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COOPERATIVE
riparian
RESTORATION

Washington State University Extension
Western Center for
Risk Management Education

Ridgetop to ridgetop non-point source water quality solutions

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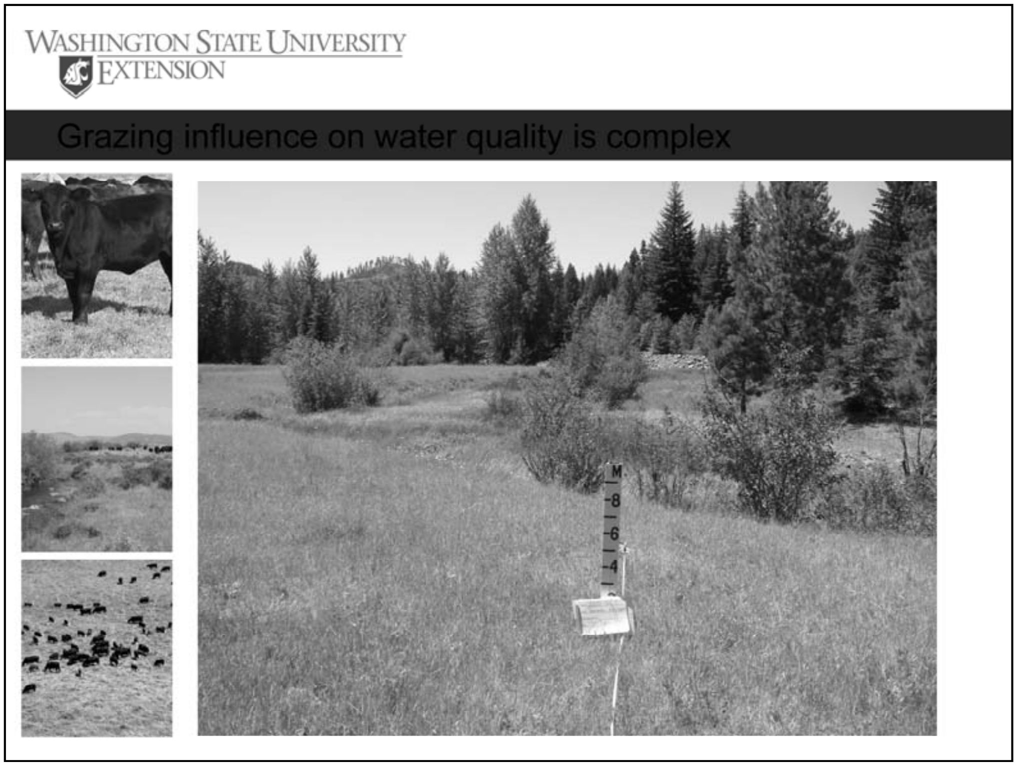
AGRICULTURE | YOUTH & FAMILIES | HEALTH | ECONOMY | ENVIRONMENT | ENERGY | COMMUNITIES



Summary of wildland WQ research.

E. Coli used as an indicator for the possible presence of pathogenic organisms.

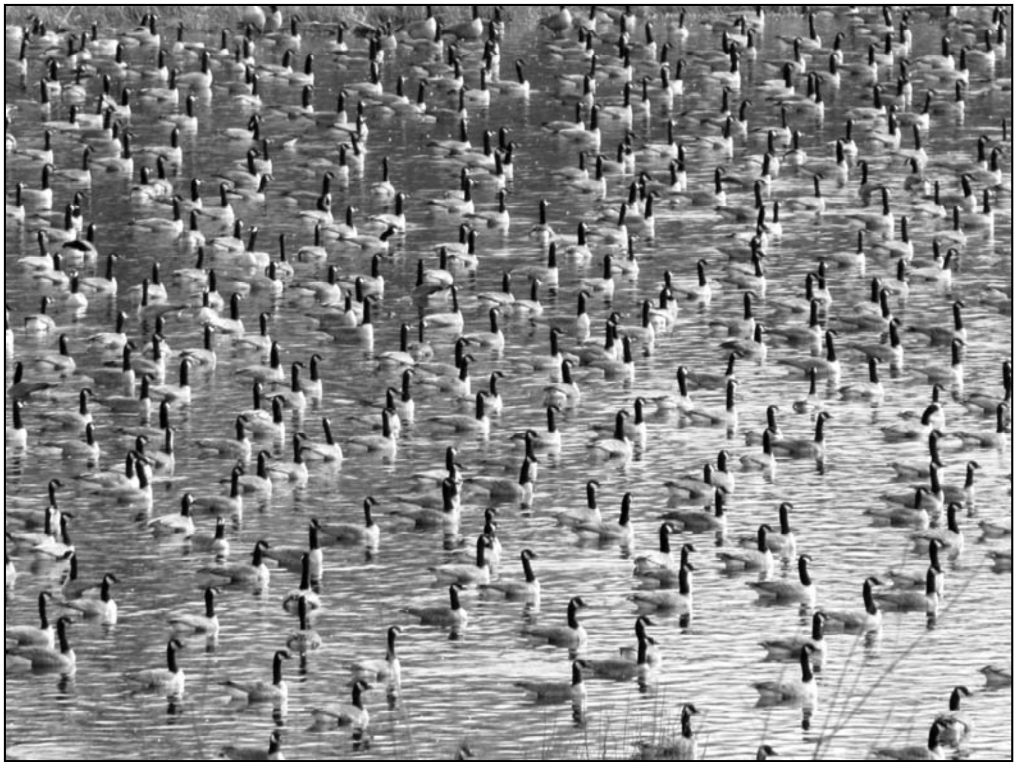
The presence of domestic livestock elevates e. coli levels.

