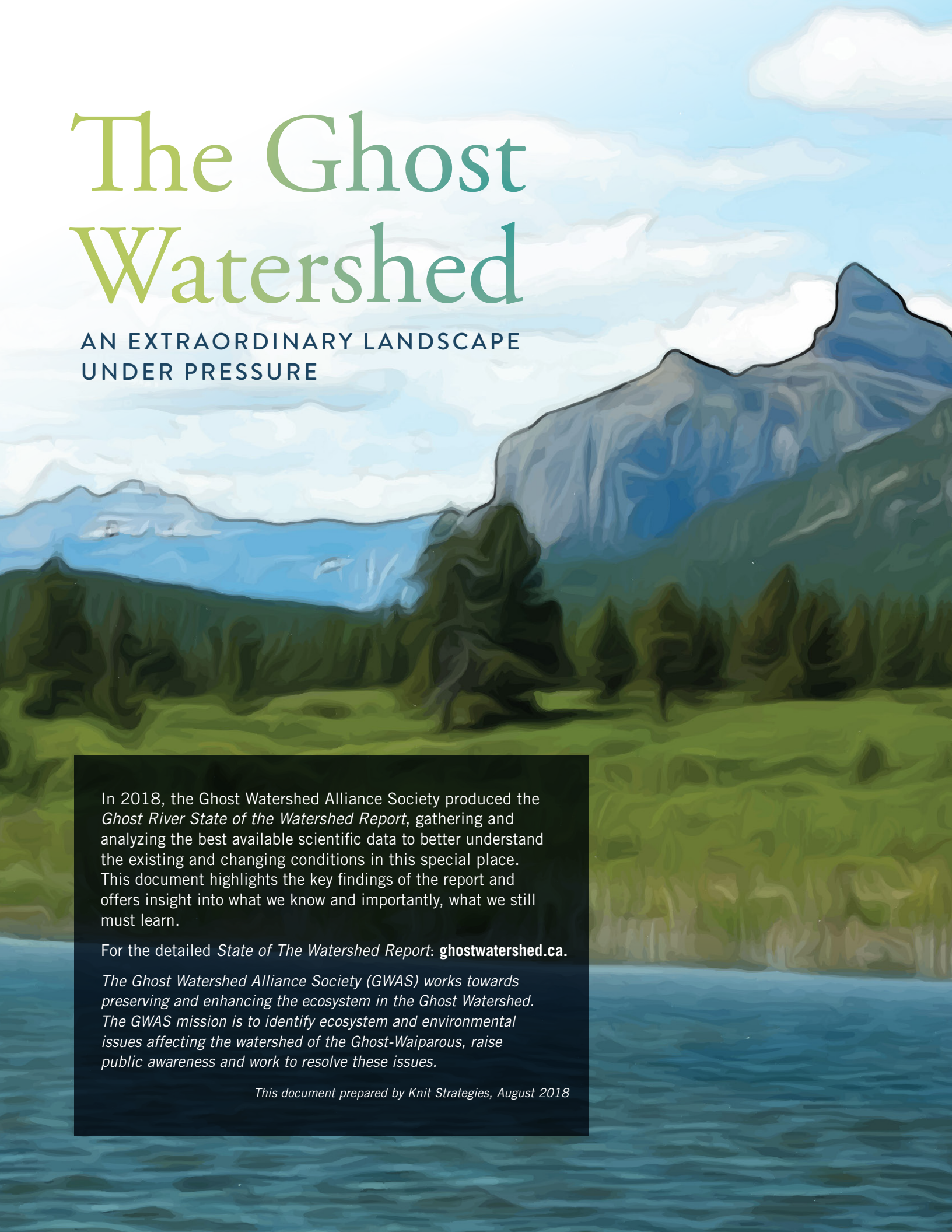


The Ghost Watershed

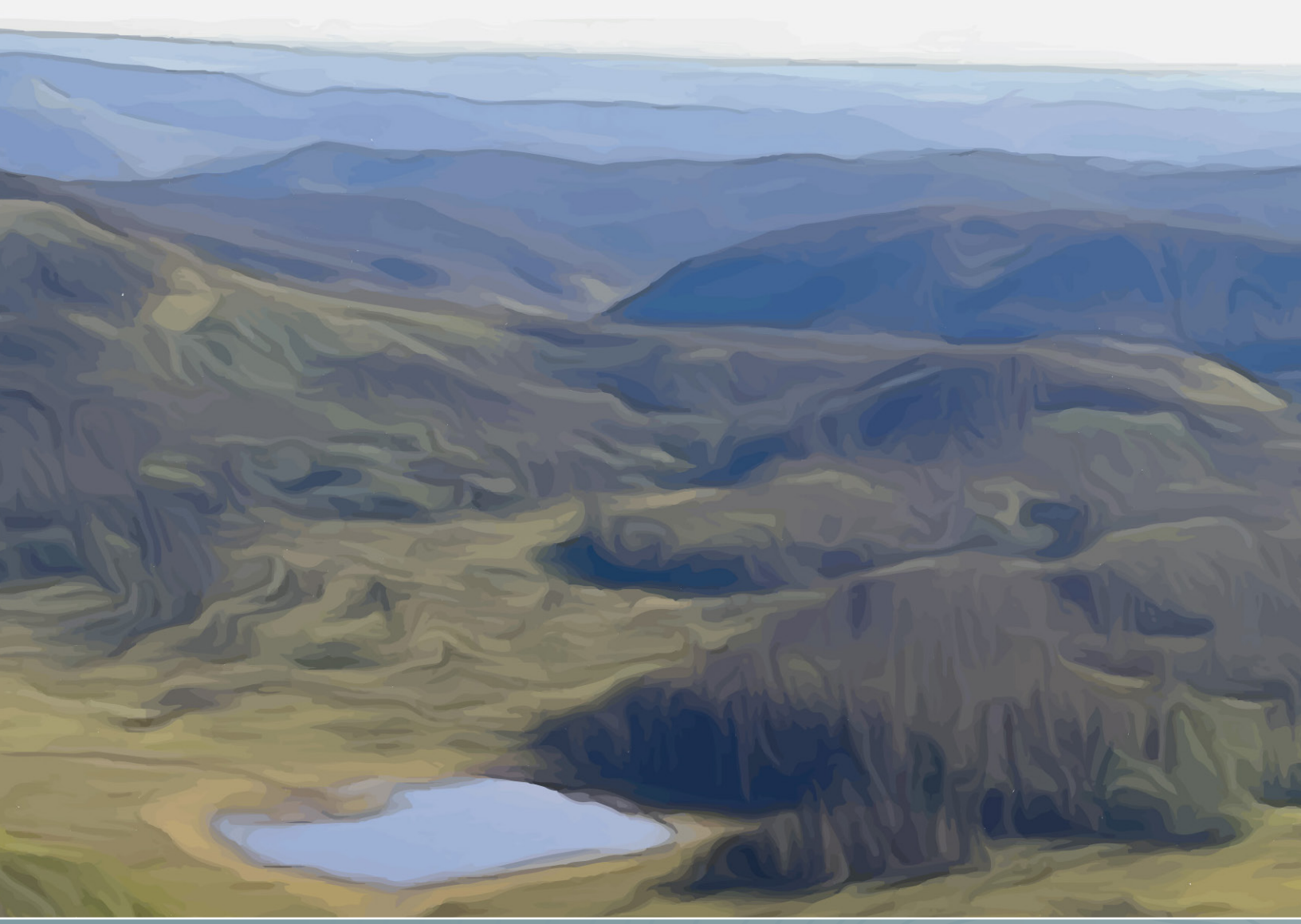
AN EXTRAORDINARY LANDSCAPE UNDER PRESSURE

In 2018, the Ghost Watershed Alliance Society produced the *Ghost River State of the Watershed Report*, gathering and analyzing the best available scientific data to better understand the existing and changing conditions in this special place. This document highlights the key findings of the report and offers insight into what we know and importantly, what we still must learn.

