

The Climate Adaptation Programs and Activities of the Yellowstone to Yukon Conservation Initiative

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Abstract—The Yellowstone to Yukon Conservation Initiative (Y2Y) is an innovative transboundary effort to protect biodiversity and facilitate climate adaptation by linking large protected core areas through compatible land uses on matrix lands. The Y2Y organization acts as the keeper of the Y2Y vision and implements two interconnected programs – Science and Action, and Vision and Awareness—to promote the landscape, political, public, and financial conditions necessary for wildlife connectivity. The Y2Y vision has inspired many others who are also undertaking programs, projects, and actions contributing to its realization. This paper provides examples of projects being undertaken by the Y2Y organization as well as those being implemented by others and includes a brief summary of successes to date.

Origins of the Yellowstone to Yukon Conservation Initiative

First conceived in 1993, the Yellowstone to Yukon Conservation Initiative (Y2Y) was inspired by the wide-ranging movements of animals like wolves and grizzly bears. A particular wolf, Pluie, was radio-collared in southern Alberta and tracked over a 100,000 square kilometer (40,000 square mile) area that encompassed portions of Montana, Idaho and British Columbia (Dean 2006). During the course of her travels, Pluie crossed through multiple local, regional, state and provincial jurisdictions and an international boundary. At times she was fully protected within national parks, while at others, she was a legal target for hunting, which was her eventual fate. The lesson of Pluie's travels is that parks and protected areas, no matter how large, cannot be relied on to ensure a future for healthy populations of large mammals (Newmark 1995). Such species use the landscape at a much

larger scale than ever can be contained within a single park or even a network of parks. Rather, an integrated approach to management is needed that recognizes the large-scale movements of such animals and the need for coordinated responses from many levels of government and private land managers.

At the same time Pluie's journey was taking place, historical studies of wildlife ranges demonstrated that populations that become isolated from each other “wink out,” or become locally extinct (Hummel and Ray 2008). A map of grizzly bear range contractions over the last two centuries graphically demonstrates this tendency (fig. 1).

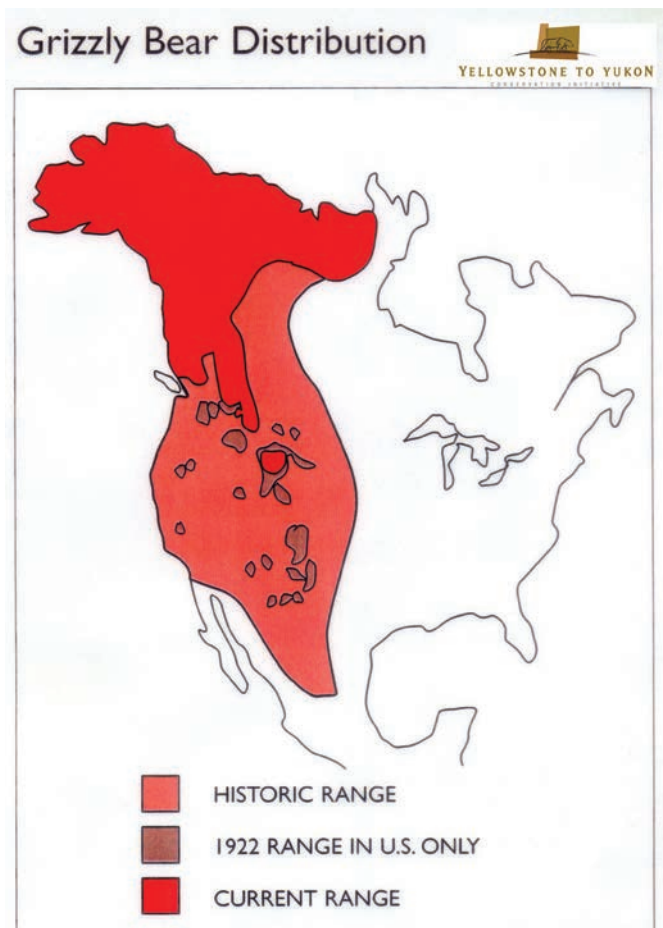


Figure 1—Map of historic grizzly bear distribution in North America.