Grazed is typically higher than ungrazed but nearly always below standard for primary contact water but above drinking water standard. Ungrazed watershed nearly always exceeds drinking water standard as well.

We have water quality laws for a reason. Good intentions arising from real problems shouldn’t, however, turn into a tool for punishing people where there are not problems.

There is a world of difference between the two sites shown in my first two slides. This is another example of grazed v. grazed. What’s the difference in management? Time and timing. Not stocking rate. What’s the difference in ecosystem goods & services? Forage yield, riparian habitat quality, water-holding capacity, flood abatement, aquatic habitat quality, and of course, water quality.

Water quality? Who knows. Could be okay, could be awful. Problems? Weed infestation, reed canarygrass choking other species out, >6” thatch. Very likely heavy rodent population and bacteria export, possibly more than before exclusion. Livestock control necessary to improve stream morphology and improve riparian function. But permanent exclusion of cattle here would not be predicted to improve water quality OVER NON-EXCLUSION ALTERNATIVES.



Is the goal to protect human health or to reduce the livestock contribution of fecal material to a stream? If human health, it is irresponsible and duplicitous to ignore wildlife inputs.

Further, if we attempt to say that the goal is reduce anthropogenic inputs of bacteria, where does that line get drawn? Rodents protected under heavy thatch created by exclusion fence? An elk feeding station with a rain-on-snow event? Ponds built for habitat improvement or sediment control

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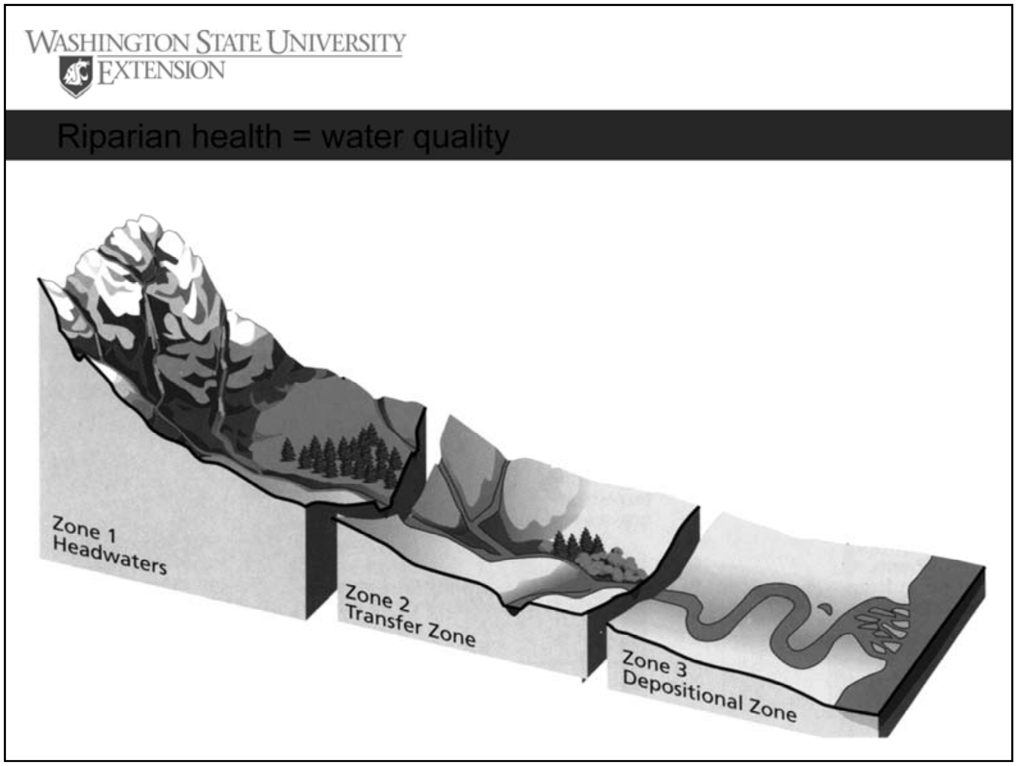
Riparian health = water quality

