



Grazing Management Practices - their history and relation to the ‘Savory’ method

Marc R. Horney, Ph.D.
Associate Professor, Ruminant Nutrition & Rangeland Resources
Animal Science Dept
California Polytechnic State University, San Luis Obispo

Section 1

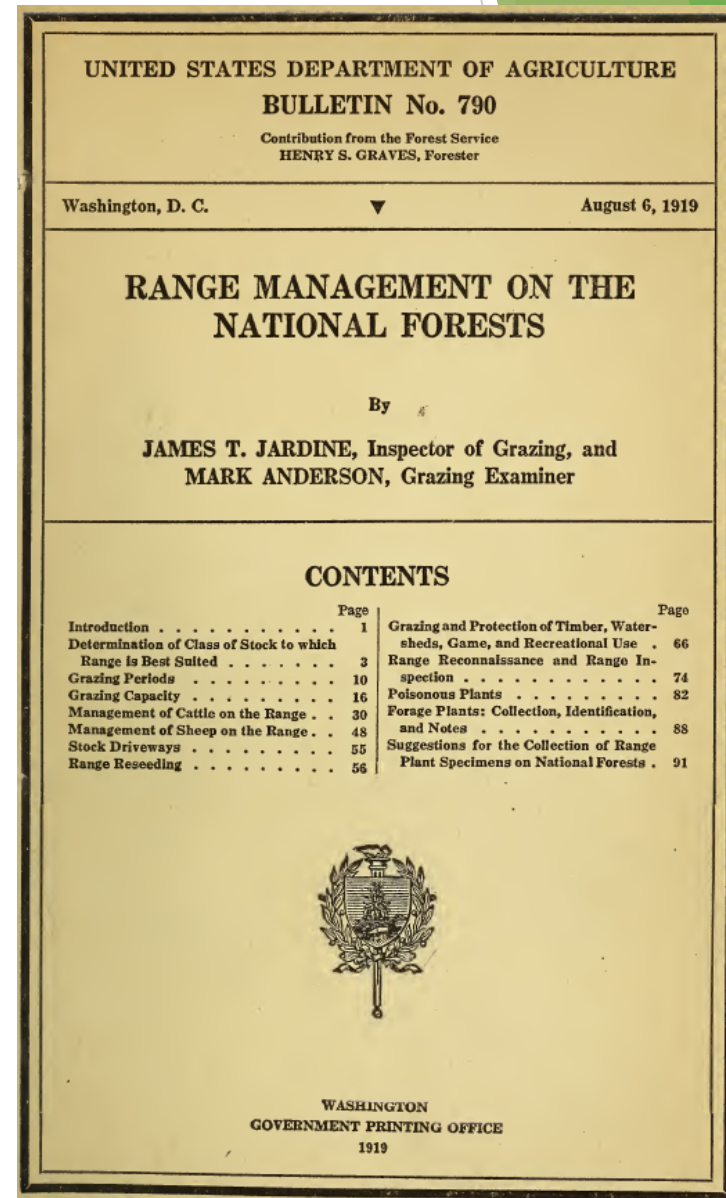
Development of the 'Conventional' View



Jardine & Anderson, 1919. Bulletin 790: Range Management on the National Forests

- ▶ First practical field guide to grazing management in the western United States
- ▶ Written to be used for making allotment management decisions by USFS staff
- ▶ Key points:
 - Grazers should avoid
 1. Starting grazing before plants can tolerate defoliation
 2. Allowing animals access to soils that are water-saturated
 - Proper stocking
 - The **maximum number of stock** which the unit will support each season over a period of multiple years **without injury to...** the range, tree growth, or watershed, and/or without unwarranted interference with game and recreation.

