Pub 71

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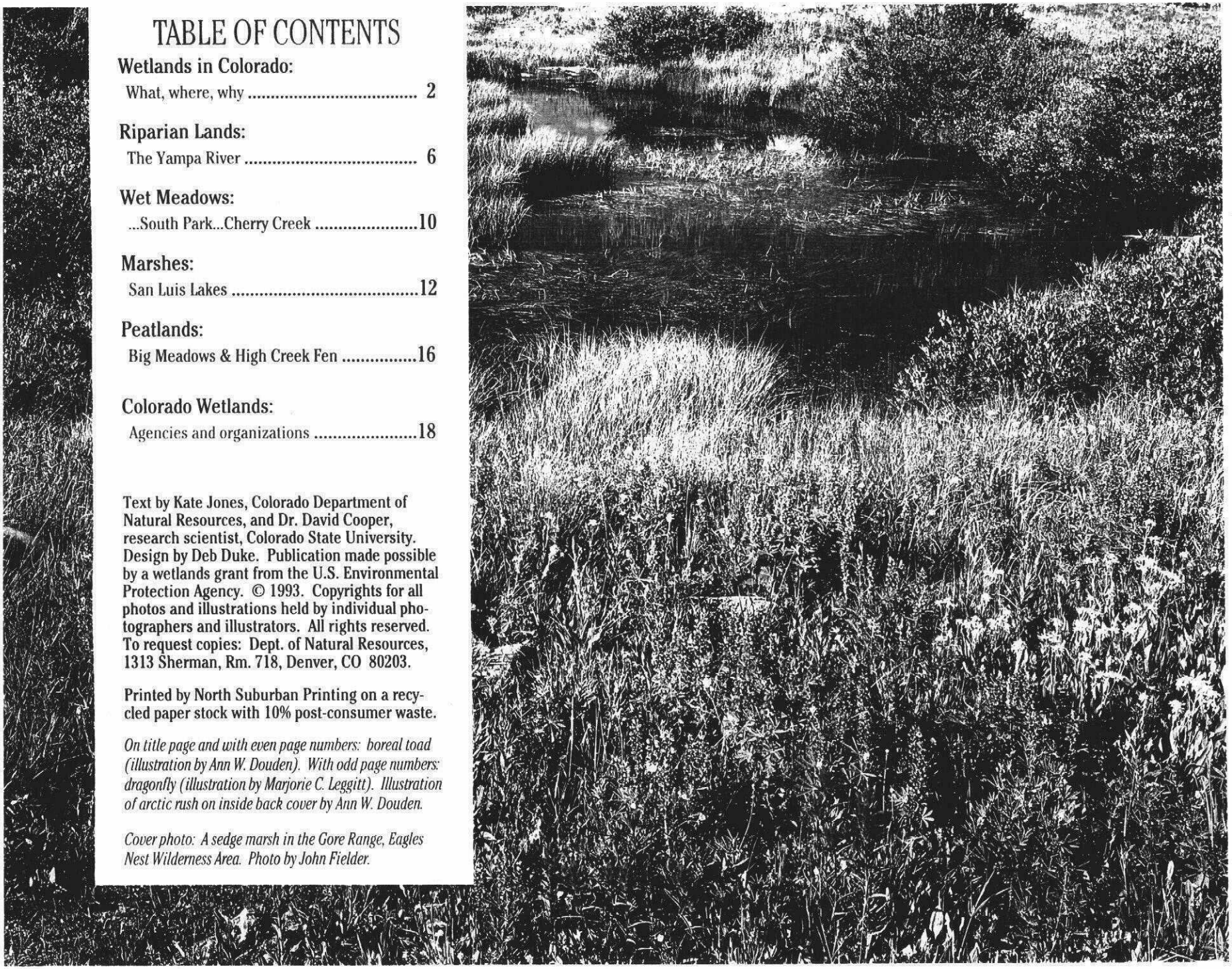
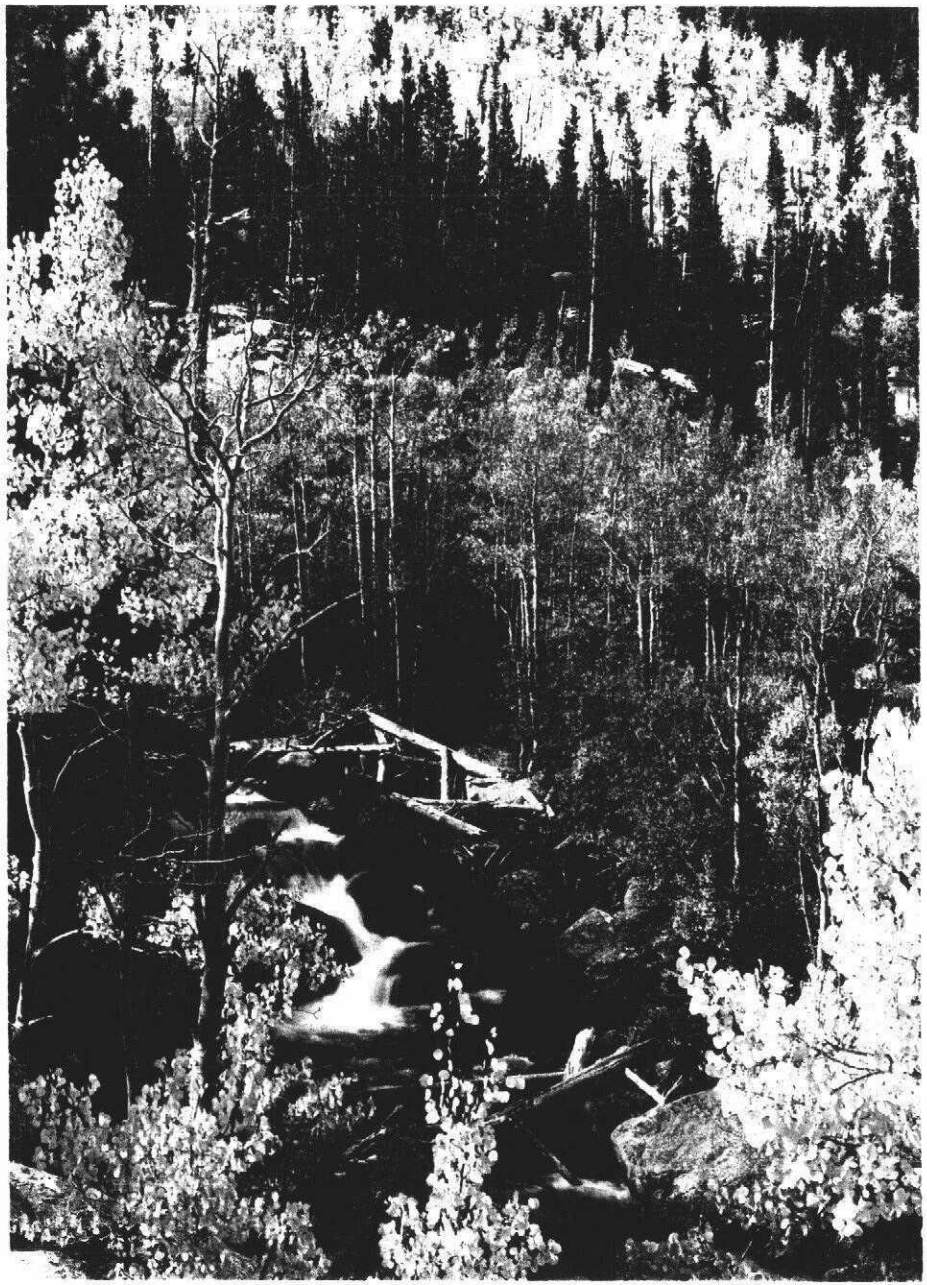
Cover photo: A sedge marsh in the Gore Range, Eagles Nest Wilderness Area. Photo by John Fielder.



WETLANDS IN COLORADO:
What, Where and Why



Aspen and spruce line Glacier Creek along Loch Vale Trail, Rocky Mountain National Park.

Haystacks in wet meadows near Jefferson, South Park. Photo by David Cooper.

Wetlands in Colorado are as varied as our landscape. They are found among high-mountain slopes and valleys and along lower-elevation rivers.

They are found in towns, pastures and irrigated fields. They can be wetlands with perennial water sources like fens, where peat accumulates over thousands of years...or wetlands with seasonal water like many marshes, which come to life with an influx of water from snow melt or rain in the spring, only to shrink or dry up later in the season. They can be willow areas flooded by beaver dams...or cottonwood forests along plains rivers.

Wetlands have always accounted for a very small percentage of Colorado's total land area. Scientists think that before settlers came to the area, only 1-2 percent of what is now Colorado were wetlands. In the last 150 years, as much as half of the state's original wetlands have been lost or changed by human activity. On the other hand, thousands of acres of wetlands have been created by irrigated agriculture.

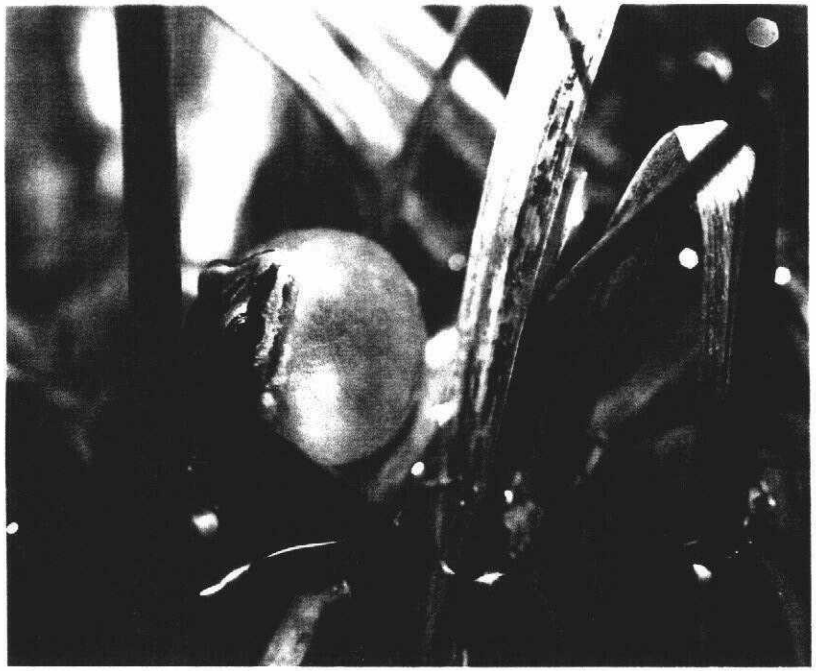
Wetlands have always accounted for a small percentage of Colorado's total land area. Scientists think that before settlers arrived, only 1-2 percent of what is now Colorado were wetlands.

