Riparian Areas and Grazing

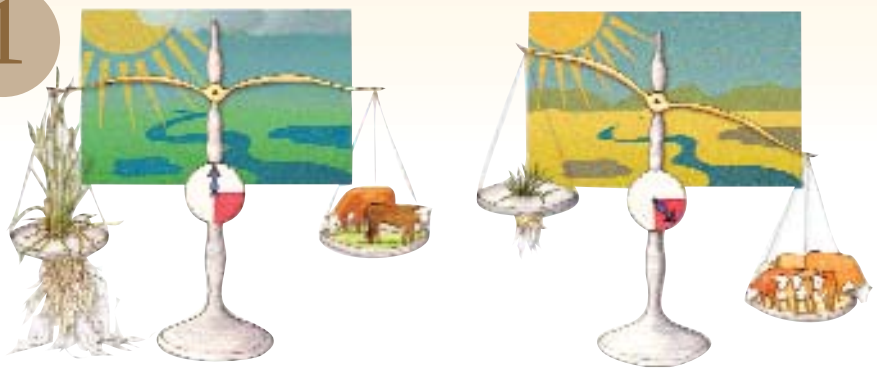
Range 101

Principles that Promote Healthy Riparian Vegetation

Healthy riparian areas are a foundation for your livestock operation. It begins with an understanding of the principles of range management and applying those principles to build and maintain the riparian foundation.

Good range management practices imitate the natural system and foster healthy native plant communities. The four key principles of good range management are:

1



Balance is the first principle to be achieved. Without it, a solid foundation for riparian and range management can't be built.

Balance animal demand with the available forage supply

- This means harvesting forage but leaving enough carryover or grass residue to protect plants and soil, conserve moisture, plus trap sediment.
- It's about understanding carrying capacity and setting annual stocking rates that don't exceed the available forage.

2

Distribute livestock evenly

- This means choosing from a long list of management tools to spread the grazing load over the landscape.
- It's about not allowing livestock to linger and overuse an area.

3

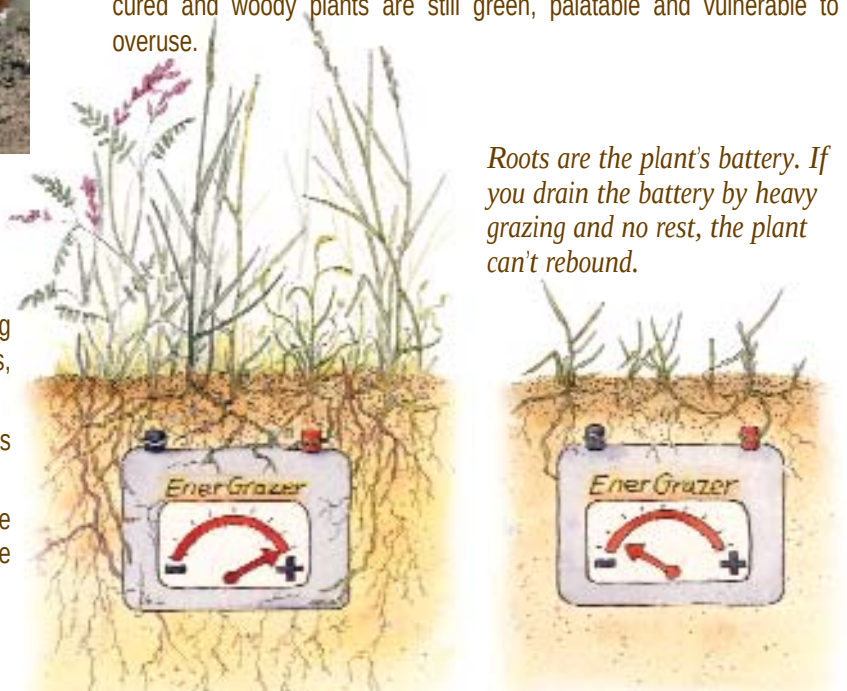
Avoid or minimize grazing the range or pasture during vulnerable times

- For riparian areas this may be when streambanks or shorelines are saturated with moisture and vulnerable to trampling.
- It could include times, like late summer or autumn when grasses have cured and woody plants are still green, palatable and vulnerable to overuse.

