



2019 Colorado School of Mines Classes Available through RMC

Unless otherwise noted all classes are worth .5 credits with 8 hours of class time.

Level I: Short-distance walks on maintained trails and/or indoor classroom sessions in accessible buildings ♦

Level II: Short-distance walks through the day on primarily level terrain ♦♦

Level III: Moderate hikes of less than five miles per day with elevation gain of less than 1,000 ft. ♦♦♦

Level IV: Hikes of more than five miles per day with elevation gain of more than 1,000 ft. ♦♦♦♦

Natural History Classes:

Coyotes: The Song Dogs of the West

Jared Gricoskie March 23 \$80 per adult ages 16 and older

Coyotes are among this country's most successful and resourceful predators. Often misunderstood and maligned, the coyote's impact on our everyday life is profound. Explore the natural history of North America's second largest canine, Native American stories, coyote discovery by Lewis and Clark, and the animal's expansion to the East. Examine the coyote's anatomy and biology; then, head into Rocky Mountain National Park to explore coyote habitat, social structure and interactions. Learn how the coyote interacts with the ecosystem, its prey and humankind, and how wolves could impact coyotes in the future. ♦♦ (CSM credit available) Meets at the Rocky Mountain Conservancy Field Institute

North with the Spring: Bird Migration

Jeff Maugans May 3 \$80 per adult ages 16 and older

April in the high country is when we welcome back birds that have wintered in warmer climates. Ducks, shorebirds, warblers, swallows, flycatchers, sparrows, sapsuckers, bluebirds and many others return for the nesting season or stop to refuel before heading farther north. Explore several locations in and around Estes Park and Rocky Mountain National Park to identify as many species as possible by sight and sound while learning about each bird's unique natural history. ♦♦♦ (CSM credit available) Meets at the Rocky Mountain Conservancy Field Institute

Fire in Ecosystems: Friend or Foe

Scott Franklin May 4 \$80 per adult ages 16 and older

Coming off of one of the worst fires seasons in the known history of the West, both managers and citizens are grappling with the complexity of how climate change may alter fire disturbance regimes. Is fire still a natural disturbance in these mountain forests? What relationship does fire have with other disturbances such as drought and bark beetle outbreaks? During this all-day class, we will explore the role of fire in mountain forest ecosystems, typical fire regimes, synergistic disturbances, and predicted changes with climate warming. We will also discuss the history of fire policy ranging from the “10 am policy” to the “let burn policy”, including the caveat of the wildland-urban interface. ♦♦ (CSM credit available) Meets at the Rocky Mountain Conservancy Field Institute

There’s More to This Place than Meets the Eye: 100 Years of Environmental Change in RMNP

DeAnna Laurel May 3 \$80 per adult ages 16 and older

This course provides an overview of the history of environmental change in the park with an emphasis on human-caused change. Discuss the history of mining, water engineering, recreational development and tourism, atmospheric inputs of dust and nitrates, wildlife management, and climate change in the context of protecting and restoring natural environments within the park. Understand how past human activities influence contemporary ecosystems and options for management of natural resources within the park. ♦♦ CSM credit available Meets at the Rocky Mountain Conservancy Field Institute

NEW! The Surprising World of Lichens

Jennifer Frazer May 11 \$80 per adult ages 16 and older

You cannot hike, bike, climb, or ski in Colorado without encountering lichens, but few people take the time to notice or examine these ubiquitous organisms. Come take your blinders off and come be blown away by the biology and beauty of these fascinating communities of organisms that live where other life forms cannot. In this class you’ll learn about the inhabitants, anatomy, growth forms, and reproductive structures of lichens. You should invest in a 10X hand lens or loupe to maximize your enjoyment. Artists and photographers welcome! ♦♦♦ (CSM credit available) Meets at the Field Institute

NEW! Endangered Species of the Rockies: Evading Extinction

Gary C. Miller May 17 \$80 per adult ages 16 and older

Concerned about threatened or endangered species, and their preservation as part of our natural world? How do species come to be at the brink of extinction, and how can they be recovered? The answers lie in the landmark Endangered Species Act of 1973 (ESA), the emerging science of conservation biology, and the resulting actions taken by scientists and citizens. Using examples of species occurring in Rocky Mountain National Park, this class will delve into these topics and their application in recovery efforts. The case histories (including little-known “backstories”) of efforts to recover peregrine falcons, Canada lynx, North American wolverine, and greenback cutthroat trout each demonstrate different aspects of endangered species management. The class includes a visit to a nesting area of the once-endangered/ now-recovered peregrine falcon.