As definitions go, this has weathered the last century pretty well



Rotational Grazing

– Briske et al., 2011. Origin, Persistence, and Resolution of the Rotational Grazing Debate: Integrating Human Dimensions into Rangeland Research

History of Rotational Grazing in the US (1)

- ▶ The rotational grazing **debate** in the US can be traced back to at least the late 1800s.
- ▶ Arthur Sampson convened what may have been the first professional symposium on rotation grazing in North America at the third annual meeting of the Society for Range Management to discuss the matter. But the roots went at least 55 years further back...
 - ▶ “As early as 1895, J.G. Smith advocated for the improvement of natural ranges by dividing them into separate pastures to be grazed in rotation, thereby providing for the spread of forage plants by means of ripened seed” (Sampson 1951, p. 20; Smith, USDA Yearbook of Agriculture, 1895)

* Professor of Forestry and Plant Ecologist with the UC Berkeley Agricultural Experiment Station

Rotational Grazing – Briske et al., 2011. Origin, Persistence, and Resolution of the Rotational Grazing Debate: Integrating Human Dimensions into Rangeland Research

History of Rotational Grazing in the US (2)

- ▶ Early in his career, Sampson (1923, p. 61) had declared that rotation grazing was “built on a thoroughly tested scientific foundation,” but by the 1950s subsequent investigations caused him to qualify, if not quite withdraw, this endorsement.
 - ▶ Summarizing the 1950 Society for Range Management symposium in the Journal of Range Management, Sampson observed that “**much diversity of opinion exists among both research workers and operators regarding the merits of rotation grazing.**” (i.e. people had very different experiences with the management practice: some good, some not)
 - ▶ He reported that the limited experimental evidence then available was inconsistent and in many cases confounded by terminological and other difficulties.
 - ▶ By this he meant that research investigations had, at that time, failed to explain why some people thought rotational grazing ‘worked’ and others thought it didn’t (this still remains the case). Many poorly defined terms describing grazing practices were in circulation, and were often used in publications - which further confused matters (this also still remains the case).

Rotational Grazing – Briske et al., 2011. Origin, Persistence, and Resolution of the Rotational Grazing Debate: Integrating Human Dimensions into Rangeland Research

History of Rotational Grazing in the US (3)

- ▶ Sampson (1952) distinguished between “**deferred**” and “**rotation**” grazing on the basis of their underlying management objectives.
 - ▶ “**Deferred** grazing” involved delaying grazing of an area “until after seed maturity” in order to encourage seed production and carbohydrate storage in perennial species.
 - ▶ “**Rotation** grazing”, by contrast, involved “shifting the livestock systematically at desirable intervals to different subunits of a range area or fenced subdivisions without specific provision for seed production.” These rotations were done during the growing season. Their purpose was to allow the available biomass to increase, and afford the forage species some measure of physiological recovery.
 - ▶ More detail from Briske et al.:
 - ▶ Rotational grazing systems are specifically designed to redistribute grazing pressure (i.e., forage availability/forage demand) in time and space for any given stocking rate (i.e., animal number/land area/time) to provide greater managerial control over the frequency, intensity, and uniformity of plant defoliation by modifying the length of grazing period

Rotational Grazing – Briske et al., 2011. Origin, Persistence, and Resolution of the Rotational Grazing Debate: Integrating Human Dimensions into Rangeland Research

History of Rotational Grazing in the US (4)

- ▶ Rapid, positive vegetation responses to grazing exclusion following years to decades of chronic overgrazing suggested to early researchers that rotational grazing might be a tool for restoring rangeland productivity.
- ▶ However, early livestock exclosures revealed not so much the effects of *grazing* management practices (short periods of rest between grazing bouts), but rather the effects of simply NOT grazing after an extended period of severe overuse.
- ▶ The recommendation to **rest** pastures for periods of weeks or months during growing seasons or to **defer** use of pastures for one or more seasons at a time to allow for seed production and establishment was attractive because it offered a way to allow a fairly continuous level of economic use (livestock production) while seeming to manage for ecological health objectives.
 - ▶ No empirical data existed at the time to validate the various ways that this strategy was implemented by a variety of people in different ecosystems, though anecdotal evidence suggested that doing so was often beneficial.