4

Provide effective rest after grazing

- Give plants time to rest when growing conditions are favourable to rebuild roots, energy supply and vigour.
- Energy stored in the roots of plants is needed to initiate growth in the spring.
- To be effective, rest has to occur during the growing season, not before or after the growth period.



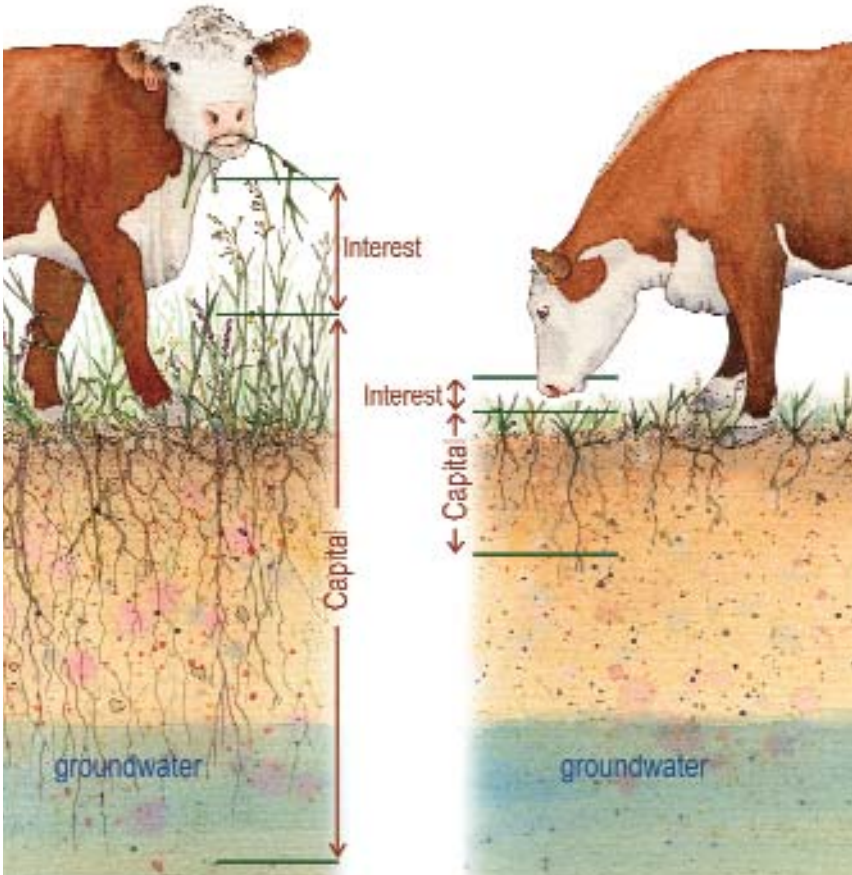
Roots are the plant's battery. If you drain the battery by heavy grazing and no rest, the plant can't rebound.

