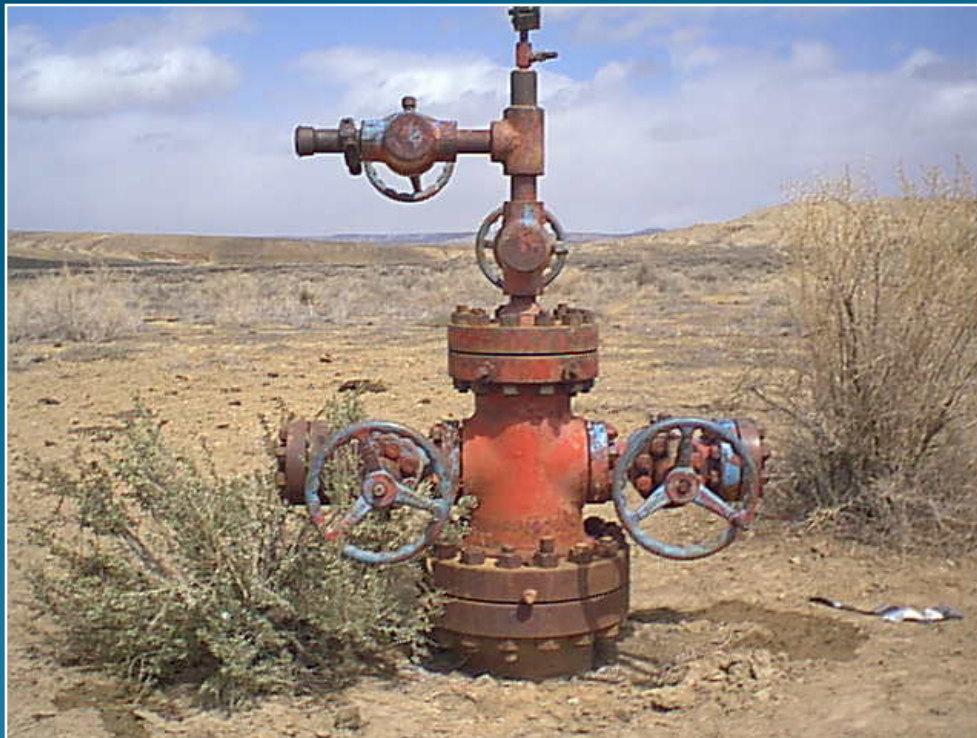


THE ECONOMICS of RECLAMATION IN WYOMING



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Outline

- I. Regulatory Changes
- II. Generalized Cost Considerations
- III. Re-thinking- Goals and Objectives
- IV. Implications

Regulatory Requirements

Federal: “. . . measures undertaken to bring about the necessary reconditioning or restoration of land or water that has been affected by exploration or mineral development, mining or onsite processing operations, and waste disposal, ***in ways which will prevent or control onsite and offsite damage to the environment.***”

[43 CFR 23.3]

State: “. . . . the restoring of the surface directly affected by oil and gas operations, ***as closely as reasonably practicable, to the condition that existed prior to oil and gas operations,*** or as otherwise agreed to in writing by the oil and gas operator and the surface owner.”

[30 WST 5-401(vi)]

New BLM rules:Focuses on both short term and long term goals, and establishes reconstruction of the previous ecosystem as priority:

1. Short term goal: immediately stabilize disturbed areas and provide conditions necessary to achieve the long term goal.
2. Long term goal: ***facilitate eventual ecosystem reconstruction*** to maintain a safe and stable landscape and meet the desired outcomes of the land use plan.”

(Lahti, 2009)

Reclamation Costs

Orphaned Oil & Gas Wells in Wyoming (1997-2007)

	Cost	Bond	Variance
Per foot	10.81	1.79	9.02
Per well	\$29,136	\$5,989	\$23,147

- a. Averages from full database (48 locations and 255 wells).
- b. Figures are constant 2007 dollars (deflated using GDP - IPD).
- c. Includes orphaned wells with no bond posted.

Source: Andersen, et al (2008)

Reclamation Cost Components

	Share (Pct.)
Plugging Service	39
Tanks, Equipment, Fluid Disposal	30
Battery Removal	11
<i>Pit and dirt work</i>	20
Total	100