Brown & Kothmann, 2009. Rotational Grazing on Rangelands: Synthesis and Recommendations

- ▶ The Journal of Range Management published 1,513 articles dealing with “grazing systems”, and 645 articles on “rotation grazing” from 1948-2003
 - It’s a topic people remain **very** interested in
- ▶ The latest round of controversy: **Briske et al., 2008**. “Rotational grazing on rangelands: reconciliation of perception and experimental evidence.” Rangeland Ecology and Management 61:3-17.
 - ▶ Found no evidence that ‘rotational’ grazing (in various forms) reliably improved either plant or livestock production as compared to ‘continuous’ grazing
 - ▶ Their review cited 47 experiments varying from 2 years to >25 years in length that were published over the last sixty years
 - ▶ Some of those experiments did find advantages of rotational grazing, in specific cases, but there were no consistent trends of this across the whole collection of trials (i.e. the benefits of rotational grazing were not broadly *generalizable*)

Briske et al., 2008

Concluding Statement:

- ▶ “Rotational grazing as a means to increase vegetation and animal production has been subjected to as rigorous a testing effort as any hypothesis in the rangeland profession, and **it has been found to convey few, if any, consistent benefits over continuous grazing.**”

Did the authors mean by this that rotational grazing is not ever a beneficial management practice?

- ▶ No. They simply showed that there was little evidence that the practice of systematically moving animals around had any consistent effects on plant/animal productivity in most cases.
 - ▶ Note: for most of the 47 studies they used, stocking rates were similar between treatments and, as far as can be told, the pastures were relatively uniform (i.e. not likely to produce varied livestock distribution patterns)

Briske et al., 2008

- ▶ What does the evidence point to, in regards to the main influence(s) on plant and animal productivity levels?

Stocking rates (animal consumptive units/unit land area/unit time)

...that are appropriate to conditions and objectives (back to Jardine & Anderson, 1919).

