

Layout and Design of Grazing Systems

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Components of the Grazing System

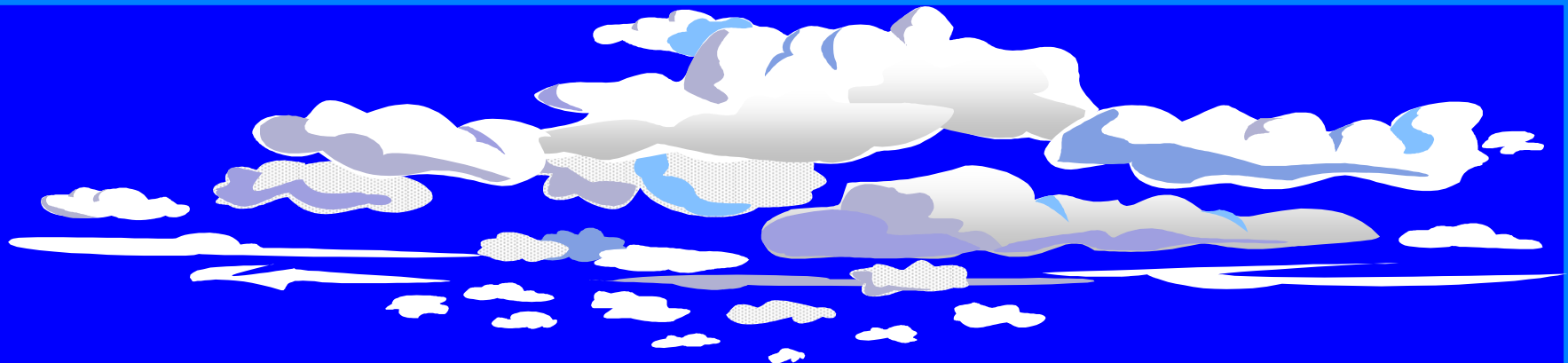
- Landscape
- Forage
- Livestock
- Water
- Fence



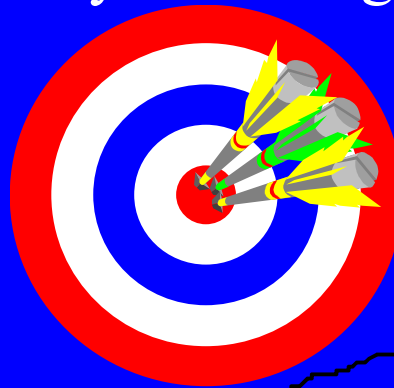
Flexibility

The ability to adapt or modify, being responsive to changing conditions

Grazing management strategies must be flexible



Remember, we're always shooting at a moving target!



Layout and Design Guidelines

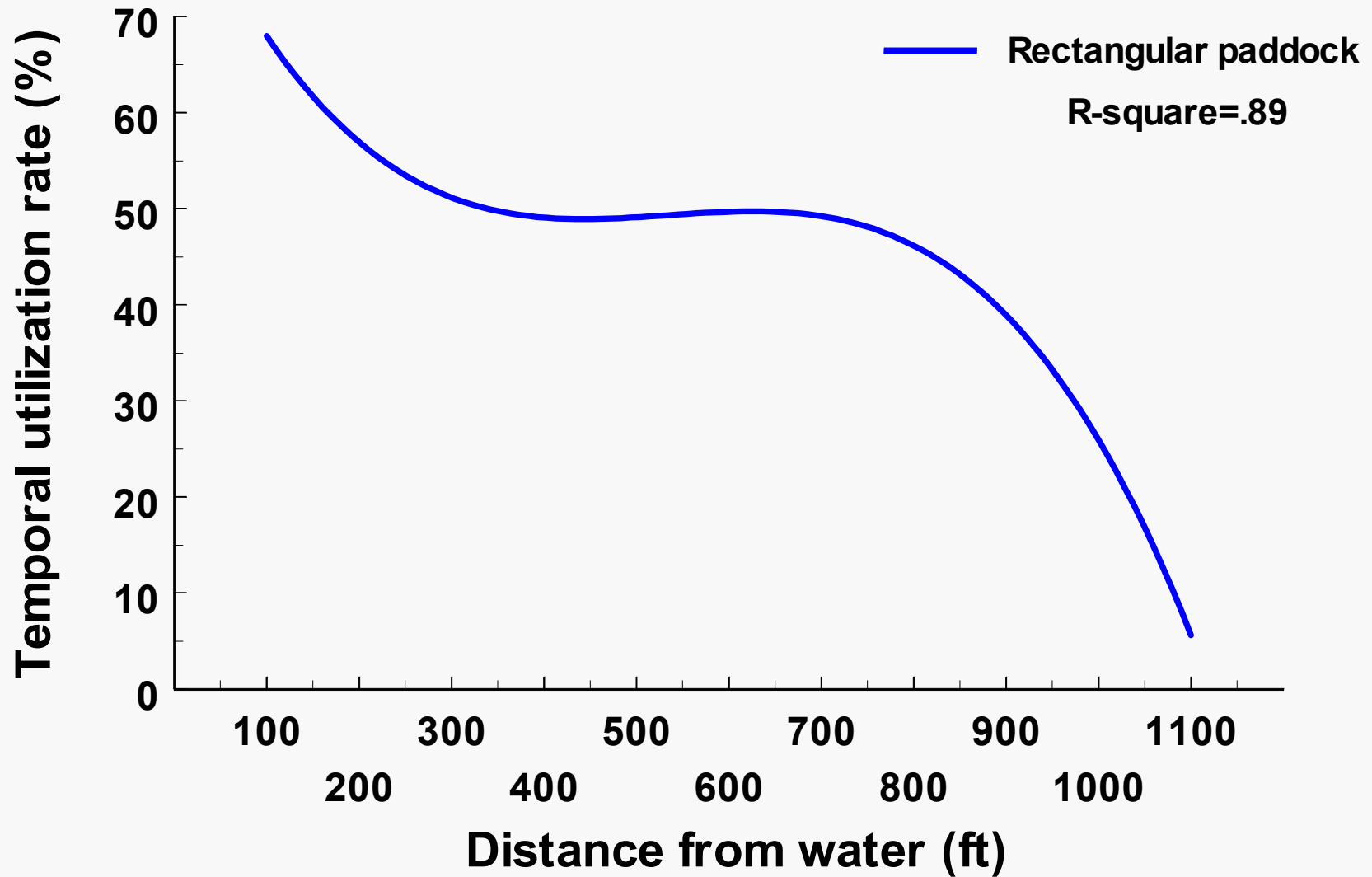
- Keep livestock within 800 feet of water

Layout and Design Guidelines (cont.)

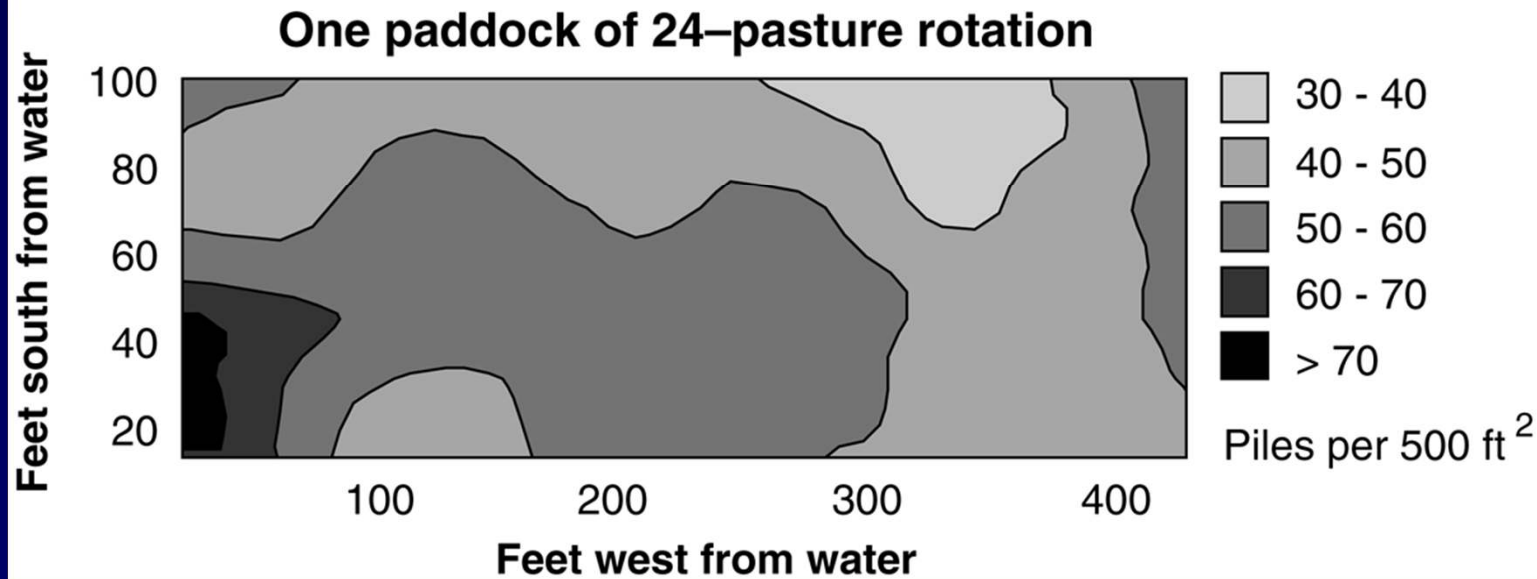
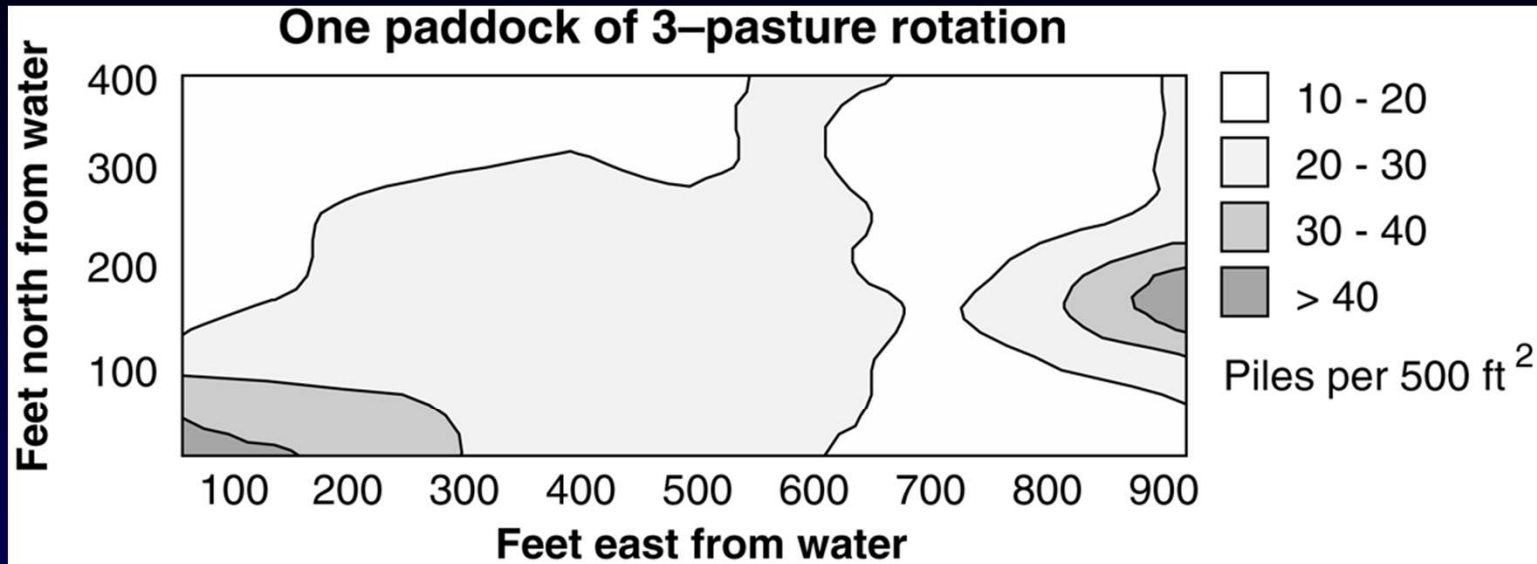
- Keep livestock within 800 feet of water
 - Improved grazing distribution
 - More uniform manure distribution
 - Increased water consumption



