

CONSERVATION

The official publication of Alberta Conservation Association

The Lure of our Lakes

Revealing the Success of Stocked Lakes

Spa Beneath the Soil

Making Miles for Mineral Licks

Got Bait?

How we have Spawned an Underground Invasion

Goats on Trial

The New Front Line against Noxious Weeds



SPRING/SUMMER 2010 www.ab-conservation.com

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CONSERVATION



Conserving Alberta's Wild Side

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ACA conserves, protects and enhances fish, wildlife and habitat for all Albertans to enjoy, value and use.



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Goats on Trial

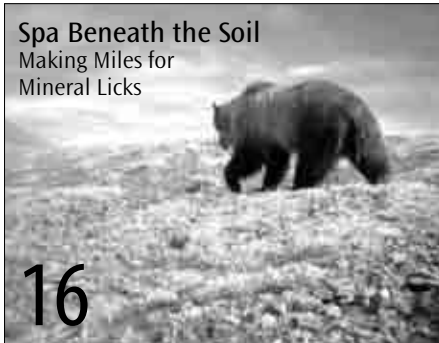
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Conservation in Action



"After spending a perfect midsummer afternoon floating down the Bow River south of Calgary, our group pulled in to cast some trout that were sipping close to the bank. This rainbow took an elk hair caddis."

Nikon D700 camera and Nikon 24-70mm lens.
Darren Jacknisky, Bluefish Studios.
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Luckily, Alberta is a province swimming in diversity.

AS Albertans, we get to enjoy diversity in a multitude of ways: from a sundry of differing landscapes to a dizzying array of flora and fauna, it's all here in one province. At *Conservation Magazine* we recognize that diversity is a natural capital, and one that's integral not only to the health of our province, but ultimately ourselves. In every issue we get to unearth the stories that connect you to the people and organizations whose work goes largely unnoticed in their attempts to keep Alberta wild, for all of us to enjoy.



Nothing struck me truer than witnessing bird bander, Rick Morse, scale up a tree to band great horned owlets. Donning a thick leather jacket and bright orange helmet outfitted with a full visor and leather flap stitched to the back to protect his neck - you have to question why someone would risk falling out of a tree or being dive-bombed by mature great horned owls. It's not because he is an adrenaline junkie: it's because people like Rick are passionate about raptors and volunteer as licensed banders to provide valuable information on the status of this species. Read more in *Avian Advocates: Dedicated to Band and Protect* on page 13.

Substituting chemicals for a few hungry goats is one approach we take to maintain healthy wildlife and fish habitat, improve water quality and restore native plant diversity. Find out how 410 goats took on ridding Silverberry Conservation Site of its worst patch of toadflax to protect the integrity of this 2,100 acre property, located 12 kilometres northeast of Myrnam. Read about it on page 7, *Goats on Trial: The New Front Line against Noxious Weeds*. To watch them at work, go to www.ab-conservation.com/goats.

You wouldn't think an earthworm could impact the diversity of its habitat. But the changes these species have in a boreal forest environment can impact a wide variety of organisms. In *Got Bait? How we've Spawned an Underground Invasion* on page 20, find out how these worms have gone from extinction to impacting our forest and what you can do to stop the spread.

Technology is increasingly important to how we conduct studies and report on data. In *The Lure of our Lakes: Trail Cams Reveal the Success of Stocked Lakes* on page 24, researchers feasibly monitor the fishing patterns of anglers on 60 lakes, 14 hours a day, seven days a week, all summer long thanks to trail cam technology. Trail cams also offer a unique way to delve into the secret world of wildlife, as you will see in *Spa Beneath the Soil: Making Miles for Mineral Licks* on page 16. Look for more photos on our website at www.ab-conservation.com/minerallicks.

Partnerships also play a huge role when it comes to diversity. Read about how ACA and Devon Energy have teamed up to conduct assessments on the disappearing spawning habitat of bull trout. In *No More Bull? Learning to Respect Bull Trout in the Upper Oldman Watershed* on page 26, we profile how a partnership is working to keep this feisty species (and our provincial fish) on the map.

You may have many reasons why you love Alberta. But I believe it's our diversity and the people that conserve it that truly set us apart. Take the time to enjoy what we have by picking up the 2010-2011 *Discover Alberta's Wild Side: Guide to Outdoor Adventure*. The guide offers a convenient and inexpensive way to explore a quarter million acres conserved for you to explore on your own or with friends or family. Visit a Conservation Site in the guide, send us your photos and enter them at "Take the Challenge, Discover Alberta's Wild Side" at www.ab-conservation.com/guide. Winners will be profiled in next year's guide.

Enjoy our natural capital and we'll keep doing our part by telling you about ways people, technology and research plan to keep Alberta diverse for future generations.

— *Editor-in-Chief, Lisa Monsees*

Letters to the Editor: Address letters to *Conservation Magazine* Editor by e-mail, fax or mail. Include your name, address and daytime telephone number. Letters may be edited for clarity and length.



Our Mission

ACA conserves, protects and enhances fish, wildlife and habitat for all Albertans to enjoy, value and use.

Conservation Magazine

Conserving Alberta's Wild Side

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Conservation Magazine

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About Us... At Alberta Conservation Association, we feel most at home when we're enjoying the natural wonders of our province. We immerse ourselves in Alberta's wild side while encouraging others to do the same – working to ensure these extraordinary outdoor opportunities are available not only for your future, but also for the futures of generations to come.

Annually, ACA directs more than \$10 million towards conservation efforts, delivering a wide variety of projects and services across the province that include Wildlife, Fisheries, Land Management and Communications programs. By donating and securing land for conservation, our donors and partners work with us to create lasting legacies. Our initiatives, scientific studies and passion for conservation help conserve wildlife, fish and habitats for all Albertans to enjoy.

We are lucky to live and work in such a precious place, surrounded by natural integrity and untamed character. Take advantage: be sure to enjoy some of the 250,000 acres of Conservation Sites and explore Alberta's great outdoors as much as you can. The breadth and beauty of our wild side is all around – let's work together to make sure it stays that way.

Keep conversations on conservation going...drop us a line, or visit us online and on twitter and facebook. Because together, we are the wild side's future.



Discover *Alberta's Wild Side* 2010-2011 Guide to Outdoor Adventure

**Twice the sites, twice the wild,
twice the adventure!**

Bigger and wilder than ever, the third edition of the Guide to Outdoor Adventure now features over 700 Conservation Sites, including 302 from Ducks Unlimited Canada.

FREE copies of the guide are now available.
Hunt, fish, hike, bird watch, watch wildlife and photograph your way across Alberta – all for free!

For more information visit www.ab-conservation.com/guide or call toll free **1-877-969-9091**.

Conservation for a Changing Planet

24th International Congress for Conservation Biology (ICCB 2010)
Edmonton, Alberta July 3-7, 2010

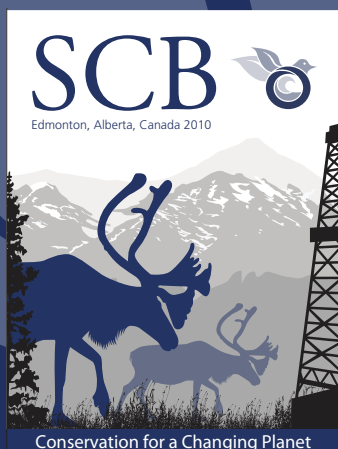
Registration now open!

Special 1 day registration fee for residents of Alberta.



Society for
Conservation
Biology

Connecting conservation professionals: working
together to achieve conservation



Developing conservation strategies to cope with our changing planet is arguably the greatest challenge facing today's world and its biodiversity. ICCB 2010 will bring 2,000 of the world's conservation professionals together to address global conservation challenges under the theme of *Conservation for a Changing Planet*.

World-wide hunting and angling communities have long been involved in conservation, and their perspectives and interests will be well represented at this landmark conference. Join us and attend conference presentations that focus on the role of sustainable use of wildlife in conservation including a special talk by Shane Mahoney who will passionately speak to the need to coordinate the efforts of all conservation organizations to conserve North America's wildlife heritage.

Congress supporters include: Alberta Conservation Association, SCI - Northern Alberta, Alberta Trappers Association, and the University of Alberta. For more information go to:

www.conbio.org/2010

Voracious eaters, lovers of the most barbed and toxic of vegetation, mouths of iron and guts of steel, goats happily munch their way through weed-infested fields, leaving behind a swath of destruction no noxious invader – no matter how biologically resistant – can overcome.

