Grant Eligible Conservation Fund 2010–2011

Annual Report of Activities & Synopsis of Funding Recipient Projects

For the Period of April 1, 2010 to March 31, 2011

Alberta Conservation Association

Conserving Alberta's Wild Side

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www.ab-conservation.com

Our Mission

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

Our Vision

An Alberta with an abundance and diversity of fish, wildlife and their habitats, where future generations continue to use, enjoy and value our rich outdoor heritage.

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Front Cover Photo: Upstream view of Nose Creek and Trout Unlimited Canada electrofishing crew downstream of confluence with West Nose Creek.

Photo: Brian Meagher, Trout Unlimited Canada
From the project 'Nose Creek rehabilitation project' (Nose Creek Watershed Partnership/Trout Unlimited Canada; 015-00-90-137)

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Executive Summary

Funded by the province's hunters and anglers, ACA's Grant Eligible Conservation Fund (GECF) supports annually a variety of projects both small and large which benefit Alberta's wildlife and fish populations, as well as the habitat they depend on. Operational since 2002, this Fund has provided more than $9.35 million to 539 projects carried out in Alberta by the conservation community. Furthermore the funding provided by the GECF continues to leverage approximately six times its value in conservation dollars, estimated at approximately $58.6 million - money that has been directly used for conservation work in Alberta.

2010-11 saw the implementation of a structural change to the GECF; the GECF was split into two parts, GECF Part A: Conservation Support and Enhancement and GECF Part B: Research. The procedures for GECF Part A: Conservation Support and Enhancement stayed the same as in previous years. GECF Part B: Research followed the application adjudication procedure that has been used for years by the ACA Grants in Biodiversity Program.

This popular grants program received 107 applications (71 to GECF Part A and 36 to Part B) requesting over $2.3 million in 2010-2011. A total of $883,617 was granted to 47 projects (33 GECF Part A projects and 14 GECF Part B projects). The aim of this report is to document the procedures for 2010-2011 and to provide an overview of activities and results of projects financially supported through the GECF in 2010-2011.

KEY PROGRAM HIGHLIGHTS for the GECF 2010-2011:

The GECF was split into two parts: Part A: Conservation Support and Enhancement and Part B: Research.

GECF Part A: Conservation Support and Enhancement received 71 funding requests requesting a total dollar value of just over $1.3 million. A total of $533,585 was granted to 33 projects: 7 small grants and 26 large grants.

GECF Part B: Research received 36 funding requests requesting a total dollar value of just over $1 million. A total of $350,032 was granted to 14 projects.

Project budgets ranged from $2,183 to $44,077.

1. Introduction

Alberta Conservation Association (ACA) believes it is our responsibility to join and support the collective effort to conserve, protect and enhance Alberta's biological natural resources. One of the ways in which ACA does this is to make grants to other members of the conservation community. The projects supported by the Grant Eligible Conservation Fund (GECF) are intended to enhance and supplement ACA activities, and aid in the delivery of ACA's Vision, Mission and Strategic Business Plan. ACA has been awarding conservation grants since 1997, with the GECF process starting in 2002-2003. The GECF has granted over $9.35 million dollars since 2002-2003 to 539 conservation projects implemented in Alberta; these projects have leveraged an estimated $58.6 million in conservation work across the province. For 2010-11 a total of $500,000 dollars were made available for the GECF Part A: Conservation Support and Enhancement and $350,000 for Part B: Research. After project selection, a total of $533,585 was granted to 33 Part A: Conservation Support and Enhancement projects and $350,032 was granted to 14 Part B: Research projects. This document provides an overview of GECF activities for the 2010-2011 funding cycle and a brief synopsis for each of the funded projects carried out between April 1, 2010 and March 31, 2011.

2. The Funding Cycle

The funding priorities, guidelines and application forms were made available to the public early October 2009 via the ACA website, by email to existing contacts and by environmental list servers. Details of the 2010-2011 funding cycle are in the table below:

2010-2011 FUNDING CYCLE DATES

Posting of the Guidelines and Application Forms on ACA's website	October 5, 2009
Window to receive completed GECF Part B applications	November 1, 2009 - December 1, 2009
Window to receive completed GECF Part A applications	January 2-29, 2010
GECF Part B adjudication meeting	February 28, 2010
GECF Part A adjudication meeting	March 4, 2010
ACA Board approval and notification of applicants as to funding status	End of March 2010
Cooperative Project Agreements signed, initial payments made, and project work begins	April 1, 2010
Interim reports due & second payments made (if required)	September 1, 2010
Final report due	March 15, 2011
Projects end & final payments made (if required)	March 30, 2011

3. Funding Eligibility

The GECF supports a wide variety of applicants and project types. Anyone with a suitable project working in Alberta can apply to the GECF for funding, with the exception of ACA staff and ASRD staff. Certain project types and budget items are not covered by the GECF, for example land acquisition, emergency funding or overhead costs. Since fiscal year 2009–10, funding priorities have been used by the GECF to guide applicants in drafting their applications. The list of funding priorities was increased from six to 12 in 2010-11 (see Section 4: Major Funding Priorities GECF 2010-11). The GECF does accept applications that do not relate to these suggested areas, however, projects that address one or more of these priority areas have a better chance of being funded than those that do not. The eligibility criteria and funding priorities can be found in full in the document "Project Submission Guidelines for Funding 2010-2011" (this document is available from the GECF Project Administrator).

The GECF Part A: Conservation Support and Enhancement offers small grants for projects with budgets of $3,000 and under and large grants for projects with budgets over $3,000. The small grants have a simplified application form; although the eligibility criteria and funding guidelines are the same for both small and large grants.

The GECF is now widely known amongst the conservation community working in Alberta and applications were received from a diverse cross-section of the population including: individuals, community groups, grassroots organizations, provincial and national institutes, as well as leading scientific researchers.

4. Major Funding Priorities GECF 2010–2011

This text is taken directly from Section C of the *Project Submission Guidelines for Funding 2010 – 2011*.

All applicants to the GECF should be aware that this grant is fully funded by the hunters and anglers of Alberta. All proposals should be able to demonstrate how the proposed project will aid ACA in meeting its mission of conserving, protecting and enhancing fish, wildlife and habitat for all Albertans to enjoy, value and use. To help direct potential applicants the following list of priority areas has been developed. While the GECF will accept applications that do not relate to these suggested areas, projects that address one or more of these priority areas will have a higher probability of being funded than those that do not.

1. Habitat enhancement activities specifically listed on provincial recovery plans for Alberta's endangered species (to be done in cooperation with recovery teams).
2. Site specific enhancements of habitat, structures and facilities aimed at increasing recreational angling or hunting opportunities, improving habitat or increasing wildlife/fish productivity on the site (i.e. planting/seeding vegetation, development of new fisheries access sites, nest box initiatives, food plot trials and cover plot trials, spawning bed enhancement, culvert removals, etc.).

3. Urban fisheries development, including : initial evaluation of water quality aspects of existing ponds to determine their suitability for fish stocking; purchase of equipment required to ensure suitable water quality for fish stocking (e.g. aeration equipment); fish stocking in public ponds; promotion of an urban fishery (including natural water bodies).
4. Stewardship Initiatives (e.g. on-going maintenance of conservation sites or fisheries access sites; adopt a fence; property inspections for invasive weeds; manual weed control; grass mowing).
5. Impacts of non-native species on the persistence of native species.
6. Improvements and innovation in matching sportsmen with landowners (e.g. facilitating hunter access to depredating waterfowl, elk and deer).
7. Develop and validate inventory tools to determine the relative density and range of ungulate species using innovative techniques such as trail cameras or passive DNA samples.
8. Evaluate the effect of pesticides or herbicides on upland game birds (sharp-tailed grouse, pheasant, gray partridge) in agricultural landscapes.
9. Evaluate the effect of recreational access (mode, timing, duration) on wildlife & fish populations and habitat.
10. Investigation of methods for reducing the spread and/or impact of wildlife or fish related diseases.
11. Evaluate the impact of various harvest management regimes on fish or wildlife populations (e.g. fish size limits, three-point or larger elk requirements, etc.).
12. Evaluate the social demographics of hunting and angling to determine the factors influencing the decision to become involve in hunting or angling and the reasons why people opt out in a particular year.

5. Proposal Review Process

The ACA Board of Directors appointed Adjudication Committees for both the GECF Part A: Conservation Support and Enhancement and Part B: Research.

GECF Part A: Conservation Support and Enhancement Review Process:

The GECF Part A adjudication committee consisted of three citizens of Alberta representing conservation organizations in Alberta, one public-at-large member of the ACA Board of Directors, and one ACA staff member. Adjudicators were tasked with providing rankings and making funding recommendations for all GECF Part A applications based on the funding priorities and guidelines provided by ACA

Proposals were evaluated on their merit and content using a three-tiered ranking system:

A: Top proposals; recommend funding in whole or in part.

B: Proposal contains merit, recommend funding in whole or in part if funds available.

C: Do not recommend funding.

The proposal adjudication meeting was held on March 4th, 2010 at ACA's Sherwood Park office, Alberta. The list of funding recommendations made by the Adjudication Committee was then approved by the ACA Board at the March 2010 Board Meeting.

GECF Part B: Research Review Process:

The application deadline for GECF Part B: Research was earlier than that for the GECF Part A to allow for a more rigorous academic review procedure; the same procedure tried and tested for many years by the ACA Grants in Biodiversity Program. All applications were sent out for review by experts in the subject of the research application. An attempt was made to get at least two reviews per application. The adjudication committee consisted of a representative from each of Alberta's three largest universities (University of Alberta, University of Calgary and University of Lethbridge), ACA's Wildlife Program Manager, ACA's Fisheries Program Manager and ACA's Board of Directors Academic Representative. Two adjudicators were assigned to review (using the application and academic reviews) and rank each application using the three-tiered ranking system. Funding recommendations were then made after the ranking process. The GECF Part B: Research adjudication meeting was held on February 28th, 2010 at the University of Alberta.

6. Funding Allocations

For the 2010-2011 funding cycle a total of $850,000 was made available for project funding via the GECF; $500,000 for GECF Part A: Conservation Support and Enhancement and $350,000 for GECF Part B: Research. Of the 71 applications requesting a total of $1.32 M to GECF Part A: Conservation Support and Enhancement, 33 were funded (a 46% success rate for applications receiving full or partial funding). Of the 71 applications to GECF Part A, 21 were small grant applications (requests of $3,000 or under). 7 of the 21 small grant applications were awarded (a 33% success rate), whilst 26 of the 50 large grants (a 52% success rate). Of the 33 GECF Part A projects funded in 2010-11, 18 (55%) had been funded in previous years and 15 were new to the GECF.

GECF Part B: Research received 36 applications requesting a total of $1.02 M for the 2010-11 competition, of these 14 were funded (a success rate of 39% for applications receiving full or partial funding). Half of the funded research projects (seven) had been funded in previous years and the other half were new to the GECF.

One of the approved GECF Part A projects did not proceed (020-00-90-163; Town of Taber); no funding was disbursed to this project. Several projects were granted extensions due to unforeseen circumstances.

All projects approved for funding, with the exception of the project mentioned above, signed the Cooperative Project Agreement with the approved proposal and budget appended. The Cooperative Project Agreement outlines the reporting and payment schedules and other contractual obligations between ACA and the grant recipient. All grant recipients provided project reports. If the project was completed at the time of the interim report (September 1st), then this one report was taken as the final project report.

7. Synopsis of Approved Projects for 2010–2011

A summary description of each of the 47 approved projects containing the project's objectives, activities and deliverables can be found in Part II of this report. The list below is in alphabetical order by organization.

GECF Part A: Conservation Support and Enhancement

Small grants (under $3,000)

Andrew Stiles, *Nest box deployment with youth to inspire stewardship,* $2,500.00

Bow Valley Habitat Development, *Willow and tree planting on Millennium Creek (Cochrane Scout Troop),* $2,182.95

Nose Creek Watershed Partnership/ Trout Unlimited Canada, *Nose Creek rehabilitation project,* $3,000.00

Sylvan Lake Fish and Game Association, *Niemela Reservoir 2010 project,* $2,975.00

Town of Taber, *Taber trout pond,* $2,200.00 (did not proceed)

Trout Unlimited Canada, *Aquatic invasive awareness campaign,* $2,838.00

Weaselhead/Glenmore Park Preservation Society, *Weed management in the Weaselhead,* $3,000.00

Large Grants (over $3,000)

Alberta Fish and Game Association, *Operation Grassland Community,* $39,670.00

Alberta Fish and Game Association, *Pronghorn antelope migration corridor enhancement*, $44,077.00

Alberta Fish and Game Association, *Volunteer habitat lands stewardship*, $11,100.00

Baptiste, Island and Skeleton Lakes Watershed Management and Lake Stewardship Council (BISL), *Aerial videography - Riparian management area health and integrity assessment for Baptiste and Island Lakes,* $9,000.00

Beaverhill Bird Observatory, *Beaverhill Lake stewardship and monitoring,* $10,200.00

Bow Valley Habitat Development, *Modifications to a section of stream channel on Ranch House Spring 2010,* $3,385.72

Castle-Crown Wilderness Coalition, *Maintaining and restoring natural habitat in the Castle Wilderness,* $9,500.00

Delta Waterfowl Foundation, *ALUS demonstration project in the County of Vermilion River,* $15,000.00

Dickson Fish and Game Association, *Dickson Dam Site #7 Conservation Property - Habitat improvements,* $5,240.00

Eastern Irrigation District, *Partners in Habitat Development,* $25,000.00

Ghost Watershed Alliance Society, *Riparian and wetlands health assessment and inventory by Cows and Fish of critical areas in the Ghost Watershed,* $35,500.00

Lac La Biche County, *Lac La Biche watershed project,* $5,000.00

Lesser Slave Lake Bird Observatory, *Monitoring migratory and breeding birds in Alberta's Boreal Forest,* $25,000.00

Mountain View County, *Riparian area management improvements,* $20,000.00

Nature Alberta (Formerly Federation of Alberta Naturalists), *Public and volunteer engagement with Alberta's Important Bird Areas,* $34,073.00

Nature Alberta (Formerly Federation of Alberta Naturalists), *Riparian water quality improvement project,* $34,000.00

Northern Alberta Institute of Technology (NAIT), *Sturgeon River watershed habitat improvements,* $20,000.00

Red Deer County, *Off the Creek Program 2010,* $25,000.00

The Calgary Zoo, *Preservation and propagation of whooping cranes and sage grouse,* $8,500.00

Trout Unlimited Canada, *Crowsnest River channel reactivation project*, $24,000.00