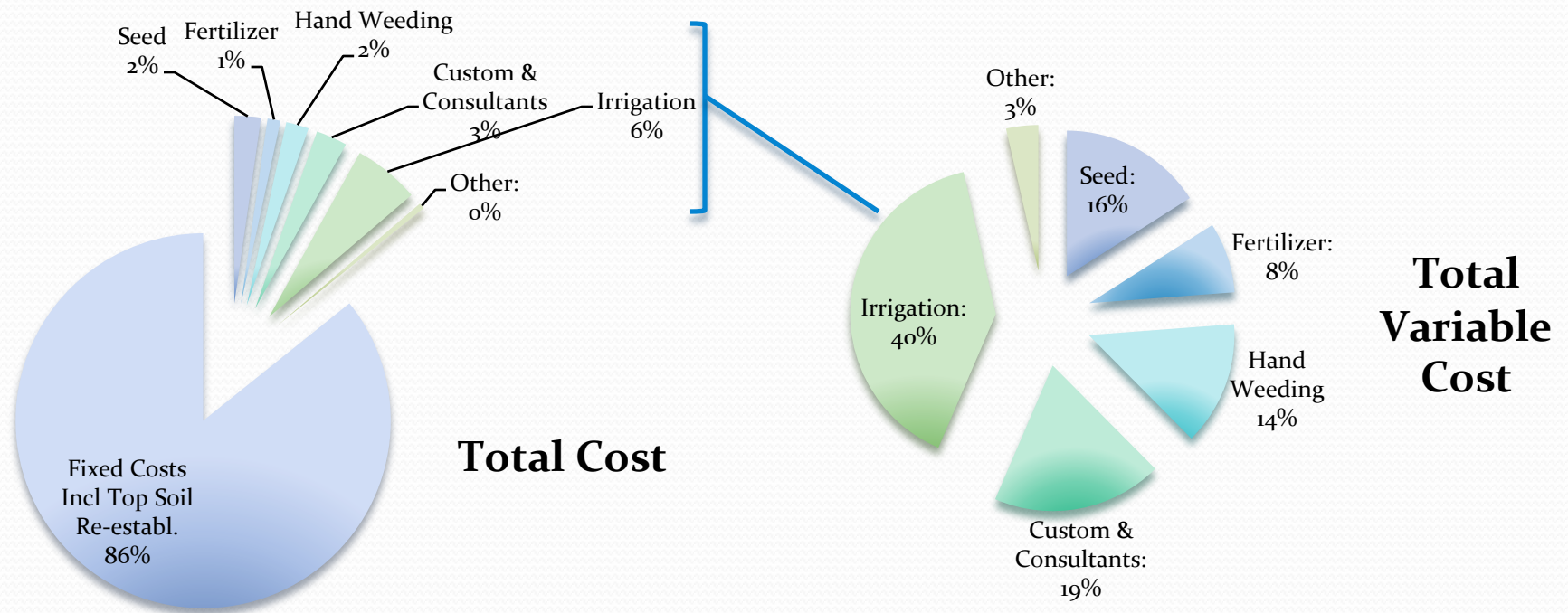
Surface Disturbance Reclamation

Costs Estimates

Total Cost Per Acre: \$6,639

Cost Excluding Top Soil Work: \$945

Re-work: \$977





Reclamation Benefits

What are the benefits of **successful** reclamation?

Why do we do reclamation? Because society places value on restoring disturbed lands.

Three ecosystem services

1. Livestock forage
2. Wildlife forage/habitat
3. Sage grouse habitat

Ecosystem Service #1: Livestock Forage

What is the value to ranch operations value of increasing forage after an energy disturbance?



Ecosystem Service #2: Wildlife Habitat

What is the value of improving wildlife habitat after an energy disturbance?



Ecosystem Service #3: Sage Grouse Habitat

What is the value to Wyoming of preventing the sage grouse from being listed as endangered?





How to achieve these ecosystem services cost-effectively?

- Understand what the ultimate objective of the reclamation project and do it right the first time.
 - Re-work is expensive; so is water treatment.
- More comprehensive management of native seed requirements and use.
 - This would provide more economic incentives to native seed producers.
- The rollover cap restriction means that energy companies should have a strong incentive to reduce the time to reclamation, IF the rollover restrictions are robust.



How to achieve these ecosystem services cost-effectively?

- Shift to a landscape perspective: undertake a mosaic of reclamation activities across the landscape for diversity of ecosystem service objectives.
 - This allows agencies to specify site-specific, site-appropriate reclamation activities.
 - This would improve ecosystem service outcomes.
 - This would improve the likelihood of successful reclamation.



Conclusions

- The costs of reclamation are difficult to calculate; the benefits of successful reclamation are even harder to calculate.
- Talking about the costs of reclamation is pointless without first identifying the final use.
- Research-based agenda for universities, agencies, and industry:
 - What ecological components are required to provide a set of specific services?
 - How long does it take to reach a successful reclamation objective?



Conclusions

- Greater clarity in goals and the best way to attain them are needed.
- Communities of concern should be insisting on more discussion of what is gained from reclamation/the high costs of unsuccessful reclamation.
- Industry prefers regulatory certainty; agencies prefer to update standards when improved science becomes available