

CHAPTER 2

STUDY AREAS



2. STUDY AREAS

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CENTRAL ROCKIES ECOSYSTEM

The Central Rockies Ecosystem (CRE) is arbitrarily defined by a combination of geographic, biotic, and jurisdictional features. It is an area of approximately 40,000 km² straddling the Continental Divide of the Canadian Rocky Mountains. This broad area encompasses lands from the Columbia Trench to the Alberta foothills, and from the north end of Banff National Park to south of Kananaskis Country in Alberta and the Elk Valley in British Columbia (Figure 1). It is managed by a host of Federal and Provincial jurisdictions, with approximately 30% afforded some form of protected status, 60% in multiple use crown lands in Alberta and British Columbia, 10% in private ownership, and 1% Federal Reserve (Treaty) lands (Komex International 1995).

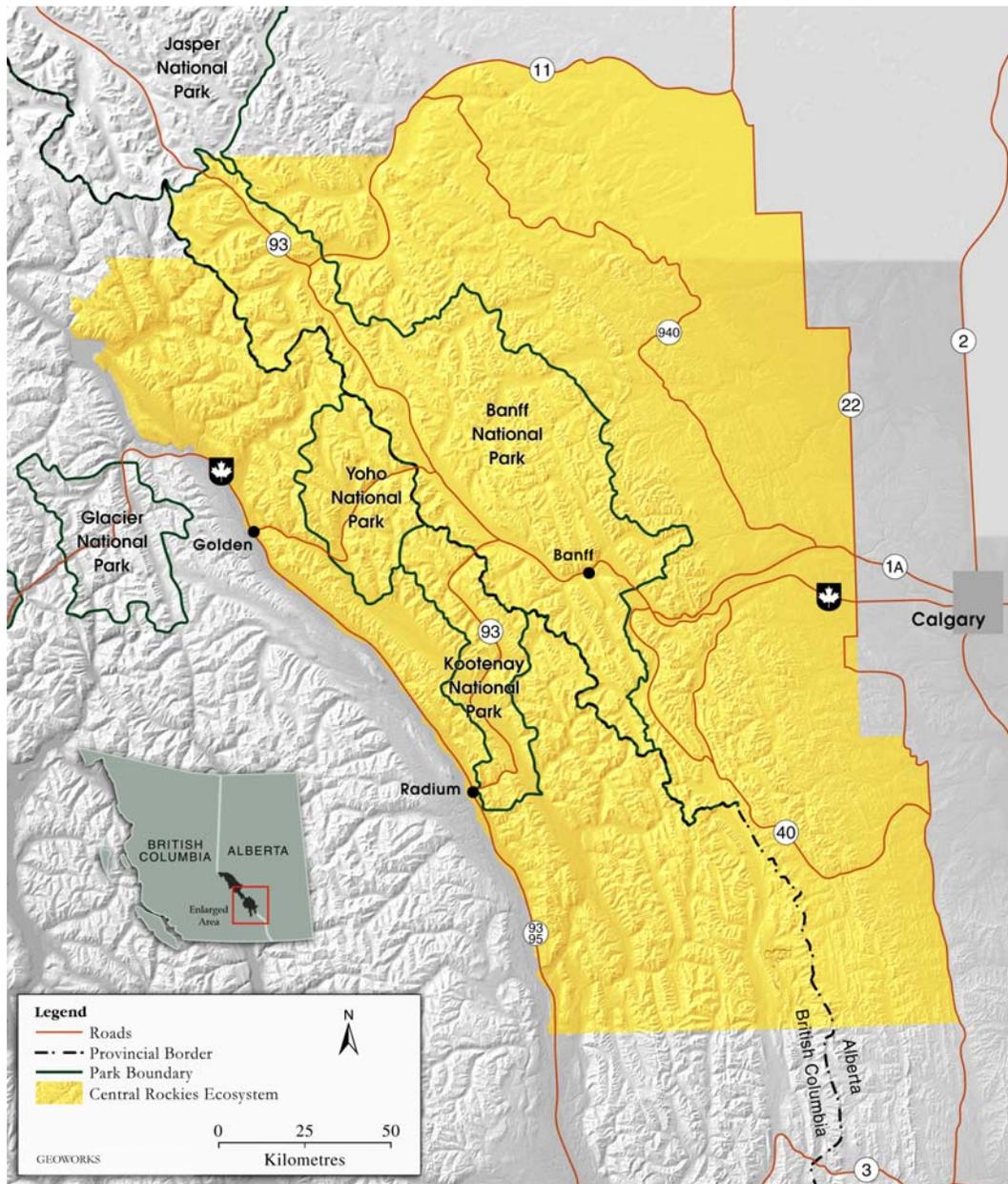


Figure 1. Study Area Central Rockies Ecosystem



The CRE is defined ecologically in the east, by the furthest extent of grizzly bear range. The Columbia Trench is the western boundary as it has intensive development, a north-south transportation corridor, and a wide river that combine to impede east-west bear movements in the area. One disadvantage of this arbitrary outline is that the grizzly bear population cannot be assumed to be closed. The boundaries, particularly in the north and south, are permeable to bear movements. Areas within the CRE available for grizzly bears varied considerably. Areas covered with rock, ice, water, bare soil and > 2500 m elevation make up a significant portion of the landscape. In the National Parks 48% of the landscape was unsuitable for foraging for grizzly bears. This contrasts with only 12% unsuitable on Alberta provincial lands, 21% unsuitable in Alberta's Kananaskis Country, and 27% unsuitable on British Columbia provincial lands.

The landscape is generally described by 3 major ecoregions: montane (1,300–1,600 m), subalpine (1,600–2,300 m) and alpine (>2,300 m). High rugged peaks with steep-sided narrow valleys characterize the mountains in the west and the climate is typically wet and cool. Dominant over story species in the montane are Western Hemlock (*Tsuga heterophylla*) or Western Red Cedar (*Thuja plicata*) in wet areas west of the continental divide or Douglas Fir (*Pseudotsuga menziesii*) and White Spruce (*Picea glauca*) in drier areas east of the divide. Sub alpine areas include Engelmann Spruce (*Picea engelmannii*) and Subalpine Fir (*Abies lasiocarpa*). Rugged mountains, steep-sided ravines and flat valley bottoms characterize the eastern mountains. The east side of the divide, with continental climate, is typically warmer and drier than the west slope. Montane regions of the east slopes are dominated by dry grasslands, wet shrub land, and forests of Lodgepole Pine (*Pinus contorta*), Douglas Fir, White Spruce and Aspen (*Populus tremuloides*). Subalpine areas are forested with Lodgepole Pine, Engelmann Spruce, Subalpine Fir and Subalpine Larch (*Larix lyallii*).