Figure 1. Impact of distance from water on temporal utilization rate in rectangular 10 acre paddocks.



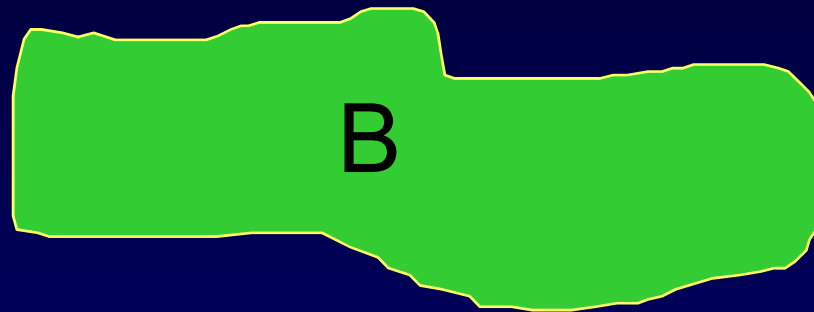
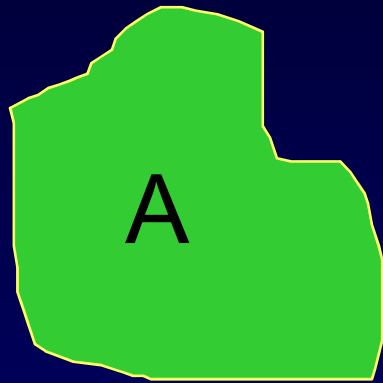
Manure Distribution



Layout and Design Guidelines (cont.)

- Keep livestock within 800 feet of water
- Make paddocks as near to square as possible

What is More Nearly Square?



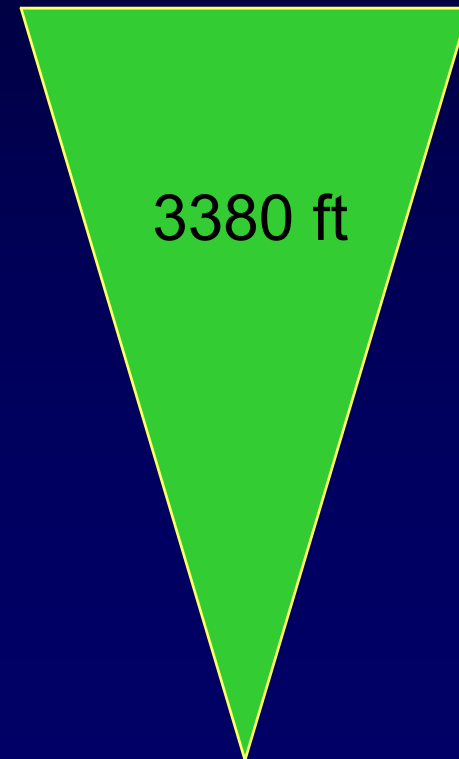
Paddock "A" is more nearly square than Paddock "B"

Layout and Design Guidelines (cont.)

- Make paddocks as near to square as possible
 - Less fence required

Square Paddocks Require Less Fence

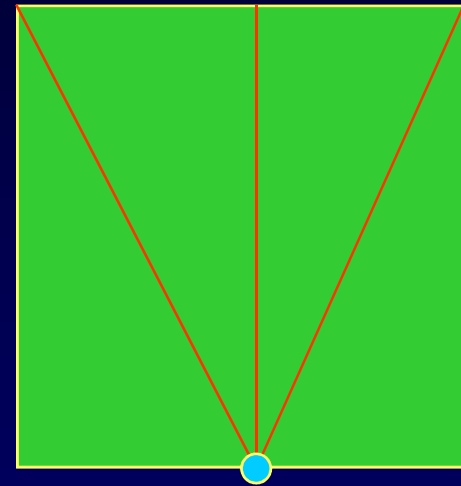
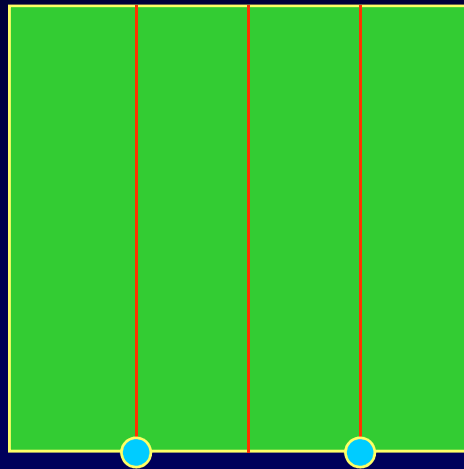
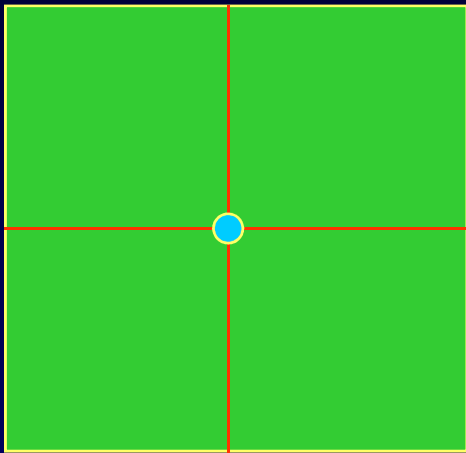
Each paddock is 10 acres !



Layout and Design Guidelines (cont.)

- Make paddocks as near to square as possible
 - Less fence required
 - Livestock are usually closer to water

