

# BIODIVERSITY Makes It Work

NAWMP in Alberta

Volume 2, 2000



Mallard duck, one of NAWMP's priority species.

## What do Ducks have to do with Biodiversity?

*A lot, that's what!* "Much of the biodiversity we see in Alberta NAWMP (North American Waterfowl Management Plan) landscapes is a direct consequence of our NAWMP waterfowl habitat programs," Jonathan Thompson, chair of the Alberta NAWMP Management Committee explains.

Brent Markham, Assistant Director with the Fisheries and Wildlife Management Division of Alberta Environment, and chair of the Alberta NAWMP Board of Directors, breaks it down even further. "The overall intention of

NAWMP, particularly in Alberta, is largely the implementation of good land management ethics and techniques. While these are directed mainly toward waterfowl, because of NAWMP's landscape approach, a large number of other species are impacted, just by protecting or creating habitat that these other species will use. Demonstrating and promoting good farming practices as NAWMP does, also has a positive effect on most species of wildlife."

"However, at the heart of Alberta NAWMP's work is waterfowl—the key here being water and wetlands," continues Markham. "This is critical habitat for a lot of species and one of the most significant habitat types we have because of the diversity it offers. Wetlands and riparian areas have been reduced or removed over the years, and have suffered more than most habitats with the possible exception of native grasslands. In settled areas, wetlands and riparian areas are where wildlife gathers."

Thompson adds, "By focusing on areas that benefit waterfowl populations and by conserving existing native and naturalized habitats, two of the guiding principles behind our conservation strategies, we will continue to positively influence the health, and therefore the biodiversity of our landscapes."



## Getting a Handle on the Status and Distribution of Alberta's Amphibians

The boreal chorus frog, one of three species of amphibians routinely caught during Allison Puchniak's study of restored and natural wetlands in the Aspen Parkland.

Things are hopping at Alberta's amphibian monitoring program. Officially known as RANA, Researching Amphibian Numbers in Alberta, this program relies on more than 200 outdoor enthusiasts and naturalists who record information on amphibian sightings. In Alberta, this includes only 2 species of salamanders and 10 species of frogs and toads, but it's an important task just the same.

Lisa Takats, RANA coordinator, is proud of what the program has accomplished. "We're doing really well. We're getting a handle on the distribution of our amphibian species and monitoring for deformities and die-offs, of which there have been very, very few." Takats adds, "At this stage, using volunteers is the only feasible way to cover the entire province."

Amphibians have not always been a high priority but are gaining prominence because of their link to clean water and healthy wetlands. RANA's volunteer-generated database also serves as a central repository for all amphibian research in the province and the program has been expanded to include intensive amphibian inventories at seven sites across the province.

Although only one of these inventory sites includes an Alberta NAWMP wetland, a two-year study comparing amphibian and bird assemblages in restored and natural wetlands is looking into more NAWMP projects. Eighteen wetlands in the Aspen Parkland Biome have been investigated; half were "natural" or relatively unaltered and the rest had been drained for at least 10 years before being restored by Alberta NAWMP. The restoration

of wetlands is a common practice for Alberta NAWMP managers, and has significantly improved waterfowl production. However, monitoring of the long-term benefits of this practice on amphibian populations has not been conducted until now.

Researcher Allison Puchniak, under the direction of Dr. Cindy Paszkowski, member of the Alberta NAWMP Biodiversity Advisory Group, reports that she's observed quite similar populations of amphibians at restored and natural wetlands. "We've seen some pretty healthy populations at the restored ponds. They're looking pretty good right now." While Puchniak notes that further analysis is required, she predicts that if there are differences they will be between the size and type of ponds she's studied (e.g. sedge vs. cattail ponds) rather than between the restored and natural wetlands. And this is just what Alberta NAWMP managers like to hear.

For more information on RANA, contact Lisa Takats at (780) 427-1249. Allison Puchniak can be reached at [a\\_puchniak@ducks.ca](mailto:a_puchniak@ducks.ca).

# Nesting Cover Planted for Waterfowl Provides Habitat for other Species

Seeding tame grasses and legumes to provide additional nesting cover for waterfowl has been one of Alberta NAWMP's standard land management programs for more than 10 years. Used throughout the Prairie Pothole Region where the lack of suitable upland cover limits waterfowl production, the effectiveness of this, and all other NAWMP programs, is regularly evaluated.