Maintain Your Range Capital - Live Off the Interest

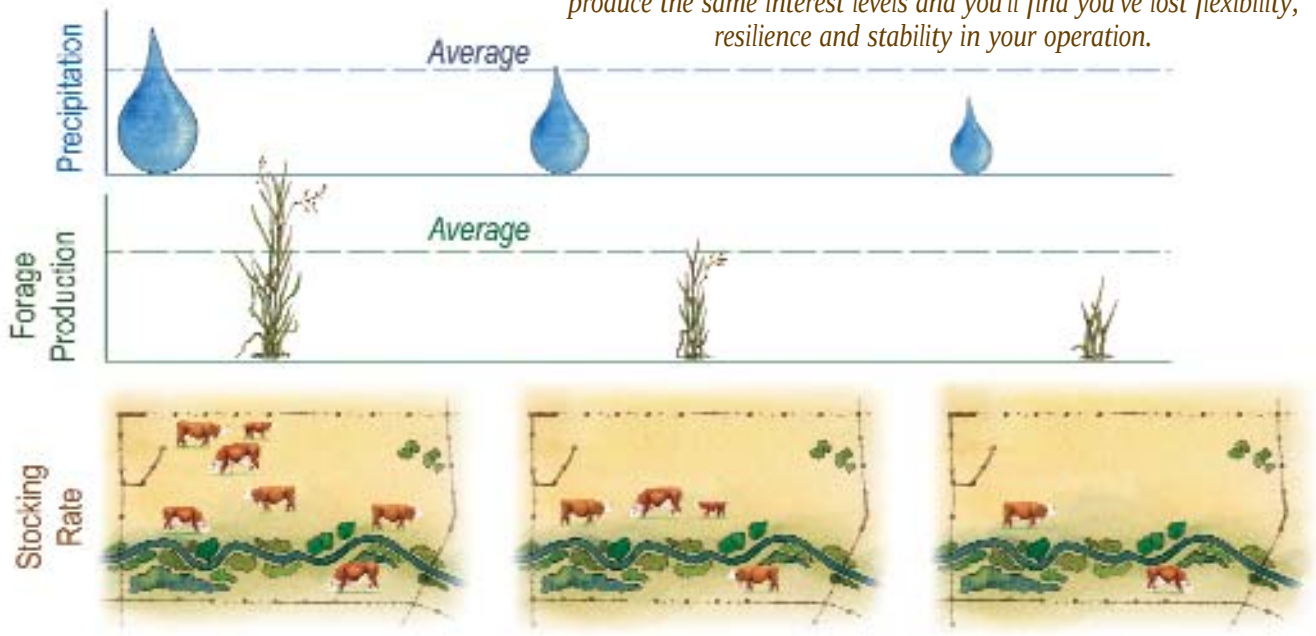
How do you know how many cows to graze on a pasture? To maintain your pasture and any riparian areas in that pasture you should be thinking about these things:

- how much forage is being produced?
- how much does a cow eat?
- when I do the math how many cattle can be safely grazed, and for how long?

Carrying capacity is the maximum amount of forage that can be grazed while still maintaining the plant community. It's like the red line on a tachometer. Running the engine consistently above the red line will shorten engine life and may cause it to break at an inopportune time. There is much wisdom in the old stockman's saying; "if you keep down the shoot, you'll kill the root". Grazing or browsing too much of the leafy material, the collector of solar energy, will wear the plant down and reduce its ability to store energy in its roots for regrowth in the next season. Heavy grazing, over long periods of time, results in shallow plant roots. This makes the plant dependent on surface moisture instead of tapping deeper, more abundant supplies of water. Pastures can become very vulnerable to drought conditions with a combination of shallow roots and no litter to conserve available moisture. A conservative level of grazing, which leaves forage as carryover helps retain moisture for additional growth. *"It takes grass to make grass."*



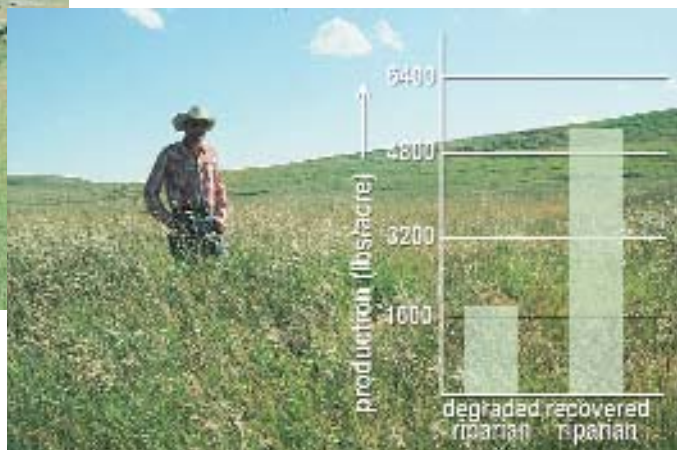
In your range or pasture bank account you have capital - the plants that sustain your operation. If that capital is maintained and managed well, with attention to carrying capacity and other range management principles, your investment will pay handsome dividends of grass interest on a sustainable basis. However, if you dip into the capital, it can't produce the same interest levels and you'll find you've lost flexibility, resilience and stability in your operation.



The primary limiting factor for plant growth is water. There is considerable variation in precipitation in Alberta, on an annual basis and variation between years. That variation causes forage quantity, and therefore the number of livestock that can be supported on a pasture, to vary. Planning your pasture use on the basis of average or high precipitation values could have you coming up short of forage in some years.

