Water on the Ranch

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Key Principles of Water Conservation

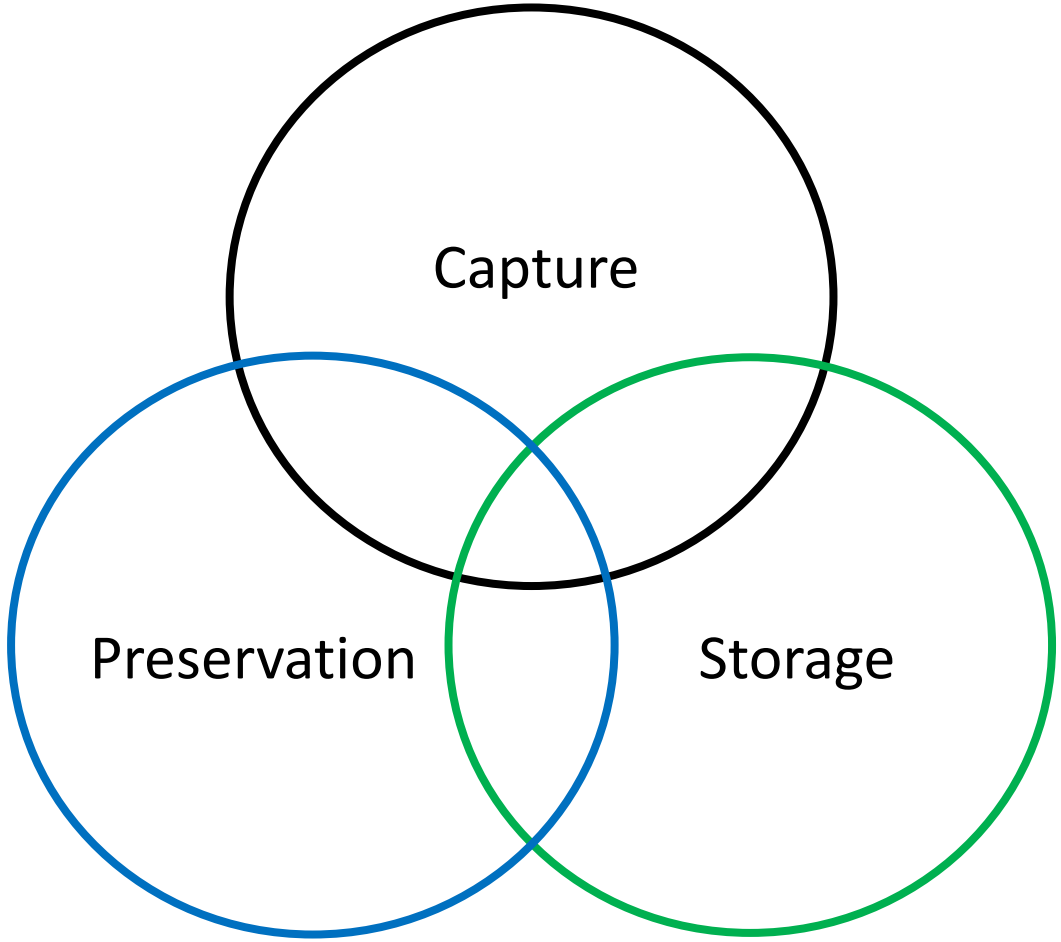



Photo: Sara Marta

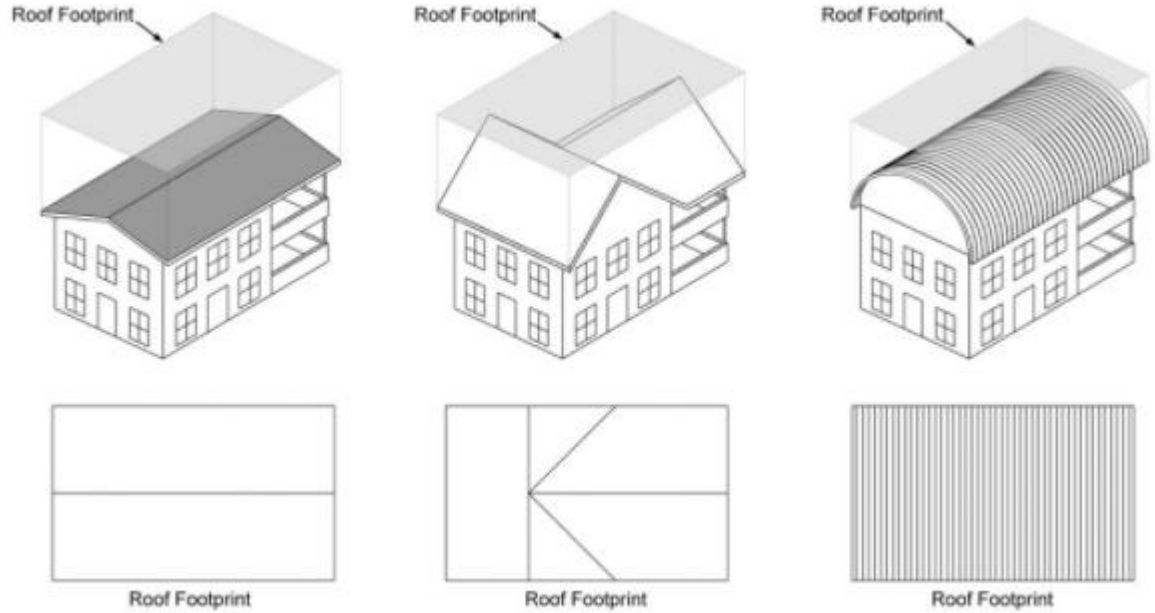
Capture

- Run-off Catchments

Capture

Capture

- Roof Catchments



Schematic by:
Texas A&M

Above ground tanks

$$\text{Harvested water (gal)} = \text{catchment area (ft}^2\text{)} \times \text{rainfall depth (in.)} \times \text{0.623 conversion factor}$$

Below ground tanks

Storage

Storage

Storage
(and preservation)

-Up to 60% of your water can be lost to evapotranspiration

-Depending on soil type, greater than 15% can be lost through seepage

How much will you have left?

Storage

Pros and cons of above- and below-ground storage systems

Storage type	Examples	Pros	Cons
Above-ground	Large purpose-built tank/disused milking tanker/recycled containers	Ease of inspection Ease of repair and maintenance of the tank and equipment Lighter and less expensive construction Easier to add or increase capacity Lower installation cost Cheaper than other systems – using a recycle IBC container holding 1cu m of water costs about £70 for the storage	Risk of frost Occupies ground space Requires a cover More susceptible to algal growth and poor water quality Requires a tank specifically designed for use above ground
Underground tanks		Helps to prevent algal growth by shielding the tank from daylight Protects the tank from extreme weather Helps to regulate the water temperature in the tank, keeping it cool and limiting bacterial growth Saves space	Additional cost of excavation and installation Less accessible for inspection and maintenance Tend to be more expensive

Source: Environment Agency

- Ideal System
  - Pros
    - Erosion prevention
    - Maximized capture
  - Cons
    - Potential Sediments
    - Cost