Trout Unlimited Canada, *East Slopes creek conservation initiative,* $28,600.00

Trout Unlimited Canada, *Late fall fisheries investigation in diversion canals of southern Alberta,* $7,000.00

West Central Forage Association, *Paddle River enhancement project - Phase 1,* $14,540.00

Wild Elk Federation, *Elk relocation,* $3,143.00

Willmore Wilderness Foundation, *Willmore Wilderness Park clean-up and stewardship initiative*, $18,360.00

Woodlot Extension Program/ Woodlot Association of Alberta, *Riparian reforestation and wildlife habitat enhancement of Beaverlodge Watershed - Phase III,* $40,000.00

GECF Part B: Research

Calgary Zoo, *Using meta-population modeling to insure the effective conservation of northern leopard frogs,* $21,194.00

Canadian Wildlife Service, *Effects of oil and gas development on grassland birds in south-east Alberta,* $20,000.00

King's University College, *Conservation genetic analysis of Alberta peregrine falcons,* $11,700.00

King's University College, *Reproductive ecology of endangered populations of limber and whitebark pine in Alberta,* $15,000.00

Laval University, *Ecology, conservation, and population demography of mountain goats in Alberta,* $19,826.00

University of Alberta, *Does petroleum development affect burrowing owl survival, nest success, fledging rate or habitat use?,* $23,520.00

University of Alberta, *Cougar distribution and prey selection in south-west Alberta,* $32,700.00

University of Alberta, *Ecology and behaviour of grizzly bears (Ursus arctos horribilis) in response to open-pit mining and implications for management and conservation,* $31,000.00

University of Alberta, *Lynx cycles and barriers: Evaluating dispersal versus climate change in flatlining populations,* $27,500.00

University of Alberta, E*dmonton urban coyote project,* $35,952.00

University of Alberta, *Trumpeter swan population recovery in Alberta: Distribution, land-use and response to disturbance,* $37,000.00

University of Alberta, *Ecological effects of sport fish stocking and aeration in Boreal Foothills lakes (the FIESTA project),* $24,640.00

University of Lethbridge, *Effects of environmental change on stream temperature: implications for native salmonid species,* $30,000.00

University of Lethbridge, *Examining resiliency of bull trout populations to brook trout invasiveness,* $20,000.00

8. GECF project contribution to the funding priorities

In total, 47 projects were approved for funding in 2010-2011: 33 Part A: Conservation Support and Enhancement projects and 14 Part B: Research projects. Again this year funding priorities were set by ACA staff and approved by the ACA Board of Directors. All projects selected were to support ACA with meeting its mission of conserving, protecting and enhancing fish, wildlife and habitat for all Albertans to enjoy, value and use; and the funding priorities were used to further guide and direct applicants by providing priority areas of specific interest to ACA. Proposals did not have to relate to the funding priorities, but applications that did address one or more of the funding priorities fared better in the project selection procedure. Whether or not a project relates to a funding priority is to some degree subjective. Some projects clearly addressed one or more of the funding priorities, whilst others only indirectly related to a funding priority. Applicants were asked to specify how their projects related to ACA's mission and funding priorities and this information was used to determine which of the selected projects for 2010-2011 contributed to ACA's funding priorities (see Table 1). Four (two GECF Part A projects and two GECF Part B projects) of the 47 projects did not address any of the funding priorities. For a complete overview of project contribution to the ACA Funding Priorities 2010-2011, see Appendix A.

TABLE 1: GECF PROJECTS IN RELATION TO ACA FUNDING PRIORITIES FOR 2010-2011

Funding Priority	# of Projects	Percentage (%)
#1 Habitat enhancement provincial recovery plans for Alberta's endangered species	10	21.3
#2 Site specific enhancements of habitat	25	53.1
#3 Urban fisheries development	4	8.5
#4 Stewardship Initiatives	24	51.1
#5 Impacts of non-native species on persistence of native species	11	23.4
#6 Matching sportsmen with landowners	0	0
#7 Develop and validate inventory tools… ungulates	1	2.1
#8 Evaluate the effect of pesticides or herbicides on upland game birds	0	0
#9 Evaluate the effect of recreational access on wildlife & fish populations	3	6.4
#10 Investigation of methods for reducing the spread of wildlife or fish diseases	0	0
#11 Evaluate the impact of various harvest management regimes	1	2.1
#12 Evaluate the social demographics of hunting and angling	0	0
None	4	8.5

The most cited funding priorities are: #2 Site specific enhancement of habitat... and #4 Stewardship initiatives; these are both broad funding priorities under which a lot of projects fit. The next most cited funding priorities are: #1 Habitat enhancement provincial recovery plans for Alberta's endangered species and #5 Impacts of non-native species on persistence of native species. These two funding priorities are more specific than the first two. Four of the funding priorities (#6, #8, #10, and #12) were not addressed by funded projects, reflects the fact that few applications were sent in dealing with these subjects. Of these four funding priorities, three were new in 2010-11 which would also reflect the limited time applicants would have to draft projects tailored to ACA's newer funding priorities. Over time applicants will likely respond to ACA's funding priorities.

PART II: GECF Project Summaries

Grant Eligible Conservation Fund Part A: Conservation Support and Enhancement

Volunteer Habitat Lands Stewardship

Alberta Fish and Game Association

Grant: $11,100

Project Code: 015-00-90-131

Project Status: Funded in 2009-10; Completed

This project provided an opportunity for Albertans to become involved in conservation activities through stewardship activities at Wildlife Trust Fund conservation properties. The project objectives included: creating awareness among Albertans about conservation; providing Albertans an opportunity get involved with conservation through stewardship activities; and developing volunteer capacity through assisting the Alberta Fish and Game Association (AFGA) in monitoring conservation properties. Meetings were held in communities close to conservation properties to explain the program and recruit interested volunteers. These volunteers were not necessarily Fish & Game members. Once recruited, training sessions were held to orient volunteers in their duties. A manual outlining the inspection process had been produced previously and was provided to volunteer stewards. An initial hands-on inspection was also done with trained AFGA personnel. On average four volunteers were placed per property.

Deliverables/Results:

Seven open house presentations were held: Mundare, April 10, 2010 (45 attendees); Lethbridge, April 25, 2010 (12 attendees) and October 17, 2010 (14 attendees); Stony Plain, April 25, 2010 (14 attendees); Athabasca (Narrow Lake), October 2, 2010 (46 attendees); Calgary, October 16, 2010 (7 attendees); Ponoka, October 3, 2010 (14 attendees).

AFGA recruited and trained stewards for 13 properties.

Operation Grassland Community

Alberta Fish and Game Association

Grant: $39,670

Project Code: 030-00-90-127

Project Status: Funded since 1999; Completed

Operation Grassland Community (OGC) is a habitat stewardship program of the Alberta Fish and Game Association (AFGA). The primary goal of OGC is to work with landholders and land managers in southern Alberta to maintain and enhance native prairie habitats for species at risk and associated wildlife. This year, OGC's objectives were to: protect upland, wetland, and riparian habitat in the grassland region for wildlife with emphasis on avian species at risk and their associated wildlife species; improve and enhance quantity and quality, and promote sustainable stewardship of grassland habitats for cohabiting cattle, species at risk, and other harvested and non-harvested wildlife; monitor trends and distributions in Alberta burrowing owl and loggerhead shrike populations; increase public awareness of threats to native grassland habitats and; maintain and increase prairie conservation partnerships. The main activities included: engaging landholders to commit to five-year voluntary stewardship agreements to protect prairie habitats; completing habitat enhancement projects for the benefit of two priority avian species in Alberta: burrowing owl and ferruginous hawk, both listed as endangered in Alberta; completing Species At Risk Conservation (SARC) Plans with OGC members to provide practical Beneficial Management Practices for four focal species; conduct the 2010 annual burrowing owl and loggerhead shrike census with participating members; producing the annual OGC newsletter, "Prairie Acres" and write and submit several OGC-related articles to local and regional media and; participating in grazing schools/shelterbelt workshops, on various working groups, on recovery teams, and with other prairie conservation partnerships.

Deliverables/Results:

Membership: To date, 16 new members have joined OGC, volunteering to protect over 32,000 acres of native prairie. Memberships of another 61 members were successfully renewed for an additional five years.

Habitat enhancement projects: This year OGC completed a total of nine habitat enhancement projects with eight OGC members, enhancing 13 nesting/ foraging sites for burrowing owl, ferruginous hawk and Sprague's pipit including: installing off-site watering systems and/ or fencing dugouts/ ephemeral wetlands (three projects, six sites, four burrowing owl nests), strategic placement of cattle oilers (one project, two oiler sites, four burrowing owl nests), re-vegetating 128 acres of cropland back to native prairie (one project, one burrowing owl nest); installed one-mile of antelope-friendly cross-fencing to improve the range health of the overall pasture, and attract and retain breeding Sprague's pipits (one project, one Sprague's pipit site) and; OGC partnered with AltaLink and ATCO Electric to provide and install three ferruginous hawk nesting platforms to OGC members in southern Alberta (three projects, three ferruginous hawk sites). AltaLink installed one artificial nesting platform and ATCO Electric installed another two structures. In addition, 34 salt blocks were given away to individual members and at the grazing schools. In addition, OGC assessed 25 existing projects completed in previous years to ensure the project was functioning as prescribed in the agreements.

Species at risk: OGC completed seven SARC Plans, three of which were in collaboration with Alberta MULTISAR. SARC Plans included Beneficial Management Practices for one or more of OGC's four focal species. OGC contractors also re-assessed 23 sites where 2005 and 2006 Beneficial Management Plans for burrowing owl and loggerhead shrike were developed and offered updated recommendations where necessary.

OGC succeeded in raising awareness of prairie conservation in many

ways. Eight articles highlighting the OGC program or specific projects were printed in several local and regional newspapers, magazines, and agricultural newsletters. OGC staff participated in two grazing schools, one shelterbelt workshop, one watershed health workshop, and attended two trade shows. OGC also gave six presentations about species at risk and prairie conservation. In May, 2010, a new Species-at-Risk Identification Guide was produced that includes photos, physical descriptions, and habitat requirements of the four avian species at risk on which OGC focuses stewardship activities (burrowing owl, ferruginous hawk, Sprague's pipit, and loggerhead shrike). This guide was included with the 2010 burrowing owl and loggerhead shrike census mail-outs and was distributed to interested members. Finally, OGC's annual newsletter, which highlighted the important stewardship contributions made by OGC members as well as other topics such as the benefits of conservation easements and the ecology of the Sprague's pipit, was produced and distributed.

Pronghorn antelope migration corridor enhancement

Alberta Fish and Game Association

Grant: $44,077

Project Code: 030-00-90-160

Project Status: Funded in 2009-10; Completed

Pronghorn antelope reach their northern-most distribution in Alberta and are known to conduct annual migrations averaging hundreds of kilometres often passing through narrow passages en-route to key seasonal ranges. Migratory corridors are critically important in ensuring pronghorn remain at sustainable populations. Several documented accounts describe mass mortalities because of barriers to movement. Fences in particular are known to create great difficulties for pronghorn as they are unwilling to jump over them. As lower strands are generally 12"- 14" above ground, crawling under often results in serious scrapes that can significantly impact the antelope's health. The migration corridor enhancement will remedy this situation by replacing lower barbed wire strands with smooth wire and at the same time raising them to a height easily navigable by the pronghorn. The project encountered two major variables: extreme wet weather in a normally dry area which delayed project starting and the discovery of page wire which greatly increased manpower requirements, as well as material costs, as now four strands of wire had to be replaced instead of the anticipated single strand. Nevertheless, critical areas were addressed and wildlife friendly fencing installed.

Deliverables/Results:

The following pronghorn fencing projects were carried out:

Pearson Ranching - July 8-12, 2010

Smooth wire installed: 6.5 miles
Barbed wire manipulated to wildlife friendly standards: 13.5 miles
Barbed wire removed: .5 miles

Silver Sage Property - July 19-20, August 10-12, 2010

First bottom wire was removed and rolled for recycling, and then the bottom smooth wire was attached at corners and braces and stretched to the appropriate tension.

Smooth wire installed: 3 miles

Barbed wire removed: 3 miles

J-J Ranching - August 13-17, 2010

AFGA staff ran 10.5 miles of smooth wire. Wire was attached at corners and braces and stretched to the appropriate tension. One AFGA staff member and 16 volunteers removed staples from existing three wires and re-spaced wires at 18", 24", 30" and 42" with the use of 1¾" barbed fencing staples. Old staples were collected and disposed of appropriately. Approximately ½ miles of old barbed wire was also removed and replaced.
Smooth wire installed: 10.5 miles
Barbed wire manipulated to wildlife friendly standards: 31.5 miles
Barbed wire removed: .5 miles

N-Bar Ranching - August 2010

Property owner installed one mile of new fence with bottom wire double-strand smooth set at 18". One mile of smooth wire supplied.
Smooth wire installed: 1 mile

Onefour Research Station - October 1-6, 2010

AFGA staff member prepared site for commencement of work. AFGA staff member and 14 volunteers removed page wire and rolled for pick up by recycling truck. Old staples were collected and disposed of appropriately. AFGA staff member and two volunteers spooled out 5.5 miles of wire. 14 volunteers stapled wire to posts.
Smooth wire installed: 5.5 miles
Barbed wire manipulated to wildlife friendly standards: 16.5 miles
Page wire removed: 5.5 miles

Sandstone Ranch - Oct 25-30, 2010

3.5 miles of new fencing installed to allow for earlier cattle grazing on tame pastures to deflect pressure from native range. Bottom smooth wire supplied by AFGA to be set at 18" height to facilitate easier movement of pronghorn through fence. Three wires above to be installed at 24", 30" and 42" to facilitate easier crossing by deer and elk. Top wire is also smooth. A contractor was hired to install the new fence and work was completed on October 30. Fence was inspected by AFGA staff.
Smooth wire installed: 3.5 miles bottom, 3.5 miles top.
Barbed wire Installed: 3.5 miles, two middle strands and set to wildlife friendly standards.