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At one time, grizzlies ranged as far south as Mexico and well out into the Great Plains. As European settlement came to dominate and fragment the landscape, the great bears were pushed out of much of their range in the United States and squeezed into many isolated pockets of habitat in remote areas. Over time, animals within these pockets were deliberately killed, hunted, or died from other fates such as disease or fire. With no ability for other bears to travel to those locations, the loss of bears there was permanent. The means to prevent such extinctions within current grizzly bear ranges is to ensure that populations remain interconnected with each other. This requires the ability of bears to travel throughout much of the landscape, regardless of its use by humans.

The Yellowstone to Yukon vision coalesced these ideas and applied them to the entire length of the North American continent's mountain chain, from Yellowstone National Park and its surrounding public lands to the Arctic Circle in northern Yukon Territory (fig. 2). A group of scientists and conservationists conceived an integrated approach to land management that would embed parks and protected areas within a matrix of public and private lands that were managed to support the ability of wild species to live in and move through them. Although the Yellowstone to Yukon regional boundary is somewhat flexible depending on the issue at hand, the landscape between Yellowstone and the Yukon shares many characteristics, including flora and fauna, topography, and climate and social characteristics, which make it a logical unit for such an ambitious endeavor.

Yellowstone to Yukon Mission, Vision, and Programs

As first constructed, the Yellowstone to Yukon Conservation Initiative was a network of dozens of scientists and environmental non-governmental organizations (ENGOS). A number of leaders from within those organizations formed a voluntary Coordinating Committee, whose role was to advance the vision, direct research projects, and produce communications materials. In the early years, a major activity of the Y2Y network was simply to keep transboundary participants connected to each other through the new medium of the Internet. After a few years, it became apparent that both a senior staff capacity and significant funding would be required to keep the momentum going. In 2000, the initiative formally shifted from being a collaborative network to a stand-alone organization with legal and charitable status in both Canada and the United States, a formal Board of Directors, and a complement of staff members having expertise in science, communications, collaborating, organizational development and fundraising.

Early in the evolution of the Y2Y Conservation Initiative, a broad strategic planning process resulted in the creation of Mission and Vision statements that have withstood the test of time and have been the inspiration for other large landscape-scale efforts.

Mission Statement

People working together to maintain and restore the unique natural heritage of the Yellowstone to Yukon region.

Combining science and stewardship, we seek to ensure that the world-renowned wilderness, wildlife, native plants and natural processes of the Yellowstone to Yukon region continue to function as an interconnected web of life, capable of supporting all of its natural and human communities, for now and for future generations.

Vision Statement

Ours is a vision for the future of the wild heart of North America. Aware that the Yellowstone to Yukon region constitutes the world's last best chance to retain a fully functioning mountain ecosystem, we envision a day:

- When a life-sustaining web of protected wildlife cores and connecting wildlife linkage areas has been defined and designated for the Yellowstone to Yukon region;
- When that life-sustaining web is embraced as a source of pride by those who live within it and visit it, and is acknowledged as a living testimony to a society wise enough to recognize the need for such a web, altruistic enough to create it, and prudent enough to maintain it;
- When all natural and human communities in the Yellowstone to Yukon region coexist in a healthy mountain ecosystem of clean air and water, abiding beauty, and abundant wildlife and wilderness;
- When land-use decisions in the region are based first and foremost on ecological principles;
- When natural resources in the region are managed with the goals of ecosystem integrity and long-term economic prosperity in mind;
- And when residents of the Yellowstone to Yukon region take it for granted that their long-term personal, spiritual and economic well-being is inextricably connected to the well-being of natural systems (Y2Y 2002).