The climate in the region is characterized by long cold winters and short cool summers (Janz and Storr 1977). Average annual precipitation varies greatly with elevation; in Alberta, from <500 mm along the foothills and in the montane to about 800mm in the upper subalpine and alpine zones (McKay et al. 1963). The eastern slopes in Alberta exhibit generally drier conditions than the west slopes in the Kootenays due to the rainshadow effect on the east side of the Rocky Mountains. January is the coldest month and July the warmest, with warm winter winds from Pacific air masses leaving the montane and foothills zones intermittently snow-free (Janz and Storr 1977). The east side of the divide, with continental climate is generally not as productive bear habitat as west of the divide with a moister climate.

For the last century in the CRE, humans have attempted to control natural processes that affect vegetation such as fire, insects, and disease. Historically, intermittent wildfires created a mosaic of forest types and ages, which supported a diverse composition of flora and fauna. However, fire suppression has created even-aged and even-canopied forest communities with a potentially dangerous buildup of fuel in the understory, and over much larger areas than in pre-Columbian times. This is leading to the heightened risk of a major fire that may burn hotter and spread farther than the frequent small historical fires. For grizzly bears, this means that large tracts of land are aging into late successional community types that do not produce the requisite food species of bears. Grizzly bears do best in post fire vegetation communities largely due to the need for fire, of two of its major food items, Buffaloberry (*Shepherdia canadensis*) (Hamer and Herrero 1987a,b, Hamer 1996) and Yellow Hedysarum (*Hedysarum sulphurescens*) (Hamer and Herrero 1987a,b, Hamer 1999). Except for horsetail (*Equisetum arvense*) in more mature forest communities, most important grizzly bear foods are found in open and seral communities (Hamer and Herrero 1987a). Many of these communities are the result of past fire events.

Management of the CRE is divided into four major governmental jurisdictions including National Parks (Banff, Yoho and Kootenay), Alberta's Kananaskis Country, Alberta provincial lands and British Columbia provincial lands (Figure 2). Each jurisdiction encompasses a range of multiple land-use mandates to include urban and rural settlements, industrial and resource developments, tourism and recreation (Gibeau 2000, Theberge 2002).

Various components of ESGBP research focused on different portions of the CRE. The Bow River Watershed was the primary area of focus.