Alberta NAWMP managers agree that where planted cover replaces annual cropland, both nest density and nest success increase significantly. Preliminary analysis of data obtained by Prairie Habitat Joint Venture researchers show waterfowl nest success in planted cover averages 21%. Significant efforts are now being made to determine under which circumstances the greatest success can be achieved.



Blue-winged teal nest monitored by researchers.

In addition to monitoring the effects of planted cover on waterfowl production, Alberta NAWMP has commissioned research into the effects of this land management program on other species. Because of the structure and composition of planted cover, and its proximity to wetlands, it can be attractive to a wide range of species. In particular, when compared to annual cropland, planted cover provides a greater volume and complexity of vegetation and therefore provides a variety of "micro" habitats. Another characteristic of planted cover is that the structure and composition of the vegetation changes as it matures, and after four or five years, management in the form of grazing or haying is initiated to increase plant vigour.

In a study of the abundance of various species of mammals in conventional cropland and among five age-classes of planted cover, three-year-old



Coyotes and other mammals prefer three-year-old planted cover.

planted cover was shown to support the greatest abundance of small mammals. Although mainly consisting of meadow voles and deer mice, the three-year-old cover provided four times the prey biomass of cropland. This year-class was also preferred by most medium-sized and large mammals including snowshoe hare, white-tailed jack rabbit, porcupine, coyote, mink and moose.

In a similar study gauging the effect of planted cover on reptile and amphibian communities, this land management treatment was found to support four species of herptiles (wood frog, boreal chorus frog, tiger salamander and plains garter snake). All were found to be more abundant in the older planted cover than in cropland. It was even speculated that the older cover may have accumulated enough litter to produce favourable overwintering sites.

As for avian species other than waterfowl, a study showed both species richness and relative abundance to increase with the age of planted cover for the first three years and then decline. Planted cover can attract a mixture of grassland, marsh-edge and shrub-loving bird species, and

## Endangered Burrowing Owls Benefit from Native Prairie Secured for Waterfowl

Since 1938, first Ducks Unlimited, then Alberta NAWMP and its partners, have worked to secure large tracts of native prairie in order to improve waterfowl production in the Prairie Pothole Region. In Alberta's Prairie Biome alone, more than 121,000 hectares of native grassland are under the Alberta NAWMP umbrella, supporting wetland creation and restoration projects, land use exchanges and land management programs such as managed grazing and planted cover. Waterfowl production in the Prairie Pothole Region has improved significantly under these and other NAWMP habitat conservation programs.

In addition to Alberta NAWMP's many waterfowl projects in the grasslands of southern Alberta, a significant portion of this native habitat is being managed for indigenous grassland species, many of which are declining in numbers. One such species is the burrowing owl. This small prairie owl began disappearing from its range in the 1930s, losing its habitat to human encroachment, either for agriculture, settlement or resource development.

Beginning in 1993, trend block surveys conducted by two Alberta NAWMP partners, Alberta Natural Resources Service and the Canadian Wildlife Service, showed that a population of burrowing owls on the privately-owned grazing lands of the Prairie Biome's Eastern Irrigation District (EID) appeared to be stable. In fact, it was determined that this was the only population in Canada that was not showing a precipitous decline. Through the Biodiversity Fund, Alberta NAWMP is currently supporting research into this "special" population of burrowing owls.

Graduate student Darcey Shyry is nearing the end of his second field season researching the foraging habits and mortality of juvenile burrowing owls in the southeastern portion of the EID. Using radio telemetry he tracks the juvenile burrowing owls while they feed at

The EID and Alberta NAWMP work cooperatively to enhance and conserve grassland habitat. There are more than 12,000 hectares of Alberta NAWMP-managed wetlands within the EID, some dating back to the 1940s.

night. So far, ephemeral wetlands or the transition zone between wetland and upland, appear to offer a good supply of insects, the most abundant prey source for burrowing owls. Also, these low areas are often used by landowners to build dugouts. Grasshoppers and beetles lay their eggs in the dirt mounds beside the dugouts, and this also provides good foraging habitat for the owls.