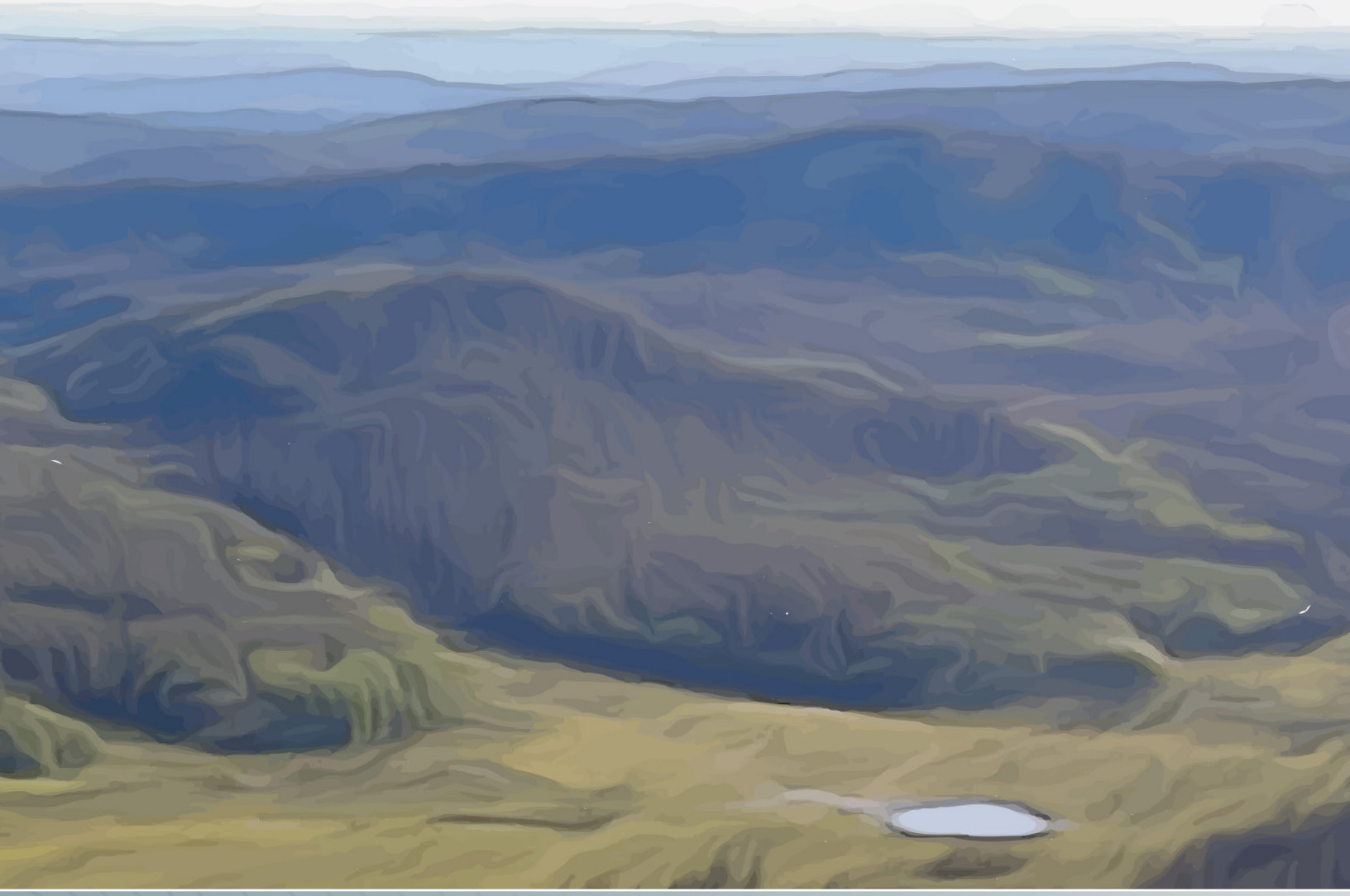
For the detailed *State of The Watershed Report*: **ghostwatershed.ca.**

The Ghost Watershed Alliance Society (GWAS) works towards preserving and enhancing the ecosystem in the Ghost Watershed. The GWAS mission is to identify ecosystem and environmental issues affecting the watershed of the Ghost-Waiparous, raise public awareness and work to resolve these issues.

This document prepared by Knit Strategies, August 2018



ROOTED IN THE NAME OF LEGENDS AND TUCKED UNDER THE SHADOW OF THE ROCKY MOUNTAINS, THE GHOST WATERSHED IS AN EXTRAORDINARY LANDSCAPE REVEALING ITSELF THROUGH LAYERS OF RUGGED MOUNTAIN PEAKS AND PLATEAUS, DEEPLY CARVED RAVINES, FORESTED HILLS, MEADOWS AND GRASSLAND. THE WATERSHED IS ALIVE WITH WATERWAYS AND WETLANDS SUPPORTING A DIVERSE AND INTERCONNECTED SYSTEM OF PLANTS, ANIMALS AND FISH HARDY ENOUGH TO THRIVE IN A CHINOOK-BLOWN ENVIRONMENT OF VARIED SOIL, FLOODS, DROUGHT AND EXTREME TEMPERATURES.



