

A WILDLANDS ADVOCATE



THE ALBERTA WILDERNESS ASSOCIATION JOURNAL

FEBRUARY 2014



**Dark and Dirty: Time to
Dethrone King Coal**

**Hidden Creek: The Good,
the Bad, and the Muddy**

**Losing a Great Forest:
The Boreal and Climate Change**

**Come Hell and High Water:
The New West?**

C O N T E N T S

FEBRUARY 2014 • VOL. 22, NO. 1

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Caribou and the Aurora Borealis – it's hard to imagine more powerful proof of Wayne Lynch's status as one of the world's outstanding wildlife photographers PHOTO: © W. LYNCH

Featured Artist

Pamela Cinnamon moved to Tête Jaune Cache with her husband in the early 1970s where they raised their family of six children. Her painting began by exploring the world of traditional folk art before progressing to custom-painted signs and then to the multi-faceted world of exploring and teaching fine art media and techniques. Pamela has been a full exhibiting member of the Jasper Artists Guild since 2004 and her work has found homes around the globe.

Her artistic goal is to interpret, simplify, and capture the overwhelming beauty of the landscape and wildlife by translating them into line, shape, colour, rhythm, and symmetry. She strives not just to mimic what she observes, but to question, search for interrelationships, and suggest a new narrative. Pattern is a strong motivational force in her art. She loves to experiment with new techniques and processes, starting each piece with a basic concept and a specific process in mind and then allowing the work to carry her forward. Passion then takes over and surprises her with the results. She loves to sketch, often en plein air, and her simple, evocative sketches are the perfect antithesis to the boisterous, vibrant, densely textured works that fill her studio easel. She may be reached at mountainfolkart@yahoo.ca.

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Knowledge, Organization, and Change

Earlier this month the Bandon Coffee Café on Oregon's spectacular south coast offered me more than fine coffee. The café was a window onto knowledge about the natural world. This appreciation came courtesy of two works of art from "The Washed Ashore Project" exhibited outside the café. Concerned about the shocking tonnage of plastic polluting the world's oceans – and killing marine life – artists started this project. By making works from the trash collected from the sea they make "art to save the sea." Their works reminded me just how much more we know today than we did decades ago – in this case about the damage our plastic garbage is doing. (facebook.com/WashedAshore)

Looking at those pieces while I was editing this issue served up a less savoury reminder – if government and industry refuse to let better knowledge rule their actions then better knowledge practically isn't worth much more than the plastic garbage floating in the Pacific. This is a useful lens to use as you consider much of

what our environmental baristas offer you in this issue of the *Advocate*.

Carolyn Campbell uses climate change to make this point in her feature article. We know that climate change is taking place. Scientists such as Dr. Rick Schneider are using impressive-sounding models to help us understand where the path we're marching along will take us. Without a sea-change in how our governing institutions act on this knowledge (here corporations get equal billing with governments) we're

Brittany Verbeek also uses climate change to support this view in her recap of Bob Sandford's talk about water, floods, and the profound economic and social costs of climate change. When I read her piece about the need to dethrone King Coal in Alberta I found it hard to see how knowledge could possibly lead the province to maintain today's coal policy emphasis. Surely the coal exploitation foci of days gone by have no place in 21st Century Alberta.

Sean Nichols' article on AWA's Hidden Creek *Freedom of Information and Privacy* Act request also underlines how broken the connection is in Alberta between improved ecological knowledge and government behaviour. The prime directive when it came to logging Hidden Creek appears to have been to ignore any knowledge that challenges business as usual.

I'm pleased we can also tempt you with articles that show the positive changes we may be able to deliver if we let better knowledge guide our actions. That's how I view the picture from Niki Wilson's conservation corner about efforts to help whitebark pine survive. It's also how I hope, five years from now, I will be able to regard the work and commitment exhibited by the participants in the Sage-Grouse Partnership.

Finally, I'm pleased to be able to introduce a new feature in this issue of the *Advocate*. Nigel Douglas is going to write a regular feature for your magazine focusing on Alberta's species-at-risk. May the knowledge that he'll share with us there help us to convince government and business of what they need to do in order to help protect and enhance Alberta's wild spaces.

Ian Urquhart, Editor



Dark and Dirty

Time to Dethrone King Coal in Alberta

By **Brittany Verbeek**, *AWA Conservation Specialist*



When I think of coal, what initially comes to mind is a distant beacon in human history; large-scale coal mining exploded in the eighteenth century and started the industrial revolution. Coal's energy has breathed life into the modern world, first via the steam engine and then through electricity. Unfortunately for our natural ecosystems and atmosphere (not to mention human health in rapidly industrializing countries), coal remains a major global player in electricity generation and steel production.

In Alberta, there are significant deposits of metallurgical (coking) coal along the eastern slopes of the Rocky Mountains, mined for export mainly to Asian countries to produce steel. There are also many sub-bituminous (thermal) coal fields under the plains that are mined and burned for electricity generation. Coal-fired power plants scattered across the central region of the province generate the majority of Alberta's electricity. Benjamin Thibault of the Pembina Institute wrote in June 2012 that just over 70 percent of Alberta's electricity generation came from coal. China, according to the World Coal Association, generated 79 percent of its electricity then from coal.

Given our province's current dependence on coal we shouldn't be surprised to learn that its exploration, mining, and combustion has significant negative impacts on land, air, and water quality. "King Coal" certainly is a dark lord when it comes to these costs. Surface mining destroys. It completely eradicates the existing vegetation, alters soil composition, and displaces fauna



The Grande Cache Coal operation, sprawling over roughly six square kilometres, is just several kilometres away from Caw Ridge and its exceptional mountain goat and caribou habitat

which results in permanently altered and/or scarred landscapes. Large sites cleared for open-pit mines and their associated gigantic infrastructure can change the entire topography of those areas. Burning coal is king again when it comes to being the number one point-source contributor to greenhouse gas emissions. This is true here in Alberta; it's true globally. Aquatic ecosystems pay a price as well. Wetlands are destroyed in site areas, significant amounts of freshwater are used for commercial cooling, and tailings ponds can leach out toxic and other pollutants into watersheds.

A devastating example of tailings pond failure occurred on October 31, 2013 when an on-site containment pond holding a slurry of coal cleaning plant waste from Sherritt International's Obed Moun-

tain Mine was breached. The breach released approximately 670 million litres of waste into tributaries of the Athabasca River – much more than all the residents of the City of Calgary use in a single day. The Obed Mountain Mine, located approximately 30 kilometres northeast of Hinton, was inactive at the time of the spill. The coal slurry began its dirty and dangerous journey in Apetowun Creek, travelled approximately 19 kilometres to meet Plante Creek and then flowed another six kilometres and discharged into the Athabasca River. The plume of wastewater contained mostly coal particles, clay, mud, shale, and suspended solids but this brew also contained toxic pollutants including flocculants, selenium, arsenic, lead, mercury, and polycyclic aromatic hydrocarbons.

This represents one of the largest coal slurry spills in North American history. The cause of the breach is still under investigation and so has not been released to the public. Alberta's Environment and Sustainable Resource Development (ESRD) reassured the public, after initial water samples were taken, that there were no health risks. However 10 communities were warned not to draw water from the Athabasca River and farmers were told not to let livestock drink from the river. Sherritt spokespeople said the materials in the containment pond were inert and not toxic to humans or fish. Yet First Nations, ENGOS, and biologists remain concerned about what the spill's sedimentation and release of toxic heavy metals will mean for native fish populations and other wildlife. The waste water eroded the banks of Apetowun Creek and the surge of the water alone seriously damaged important aquatic habitat. As the plume slowly dissipated along the course of the Athabasca River, muddy sediment loaded with heavy metals coated the riverbed. This could prevent invertebrates from re-colonizing and have detrimental impacts on the early life stages of whitefish and bull trout. Due to the timing of the spill, remediation and assessments were limited by winter conditions and the effects of the spill on aquatic ecosystems may not be evident until spring thaw and will only be fully determined through long term monitoring and mitigation.

An emergency protection order was issued by ESRD 19 days after the spill occurred. The emergency protection order required Sherritt International and Coal Valley Resources to produce plans for remediation, wildlife mitigation, recovering solids, and managing waste and wastewater. Heavily criticized for the delay in delivering the order, the provincial government will hopefully offer more transparency moving forward.

Fraser Thomson and Melissa Gorrie from Ecojustice wrote a letter to the ministers of Health, Energy, and ESRD as well as the CEO of the Alberta Energy Regulator (AER) on behalf of AWA and the Keepers

of the Athabasca. They requested answers to many questions regarding the spill's contents, causation, impacts, and regulatory actions taken by AER. Several weeks later, Ecojustice received the response that investigations and impact assessments were ongoing and the results of water sampling done by both ESRD and Sherritt were publicly available.

Based on ESRD results from water samples taken immediately following the spill, many of the total recoverable metals (including silver, aluminum, lead, and arsenic) were well above the Canadian Drinking Water Guidelines. Benzo(a)pyrene levels, a suspected cancer-causing polycyclic aromatic hydrocarbon (PAH), exceeded Canadian Council of Ministers of the Environment's (CCME's) "Protection of Aquatic Life" guidelines. The amounts of these heavy metals peaked at the mouth of Plante Creek and as the processed water became diluted and suspended sediment settled on the river bottom, the contaminant concentrations in the surface water were reduced. Results for dissolved metals in the surface water showed both arsenic and selenium levels were much higher than normal pre-plume conditions. Selenium is of special concern because the testing results in the days immediately following the spill displayed levels exceeding the "Protection of Aquatic Life" guidelines. Bad news for the fish.

ESRD also stated in their response that AER inspects coal mines once a year but if concerns are identified in the audit, inspections occur more frequently. Since 2011, AER has inspected the Obed mine five times. This suggests the possibility they had concerns about the mine prior to the spill. Ecojustice has not yet received a response to a letter requesting the AER inspection reports done on the Obed coal mine for the last two years.

A spill of this magnitude may not occur frequently but it does call into question other coal mining project applications in Alberta. Coalspur Mines' Vista Coal Project, a proposed project located just east of Hinton, could become one of the largest open-pit coal mines in North America.

Robb Trend Coal Mine Expansion Project is a massive proposed expansion to Coal Valley Resources' existing coal mine area located near the hamlet of Robb, approximately 30 kilometres southeast of Hinton. The proposed mining area is 37km in length and encompasses three rivers – Erith, Pembina and Embarras – that all drain into the Athabasca River. As the project is currently undergoing federal and provincial environmental assessments, both governments should recognize the far-reaching and resonating impacts of coal production on already strained ecosystems.

A renewed interest in coal development within the Crowsnest Pass area is also very concerning. Altitude Resources and Riversdale Resources are two companies currently pursuing coal mining opportunities in that region. Australia's Riversdale Resources purchased the coal leases for the Grassy Mountain Project, north of Blairmore, early in 2013. The company plans to mine metallurgical coal for export to Asian countries. Last summer, Altitude Resources signed an exploration and option agreement with Elan Coal Ltd. The agreement gives Altitude the option to acquire up to 51 percent of Elan's 27 Alberta coal lease applications, 22,951 hectares of which are located in the Crowsnest Pass region, adjacent to the Grassy Mountain project. An initial exploration and drill program is already underway. The extent of progress into coal development by both companies is alarming considering that land use planning is currently going on in this region and has not been finalized yet.

Coal exploration and development is briefly mentioned in the draft South Saskatchewan Regional Plan as an economic opportunity in the mountains, foothills, and plains. The draft land-use plan does not, however, acknowledge the additional conflict open pit coal mines would cause in an area already riddled with competing land-use overlaps. When considering cumulative effects, the regional plan's original intent, it is irresponsible to add huge land disturbances, increased linear footprints, and place at risk important watersheds that



Spills such as the Obed coal slurry spill on October 31, 2013 represent another threat to the Athabasca River and watershed. PHOTO: © J. HILDEBRAND

would be vulnerable to spills or leaks. It would be a huge regression, a gigantic step back, from securing headwaters and recovering species at risk where linear density thresholds have already been surpassed.

Alberta Coal Policy

For the past 38 years, coal mining along the eastern slopes has been regulated by Alberta's coal development policy (*A Coal Development Policy for Alberta*, 1976) which includes land categorization that determines restrictions on coal exploration and extraction. Previous to its establishment, intensive exploration resulted in unprecedented habitat fragmentation and caused a public outcry. As a result, scientists and engineers from within the government institutions were called on to assess Alberta's coal reserves and coal development potential in western Canada. Their goal was to develop a guiding policy that would calm public concerns and allow controlled coal development in choice resource areas, while protecting areas of paramount wildlife habitat and aesthetic values. In recent years, the Coal Association of Canada has been pushing for a policy update, claiming the existing policy is outdated, hampering new projects and creating investment uncertainty. After hearing several rumours through the grapevine, AWA has received confirmation from Alberta Energy that it is in the process of updating and changing the coal policy.

The environmental concerns of Alberta's coal policy must not only be maintained but enhanced in certain environmentally significant areas. These areas include, but are not limited to, the Bow and Oldman watersheds and Caw Ridge near Grande Cache. Any changes to the policy should not further exacerbate land and water disturbances along the eastern slopes. Those lands in Alberta that were assigned the least stringent restrictions coal development, the coal bearing lands that the coal policy refers to as *Category 4*, were carefully chosen for their reserve amounts, mineability, and proximity to existing rail lines. Coal companies in Alberta are now most interested in lands referred to as *Category 2*, lands:

in which limited exploration is desirable and may be permitted under strict control but in which commercial development by surface mining will not normally be considered at the present time. This category contains lands in the Rocky Mountains and Foothills for which the preferred land or resource use remains to be determined, or areas where infrastructure facilities are generally absent or considered inadequate to support major mining operations. In addition this category contains local areas of high environmental sensitivity in which neither exploration nor development activities will be permitted. Underground mining or in-situ operations may be permitted in areas within this category where the surface effects of

the operations are deemed to be environmentally acceptable. (my emphasis)

Allowing a new wave of coal exploration in *Category 2* lands with new roads, drilling sites, and land disturbance should lead to the same conclusion as was reached in the 1970s – very few mines are viable.

Alberta must also consider its place as a world coal supplier. There may be a short-term increase in demand from primary Asian markets for thermal and coking coal, but there are many other sources closer and cheaper (such as Australia) that Alberta would be competing against. Even within western Canada, the British Columbia coalfields offer better and more numerous coal mine development opportunities than coal deposits along Alberta's eastern slopes. In addition, increased awareness and acceptance of climate change combined with harsh criticism for excessive pollution is encouraging countries to enforce strict regulations on coal-fired power plants and to move to natural gas generated electricity.