GOATS ON TRIAL

THE NEW FRONT LINE AGAINST NOXIOUS WEEDS

■ *by Nicole Nickel-Lane*
photos by Lisa Monsees



Many of the patches of purple, yellow, white and pink flowers that sprinkle our summer prairie landscape were brought to Alberta decades ago as ornamental plants. The problem is, as pretty as they are, oxeye daisy, buttercup, toadflax and other varieties escaped the flower box and have infiltrated our prime agricultural, grazing, and protected natural lands, costing the province and private landowners millions of dollars annually in lost productivity and weed control. And these weeds continue to spread, choking out native vegetation, destroying the delicate balance of riparian areas, and jeopardizing the health of the food chain, despite our desperate efforts to rein them in with herbicides of all descriptions.

Now for the good news: Alberta Conservation Association has recently conducted a weed control experiment against the spread of toadflax at Silverberry Conservation Site (an ACA managed piece of Crown land) – without harsh chemicals or hours of back-breaking hand pulling, but with a few hundred rather hungry ... goats.

Silverberry: no ordinary Conservation Site

Silverberry is located 200 kilometres east of Edmonton, just northeast of Myrnam. It covers almost 2,100 acres and includes Slawa Creek and associated wetlands, and a small lake in the centre of the property.

Silverberry is a unique place that hosts a variety of terrestrial and aquatic habitats and a diversity of species. Several acres of mature white spruce are located along the south shore of the lake, while the east side features black spruce muskeg. A water control structure has created an excellent waterfowl marsh west of the lake. Perhaps the most interesting water feature on the property is a continuously flowing artesian well, which is easily accessible by foot along a well-used path from the south end of the lake. Otherwise the topography is pleasant and hilly, with a mosaic of young to mature poplar forests, shrublands and large areas of grasslands.

The property is home to otter, deer, moose and bear, as well as pelicans, turkey vultures and other migratory birds. In addition to wildlife watching, Silverberry's recreational opportunities include canoeing through the weedy islands of the lake, hunting, and picking hazelnuts, wild mint, and berries along its many hiking trails. All of these are accessible via two parking lots located along the west and central portions.

Toadflax: a noxious menace

There are more than 60 weeds classified as restricted, noxious, or nuisance in Alberta. Like many other noxious weeds, toadflax propagates via seed and root. It is a prolific seed producer: a single plant can produce as many as 30,000 seeds, creating a dense seed bank that is extremely difficult to eliminate. The seeds themselves are surrounded by circular papery wings, allowing them to travel great distances by wind, or be carried to new areas by insects or birds. Though seed germination rate is generally less than 50 per cent, seeds can remain dormant for up to eight years, making toadflax extremely difficult to eliminate with any one, isolated method of treatment. Equally menacing are its roots: a single plant's root system can spread one to two metres per year. Within toadflax patches, this creates a root thatch of hundreds of stems per square metre. Root depth can be as much as one metre, arming the plant with ample resistance to drought and frost.

The herbicide Tordon 22k is the chemical of choice in the control of toadflax. It has been well engineered to kill the weed but not surrounding grasses. The downside is that it remains in the soil for almost a year and is very toxic to aquatic environments, which, given the coarse textured soils and high aquatic habitat value at Silverberry, makes it an unpractical option. Up until now, teams of biologists and volunteers have done their best to control the spread of toadflax at Silverberry with hand pulling or clipping seed heads. But given its aggressive, prolific capacity to spread and propagate, no amount of hand pulling or mowing will ever eliminate the problem.

Given the aggressive, prolific capacity to spread and propagate, no amount of hand pulling or mowing will ever eliminate the problem.

The best chance for recovery of the landscape is to allow the native vegetation to gain a foothold over the toadflax that is choking them out. But besides chemicals and selective hand pulling, what else can be used to 'weed out' toadflax? Goats.

Weeds got your goat? Get this.

They have voracious appetites, able to consume 4.5 pounds of dry matter per 100 pounds of body weight per day.

Upon closer inspection, it would appear that goats have been engineered specifically for the control of noxious weeds, given their near-perfect combination of dietary preference and digestive tolerance. Evolution has its share of quirks but how can a species possibly consume an entire bellyful of something as deadly and potent as hemlock?

The basics: within the ruminant family, goats are browsers, whereas cows and sheep are grazers. Browsers prefer to eat twigs and broad-leaved plants, digging in to species that other animals find unpalatable – even toxic. For a goat, sweet green grass will be passed up for such delicacies

as thistle, spurge, toadflax and the like. This practice of selective browsing is what allows goat herds to actively forage an area for several days, eliminating the "bad" vegetation and leaving the "good" vegetation intact. Add to this the by-products of their feasting – namely manure and urine for fertilizer, and good aeration from their hooves – and you have a very effective, environmentally friendly method of both weed control and habitat restoration.

The goat's ability to withstand – indeed relish – such an extreme diet is thanks to a very specialized digestive system. This begins at the goat's narrow and triangular mouth, which is able to strip only the broad leaves from a plant, leaving the stalks behind and rendering it unable to photosynthesize. Their jaws are particularly strong, able to crush and grind seed matter beyond recovery. Special enzymes in the goat's saliva begin to neutralize toxins before entering the digestive tract and, once ingested, any remaining toxins are filtered out by its larger-than-normal liver. They also have voracious appetites, able to consume 4.5 pounds of dry matter per 100 pounds of body weight per day.

The contractor hired for the Silverberry project was Rocky Ridge Vegetation Control of Beaverlodge, Alberta. The company's owner,

Conrad Lindblom, is part of the onsite team (together with an assistant, two horses, Dixie the pet goat and six dogs) to manage the herd and ensure they are feeding in the right areas. While onsite, Conrad and his team must watch for the goats' consumption of the target weed species. Goats tend to browse in a spiral pattern, selectively cleaning out the area of their first choice of plant, then second, then third and so on through a series of consecutive returns. And though they can tolerate almost anything, the herd must sometimes be moved to a different area to prevent overconsumption of a particularly toxic variety.

Operators such as Lindblom will use different species of goat to control different species of weeds, or those that are best suited for different terrain. For example, a cashmere goat (whose coats are shorn and sold for fiber) would not do well in areas overgrown with thorny, prickly varieties of weeds such as thistle. Lindblom's herd is a hybrid of the South African Boer goat breed. This type of goat is less agile than others, and is not well suited to rocky, craggy, or heavily forested areas, but it is quite at home on flatter prairie landscapes.



OTHER GOAT BENEFITS: FOREST FIRE BARRIER CONTROL

Goats help control forest fires in parts of California and Arizona that are particularly prone to drought. Their role? To graze out the low-growing forest underbrush, helping to prevent flames from jumping to the higher canopy and being spread by the wind.

Lindblom and his crew of 410 goats arrived at Silverberry on September 14, 2009 for a 12 day trial to rid the area of its worst patch of toadflax. To watch Lindblom's goats in action, visit www.ab-conservation.com/goats for video footage.

The trial at Silverberry

There has been a long term problem with toadflax at Silverberry. Several control methods have been attempted on the property over the years, from haying and seeding to manual removal to the release of non-native insects which feed on toadflax, each with some degree of success. But because toadflax is classified as a noxious weed in Alberta it is legally incumbent upon the landowner or manager to eradicate it. So a better solution had to be found.

Silverberry is surrounded by agricultural land, and when it comes to the propagation and control of toadflax and other noxious weeds, agriculture and conservation must be good neighbours. Landowners find it futile to control weeds on their property when there is no weed control on adjacent lands, and conservation groups must encourage landowners to consider the impact of herbicide application to shared riparian areas and watersheds.

The current vegetation at Silverberry is a mixture of tame and native Aspen Parkland grasses and plants. This combined plant community is holding up remarkably well against the influx of toadflax, but in the absence of haying, grazing or other methods of control it could impact the rate of native species reestablishment on the property, in addition to potentially reducing the land value and crop production on neighbouring properties.

Lindblom and his crew of 410 goats arrived at Silverberry on September 14, 2009 for a 12 day trial to rid the area of its worst patch of toadflax. The goats don't tend to spread out as they forage; rather they move as one compact, unified group, guided by their noses and given subtle nudges by Lindblom, his assistant and their six dogs. They move across the land relatively quickly and remarkably quietly, heads down, continuously nibbling, the only sound the rustle of hundreds of small hooves shuffling through the grass.