J-J Ranching - October 15-22, 2010

A contractor was hired to install the 3.5 miles of new cattle fencing. Three wires above installed at 24", 30" and 42" to facilitate easier crossing by deer and elk. Fence was inspected by AFGA staff.
Smooth wire installed: 3.5 miles bottom.
Barbed wire Installed: 3.5 miles, three strands and set to wildlife friendly standards

Nest box deployment with youth to inspire stewardship

Andrew Stiles

Grant: $2,500

Project Code: 030-00-90-147

Project Status: Funded in 2009-10; Completed

Andrew Stiles used birdhouse building as a way of inspiring youth to make a difference on the landscape. With the grant money, materials were obtained to construct 194 bluebird nest boxes, as well as five duck boxes. While these structures certainly enhanced habitat, more importantly they gave young people a chance to see the culture of

stewardship in action. First Nations youth (100) built boxes for their Reserve and were encouraged to adopt other stewardship activities within their reach like trash busting on Earth Day. Junior Forest Wardens and outdoor club students were also involved in the process. The project was completed as planned with the note that the target number of boxes was not realized due to bad weather forcing the cancelling of trips to rural First Nation Reserves.

Deliverables/Results:

In total 194 blue bird boxes were built, and five duck boxes built and set up.

The following events were held:

Airdrie Junior Forest Wardens built 14 boxes (April 6, 2010)

That Bloomin' Garden Show, Edmonton, underprivileged kids built 30 boxes (May 8, 2010)

Westmount Charter School built and set up five duck boxes (February 3 & 10, 2011)

Morley Reserve School birdhouses with Susan Miller's Grade Threes built 12 boxes (January 13, 2011)

Morley School birdhouses with Renee Andersen's Grade Fives built 38 boxes (January 14, 2011)

Eden Valley Reserve school birdhouse building day, 50 boxes (March 17, 2011)

Junior Forest Wardens in Airdrie building for the Nature Conservancy, 50 boxes (March 22, 2011)

Aerial videography - Riparian management area health and integrity assessment for Baptiste and Island Lakes

Baptiste, Island and Skeleton Lakes Watershed Management and Lake Stewardship Council (BISL)

Grant: $9,000

Project Code: 015-00-90-142

Project Status: New; Completed

The purpose of the project was to assess the shoreline, riparian health, fish, bird and animal habitat health of Baptiste and Island Lakes. The aerial perspective allows a view of the entire management area including the emergent vegetation zone, the riparian zone, and the upland buffer protective zone. The procedure also gives a view of associated land uses. The methodology incorporates the connection of the aerial videography at time of capture with Geographic Information System (GIS) data. This allows the results of the assessment to be tied accurately to the DVD format video and mapped in association with background satellite imagery. The products make excellent education and awareness tools for preservation and rehabilitation of fish, bird and animal habitat on the shore land of Baptiste and Island Lakes.

Deliverables/Results:

Low level helicopter riparian video capture of Baptiste and Island Lakes and production of DVDs, scorecards and maps have been completed.

Every property at Island Lake has been inspected for any type of contamination such as improper sewage disposal, storage and leakage of any materials.

Presentations have been completed at the Summer Villages of South Baptiste, Sunset Beach, Island Lake and Whispering Hills. Other presentations are being planned.

Beaverhill Lake stewardship and monitoring

Beaverhill Bird Observatory

Grant: $10,200

Project Code: 030-00-90-124

Project Status: Funded since 2006-07; Completed

This project's goal continues the Beaverhill Bird Observatory's (BBO) work as stewards of the Beaverhill Lake Natural Area. The project objectives were: to monitor the recovery of the wetlands that were damaged by cattle in previous years; to continue monitoring the breeding birds in the Natural Area and the migrating songbirds, waterfowl and shorebirds (as part of BBO's long-term dataset); to improve road and trails access to the Natural Area by smoothing road and clearing trails; to replace the roof of the lab; to conduct two major interpretive events on site and three off site to inform the public about the importance of the Natural Area, the importance of birds as an indicator of the health of an ecosystem and the importance of multiple-use conservation sites. The success of the fencing was monitored. Spring and fall songbird migration and MAPS (Monitoring Avian Productivity and Survivorship) banding were successfully completed this summer. In addition the BBO monitored nest boxes, and completed fall saw-whet owl migration. Two major public events were held on site: Steaks and Saw-whets and the BIG Birding Breakfast, and talks and presentations were given at a variety of other venues.

Deliverables/Results:

The fencing was monitored, and although cattle did not access the Natural Area there was little recovery to the wetlands due to low water levels.

Two trail clearing events were held. Holes in the road were filled in the spring and smoothed in the fall. The roof was replaced on the lab.

The BBO conducted spring migration monitoring (May 1, 2010 - June 9, 2010), summer MAPS program (900 hours), tree swallow nestbox monitoring (three grids of 50 boxes), saw-whet owl nestbox monitoring (100 boxes), waterfowl and shorebird surveys, and fall songbird migration monitoring (August 1 - October 10, 2010). The first Western bluebird nest ever documented at Beaverhill Lake was discovered!

Fall saw-whet owl migration was conducted from September 10 through November 15 (the longest season ever). This effort was made to try and get an idea of the end date of the migration.

All data was submitted to Bird Studies Canada, Institute for Bird Populations, Nature Alberta (nestcards) and to ASRD.

The BIG Birding Breakfast was held on June 6, 2010 (45 visitors) and the Steaks and Saw-whets event held October 1 and 2, 2010 was a huge success again with over 100 people coming out to the lab to observe saw-whet owl banding.

Publication:

Priestley, L. et al., 2010. Encounters of northern saw-whet owls (*Aegolius acadicus*) from banding stations in Alberta and Saskatchewan, Canada. J. Raptor Res. 44(4):300–310

Willow and tree planting on Millennium Creek (Cochrane Scout Troop)

Bow Valley Habitat Development

Grant: $2,182.95

Project Code: 015-00-90-136

Project Status: Funded several restoration projects on Millennium Creek; Completed

In May 2010, the Cochrane Scout Troop planted indigenous willows along a 50 metre reach of Millennium Creek. The objective was to add cover and shade to the stream channel and create a more natural riparian zone. During the evening of May 13, 2011, a total of 144 willow plants were transplanted at the planting site along Millennium Creek. On May 22nd, a total of 146 plants were planted at a site downstream near the confluence of Millennium Creek and the Bighill Creek. After each planting event on both days, a meal with refreshments was provided for the work crew. Also during both outings, some troop members took the initiative to do a garbage clean-up at both sites.

Deliverables/Results:

The planting program was a major success with a total of 290 pre-rooted willow plants planted along the stream bank. This result exceeded the original goal of 200 plants by 90; additional plants were prepared to ensure enough healthy plants would be available for the planting project. Volunteers contributed 80 hours to the project.

Modifications to a section of stream channel on Ranch House Spring 2010

Bow Valley Habitat Development

Grant: $3,385.72

Project Code: 015-00-90-139

Project Status: New, although funded a Bighill Creek fishery study in 2009-10; Completed

The project objective was to remove a small waterfall of approximately 25 cm on a small feeder spring tributary to the Bighill Creek, so that juvenile trout can migrate upstream and utilize the habitat. In 2009 ACA provided funding support for the fisheries study on Bighill Creek in 2009, which identified the problem on the small feeder spring. Trout were captured downstream of the waterfall but not upstream, where there is suitable habitat. In-stream construction took place July 2, 2010. Prior to the start of in-stream work, all necessary materials were gathered and transported to the site. The plan involved installing a total of 10 opposing rock deflectors over a 20 metre reach of the stream, both upstream and downstream of the waterfall. The waterfall would be removed during the construction, when the flow by-pass was in place. Large, 50 kg rocks would be used for the deflectors. After completing the in-stream work on the site, it was determined that planting willows along the enhanced reach of the stream would help add further stability and cover to the stream channel. Bow Valley Habitat Development (BVHD) had a surplus of 59 willow plants from other projects completed in the spring of 2010.

Deliverables/Results:

Approximately two weeks after the project was completed on Ranch House Spring Creek, small fish were spotted in the habitat upstream of the old waterfall site, over a distance of approximately 160 metres upstream. Surprisingly, one fish was spotted upstream of the first parking lot culvert. BVHD suspected that some or all of the fish observed in the upper channel, were trout.

Maintaining and restoring natural habitat in the Castle Wilderness

Castle-Crown Wilderness Coalition

Grant: $9,500

Project Code: 015-00-90-135

Project Status: Funded in 2009-10; Completed

The goal of the Castle-Crown Wilderness Coalition (CCWC) is: the establishment, restoration, maintenance and environmental protection of the Castle Wilderness as a viable wilderness within the Crown of the Continent ecosystem. This project focused on encouraging new volunteers to maintain and restore this beautiful and ecologically important landscape. Several public outreach events were attended: the AWA Tower Climb in Calgary, The Waterton Wildflower Festival, Heritage Days Fair in the MD of Pincher Creek, Crown of the Continent Conference in Waterton and Forest Management and Logging, a Community Conversation. Outreach was also done through distribution of the new posters and brochures to 17 communities throughout southern Alberta. Stewardship days and hikes were organized, as well as three stewardship events. CCWC's stewardship activities include teaching of best practices in the backcountry, removal of invasive species and trash, shoreline clean-up and trail repair. Large weed infestations and/or infractions of the Castle Special Management Plan are also reported to other agencies.

Deliverables/Results:

Over the period of this project CCWC worked with more than 100 volunteers who worked well over 600 hours of volunteer time. Approximately 41 new volunteers came out to help with CCWC's work in the Castle. This includes 23 from partner organizations and community groups, 13 from Katimavik, three new hike leaders and two new volunteers to help us with backcountry sites where horses are used to get in and out.

More than 30 stewardship reports were submitted to CCWC this year. Reports included sightings of rare plants such as mountain lady slipper, blue columbine, yellow monkey flower, white bog orchid, bronze bells and rose root. The sighting of a wild turkey with three young was also submitted on a report. No species-at-risk (SAR) reports were received at CCWC, although stewards are requested to send CCWC a copy of SAR reports it does not always happen. CCWC staff and volunteers joined MULTISAR on their harlequin duck surveys on the Old Man and Carbondale Rivers. There were only three positive sightings for one location on this survey. Reports for these days were given to MULTISAR.

An information kiosk is planned near the Ecological Reserve; permits for the kiosk were pursued through ASRD throughout the year. Mapping and survey information was submitted and amended as requested. The permit and contract was issued on February 18, 2011. The kiosk will be built in the summer of 2011.

A new brochure and poster were developed and printed. However the messaging and information contained in the brochure was changed to heighten awareness of the need for protection of the Castle as a Special Place for future generations. This information is shared on CCWC website (www.ccwc.ab.ca/files/RestorationBrochure.pdf) and

distributed throughout southern Alberta and is given out at public events.

CCWC delivered more than 100 bags of weeds to the furnace throughout the summer season.

Outreach: Stewardship days were hosted at 28 sites, as well as three stewardship events. The CCWC coordinated over 20 hikes.

ALUS demonstration project in the County of Vermilion River

Delta Waterfowl Foundation

Grant: $15,000

Project Code: 015-00-90-141

Project Status: New; Completed

The goal of this multi-year project is to demonstrate how a community-led and farmer-delivered Alternative Land Use Services (ALUS) model can be used to deliver an ecological goods and services program. Aside from demonstration farms, Delta Waterfowl Foundation (DWF) is advancing ALUS through communication and outreach, monitoring and developing community capacity. The ultimate goal of this project is to see ALUS used as the delivery model for a province-wide program. To date, 11 agreements have been signed with local producers to deliver ALUS projects on their farms. These farms demonstrate a variety of services that enhance the farms from an environmental perspective. The producers selected are also excellent spokespeople that articulate the benefits of the ALUS approach very well. As far as communications and outreach, tremendous interest has been shown in ALUS from a wide array of groups including other counties, producer groups, environmental groups, universities and producers themselves. This project is part of a national effort, with other ALUS projects being considered for Saskatchewan and Manitoba and ongoing efforts in Ontario and Prince Edward Island.

Deliverables/Results:

Partnership Advisory Committee (PAC) has seen tremendous growth in its capacity to guide and drive ALUS on a local community level. DWF have met and corresponded with numerous interested parties about ALUS and how it works to deliver ecological goods and services. A newsletter has been developed to help keep those interested up to date on the project's progress. ALUS tours are planned for summer 2011 and a workshop in spring 2012 to further this outreach effort.

As far as demonstration farms go, DWF entered discussions with over 20 producers and signed 11 agreements to date. In all there was 1,036 acres signed up including new and existing wetland, riparian and upland habitat. Of these acres, approximately 250 are wetlands. Included in the upland development are establishing native prairie, shelterbelts, and wildflower/pollinator habitats.

In partnership with Cows and Fish, baseline inventories have been completed on five project areas that will help monitor environmental change over the lifetime of the agreements. These surveys included nine wetlands, two tame forage pastures and one native grassland pasture. Various environmental indicators were recorded including water quality, vegetation analysis, presence of bird and amphibians, water levels, etc. Photo stations were also set up to help document the projects over time.

Through a separate agreement DWF have worked with ACA and Wildlife Habitat Canada to install and maintain close to a hundred hen houses to help mallard production. Several of these hen houses are on ALUS projects with the producers themselves handling installation and maintenance chores.

Hen House. Photo credit: Delta Waterfowl Foundation, Jim Fisher

Dickson Dam Site #7 Conservation Property - Habitat Improvements

Dickson Fish and Game Association

Grant: $5,240

Project Code: 015-00-90-140

Project Status: New; Completed

The goal of this project is to create or enhance wildlife habitat quality in a woodlot near conservation property Dickson Dam Site #7. The Dickson Fish and Game Club (currently listed with the Innisfail Fish and Game as Volunteer Stewards of this property) have been involved with this piece of crown land since the Dickson Dam has been in operation. The overriding reason to do the project is to create a more diverse stand structure within a dead and dying aspen parkland forest. This would then create more niche habitats for a variety of species providing food, water and edge effect for all local species. In addition to the upland habitat improvements, watering sites were selected to give animals a convenient place to water so they could avoid vehicle contact on a nearby roadway. A large portion of the project was talking to the stakeholders and gaining all the necessary approvals from government agencies including Water Resources, Public Lands and Fish and Wildlife. Planning and mapping the clearing areas then taking the plan to the field and surveying the work site. The third step in the process was applying for land use agreements with area petroleum producers. The fourth step was tendering a contract to complete the work. The club has chosen a successful candidate that exceeds all conditions of the work, and job site safety. The final step will be to review the progress of re-growth of the sites and monitor the use of the improvements over the summer and fall of 2011.

Deliverables/Results:

The project is complete as of April 7, 2011; habitat and watering sites for wildlife have been created. Ongoing monitoring of the sites will occur during the summer and fall 2011.