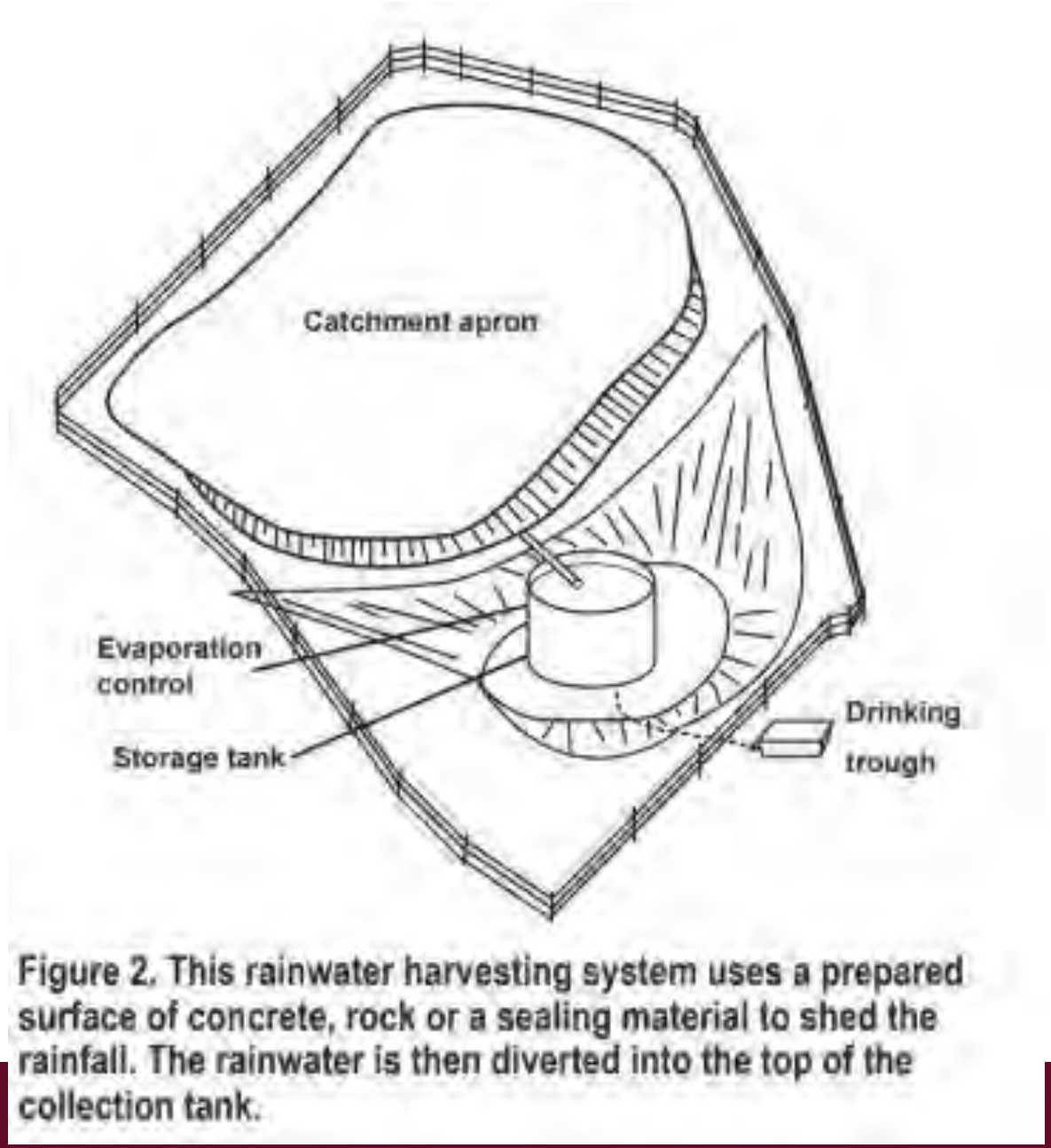


Figure 2. This rainwater harvesting system uses a prepared surface of concrete, rock or a sealing material to shed the rainfall. The rainwater is then diverted into the top of the collection tank.

Preservation

- The silent thieves
  - Salt cedar
  - Poplars
  - Willows
  - Piñon - Juniper

https://www.usbr.gov/assetmanagement/docs/Canal_Vegetation.pdf

RECLAMATION

Managing Water in the West

Canal Operation and Maintenance:

Vegetation

U.S. Department of the Interior
Bureau of Reclamation
Office of Policy
Technical Service Center
Denver, Colorado

November 2017

Preservation

Figure 15. The earlier you remove the vegetation, the less it will cost.