At the end of the 12 days, the area appeared to be completely scoured of toadflax. The proof of the experiment's success won't be fully understood until this summer, when any residual toadflax will be in flower and can be compared to the stem count within caged enclosures (control areas) put in place during the trial.

Given the tenacity and prolific nature of most noxious weeds, Lindblom advises that foraging should be repeated for three consecutive years for optimal success – a small investment of time and energy when compared to the seemingly never-ending cycle of chemical and mechanical methods of weed control. And then there are the economics. Herbicides can be cost-prohibitive for larger infestations. But the price of not eradicating the problem is also steep: Alberta Agriculture estimates that toadflax infestations of as few as 12 stems per square metre can reduce canola and wheat yields by as much as 20 per cent.

Besides the ecological (and potential economic) benefits to using goats for weed control, there are social benefits as well. According to Lindblom, the sheer curiosity of hundreds of goats munching their way along a streambank or across a field is enough to compel passersby to stop and ask about what's going on, and in turn to learn about noxious weeds and this unique, low-impact way of controlling them. (The goats like the attention too; they are always happy for a scratch on the chin before moving on.)

Most importantly, for a Conservation Site such as Silverberry – whose recreational activities include hunting – no price tag can be attached to the benefits of managing the property without chemicals. Nor can there be to the value of restoring native plant diversity, maintaining wildlife and fish habitat, decreasing soil erosion, and avoiding hazards posed by invasive plant species.

What's next for Silverberry?

Once the toadflax infestation is reduced or brought under control at Silverberry, the existing non-invasive plant community may be vigorous enough to stage its own recovery. If not, reseeding with good vegetation will give the existing community a boost.

ACA will reassess the continuation of goat browsing in fall 2010, using field results and costs to determine future programs not just at Silverberry, but also at other sites where noxious weeds are an issue. Watch for a follow-up article in the Spring/Summer 2011 issue of *Conservation*.

As for the goats? A drink, a contented bleat, and another day of feasting to look forward to tomorrow. It's a goat's life. ■

Clockwise from top left: Linbolm's horse enjoys a much needed break; a well-used footpath accessible from the south end of the lake takes you to an abandoned building and nearby artesian well; Dixie, more pet than working goat, gets a good rub from the author; toadflax in flower before the goat brigade devours it from the top down; Conrad Lindblom stands with a watchful eye over his 410 goats; a small lake at the centre of the site is home to pelicans and other migratory birds.

YOU CAN HELP PREVENT THE SPREAD OF NOXIOUS WEEDS

- Carefully read the contents of wildflower seed mixes, and do not purchase seed mixes which do not list their contents.
- Get involved in community events. Nature Conservancy Canada hosts an annual 'Knapweed Rodeo' in the Waterton area, or join in the 'Blueweed Blitz' hosted by the Pincher Creek Watershed Group. Visit the Alberta Invasive Plants Council at www.invasiveplants.ab.ca for more information.
- Cross-country activities such as hiking and quadding can easily transfer invasive plant seeds from one area to another. Consider taking a few minutes to hose off your boots and / or vehicle before visiting another area of the province.



Photo: Len Peleshok



NOT-SO-TRIVIAL NOXIOUS WEED TRIVIA

- According to the World Conservation Union, invasive species are the second most significant threat to biodiversity. (Source: MULTISAR)
- Invasive plants have infested 100 million acres in North America, spreading by three million more acres each year. They have claimed seven million acres of National Park land, and infest 10 square miles of public and Crown land every day. (Source: National Park Service, US Department of the Interior)

Nature talks. We listen.

A thriving herd of bison is testament to our successful land reclamation program. Since our operation began we've replanted 5 million tree and shrub seedlings, contributing to a healthy environment for two-legged and four-legged creatures alike. We've now reclaimed more than 4,600 hectares of former mining land—about 22 percent of our base operation—and we're pioneering new methods in re-establishing wetlands. That's why we've been industry leaders from the beginning—innovating in all areas of oil sands development.

For continued updates on our environmental initiatives and commitment to responsible development, sign up for our e-newsletter at syncrude.ca

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Avian Advocates

DEDICATED TO BAND AND PROTECT

Two heavily clothed men stand on the side of an Alberta highway in the dead of winter. One holds a fishing rod, while the other stands armed with a padded salmon landing net. You may wonder – what on earth are they doing? **Is this legal?**

■ by Gordon Court



Brenda Bohne, an owling volunteer, prepares to release two great gray owls after banding.

What sounds like a fun and exotic wildlife hobby is actually much more than meets the eye. Both men are hoping to catch a great gray or northern hawk owl as dedicated members of a small cadre of volunteers licensed by the Alberta Fish and Wildlife Division and the Canadian Wildlife Service to capture and band raptors in the province. Their annual job: search appropriate habitat to determine the breeding/wintering presence of a wide variety of raptor species that they will ultimately band.

These dedicated Citizen Scientists contribute greatly to raptor conservation. Their efforts have led to a greater understanding of avian longevity, survival estimates, migratory behaviour, dispersal behaviour, age and sex distributions of wintering populations, moult patterns, aging techniques, condition indices, primary mortality factors...and the list goes on and on.

Beyond the lengthy list of scientific findings, banding activities provide critical information on avian species in Alberta. The general status ranks (AlbertaWildSpecies.ca) for most birds of prey in the province are made using the data, knowledge, and, sometimes, opinion of banders.

For instance, recognizing the declines in broad-winged hawk populations in Alberta's aspen parkland ecoregion is almost entirely because of trend information gained from personal records of licensed banders, some of it dating back over 50 years. The species is currently listed as *Sensitive*.

There is an ongoing concern that human-induced environmental change is negatively affecting many wildlife species. Raptorial birds are excellent "barometers" of such change provided someone is out there collecting data. Such data from licensed banders, some of it more than 40 years old, has been instrumental in revealing long-term declines in the annual productivity of Swainson's and ferruginous hawks. This type of information helps put the concern over prairie raptor population declines in context.

Many raptor species are secretive, with evidence of their presence hard to obtain. Thanks to data from licensed banders, we now harbour conservation concerns for certain species. Alberta Fish and Wildlife biologists don't have the time and resources to conduct extensive inventories for many of these species; but when banders supply point location data on raptor nest sites to FWMIS, area and regional biologists gain the additional information needed to respond appropriately to land-use referrals involving the disposition of certain Crown land holdings. Similarly, Alberta Conservation Association biologists would review such databases when they evaluate potential Conservation Sites. A simple search of FWMIS shows the massive increase in our knowledge of the presence/absence of raptor nesting locations in the last decade, most of it is collected from licensed bander volunteers.

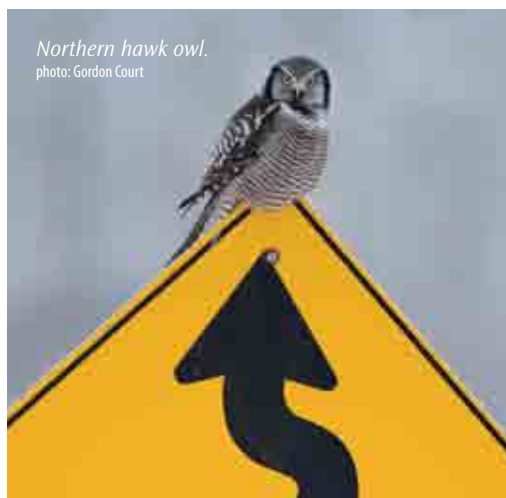
Alberta Fish and Wildlife biologists put considerable time, energy and resources into developing tools, like the Habitat Suitability Index Models

for sensitive species. These models, used in land-use planning, are often derived from the literature and need to be validated by data collected around local nests; many times licensed banders have offered up the information to facilitate the process.

Information on the wintering habitat requirements of many raptors is also coming to light, almost entirely from the records of licensed banders. A simple mapping exercise on winter captures of the great gray and northern hawk owl would quickly delineate areas of consistent winter use by these species. Such conclusions might, one day, be used as the rationale to protect areas, such as Crown holdings.