Progress Toward the Vision

Translating the Yellowstone to Yukon vision into conditions that foster healthy and connected wildlife populations will require a myriad of actions, decisions, and policies by numerous actors (Federal, state and provincial agencies, industrial land managers, Native American Tribes, First Nations, private land owners, municipal decision-makers, and individuals) whose activities occur within the natural landscape. Progress toward the Y2Y vision is being accomplished in three ways:

- Through programs and activities undertaken by the staff, contractors, volunteers or partners of the Y2Y organization;
- Through programs and activities inspired or influenced but not led by the Y2Y organization; and
- Through programs and activities that are neither inspired nor influenced by the Y2Y vision but nonetheless are contributing to its achievement.



Figure 2—Map of protected areas in the Y2Y region.

Science and Action Programs and Activities of the Y2Y Organization—The activities of the Y2Y organization are delivered through two interconnected programs: (1) Science and Action and (2) Vision and Awareness. The Science and Action program seeks to create the landscape conditions that will maintain and restore the biodiversity of this vast, unique, and significant region. Vision and Awareness activities are designed to foster the public, political, and financial support necessary to achieve the Science and Action goals. The two programs operate synergistically to increase their effectiveness and efficiency.

Y2Y Priority Areas—At the heart of the Yellowstone to Yukon vision lies the string of large protected areas that form the core of the Yellowstone to Yukon region (fig. 2):

- Yellowstone National Park and surrounding Wildernesses,
- Waterton Lakes-Glacier-Bob Marshall-Scapegoat complex,
- Salmon-Selway-Bitterroot Wildernesses, Canadian Rocky Mountain Parks and adjacent provincial parks,
- Muskwa-Kechika Management Area in northern B.C., and
- Nahanni National Park Reserve in the Northwest Territories.

Ensuring that these core reserves are managed to the highest levels of protection for source populations of key wildlife species is a major strategy of Y2Y.

In addition, these reserves need to be buffered to provide an added layer of protection and ensure that development and fragmentation don't encroach right up to the parks' boundaries. Y2Y and its partners are advocating for new core protected areas in several key locations within the Yellowstone to Yukon region, including (1) new Wilderness areas in northern Idaho and western Montana; (2) adding B.C.'s Flathead Valley to Waterton Lakes National Park; (3) securing provincial park protection along the east flank of the boundary between Banff and Jasper National Parks, an area called the Bighorn Wildland; (4) protecting endangered caribou habitat in Alberta's Little Smoky River region; and (5) protecting a majority of the almost 70,000 square kilometer (17 million acre) Peel Watershed in northern Yukon.

However, it is what occurs on the lands that lie between protected areas that will determine the success, or failure, of the Yellowstone to Yukon initiative. These lands are owned or managed by governments at various levels, by Native American tribes or Canadian First Nations, by industries, or by private owners. Therefore, key strategies must include the promotion of Federal, state, provincial, aboriginal and municipal land management policies that reduce fragmentation and enhance connectivity. Industrial land managers must be convinced to implement best practices to coordinate access and reduce the impacts of roads and other fragmenting features. Private land stewardship is an increasingly important strategy, especially in the southern third of the Yellowstone to Yukon region.

In order to approach these issues in a systematic and manageable way, Y2Y divides the region into 12 priority areas (fig. 3). Eight of these priority areas were identified