Livestock will usually be closer to water in a square paddock

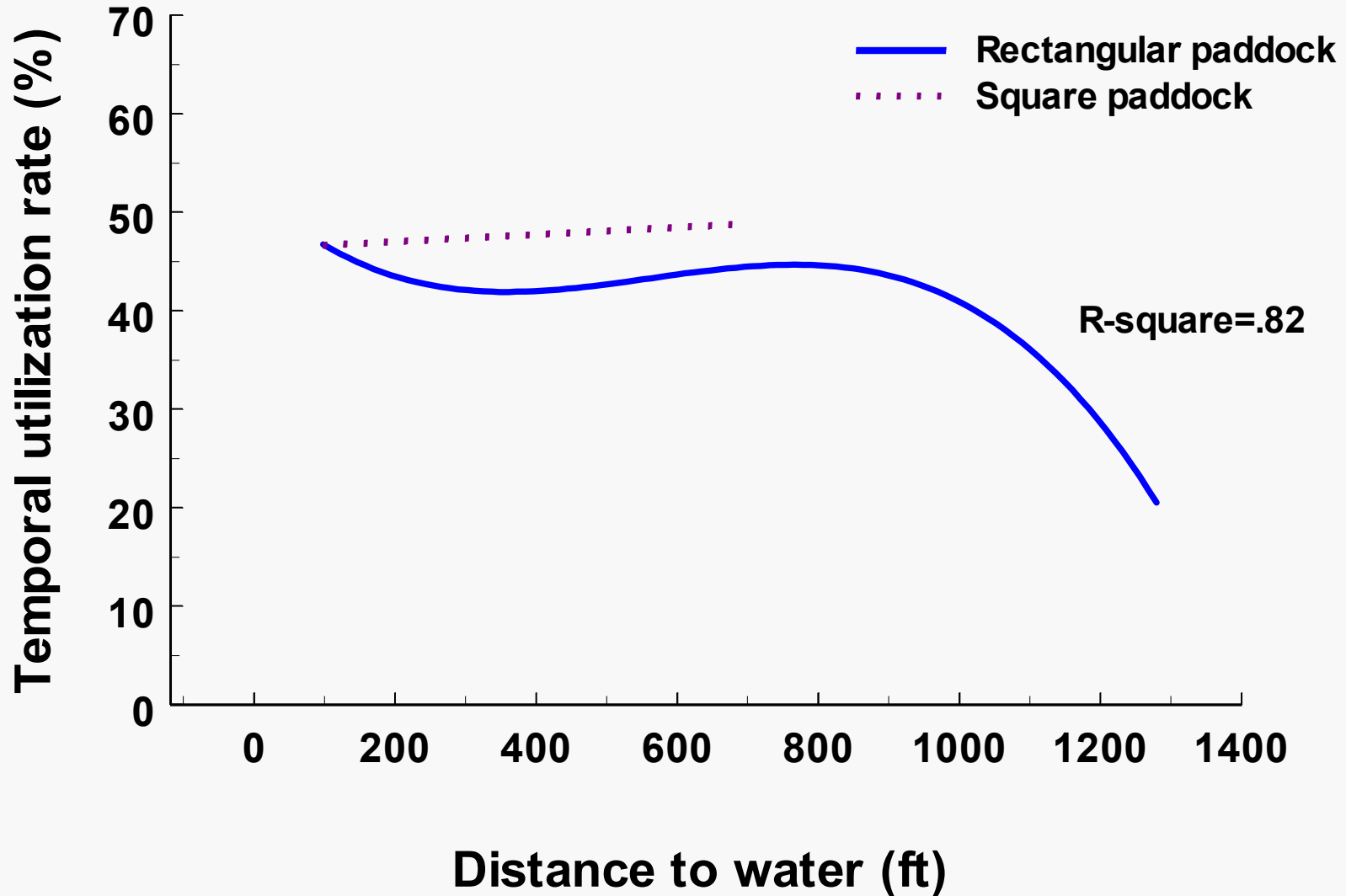


Three options for dividing a 40 acre pasture

Layout and Design Guidelines (cont.)

- Make paddocks as near to square as possible
 - Less fence required
 - Livestock are usually closer to water
 - More uniform grazing distribution

Figure 2. Impact of distance from water on temporal utilization rate in square and rectangular 10 acre paddocks.



Layout and Design Guidelines (cont.)

- Keep livestock within 800 feet of water
- Make paddocks as near to square as possible
- Follow landscape lines for paddock boundaries

Layout and Design Guidelines (cont.)

- Follow landscape lines for paddock boundaries
 - Soil type and drainage
 - Topography
 - Plant community
 - Plant growth rates

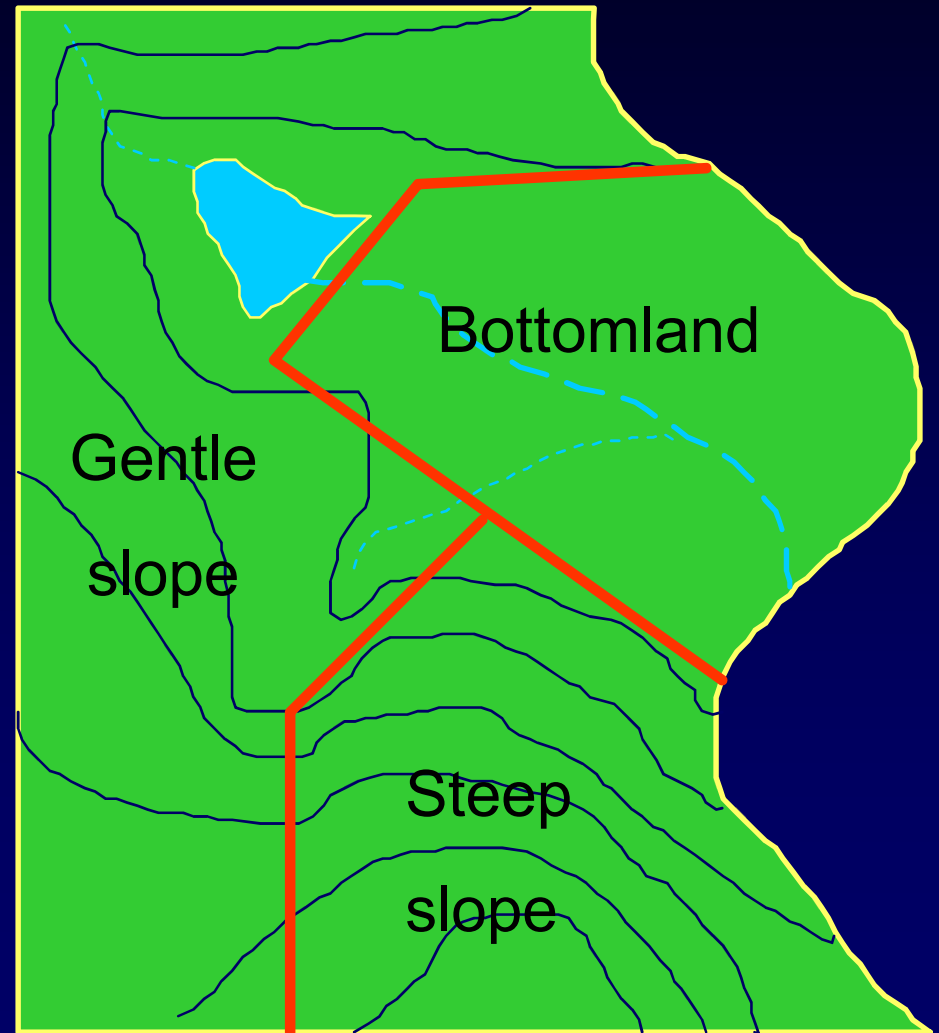
Grazing System Design

Make primary subdivisions along contour lines or major soil changes



Grazing System Design (cont.)

Make primary subdivisions along contour lines or major soil changes



Layout and Design Guidelines

- Keep livestock within 800 feet of water
- Make paddocks as near to square as possible
- Follow landscape lines for paddock boundaries
- Make paddocks of similar grazing capacity

Layout and Design Guidelines (cont.)

- Make paddocks of similar grazing capacity
 - Keep diet(availability) more consistent
 - Ease of rotation management
 - Can maintain desired rest period regardless of order pastures are grazed

Layout and Design Guidelines (cont.)

- Keep livestock within 800 feet of water
- Make paddocks as near to square as possible
- Follow landscape lines for paddock boundaries
- Make paddocks of similar grazing capacity
- Plan lanes for livestock movement only



Layout and Design Guidelines (cont.)

- Plan lanes for livestock movement only
 - Most erosion begins with vehicle traffic
 - 15 - 20% of manure deposited in lane
 - 15% higher water consumption if water available in paddock
 - Ease of livestock movement reduces stress on livestock and you
 - If it becomes too unhandy or hard to move livestock you quit or do what's easy not necessarily graze what needs to be grazed next

Animal Movement

Goals

- Move livestock from any paddock to any other paddock without going through a third paddock
- Move animals from any paddock to working facilities without going through another paddock

Layout and Design Guidelines (cont.)

- Keep livestock within 800 feet of water
- Make paddocks as near to square as possible
- Follow landscape lines for paddock boundaries
- Make paddocks of similar grazing capacity
- Plan lanes for livestock movement only
- Provide secure training facilities

Layout and Design Guidelines (cont.)

- Provide secure training facilities
 - When exposing new animals to electric fencing they must be trained to respect psychological barriers
 - Area must be a physical barrier
 - Crowd animals within physical barrier with electric fencing
 - Goal is to get as many animals educated (shocked) in as short of time as possible
 - Make 1st experience a memorable one

Layout and Design Guidelines (cont.)

- Keep livestock within 800 feet of water
- Make paddocks as near to square as possible
- Follow landscape lines for paddock boundaries
- Make paddocks of similar grazing capacity
- Plan lanes for livestock movement only
- Provide secure training facilities
- Plan for adverse weather conditions

Layout and Design Guidelines (cont'd)

- Plan for adverse weather conditions
 - Sacrifice paddock for extremely wet conditions and during drought
 - Shelter from extreme cold/wet conditions
 - Shade – during extreme heat

Do livestock need shade?

- It depends!
 - Are cattle grazing endophyte infected fescue?
 - Is the heat index over 100?
 - Have the cattle been selected for short hair coats and heat tolerance?
 - Is plenty of good quality water present?
 - What is the overall condition of the animals?

Shade – good and bad

- Cattle tend to congregate under shade even when they don't need it
 - Time spent under shade reduces time spent grazing
 - Less grazing time results in less intake and reduced performance
 - Manure concentration vs. distribution
- Shade is probably needed to help reduce heat stress any time the heat index is 100 or above
 - Especially if livestock are grazing endophyte infected fescue

Effects of endophyte and shade

Cow/calf – MU Southwest Center 2000

	E+S-	E+S+	E-S-	E-S+
Cows				
ADG	-0.45	0.27	0.61	0.48
Δ BCS	-0.5	-0.1	0.1	0.1
Δ HS	0.3	-0.1	-0.5	-0.3
%Preg	37.5	87.5	62.5	87.5
Calves				
ADG	1.70	1.87	1.99	2.13

Effects of endophyte and shade

Cow/calf – MU Southwest Center 2000

- Cows were bred AI/cleanup bull prior to study
- Preg check at start of study confirmed 85-90% bred at the start of study
- Evidently heat stress with no shade caused cows to slip calves
- Studies elsewhere have shown heat stress with no shade reduced bull fertility/cow cycling.

Effects of endophyte and shade

Steers – MU Southwest Center 2001

	E+S-	E+S+	E-S-	E-S+
ADG	1.13	1.46	1.46	1.53
Δ HS	-0.2	-0.3	-0.1	-0.9

Layout and Design Guidelines (cont'd)

- Providing Shade

- Shade can be portable, natural shade within the paddocks, or shaded areas to move livestock to.
 - Portable shade must be moved often to prevent nutrient displacement and maintain good ground cover
 - Some producers successfully graze shady paddocks during the day and move to paddocks with no shade at night

Providing Shade - portable



How many paddocks do I need?

