







Left: Encampment at Egg Mountain, a paleontology site on the Rocky Mountain Front, west of Choteau.



Right: A pack trip comes off of the east side of Headquarters Pass – the boundary of the Bob Marshall Wilderness – on the Rocky Mountain Front.









Above: A winter day's first light tints snow ghosts pink in the Whitefish Range.

Left: Winter in the North Fork of the Flathead.

















Above: Flathead Lake, south of Wood's Bay. Courtesy of the UM Flathead Lake Biological Station.  
Previous page: Descending Holland Peak on the crest of the Swan Range, summer. R&S









Looking south on the Continental Divide, the Chinese Wall, in the heart of the Bob Marshall Wilderness. Photo courtesy of Larry Mayer.





# CONSERVATION COOPERATION &

Story and Photos by Len Broberg

**A**s our vans of students pulled in, Beth Russell-Towe's smile lit up the gray October day. The Waterton wind tugged at a few loose strands of hair as she greeted the students. We were on a trip across Montana, Alberta and British Columbia for a graduate course offered jointly by the University of Montana Environmental Studies Program and the University of Calgary Faculty of Environmental Design as part of the Transboundary Policy, Planning and Management Initiative at the two schools.



Right: Guy Greenaway of the University of Calgary Miistakis Institute explains Canadian land conservation methods to UM and UC students.

Opposite: Kim Pearson of Nature Conservancy Canada points to the area protected in the Waterton Front project. Virtually all of the land in the photo is either in Waterton Lakes National Park or under conservation easement.



Beth bubbled with enthusiasm as the students described their work one by one, and this left them with a smile. With a spring in her step, she then took us on a tour of the townsite of Waterton Park, Alberta, describing its unique history and the challenges of managing a community within a national park. Renowned for her efforts to promote ecologically sustainable tourism in the Crown of the Continent and the Trail of the Great Bear, Russell-Towe is just one of many remarkable human and natural resources we encounter on our annual journey through Montana, Alberta and British Columbia.

The week-long trip is the centerpiece of the graduate course and the foundation of the initiative at the two schools. Throughout the journey, students meet with landowners, private industry managers, government managers and nonprofit staff to learn their perspectives, issues and approaches to conservation around different themes—energy development, large carnivore conservation, or growth management, to name a few. The course, first offered in 2000, is often the seed for research questions that the graduate students pursue for their final projects. Generously funded by the H.P. Kendall Foundation for almost a decade, the course is now a core offering at both institutions.

While the half of the course in Montana offers many new insights, beautiful scenery and engaging speakers, it is the trip north of the 49<sup>th</sup> parallel that generally offers the most striking learning opportunity for the University of Montana students. Most of the students have not studied Canada in depth or even visited Alberta or British Columbia

before. The voices they hear and the sights they see leave a lasting impression. Likewise, their Canadian counterparts are offered new glimpses into land management in the U.S. The chance to share their thoughts and ideas with one another as we transect the landscape offers a profound experiential learning opportunity.

For instance, one day we find ourselves perched on the edge of a yawning coalmine pit in British Columbia. The wind is slicing through the group as we huddle together to hear how the mine reclaims the land it disturbs. To the north and west, we can see the snow-dusted crest of the Greenhills Range above the Elk River.

The students shiver under their hard hats and focus on the scale of the mining operation and the mountain peaks surrounding it. There is hard-won information gained here: how trees, for example, can grow in newly created topsoil laid down by the grass that was previously planted on the site's bare mineral ground; moreover, how, with the fluctuating value of the coal resource still found below, this site may be surface-mined again. Unlike the requirements of surface coal mining in the U.S., the original topsoil does not need to be retained for reclamation under British Columbian regulations.

On another day, we hike into a grove of giant cottonwood trees down in the Elk River Valley. These are some of the oldest cottonwoods now living on the planet, and we marvel at their age and the human history they have lived through. Predating the arrival of Western European explorers like David Thompson by several hundred years,



these trees have likely witnessed K'tunaxa and Kootenay First Nation members fishing, hunting, traveling and camping among their trunks.

Our tour guides for this day are from the Nature Conservancy Canada, Shell Canada and Tembec Corporation. Shell has turned over the Mount Broadwood area of British Columbia to Nature Conservancy Canada (NCC) to manage for conservation. We stand at a turnout above the Wigwam River and survey the mountainside for bighorn sheep. NCC continues to allow hunting in the reserve, as well as fishing and other recreation, but it carefully manages access and motorized vehicle use to preserve habitat security for grizzly bears and other animals using the site.

We bump and rattle over many kilometers of gravel roads, then over a pass and down to the Flathead River. Relieved students rush out of the van, a few showing the effects of a couple hours of twists and turns behind the rear axle. Just a few miles downstream, the name of the same body of water changes to “North Fork of the Flathead” once it crosses the border into Montana. All that marks the border along the river now is a concrete obelisk, like a miniature Washington Monument; the border cut (a swath of cleared forest stretching through Waterton-Glacier International Peace Park); and an abandoned border-crossing station.

Along the river just north of the border lies another abandoned building, which once housed the only full-time residents in the BC Flathead, and a tavern-store. After our long trip in, we can appreciate the isolation and difficulty of access that led to the abandonment of the homestead. The BC Flathead is the largest unpopulated watershed along the length of the U.S.-Canada border. In the winter, access would be even more challenging.

We load up again and travel a short way up Sage Creek on the east side of the Flathead watershed. There Tembec representatives tell us about their management of the Kootenay timber tenure. In Canada, the provinces manage the public land (Crown land) outside of national parks. Instead of making individual timber sales, like in the U.S., the province enters a forest management agreement with a timber company for a period of years. Tembec has the agreement for much of the Flathead, and it mandates a certain amount of harvest within the term of the tenure agreement. The eastern peaks of the watershed mark the

boundary with Waterton Lakes National Park. A trail that starts in the Waterton townsite snakes over the divide through Akamina Pass and continues down into Akamina-Kishenina Provincial Park—a provincial protected area that encompasses the peaks on the west side of the divide and trails down along part of the northern border of Glacier National Park. Some conservationists have promoted the idea of placing the east side of the Flathead into an expansion of Waterton Lakes National Park, thus regaining some of the land taken out of the park soon after its establishment in the early twentieth century. We look up toward the peaks and see the densely forested lands that would be part of this national park for off-road vehicles, including snowmobiles.

Our speakers and students share mixed opinions about such use of the watershed, weighing conflicts between the grizzly bears habitat security and the opportunity to see a wild area through motorized access. During the winter months, snowmobiles are the only way into the area. A provincial management plan that is adopted after our trip closes the southern part of the Flathead watershed's east side to most motorized access off the existing road network, settling the issue for now.

On the east side of the Continental Divide, we hear from ranchers outside the national Park. They speak of the pressures of recreational home development from Calgary, which can change the landscape, put stress on traditional agricultural uses and make for some uneasy neighbors. Nature Conservancy Canada has found many willing landowners for conservation easements, a type of private land

agreement where the landowner gives up certain future uses in exchange for cash and reduced property values, which lessens the burden of property taxes. For those in the cattle industry of southwestern Alberta, this can be a substantial benefit, as it allows them to maintain their business through marginal years by giving up the right to subdivide and build more structures forever.

NCC sees the benefit of reducing the stress on what has always been vital habitat for large mammals such as elk, grizzlies and mule deer. With recreational home development come roads, pets and garbage—all sources of potential conflict with these species, especially with grizzlies. We hear that Waterton Lakes National Park is not large enough to support grizzlies, and thus, these private lands are essential for providing areas of low elevation



The US-Canada boundary line monument on the shores of the Flathead River.





Students visit an Elk Valley Coal mine near Sparwood, BC.

that can serve as naturally food-rich habitats for this large predator. Across the entire Crown of the Continent, the major source of grizzly mortality is human conflict. Containing recreational development adjacent to the park is a good deal for the bears.

Another side trip takes us to two reclamation sites along the Eastern Front. Our companions are members of the Castle-Crown Wilderness Coalition, a non-profit Canadian advocacy group. The first site is a reclaimed gas well site held by Shell Canada. We carefully pick our way through the muddy, rutted ground at the end of the gated road to walk into the site and see the work that has been done. Some native plants appear to be taking hold, and small shrubs stick up out of the patchily vegetated ground. CCWC pushed to have this site reclaimed. Every canyon along the southwestern Alberta East Front that is not within a national park has roads and well sites, often several. The potential number of reclamation sites is large, especially as production in parts of the Waterton gas field declines with age.