With an already strained and scarred landscape in one hand and uncertain global demand for coal in the other, Alberta should give pride of place to the harmful impacts of coal mining. Maintaining healthy watersheds, intact wildlife habitat, biodiversity, and places of stunning, natural beauty for tourism and recreation are undoubtedly of greater value to society than more coal production. 🌱

Alberta's Response to AWA's Hidden Creek FOIP Request: the Good, the Bad and the Muddy

By Sean Nichols, AWA Conservation Specialist



Last September, ten months after AWA requested materials related to the license granted to Spray Lake Sawmills (SLS) to log in Hidden Creek over the winter of 2012/2013, we received a response. The request was a *Freedom of Information and Protection of Privacy Act* (FOIP) request and was directed to Alberta Environment and Sustainable Resource Development (ESRD).

In November 2012, AWA learned that an approval was being granted to log several cut blocks in the Hidden Creek valley of the Oldman River headwaters within the C5 Forestry Management Unit. AWA objected to that cutting approval on several counts: that the closure of a seismic line threatening the creek that was promised in 1984 never happened; that no proper environmental assessment (especially a compartment assessment) of the logging operation had been performed; that logging the steep slopes of the Hidden Creek valley would cause erosion and siltation in the creek, a vital spawning ground for a number of threatened fish species including bull trout and westslope cutthroat trout; and that the logging action would be inconsistent with ESRD's freshly-announced moratorium on logging elsewhere in the C5 unit pending the outcome of the South Saskatchewan Regional Planning (SSRP) process.

Approval was nevertheless granted and logging proceeded over the course of roughly three months from November 2012 through February 2013. SLS was ordered to treat Hidden Creek as a Class 'A' watercourse in order to protect those threatened fish species.

AWA participated in a site visit as well as follow-up discussions with ESRD Forestry Department staff and officers. It was clear to us that there had been numerous exceptions to the Class 'A' related limitations in SLS' Operating Ground Rules (OGRs) and that other aspects of the operation suffered from many other deficiencies (for more on these and other concerns related to the Hidden Creek logging operation, see Lorne Fitch's article in the June/July 2013 issue and Sean Nichols' article in the February 2013 issue of WLA).

On November 6, 2012 AWA submitted a FOIP request for information regarding:

- the decision to log Hidden Creek (*"Who in the Forest Service made the decision to overrule the hold placed on logging Hidden Creek and the rationale"*);
- the reclassification of Hidden Creek to a Class 'A' watercourse (*"All explanations about why this re-designation request from AB Fish and Wildlife (almost 3 years ago) is being ignored and Spray Lakes Sawmills has been directed to proceed with logging plans and logging in Hidden Creek"*); and
- any Fish and Wildlife objections to same (*"All objections to logging and road building by Fish and Wildlife with the accompanying decision to overlook those objections"*).

The government's response raises many concerns. Despite promises to release a substantial amount of information, the final amount delivered is less than a tenth of what had been expected. Nevertheless this slim offering sheds a disturbing light on decision-making processes within ESRD. The

government documents describe a process whereby sound science-based judgments are ignored or overruled at the behest of logging interests.

Analysis of the Government's Response

Reading through the FOIP documents, we were struck by the repeated recommendations made by Fish and Wildlife staff; those recommendations are part of an analysis ESRD must perform before they approve an Annual Operating Plan (AOP). Key recommendations included:

- The harvest as a whole should be deferred for a period of at least 5 years to evaluate alternatives.
- Tributaries to Hidden Creek should also be considered Class 'A' for a distance of 2km upstream from the mouth of the tributary.
- Neither the "High Road" nor the "Low Road" proposed to access the cut blocks would represent an acceptable level of risk to the Hidden Creek fishery. The "high road" and "low road" options were two alternatives contemplated for routing the access road. They required the Ministry to approve a substantial deviation from SLS' OGRs to allow the road to run inside the mandatory 100m buffer from Hidden Creek for nearly 2km.
- Maintaining a low-grade quad trail following road reclamation would only serve to encourage recreational OHVs to use it following harvest; no such trail should be left in place.
- It was unlikely that the work could avoid migration, spawning, and incu-

bation periods for both the threatened bull trout and westslope cutthroat trout species.

Fish and Wildlife staff concluded:

This portion of the AOP [proposing the harvest of blocks within the immediate vicinity of Hidden Creek] is not approved and is deferred based on the following information:

1. [...] Fish and Wildlife considers Hidden Creek to be Class 'A' [...] and will

be pursuing a legislation change to reflect this new information. [...] Bull Trout [...] populations throughout the province are threatened and [...] Hidden Creek [...] is one area in the [Upper Oldman] watershed for which current data unequivocally supports a critical habitat designation.

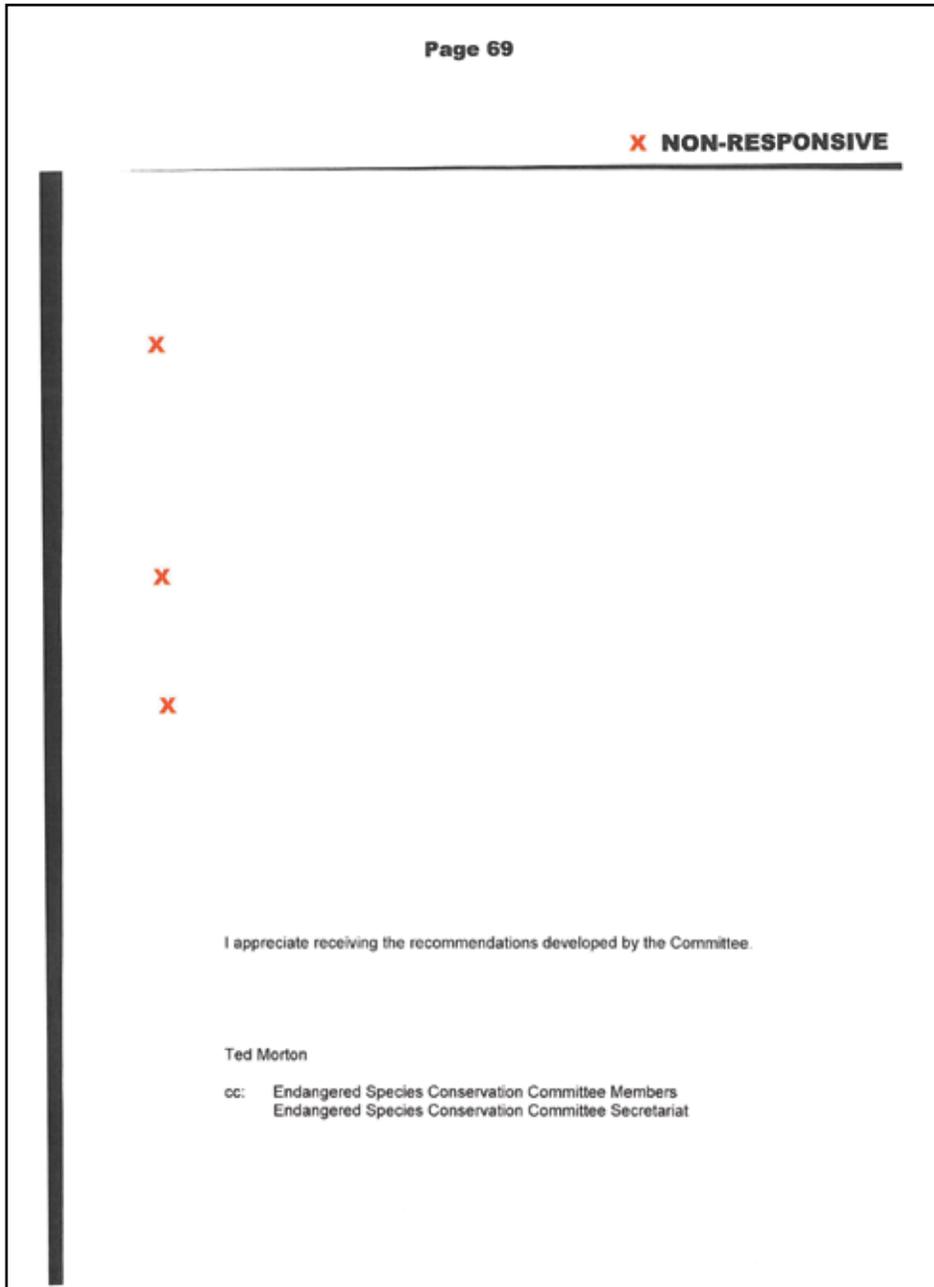
2. Genetic data [...] has identified pure strain Westslope Cutthroat Trout as residing in Hidden Creek as well. [...] Because of the highly restricted distri-

bution [...] all habitat occupied by this species is critical to its continued viability.

At various points, Fish and Wildlife added other concerns. Especially notable were those made following an August 2011 site tour:

- The tour was conducted with the understanding that deviations from the OGR requirements for Class 'A' streams could still be approved and Hidden Creek could continue to be treated as a Class 'B' watercourse.
- **There was unanimous support amongst the management team that SLS must clearly demonstrate that whatever they propose for Hidden Creek will not impact the Bull Trout spawning habitat, and that above and beyond normal mitigation measures will be used.** (my emphasis)
- The proposed road crosses two tributaries ~60 m from Hidden Creek, which are well within the distance before suspended sediment would settle out of the water column and immediately upstream of a 1.8 km section of the creek with the highest Bull Trout redd densities anywhere in the Oldman basin. Bull Trout are [...] particularly sensitive to sedimentation. [...] **The AOP does not demonstrate that these impacts of harvest have been assessed by SLS. No aggressive erosion control measures have been identified in the AOP.** (my emphasis)
- The [...] letter [sent by the Forestry Department to SLS] indicated harvest could actually proceed [...] but it clearly specified the conditions no roads, landings, decking, bared areas, or removal of timber within 100 m of Hidden Creek.
- There are still some block boundaries where there is no flat ground beyond the edge, and they extend to the top of the bench with steep slopes down to Hidden Creek.

What is most notable is that initially the Forestry Department in (then) SRD, through the Forestry Program Manager,



AWA welcomed the information that Minister Morton appreciated the recommendations. Darn though... we had hoped to see some indication or glimpse of the substance of what the Minister was appreciating. A red "x" indicates the information has been redacted; the government refused to release any information about the recommendations themselves.



AWA staff, joined by Lorne Fitch, on a Hidden Creek site tour conducted by Spray Lakes Sawmills PHOTO: © C. CAMPBELL

wrote to confirm many of the Fish and Wildlife recommendations and in an April 20, 2009 letter to SLS included the additional notation:

- **This area is to be deferred until such time as the re-classification of Hidden Creek has been completed. SRD will then initiate a compartment assessment** within this watershed area to further assess overall forest management objectives. (emphasis added)

Yet through the early months of 2012, there was increased impatience and pressure within that very department to approve SLS' 2012-2013 AOP and to start logging. As early as February 14, 2012, there is a reference to the area forester having "[requested] that SLS resubmit an AOP. This is despite the original letter sent to SLS April 20, 2009."

A week later, further comments from forestry staff suggested that they "reply [...] that [SLS] has reached the point that they want to clean up this small volume [of timber]." Also: "I have been unable to get a

written response from [Fish and Wildlife] that would allow approval of a fall early winter harvest. This is outstanding and should have been dealt with months ago."

Further noteworthy excerpts include: "My understanding is that we are proceeding with reviewing the changes to roading and moving to AOP approval this spring. [...] this means [...] that decisions have been made by upper management to proceed with the AOP." Also the same email thread at one point asks: "How long do we hold off, waiting for the designation to change before we make a decision?"

Finally we discovered there was a meeting on May 28, 2012 between Fish and Wildlife and Forestry, after which all references to any of the earlier Fish and Wildlife concerns stop. Nor is there any more reference to their recommendations that had once had forestry staff support. This is followed up by a letter in which Fish and Wildlife submit a watered-down list of conditions they would want to see in place in order to agree to the logging. These conditions

again make no reference to any of the aforementioned concerns or recommendations. Indeed they stand in sharp contrast to the Fish and Wildlife position maintained throughout the previous 165 pages of correspondence.

The FOIP materials don't help us to determine the tone of the May 28 meeting. However the above context, taken as a whole, paints a very explicit and quite disturbing picture: forestry officials decided that timber yield was their one and only priority for managing Hidden Creek and one can surmise they told Fish and Wildlife to "get in line."

Implications for Hidden Creek, Alberta's Forests, and Forest Species

Those concerns repeatedly highlighted by Fish and Wildlife throughout the FOIP response mirror very closely the conclusions AWA had drawn and communicated to ESRD about the Hidden Creek operation. These comments reflected our worry that

the observed practices and that the inability of ESRD to properly address them would lead to slumping, erosion, and significantly damage Hidden Creek's habitats.

Subsequent observations from the summer and fall of 2013 have borne those worries out. The heavy rainfall events that caused flooding elsewhere significantly affected Hidden Creek. Clearcut logging and the removal of the canopy changed the hydrologic response of the watershed to rainfall and snowmelt events. Immediately after the late June rainfalls, Hidden Creek began to fill with massive amounts of sediment-laden water. It's crucial to note that inspections showed the stream running completely clear upstream of the logged area of the watershed. This continued for most of the summer and early fall. Several naturally unstable banks on Hidden Creek within the sphere of logging slumped and eroded substantially; comparable unstable banks upstream of the logging didn't.

AWA is concerned that the lack of diligence on the part of forestry officials has led to this sediment problem in Hidden

Creek. Despite repeated recommendations for such diligence, no risk assessment, compartment assessment, or any cumulative effects analysis was performed. None of these exercises were ever used to decide on logging. It remains to be seen whether the province's westslope cutthroat trout will be able to withstand this disruption to a creek providing spawning habitat to 80 percent of the Oldman Basin pure-strain population.

What the FOIP documents suggest is that considerable pressure was exerted on other parts of the department to "sign off" and agree to logging. There is a clear focus on timber quotas and the bottom line. What is missing is a coordinated, integrated approach to resource management that encourages and demonstrates respect for the expertise within all related departments. Albertans have a right to expect a level of cooperation and decision-making regarding our natural resources and ecosystems that embraces and reflects the very best knowledge available at the time.