♦♦♦ CSM credit available Meets at the Rocky Mountain Conservancy Field Institute

NEW! Owls of Rocky Mountain National Park

Jeff Maugans May 17 \$80 per adult ages 16 and older

Participants will explore Rocky Mountain National Park in search of 3-4 species of owls during the spring courtship and nesting season. Students will be listening for the vocalizations of Northern Pygmy, Northern Saw-whet, Flammulated and Great Horned Owls. The group will head into the field well before dark as Pygmy Owls are diurnal which provides a great opportunity to get great looks at this species. After dark participants will listen for the other species and hopefully locate a nesting pair or two while seeing first-hand the habitats these species require. ♦♦ CSM credit available Meets at the Rocky Mountain Conservancy Field Institute

NEW! Early Wildflowers of RMNP

Leanne Benton June 1 \$80 per adult ages 16 and older

Some of the park's early blooms are the loveliest, from tiny alpine forget-me-nots to colorful Calypso orchids. Search out these beauties with former Rocky Mountain National Park interpretive naturalist Leanne Benton as we explore from high alpine ridges to lower montane meadows depending on what is blooming. Participants will get up-close with the mountain flora to discover their adaptations for survival and interesting stories behind their beautiful faces. Identification techniques will be honed, and participants will gain confidence using a simple flower key. ♦♦ CSM credit available Meets at the Rocky Mountain Conservancy Field Institute

NEW! North American Eagles

Perry Conway June 1 \$80 per adult ages 16 and older

Colorado has both North American eagle species, as does Rocky Mountain National Park. The evolution, ecology, behavior, anatomy and population status of both the bald and the golden will be discussed using a highly professional illustrated lecture. In addition, a beautiful live female golden eagle, with a 7' wing span, will be used to reinforce the lecture's content. After lunch, we will travel to nearby nests to see what kind of habitat is needed for reproduction. We will drive as close as possible to the nest sites, but participants should come prepared for short hikes to the best viewing areas. ♦♦ CSM credit available Meets at the Rocky Mountain Conservancy Field Institute

Edible & Medicinal Plants of the Rockies: Plants for Hunger & Health

Abby Schreiber June 7; August 3 \$80 per adult ages 16 and older

Explore the flora of the park with a former RMNP interpretive ranger and Master Herbalist. Focus on plants that have been used historically by Native American tribes as food and medicine and those in current use. Herbal remedies based on popular traditions, herbal lore and cultural customs will be complemented with knowledge of therapeutic value discovered by scientists for a holistic portrayal of medicinal plants found in the Rocky Mountains. Discover the edible plants, their pharmacology, identification, conservation and ethics surrounding their harvest and use. Seeds and berries will be discussed at the August class. ♦♦ CSM credit available Meets at the Rocky Mountain Conservancy Field Institute

Rocky Mountain National Park Butterflies: East of the Divide

Paul Opler & Evi Buckner-Opler June 8 \$80 per adult ages 16 and older

Butterflies are easily observed in every life zone of Rocky Mountain National Park. Learn basic butterfly biology, behavior and identification. In the field, visit several different habitats on the east slope of the park to search for summer species, such as pale swallowtail, blues, several fritillaries, hoary comma and Weidemeyer's admiral. Learn to identify these species, and also discuss their life histories and ecology, host-plant associations and conservation concerns. Observation will rely on binoculars and digital photography; however, the instructor will have a net-and-release permit to allow participants a close-up look at a variety of species. ♦♦ CSM credit available Meets at the Rocky Mountain Conservancy Field Institute

NEW! Untangling the Mystery of RMNP Native Orchids

Marlene Borneman June 8 \$80 per adult ages 16 and older

What is an Orchid? The orchid family (Orchidaceae) is the largest family of flowering plants, about 35,000 species. Surprisingly there are about 26 species native to Colorado with many growing in the montane and subalpine zones of RMNP. Our day includes learning the characteristics of the Orchid family, Orchid terminology, their symbiotic relationship to other plants, history of uses, and looking at specific Orchid species found in RMNP. We will see how many species we can find and identify in the field, while enjoying these elusive and mysterious plants.

