Rangeland Grazing Management

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- Each operation is different
- No single management strategy fits all
- Your land, Your objective, Your decision

- **Provide basic concepts to help you**

What is rangeland management?

- Manipulation of rangeland components to obtain optimum combination of goods and services for society on a sustained basis.

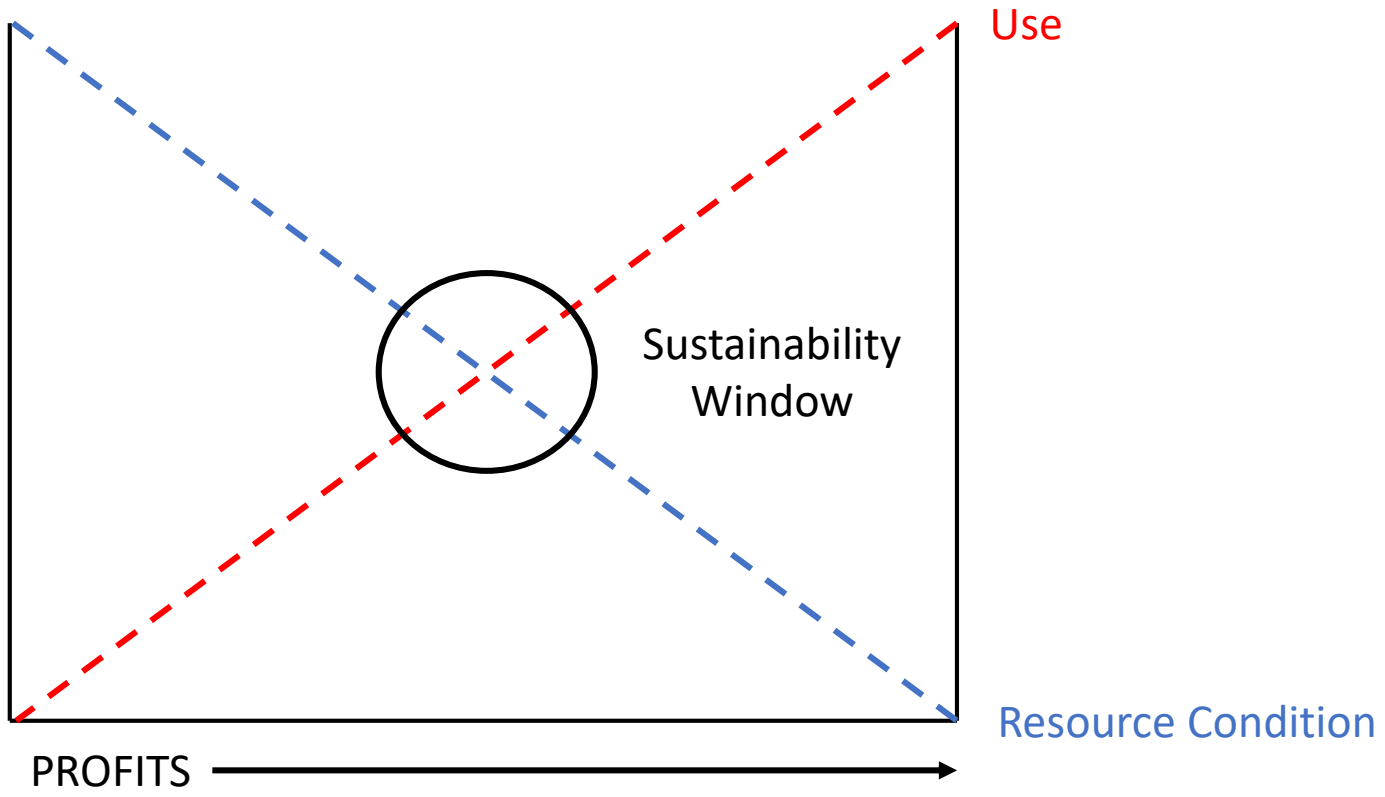
- Use of rangeland components in a sustainable manner.