Partners in Habitat Development

Eastern Irrigation District

Grant: $25,000

Project Code: 015-00-90-103

Project Status: Supported by ACA from 1998 – 2001; GECF funding since 2005-06; Completed

The Partners in Habitat Development (PHD) program is a long-term habitat initiative developed to mitigate the loss of wildlife habitat in southern Alberta agricultural regions. Degradation of wildlife habitat within the region over the last 30 years can be attributed to many factors including urbanization, more intensive agricultural practices, improvements to irrigation infrastructure, and increases in industrial activities. The PHD program is a partnership-based program that mitigates for the loss of wildlife habitat in southern Alberta agricultural regions. The main objective of the program is to enhance upland game bird habitat within southern Alberta's irrigated agricultural areas. This is achieved by undertaking habitat enhancement plantings, fencing of new or existing habitat from livestock access and mitigating the loss of canal seepage due to irrigation efficiency achievements. These activities have the potential to increase food resources, shelter, security and nesting and brooding cover of not only upland game birds but other terrestrial species found in these areas. During this year's project, the PHD program developed 17 habitat projects in conjunction with 15 different landowners. A total of 90,580 seedlings were planted on habitat sites. A total of 4.5km of fencing materials were provided to landowners for installation to protect seven habitat sites from livestock access. One construction project was completed to maintain existing habitat. Additionally, a number of wildlife surveys were conducted throughout 2010-11.

Deliverables/Results:

35,870 seedlings planted by PHD staff on new habitat enhancement sites.

7,795 seedlings planted by PHD staff as replacements on previous PHD habitat sites.

46,923 seedlings ordered by PHD but planted and maintained by landowners.

4.5 kilometres of fencing distributed to protect seven habitat sites from livestock access.

One construction project completed to allow maintenance and enhancement of existing shrubby vegetation within an abandoned canal.

The Southern Alberta Partners in Habitat Development Annual Report (available upon request).

Riparian and wetlands health assessment and inventory by Cows and Fish of critical areas in the Ghost Watershed

Ghost Watershed Alliance Society

Grant: $35,500

Project Code: 015-00-90-143

Project Status: New; Completed

In 2010, the Alberta Riparian Habitat Management Society (Cows and Fish) partnered with the Ghost Watershed Alliance Society (GWAS) to inventory riparian health along select streams and wetlands within the Waiparous Creek watershed. This initiative was the first phase of the goal to inventory riparian health in the entire Ghost River watershed to inform watershed management planning. In 2010, the project scope included inventorying riparian health along representative reaches of Waiparous Creek and associated tributaries and wetlands. During July 2010, Cows and Fish completed riparian health inventories on Waiparous Creek, Johnson Creek, Meadow Creek, Lost Knife Creek, Four Mile Creek, Aura Creek, an unnamed tributary to Waiparous Creek, and the Aura wetlands. A total of 37 inventories were completed representing a cumulative total of 26 km of stream length and seven hectares of wetland area: 34 lotic (stream) and three lentic (wetland) riparian health assessments. Based on the results of this riparian health inventory project, most riparian areas within the Waiparous Creek watershed appear to be in healthy condition. However, there are isolated areas where land use impacts have degraded riparian health. The overall high level of riparian health in the Waiparous Creek basin and the relatively low abundance of invasive and disturbance plant species presents a good chance of success for restoration and recovery of impacted riparian sites.

Deliverables/Results:

Education and Awareness: A workshop describing how riparian health inventories are done was held in May 2010 and a follow up workshop was held on April 15th, 2011, at which Cows & Fish presented the results of the project to stakeholders and the public. Cochrane's local newspaper, the Cochrane Eagle, reported on the presentation the week of April 25th.

Riparian Health Inventories: The average health rating for the seven stream systems evaluated in the Waiparous Creek watershed is 92% (healthy). This is an average of 34 riparian health inventory sites. Five sites (15%) rate healthy, but with problems and the remainder (85%) are in the healthy category. The average health rating for the three Aura wetland sites is 86% (healthy). Only one of these wetland sites is in the healthy, but with problems. None of the stream or wetland sites assessed are in the unhealthy category.

Project report is complete: 2010 Riparian Health Inventory Waiparous Creek Watershed by Cows and Fish. (www.ghostwatershed.ca/GWAS/Research_&_Data_files/Waiparous%20CR_GWAS_2010_FINAL.pdf)

Lac La Biche watershed project

Lac La Biche County

Grant: $5,000

Project Code: 020-00-90-160

Project Status: Funded in 2008-09; Completed

The Lac La Biche Watershed Project is guided by the Watershed Advisory Committee & Watershed Steering Committee; consisting of two watershed groups comprised of volunteers and municipal members. The main objective of the Lac La Biche Watershed Project is to maintain a healthy watershed and ensure a safe, secure source of drinking water. The main project goals also consist of the improvement of lakes and aquatic ecosystems throughout the County. This has been achieved through analyzing and monitoring water samples collected throughout the sampling season. During 2010-11 the testing of five lakes, 20 inflows, and bacteriological testing at several beaches throughout the County was conducted. By improving lake and ecosystem health, fish populations will also have a chance to increase from their recently declining populations. All results from the sampling season are compiled into databases and reports, which enable us to compare to previous years and monitor the progress of this project. All reports are made available to the public and community residents are encouraged to express any comments or concerns they have with the results. Public involvement has been encouraged through public consultation meetings, open houses, workshops, sampling events, field days, and other community events organized by project members. Locally distributed newsletters containing surveys, sampling updates, and contests also provide residents with watershed information and encourage participation and feedback. Youth programs, such as the summer 'Mad About Science' Program hosted at Fun in the Sun and community day camps, help encourage involvement and provide education for future generations.

Deliverables/Results:

14 sampling events were conducted on six different lakes. The following lakes have been sampled throughout the 2010-2011 sampling season: Lac La Biche (East basin) sampled four times, Lac La Biche (West basin) sampled twice, Elinor Lake sampled twice, Ironwood Lake sampled twice, Beaver Lake sampled twice, Square Lakes sampled twice. Water quality has remained relatively stable over the past years of study, with no significant changes. Bacteriological beach sampling was conducted weekly on 11 different recreational areas. E.coli and fecal coliform counts did not exceed threshold values; therefore no areas were closed throughout the summer of 2010. Inflow sampling was conducted a minimum of once a month at 20 different inflow sites.

Lake Reports containing lake, inflow, and beach sampling results conducted at all sampling sites were completed and are available upon request.

Approximately 300 registrants participated in the youth Mad About Science Program for youth ages 6-12. This summer, numerous day camps were held at various locations within the County: Fork Lake - one day camp, Lac La Biche - two day camps, Plamondon - two day camps have been conducted here. The average number of participants for each day camp was approximately 20 registrants.

For the new "Christmas Tree Recycling Program", 15 trees were collected and 15 will be planted throughout the Parks and Open Spaces of the County.

Three "Watershed Newsletters" have been distributed to local residents (Spring, Summer, and Fall editions).

Monitoring migratory and breeding birds in Alberta's Boreal Forest

Lesser Slave Lake Bird Observatory

Grant: $25,000

Project Code: 030-00-90-128

Project Status: Supported by ACA since 1999, GECF funding since 2004-05; Completed

The first objective of this project was to collect accurate avian data to provide accurate long term population data and trends on migratory and breeding birds in the boreal forest. This was achieved through the successful completion of all core monitoring programs at the Lesser Slave Lake Bird Observatory (LSLBO) this year: Spring Migration Monitoring, Fall Migration Monitoring, Monitoring Avian Productivity and Survivorship Program (MAPS - breeding bird program), and Northern Saw-whet Owl Program. All data has been forwarded to Bird Studies Canada for analysis and interpretation of the LSLBO long-term dataset to detect changes in species populations, help to focus future research on potential causes or habitat changes, and to initiate conservation efforts. In addition, field work continued on the LSLBO Canada warbler project including comprehensive vegetation surveys within the LSLBO study grid and a breeding bird survey program to assess Canada warbler occurrence within Lesser Slave Lake Provincial Park. This species was recently classified as threatened in the Federal Species at Risk and the LSLBO is currently developing a five-year plan to provide guidance and support for this important study. The LSLBO Fifteen Year Technical Report was completed and presented at the Annual Songbird Festival in June 2010. In addition, the LSLBO has established a partnership with Dr. Erin Bayne at the University of Alberta and Alberta Parks to support research initiatives at the Boreal Centre for Bird Conservation. Field work commenced on three unique research projects this summer to gain a better understanding of the avian data being collected by the LSLBO. The second objective of this project was to increase public awareness about the importance

of the boreal forest and its importance to wildlife. Environmental education and public interpretive programs were delivered to over 8,300 children and adults over the past year. New programs continue to be developed to supporting the LSLBO's objective of providing year round education and recreational opportunities for residents of northern Alberta. Over 6,000 visitors came to the Boreal Centre during this project to learn about the boreal forest and its diverse resources.

Deliverables/Results:

LSLBO Annual Report – copy available upon request.

Summary of Education programming developed and delivered by LSLBO Educators.

New Education Programs developed and delivered this year: Amazing Race; 4H Tour Birding Challenge; Orienteering Program; Nature Scavenger Hunt; Winter Survival Program: Shelters and fire lighting; Grade Two Hot and Cold Temperature field trip; Grade Five Snow Study Program; Boreal Forest Ecology Program and Soils Lab for NLC Petroleum Operators Program; and Owl Banding Program.

New Interpretive Programs developed and delivered this year: Wonderful World of Weasels; Bug Safari Family Program; Owls of Northern Alberta Webinar; Spring Migration Webinar; Moonlight Snowshoe Ecology Hike; Nature Photography; Introductory Drawing Program; Drop-in Art Program with Aboriginal Artist in Residence: Margaret Cardinal; Waterfowl Birding Program; Special Event: LEEDing the Way.

LSLBO Newsletters and BCBC Bulletins.

Scientific publication:
Flockhart, DT Tyler. Timing of events on the breeding grounds for five species of sympatric warblers. Journal of Field Ornithology. 81(4):373–382, 2010.

Riparian area management improvements

Mountain View County

Grant: $20,000

Project Code: 015-00-90-102

Project Status: Funded since 2005-06; Completed

The goal of the Riparian Areas Management Improvements Program is to help improve and preserve the health of Mountain View County's riparian areas. This program has helped improve water quality and wildlife habitat throughout the County. Producers are becoming aware of the importance of sustainable agriculture and beneficial management practices. ACA has helped fund 13 exclusion and riparian pasture fencing projects this past year. As well Mountain View County (MVC) has helped fund seven off-site watering systems. All of these projects will improve the riparian health of the project area. Livestock producers are keeping their cattle out of riparian areas by using off-site watering systems and fencing; this will reduce the potential amount of manure from entering water bodies and improve the water quality for future fish habitat.

Deliverables/Results:

There were 13 riparian area management projects completed this year in five different watersheds. This results in 13 more producers who are aware of the importance of beneficial management practices and sustainable agriculture. These projects protected a total of 15 km of finished riparian fence and 298 acres of riparian area.

Five of the 13 producers who installed a riparian fence also purchased one or more off-site watering systems. These watering systems were partially funded by MVC and the Growing Forward Program.

Project profile sheets have been completed for each project and will be made available.

The results from the riparian health assessments will be made available.

Projects are available for tours.

Public and volunteer engagement with Alberta's Important Bird Areas

Nature Alberta

Grant: $34,073

Project Code: 030-00-90-158

Project Status: Funded in 2009-10 and similar project funded from 2003-04 – 2006-07; Completed

Nature Alberta's main goals were to develop an interactive website where volunteers and members of the public could contribute material which will showcase Important Bird Areas (IBAs) (photos, video and stories); create five videos that will be posted on the website that will showcase five IBAs and the people that enjoy them and increase IBA stewardship coverage to 70% in Alberta (34 sites). The interactive website has been developed and caretakers, partners and the public will be able to share their videos, photos and stories about the IBA program in a common place online. Site-specific videos were made at IBAs with caretakers. For example, it was great to interview Lloyd Bennett on camera about his activities at Hays Reservoir IBA. Lloyd has been visiting his IBA since the early 1990s. Interest and awareness of the IBA program grew. To achieve this, articles were written for the column 'Eyes on IBAs' which appeared in the magazine 'Nature Alberta'. Presentations were made to people across the province including Buffalo Lake Naturalists Club, Lac La Biche Birding Society, Lethbridge Naturalists Society, Red Deer River Naturalists Society and Vermillion River Naturalists Society. The caretaker network continued to grow during 2010/11. Currently, 71% of Alberta's IBAs either have caretakers or have caretakers who are considering taking on the IBA caretaker role.

Deliverables/Results:

Interactive website dedicated to Alberta's IBAs. A new web-based tool has been developed. On the website, caretakers, partners and the public will have an opportunity to share their stories about IBAs. Rather than simply telling people about IBAs and their importance Nature Alberta wanted to create a platform for everyone to be part of the conversation. This interactive website does not appear to be live yet.

Five videos on website. Videos were created at IBAs and with caretakers. These have been used on the website, although the link to these videos is not yet available.

Eyes on IBAs' articles: Articles were written for Eyes on IBAs – a column in Nature Alberta's magazine 'Nature Alberta'.

Awareness of IBAs and the IBA program grew during 2010/11. Presentations were made to Buffalo Lake Naturalists Club, Lac La Biche Birding Society, Lethbridge Naturalists Society, Red Deer River Naturalists Society and Vermillion River Naturalists Society.

The caretaker network continued to grow during 2010-11. Currently, 71% of Alberta's IBAs either have caretakers or have caretakers who are considering taking on the IBA caretaker role (possible caretakers were reached during outreach efforts and they expressed interest in the program and are considering how best to participate in the caretaker role).

Riparian water quality improvement project

Nature Alberta

Grant: $34,000

Project Code: 015-00-90-129

Project Status: Funded since 2003-04 (except 2008-09); Completed

It is well known that fish and wildlife habitat is often destroyed to make beaches and boat launches in front of cottages along lake shores. Nature Alberta's goal is to reduce this type of activity by educating shoreline property owners about the choices they make and actions they take on their properties. Nature Alberta also strives to improve local stewardship capacity, and increase appreciation for fish, wildlife and their habitats. Through data collection and analysis of community perceptions of fish and wildlife habitat and their actions, the project's impact on shoreline communities can be measured. Through education, the riparian water quality improvement project helps create and preserve healthy waterfront habitat for residents and wildlife. Emphasis is placed on the importance of lake awareness days, riparian and wetland restoration sites, and other opportunities to increase the level of education and awareness for watershed residents and stakeholders. Shoreline residents can have a substantial impact through simple changes in their actions, within their houses, around their properties and on or in the water. Although the overall target audience is lakeshore residents emphasis the target communities in 2010 were placed in the communities of Sylvan Lake, Pigeon Lake, Wizard Lake, Clear Lake and Wabamun Lake. Each lake has been identified as having growing shoreline communities that in turn are negatively impacting fish habitat and water quality. Each particpated in the Shoreline Resident Consultation Program, Workshop in a Box and Shoreline Action Challenge. The project is growing in popularity, community residents are responding positvely to the education provided and residents are eager to participate in the project.