Western Center for Risk Management Education grant project

- Financial risk
  - Fines for violation
  - Costs for fixing problems
- Production risk
  - Reduced forage yield/ac
  - Reduced forage quality
  - Decreased animal health
- Environmental risk



It is the nature of riparian ecosystems to support a diversity of life forms, most of which have fecal coliform bacteria in their digestive tracts. It is also the nature of stream systems to filter out that fecal material. The input and subsequent assimilation of that material operates in a kind of dynamic equilibrium, much like the stream processes of degradation (suspension and movement of sediment) and aggradation (deposition of sediment downstream that raises the streambed). System differs from system in how much fecal coliform bacteria is natural at background levels. There are also a number of causes for natural spikes in FC, independent of domestic livestock.

The primary objective of this project is to connect upland and riparian health to water quality, and to use specific attributes of riparian areas identified through a qualitative assessment procedure to guide management changes designed to created proper functioning condition and thereby improve water quality.

Pasture quality indicators

1. Species diversity
2. Deep-rooted plants (no depth without height)
3. Multiple legumes present (representation from each functional group)
4. Dense plant distribution
5. No bare soil (minimal bare soil if less than ~20” precipitation)
6. Even growth – no patchiness, often an indicator of poor soil or poor grazing management
7. Few weeds, indicators of poor soil quality
8. No soil loss

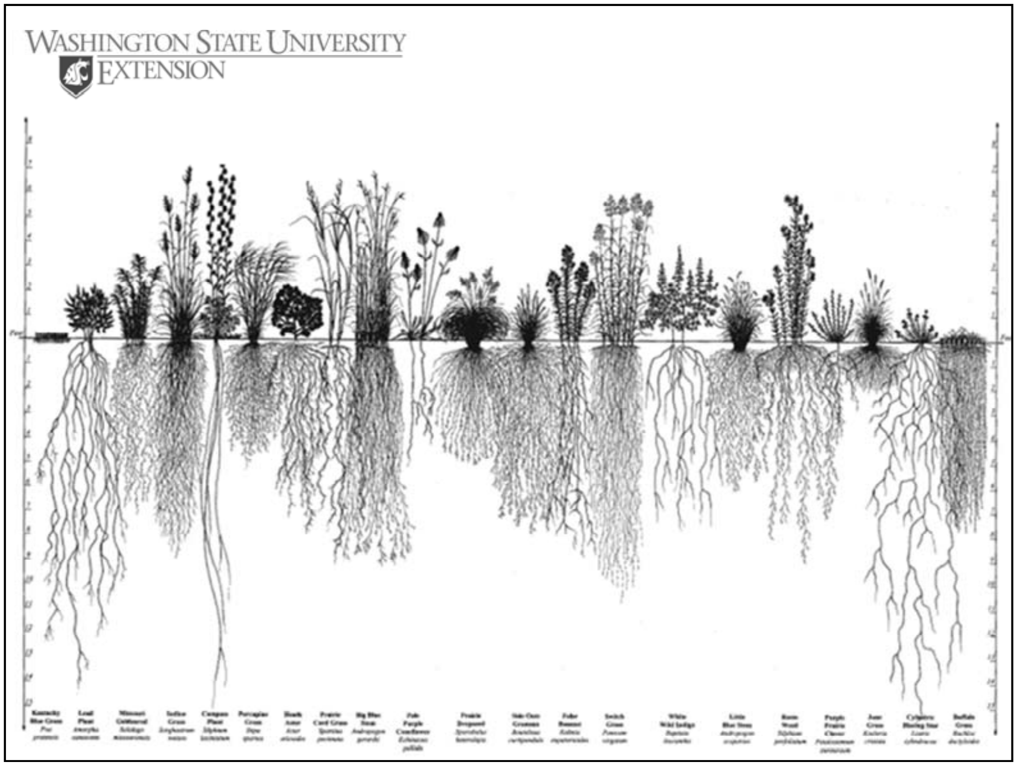
The term “sustainability” has nearly become useless, but I like to retain at least the three dominant components of the classical understanding of sustainability : ecological, economic, and social

Economic incentive to maintain healthy vegetation and water quality. This situation is bleeding red ink. The pathogens we are concerned about for human health are also detrimental to livestock: E. coli, cryptospiridia, salmonella, giardia, etc.