♦♦ CSM credit available Meets at the Rocky Mountain Conservancy Field Institute

NEW! Birding RMNP by Ear

Nathan Pieplow June 21 \$80 per adult ages 16 and older

Birds are far more often heard than seen – but learning to identify them by ear can be a challenge. This course will introduce the most common bird sounds of Rocky Mountain National Park. We will begin with a field trip in the morning to several different habitats, to hear and practice identifying as many birds as possible. In the afternoon, we will reconvene indoors for a class session to reinforce and extend the learning from the morning. Both indoors and out, we will work on learning a standard vocabulary for describing sounds, and visualizing sound using spectrograms, so that our eyes can help train our ears.

◆◆ CSM credit available Meets at the Rocky Mountain Conservancy Field Institute

NEW! Grand Lake Area Class

The Glacial & Geologic History of Rocky's West Side

Keith Graham June 22 \$80 per adult ages 16 and older

In this course, participants will spend time in the field examining features of glacial and geological interest. The goal of this course is to provide both a general knowledge of the geologic history of this region as well as the thought processes and geologic tools used by geologists to decipher this history. We shall also point out that much remains to be learned about some of the geologic processes that shaped the geology and glaciology of the western part of the park. ◆◆ CSM credit available Meets at Farview Curve

Wildflowers of RMNP

Leanne Benton June 29-30 \$160 per adult ages 16 and older for both days or \$90 for each day

Explore the wonder and diversity of the park's wildflowers with a former Rocky Mountain National Park interpretive naturalist. The park's vertical topography allows for variety of habitats; this class will search out lush wildflower displays from montane meadows to high alpine ridges. Get up close with the mountain flora to discover their adaptations for survival and interesting stories behind their beautiful faces. Hone identification techniques, and gain confidence using a flower key. Day 1: montane and subalpine wildflowers; Day 2: alpine wildflowers. ◆◆ CSM credit available Meets at the Rocky Mountain Conservancy Field Institute **This class has over 16 hours of contact time for 1 credit.**

Birding the Life Zones

Jeff Maugans June 29-30 \$160 per adult ages 16 and older

Rocky Mountain National Park is a birder's paradise during the nesting season. This two-day class will explore the various ecosystems (life zones) of the park to find 50-70 bird species. We will identify hawks, falcons, eagles, ducks, white-tailed ptarmigans, brown-capped rosy-finches, swifts, broad-tailed hummingbirds, swallows, tanagers, sparrows, warblers, American dippers, wrens, woodpeckers, owls, nuthatches, chickadees, kinglets, jays, common ravens and other corvids, and a number of other members of the area's avifauna. We will discuss the natural history of both the birds and the montane, subalpine, alpine, and riparian environments they inhabit. ◆◆◆ CSM credit available

Meets at the Rocky Mountain Conservancy Field Institute **This class has over 16 hours of contact time for 1 credit.**

NEW! Longs Peak Up-close

Marlene & Walt Borneman July 6 \$80 per adult ages 16 and older

Have you ever wondered about those who have explored and studied this unique and famous feature? Ever wondered about the character of Longs Peak itself? Join Walt and Marlene Borneman for a day of intimately connecting with Longs Peak's history, heritage and folklore - from geology to colorful characters. Along the way, Marlene will point out various flora and fauna.

◆◆◆ (CSM credit available) Meets at the Field Institute

Grand Lake Area Class

Birds of the Kawuneeche Valley

Jeff Maugans July 6 \$80 per adult ages 16 and older

This all-day birding excursion will begin with a brief indoor session followed by a day spent in the field within Rocky Mountain National Park. We will identify birds by sight and voice and learn about their natural history. This is prime time to find birds nesting, and we expect to locate woodpeckers, bluebirds, swallows and wrens at their cavity nests. We will break for lunch at a restaurant in Grand Lake and then resume our field explorations in the Kawuneeche Valley. ♦♦ CSM credit available Meets at Kawuneeche Visitor Center

NEW! Alpine Wildflowers: The Beauty and Resourcefulness of Life in Miniature

Abby Schreiber July 13 \$80 per adult ages 16 and older

Spend a day in the rugged environment of the alpine tundra and explore how life survives and thrives. Plants have adapted to these harsh conditions allowing for a lushness that begs to be seen and experienced up close. We will explore the ecosystem; specifically, how alpine plants adapt to extreme forces. The class is scheduled to make the most of the seasonal wildflower display. Come play up top in the crystalline air with spectacular views! ♦♦ CSM credit available Meets at the Rocky Mountain Conservancy Field Institute