Deliverables/Results:

Four community volunteers were trained, one each from Wabamun Lake, Clear Lake, Pigeon Lake, and one from outside the target lakes, Bear Lake.

Two summer interns were hired to perform Shoreline Consultations.

Books were provided to Pine Lake and numerous brochures and pamphlets were distributed to all target communities.

Information on best management practices was provided to government bodies and other non-profits as requested.

12 presentations and displays were given.

53 new households participated in the resident shoreline consultation. Nine follow-up consultations were performed. Information will be used to analyse the success of the program.

Sturgeon River watershed habitat improvements

Northern Alberta Institute of Technology (NAIT)

Grant: $20,000

Project Code: 015-00-90-144

Project Status: New; Completed

This project assessed fish habitat and watershed health of the Sturgeon River drainage, in collaboration with the City of St. Albert, NAIT students, and the North Saskatchewan Watershed Alliance. The first objective was to assess stream crossings to determine potential impacts on fish habitat. In 2010, 101 stream/river crossings on permanent water courses within the Sturgeon River watershed study area were assessed once, using standardized procedures. Twenty culverts and 81 bridges were assessed. Sedimentation sources were identified at 15% of the culvert crossings and 80% of the bridge crossings. The second objective was to provide ASRD with a prioritized list of stream crossings that require maintenance work to reclaim fragmented fish habitat, with the intent of using this information to focus Fish Habitat Compensation proposals. A prioritized list of stream crossings that require maintenance work was provided to the counties, the City of St. Albert, and ASRD. Project leaders are working with County and City representatives to facilitate best management practices. The third objective was to use historical and current data to establish permanent sample plots for collecting baseline and long-term water quality data on the Sturgeon watershed to facilitate best management practices and decision making. Sites for water quality data collection were selected using historical data and in consultation with a regional limnologist and hydrologist. A total of 49 sites were sampled in 2010, once in spring (May-June) and once in summer (July-August). Based on data from these sites, 20 sites will be selected for long-term water quality monitoring, some of which correspond to historical sampling sites. At each site, current velocity, turbidity, temperature, conductivity, and dissolved oxygen and chlorophyll concentrations were measured with various meters. Water samples were collected for chemical analysis. Concentrations of dissolved oxygen, total phosphorus, and total solids were determined. Where possible, laboratory analyses followed the same procedures used by Alberta Environment to permit comparison of results to historical and/or related data. Water quality data has been shared with the North Saskatchewan Watershed Alliance and the City of St. Albert, and will be made available to Aquality Environmental Consulting as they are currently preparing the State of the Sturgeon River Report. Objective 4 was to provide research and field opportunities for NAIT students and the community to assess water quality using established sampling plots. Three NAIT graduates were hired to work on this project during summer 2010, along with a student from University of Alberta, Augustana. In addition to regular data collection, summer staff was responsible for developing and presenting an environmental education program, consistent with the Grade Five science wetland curriculum objectives. Objective 5 was to develop proactive partnerships with multiple stakeholders including industry, landowners, and the community, to monitor and improve fish habitat. Numerous partnerships and letters of support from multiple stakeholders have been established, including: North Saskatchewan Watershed Alliance, City of St. Albert, ASRD, Sturgeon County, Lafarge Aggregates and Concrete, ALS Laboratories, and J.R. Golf Course.

Deliverables/Results:

Culverts made up a small percentage of the stream crossings in the watershed. No hanging culverts were identified; however, other potential fish barriers (25%) and sources of sedimentation (72%) were identified at crossings throughout the watershed. Potential fish barriers were identified at 35% of the culvert crossings and 22% of the bridge crossings.

Dissolved oxygen (DO) levels were low throughout much of the watershed, especially in the summer; at many sites DO concentrations were below the acute (1 day) level set as by the Alberta Guidelines for the Protection of Freshwater Aquatic Life. DO concentrations tended to be higher in the headwater reaches of the Sturgeon River, and declined toward the mouth, especially in the reaches downstream of Big Lake and through the City of St. Albert. Total Solids concentrations (TS) were generally higher in spring than in summer throughout the watershed, and by summer were less than 400 mg/L at all sites on the Sturgeon River downstream of Matchayaw Lake, except at the mouth of the river, which was slightly higher. Chlorophyll a concentrations measured with the field meter were typically less than 10 µg/L at the Sturgeon River sampling sites. Low primary productivity, combined with low flow rates and warm water temperatures are likely major factors in low DO levels. At many of the sites, flow rate was too low to be measured, especially during the summer months. Total phosphorus concentrations were high, indicating eutrophic to hypereutrophic conditions in the streams and rivers throughout much of the watershed. High phosphorus levels result from natural sources (soils) and from anthropogenic activities and land use (crop and turf fertilizers, livestock).

The project deliverables included a report, map and photo log identifying specific point sources of impacts on fish habitat including fragmentation (hanging culverts), and sediment sources; recommendations for improving impacted sites to enhance fish habitat; a map and report identifying proposed permanent sample locations along the Sturgeon Watershed, and a summary of the data collected at these sites; and an education program to complement the Grade 5 Wetland Unit in the science curriculum.

Additionally, two significant student projects were initiated through the Sturgeon River project:

1) Assessing Adverse Effects of Winter Bridge Deck Ploughing on the Sturgeon River (October 2010 to April 2011). Student researchers presented their research in a poster session at the Alberta Wildlife Society meeting in Camrose, March 11-12, 2011 and at the Alberta Institute of Agrologists conference in Banff, March 15-18, 2011 (awarded 3rd prize).

2) Impact of Snowmobile Snow Compaction on River Ice Thickness (January – March 2011). A student poster presentation was given on this work at the Alberta Institute of Agrologists conference in Banff, March 15-18, 2011 (awarded 2nd prize).

Nose Creek rehabilitation project

Nose Creek Watershed Partnership/Trout Unlimited Canada
Grant: $3,000
Project Code: 015-00-90-137
Project Status: New; Completed

Nose Creek has been identified by the Bow River Basin Council as a priority tributary to the Bow River. Historically, Nose Creek was a productive fishery but due to cumulative effects of development and agriculture in the watershed, water quality has declined so dramatically that sport fish are present only at the mouth and select locations upstream. The Nose Creek Rehabilitation project was designed and implemented by Trout Unlimited Canada (TUC) biologists and the Nose Creek Watershed Partnership (NCWP) to aid in the recovery of Nose Creek to previous conditions suitable for sport fish and to enhance prime brown trout spawning areas at the confluence with the Bow River. The goal of the NCWP is to improve water quality and protect riparian areas in the Nose Creek watershed. In order to achieve these goals, the NCWP developed the Nose Creek Watershed Water Management Plan (NCWWMP) in 2006. This plan outlines recommendations and an implementation plan for municipalities, the provincial government, the Nose Creek Watershed Partnership (in cooperation with TUC) and other agencies to implement to improve conditions across the watershed. Much of the restoration work is completed by volunteers and supplies and equipment are obtained through corporate partnerships, donations and grants. In 2010, the NCWP was successful in engaging over 400 local residents through a variety of stewardship opportunities. In addition, the NCWP implemented the first full year of the Long Term Water Monitoring Program, completed work on several Plan recommendations, developed new corporate partnerships and began a fisheries monitoring program.

Deliverables/Results:

Water Monitoring project complete for 2010 – Preliminary results appear to indicate some improvement in certain parameters since 2001 monitoring was completed.

Fish sampling was completed in Nose and West Nose Creeks by TUC as part of a training exercise for Fish Rescue staff. Brown trout were observed higher up in the system than had ever previously been recorded. Fish sampling will be conducted in 2011 in select locations to further the fisheries monitoring efforts. Fish were present in areas of high quality habitat and this has provided the NCWP with increased incentive to improve habitat on Nose Creek.

Community engagement and stewardship: The NCWP did not obtain additional funds from Evergreen to purchase native plant material; however, approximately 400 local residents participated through a variety of stewardship events. Volunteers completed creek clean ups and weed pulls along the banks of Nose Creek removing hundreds of pounds of garbage and noxious weeds from the creek and surrounding riparian area. Approximately 200 residents of the watershed attended the rain-barrel sale and Eco-fair and learned about watershed ecology and responsible water-use practices.

The NCWP annual report and water monitoring report are available upon request.

Erosion Monitoring Report: Erosion Monitoring project was delayed in order to combine efforts with a related project being undertaken by the City of Calgary in 2011.

Off the Creek Program 2010

Red Deer County

Grant: $25,000

Project Code: 015-00-90-128

Project Status: Funded since 2006-07; Completed

The goal of the Off the Creek Program 2010 was to work with interested landowners who wanted to implement actions on their land, which conserve or improve riparian and wildlife habitat in Red Deer County (RDC). The objectives of the Off the Creek Program 2010 were to: a) support RDC landowners in protecting and/or restoring riparian habitat on their land, by providing financial and technical resources for their on-the-ground projects; b) protect and/or restore riparian habitat in RDC, through these on-the-ground projects; and c) assist in the development of a riparian management plan for each of the completed projects. Activities of the Off the Creek Program 2010: program promotions to landowners and others, working with interested landowners on developing project plans, project construction/ installation (i.e. on-the-ground action) by landowners, working with landowners in developing riparian management plans for their projects.

Deliverables/Results:

16 projects were initiated by 14 landowners throughout Red Deer County.

195 acres of riparian area are now being protected or restored by these 16 projects.

821 Animal Units are now under new, sustainable management approaches, when it comes to their access or use of these riparian acres. In addition, one project's outcome is to establish a permanent forage buffer zone along a creek, which will help stabilize the creek bank and reduce nutrient input, erosion and downstream siltation.

For every Off the Creek (i.e. "public") dollar that went to voluntary, on-the-ground action by landowners, those landowners contributed over one dollar of their own (in cash, time, and equipment).

Off the Creek Program advertisements have appeared in the County News 12 times, and one article in the County News has discussed the Off the Creek Program (County News circulation ca. 10,000)

Off the Creek Program has been displayed/featured at the following public events: Cygnet Lake Drainage District AGM (Apr); Dickson Drainage District AGM (Apr); Alberta Stewardship Network Stewardship in Motion 8 Workshop at Sylvan Lake (Jun); Ladies Livestock Lessons (June); Riparian and Range Health Field Day (June), Friends of the Little Red Deer River Society Info Night (June) Enterprising Ag Tour (July), Red Deer River Watershed Alliance Tour (August), Working Well Workshop (Nov), Agri-Trade (Nov), Environmentally Significant Areas Public Meeting (November), Medicine River Watershed Society Community Information Night (Jan), Red Deer River Watershed Alliance Annual Watershed Stewardship Groups Meeting (Feb), Adams Lake Community Conversation (Mar), Gaetz Creek Community Conversation (Mar)

A webpage was started specifically for the Off the Creek Program: www.offthecreek.blogspot.com and Off the Creek Program information is on the RDC website.

Niemela Reservoir 2010 project

Sylvan Lake Fish and Game Association

Grant: $2,975

Project Code: 020-00-90-164

Project Status: New; Completed

The main objective was to continue to provide a quality angling experience for the general public and to upgrade and maintain the site. The site was maintained and the grass areas, washroom, garbage sites and access road were upgraded. The site was becoming more aged and was vandalized requiring improvements to the location. Extensive work was required on the spillway and surrounding area to conform to specs as required by the Alberta Dam Inspection Agency.

Deliverables/Results:

Cleaned washrooms, installed puck board and framing and installing a new door.

A contractor was hired to keep grass areas cut and maintained throughout the summer months and for the spring clean-up. Lawn contractor and membership have removed garbage regularly.

Gravel for access to be installed and spread.

Washroom door to be secured and spring clean-up completed.

Preservation and propagation of whooping cranes and sage grouse

The Calgary Zoo

Grant: $8,500

Project Code: 030-00-90-172

Project Status: New; Completed

This project focused on protecting Alberta's critically endangered whooping crane and it also supplemented future efforts to ensure the long term viability of sage grouse which are declining in our province. Funds from ACA enabled the Calgary Zoo to transfer live, adult whooping cranes which were needed at the International Crane Foundation for breeding purposes. Other components of this project included partnerships with (1) Canadian Wildlife Services & Environment Canada and (2) Canon Canada for infrastructure improvement, and with (3) the Canadian Museums Association and the federally sponsored Young Canada Youth Works Program to provide opportunities for Aboriginal youth and (4) the U.S. Fish & Wildlife Division and other partners associated with the whooping crane recovery team. In the first quarter of 2010, 80 % of the infrastructure was completed on two crane enclosures and one additional enclosure has subsequently been modified to house both whooping cranes and sage grouse. The Calgary Zoo are preparing should the need become necessary for captive sage grouse breeding. In the second quarter of 2010, ten live whooping crane eggs were cultured to final stages of incubation and then transferred to American project partners. All ten eggs hatched out after a successful transfer sponsored by the U.S. Fish & Wildlife Service. Two chicks died post hatching. Two chicks were cultured to fledgling stage and will join the cohort of birds flying with Operation Migration. Five fledged chicks will join a new non-migratory flock in Louisiana. Establishing additional whooping crane flocks separate from the Alberta flock that migrates to Texas prepares for any environmental mishaps such as food shortages in wintering grounds or oil spills. In the last

quarter, after many weeks of permitting discussion, arrangements were made through U.S. Fish & Wildlife Service and Canadian Regulatory Authorities to transport three adult whooping cranes to the International Crane Foundation in Wisconsin. Moving endangered species across borders is complex because of regulatory requirements and the necessary precautions to ensure animal welfare. Shipping crates were constructed and an attendant accompanied the cranes on Fedex Air Transport. On arrival in Chicago the cranes were transported by truck to Baraboo, Wisconsin.

Deliverables/Results:

Transferred live eggs to conservation partners in the United States.

Provided whooping cranes for new non-migratory flock in Louisiana.

Completed renovations to three whooping crane enclosures. One of these renovations can be used for sage grouse if deemed appropriate by the Recovery Team.

Completed a successful internship for an Aboriginal graduate preparing her for the workforce.

