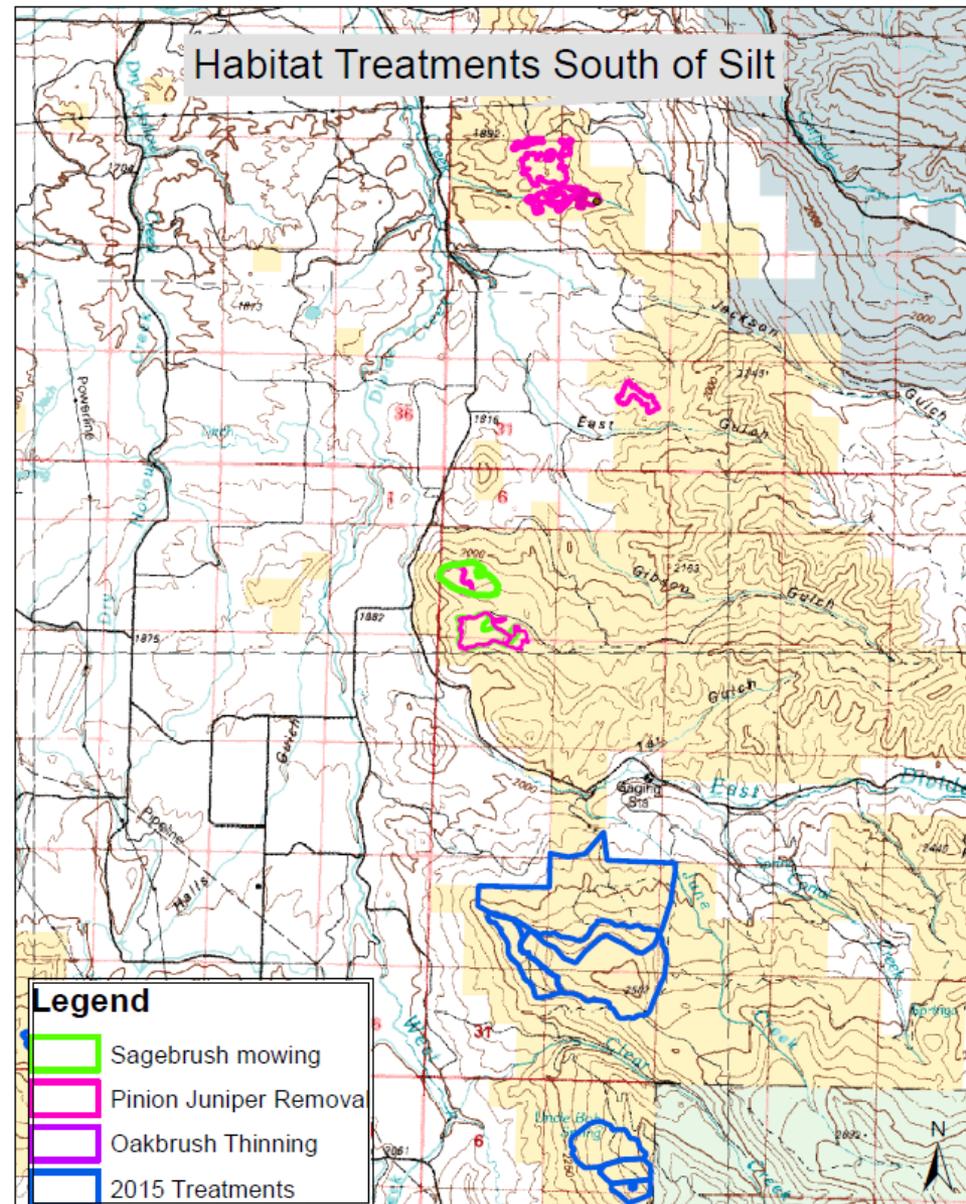