Rangeland Components

- Vegetation – grasses, trees
- Soil – minerals, oil & gas
- Water

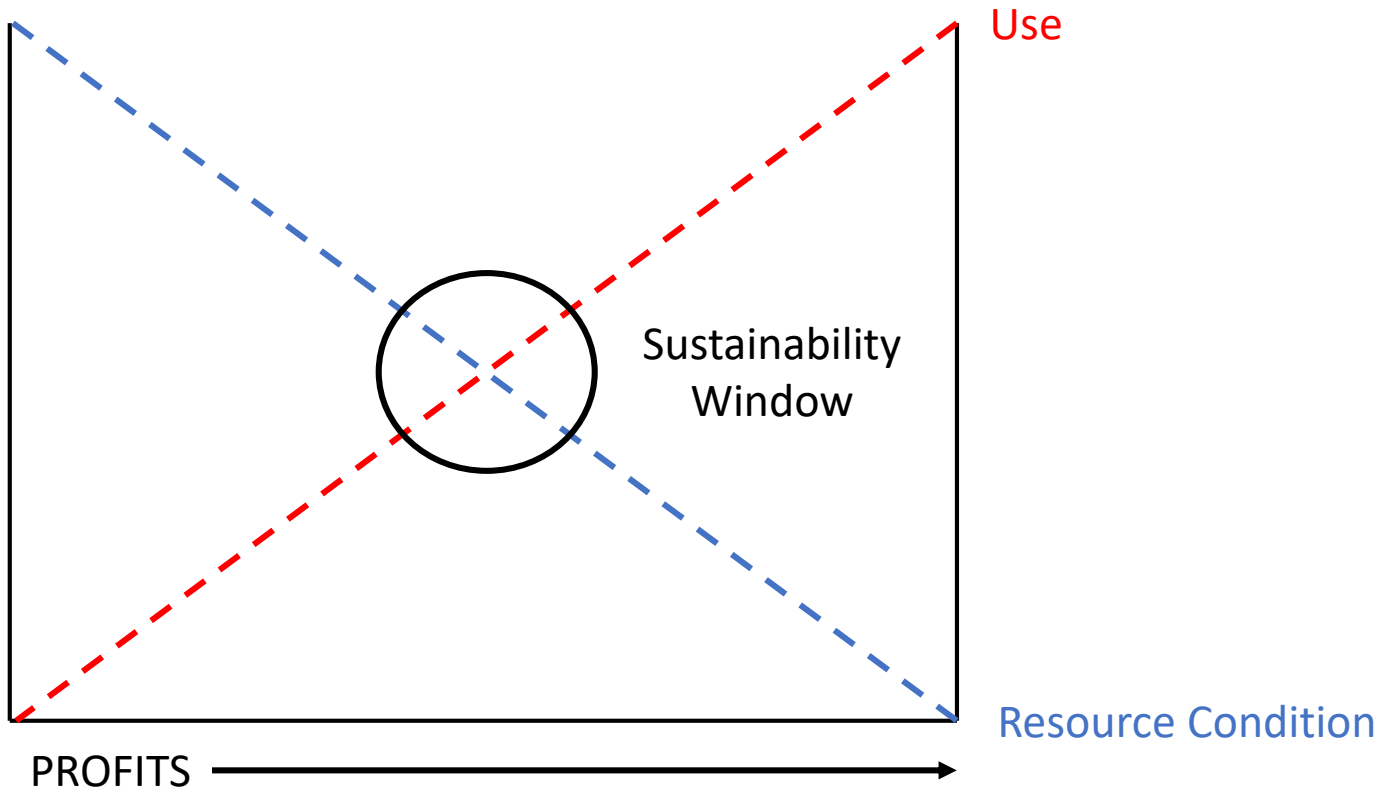
Sustainability

- Dependent upon objective and time



Sustainability

- Dependent upon objective and time



The key to <u>successful</u> rangeland grazing management is balancing use with available resources for future and continued use.

Success is subjective without a measurement

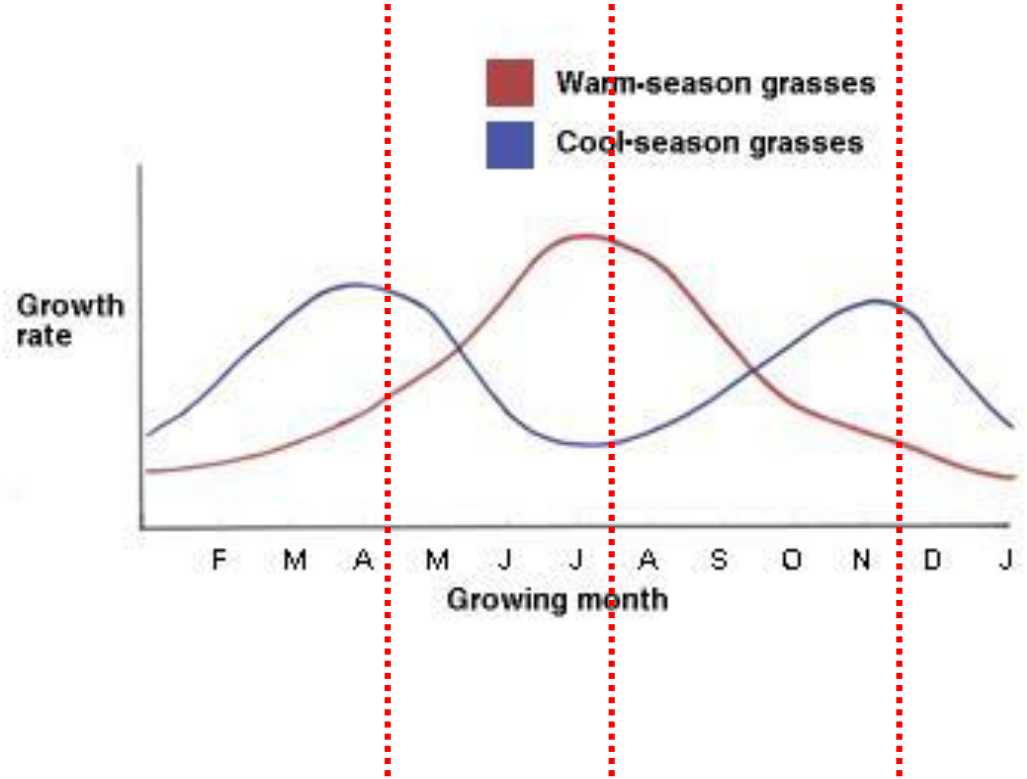
- HOW DO YOU MEASURE SUCCESSFUL RANGELAND MANAGEMENT??

Monitoring

- Timing
- Location
- Ocular Assessments
- Photos
- Biomass Availability
- Cover
- Species
- Species Height

When to monitor?

- Every area is unique!
  - Elevation
  - Forage types
  - Terrain/slopes
  - Precipitation
- In General: when target forage reaches maturity, take measurements