Another source of food for burrowing owls is the ditches of raised gravelled roads. Unfortunately, this is also a source of mortality for the burrowing owl. A review of published research shows that road kills account for around 17% of burrowing owl mortality. An analysis of Shyry's data from the 1999 field season showed an overall juvenile mortality of 43%. Shyry is hopeful that data collected during the 2000 field season will shed more light on this and other causes of juvenile mortality. A similar burrowing owl study is underway in Saskatchewan



Standing tall on their stilt-like legs, the burrowing owl is a symbol of the arid, short-grass prairie.

where native grassland habitat is more fragmented, there are more farms, and therefore more roads.

Shyry is also collecting information on the number and success of burrowing owl



Shyry reports finding a dead eared grebe in one of the burrowing owl nests in his study area. Eared grebes weigh 450 g while burrowing owls weigh only 150 g!

contribute to breeding success. Specifically, planted cover can provide additional breeding habitat for grassland birds that have experienced declining numbers such as clay-coloured sparrows and sedge wrens.

The results of these and other studies of the biodiversity benefits of planted cover are being combined with evaluations of waterfowl production. This will help Alberta NAWMP managers determine where and when this land management treatment will yield the best results not only for waterfowl but for other species as well.

For more information, review the summaries of these studies posted on Alberta NAWMP's website <[www.ducks.ca/nawmp](http://www.ducks.ca/nawmp)>.

Skinner, D.L., S. Johnston and D.A. Westworth. 1995. Abundance and distribution of mammals in planted nesting cover in the aspen parkland of Alberta: North American Waterfowl Management Plan.

Fisher, C.C., and W. Roberts. 1994. Herpetofaunal investigations on North American Waterfowl Management Plan properties in Alberta.

Prescott, D.R.C., and A.J. Murphy. 1995. Bird populations and vegetation structure of tame dense nesting cover (DNC) in Alberta's Aspen Parkland.

## Dragonflies and Leopard Frogs: Biological Indicators of Wetland Health

Alberta NAWMP is currently supporting research studies of two biological indicators, odonates or dragonflies and damselflies, and northern leopard frogs.

Christine Rice is spending the second of three field seasons catching dragonflies and damselflies by the hundreds. Rice feels odonates are among the best biological indicators of wetland health, and she considers more than this species' sensitivity to environmental changes in her recommendation. "For one thing, they're territorial which makes them easy enough to catch as aerial adults, and they have a well-known taxonomy and can be readily identified to species—something which is rare in invertebrate biology." More important contends Rice is the reliance of odonates on different parts of a wetland for their life history. In their larval stage, which can last up to four years, odonates are strictly aquatic, and require good water quality, cover provided by submergent vegetation and, as the top predator, a steady supply of aquatic invertebrates for food. As adults, odonates require both aquatic and terrestrial vegetation for mating strategies and reproductive success.

Rice is studying odonate abundance and diversity at several wetlands in the Brooks area of Southern Alberta. Some of these wetlands are on private land and are used by cattle, other grazed areas are managed by Alberta NAWMP chiefly for waterfowl production and the remaining wetlands are in an idle, ungrazed state. So far, her research indicates that diverse wetland habitats support diverse odonate communities. Rice has recorded 25 species of odonates throughout her study area, including one species that is new to the province. Future research is needed to narrow down the number of odonates into a manageable few that can be used as bio-indicators. Rice believes the management implications of her work could be extremely important. "It just isn't practical to sample all the water bugs in a wetland. As the top predator of wetland macroinvertebrates, odonates reflect the health of the entire wetland community. And because waterfowl are known to select wetlands with large macroinvertebrate communities, monitoring odonate abundance and diversity can provide managers with another tool to measure the productive capability of wetlands for waterfowl."

Where the presence of a diverse community of odonates can indicate a healthy wetland, the absence of another bio-indicator, the northern leopard frog can show that the health of a wetland ecosystem may be in doubt. Once the most wide-spread of all frog species in North America, the number of northern leopard frogs declined drastically in the 1970s. Although the reasons behind the sudden decline of this species remains a mystery, habitat loss and fragmentation, and declining water quality are among the more important contributing factors identified.