Often, Alberta landowners are unaware if certain raptor species are present on their land. A common way they become aware of such species is through contact (and often a long-term friendship) with a licensed bander. Many Edmonton area banders make a point of including landowners and their extended families in their work, most often to encourage the stewardship of the owl habitat on private property. Some landowners have gone on to request information on conservation easements for the long-term protection of such habitat. At the very least, others know of the habitat under their stewardship and will likely consider the raptors in future land management activities.

Some raptor species have become relatively rare in certain parts of the province through habitat destruction or alteration. Recreational banders have reversed such trends in some areas by providing artificial nesting structures for these birds. For example, veteran bander Ray Cromie (1,421 FWMIS records to date), with the help of funds from Alberta Sport, Recreation, Parks, and Wildlife (ASRPW), has been placing owl nest boxes in forested areas lacking the structure (standing deadwood) needed



Northern hawk owl.
photo: Gordon Court

Bird banding in North America goes back over 100 years. Banders in Alberta are required to have their permits reviewed on an annual basis and they are also required to submit all of their data to the Alberta Fish and Wildlife Division. The information is then stored in a state-of-the-art Fisheries and Wildlife Management Information System (FWMIS) database.

photos: Ferruginous hawks on nest baskets.



photos: Gordon Court



photos: Lisa Monsees

Great horned owllets (20 days old).

Attempting to band great horned owllets (May 2010).

Ray Cromie climbs to one of more than 300 nesting boxes he has installed for cavity-nesting owls, like this saw-wheat owl.

for natural cavities. Ray and his small team of volunteer “owlers” have constructed over 300 nesting boxes, installing them in suitable woodlots throughout the counties of Athabasca, Lamont, Beaver and Strathcona. This project is very successful and many Albertans, from landowners to graduate students, have benefited. Most of all, wildlife has benefited too. As many as 31 pairs of northern saw-whet owls, two pairs of barred owls, and two pairs of boreal owls have been nesting in these boxes in the last 10 years. Other species, like the northern flying squirrel, goldeneye and bufflehead, also routinely raise their young in the boxes.

Thanks to ASRPW funding, Hardy Pletz has been erecting nest baskets for ferruginous hawks in areas where traditional nesting trees are dead or dying, unable to support large sticknests. With 3,262 FWMIS records to date, Pletz also protects the remaining live nesting trees by stacking rocks at the base of trees or by winding barbed wire along trunks. Both techniques stop cattle from rubbing off the bark and killing the trees.

You might ask if all this information is really worth subjecting wild animals to the disturbances that may be caused by licensed banders. Records indicate raptor banding injuries in Alberta occur in less than one tenth of one per cent of all captures. This is virtually negligible considering the annual bird losses (numbering in the thousands) from collisions with cars each year. Considering this fact, and the tremendous number of positive spin-offs from the activities of licensed raptor banders, it’s safe to conclude these activities, when well-regulated, are worth the risks and will continue to deliver conservation dividends in Alberta for many years to come. ■

For more information on Alberta Conservation Association Conservation Sites visit: www.ab-conservation.com



photos: Gordon Court

With its soil exposed and hummocky it looks more lunar than earthly, yet a web of deeply eroded trails reveals the historical importance of this landscape. At its core, a pungent odour permeates the surroundings like formaldehyde in a high school biology lab, and hairy tufts dangle from nearby vegetation like tinsel on a tree.

If you are trekking through Alberta's mountainous terrain and come across something that matches this description, you've probably stumbled onto a mineral lick. It would hardly seem as though you've hit a goldmine, but to a mountain goat, bighorn sheep and other wildlife, this is the ultimate spa, providing nutrients essential to their wellbeing.

■ photos and text by Mike Jokinen

SPA BENEATH THE SOIL

Making miles for mineral licks



It's all in the soil

Alberta's mountain goats and bighorn sheep consume mineral lick soil to compensate for dietary deficiencies during late spring and early summer. When they make a quick transition from their winter diet to lush, green spring forage, its chemical properties impair food absorption. Lick soils help stabilize the digestive system and supplement dietary demands during body and horn growth or while nursing young. Sodium is often thought of as being the driving attractant of a mineral lick; however, other elements are also important. The chemical content of a southern Alberta bighorn sheep mineral lick is similar to a sheep mineral lick located in San Gabriel Mountains of California, where researchers found calcium and magnesium to be the likely elements the sheep were seeking for their dietary needs.

Mineral attraction

A mineral lick is not only an important dietary source, but also a fundamental component of mountain goat and bighorn sheep territory, influencing movement patterns and affecting population distribution. Mountain goats and bighorn sheep migrate along traditional travel routes within their territory to access lick regions. Researchers in British Columbia

found mountain goats traveling up to 17 kilometres to access licks during the summer season. High use mineral licks can attract dozens of animals at one time, day and night during the peak season. In Glacier National Park, approximately 120 goats travel several kilometres to a single lick along the park's southern boundary. A neighbouring population of about 40 goats inhabiting the adjacent national forest travel far greater distances to access the same lick. The travel routes used by goats and sheep are typically well established trails that are learned from a young age. Maintaining connectivity between mountain passes and ridges traditionally used to access lick regions and ranges adjacent to licks is essential to population health. These travel routes are not only important to mountain goat and sheep populations, but also to a wide variety of wildlife.

Where the wild things are

The conservation of mountain goat and bighorn sheep populations requires protection of their habitats, since nearly all of their range in Alberta is located on public land. Disturbance of the area surrounding these essential mineral licks may negatively impact goat and sheep populations. When it comes to land-use planning for these areas, travel corridors, and the landscapes surrounding them, we can't afford to gamble.

If you stumble onto a mineral lick, find a comfortable seat at a distance and enjoy the wildlife viewing experience. Ask yourself how much value and enjoyment you receive from experiences like this and will future generations witness these wild places in the same way. ■

Natural mineral deposits, or salt licks as they are more often referred to, are composed of concentrated minerals that have become exposed by erosion. They typically occur near groundwater seeps, around tree roots, or on cliff faces.

To see the secret world of wildlife captured on trail cams at these mineral licks, visit us online at www.ab-conservation.com/minerallicks.



Mineral licks are essential to the diet of wildlife species worldwide. Bats, parrots, monkeys, apes, and several African game species benefit from mineral licks. In Nigeria, wild game frequent mineral licks, providing tourists and researchers with excellent photography and behavioral observation opportunities. In North America, mineral licks are primarily used by deer, moose, pronghorn, elk, bison, sheep and goats; however, grizzly and black bears also consume mineral lick soils.

The Bonds of SURVIVAL

The evolution of maternal behaviour in elk

■ by Dr. Wayne Lynch

Maternal behaviour in elk has evolved to lessen the predator risks to their calves. Mothers start by giving birth alone in a secluded location, favouring areas where there is a mix of dense cover, open meadows, and nearby water. Elk calves are wobbly at birth and spend the first few weeks of life hiding, outstretched and motionless under bushes or among thick grasses. Their spotted coat camouflages them further.

In Jasper last spring I watched a spindle-legged young elk calf trot closely behind its mother as if led by an invisible leash. Within moments the pair disappeared into the shadowed seclusion of a clutter of lodgepole pines. I wondered at the time how likely it was that this vulnerable calf would survive until the following summer. In the year to come, many forces, including predators, inclement weather and lack of food would conspire against the young elk. Would it be one of the lucky survivors?

In Alberta, most elk calves are born in the few weeks around June 1st. At birth they weigh an average 16 kilograms, but their weight can be a third less if their mother endured a difficult winter with deep snow, exceptionally cold weather or poor feeding conditions. From the very beginning, such featherweight calves stand little chance of survival and predators soon weed them out.

In the mountains of Alberta, three main predators have a taste for “elk calf au printemps”: bears, wolves and coyotes. Predators are a strong evolutionary force influencing the behaviour of elk in their struggle to survive. In the 1980s, researchers looked at grizzly predation on elk calves in Banff, Alberta. They discovered that grizzlies purposefully travel to areas where elk calves are frequently born. In these areas, the resourceful bears zigzag back and forth, walking rapidly, and repeatedly sniffing the ground and the air. In one instance a mother elk tried to lure a hunting grizzly away from its hidden calf six different times by approaching the bear closely, sometimes as near as 20 metres.