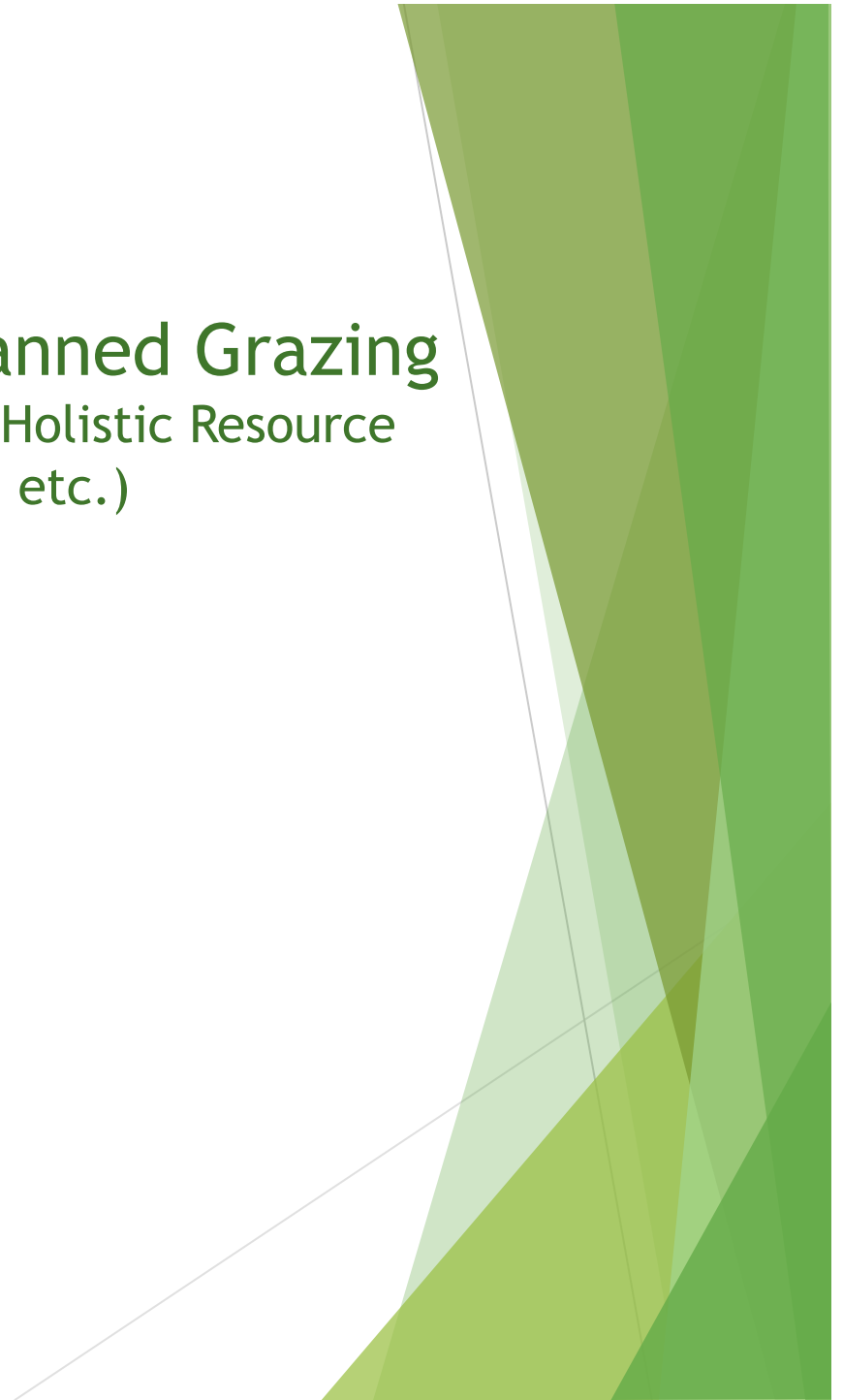
Seasonal weather patterns

...still not something we can anticipate well, let alone manipulate

Section 2

