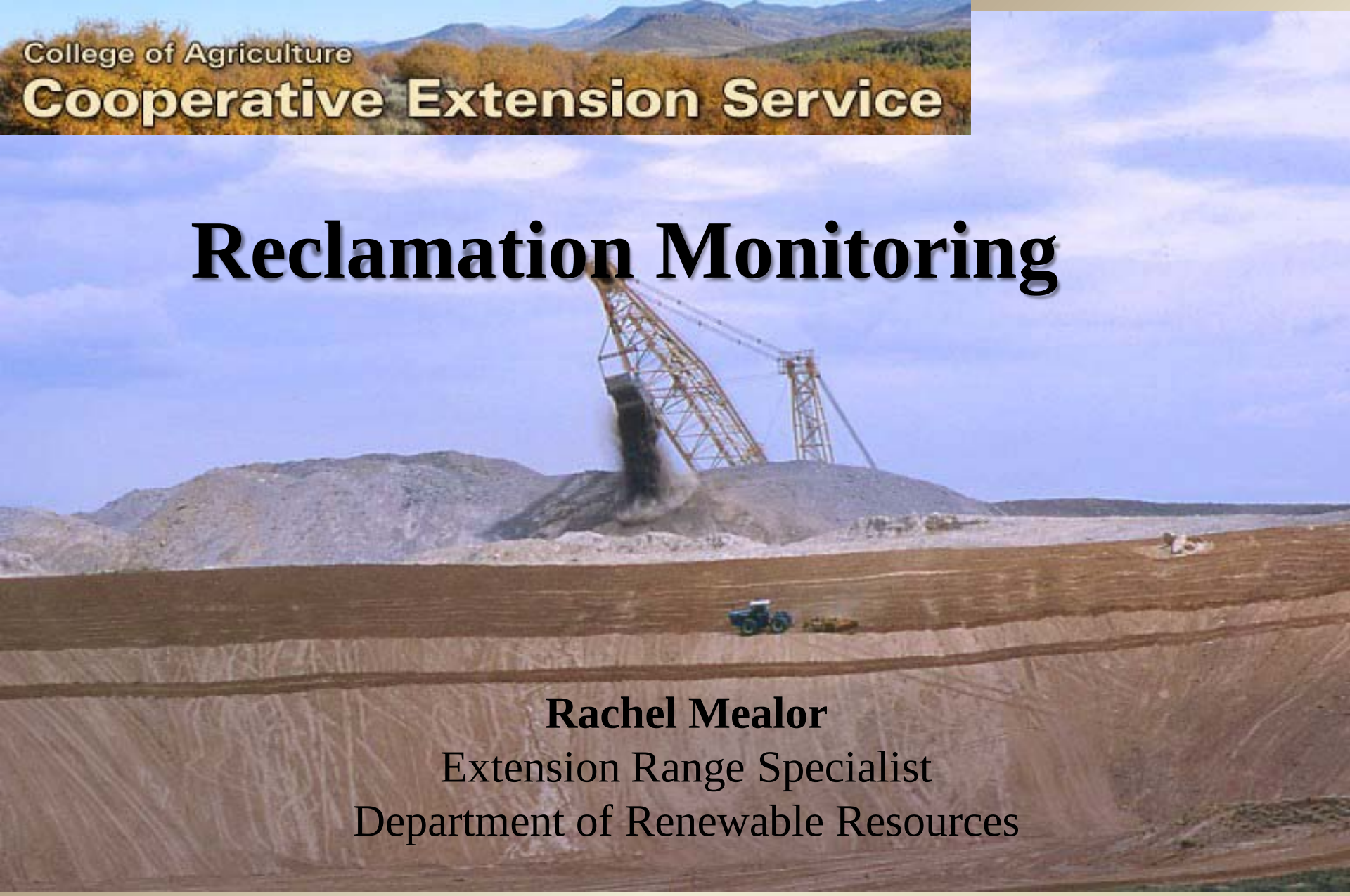
College of Agriculture
Cooperative Extension Service

Reclamation Monitoring



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Road Map

- Considerations for monitoring, both pre- and post reclamation
  - Reclamation site dealing with (reference site)
  - Monitoring for… (have a program for each)
    - Vegetation
    - Wildlife
    - Etc.