Often, the sites lie dormant and are left classified as “active,” either in anticipation of reopening the well or in order to avoid reclamation costs. This site has progress to be made, but it is encouraging to CCWC that some reclamation is happening.

The second site shows how the errors of the past can continue to haunt us today. The land was reclaimed and made available for livestock grazing. The cattle, however,

avoided an area within the site. Shell tested the site and found that it was heavily contaminated from disposal of drilling waste. It had not been designated as a dump site or managed to contain those types of waste, thus the disposal was unknown to Shell management. Nevertheless, reclamation will require digging up the contamination and disposing of it properly. CCWC played a role in the discovery of the contamination and is pleased that it is being addressed.

The last morning dawns mostly clear, with a few clouds tinged pink by the rising sun behind the peaks of Waterton Lakes National Park. We gather in the lodge’s cozy breakfast

room and pack up. The students are sad to leave, and our parting with Beth Russell-Towe is bittersweet. She waves as we head out of the drive.

Our final visit is with a biologist from Waterton Lakes National Park in the bison paddock at the park. Looking across the golden fall grass, we can see part of the herd in the distance, grazing lazily. Bison are fenced in a small paddock in WLNP, although we hear how the park has explored the possibility of making the herd free-ranging to be consistent with its mission to promote ecological integrity—in this case, to restore a large grazer that maintained the grasslands in the park. Through discussions with neighboring landowners as well as a review of the biological and historical information, it becomes clear to the park staff that the area needed for a year-round free-ranging herd of bison would encompass a large area of private land. Those landowners see the use of their land as forage for livestock and open space for wildlife, but not bison. The park has shelved the idea of a free-ranging bison herd for now, seeing it as impractical and costly.

We gather to say our goodbyes to the other half of the class and load up for the drive home. It has been a full week, but a good one. Students have likened the experience to drinking from a fire hose. Yet, after some time for reflection and more background research, some of the students will decide to work on research issues relevant to the management of the Crown of the Continent. It is, in some small way, a means to give back to the people and the landscape we have met on our journey.







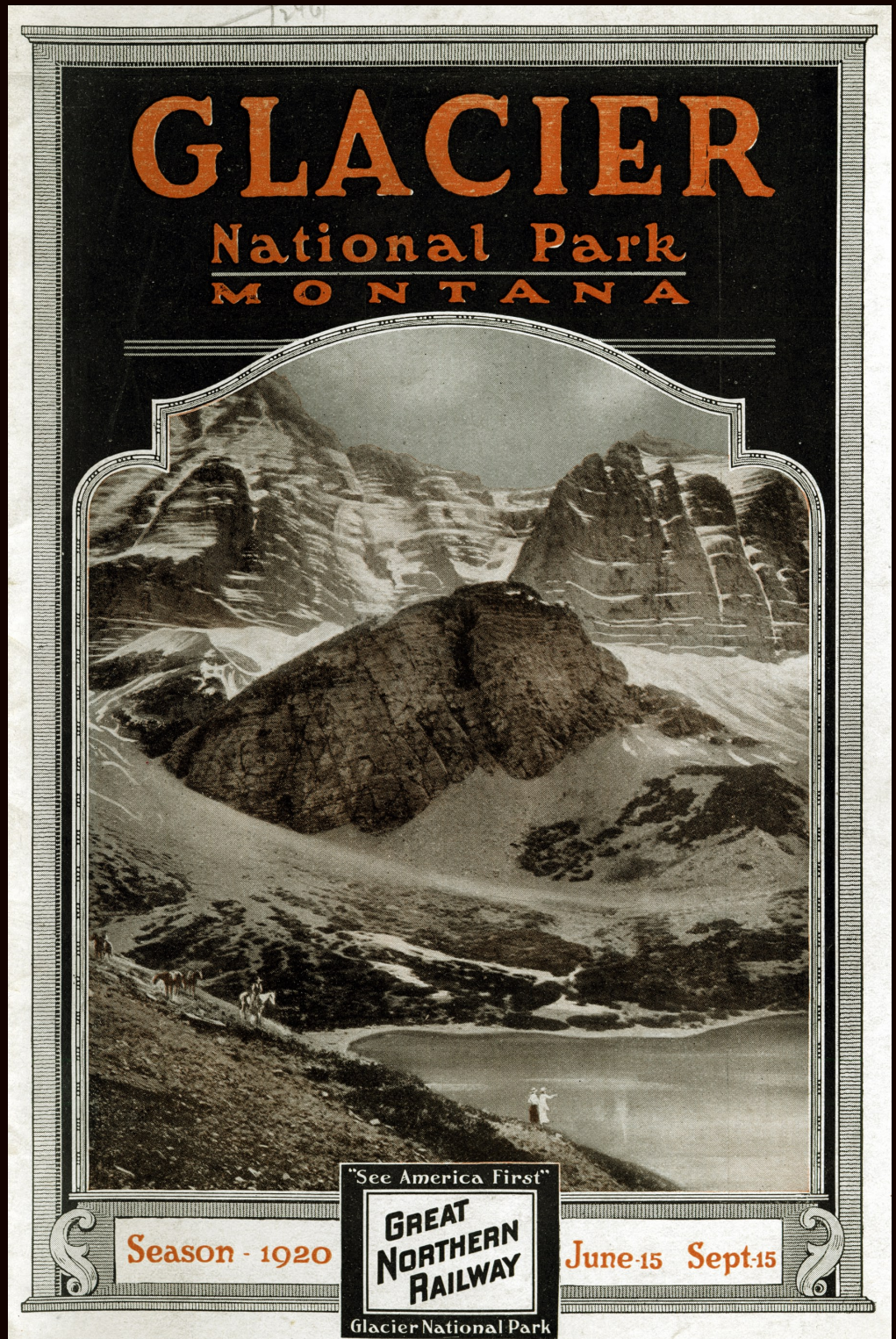


Above Left: Glacier Park busses, Many Glacier Valley, ca. 1920. Unknown photographer.

Right: Front cover of a 1920 Great Northern Railway brochure.

Bottom: US Forest Service Ranger Frank Liebeg, ca. 1906. Unknown photographer.