Profit: Subclinical animal health problems represent a sleeping profit killer in the livestock industry. You can lose money be spending too much on animal pharmaceuticals because of unhealthy (acute) illnesses, etc. OR you can lose money by having most of your herd be "poor-doers"; sacrificing rate of gain, feed efficiency.

Imagine that this lot has short plant crowns between the dirt clods.

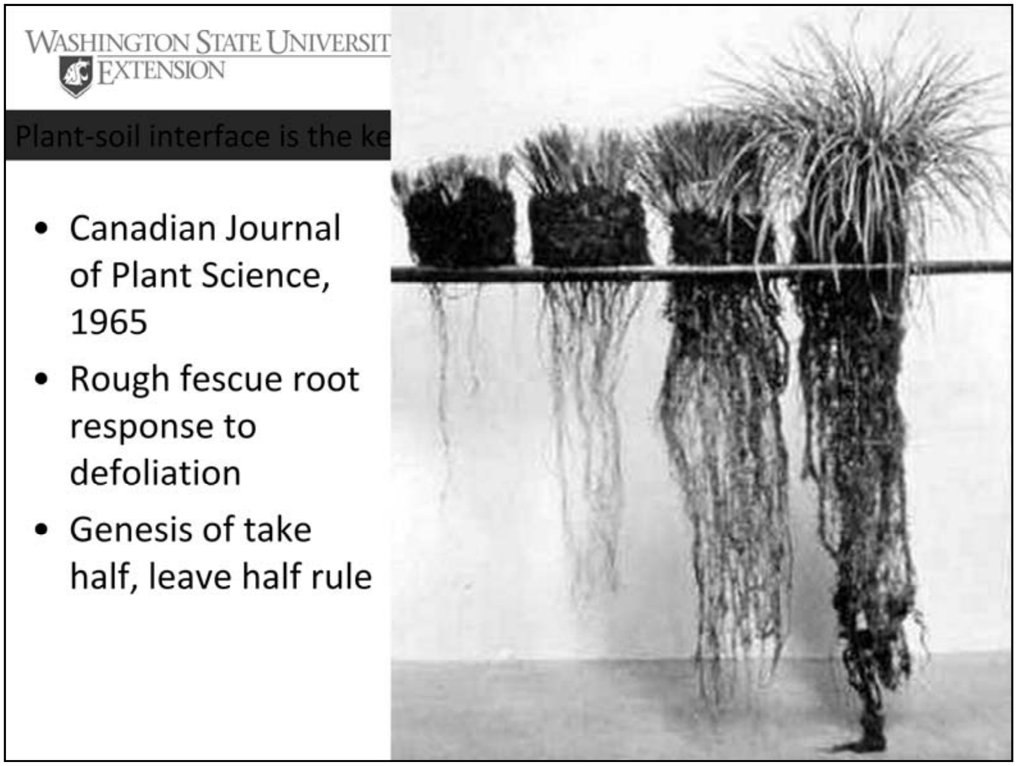
Healthy pastures maintain strong immune systems, avoid unnecessarily severe challenges to immune systems (pathogen, ectoparasite, and endoparasite load).



What is typically missing in grazing schedules that fail to protect streambanks and maintain wetland-obligate species is an adequate recovery period. Stocking rate may be appropriate for the available forage in a given grazing unit, whether 20 acres or 20,000, but if the duration of grazing pressure is too long, riparian vegetation suffers. The take-home message for producers: plan for shorter grazing periods, which may mean increasing the number of paddocks within a grazing unit or allotment. The goal is BITE EACH PLANT ONLY ONCE. Season-long grazing rarely works except in very large units with very light stocking rates where active herding strategies are used to properly distribute livestock and prevent overuse of riparian vegetation.