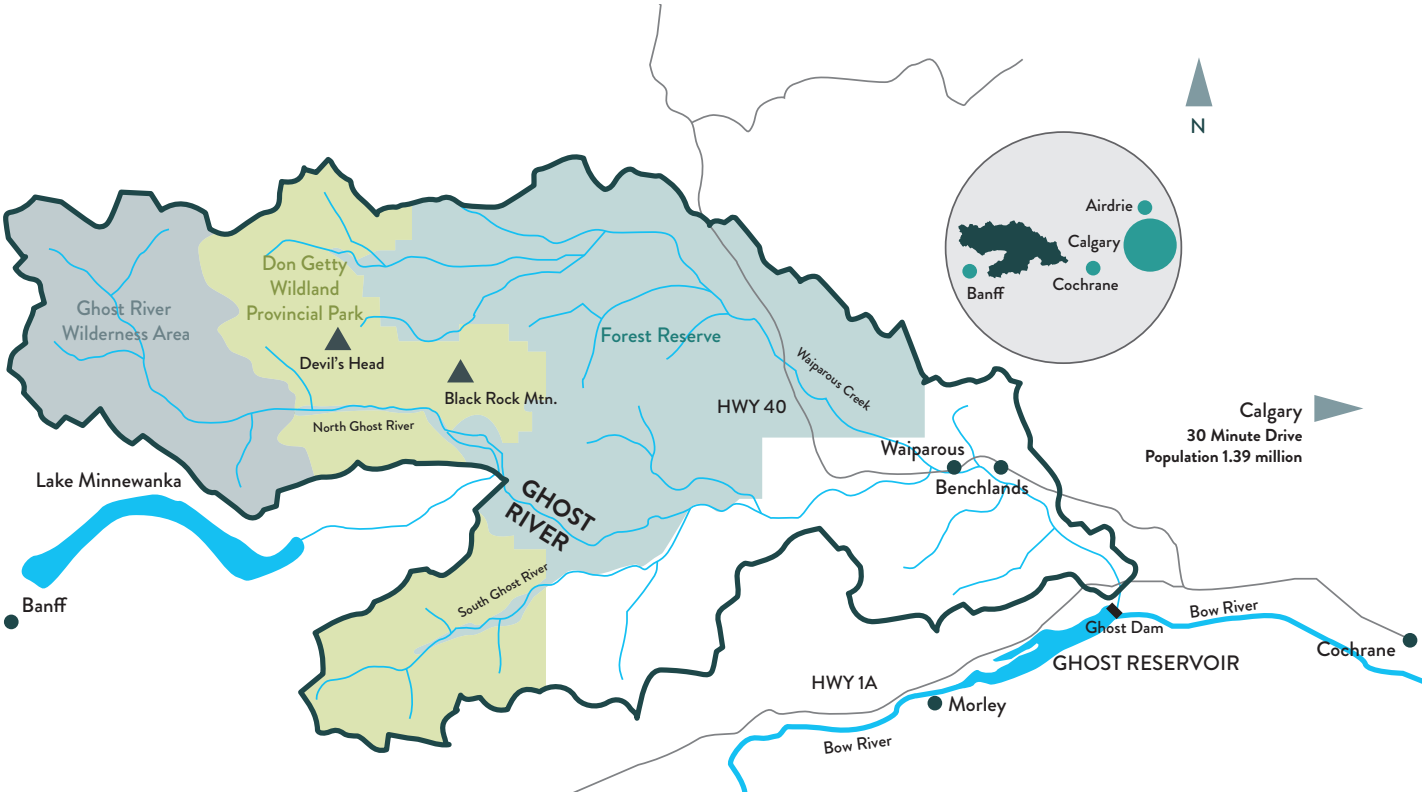
At the surface, the Ghost is a healthy, resilient land of grizzlies, clean air, clean running rivers and creeks, and diverse forests seemingly untouched by development. But, this is an environment under increasing strain. With its close proximity to the large and quickly growing population of the Calgary region, more and more people seek access to what makes it so magic. And, as the multiple conflicting uses of the Ghost – from timber, grazing, energy extraction to recreation – continue to increase, the coordinated and visible management and oversight of the watershed has decreased, pushing it dangerously close to an environmental tipping point.

This is a story about the Ghost Watershed and the plants, animals, fish and people that call this special place home. It's about the human imprints and activities shaping its future, resilience and health. And, it's about working together today to protect the watershed for everything, and everyone, that depends on it.

As the multiple conflicting uses of the Ghost – from timber, grazing, energy extraction to recreation – continue to increase, the coordinated and visible management and oversight of the watershed has decreased, pushing it dangerously close to an environmental tipping point.