Taber trout pond

Town of Taber

Grant: $2,200

Project Code: 020-00-90-163

Project Status: New; Project not completed - funds not disbursed

The goal of this project was to return a former functioning trout pond to a useable urban fishery. The pond was originally formed by coal mining activities in the 1950s – 1960s but quickly came under the stewardship of local community groups and was turned into a trout pond and picnic area. In the 1980s the area suffered neglect and at some point pike and perch were introduced to the water body. Since the introduction of the pike and perch, the pond fell into disuse as an urban fishery. Additionally, the pond has become habitat for northern leopard frogs and the project strives create a balance between useful habitat for a species at risk and urban fishery expectations.

Deliverables/Results:

Project not completed.

Aquatic invasive awareness campaign

Trout Unlimited Canada

Grant: $2,838

Project Code: 020-00-90-159

Project Status: New; Completed

This is a public education awareness program with the development of a brochure, promotional items and signs that were posted around the province strategically. It focuses on invasive plants, microscopic invaders, snails, algae and mussels. It describes proper cleaning methods and identifying features. The reason TUC chose to look at different species is related to the fact that the cleaning protocols for all angling gear and boats are similar. It is the goal of this project to make individuals aware of the issues and also take proper precautions to stop the spread of these invasive species throughout the province. Originally TUC were going to produce up to 250 chloroplast-type posters, but after a similar project was undertaken focusing on one invasive species for local water bodies by ASRD, the focus was changed to produce 48 informative panels (23" x 31"). These panels are being placed strategically at provincial border crossings and at other access locations not occupied by the ASRD signs. Positive feedback has been received about the program from those involved. A smaller version of the sign will be produced to be provided with the promotional items.

Deliverables/Results:

Hard copies of the posters and signage are currently available upon request.

Promotional items can also be provided upon request.

Late fall fisheries investigation in diversion canals of southern Alberta

Trout Unlimited Canada

Grant: $7,000

Project Code: 020-00-90-116

Project Status: Funded since 2005-06; Completed

The goal of the fish rescue project is to go into southern Alberta canals to safely collect and remove all fish via electrofishing or netting, and then return fish into local rivers or reservoirs. This is an educational project with help from many different volunteer groups and individuals. In 2010 all collected fish were identified, sorted, counted and measured (depending on species). The final results included 410 volunteers providing 2,481 hours of effort helping to rescue over 23,000 fish across 11 field days. This was the second lowest number collected from all rescues. This is being attributed in part to a wet summer and fall season where much of the demand for irrigation was reduced, but also many of the canals were closed for portions of the summer to reduce potential damage from excessive flow in the canals. An additional location was added to the 2010 effort - a section of canal that typically is dry each fall, but with the excess water observed in 2010 this reach retained fish that required a rescue effort. TUC were able to rescue a number of mature individuals from this location. This location will be revisited in 2011.

Deliverables/Results:

Over 23,000 fish were rescued over 11 days of effort; this is less fish than expected, but TUC speculate that the reduced numbers are due to the wet summer and the decreased flow into these canals. This potentially shows how small changes in the operation of these structures could have a positive impact on local fisheries.

Full report is available on the TUC website: www.tucanada.org/reports/AB-022_FishRescue_2010.pdf

Crowsnest River channel reactivation project

Trout Unlimited Canada

Grant: $24,000

Project Code: 020-00-90-161

Project Status: New; Completed

The Crowsnest River supports an exceptional sport fishery; this is reflected in the local economy which relies heavily on tourism as a source of revenue. Given this, and a comprehensive understanding of river behaviour, there is growing interest in reactivating the historic river channel. TUC and its partners plan to restore a section of the

Crowsnest River by reactivating a portion of the historic channel. The goal of the Crowsnest River channel reactivation project is to improve habitat potential for aquatic species by restoring flow to the original, natural channel. The comprehensive approach incorporates elements that will increase the quantity and quality of fish habitat in the river, increase public education and stewardship of the aquatic environment, and enhance the aesthetic value of the river for regional residents. The proposed project will incorporate local participation and develop partnerships that will improve stewardship in the community for the long term. This proposal has been discussed with local members of industry, community groups, and schools, several of which have expressed interest in the project. Subsequent discussions have led to the development of possible partnerships and opportunities to provide long-term support for the project. The objective is to engage the community by building this project while developing a conservation legacy that benefits the local fishery and residents.

The inventories of the river and the side channel required to move to the next phase of the project were completed. Unexpectedly some anomalies were found within the chemical analysis of the soil samples and this must be addressed with additional soil sample analysis before moving forward with the project in 2011.

Deliverables/Results:

Fisheries inventories and redd surveys were completed throughout the year and details compiled in a final report by the consultant.

A consultant completed the hydrological report, including a chemical analysis of the soil samples taken. This report is in press and will be available shortly from TUC. Once this report (awaiting further soil chemical analysis) is completed, a consultant will take this information and complete the engineering routing of the realignment.

Interpretive path and associated signage has been completed.

Signage along interpretive trail. Photo credit: Robert Anderson ACA

East Slopes creek conservation initiative

Trout Unlimited Canada

Grant: $28,600

Project Code: 020-00-90-155

Project Status: Funded since 2008-09, Quirk Creek component was funded in the past; Completed

Many Alberta creeks are pristine and untouched, but others have been impacted by various land use activities (activities including urban development, cattle grazing, and forestry). This initiative focuses on protecting small systems as gains are often easily achievable and observed by local groups who reside in these areas and depend on improving water quality. Additionally locals can become intimately involved with the project which also increases buy-in and provides a sense of ownership. Through education and awareness these watersheds become easier to maintain and less work is required in the future to protect the creeks. The goal is to enhance Alberta's East Slopes creek fisheries through education, awareness and hands-on activities in the field. Excellent input was received from the local community, as well as help during volunteer events on Policeman Creek; new landowners were engaged in the Drywood Creek watershed with additional fencing projects and help of Lethbridge College environment students; and the scope of the Quirk Creek education project was broadened to include new anglers and additional streams for the stewardship licensing initiative. All these systems have specific issues, but this is a step that will educate individuals including the next generation to make small changes on the landscape. These changes will have long-term positive results by increasing water quality and protecting these unique fisheries.

Deliverables/Results:

Policeman Creek:

Fisheries inventory of Policeman Creek: Inventories have been completed and a draft report is being reviewed.

Redd surveys have been completed and results are available and a draft report is being reviewed.

Identify locations for excavation of holding pools: nine locations have been identified for excavation in 2011, of these sites the plan is to focus on two-five specific locations with the final decision based on access and water levels.

A long term monitoring strategy has been developed for ongoing monitoring for this project for the next three years including redd surveys, electrofishing and pool evaluations.

Drywood Creek:

Two major fisheries investigations were completed in this drainage, along with other three smaller investigations in relation to educational tours. Report is in final stages of editing.

Four kilometre of fencing completed with and upgraded water system, cattle handling areas are now located away from the river.

Three tours/education days were hosted in the watershed over the course of the late summer and fall.

Quirk Creek:

Two populations estimates were conducted, reports are still being produced by a partner organization. Reports will be available on the TUC website once completed.

Drift fences were completed as promised in multiple locations along the creek.

Anglers were involved in the brook trout suppression project to remove non-native species from this system and the newly developed Stewardship Licensing Program, which expands the Quirk Creek Program to five other systems in the area.

For Policeman Creek the main result is that for intermittent rivers, potential hiding cover is essential for the survival of these fish populations using this creek. For Drywood Creek riparian protection is imperative for the long term survival of these populations. Finally the Quirk Creek project demonstrates different management tools can be utilized to help preserve a watershed's native fishery.

Weed management in the Weaselhead

Weaselhead/Glenmore Park Preservation Society

Grant: $3,000

Project Code: 015-00-90-127

Project Status: Funded in 2009-10; Completed

The goal of this project is to maintain the structure, composition and function of the natural ecosystems in the Weaselhead Natural Environment Park. Project objectives were to: raise public awareness of invasive species; prevent establishment of new invasive plants in the Weaselhead that have the potential to interfere with the goal above; halt the spread and/or reduce the abundance of invasive plants that are established in the Weaselhead and interfere with achieving the goal above; and evaluate the success of natural regeneration of native vegetation after weed removal. Public awareness of invasive species was increased through the Society's education programs; publicity events; promotion of volunteer activities to members, NGOs and corporations; through a series of articles in local community newsletters and through the Society website. Four different species of invasive plant were prevented from establishing in the Weaselhead; these were detected by the Early Detection Rapid Response team and subsequently removed or reported to the City of Calgary Parks for herbicide treatment. Volunteers donated over 480 hours of their time between May and October, digging up 300 Peking cotoneaster, 175 common buckthorn and 25 tartarian honeysuckle plants, and stripping flowers to prevent seeding patches from yellow clematis, creeping bellflower and leafy spurge. In addition the Society arranged with the City release of bio-control agents directed at controlling leafy spurge, and arranged herbicide application to two isolated European barberry bushes. Initial data was acquired on seed bank composition; sites were identified and mapped for monitoring the effect of weeding on vegetation over the next three years; research project was developed to quantify effect of weeding on native and non-native vegetation.

Deliverables/Results:

Education and publicity:

5,000 children and adults introduced to the issue during Society's ongoing outdoor education programs;

Program advertised at the Society display booth at five public events;

Series of articles on invasive species in Lakeview Community newsletter (ongoing);

Article on project in Elbow River Watershed Partnership newsletter;

Article about volunteers in Total E & P Canada in-house newsletter;

Presentation on project at Southlands Leisure Centre and to City of Calgary Parks staff;

85 members of the community directly involved with project as volunteers.

New pull-up display banners (33.45" x 82.5") completed.

Control and/or eradication of targeted invasive plants:

Survey of distribution and abundance completed in floodplain area of Park and downloaded to GIS;

26 weeding workshops took place resulting in removal of 12 – 15% of Peking cotoneaster, an estimated 9% tartarian honeysuckle and 50% of known occurrences of common buckthorn (abundance of this species not fully mapped) occurring in the floodplain.

Isolated patches of yellow clematis, cicer milkvetch, creeping bellflower and leafy spurge had flowers removed to prevent seeding.

Initiated bio-control of leafy spurge in the Park (in conjunction with City of Calgary and AgCanada).

Early Detection Rapid Response: team established that submitted eight reports of 'searched' areas, found 11 specimens of 'unwanted' plants – subsequently removed or reported to the City of Calgary Parks for herbicide treatment.

Evaluation of natural generation: Partnered with SAIT in project to examine the composition of the seed bank in the Park and with St Mary's College Conservation Ecology program to examine re-growth of vegetation after invasive shrub removal. However SAIT results were inadequate for any conclusions to be drawn (project to be continued this year), and St Mary's College student changed course before completing this project. This project was then redesigned as an opportunity for volunteers to become involved with research in 2011.

11 volunteers were trained and actively participated in this activity in 2010.

11 'Weasel Weeders' regularly participated in weeding workshops. They were supplemented by a group of four – six volunteers from the Youth Volunteer Corps. In addition five 'one-off' weeding events were held.

Weed Management Plan for 2011 completed that takes into account information and experience gained during 2010.

Paddle River enhancement project - Phase 1

West Central Forage Association

Grant: $14,540

Project Code: 020-00-90-162

Project Status: New; Completed

The landowners along the upper reach of the Paddle River recognize the importance of the water and lands within the watershed in which they live. Healthy riparian areas provide habitat for fish and wildlife, improve water quality for livestock and downstream water users, and can mitigate the impacts of drought or floods. The Paddle River Stewardship decided to gather baseline data on the health of riparian areas along the Paddle River. Through this initiative a representative sampling of the Paddle River riparian areas above the dam, an estimated total distance of 30 km. Cows and Fish collected data on approximately one third of that length, with ten sites complete in this inventory. The sites were chosen by using current aerial photography

and in consultation with the Paddle River Group, and West Central Conservation Group. The local watershed was delineated into sections or reaches with similar physical, vegetative and management influences along the river. Landholdings, generally those belonging to people who requested an inventory of their riparian areas to be completed, were chosen to represent each reach. Riparian inventory sites, or polygons, were then identified within those landholdings after one-on-one discussion with the landowners, who described the different management practices used in the pastures and fields along the stream.

Deliverables/Results:

Introductory community meeting was attended by five individuals in March 2010.

Riparian Health Field Day May 29, 2010 was attended by eight landowners to learn more about riparian areas, plant identification and health assessment methodologies.

Cows and Fish completed lotic riparian health inventories on permitted sites to gather a representative sample of riparian health. In total, ten sites were assessed on nine landholdings within the project area. Overall, the average riparian health of these Paddle River sites is healthy, but with problems (66%). Weighted by area, the average is slightly higher (71%) but still within the healthy but with problems category. Due to the small number of sites inventoried these health ratings do not represent the health of the entire Paddle River watershed but do well represent the main stem of Paddle River upstream of the Paddle River Dam Reservoir. Of the ten sites assessed, two (20%) rated healthy, four (40%) rated healthy, but with problems; and the remaining four (40%) rated unhealthy.

The main result of this project was to complete the assessments (July – August 2010), compile the information into a report and present the report to the participants with recommendations for improvements to management practices. This information was also shared within the community.

One unexpected result of the project was the opportunity to have a planting day where the members of the group were able to get together and plant approximately 500 seedling spruce along the riparian area on a stretch of the river; action which will enhance the health of the riparian area.

Follow up meetings were attended by landowners (seven individual farms met with Cows and Fish to review assessments and recommendations, five people in attendance for group meeting) to hear the results of the inventory, recommendations for improvement and discuss next steps (January 13&14, 2011).

Elk relocation

Wild Elk Federation

Grant: $3,143

Project Code: 030-00-90-173

Project Status: New; Extended until March 2012

The project objectives are to protect the ecological integrity of Elk Island National Park (EINP) by removing surplus elk; to assist ASRD in meeting its elk population targets in an area adversely affected by industrial activity and wildlife predation. The project activities will include trapping surplus elk at EINP using lure hay and alfalfa within capture corrals; treating captured elk for tuberculosis, parasites and liver flukes at EINP elk handling facility and hold them in quarantine for thirty days. Treated elk will then be loaded into livestock trailers and transported to release sites identified by ASRD in Alberta's Eastern Slopes Region. Two convoys will be required to facilitate the move with Wild Elk Federation and loaned trailers. Wild Elk Federation volunteers with support from veterinarian and professional staff from Parks Canada and the Canadian Food Inspection Agency will staff the convoys.

Deliverables/Results:

Parks Canada, Canadian Food Inspection Agency and Alberta Fish and Wildlife have been consulted and the project is scheduled for the winter of 2012. Up to 100 surplus elk will be included in the project and the funds allocated by ACA for ear tags, Fasinex, Ivomec, Dystocel and Nutricharge will be expended in January and February 2012.