• *It depends...*

■ *length of grazing period desired*

– *producer goals, livestock performance*

■ *length of rest period needed*

– *based on plant needs, changes seasonally*

● *Paddock number = $\frac{\text{rest period needs}}{\text{grazing period}} + 1$*

Grazing period Needs

- Plant based:

- 2 - 5 days fast grow
- 5 - 9 days moderate
- 9 - 12 slow growth

- Animal performance:

- .5 - 1 day dairy cows
- 1 - 2 days
growing/fattening
- 2 - 4 days lactating
beef cattle, sheep,
goats, horses
- 4 - 7 days dry
animals

Matching forage and livestock resources

- Economic potential of grazing enterprises
 - Pasture-based dairy
 - Dairy replacements
 - Beef stockers
 - Sheep and goats, Cow-calf,
Horses

Paddock #'s



Rest period needs

- Rest period needs:
 - 15 - 20 days during rapid growth
 - 20 - 30 days during moderate growth
 - 30 - 40 days during slow growth
 - 40 - 60 days very slow growth

How many paddocks do I need?

- Paddock Number = $\frac{\text{rest period}}{\text{grazing period}} + 1$

- Ex:

$$\frac{20 \text{ day rest period - spring}}{3 \text{ day grazing period}} + 1 = 8$$

$$\frac{40 \text{ day rest period - summer}}{3 \text{ day grazing period}} + 1 = 14$$

How many paddocks do I need?

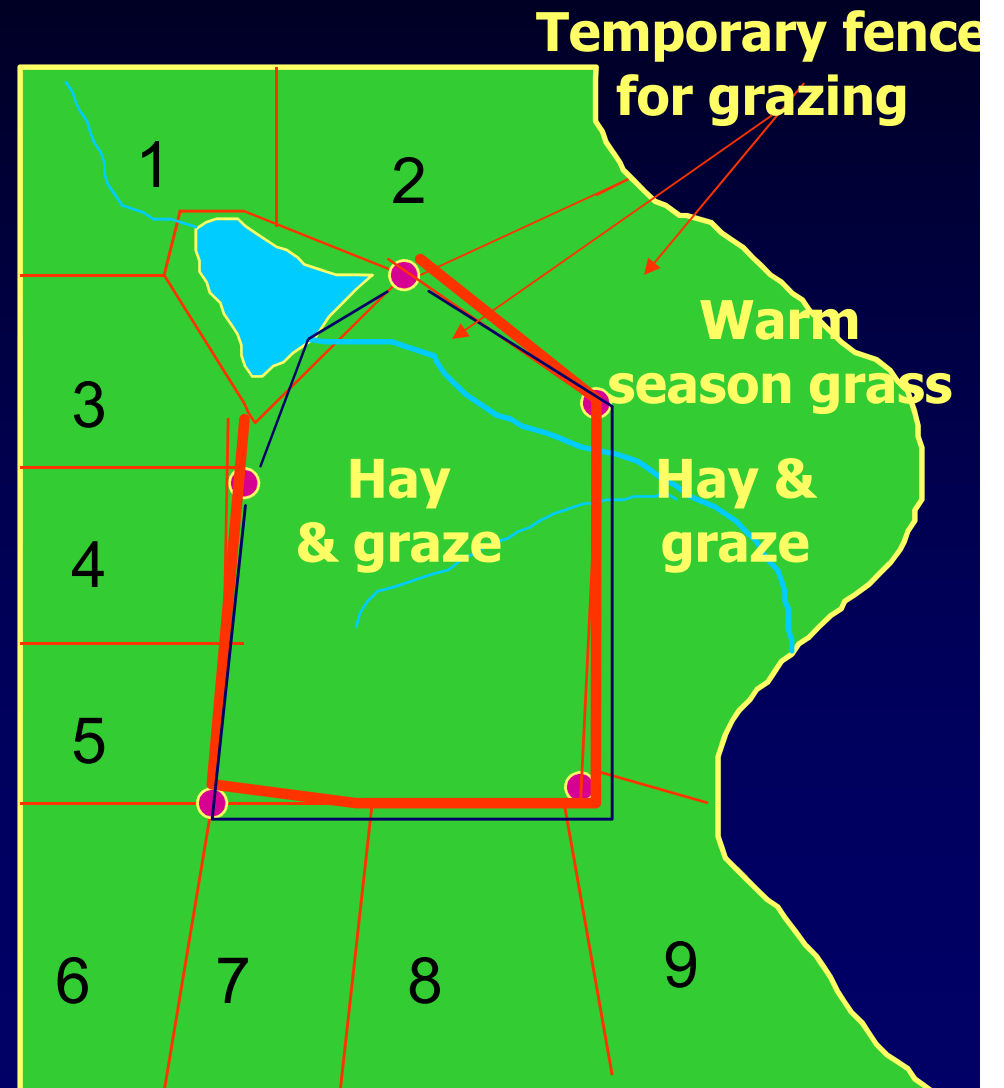
- Or:

$$\frac{40 \text{ day rest period}}{5 \text{ day grazing period}} + 1 = 9$$

- *You either have to have flexible paddock numbers or flexible grazing periods...they both can't be static!*

Fixed/Flexible System Design

- 9 paddock fixed system
- Flexible paddock numbers in hayfields and/or warm season grass
- Water available in every paddock
- Alleyway for ease of livestock movement
- Very flexible, workable system



Optimum Paddock #'s based on Livestock Type (Rule of Thumb for 15 – 45 days rest)

Livestock type	Grazing Period (Days)	Paddock #
Dairy & Beef finishing	0.5 – 1	20 - 90
Dairy Heifer & Beef Stockers	1 - 2	15 - 45
Cow/calf, Sheep, Goats, Horses	2 - 5	8 - 16

Grazing System Design

- 2 types of systems
 - Fixed system
 - Uses permanent fence and watering points
 - Flexible system
 - Uses portable fence and water facilities in a framework of permanent fence

