Grazing Systems

- Grazing systems are controlled grazing management practices that manipulate livestock to systematically control periods of grazing, deferment, or rest. An extremely important concept in creating grazing system is to select the appropriate season of grazing or rest:

  - Grazing during dormant season is least damaging (except for shrubs).
    At this time, the plant is not actively photosynthesizing and plant does not try to regrow after being grazed. However, grazing during this time may be detrimental to shrubs that are maintaining and forming buds which are accessible to herbivores.

  - Grazing when plants initiate growth has intermediate negative effect.
    The plant is actively growing and has significant demand for photosynthetic products. However, the conditions for growth are optimal (i.e., plenty of soil moisture and nutrients). This active photosynthesis can provide the carbohydrates (CHOs) necessary for growth. During drought years this period of effective soil moisture may be limited and grazing may be detrimental until the plant becomes senescent.

  - Grazing during flower initiation through seed developments is most damaging.
    During this time, the plant's demand for soluble CHO's is considerable as the plant is near peak biomass (i.e., has a lot of biomass to support) and is using CHO's for seed development. Defoliation can also be detrimental during this time because the conditions for active photosynthesis are less favorable (i.e., less soil moisture, higher temperatures) and there is less time in the growing season to recover from defoliation

  - **Grazing period** = The season and number of days during which a pasture is grazed.

  - **Deferment** = A delay of grazing (or a period of non-grazing) in a pasture until the key forage species set seed and seeds mature.

  - **Rest** = A period of non-grazing for a full year.

- **What management goals can be reached with grazing systems?**
  - *Soil watershed protection*
  - *Manage forage value of plants*
  - *Improve range condition*
  - *Mitigate negative impacts of grazing*
  - *Improve wildlife habitat*
  - *Provide for multiple uses*
  - *Improve livestock production*
  - *Etc., etc., etc.*

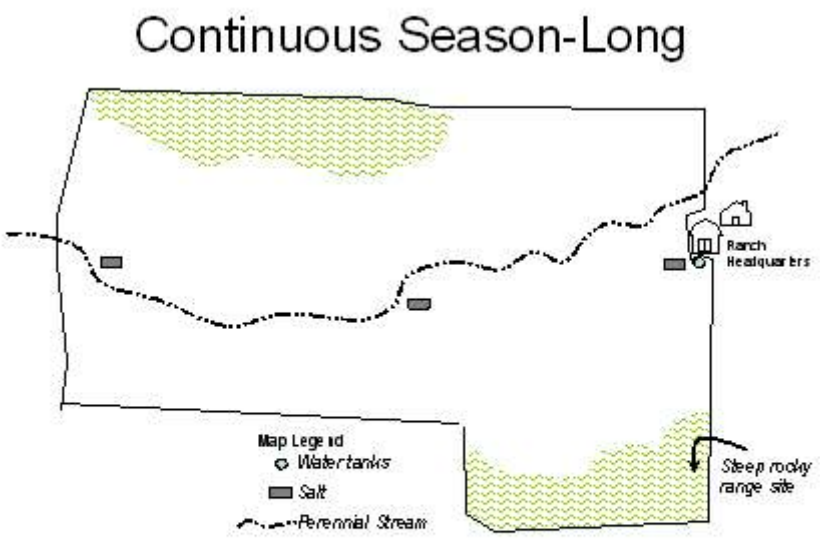
- **How can grazing systems affect the following (specifically)?**
  - **Livestock production** (i.e., gain)?
    - *Can increase forage production or quality over time*
    - *Can improve forage quality by grazing regrowth*
    - *Make better use of whole resource*
    - *Increase opportunities to observe livestock and reduce health problems, distribution problems, or other sources of lost animal gains*

- **Livestock distribution?**
  - *Create smaller pasture*
  - *Increase stock density*
- **Plant community composition?**
  - *Affect evenness of grazing intensity among plants*
  - *Even out competition between plants*
  - *Provide a specific season of rest or deferment to benefit some plants*
- **Wildlife populations?**
  - *Leave biomass for cover or forage or remove excessive forage*
  - *Change composition of plant community (i.e., favor shrubs over grasses)*
  - *Improve forage quality*
  - *Determines where livestock are on the landscape. Could also provide for areas where livestock are absent.*

- **Grazing systems cannot:**
  - Rectify mismanagement:
    - Wrong species or class of animal
    - Incorrect stocking rate
    - Major distribution problems because of water avail or topography
  - Achieve range improvement in plant communities that are dominated by long-lived woody plants.