Willmore Wilderness Park clean-up and stewardship initiative

Willmore Wilderness Foundation

Grant: $18,360

Project Code: 015-00-90-138

Project Status: New; Completed

The Willmore Wilderness Foundation manages 4,600 sq km of rocky terrain in the in the Rocky Mountain wilderness. The Foundation assesses and monitors this wilderness area, as well as clears trails, maintains campsites, cleans up garbage, corduroys boggy areas and provides information to the general public. This land base is managed as high-quality wildlife habitat and provides recreational and educational opportunities for Albertans. In order to maintain this high quality Park, volunteers and staff have participated in ongoing inspection and collection of various data to ensure proper management. This has been done over the past three years. Reports came in detailing evidence that there are swaths of pine beetle plastic tape throughout the Park. To complicate matters, the trails have been obstructed by trees fallen by pine beetle workers and have become impassable in some places. The Willmore Wilderness Foundation trail clearing crew cleaned up and burnt hundreds of yards of fluorescent red plastic flagging tape that was left by pine beetle workers. They cleaned up campsite garbage including abandoned plastic fencing left by an Alberta Environment Weather Station. The Foundation cleared numerous obstructions from pine beetle slashing.

Deliverables/Results:

Trails are more accessible to anglers, hunters and trappers. GPS coordinates of the cleared trails are available.

Thousands of yards of unsightly red ribbon, garbage and plastic has been cleaned up, including an abandoned weather station. The Foundation has a map that outlines which trails were cleared in 2010. They estimate that ribbon was collected from a 100-square km area and that approximately 400 yards each side of the trail were cleared but more work needs to be done farther in, as the ribbons are everywhere.

Eight youth were mentored including six aboriginal and two others.

Project information has been posted to the Foundation's website, including a short video used for education and outreach. These can be viewed by going www.PeopleandPeaks.com and on www.vimeo.com/17623303

A project summary article has been written in the January 2011 issue of the Willmore Wilderness Newsletter, which is distributed internationally.

A short trailer of a movie called Diamond Hitches is available at: www.peopleandpeaks.com/Page%20Folders/Movies/Diamond_Hitch.html. Note that there is credit to ACA at the end of the trailer for sponsoring the trip. A full documentary is in production and ACA will be credited for its support. The documentary will show both the trail clearing, garbage and ribbon clean up initiatives.

Riparian reforestation and wildlife habitat enhancement of Beaverlodge Watershed - Phase III

Woodlot Extension Program/Woodlot Assoc of Alberta

Grant: $40,000

Project Code: 015-00-90-121

Project Status: Funded since 2008-09; Completed

The Beaverlodge River watershed's riparian areas, bordering woodlands and wetlands have experienced extensive deforestation and habitat degradation that has led to poor water quality, significant bank erosion, higher water temperatures and the loss of many native fish and wildlife species such as arctic grayling and northern pintails. This project hopes to build awareness of how habitat adjacent to the river can be restored through reforestation to improve riparian health and wildlife habitat. The project goal is to demonstrate the restoration of riparian buffers and upland forests within the Beaverlodge River watershed and to have planted a total of 150 total acres at the end of Phase III. The project worked with landowners in this watershed to reforest degraded riparian and buffer zones. Overgrazed pastures and cultivated farmland with no trees along the waterways are the primary focus of this work. This year 50 more acres were reforested along the Beaverlodge River and its tributaries. Ultimately, the hope is to inspire other municipalities, landowners and organizations to consider projects similar to these ones in other areas of Alberta.

Deliverables/Results:

The main results of the project are approximately 76,000 trees on 150 acres of degraded riparian uplands at 25 different farms over the past three years. This includes approximately 22,000 planted on new properties with 10,000 that were used as replacements for areas that had poor survival in previous years. For Phase III, 50 acres were reforested with 12 landowners participating. Positive feedback has been received from the community and municipality regarding the project.

Tree survival was conducted at three different planting areas. The results from all three sites also confirmed that under-story planting is the most favoured by white spruce species and trees in these conditions perform better than those in open areas.

Factsheet and newsletters were revised and the area map was updated with the new sites that were planted.

A tour of the Beaverlodge River was held in the fall in cooperation with County of Grande Prairie, West County Watershed Society and Fish and Wildlife. Four project sites were visited and three different aged plantings were examined. The future plans for the watershed were discussed. Fish and Wildlife also did a presentation on the electrofishing and tour attendees had a chance to observe some of the fish species that reside in the river.

Media coverage included:

Peace Country Sun article. www.peacecountrysun.com/ArticleDisplay.aspx?archive=true&e=2559126

"Recuperación de Ríos" interview with CBC Radio Canada (Spanish Network) www.rcinet.ca/espagnol/emision/canada-en-las-americas/archivos/episode/19-11_2011-03-01-canada-en-las-americas-01-03-2011/

"The Importance of Trees to Riparian Areas" interview on Call of the Land.
www1.agric.gov.ab.ca/$department/newslett.nsf/all/cotl17567.

Publications:

"When the Arctic grayling disappeared from the Beaverlodge River, it was a sign to rehabilitate its waters" by Christopher Pollon in *Canadian Geographic*. www.canadiangeographic.ca/magazine/jf11/arctic_grayling.asp

"Riparian Buffers for Habitat Enhancement of Beaverlodge Watershed - Alberta, Western Canada" by Macaulay, D; Hallet' J.; and Henry, J. is published in *Agroforestry as a Tool for Landscape Restoration*. www.amazon.com/Agroforestry-As-Tool-Landscape-Restoration/dp/161728940X

"Restoring Fish Habitat One Tree at a Time" in *Silviculture*. www.silviculturemagazine.com

Conference Presentations:

"Riparian reforestation and wildlife habitat enhancement project" poster presented at the 24th International Congress for Conservation Biology in July of 2010. posters.f1000.com/PosterList?sectID=&specID=&posterID=230

"Riparian Buffers for Habitat Enhancement of Beaverlodge Watershed - Alberta, Western Canada" oral presentation to be presented at 12th North American Agroforestry Conference in Athens, Georgia in June 2011. hosting.caes.uga.edu/2011NAAC/

"Riparian Buffers for Habitat Enhancement of Beaverlodge Watershed - Alberta, Western Canada" poster to be presented at Arctic Grayling Symposium & Workshop in Grande Prairie, June 2011. www.tucanada.org/ARGR2011/

Other results:

The West County Watershed Society was formed.

The project was a finalist in the 2010 Emerald Awards for a Community Group:

Tree planting pledge made to the United Nations Billion Tree Campaign.

The Agroforestry and Woodlot Extension Society is working with Red Deer County's "Off the Creek" program to initiate a similar project there.

Grant Eligible Conservation Fund Part B: Research

Using metapopulation modeling to insure the effective conservation of northern leopard frogs

Calgary Zoo (Dr. D. Smith)

Grant: $21,194

Project Code: 030-00-90-170

Project Status: New; Completed

The northern leopard frog (NLF) is an at risk species in the Pacific Northwest of North America. In Alberta a decline in the NLF range has been detected. However, to date an accurate assessment of NLF status, the rate and causes of the decline have been elusive. Consequently, improved monitoring is necessary to gain a thorough understanding of their current status and the ecological processes that govern this species in order to implement effective conservation strategies. In 2009, the Calgary Zoo commenced a five year investigation that combines sophisticated mathematical modeling with intensive surveying of NLF across 90,000 km2 of Alberta's prairies to achieve the following objectives: 1) Develop rigorous monitoring protocols for NLF using a site occupancy model that considers several covariates on probability of detection; 2) Determine whether, or to what extent, the NLF population is still declining in Alberta by examining if there is equilibrium in metapopulation dynamics; 3) Determine the amount of management effort necessary to ensure the long term survival of NLF in Alberta; 4) Identify key habitat associations and correlates of NLF occupancy on the Western Great Plains. This is the second year of a multi-year study. Results so far suggest that one-off site surveys historically employed in the monitoring of NLF in Alberta are likely to result in severely negatively-biased estimates. Survey accuracy can be improved by avoiding sampling in strong winds, wind chill and cold water temperatures. Ideally two repeat surveys of each site should be undertaken, but use of a removal design would improve the cost-effectiveness of this survey approach. In southern Alberta the occupancy of sites by NLF increased in 2009 and remained stable in 2010 (~57% of sites occupied). The rate of site colonization was higher than the rate of site extinction in 2009, but may have been declining throughout 2010. There is no historical data of this precision to assist with determining whether ~57% occupancy is a good position for this species to be in or whether it is a cause for concern. Consequently, there is a need to continue this research for several more years to develop a long term dataset.

Deliverables/Results:

Kris Kendell (Senior Biologist, ACA) and Dave Prescott (ASRD, Fish and Wildlife and team leader Albertan Northern Leopard Frog Recovery Team) have been kept informed of the progress of this research and results through lengthy emails aimed at soliciting group discussion. Annual reports for this project have been written for 2009 and 2010 and are available on request from Dr. Des Smith. Additionally, a description of this research and its interim results has been incorporated in the Alberta Northern Leopard Frog Recovery Plan (2010-2015).

Scientific publications:

It is intended that a manuscript detailing covariates on probability of detection and how to improve survey design will be submitted to a science journal by the end of May 2011.

Conference presentation:

Smith, D.H.V., and Jones, B. 2010. Improving the accuracy of surveys of an 'at risk' amphibian on Alberta's Great Plains. *24th International Congress for Conservation Biology*, Edmonton, Alberta, Canada. July 2010 to the Society for Conservation Biology

In 2010, PowerPoint presentations on this research and its results were given at the annual meeting of the Alberta Northern Leopard Frog Recovery Team, and at the annual meeting of the Alberta Amphibian and Reptile Specialist Group (AARSG). In February 2011 this research was presented to the Friends of Fish Creek Provincial Park.

Effects of oil and gas development on grassland birds in southeast Alberta

Canadian Wildlife Service/University of Regina (Dr. S. Davis)

Grant: $20,000

Project Code: 030-00-90-167

Project Status: New; Completed

Native grasslands in Alberta provide important breeding habitat for many grassland birds. However, the quantity and quality of remaining grasslands in southeastern Alberta may currently be threatened by expansion of oil and gas development. For example, natural gas development has been shown to negatively influence greater sage grouse abundance, lek persistence, and reproductive success but impacts on grassland songbirds are poorly understood. The goal of this project is to determine whether oil and gas development has a negative, neutral, or positive influence on grassland songbird populations so that effective policies can be put in place to ensure that energy resources are extracted in a manner that is ecologically sustainable. The project objectives are to determine the extent to which oil and gas development influence the density and reproductive success of grassland songbirds, particularly the threatened Sprague's pipit.

The researcher found 145 nests of seven grassland songbird species; of these nests, 46% successfully fledged young, while the remaining 54% were unsuccessful due to predation, desertion, and inclement weather. The number of young fledged per nest did not differ between high and low treatment plots, likely due in part to small sample size. Apparent nest success (proportion of monitored nests successfully fledging at least one host young) was greater on high disturbance plots than on low disturbance plots. However, apparent nest success estimates are biased since they do not take into account when the nest was found and the duration it was monitored. More robust models of nest survival in relation to oil and gas disturbance were therefore conducted on species for which at least 15 nests (Sprague's pipit, Baird's sparrow, savannah sparrow, and vesper sparrow) were found. Nest survival tended to be lower in high disturbance plots for Sprague's pipit and Baird's sparrow; while savannah and vesper sparrow nest survival was higher in more disturbed sites. A larger sample of nests is required to more accurately determine the effects of energy development on grassland songbirds.

Deliverables/Results:

Preliminary and final results will be used by the Sprague's pipit recovery team to assist in establishing criteria for selecting critical habitat and factors that cause destruction (Ongoing).

Information from the study will be shared with the Province of Alberta and federal government branches to refine set-back distance policies (Ongoing).

Progress reports (annual) and a final report (winter 2012) will be drafted for funding partners.

Results will be submitted to peer-review journals (spring 2013) and presented at scientific conferences (Ongoing).

All species-at-risk sightings will be provided to the FWMIS.

Conservation genetic analysis of Alberta peregrine falcons

King's University College (Dr. K. McFarlane)

Grant: $11,700

Project Code: 030-00-90-171

Project Status: New; Extended until September 2011

The goal of this project is to provide an assessment of peregrine falcon population genetic data that can be used to address ambiguous aspects about population dynamics and enhance understanding of peregrine populations. The main objectives were to collect samples from Alberta and comparison populations, isolate DNA from those samples, and assess genetic diversity within the populations by performing DNA fingerprinting analyses. Samples from a captive population of Alberta peregrines were successfully obtained. Samples were also obtained from a comparison population of wild peregrines in Nunavut as a direct result of their request for samples from the 2010 National Peregrine Falcon Survey. For the Alberta and comparison populations the level of genetic diversity was determined by measuring heterozygosity, allelic richness, and FIS (inbreeding coefficient). Their results show that a captive population of Alberta peregrines is less inbred than a wild population of peregrines from Nunavut. However, the population of Alberta peregrines possesses lower heterozygosity and allelic richness, suggesting that the population's genetic health could someday become a matter of concern.

Deliverables/Results:

Conference and symposia presentations:

Biel, V. and McFarlane, K. A genetic exploration of family dynamics among peregrine falcons. Oral presentation at The King's Natural Science Research Day, Edmonton, AB. – April 15, 2011.

Mahaffy, N., Boer, C, and McFarlane, K. 2010. Genetic analysis of captive and wild peregrine falcon populations. Oral presentation at The King's Natural Science Research Day, Edmonton, AB.

Mahaffy, N., Boer, C., Franke, A., and McFarlane, K. 2010. Making a comeback: a study of population genetic health of the peregrine falcon in bottlenecked and wild populations. Poster presented at 24th International Congress of Conservation Biology, Edmonton, AB.

Penner, S. and McFarlane, K. Conservation genetics of peregrine falcons. Oral presentation at the 11th Annual King's University Undergraduate Research Symposium – scheduled for September 2011.

B.Sc. theses:

Biel, V. A genetic exploration of family dynamics among peregrine falcons. Bachelor of Science Senior Thesis, The King's University College, Edmonton, AB. – submission April, 2011.

Mahaffy, N. 2010. Genetic analysis of a captive peregrine falcon (*Falco peregrinus anatum*) population: comparison to a wild *F. p. tundrus* population and appraisal of evidence for a past genetic bottleneck. Bachelor of Science Senior Thesis, The King's University College, Edmonton, AB.