Researchers in Jasper noted that wolves preyed upon elk calves most heavily when the calves were born in areas where wolf dens were located. In fact, these nearby calves were preyed upon six to eight times more often than calves that were born at a distance from denning wolves. To avoid the threat of wolves, mother elk will sometimes give birth on heavily wooded islands surrounded by swift flowing waters, and they commonly do this along stretches of the Athabasca River. The use of secluded islands for calving was well known to aboriginal people. Accounts from the Palliser Expedition of 1857-1860 stated that native hunters annually visited islands in the Kananaskis Lakes in early summer to search for mother elk and their calves. Another tactic used by birthing mother elk to reduce wolf predation is to leave the valley bottoms where wolves typically have their dens and move to alpine areas where encounters are less likely and visibility is greater.

The first three weeks of life are the most vulnerable time for an elk calf.

The first three weeks of life are the most vulnerable time for an elk calf. During these weeks the calves stay hidden and are visited by their mothers just five or six times each day to nurse. I witnessed one nursing session that lasted less than two minutes, the usual duration of these maternal visits. Typically, mother elk monitor their calves from a distance; close enough to react to danger, but far enough away so that their own strong scent doesn't betray the youngster's location. To further lessen odours that might disclose a calf's presence, mother elk commonly consume the placenta and eat any dirt and leaf litter that gets soiled with birth fluids. Following nursing sessions, mothers also frequently consume the feces and urine of their offspring. Newborn elk calves give off so little odour that domestic dogs have been known to pass within a metre or two of a hidden calf without detecting it.

At 20 days old, an elk calf has more than doubled its birth weight and has the strength and stamina to outrun most predators. Mothers with calves of this age join together in temporary cow-calf groups that commonly number between six and ten animals. Biologists recognize this grouping behaviour as an anti-predator strategy. They call it the “selfish herd.” What better way for a mother elk to protect her offspring from a predator than to surround it with other vulnerable calves, any of which might be preyed upon instead of hers.

The choices a mother elk makes to ensure the welfare of her calf actually begin in the autumn rut, 8½ months before the calf is born. Female elk preferentially mate with dominant mature bulls, identifying bulls with the “right stuff” by the loudness and frequency of their bugling, as well as the size of their antlers and the seductive scent of their urine. When mature bulls do the majority of mating the rut is shorter in duration (roughly three to four weeks) and is more synchronized. All of these characteristics ensure that calves are born at the optimal time in the early spring. A rut that is dominated by yearling bulls and two-year-olds is much less synchronized and may last a month longer. As a result, calves may be born later than usual in summer. These late arrivals nearly always suffer higher predation rates, and with less time to grow, often enter the winter season in feeble condition.

Perhaps the most fascinating aspect of the mother-calf relationship is how evolution has shaped a mother elk's biology and to unconsciously maximize her lifetime output of calves. Female elk typically give birth to a single calf each year after they reach the age of three or four. Male calves weigh more at birth, nurse more frequently and for longer periods during each feeding session, wean later, and grow faster than female calves. Male calves that are well fed in their first year are more likely to become dominant bulls and eventually breed with multiple partners - as many as 20 during a single rut - thus passing their mother's genes to many

offspring. However, raising a male calf places greater energy demands on a mother elk because she must produce more milk. The drain on her energy reserves may be so extreme that she has to skip having a calf the following year to give herself time to recover. If a mother elk tries to raise a male calf on less milk she may end up raising a weakling calf who is unlikely to grow up and become a dominant bull strong enough to breed. From an evolutionary standpoint, the mother who invests in a weakling male calf wastes her reproductive effort and passes on no copies of her genes. In this latter instance, it's better for the mother elk to produce a female calf, all of which, once they reach maturity, usually breed every year. In Eurasian red deer, which some biologists believe is the same species as the North American elk, researchers have shown that mothers unconsciously play it safe when they are young and have a tendency to rear female calves. As an adult female red deer grows older and more experienced, she can afford the extra costs of rearing a strong male calf who has the potential to become a dominant bull and pass on many copies of its mother's genes. Such marvelous examples of flexible behaviour keep me endlessly fascinated with the natural world. ■

Dr. Lynch is a popular guest lecturer and an award-winning science writer. His books and photography cover a wide range of subjects, including the biology and of owls, penguins and northern bears; arctic, boreal and grassland ecology; and the lives of prairie birds and mountain wildlife.



Did you know?

Elk calves weigh as little as 16 kilograms at birth and are completely helpless. But by just 20 days of age, young elk have doubled their weight and can outrun most predators.

- Nicole Nickel-Lane



Alberta
WORM INVASION
Project

Lumbricus terrestris.

Got Bait?

■ by Erin Cameron

How we've spawned an underground invasion

According to angler surveys conducted by Alberta Conservation Association (ACA) in 2009, only 19 per cent of anglers in northern Alberta were aware that earthworms are a non-native species in the province.

Sampling for earthworms by hand-sorting leaf litter.

If you were asked to recount an interesting fact about earthworms, you might say that when you cut an earthworm in half, both pieces survive or that earthworms come up when it rains to avoid drowning, or that they're good for the soil.

Surprisingly, none of these statements are true. Only the front end of an earthworm continues to live after it's cut. Earthworms can survive in wet soil and even live underwater for weeks. And they only rise to the earth's surface on rainy days because it allows them to avoid drying out when searching for food or a mate.

As for the last statement, it's hard to believe that earthworms are not good for the soil. However,

even though they are beneficial in gardens and other agricultural areas, earthworms can have a negative effect on forests.

Earthworm Origins

You may be even more surprised to learn that most earthworms are non-native to North America. They became extinct during the last ice age, approximately 10,000 years ago. Only one native earthworm species has been found in Alberta's Porcupine Hills, an area that was not covered by glaciers.

All other earthworms identified in the province are from Europe. European settlers brought soil and plants likely containing earthworms or their cocoons (egg sacs). Earthworms may also have been introduced in ballast used by ships, as ballast was originally soil and not water.

Invading our Forests

Following their introduction to North America, non-native earthworms spread across the continent. Only recently have earthworms begun invading Alberta's forests. University of Calgary soil science professor Dennis Parkinson first published a report of earthworms spreading into his study plots in the mid-1980s. As a result, Parkinson and his research group were one of the first in North America to investigate the impacts of non-native earthworms in forests. Since Parkinson's initial research near Kananaskis, earthworms have continued to invade that area and there are now four species present. In northern Alberta's boreal forest, where University of Alberta biology professor Erin Bayne and I have been conducting research since 2004, we have found six species of non-native earthworms.



photo: Erin Cameron

Should we be concerned about non-native earthworms in our forests? Earthworms are considered beneficial in agriculture and gardens because they promote nutrient cycling and soil structure development by breaking down organic material. Yet these same activities in forests can have a detrimental effect on organisms that rely on a thick leaf litter layer.

Depending on the particular earthworm species invading an area, an invasion may remove an entire leaf litter layer. Research is showing that small mammals, birds, salamanders, and plants can be negatively affected by earthworm invasions in forests. As the leaf litter layer shrinks, so does the number of litter-dwelling insects; with less available food, the woodland salamander population declines. In the northeastern United States, where most of this research is being conducted, earthworms appear to be the driving force behind changes in native forest plant communities rather than non-native plants, as was previously believed.

Ecosystem Engineers

In Alberta's foothills, University of Calgary research has also found dramatic changes in soil structure, fungi, invertebrates, and understorey plant communities as a result of earthworm invasions. To get an idea of what these changes look like, imagine walking through a forest without hearing the familiar crunch of leaves beneath your shoes and seeing fewer varieties of plants. These effects may seem large for something as small as an earthworm, but they are entirely possible. Earthworms are ecosystem engineers. Like beavers, which are a more familiar engineering species, earthworms change the structure of their environment. These changes can impact a wide variety of organisms. In boreal forest environments, where less is known about the impacts of earthworm invasions, we are beginning to examine their effects on carbon storage, soil structure, hydrology and plant communities.

The Big Bad Worm

Unlike other invasive species such as the mountain pine beetle that disperse by flying, earthworms can't spread rapidly on their own. When left to their own devices, they only invade 10 metres per year.

Humans may be to blame for how earthworms invade more quickly. Transport by vehicles is likely to be particularly important in the spread of litter-dwelling earthworms because their cocoons are found on or near the surface of the litter, easily picked up by vehicle tire treads.

An interesting study conducted in Holland examined this phenomenon by using coloured beads. The authors found the beads, which were the same size as a cocoon, were easily transported by vehicles.