All photos courtesy of Glacier National Park Archives





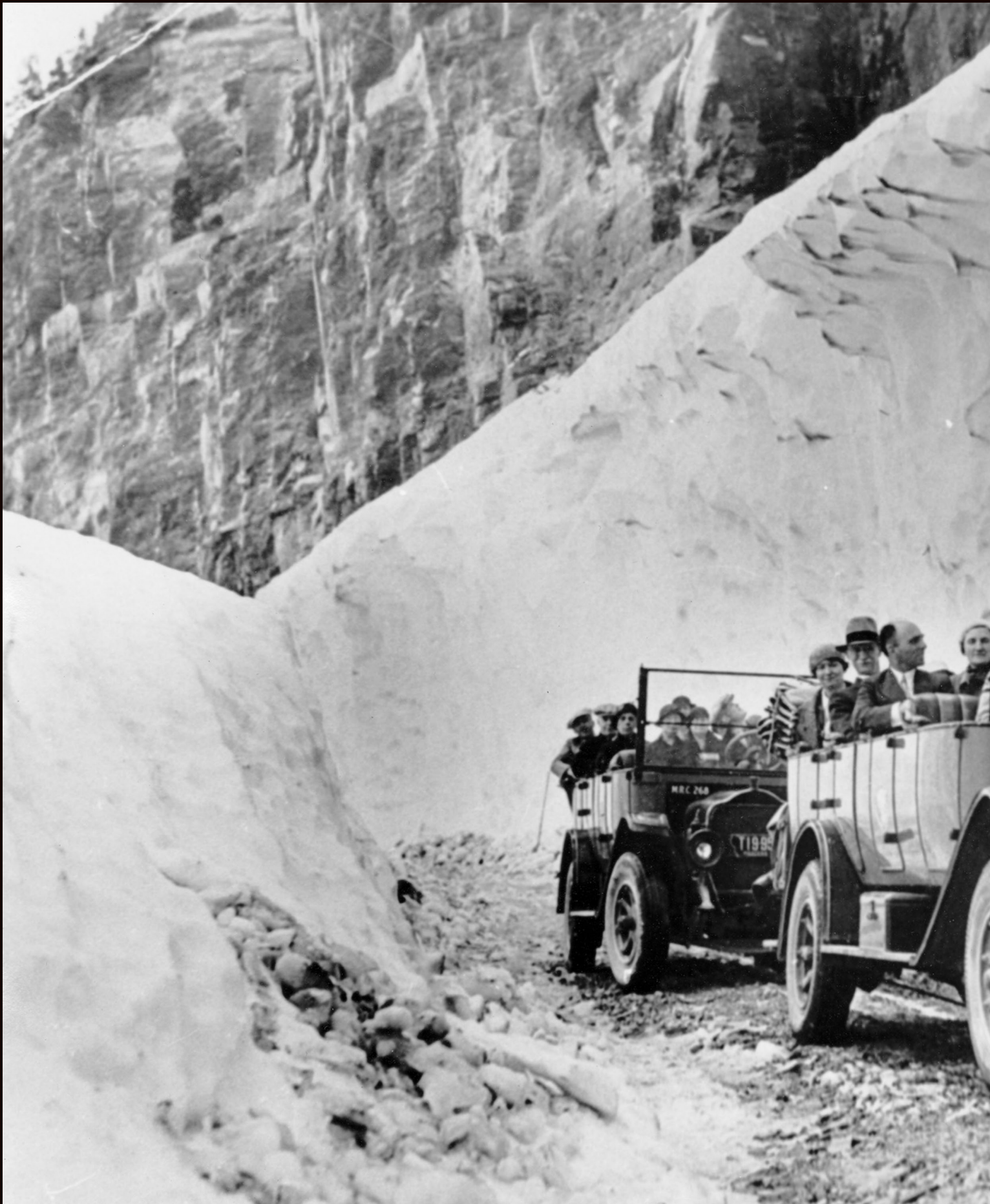






Bill Daucks, Frank Geduhn, Esli Apgar, and Dimon Apgar at foot of Lake McDonald, ca. 1901. Glacier National Park Archives.









Supposedly first cars over GTS Road, June, 1933. Photograph by T. J. Hileman. Glacier National Park Archives.









Granite Park Chalet, ca. 1925. Photograph by T. J. Hileman. Glacier National Park Archives.









Early day Flathead  
Reservation photos.  
Elrod Collection, the  
UM Maureen and Mike  
Mansfield Library









Left: Floating logs on Flathead Lake, near Bigfork.

Right: Downtown Bigfork, an early 1900s logging community.

All photos courtesy of the Elrod Collection, the UM Maureen and Mike Mansfield Library





Above: Belton, now West Glacier, ca. 1915. Photograph by R. E. "Ted" Marble. Glacier National Park Archives.

Right: Bigfork from above the dam. Elrod Collection, the UM Maureen and Mike Mansfield Library.

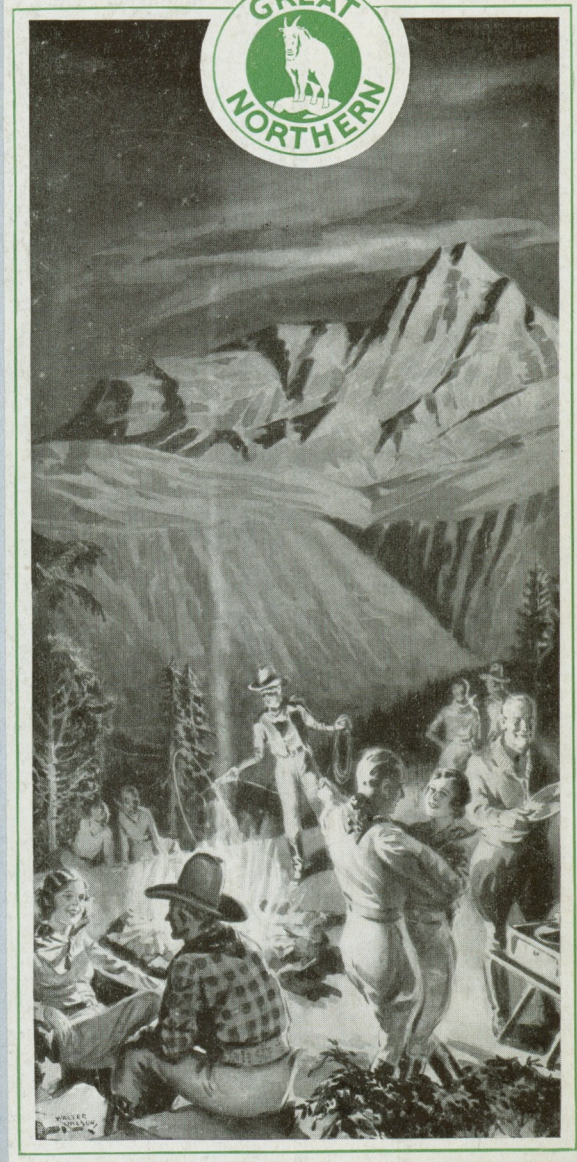
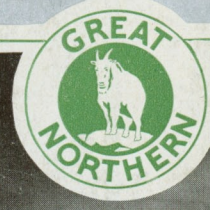




# DUDE RANCHING IN THE ROCKIES



# DUDE RANCHING IN THE ROCKIES



GREAT NORTHERN Ry.

GREAT NORTHERN Ry.

Front cover "Dude Ranching in the Rockies," Great Northern Railway brochure, ca. 1930. Glacier National Park Archives.







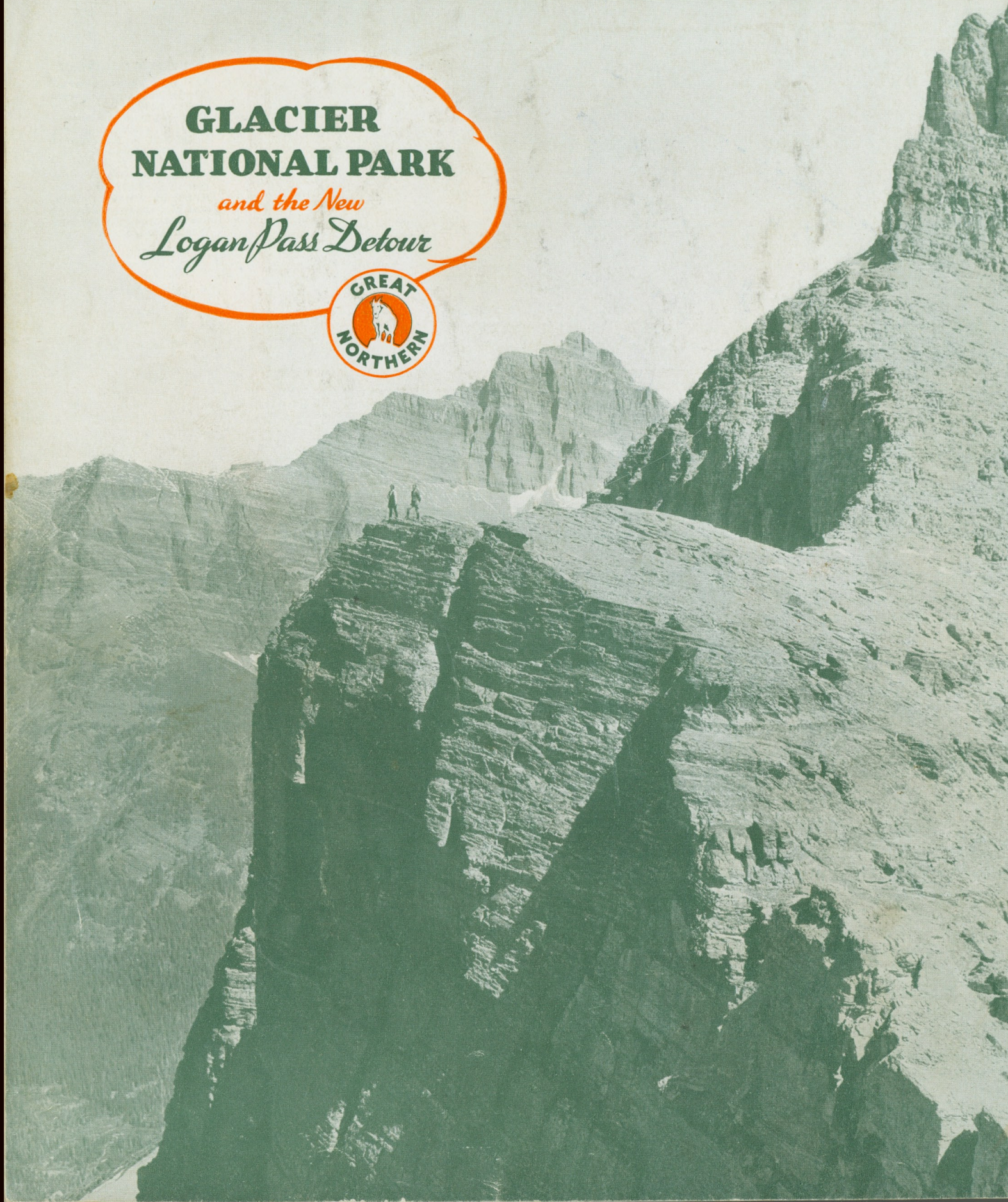


Going-to-the-Sun Chalet, ca. 1925. Photograph by T. J. Hileman, courtesy of Glacier National Park Archives.