Monitoring is the orderly collection and analysis of data to determine progress toward goals

Reclamation Site

- Pre-disturbance inventory
- Reference sites
  - Vegetation, wildlife, post-disturbance use

Check where you have been, to know where you are going

Considering site potential


Mixed Grass Prairie


Sagebrush Grasslands


Montane Forests & Grasslands


Subalpine Forests & Grasslands

Pre-disturbance inventory

- Identify Ecological Site
  - Soil types
  - Depth
- Record Plant Species
- Determine Cover
  - Grasses
  - Forbs
  - Shrubs
  - Bare Ground
- Topography
  - Slope
  - Drainage patterns
- Weeds
- Wildlife Habitat

Putting Monitoring into Action!

Develop Monitoring Plans and Conducting Programs

Monitoring for Successful Reclamation

- Method used depends on monitoring goals
  - Photo point transect
  - Quadrats (to determine emergence by life form or species, density and composition)
  - Line point intercept
  - SamplePoint

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Monitoring Techniques and Vegetation Attributes

Method	Frequency	Cover	Density	Structure	Composition
Photo-point	•			x (with scale)	•
Quadrats	•	x	x		•
Line Point Intercept	•	x			•
SamplePoint	•	x			•

x indicates a primary attribute that the technique collects

• indicates a secondary attribute that can be collected or calculated

Frequency

Describes abundance and distribution of species – determine how common a species is within a management unit (useful to detect changes in plant community over time)

Cover

Percentage of ground surface Covered by vegetation

Density

Number of Individuals per unit area (closeness of individual plants to one another)

Structure

How the Vegetation is Arranged in a three-dimensional space

Composition

Calculated Attribute rather than one that is directly collected in the field

Key	Image	%Grass	%Forb	% Shrub	% Bare Ground	% Cheatgrass	Total
1	South pasture	16.7	83.3	0	0	0	100
2	North pasture	5	0	75	20	0	100
3	Dry Lake pasture	100	0	0	0	0	100
4	Red Mtn. pasture	0	0	5	15	80	100
5	West pasture	25	25	30	10	10	100