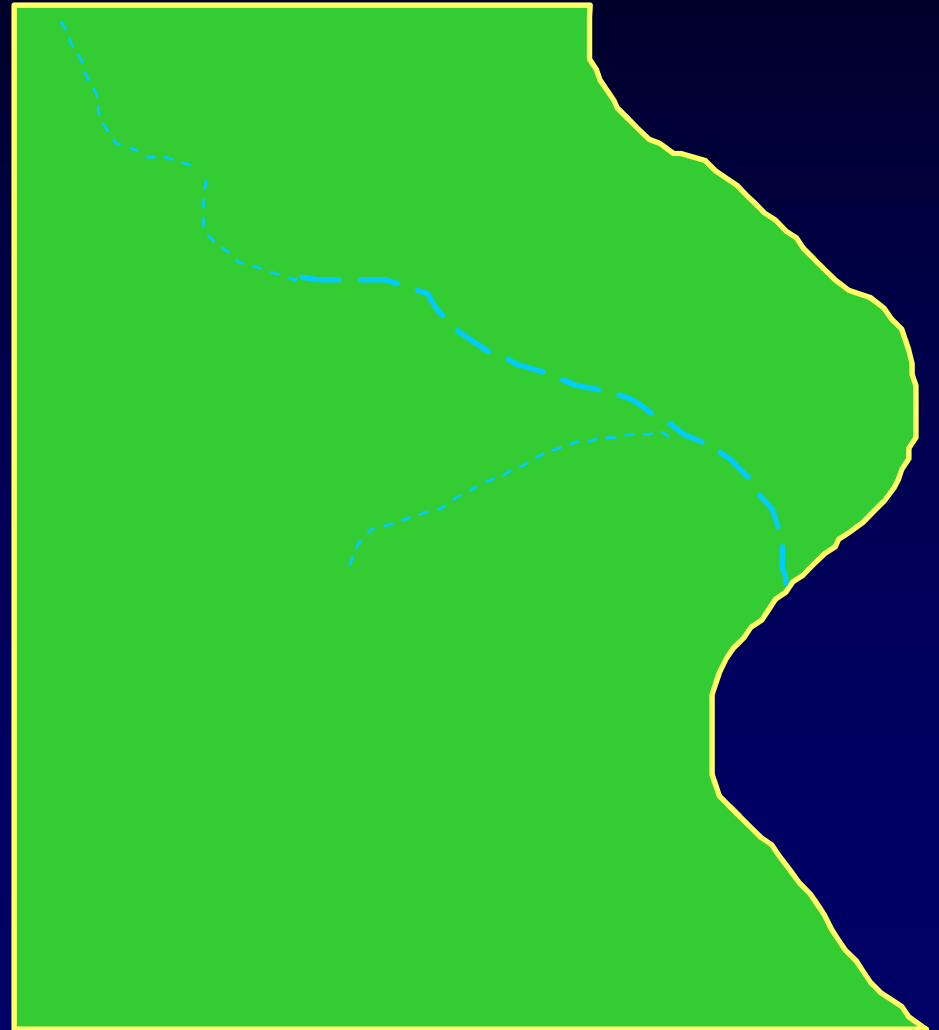
Grazing System Design

- 140 acre pasture



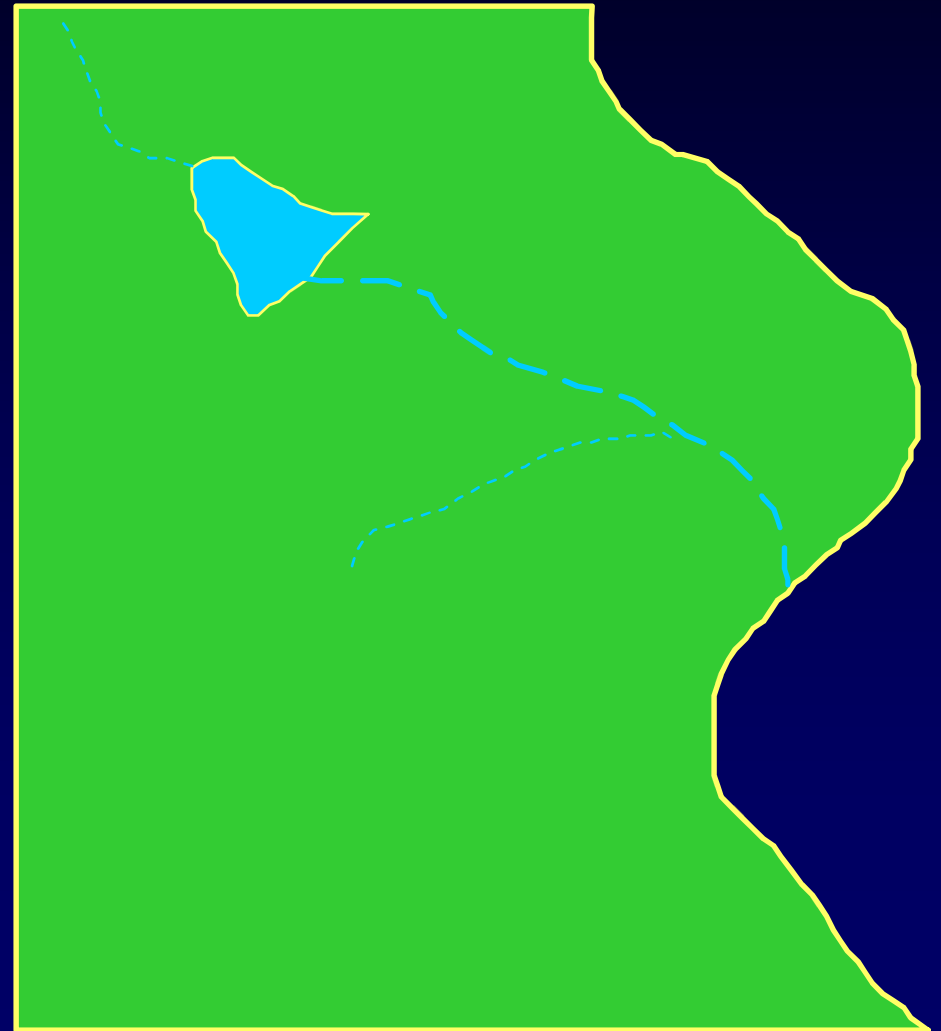
Grazing System Design (cont.)

- 140 acre pasture
- Intermittent streams



Grazing System Design (cont.)

- 140 acre pasture
- Intermittent streams
- One water source



Grazing System Design (cont.)

- 140 acre pasture
- Intermittent streams
- One water source
- Variable landscape



Grazing System Design (cont.)

- 140 acre pasture
- Intermittent streams
- One water source
- Variable landscape
- 2,000 ft maximum travel distance to water

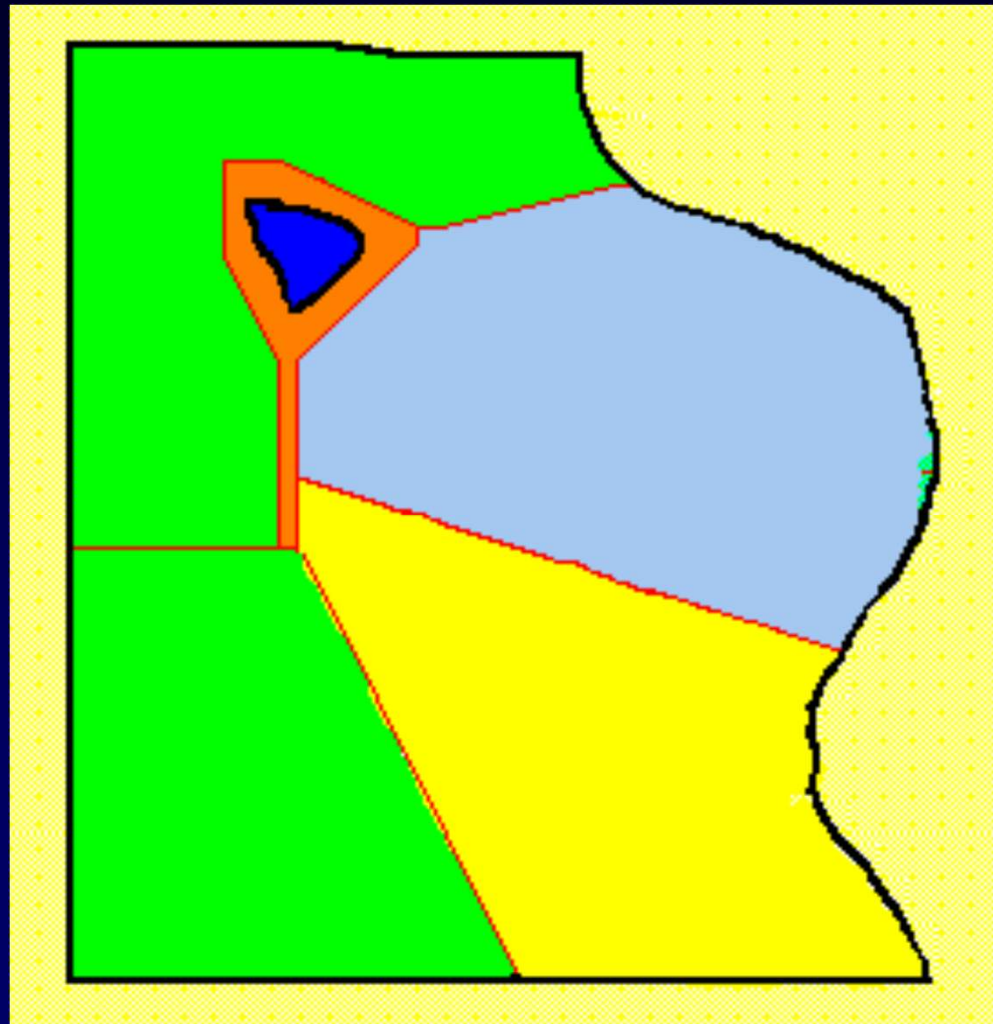


Grazing System Design (cont.)