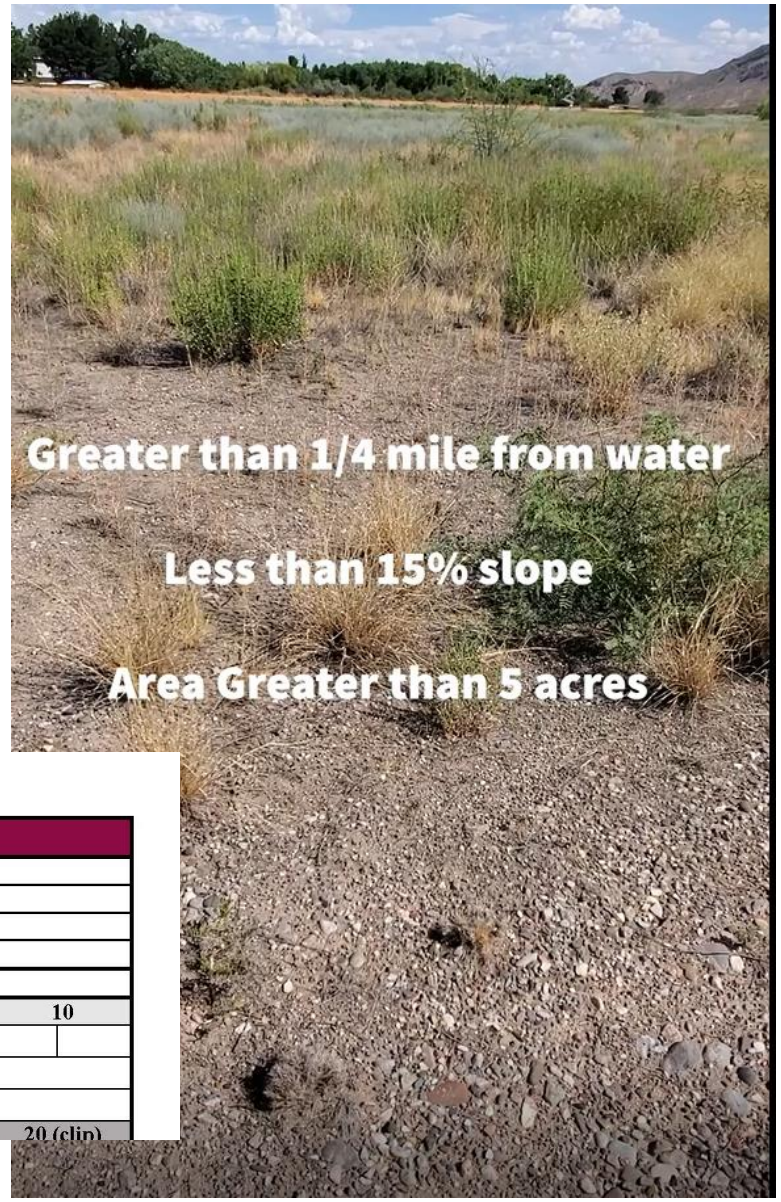
Sharpe and Rayburn, 2019

Where to monitor?

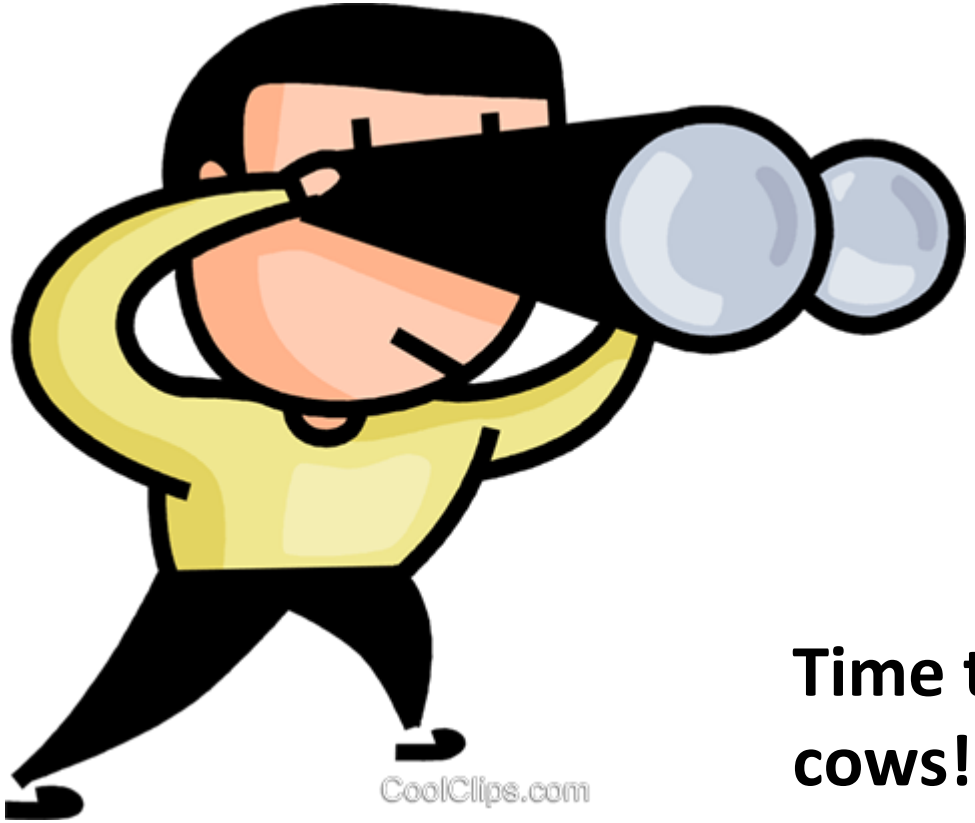
RaDAR – Data Worksheet

	Pasture Name
	Collector Name(s)
	GPS Coordinates
	Heading
	Measurements

4	5	6	7	8	9	10
14	15	16	17	18	19	20 (clip)



Ocular Estimation & Variability



Time to move the cows!! Or is it?

Ocular Estimation & Variability

- As actual cover declines, variability increases

- Drought decreases forage cover and increases variability from ocular estimation

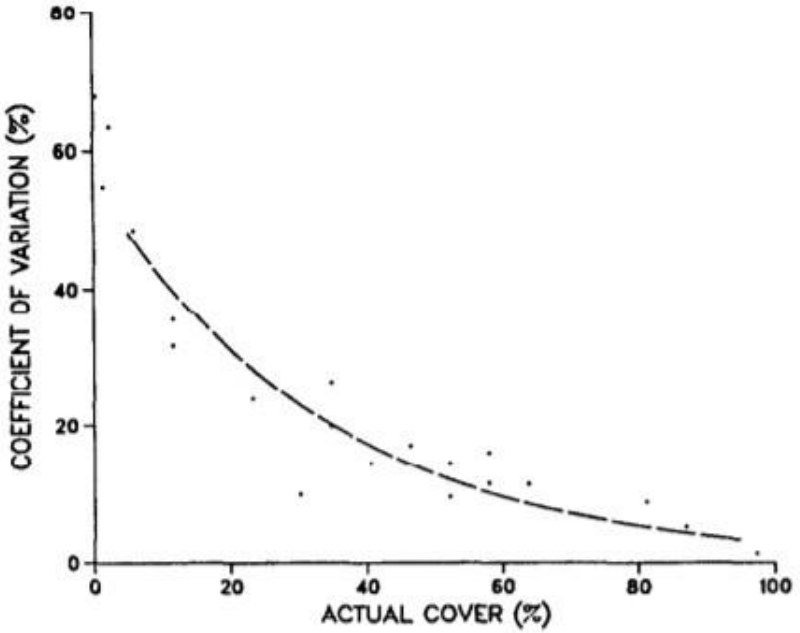
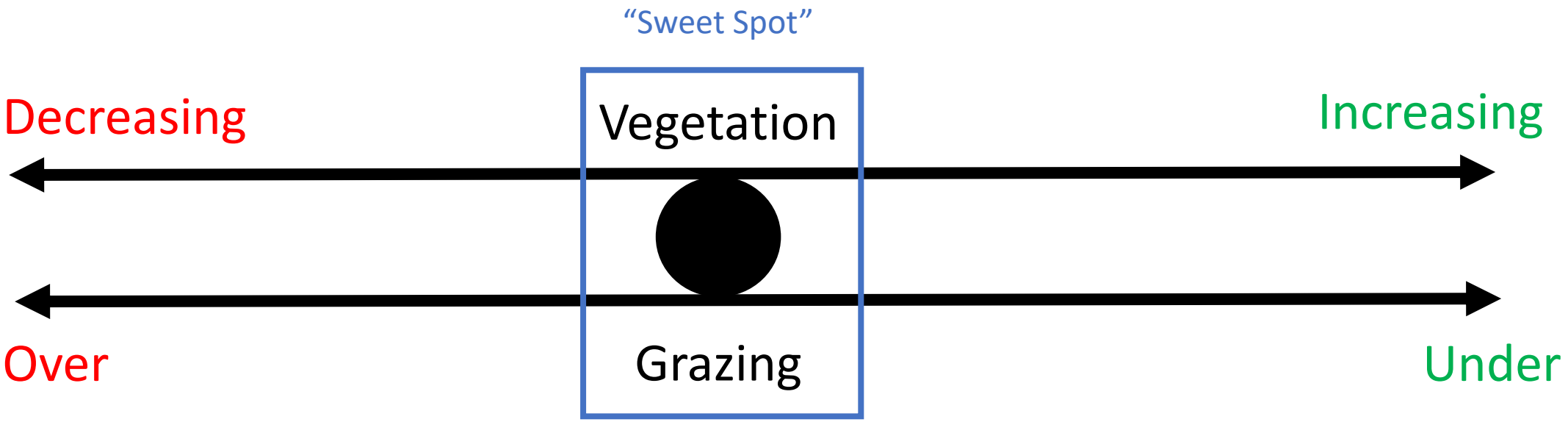