Allan Savory and Holistic Planned Grazing

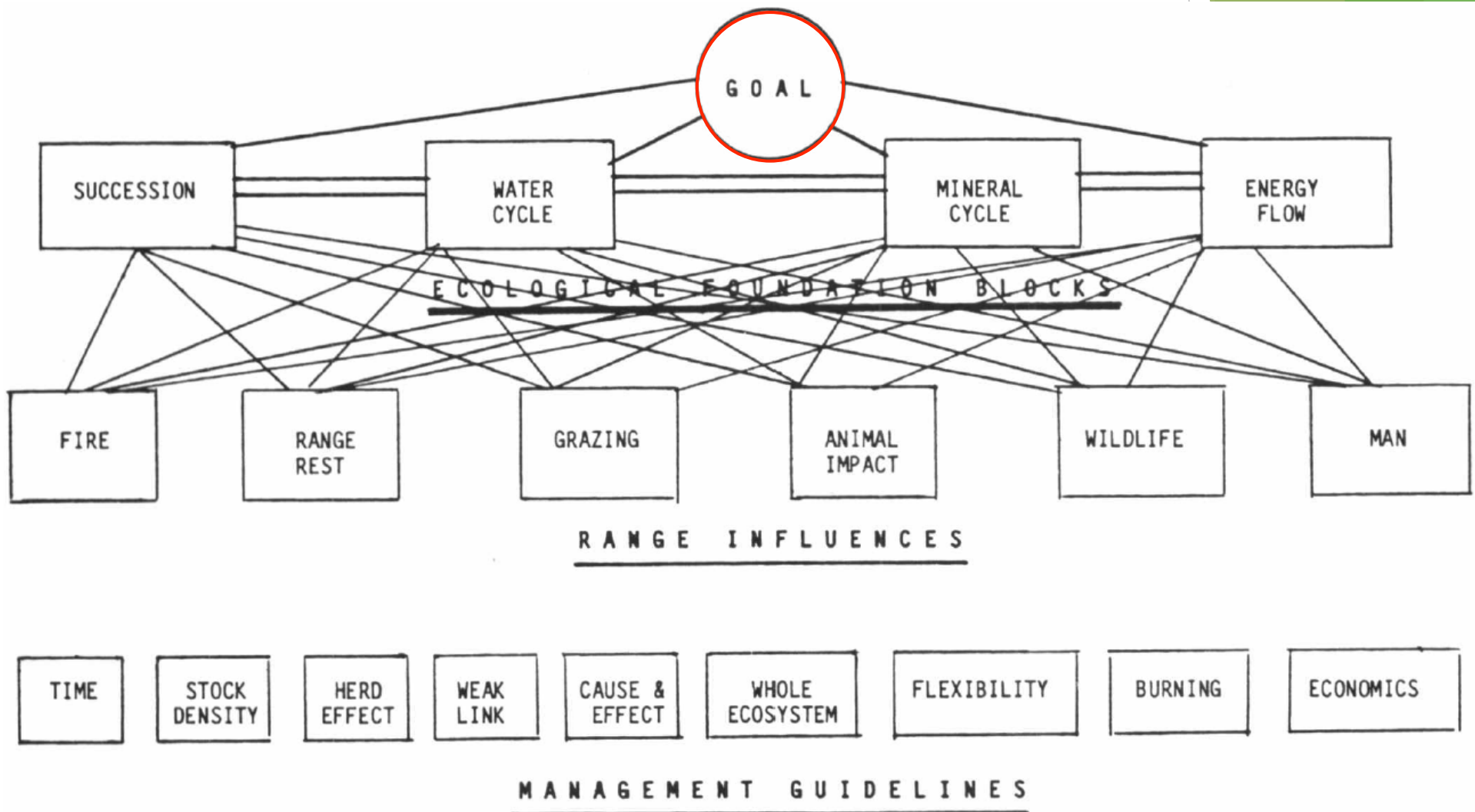
(a.k.a. the “Savory Grazing Method,” “Holistic Resource Management,” “Holistic Management,” etc.)