HOW CAN YOU KNOW A WETLAND WHEN YOU SEE ONE?

Because wetlands are so varied, deciding whether an area is a wetland or not can sometimes be tricky. For example, portions of some wetlands, such as marshes, may be very dry by July. Other types, such as wet meadows and riparian wetlands, often have been altered by human activities, from grazing and hay production to the building of towns and roads. In addition, an individual's idea of what a wetland *should* look like may not include all types of wetlands.

Three criteria are used to determine whether a piece of land is a wetland or not—and they all involve the root word *hydro-* (from the Greek word for water).

An angler on the North Fork of the White River in Colorado's Flat Tops Wilderness Area. Photo by Al Marlowe.



A common wetlands amphibian in Colorado—the chorus frog or "peeper." Photo by Lauren J. Livo and Steve Wilcox.

The criteria:

- a site's hydrologic regime—when and how it gets its water;
- whether its soils are hydric—that is, contain little or no oxygen; and
- whether hydrophytes (water plants) are present.

In simplest terms, wetlands are places where the *hydrologic regime* keeps soils flooded or saturated long enough in many years that most plants would drown, because *hydric* soils are oxygen-poor.

Plants that are adapted to grow in these wetland environments are called *hydrophytes*. Common hydrophytes include cattails, bulrushes, sedges, saltgrass, willows and cottonwoods, as well as plants with showy flowers like marsh marigolds and fringed gentian. These plants act like snorkels—bringing oxygen from the atmosphere down their stems to their root systems. Wetland plants are by nature conservative: When a leaf dies, the plant recycles the leaf's nutrients back to the roots and reuses them in other leaves.

It is not only an abundance of water and the presence of certain kinds of plants that mark an area as a wetland. Even the bacteria that function in wetland soils are different. When soils lose their oxygen, anaerobic bacteria become active and change the chemical character of the soil.

WHAT KINDS OF WETLANDS ARE FOUND IN COLORADO?

There are nearly as many ways of classifying wetlands as there are kinds of wetlands.

For this booklet, we have divided Colorado's wetlands into four major types:

riparian lands,
including willow, alder and cottonwood forest ecosystems. *Riparian* is a geographic term, meaning along the banks of rivers or streams; marshes and wet meadows can also occur in riparian areas.

wet meadows,
having saturated soils for long periods of time during the growing season—but not deep flooding

marshes,
which are very dynamic wetlands characterized by influxes of water in the spring that can create flooded conditions and relatively deep water, followed by dropping water levels during the growing season

peatlands,
created where groundwater seeps to the surface and peat accumulates slowly over thousands of years

Of these four types, wet meadows account for the largest number of acres. Although peat mining has occurred in Colorado, many of our peatlands still exist because they are located in isolated mountain valleys. Riparian systems and marshes have not fared so well. Most of our marshes, which were once very common at altitudes below 8,500 feet, have either disappeared or been reduced in size. Riparian areas along many of our lowland rivers have been radically altered.

WHAT DO WETLANDS DO?

One of the most important—if unseen—functions of a wetland is cleaning the water that flows through it. Because wetlands occur at low points in the landscape, they can serve as collection points where water can spread out and unload sediment that may be laden with heavy metals like lead and zinc, pesticides and fertilizers. Wetland bacteria and plants can also absorb nutrients, metals and other substances that can be stored in the wetland's soil and sediments.

Because of their abundance of water and the diversity of the plants that grow in them, wetlands are very productive sources of forage for both wildlife and livestock—and very important as nesting, feeding and resting areas for birds and as sites for human activities that range from hunting, fishing and bird-watching to farming and ranching. Wetlands are also important as outdoor laboratories and classrooms.

Wetlands—especially riparian wetlands and marshes—can also help prevent downstream flooding by spreading out and storing some flood waters. Wetland vegetation along streams and rivers stabilizes banks and prevents erosion. Wetlands are also usually sites where groundwater supplies are replenished.

Project WILD training session at a marsh in South Platte Park, Littleton. Managed by the Colorado Division of Wildlife, the Project WILD curriculum teaches students about wildlife and their habitat. Photo by Weldon Lee.

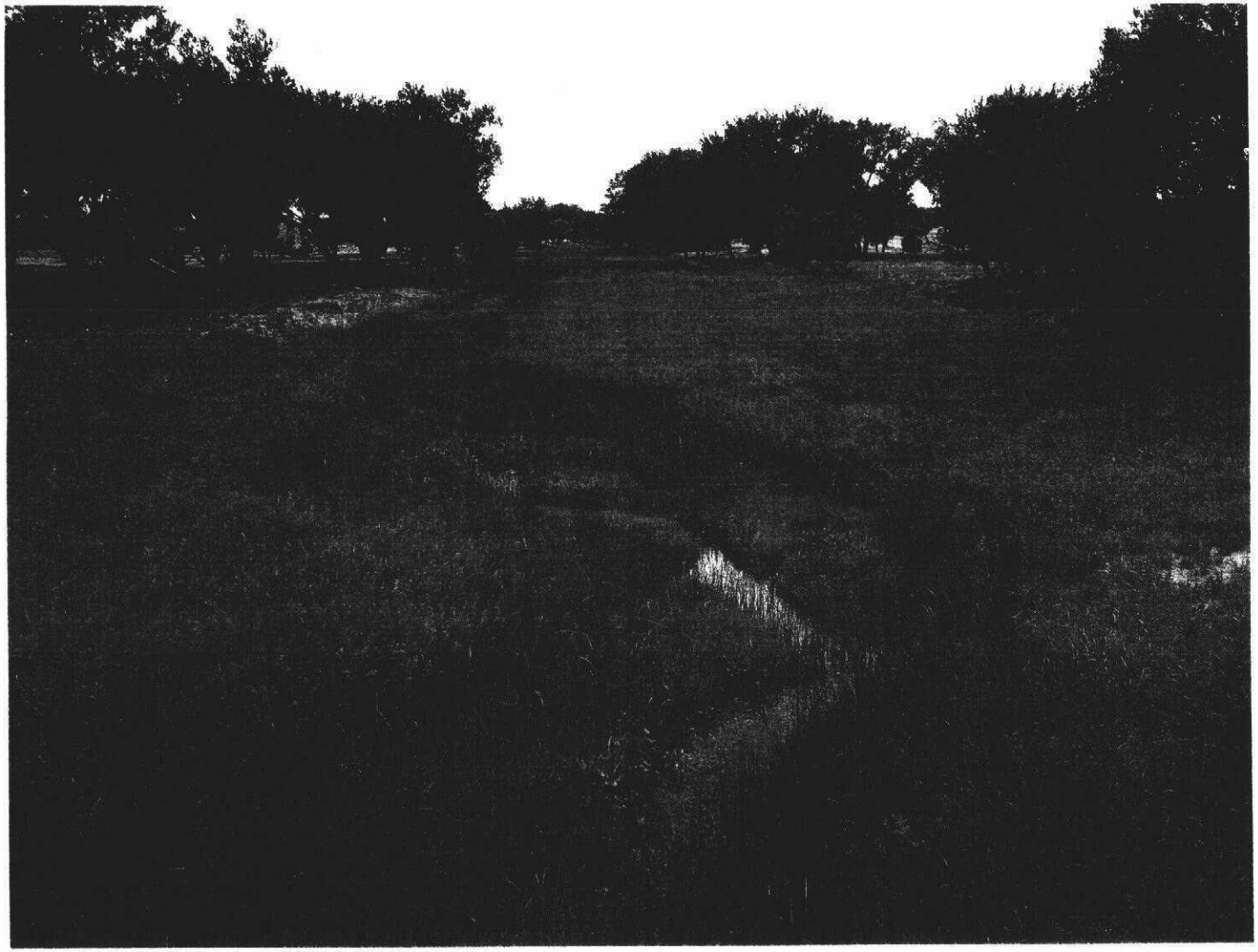
Beaver. Illustration by Ann W. Douden

Acre for acre, Colorado's wetlands are some of the state's most valuable real estate—not necessarily in terms of dollars per acre, but in terms of importance to agricultural production... to wildlife habitat...to water quality...to tourism and outdoor recreation.

As the 20th century draws to a close, more and more people—from farmers and ranchers to hunters and anglers to members of conservation organizations and private citizens—are becoming more and more interested in the future of the state's wetland resources. At the same time, human activity in wetlands is coming under increased scrutiny from federal agencies and others charged with wetlands regulation. This increased interest has raised hard questions:

How can we balance the values of wetlands as wetlands with the rights of property owners to farm, ranch or build on their land?

How can we conserve both publically and privately owned wetlands and their important functions and still allow traditional land uses and vocations to continue?