# GLACIER NATIONAL PARK

*and the New  
Logan Pass Detour*





# The Call of the Mountains



## Vacations in Glacier National Park Waterton Lakes National Park

Opposite: Back cover "Logan Pass Detour", Great Northern Railway brochure, ca. 1933.

Above: Front cover of "Call of the Mountains", Great Northern Railway brochure, ca. 1930.

Photos courtesy of Glacier National Park Archives





Above: Winter in Glacier National Park, location unknown.

Right: Civilian Conservation Corps Camp, Many Glacier Valley, ca. 1933. Photograph by T. J. Hileman.

Courtesy of Glacier National Park Archives











# LAND OF EXTREMES

Story by David Bernhardt

Photos by Rick and Susie Graetz

*Weather on the Crown*

**T**he weather and climate of the Crown of the Continent is as varied as its topography. Though known for extremes in temperature and precipitation, the remoteness of this area has limited the amount of weather data collected. Most weather data has been collected on the periphery of the Crown. The oldest records date from around 1918, with more complete records from the late 1940s to the present. Some weather stations on the periphery began in the late 1800s.

The Crown is a land of mountainous climate regimes. As such, the average temperature, precipitation and wind patterns are somewhat determined by elevation. Also, the continental divide further separates the area into two distinct climatic areas. On the west side, more precipitation falls, temperatures average warmer and winds are lighter. In the cool season, clouds more often fill the skies. The east side is somewhat the opposite—drier, cooler average temperatures and much windier. This area is subject to the rain shadow effect, where air masses dry out as the air moves at high average speeds down the east slopes, known as the Chinook zone. Again, precipitation is influenced by topography—the highest points have the highest average precipitation.



# WINTER: *November - February*

*The seasons in the Crown* do not follow widely used three-month seasonal divisions. A short summer follows long winters on the Crown and much of the surrounding area. The winter season is the coldest and wettest period. As noted before, precipitation amounts normally vary with elevation, with higher areas having the greater average amounts. Snow can fall in any month, but the greatest amounts generally fall during the winter months. The highest official amount from one storm was 77.5 inches at Summit in Marias Pass January 17-22, 1972. During that month, over 131 inches of snow accumulated there.

Extreme snowfall and precipitation may accumulate, especially during years influenced by a La Nina cycle. During the winter of 1996-97, Flattop Mountain recorded 28.30 inches of precipitation in January 1997. Large daily amounts also occur. In November 2006, a foot of rain melted a foot of snow at Flattop Mountain, and in a 24-hour period six inches of rain cause a flood that wreaked considerable damage to roads and culverts. Rivers approached record high levels. The level of Sherburne Reservoir increased over 17 feet as runoff from this storm accumulated in the reservoir. Swift-current Creek at Many Glacier crested just under 10 feet, which was slightly below the record high level at this location.

Some of the largest short-term temperature changes can also occur during the winter season. At Browning

in January 1916, the temperature fell 100°F, from 44°F to -56°F, within 18 hours. Although severe arctic cold air masses can cut temperatures to -40°F to -55°F, an extreme of -70°F was recorded near Rogers Pass on January 24, 1954 after a fresh and heavy snowfall. Cold air masses of sufficient depth on the east side of the divide can spill through passes into western valleys, resulting in bitterly cold temperatures. The chill intensifies during the long nights under inversions, where the air is coldest at the surface and warms as one rises.

Dramatic warming also can occur. In January 1962, the temperature climbed 61°F in 1 hour at Pincher Creek, Alberta. Warmer Pacific air masses moderate temperatures and are often accompanied by strong Chinook winds. During these conditions, January temperatures can exceed 55-60°F on the eastern slopes. Chinook wind speeds can exceed 100 mph, but a gust of 143 mph was recorded at Miller Colony on 21 February 2002. Gusts up to 133 mph have been recorded at Logan Pass, most recently in January 2009. In January, wind speeds average as high as 27 mph over portions of the Blackfeet Reservation, just east of the Rockies. With fresh snow cover, these strong winds occasionally produce blizzard conditions on the eastern plains before the Chinook warming melts the snow. Without the periodic warm-ups, the west side retains snow cover for most of the winter.



Above: Geese gather at Freezeout Lake on a frosty day.

Opposite: Rainy Lake in the Swan Valley.



# SPRING: *March - June*

*Temperatures warm during the spring months, but several cold and stormy periods can still prevail. There have been occasions when April averages colder temperatures than March. Precipitation drops in the late winter and early spring and increases again in May and June. The month with the greatest flood potential is June. Some of the heaviest 24-hour precipitation occurred in June 1964, when 6-7 inches of rain fell from Glacier National Park south to near Gibson Dam. During this storm, up to a foot of rain fell, this produced major flooding and severe damage to infrastructure. Swift Dam, west of Dupuyer, failed during this major rain-producing storm. In June, warming temperatures rapidly melt snow, and strong spring storms may dump heavy precipitation or produce thunderstorms, which increase in frequency throughout the spring months. Thunderstorms also have the potential to spawn large hail and strong, gusty winds. One storm in June 1955 produced 6.30 inches of rain in southwestern Alberta. Average wind speeds slowly decrease during the spring months. Over some areas west of the divide, average speeds peak in March and April, but are still lighter than the east side.*





# SUMMER: *July - August*

*July and August have the most consistently warm and driest weather patterns. Precipitation and average wind speeds are at a minimum, while temperatures peak. Extreme temperatures of 95-100°F are common over most areas, except the highest summits. Temperatures have reached 105°F on the Crown's periphery (areas near Polebridge and Browning). Occasionally, stronger weather systems will produce down slope or ridge-top wind of 25-30 mph and higher gusts, but wind speed averages are lightest in the warm season. Gusts over 70 mph have occurred at Logan Pass even during the summer. Inversions in the summer produce cold temperatures, near or below freezing at night in the valleys.*

In general, dry air contributes to large diurnal temperature swings. It is not uncommon to rise from near freezing in the morning, to near 85°F in the afternoon in some of the Crown's higher basins. Thunderstorm season usually peaks during the summer months, dropping off in August. Moisture is limited, meaning thunderstorms produce less rain and more lightning, which has dire implications for wildfires. Snow, occasionally heavy, may fall on the higher peaks. Even lower elevations, such as Summit (elevation 5300 feet), can collect snow under the proper conditions. In July 1972, Summit accumulated four inches on one day. An early winter storm in late August 1992 dropped a foot of snow at St. Mary.



Above: Flathead Lake as summer inches into fall.

Next page: A storm sits on the Rocky Mountain Front, causing chinook winds.



