1991 Summer Compendium of Wildlife Appreciation Opportunities

COLORADO DIVISION OF WILDLIFE
Nongame and Endangered Wildlife Program
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Colorado's Wildlife Company

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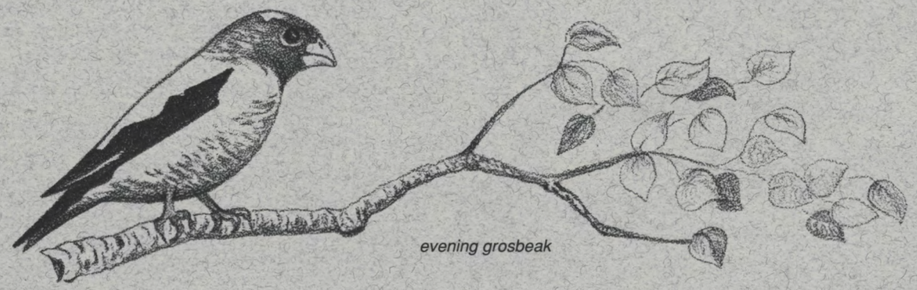


evening grosbeak

Why is a Pika Like an Elk

By Mary Taylor Gray

Perhaps they seem like a wildlife Mutt and Jeff — the elk, a majestic deer weighing 700 pounds, a mountain king known for his haunting autumn bugling and magnificent rack of antlers; the pika, a six ounce furball, busily defending his rock-pile home with squeaks and warning barks. Certainly no two mammals could be less alike.

Yet in the scheme of energy transfer, the elk and pika are very alike. Both are herbivores, first level consumers with a vital role in converting plant tissue to animal tissue. Under this broad definition, the two species perform the same job, yet the contrasts between them illustrate the diversity of life. Though both are plant eaters and often found in the same habitat — alpine meadowlands — competition between elk and pika is kept to a minimum because they occupy different niches. Pika eat among the boulder piles that elk find difficult to navigate. And although there is overlap in food choice, elk are primarily grass-eating grazers and pikas are nibblers of alpine shrubs and forbs.

Elk and pika also use different strategies to complete digestion of plant material. Like cattle, elk are ruminants with chambered stomachs. Food is moved through successive chambers, each pouch furthering the digestion process. Partially digested food is regurgitated into the mouth where it is remasticated — elk chew cud.

As members of the rabbit family, pika have an equally charming mode of digestion — coprophagy. Food passes once through the animal's digestive system and is excreted as soft, green caecal pellets (not to be confused with the hard, brown fecal pellets). These soft pellets are then re-ingested by the pika to pass through the intestines again for final processing. Sort of another way of chewing cud . . .

Do Beavers Eat Fish? **

By Mary Taylor Gray

My favorite question in the game of *Trivial Pursuit* has always been "Do Beavers Eat Fish?" It's logical to assume they might, since they live in water. But animals don't always eat what we think they should, and animal feeding behaviors are far more complicated than implied by the simplified image of the food web.

