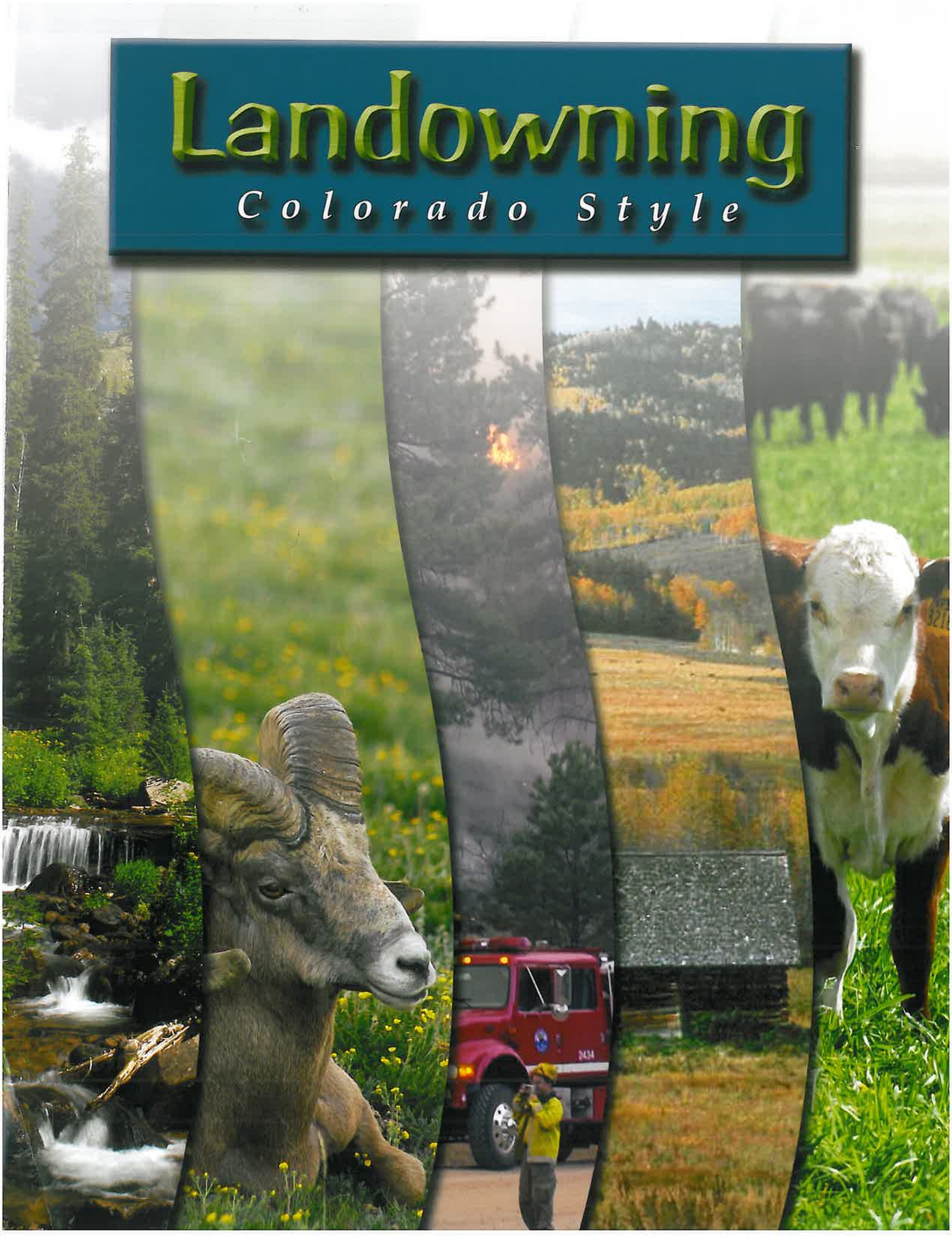
Landowning

Colorado Style



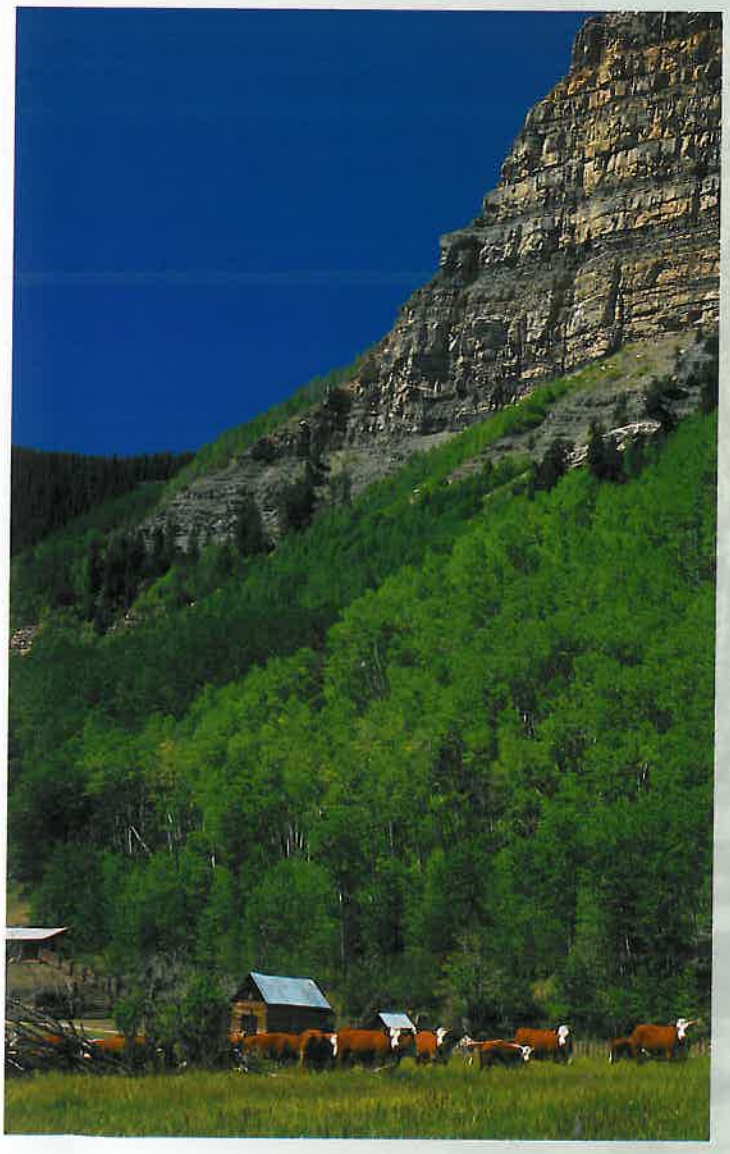
Introduction

According to the 2000 Census, Colorado was the third fastest-growing state between 1990 and 2000 with a population growth of about 30 percent. One doesn't have to wonder why; the state has some of the most beautiful scenery and countryside in America. With its grand rivers, breathtaking mountains and wild valleys, rugged canyons, rolling prairies, and vast agricultural lands, it is indeed an environmental sanctuary.

Population increases have not slowed down; Colorado saw even greater growth in 2001 and 2002. What *is* new is where many Coloradans are opting to live. Many are choosing to live outside urban areas and on small-acreage parcels from 2 to 35 to even 100 acres. (The term "lot" is often found when looking at houses or land for a house in a town or city; it is traditionally smaller in size than an acre. The term "parcel" often describes larger acreage, such as 35 acres.) Many of these sites are located on the edges of the Front Range, providing the landowners with, in their words, "the best of both worlds." For many, however, their new residence will be their first experience living in rural America. It's important to understand, respect, and adhere to environmental, natural resource, and "nature's" laws.

The choices new residents make about building a home, using water, grazing livestock – even about taking care of their pets – have impacts far beyond their own land. These choices affect Colorado's water resources, forests, wildlife habitat, and traditional farming and ranching communities. They also can affect long-term property values – and even personal safety. In a nutshell, it's important for private landowners to understand that we live in an interrelated environment, that everything is connected, and that we all live downstream.

This guide offers information about the natural and manmade laws of the Colorado countryside, as well as many recommended practices, tips, and tools that will help facilitate a smooth adjustment to land stewardship. It's important for landowners to understand that in this interrelated environment, one practice for a particular desired outcome may negatively affect another natural resource. In order to avoid this, landowners should engage in areawide planning to ensure that potential practices reap positive results.



Did You Know?

In the southern Colorado Rocky Mountains, nestled in a desert valley, lies a field of sand dunes, some more than 700 feet tall.