Other species of earthworms that live in the soil beneath the litter layer (mineral soil) are larger and, as a result, are often used as fishing bait. Dumping of leftover bait on shores or in lakes is another major way that earthworms may be introduced. Besides these human-related methods of transportation, earthworms may

also spread along waterways or be carried by vertebrate predators such as robins.

Erin Bayne and I studied how earthworms spread in the boreal forest of northern Alberta. Our results showed that earthworms were more likely to be found near roads and boat launches as compared to forest interiors and opposite shores of lakes. This suggests that vehicles are a major cause of earthworm invasion. We also found that earthworms are not normally present after the construction of a new road. Instead, they become more common after traffic on the

WRANGLE YOUR WORMS

Earthworms are invading Alberta's forests and can harm plants and wildlife.

HELP STOP THE SPREAD

- **DON'T DUMP** (don't dump worms or bait) (don't dump)
- **SAVE WORMS** (do your best to keep worms out of the garbage)
- **AVOID TRANSPORTING** (avoid transporting worms)

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Alberta WORM INVASION Project



Aporectodea tuberculata.
photo: Cory Olson

Depending on the particular earthworm species invading an area, an invasion may remove an entire leaf litter layer.

road increases, suggesting that earthworms are most often introduced by traffic rather than soil and gravel used for construction.

Popular species used for bait were most often found near boat launches. Consequently, anglers leaving bait behind also appears to be a key mechanism of earthworm introduction. Transport by waterways or non-human vertebrates appear to be much less important than those human activities in promoting earthworm spread.

STOP the Spread

A key question remains concerning the extent of earthworm invasions in Alberta. Our data on earthworms near roads predict that approximately nine per cent of the boreal forest of northeastern Alberta is likely invaded by earthworms. In the next 50 years, 49 per cent of

suitable forest habitat is projected to be invaded as human activity intensifies in northeastern Alberta. This is according to a model we created to estimate future earthworm spread. The area invaded may be even larger, as this estimate includes spread of earthworms by only vehicles, not anglers.

On a more positive note, our surveys suggest species that spread mainly via anglers have a more restricted distribution. Larger, mineral soil-dwelling species tend to have a more severe impact than the smaller species living in leaf litter. Even though the smaller litter-dwelling species may have less severe impact, the changes they cause in forest soil structure are believed to make it easier for mineral soil-dwelling earthworms to establish themselves. ■

Erin Cameron's research on earthworm invasion was funded through ACA's Grant Eligible Conservation Fund. Visit www.ab-conservation.com for details.

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The Lure of our Lakes

Trail cams reveal the success of stocked lakes

■ by Bill Patterson, ACA

A picture is worth a thousand words...

In our case, it's worth even more than that. Consider the constraints of tighter budgets, the necessity to work efficiently, and undoubtedly the most important, the needs of anglers across the province – the people who spend tens of thousands summer hours fishing for stocked rainbow trout at their favourite lake.

The job *sounded* easy: all I had to do was evaluate Alberta Conservation Association's (ACA) rainbow trout stocking program, better known as the Enhanced Fish Stocking Program (EFSP). Keen on effectiveness and efficiency, ACA ensures the primary objective of the stocking program is to "increase opportunities to catch and harvest" fish and assess how well we're stocking rainbow trout. I planned to use common methods to assess fishing quality, effort and satisfaction, as well as stock abundance and structure. The timing was perfect as I was in the midst of pursuing my Masters of Science degree. Thanks to the EFSP, I was armed with an interesting project and necessary support for my MSc research.

photo: Bill Patterson



photo: Paul Jpnes

This is when that simple yet significant picture changed everything. Turns out, evaluating 60 lakes across Alberta is somewhat costly! Fortunately, I met the man behind the camera: Brett van Poorten, a University of British Columbia fisheries researcher, was exploring the costs and benefits of programmable trail cameras and aerial flights to estimate angling effort on stocked rainbow trout lakes near Kamloops. What a brilliant idea – using a trail camera to capture pictures of anglers every hour. After all, labour is what makes creel or angler surveys so expensive. Now cameras could take on the brunt of the work, all day, seven days a week, all summer long.



Emily Turton, ACA seasonal employee, assists with the study.

In addition to measuring angling effort and harvest, we had to estimate the number of rainbow trout left in the lakes after the summer. I looked to research conducted by Alberta Fish and Wildlife to help me estimate population size using a gill netting protocol during cool water temperatures like the fall.

We didn't stop learning that first year. To help calibrate the catches in gill nets, I planned to mark fish during the summer months and recapture them. If I captured marked fish, I could calculate the efficiency of the gill net (the proportion of the rainbow trout biomass or stock it catches). We tried to catch and mark fish with lake traps, angling and boat electrofishing at night. And...no luck. Well, we caught *one* fish... over and over. At the same time, the anglers

series of interviews with anglers, asking them how long they fished for and how many rainbow trout they caught. They told us about their experiences from fishing at the study lakes. We soon learned that on average, the anglers needed six to 32 hours to catch a rainbow trout. That was odd given the seemingly high stocking rates, ranging from 300 to 1,500 fish per hectare (an area of 100 by 100 metres). But because of the surprisingly low catches, the estimates of anglers' harvest were also low and ranged from eight to 31 fish per hectare for the summer.

We found more than the statistical results of the surveys to be interesting: while we thought the anglers would be disappointed with their fishing experiences given their low catch rates, the opposite was true. They were satisfied with both their catch and the size of fish.

The fall gill netting went on without snags: cool and sunny weather made for perfect conditions working in a small boat. When we finally confirmed the estimates of rainbow trout after a summer of fishing, we were somewhat taken aback. We expected low numbers because of the challenges we had in marking the fish and the very low angler catches, but not that low. The 2009 field season brought more of the same: we recorded very low angler catches, high satisfaction with varying motives, and low populations in the fall after the summer angling season.

Meanwhile, the programmable trail cameras were working wonderfully. The estimates of angling effort (hours) at the study lakes had adequate variances; however, we were unsure if we were miscounting anglers in the pictures. So during the 2009 season we validated the method by visually counting anglers at the same time cameras snapped away. We learned that we were not under or overestimating angling effort – excellent, and certainly a relief.

Our next step was to investigate stocking rates. That is, in light of low catches and survival, can we manipulate the stocking practice and maintain (or maybe even improve) catches and

number of rainbow trout stocked in some lakes allows us to redistribute fish into lakes that do better in terms of catch and survival.

All of these small details add up to our big picture. To evaluate how we are managing a program, we compare the results to the original goals and make the necessary adjustments.

Stocking Alberta lakes with rainbow trout has helped improve angling opportunities throughout the province. With organizations such as ACA discovering more sustainable ways of managing their resources, they are also becoming more accountable. Therefore, we are more in tune with the sociological, economical, and ecological components of our stocking program. Because after the research has wrapped up, thousands of photographs later, we'll never tire of that picture – of an angler enjoying his favourite lake, poised in expectation to catch a rainbow trout. ■



photo: Brendan Ganton

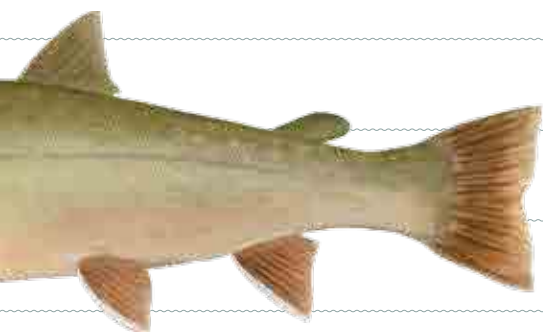
Number Crunch After snapping all summer long, our trail cams took pictures for approximately 100 days from late May to August 31. Four cameras at three lakes took a picture every hour for 14 hours a day, beginning at 8 a.m. and taking a break for the night at 10 p.m. A quick number crunch indicates approximately 5,600 photos taken last summer (100 days × 4 cameras × 14 hours = approximately 5,600).

were not having much luck either.

While the cameras were busily snapping pictures of anglers on the lakes, we began the angler survey portion of the project. We conducted a

angler satisfaction? If these adjustments uphold anglers' motivations and satisfaction with their catches, ACA is recognizing the value of these sport fisheries yet being more accountable with stakeholder dollars. Potentially adjusting the





Seventy per cent of migratory bull trout spawn in a four-kilometre reach of a single tributary of the upper Oldman River, then migrate downstream to various over-wintering tributaries and main stem channels – meaning this **single** tributary is vital to the long-term perseverance of the species.