Fig. 1. *The relationship between the coefficient of variation for mean estimated cover and actual cover of a two-dimensional population of artificial paper images.*

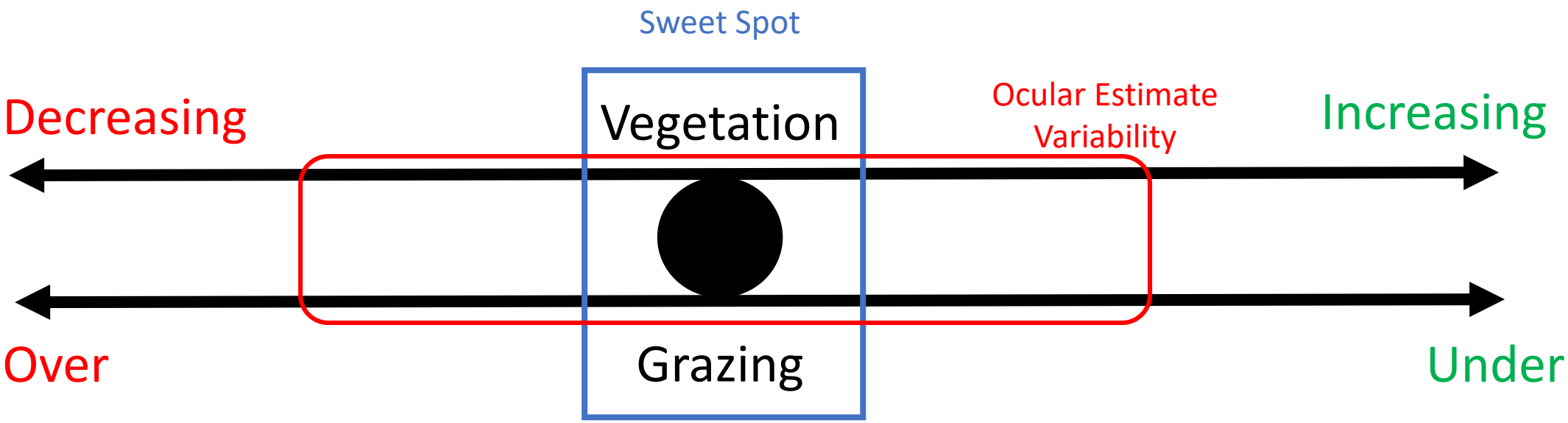
- Hatton et al., 1986. "Relationships of the error associated with ocular estimation and actual total cover."

The Vegetation-Grazing Relationship



BUT HOW DO YOU KNOW WHERE YOUR AT???

The Vegetation-Grazing Relationship



BUT: THE PRODUCER KNOWS HIS LANDS THE BEST!!!!