Introduction

Respect: The Code of the West

When you move into a rural area, you're moving into a social and economic system that's been evolving for 150 years – and a natural environment hundreds of thousands of years older than that.

Respect for property and people and a willingness to lend a helping hand are the values that knit rural communities together. ***Get to know your neighbors;*** they're valuable sources of information on what it takes to live in rural areas. Neighboring farmers and ranchers especially will appreciate your learning about their operations and understanding how you can co-exist with them.

Being a Good Neighbor

About 40 percent of Colorado is owned or managed by state and federal government. West of the Continental Divide, that percentage is much higher. The largest land managers are:

- U.S. Forest Service (14.5 million acres)
- U.S. Bureau of Land Management (8.3 million acres)
- Colorado State Board of Land Commissioners (3 million acres)

Other public landowners are the National Park Service, U.S. Fish and Wildlife Service, Colorado Division of Wildlife, Colorado State Parks, tribal lands, and local governments.

Each agency has its own rules about the access to and use of its lands. All of them want to work with neighboring landowners to promote good stewardship on issues that cross ownership boundaries – such as protecting riparian areas along streams and lakes, maintaining wildlife habitat and migration routes, controlling weeds, keeping forests healthy, and reducing wildfire hazards.

Treat federal lands – lands owned or managed by the National Forest System (NFS) or Bureau of Land Management (BLM) – just like you would any other neighbor's property.

- Prior to putting in any improvements (such as roads, fences, buildings, or water wells) or doing any vegetative treatment (brush or tree cutting, lawn mowing) on NFS/BLM lands, contact the local office to obtain a Special Use Permit application.
- Return a completed application to the local office where your requested use of NFS/BLM lands will be reviewed.
- The proposed use will be screened against criteria to ensure that is meets minimum requirements applicable to all special users.
- IF the use is determined to be an appropriate use of NFS/BLM lands, you will be issued a Special Use Permit authorizing such use and be required to pay an annual fee for the approved use.
- Failure to obtain a Special Use Permit authorizing use prior to putting improvements or modifying vegetation on NFS/BLM lands will result in your having to remove the improvements and pay for any damage done to the federal property as well as the possibility of having to pay violation fees.

A Few Things You Need to Get Along in the Country

- *Take the natural environment – from rocks, soils, vegetation, and water to fire danger – into account when you build on and manage your property.*
- *Know and respect private property boundaries. Ask first before entering private land – even for a casual stroll – and before driving on private roads. And leave gates the way you find them – open or closed.*
- *Keep your pets under control and build fences that contain your livestock but allow wildlife to pass through easily.*
- *In our semiarid climate, water is one of our most precious natural resources. Use it wisely – and protect riparian areas and wetlands on your lands.*
- *Practice good land stewardship: Control weeds and avoid overgrazing, which can damage your land and local water quality.*
- *In Colorado, water is owned just like other property. Using water you're not legally entitled to is a sure route to trouble with the neighbors and the law.*

If your property adjoins public land, contact the responsible agency and ask about their management goals and ways you can cooperate.

Soils

Soil: More Than Just Dirt

The kind of soils your land has will greatly affect what you can build and grow on it. Soils can vary widely, even over a distance of just a few feet. They differ in chemical makeup and physical properties based on:

- parent material (the kinds of rocks your soil has been formed from)
- climate
- temperature
- biological factors (native vegetation)
- topography
- time (most of Colorado's soils are "young" in geologic time-meaning thin topsoils and lower fertility)

Soils and Buildings

Whether you live on the Eastern Plains or the Western Slope, you need to work with the geology and soils of the land – not against them. A few questions to ask:

1. Are soils around a building or on a building site prone to the "shrink swell" syndrome – expanding when they're wet and contracting when they're dry?

   If the answer if yes: Maintain low-water plantings around existing buildings to minimize damage to foundations. (See photos on page 7.) If you're building: Consult with a geotechnical engineer and make sure proper design and construction procedures are followed.

2. Is radon gas present in the soil and bedrock?

   If the answer is yes: Place radon test kit in your finished basement. (In new construction, place in basement after space in enclosed but before construction is finished.) If readings are high, install proper ventilation.

3. Is your building site on a slope of more than 7 to 10 percent?

   If the answer is yes: Consult a geotechnical engineer for a slope-stability study before you build.

4. Is your building site on or near abandoned coal mine workings or in a historic metal mining area?

   If your site is on or near an abandoned coal mine, a geotechnical engineer should conduct a subsidence investigation. If you are building in a historic metal mining district, you should have an environmental audit done to evaluate mine waste material on your site and the extent of underground mine workings. If you have a hazardous mine opening on your land, contact the Inactive Mine Reclamation Program of the Division of Minerals and Geology.

For more answers: *Many rural subdivisions have geological hazard reviews on file in the local planning or zoning office. Information on specific problems also is available from the Colorado Geological Survey, the Colorado Division of Minerals and Geology, and the Environmental Protection Agency.*

Soil Texture

How does it feel in your hand?

- *Silt feels silky smooth when wet.*
- *Sand feels coarse and gritty.*
- *Clay feels sticky when wet.*
- *Loam is a combination of all of these.*

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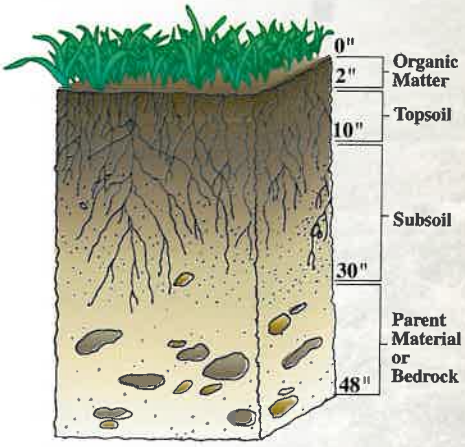
Is Your Soil Covered?

...not by insurance, but by vegetation! Vegetation protects the soil from erosion by rain, runoff, and wind. Vegetation increases filtration of water through soils and holds soils in place on slopes and along streams.

How Fertile Is Your Soil?

You'll need a soil test to find out. Contact your local Natural Resources Conservation Service or Colorado State University Cooperative Extension office to find out how to take a soil sample and where to send the sample for testing.

A Soil Profile



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Soils and Living Things

The kinds of soils you have will affect:

- *what type and how much grass or crops your land can produce.*
- *how quickly water moves through the soil.*
- *if the soil will filter animal and human wastes before they reach the groundwater.*
- *how often you need to water.*
- *how much fertilizer is needed.*
- *if your soil is subject to deep percolation constraints.*
- *whether you have a salinity or selenium problem.*

For information about your land's soil, refer to your county soil survey, available from your Natural Resources Conservation Service office.

Weeds

What's So Bad About Noxious Weeds?

Coloradans now exercise increased influence in protecting our natural resources and private property values through the recent amendment of the Colorado Noxious Weed Act. Colorado will prioritize weed species so that control measures can be more effectively implemented. The amendment requires that weeds be placed in one of three categories:

- **A** – requires eradication
- **B** – may require eradication, containment, or suppression
- **C** – recommends control (local weed control entities may require stricter control)

Because noxious weeds are not native to the United States, they grow unchecked by natural enemies such as insects or diseases. All noxious weeds are aggressive and competitive, stealing moisture, nutrients, and sunlight from other plants.

Noxious weeds can get started in soil disturbed by construction, recreation, and other human activities. They are spread by wildlife, livestock, machinery and vehicles, people, wind, and water. Their biology allows them to spread rapidly and invade neighboring land covered by native plant communities. About 17 percent of Colorado's approximately 3,000 native plant species already have been displaced by non-native weeds.

Managing Weeds

Under state law, landowners are responsible for controlling noxious weeds on their property. Weeds can spread fast, so regularly look for new weed patches and act immediately to eradicate them. Team up with neighbors to keep weeds from spreading. Remember: Weed control by itself is not enough. You'll also need to modify the land management practices that caused weeds to become established in the first place.

Prevention: Good management will help keep desirable vegetation healthy and weeds under control. Buy only weed-seed-free hay, plant only certified seed, wash your vehicle and equipment after being in a weed-infested area, monitor your property, and respond quickly to new weed infestations. Reseed soil that has been disturbed with a seed mix that will work at your site and provide desirable grasses to guard against weed invasion.

Biological: Biological control attempts to find something in nature that can weaken or eventually kill weeds. Successful bioagents include certain fungi and insects from a weed's country of origin.