Allan Savory and 'Holistic' Grazing Management

- ▶ In the late 1970s, former Rhodesian wildlife ecologist, Allan Savory, came to the United States and began promoting a 'new' idea for managing ranches and grazed lands
- ▶ He asserted that the scientific community had been giving ranchers bad advice, which was leading to the damaging of arid and semi-arid grasslands
 - ▶ The chief problem, he argued, was that rangeland management professionals were too focused on specific causal relationships to give useful advice to land managers, who needed to comprehend and integrate a wide diversity of elements which interacted together in ranching enterprises
 - ▶ He believed that he had developed and refined a systematic '**holistic**' approach that was a superior way of planning and managing ranch and wildland enterprises
 - ▶ Under his holistic approach, a land manager would consciously and simultaneously account for all the interacting physical, biological, climatic, social, and economic components of the land area that s/he was managing.

Schematic of the interaction of the Savory “Goal” to the components of the “whole” SGM/ HRM handout, *circa 1983*



Allan Savory's Provocative Assertions:

- ▶ “No matter how bad the range **deterioration**, there is never a **need to reduce stock numbers** to start the reclamation process.”
- ▶ “As a general rule, the conventional or government-prescribed stocking rates can safely be **doubled** in the first year of operation as long as **adequate time control** is brought into the grazing handling.”
- ▶ “Furthermore this doubling of government or conventional rates can be done **regardless of how poor the range condition is** at the time.”
- ▶ “Anyone describing [this method] as a ‘grazing system’ is merely indicating that he has not yet understood the holistic approach to the management of all resources simultaneously, with **constant monitoring and adjustment** to achieve a goal.”
- ▶ “...ranchers correctly applying SGM are achieving higher animal performance with higher stocking rates and that **in some cases yields of meat per acre have risen by as much as 200%**.”