The Waldron Ranch - Making Change Pay Off

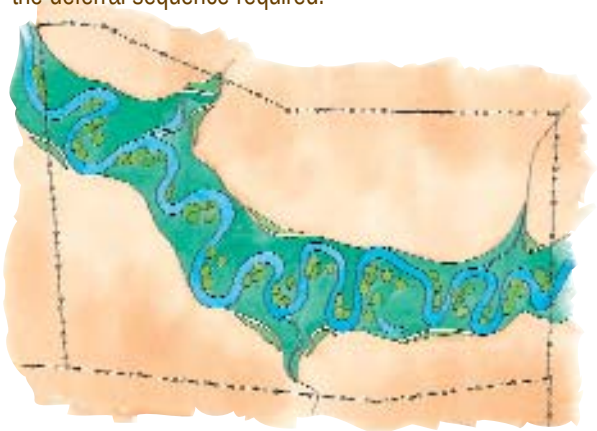
Callum Creek field under continuous grazing.



A change to rotational grazing, from a season-long, continuous style, produced a significant response in forage production. Forage production went from pounds/acre in 1988 to tons/acre in 1997.

The Waldron Ranch, a producer-owned and managed co-operative in southwestern Alberta, became concerned in the 1980s over bank trampling and erosion of Callum Creek, and serious declines in range condition and productivity of the floodplain pastures. It was determined that the problem was a combination of a season-long, continuous style of use, poor distribution in many fields (including overuse of riparian areas) and prolonged drought conditions. Changes were made that included a reduction in grazing period, more frequent moves of livestock, and deferral of grazing, to provide growing season rest to plants. The most important change was a greater attention to carrying capacity to build flexibility into the grazing system. Following these changes dramatic increases in forage yields (up to three times as much as before) occurred on the floodplains, providing a much more stable forage base over a range of moisture conditions. Increased forage yields are a reflection of improvements in plant species composition and plant vigour. The new grazing rotation did not require any new capital costs like watering sites or fencing. The big change was in animal management- moving livestock from field to field as grazing use and the deferral sequence required.

The recovery of Callum Creek has been accompanied by deep-rooted forage species, new willow growth and improved bank stability.

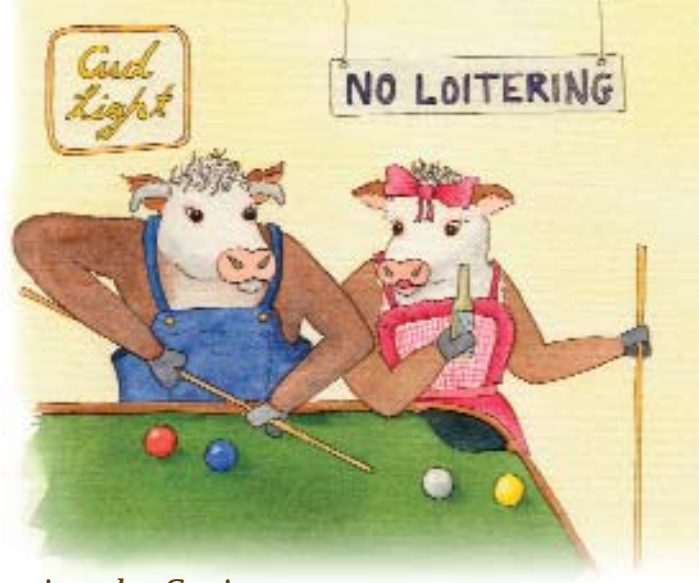


The riparian portion of this Waldron Ranch field makes up only 54% of the pasture, yet, in good range condition it can supply 82% of the forage. That's a big return for careful management of a small area.

Healthy riparian areas contribute substantially to forage yield in a pasture.

What Can We Learn from the Natural System?

The Canadian plains evolved with millions of grazing animals. Bison impacts on prairie, parkland and foothills ranges and riparian areas could, at times, be severe. However, these impacts were short-lived and riparian areas were maintained over thousands of years. The key feature of the natural system was that after there was grazing, there was rest and, often, long periods of rest.