Photo-points

- Ruler
- Whiteboard
- Marker
- Camera

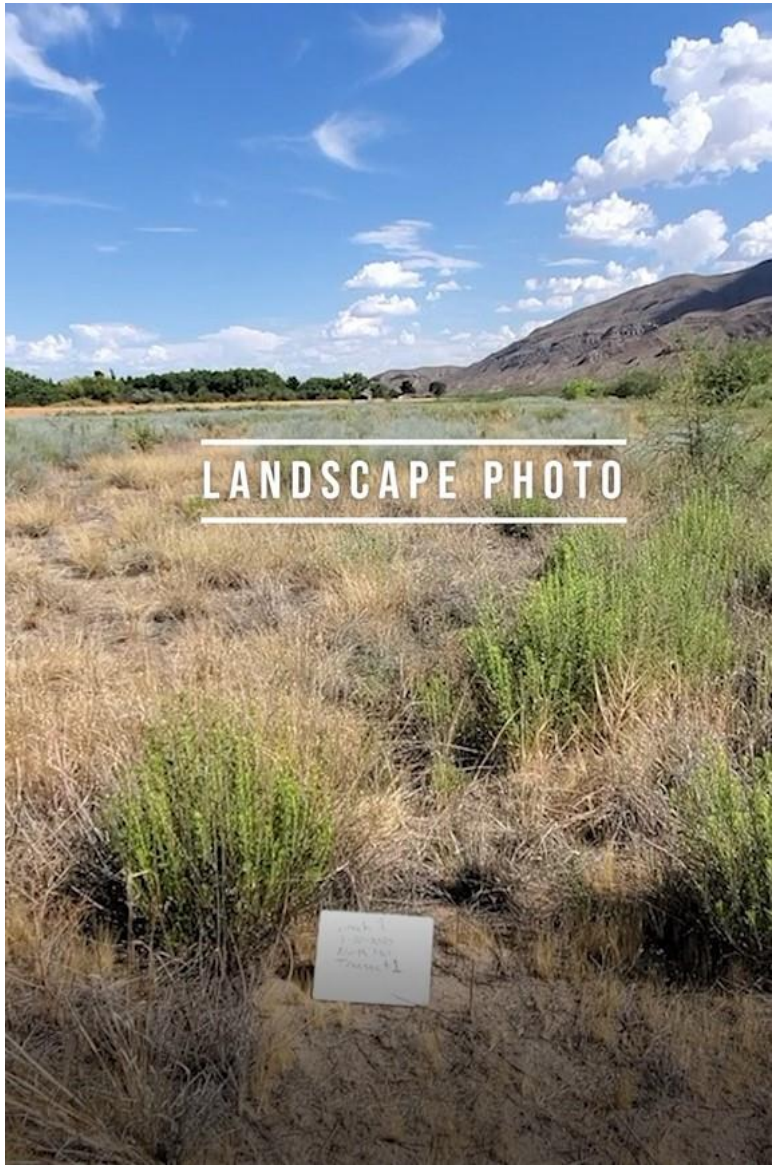
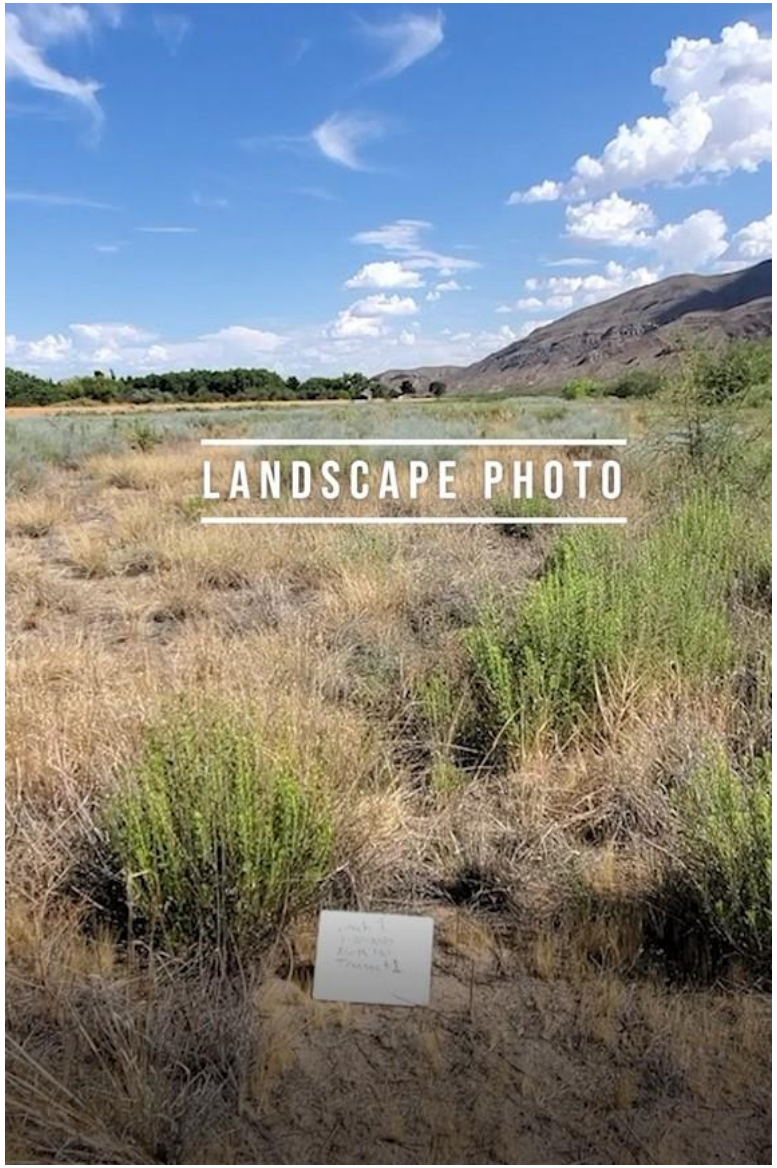


Photo-points

- Visual estimate of range conditions over time



Numerical Data is Critical to Support Non-numerical

RaDAR - Rangeland Data Analysis & Record

Producer Name:	Jo Rancher	**Pasture Name:**	North 40
Date:	12/20/2019	**Collector Names:**	Casey
Transect Number:	1	**GPS Coordinates:**	-112.83 N, 38.5 W (120°)

Notes: This is a test message for assessment of the rangeland condition and a monitoring record

Biomass Availability	Pasture Size	Stocking Rate
2000.0 ± 353.6 lbs/acre	2240 acres	188.8 acres/AUY

Cover %		Vegetation Cover Composition	
Bare Ground	17	Common Name	Percent
Litter	38	BOGR1	5
Vegetation	13	BOCU	3
Rock (>3/4")	23	Arist	2
	91	BLTR	1

Forage Composition

Common Name	Symbol	%	Avg. Height (inches)	Minimum Stubble Height Guidline
Blue Grama1	BOGR1	40	2.5	0.75
Threeawns	Arist	19	5.4	2.5
Sideoats Grama	BOCU	14	7.4	4
Little Bluestem	SCSC	5	13.0	4
Pine Dropseed	BLTR	4	6.5	4

Soil Moisture Depth	6 ± 1.4 inch(s)	Annual Forage Biomass	1400 ± 70 lbs per acre

Photos

Vegetation Amounts

- Clip
- Dry
- Weigh (grams)
- Convert (lbs/acre)

Utah State University Extension | electronic publishing

Calculating Available Forage

Mindy Pratt and G. Allen Rasmussen

Range Management Fact Sheet

May 2001 NR/RM/03

TABLE 5: Range Hoop and Square Conversions and Dimensions

0.96 ft² Plot:
Conversion Factor: Grams collected X 100 = pounds per acre
Radius = 0.55 feet
Circumference of Hoop = 3.5 ft
Dimensions of Square Plot = .98 ft x .98 ft

1.92 ft² Plot:
Conversion Factor: Grams collected X 50 = pounds per acre
Radius = 0.78 feet
Circumference of Hoop = 4.9 ft
Dimensions of Square Plot = 1.386 ft x 1.386 ft

2.40 ft² Plot:
Conversion Factor: Grams collected X 40 = pounds per acre
Radius = 0.87 feet
Circumference of Hoop = 5.5 ft
Dimensions of Square Plot = 1.55 ft x 1.55 ft

V.S.