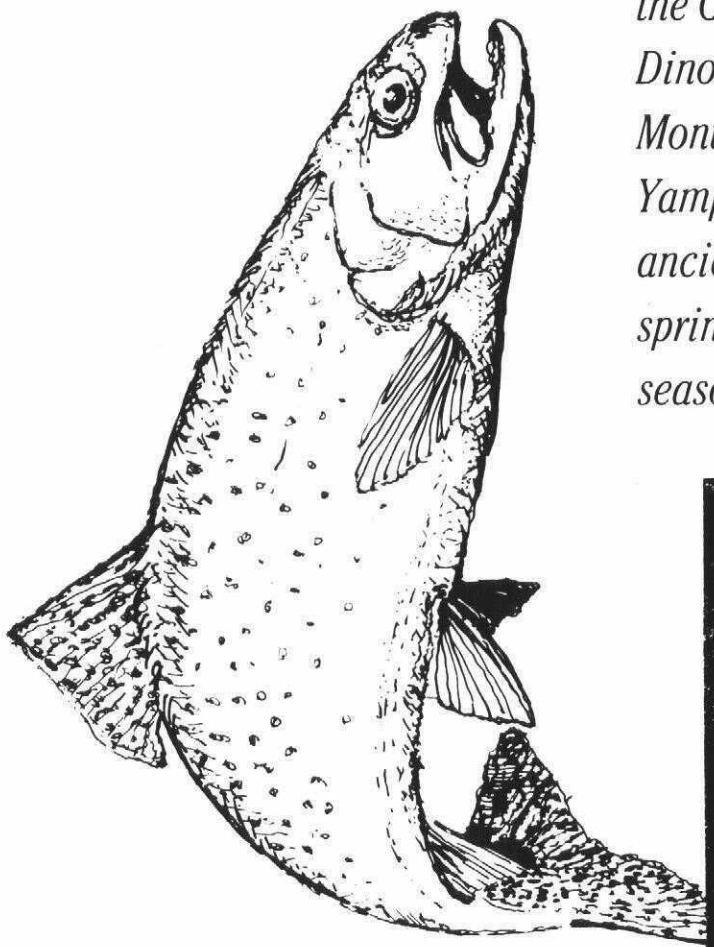


A riparian wetland on private land along the Arikaree River in the plains of northeastern Colorado. Photo by John Fielder.

The last portion of this booklet focuses on creative approaches to wetland issues, from city and county ordinances to management initiatives by land-management agencies to cooperative efforts involving a variety of government agencies and private groups that are interested in wetland management in Colorado. Where wetlands are concerned, the challenge for the 1990s is to forget labels and to work together to conserve wetland and riparian values—as well as the human values and activities that built the West.

RIPARIAN LANDS:
The Yampa River

From its headwaters to its junction with the Green River in Dinosaur National Monument, the Yampa follows an ancient pattern of spring flood and late-season low water.



Colorado cutthroat trout. Illustration by Ann W. Dowden.

Like all of the state's river systems, the Yampa is driven by a high-country reality: snowmelt. Snow accumulates in the Park Range and other high mountains of northwestern Colorado from October to April. Warming weather turns snow to water, which soaks the soil, then fills numberless streams and creeks. These tributaries channel a huge volume of water downhill in a short amount of time—gaining power (and sediment) as they go.

What sets the Yampa apart from its sister rivers is that relatively few—and fairly small—dams are found in its watershed. The river still follows its ancient pattern of spring flooding and late-season low water.

The interaction of the river and the plants that grow along it changes as the Yampa drops from its headwaters to its junction with the Green River. The river flows through a continuum of ecosystems that range from alpine tundra to the sagebrush lands of Dinosaur National Monument. And the lower down in the watershed the ecosystem occurs, the greater the river's power.

In higher-elevation areas (about 9,500-11,000 feet), spruce forests line narrow streambeds—and have a big impact on the stream. Their shade helps keep the water cold and rich in oxygen, which is important for trout and other fish. The leaves shed by trees and shrubs drop into the water—

Autumn—and low water—on the Yampa River at The Nature Conservancy's preserve near Hayden. Photo by Christopher Brown.

and supply food for insects, which are food for fish. When they die, the trees fall into the stream, creating "organic dams"—and the pools and riffles fish and insects rely on. Tree roots also help hold the streambanks in times of high water.

As the river drops in elevation, the vegetation that grows along its banks changes. From about 7,000 to 10,000 feet, willow wetlands are an important riparian wetland type.

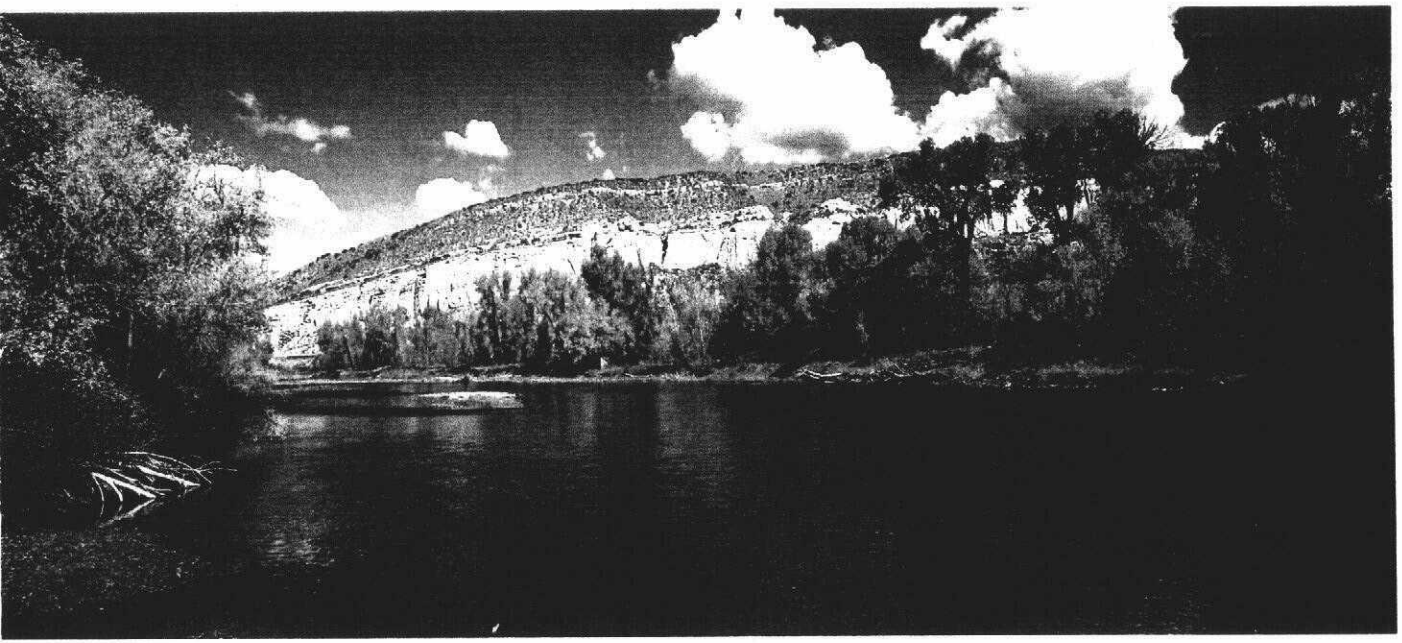
Beavers live and feed in many stands of willows and alders along the river, building dams and creating ponds. In many areas they have greatly expanded the size of a wetland by spreading water out across the landscape, keeping the soil saturated and low in oxygen, so that wetland plants can thrive.

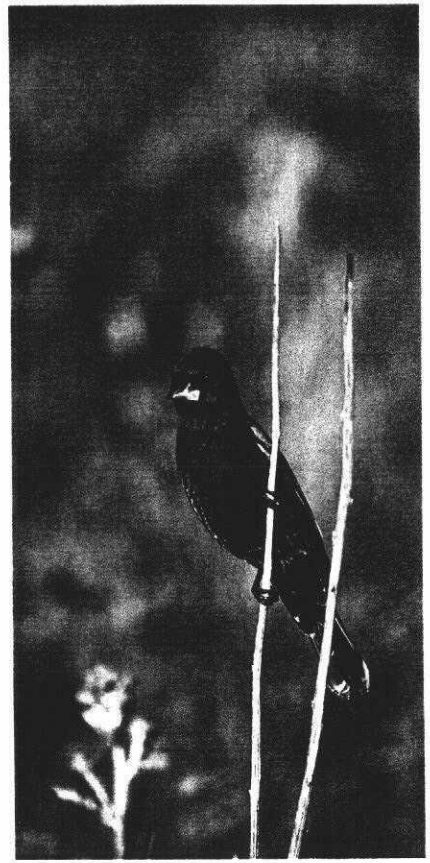
During the dry season, part of the water stored in the wetland seeps back into the river, maintaining base river levels even in late summer and fall. These wetlands also provide food and cover for a variety of animals, from trout, moose, elk and otter to waterfowl, warblers and snipe.

At about 8,500 feet, narrowleaf cottonwood forests begin to appear—often with an understory of red-osier dogwood. At about 6,500 feet, the Fremont cottonwood takes over as the dominant tree along the river. At this elevation, stream power rules the Yampa Valley. Over decades and centuries, the river "dances" back and forth across its floodplain, eroding banks, cutting new channels, dropping sediment to form new land and leaving behind oxbows—bends in the river cut off from the main channel as the Yampa seeks the easiest course downhill. This dynamic is critical to the life cycle of three endangered fish found in the Yampa: the Colorado squawfish, the razorback sucker and the humpback chub.