The Ghost

A SPECIAL PLACE OF CONTRASTS AND DIVERSITY



THE LAND, AIR AND WATER

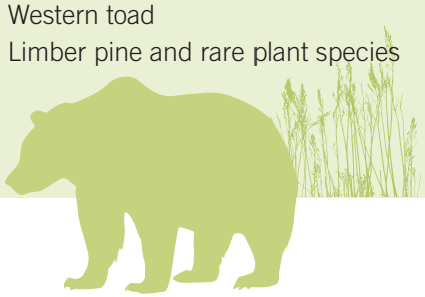
Home to an abundance of plants, wildlife and a lucky few residents, the Ghost Watershed is an interconnected network of land, air and water spanning 947 square kilometres. A critical element in the Bow River system, the watershed works hard to clean, supply and store water all the while doing its part in providing natural capacity for flood and drought mitigation.

Overseen by the imposing ramparts of Black Rock Mountain and Devil's Head, the Ghost begins at the eastern slopes of the Rocky Mountains adjoining Banff National Park and slopes eastward into the foothills. This is a contrasting environment that varies widely from one end to the other. Starting from the cold, wet and treeless heights of mountain peaks, the watershed rolls down to the middle elevations of subalpine fir and spruce forests, then onto lower slopes with warm, drier forests of Douglas-fir, fire-origin lodgepole pine, and spruce mixed with aspen and grassland. Its peaks and valleys tell the tale of advancing glaciers while the rocks and soil tell of their retreat. Towards the east, the slope changes as well as the geology, soils, climate, vegetation and human use.

HUMAN IMPACT

- Habitat degradation
- Habitat loss
- Habitat fragmentation from roads and trails
- Erosion from off-highway vehicles, timber, industrial and livestock use
- Spread of invasive plant and fish species and disease
- Overfishing

IN THE WATER	ON THE LAND	IN THE AIR
SPECIES OF NOTE – EXAMPLES	**SPECIES OF NOTE – EXAMPLES**	**SPECIES OF NOTE – EXAMPLES**
• Bull trout	• Grizzly bear	• Ferruginous hawk
• Westslope cutthroat trout	• Western toad	• Olive-sided flycatcher
• Spoonhead sculpin	• Limber pine and rare plant species	• Barn and bank swallows
• 33 kinds of invertebrates		• Loggerhead shrike
		• Barred owl



The Ghost River, the lifeblood of the watershed, is fed by Waiparous Creek and many smaller streams as it winds its way through the landscape to the confluence with the Bow River at the Ghost Reservoir. A vital part of the Bow River Basin, the Ghost is a contributing source of drinking water and irrigation for a significant downstream population.

Compared to that of surrounding regions, this is a land that is mostly untouched by commercial or residential development. It is sparsely populated, containing only three small communities, along with ranches and rural private properties. However, especially on summer weekends and holidays, it can see thousands of motorized users and random campers.

As an environment mostly removed from the challenges of development, many indicators of health in the watershed are positive and contribute to what makes it such a unique place. Very little water is used by humans within the watershed itself. Tests of the rivers in the Ghost show that water quality throughout is generally good or in a natural state.

Riparian areas border rivers, creeks and wetlands. They are the spaces where land and water interact, forming a crucial ecosystem of invertebrates, fish and wildlife and, when healthy, are the anchors of waterways, with native plant roots preventing erosion and filtering runoff. In the Ghost, these riparian areas are in generally good condition with some areas showing signs of problems primarily due to off-highway vehicle (OHV) recreation use.

I remember fishing with my grandfather and the cutthroat trout were so prolific we could fish all day long. It is so dramatically different now. The fish aren't there.

Bill Motherwell
GWAS Board Member & local resident

THE PLANTS, ANIMALS AND FISH

The Ghost is a place where, in some remote corners, rare and extraordinary opportunities exist to witness grizzly foraging on a faraway slope, a golden eagle soaring over a mountain ridge, or a cutthroat trout leaping out of the river to capture a mayfly. Locals regale of having a grizzly on their deck one day and a cougar under it the next. The diversity of wildlife, plants and fish is part of what makes the area so appealing, particularly for the fishers and hunters that consider it a destination.

On the land, the grizzly sets itself apart as a keystone species. Its presence in the Ghost is a key indicator of the health of its habitat and the environment. Many other species such as moose, mule deer, white-tailed deer, elk, black bear and cougar make this land their home. They wander upon and within a flourishing plant system that reveals many rare plant species including rare mosses and lichens and the endangered limber pine. The varied nature of the watershed results in a wide range of plants that, as one early botanical artist described, "grow in the region as survivors perfected by adversity."