What is perhaps most distressing is that this is not an isolated example. Previous

FOIP requests and responses have revealed similar decision making processes. Logging continues to occur throughout southern Alberta in crucial habitat for fish species with scant concern for the needs of those species.

AWA has sent a letter to the minister of ESRD expressing in no uncertain terms the same concerns detailed in this article. In that letter we have requested a meeting with that minister and his staff to work through these issues. At the same time we are working with the rest of Alberta's conservation community to search for grass-roots solutions. We are planning a *Fish and Forests* public forum for sometime in 2014 that will include working with, and soliciting feedback from, our membership and the wider public on this issue.

Between the conservation community, the scientific community, the provincial government, and the concerned public, we are hopeful that a brighter and more sustainable future for Alberta's fish and forests can be forged. ▲



As this photo by Trout Unlimited's Brian Meagher illustrates so well, this reclaimed portion of the Hidden Creek access road has left a trail for OHV access. PHOTO: © B. MEAGHER

Losing the Boreal:

A View of How Climate Change Could Shift Alberta's Ecosystems

By Carolyn Campbell, AWA Conservation Specialist.



Every now and then you learn something that really shifts your world view. That happened for me in autumn 2013 when I saw University of Alberta biologist Rick Schneider present the first phase of his work modelling what Alberta could look like under a range of likely climate change effects. I've followed the UN's Intergovernmental Panel on Climate Change (IPCC) reports since 1997 and so I've been aware of some of the global food, water, and political implications of what we are leaving to future generations. The revelation in Schneider's work is literally how close to home it hits: it allows us to glimpse how Alberta's regions have changed in response to climate change in the past and to imagine how our touchstone landscapes in Alberta could shift in the next 80 years – the average life expectancy of a baby born in Alberta today. Most importantly, this work can help inspire us to act to conserve them.

Schneider published the paper *Alberta's Natural Subregions Under a Changing Climate: Past, Present, and Future* in August 2013. It is the first of three studies he will undertake as part of the Biodiversity Management and Climate Change project led by the Alberta Biodiversity Monitoring Institute (ABMI). This first study outlines how our Natural Regions and Subregions might change by the end of this century. The second study, now near completion, looks at options for adapting to climate change and setting objectives for biodiversity conservation in light of climate change. His third study, starting in April 2014, will focus on the design of a protected areas network in the face of climate change.

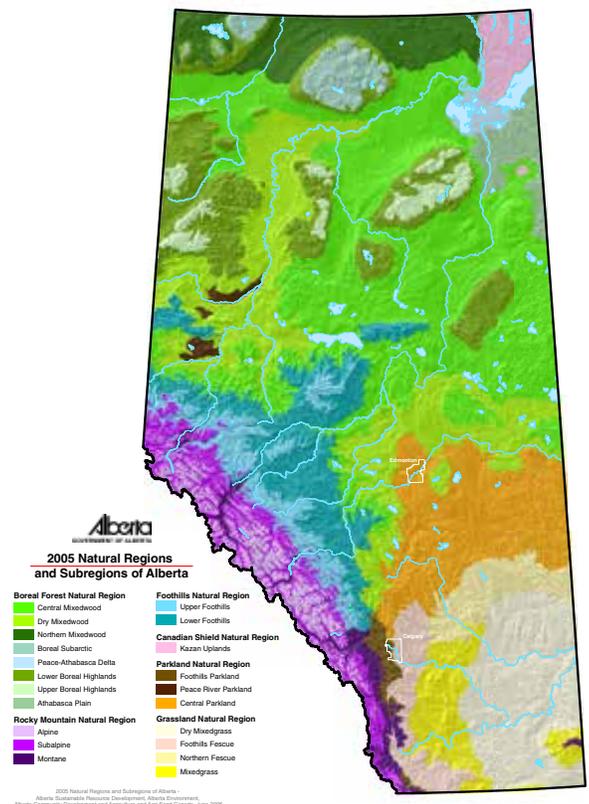
In summary, Schneider considers drier future scenarios more likely than wetter ones. On the most likely trajectory, grasslands and parkland climates will shift at least one Natural Subregion northwards by the 2050s, and water will become scarcer across the enlarged parkland and grassland regions. The rate at which wetland areas and forests would be displaced by grasses would depend on fire, insect outbreak, drought, and the rate at which species migrate. There is potential to reach a tipping point by the end of the century where our vast Mixedwood Boreal Forest, consisting of extensive peat wetlands and mixed aspen and conifer forests, would be transitioning towards a much drier parkland ecosystem or even towards grasslands. Though Schneider does not dwell on this, the potential for such dramatic loss of species in Alberta leaves a deep impression of why it is so important for us to reduce global greenhouse gas emissions.

Understanding the Present

Schneider clearly explains why Alberta looks the way it does now in terms of the essentials of elevation, temperature, and precipitation. Of all our Natural Regions, the Rocky Mountains and Foothills receive the most precipitation; there, vegetation changes with altitude and, in some areas,

directional aspect. Outside the mountains and foothills, precipitation follows an arc: roughly speaking, the most falls in the middle of the province and amounts decrease as you move north and south. Following this pattern and to my surprise, Medicine Hat gets roughly the same precipitation as the northern boundary of Wood Buffalo National Park.

For plants, what matters is how much moisture stays in the ground. In simplified terms, Alberta can be divided into regions that are forested and those that are not. The moisture is driven out of the soil in warm



Map of Alberta's Current Natural Regions
CREDIT: GOVERNMENT OF ALBERTA.

Medicine Hat, so grasslands prevail. In the much cooler boreal forest region, which covers about 60 percent of the province, the soil retains enough moisture to support trees. Soil moisture levels are fairly uniform across large portions of Alberta's boreal, an exception being the cooler, wetter areas of boreal hills such as the Birch Mountains. Such relative uniformity implies that once a tipping point in temperature change is reached, it will affect most of Alberta's boreal forest.

Glimpse into a Warmer Past – the Hypsithermal Period

An early section of Schneider's report reconstructs how Alberta's Natural Regions and Subregions responded to a warmer temperature period in the mid-Holocene era called the Hypsithermal period. It occurred 4,000 to 8,000 years ago. His reconstruction draws on previous research based on pollen obtained from lake and pond sediments from across the province. Schneider states that the Hypsithermal period is of particular interest because Alberta summer temperatures were 1.5 to 3° C warmer than at present; that is at the low end of what is expected later this century as a result of global warming. The Hypsithermal also had colder winters than what current predictions suggest so it's not a perfect match. Nonetheless it reveals how our Natural Regions responded in the past to growing season changes arising from warmer summers.

Subregions occurred approximately one Subregion to the north of their present locations. There is limited data from the Parkland and the Grassland but, in both of these regions, it is clear there was a significant decrease in available water. Most lakes in these two regions, except those fed by deep groundwater sources, were largely dry during the Hypsithermal. This suggests that from the Edmonton area eastward and southward, what is now the aspen-grass Central Parkland would have mainly supported grasses and more extensive sand dunes.

In the Dry Mixedwood Subregion of today's Boreal, Central Parkland character-

istics existed during the Hypsithermal period. At lower elevations, Dry Mixedwood Boreal characteristics replaced what is now the largest Subregion, the moister Central Mixedwood. In the Foothills, the water table also was lower and the fire rate and proportion of pine increased at the expense of spruce. In the Rocky Mountains, many southern Alberta glaciers melted (to be re-established in later millennia), the treeline moved up 200 metres and there was some upslope movement of tree species.

Looking at a Range of Future Climates

Today the atmospheric CO² concentration is nearly 397 parts per million (ppm), about 25 percent more than the 320 ppm of 1965. Levels of greenhouse gas emissions over the next 80 years are uncertain. They will depend in large part on future population growth, rate of economic development, and the effectiveness of policies to curb emissions. Predictions vary on how increased greenhouse gas emissions will affect future temperatures and precipitation. Schneider uses the range of those predictions to try to identify the likely results for Alberta. I'll briefly describe that process.

Schneider selected one higher (A2) and one lower (B1) standardized or well-accepted scenario of greenhouse gas emissions levels. B1 projects CO² concentrations of 488 ppm in 2050 and 549 ppm in 2100. For those same years, A2 projects CO² concentrations of 532 and 856 ppm, respectively. He then looked at 24 climate models (Global Circulation Models or GCMs) developed by different teams of scientists that have been used to generate temperature and precipitation responses to emissions for western North America.

The average across all 24 models is for the Mean Annual Temperature for Alberta to rise by 4.2° C by the end of the century under the high-emission A2 scenario and by 2.8° C under the lower B1 scenario. These predicted increases are relative to the average temperature for the "baseline" period of 1961 to 1990. Notably, not one model projects an increase of less than 2.0° C. Such a

temperature increase will increase growing degree-days by between 33 and 56 percent, mainly through an earlier spring season.

None of the models predicts a decline in Mean Annual Precipitation (compared to 1961-1990) but 21 out of 24 models predict Alberta will become substantially drier in the coming decades. This is because warmer temperatures increase evapo-transpiration from soils and vegetation and reduce winter snow cover duration. They combine to produce a longer period of evaporative moisture loss. As well, in the middle of summer when moisture stress is greatest, precipitation is expected to decline from today's levels.

Examining the temperature-precipitation outputs from the emission scenarios and models, Schneider focussed his research on scenarios representing a range of five climate outcomes. These scenarios are "Wet," "Cool," "Median," "Hot," and "Dry," based on the defining feature of each profile. Next Schneider used the "climate" output from these five models to model how vegetation would respond in those Alberta Natural Subregions with a strong causal relationship between climate and ecosystem type. He could not do this for several Subregions where non-climatic factors (for example, extensive delta or bedrock) dominate the ecosystem (such as in the Peace-Athabasca Delta, or the Kazan Upland in Alberta's Canadian Shield region). But he could do it for most Subregions.

Less Likely "Wet," More Likely Drier

The effects of increased precipitation predominate in the "Wet" scenario (24 percent higher precipitation, a 4° C temperature increase by the end of the century). Vegetation succession under a hotter and wetter climate is difficult to predict. It would be something like Minnesota's climate, which doesn't exist anywhere in Alberta now. In this scenario, Schneider believes that plant communities would shift due to warming and increased climate variability. But species best suited to the climate would be too far away to out-compete most native species.

Species from more distant warmer regions would eventually arrive but major changes in ecological composition would be unlikely to occur before the dawn of the 22nd Century. Schneider concludes that “Wet” is unlikely because only three of 24 GCMs support this outcome. He does not develop it in as much detail as the scenarios where higher temperature effects dominate.

Of the four scenarios where increased temperature effects dominate, “Dry” is at the other precipitation extreme from “Wet,” with zero precipitation change from the baseline and a 4° C temperature increase. “Cool” (a nine percent precipitation increase and an almost 3° C temperature increase) is not really cool but it involves the least change along a range of “in-between” precipitation outcomes. Those in-between outcomes also include “Median” (a nine percent precipitation increase and a 4° C temperature increase) and “Hot” (a six percent precipitation increase and a 6.5° C temperature increase). These three scenarios follow a common pathway of vegetation change, with the main uncertainty being how fast and how far Alberta’s Subregions shift along that path.

Schneider produces a series of fascinating maps portraying the modelled shifts in various Natural Subregions for the “Cool,” “Median,” “Dry,” and “Hot” models (there are maps of “Wet” in the Supplemental Map appendix). In the text, he focuses most on describing vegetation shifts under the “Cool” and “Hot” models, which bound the minimum and maximum amount of change expected by the year 2100. He emphasizes how vegetation succession would occur instead of specific endpoints because of the many uncertainties about the timing of changes.

The Drying and Expansion of the Grasslands

Today’s Parkland region is the most densely populated region in Alberta, containing Edmonton and Red Deer. Of the four Grassland Subregions, Calgary is now located in the most westerly, the Foothills Fescue. That Subregion extends in a corridor south

to the US border and includes the areas around Nanton, Pincher Creek, and Cardston. Precipitation and elevation levels generally decline as we move eastward through the Mixedgrass and Dry Mixedgrass Subregions, with the Northern Mixedgrass Subregion now arching east through Rockyford, Drumheller, and Coronation.

In the “Cool” model, representing the least amount of predicted climate change, Grassland and Parkland Subregion climates shift roughly one Subregion northward by the 2050s. Plant communities preferring the warm and dry end of the spectrum within a given Subregion will flourish, at the expense of communities on the cool and wet end of the spectrum, mainly through competition. Presumably, the Calgary area will remain in Foothills Fescue, but would favour plant communities now found closer to the US border. The Northern Mixedgrass (now in the Hanna-Coronation-Sullivan Lake area) acquires a Dry Mixedgrass climate. Southeast Alberta’s Dry Mixedgrass would shift to more closely resemble conditions in northern and central Montana.

In the “Hot” model, the same Grasslands changes as predicted in “Cool” are likely to occur up until the middle of the century. After that, species now outside Alberta that are better suited to dry conditions will be needed for colonizing. A big question is whether species migration can match the rate of climate change, especially under the hottest and driest scenarios. Alberta’s current Dry Mixedgrass Subregion in the southeast would have a 2080s climate similar to the driest parts of Wyoming and southern Idaho, suited to sage brush adapted to extreme aridity and with more active sand dunes.

Across today’s Grassland and Parkland regions, as in the Hypsithermal period, the average water level of “prairie pothole” wetlands and lakes will decline. Seasonal wetlands will remain dry for longer periods. The change will be proportional to the increase in temperature.

Due to agricultural settlement, few native vegetation areas now remain in Alberta’s Parkland region. Under the “Cool” model, conditions will favour Northern Fes-

cue grassland vegetation now seen in the Castor-Coronation area to take over in the Edmonton area (which is now Parkland) by the 2050s. In the “Hot” model, a shift to the Oyen-Medicine Hat Dry Mixedgrass climate will occur in the Edmonton area by the second half of the century. This is a striking change. Schneider’s paper does not focus on possible effects to agriculture but there undoubtedly would be important impacts. Where native vegetation persists, the drier climate would reduce the ability of the Parkland’s characteristic aspen to withstand drought and insect attack and would favour a transition to grass depending on the temperature change.