Mechanical: Techniques like mowing, tilling, hand-pulling, or burning can physically disrupt plant growth. Use caution with tilling, which can help spread some weeds.

Livestock Grazing: Grazing with sheep, goats, or cattle can be a practical form of control for non-poisonous weeds. Livestock and wildlife can carry and spread weeds on their coats or in their feces; avoid moving livestock from weedy areas to weed-free areas when weeds are producing viable seed.

Chemical Herbicide: Herbicides can be safe and effective when applied properly. Get advice from a specialist to make sure you aren't wasting money or endangering shrubs, trees, and native plants.

If applying a chemical yourself, follow label instruction carefully. Keep chemicals away from water to safeguard humans and animals and prevent pollution of streams and groundwater. Properly dispose of leftover chemicals.

Only certified pesticides applicators can apply restricted herbicides. Your local Colorado State University Cooperative Extension agent can help you find custom chemical applicators to spray your weeds.

Control Weeds Before They:

- *choke out desirable forage for livestock and wildlife.*
- *reduce the productivity of your land.*
- *cause water pollution and soil erosion because they're less effective at holding the soil.*
- *spread rapidly.*

Water Quality

Water Moves

Your water comes from a watershed. A watershed is simply all the land that drains to a specific point. En route to your well or stream, water can pick up organic debris, bacteria, motor oil, pesticides, and other pollutants. Rivers, streams, reservoirs, lakes, ponds, and wetlands are obvious surface water sources. Less obvious are swales, gullies, or even the highway road ditches that only collect and carry water after a rainstorm. These surface water sources sustain wildlife and livestock and also are sources of drinking water for humans, or contribute to the recharge of groundwater aquifers that supply our wells. They also are all at risk of pollution when contaminants are introduced into watersheds. Understanding the risks from placing contaminants in proximity to surface and groundwater resources is key to protecting water quality.

Did You Know?

- *As of 1972, if you have less than 35 acres (34.99 or less), you are issued a "Household Use Only" permit, which is for use inside your home only. This explains why most mountain properties are sized at least 35 acres.*
- *Wells in mountain areas along the Front Range typically average 350 feet deep.*
- *As a rule of thumb, each person in a household requires 75 gallons of water per day to satisfy basic human needs.*

Protecting Water Quality

Drinking Water Wells

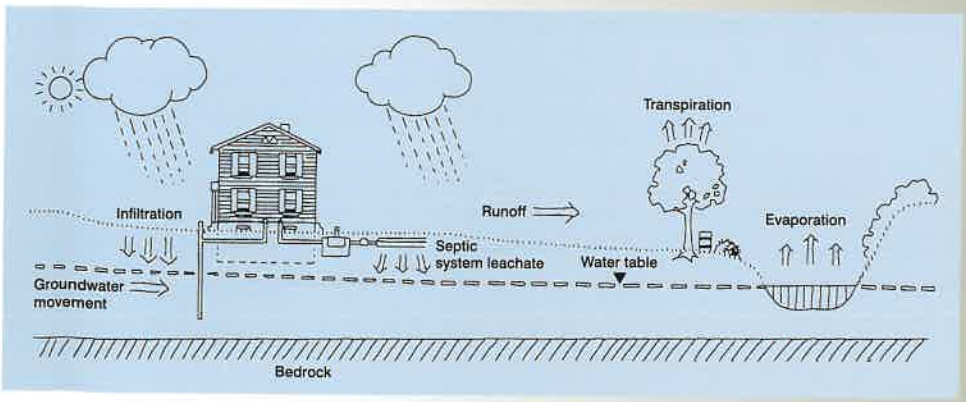
Whether you water comes from an individual well or spring on your property or a community well and water system, adequate well protection is the key to preserving drinking water quality. A well downhill from a livestock yard, a leaking fuel storage tank, or failing septic system has a greater chance of being contaminated than a well uphill from these pollution sources. Wells should be at least 50 to 100 feet away and uphill from any source of contamination. Factors such as location to surface drainage courses and direction of groundwater flow also are important. Wells must be constructed by a licensed well installer in accordance with Colorado regulations, which vary for different types of wells. Contact the Colorado Division of Water Resources (State Engineer) for more information, or read more at www.water.state.co.us/groundwater/groundwater.asp.

TABLE 1. Concerns and Actions for Well Protection

Concern	Action
1. Natural or human-induced pollutants may have already contaminated the well.	• Collect a sample from the drinking water tap and have it analyzed by the county health department every 1 to 2 years.
2. A dug or driven well (rather than a drilled well) or a well more than 20 years old may lack adequate protective measures to prevent contamination.	• Have a licensed well installer or professional engineer inspect the well and develop a well head protection plan.
3. Improper well casing allows runoff-borne contaminants into the aquifer.	• Make sure that wells are cased, that the casing is properly grouted, and that the casing (pipe) extends a minimum of 12 inches above and 19 feet below the ground surface. • Repair or replace any casing that has cracks or holes.
4. A well downhill from a contaminant source is vulnerable.	• Locate new wells uphill from contaminant sources such as fuel or fertilizer storage areas, animal pens, or septic systems. • Locate new wells 50 feet or more from a septic tank or chemical storage sites and 100 feet or more from a septic leach field. • Grade your land to divert flow away from existing wells in vulnerable sites and to prevent ponding of runoff around the well.
5. Improperly abandoned wells create a high risk for aquifer contamination.	• Have a licensed well installer or professional engineer inspect the abandoned well and develop a well decommissioning plan.

Septic Systems

The Septic Process: Septic systems are designed to discharge contaminants below ground. A poorly designed system or one in need of maintenance makes your water supply susceptible to contamination. Locate your septic system to provide the maximum possible separation between it and surface or groundwater sources. Septic system designs must satisfy county regulations and should be installed by an experienced contractor. Routine maintenance involves regular inspections, removing accumulated solids from the septic tank, and limiting the types of materials disposed of to those that the system can handle.



The Septic Process

How Safe is Your Drinking Water?

1. Do you own a dug or driven well, rather than a drilled well?

2. Is it more than 20 years old?

3. Has it been more than a year since you tested your drinking water supply?

4. Is your well casing (well pipe) less than 12 inches above ground and/or 19 feet below ground?

5. Is there an earth depression around your well casing or does the casing have cracks or holes?

6. Is your well downhill from contamination sources (such as septic system, pesticides, fertilizer, animal manure, petroleum storage, or other pollutants)?

7. Do you have any abandoned wells on your property?

8. Do you have a leachfield or livestock corral less than 100 feet from your drinking water well or stream?

9. Is your drinking water well shallow (less than 50 feet deep)?

10. Do your well tests show fecal or nitrate contamination above safe drinking water standards?

If you've answered yes to any of these questions, you will want to take immediate action.

Water Quality

Location, Location, Location

A riparian zone is the area adjacent to and influenced by a surface water body. Healthy riparian areas (which may extend 50 to 250 feet from the water's edge) and wetlands provide a natural filter for contaminants that can run off the land. This natural water quality protection is threatened when human development intrudes upon the riparian zone.

For new developments (involving one owner or many), siting decisions should be made to prevent damage to existing riparian and wetland areas. Avoid construction in active floodplains, and maintain or enhance the existing natural vegetative buffer between the developed area and water.

Riparian areas that have been damaged by previous actions are a landscaping opportunity. Restore at least a 50-foot-wide buffer using a mix of grasses, shrubs, and trees that not only will enhance aesthetics but also will provide desired water-quality protection. Feature native plants that require a minimum amount of water and maintenance while avoiding exotic species (no matter how attractive they may be) that can become noxious weeds.