- **Major Types of Grazing Systems:**
  - **Continuous**
    - Grazing a specific unit of land throughout the whole grazing season or year, repeated year-after-year.
    - Early in the study of range management it was believed that continuous grazing led to over-use of preferred grasses since livestock could defoliate a plant several times during the season. However, research does not support this speculation:
      - Studies show that livestock select a varied diet, including short-lived forbs, which may reduce grazing pressure on grasses.
      - Studies also show that the number of times an individual plant is defoliated during the season may not be different for a continuous vs a rotational system.
      - Also, because no part of the range unit is under deferment, the actual grazing pressure during the critical growing season is relatively light.
    - **Suited for**:
      - Dry flat land without major topographic limitations.
      - Plants communities with frequent rains throughout the growing season and adapted to year-long grazing (i.e., shortgrass prairie & Northern Mixed Prairie).
      - Pastures with adequate water distribution.
      - Communities where most plants have grazing value.
    - Effect on **animal performance**:
      - Usually improves animal gains because animals have maximum opportunities to select high quality forage and use plants when they are most palatable.
      - Low stress system because animals are not moved from pasture to pasture.

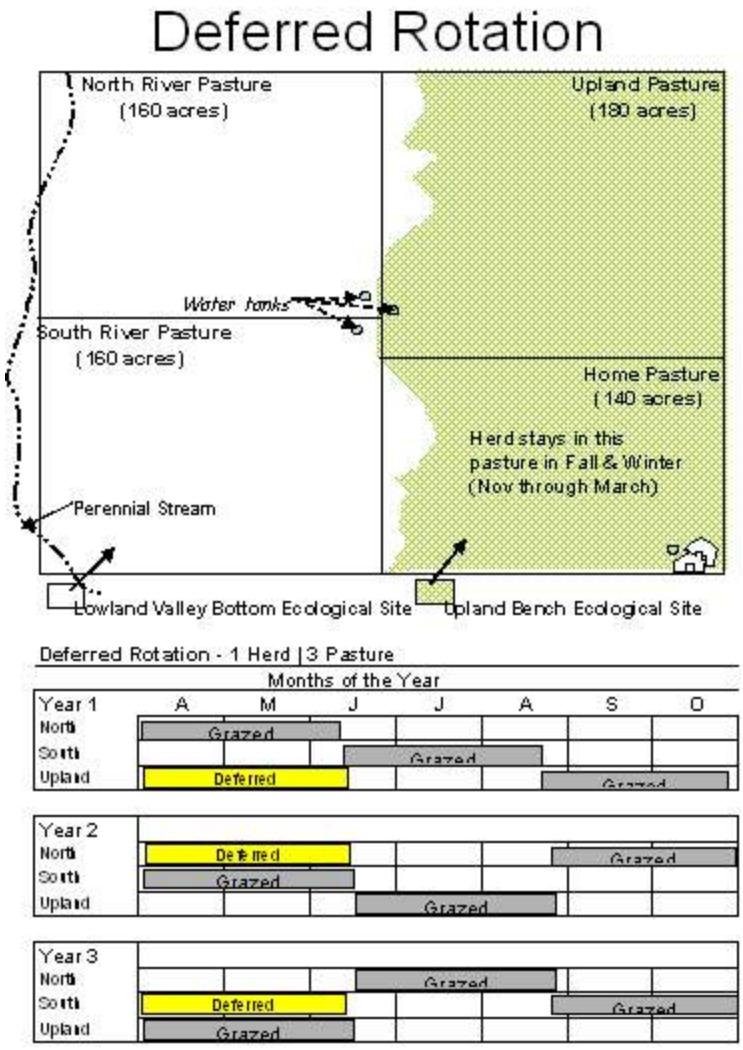
- Effect on **range condition**:
  - Can reduce desirable plants because of repeated selection by herbivores.
  - Affect depends on stocking rate and species of grazing animal.
  - Livestock have preferred grazing areas (i.e., riparian, near cover, preferred forage plants) these areas may be overgrazed because livestock are not restricted from using them.
- Effect on **wildlife**:
  - When grazed by cattle can provide shrubs and browse for big game and cover for small animals.
  - Livestock are dispersed throughout the pasture and not confined to one small area of the landscape. This could be detrimental to wildlife because there is never a part of the pasture that is "guaranteed" not to have livestock.
- **Management inputs** required:
  - Fencing around the pasture, but no cross-fencing.
  - Careful placement/development of water points to improve livestock distribution.
  - Careful attention to stocking rate.
- Additional **Considerations:**
  - **Pros:**
    - Low labor required.
    - Low operating cost, because of low fencing requirements.
    - Reduced fuels for wild fire from patchy grazing patterns.
    - Higher livestock production on an individual animal basis.
  - **Cons**
    - No "guaranteed" rest periods.
    - Potential loss of desirable species.