Upward Migration in Foothills and Mountains

In the elevation-sensitive Foothills and Rocky Mountains, climate change effects will mean that current low elevation plant communities will mix with and gradually displace higher elevation plant communities. The Foothills under the “Cool” scenario should remain forested because of its high precipitation. Present even-aged lodgepole pine stands will transition to more complex communities including aspen and possibly Douglas fir from the Montane. In the “Hot” scenario, the southern Lower Foothills (north of Cochrane and just west of Sundre and Caroline) will be moisture-limited by the 2050s, and the entire Foothills will be moisture-limited by the 2080s. At that point, a northern expansion of Grasslands from the Foothills Parkland (where Cochrane and Turner Valley are situated) and Foothills Fescue (where Calgary is situated) is likely. Due to the expected time required for grasslands succession, there may not be widespread forest loss by 2100, but the change will be underway.

In the Rocky Mountain Subalpine and Alpine, species will generally move upslope, but at different rates due to local site conditions. The pace of succession will be slow due to the short growing season but eventually Alpine communities will be less able to shift upwards because of slope steepness and lack of soil. Vegetation communities of

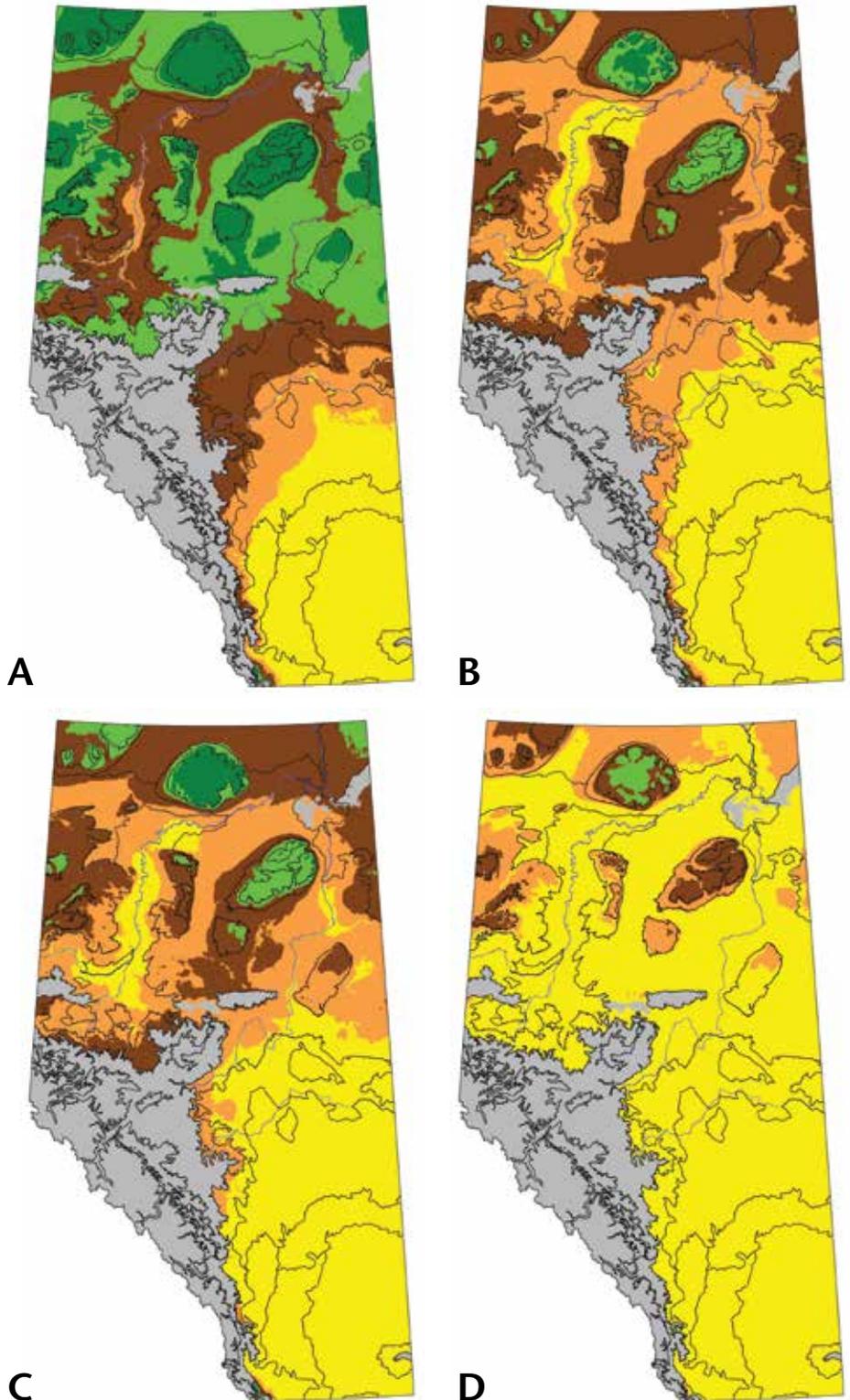
Montane, Subalpine, and Alpine may mix to an extent. Today's Montane area west of Turner Valley and Cochrane consists of open forest and grasslands. At least some Montane forest will remain in the "Cool" model but, under the "Hot" scenario, it will likely transition to Grassland.

The Rocky Mountains and Foothills are our headwaters lands, generating over 80 percent of the annual flows of the North and South Saskatchewan River systems. Groundwater "base flows" and seasonal runoff patterns of the main tributaries and mainstems of these rivers, driven by Mountain and Foothills precipitation and temperature, are vital to downstream urban settlements, irrigated agriculture, and many other industries across Alberta, Saskatchewan, and Manitoba. Since Schneider is focusing on native vegetation change he does not model flow variation of major rivers expected from these climate change scenarios. Other groups such as the Prairie Adaptation Research Collaborative are working on this important topic.

The Contraction of the Boreal

When I interviewed Rick Schneider to ask him what the key climate change impact of his research was, he stated, "The biggest story is the potential for Alberta's boreal to reach a tipping point. We should prepare for it." According to Schneider's modelling, it will only take a couple of degrees' increase in temperatures to reach that tipping point. Because of the large area of relatively uniform boreal forest climate, this implies the potential for a massive change.

The Dry Mixedwood Subregion makes up 22 percent of Alberta's boreal region today (it's shown as "Deciduous" in Schneider's map simulations). It includes the towns of Athabasca and Bonnyville in the northeast and stretches along much of the Peace River up to High Level. Where it has not already been cleared for agriculture, it is primarily aspen forest and roughly 15 percent wetlands. The "Cool" model predicts transition to an aspen-grass Parkland climate over the next few decades. As moisture levels



Maps of four models of potential Alberta Natural Region climate conditions in the 2080s. All the maps show in varying degrees the expansion of Grasslands and contraction of Boreal Forest climate conditions compared to today. Panel A= Cool model; Panel B = Median model; Panel C = Dry model; Panel D = Hot model. CREDIT: SCHNEIDER (2013), P. 42.



decline, they eventually limit aspen regeneration and promote grasslands. Strikingly, the “Hot” model predicts Medicine Hat’s Dry Mixedgrass climate will be established across the Dry Mixedwood by the latter half of the century. After the 2050s, depending on the rate of fire and insects, aspen regeneration would decline and widespread transitions would occur beginning with south and west-facing slopes.

The Central Mixedwood is by far Alberta’s largest Subregion today, covering 44 percent of the Boreal or a quarter of the entire province. In the northeast, the Central Mixedwood extends from Lac La Biche to about 100 kilometres north of Fort McMurray, where the drier, sandier Athabasca Plain begins. In north central Alberta, it extends from Lesser Slave Lake to Wood Buffalo National Park, interrupted by several boreal hill systems. In the northwest it includes a wide area around the Hay-Zama Lakes, bounded by Boreal Highlands.

The relatively flat topography of the Central Mixedwood means that excess water tends to pool in low lying areas. Since the last glacial period, slow decomposition in these wetlands due to cool temperatures has led to the accumulation of peat wetlands (fens and bogs) over almost half the Central Mixedwood landscape. These wetlands include extensive areas of black spruce fens. On the uplands there are aspen, mixedwood, and white spruce forests, with jack pine stands on the sandier soils to the east. Though Schneider does not address wildlife impacts in his paper, the Subregion supports a range of fur-bearing carnivores, dozens of migratory bird species during their breeding season and, in its intact peatland complexes and old growth forests, populations of boreal woodland caribou.

For both “Cool” and “Hot” models, climate change effects in the Central Mixedwood will begin first in lower areas, and widespread change across the higher elevation areas will follow. In the “Cool” scenario, Dry Mixedwood characteristics would appear along the Peace and Athabasca Rivers by the 2020s and extend across most of the Subregion by the 2050s. After 2050,

a Parkland climate would be established, and most white spruce would be lost from low elevations by the end of the century. At higher elevations in the Central Mixedwood, there would be minimal permanent loss of white spruce before 2050; after that, the shift would be driven by forest fires. Total surplus surface water will decline, peat formation will stop, and most wetlands will eventually transition to Parkland characteristics, albeit with a significant lag. The availability of groundwater is an uncertainty; it may slow this transition, or not. Even this change, from Central Mixedwood to Parkland under the “Cool” scenario, would involve an astonishing loss of Alberta’s species diversity in the lifetime of today’s young children.

In the “Hot” scenario, almost the entire Central Mixedwood experiences a Grassland climate by the 2050s. The transition to a moisture limited system happens quickly, and fire would be the main factor in the succession rate. Additional tree mortality could occur from prolonged drought. Forest loss can also be expected from ongoing forest clearing by the petroleum industry and from harvesting by the forest industry if efforts at regeneration prove unsuccessful in the dry climate of the “Hot” model. Because of the large amount of water now stored in the Central Mixedwood, Schneider notes that a transition of wet sites to grassland by the end of the century is unlikely. It is unclear what the intermediate stages might be, but eventually, most wetlands will transition to grassland characteristics. The remaining water bodies will eventually be those either fed by groundwater or those whose waters are deep enough to sustain summer outflows and evaporation.

In the uplands, the transition to grassland would be affected by the limited number of dry-adapted grass species available in forested areas, and possibly by soil type as well. Invasive grass species could become abundant given the extensive road network in the Boreal and the relative absence of native grass species. A forest industry response may be to plant non-native dry-adapted tree species, which could also

affect succession patterns.

The Upper and Lower Boreal Highlands make up 18 percent of the Boreal, and include the Chinchaga region, Birch Mountains, and Caribou Mountains. Their succession pathway is similar to the Central Mixedwood, only delayed because of higher elevations. Under the “Cool” model, Central Mixedwood climate conditions are achieved by the 2020s or 2030s. In the “Hot” scenario, the climate conditions reach the current Dry Mixedwood by the 2050s, and the lower hills eventually transition to a Parkland or even a Grassland climate.

In the Northern Mixedwood that now covers eight percent of the Boreal, permafrost thawing is likely to be complete by the end of the century under the “Hot” model, but some permafrost patches may remain under the “Cool” model. This thawing initially favours the formation of bogs and fens, which then dry as temperatures warm. Again, because of the water now stored in this Subregion, Schneider considers it unlikely to change much beyond a wetland stage by the end of the century. Under the A2 scenario, greenhouse gas emissions do not stabilize by 2100. If humanity goes down that path, climate warming and associated forest transitions would continue. This would eventually expose most of Alberta’s boreal forest to a grassland climate. This would indeed mean a profound transformation of the Alberta we know now.

Understanding how Natural Regions and Subregions may well change in the next 80 years will hopefully strengthen our resolve to work to slow down the likelihood of this change by reducing global greenhouse gas emissions. It should also inform our conservation planning and adaptation efforts. Edmonton and area members can get a preview of Schneider’s work to date on this topic at our Edmonton Talk that he will present on April 7 (see Events section). We will also keep our readers posted as more instalments of these landmark studies are completed. 📌

Partnership Plus An Emergency Protection Order:

A Potion to Save Greater Sage-Grouse?

By AWA Staff

Without emergency action, greater sage-grouse will disappear in Canada in three to five years. Gone... totally. This forecast, based on scientific data and current population trends, was delivered on January 17, 2014 at a workshop of experts hosted by the Calgary Zoo and facilitated by the International Union for Conservation of Nature's (IUCN's) Conservation Specialist Breeding Group. The magnitude of our sage-grouse crisis precipitated the gathering of experts to identify and prioritize emergency measures.

Greater sage-grouse and the sagebrush habitat on which they depend have been in decline for decades. More than 80 percent of the natural habitat thought to have once supported sage-grouse in Canada is gone, swept aside by industrialization and agriculture. Canada's current population of sage-grouse is estimat-

ed to be fewer than 100 individuals and these survivors occupy less than 10 percent of their historic range.

Long term monitoring of greater sage-grouse and their habitat has provided clear evidence of long term decline but actions to conserve habitat and recover the species have been slow in coming. The federal government produced the first recovery strategy for greater sage-grouse under the *Species at Risk Act* in 2008; however, the associated identification of critical habitat addressed only federal lands. Recognizing that the identified critical habitat was woefully inadequate, AWA and several other environmental organizations joined forces with Ecojustice to use the courts to try to force the federal government to comply with the *Species at Risk Act* and produce a meaningful strategy that might realistically recover sage-grouse. We won that round in

2009, more than four years ago now, when there were still over 100 sage-grouse in Alberta. After that ruling federal government staff went to work identifying additional critical habitat outside of federal lands and updating the recovery strategy.

In September 2011, AWA hosted the Emergency Sage-grouse Summit in Calgary. The Emergency Summit brought together leading international scientists, local landowners, and environmental organizations dedicated to ensuring greater sage-grouse remains on Canada's prairie landscape. Recommendations from the Emergency Sage-grouse Summit included: restoring the functionality of critical habitat and previously occupied range, severely limiting new development in and around critical habitat, and designating additional critical habitat as identified on proposed critical habitat maps made in 2010.

Again, action to recover the species lagged dismally behind the planning, mapping, and monitoring that was occurring. In 2011, with only 30 sage-grouse left in Alberta, an international coalition of conservation groups including AWA sent a petition to then Environment Minister Peter Kent demanding he issue an emergency protection order and take other action. When the deadline passed for the Minister to respond to the petition, Ecojustice filed an application in federal court to force his hand. We won again and the emergency order was finally released in December 2013. The emergency protection order restricts the construction of new roads, tall or noisy objects, and fencing that is not "grouse-friendly." It also restricts loud noises at certain times of year. However, it is widely recognized that the emergency order restrictions alone will not



Dr. Mark Boyce (l), from the University of Alberta, and Dr. Cam Aldridge, from Colorado State University, at the September 2011 Sage-Grouse Summit convened by AWA PHOTO: AWA



June 2013 Sage-Grouse Partnership meeting in Manyberries Alberta PHOTO: © C. OLSON

recover greater sage-grouse.