Alberta NAWMP is supporting two projects designed to improve the status of this "at risk"

species. The first is a reintroduction of leopard frogs to selected areas of their former range. Because many populations are localized and separated by unsuitable habitat, this species shows limited potential to recolonize. Luckily, researchers like Kris Kendell have found a way to help these amphibians. Egg masses are collected from healthy populations, hatched, and tadpoles are raised to juveniles in a special rearing facility at Alberta Environment's Raven Brood Trout Station, near Caroline, Alberta. Over the last two years more than 2500 young leopard frogs have been marked and released in the area surrounding the rearing facility, which is part of this frog's historic range in the upper headwaters of the Red Deer River drainage.

Kendell notes, "The goal of this program is to create more healthy, viable breeding populations. As it stands, isolated and localized populations of leopard frogs are vulnerable to catastrophic events such as disease and drought, and can be wiped out." He adds, "By reintroducing leopard frogs in mountain headwaters, it is our hope that they will naturally disperse downstream, recolonizing part of their former range."

The second leopard frog project supported by Alberta NAWMP and its partners involves revisiting the sites of nearly 500 leopard frog sightings over the last hundred years. Kendell admits this is a long and arduous, but necessary task. "It's important to determine which of these sites still have leopard frog populations and get an indication of their productivity. We also assess habitat characteristics at each site such as vegetation and water quality."



Female *Libellula quadrimaculata*, the four spotted skimmer, common throughout Christine Rice's study area.

Like odonates, leopard frogs rely on wetlands for their entire life history (and provide food for a variety of wetland birds!). "Good water quality, abundant cover and vegetation, and healthy insect populations provide the best habitat for leopard frogs." Equally important adds Kendell, "are waterbodies that don't freeze to the bottom during winter, offering opportunities for leopard frogs to hibernate."

"We have identified a number of leopard frog populations which occur within Alberta NAWMP-managed wetlands, and there's certainly potential to find more," says Kendell. "This is a good because conditions can really be improved or stabilized for leopard frogs. For example, a healthy leopard frog population at the Circle E Ranch in southern Alberta, a NAWMP property, has been identified as a source to draw egg masses from." Kendell adds, "We're all interested in the same thing—healthy wetland systems."

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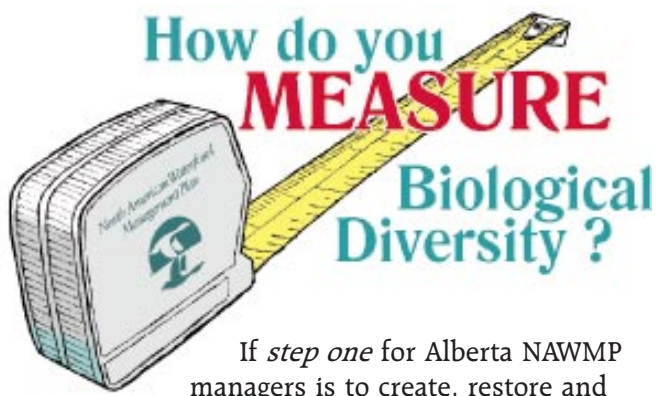
nests he encounters, as well as adult mortality. Research of this nature is vital to understanding the reasons behind the apparent success of the EID's burrowing owl populations. Equally important are the efforts of Alberta NAWMP and other conservation organizations to conserve and protect native grasslands and native grassland species. One such endeavour is Operation Burrowing Owl delivered by the Alberta Fish and Game Association with the cooperation of the EID. Through this program, conservation easements are offered to landowners, trend data are collected and road signs are erected to warn motorists to slow down and watch for burrowing owls!

For more information, contact Darcey Shyry at [hooverhunter@hotmail.com](mailto:hooverhunter@hotmail.com).

### Alberta Amphibians and their Population Status

Tiger Salamander	Not at Risk (Green*)
Long-toed Salamander	May be at Risk (Yellow B)
Plains Spadefoot Toad	May be at Risk (Blue)
Great Plains Toad	At Risk (Red)
Boreal Toad	Not at Risk (Green)
Canadian Toad	At Risk (Red)
Boreal Chorus Frog	Not at Risk (Green)
Wood Frog	Not at Risk (Green)
Spotted Frog	May be at Risk (Blue)
Northern Leopard Frog	At Risk (Red)

\*Population status categories as defined by Alberta Environment.



If *step one* for Alberta NAWMP managers is to create, restore and secure habitat that will be attractive to waterfowl and other wetland species, then *step two* is to ensure that these species will reproduce in these habitats. Without productivity, you've really achieved nothing.