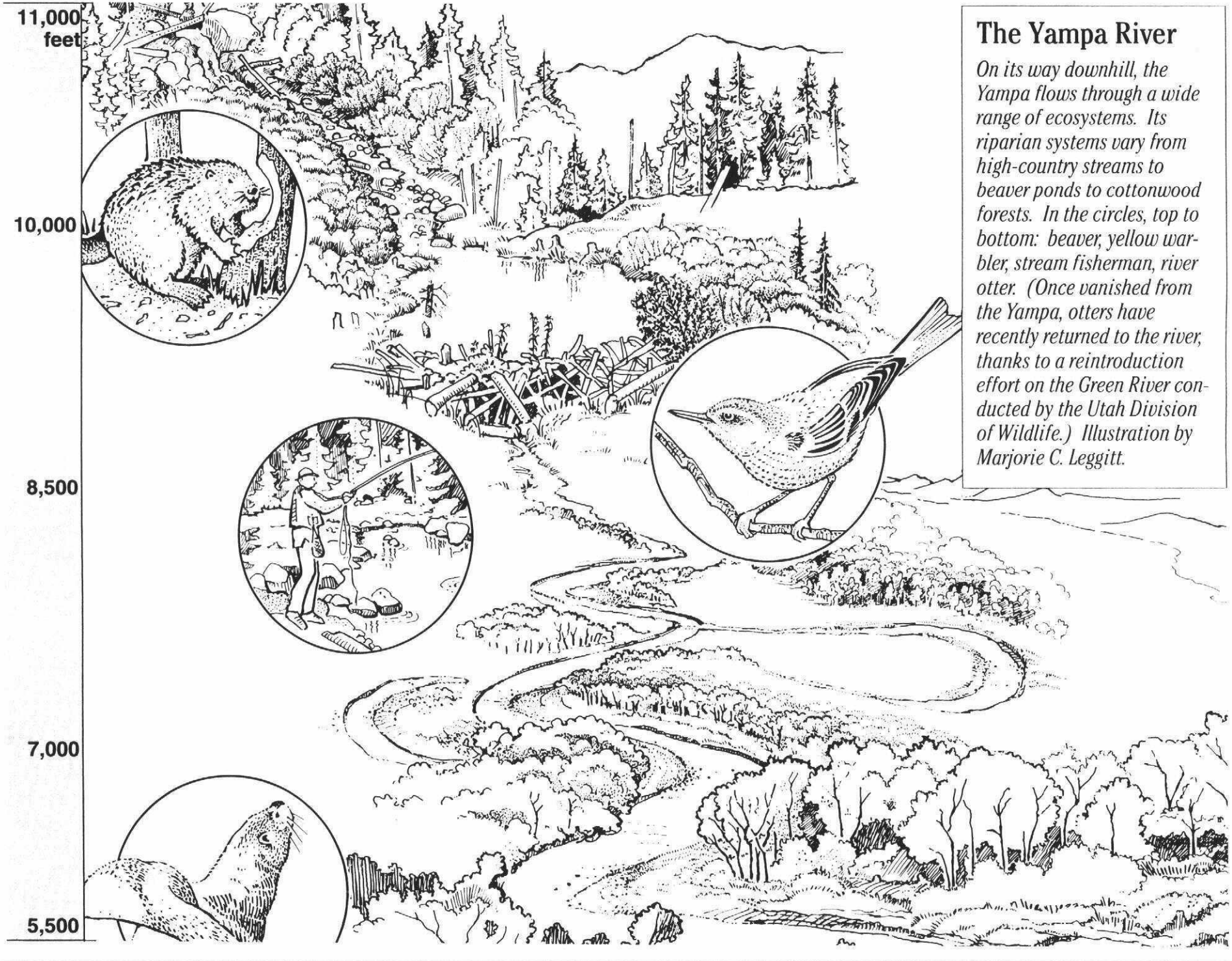
Cottonwoods also depend on this cycle of flooding and erosion in order to reproduce. To germinate, cottonwood seeds must make contact with bare, wet soil produced by spring flooding. Once the new plants sprout, they grow very fast. They can send roots 3 feet into the earth during their first season, and they can be established trees 10 feet tall in a few years. Cottonwoods can survive the periods of low water that are also typical of lowland riparian areas if their roots reach underground water supplies.

Then the next time a flood comes along, the force of the water rearranges enough of the floodplain that there are bare spots for new cottonwoods to become established.





The blue grosbeak, one of the species of birds that depend on the Yampa's riparian areas. Photo by Wendy Shattil and Bob Rozinski.



The Yampa River

On its way downhill, the Yampa flows through a wide range of ecosystems. Its riparian systems vary from high-country streams to beaver ponds to cottonwood forests. In the circles, top to bottom: beaver, yellow warbler, stream fisherman, river otter. (Once vanished from the Yampa, otters have recently returned to the river, thanks to a reintroduction effort on the Green River conducted by the Utah Division of Wildlife.) Illustration by Marjorie C. Leggitt.

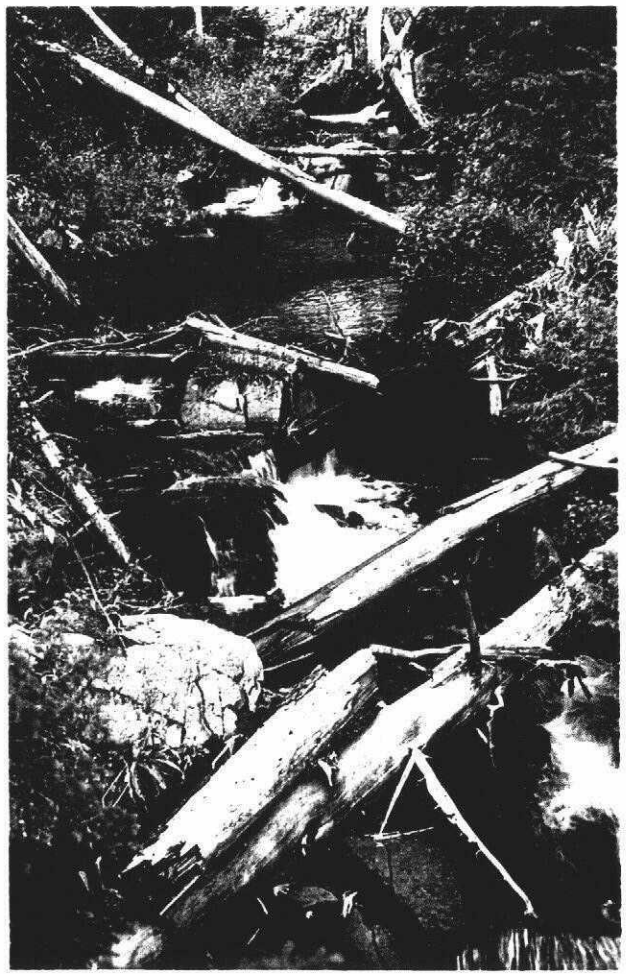
These dynamics create a mosaic of older, middle-aged and young trees. The mark of a healthy cottonwood ecosystem? Young trees filling in abandoned stream channels and newly formed sandbars, to replace older trees as they die.

Wherever they are found, riparian cottonwood forests are the most important habitat in the state for the most bird species. The Yampa and its tributaries are oases amid vast areas of rangeland and agricultural lands. Birds, including many species of ducks, hawks, eagles, songbirds and the sandhill crane, use its riparian areas as resting spots during migration. Others, such as Canada geese, nest on islands and streambanks, then rear young in adjacent wet meadows.

The cottonwoods are especially important for insect-eating and seed-eating birds: vireos, warblers, orioles, blackbirds, grosbeaks, finches and flycatchers...as well as cavity-nesting birds such as woodpeckers and merganser ducks—whether they spend all year in the Yampa Valley or winter farther south. And raptors—from golden eagles and prairie falcons to Cooper's hawks, American kestrels, great-horned owls, long-eared owls and even peregrine falcons—nest and feed along the river, its forests and its cliffs. Just how many kinds of birds use the river? Estimates are that around 125 species depend on the Yampa's riparian areas for at least part of the year, every year.

Wherever they are found, Colorado's riparian cottonwood forests are the most important habitat in the state for the greatest number of bird species.

A beaver dam and willow-alder riparian wetland, where Service Creek enters the Yampa. Photo by Ken Proper/Proper Exposure.



A high-country stream, complete with coarse woody debris. Photo by David Cooper.

WET MEADOWS:

...South Park...Cherry Creek...

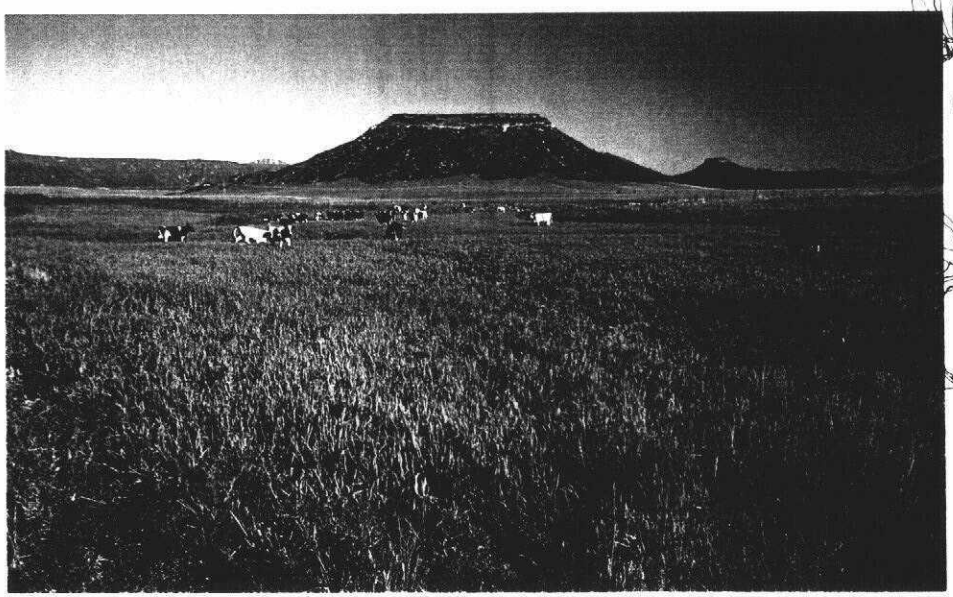
If you've traveled to Gunnison on U.S. Highway 50 from Monarch Pass down through the Tomichi Valley...or driven U.S. 285 through South Park...or even the Boulder Turnpike...you've passed right by wet meadows. This type of wetland is very common across Colorado below 9,000 feet, wherever seasonal snowmelt or irrigation keeps soils saturated for extended periods of time but deep flooding does not occur.