North American Bears: Ecology, Behavior & Evolution

W. Perry Conway July 13 \$80 per adult ages 16 and older

Bears are the iconic symbol of the American wilderness. North America has three of the world's eight species. Historically, the park had two of the three – now only one. Learn the natural history of all three North American species – their evolution, behavior and habitat needs. With illustrated classroom sessions and field trips, you will learn which areas of the park provide proper black bear habitat, what they eat and their population status. In addition, instruction as to where to view and safely photograph North American bears will be provided. ♦♦ CSM credit available Meets at the Rocky Mountain Conservancy Field Institute

NEW! Glaciers in Rocky

Dr. David Lindsey July 20 \$80 per adult ages 16 and older

During the ice ages, glaciers moved down the valleys of the Fall River and the Big Thompson. Glaciers carved U-shaped cross sections into formerly narrow stream valleys and left natural dams of glacial debris at their terminus. Striated and grooved bedrock, glacial erratics, and ridges of debris along valley walls are some of the other calling cards of ice. The ebb and flow of glacial advance is controlled by astronomical phenomena: the eccentricity of the earth's orbit, the tilt of the earth's axis of rotation, and the precession of the equinoxes. These move in cycles that combine to produce glacial maxima about every 100,000 years. The last glacial maximum was about 21,000 years ago. Since that time, the earth has warmed, not steadily, but in fits and starts that reflect other complex but poorly understood processes. Today all of these natural processes are further affected by man's activities. The class will examine classical glacial features in the Fall River and Big Thompson valleys and discuss the processes that formed them. ♦♦ CSM credit available Meets at the Rocky Mountain Conservancy Field Institute

Bats of Colorado & RMNP

Jeremy Siemers July 26 \$80 per adult ages 16 and older

Colorado is home to 19 bat species, and 8 are found in the vicinity of Rocky Mountain National. The evolution, ecology, behavior, anatomy, threats and population status of Colorado's bats will be discussed. Examples of survey equipment, video, and acoustic materials will be used to reinforce the lecture's content. After dinner, we will travel to nearby foraging habitat to observe and listen to bat activity. We will drive as close as possible to the field sites, but participants should come prepared for short hikes. ♦♦ CSM credit available Meets at the Rocky Mountain Conservancy Field Institute

Bighorn Sheep: Ecology & Management

Jeff Connor July 27 \$80 per adult ages 16 and older

The bighorn sheep is the rightful symbol of Rocky Mountain National Park and the state of Colorado. It is one of the most highly esteemed mammals in North America, representing the majestic mountains of the park. There are few people, who are not impressed by the sight of a large bighorn ram bearing its

crown of massive horns. Spend a day with naturalist Jeff Connor learning about the ecology, population dynamics, behavior, food habitats, and mortality causes of bighorn sheep. Learn how to identify a ram from a ewe, a yearling from a lamb, and how to age rams by rings on their horns. Participants will discuss the importance of escape terrain and where ewes have their lambs. The class will also visit two mineral licks, learning why they are so important to the survival of sheep and Jeff will discuss important park management issues related to bighorn sheep.♦♦♦ CSM credit available
Meets at the Rocky Mountain Conservancy Field Institute

NEW! Antibiotic Resistant Bacteria: Resistance in Rocky

Laura Scott July 27 \$80 per adult ages 16 and older

Antibiotic resistant infections are an imminent threat to human health. Could these bacteria be lurking in environments as pristine as Rocky Mountain National Park? What factors might cause them to be in pristine environments? This course seeks to offer insight into these questions and the implications of such research. Students will be introduced to basic microbiological field and laboratory techniques. The course will focus on collecting and analyzing soil and water samples for antibiotic resistant bacteria. In the field, soil and water collection techniques will be taught while gathering samples along a human impact gradient. In the lab, samples will be prepared and analyzed to detect antibiotic resistant bacteria. This class will involve handling of potential BSL-2 pathogens. Proper safety techniques will be demonstrated and maintained, but every student must abide by protocol in order to protect themselves and others.

♦♦♦ (CSM credit available) Meets at the Field Institute

Grand Lake Area Class

NEW! Wild Mushrooms & Fungi of RMNP

Jon Sommer August 10 \$80 per adult ages 16 and older

Often thought of as something to be avoided, fungi (including mushrooms) represent a vast and diverse group of organisms that play a critical role in virtually every terrestrial environment on the planet. Formerly thought of as plants, it is now known that fungi represent their own kingdom, along with plants and animals. Exemplified by prevalent and often colorful mushrooms, Rocky Mtn National Park has a bountiful and diverse fungal flora. Come learn the basics of mushroom identification, their important role in the ecosystem and a brief overview of the fungal kingdom. We will spend a good part of the day in the field, identifying mushrooms and other fungi, and gaining a first-hand appreciation of these interesting and important organisms. ♦♦♦ (CSM credit available) Meets at Trail River Ranch