# AUTUMN: *September - October*

*The autumn season rapidly transitions to winter. Average temperatures fall quickly in September, but some delightful weather can still be found in the Crown at times. Most areas will see their first frost by the first week of September, and precipitation and winds increase. Early winter storms have produced heavy snows on the east side, followed by cold air. Even in September, Summit has recorded nearly 30 inches of snow. The Marias Pass town has recorded as much as 61 inches of snow in October (in 1951), and an extreme minimum temperature of -30°F was recorded there on October, 31 1935. Winds do increase in October on the east side, averaging near the winter mean during the month. Gusts over 100 mph have been recorded in and just to the east of the park.*

*Overall, the Crown is a region of weather extremes due to the Crown's widely varying topography. Temperatures peak at 100°F or slightly higher and bottom out at -50 to -70°F. The Crown in winter claims some of the coldest temperatures in Montana and surrounding areas, and not just in the month of January. Temperatures colder than -50°F also are recorded in November, December and February with heavy precipitation. This region has the highest average precipitation average in the area. Flattop Mountain averages 79.90 inches per year, with lower elevation Many Glacier averaging nearly 50 inches. The former recorded an incredible 122.40 inches of precipitation in one year (1990). When precipitation was monitored at Grinnell Glacier, a 12-month period in 1953-43 recorded 138.20 inches of moisture. Yet the rain shadow areas just east of the mountains often experience desert-like precipitation conditions.*

*Though the Crown has some of the most beautiful scenery in the world and can supply delightful weather days, it can experience some of the harshest weather conditions that nature can deliver.*









# TEACHING THE CROWN IN POLEBRIDGE, MONTANA



Story by Sarah Halvorson  
Photos by Susie Graetz, Sarah Halvorson and Casey Ryan

For the second consecutive year, UM students had the opportunity to learn about the Crown of the Continent ecosystem during all of its wintery glory. Based out of the close-knit town of Polebridge, a UM Geography course, “Montana’s Mountains” (GEOG 138, 3 credits), was held during the week of January 19–22, 2009. The course, first taught during Wintersession 2008, is the brainchild of Rick Graetz of the University’s geography faculty.

This year, Graetz was joined by the department’s chair, Sarah Halvorson, to provide a hands-on and field-based learning environment centered on the unique cultural and physical landscapes of Glacier National Park (GNP) and the North Fork of the Flathead River. Polebridge (winter population: 25) is situated just outside of the GNP boundary and “off-the-grid” in the floodplain of the North Fork. This year, a total of 21 students participated in the course, effectively doubling the town’s population during the week!

In addition to lectures by the Geography instructors, GNP officials, U.S. Forest Service staff, representatives of non-governmental organizations, and residents provided historical context, background, and science-based information on a range of subjects. Topics included geology and physical geography, the history and role of forest fires, tourism and recreation management, wildlife biology, cultural heritage resource management, climate change, park management, water rights and policy, and changing cultural landscapes.





Students spent their afternoons on field excursions, which explored many topics including winter wildlife activity.



Following the morning instruction, instructors and students embarked on field excursions with snowshoes. Three different treks took students onto the bench overlooking the North Fork, into the foothills of the Livingston Range via the Bowman Lake Road, and along the frozen floodplain of the North Fork, a river with Wild and Scenic designation.

The outings provided the opportunity to observe first-hand a number of fundamental aspects of the area: the orographic processes and workings of glaciation evident in the magnificent Livingston Range; the results of wildland fires on forest succession; mountain weather and climate; the winter activity of wildlife such as wolves, coyotes, foxes, bobcats, elk, moose, deer, snowshoe hares, river otters, and bald eagles; and evidence of the human history and impact, both ancient and contemporary, in the area. The field observations even included an international component, owing to the fact that the North Fork is at the center of major transboundary energy development disputes between the U.S. and Canada that threaten the integrity of the entire Flathead basin.





Students snowshoe on the North Fork of the Flathead, near Polebridge.

Much of the area is covered in deep snow and a blanket of cold in the winter. Nevertheless, the community of Polebridge offers students a connection to individuals and a community that is deeply involved in caring for and protecting the natural capital of the area. Historically, Polebridge served as the commercial center for homesteaders, including Ben Hensen, the homesteader who gave the little town its name in 1920.

The Mercantile’s baked goods, dinners at the Northern Lights, and the cozy setting of the North Fork Hostel easily made up for the lack of electricity and indoor plumbing when the temperatures hovered at or below zero each day. One student summed it up in this way: “I really enjoyed the intimate setting and the field work. I feel that the week-long immersion in the course was great for learning.”

Student evaluations of the course underscored its important role in connecting UM students in meaningful ways to the land and to a landscape that has incredible conservation values and cultural and scientific relevance for Americans, as well as the global community. The most beneficial aspect of the course for one student was “being in the area of study. If we were sitting in a classroom, I would have retained maybe half as much.”

Another student commented, “I really enjoyed this Wintersession course because the students were responsible for their own perspective of the place.” This very personal connection to place that was gained by the students this January will be incredibly important for the future trajectory of environment-society interactions in the Crown of the Continent.



*ting in a classroom, I would have retained maybe half as much.”*



Above: The “Merc”

Left: Students dig into the ice on the Flathead River.



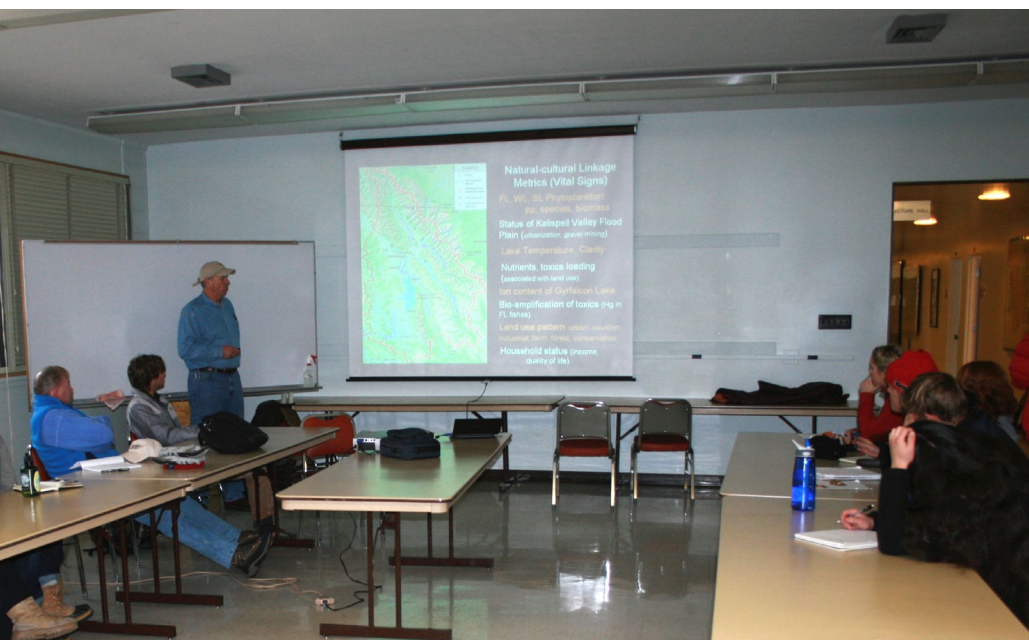


Glacier National Park forest fire specialists Mitch Burgard and Dennis Devokey lecture students on the North Fork flood plain.





Above: Sarah, Rick and the 18 students at the North Fork Hostel.



Left: Students receive one last lecture before returning to campus from Jack Stanford, director of UM's Flathead Lake Biological Station.





Above: Students get a feel for the “classroom” while Mitch Burgard of Glacier National Park lectures on forest fires.

Right: Various tracks from animals in the area are displayed in the North Fork Hostel.