Preventing Water Pollution

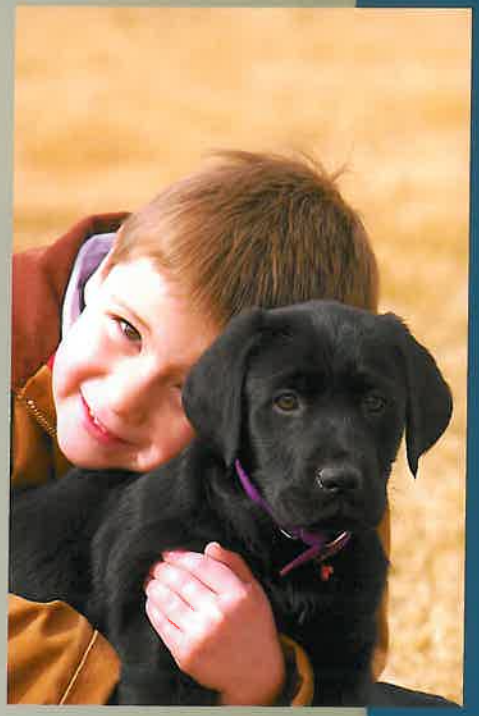
- *Plant and maintain shrubs and grasses along streams and round livestock corrals and pens to trap and absorb pollution-laden runoff before it reach streams or groundwater.*
- *Locate livestock corrals, pens, and septic systems downslope of streams and domestic wells.*
- *Use off-stream stockwater tanks to keep livestock from trampling streambanks.*
- *Avoid over-irrigating crops and lawns. It wastes valuable water, leaches soils nutrients, causes erosion, and spreads fertilizer and pesticide.*
- *Properly dispose of manure, feed, and bedding wastes by composting or spreading on cropland.*
- *Contact your county health department about proper disposal of weed-control chemicals, used motor oil, or other toxic substances.*
- *Keep soil covered with vegetation to prevent erosion.*
- *Maintain septic systems.*
- *Practice integrated pest management.*
- *Avoid over-fertilization.*

TABLE 2. Concerns and Actions for Preventing Septic System Problems

Concern	Actions
1. System location creates potential to contaminate adjacent water sources.	Locate system properly: • 50 feet from septic tank to well. • 100 ft. between leach field or lagoon and well. • 100 feet away from a surface water body. • Avoid areas with shallow (<10 feet) groundwater tables.
2. Failure due to overload from excessive water use.	• Practice water conservation to lessen the work the septic system must perform.
3. Poor quality effluent due to inadequate microbial treatment.	• Dispose of hazardous household chemicals at an approved hazardous waste collection center. • Use bleach, disinfectants, drain and toilet bowl cleaners, and other "poisons" sparingly and in accordance with product labels. • DON'T use commercial septic tank additives – these products rarely help and some may even hurt your system.
4. Failure due to accumulation of solids in the septic tank.	• DON'T use your toilet as a trash can by dumping non-degradables down your toilet or drains. Keep grease, diapers, plastics, etc., out of your septic system. • Have your tank pumped out and system inspected every 3-5 years (1-2 years if a garbage disposal is used) and keep records.
5. Failure of the soil adsorption field (leach field).	• Construct two fields so one may rest while the other is in use. Alternate use every year. • Divert surface water from gutters, driveways and hillsides away from the septic system. • DO NOT drive or park over any part of the system. The area over the drain field should be left undisturbed with only a mowed grass cover. • Don't plant trees or wood shrubs near the system; roots may clog and damage drain lines.

Contaminants In and Around the House

Chemicals used in and around our homes can be a risk to water quality when used or disposed of improperly. Oil, anti-freeze, paint, household cleaners, and other chemicals spilled or disposed of on the ground can wash into streams or leach through soil into wells. If driveway or sidewalk de-icers are necessary, use organic-based products that pose minimal risk if washed into an adjacent creek or wetland. Minimize fertilizers and pesticides, don't exceed the recommended application rates or frequency on the product label, and leave an untreated area as a buffer between the treated areas and riparian zones. Store trash in areas where wind or floods can't carry it away, and recycle or dispose of chemical containers in accordance with the manufacturer's recommendations and applicable laws and regulations.



Pets and Livestock

Man's best friend may be water quality's enemy if contaminants from pet feces and urine run off into water bodies. Overuse of pastures and paddocks may result in erosion and stream-choking sediment being carried offsite. Pet runs and livestock pens should be located as far away from riparian areas as possible and downslope from wells; maintain a vegetated buffer between them and the water course or well. Develop a regular routine for collecting feces; store it where runoff won't carry it away until it can be disposed of. Recycle livestock manure and bedding for use as fertilizer on gardens or cropland, either directly or after composting. Maintain vegetation in pasture areas through proper grazing techniques. An animal feeding operation (AFO) is defined as a facility where livestock (cattle, hogs, sheep, poultry, and horses) are confined more than 45 days per year in an area without permanent vegetation. All AFOs, regardless of size, are subject to Colorado water quality regulations. Contact your local NRCS or Colorado State University Cooperative Extension office for more information on best management practices for water quality protection for livestock operations.

Standing Water – Mosquito Control

Mosquitoes breed in standing water and carry numerous viruses including West Nile. Usually, this water is the result of practices that can be changed. Eliminating breeding sites is an effective and long-term solution; sites can be drained or removed. Mosquitoes can breed in important wetlands, so habitat modification may not always be an option.

Mosquito Control

- *Control seepage and fix leaks in pet and livestock waterers and irrigation systems.*
- *Avoid excess landscape watering that creates runoff and ponding in low areas.*
- *Reduce or eliminate vegetation and debris in ditches, ponds, etc.*
- *Eliminate standing water in low spots, ditches, gutters, and similar areas.*
- *Empty weekly or remove receptacles that collect rainwater (bird baths, old tires).*

Additional Resources

Small-acreage management: *www.cnr.colostate.edu/frws/outreach/rc/small.htm*
Water wells: *www.ag.state.co.us/DPI/GroundWater/Wellasyst.html*
West Nile virus: *www.ext.colostate.edu/westnile/reslist.html*
Protecting water quality at home: *www.ext.colostate.edu/pubs/water/xcm223.pdf*

Riparian Areas

Riparian Areas

Riparian areas along streams and lakes make up less than 3 percent of Colorado's landscape – but contain about 75 percent of our plant and animal diversity. Almost everything we love about living near a stream or wetland in Colorado's semi-arid climate depends on humans leaving them in their natural state.

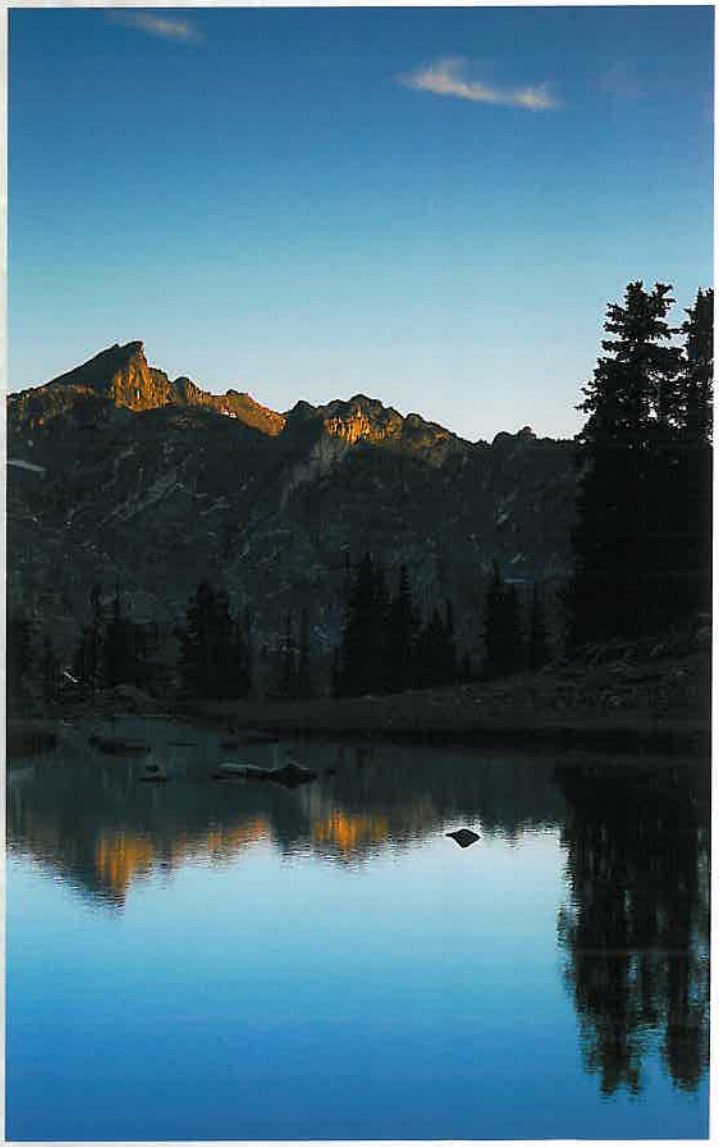
Keys to a Healthy Riparian Area

Good stewardship maintains or improves important riparian vegetation and prevents streambank erosion, loss of water quality, and loss of wildlife habitat.

Did You Know?