Continuous Season-Long: Livestock placed in pasture in spring and removed at end of grazing season, or grazing all year in one pasture

Deferred Rotation

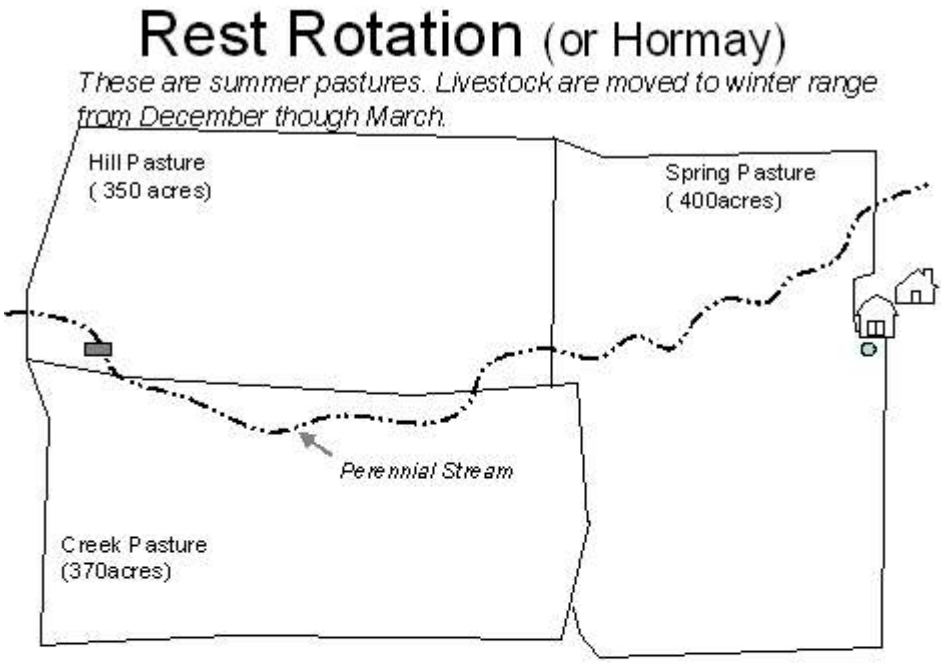
- A deferment is provided to each range unit (or pasture) on a rotating basis. Requires at least 2 pastures and just 1 herd or flock.
- Designed to increase grazing pressure in a specific pasture to improve livestock distribution and still provide preferred species with a period of non-grazing in improve condition.
- Stocking rate is critical and must be set at a moderate, not heavy level.
- **Suited for**:
  - Riparian areas & stringer meadows.
  - Bunchgrass ranges, mountain coniferous forests, mixed grass and tall grass prairie.
  - Rough topography .
  - This system works best where considerable difference in forage plant palatability exist or patch grazing is a problem.
- Effect on **animal performance**:
  - Often reduces animal gains because it limits animal selection. Plus, deferred pastures will have older, more mature forage, that will be less nutritious.
  - Over time improved range condition could lead to better forage supply and improved livestock gains.
  - Deferred systems are often implemented with increased stocking rates that can reduce livestock weight gains
- Effect on **range condition**:
  - Creates a period of non-grazing when plants are most sensitive to grazing. This can improve plant vigor.
  - Allows a period for seed-set.
  - Maintains balance between species (i.e., species are potentially used more evenly during the season).
- Effect on **wildlife**:
  - Can change plant composition for better or for worse, depending on wildlife requirements.
  - Allows for some pastures to be unoccupied by livestock during critical use periods such as calving, fawning, or nesting.
- **Management inputs** required:
  - Increased labor to move livestock between pastures.
  - Increased fencing.
- Additional **Considerations:**
  - **Pros:**
    - Relatively low labor required.
    - Allows opportunities for range improvements such as prescribed burning, planting, or herbicide application.
    - Can allow for increased stocking rates.
    - Often improves range condition.
  - **Cons**
    - Not flexible unless more than 2 pastures.
    - Cost of fencing or herders.