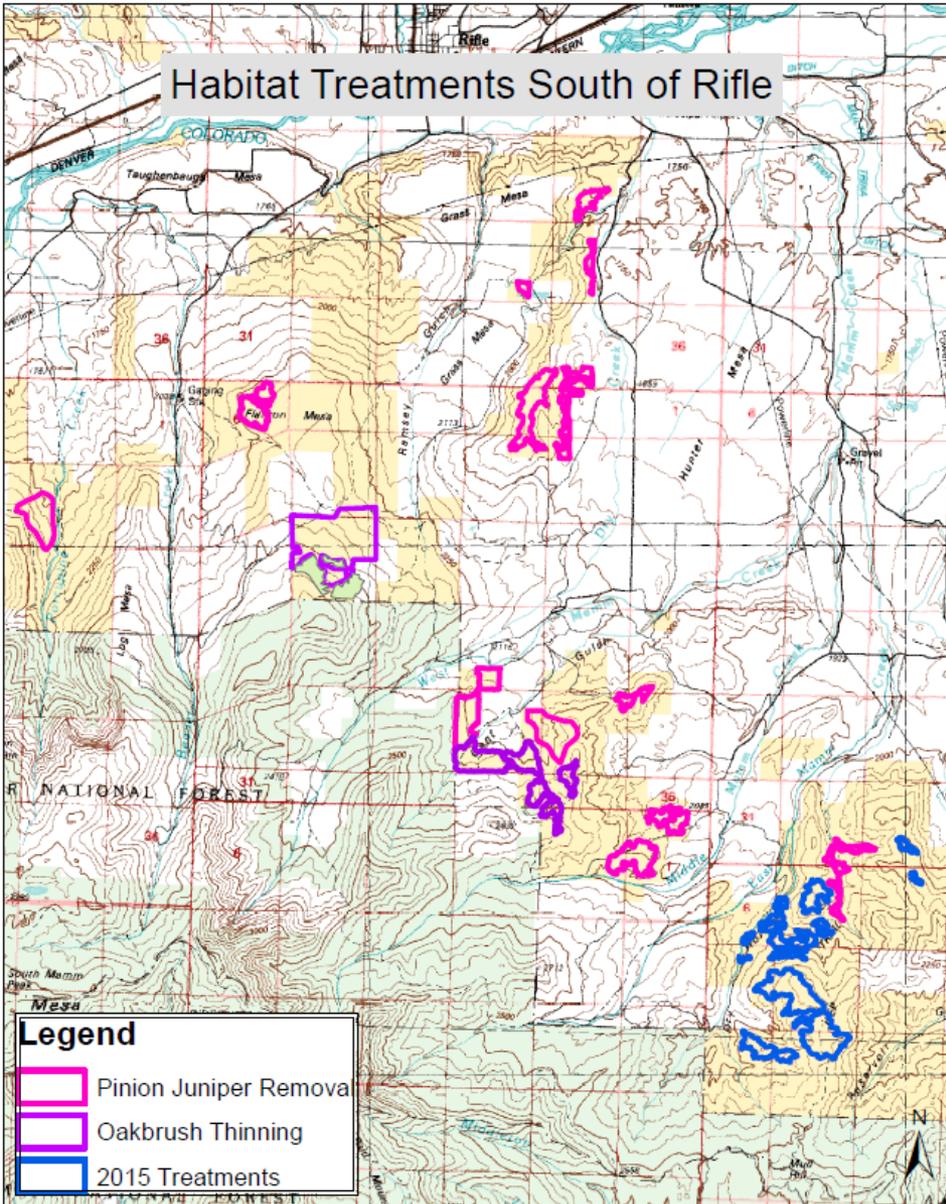
Water Developments