Frustrated by the lack of action and collaboration, AWA set out to work with the local community in southeastern Alberta to establish a partnership that would be capable of moving action forward. Recognizing that the support of local ranchers and local industry was vital to accomplishing success, a series of community meetings was held in 2013. Out of those meetings a core group of dedicated individuals emerged and the Sage Grouse Partnership (SGP) was formed.

The SGP is co-chaired by Cliff Wallis from AWA and David Heydlauff, a local rancher whose land supports some of the few remaining sage-grouse in Alberta. Much time was spent learning what the Alberta and Canadian governments and other jurisdictions were doing to conserve and recover greater sage-grouse. Dr. Dave Naugle, one of North America's leading grouse experts, attended one meeting to discuss the U.S.-based Sage Grouse Initiative and to provide advice.

The SGP proceeded to prioritize actions that should be taken to address the decline of greater sage-grouse. They then identified the actions that could be advanced by the partnership without overlapping with activities already being undertaken. Currently, the SGP is focussing on minimizing the impact of recreational access, ranch planning to improve hiding cover and forb availability, and encouraging the removal of older industrial, agricultural, and residential structures on the landscape. All of these activities have the potential to increase sage-grouse survival and productivity. Other actions were also deemed critical and the SGP will either support the implementation of these actions by others or undertake them directly. For example,

management of predator populations within sage-grouse critical habitat is considered a high priority, short term strategy which may be undertaken by the provincial government.

Alberta Environment and Sustainable Resource Development (ESRD) also recognized the need for emergency measures. The first Alberta Greater Sage-Grouse Recovery Plan was published, if not acted on, in 2005. When sage-grouse numbers declined by 50 percent in Alberta in 2010 and by a further 50 percent in 2011, they worked to update the plan. The five-year updated recovery plan was released in September 2013. Coinciding with the preparation of the recovery plan, ESRD implemented numerous reclamation and conservation actions and identified land use standards for industry to further sage-grouse protection. They also negotiated the translocation of sage-grouse from Montana in 2011 and 2012 to supplement the Alberta population. A total of 41 birds were translocated to Alberta. They were fitted with transmitters, which have allowed biologists to track them. Many died, primarily due to predation by avian and mammalian predators, but at least two of the translocated hens nested in 2013. Greater sage-grouse numbers didn't fall any further in Alberta between 2012 and 2013, likely due to the translocations, which are seen as a temporary stop-gap measure.

The amended version of the proposed federal sage-grouse recovery strategy was posted on the Species at Risk Public Registry in December, 2013 and the public can provide comments until February 18, 2014. AWA submitted an extensive review of the amended strategy; the bottom line is it simply doesn't go far enough, fast enough.

It might have seemed a bit like déjà vu

to the participants of the Emergency Sage-Grouse Summit who also attended the Population and Habitat Viability Assessment (PHVA) Workshop hosted by the Calgary Zoo in January 2014. The issues and threats associated with the decline of greater sage-grouse in Canada have not changed, but the situation has become more critical. Participants at the PHVA workshop recommended several critical measures needed to recover sage-grouse in Canada. Three of those were considered essential and urgent. The first urges implementing a captive rearing program to create an assurance population that conserves the potentially unique genetics of greater sage-grouse north of the Milk River and that may contribute to future reintroductions. Second, restoring, rehabilitating, and enhancing sagebrush habitat – a very broad measure encompassing numerous actions from predator reduction to ranch planning. Third, increasing the capacity for and effectiveness of actions by establishing an interprovincial working group to facilitate collaboration between various stakeholders as well as between jurisdictions. This third measure is critical to enhancing the success of the first two measures.

Meanwhile, the SGP will support these measures and will forge ahead with sharing information and implementing actions to optimize the remaining greater sage-grouse sagebrush habitat. Two goals are paramount here. First, retain at least some of the extant Canadian birds so their genetics and behavioral knowledge will contribute to at least some part of a future recovered population. Second, conserve, enhance, and restore sagebrush habitat in Alberta – not just for the recovery of greater sage-grouse but also to avoid similar crises from afflicting other species dependent on this ecosystem. The path forward is fraught with risks and challenges; therefore, it is essential that there is well-resourced, concerted, and immediate action from land managers, government, industry, and conservationists. This is critical if we are to retain this magnificent species in the northern sagebrush steppe ecosystem. 🍄

Focus:

Alberta's Species-at-Risk

By Nigel Douglas



Mention endangered species in Alberta and many of us will think about the larger, more glamorous species that tend to make the headlines – grizzlies, woodland caribou and (in no small part due to the work of AWA) greater sage-grouse. But of course there are many more endangered species of fauna and flora. The website for Alberta Environment and Sustainable Resource Development (ESRD) lists:

- 28 species as *At Risk*,
- 449 as *May be at Risk*, and
- 662 as *Sensitive*.

Many of these are species that the huge majority of us are unfamiliar with or have never heard of. There are 107 *May be at Risk* species of lichen alone, for example, including such tantalising delights as the reptilian pixie-cup, the concentric jellyskin and the blinking owl lichen.

Ord's Kangaroo Rat

Here we turn our attention to one of Alberta's less well-known endangered species, the Ord's kangaroo rat.

The majority of Alberta's endangered species – around 66 percent – are grassland specialists. As less than one percent of Alberta's Grassland Natural Region is protected, this means that many of our most imperilled species are particularly vulnerable. Ord's kangaroo rat is a case in point. Though these fascinating critters live throughout the dry grasslands and deserts of western North America, in Canada they are limited to small, isolated populations in southeastern Alberta and southwestern Saskatchewan.

Ord's kangaroo rats are, of course, not rats at all (nor indeed kangaroos!) but small, nocturnal rodents. They measure up to 25 cm (10 inches) from nose to tail, more than half of which is made up of an impressively long

tail. They hop along, kangaroo-style on disproportionately large back feet, tail streaming out behind as a counter-balance. They spend most of their days in underground burrows, emerging only at night to feed and search out mates. The diet consists mostly of seeds and plants which are stored, hamster-style, in cheek pouches and taken back to the burrow to be eaten or cached. They are highly adapted to living in dry habitats and, interestingly, they can survive without drinking virtually any water. Their predators include owls, snakes, and badgers.

Unlike a lot of other desert rodents that may live for several years and reproduce relatively slowly, kangaroo rats live very short lives (most live for less than a year) and have a high reproductive rate. Though Ord's kangaroo rat populations stretch south to the southern United States and Mexico, Alberta's residents are the only ones which are known to hibernate. Alas this does not seem to be a highly successful life strategy. In most years, 90 percent of Alberta's population does not survive the winter, succumbing to starvation or cold. The ones that do survive can breed rapidly, raising up to four broods a year and their young can themselves become sexually mature within 50 days, time enough to breed and raise their own offspring.

Though the enormous natural fluctuation in numbers makes the population of Ord's kangaroo rats in Alberta very difficult to estimate, it is likely that their numbers are declining. The federal Species at Risk website notes that "changes in available habitat strongly suggest long-term population declines."

Ord's kangaroo rats have very specific hab-



Ord's Kangaroo Rat PHOTO: © A. TEUCHER

itat requirements. They need open, thinly-vegetated ground with plenty of sand in which to excavate their burrows. In practice this means that, in Alberta, they are limited to sand dunes and arid grasslands with loose sandy soil. Even in southeastern Alberta, this habitat is in very short supply, being restricted to the Middle Sand Hills along the South Saskatchewan River and the Great Sand Hills. Just under half the species' Canadian range is in Canadian Forces Base Suffield National Wildlife Area, federal lands protected since 2003 under the *Canadian Wildlife Act*.

Historically the grasslands, and the sandhills particularly, would have been dynamic ecosystems, continuously changing. Occasional fires and periodic intense grazing by bison would have kept the vegetation down and bare ground would have been common. Winds would have ensured that sands were continuously shifting, creating new areas of open sand that the kangaroo rats need. Today with fire suppression and the enormous ecological hole left by the destruction of 50 million bison across North America, those open sandy habitats are increasingly hard to find. Ironically, industrial access roads may provide attractive habitat to kangaroo rats, but they also make things much easier for

potential predators such as badgers or coyotes, not to mention those unintentional predators – vehicles.

This was confirmed in the 2009 report from the Suffield Joint Review Panel, which noted Environment Canada's concerns that "the trend towards increasing use of... roads, trails, fireguards, and bare ground associated with oil and gas facilities and the margins of cultivated agricultural lands appeared to be a threat to Ord's kangaroo rat in Canada, and that these anthropogenic habitats appeared to be low-quality 'sink' habitats in which mortality exceeded recruitment." As with grizzly bears, roads represent both an attractant and a source of mortality.

Interestingly, it's plausible to argue that explosions on the Suffield bombing ranges are an excellent substitute for natural processes in creating open sandy kangaroo rat habitat.

Like all species at risk in Alberta (and indeed anywhere) the survival of Ord's kangaroo rat into the future depends on protecting habitat. More than this, the species needs protection of areas sufficiently large to allow the *processes* to be maintained that produce the shifting sandy conditions they require. Protecting their remaining habitat in the sandhills will also protect habitat for other endangered species, including small-flow-

ered sand verbena, western spiderwort, and hognose snakes. As the Alberta government's *Recovery plan for Ord's kangaroo rat in Alberta* points out, "efforts to conserve and enhance sand dune habitats should benefit a diversity of species at risk in Alberta."

The long-awaited draft Regional Plan for the South Saskatchewan offers some encouraging words, about maintaining intact native grasslands and habitat on public lands but, as Brittany Verbeek pointed out in the last issue of WLA, it is very short on substance. AWA is intensely disappointed that more leadership was not shown on formally protecting grassland areas that will benefit many species at risk. The draft plan is available for public comment until February 28, 2014 so there is still a chance for enhanced grassland protection if more Albertans demand it. 🐾

Quick Facts:

- Ord's kangaroo rat, *Dipodomys ordii*
- Federal status: Endangered
- Provincial status: Endangered
- Length: up to 25 cm (10 inches)
- Average weight: 69 grams
- Surprising fact: In most years, 90 percent of Alberta's kangaroo do not survive the winter, succumbing

Woodland caribou

Regular readers of the WLA will be very familiar with the sad plight of woodland caribou in Alberta. But as we get caught up in the desperate need to protect caribou habitat in Alberta before the species is driven to extirpation (local extinction), we can sometimes lose sight of the animal itself. Here we take a look at caribou themselves and their place in the world.

Caribou are members of the deer family and they occur across a huge swathe of the Arctic and Subarctic regions (the European reindeer is the same species as the caribou, *Rangifer tarandus*). Caribou are superbly adapted to their harsh environment. They are surprisingly compact animals, often no more than a metre tall at the shoulder with small ears and tails. They have dense



PHOTO: © P. SUTHERLAND

two-layer coats, with fine, thick undercoats, and outercoats of hollow guard hairs which trap air to provide insulation. They even grow hair between the “toes” of their hooves, to reduce heat loss in winter. Their broad, splayed hooves allow them to travel comfortably through deep snow. Overall, the coat is a warm brown (becoming greyer in the winter) with a creamy white neck, mane and underbelly. Caribou are the only member of the deer family in which both sexes grow antlers.

The numerous different subspecies, populations and ecotypes of caribou are somewhat complex. New techniques in genetic fingerprinting of caribou sometimes seem to make the picture clearer and sometimes to make it even more complicated.

So the *woodland caribou* is a subspecies of caribou. It is the largest and darkest-coloured caribou, occurring in scattered populations across a huge area of boreal forest and mountains from British Columbia in the west to Newfoundland in the east. The *Boreal* and *Southern Mountain* are two distinct ecotypes of woodland caribou. The *Boreal* population occurs from the Mackenzie Mountains in the northwest to southern Labrador in the east and as far south as Lake Superior. The *Southern Mountain* ecotype is much more localized, consisting of scattered populations in Alberta and British Columbia. Alberta is home to both the

Boreal and *Southern Mountain* ecotypes of woodland caribou, which are spread across fifteen separate herds, many of which are geographically isolated from each other.

Caribou in Alberta

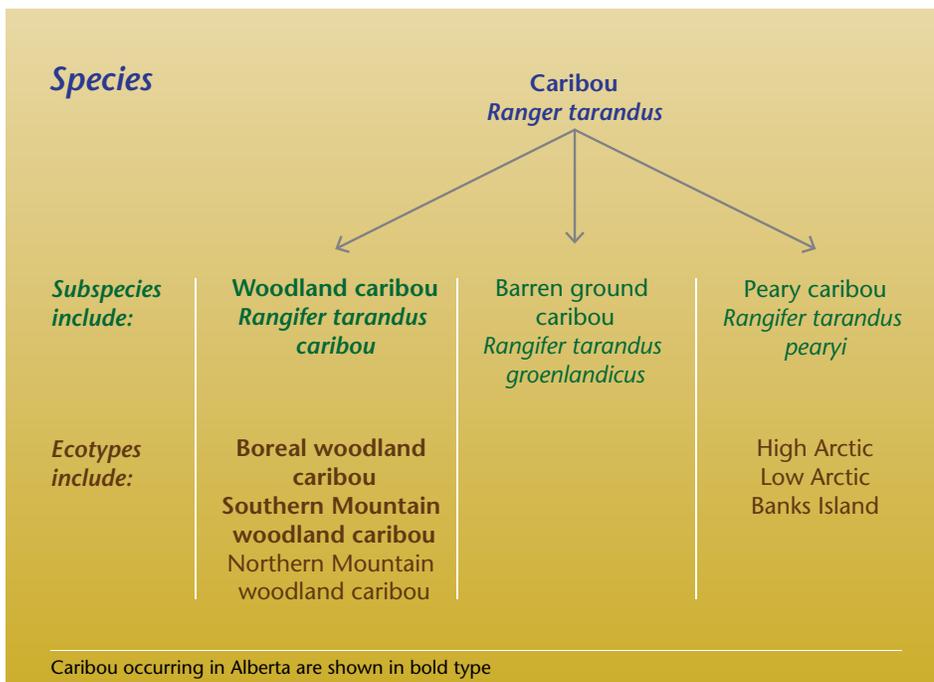
Both Alberta’s populations (*Boreal* and *Southern Mountain*) are listed, both federally and provincially, as threatened and there is little doubt that their future in the province is extremely precarious.