Rotational Grazing

– Briske et al., 2011. Origin, Persistence, and Resolution of the Rotational Grazing Debate: Integrating Human Dimensions into Rangeland Research

“Savory Method”/Holistic Resource Management

- ▶ Allan Savory and his proponents have continued to animate rotational grazing discussions from their particular point of view for nearly 40 years now
- ▶ Savory (1988) likened active movement of grazing livestock to the behavior of wild grazers—a comparison that Clements (1920) and other early range researchers had also made—and he promoted methods of doing this as a means of restoring degraded rangelands—much as Sampson (1952) had previously done.
- ▶ High costs for fencing, water developments, and labor required to implement intensive rotational grazing represented a substantial economic investment that could be recouped, Savory asserted, by being able to carry 2-4x **more** animals.
 - ▶ This assertion was somewhat undermined by his own inability to do this in the single research effort he ever made (“Charter Trials” project, 1969-78)

Rotational Grazing

– Briske et al., 2011. Origin, Persistence, and Resolution of the Rotational Grazing Debate: Integrating Human Dimensions into Rangeland Research

“Savory Method”/Holistic Resource Management

- ▶ Earlier proponents of rotational grazing, emphasized the idea that grazing (**which produces stress**) is damaging to plants, and rest (**removal of disturbance for sufficiently long periods with adequate resources**) leads to their recovery
 - ▶ Savory’s conception of the relationship between animals and plants inverted this, such that he imagined “herd effect” disturbances produced by concentrated livestock grazing and trampling to **directly stimulate** grazed plants to grow more vigorously. Frequent rest, he often argues, produces **declining** soil conditions and undesirable competition among plant species

Not stated, but possibly underlying Allan Savory’s conception of the stimulatory affect of grazing is the phenomenon of compensatory growth. About that, McNaughton (1983) reported that forage plants commonly have some capacity to compensate for herbivory and may, at low levels of herbivory, overcompensate for damage so that their productivity may be slightly and temporarily increased.

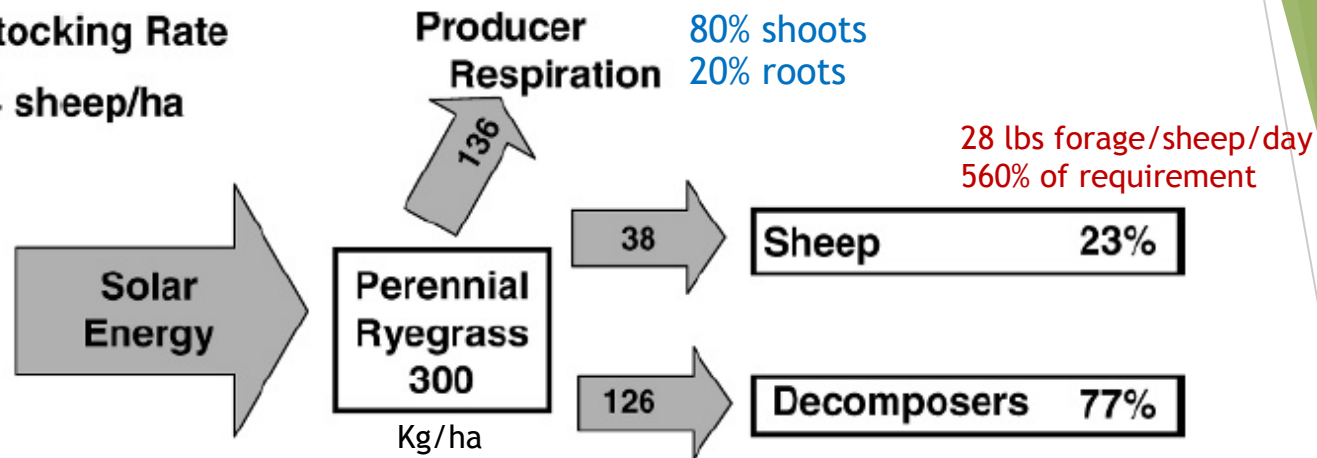
Nothing in his work or that of others has suggested that high levels of defoliation can produce sufficiently high and sustained levels of compensatory growth under field conditions to increase grassland productivity under grazing. More commonly, high levels of defoliation will lead to significant reduction in productivity.