- Fixed system
 - Uses permanent fence and watering points



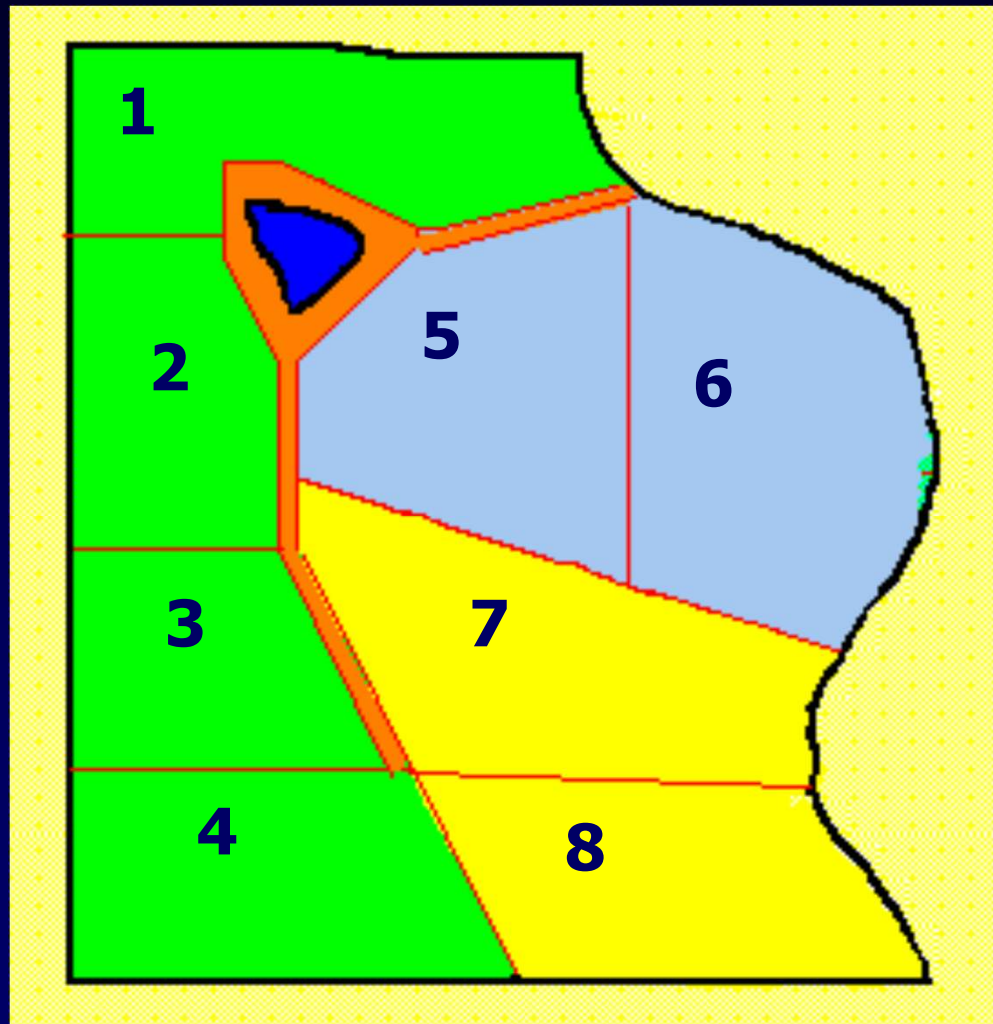
Guidelines for Grazing System Design



The starting point for planned grazing management

Can manage each field according to needs:
fertility
plant species
growth/rest

Guidelines for Grazing System Design

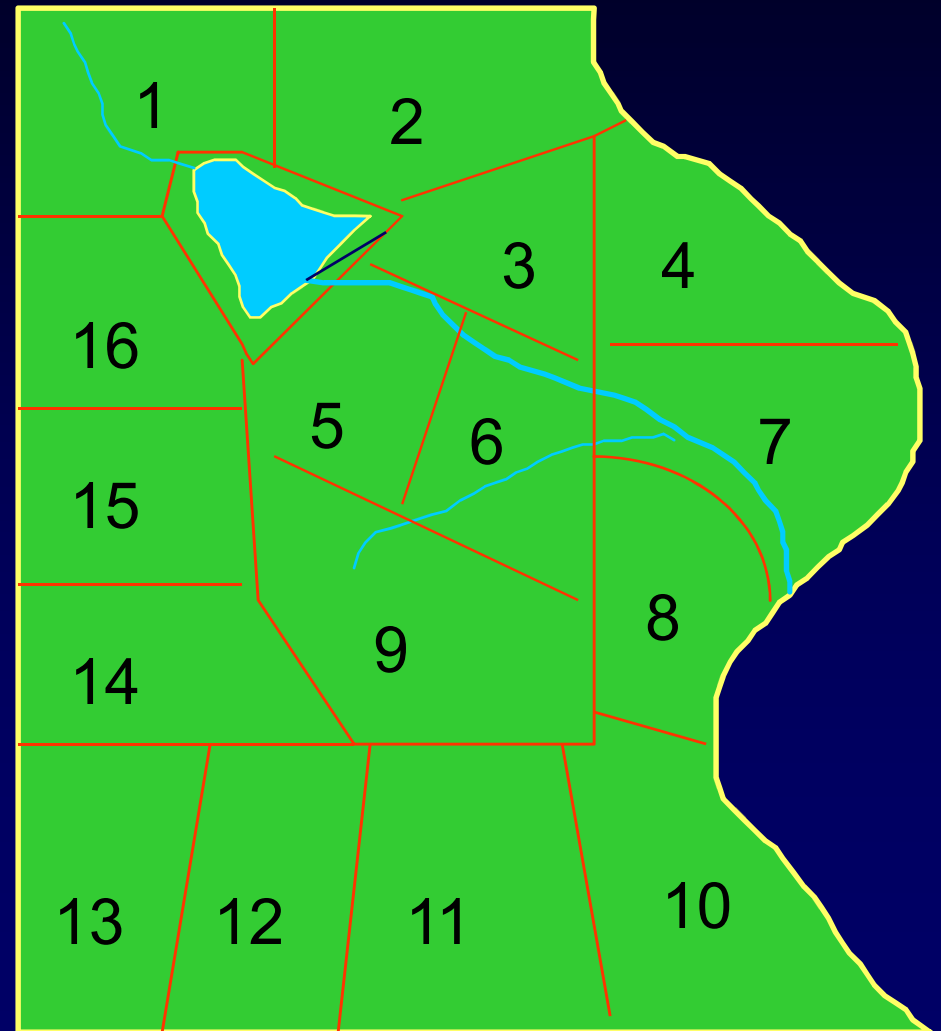


The beginning
of management
intensive
grazing

Can you
identify
potential
problems?

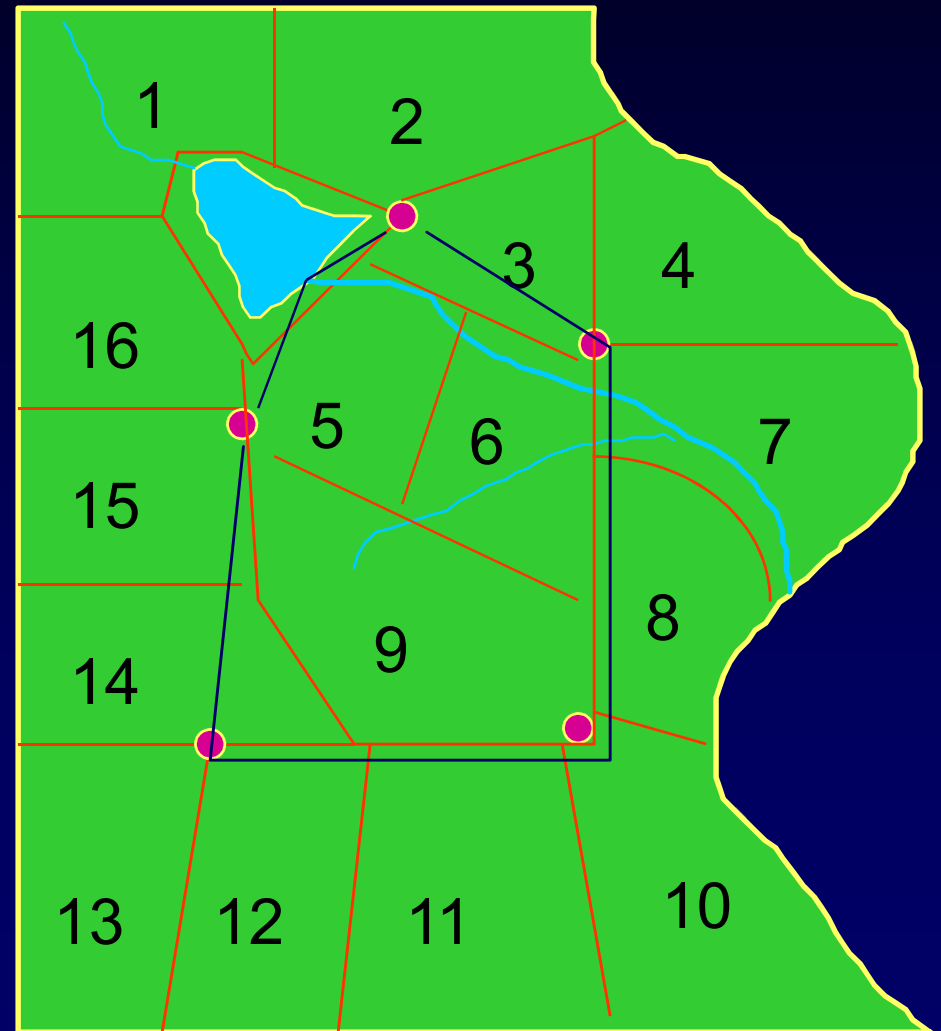
Fixed System Design

- 16 paddock system



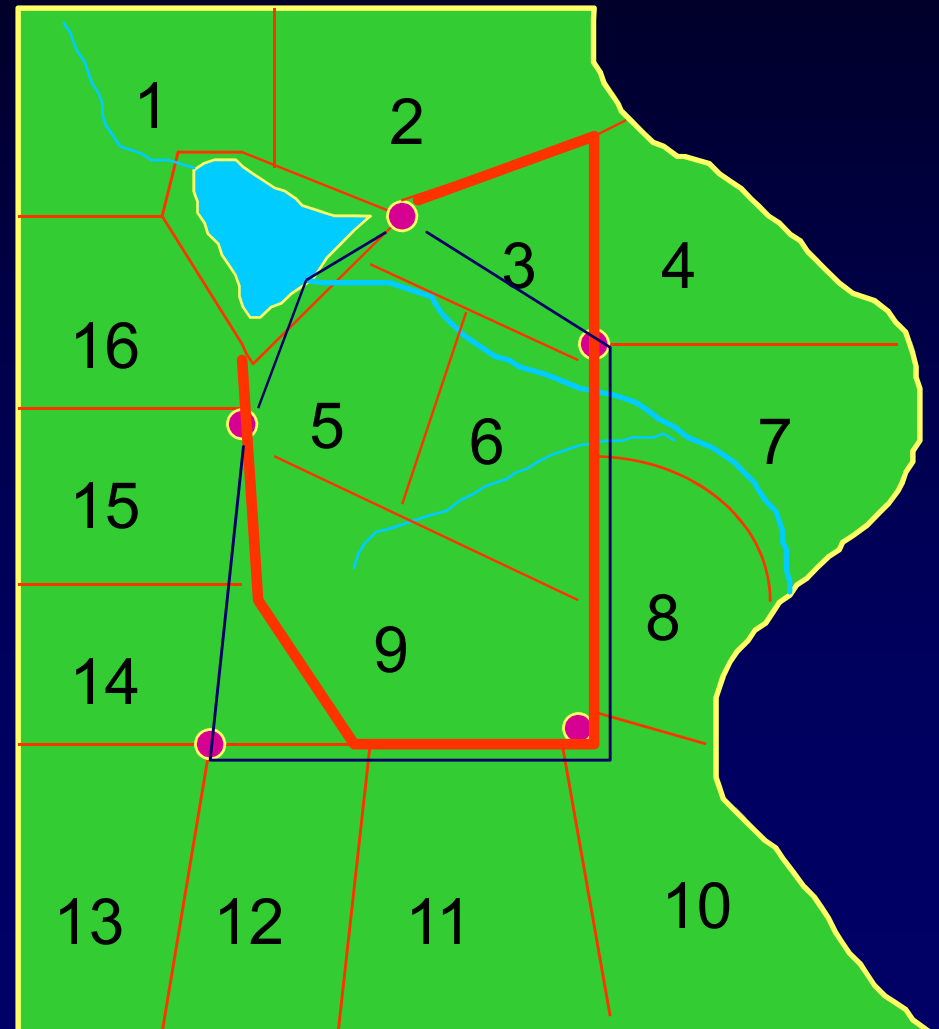
Fixed System Design (cont.)

- 16 paddock system
- Water available in every paddock



Fixed System Design (cont.)