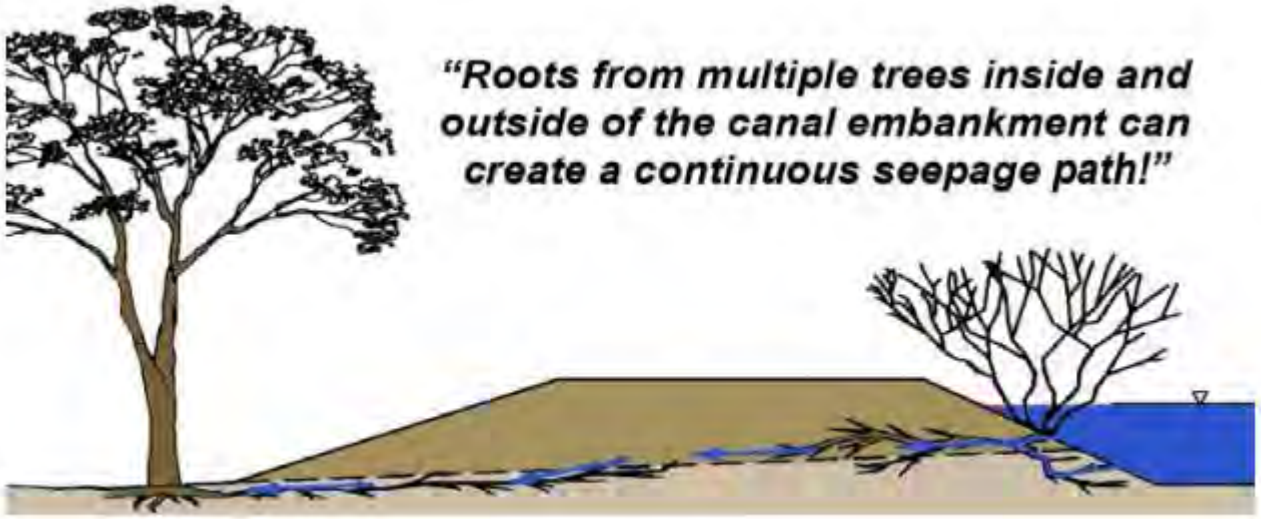


Figure 4. Potential seepage paths from roots.

Figure 5. Blown over tree blocking flows.

Figure 7. Aquatic weeds impeding flow in a canal.

Preservation

Figure 22. Major methods to control vegetation.

Salt cedar

Tamarisk Beetle

Options
- Mechanical
- Chemical
- Biological

Willows

Options
- Mechanical
- Chemical
- Goats

Poplars

Options
- Mechanical

Piñon Juniper

Options
- Mechanical
- Chemical
- Fire

COLLEGE OF AGRICULTURAL, CONSUMER AND ENVIRONMENTAL SCIENCES

Chemical Weed and Brush Control for New Mexico Rangelands

Revised by Kert Young and Casey Spackman[1]

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Mesquite brush is a common woody plant found in many parts of New Mexico.

Noxious woody and weedy plants inhabit much of New Mexico's rangelands. Dense stands of brush and weeds use vast quantities of water, reduce forage production, and contribute to erosion. If rangelands are to reach their productive potential, noxious plants need to be managed effectively. Herbicides can be effective, economical, and an efficient method for controlling brush and weeds and improving and maintaining rangelands.

This circular lists current herbicides to control woody and herbaceous weeds on rangelands. Herbicide control is highly variable and is dependent on species. However, seldom is a species eradicated. When developing a woody and herbaceous weed management program, consider all possible rangeland uses. Many woody plants and forbs are a valuable source of food and cover for wildlife and can also be important to livestock operations. A woody and herbaceous weed management program should use control methods that provide optimal benefits to all animal species.