Bison impacts on the prairie and foothills ranges were often severe, but after grazing there was rest. The yearly cycle of bison migration that incorporated summer use of the plains with winter use of the foothills and parkland provided effective rest for the riparian areas.

"They chased him (the Bison) and hunted him and blessed his beef and cursed his habit of filling every slough and water hole with mud and excreta."

"... they gagged when they drank the brackish water full of wigglers or nauseous with buffalo urine."

- experiences of the border surveyors from <u>Wolf Willow</u> by Wallace Stegner

Compressing the Spring

When grazing is too intense, or happens during vulnerable periods, or occurs without rest, or when distribution is poor, livestock can hold down the "spring" of riparian plant succession.

Releasing the Spring

When grazing management principles are carefully applied and in balance, riparian plant communities will "uncoil" and deep-rooted plants and woody species are released. Boing!

No Loitering Permitted!

Grazing, regrazing and trampling will damage vegetation and soil. In the natural system localized impacts were short-lived because animals did not loiter for long periods of time and use was followed by rest.

Early travellers often noted severe impacts to streams and wetlands from migrating herds of bison. Natural events such as floods, grazing from native ungulates, fire, drought, beavers and landslides did affect riparian condition and the results of these disturbances meant health could vary over time and from reach to reach. Because of the natural resilience of these systems and the long return intervals between use or disturbance, it is likely riparian areas healed quite quickly.

Long Grazing Periods Will Stress Riparian Areas

Long grazing periods allow cattle to graze where and when they choose to, not where and when we want them to. These long grazing periods fail riparian areas on all four range management principles.

Poor Distribution

- animals prefer to graze and loiter in riparian areas.
- they will stay there unless moved.

Vulnerable Period Use

- animals are present through all the vulnerable periods such as when banks are saturated and fragile or when woody species are susceptible to over-browsing.

No Rest

- favoured plants are grazed, then regrazed when they should be allowed to rest and recover.

Continuous, Heavy Grazing

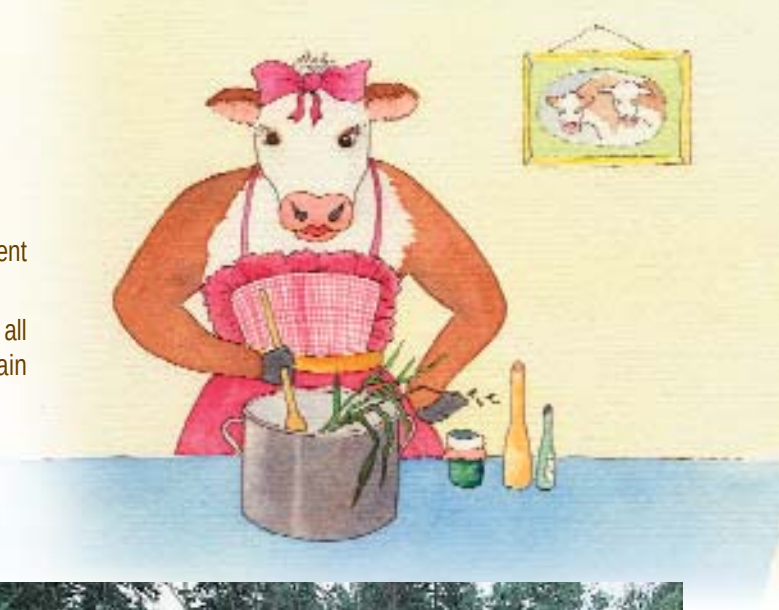
- animals loitering or making frequent visits for water will graze and regraze riparian vegetation to a short stubble, before grazing the uplands.
- insufficient carryover or grass residue is left to protect plants and soil.

When livestock are allowed to graze riparian areas for extended periods, especially under a season-long or continuous type of use, riparian areas will become degraded. Shortening the grazing period starts to fix the problem.

Ingredients for Success -
What is the "Right Stuff"?

By putting into practice the principles of good range management you can achieve a number of key conditions in riparian areas.

These conditions produce a common thread that runs through all successful riparian grazing strategies, ones that maintain productive riparian areas.



Healthy Vegetation

- rest and regrowth produce vigorous, productive riparian plants,
- energy stored in roots will sustain healthy riparian growth,
- healthy plants build strong streambanks and shorelines,
- healthy plants have deeper root systems, can tap deeper water and can withstand drought better,
- woody vegetation adds reinforcement,
- plant species diversity adds forage and shelter values.