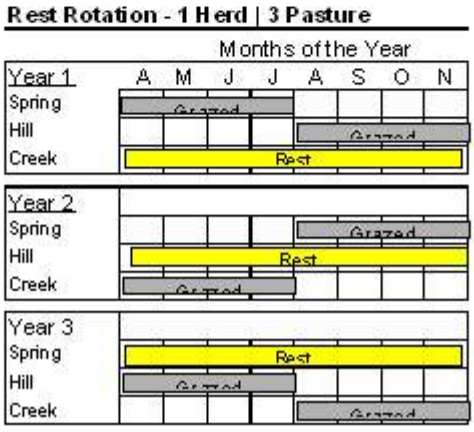


" **Rest Rotation Grazing (a.k.a., Hormay System)**

- This system allows for a full-year of rest from grazing for pastures on a rotating basis. This system requires at least 3 pastures and 1 herd. The rotation sequence for each pasture is usually defer (fall graze), then rest (no graze), then spring graze.
- In a typical rotation:
  - A pasture is not grazed in spring so plants can set seed , then
  - Grazed in fall to plant seeds through hoof action, then
  - The pasture is rested so the seedling could establish before they are grazed the following spring.
- **Suited for**:
  - Rugged terrain
  - Land not used for crop production or improved pasture
- Effect on **animal performance**:
  - Lower animal gains because animals are not consuming most nutritious forage. Livestock always graze a pasture after rest or deferment when there is dead material built up in the plant.

- Effect on **range condition**:
  - Improves range condition because plants have time to set seed and recover from grazing.
- Effect on **wildlife**:
  - Provides a disturbance free pasture and spatial separation from livestock.
  - Provides a variety of habitat conditions (spring-grazed, fall-grazed, or rested).
- **Management inputs** required:
  - Fencing for at least 3 pastures.
  - Labor for moving livestock during the rotation.
  - Water necessary for each pasture.
- Additional **Considerations:**
  - **Pros:**
    - Could provide for multiple-use because some pastures are without livestock.
  - **Cons**
    - Requires low stocking rates to avoid damage to plant resources.
    - Can "look bad" because the fall grazed pasture has a triple stocking rate and can look "hammered."





High intensity/Low Frequency (HILF) Grazing (1-herd: Multi-pasture)

▹ This system concentrates animals in a small area for a short period of time, followed by a period of rest. Pastures are usually grazed only once per season.

▹ Designed to force animals to eat less palatable plants. The intent is to reduce competition to the more palatable plants from unpalatable plants that are not eaten and prevents the development of tall, course, ungrazed "wolf" plants.

▹ Works best for grassland vegetation types where most plants have good forage value and recover quickly from grazing (i.e., are grazing tolerant).

▹ Benefit - can be used as a tool for vegetation manipulation (i.e., oak in Colorado/Utah; fire lanes in California).