- *More than 5,000 plant species, 190 species of amphibians, and one-third of all native bird species in the United States are supported through wetlands.*
- *Nearly 12 million ducks use U.S. wetlands annually as breeding grounds.*
- *Riparian habitat makes up less than 3 percent of the land in Colorado but is used by more than 90 percent of the wildlife in the state.*

Use the tips found in the Water Quality section of this guide to prevent water pollution.



A healthy riparian system will:

- slow flood flows and reduce soil erosion and property loss.
- provide food and cover as well as nesting and breeding sites for wildlife.
- keep water cooler in the summer and prevent ice damage in winter.
- reduce water pollution by filtering out sediments, chemicals, and nutrients from runoff.
- hold more water in the soil, slowly releasing it to keep streams flowing longer and replenishing groundwater.

So You Have a Wetland?

Whether an area is a wetland or not is determined by specific soil, vegetation, and hydrologic conditions. If you're not sure, contact your local Army Corps of Engineers.

Wetlands are legally protected under Section 404 of the federal Clean Water Act. Section 404 establishes a permitting process to ensure that excavating, dredging, or filling in a wetland or riparian area complies with the law. The Army Corps of Engineers and Environmental Protection Agency jointly administer this permitting process. Before you drain or fill an area, contact your local office of the Corps of Engineers to find out if you have a wetland on your property.

The "Swampbuster" provision of the 1985 Food Security Act, as amended, requires all agricultural producers who receive federal farm program benefits to protect wetlands on land they own or operate.

The Colorado Department of Public Health and the Environment Water Quality Control Division can answer questions about state and federal water quality laws. See the "Contacts" section on the back of this booklet for other agencies that can help you learn more about water quality, riparian areas, and wetlands.

Grazing

The plant communities that make up pasture and rangeland are living ecosystems. Land managers need to have a basic understanding of plant growth, soils, and nutrient cycling to keep their grazing land productive and healthy.

Pasture and Haylands

Proper treatment and use is critical in prolonging the life of desirable forage species and in maintaining or improving the quality and quantity of forage produced. Pasture and haylands often are planted with both native and non-native grass species or legumes to increase production, forage quality, and/or the length of the growing season.

Producing high-quality grazing for their animals requires an understanding of:

- forage (how much forage for your animals your pasture can produce – and at what times of the year).
- supplemental water requirements (irrigation).
- soil fertility and nutrient availability.

Rangeland is land on which the native vegetation is mainly grasses, grass-like plants, shrubs, or forbs (herbaceous plants other than grasses, sedges, or rushes). Range management needs to be based on the ecological potential of plant communities, and the site is generally determined by comparing the present plant community with that of the native ecological potential of plant community:

Range Condition Class	Percentage of Present Plant Community as Compared to Native Ecological Potential (Similarity Index)	
Excellent	76%	100%
Good	51%	75%
Fair	26%	50%
Poor	0%	25%

Grazing – Components of a Forage Management Program

- Develop a grazing plan with help from your local NRCS office or CSU Cooperative Extension agent.
- Eliminate continuous, season-long grazing by subdividing larger pastures into smaller ones and developing a rotation system – or by finding alternative pasture.
- Allow long rest periods or use a high-intensity, short-duration grazing system to rejuvenate poor pasture.
- Avoid overgrazing. Overgrazing occurs when more than 50 percent of the grass plant is removed all at once. Overgrazing stops root growth and reduces grass

production. Look what happens when you try to sneak in another 10 percent "harvest" – 50 percent of the roots stop growing (see figure below).

- Provide a water source for each pasture.
- Develop irrigation – if you have water rights – and practice proper irrigation water management. Insufficient irrigation may shorten the life of plants (especially alfalfa), and excess irrigation can drown plants, increase salt problems, promote weed growth, and waste water – and your time. Over-irrigation also can leach nutrients from your soil and cause erosion and fertilizer and pesticide run-off.
- Practice controlled agricultural burning. Burning of irrigation ditches and pasture should be done with caution. Notify the local fire department before you start – and after you complete – a burn.
- Fertilize irrigated pastures according to soil test recommendations. Fertilizing normally is not recommended on non-irrigation pastures.
- Drag or harrow to spread nutrient-rich livestock manure.
- Control weeds.
- Reseed, if necessary, following recommendation from the NRCS or CSU Cooperative Extension.

Many landowners find it too expensive to own their own farm equipment. Ask your neighbors if they know any custom farmers or ranchers in the area who can handle the farming practices necessary to improve your pasture.

Are Your Grazing Animals Properly Managed?

1. Do you have so little grass in your pasture that your animals consume dirt while trying to graze?

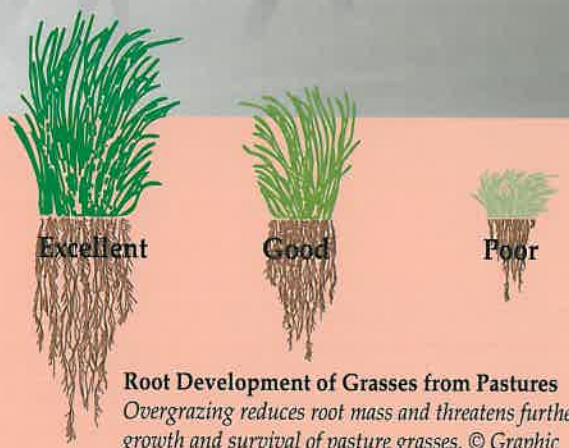
2. Are your animals browsing on trees, shrubs, fences, or barns?

3. Are your animals losing weight or are they overweight?

4. Do your animals have scruffy coats?

5. Are your animals prone to colic or respiratory problems?

If you answered "yes" to any of these questions, you need a new grazing program that will provide more forage and healthier animals.



Root Development of Grasses from Pastures
Overgrazing reduces root mass and threatens further growth and survival of pasture grasses. © Graphic courtesy of Montana Department of Natural Resources

Grazing

NOTE:

Smooth wire is safer for wildlife than barbed or woven wire. Space wires at 16, 22, 28, and 40 inches from the ground to allow antelope, deer, and elk to get through with reduced fence damage. The 12-inch gap between the top two wires keeps animals from getting tangled in the wires.

Do You Have Enough Feed and Forage for Your Livestock?

In Colorado, livestock usually are allowed to graze perennial forage during the summer or fall growing seasons. This is followed by dormant (winter) season grazing of forage regrowth. Spring grazing also may be available if the forage has regrown enough.

Forage is what your animals consume by grazing or what can be harvested for feed. Forage production generally is measured in animal unit months (AUMs) – basically, the amount of forage one 1,000-pound cow will consume in one month.

An animal unit equivalency (AU) for a 1,000-pound cow is the standard used to compare all forage animals. One AU is equal to forage demand of 790 pounds of air-dried forage per month. A horse is equal to 1.25 AU requiring 988 pounds of air-dried forage per month.

Feed is the hay or grain fed to livestock as a supplement or when adequate forage is not available. Hay production generally is measured in tons per acre, and feed is measured in pounds.

To avoid overgrazing of your pastures, calculate you anticipated available forage and animal feed requirements prior to each grazing season. If adequate forage is not available, consider:

- purchasing additional feed or renting additional pasture.
- reducing the number of animals.

Livestock Laws

- Your county may have specific zoning ordinances concerning the number of livestock landowners can have per acre.
- Colorado fence law requires landowners to fence neighbors' livestock out. However, you can collect damage if livestock trespass through a legal fence on your property. (A legal fence is a fence with at least three strands of barbed wire with posts not more than 20 feet apart.)
- Some Colorado counties now require a livestock permit; contact your county for specifics in your area.
- A fence that's been in place for 18 years becomes a legal property boundary.
- You have a legal right to protect your livestock from dogs that are running loose and harassing your animals.
- You have a legal right to use certain public rights-of-way and historic easement as "stock drive" in order to move your animal across certain public or private lands.
- All cattle, horses, and domestic deer and elk must have a certificate from the area brand inspector if they are sold, processed for consumption, or transported more than 75 miles across the state line.
- For more information on livestock laws, contact the Brand Inspection Division, Colorado Department of Agriculture.

How much feed and forage your animal needs each year depends on many factors and may vary with season, amount of use, and the age and size of the animal.