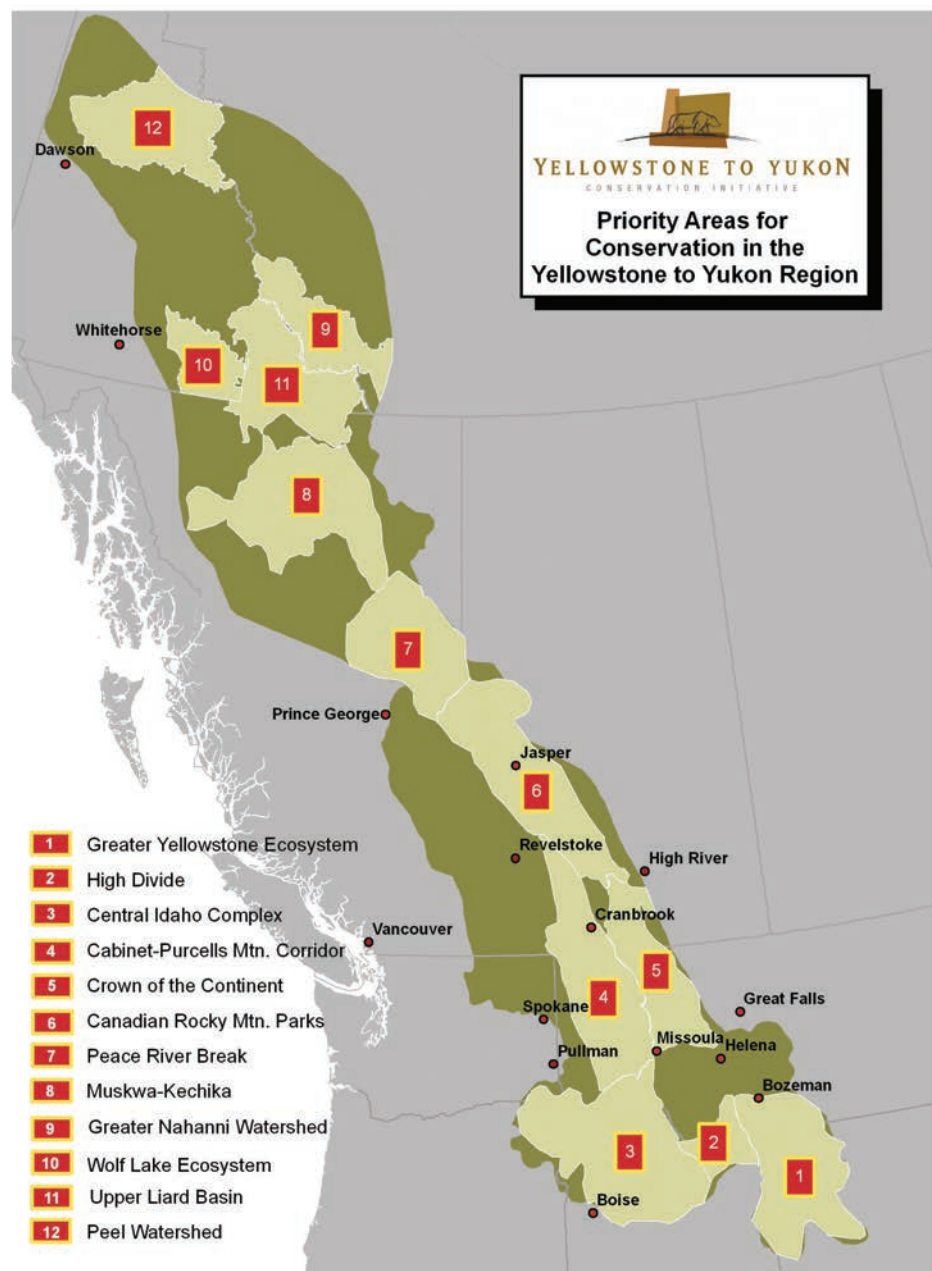


Figure 3—Map of Y2Y's priority areas.

through extensive research into the status of grizzly bear populations throughout the Yellowstone to Yukon region. Grizzly bears were chosen as a species around which to develop conservation programs because of their ability to act as an umbrella species, i.e., a surrogate for biodiversity. Grizzly bears have such large-scale habitat needs that if a landscape is managed for the survival of viable grizzly bear populations, many other species will also thrive under such management (Frankel and Soule 1981). Y2Y's conservation objectives and activities are intended to ensure the survival of populations of grizzly bears—and thus a vast majority of other species—over evolutionary time scales (i.e., centuries).