Limber pine in lower Devil's Head Valley
Photo credit: A. Holcroft Weerstra.

In the air, barn and bank swallows perform a mesmerizing dance as they weave and dive for insects. With a diverse population of birds in the Ghost, these aerial masters are just two of the many at risk or threatened bird species seen in the watershed. Others, such as evening grosbeak, loggerhead shrike and barred owl are occasionally spotted.

The rivers, creeks and streams are home to an abundant microscopic community. Aquatic invertebrates such as the larva or nymph stages of mayflies, stoneflies and caddisflies are sensitive to pollution. So, their presence in high numbers tells us that the waters of the Ghost Watershed are in good ecological health. And it is insects such as these that support the variety of fish swimming in the streams, rivers, ponds and lakes.

Mayfly nymph
Source: University of Illinois.

While the invertebrates shine a light on the positive, it is the fish that shine light on potential problems in the watershed. Overfishing and habitat decline are factors threatening once thriving populations of native westslope cutthroat trout and bull trout. Invasive species such as brook trout and rainbow trout are also putting severe pressure on native fish. Most recently and alarmingly, the watershed was identified as being located within a whirling disease infected area. Whirling disease is a parasite that causes deformities in trout and whitefish. How this impacts this fish population is yet to be seen.

When I lived away and came back home, as soon as we came around the corner and I saw the view and the meadows, I always had a feeling of excitement and happiness. It's my place, my home.

Local Resident

THE PEOPLE

Long before European explorers, the Assiniboine people of the Nakoda dialect lived on the land and used it as a harvesting location. Before the 1800s, the Assiniboia formed two distinct groups: the Mountain Stoney and Plains Stoney. The signing of Treaty 7 assigned reserve lands and, as part of that, the Nakoda retained reserve land in Morley that extends north from the Bow Valley to the Ghost River.

Indigenous stories are reflected in the Ghost's name, Winchinaiwapta in Nakoda. Many legends have been told sharing the common themes of battles, ghostly voices over the river, and sightings of spirit horses and mystical warriors in the night.

The word "Stoney" was used by early European traders to describe the Nakoda people who heated stones in fires and dropped them into broth for boiling soup or tea. Today, the Stoney Nakoda First Nation comprises three bands: Bearspaw, Chiniki and Wesley.

Early explorers including David Thompson documented the area and its abundance of buffalo and Dr. James Hector had help from the Stoney to navigate the valleys and passes of the area. Early settlers trickled in during the late 1800s. Over time homesteaders and ranchers saw the arrival of those seeking nature in the summer months with the start of small communities. As a testament to the allure and pull of the Ghost, many locals today are descendants of the original ranchers and homesteaders. For them, this magical place is home and, they say, part of who they are and what makes them whole.

That lure also exists for many visitors who are drawn to the area by its beauty, its diversity and the opportunity to connect with nature. A wild and natural treasure, the Ghost is a stark contrast and welcome respite to its bustling and rapidly growing neighbours of Cochrane, Calgary and other communities that bring the region's population to nearly 1.5 million people today, a number that some predict could double in the next 30 years. Hikers, hunters, fishers, horseback riders, photographers and mountain climbers take advantage of increasingly rare opportunities to access remote, unique and quiet areas. On summer weekends, large but untracked numbers of random campers congregate in the more accessible areas and OHV users travel the area's designated and, although not permitted, non-designated trails.

Originally developed to generate hydroelectricity, the Ghost Reservoir has also seen a massive surge in unregulated and unmanaged recreational activities. Powerful speedboats, OHVs and snowmobiles descend on the reservoir, increasingly using the relatively small Ghost arm of the reservoir as a way to head upstream for motorized exploration. As the presence of unregulated motorized activities increases, so do the impacts – from higher levels of sediment to shoreline erosion and declining wildlife and fish habitat.

The watershed's neighbour, a rapidly growing region of nearly 1.5 million today, is predicted to as much as double in the next 30 years.

The Ghost's land-use history has been one of increasing access, roads and human impact.

People + Land

THE ACTIONS AND DECISIONS IMPACTING THE GHOST'S FUTURE

Crown lands, managed for livestock grazing, forestry, watershed, wildlife, fisheries and recreation, comprise nearly 78 per cent of the Ghost Watershed. Large parts of this Crown land within the Rocky Mountains Forest Reserve, Don Getty Wildland Provincial Park and Ghost River Wilderness Area are intended to provide protection from development and OHV use. Areas of the watershed are managed by different, loosely coordinated administrative bodies in the complicated land-use context of more than a dozen legislative acts, plans and frameworks.