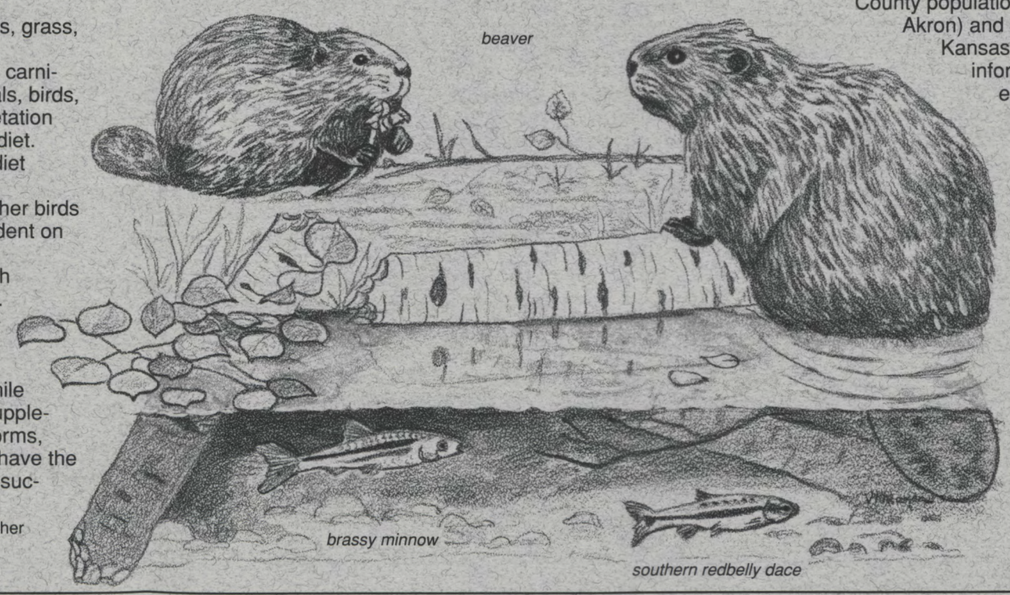
Some animals are herbivores at certain life stages and carnivores at others. Tadpoles eat mainly algae, plant material and detritus (dead and decaying matter); after metamorphosing into frogs, they eat mostly insects. Since both larval and adult stages live in the same pond, a single species occupies two different niches within the ecosystem during its different life stages.

Many animals are omnivores — eating whatever food is available to them, whether plant or animal. Coyotes are a great example. Since they belong to the order Carnivora and have the shearing teeth of a predator, we might assume they're strictly meat eaters. Yet coyotes are typical opportunists. Their diet includes rodents, birds, carrion, plants — whatever they can find. Examination of coyote scat bears this out; it typically contains not only fur and rodent bones but seeds, grass, dried berries and other plant material.

Bears are another omnivore classified as carnivore. They eat berries, nuts, roots, fish, mammals, birds, and invertebrates. At certain times of year, vegetation accounts for as much as 90% of a black bear's diet. Much of the "meat" in the remaining 10% of its diet comes from insects.

Pheasants, prairie-chickens and many other birds we think of as grain and seed eaters are dependent on animal foods during certain times of their life cycles. Grasshoppers are essential to the growth of the chicks of many grassland grouse species. Without the protein from the insects, the young can't get the nutrients they need for growth. Similarly, during their migration through the San Luis Valley, sandhill cranes are highly visible while feeding on waste grain in fields. Cranes must supplement this vegetarian diet with grubs, insects, worms, fish, frogs, shellfish and other animal protein to have the strength to endure an arduous migration and to successfully breed and produce young.

** The answer to this question can be found in another article in this publication!



beaver

brassy minnow

southern redbelly dace

DOW — Working for Wildlife

Report: Greater Prairie-Chickens

Listed as an endangered species in our state, greater prairie-chickens are coming back! A team of Colorado Division of Wildlife (DOW) biologists, researchers, and wildlife officers is working to establish at least three separate populations of greater prairie-chickens in eastern Colorado. They hope new and stable populations of prairie-chickens will enable DOW to remove them from the endangered species list.

Tim Davis, a DOW biologist based in Sterling, explained that greater prairie-chicken populations declined in Colorado when a large proportion of native prairie grassland was converted to agricultural cropland in the early 1900s. According to Davis, prairie-chickens need large, unbroken stretches of warm-season grasses that typically grow on Colorado's mid-grass prairies; they can tolerate only about 30 percent of their habitat under cultivation.

Until several years ago, the only population of greater prairie-chickens remaining in Colorado lived on private rangelands in Yuma County. In order to protect the birds (disease could wipe out an entire population), a noncontiguous population was established on public land. DOW reintroduced greater prairie-chickens to the Tamarack State Wildlife Area in 1984 and 1985. Thirty-six birds were reintroduced the first year and 40 more were added the second year.

Since 1982, DOW has managed 3,000 acres of the south Tamarack specifically to improve greater prairie-chicken habitat. Davis and wildlife researcher Warren Snyder have been working with Marvin Gardner, Larry Crooks, Katy Kinney and other DOW employees to reestablish warm-season grasses in the area and to create wet meadowlands that attract grasshoppers for the chicks to eat.