Despite being listed as threatened for 28 years, the decline of Alberta’s caribou has been continued and relentless. As far back as 1979 Michael Bloomfield, Alberta’s provincial biologist, was quoted as saying: “Continued hunting and unrestricted development in caribou range could result in the disappearance of our resident populations.” Although caribou hunting has ceased (with the exception of a First Nations harvest), development in caribou range has not and so the species continues to decline.

That decline has been understood for many years. While other deer species such as mule deer and white-tailed deer are very adaptable to human disturbance, caribou are much more sensitive. The biggest culprit is the loss of intact older forest and motorized access development which comes with industrial disturbance. In undisturbed habitats, caribou are scattered so thinly across the landscape that it is not worth predators,

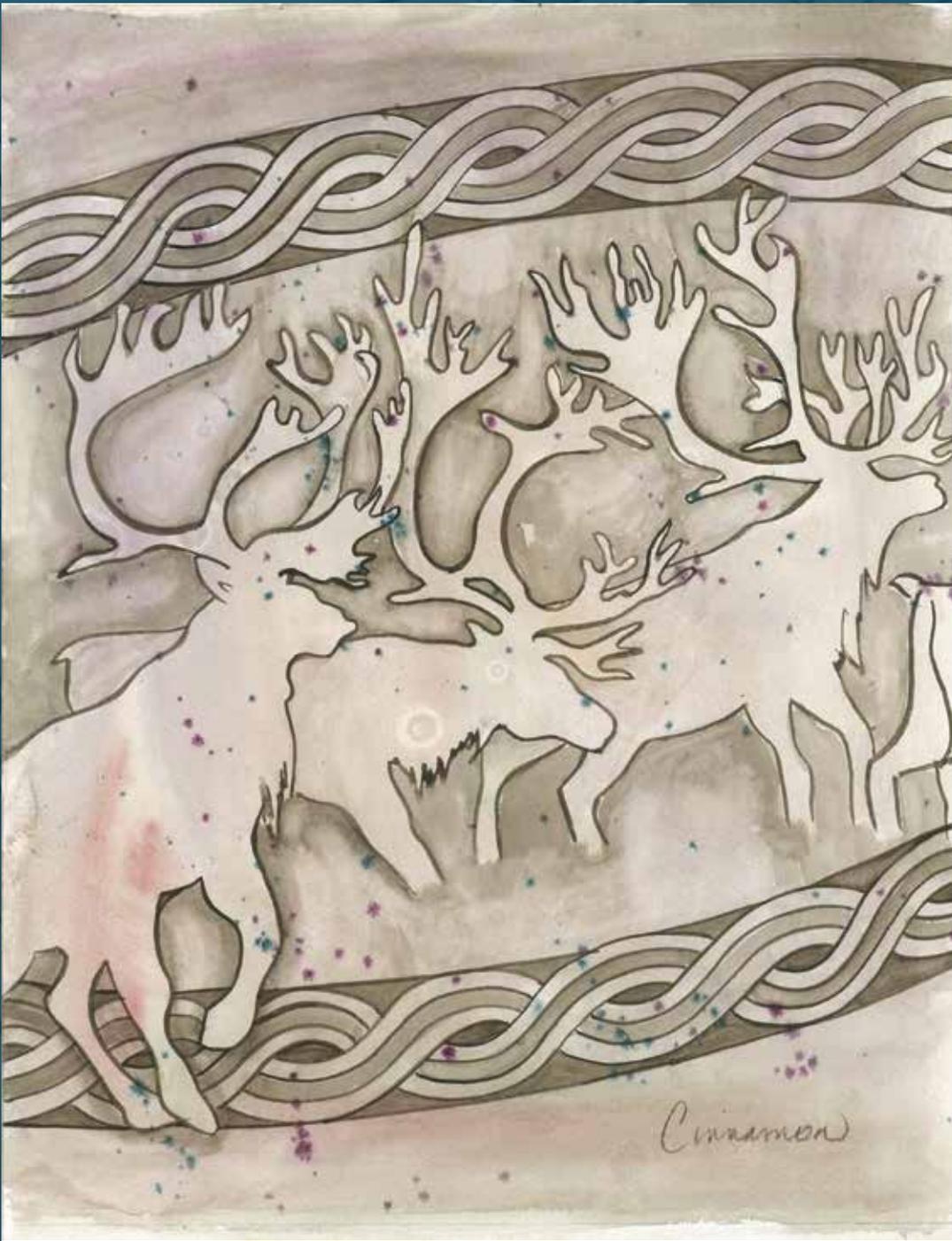
particularly wolves, investing time in hunting them. Add networks of roads, cutblocks and seismic lines to that landscape, and suddenly it’s harder for caribou to separate themselves from deer and moose, and it becomes much easier for wolves to travel, particularly in winter, and so caribou predation becomes a serious issue. Unfortunately the appetite for a quick-fix solution to the problem by killing wolves has not been matched by any appetite to reduce the real root of the issue which is industrial access.

On the surface it is a relatively straightforward picture: to recover any species the answer is to protect its habitat. But that brings with it political repercussions in a province so profoundly tied to oil and gas development and industrial forestry and so for the past three decades, progress on caribou recovery has been minimal. More recently there have been signs that the Alberta government may belatedly be prepared to move to reduce disturbance in some caribou habitat. In May 2013, energy lease sales were suspended in the range of two of the most endangered of Alberta’s fifteen caribou herds, the Little Smoky and A La Peche herds. And two months later, some forestry activity was reduced in the Little Smoky (though not, alas, in the A La Peche). It is an encouraging start, but only time will tell if it is too little too late. 🐾



Quick Facts:

- Woodland caribou, *Rangifer tarandus caribou*
- Federal status: Threatened
- Provincial status: Threatened
- Height: 1.0 to 1.2 m high at the shoulder
- Weight: 110 to 210 kg (bulls weigh on average 180 kg, cows weigh on average 135 kg)
- Surprising fact: Male reindeer (the same species as caribou) shed their antlers at the beginning of winter, usually late November to mid-December. Female reindeer, however, retain their antlers until after they give birth in the spring. So if Rudolph still has antlers at Christmas, then she is likely to be a female!



Caribou Entwined, 11"x14" pen, ink, and watercolour mounted on wood panel.
 PHOTO: © P. CINNAMON

Pamela Cinnamon

Pamela has a long-standing interest in the health of the caribou herds in Jasper National Park. The images included in this issue of the Advocate are taken from a series entitled "Caribou – I weep for you." Pamela writes:

Caribou - I weep for you ...

Entwined, intertwined, confusing, chaotic, curled and hidden ...
 I could draw and paint your intriguing designs forever.

Endangered, threatened, not showing signs of recovery ...
 I am in love with your sinuous, twisting, curvaceous shapes.

Human trails lead predators ever further into your territory ...
 I feel the memory of the ages in your antlers' story.

Habitat destruction, interruption of natural pathways ...
 I weep for the loss of you, caribou.

Conservation Corner:

Whitebark Pine: Resistance Is Not Futile (in fact, it may be key to saving the species)

By Niki Wilson



Whitebark pines, the long-lived giants of the Rocky Mountain sub-alpine, have been fending off attacks from numerous threats for the better part of a century. Populations have declined due to mountain pine beetle infestations, fire suppression, and climate change. However, by far the most devastating foe has been an exotic disease called white pine blister rust. This rust has decimated whitebark pine populations up and down the spine of the continent.

Whitebark pine forests are hubs of a unique sub-alpine ecosystem, largely based on the high calorie fuel their seeds provide. Many of the seeds are eaten by Clark's nutcracker, a bird upon which whitebark pine relies to distribute its seeds. Red squirrels also harvest cones and store the seeds in underground middens. These middens are routinely raided by

grizzly bears, a species with an especially strong ecological link to whitebark pine. Some scientists suggest whitebark pine is important to over 100 species of plants and animals.

Blister rust impacts whitebark pine by infecting and killing the cone-bearing branches of the tree's canopy, reducing seed availability and dispersal. It kills the main stem by girdling it, thereby cutting off food and water supply. Throughout the Canadian Rockies, very few populations remain rust free. In some areas, like that of Waterton Lakes National Park, 97 percent of the whitebark pine population has succumbed over the past 100 years. As a result of mass declines, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) lists whitebark pine as endangered, as does the Province of Alberta.

Despite these losses, hope can be found in a handful of individual trees that appear to have developed a natural resistance to the rust.

Cyndi Smith, Assistant Director of the Whitebark Pine Ecosystem Foundation, and Scientist Emeritus of Waterton Lakes

Clark's Nutcracker

The Clark's nutcracker is solely responsible for the distribution of whitebark pine seeds. With its dagger-like beak, it is specially adapted to pry open the hard, tightly packed cones. The nutcracker can shove up to 150 seeds into a pouch below its tongue, which it then caches 10 to 15 at a time. By the end of the summer, one bird may have stored tens of thousands of seeds in the ground. The nutcracker remembers where most of its caches are, but occasionally forgets one. In a forgotten cache the seeds germinate and whitebark pine seedlings radiate out from the cache. Without the nutcracker, whitebark pine would cease to exist.



Niki "Sticky Hands" Wilson helped Parks Canada ecologist Brenda Shepherd harvest seeds from whitebark pine cones like this one for restoration. Tip: Sap is best removed from hands with butter.
PHOTO: © N. WILSON



PHOTO: PETER WALLACK

National Park, first began identifying these trees in 2006. She says ecologists call them “plus trees,” meaning trees are assumed to be resistant, although they have not been tested in a lab to prove it. In Waterton Lakes, trees were assumed resistant if they were healthy in a stand where the other 90 percent was dead or dying from blister rust.

With enough plus trees one might expect the species to recolonize their home range over time. The problem is that there are relatively few rust resistant individuals. Some landscapes contain so few whitebark pine that biologists are concerned nutcrackers will consume the majority of the seeds they collect, instead of leaving some to grow into seedlings.

To help whitebark pine along, Smith and colleagues in Waterton Lakes developed programs to protect plus trees from other threats, like fire. They collected seeds and sent them to a nursery to be grown into seedlings for replanting. In recent years, the seeds of some of these trees have been accepted into a resistance-testing program in the United States in the hopes of confirming their resistance. However,

patience is key – the testing takes five to seven years.

Another factor complicating the restoration of this species is that, as Smith points out, whitebark pine trees don't produce mature cones until they are at least 40 to 60 years old, and often much later than that. In the meantime, a shortage in seed crops could be problematic.

In response to this, Smith says creating “seed orchards” may help accelerate cone production in the short term. Specialists in this technique take a cutting or “scion” off of the branch of a plus tree, usually in the winter when it's dormant. “They then graft that branch onto a faster growing conifer,” says Smith. She points to one case where ten years after grafting the grafted branch produced a whitebark pine cone.

The efforts of Smith and many who share her passion to leverage the natural resistance of plus trees and restore whitebark pine to the landscape have been monumental. One wonders if, in the face of other threats like climate change, it's worth the effort.

“You can make the economic argument that these species should be saved for

water retention in higher elevations as climate changes. We're going to need as much help conserving water downstream as possible,” says Smith. However, her appreciation for the species extends far beyond what it can do for us. “As an ecologist, I feel this species has an intrinsic right to exist, and by saving whitebark pine, you're helping a lot of other species.”

Niki Wilson is a multi-media science communicator and biologist living in Jasper. Visit her at www.nikiwilson.com



Whitebark pine seeds, if you eat one, remove the husk first (they don't taste very good)
PHOTO: © N. WILSON

Lighting It Up: Adventures in Terra Torching

Cyndi Smith says fire can be both friend and foe to whitebark pine. “Fire can be bad if it's going to kill seedlings or kill mature cone-producing trees. However, having some fire to kill off other conifers that are out-competing it is okay.”

Parks Canada uses prescribed fire to help restore whitebark habitat in Waterton Lakes National Park. However, getting the right conditions to properly control a burn can be tricky. In response to this, Smith says Parks Canada developed a “Terra Torch” to be used in places where prescribed burns had been planned, “but could never get the appropriate conditions at higher elevations to drop the match.” The apparatus is essentially a giant blow-

torch fed from a barrel of helicopter fuel. The blast and application of the torch is designed to mimic a lightning strike and only burns a very localized area or tree. Crews plant plus tree seedlings in the freshly charred earth after things cool off.



Seedlings of whitebark pine plus trees planted in freshly burned earth.
PHOTO: PARKS CANADA.



Terra Torching in Waterton Lakes National Park
PHOTO: PARKS CANADA.

Come Hell and High Water:

A Recap of Bob Sandford's Talk on Managing Hydro-Climate Change in a Rapidly Changing West

By **Brittany Verbeek**, *AWA Conservation Specialist*



On Tuesday, November 26, 2013 the AWA Hillhurst office was jam packed with people who had come to listen to a presentation by Robert Sandford, an internationally respected expert on water related climate policy. Sandford is the EPCOR Chair of the Canadian Partnership Initiative in support of the United Nations International Decade for Action "Water for Life". He is part of numerous national and international committees related to water, including the advisory committee of the Rosenberg International Forum on Water Policy and the advisory board of Living Lakes Canada. He has published six books and in 2013 was recognized as one of the year's 50 most influential Albertans by magazine. AWA was extremely fortunate and pleased he volunteered his time to be part of our speaker series.

Bob began his talk by stressing there are huge gaps between the scientific knowledge we possess and the actions that need to take place in regards to global water concerns. Water related issues are one of the greatest global threats to economic growth and are a huge threat to the health of Alberta's economy. With an already limited water supply in a resource rich southern Alberta region readily prone to drought, water should be treated like gold.

He emphasized that, despite people's misconceptions, climate change doesn't imply a uniform and incremental warming over time; instead it means destabilized weather patterns. Melting polar ice causes an increase in ocean acidification, reduces temperature differences of polar and equatorial regions and contributes to extreme weather

events. He explained that jet streams are forming very different patterns than they used to and extending into areas never previously seen. Could the great central plains become uninhabitable if climate change continues at the same rate? Desertification of Canadian prairies, and forests transitioning to grasslands, are both predicted by climate change modelling. Conversely, the longer, heavier rainfalls that are taking place are not without consequence; they can drastically decrease water quality. More frequent flooding, occurring in industrial, urban, and agricultural areas, causes notable increases in water contamination because floodwater can potentially carry any water soluble contaminant. A specific example Sandford used was the eutrophic

conditions of Lake Winnipeg caused by increases in runoff and nutrients from agricultural fertilizers.