Annual Production
-yearly potential
-yearly total

Current
Residual
Seasonal

Production
-point in time
-temporary

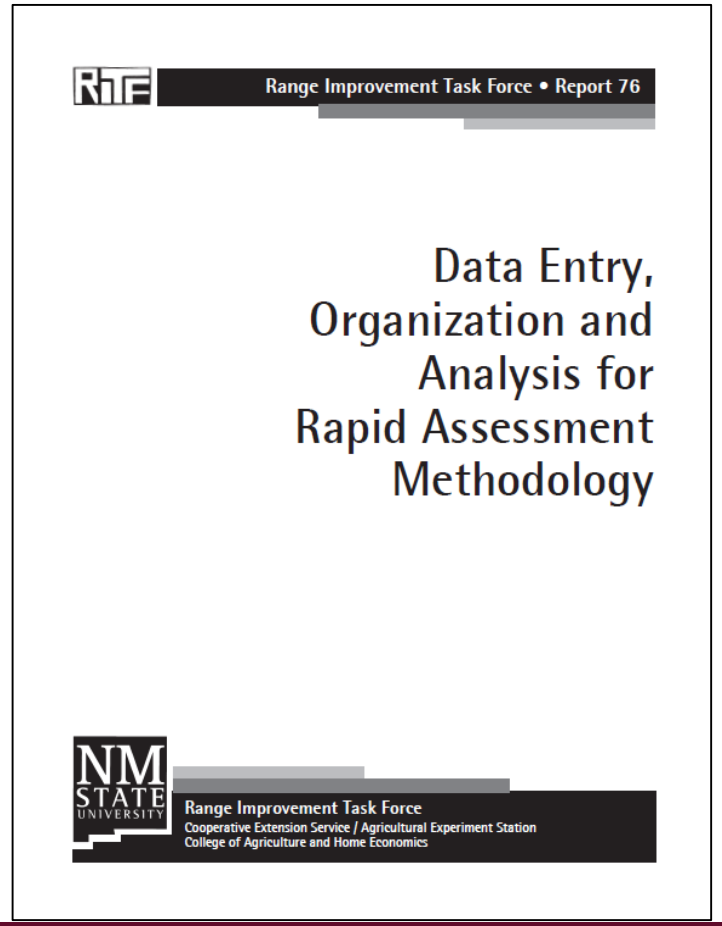
V.S.

Annual Production – Residual Production = **Utilization**

UTILIZATION

- Can be used for short-term assessment and management changes but should NOT be used as a sole source in management planning.
- Highly dependent upon stocking rate, timing of grazing, livestock distribution, and forage type (individual vs. diverse community), environmental fluctuations…
- Gives a relative estimate of “use” (i.e., 40%) but SHOULD include other measurements (stubble height, ground cover, species composition) to develop management plans/regulations.
- Compare with multiple years (trends) to estimate stocking rates (greater than 7 years)

Rapid Assessment Methodology (RAM)



RaDAR – Data Worksheet

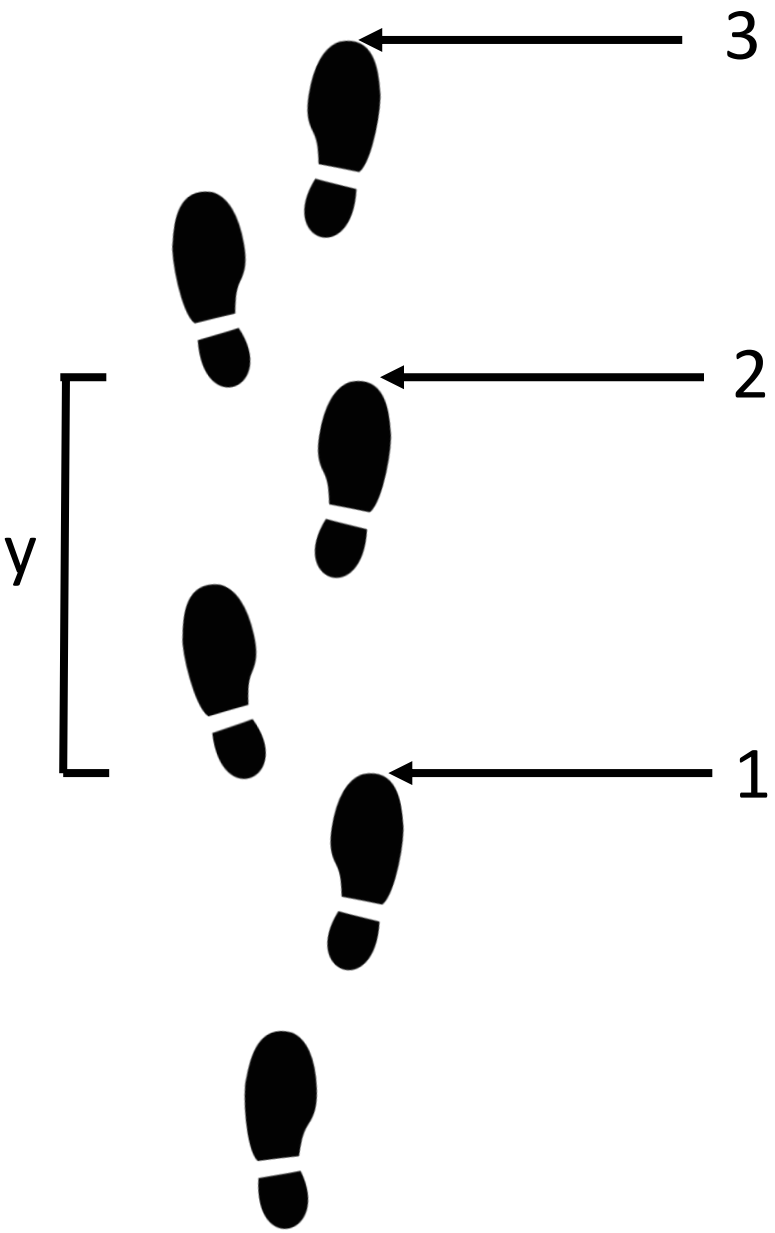
Producer Name	Pasture Name
Date	Collector Name(s)
Transect Number	GPS Coordinates
Pasture Size (acres)	Heading