GRASSHOPPERS! BUT I THOUGHT PRAIRIE-CHICKENS WERE HERBIVORES!

According to Davis, like most gallinaceous (ground nesting) birds, greater prairie-chickens are primarily herbivores as adults. But during the summer months, 80 - 90 percent of the prairie-chickens' diet consists of grasshoppers.

The team also has attempted to help greater prairie-chickens establish leks (traditional breeding grounds) by mowing small areas of the Tamarack. Concerning affairs of the heart, however, the prairie-chickens have declined to follow the team's lead, choosing only one mowed site as a temporary lek. Still, everyone is happy because the birds have established 8 to 10 leks of their own choosing.

Today the Tamarack State Wildlife Area and adjoining rangelands support a healthy population of about 200 birds, and DOW is currently working to establish two new populations. This year, they transplanted 43 greater prairie-chickens from the Yuma County population to a site near Pinneo (west of Akron) and 50 greater prairie-chickens from Kansas to a site east of Greeley. Recent information shows that leks have been established and hens are nesting at both new sites.

The Yuma County population, by the way, has rebounded to between 6,000 and 10,000 birds. Davis believes this may be partially due to the Conservation Reserve Program, where farmers have been reimbursed for taking highly erodible land out of agricultural production and putting it back into natural grasses. So, altogether, things are looking up for greater prairie-chickens in Colorado.

Writing: Mary Taylor Gray, Janet Duvall; Graphic Design: Vicki Mayea; Illustrations: Vicki Mayea and Maida Cummings; Biological and Program Advisors: Bob Hernbrode, Judy Sheppard, and Jim Bennett.

The Food Chain Revisited

By Gray and Duvall

First, the Chain

We learned about it in fifth grade — the food chain. It's a simplified way to show how energy and nutrients pass through the environment. The "links" in the food chain represent different levels of feeding and being fed upon: trophic levels.

Energy, originating from the sun, takes a one-way trip through the food chain — from green plants (producers), to plant eaters (herbivores), to plant-eater eaters (carnivores). At each trophic level, energy is dissipated as heat during respiration and other metabolic processes; thus, less energy is available to the next trophic level. At the end of the food chain, decomposers use what energy remains in dead plant and animal material. Without a continual input of energy from the sun and the transformation of that energy by green plants, the world ecosystem would collapse.

Minerals, on the other hand, are continually cycled through the ecosystem. Taken up as nutrients by green plants, minerals are stored in plant tissue, ingested by herbivores, passed along to carnivores, and tend to increase or concentrate (bioaccumulate) with higher trophic levels. When an organism dies, decomposers return minerals to the soil to be taken up again by green plants.

Then, the Web

After grade school, we learned life is a lot more complicated. Rather than a linear, chain-like relationship, species are "linked" between trophic levels through multiple strands. And many species, like bears, eat plants, herbivores, and carnivores. The interlocked design of a web comes closer than a chain to a visual representation of real ecosystem interrelationships.

When one thread in the web is clipped or removed, as in the loss of a species — plant or animal — it weakens the whole system. If enough strands are broken, the entire web could unravel. As one ecologist noted, "It is not only more complex than we think. It is more complex than we *can* think."

Next, the Organism

Beyond the complexities of the food web, we are learning to look at all life forms as inseparable, interrelated parts of one system. Perhaps this system could best be visualized as one living organism, dependent upon all its parts for the survival of the whole. Rather than thinking of discrete species unaffected by impacts upon other species, we are starting to see all organisms (including humans) as integral players in the one and only game of life. Humans have a profound impact on the web of life and are, in turn, affected in ways we are just beginning to comprehend.

Producers — Green Plants:

Plants are the only living things that can convert radiant energy (sunlight) to chemical energy, thereby directly or indirectly providing food for the entire ecosystem.

In our concern over threats to wildlife, we often overlook the disappearance of endangered plants. Of 18,000 native plant species in the United States, 4300 are currently threatened, and an estimated 700 to 1000 will become extinct over the next ten years. A loss of diversity at the producer level narrows the options for all life forms.