In addition to the eight priority areas identified by the grizzly bear strategy, the Y2Y organization also identifies four areas in the Yukon and Northwest Territories as priorities for conservation action. Identified as large, intact watersheds, these are the Upper Liard watershed, the Wolf Lake ecosystem, and the Nahanni and Peel River watersheds. These northern landscapes contain the largest, most intact, wildest lands remaining within the Yellowstone to Yukon region.

Y2Y's Conservation Activities—Each of Y2Y's eight grizzly bear priority areas and northern watersheds is unique.

One major lesson of Y2Y's efforts to date is that there is no one recipe for achieving conservation outcomes. Having said that, Y2Y's general approach in its priority areas is to build networks of diverse partners who are willing to agree on common objectives and work collaboratively on projects and activities to achieve them. Y2Y acts as a catalyst, a convener, and a resource for these partnerships.

The Cabinet-Purcell Mountain Corridor is the most advanced of Y2Y's collaborations (fig. 4). Y2Y chose this landscape—which straddles the Canada-U.S. border and includes portions of British Columbia, Idaho, and Montana—because it is one of only two linkages remaining on the continent with the potential to keep grizzly populations connected to each other at the continental scale. A consensus of scientists convened by Y2Y over the years concludes that the best way to ensure the future health of Yellowstone's grizzly bears is to encourage the movement of bears from Yellowstone northwest through the region known as the High Divide into the Wildernesses of central Idaho, and to facilitate a similar movement of bears from British Columbia south through northern Idaho and western Montana to the same Wilderness areas (Y2Y 2009). The Cabinet-Purcell Mountain Corridor is the name given by Y2Y to the region of southeast



Figure 4—Map of the Cabinet Purcell Mountain Corridor.

B.C., the Idaho Panhandle, and western Montana within which public and private land management must favor the successful presence and movement of grizzly bears in order to facilitate their return to central Idaho.

Over a 5 year period, Y2Y has engaged dozens of groups, scientists, government agencies, Native American Tribes, First Nations, and progressive businesses in a series of meetings and workshops that have identified regional opportunities for, threats to, and strategies for increasing the likelihood of co-existence between people and bears in this important landscape. Participants organized themselves into the following working groups to prioritize and resource projects that address the primary threats to grizzly bear occupation of the landscape:

- Impacts of major transportation corridors;
- Managing garbage and other attractants to reduce conflicts between bears and people;
- DNA and radio-collared bear research to understand how bears are using the landscape and how populations are connected to each other;
- Reducing the impacts of roads and motorized access on remote public lands; and
- Identifying and acquiring through purchase or easement private lands within known wildlife movement areas.

These efforts, which have been 5 years in the making and will need to continue for many more in order to achieve lasting conservation outcomes, are starting to show promising results with respect to the ability of grizzly bears to move toward central Idaho.

In 2007 (Ridler 2007) and again in 2009 (Kramer 2009), grizzlies were found in parts of Idaho where they had not been seen for decades. These bears managed to move from northwestern Idaho or western Montana through cities and towns and across a busy interstate highway before meeting untimely ends—one was mistaken for a black bear and killed by a hunter, the other by a rancher defending his livestock. Despite these deaths, the movement and presence of grizzly bears in this part of Idaho is a validation of the approach being taken by Y2Y and its partners that their efforts are increasing the connectivity of the landscape for key wildlife species.

In addition to the Cabinet-Purcell Mountain Corridor, Y2Y is fostering collaborative approaches to wildlife connectivity and other relevant issues in the Canadian portion of the Crown of the Continent ecosystem, in the Canadian Rocky Mountain Parks and surrounding provincial and private lands and in the Peace River Break. Within the Muskwa-Kechika Management Area, Y2Y is leading a scientific assessment that will provide managers of this unique conservation model with new information upon which to assess development proposals and anticipate climate-related changes. Within the four northern Priority Areas, Y2Y supported partners' successful efforts to expand Nahanni National Park Reserve and is lending a hand to the campaign to protect the Peel River watershed.