Measurements

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20 (clip)
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40 (clip)
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60 (clip)
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80 (clip)
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100 (clip)

Dot Tally	Soil Moisture Depth (inches)		Comment or Notes
Horse	Biomass Availability (grams)		
Elk	Annual Forage Biomass (grams)		
Cattle	Inside of Cage		
Deer	Outside of Cage		
New Mexico State University – ACES - EASNR	Sampling Hoop Conversion Factor		

Step-point Transect



Ground Cover

Record on datasheet

- Vegetation = ‘V’
- Bare ground = ‘B’
- Rock = ‘R’
- Plant litter = ‘L’

Ground Cover

- **Used to determine soil stability and erosion potential**
  - as bare ground increases, erosion potential increases
  - litter is an indicator of soil organic matter
  - more vegetation cover the better

Composition

Height Classes of Common Species & Minimum Stubble Heights								
Extra Short (¾ inch)			**Short-Mid (2.5 inches)**			**Mid (4 inches)**		
BOGR1*	Blue Grama*	Bouteloua gracillis*	AGRC	Crested Wheatgrass	Agropyron cristatum	AGIN	Intermediate Wheatgrass	Agropyron intermedium
HIBE	Curly Mesquite	Hilaria belangeri	AGSM	Western Wheatgrass	Agropyron smithii	ARAR	Arizona Threeawn	Aristida arizonica
MUTO	Ring Muhly	Muhlenbergia torreyi	ARIST	Threeawns	Aristida	BLTR	Pine Dropseed	Blepharoneuron tricholepis
			ARPA	Wooton's Threeawn	Aristida pansa	BOCU	Sideoats Grama	Bouteloua curtipendula
			ARPU	Purple Threeawn	Aristida purpurea	BRIN	Smooth Brome	Bromus inermis
			BOER	Black Grama	Bouteloua eripoda	DAGL	Orchardgrass	Dactylis glomerata L.
Short (1.5 inches)			FEOV	Sheep Fescue	Festuca ovina L.	DAIN	Timber Oatgrass	Danthonia intermedia
BOAR	Needle Grama	Bouteloua aristoides	PLJA	Galleta	Pleuraphis jamesii	DAPA	Parry's Oatgrass	Danthonia parryi
BOGR	Blue Grama	Bouteloua gracillis	JUNCU	Rush	Juncus spp.	DECA	Tufted Hairgrass	Deschampsia caespitosa
BOHI	Hairy Grama	Bouteloua hirsuta	KOCR	Junegrass	Koeleria cristata	ELEL	Squirreltail	Elymus elmoides
BRTE	Cheatgrass	Bromus Tectorum	KOMA	Praire Junegrass	Koeleria macrantha	FEAR	Arizona Fescue	Festuca arizonica
CAREX	Sedge	Carex spp.	LYPH	Common Wolftail	Lycurus phleoides	FETH	Thurber's Fescue	Festuca thurberi
BOBA	Six-week Grama	Bouteloua barbata	MUMO	Mountain Muhly	Muhlenbergia montana	MUVE	Screwleaf Muhly	Muhlenbergia straminea
			MUHL	Muhly	Muhlenbergia spp.	ORHY	Indian Ricegrass	Oryzopsis hymenoides
			MUWR	Spike Muhly	Muhlenbergia wrightii	PHPR	Timothy	Phleum pratense
			POFE	Muttongrass	Poa fendleriana	SCSC	Little Bluestem	Schazachyrium scoparium
Tall (8 inches)			POPR	Kentucky Bluegrass	Poa pratensis	SPCR	Sand Dropseed	Sporobolus cryptandurs
ANDRO	Bluestem	Andropogon spp.	PLMU	Tobosa	Pleuraphis mutica	STIPA	Needlegrass	Stipa spp.

* Bouteloua gracillis is placed in extra short when in sod form, and short when in bunchgrass form

Composition

- **Species composition as a percentage of vegetation cover**
  - Certain species are more palatable to livestock (more desirable for grazing)
  - Certain species are more drought tolerant
  - Certain species can be indicators of range health

Stubble Height

- If cover is not ‘V’, go to nearest grass
- Extend last leaf and measure to the tip (not flower head)
- Record height in inches

Stubble Height

- Estimates extent of use (grazed vs. ungrazed)
- Threshold of species survivability (growing points)

What's the Time and Money Commitment?