Herbicides are effective and safe when they are used properly (Appendix A). Misuse can result in poor woody and herbaceous weed control, increased expense, and possible hazards from herbicidal drift or residues

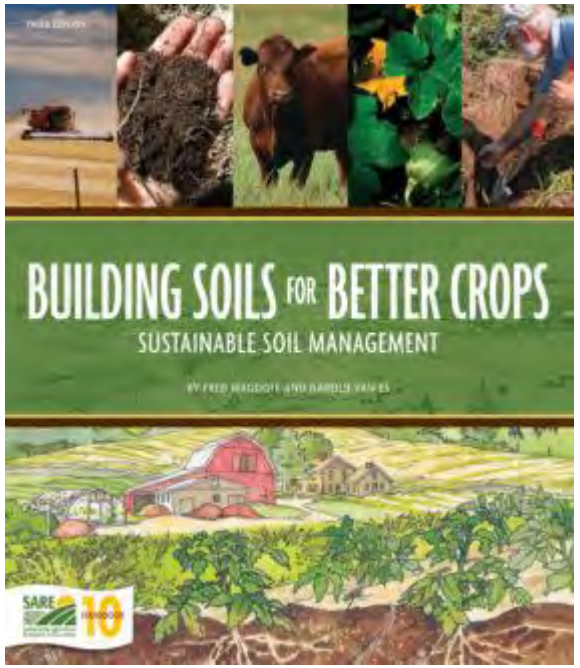
[1]Respectively, former Extension Brush and Weed Specialist and Assistant Professor/Extension Range Specialist, Department of Extension Animal Sciences and Natural Resources, New Mexico State University.

Table 1. Herbicides for Controlling Undesirable Brush and Weeds on Rangelands

Plant controlled	Trade name example	Herbicide (common chemical name and active ingredient)	Herbicide quantity (active ingredient or acid equivalent in parenthesis)		Spray volume (broadcast per acre or individual plant)	Time of application	Remarks
			Broadcast rate (per acre)	Individual plant/ spot treatment			
African rue (*Peganum harmala*)	Arsenal	imazapyr	3 pt (3/4 lb)	1 gal per 100 gal. water (2 lb per 100 gal water)	10–25 gal for ground broadcast	Spray only actively growing (non-stressed) plants	Caution: Arsenal or Velpar L will damage or kill other sprayed or nearby vegetation
	Velpar L	hexazinone		2 ml/plant	Individual plant treatment only	Any time of year	
	Pronone Power Pellets	hexazinone		1 pellet/plant			
Algerita (*Mahonia trifoliolata*)	Velpar L	hexazinone		3 ml/3 ft canopy height	Individual plant treatment only	Any time of year. Optimum is prior to rainy season	Do not apply to snow-covered or frozen ground
	Pronone Power Pellets	hexazinone		1 pellets/2 ft canopy height			
	Spike 20P	tebuthiuron		1/16 oz pellets/3 ft canopy height			
	Banvel, Clarity	dicamba	1 pt to 1 qt (1/2 to 1 lb)		10–25 gal for ground broadcast application. Use surfactant as per label.	Summer fallow prior to planting and when weeds are actively growing, or in late summer or fall prior to post-bloom or killing frost. Follow-up applications should be made in spring to control seedlings. Spring to fall.	
	Overdrive	dicamba: diflufenzopyr	4 to 8 oz (5:2 mixture) (1/4 to 1/2 lb)				
	Plateau	imazapic	4 to 8 oz (1/16 to 1/8 lb)				
	Weedmaster	dicamba:2,4-D	1 pt to 1 qt (1:3 mixture) (1/2 to 1 lb)				
	Tordon 22K**	picloram	1 to 2 qt (1/2 to 1 lb)				
	Paramount	quinclorac	5 to 8 oz (1/4 to 3/8 lb)		10–25 gal for ground broadcast. Add 1–2 pints MSO.		
	Roundup*	glyphosate	4 to 5 qt (4 to 5 lb)			Full bloom to early seed stage	
	Tank mix Roundup + Banvel, Clarity	glyphosate + dicamba	1 qt + 1/2 pt (1 lb + 1/2 lb)			Mid- to late-bloom	
						Fallow or post-har-	