Y2Y's Partner Grants and Contracts—Given the size of the landscape and the breadth and depth of activities necessary to promote policies, decisions, and actions that favor connectivity, Y2Y must inspire and support the actions of myriad partners. A primary tool that has become increasingly important over the years is the provision of

grants to partners or contractors who deliver projects that contribute to the Yellowstone to Yukon vision. In 2008, Y2Y flowed almost US\$500,000 to over 30 partners throughout the region. Some of this funding represents partner grants that are awarded through an open call for proposals. Other funding is targeted at specific partners as a result of joint fundraising efforts. It is estimated that since its inception, the Y2Y vision has attracted more than \$50M new dollars to support conservation activity in the region. Y2Y hopes to continue to expand its capacity to attract financial resources and share those with its growing network of partners.

Vision and Awareness Programs and Activities of the Y2Y Organization

Y2Y's Communications Activities—In order to create the political will to implement policies and decisions that favor connectivity for wildlife, Y2Y undertakes significant outreach and communication efforts to reach broad regional, national and international audiences. A new website, launched in 2008, is attracting hundreds of visitors per day. Several other regular communications tools keep the vast network of Y2Y participants connected to each other, including a thrice-weekly news digest, several list servers, organizational and project-based newsletters, fact sheets, and annual reports. Y2Y staff members and contractors regularly present at local, regional, national, and international conferences and gatherings.

Y2Y uses a variety of innovative tools to reach ever-widening audiences, including most recently being a sponsor of the international tour of the Banff Mountain Film Festival, and partnering with Seattle's Burke Museum and the Chicago Field Museum to exhibit photographs from Florian Schulz' stunning book, *Freedom to Roam*. Upcoming exhibits include a major new display on bears at Chicago's Brookfield Zoo, and an exhibit of the wildlife art of Dwayne Harty at the National Museum of Wildlife Art in Jackson, Wyoming, (in 2011) and at Banff's Whyte Museum (in 2012).

Programs and Activities of Others Inspired by or Contributing to the Realization of the Y2Y Vision

The number of actions and projects contributing to the Y2Y 100-year vision that are perhaps inspired by but beyond the sphere of Y2Y's influence are too numerous to list. A few examples will demonstrate how extensive and diverse they are.

Freedom to Roam—Freedom to Roam is both a campaign of the outdoor gear manufacturer, Patagonia, as well as a coalition of ENGOs. The goal of both is to create public awareness and support for the concept of wildlife corridors and landscape connectivity. Freedom to Roam is directed by a unique collaboration of conservationists and businesses. It is developing a suite of communications tools that will reach out to diverse audiences with resonant messages about the need to protect corridors and to promote Federal and state policies that will help implement corridors on the ground.

Heart of the Rockies Initiative—In 2002, Y2Y supporters convened a ground-breaking meeting of land trusts and

conservancies operating in the southern third of the Y2Y region. This meeting was the genesis of the Heart of the Rockies Initiative, a partnership of 24 independent local, regional, and national land trusts in three states and two Canadian provinces, working together to protect high priority lands. Collaborative efforts involve conservation planning, capacity building, and capital fundraising. This venture has resulted in a significant increase in the pace and amount of private land being stewarded for conservation objectives. From 2002 to 2007, Heart of the Rockies partners worked with landowners to conserve over 400,000 acres, 87% of which has been identified as having high conservation value. The Initiative also has supported or catalyzed several programs that have increased the funding available for private land conservation in the region.