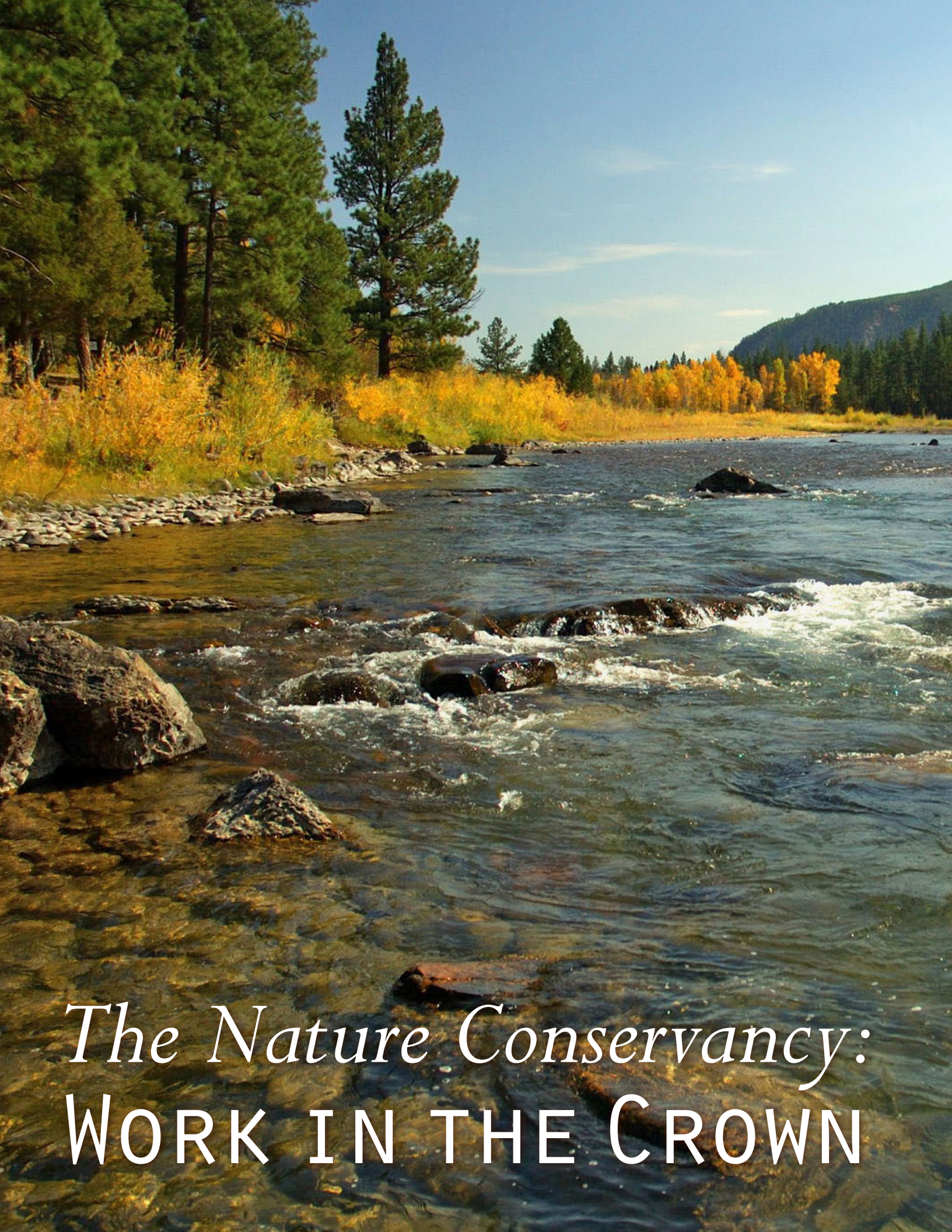


Dinner at the Northern Lights Saloon.



The Polebridge "class orchestra" celebrates after an evening meal.





*The Nature Conservancy:*  
**WORK IN THE CROWN**





by The Nature Conservancy of Montana

The Crown of the Continent has long been a centerpiece of The Nature Conservancy's conservation efforts in Montana. On the eastern edge of the Crown, we have been particularly successful in leveraging funds from a variety of sources for expanding the number of conservation easements placed on the Rocky Mountain Front. Likewise, we've worked hard to forge lasting partnerships with public and private organizations, as well as the ranching community. To date, we are well over a third of the way toward our goal of conserving 350,000 acres on the Front.

Partnership and collaboration were also keys to success in the Blackfoot Watershed at the southern edge of the Crown. In 2004, in partnership with the Blackfoot Challenge, the Conservancy purchased 89,000 acres of Plum Creek Timber land. Most of that land has been transferred to public ownership, but the core of the area—known as the Blackfoot Community Conservation Area—is now owned by the Blackfoot Challenge and is being managed by the community itself. In addition to the Plum Creek land, more than 100,000 acres of private land in the Blackfoot are protected by conservation easements.

Our work in the Blackfoot launched our newest, and most ambitious, effort to date, The Montana Legacy Project. Along with the Trust for Public Land, we're in the process of purchasing more than 310,000 acres in the Crown from Plum Creek—including all of Plum Creek's more than 65,000 acres in the Swan River Valley, which anchors the western side of the Crown. Eventually these lands will be transferred to a combination of public and private owners. In the meantime, TNC and TPL will manage the land for preservation of wildlife habitat and watershed health, recreation, as well as sustainable timber harvests.

—The Blackfoot River. Rick and Susie Graetz



# GET A GLACIER EDUCATION

Do I have to dig all the way to the bottom of the snow? What kind of animals could we see out here now? Hey! It's a stellar crystal—look at this cool snowflake with the magnifying glass.

by Laura Law, Glacier National Park

These are some of the comments you might hear while out snowshoeing with a middle-school group on a field trip to Glacier National Park. The middle school students arrive in the morning at the Apgar Visitor Center, where education rangers introduce them to the value of protecting national parks. The rangers then take a few minutes to help the students find significant features on a large relief map and discuss the area in which they are located. When it's time to head outside, students are given “winter study packs” that contain magnifying glasses, snow crystal charts, rulers, snow density measuring equipment, shovels, maps, compasses, and weather instruments. The students spend 2–3 hours out with the education rangers on the trail learning about winter ecology. They also learn how snow affects the survival of winter organisms as well as how to calculate the amount of water that is in the snow. Some of the culminating questions for the day are: “How can small mammals survive all winter with the cold and snow?”; “Why do we need to keep track of how much water is in the snow?”; “What would happen if we got rain instead of snow?” Before students leave, they assemble a floor puzzle map of the Crown of the Continent Ecosystem. The students see that Glacier National Park is in the middle of the ecosystem, and they think about how everyone who lives in north-west Montana (and neighboring Canadian regions) not only shares these wonderful resources but also has a responsibility to care for them as well.

This is just one example of the opportunities available to local students and teachers within commuting distance of Glacier National Park. Although teachers have been extending the walls of their classrooms by taking field trips to Glacier for many years, the park itself has been able to increase the number of ranger-led programs in the past four years thanks to the support of the Glacier National Park Fund and the Glacier Association. Today, teachers from grades K–12 participate in programs that are aligned with the Montana Content and Performance Standards for Science. First and second grades come to visit Glacier's different habitats and learn about wildlife. Third through fifth grades might walk in a recently burned forest, imagining the heat and flames of the fire while considering the re-growth that has taken place since. These grades can also travel up to the Trail of the Cedars to indulge their senses in the smells and sounds of an ancient forest while observing and learning about decomposition, photosynthesis, or the parts of a tree. Many middle schools in the area consider it a “rite of passage” for the sixth graders to hike the Avalanche Lake Trail with a ranger and eat lunch at Avalanche Lake. The students learn the importance of the Avalanche Lake area for the Kootenai Indian people. They also see excellent examples of erosion, weathering, and the power of water in shaping the landscape.

Student service-learning projects are available in Glacier National Park through the native plant pro-





Looking into the Many Glacier region from the park's east side Rick and Susie Graetz

gram. The native plant program focuses on teaching students about stewardship. Middle and high school students assist plant nursery staff members throughout the school year with collecting and sowing seeds and then planting the young native plants in restoration plots in the park. You can see signs marking the boundaries of some of the restoration areas at places like the Trail of the Cedars and in the Apgar and Two Medicine campgrounds. The signs alert people not to step on the new plantings and also indicate the name of the school that helped with the restoration.

In addition to all of these opportunities, Glacier National Park is fortunate to have the Glacier Institute as an education partner. The institute provides adult education courses at its field camp location in West Glacier. The courses range from one-day to multi-day trips and provide in-depth investigations with expert instructors on various park resources. The institute also offers a residential program for students and teachers at the Big Creek Outdoor Education Center in the North Fork of the Flathead River Valley. These lessons are curriculum-based and aligned with the Montana Content and Performance Standards.

For families visiting Glacier in the summer, the park offers “family backpacks” that can be checked out for free for 24 hours. The packs contain field guides, binoculars, magnifying glasses, and suggestions on activities to do with the equipment. The

backpacks get the whole family investigating and exploring. A trip to the Discovery Cabin in Apgar will allow children to play track twister, match animal pelts with the correct skulls and photos, or use their sense of touch to describe objects hidden inside the “touch box.” The most popular activity for children in the summer is the National Park Service’s Junior Ranger Program. Glacier’s program helps children learn about wild animals and wild places, history, geology, and climate change. Families pick up the Junior Ranger Booklets for free at a park visitor center, and children who complete the required number of activities can receive a Glacier Junior Ranger Badge. Each summer, park rangers lead a variety of programs that include boat trips, hikes, evening slide shows, and family programs. A listing of all the programs can be found on the park website and in the “Glacier Explorer” newspaper available at park visitor centers.