For waterfowl, methods of determining productivity have become quite accurate and sophisticated. First, nests need to be located so they can be monitored. Nests of most upland



Researcher using radio telemetry to locate nesting mallard hens.

nesting waterfowl can be located using a chain pulled along the ground between two ATVs, but mallards are often studied differently. For this species, hens are trapped, then surgically implanted with radio transmitters so their movements and their nests can be monitored.

With the goal of recording better-than-average production for all species, nest density and nest success are documented, and mortality rates recorded several times between hatching and fledging. Hen mortality is also recorded and some birds are banded to determine overwintering success. As Jim DeVries, Prairie Research Scientist with Ducks Unlimited Canada explains, "Population ecology involves following individuals through time. A population is sustaining itself when a female replaces herself in her lifetime. In this way, recruitment is the key measure of productivity."

Measuring productivity in other species such as grassland songbirds can be much more difficult than it is for waterfowl. "They're smaller and their nests are smaller too," says Brenda Dale, Songbird Specialist with the Canadian Wildlife Service. "Nest searching is more work and nests have to be checked several times because the young stay in the nest for only 7 to 10 days while ducklings move to water with their Mom." Songbird nests can be located using rope drags (similar to ATV chain drags for waterfowl) and walking searches, but productivity can often only be measured indirectly.



Savannah sparrow with young

Here parental behaviour, and expert knowledge of individual species, is key. Evidence of young can be determined by observing parents carrying food and fecal sacs (to keep the nests clean). However, because male clay-coloured sparrows will carry food to their incubating mates, both parents of this species must be observed carrying food to indicate young in their nests. Some songbirds, such as savannah and Baird's sparrows, use different alarm calls when they have young to protect. Ultimately, these measures of productivity for songbirds, along with indications of waterfowl recruitment, are used by Alberta NAWMP managers to evaluate the effectiveness of their land management programs.

All photos courtesy of Ducks Unlimited Canada



Did you know that all kinds of rare and unusual birds have been spotted at Alberta NAWMP wetlands?

Tom Sadler, a Field Biologist with Ducks Unlimited Canada certainly knows, and he provides us with this bio-fascinating list.

At Frank Lake, an Alberta NAWMP wetland conservation project in southern Alberta, several unexpected sightings of rare marsh and shorebirds have been made over the last three decades. Southerly birds such as the Great and Snowy Egrets, Clarke's Grebe, the Black-necked Stilt and the beautiful White-faced Ibis have all been seen at this wetland. Both the Black-necked Stilt and the White-faced Ibis have recently colonized southern Alberta but remain uncommon. Nesting of the Black-necked Stilt has been confirmed at Frank Lake while White-faced Ibis have been summer residents on several occasions with up to 20 birds being seen at one time. This species has most likely bred here as well. The first confirmed sighting of the ibis was at the West Arm Pakowki Project in 1974, with nesting later confirmed at Kininvie Flat, West Arm Pakowki and Stirling Lake, all Alberta NAWMP-managed wetland projects.



Black-crowned night heron

West coast migrant species spotted at Frank Lake have included the Pacific Golden Plover and the Red Phalarope, both of which are rarely seen in Alberta. The first confirmed Alberta occurrence of the normally Asiatic Curlew Sandpiper was recorded at Frank Lake in 1975. Two other rare Asiatic vagrants, the Sharp-tailed Sandpiper and Red-necked Stint were observed at Frank Lake in 1995, and the equally rare migrant from eastern Asia, the Spoon-billed Sandpiper has been seen twice at the Boyack wetland project near Strathmore, Alberta.

Although now a regular breeder in south and central Alberta, the Black-crowned Night Heron was first recorded in 1958 at the Stobart Lake Project, where it has established a breeding colony. Forty-one years later, odonate researchers, Christine Rice and Jonathan Hornung encountered ten Eastern Forktails, a new damselfly record for the province of Alberta at the 12-Mile Coulee wetland project on June 18, 1999, while working on a study partly funded by Alberta NAWMP.

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North American Waterfowl Management Plan

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Northern pintail pair, a common sight at Frank Lake.

The *Biodiversity Makes it Work* newsletter is published by Alberta NAWMP for its partners and supporters across North America, and for all those who are concerned about maintaining biologically diverse and healthy ecosystems.

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