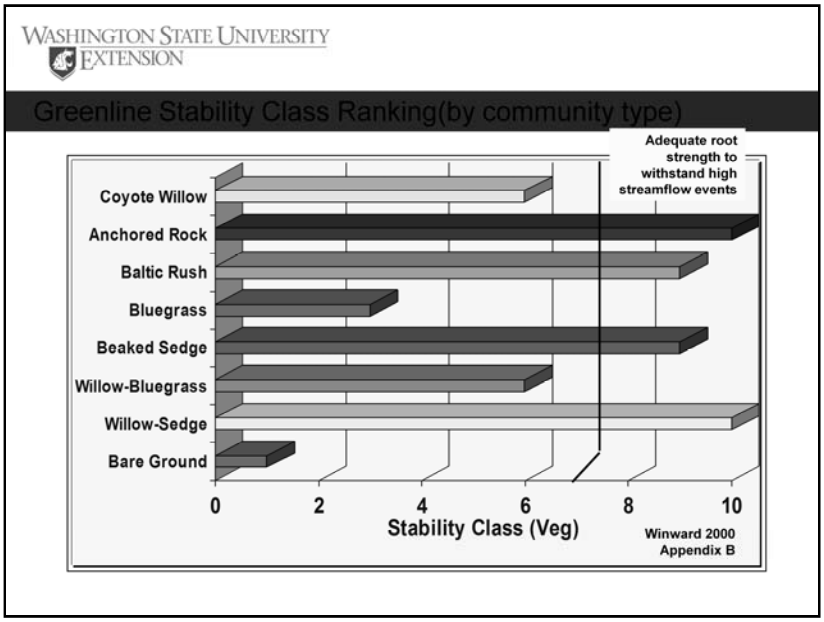
Results of season-long grazing

1500 lbs DM/ac is approximately the threshold for minimum standing forage to support optimal intake. Less than this, and animals are spending too much energy trying to get a mouthful.



Here’s what’s going on beneath the soil surface.

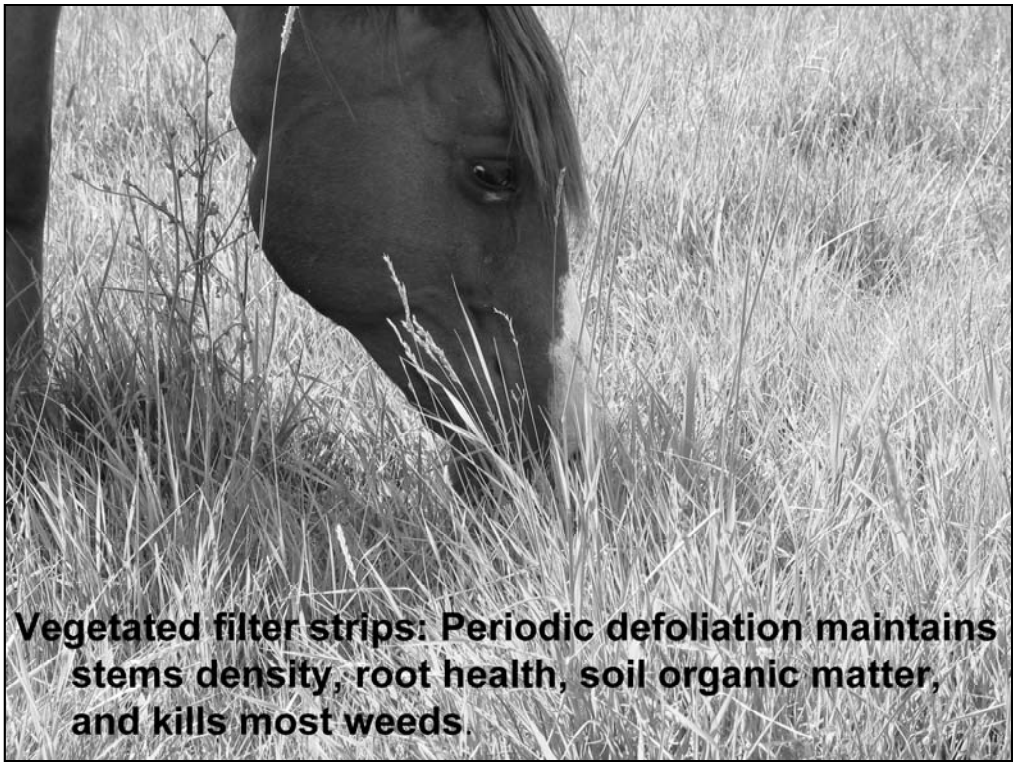
The key to healthy, high-yielding pastures is maintaining adequate residual leaf area. 30 years ago it was believed that managing carbohydrate storage in roots and crown was the key to pasture health. It is now known that most species store very little carbohydrates in the roots and crown – most of the storage is in the first 3-6” of stubble, and there is just enough to initiate growth and generate some photosynthetic leaf tissue. This is why pastures going into winter with 1” stubble are late greening up. Stubble is also important for protecting meristems (growing points) in plant crowns. In cool-season grasses, the dominant stored carbohydrate is fructosan, a relatively sweet molecule. Ruminants readily consume this stubble. Once plants are up, regrowth following partial defoliation from a grazing event is directly related to how much solar panel is left behind. More green equals more photosynthesis and a faster rate of growth.