Photo: Sara Marta

Preservation



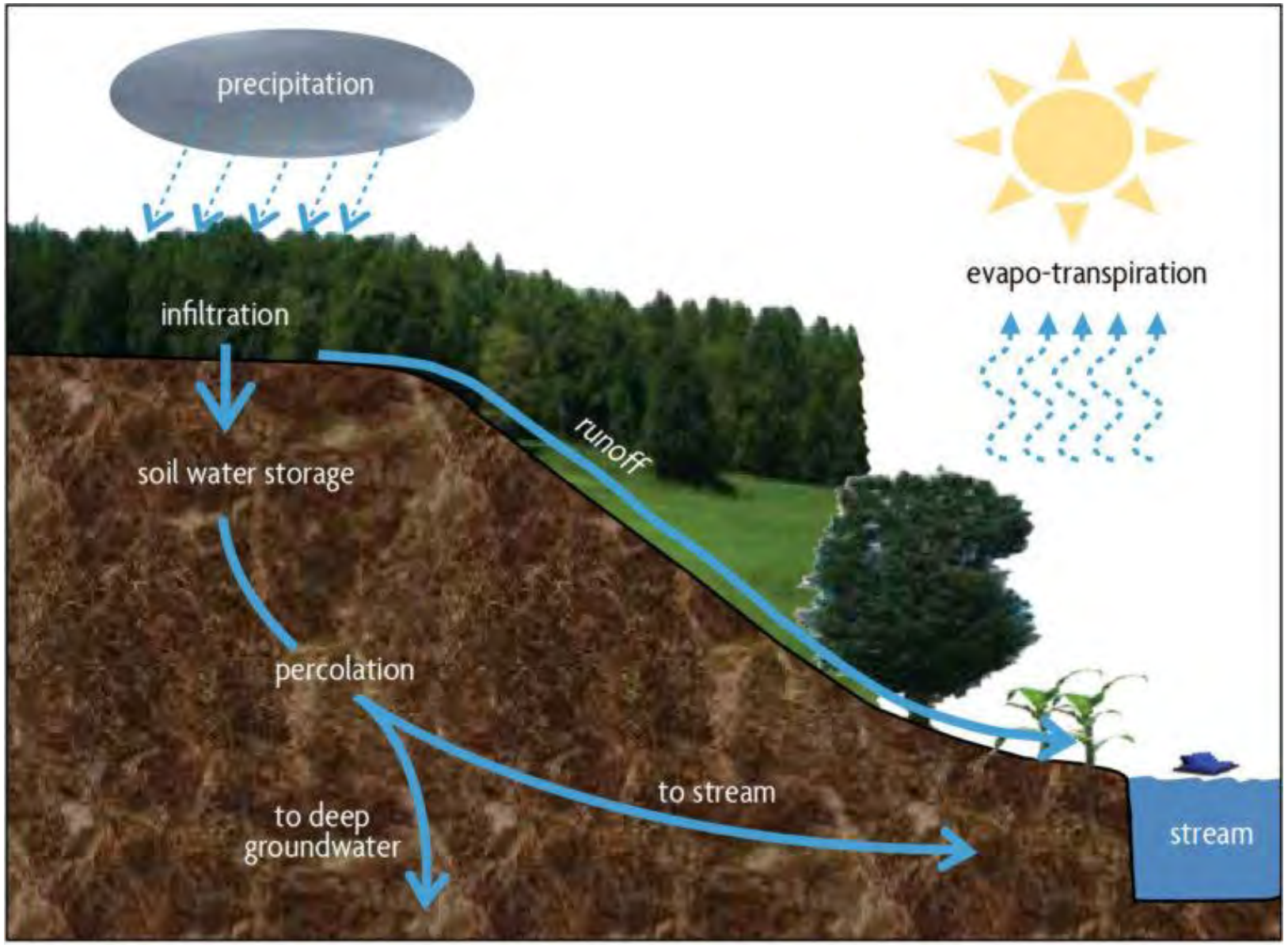
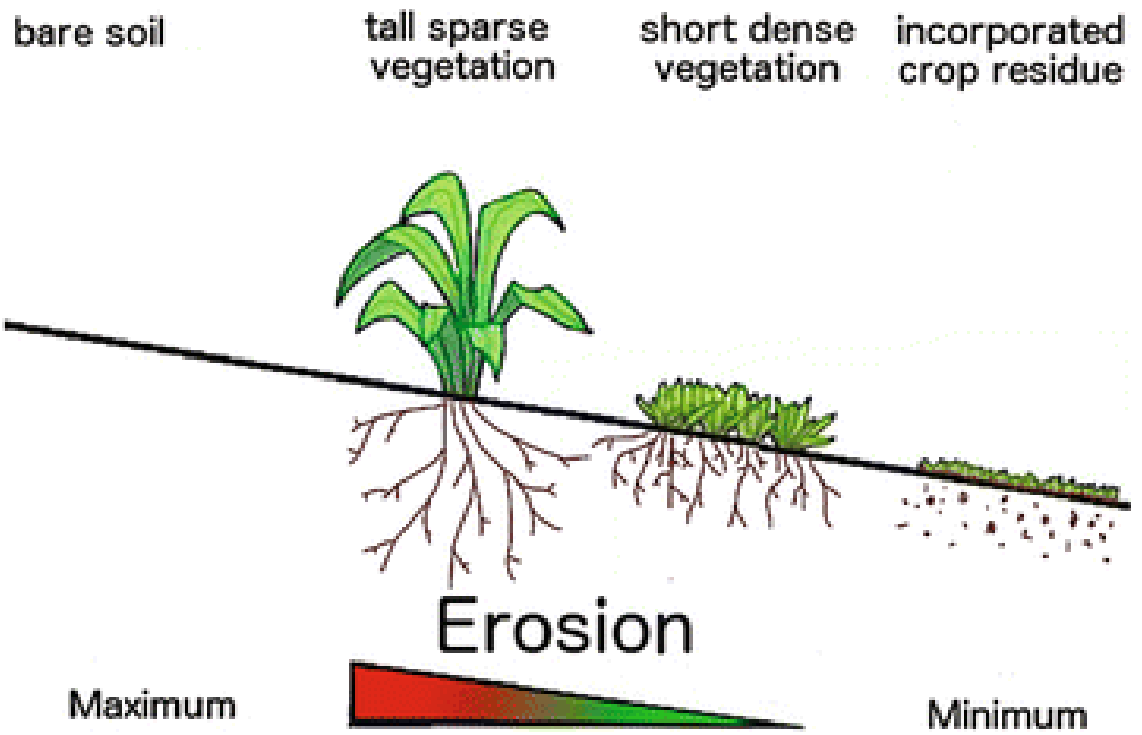