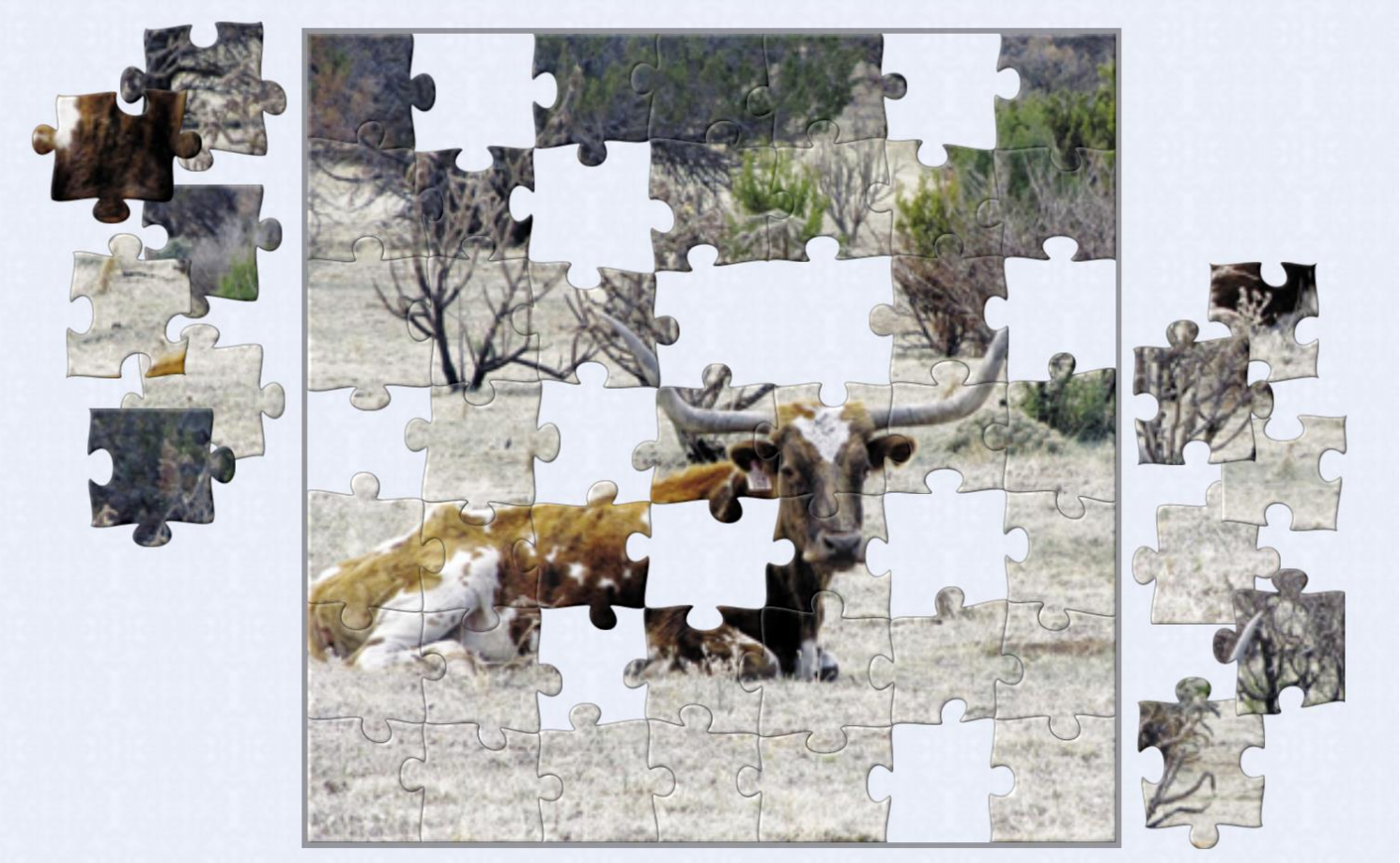
- 30 – 60 minutes to complete and record one transect using RAM
- Rangeland Data Assessment and Records (RaDAR) automatically tabulates a record as you enter the RAM data
  - Approximately 30 minutes to enter one datasheet
- Plan to spend $50 – $450 per monitoring kit
  - Depends on what you plan to measure
  - Quality of supplies (i.e., garmin gps unit $200+, pesola scale $75+)

- **TOTAL: 90 min per transect and a $150 kit**
- **How much does your yearly insurance policy cost?**

NO SINGLE MONITORING METHOD WILL GIVE YOU AN ANSWER!

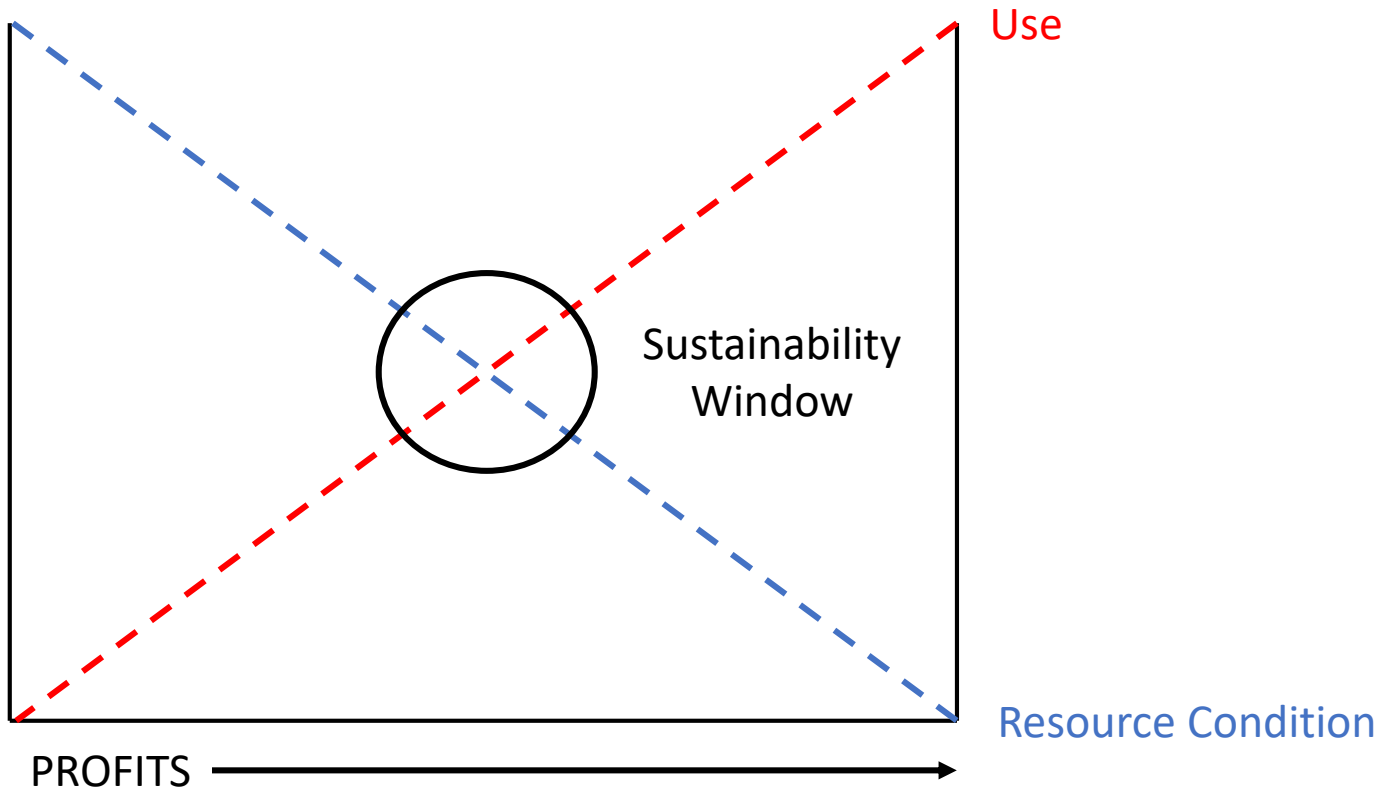
- It is the combination of all the information (i.e., biomass, stubble height, photopoints, etc…) that will give an estimate if the range is ready for **‘return to grazing’**

- Multiple years of data will give a better picture than a single year



Sustainability

- Not all aspects of monitoring need to be assessed
- Start small (two minimum) and build your monitoring program



The key to <u>successful</u> rangeland grazing management is balancing use with available resources for future and continued use.

QUESTIONS

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