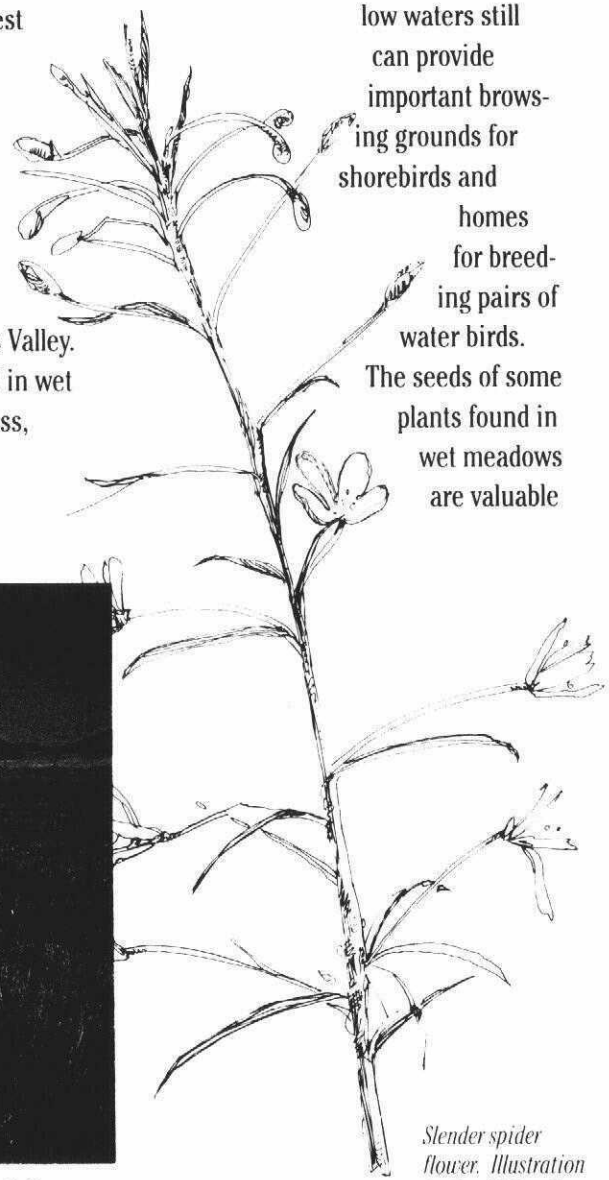
Wet meadows often exist alongside other types of wetlands, such as riparian areas and marshes. Like other wetlands, they have very important purposes, including flood and pollution control and groundwater recharge.

Wet meadows often show up greener or darker than the rest of the landscape. Plants found in these wetlands range from some of the most common hydrophytes in the state, like the arctic rush, to some of the most rare, like the slender spider flower, which is found only in wet meadows in the San Luis Valley. Native grasses commonly found in wet meadows include tufted hairgrass, manna grass and redtop.

In agricultural areas, this type of meadow—whether it occurs naturally or has been created as a result of irrigation—is often used for hay production and for livestock grazing. Wet meadows are also grazed by deer and elk. When these wetlands are grazed or hayed close to the ground, their shallow waters still can provide important browsing grounds for shorebirds and homes for breeding pairs of water birds. The seeds of some plants found in wet meadows are valuable food for birds like mallards and pintails. If wet meadows are not grazed or hayed, they offer early nesting sites to species like mallards, which nest in the hummocks of grasses and other plants that rise above the wet parts of the meadow.

Depending on elevation and the presence of a steady water supply, a wet meadow may also be used by a variety of amphibians, from leopard frogs to chorus frogs and boreal toads. The boreal toad, Colorado's only high-elevation toad, once thrived in wetlands above 7,000 feet. Since 1985, these toads have disappeared from more than 80 percent of their historic range. Experts believe environmental degradation—perhaps ozone depletion—may be to blame.





Slender spider flower. Illustration

Wet meadows are very common in Colorado at elevations below 9,000 feet. They often exist alongside other types of wetlands, such as riparian areas and marshes.

Slough grass in a wet meadow in South Park. Photo by John Fielder.

Grebes and mallards are silhouetted against a sunset at San Luis Lakes. The lakes are home to both a state wildlife area and a state park. Photo by Ken Archer.

MARSHES:
San Luis Lakes

Bulrush and smartweed (the plants in the water). Photo by David Cooper.

The San Luis Valley is like nowhere else in Colorado—a rift valley larger than the state of Connecticut, created millions of years ago when a great block of land slowly dropped while the surrounding San Juan and Sangre de Cristo mountains rose. The "basement floor" of the valley is two to three miles below the surface; in between the floor and the surface is about 10,000 feet of sediment—chock full of water and impervious layers.

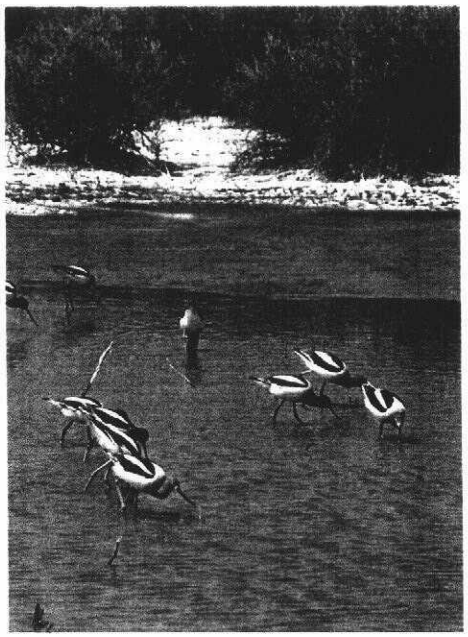
The southern part of the valley is drained by the Rio Grande River and its wetland systems. On the other hand, the northern portion of the San Luis Valley is a "closed basin": Water flows in and does not flow out again. This closed basin acts like a giant bucket, creating a perennially high water table, a situation ideal for marsh ecosystems.

Marsh systems like those found in the San Luis Lakes State Wildlife Area 30 miles northeast of Alamosa are very dynamic wetlands. Their size and the depth of the water that covers them vary with regional weather patterns and with the seasons. San Luis Valley marshes have standing water for part of the year; water can cover them as deep as 12-18 inches, or even up to 3 or 4 feet. Then, by the end of the summer, most of that water may be gone, leaving behind shallow temporary lakes called *playas* and a few deep-water lakes.

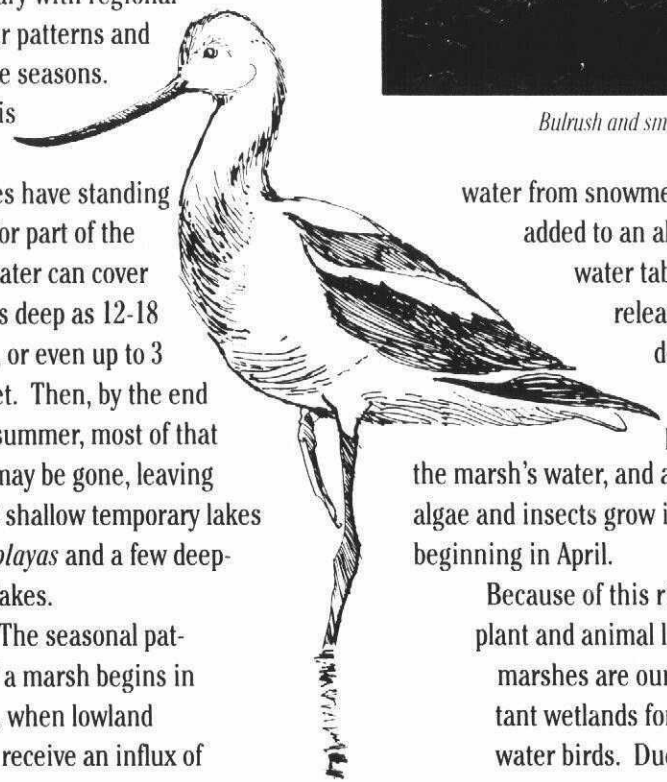
The seasonal pattern of a marsh begins in spring, when lowland basins receive an influx of water from snowmelt that is added to an already high water table. Nutrients released from the decomposition of last year's plants fertilize the marsh's water, and aquatic plants, algae and insects grow in a rush beginning in April.

Because of this richness of plant and animal life, Colorado's marshes are our most important wetlands for migratory water birds. Ducks...geese... shorebirds...wading birds...all use marshes as stopovers during migration, as resting and feeding sites and/or as breeding and moulting grounds.

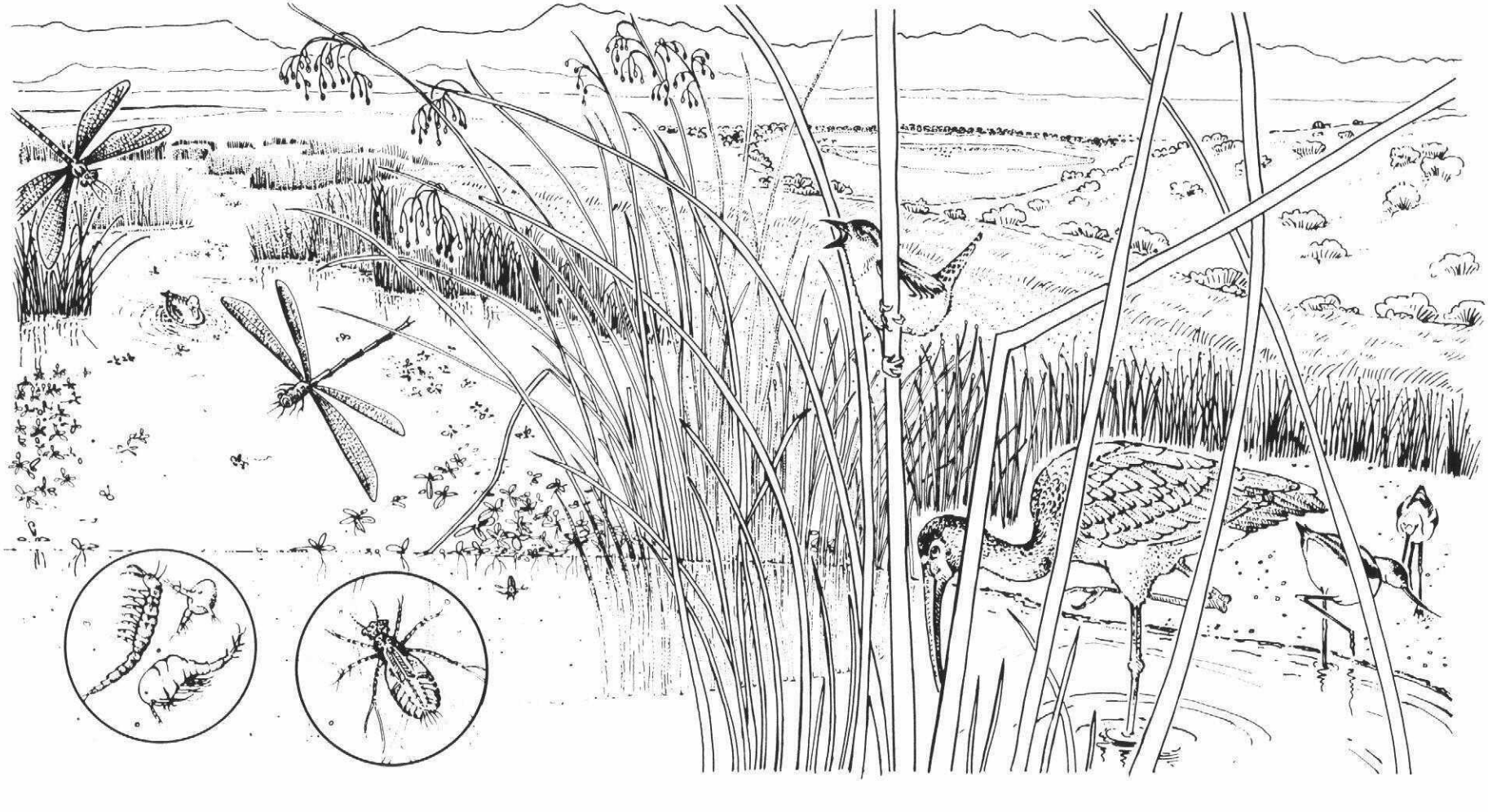
As the mud and shallow waters begin to warm in the spring, the first birds are waiting to feed on fairy shrimp and midge larvae—sometimes as soon as early April. Several species of ducks, as well as killdeer and spotted sandpipers, depend on this same food source to provide them with the protein they need for egg laying and to put on fat to fuel their northward migrations.