No More Bull?

Learning to Respect Bull Trout in the Upper Oldman Watershed

■ by Trevor Council, ACA

Slapped with a bad rap

Maybe you have heard the tale before: after a tiring day with little luck, the fisherman finally has the elusive 12-inch rainbow trout heaving at the end of his line...only to have a voracious bull trout double its size snap up his prize. As tenacious fighters and aggressive feeders that don't hesitate to snack on the young fry of other species or even fish smaller than them, bull trout have been slapped with a bad rap.

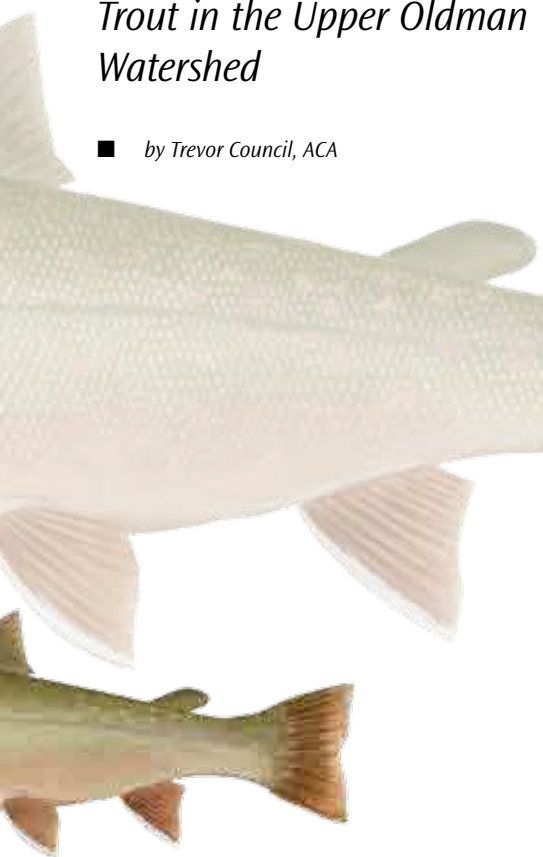
In fact, the ingrained predatory nature of Alberta's provincial fish is the primary reason they are accused of the decline in the more desirable cutthroat trout and mountain whitefish – even though all have coexisted for thousands of years. Bull trout were routinely culled or caught, thrown on the streambank to die. And while this angler attitude has certainly led to declining bull trout populations in Alberta, it's not the only perpetrator piloting the decline.

Numbers don't lie

For over 50 years, human activities including the creation of barriers to fish migration and the introduction of non-native fish species have had a profound influence on bull trout distribution and abundance. Habitat degradation and

fragmentation is prevalent in several drainages, particularly in southwestern Alberta, with blockages caused by major dams, irrigation diversions, and industrial and municipal roads. Bull trout are particularly sensitive to these disturbances, and the intense recreational and industrial activities in the upper Oldman watershed have only exacerbated the problem. Numbers don't lie: bull trout currently occupy 34 per cent of their historical distribution in the Oldman River watershed, with similar declines documented throughout the rest of the province. We can now slap bull trout with another label: they are officially a *Species of Special Concern* in Alberta.

How do we know what we stand to lose if we do not know what we have? As part of a drainage-wide assessment of the cutthroat trout population conducted by Alberta Conservation Association (ACA) in 2006, we sampled one of several tributaries in the upper Oldman watershed. Earlier that year, several sites had already been electrofished and yielded numerous juvenile bull trout. The sample sites on this tributary, were unique as bull trout in the 60 cm to 80 cm range were found in a creek a mere few metres wide. Why were these bull trout here?



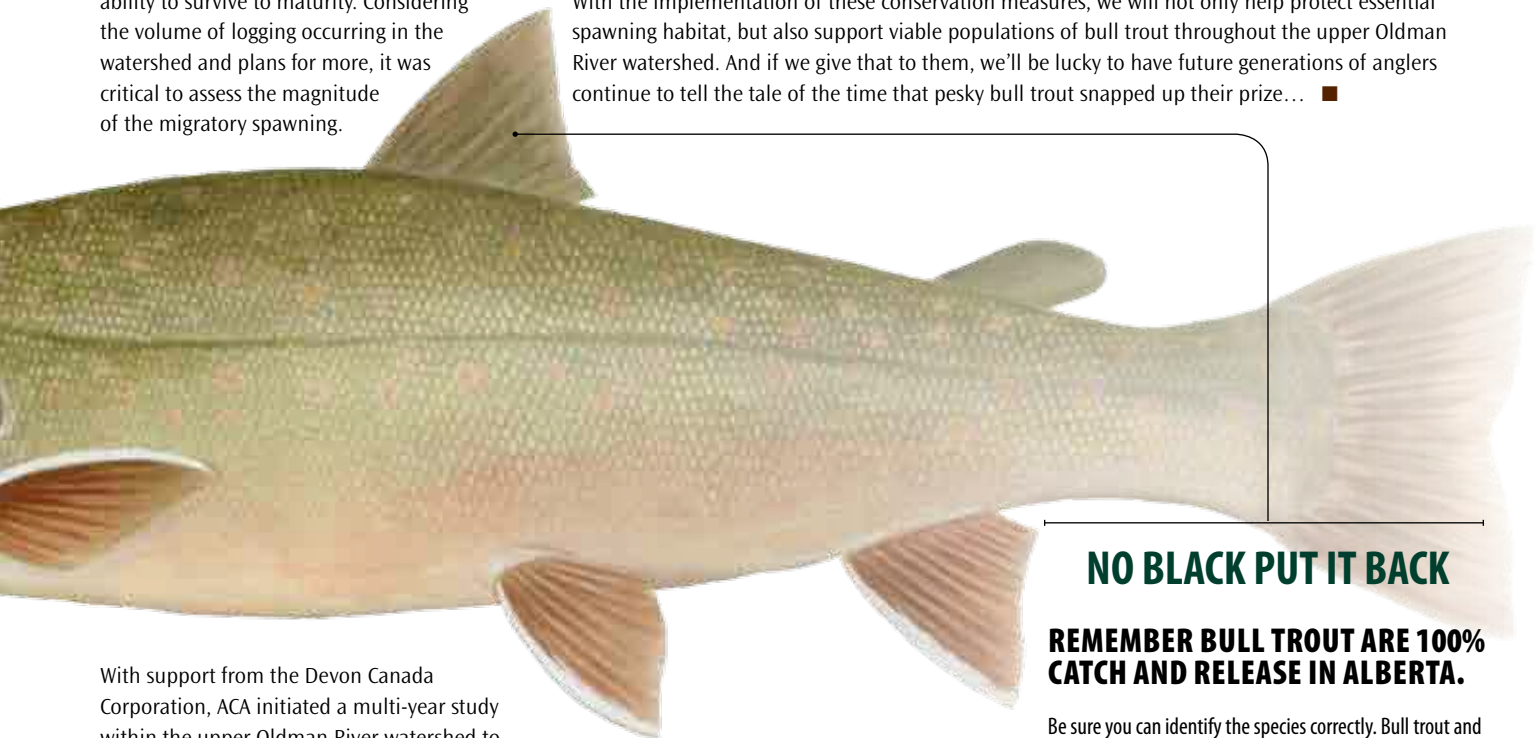
Size matters

The ultimate clue was the size of these particular fish: we suspected they were migrating into the tributary in preparation for fall spawning. Bull trout have very specific spawning habitats, requiring clean, sediment-free, groundwater-fed streams. Any modification that causes erosion, increased silt, or changes in flow or temperature affects the number of trout that hatch and their ability to survive to maturity. Considering the volume of logging occurring in the watershed and plans for more, it was critical to assess the magnitude of the migratory spawning.