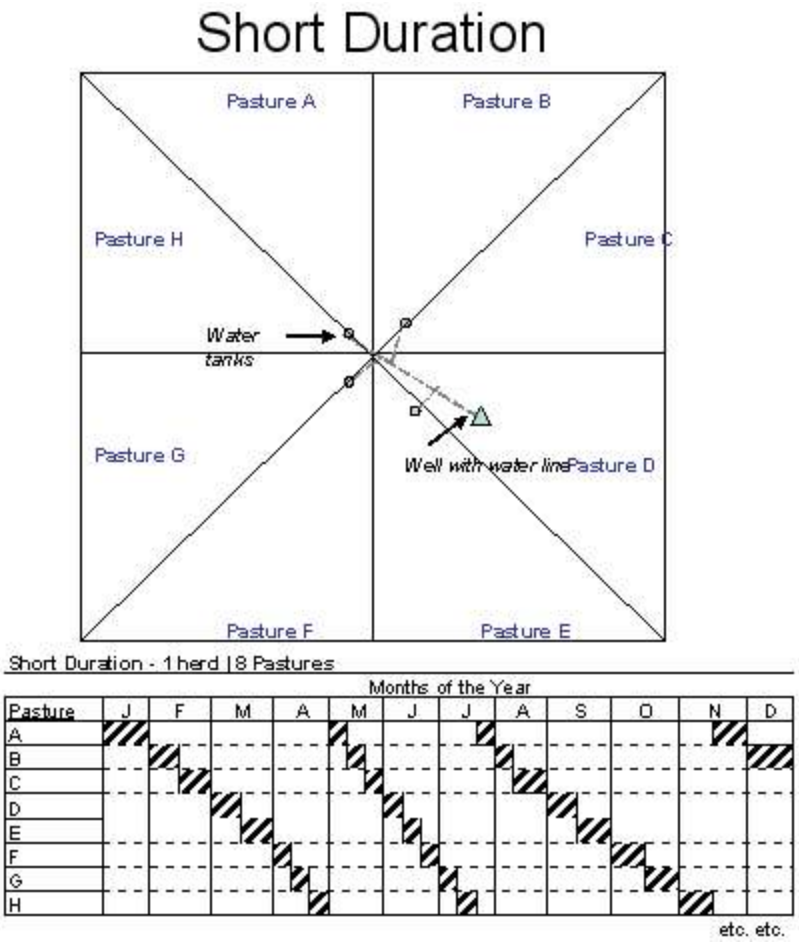
▹ Problem - Individual animal performance is adversely affected because animals are forced to eat course, old, unpalatable vegetation.

Short Duration (SDG)

- ▹ This system is an advanced rotation system them requires more than 8 pastures (called paddocks) with very short grazing periods (4-9 days) followed by shorter rest periods (30-60 days). SDG is basically an extreme HILF with shorter grazing periods and it is designed so that pastures are grazed at least twice during the grazing season.

- ▹ **Suited for**:
  - Pasture or rangeland with gentle terrain and long-grazing seasons.
- ▹ Effect on **animal performance**:
  - System designed to maintain or improve animal performance by consistently allowing animals to graze new growth or re-growth plant material. However, research has shown that animal performance is usually lower than other systems because animals are not given opportunity to select preferred forages and need to use a large proportion of all plants available to encourage regrowth which will be available in subsequent grazing periods.
- ▹ Effect on **range condition**:
  - Generally, maintains condition. This system requires that stocking rate be high enough to even out utilization among plants. Therefore, it is designed to reduce animal impact on some plants more than others. Also, because high stock densities are achieved, livestock distribution is usually improved.
- ▹ Effect on **wildlife**:
  - Often requires more fences and yields more human an livestock activity.
  - However, human and livestock activity is concentrated in a small area at any specific time.
- ▹ **Management inputs** required:
  - Fencing for at least 8 pastures
  - Labor for moving livestock during the rotation.
  - Water necessary for each pasture; often provided in the center of all paddocks.

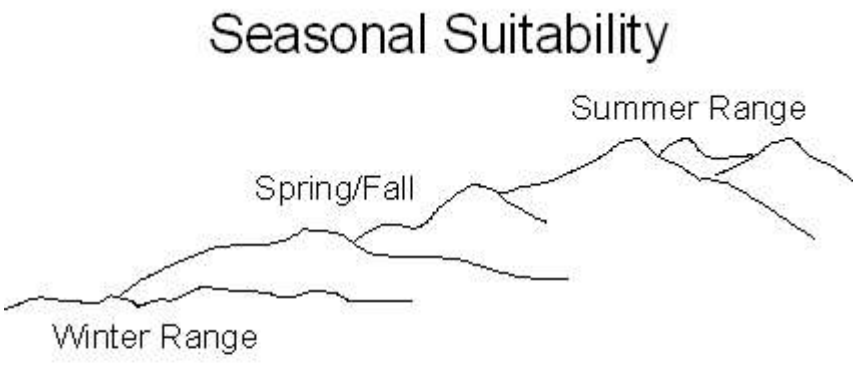
- Additional **Considerations:**
  - **Pros:**
    - Once livestock become accustomed to the rotation, they often be come very easy to move from pasture to pasture.
    - Increase interaction between humans and livestock can create herds of livestock that are very easy to handle (or, it can sometimes create the opposite).
  - **Cons**
    - Can have extensive impact around central water sources.
    - Requires nearly daily attention to cattle and pastures.