- 16 paddock system
- Water available in every paddock
- Alleyway for ease of livestock movement

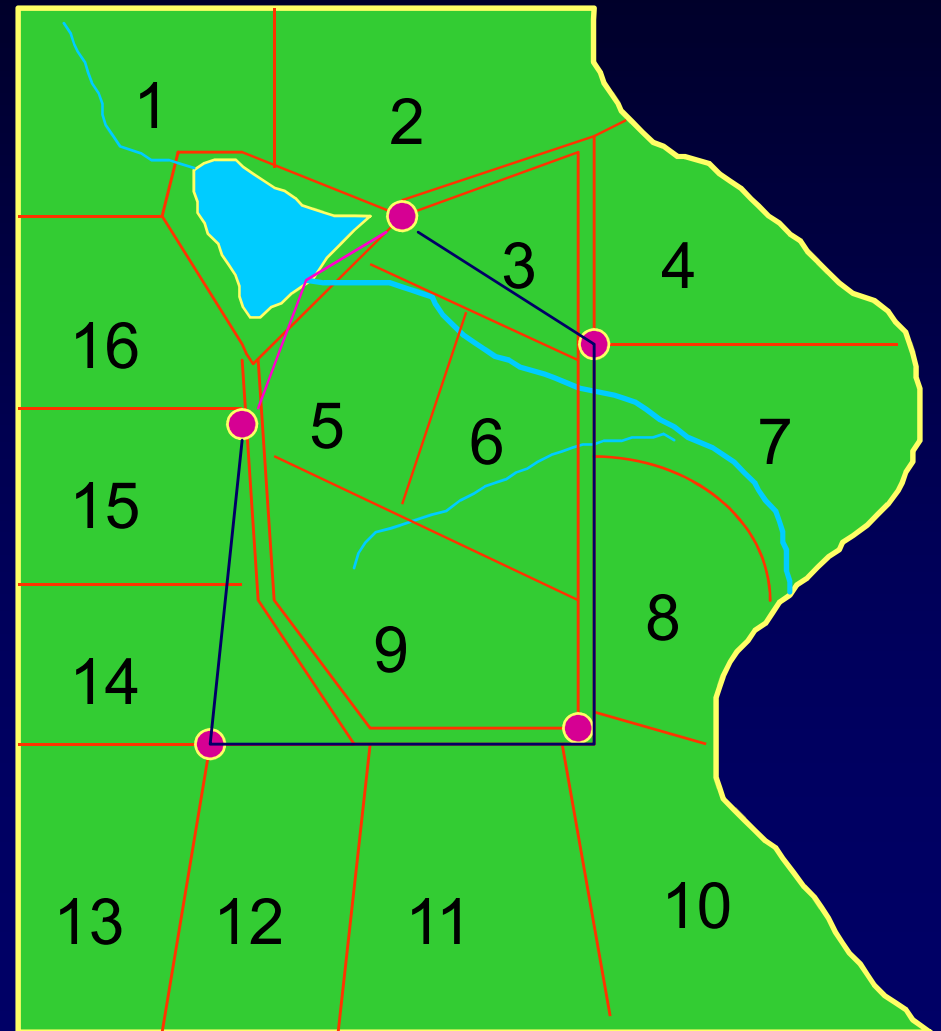


Fixed System Design (cont.)

Subdivision fencing:

18,744 feet \$3,650

= \$26.07/acre



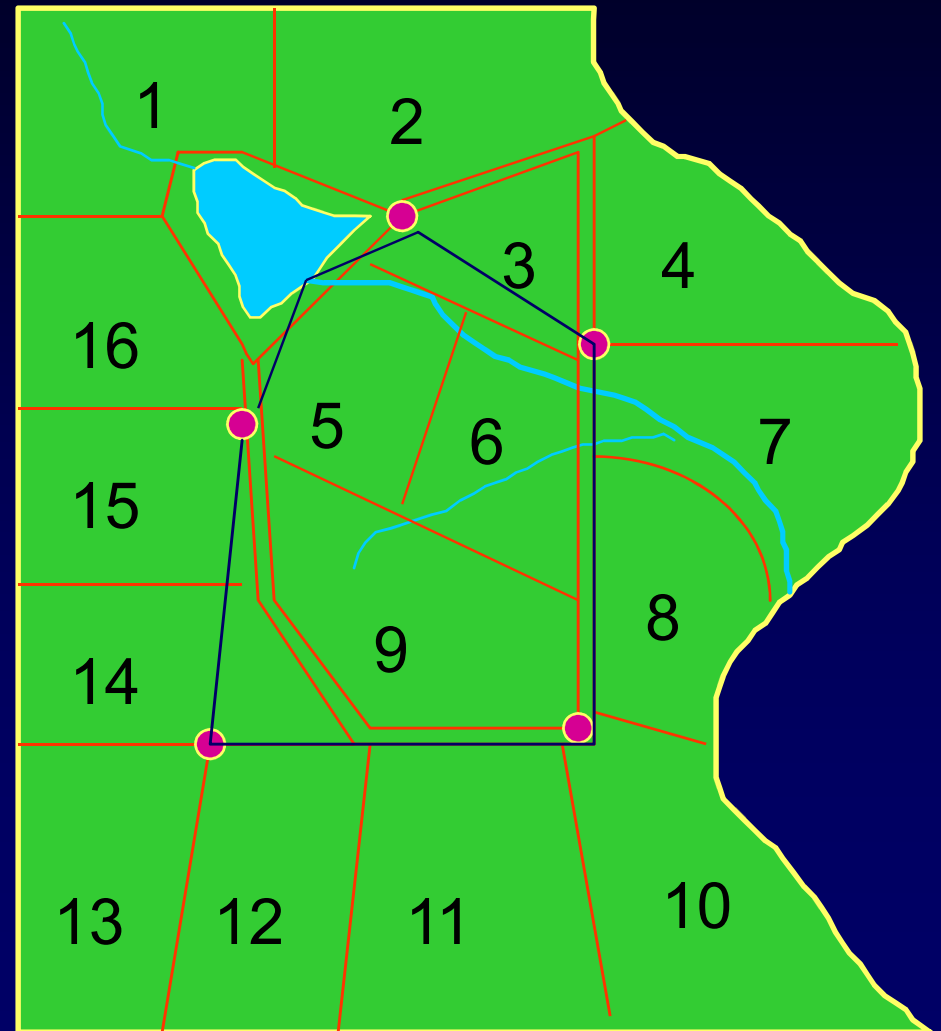
Fixed System Design (cont.)

Subdivision fencing:

18,744 feet \$3,650
= \$26.07/acre

Water development:

Power	\$700
Pump system	\$1,200
Water lines & tanks	\$4,150
TOTAL	\$6,050
	= \$43.20/acre



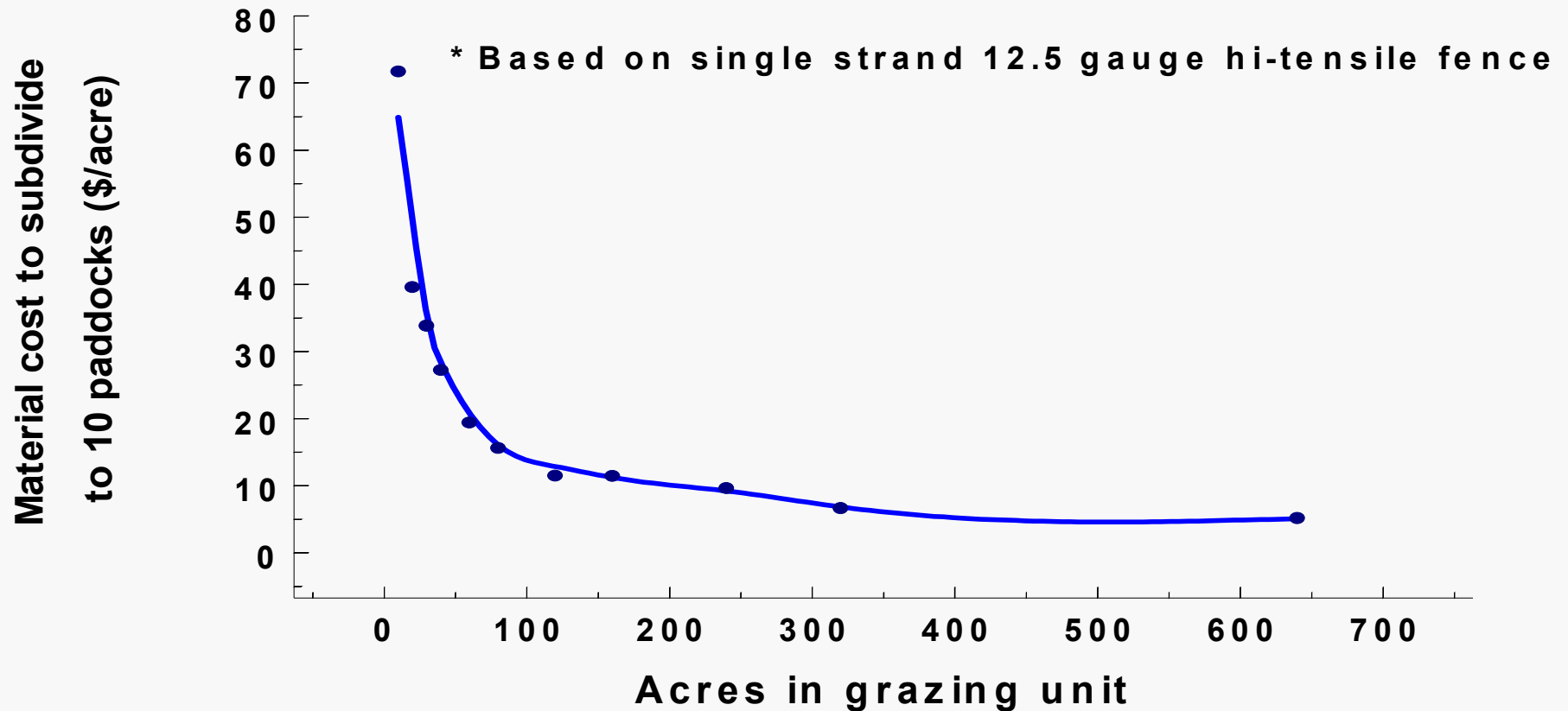
Grazing System Design

- Fixed system
 - Uses permanent fence and watering points

Advantages:

- Relatively low cost on large installations
- Minimal daily labor
- Low maintenance

Larger grazing units have lower per acre costs for permanent fencing



Grazing System Design

- Fixed system
 - Uses permanent fence and watering points

Advantages:

- Relatively low cost on large installations
- Minimal daily labor
- Low maintenance

Disadvantages:

- Relatively high cost on small operations
- Limited management flexibility

Grazing System Design (cont.)