See next two slides for some interesting mathematics describing the effects of grazing intensity on the physiology of plant growth and productivity...

Parsons et al., 1983. The physiology of grass production under grazing

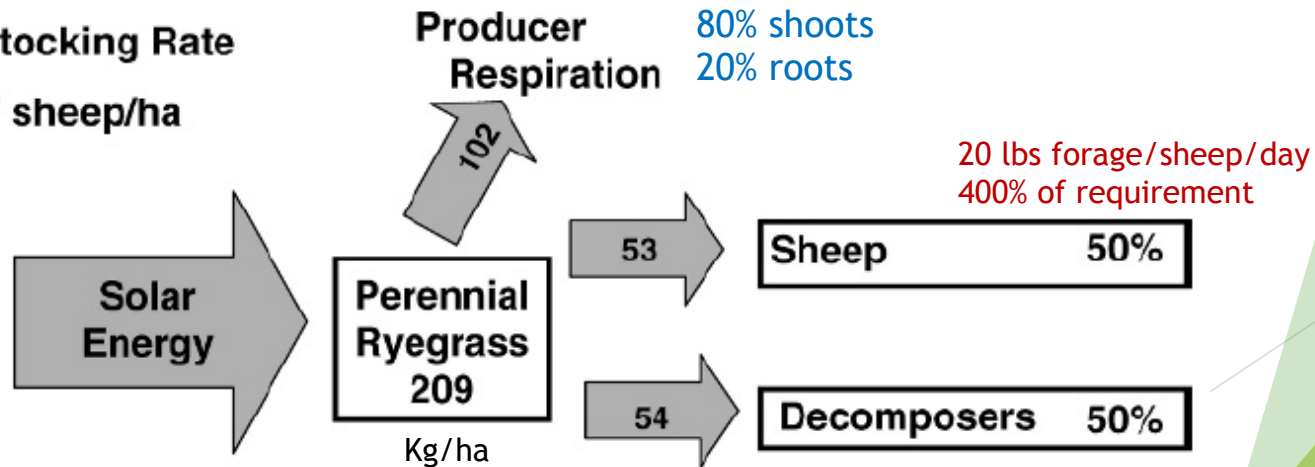
A. Low Stocking Rate

LAI=3; 24 sheep/ha



B. High Stocking Rate

LAI=1; 47 sheep/ha



Parsons et al., 1983. The physiology of grass production under grazing

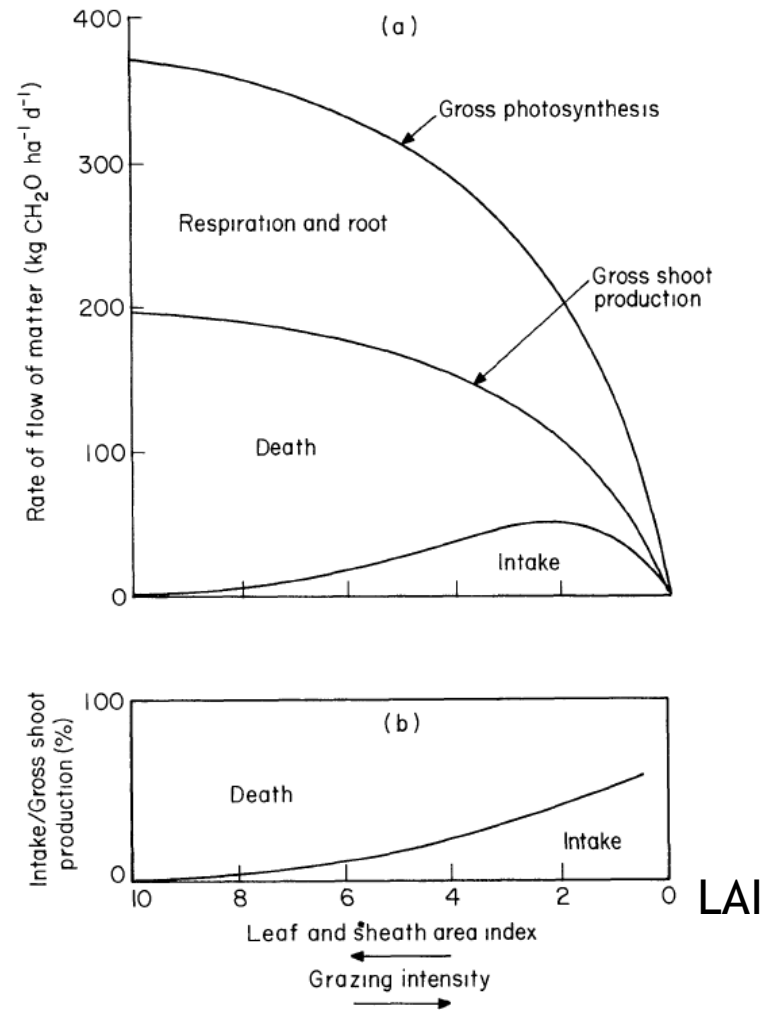


FIG. 5. Results of an analysis to demonstrate the physiological limitation to production under continuous grazing. The diagram (a) shows the relationship between the uptake and loss of matter, and the animal intake that can be achieved in swards maintained at each of a wide range of LAI. The relationship between shoot production, intake and death is redrawn in (b) to describe the proportion of the shoot that is harvested rather than lost to death.

'Holistic'/'Planned' Grazing Management: What does Savory/HRM get right?

1. Active and flexible land management practices require **regular, consistent monitoring records**
 - a. Record-keeping systems tuned to inform specific management actions
 - b. Records need to be objective and accurate enough to reveal errors in the managers' own opinions and assumptions, when they are present
2. Cultivating a **formal planning process** that engages and involves everyone involved in the enterprise is an effective, if difficult, approach.
3. Enterprise **goals** need to be established at the system level, with management **objectives** addressing the elements (see 1.a.) needed to achieve the goals.
4. The **planning process must be dynamic**, capable of responding to changing conditions and circumstances

These do not seem materially different from similar tools used in “adaptive management” processes, which were most recently organized and promulgated in the 1990s and early 2000s, although there are evidences of cultures using them centuries ago.

My view on the perpetual ‘Holistic’ versus ‘Reductionist’ thumbwrestling contest

The approaches that people routinely take to understand the world have sometimes been classified into two opposite forms: holism and reductionism. These approaches have been at work and in tension since the beginnings of recorded human history.

Reductionism is the philosophical view that the world and its workings are best understood in terms of the ultimate constituents and forces that define their relationships.

Reductionism is commonly used in scientific efforts, but all reductionistic approaches are not necessarily legitimate science.

Adapted from Raman, 2005

The perpetual 'Holistic' versus 'Reductionist' thumbwrestling contest

Holism is the philosophical view that by considering the whole picture one gets a deeper and more complete view of a situation than by analyzing it into its component parts, i.e. that a system consisting of several recognizable parts has properties which are not present in any of its component parts. The properties of a forest are different in many respects from those of its individual trees.

While holism is often represented as anti-science, and commonly used by some to rebut scientific explanations, it is a perspective commonly adopted and examined by many scientists - especially in integrative and applied disciplines.

Adapted from Raman, 2005

The perpetual 'Holistic' versus 'Reductionist' thumbwrestling contest

When we focus on the reductionist and separateness aspect of the phenomenal world, we get one vision of reality. When we focus on its holistic feature, we experience another vision of reality. Each is relevant and important in its own context.

Each mode of apprehending reality is meaningful and satisfying in its own way, but neither is a complete description of reality.

From this perspective reductionism and holism are somewhat like the microscope and the telescope: two powerful instruments to explore the world, one revealing the smallest constituents of what makes up the world, while the other is sweeping the cosmic grandeur and makes us aware of the unity behind the diversity.

Raman, 2005