Animal	Average Requirements	
	Feed (hay) in tons/month	Forage in AUMs of grazing/month
1 cow	.40	1.20
1 horse	.50	1.25
1 sheep	.10	.20
1 llama	.15	.30
1 goat	.10	.20

1. Forage Requirements:

2 horses
x 988 pounds per horse per month
x 6 months
= 11,856 pounds for 2 horses
or 5.9 tons for 6 months

2. Forage Production Yearlong:

10 acres seeded pasture (fertile non-irrigated soil)
x 360 pounds useable forage
= (800 pounds per acre total production)
3,600 pounds useable forage per year

3. Forage Balancing:

A. *988 pounds needed per horse per month; therefore:*
2.74 horse per month per acre
(988 ÷ 360 pounds usable forage)
x 2 horses
x 6 months grazing period
= 32.9 acres needed for 2 horses for 6 months
(true at this production site only)

B. *10 acres ÷ 5.48 acres for 2 horses per month*
= 1.8 months of grazing available for 2 horses

Note: *The deficit of 4.2 months needs to be made up with feed. Animals should be corralled and fed the deficit.*

A Healthy Forest

Many of Colorado's forests are in an unhealthy condition. This is due to human interruptions in the natural cycles of disturbance that occur in forest ecosystems. Some forests have become significantly more dense and less diverse than they were before the last 100 years of fire suppression. The stress of competing for sunlight, water, and nutrients leaves trees extremely vulnerable to insects, diseases, and wildfire. To improve forest conditions on your land:

- Maintain a variety of tree species and ages suited to your site. Concentrate on species native to Colorado and to your area.
- Remove trees and debris infected with disease or infested with insects as soon as possible to reduce loss of nearby healthy trees.
- Thin trees to improve growth, health, and vigor; increase forage; and reduce wildfire hazard. Remove damaged or poorly formed trees, and leave healthy trees.
- Avoid concentrated livestock use of your forest. This compacts soils and damages trees by browsing or rubbing.
- Dispose of heavy accumulations of downed woody materials. Leave some standing dead trees and large downed logs for wildlife habitat and as a nutrient source for your forest.
- Construct access roads away from streams, construct adequate drainage where needed, and plant grass on fills or cuts promptly to reduce soil erosion and water pollution.
- Use only properly registered chemicals to control weeds (or contact an expert). Keep chemicals away from water and live trees.
- Avoid activities that damage roots or lower trunks of trees. This is especially critical during construction.

Remember – what you do in "your forest" affects your neighbors, other forest residents (including wildlife), and those downstream from your land.

Cost-share funding may be available for some of these practices. Contact your local office of the Colorado State Forest Service.

Did You Know?

- *Most of Colorado's native tree insect pests and diseases are always present in our forests. What we sometimes encounter are epidemics due to unhealthy forest conditions.*
- *Windbreaks can reduce heating costs in winter by 25 percent; in the summer, shade trees can reduce cooling costs by up to 50 percent.*
- *During catastrophic wildfire seasons, there are not enough firefighters to defend every home. That is why it is critical that homeowners take responsibility to create defensible space around their homes.*

Zone	Approximate Elevation (ft.)	Common Trees
Alpine	Above 11,500	None
Sub-Alpine	10,000 - 11,500	Bristlecone pine, alpine fir
Montane	8,000 - 10,000	Englemann spruce, lodgepole pine, aspen
Foothills	6,000 - 8,000	Ponderosa pine, blue spruce, Douglas-fir
Plains	3,500 - 6,000	Piñon pine, cottonwood, willow

Common Forest Insects, Disease, and Damage

Bark Beetles
Vulnerable trees: all conifers, fruit trees, and elms.
Symptoms: pitch tubes or masses of pitch on the trunk, or mounds of red-orange boring dust at the base of the tree.

Budworms
Vulnerable trees: Douglas-fir, white and subalpine fir, blue and Engelmann spruce, and ponderosa pine.
Symptoms: silky webbing in new needles, followed by chewed needles turning brown at branch tips.

Mistletoes
Vulnerable trees: ponderosa, lodgepole, limber, and piñon pines; Douglas-fir; white fir; and Rocky Mountain juniper.
Symptoms: witches-broom on infested branches and/or small orange or yellowish-green plants growing from swollen portions of branches.

Physical Damage
Vulnerable trees: all species and ages.
Symptoms: outer bark removed, exposing inner layers of wood; broken or split trunks and branches; patterns of chewing or drilling.

Agroforestry – Working with Trees for Rural Living

The force of the wind exaggerates daily weather conditions. A well-designed windbreak around your home, ranch, or farmstead slows the wind and improves the surrounding environment.

- Energy costs may be cut as much as 20 to 40 percent by planting trees to create living, working windbreaks.
- Chores such as firewood cutting, working on equipment, and feeding livestock are safer and more comfortable in areas protected from cold winds.
- A properly placed windbreak can reduce or eliminate snowdrifts on driveways, in work areas, and around buildings.
- Strategically placed trees and shrubs can improve living conditions by screening undesirable sights, sounds, smells, and dust.
- Well-placed shade trees provide summer energy savings of 15 to 35 percent. Shaded areas protected from wind by windbreaks provide a private park-like atmosphere for family enjoyment.
- Plantings for wildlife habitat provide food, shelter, nesting, and breeding areas for many birds and animals.
- Firewood, fence posts, fruit, and wild game are potential products from the forest you create when you plant working trees for rural living.

Professional help and, in some cases, cost-share assistance is available to assist you in planning and designing your planting project. Contact your local office of the Colorado State Forest Service.

Are You Firewise?

Protect Your Home from Wildfire – It's YOUR Responsibility

Create Defensible Space Around Your Home

- Typically, a defensible space, on flat ground, extends a minimum of 70 to 75 feet around a home. This distance is extended if the structure is located on a slope.
- Thin out continuous tree and brush (shrub) cover around structures. Remove flammable vegetation from within the initial 15 feet around structures.
- Beyond the initial 15 feet, thin trees to a 10- to 12-foot crown spacing. Occasional clumps of two or three trees are acceptable for a more natural appearance if additional space surrounds them.
- Mow grasses and weeds to a height of 6 inches or less for a distance of 30 feet from all structures.
- Prune tree branches within the defensible space up to a height of 10 feet above the ground.
- Dispose of all slash and debris left from thinning by either chipping, hauling away, or piling and burning. Contact your local fire department or office of the Colorado State Forest Service for burning restrictions and/or assistance.
- Remove shrubs and small trees or other potential "ladder" fuels from beneath large trees. Left in place, these fuels can carry a ground fire into tree crowns.
- Trim any branches extending over roofs, and remove branches within 15 feet of chimneys.
- Clean pine needles, leaves and other debris from roofs and gutters. This will eliminate an ignition source for firebrands, especially during hot, dry weather.
- Stack firewood and wood piles at least 30 feet from any structure. Make sure these piles are uphill or on the same level as structures. Clear away flammable vegetation from within 10 feet of these woodpiles.
- Place liquified petroleum gas (LPG) containers at least 30 feet from structures. Clear flammable vegetation from within 10 feet of all such tanks.

Remember, you must maintain your defensible space annually by removing debris, shrubs, and other vegetation that has accumulated through the year.

Construction Design and Materials

Your house may be vulnerable to a wildfire because of its design, construction, and/or location. When preparing to build, buy, or remodel, the following tips can reduce the chance of your home catching fire or resist further damage if it does catch fire.

Location

- Choose a site away from heavily vegetated areas.
- Build on the most level portion of the property.
- Avoid ridge tops, canyons, and areas between high points on a ridge.
- Set your structure a minimum of 30 feet back from ridges or cliffs; increase the distance if your home will be more than one story.