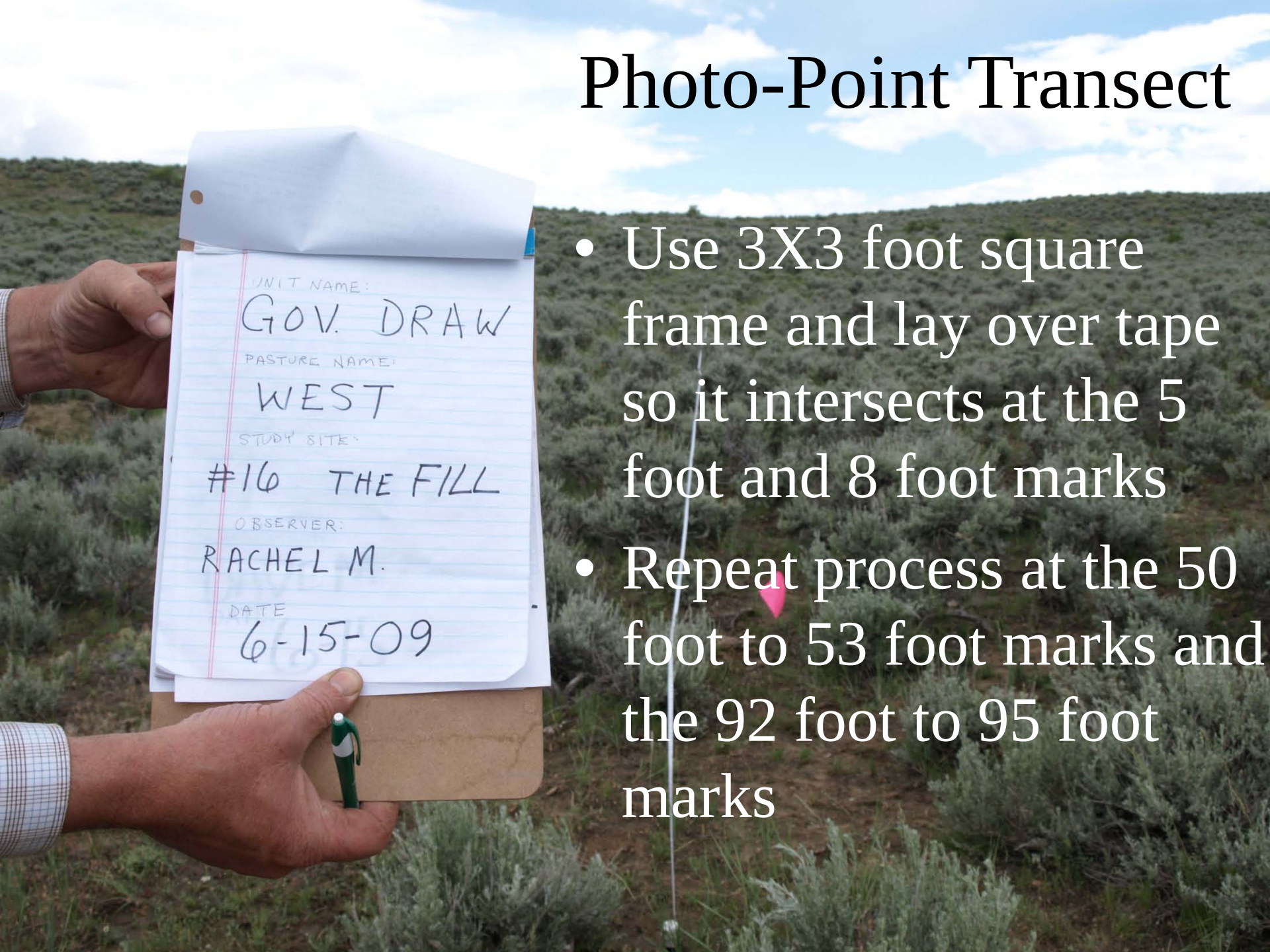
Information

- Oil & Gas: Unit name or number
- Study site where data are being collected
- Date
- Observer
- Methods
- GPS coordinates

Photo-Point Transect

- Use consistent techniques
- ID date and location within picture
- Take picture during same stage of plant growth each year
- Include same skyline in landscape picture
- Carefully relocate photo points each time
- (or others found in the Wyoming Rangeland Monitoring Guide)

Photo-Point Transect



- Use 3X3 foot square frame and lay over tape so it intersects at the 5 foot and 8 foot marks
- Repeat process at the 50 foot to 53 foot marks and the 92 foot to 95 foot marks

Quadrats (emergence)

- Usually conducted in first year after planting
- Document date of emergence and life form
- Check for soil crust
  - If crust present use harrow to break the crust
- Continue to monitor after emergence to determine establishment

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Quadrats (plant density & composition)

- Count plants within a ½ meter frame at several locations within the reclaimed area
- Determine species composition
- Are the desired species present?

Line Point Intercept

- ID date and location within picture
- Install two transect stakes 101 feet apart and stretch tape tight between them
- Photos are taken looking down and back up the transect
- Beginning at the 1 foot point on the tape, lower a wire pointer until initial contact is made with vegetation or the ground surface
- Record data (by dot tally) in appropriate column and row
- Repeat this at each foot-mark along the tape until 100 points have been sampled
  - Life form categories are: grasses (and grass-likes such as sedges), forbs, shrubs, litter, moss and lichen, rock, and bare ground

SamplePoint

- **Lay out 100’ transect**
- **Photos at beginning (facing end) and end (facing towards beginning) of transect**
- **3’x3’ plots**
- **10 plots per 100’ transect @**

  5’-8’, 15’-18’, 25’-28’, 35’-38’, 45’-48, 55’-58’, 65’-68’, 75’-78’, 85’-88’, 95’-98’.
- **SamplePoint program**

Additional information for inclusion in monitoring report

- Topsoil stripping depth
- Ripping/topsoil spreading
- Seed variety/rate and seeding method
- Soil amendments
  - Fertilizer
  - Compost
  - Etc.
- Weed control methods


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Vegetation Monitoring Methods

- **Multiple Vegetation Monitoring Techniques**
  - **www.blm.gov/nstc/library/pdf/MeasAndMon.pdf**
  - **http://www.nm.nrcs.usda.gov/Technical/tech-notes/range/range-handbook/interagn-SamplingVegAttributes1.pdf**
- **Cover by life form and Photo Point**
  - **Wyoming Rangeland Monitoring Guide**
- **SamplePoint**
  - **www.ars.usda.gov/services/software/download.htm?softwareid=254**

Conclusions

- Develop monitoring priorities and areas of interest
- Design a monitoring program that works with goals and objectives identified

Questions or Comments?

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