Protection depends on designation

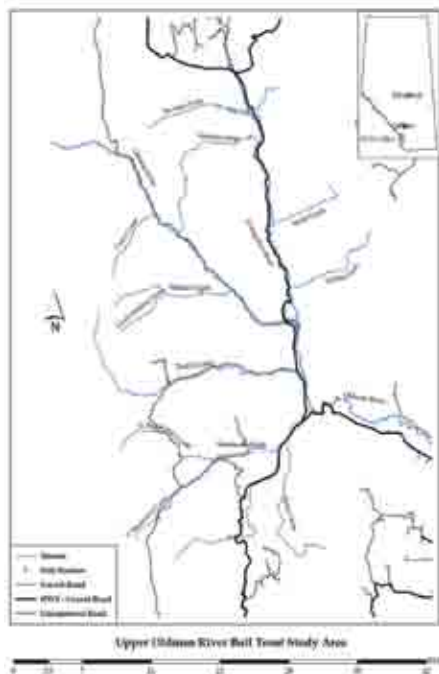
Alberta Sustainable Resource Development is considering the modification of logging operations upstream of an area with the highest redd densities until the tributary is classified as a *Class A* water body. This is the highest habitat sensitivity designation possible under Alberta's Water Act *Code of Practice for Watercourse Crossings*. The legislation would see any proposed activities affecting this critical stream follow a process that involves site-specific review and approval by Alberta Environment, Department of Fisheries and Oceans and Alberta Fish and Wildlife. Special restrictions associated with building watercourse crossings over *Class A* streams also prevent any further harvest in the tributary.

With the implementation of these conservation measures, we will not only help protect essential spawning habitat, but also support viable populations of bull trout throughout the upper Oldman River watershed. And if we give that to them, we'll be lucky to have future generations of anglers continue to tell the tale of the time that pesky bull trout snapped up their prize... ■



With support from the Devon Canada Corporation, ACA initiated a multi-year study within the upper Oldman River watershed to better define the status of bull trout and identify spawning habitats that required protection. We assessed population abundance from mark-recapture surveys using traps, while redd (the gravel nests created by spawning trout) surveys pinpointed the location of spawning habitat. The project was expanded in 2008 to increase trapping effort on three additional tributaries and to increase redd survey coverage.

The project revealed that 70 per cent of migratory bull trout spawn in a four-kilometre reach of a single tributary of the upper Oldman River, then migrate downstream to various overwintering tributaries and main stem channels – meaning this *single* tributary is vital to the long-term perseverance of the species. Any negative impact within the tributary will further decline the sensitive populations of bull trout, and without protection, they have little hope.



NO BLACK PUT IT BACK

REMEMBER BULL TROUT ARE 100% CATCH AND RELEASE IN ALBERTA.

Be sure you can identify the species correctly. Bull trout and brook trout are quite similar, and even experienced anglers get them mixed up. Brook trout have black spots on their dorsal fin, whereas bull trout do not.

Remember: **No Black Put it Back.**

Practice safe fish handling. Use barbless hooks, retrieve the fish quickly and limit handling time as much as possible.

Avoid angling on those especially hot summer days. Exposure to extreme heat is very stressful to fish and can significantly increase mortality.

- Nicole Nickel-Lane



Conservation in Action

Canada and the US: Conference puts Alberta on the Map of Bull Trout Conservation

■ by Nicole Nickel-Lane



Often times the most inspiring part of conservation isn't the achievement so much as it is the passion that motivates people to do something that makes a difference.

So when a handful of researchers in the Pacific Northwest expressed concern to one another about the declining numbers of bull trout in their regions, they decided to get together to talk about it – not in some boardroom with catered lunch, but in tents, in a field, on their own time and their own dime. From these humble, informal, collaborative beginnings the *Salvellinus Confluentus* Curiosity Society (ScCS) was born.

At the time, bull trout conservation wasn't part of anyone's work plan, but it was quickly included following that first fireside 'conference.' Though the bull trout has since become a priority species for many agencies, the ScCS continues to meet for their annual Conference outside of any official framework. In fact, many delegates still devotedly attend on their own personal time and budget, driving their own vehicles with family in tow.

Why this extraordinary level of dedication?

The goal of the ScCS was set during that first Conference in 1989: To share knowledge and energies to develop rational management of wild bull trout stocks and habitat in the northwest. The Society doesn't come up with a universal bull trout management plan since most are already underway at the agency level. Rather, the meetings function as a sounding board, an open forum in which to share problems, best practices, what can be done and how to move forward. This open exchange of information allows bull trout biologists and agency officials to learn from one another, do more with less staff, use angler dollars more wisely, and generate better reports and data to manage the species most effectively. And this, it seems, has made the biggest difference in the conservation of bull trout throughout western Canada and the northwest USA.

Today, the Conference consists of two and a half days of formal presentations planned around a day of field work where participants assist with ongoing bull trout studies occurring in local watersheds. Typically the meeting is attended by 60-100 people including biologists and agency representatives from across the Pacific Northwest, British Columbia and Alberta. The agenda is relatively informal, which helps foster camaraderie and an atmosphere of collaboration amongst participants.

The highlight of the agenda is the field day, which provides an excellent opportunity for delegates to see bull trout in other habitats and in conjunction with other land use programs. Exposure to the same species in different habitats offers valuable alternate perspectives to common problems.

An Albertan perspective

ACA was proud to host the 2009 *Salvelinus confluentus* Curiosity Society Conference in Kananaskis Country, Alberta – the first time this meeting has been held outside the USA.

ACA representatives have attended and presented at the ScCS Conference for several years. After volunteering to host the gathering in 2007 and 2008, the Society agreed to come to Kananaskis Country for the 2009 Conference to get a uniquely Albertan perspective on management of the species and its habitat.

Bull trout are classified as *Threatened* in the US, meaning that as a legally-protected fish, there are far stricter regulations surrounding where they can be angled and how they can be handled – if at all. By contrast, they are classified as a *Species of Special Concern* in Alberta; the regulations are far more relaxed. US biologists attending the Conference in Kananaskis enjoyed angling for the species, handling and observing them in a far more hands-on manner than permitted in many areas in the US. Add to this that some

of Alberta's bull trout haven't experienced the severe declines of many US populations, and there is an even greater opportunity to see relatively healthy populations.

For Albertan delegates, the Conference presents an invaluable opportunity to tap into the wealth of knowledge being generated and shared by our US counterparts. Survey methodologies learned from US programs have been applied with great success here in Alberta as well, the data from which has helped direct our own management of the species. More importantly, though the ScCS began as a US-based conservation effort, our participation in the Conference has firmly put Alberta on the map of bull trout conservation.

The 2010 *Salvelinus Confluentus* Curiosity Society Conference will be held at Wood River in southern Oregon's Klamath Basin drainage. For more information on bull trout in Alberta or the ScCS 2009 Conference in Kananaskis, please contact ACA's Kevin Fitzsimmons or Mike Rodtka (1-877-969-9091). ■

Why do bull trout need active conservation?

AGGRESSIVE EATERS.

They are easily angled and therefore easily overfished.

SPECIFIC HABITAT REQUIREMENTS.

They need cold water to survive and don't like anything that increases the turbidity of the water (such as industry or road construction), and they like complex, interconnected habitat.

COMPETITION.

They compete directly with brown and brook trout for food.

photo: Aubree Benson



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Conserving Alberta's Wild Side

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Whitebark pine (*Pinus albicaulis*)

■ by Lance Engley, ACA

Whitebark pine is a unique tree species found only in high elevation areas. In Alberta, it can be found in the Rocky Mountain Natural Region, from the Willmore Wilderness Park south to the Alberta-Montana border. Reaching heights of up to 20 metres (or 65 feet: roughly the size of a blue whale), it is often the last tree you see approaching the treeline, where it becomes gnarled and stunted by harsh, icy winds. Whitebark pine produces large seeds, or pine nuts, that are high in fat and provide an important food source for squirrels and grizzly bears. Squirrels gather and store whitebark pine cones in their dens (called middens), which may be dug up by grizzly bears that then feast on the seeds in the stored cones.



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The whitebark pine shares a mutualistic relationship with Clark's nutcrackers. As the nutcrackers gather and cache the seeds, the ones that are not retrieved germinate into new whitebark pine seedlings. So interdependent is this relationship that the Clark's nutcracker is almost entirely responsible for the whitebark pine's dispersal and reproduction.

Whitebark pine is one of the most ancient tree species in the world — the oldest one recorded in Alberta is over 1,000 years old and is in Banff National Park. The species is now listed as *Endangered* in Alberta. An introduced fungus called white pine blister rust is the greatest threat to this tree in our province. Other threats causing population decline include mountain pine beetle and fire suppression. ■

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