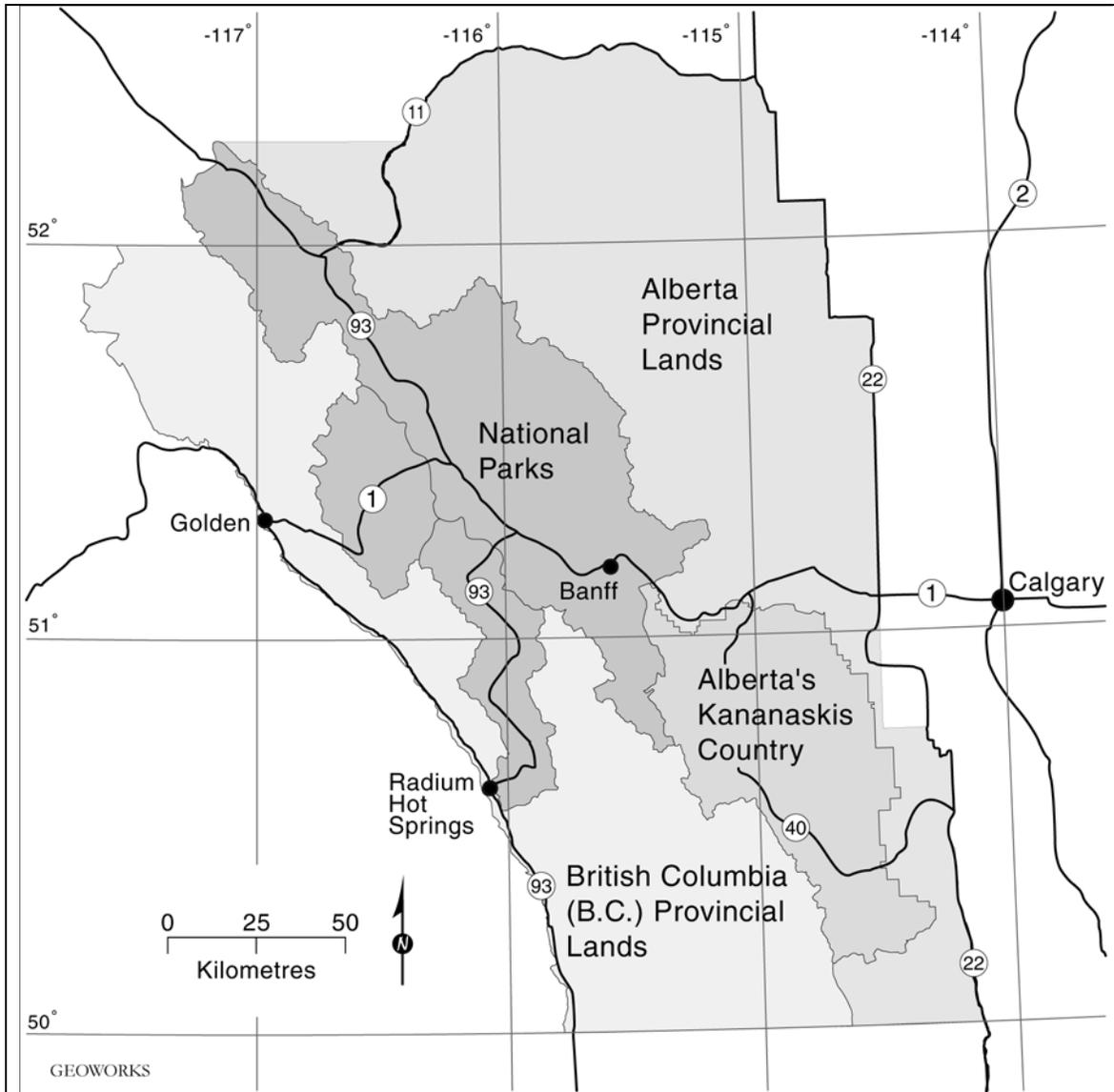


Figure 2. Study Area map showing management jurisdictions

BOW RIVER WATERSHED

The Bow River watershed of southwestern Alberta constituted the central core of the study area. This area is 11,400 km² of mountainous terrain 50-180 km west of Calgary (Figure 3). The area includes roughly 50% of Banff National Park (BNP) and all adjacent Alberta Provincial land known as Kananaskis Country. All study bears were initially trapped within this study area but were monitored over a much broader area of approximately 20,000 km² of the CRE. Neither jurisdiction permitted grizzly bear hunting although bears were exposed to hunting outside the Bow River Watershed. Differing agency mandates oversee preservation, industrial tourism, recreation, forestry, oil and gas extraction, mining, and stock grazing. Native councils, towns and municipalities, commercial developers, and residential owners further diversified land administration.

People accessed the area using primarily the Trans Canada Highway (TCH), a major transcontinental transportation route that bisects the study area northeast to southwest (Figure 1). The TCH, is a high-speed, high-volume (21,000 vehicles per day, average daily summer traffic volume; Parks Canada, unpubl. data) 4-lane divided highway through much of the study area. Forty-five km of the TCH through BNP has been



fenced to keep wildlife off the road. Wildlife crossing structures have been placed throughout the fenced section to facilitate movement across the highway (Clevenger and Waltho 2000). Several high speed, 2-lane paved roads serve as arterial transportation routes. Numerous 2-lane paved secondary roads complete the transportation system through most of the low elevation valleys. Traffic volumes on these arterial and secondary paved roads are high during the day (>300 vehicles per hour) but low at night (<50 vehicles per hour) which is significantly different than the continuous high volume on the TCH (Gibeau and Herrero 1998). There are few gravel roads in the study area. We know of no other area within occupied grizzly bear habitat in North America that has such an extensive network of high speed, high volume highways.