Dr. Alma Winward developed a list of riparian communities and their stability class (veg), ranging from 1 (least) to 10 (greatest), rating its ability to buffer the forces of moving water. The rating is based on the strength, amount, and depth of roots, as well as special leaf and crown features (Winward 2000).

You can see the strength of willow/sedge communities compared to Kentucky bluegrass or even willow/Kentucky bluegrass.

It is estimated that a stability class of 7 or higher is needed for adequate root strength to withstand high streamflow events. There is a general consensus that most streams require at least 70% of their potential late seral types to be minimally functional (Elmore and Winward 2007).


Vegetated filter strips: Periodic defoliation maintains
stems density, root health, soil organic matter,
and kills most weeds.

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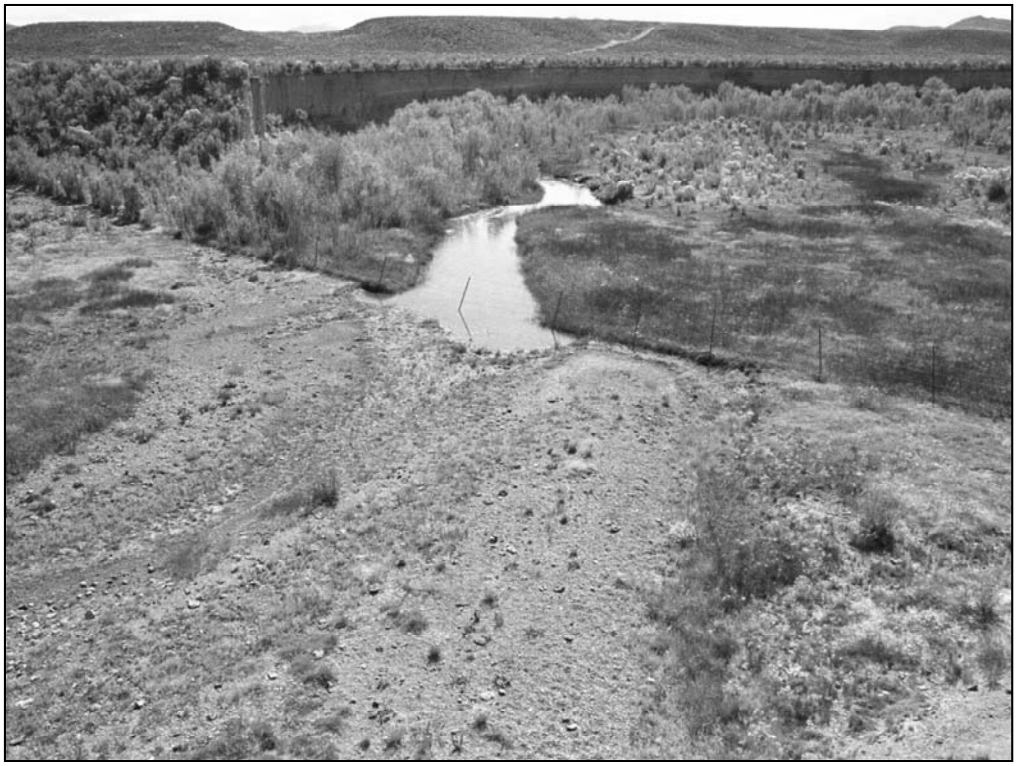
Riparian health = water quality



Proven strategies to maintain health

1. Shorten duration of use
2. Change timing of use from year to year
3. Provide off-stream water where possible
4. Establish riparian pastures
5. Hot-season grazing must be short duration
6. Utilize other upland distribution tools
   a. Supplement
   b. Salt
   c. Herding