Avocets feed in a playa in the San Luis Lakes area. Photo by David Cooper.



Avocet. Illustration by Ann W. Douden.



During the growing season, a marsh ecosystem bursts with life. In the right foreground, a white-faced ibis wades and a marsh wren clings to a bulrush. At the shoreline, two avocets feed, flanked by a stand of spikerush. At the left of the illustration, dragonflies cruise above the marsh's open-water area. Duckweed floats on the surface, while a mallard feeds further out in the open water. In the background, a playa (temporary lake) lies amidst greasewood. The details shown within the insets at the bottom left of the illustration show common invertebrates that provide food for birds. The circle at the left shows three invertebrates: a fairy shrimp (left), a shrimp larva (top right) and a copepod (bottom right). The circle at the right shows a dragonfly nymph.

Illustration by Marjorie C. Leggitt.

Common marsh plants: smartweed (with pink flowers) and water crowfoot. Photo by David Cooper.

As the weather—and the water—continue to warm, shorebirds and ducks that breed in the area begin to arrive and feed on invertebrates: mallards, pintails, green-winged teal, American avocets, common snipe, white-faced ibis, Virginia rails....

As the deeper waters warm and the marshes grow green, American wigeon, gadwall and other plant-eating birds come to breed and to feed on the new leaves and shoots. The marsh wrens and blackbirds that nest in bulrushes, cattails and other tall marsh plants feed themselves and their young on insects like mayflies and damsel flies. Snowy egrets and black-crowned night herons feed on fish and amphibians. Eared grebe and diving ducks like canvasbacks and redheads feed on snails, insects and plants in areas of open water.

The birds of the San Luis Valley have many ways of dealing with competition for food, which can be intense early in the season. Some species, like red-winged blackbirds, stake out a territory and defend it against other members of their species. Other birds specialize in what they eat, the way they eat it or where they hunt for things to eat. For instance, ducks have filtering structures called *lamellae* in their beaks. Shovelers have very small lamellae and feed on very small organisms. The lamellae of cinnamon teal are a little larger, and those of mallards larger still.

Marsh systems like the San Luis Lakes do more than provide feeding grounds for migrating birds and nesting areas for birds that raise their young there. In mid- to late summer, mallards, gadwall and other ducks may travel hundreds of miles to the lakes and other deep-water areas in order to moult and to feed on the high-protein foods that help them produce new feathers. Since these species shed all of their flight feathers at once, they must remain in the areas they choose as moulting grounds until new feathers mature and they can head south.

As fall approaches and water levels are at their lowest, both adults and young birds raised in the area depend more and more on the valley's lakes, where they eat the seeds and tubers of marsh plants. Shorebirds on their way south for the winter may linger to use the mudflats created by receding waters as feeding grounds.

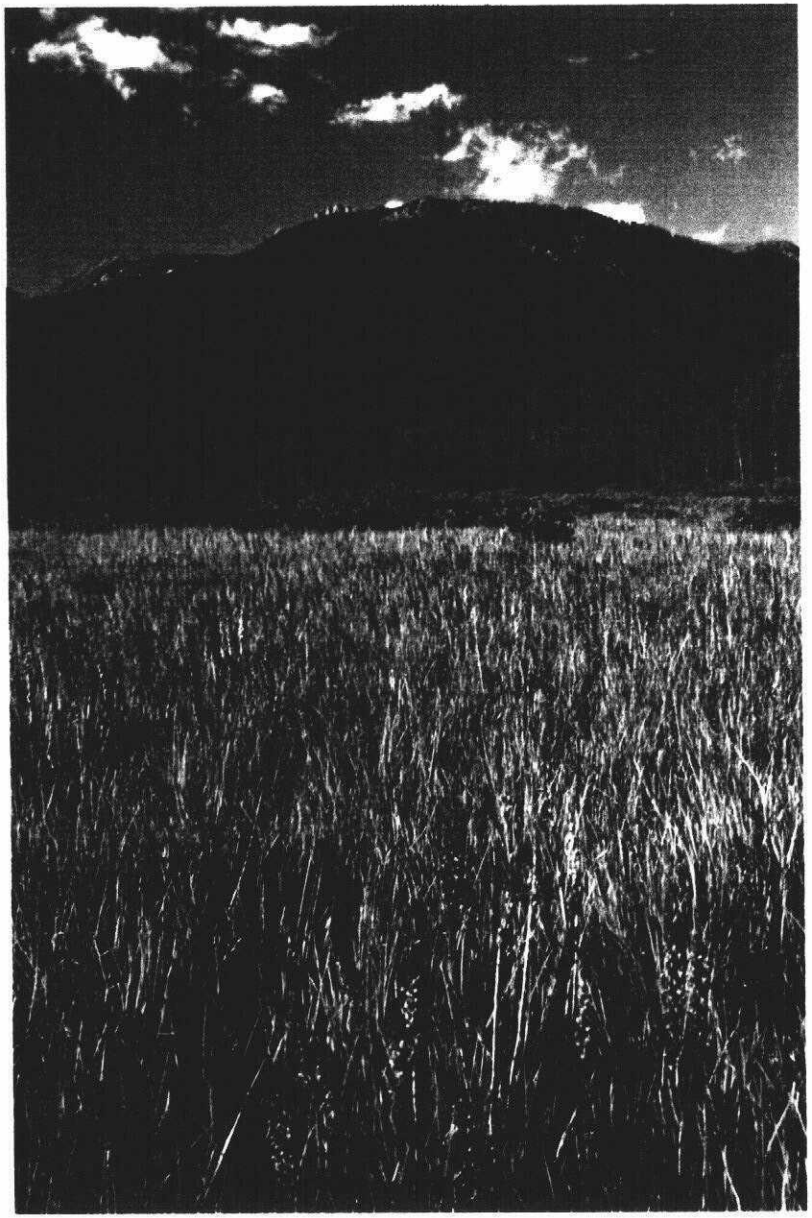
Even when the lakes freeze over, Canada geese and some mallards stay on, living on the warmwater seeps that are created around the valley's artesian springs—where water temperatures hover around 50 degrees Fahrenheit all winter. These birds will be first in line for the abundance of the returning spring.

Marshes like those found at San Luis Lakes are very dynamic wetland systems. Their size and the depth of the water that covers them vary with the region's weather patterns and with the passing seasons.

Outlined by a San Luis sunset, a hen mallard dries her wings. Photo by Ken Archer.

PEATLANDS:

Big Meadows & High Creek Fen



Peatlands are high-country wetlands that form around gigantic springs. Many Colorado peatlands have existed since the last glaciers retreated, about 12,000 years ago. The glaciers left behind huge moraines and outwash plains—lobes of gravelly material—on valley floors. Water from snow melting in the high country seeps through this gravel, then creates large springs when it surfaces at the toe of the outwash, or where a glacial moraine blocks a valley. It is at these springs that Colorado's peatlands—technically known as "fens"—have formed.

In Colorado's peatlands, which are technically known as "fens," dead plant material accumulates very slowly, forming peat at an average rate of about 8 inches every 1,000 years.

Because peatland soils are low in oxygen, the bacteria that decompose the leaves of peatland plants don't work very efficiently. This means that instead of rotting and turning to soil, dead leaves and roots slowly accumulate to form peat. Colorado peat does not come from moss, making it very different from the sphagnum peat moss commonly sold at garden centers, which comes from the northern U. S. and Canada. In Colorado's fens, dead plant material accumulates very slowly, forming peat at an average rate of about 8 inches every 1,000 years.

The state has two major types of peatlands, one of which is very rare. The type—and the rarity—are determined by the kind of rock the water flows over on its way downhill. If the surrounding mountains are primarily made of granite or other igneous rocks, nutrient-poor peatlands like Big Meadows in Rocky Mountain National Park are created. This type of peatland is found in many parts of Colorado in mountain valleys with elevations above 8,000 feet.

The water that feeds Big Meadows flows over hard bedrock, making it acidic and low in salts. Big Meadows and wetlands like it are dominated by sedges and other species that can tolerate soils that are cold and low in both oxygen and nutrients. These plants survive by being efficient recy-

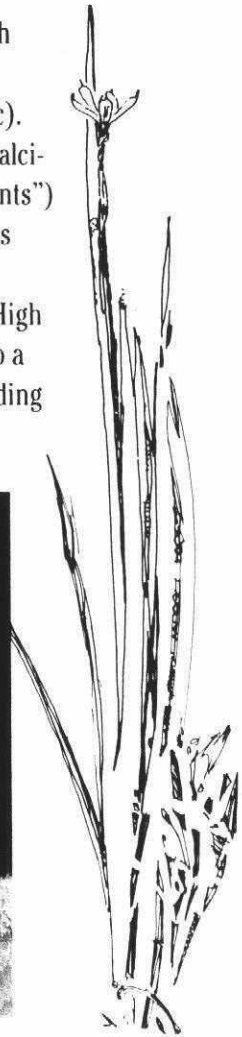
cling systems. Nutrients are drawn up from the roots into the leaves; then when a leaf is ready to die, the nutrients it contains go back into the roots to be recycled into new leaves.