As the students in the middle school group take off their snowshoes and walk back into the visitor center to close out their day, a student turns to the ranger and says, “Wow, this was really fun!”

Exactly! Glacier National Park offers a variety of educational and inviting programs that are fun for students and educational at the same time. Connecting children with the significant resources and values of the park is one of the main goals of Glacier Education.





A view of the McDonald Valley from the Going-to-the-Sun Road. Rick and Susie Graetz

# MANAGING *for* AN ECOLOGICALLY HEALTHY CROWN *of* THE CONTINENT

by Mary Riddle, Glacier National Park

Since 2001, representatives from local, provincial, state and federal government agencies, tribes and first nations with land or resource management responsibility within the Crown of the Continent Ecosystem have been meeting to explore ecosystem-based ways of collaborating on shared issues in the Crown. This collaboration came to be known as the Crown Managers Partnership (CMP).

The vision of the CMP is “an ecologically healthy Crown of the Continent ecosystem;” a vision we pur-

sue by working together to: improve understanding and raise awareness of the ecological health of the Crown of the Continent ecosystem; respect individual agency mandates in alignment with the vision; and build enduring relationships and promote collaboration across mandates and borders.

The “Crown of the Continent” ecosystem is one of North America’s most ecologically diverse and jurisdictionally fragmented ecosystems. Encompassing the shared Rocky Mountain region of Montana,



British Columbia and Alberta, this 28,000 square-mile (72,000 square-kilometer) ecological complex spreads across two nations, one state and two provinces; it also reaches across numerous aboriginal lands, municipal authorities, public land blocks, private properties and working and protected landscapes.

The Crown is internationally recognized for its biodiversity and landscape form, ranging from flat grasslands to soaring peaks, rock and ice to lush forests, and uninhabited wilderness to densely populated settlements. This varied landscape includes the headwaters of three of North America's major river systems as well as a full complement of wildlife species and vegetation communities; it also represents one of the last areas with the potential for large-scale connectivity.

The landscape has drawn people to the region for millennia, and the long-term ecological integrity of the region is challenged because it faces intensification in all areas of human activity. The result has been increased fragmentation and loss of wildlife habitat, a decreased quality of wilderness-oriented recreational experiences, the degradation of important ecological goods and services, and uncertainty and frustration for both industrial and protection efforts.

Federal, provincial, state and local land and resource management agencies, tribes and first nations in the Crown recognized that, in order to maintain essential ecological processes and manage human use within this landscape; a need existed for transboundary collaborative approaches to ecosystem management at a regional scale. Political, financial and technical barriers often impede this type of management, and no single agency has the mandate or the resources to focus on the entire region.

In February 2001, government representatives from over 20 agencies gathered in Cranbrook, BC, to explore ecosystem-based ways of collaborating on shared issues in the transboundary Crown of the Continent. Participation included federal, aboriginal, provincial and state agencies or organizations with a significant land or resource management re-

sponsibility within the Crown of the Continent Ecosystem. No attempt was made to put a firm boundary around the area of interest, but the region is generally defined by the Rocky Mountain ecoregion from the Bob Marshall wilderness complex (MT) to the Highwood River (AB) and the Elk Valley (BC).

The highly successful workshop resulted in a commitment by all participants to move forward collaboratively on regional ecosystem management. A steering committee was struck, and what came to be known as the Crown Managers Partnership began a tradition of meeting annually for the Crown Managers Forum.

The CMP is open to all federal, state, provincial and local public land and resource management agencies, tribes and first nations within the Crown of the Continent Region. The interagency steering committee takes its direction from the partnership through the CMP Annual Forum and implements that direction through an annual workplan. Since the conception of the CMP, the Miistakis Institute has provided the administrative needs and is known as the CMP Secretariat.

CMP participants include: Waterton Lakes National Park, Glacier National Park, Blood Tribe, Alberta Community Development, Alberta Environment, Alberta Sustainable Resource Development, British Columbia Ministry of Environment, Flathead Basin Commission, Montana Department of Fish, Wildlife & Parks, Montana Department of Natural Resources & Conservation, University of Montana, University of Calgary, Blackfoot Tribe, U.S. Fish and Wildlife Service and Flathead National Forest.

The CMP's current strategic priority is the "Managing for Ecological Health" project. The project will: define what health means in the Crown context; describe the current state of the Crown; understand the trajectories that have taken the region to this point and the likely future trajectories and their environmental implications; identify with the broader community and stakeholders the desired state for the Crown; and collaborate and adapt environmental and natural resource management to achieve the desired state.



# THE GLACIER INSTITUTE

by Joyce H. Baltz

The Glacier Institute has been providing outdoor education to youth and adults in the Crown of the Continent ecosystem for over 25 years. During that time more than 20,000 students have participated in the Glacier Institute Discovery School programs

Courses are offered at the two Glacier Institute-operated field sites—in Glacier National Park and in the Flathead National Forest—and in the surrounding 10 million acre outdoor classroom. The Institute operates in formal partnerships with Glacier National Park, the Flathead National Forest, Montana Fish, Wildlife and Parks and the Flathead Valley Community College as well as in informal partnerships with the many local school districts that participate in our programs.

The Glacier Institute offers many types of programs: Discovery School and Youth Science Adventure Camps for school-aged children at our Big Creek Outdoor Education Center on the Flathead National Forest, and Outdoor Adventure field seminars for adults at our Field Camp located in Glacier National Park. Students and teachers at Discovery School participate in hands-on, field-based outdoor education programs designed for K-12 students. Teachers may choose sessions ranging from one to three days. Discovery School curriculum and programs meet Montana State standards for math and science. Students study aquatic ecology, wildlife, forestry, fire ecology and many other outdoor subjects in the Flathead National Forest. Discovery School offers students and teachers a unique learn-



St. Mary Lake, Glacier National Park. Rick and Susie Graetz

ing experience that takes the classroom outside and connects them directly with the Crown of the Continent ecosystem. Discovery School encourages lifelong learning in students; fosters an environment where students can build self-esteem, leadership, confidence and respect for themselves and others; and creates an informal setting for students, teachers and parents to build a sense of community that will transfer back to the classroom.

Our Field Camp located just inside the West entrance of Glacier National Park has been home for many of our adult field courses, family and custom programs since 1983. Emphasizing outreach and field-based outdoor learning experiences, the Institute provides an objective, science-based understanding of the area's natural, historic and cultural environment by offering courses addressing the history, geology, flora, fauna of the Crown of the Continent.

The Glacier Institute wishes to thank its supporters, donors, volunteers and directors, past and present, for all that they have done to sustain these programs during our first 25 years.



# SCIENCE IN THE CROWN

by Paul Ollig, Glacier National Park

“The Crown of the Continent”—the name alone stirs the imagination, doesn’t it? It hints at a place of sublime beauty and incalculable worth. For Glacier National Park, this title could not be more appropriate. For nearly 100 years, the park has existed to protect the fragile resources encompassed within this vast ecosystem. Scientists have come from around the globe to study the unique features, flora and fauna of this majestic landscape.

But how much of what they have learned is accessible to the millions who visit the park each year—those who come simply to admire its beauty and experience its wildness? How can they be expected to care about the research being conducted in Glacier National Park if they don’t know how to access it or are unaware that it exists? What do people want to know about the research being conducted at Glacier National Park?

The Crown of the Continent Research Learning Center (CCRLC) is dedicated to making this research accessible to the widest audience possible. The CCRLC helps provide access to this science through a variety of programs, including citizen science, web-based interpretation and student intern and fellowship opportunities.

Imagine, for instance, paddling across a tranquil mountain lake listening for the haunting call of a loon, scanning the park’s towering cliffs for a glimpse of a mountain goat, or investigating a rocky talus slope for signs of the tiny and charismatic pika. What sounds like the adventure of a lifetime is so much more when you are a citizen scientist. Citizen-science projects utilize trained volunteers to collect scientific information that would otherwise be unavailable due to lack of personnel or funding. Through the participation of volunteer citizen scientists in research and resource management projects, park managers can continue to learn more about Glacier National Park’s fragile resources. For the citizen scientists, the reward is a sense of stew-

ardship and a greater understanding and awareness of the park’s resource issues.