- Flexible system
 - Uses portable fence and water facilities in a framework of permanent fence

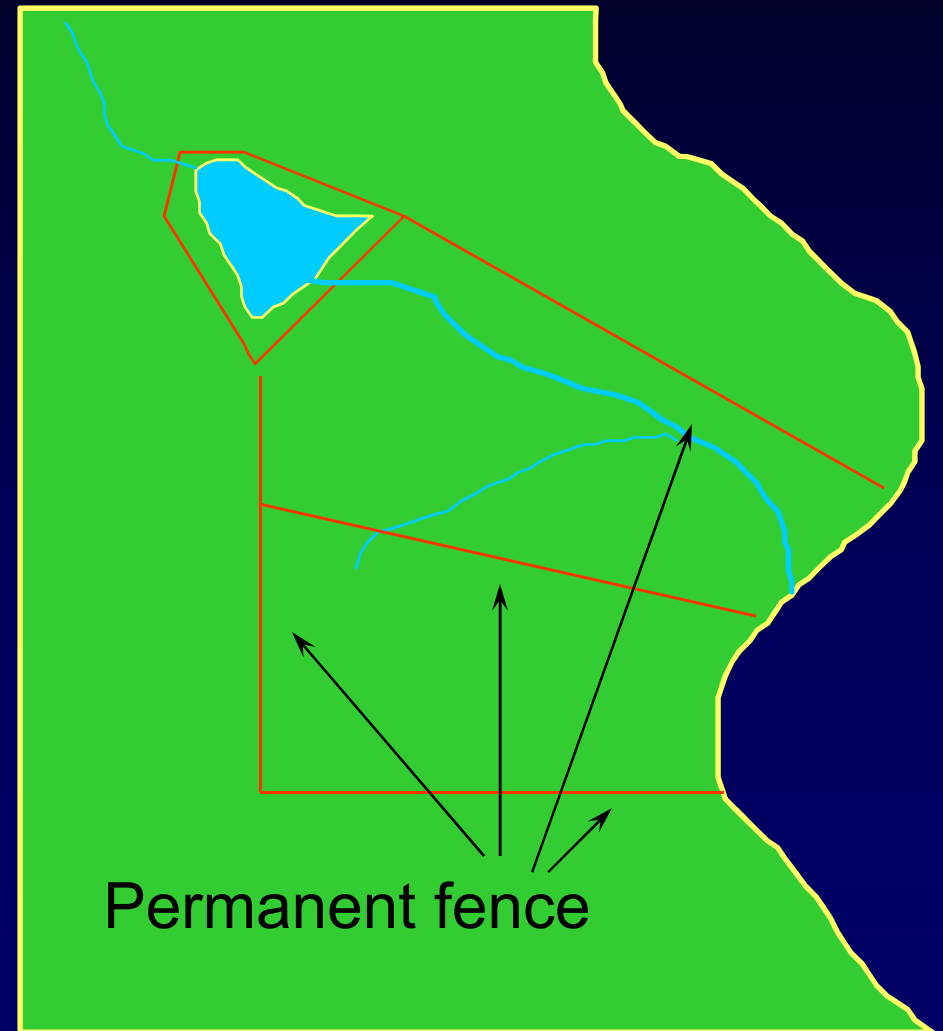


Flexible System Design

- Minimizes use of permanent fence
- Make corridors as near to parallel as feasible
- Keep fence spacing less than 660 feet

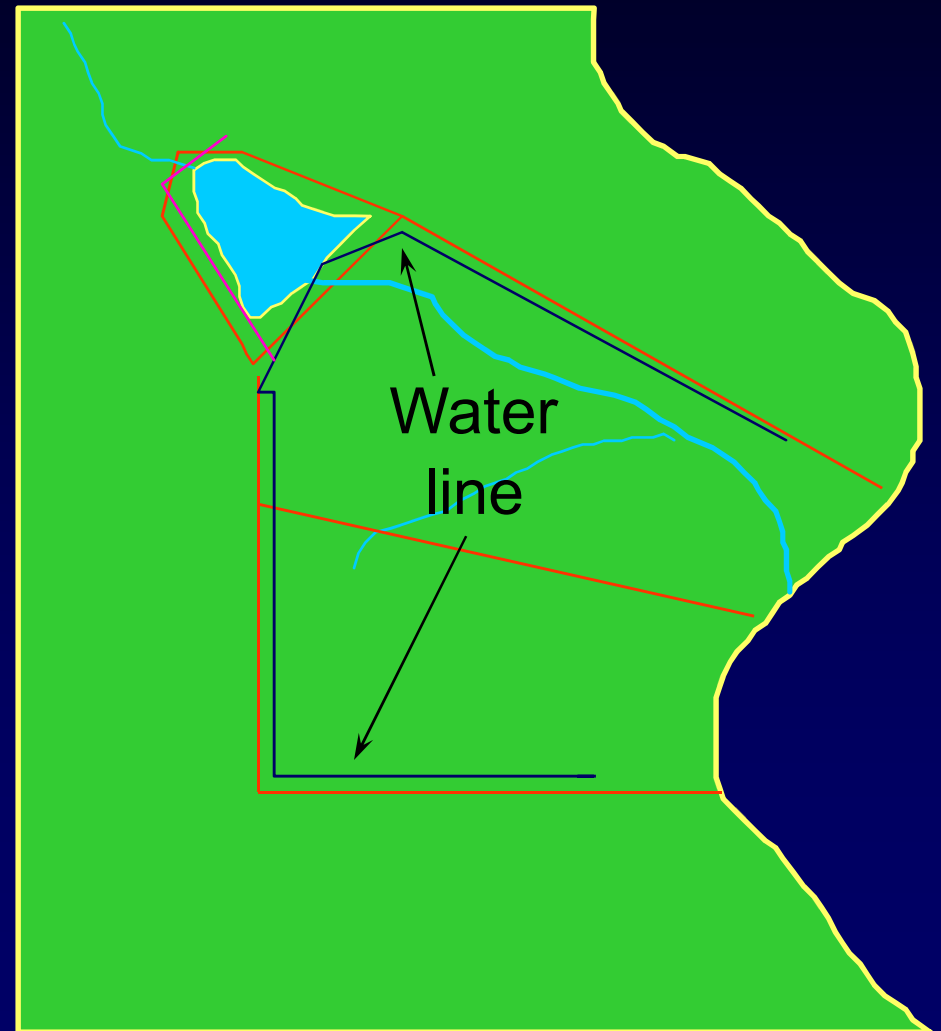


Flexible System Design (cont.)



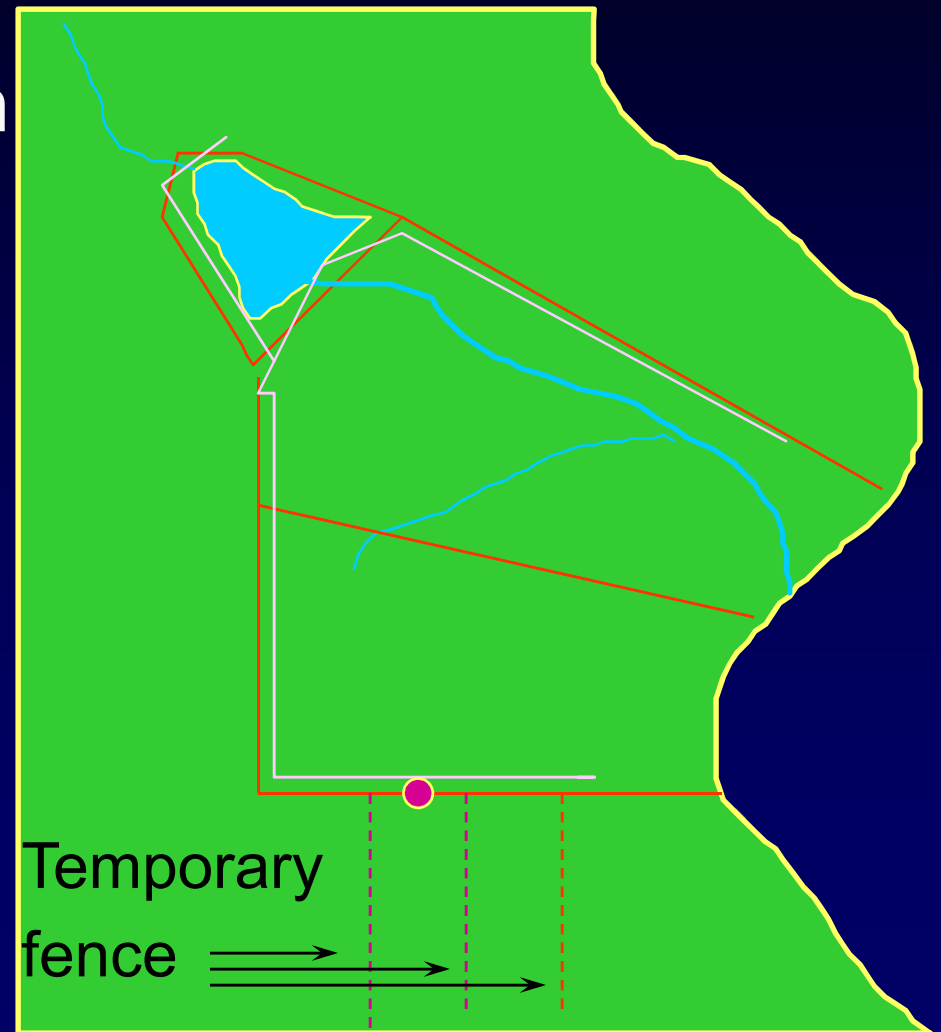
Flexible System Design (cont.)

**Above ground water
Line/quick connect
couplings**



Flexible System Design (cont.)

Can give daily allocations
or can give a weeks worth
of grass if needed.
Can cut part for hay
without a lot of fences
in the way.
Gives maximum flexibility.



Grazing System Design

- Flexible system
 - Uses portable fence and water facilities in a framework of permanent fence

Advantages:

- Maximum management flexibility
- Lower initial capital cost
- Works well on rented land

Grazing System Design (cont.)

- Flexible system
 - Uses portable fence and water facilities in a framework of permanent fence

Advantages:

- Maximum management flexibility
- Lower initial capital cost
- Works well on rented land

Disadvantages:

- More daily labor required
- More maintenance

Summary

- There is no perfect system, only those that use good management principles to best fit available resources.
- The most flexible system will have some combination of permanent and portable fencing and water.