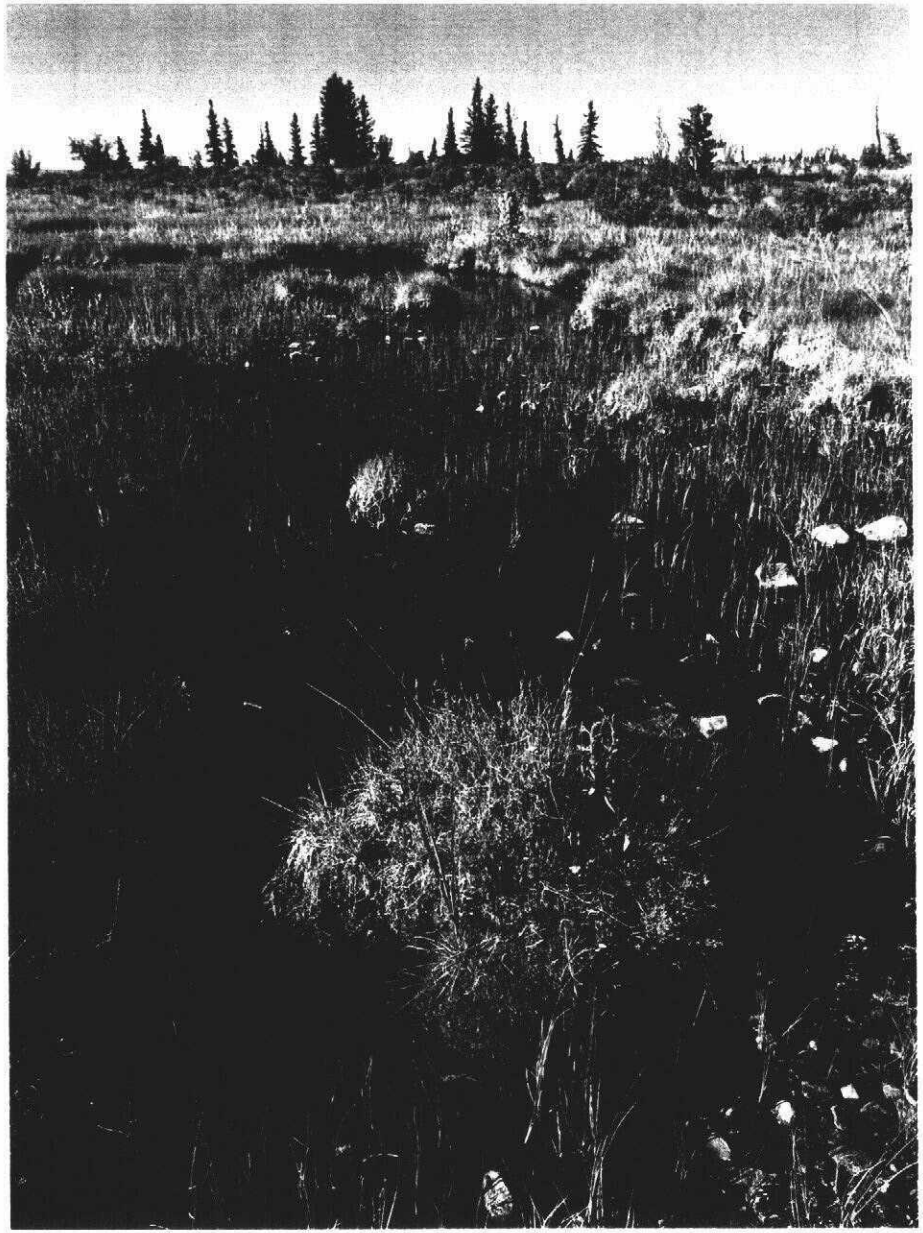
Because they occur in valleys surrounded by spruce and pine forests that produce little forage, these peatlands and their evergreen sedges can provide deer and elk with an important source of food. They are also home to high-country amphibians like chorus frogs and boreal toads—not to mention damsel flies, mayflies and mosquitoes.

Peatlands like Big Meadows purify the water that flows through them. Often you will find a peatland sitting in the middle of a valley's watershed. Water filters through the peat and can be cleaned of metals and other contaminants.

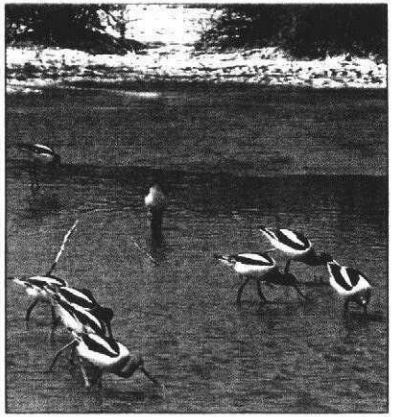
The other type of peat ecosystem, the rich fen, is very rare in Colorado; only about six examples have been found. Rich fens are formed when water flows over limestone or dolomite rocks, such as those found in the Mosquito Range above South Park. These rocks are rich in calcium carbonate and other salts, and they release these substances into the water, giving it a high pH (alkaline), rather than a low pH (acidic). These fens support calciphytes ("calcium-plants") that occur only in this kind of peatland.

South Park's High Creek Fen is home to a dozen plants—including pale blue-eyed grass and Greenland primrose—most of which are common in Canada but rare in Colorado and the rest of the continental United States. The 715-acre fen and another approximately 500 acres surrounding it are owned and managed by the Colorado Program of The Nature Conservancy.





COLORADO WETLANDS: Agencies & Organizations



Section 404 of the federal Clean Water Act regulates activities involving wetlands in Colorado and across the nation. Section 404 established a permit program to ensure that discharges of dredged and fill material into—or excavation in—wetlands and other waters of the United States comply with federal requirements. The ***U.S. Army Corps of Engineers*** and the ***U.S. Environmental Protection Agency*** jointly administer the Section 404 program. The U.S. Fish and Wildlife Service, as well as the Colorado Division of Wildlife and other state agencies, play advisory roles in the process.

Failure to obtain a 404 permit in cases where one is required may result in an enforcement action and possible penalty. If you are planning a project that may involve wetlands or other waters—or if you want more information on the 404 process, contact the Corps of Engineers at 303/979-4120 in Denver.

In addition to its Section 404 responsibilities, the Environmental Protection Agency also administers an Adopt-A-Wetland Program that allows local groups to sign on as stewards of a particular wetland. EPA also maintains a Wetlands Hotline for general information on wetlands: 1-800-832-7828 (Mon.-Fri. 9 a.m. 5:30 p.m. EST.) EPA's Denver office also offers a variety of information on wetlands: EPA, Region VIII (8WM-WQ), 999 18th St., Suite 500, Denver, CO 80202-2466. (1-800-227-8917)

The U.S. Fish and Wildlife Service (USFWS) reviews proposals for development projects that require federal permits or licenses such as Section 404, to ensure that impacts to wetlands are avoided or mitigated and that threatened and endangered species are protected. In Colorado, the Service manages five national wildlife refuges and their wetlands: the Rocky Mountain Arsenal, Alamosa-Monte Vista, Arapaho (near Walden) and Browns Park (near Maybell). In cooperation with the Colorado Division of Wildlife and private groups such as Ducks Unlimited, the USFWS has initiated Partners for Wildlife (PFW) to provide funds for sharing the cost of local wildlife habitat projects. Since 1990, the program has developed more than 100 cooperative agreements with private landowners across Colorado to create nesting and wintering habitat for water birds. For more information on PFW, contact Bill Noonan, 303/231-5280.

The U.S. Soil Conservation Service is primarily involved with wetlands on private lands. The Food Security Act of 1985 and the Food Agriculture Conservation and Trade Act of 1990 require SCS to survey wetlands on lands that are used for crops or could potentially be used for crops and to let agricultural producers know about the wetlands on their property. In general, producers who manipulate wetlands on their land after Dec. 23, 1985, are not eligible for most U.S. Department of Agriculture programs.

The Bureau of Land Management (BLM) recently published its nationwide "Riparian-Wetland Initiative for the 1990s," which is designed to provide a blueprint for management and protection of the riparian and wetland resources on BLM lands. In Colorado, the agency is working to achieve healthy and properly functioning conditions on its 60,000-plus acres of riparian areas and wetlands. One example: The ongoing cooperative effort between BLM and Colorado Trout Unlimited to restore the riparian area along Trapper Creek and to improve aquatic habitat in order to allow native Colorado River cutthroat trout to expand their numbers and range within the creek.

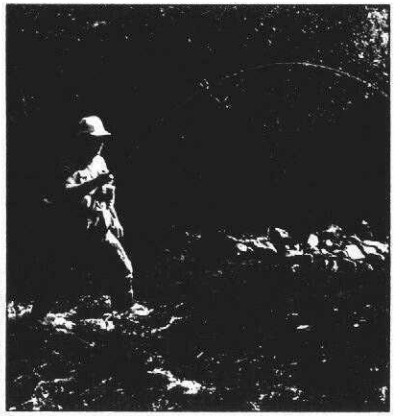
The U.S. Forest Service has launched a major inventory and planning effort involving riparian and wetland areas in the Rockies. The effort includes "Integrated Resource Inventories" of major watersheds; these inventories are designed to yield solid scientific information on what types of riparian areas, wetlands and other lands are located on the agency's property—and what kind of shape they're in. This data will be used to create Riparian Action Plans for each watershed —and to identify wetland and riparian demonstration areas that can showcase innovative management techniques. Scheduled completion date: 2000.

The Colorado Division of Wildlife, a division of the Department of Natural Resources, implements wetlands programs through money generated by sale of its migratory waterfowl stamps, which are required for hunting ducks and geese in Colorado. These dollars have generated additional funds for the creation and restoration of wetlands through partnerships with other government agencies and private groups. One example: CDOW participates with the Fish and Wildlife Service, as well as Ducks Unlimited and other private organizations, in the Partners for Wildlife (PFW) program. Other activities include conducting research on wetlands ecology, commenting on Section 404 permit applications and advising citizens on how to manage and create wetlands.