Despite the management and protection measures in place and the sparse population, the Ghost's land-use history has been one of increasing access, roads and human impact. While much of the land is protected by various legislations, commercial and recreational use is heavily concentrated in specific areas causing significant impact throughout the whole watershed. Over time, on-site and visible management, monitoring and enforcement of the Ghost has diminished in parallel with increasing public and commercial use. As such, there is much we still do not know about how each of our land-use decisions impact the watershed's many natural elements, relationships and processes.

> The quiet is broken. It's like a hornet's nest the way they buzz around and with the sound they make.
>
> **Local Resident**

For generations horse and ranching practices have endured. Livestock grazing on Crown land is a common occurrence with 56% of the watershed designated as Crown grazing lands. If not properly managed, livestock grazing can compact the soil, introduce invasive species and erode the banks of streams and creeks.

Erosion from OHV use at Aura Sand Hills. The area is located within a critical wildlife zone.
Photo credit: M. Enns

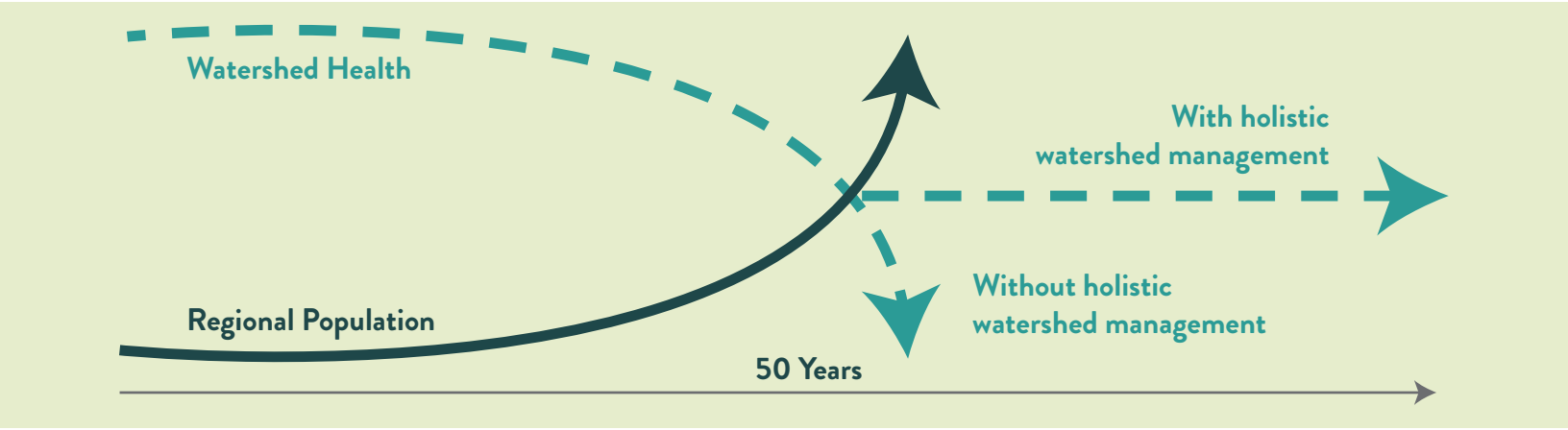
Forestry also has a long and large land-use history in the Ghost. There is much we do not know about the impacts of forestry on the watershed but concerns about the size of cut areas, the impact on waterways and wildlife habitat, and increased runoff impacting flooding and regrowth of the forest have been raised over the past decade. We do know that forestry along with oil and gas extraction has resulted in an increasing number of roads networked across the watershed.

With more roads for industry access, comes more access for OHV use. And with just a short drive from surrounding cities and communities, an army of dirt bikes, quads and jeeps make their way onto the Ghost's roads and trails each weekend. While OHV activity is only allowed in a portion of the watershed, the lack of properly designed, maintained and managed trails and lack of enforcement in these concentrated areas have significantly impacted the watershed and had both locals and visitors expressing concern for nearly 20 years. Impacts of OHV use have been noted including eroded soils and vegetation damaged from driving along or through creeks, fuel spills, excessive noise and clouding rivers and creeks. Related random camping has also resulted in clean-up costs and contamination. And for many in the OHV community, without a clear funding model to build and maintain a trail system, they rely heavily on volunteers to do the work in an effort to keep wheels out of the water.