Herbivores — Plant Eaters:

Plant eaters have digestive systems designed to unlock the energy stored in plant tissue — and they do so in a number of different ways. One "strategy" is exemplified by ruminants like deer and elk. Their chambered stomachs carry food through repeated levels of digestion. Other herbivores, including rabbits, produce partially digested pellets that they eliminate, re-ingest and run through the system again. But plant eaters can't do it alone; they have a diverse group of micro-organisms in their intestines that help them break down plant material into usable food. Without this intestinal flora, beavers could not digest the cellulose of the wood they eat, and they would starve to death regardless of how much they ate.

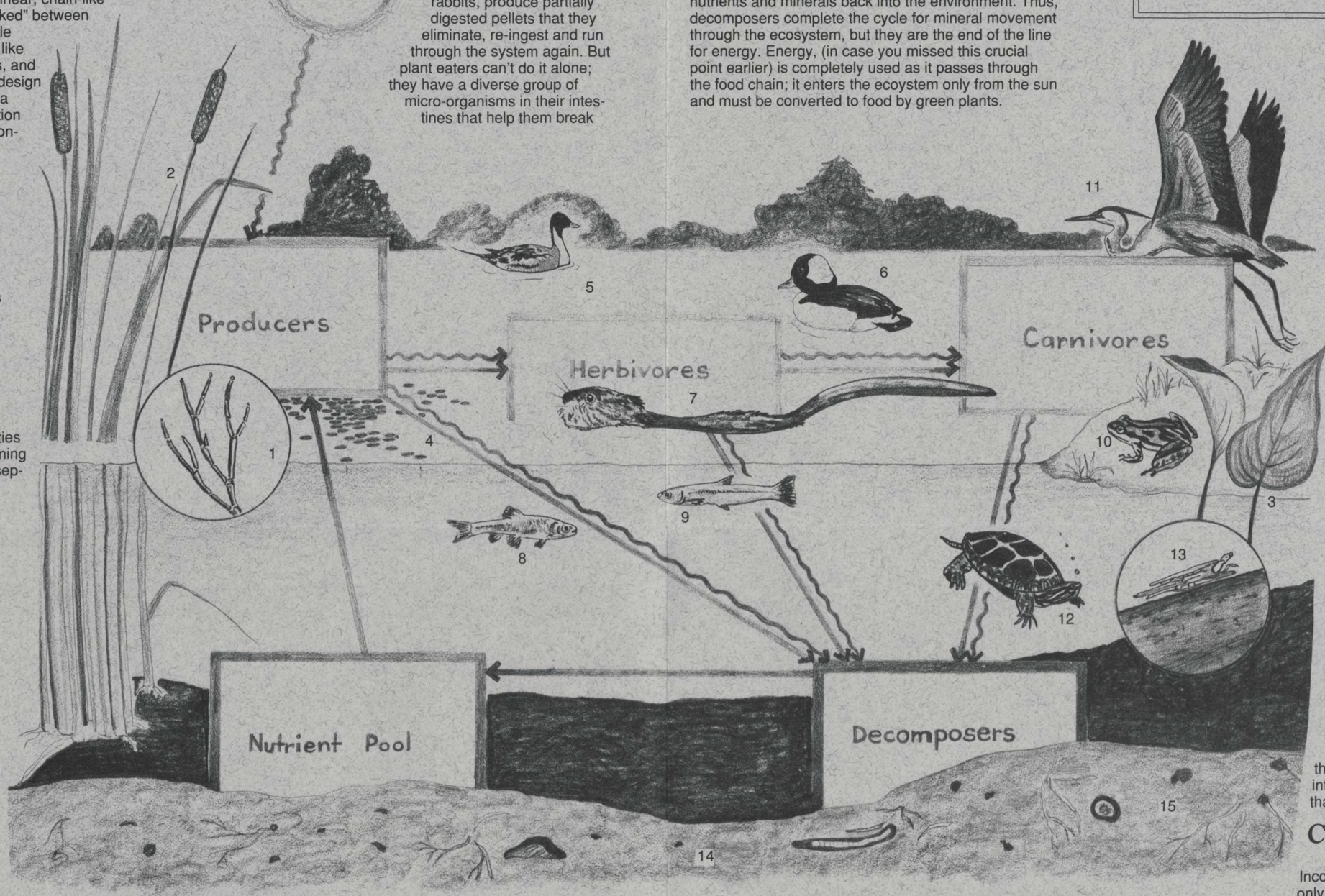
Carnivores — Plant Eater Eaters:

Carnivores are as dependent upon green plants for food as the herbivores, but carnivores eat plants indirectly. They depend on the "middleman" (the herbivore) to convert plant fiber into body tissue. Essentially, the lynx gains the nutrition and energy in many acres of browse by eating just one snowshoe hare. Carnivores as a group, however, do not receive all the plant energy available to their prey; most energy consumed by herbivores is used for their own respiration and metabolic functions.

We think of predators controlling prey species, but in reality the opposite is true. Studies of Canadian lynx found that the cats' predation on snowshoe hares did not control hare populations. Instead, the abundance of snowshoe hares (the energy source) regulated the lynx population. Think about it: the abundance and diversity of the plant population shapes the health of both herbivore and carnivore populations . . . that includes you and me.

Decomposers — Recyclers:

Fungi, bacteria and other decomposers break down dead plant and animal tissues, using the remaining energy for their own metabolic needs. They utilize "biodegradable" organic material, ultimately releasing carbon, nitrogen, phosphorous and other essential nutrients and minerals back into the environment. Thus, decomposers complete the cycle for mineral movement through the ecosystem, but they are the end of the line for energy. Energy, (in case you missed this crucial point earlier) is completely used as it passes through the food chain; it enters the ecoystem only from the sun and must be converted to food by green plants.



A simplified model of energy and mineral movement in ecosystems. Note that energy flow is noncyclic, whereas nutrient movement is cyclic. (From: E.J. Kormandy, Concepts of Ecology, Prentice-Hall, New Jersey, 1969)

KEY

Producers
1) cladophora (green algae)
2) cat-tail
3) pickerelweed
4) duckweed (free-floating plant)

Herbivores
5) pintail (surface-feeding duck)
6) bufflehead (diving duck)
7) muskrat
8) fathead minnow
9) plains minnow
10) striped chorus frog

Carnivores
5) pintail
6) bufflehead
10) striped chorus frog
11) great blue heron
12) painted turtle
13) caddisfly larvae (in its case)

Decomposers
14) fungi
15) bacteria

A Food Web Fable

The story begins with a stream rushing between treeless, grassy banks. Nothing much lived in the water, but one particularly demanding oxbow slowed the water enough to enable a willow to take root near the water's edge. One thing led to another, and soon shrubby willows and alders grew around the oxbow, and a good stand of aspen lined the bank beyond. That was when the beavers moved in.

Like most beavers, they preferred slow-moving streams and ponds, and they began working immediately to build a dam. As the stream backed up behind the beaver dam, the water slowed further, a pond formed, and leaves and other organic materials began to accumulate instead of being carried downstream. Decomposition of the organic materials provided a constant supply of nutrients. A healthy population of algae grew in the pond and, through photosynthesis, provided both food and oxygen to the underwater community—primarily microscopic animals (protozoa).

The beavers kept the dam in repair and regulated the water's flow. Soon the pond was able to support larger aquatic animals that fed upon the protozoa, algae and aquatic plants. Ducks started to frequent the pond in pursuit of the plants and insects it offered. American avocets waded along the shore searching for aquatic insects and small crustaceans. Blackbirds and grosbeaks arrived for the pond's supply of insects and seeds. Great blue herons came for the minnows, the frogs and the crayfish. Muskrats moved in with the cattails and water lilies. All kinds of small mammals were attracted to the pond to drink and to eat the variety of plant and animal life it supported. Vegetation growing around the pond provided escape cover for small mammals and birds, but raptors, owls and coyotes still found many delicious reasons to visit the beaver pond.