Enough Vegetation During High Water

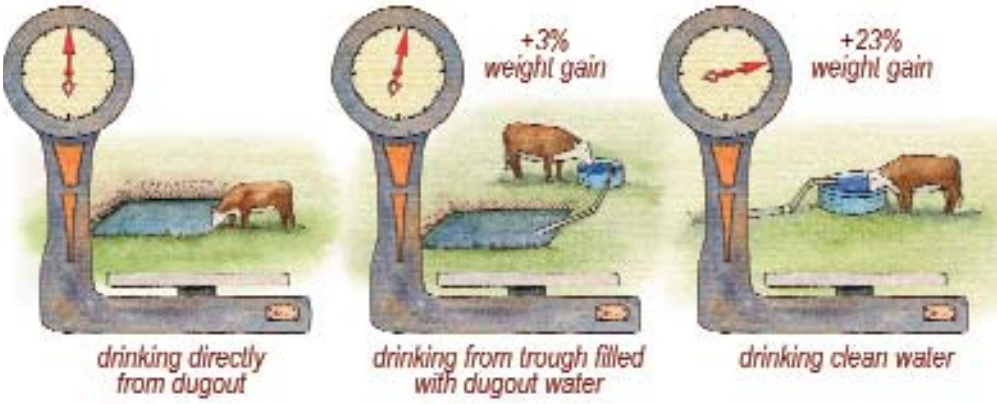
- dissipate stream and wave horsepower,
- trap sediments and build streambanks and shorelines,
- build ground water reserves,
- maintain stream channel shape.

Protection During Vulnerable Stages

- protect banks from trampling when fragile,
- protect brush species during periods of dormancy,
- maintain productive forage species.

A Word About Water

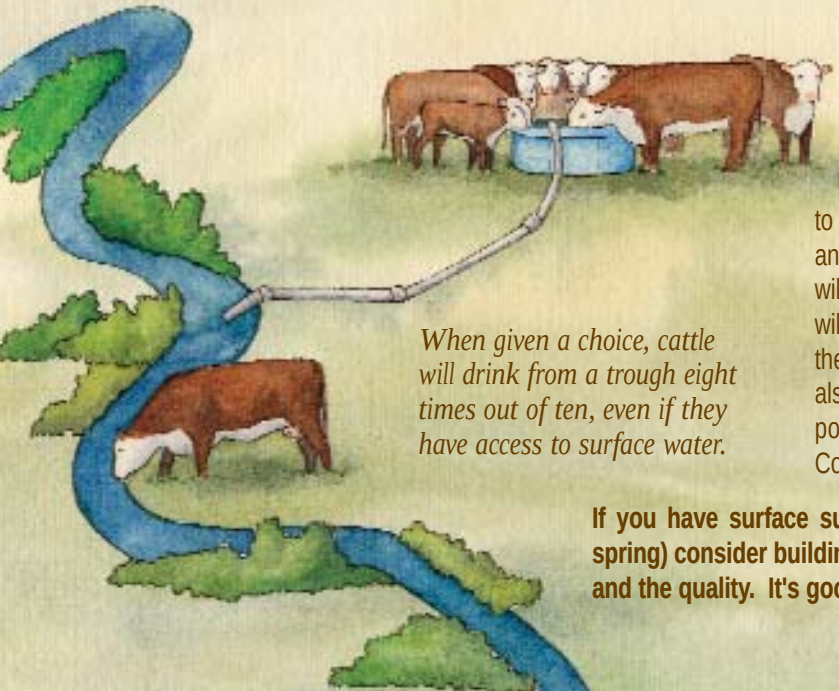
Water is important! It's not just grass that makes beef; it takes water to process food during digestion. Water is the most important nutrient and is often overlooked. Water shortage seriously affects the productivity of livestock. A cow eats about 12 kg of forage a day (measured as dry material) and requires 40 to 60 litres of water to digest that forage. Water quantity is one factor affecting livestock performance; water quality is also an important consideration. Livestock prefer to drink clean water. Cattle that drink clean water spend more time grazing and ingest more forage. Cattle gain more weight, when clean water is available to them, compared to watering directly from a pond or dugout. Research suggests water palatability, or taste, determines how much water cattle will drink and how long they will spend drinking, to meet their needs.