Path of the Pronghorn—In south and central Wyoming remains one of the longest seasonal mammal migrations remaining on the continent—the annual 270 mile round-trip journey of a herd of 300-400 pronghorn antelope from their summer habitat in Grand Teton National Park south to their wintering grounds in the upper Green River valley. In 2005, conservation scientists began raising the alarm that a boom in energy development was constricting the antelope's movement opportunities to the point where a complete blockage was a possible outcome (Wilkinson 2005). A successful campaign by local scientists, communities, and conservation organizations led to the official establishment in 2008 of a nationally designated wildlife corridor, managed by the U.S. Forest Service (Environmental News Service 2008).

U.S. Federal Legislation—At the time of writing, there is almost a frenzy of activity in Washington, DC, as legislators in both the House and Senate promote several pieces of legislation that could advance the identification and establishment of a network of wildlife corridors for the purposes of adaptation to climate change. Generally speaking, these programs would generate the data necessary to identify the location of corridors used by specific species and require consideration of the impact on those corridors from new development proposals, particularly energy developments.

The creation of new Wilderness also advances the Y2Y agenda. In early 2009, Congress passed and the President signed an omnibus bill that, among other things, withdrew from oil and gas leasing over 1.2 million acres of breathtaking, wild landscapes in the Wyoming Range of western Wyoming's Bridger-Teton National Forest. The iconic Wyoming Range features world-class hunting, strongholds for cutthroat trout, and half of Wyoming's moose populations, all of which would be threatened by extensive oil and gas drilling.

At the time of writing, another piece of legislation, co-sponsored by Senators Testor and Baucus from Montana, would establish almost 700,000 acres of new Wilderness protection within the Y2Y boundary in western Montana.

Western Governors' Association—This cooperative venture between the governors of 19 western U.S. States has, since 1984, provided a forum for policy and program coordination. In 2008, the Association established the Western Governors' Wildlife Council to identify and conserve key wildlife corridors and crucial wildlife habitats in the West. To implement this objective, each state is now developing wildlife decision support systems that will help public land managers make decisions about the impacts on habitats

and corridors of various development options (WGA 2009). Several pilot projects have been proposed for funding, one of which would benefit wildlife movement across the Idaho/Montana border within Y2Y's Cabinet Purcell Mountain Corridor.

Hiking from Y to Y—In the mid 1990s, Karsten Heuer, a young biologist from Banff National Park, approached the Y2Y Board with an audacious plan—to hike from Yellowstone to Yukon, to see if the continental scale connections between core habitats still remain. By 1999, he and his partner, Leanne Allison, had accomplished that task, by foot, canoe, ski and horseback. Along the way, they observed grizzly bears or signs of bear on the vast majority of their days on the trail, and discovered that it is indeed still possible, theoretically, for the great bears to travel from Yellowstone to Yukon. During the trip, Karsten and Leanne also helped to raise awareness about the Y2Y effort and answer questions from dubious communities by holding public talks in many of the towns and villages that dot the landscape. Although they have moved on to other projects, Karsten and Leanne remain closely associated in people's imaginations with the Y2Y initiative.

Another marathon hiker, 'Walkin' Jim Stoltz, also has hiked from one "Y" to the other. Jim has spent his adult life hiking enormous distances across, up, and down the North American continent. In the late 1990s, he too walked from Yellowstone to Yukon. Today he sings and tells stories about this and other adventures as he travels the country visiting schools and other venues.

Successes to Date

Because the Yellowstone to Yukon landscape is so large and because the vision is being implemented through the myriad and sometimes uncoordinated actions of individuals, communities, groups, and aboriginal and non-aboriginal governments, it is impossible to know all that is contributing to its accomplishment. However, a few major outcomes deserve mention as examples of the diverse ways in which the Y2Y goal can be achieved.