Building Materials

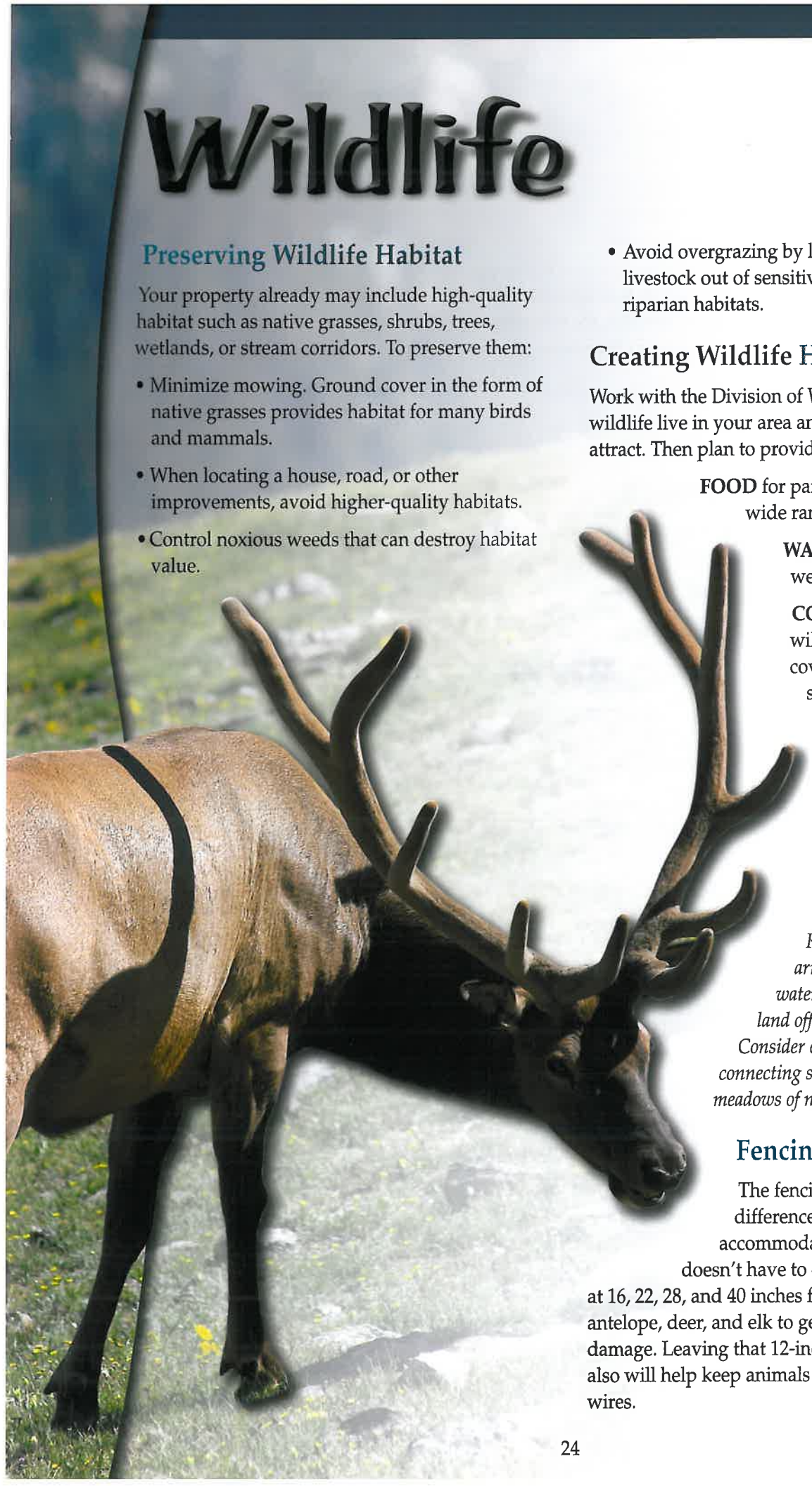
- Use Class A or B roofing materials such as asphalt shingles, slate or clay tile, or metal. Avoid wooden shake-shingle roofing.
- Fire-resistive or noncombustible construction materials are essential for siding and walls. Use a minimum of Class III flame/spread-rated siding material – stone, brick, and stucco are best.
- Limit the length of roof eaves so that they do not extend beyond exterior walls. If the eaves are longer, enclose them with fire-resistive materials.
- Foundations may come in contact with a spreading wildfire before other areas of the structure. Enclose foundations with concrete block, cement walls, or other fire-resistive materials.
- Minimize the size and number of windows on the downhill side of the house or the side most likely to be exposed to wildfire. Both size and materials used are crucial in windows and sliding-glass doors. Multi-paned glass or tempered glass is recommended.
- Cover exterior attic, soffit, and underfloor vents with metal wire mesh (openings no larger than one-eighth of an inch) to prevent sparks from entering structures through vents. Install eave and soffit vents closer to the roof line than to the walls.
- Do not locate decks at the top of a hill; a fire's spread is generally uphill. Enclose the undersides of balconies and decks with fire-resistive materials so that burning embers cannot accumulate.
- Cover chimneys and stove pipes with a nonflammable screen (mesh openings no larger than one-half inch.

Wildlife

Preserving Wildlife Habitat

Your property already may include high-quality habitat such as native grasses, shrubs, trees, wetlands, or stream corridors. To preserve them:

- Minimize mowing. Ground cover in the form of native grasses provides habitat for many birds and mammals.
- When locating a house, road, or other improvements, avoid higher-quality habitats.
- Control noxious weeds that can destroy habitat value.
- Avoid overgrazing by livestock; consider fencing livestock out of sensitive areas like streambanks and riparian habitats.



Creating Wildlife Habitat

Work with the Division of Wildlife to determine what wildlife live in your area and what species you want to attract. Then plan to provide:

FOOD for particular species by planting a wide range of native vegetation.

WATER from a pond, stream, or wetland.

COVER. The variety of species of wildlife in Colorado have different cover requirements. Some bird species require tall grass for nesting and brood rearing, while others get along just fine without it. Contact your local Division of Wildlife biologist to determine what species occur in your area and what their cover requirements might be.

Remember: The way cover is arranged in relationship to food and water determines whether or not your land offers usable habitat for wildlife. Consider creating "islands" of habitat by connecting stands of trees and shrubs with meadows of native grass.

Fencing For Wildlife

The fencing you choose can make a big difference to wildlife, and fencing that accommodates both livestock and wildlife doesn't have to cost more. Spacing fence wires at 16, 22, 28, and 40 inches from the ground will allow antelope, deer, and elk to get through with reduced fence damage. Leaving that 12-inch gap between the highest wires also will help keep animals from getting tangled in the wires.

Your Pets and Wildlife

Uncontrolled pets are one of the biggest threats to wildlife. Domestic cats kill many thousands of small mammals and birds every year. Dogs on the loose can harass and kill wildlife and livestock. Law enforcement officers are authorized to destroy dogs seen chasing livestock or wildlife – and fine the pet owner. Free-roaming pets also are easy sources of food for predators. Pets should be under control at all times – leashed, kenneled, or kept indoors.

Avoiding Conflicts with Wildlife

Some tips for avoiding unpleasant interactions with your wild neighbors:

- Don't feed deer, elk, or other wildlife. Putting out food for deer and elk also will lure predators that may prey on the wildlife – and livestock and pets. It also can cause nutritional problems and even disease in wildlife. Instead, concentrate on planting natural foods for wild creatures.
- Store garbage in plastic and metal containers with tight-fitting lids; keep the containers in a closed shed or garage and put them out only on trash-collection days. Clean trash cans periodically with hot water and chlorine bleach to control odors.
- Feed pets indoors and store pet food inside.

If you live in bear country (roughly anywhere from the Front Range foothills west), take special precautions:

- Use specially designed bear-proof trash containers. (The Division of Wildlife can provide designs.)
- Clean grease from your barbecue grill and store the grease inside.
- Hang bird seed, suet, and hummingbird feeders on a wire between trees or on your porch or deck – and bring them in at night.
- Do not put fruit, melon rinds, and other tasty items in mulch or compost piles.

How Well Do You Get Along with Your "Neighbors"?

1. Does your land offer a wide range of native vegetation that wildlife can use for food and cover?

2. Is water from a pond, stream, or wetland available to wildlife?

3. Do you keep pets under control at all times?

4. Do you keep trash, pet food, etc., in "wildlife-proof" containers?

5. Can wildlife get through your fences?

The more "yes" responses you have, the more "wildlife-friendly" your property is.