Clean water produced 23% greater weight gains for yearlings compared with direct access to dugouts or ponds. Pumping water to a trough from a dugout produced 3% greater weight gains (water quality does not change much). Livestock perform better with cleaner water!

When livestock have unrestricted access to surface water, they can contaminate that supply. While drinking, cattle will drop a load in that water about 25% of the time. Given a choice, cattle avoid water fouled by even small amounts of manure. Animal manure in water encourages algae growth. A kilogram of phosphorous, derived from animal manure, will spark the growth of 500 kg of algae. Coupled with other nutrient sources, lakes, ponds, dugouts and sometimes rivers and streams can experience large algae blooms. This strongly influences water palatability and some algae may be toxic to livestock.

How can we improve water quality, aid livestock distribution and increase livestock performance? Research suggests that choice can be provided to livestock, often without fencing, by piping or pumping water from surface sources to troughs. In the trials, livestock overwhelmingly selected troughs over surface water supply, even though no fences were present to restrict access. Often cattle would walk further to water at a trough than drink from a stream. Some of this must have to do with the difficulty of access to some surface water - wading through mud on the edge of a dugout or negotiating a steep streambank. It may also be related to animal security and comfort - the ability to see the surrounding area while drinking. Whatever the reason, it seems to work.



When given a choice, cattle will drink from a trough eight times out of ten, even if they have access to surface water.

Because off-site water changes livestock distribution, it reduces the risk of water contamination and better captures nutrients for plant growth in the pasture. About 65% of the manure produced will be deposited within 30 metres of bedding and loafing sites. These sites tend to be riparian areas, so moving water and providing shelter and shade away from streams, ponds, wetlands and lakes will improve water quality. Changing livestock distribution will improve the vegetation in the riparian fringe, which is the zone of critical filtering and buffering. Off-site water is also a way to extend the life of constructed dugouts and ponds, reducing cleaning and reexcavation costs. Conservation of water supply can be another benefit.

If you have surface supplies of water (a stream, river, lake, wetland, or spring) consider building an offsite watering system to maintain the supply and the quality. It's good for you, your cattle and downstream water users.

Tools and Techniques for Outsmarting a Cow

If left to themselves, livestock will graze where and when they choose. Successful riparian management requires modifying animal behaviour to control grazing patterns, timing and intensity.

1. Alter livestock distribution

- salt and mineral location,
- stock water development,
- drift or temporary fencing,
- animal placement/herding,
- alter species or class of livestock,
- alternative shade or shelter.

2. Control access to water

- provide off-stream, or off-site watering areas.
- provide ease of access through gravelled or hardened access points, that livestock will prefer to use.

3. Alter the timing of grazing when riparian areas are vulnerable

- avoid soft streambanks and shorelines or times that may be stressful to key plants such as tree seedlings and shrubs in autumn or winter.

4. Add more rest to the grazing cycle

- this enhances plant vigour, allows for bank building and allows tree seedlings to grow and reach a more grazing resistant stage.

5. Control grazing intensity

- intensity is a function of number of animals times duration of grazing.
- lower intensity results in better plant vigour and species composition.
- grazing intensity may also be regulated by providing supplemental feed.

6. Riparian pastures

- fence the riparian area into a separate pasture, with separate management objectives and strategies.
- riparian pastures increase your control over the grazing process (animal numbers, season grazed, length of grazing and rest periods).

7. Grazing systems

- a grazing system defines recurring periods and patterns of grazing and rest for two or more pastures. Grazing systems put range management principles and practices into effect.
- these grazing systems are a management tool to enhance livestock production and maintain or improve the plant community.
- when properly designed, a grazing system provides adequate rest and deferment periods to offset the impact of grazing and trampling during the grazing period.
- examples include deferred rotation, rest rotation and time controlled systems. Case studies of grazing systems are presented in the following section.

8. Corridor or exclusion fencing

- although not a favoured option for all situations, exclusion of livestock grazing may be the only option to deal with riparian grazing problems in high risk or chronic problem areas.