Human presence is widespread both within and outside of BNP. Three towns, Banff (population 7700), Lake Louise (population 2000) and Canmore (population 10,800) are world-renowned tourist destinations that attract approximately 4 million visitors annually. Calgary, a rapidly growing and affluent city of 960,000, is a half to 2 hour drive from most of the road access points in the study area. Developments, in addition to the towns that support tourism and industry, include a transcontinental railway, numerous hotels, campgrounds and picnic areas, 5 golf courses, 5 downhill ski facilities, and an extensive network of hiking, biking, and equestrian trails. The combination of a well-developed transportation system and elaborate infrastructure make the Bow River Watershed one of the most intensively developed landscapes in the world where a grizzly bear population still survives (Gibeau 2000, Herrero et al. 2000).

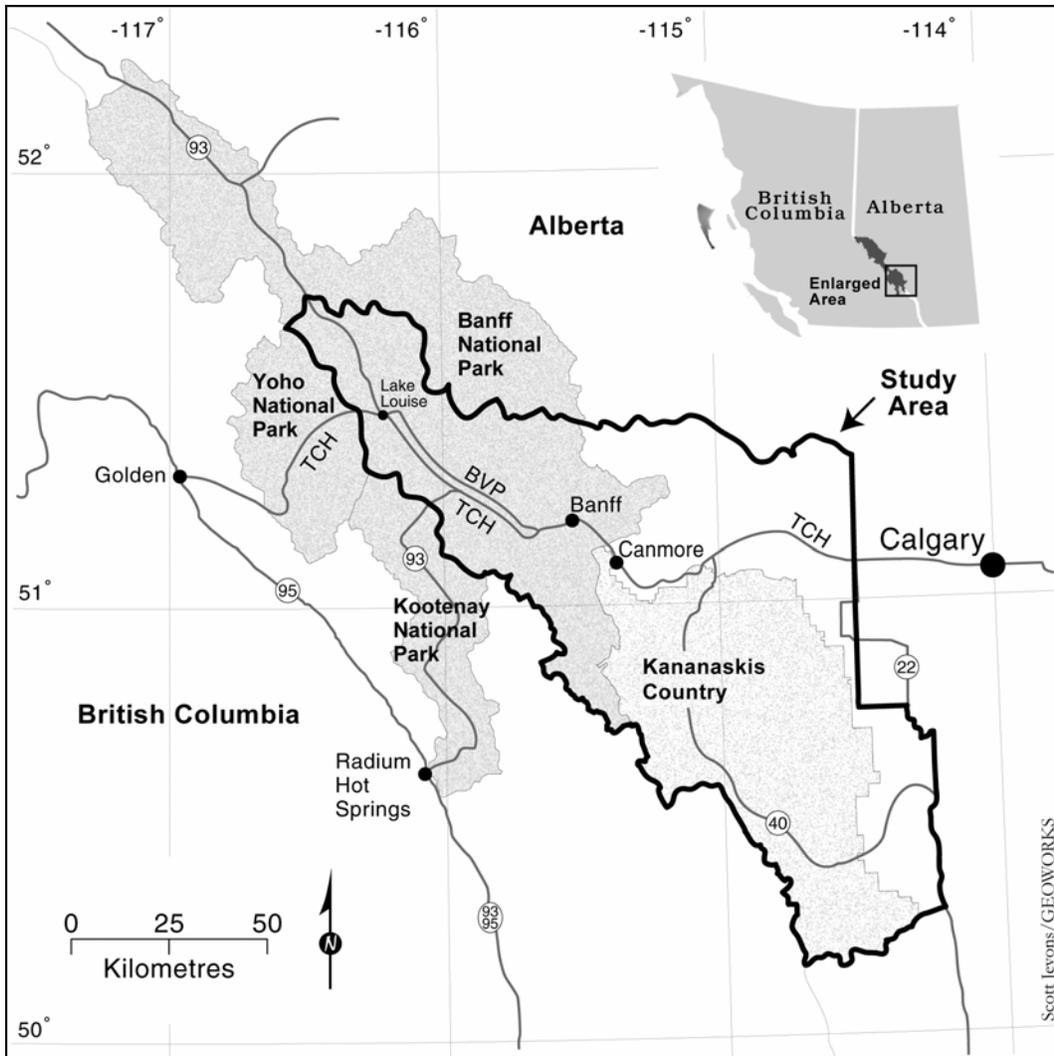


Figure 3. Bow River Watershed Area Map



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