Homesite Planning

Land Management Planning

Whether you own undeveloped land or property with an existing house and improvements, every landowner needs a management plan. Some suggested steps for developing this plan are:

1. Draw a sketch of your property and take note of:

- property boundaries
- fences, corrals
- existing structures
- utilities (wells, septic systems, power and telephone lines, etc.) – above and below ground
- streams, wetlands, ponds
- adjacent roads, driveways, easements (access, utility, etc.)
- lay of the land (direction and steepness of sloping ground, cliffs, rock outcroppings)
- existing vegetation (grass, trees, shrubs, cropland, weeds) and its condition
- wildlife that use the area and existing wildlife habitat and migration corridors
- soils (request a soil survey from your county) and its fertility (get a soil test done through the Colorado State Cooperative Extension Service)
- natural hazards (swelling soil, rockslide potential, avalanche corridor, etc.)
- neighboring land uses and concerns
- floodplain or constraints such as high water table, flooding potential, and wetlands, which may not be obvious in dry seasons
- unique features such as views, historical significance, rare plants or animals
- adequate access to your property

2. Answer these questions:

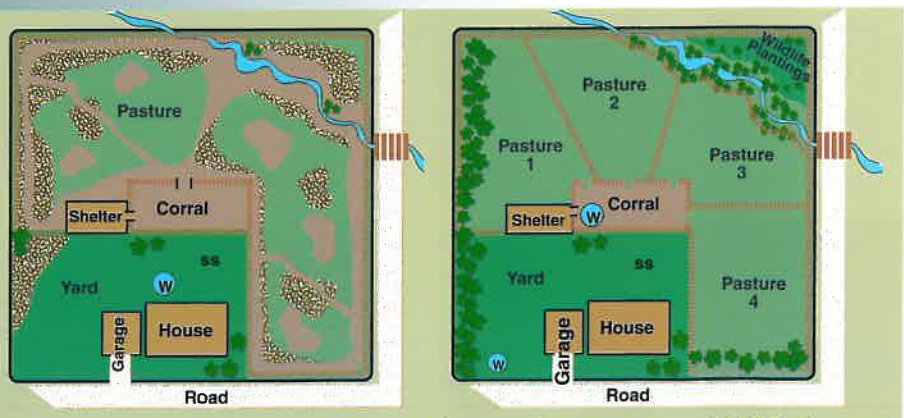
- Why do you own your property?
- What do you want from your property?
- What can your land support?

Did You Know?

- *Colorado's conversion of agricultural land to development is averaging 141,000 acres per year.*
- *Water rights in Colorado are considered private property rights and can be sold or inherited, and prices may vary according to supply and demand.*
- *Your neighbor has "right-of-access," which allows him or her to enter onto your property to access an irrigation ditch that runs through your property.*

Before You Plan, Look at What You Have:

- *Property boundaries*
- *Fences and corrals*
- *Buildings*
- *Wells (human or stock)*
- *Septic system*
- *Streams, wetlands, ponds*
- *Bare or muddy ground*
- *Weeds*
- *Lawn, pasture, or cropland*
- *Trees or shrubs*
- ✔ *Soil type*
- ✔ *Depth to groundwater*
- ✔ *Neighboring land uses*
- ✔ *Flat or sloped ground*



Before you plan, look around, make a sketch, and take a few notes about your property (left). The four pastures in this "after" plan (right) allow better management of livestock and increased forage production. A stockwater tank in the corral is accessible from all pastures and reduces streambed trampling. Shrub and tree plantings along the streambank prevent erosion, replace weeds and bare areas, and provide wildlife habitat.

© Graphics courtesy of Montana Department of Natural Resources

3. **Check zoning, building codes, and other regulations that govern land use in your area.**
   You may find that you have to modify some of your goals because they are not realistic or allowed on your property.

4. **Prioritize action steps and develop a timeline to move from what you have to what you want. This may include:**
   - type and placement of buildings and improvements
   - changes in vegetation and condition
   - protection of existing features or conditions
   - mitigation of hazards
   - enhancement of deficiencies

5. **Prioritize your planned actions and implement them accordingly.**

6. **Monitor results of your actions to make sure you are getting the desired outcome and that the land is being used in a sustainable manner.**

7. **Make necessary corrections to your planned actions and uses.**

Tips for Planning a Homesite

- Be alert for unintended consequences (for example, road construction may spread weeds and increase erosion; gardens may attract wildlife). Natural geology, topography, and vegetation can work for you.
- Check with your town or county to get background history or any studies (geologic and wildfire hazard) associated with your parcel of land. Check to see if your homesite is located in a floodplain.
- Check with your county about local zoning and building codes and obtain proper permits if required.
- Minimize the amount of site disturbance.
- Construct homes and roads away from streams, in level areas, and on stable soils.
- Avoid disturbing wildlife migration corridors, wetlands, and riparian areas.
- Avoid foundation and utilities excavations that remove large amounts of hard rock or cut tree roots.
- Create defensible space to mitigate wildfire hazards.
- Maintain or plant native vegetation – especially around your home's foundation. It requires less water and keeps soil from eroding.
- Locate your home to maximize the benefits of sunshine and shade.
- Use appropriate materials and design choices (for example, nonflammable materials for roofs and siding).
- Consider how your homesite will impact neighbors. By working together, you and your neighbors can help preserve and provide wildlife habitat, protect views, and minimize problems with noise and dust.
- Consider a conservation easement on your land to protect natural values.
- Check with land trusts and conservation organizations about efforts to preserve open space in your area.

Contacts

Soils

Soil surveys: Local office of the Natural Resources Conservation Service (under United States Government, Department of Agriculture in the phone book); http://www.co.nrcs.usda.gov/contact/index.html

Soil tests: Local offices of Colorado State University Cooperative Extension (under county government in the phone book): http://www.ext.colostate.edu

Geologic hazards: County planning offices Colorado Geological Survey, (303) 866-2611; http://www.geosurvey.state.co.us

Radon: Environmental Protection Agency, Region 8: 1-800-277-8917; http://www.EPA.gov

Active mining and abandoned mines: Division of Minerals and Geology, (303) 866-3567; http://mining.state.co.us

Weeds

Local offices of Colorado State University Cooperative Extension (under county government in the phone book): http://www.ext.colostate.edu/links/linkfiel.html

Colorado Weed Management Association, 4800 County Rd. 56, P.O. Box 1910, Granby, CO 80446-1910; (970) 887-1228; http://www.cwma.org

Water

Well permits: Division of Water Resources Ground Water Information Desk, (303) 866-3587; http://water.state.co.us/groundwater/groundwater.asp

Water rights: Division offices of the Colorado Division of Water Resources: South Platte River (Greeley), (970) 352-8712; Arkansas River (Pueblo), (719) 542-3368; Rio Grande River (Alamosa), (719) 589-6683; Gunnison River (Montrose), (970) 945-5665; Colorado River mainstem (Glenwood Springs), (970) 945-5665; Yampa River (Steamboat Springs), (970) 879-0272; Animas/San Juan rivers (Durango), (970) 247-1845

Water Quality

Wetlands:

Local office of the Natural Resources Conservation Service (under United States Government, Department of Agriculture in the phone book)

National EPA Wetlands Hotline: 1-800-832-7828

U.S Army Corps of Engineers district offices for Colorado: South Platte drainage, (303) 979-4120, http://www.usace.army.mil; Arkansas and Rio Grande drainages, (719) 543-9459; Colorado River drainage, (970) 243-1199

State and federal water quality laws:

Water Quality Control Division of the Colorado Department of Public Health and the Environment, (303) 692-3500; http://www.cdphe.state.co.us/wq/wqhom.asp

EPA Region 8 toll-free number: 1-800-227-8917

Grazing

Local office of the Natural Resources Conservation Service (under United States Government, Department of Agriculture in the phone book)

Colorado State University Cooperative Extension (under county government in the phone book)

Grazing on public lands:

Colorado State Board of Land Commissioners, (303) 866-3454; http://lands.state.co.us

U.S. Bureau of Land Management (under United States Government, Interior, Department of); http://www.blm.gov/nhp/index.htm

U.S. Forest Service (under United States Government, Department of Agriculture): http://www.fs.fed.us

Livestock laws: Brand Inspection Division, Colorado Agriculture Commission, (303) 294-0895; http://www.ag.state.co.us/livestockinspection/LivestockInspection.html

Trees and Forests

Colorado State forest Service, State Office, (970) 491-6303 or local offices (under State of Colorado, Forest Service in the phone book); www.colostate.edu/Depts/CSFS

Wildlife

Local offices of the Colorado Division of Wildlife (under state of Colorado, Natural Resources, in the phone book): http://wildlife.state.co.us

U.S. Fish and Wildlife Service (under United States Government, Interior, Department of): http://www.r6.fws.gov/co.html

Homesite Planning

General questions:

Colorado State Forest Service (under State of Colorado, Forest Service, in the phone book)

Natural Resources Conservation Service (under United States Government, Department of Agriculture in the phone book)

Colorado State University Cooperative Extension (under county government in the phone book)

Local planning and zoning rules: Your county planning and zoning office (under county government in the phone book)

Conservation easements and open space:

Colorado Open Lands, 5555 DTC Parkway, Ste. C-2050, Englewood, CO 80111; (303) 694-4994; http://www.coloradoopenlands.org

Colorado Coalition of Land Trusts, P.O. Box 1651, Durango, CO 81302; (303) 271-1577; http://www.cclt.org