Sandford reminded the audience that water does not disappear; it simply changes form. Climate change causes liquid water to move to a different space in the hydrosphere. Three hundred glaciers disappeared between 1920 and 2012 and at an accelerating rate – half of those disappearances took place between 1985 and 2012. Where did their water go? The answer, he told us, is the atmosphere. Recently scientists have discovered the presence of "atmospheric rivers" that can carry seven to fifteen times the average annual flow of the Mississippi River at the mouth of the Gulf of Mexico.

Water changes have already begun to af-



Bob Sandford, internationally-recognized water expert, outlining the lessons we should take from the 2013 Alberta flood PHOTO: © S. NICHOLS

fect the economy and unmask liabilities. Manitoba experienced 1.3 billion dollars in lawsuits related to floods, a direct link between hydrology and economy. As early as 1979, a major flooding event had been predicted for the Calgary area. Sandford doubts the major southern Alberta flood of 2013 was the “one in 100 year” event it is often cited to be and believes floods will likely occur more frequently.

So what did we learn from the 2013 flooding? Sandford listed numerous lessons to take away from the event and to be used in future decision-making. These included:

- Establishing proper flood prediction systems;
- Creating current and relevant flood maps;
- Accepting that adaptation to the “new normal” is going to be expensive socially, economically, and politically; and
- Understanding that governments are unable to solve problems of this scale on their own.

He noted several broader, overarching lessons as well. We need to come to terms with the fact that these problems are not going away and the flooding last year was small compared to what the atmosphere

can deliver. We need nature’s help; we cannot rely on engineering alone. We need to better understand and, where possible, better manage the hydrological cycle. In order to gain better control we need to reverse land degradation and restore wetlands. We must manage water on a basin-wide scale and start taking greenhouse gas emission cuts seriously.

He finished off his talk with some very astute advice to Alberta Wilderness Asso-

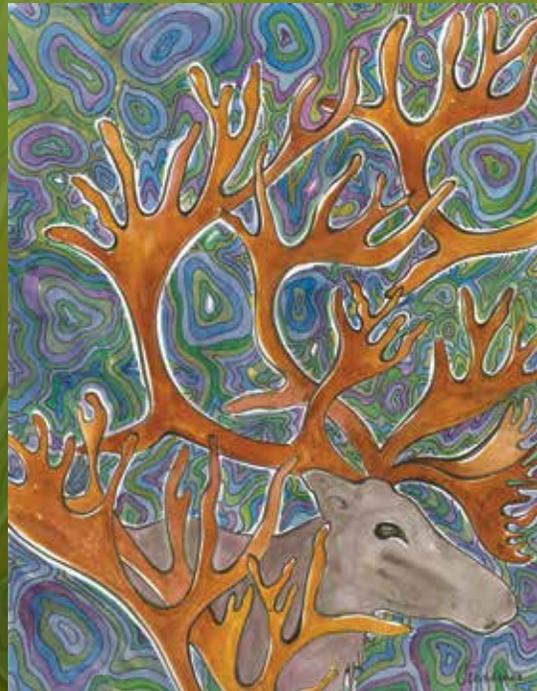
ciation and other environmental organizations. He said it’s important to recognize and emphasize that climate change is far more than an environmental problem; it is a huge economic and social problem as well. This is useful to consider because while it seems our provincial and federal governments are marginalizing science and environmental issues, they are all ears when it comes to economic and social issues. 🌱



Street in Calgary’s Mission neighbourhood during the June 2013 Alberta flood. PHOTO CREDIT: AWA



Caribou Couple 11”x14” pen, ink, and watercolour mounted on wood panel. PHOTO: © P. CINNAMON



Caribou Quandary 11”x14” pen, ink, and watercolour mounted on wood panel. PHOTO: © P. CINNAMON

Updates

Wolf Matters – Humans Standing Up for Wolves

Are humans hard-wired to fear and hate wolves? Is this why, given the opportunity, some will unleash savagery against them? Within days of the U.S. rescinding protected status for the wolf, hundreds were slaughtered.

In Alberta, wolves are fair game throughout the hunting season, landowners can kill them on sight, and some trappers kill them during the trapping season. Clubs like local Alberta Fish and Game Association affiliates even offer bounties for dead wolves.

Alberta's government offers no protection for wolves. In fact it plays in this killing game by aerially gunning down wolves to protect caribou. Many forms of wolf torture are condoned – poisons, leg hold traps, and insidious snares are all allowed. Poisons and snares are indiscriminate and their “collateral damage” includes eagles, magpies, coyotes, bears, wolverines, and even deer and horses. All of this “by kill” is officially tolerated. The fact that killing one member of the dominant pair of wolves in a socially ordered pack will trigger the subdominant pack members to breed and produce many more wolves seems lost on Alberta's wolf managers.

Four years ago, one man, an ex-government employee, began to expose the wolf's plight. After two frustrating years of trying to get attention, Dwight Rodtka got a call from Bob Scammell, one Alberta's top outdoors writers, and doors began to open. A group of infuriated Albertans began to take action.

They wrote to the International Union for Conservation of Nature (IUCN) calling for humane and scientific management of Alberta's wolves, led by government, not private clubs. The IUCN's Wolf Specialist Group took an interest, wrote the Alberta government, has received a reply, and is likely to ask Alberta to do more than the government seems prepared to do. Correspondence continues.

Wolf Matters is developing several stunning posters and has a well designed website that is regularly updated and is receiving hundreds of hits every day. Dwight Rodtka's

message is striking a chord with the public and a list of activists is growing

Vivian Pharis

Biodiversity Assessment in the Athabasca Oil Sands Area

In early December 2013, the Alberta Biodiversity Monitoring Institute (ABMI) released its latest regional status report on species diversity. This report, *The Status of Biodiversity in the Athabasca Oil Sands Area, Preliminary Assessment 2013*, documents the high-profile Athabasca Oil Sands Area (AOSA), an Alberta government administrative area indicating tar sands development potential. Extending from Lac La Biche to only a few kilometres south of the Wood Buffalo National Park border, AOSA covers 14 percent of Alberta, all in the Boreal Forest Natural Region. It includes the entire mineable oil sands region, where bitumen deposits are shallow enough to strip mine, as well as what ABMI calls the Active In-situ Oil Sands subregion, where the bitumen is deeper and there are either operating or approved projects to steam (typically) and pump out bitumen. ABMI has provided estimates of species intactness for the Mineable and Active In-situ subregions as well as the overall AOSA. ABMI cannot measure intactness compared to historic conditions, as sadly, these are unavailable. Instead, it measures intactness compared to its 2003-2007 reference data, taken from sampling sites in the least disturbed areas in the region.

The key conclusions, based on surveys of over 350 representative species, are summarized in Table 1.

Adding description to the numbers, the report observes that species that adapt well to human disturbance such as coyote and song sparrow are now more abundant compared to intact reference areas. Species that depend on old-growth boreal forest habitat such as bay-breasted warbler, boreal chickadee, marten and fisher are less abundant. Non-native weeds are found at 32 percent of the surveyed sites.

The relative intactness of the mineable area may come as a surprise. According to Alberta Energy, as of July 2013, 99 percent of the mineable oil sands area had been leased but “only” 15 percent (715 km², or more land than is covered by Edmonton proper) had been disturbed. Peat wetlands cover over half the pre-disturbance landscape in the mineable area. As the Shell Jackpine Mine Expansion Joint Review Panel noted in July 2013, there is little prospect that reclamation will mitigate mine effects on wetlands and old growth forests. Mining impacts will persist long term along this major migratory bird flyway along the Lower Athabasca River enroute to the internationally significant wetlands in the Peace-Athabasca Delta.

The summary human footprint data above is presented without any buffers applied (e.g.: around seismic lines, pipeline corridors, and forest cutblocks). Such disturbance has different impacts or “zones of

Region	Percent Intact	Compared to Reference Condition	Human Footprint
Entire AOSA	95%	Loss of 6%	6.8%
Mineable Area	86%	Loss of 14%	20.8%
Active In-situ Subregion	91%	Loss of 9%	7.7%

Table 1: biodiversity intactness of the Athabasca Oil Sands Area.

influence” for different species. Within the report, an important “Core Habitat” section reports the area of native habitat that is at least a certain buffer width away from human disturbance. Only 46 percent of native habitat in AOSA, 29 percent in the Mineable area, and 28 percent in the Active In-situ subregion, is more than 200 metres away from human disturbance.

The health of woodland caribou, as a species relying on intact peat wetlands and old growth forest to separate itself from deer, moose, and predators, is another indicator of the intactness of this region. Forestry cut-blocks and in-situ infrastructure stimulate deer and moose populations and facilitate predator travel. For its national woodland caribou recovery strategy, Environment Canada used a buffer of 500 metres around human footprint as best describing the harmful zone of influence on caribou from that footprint. Using the same buffering technique, Global Forest Watch Canada concluded in a report also published in December 2013 that “all of the woodland caribou herd ranges in Alberta suffered substantial declines of intact forest landscapes over the period 2001 to 2010.” Instead of reporting a 500 metre disturbance buffer, the ABMI report’s section on woodland caribou notes declining caribou populations (wherever data is available) and an increasingly larger human footprint in caribou ranges across AOSA. No matter how you look at it this region is not being developed responsibly given legal requirements and stated policy objectives to support self-sustaining caribou populations in Alberta.

The 2013 ABMI biodiversity status report for AOSA already shows clear impacts from forestry and energy across a large region that experienced little human disturbance prior to the 1990s. It will provide an important baseline to compare with future ABMI reporting, given the intense industrial activity expected on this landscape. Even more importantly, it should motivate Alberta to deliver the overdue biodiversity management framework and land disturbance limits promised in the 2012 Lower Athabasca Regional Plan.

Carolyn Campbell

Feral Horse Advisory Committee

It strikes me as bizarre that the Alberta Government would see developing a strategy for managing feral or wild horses as urgent and necessary but it has set up a public advisory committee to do so. A 2013 count indicates fewer than 1,000 feral horses roam mostly southern Eastern Slopes lands although numbers are increasing. Meanwhile, caribou numbers are plummeting while committee debates drag on for decades and government refuses to take meaningful action.

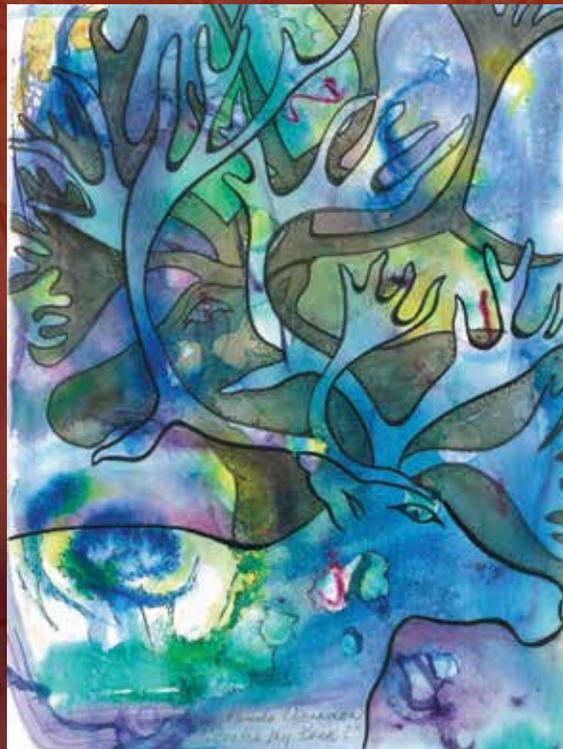
AWA was asked to participate in this committee and I was asked to be the representative because of my knowledge of domestic horses and of several Eastern Slopes areas where feral horses are abundant.

The first meeting was held in early October 2013 in Red Deer. I have sat on various government committees over the years, but was struck by the organization of this one. It comes with balanced representation and a message of urgency from the Minister of Alberta Environment and Sustainable Resource Development. The Minister wants to develop a strategy within a year.

The first meeting concentrated on an immediate issue – should the capture program, which has been suspended for the past two years, be reinstated? A focused discussion followed a presentation by University of Alberta rangeland specialist, Dr. Edward Bork, on feral horse habitat preferences, and a decision was taken to proceed with a capture program in two key areas under some habitat stress – the first being McLean Creek/Ghost and the second an area west of Sundre. The problems are that few in Alberta have the skills needed to receive a permit to capture feral horses, it is not a lucrative business, and since few people want to adopt feral horses most captured horses go to slaughter.

At the second meeting in mid December, management strategies from other jurisdictions were examined, from Australia to Sable Island in Nova Scotia. Australia has some 400,000 brumbies (free-roaming feral horses) and 250,000 feral camels taking a toll on ecosystems not adapted to them. It makes Alberta’s “problem” seem miniscule.

Vivian Pharis



Caribou Scratch My Back?
11"x14" pen, ink, and watercolour mounted on wood panel.
PHOTO: © P. CINNAMON

Gear Ideas

New Year's Resolution: Hoe he'e nalu - the NRS Mayra Stand Up Paddleboard (Women's)



By Kristina Vyskocil

The advent of another new year has some outdoor enthusiasts making resolutions to ride harder, live better, run faster, and climb stronger. But if you're looking to make your New Year's resolution less intense and a bit more chill, why not try stand up paddleboarding (SUP)? Originating in Hawaii, SUP is an offshoot of surfing and allows a person to travel farther on a board with the assistance of a paddle or an oar. The NRS Mayra Stand Up Paddleboard is designed specifically for paddlers who practice yoga (or, alternatively, yogis who SUP). This means you can practice those yoga poses and get a feel for the board even when the ice floes continue to drift down the North Saskatchewan River (\$895 at MEC; backpack for carrying and storage, a pump with pressure gauge, valve adapter and repair kit included; leash and paddle not included).

What is the NRS Mayra Stand Up Paddleboard?

The NRS Mayra Stand Up Paddleboard is an inflatable board designed with fitness in mind and aimed at both yoga and paddling enthusiasts.

What does the NRS Mayra Stand Up Paddleboard do well?

Don't be deceived by the pink graphics – although advertised for women, the

Mayra is better suited for lighter weight paddlers in general. Weighing 10.8kg (23.8lbs), the Mayra is easy to carry, and can accommodate paddlers up to 90.7kg

(200lbs) when inflated.