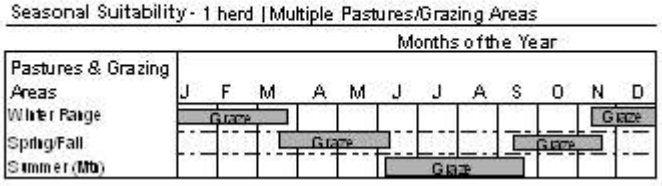


Seasonal Suitability

- This system creates movement of livestock to different areas of range depending on the growth patterns of different vegetation types.
- The patterns of rangeland sheep production best exemplifies this system. In most range-sheep operations, sheep winter on the cold desert, have their lambs on the benchlands, move progressively up the mountain as the season progresses, lambs are sold and trucked off the mountain in September, then sheep are trailed back to winter range.

- **Suited for**:
  - Rugged terrain with a strong elevation or latitude gradient.
  - Land including vegetation types that green-up and mature at different times of the season.
- Effect on **animal performance**:
  - Generally, high animal performance because animals have access to young green forage for an extended time. In this system animals "follow the green" up the mountain and "lead the snow" down the mountain.
  - Animal performance is also high because the winter range of most seasonal suitability systems are shrub-dominated giving the advantage of the higher relative winter nutritive value of shrubs, compared to grasses and forbs.
- Effect on **range condition**:
  - Usually, maintains or improves range condition because, if done right, plants experience defoliation well before flowering and seed production at a time when they are not highly susceptible to damage.
- Effect on **wildlife**:
  - Can improve wildlife habitat by providing nutritious regrowth after herds move out of the area
  - Can also be detrimental because livestock are basically following the grazing patterns used by wildlife, especially big game. Therefore, there is increased opportunities for interaction and competitive exclusion.
- **Management inputs** required:
  - Fencing or herding is required to control livestock movements.
- Additional **Considerations:**
  - **Pros:**
    - Mimics grazing patterns of native grazing herbivores and therefore, could have very limited negative effects on land.
  - **Cons**
    - Only works in mountainous areas where sufficient elevation gradients exist.





Decisional (Rotational) Grazing (1 herd: Multi-pasture)

▹ Many grazing systems would be best described as “decisional” systems. In this category of systems, the manager moves the herd from unit to unit depending on management considerations such as:

- Available forage
- Available water
- Cover for calving or lambing
- To facilitate other practices such as sheering or haying

▹ These systems are probably the most common in the world and their success depends on the experience and decisions of the manager.

▹ **Pros:**

- Often achieve excellent animal gains.
- Require minimal planning and are very flexible.

▹ **Cons:**

- Require constant monitoring.
- Difficult to make long-term plans.
- Dependant on the skill of the manager.

▹ These systems include:

- **Best-pasture system** - move livestock to pasture that looks the "best" in terms of forage availability. Designed for arid areas where rain may improve forage on one part of a ranch but not affect another part.

- **Seasonal-suitability** - movement of livestock to different areas of range depending on the growth patterns of different vegetation types - (described above)

- **Complementary system** - Designed in the central prairies where animals rely on cultivated or improved pastures for part of the year and then are moved to native range.

Summary Comments:

" ***There is no one-size-fits-all grazing system!*** I have seen each of the above systems work on the right piece of ground with the right stocking rate.

" A lot depends on the skill of the manager. Nearly all of these systems will work with a well skilled manager.

" There are thousands of variation on this theme. The exact ways that rest, deferment, grazing, and rotation are combined can create new and appropriate systems.

" No matter the system – stocking rate and species of grazing animal are very important in determining how the systems affect vegetation communities.

" All systems need to be flexible to manage unexpected disturbance such as fire or weed invasions.

" The exact ways that rest, deferment, grazing, and rotation are combined can create new and appropriate systems. There are thousands of variations on these themes.