As beavers built their second lodge, people built homes and planted crops on land adjacent to the pond. For a while children visited the pond to swim, fish and catch tadpoles. But over time, water drained into the pond from nearby yards and fields and brought phosphorous and nitrogen from chemical fertilizers to the pond. The fertilizer runoff raised the nutrient level in the pond higher than it had ever been, and it stimulated a bloom of algae. The growing algal population used more oxygen for its own respiration than it could produce. Ensuing decomposition used up even more oxygen.

As oxygen levels decreased, fish, aquatic insects, aquatic invertebrates and every creature living under the pond's surface suffocated. With nothing to eat, frogs and salamanders died. When ducks, avocets and herons returned to the pond, they found their food supply gone and were forced to fly many miles in search of a pond with living fish and bottom fauna. The beavers and muskrat moved out as the pond overflowed with algae and choked with thick plant growth around its edges.

One thing led to another as it always does. Without beaver maintenance, the stream couldn't flow through the pond and followed a new course, cutting off the old oxbow. As chemical nutrients continued to drain into the pond, the composition of the aquatic plant and animal communities changed to those forms needing less oxygen. Instead of a jolly pond of tadpoles and fish, it became a stagnant breeding ground for mosquitoes. Nobody visited the place anymore — no raptors, no owls, no coyotes, no kids.

ESSAY QUESTION: Beavers and humans are able to profoundly change their own habitat. Beavers make changes that improve the quality of their habitat and ensure their long-term survival. Are humans doing the same thing? (Send your answer in 500 words or less to Editor Janet Duvall, P.O. Box 228, LaPorte, CO 80535. The winning essay will be published in *Colorado's Wildlife Company*.)

The Money Chain

Sometimes it appears that the money chain has stronger influence over wildlife's survival than the food chain.

Check-off

It looks as if the Nongame Income Tax Check-off may generate only $344,555 for the 1990 tax year. Putting this number into perspective, this is less than half of the income generated by the check-off during its early years (1981 $740,700 and 1982 $692,000).

Although this preliminary number is only an estimate based on early tax returns, some people are wondering if multiple choice on the tax form is splitting the contribution pie into too many pieces. In 1990, Colorado taxpayers could choose to contribute to four different programs in addition to a mandatory "contribution" to a fund for non-insurable citizens. Already looking ahead to the 1991 tax year, legislators have added yet another check-off (Operation Desert Storm Active Duty Military Fund) to the Colorado tax form.

Great Outdoors Colorado!

At the same time, a proposal that would have allowed voters to decide how to fund wildlife and outdoor recreation was killed by the Senate Finance Committee on April 16, 1991. Proposed funding mechanisms were based on the recommendations of Governor Romer's Great Outdoors (GO) Colorado Citizen Committee. (GO Colorado recommendations were summarized in the 1990/91 Winter issue of *Colorado's Wildlife Company*.)

David Harrison, chairman of the GO Colorado citizen's committee, says a nonprofit organization has been formed to carry forward the committee's recommendations. Citizens for Great Outdoors Colorado, Inc., will spearhead a campaign to take the funding issue to the voters. In order to put the question on the ballot, the group will need to gather about 50,000 signatures before August 1992. Following that, they plan to educate the public about the initiative before the November 1992 election.

In the meantime, Citizens for Great Outdoors Colorado, Inc., is building its organization and raising money for the work ahead. Until the new organization has established an office, anyone interested in contributing time or money can contact them through Steve Norris in the Department of Natural Resources, 866-3311.

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Inside this issue:

1. A Mind-Riveting Reader Survey. This is your chance to tell us what you really think about *Colorado's Wildlife Company*. (Only a sample population of readers will receive the survey.)
2. A Thought-Provoking Essay Question. Send us your answer by September 1. The best essay we receive will be published in an upcoming issue of *Colorado's Wildlife Company*.
3. The hottest greater prairie-chicken information.
4. Intriguing news about pika, elk, beaver and fish.
5. Real-life food chain considerations.
6. Update on wildlife funding realities.

bushy-tailed woodrat

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