Banff's Wildlife Overpasses

In the early 1990s, the Canadian Federal government proposed to "twin" the Trans-Canada Highway through Banff National Park, expanding it from a two-lane to four-lane highway. In order to minimize the inevitable collisions between vehicles and wildlife, the government intended to construct miles of parallel fencing to prevent animals from entering the roadway. Small culverts and underpasses would be constructed to facilitate wildlife movement between the two sides of the highway. Based on the emerging understanding that connectivity between large mammal populations must be maintained on the continental scale and research demonstrating that bears, in particular, were not using the existing underpasses, local conservationists called for a solution that would serve all animal species and prevent a "Berlin Wall of biodiversity" from dividing the national park in two. As a result, two 50 meter wide overpasses were constructed between Banff and Lake Louise. Over fifteen years later, monitoring has demonstrated that all of the park's

resident species are using the overpasses and underpasses and that connectivity has been restored. Banff's overpasses remain a world model of successful highway wildlife impacts mitigation.

This success has inspired efforts to reduce the impacts of highways and railways that transect other areas within Y2Y, including Interstate 90 through Bozeman Pass, Montana; Highway 93 south in Idaho; and Highway 3 through the Crowsnest Pass, Alberta and British Columbia.

Muskwa-Kechika Management Area

The science that inspired the Y2Y initiative also influenced a campaign to set aside an unbelievably large tract of unspoiled forest, river valleys, and mountains in northern British Columbia. The Muskwa-Kechika Management Area is the product of a collaborative land use planning process involving all those with an interest in the landscape's management, including First Nations, outfitters, hunters, resource industries and environmental organizations. Over several years of negotiations, they hammered out an agreement, subsequently ratified by an Act of the B.C. legislature, to manage almost 16 million acres of land (equivalent in size to the island of Ireland) as a unique experiment in wilderness conservation, within which 11 million are managed as protected areas and another 5 million as special management zones where sustainable resource development can occur.

Highway 3 Wildlife Linkages

One of the more successful collaborative efforts to emerge from Y2Y's leadership in the Cabinet-Purcell Mountain Corridor is coordination between grizzly bear researchers and managers and private land conservancies located in both the U.S. and Canada. These agencies and organizations agreed on research priorities and also collaborated on the identification of the most critical private lands for the conservation of connectivity across three major highways that transect the region. Guided by this shared agenda, funds were raised to purchase the highest priority lands along Highway 3 in southern British Columbia, which are now owned and stewarded by the Nature Trust of B.C. Located along drainages where grizzly bears descend from the mountains to cross the highway, these linkages are now assured permanent protection for the bears' use.

Nahanni National Park Expansion

In 2009, the Y2Y vision received a major boost when the government of Canada, in partnership with the Deh Cho First Nations, announced that Nahanni National Park Reserve in the Northwest Territories was being expanded to six times its original size. The reserve now protects the headwaters of the Nahanni River, a tributary of the Mackenzie, as well as globally unique karst formations. At almost 30,000 square kilometers (more than seven million acres, or three times the size of Yellowstone National Park), Nahanni now serves as the majestic northern anchor of the Yellowstone to Yukon vision.

Conclusions

The Yellowstone to Yukon Conservation Initiative conceives and, with the help of hundreds of partners, implements a biodiversity conservation strategy at a scale unprecedented in the world. Yet, all the best science indicates that this is the scale at which conservation planning must occur if we are to counter the myriad threats that are creating the current extinction crisis, particularly the threat of climate change. As detailed in other sections of this report, maintaining connectivity at the continental scale, through the programs and activities of the Yellowstone to Yukon Conservation Initiative and many other actors, is the exact prescription for ensuring that biodiversity has the best chance of adapting to changing conditions.

When it was launched formally in 1997, Y2Y gave itself 100 years to accomplish its vision. Given that timeframe, a great deal has been accomplished. However, much, much more remains to be done. As the impacts of climate change are increasingly felt throughout the planet, the imperative for the Yellowstone to Yukon vision is even more urgent and timely.

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The content of this paper reflects the views of the authors, who are responsible for the facts and accuracy of the information presented herein.