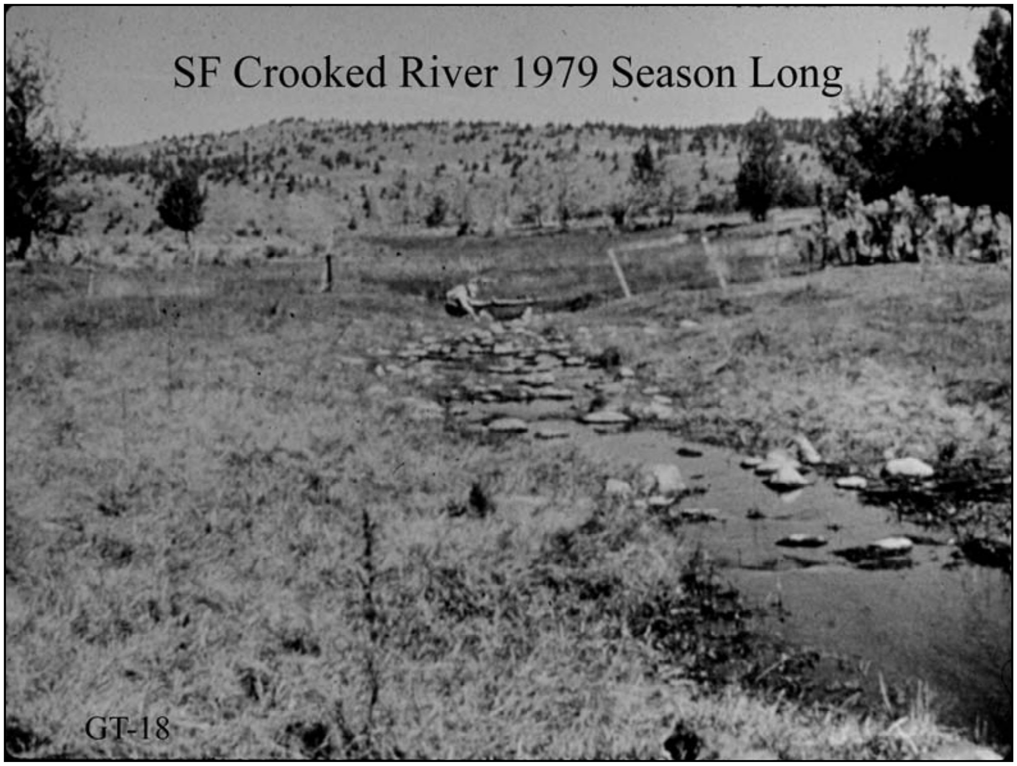
Overgrazing is simply providing inadequate rest period following a grazing event for the plants to fully recover.

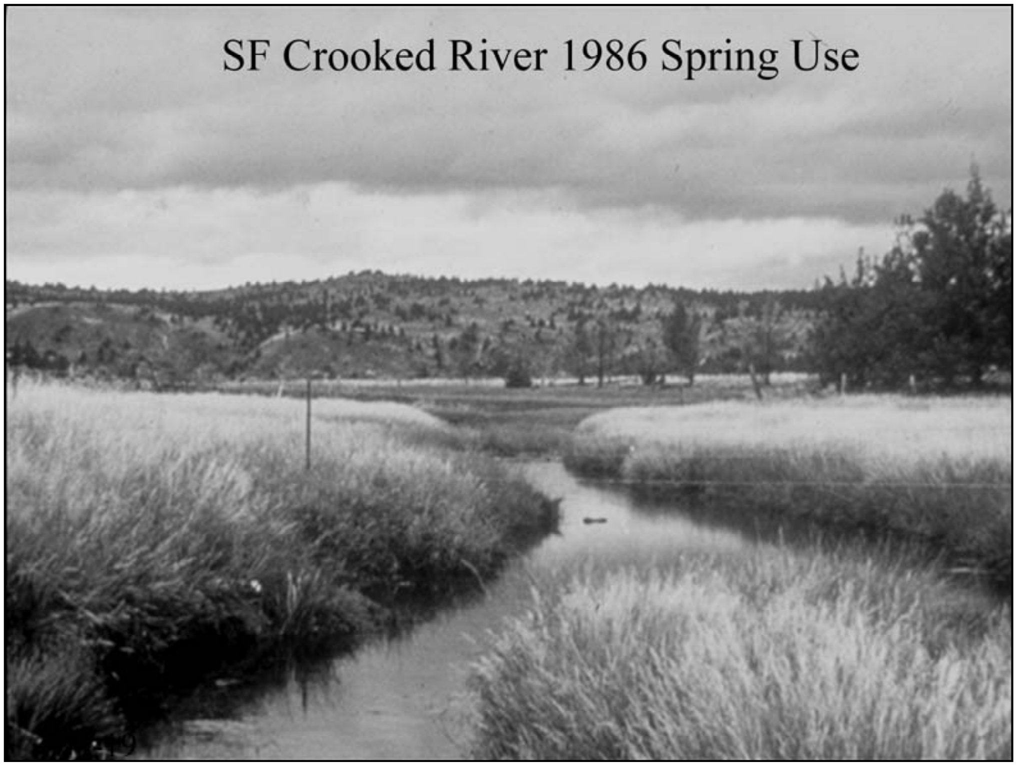
Recovery means:

3 new leaves

Double height?