NEW! Grand Lake Area Class

The History of Moose in RMNP

Jeff Connor August 17 \$80 per adult ages 16 and older

Even though not guaranteed we should see moose and even some that have radio collars. The story of present-day moose in Rocky Mountain National Park did not get started until 1978. Before 1978 there is some debate on if moose were considered residents of the park. We will discuss why there is some debate and where the present population came from. The focus of the day will be on what they eat, their seasonal behavior, why some are wearing radio collars, and their impact on the delicate willow communities of Kawuneeche Valley. Other questions we will answer are their relationship to other wildlife in the park such as elk and birds, do they have any predators that still exist in the park and why are willows showing such a dramatic decline? The cause maybe a surprise when we discuss the relationship between avian sapsuckers, a fungus, beaver, wildfire, elk and what does all that have to do with moose? We will also discuss present and future park management of this charismatic species. ♦♦♦ CSM credit available Meets at Trail River Ranch

Mountain Lion: RMNP's Top Predator

Caroline Krumm & Dr. Don Hunter August 17-18 \$160 per adult ages 16 and older

Explore mountain lion ecology, ongoing research, human-mountain lion interaction, and community stewardship of wildlife resources during morning lectures followed by hands-on instruction in the field. Demonstrations of research methods, tools and data collection will be included with practical instruction

on how to “read” the signs left by mountain lions. Mountain lion safety, current research techniques, key management issues, and how communities across the West are becoming involved also will be discussed. ♦♦ CSM credit available Meets at the Rocky Mountain Conservancy Field Institute **This class has over 16 hours of contact time for 1 credit.**

The Persevering Pika: Secrets of Alpine Survival

Chris Ray August 31 \$80 per adult ages 16 and older

Watch the American pika demonstrate its alpine survival strategy. Pikas and their hibernating neighbors—yellow-bellied marmots, chipmunks and squirrels—are easy to watch in the summer and fall as they forage among the alpine wildflowers. Learn to spot different animal behaviors that provide clues to surviving the long, cold winter. Pikas don’t hibernate, so you’re sure to learn a few survival tips from these resourceful little beasts. ♦♦ CSM credit available
Meets at the Rocky Mountain Conservancy Field Institute

Cultural Classes:

Phantoms: The Primordial, Prehistoric, & Hidden History of RMNP

Mary Taylor Young June 22-23 \$160 per adult ages 16 and older

What stories hover like phantoms behind the contemporary face of Rocky Mountain National Park? Roam the park with award-winning writer Mary Taylor Young, author of the park’s centennial history *Rocky Mountain National Park: The First 100 Years*. Discover traces of park history that lie hidden beneath the surface and off the beaten path, places and events that are generally not interpreted by the park, but are apparent when you know where to look. See billion-year-old rocks, and discover Apache Fort, site of an early Indian battle. Visit the location of the 1915 RMNP Dedication Ceremony. Discover the “phantom” Big Thompson entrance station, a main park entry that was obliterated in the 1960s and Phantom Valley Ranch, an early homestead turned guest ranch tucked along the Colorado River. Explore the site of the park’s ski area. Check out a 1930s CCC camp. Witness the changes floods in two different centuries have left on the park. Wander inside an elk enclosure, and see 21st century wildlife management in action. ♦♦ CSM credit available Meets at the Rocky Mountain Conservancy Field Institute **This class has over 16 hours of contact time for 1 credit.**

Hiking & Skill-building Classes:

NEW! Tracking Wildlife in Rocky: Signs of Creatures Big & Small

Jeff Connor May 10 \$80 per adult ages 16 and older

A story exists all around us as we walk through the woods. Animals use the same area we do, but often go unnoticed since much of their activity occurs off trails, at night, or early or late in the day. Do you know how to read the signs they leave behind? If not, this class is for you. Walking through the woods, along streams and in meadows we will look for animals and their signs, visit den sites used by bobcats, fox, coyote, and other animals and nests used by birds. From a distance if the road is open to Rainbow Curve we will look at the habitat black bears use to select their dens. Participants will be surprised by the abundance of sign left behind by our furred and feathered friends. The class will also provide a better understanding of community ecology and dynamics relative to hierarchical structure and trophic cascades. ♦♦ CSM credit available Meets at the Rocky Mountain Conservancy Field Institute