Another division of the Department of Natural Resources, ***Colorado State Parks***, has worked with Martin Marietta, Ducks Unlimited, the Division of Wildlife, the Department of Transportation and the Army Corps of Engineers to create a 20-acre wetlands/watchable wildlife area at Chatfield State Park in Littleton. The division's ***Natural Areas Program*** is inventorying and creating management plans for wetlands on State Parks land. This work is funded by a grant from the U.S. Environmental Protection Agency.

The Water Quality Control Division of the Colorado Department of Health is involved in wetlands protection in two ways: Under Section 401 of the federal Clean Water Act, the division is required to certify that discharge of dredged or fill material will not violate state water quality standards—including standards for wetlands that have been adopted by

the Water Quality Control Commission. Section 402 of the same act requires a permit for point sources that discharge pollutants into waters of the state, including wetlands.



Stream angler/Al Marlowe

The Colorado Department of Transportation (CDOT) is responsible for evaluating the impacts of all its transportation projects on environmental resources, including wetlands. If it is not possible to avoid impacts, CDOT works with state and federal agencies to develop mitigation plans that may include enhancement, restoration or creation of wetlands. One such plan benefited a wetland profiled in this booklet: As part of the wetlands mitigation plan for widening State Highway 9 in Summit County, CDOT contributed $110,000 to help The Nature Conservancy restore High Creek Fen *(see p. 17)*.

The Colorado Cattlemen's Association (CCA) is a non-profit trade association that serves as the "spokesman" for Colorado's 10,000-plus ranching families. CCA promotes good animal and resource stewardship among its members through individual recognition and educational programs on topics that include riparian management. For more information: 8833 Ralston Rd., Arvada, CO 80002. (303/431-6422)

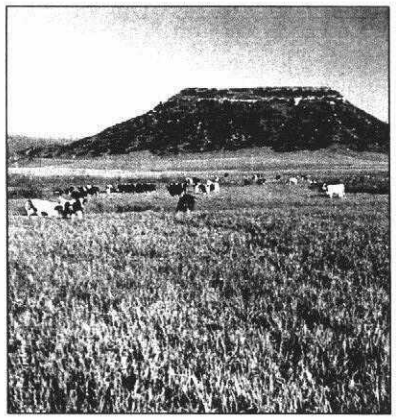
The Colorado Coalition of Land Trusts is made up of some 25 grassroots land trusts, as well as several regional and national trusts. These groups work mainly with private landowners to obtain easements that preserve significant lands, including wetlands. (Some, like the Crested Butte Land Trust, have wetlands preservation as a major goal.) The coalition's primary job is keeping its members up to date on issues and innovations. As of fall 1993, coalition members had protected more than 90,000 acres in Colorado—some 52,000 acres protected with easements, the balance owned by trusts or protected by transfer to a third party. For more information, contact CCLT, P.O. Box 1651, Durango, CO 81302. (303/259-3415)

The Colorado Riparian Association is a group of landowners, resource managers, organizations and interested individuals who work to increase awareness and appreciation of the state's riparian areas. For more information, write CRA at 2060 Broadway, Suite 230, Boulder, CO 80302.

Colorado Trout Unlimited and its 28 local chapters and 5,300 members provide thousands of volunteer hours every year to projects that preserve, protect and enhance the state's cold-water fish habitat using revegetation, fencing and instream improvement structures. Other activities include education programs for youth and stream monitoring through the River Watch Program. For more information: Colorado Trout Unlimited, 7200 E. Dry Creek Rd., Ste. G-201, Englewood, CO 80112. (303/220-7766)

Ducks Unlimited's mission is to preserve, enhance, manage and re-create wetlands. In Colorado, DU works closely with the Division of Wildlife, accepting wetlands proposals from government agencies and private landowners that may be funded from sales of duck stamps or from private dollars raised by DU. The 6,000 members of DU's Colorado chapter raise about $600,000-700,000 a year for projects benefitting some 600 species, from ducks to deer and songbirds. For more information, contact DU at 1269 Solstice Ln., Ft. Collins, CO 80525.

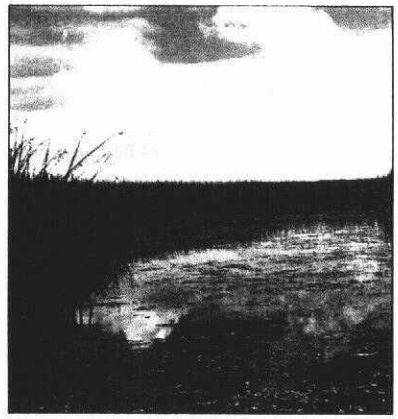
In the last four years, the ***Colorado Program of The Nature Conservancy*** has focused much of its attention on wetlands. The group has acquired riparian areas along the San Miguel and Yampa rivers, as well as High Creek Fen in Park County *(see p. 17)*. TNC is also working with the Bureau of Land Management and other organizations to promote sound management of an outstanding stretch of the San Miguel River. For more information: The Nature Conservancy, 1244 Pine St., Boulder, CO 80303. (303/444-2950)



Cows near riparian area/Darrow Cooper

Examples of Colorado towns and counties that are involved in local efforts concerning wetlands:

The ***City of Boulder*** has adopted a wetland protection plan aimed at "no net loss" of wetland acres or function. This plan includes a local permitting program, purchase of significant wetlands in parts of the Boulder Valley and public information and technical assistance to encourage property owners to preserve, restore and enhance wetlands voluntarily.



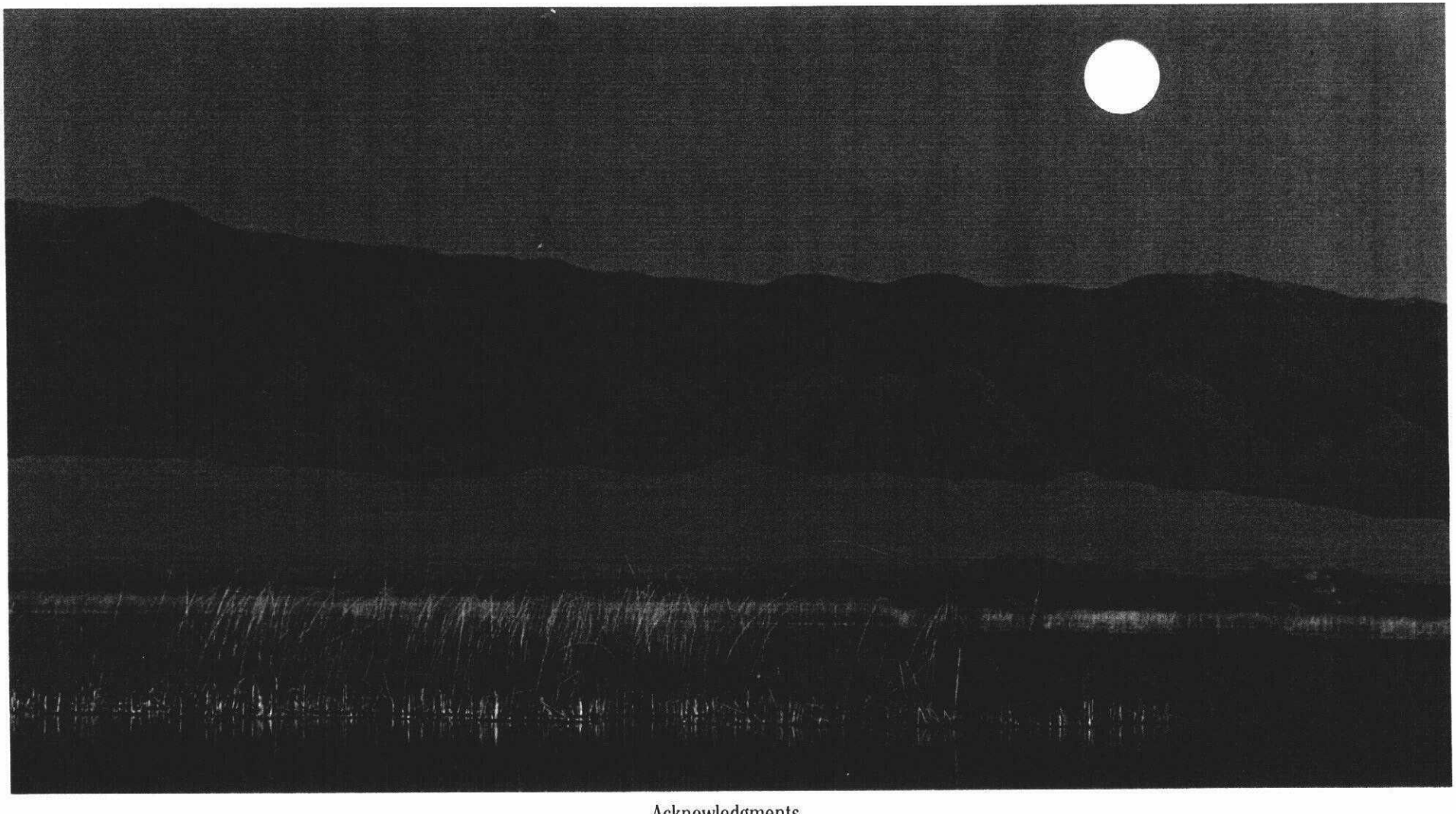
San Luis marsh/Darrow Cooper

Boulder County has completed a project to identify, locate and rank wetlands on private property in the unincorporated portions of the county—about 350 square miles. The project included interpretation of aerial photographs, as well as field surveys when landowners granted access. This preliminary assessment will be used for general resource planning and development review.

San Miguel County's Wetland Area regulations are aimed at preserving wetlands in the county primarily by requiring development activity to avoid wetland areas whenever possible—and to minimize impacts that cannot be avoided. The regulations apply to all wetland areas, to 100-foot buffer zones around them and to all waters of the county and require anyone proposing development within a wetland or buffer zone to apply for a county special-use permit.

In cooperation with the Crested Butte Land Trust, the ***Town of Crested Butte*** has established a long-range program to preserve critical wetlands. Wetlands within a three-mile radius of the town have been evaluated and prioritized, and the town will protect wetlands and other critical lands through land-use controls such as spacing of residential dwellings at the time of annexation. The land trust has begun a program to acquire high-quality wetlands.

Moonrise over the San Luis Valley. Photo by Wendy Shattil and Bob Rozinski.



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