Often is 25 – 50 days for cool-season grasses


SF Crooked River 1979 Season Long
GT-18


SF Crooked River 1986 Spring Use

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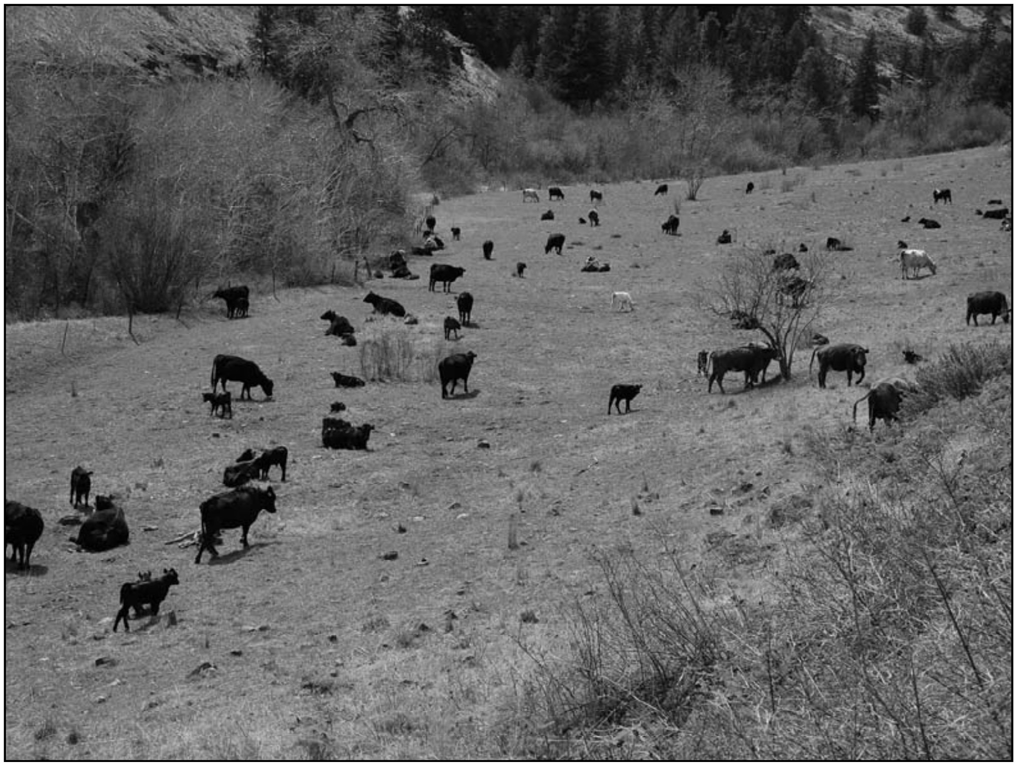
Bear Creek (3.5 Miles)

	1978	1994
Riparian Area	3.8 acres	12 acres
Bank Erosion	12,448 feet	799 feet
Water Storage	500,000 gal/mi	2,096,000 gal/mi
Production	200 lbs/acre	2000 lbs/acre

Data from C. Rasmussen (1996) and W. Elmore

Additional data: AUMs increased from 75 AUM's in 1977 (25 cows for three months-June, July, August) to 250 AUMs during February, March and April in 1994.

The plots have not been clipped since 1994, but professors from Oregon State University Range Science Department estimate that production is now over 3,000 pounds per acre and bank erosion is less than 100 feet.



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RESOLVING ENVIRONMENTAL, FINANCIAL, AND LEGAL RISK

2012 riparian grazing & water quality workshops

May 21–22 in Mt. Vernon
May 24–25 in White Salmon

Participants will learn to:

- Assess riparian health using Proper Functioning Condition
- Identify risks to water quality
- Manipulate livestock behaviors and vegetation characteristics to achieve landscape goals
- Design grazing strategies to improve riparian health and water quality
- Implement cost-effective monitoring methods to evaluate results
- Link environmental health to profitability

To register, call 509-962-7507 or email hudsont@wsu.edu