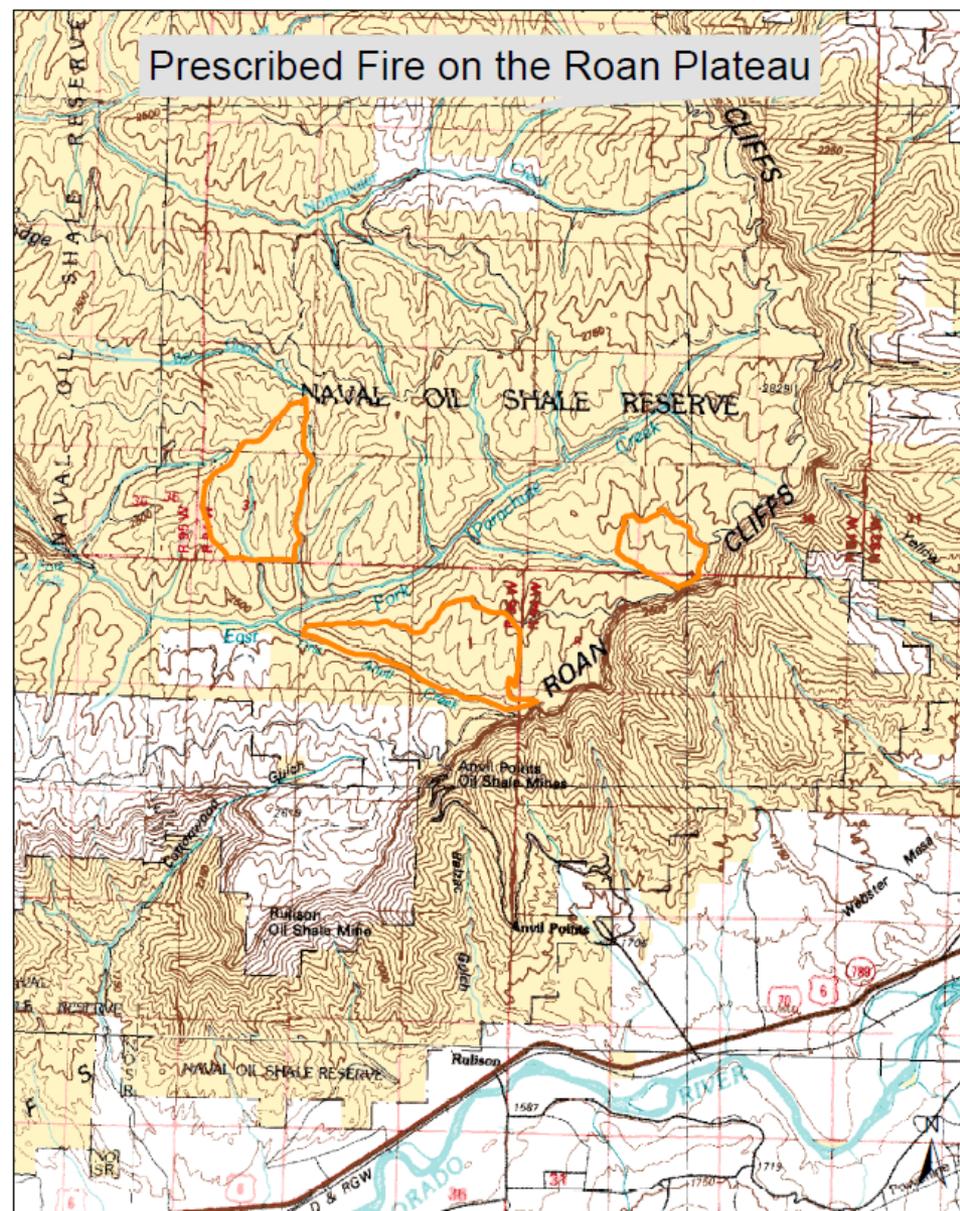
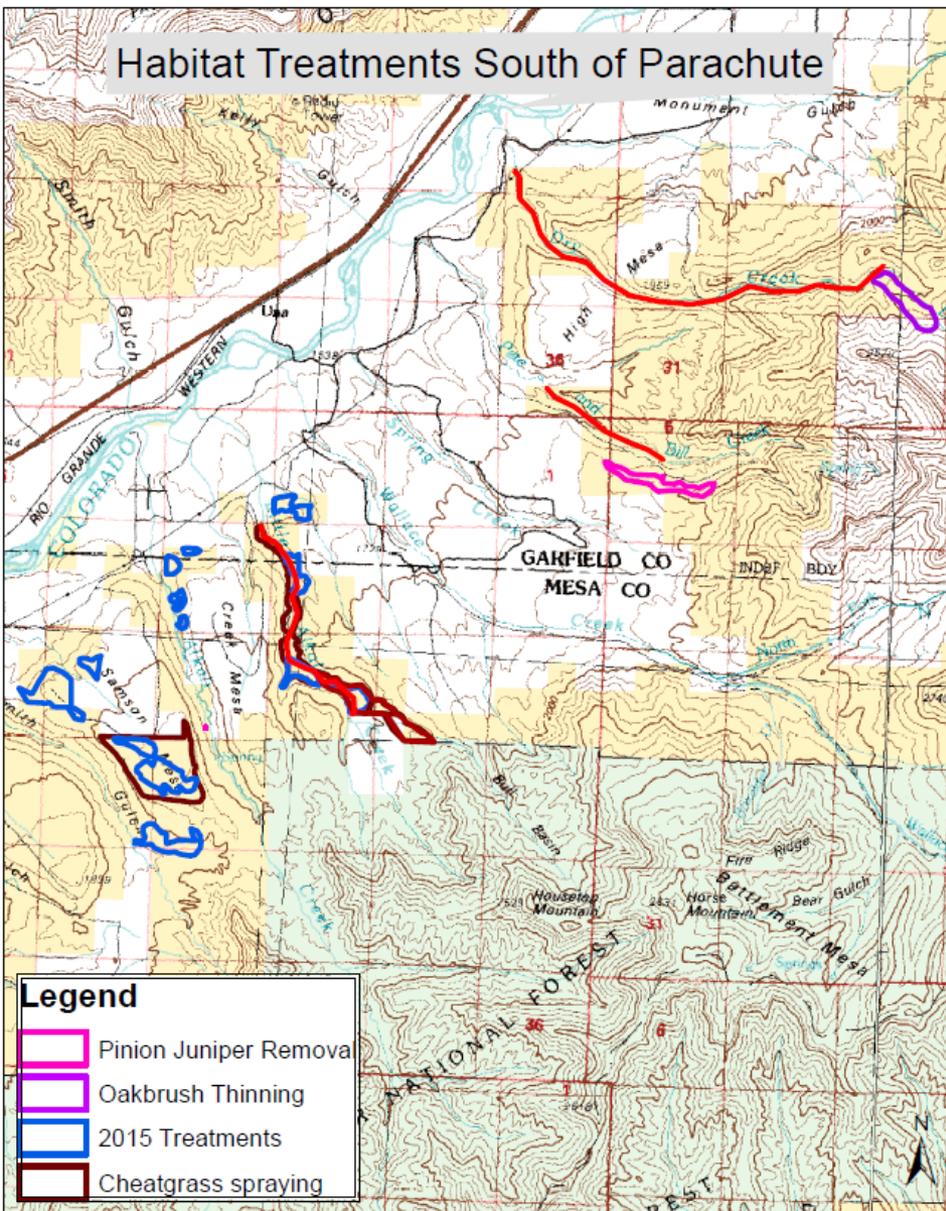
Fence Removal or Replacement



What have we done in the Colorado River Valley Field Office?



What have we done in the Colorado River Valley Field Office?



Sustainable development

- Mule deer and elk are not immune
- Cumulative impacts
- Opportunities at each phase of development - planning, development, reclamation
- Adaptive management
- Mitigation



References and credits

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Acknowledgements

A slide that acknowledges the contribution of colleagues or funding support is appropriate, but the persons mentioned should have contributed significantly to the study.

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A conceptual graph can be effective for the last slide, especially if it summarizes your key points and connects to the points you made on the first slide of your presentation.

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