Figure 5.8. The fate of precipitation at the land surface determines whether water infiltrates or runs off the surface.

Preservation

- More plant cover = more infiltration
  - Litter
  - Reduced crusts/compaction
  - Increased organic matter



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Preservation

- Grazing
  - Less than 50% plant use
  - TIDD (Timing, Intensity, Duration, Distribution)

Table 8.2
DESCRIPTION OF GRAZING INTENSITY CATEGORIES.

Qualitative Grazing Intensity Category	Use of Forage by Weight (Percentage)	Qualitative Indicators of Grazing Intensity
Light to nonuse	0–30	Only choice plants and areas show use. There is no use of poor forage plants.
Conservative	31–40	Choice forage plants have abundant seed stalks. Areas more than 1 mile from water show little use. About one-third to one-half primary forage plants show grazing on key areas.
Moderate	41–50	Most of accessible range shows use. Key areas show patchy appearance with one-half to two-thirds of primary forage plants showing use. Grazing is noticeable in zone 1–1.5 miles from water.
Heavy	51–60	Nearly all primary forage plants show grazing on key areas. Palatable shrubs show hedging. Key areas show a lack of seed stalks. Grazing is noticeable in areas over 1.5 miles from water.
Severe	61+	Key areas show a clipped or mowed appearance (no stubble height). Shrubs are severely hedged. There is evidence of livestock trailing to forage. Areas over 1.5 miles from water lack stubble height.

Source: Adapted from Holechek and Galt (2000).

Holechek et al., 2011

Thank you!

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