Example of typical impacts from OHV use within the Ghost Watershed.
Photo credit: A. Holcroft Weerstra

The Ghost Watershed

A TIPPING POINT



While there are many positive indicators of the Ghost's resilience, just how long these positive signs will remain is in question. By probing deeper into its parts, concerns appear that cumulatively and over time could tip the balance for the whole watershed.

This is a place where the rivers and creeks downstream tell the story of human activity upstream. For example, in much of the watershed, the rivers and creeks run clean and clear. At a closer look, higher levels of sediment are clouding the waters in Waiparous Creek, while areas in Benchlands show fecal bacterial levels above normal.

Riparian areas are generally considered healthy across the watershed, yet some sections along the Waiparous Creek are rated as healthy but with problems. Intense OHV stream crossings result in erosion and make the area more vulnerable to invasive plant species such as Canada thistle and Kentucky bluegrass. Other riparian locations have been deemed to be healthy but with problems due to impacts of livestock.

Areas such as along the Ghost River near its entrance to the reservoir show problems of erosion, invasive plant species and sediment as well. Upstream, sediment makes its way into the river and streams and accumulates downstream, altering and clogging the natural course and flow of the river. Sediment continues to build up where the river and the reservoir merge, reducing the reservoir's storage capacity and flood mitigation potential.

As more roads, undesignated trails and transmission lines are added to the landscape, the watershed is becoming a fragmented puzzle. These disturbances cause more sediment in rivers since without vegetation, dirt and silt run off the roads into rivers and streams when it rains or snow melts. And, more roads and trails attract more usage by off-highway enthusiasts that expose the landscape further. Studies show that high density of trails and roads ultimately have a negative impact on wildlife. In the Ghost, density of roads and trails has reached a level where grizzly bears may be displaced and bull trout populations are at risk.

Compounding the issues above are the climbing populations of nearby communities and the growing demand to connect with and access this watershed. This pressure for access is further complicated by the uncertainty of climate change – and the effects that will undoubtedly alter how the watershed functions. With all these factors, it is clear that we must address the individual impacts and the cumulative effects of the decisions and actions occurring across the watershed today and into the future.

> Action has to happen now.
> Everyday we wait could cause more damage.
>
> **Bryne Weerstra**
> GWAS Board Member & local resident

Next Steps

WORKING AND PLANNING TOGETHER TO PROTECT THE GHOST'S FUTURE

With the watershed at a tipping point there is a decreasing window of opportunity to right the balance. There is much that can be done to preserve and protect the watershed and halt the impacts that are cumulatively shifting and eroding its resilience. It requires a holistic view that recognizes that every decision we make on the landscape has an effect.

WORKING TOGETHER TO PROTECT THE WATERSHED FOR GENERATIONS TO COME.

A holistic approach hinges on bringing together the people using the landscape and the organizations managing it. Sustainable land-use management needs to be employed and coordinated with all stakeholders, including municipalities, provincial government, First Nations, industry, private citizens and non-governmental organizations. With more than a dozen legislative acts, plans and frameworks spanning the watershed, it's vitally important to align efforts, identify gaps, and coordinate implementation and enforcement at all levels.

UNDERSTANDING AND ACKNOWLEDGING THE CUMULATIVE EFFECTS.

We must also do more to fully understand the watershed in order to proactively address concerns and plan for the long term. A coordinated, connected and focused approach to additional research is needed to identify, understand and acknowledge the cumulative effects of human access, industrial use, a maturing Ghost Reservoir and climate change.

Addressing knowledge gaps will help complete the puzzle picture and inform needed management steps to address current threats.

Recommendations include but are not limited to:

- updating and expanding data for air quality, ground water quality, surface water quality, biodiversity and riparian and wetland inventories;
- implementing strict measures to stop the spread of invasive species;
- understanding and mitigating the effects of road and trail networks and related OHV activity;
- implementing a holistic land-use management approach that includes the effects of recreational activities combined with industrial land use and the impacts of climate change.

This Special Place

THE GHOST WATERSHED IS A PLACE UNLIKE ANYWHERE ELSE. FOR THOUSANDS OF YEARS, THIS LAND HAS BEEN HOME TO PLANTS, ANIMALS AND PEOPLE HARDY ENOUGH TO NAVIGATE AND THRIVE IN ITS EXTREME LANDSCAPE. BUT INCREASING HUMAN PRESSURES – HOW WE ACCESS, USE AND MANAGE THE LANDSCAPE – ARE CHANGING THE WATERSHED. WE ALL HAVE A ROLE TO PLAY TODAY TO HELP PROTECT THIS SPECIAL PLACE FOR TOMORROW.