What about those people who never have an opportunity to visit Glacier National Park, or who don’t have the time to commit to becoming a citizen scientist? Everyone deserves an opportunity to learn about the science being conducted in the park. Who doesn’t want to watch a glacier recede and discover how climate change is impacting the park’s resources? Who wouldn’t want to listen to a bird’s call and discover how its presence maintains the fragile balance of Glacier’s ecosystem, or take a trip back in time and listen to the stories of the men and women who built the world-famous Going-to-the-Sun Road?

Through the continued development of an interactive website, the CCRLC hopes to make all of this (and more) possible in the near future. This virtual Research Learning Center will make park science accessible to everyone by providing a portal for both park interpretive staff and a worldwide audience to connect not only to Glacier’s tremendous resources, but also to the current research being conducted in the park.

Finally, proper management of our nation’s natural and cultural treasures requires informed and experienced resource professionals. Through fellowship programs that seek to address that need, the CCRLC promotes student research on high-priority natural and cultural resource topics. By encouraging undergraduate and graduate student participation, these fellowships help facilitate a greater understanding of critical resource issues while fostering the next generation of resource professionals.

There is a tremendous amount of research that has been and is currently being conducted at Glacier National Park. The Crown of the Continent Research Learning Center is the public’s conduit to exploring the fascinating discoveries being made through science and research.



# SHAPING

## *the Future of the Crown*

◀ by Matt McKinney ▶

**T**he future of the Crown of the Continent relies on the simple fact that over 100 government agencies, non-government organizations, and place-based partnerships are working in the region.

Each effort—whether regional (i.e., Crown-wide) or sub-regional—came into existence because of a government mandate or because a conservation or stewardship need/opportunity was not being addressed. Moreover, each initiative continues to operate because it has mobilized the right people around a compelling purpose and has found sufficient financial support to continue its work.

While the efforts of each agency or initiative are important to conservation and stewardship in the Crown, no initiative works in a vacuum—all interact with at least some of the other initiatives. Based on this observation, 32 leaders from the public, private, and non-profit sectors met on November 6–7, 2008, at Flathead Valley Community

College near Kalispell, Montana. The purpose of this Roundtable on the Crown of the Continent is to share information, build relationships, and explore opportunities to work together on issues of common concern.

At the November meeting, participants agreed that the Crown is valuable for ecological, economic, cultural, spiritual, educational, recreational, and other reasons. As one of the

*...the Crown is valuable for ecological, economic, cultural, spiritual, education, recreational, and other reasons. As one of the most intact large-scale landscapes in the world, it also serves as a unique international laboratory on how to mitigate and adapt to the effects of climate change.*

most intact large-scale landscapes in the world, it also serves as a unique international laboratory on how to mitigate and adapt to the effects of climate change.

In addition to finding common ground

on the values that define the Crown, the participants agreed on a number of issues that confront the region, including the need to generate a sustainable economy, conserve wildlife corridors, and respond to fire and insect threats.

The participants agreed that the best ways to





address these issues are to continue the Roundtable; to reach out to private landowners, tribes, and local officials; and to raise awareness and understanding about the Crown through a variety of educational activities.

Participants who volunteered to coordinate the next steps include Evan Berger (an elected and appointed official in Alberta); Mary Sexton (an appointed official in Montana); Rich Moy and Bill Dolan (with the Crown Manager's Partnership); Jerry Sorenson and Racene Friede (from the business community); Lex Blood (an educator); and Katie Deuel (from the conservation community).

The Roundtable is convened and staffed by the Lincoln Institute of Land Policy and the Public Policy Research Institute at The University of Montana. Participants in the Roundtable come from Alberta, British Columbia, and

Montana and include representatives of public land management agencies, conservation groups, businesses, universities, communities, and elected and appointed officials.

The next meeting of the Roundtable is scheduled for mid-September 2009. In the meantime, a small delegation of participants will attend a national policy dialogue in Cambridge, Massachusetts, to explore the development of a national landscape-conservation strategy—and highlight the Crown as a case in point. Staff is also working with tribes and the business community to determine how they want to engage in the Roundtable.

For more information on the Roundtable, including more than 50 GIS-based maps, go to [www.crownroundtable.org](http://www.crownroundtable.org) and/or contact Matt McKinney at 406-457-8475 or [matt@umtpri.org](mailto:matt@umtpri.org)



# CONTRIBUTORS

**Gerald Fetz** is a native Northwesterner, having grown up and lived in Washington, Idaho, Oregon, and, since 1970, Montana. He retired in December 2008 as Dean of the College of Arts and Sciences at The University of Montana, where he had served as a professor (German Studies and Humanities) and administrator (Chair of the Department of Foreign Languages and Literatures and Dean of the Davidson Honors College, in addition to CAS Dean) for 39 years. Though retired from full-time work at UM, he continues to teach part-time and is involved with two University-wide initiatives, serving as their Co-Director with Rick Graetz of the UM Crown of the Continent Initiative and the UM Press.

**Rick Graetz** is a member of the University's Geography faculty, teaching Montana and mountain-related courses, as well as Co-Director of the Crown Initiative and the UM Press. He is the founder of Montana Magazine and American Geographic Publishing. **Susie Graetz** is a researcher and visiting scholar in the University's Central/Southwest Asia Program. Together the couple has authored and published numerous books and papers on Montana, regions of the USA, and titles for countries in Asia and the West Indies. They also write a syndicated newspaper column titled This Is Montana.

**Sarah J. Halvorson** is Associate Professor and Chair of the Department of Geography at The University of Montana. Her research and teaching interests are in mountain geography, water resources, environment-society interactions, and hazards research in the Northern Rockies and mountainous areas of Central Asia. She also teaches courses related to the Crown of the Continent

**Jack A. Stanford** is Professor of Ecology and Director of UM's Flathead Lake Biological Station and teaches field ecology courses at FLBS. He is most noted for his long-term studies of the Flathead River-Lake ecosystem in Montana and British Columbia. In 1999 Dr. Stanford began extensive work on a suite of observatory salmon rivers in Kamchatka, Argentina, Alaska, and British Columbia. In June 2004 he received the Award of Excellence of the North American Benthological Society, the leading professional society in the world concerned with river ecosystems. Jack has authored more than 150 papers and books.

**Dan Fagre** is Research Ecologist for the Northern Rocky Mountain Science Center of the U.S. Geological Survey and Director of the Climate Change in Mountain Ecosystems Project stationed in Glacier National Park. Dr. Fagre is a faculty affiliate at the University of Montana and several other universities and has worked for the past 18 years with many staff, partners and collaborators in the Northern Rockies to understand how global-scale environmental changes will affect our mountain ecosystems. Dan is the author of more than 120 publications and has co-published three books.

**Len Broberg** combines his nine years experience in the practice of law with his training in conservation biology to teach and research in the area of biodiversity conservation and environmental policy/law with a focus on the Crown of the Continent region of the US and Canada. For the past ten years he has been a co-leader of the Transboundary Planning, Policy and Management Initiative with Dr. Michael Quinn of the University of Calgary (Faculty of Environmental Design), a graduate research



and education initiative spanning the borders of Montana, Alberta, and British Columbia, Canada. Len is currently Director of the Environmental Studies Program at The University of Montana.

**Other Contributors** — Several other writers have authored pieces for this publication on behalf of their respective organizations. Rather than profile them individually here, future issues of this E Magazine and our Crown newsletters will feature profiles of these affiliates as well as other partners who are involved with work in the Crown of the Continent.

**The Future** — The Crown of the Continent Initiative is a work-in-progress. This, our first E Magazine, will be followed by occasional newsletters as well as the second issue, in Fall 2009. We plan to publish two issues of this electronic magazine a year as well as at least two newsletters. The first Crown symposium was sponsored by The University of Montana and Flathead Valley Community College and held in Kalispell. More will follow elsewhere in the Crown region. Classes on this eco-system are regularly taught at UM, and plans are underway to make field courses available to the public through our affiliates. We have also begun work on an extensive book about the Crown. Our UM Crown of the Continent Website is currently “under construction,” but we hope to have it “live” sometime this summer. Stay tuned!



Bear Lake and Prarie Reef, looking across “The Bob” toward the Chinese Wall. Rick and Susie Graetz



# CROWN OF THE CONTINENT ECOSYSTEM