The heavy-duty 4" PVC provides optimal performance against abrasion and abuse, as well as stability for both beginner and experienced paddlers. Rivaling the performance of a hard board, the Mayra inflates to 15 psi with the reliable assistance of a top-quality Leaffield C7 inflation/deflation valve. The Mayra then rolls up compactly when deflated for easy transport and storage, making it the ideal choice for SUPers who drive compact vehicles or often travel to the Aloha state!

Constructed with a high-volume nose and tail, the Mayra is durable, responsive, and stable enough for paddling and practicing asanas on the water. A three-quarter diamond-textured foam deck pad (2.0m x 71cm; 80" x 28") provides comfortable padding for the knees, ample grip for riding control, a no-slip standing surface, and plenty of room for poses on the board (3.2m x 81cm; 10'6" x 32"). Three removable, interchangeable fins flex to absorb impact without breaking, and allow you to customize your board for tracking and turning no matter what the water conditions may be (two 2" fins; two 5" fins; one 9" fin). The two sturdy webbing handles, located in the center and the rear of the board, make the board easy to carry to and from the shore, and hold on to during a swim. Three stainless D-rings provide you with the option to attach gear and a leash (not included).

In addition to MEC's "Rock Solid Guarantee" (if an item hasn't met your expectations, you can bring it back), the Mayra also comes with a three-year retail warranty.

What's the bottom line?

Whether you're looking to take up SUP yoga for the first time, or are an experienced SUPer looking to try something different, you'll find the NRS Mayra Stand Up Paddleboard an accommodating board at a great value - da kine?



Recall of the Wild

In this issue of *WildLands Advocate* we're pleased to publish a poem Buddy Gale submitted last year in the Louise Guy poetry contest. Buddy was born in 1928 and grew up just south of Buck Lake, Alberta. His grandfather, who was a sniper during the First World War, settled there in the late 1800s and taught Buddy how to hunt, track, and trap. The scene recalled in his poem is now just a memory – a change Buddy attributes to pesticides, sport hunting, and habitat loss.

Prairie Chicken

By Buddy Gale

Sentries fly in
with a whistling sound
Almost silent
For their wings are on glide
To sit in a tall tree
And look side to side
First there is one
Then there are three
It's very important
This job of sentry

They sit there silent
Examine all things

Then a prairie chicken cackle
Now there's hundreds of wings
Here comes the flock
It's safe to come in
Just land and be silent
Until it's okay again
The sentries sit still
with eyes that can see
The slightest thing different
where danger might be

They watch a few minutes
Maybe it's five, then an all clear cackle
It's now time to jive
They move like an army
Not afraid anymore
Hens circle the roosters
In this mate dance of war
The roosters are fierce
with their plumage and strut
The hens in mock fear
Say he acts like a nut

The dance is serious
Their wings pound the ground

They kick their feet side ways
And charge all around.
The sentries never leave
Their perch in the trees
Then a sharp clucking sound
Says every one freeze

They shut down silent
All crouching low
Another sharp cluck
It's danger let's go
They fly in all directions
It's the safest way to leave
How they know this, I don't know.
It's just something to believe

They've gone to hide away
Completely out of sight
They'll be back to dance again
When everything is right

How was I to know
That someday
This all would be
A part of a world we've lost
Now it's only
A private memory

*Written in 93- From the year of 1938
When I was 10 yrs old*

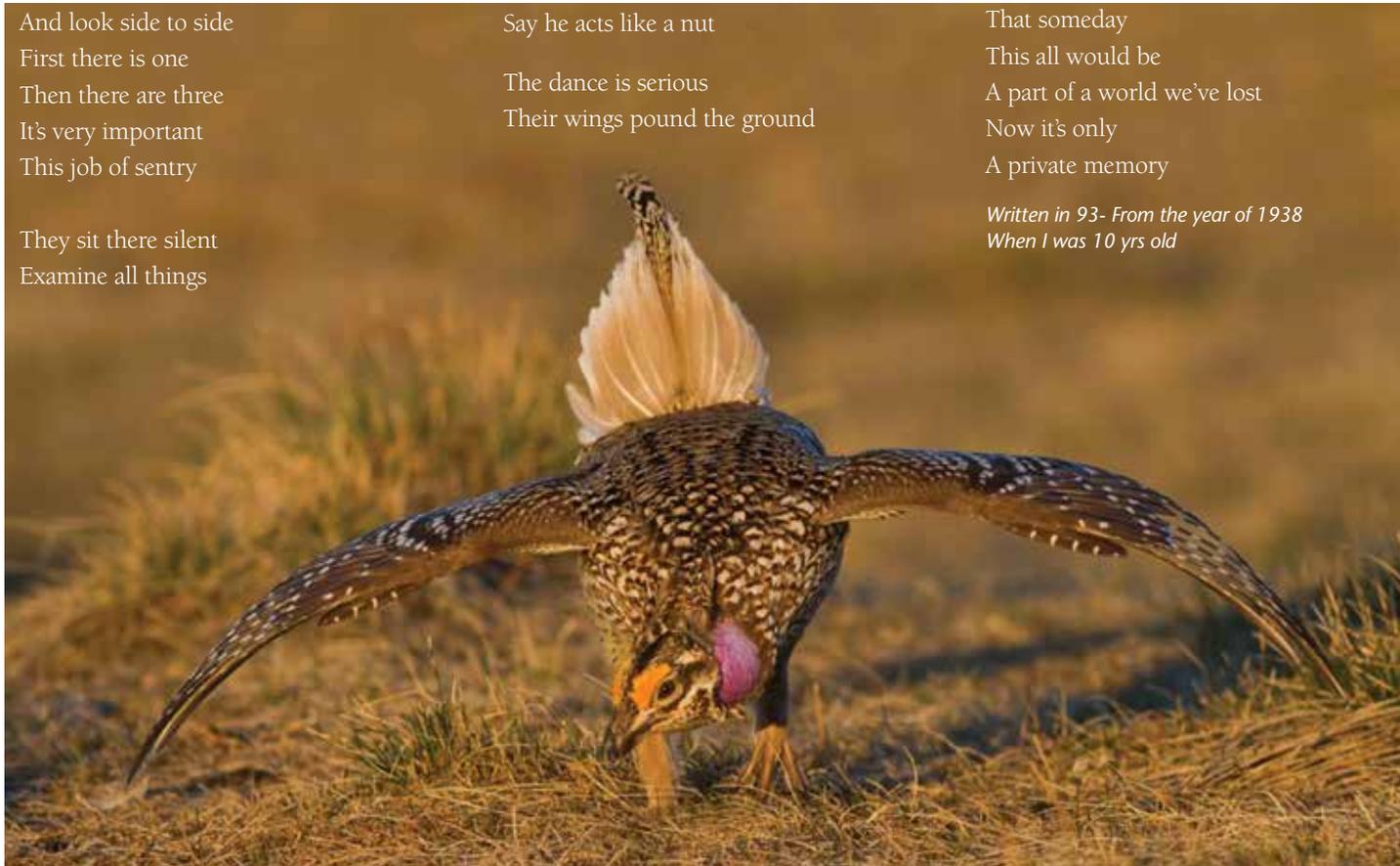


PHOTO: © J. GROVES

Letters to the Editor

Note: *Letters should be less than 250 words long. Letters of any length may be edited or rejected.*

Martha Kostuch Annual Lecture

Grateful congratulations to *Wildlands Advocate* for highlighting in its October 2013 issue the disgraceful treatment by the Alberta government of the Oil Sands Environmental Coalition. The blackballing of conservation groups speaking up on behalf of environmental interests is worse than appalling. Thank goodness for the AWA and its ongoing vigilance regarding such actions.

All the more shocking, then, was the apparent acquiescence of the AWA to the message delivered to its annual Lecture and Awards night by Lorraine Mitchelmore, president and country chair of Shell Canada Ltd. I'm afraid I was part of the audience that appeared to sit contentedly as Ms. Mitchelmore regaled us in mellifluous tones with stories of Shell's sterling and selfless environmental record in Alberta; the remarkable potential of Shell's technical solutions, especially carbon sequestration under its outstanding leadership; and the confluence of Shell's and the AWA's bedrock support for

conservation values.

Even worse than that, though, was Ms. Mitchelmore's contention, in answer to a question from the audience, that Alberta has the best environmental regulators in the world. The awards night refreshment went down very well, but that remark continues to stick in my craw, especially in view of documented government horrors such as the one AWA brought to light again in its piece on "Blacklists and Witch-hunts."

The ongoing timidity and failures of Environment and Sustainable Resources Alberta, for example, are well known to AWA. The sorry mess of the South Saskatchewan Regional Plan is just the latest of its abominations. I don't want to say we should not invite industry representatives to speak to events like the annual lecture – although Martha Kostuch must be stirring in her grave. It's just we shouldn't give them such an easy ride when they spout such stuff.

Yours truly,
Andy Marshall

Lu Carbyn's Letter on Immigration

Please add my voice to those who agree with Lu Carbyn and David Suzuki on immigration.

I grew up in Southern Ontario in the 1970s to claims about how we were an "underpopulated country" with a density of people "one tenth that of the U.S." our neighbour. Living in the so-called "Golden Horseshoe" I recoiled in horror. "Oh my God," my young mind wondered, "how could the U.S. possibly be more congested than *this*?"

You can't judge how over or under-populated a place is based on surface area alone, although even such Canadian illuminati as Peter C. Newman insist on committing this error and perpetuating the myth of an under-populated country. Yes, Canada is gigantic but the places attractive to settlement are now chockablock with humanity. If anything we are over-populated.

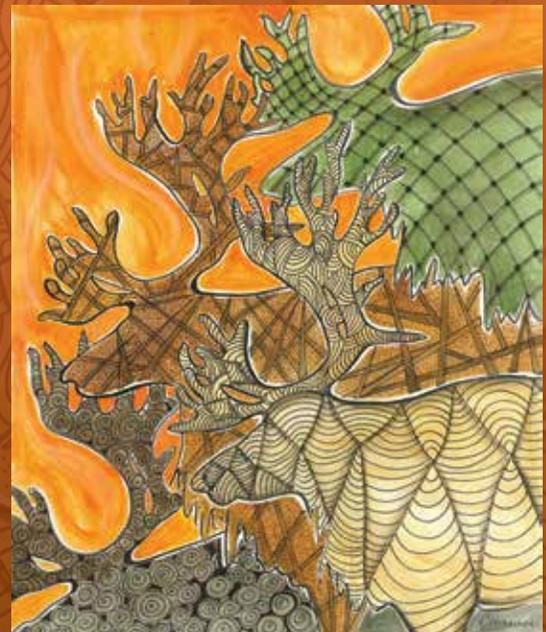
I think a storm lies ahead. This storm, like those that hit earlier civilizations, has many causes. It's fundamentally about outstripping our energy equation and the growing inability to generate "real" wealth, as opposed to the illusory wealth of today's financial instruments. When this happens, things are going to get tough. At that time, we'll be wishing we had fewer mouths to feed, not more.

I'm happy to see I'm not alone in my feelings about what I have long recognized as the folly of our immigration policy.

Jonathan Wright



Sweet Dreams 11"x14" pen, ink, and watercolour mounted on wood panel. PHOTO: © P. CINNAMON



Caribou Quartet 11"x14" pen, ink, and watercolour mounted on wood panel. PHOTO: © P. CINNAMON

Upcoming Winter/Spring Events

Snowshoe Day Trip with Ed Hergott

Saturday, March 1, 2014

Join Ed Hergott on a snowshoeing hike in Kananaskis Country to get some fresh air, exercise and enjoy the winter wilderness!

Location: Mt. Lawson- South Summit, Kananaskis

Distance: 7km return (elevation gain 650m)

Estimated duration of hike: 6 hours

Cost: \$20.00 members/\$25.00 non-members

Registration: (403) 283-2025

Online: www.albertawilderness.ca/events

Talk: Loss of Biodiversity and Why it matters to us? with Gus Yaki

Tuesday, March 4, 2014

Gus Yaki has been a life-long naturalist, famous birder and wildlife advocate. He has lead nature tours all across Canada and around the world. He will be sharing his expert knowledge on the ever increasing number of species that are rapidly declining and why we need to preserve and increase biodiversity in Alberta.

Location: 455 – 12 Street NW, Calgary

Time: Doors open at 6:30 p.m. Talk starts at 7:00pm

Tickets: \$5.00

Registration: (403) 283-2025 **Online:** www.albertawilderness.ca/events

Music for the Wild

Saturday, March 29, 2014

Headline act: Horizon Ridge

Fine singers, songwriters and players (Dianne Quinton, Craig Blakney, Steve Goodchild, & Helen Goodchild) playing a broad swath of 'folk' music with panache. Their music is a mixture of country tunes, Celtic, blues, rock, traditional and contemporary folk; all with good stories and great arrangements. The band members have played in folk festivals, folk clubs and concerts in Alberta, the U.S and U.K. and have completed several very good CD's.

Opening: Dr. J

Dr. J (Ted Jablonski) is an award winning multi-instrumentalist singer songwriter from Calgary. Ted has released 7 indie CDs and has produced 2 Canadian music Compilations featuring a number of great Canadian artists.

Location: 455 – 12 Street NW, Calgary

Time: Doors open at 7:00 p.m. Music at 7:30pm

Tickets: \$20.00

Registration: (403) 283-2025 **Online:** www.albertawilderness.ca/events

Beer, Nuts and Wolves!

An evening with
Andrew Manske

May 6, 2014

Don't miss a spectacular evening with renowned Canadian wildlife filmmaker Andrew Manske as he shares his experiences filming wolves all over Canada and his footage of this breathtaking animal. Alcoholic beverages will be served along with delicious snacks!

Location: 455 – 12 Street NW,
Calgary

Time: May 6, 2014

Tickets: \$20.00

Edmonton Talk: Conserving Alberta's Biodiversity in the Face of Climate Change

with Dr. Rick Schneider

Monday, April 7, 2014

In this presentation Dr. Schneider will summarize recent climate projections for Alberta and describe how ecosystems and species are expected to respond. He will also provide an overview of new climate-ready conservation objectives and management options for adapting to change.

Location: TBA – Stay tuned on our website!

Time: TBA

Tickets: \$5.00

Registration: (403) 283-2025

Online:
www.albertawilderness.ca/events

23rd ANNUAL



April 26th, 2014

Celebrate Earth Day at the Calgary Tower

*Climb 802 stairs or Race 1km and Climb 802 stairs
to raise money and promote awareness for
Alberta's wild spaces*

Registration: 403 283 2025

Online: www.climbforwilderness.ca



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