Scientific publication:

A journal publication is anticipated to be submitted to the journal *Avian Conservation and Ecology* by September 2011.

Reproductive ecology of endangered populations of limber and whitebark pine in Alberta

King's University College (Dr. V. Peters)

Grant: $15,000

Project Code: 030-00-90-161

Project Status: Funded by GECF in 2009-10; Completed

Limber pine (*Pinus flexilis*) is listed provincially as endangered in the northern part of its geographic range (Alberta) due to the high mortality caused by white pine blister rust (WPBR) (*Cronartium ribicola*) and mountain pine beetle (*Dendroctonus ponderosae*), and limited regeneration opportunities due to fire exclusion. In the case of an endangered species, seed predators (i.e. the red squirrel, *Tamiasciurus hudsonicus*), may accelerate this decline, hence, the researcher investigated whether: 1) squirrel cone predation differs in areas with low versus high WPBR infection rates, 2) cone predation differs in limber pine-dominated versus mixed conifer stands containing limber pine, and 3) cone production declines at the tree and stand level relative to WPBR levels. Limber pine populations in Alberta occur in the southern foothills of the Rocky Mountains at elevations typically ranging from 1300–1900m. The low WPBR study area (1% live tree infestation in 2003) contained nine stands ranging from pure limber pine, to limber pine mixed with Douglas fir (*Pseudotsuga menziesii*), white spruce (*Picea glauca*), or lodgepole pine (*Pinus contorta*). The high WPBR study area (38% live tree infestation in 2003) contained stands of either pure limber pine or limber pine–Douglas-fir mixtures.

Significantly more cones escape seed predators and are available for seed dispersal in high cone years (24 cones/ tree) versus low cone years (2 and 3.5 cones/ tree in 2008 and 2009, respectively). Only limber pine produced a large cone crop in 2010 (mast year), while all conifer species had low cone production in 2008 and 2009 (non-mast years). Preliminary results suggest that large differences in squirrel abundance in low vs. high WPBR study areas (1.6 vs. 0.4 active middens/ha, respectively) did not affect the proportion of cones removed. Rates of cone removal averaged 83 and 77% in 2008 and 2009, respectively, while only 44% of cones were removed in 2010. Cone removal rates did not differ significantly between landscapes with low versus high WPBR infections in any year; however, fewer squirrels harvested the much greater cone production in high WPBR study areas, suggesting squirrels in high WPBR regions eat ten times as many limber pine cones per squirrel. Differences in foraging habits may be explained by squirrel behavioural differences in different stand types. More limber pine cones were removed in stands where

lodgepole pine was present (93%) versus pure limber pine (77%). Mixed limber and lodgepole pine stands generally supported higher squirrel populations, suggesting stands with lodgepole pine (i.e., a persistent aerial seed source) provide a more stable cone supply than stands with one or more masting species (limber-fir or limber-spruce mixtures. Limber pine may frequently escape seed predation by squirrels, by virtue of its preference for open and exposed habitats, which have fewer trees of other species and lower basal area overall. Surprisingly, 1.7 times more cone production per tree occurred in high WPBR populations overall (2008 – 2010). More detailed analyses of historic cone production (1998-2009) relative to WPBR stem cankors on individual trees indicated that cone production does decline with increasing severities of infection. Greater seed availability did not result in better regeneration success, as the lightly infected WPBR study area had 24 times more seedlings regenerating.

Preliminary findings suggest an uncoupling of seed availability and regeneration processes in northern limber pine populations. This phenomenon could occur from a variety of causes including greater mortality of seedlings from blister rust, disperser limitations of the mutualistic Clark's nutcracker, or differences in germination microsites and cattle grazing between study areas. The results suggest that red squirrels are capable of removing most of the cones in poor cone years, even when present in low numbers. Squirrels may limit regeneration opportunities of limber pine by reducing landscape level cone production below the densities required to attract mobile dispersers like the Clark's nutcracker. Conserving limber pine will require rapidly identifying populations that are most subject to limited regeneration and in need of mitigation.

Deliverables/Results:

Conference presentations:

Peters, V.S. Pre-dispersal seed predator dynamics at the northern limits of limber pine distribution, High Five Symposium – the Future of High Elevation Pines in North America, Missoula, USA, June 2010.

Peters, V.S. Uncoupling of seed availability and regeneration processes in endangered limber pine populations of Alberta, Society of Conservation Biology – Conservation for a Changing Planet, Edmonton, Canada, July 2010.

Peters, V.S. and Gelderman, M. Spatial and temporal dynamics of seed predation in the endangered limber pine, Society of Conservation Biology – Conservation for a Changing Planet, Edmonton, Canada, July 2010.

B.Sc. Theses (King's University College):

Fehr, K. Effects of WPBR on cone production in limber pine populations of Alberta. Expected completion, April 30th, 2011.

Gelderman, M. Spatial and temporal dynamics of squirrel predation in endangered populations of limber pine in Alberta. Expected completion, April 30th, 2011.

Korner, N. Discrepancies in tree based versus area based estimates of cone production in limber pine. Expected completion, April 30th, 2011.

Price, C. Midden-level analysis of red squirrel foraging habits in low versus high cone crop years for limber pine. Expected completion, April 30th, 2011.

Van Huizen, J. Post-dispersal cone predation in limber pine stands. Completion: December 31st, 2010.

Reports/Scientific publications:

Progress report to members of the Limber Pine and Whitebark Pine Recovery Team, and NSERC Strategic Project Grant collaborators, June 9th, 2010, Calgary, AB.

Journal publications are planned for conference presentations in 2011-12.

Ecology, conservation, and population demography of mountain goats in Alberta

Laval University (Dr. S. Côté)

Grant: $19,826

Project Code: 030-00-90-117

Project Status: Funded by ACA since 2004-05; Completed

Research on the ecology, population dynamics, and management of mountain goats (*Oreamnos americanus*) on Caw Ridge was initiated following a decline in goat populations in west-central Alberta during the 1980's. The project goals are to measure variation in individual survival and reproductive success in both sexes using marked animals, identify factors that affect population size, monitor dispersal, and examine whether mountain goats can habituate to helicopter and all-terrain-vehicle traffic. Dr. Côté combines the monitoring of life-history traits of marked individuals with field observations of behaviour to determine the factors influencing population size. Summarized below are some of the main findings of the study so far. Kid production increases with female age from four to six years, peaking at 80% at eight-twelve years and decreasing afterwards. Because of the late age of primiparity and increasing kid production with age, much of the recruitment of yearlings in the population is contributed by females aged eight to twelve years. Adult survival is greater for females than males. For both sexes, survival is lower for two year-olds than for older goats and it shows clear evidence of senescence, for females beginning at ten years of age and for males from eight years of age. Survival of adult females is similar to that of other female ungulates of similar body size but survival of adult males appears lower. Female survival in the last year, however, was very low. Paternity is highly skewed, with a few males siring the majority of offspring. Male yearly reproductive success increases with age until apparent reproductive senescence at nine years, but mass is a stronger determinant of siring success than age, horn length or social rank. Predation seems to play a limited role on population dynamics. Predation on small, isolated populations of mountain ungulates could vary with the behaviour of individual predators in a density-independent fashion, and therefore may be highly unpredictable. Native mountain goat populations are sensitive to overharvest if adult females are shot. They have a low natural recruitment rate and show little evidence of density-dependence or of compensatory responses to hunting. Hunting mortality thus appears additive. Mountain goats are very sensitive to helicopter disturbance: helicopters should not be allowed to fly within two kilometres of mountain goat habitat.

Deliverables/Results:

The Caw Ridge study is the leading research project on mountain goats in North America, as demonstrated by the number and quality of publications that have resulted from this work, by its value in training graduate students and by the frequent references to this study found in the Management Plan for mountain goats in Alberta. The value of this long-term project is becoming more and more

evident, with the publication of results on individual reproductive strategies and population dynamics. The results of this work provide also important biological information to manage mountain goat hunting and conservation in Alberta and elsewhere.

Recently, two papers on the mountain goat study have been published in high-profile international scientific journals and four other papers are currently in press (see list below). Three papers have been submitted that are currently under review. Eleven oral presentations were given on the mountain goat project this year. All scientific communications are listed below.

Scientific publications in 2010-2011:

Shafer, A.B.A., J.M. Northrup, K.S. White, M.S. Boyce, S.D. Côté and D.W. Coltman. Habitat selection predicts genetic relatedness in an alpine ungulate. *American Naturalist*, submitted March 2011.

Hamel, S., N.G. Yoccoz, and J.-M. Gaillard. Definition and statistical estimation of life-history trade-offs. *American Naturalist*, submitted March 2011.

Shafer, A.B.A., K.S. White, S.D. Côté and D.W. Coltman. Deciphering translocations from relicts in Baranof Island mountain goats: Is an endemic genetic lineage at risk? *Conservation Genetics*, submitted September 2010.

Hamel, S., S.D. Côté and M. Festa-Bianchet. Tradeoff between offspring mass and subsequent reproduction in a highly iteroparous mammal. Oikos, in press.

Ortego, J., G. Yannic, A.B.A. Shafer, J. Mainguy, M. Festa-Bianchet, D.W. Coltman and S.D. Côté. Temporal dynamics of genetic variability in a mountain goat (*Oreamnos americanus*) population. Molecular Ecology, in press.

Shafer, A.B.A., J. Poissant, S.D. Côté and D.W. Coltman. Does reduced heterozygosity influence dispersal? A test using spatially structured populations in an alpine ungulate. *Biology Letters*, in press.

Shafer, A.B.A., C. Cullingham, S.D. Côté and D.W. Coltman. 2010. Of glaciers and refugia: a decade of study sheds new light on the phylogeography of northwestern North America. *Molecular Ecology* 19: 4589-4621.

Shafer, A.B.A., S.D. Côté and D.W. Coltman. 2011. Hot spots of genetic diversity descended from multiple Pleistocene refugia in an alpine ungulate. *Evolution* 65: 125-138.

Hamel, S., S.D. Côté and M. Festa-Bianchet. 2010. Maternal characteristics and environment affect the costs of reproduction in female mountain goats. *Ecology* 91: 2034-2043.

Côté, S.D. 2010. Understanding the ecology of mountain goats: the long-term study of Caw Ridge. *Wild Lands Advocate* 18: 4-7 (not-refereed publication).

Conference Presentations in 2010-2011:

Côté, S.D. 2010. Evolution of life-history strategies in Rocky Mountain goats: what have we learned in 20 years of research? XIII Congreso Nacional y X Iberoamericano de Etologia, Ciudad Real, Spain (invited speaker).

Shafer, A.B.A., S.D. Côté and D.W. Coltman. 2010. Refugia, mountains, and radiocollars: patterns of genetic differentiation in mountain goats. Alaska Fish & Game, Juneau, Alaska (invited speaker).

Shafer A.B.A., S.D. Côté and D.W. Coltman. 2010. Were there mountain goats on Baranof Island prior to the 1923 introduction? Natural History Seminar Series, University of Alaska Sitka Campus, Sitka, Alaska (invited speaker).

Shafer A.B.A. and S.D. Côté. 2010. Caw Ridge's mountain goats: insights from a long-term study. 2010 Annual meeting of the Alaska chapter of the Wildlife Society. Anchorage, AK, USA (invited speaker).

Shafer A.B.A., S.D. Côté and D.W. Coltman. 2010. Temporal and geographic patterns of mountain goat genetic differentiation: a focus on Alaska. 2010 Annual meeting of the Alaska chapter of the Wildlife Society. Anchorage, Alaska, USA (invited speaker).

Théoret-Gosselin, R. and S.D. Côté. 2010. Les effets maternels et leurs impacts sur la survie des jeunes chèvres de montagne. 35th Annual meeting of the Société Québécoise pour l'Étude Biologique du Comportement, McGill University - Campus McDonald, Montréal, QC, Canada.

Fan C., A.B.A. Shafer, S.D. Côté and D.W. Coltman. 2010. Range-wide genetic paucity at the MHC DRB locus in the North American mountain goat (poster). Rising Stars of Research 2010, Vancouver, BC, Canada.

Shafer A.B.A., S.D. Côté and D.W. Coltman. 2010. Dispersal patterns of the North American mountain goat. 17th Northern Wild Sheep and Goat Council Symposium, Hood River, OR, USA.

Shafer, A.B.A., J. Poissant, S.D. Côté and D.W. Coltman. 2010. Does reduced heterozygosity influence dispersal? (poster) 5th Annual Meeting of the Canadian Society for Ecology and Evolution, Québec, QC, Canada.

Godde, S., D. Réale and S.D. Côté. 2010. Social structure in female mountain goats (*Oreamnos americanus*) (poster). 5th Annual Meeting of the Canadian Society for Ecology and Evolution, Québec, QC, Canada.

Théorêt-Gosselin, R. and S.D. Côté. 2010. Étude du développement de l'indépendance menant au sevrage chez la chèvre de montagne. 1er colloque de biologie de l'Université Laval, QC, Canada.

Copies of all reports, popular and scientific articles are available. ACA has been acknowledged in all oral presentations and papers.

Does petroleum development affect burrowing owl survival, nest success, fledging rate or habitat use?

University of Alberta (Dr. E. Bayne)

Grant: $23,520

Project Code: 030-00-90-115

Project Status: Funded since 2008-09; Completed

The objective of this project is to develop mitigation techniques to help reduce energy sector impacts on the endangered burrowing owl. The project has three main goals toward which the researchers have made considerable progress in the past year: 1) determine the impacts of energy-sector footprint on burrowing owl reproduction; 2) determine whether burrowing owls are avoiding, attracted to, or neutral with respect to each component of industrial infrastructure and each industrial activity; 3) With respect to gas & oil infrastructure and activities, communicate recommendations for i) modifying management of burrowing owls, ii) defining & 'effectively protecting' critical habitat from destruction, and iii) outlining any additional

data needs for future work. This year 44 burrowing owl nests were discovered and monitored and the number of young produced at each was determined. Preliminary analysis has shown a positive relationship between road density surrounding nest sites and fledging rate from successful nests, but a negative relationship with nest success. From the nests monitored, 16 adult male owls were tracked with micro GPS dataloggers during their nocturnal foraging activities. Resources selection analysis shows that the owls are attracted to roads and this attraction may be because of the higher abundance of small mammals. This could explain why more young are produced if the nest does not fail and higher nest failure could be from higher mortality while hunting on roads. These preliminary analyses have shown some interesting results and a more detailed analysis of these data is ongoing.

Deliverables/Results:

The first objective was to collect the field data for the final year of this project, and this objective was completed in October, 2010. Preliminary analysis of these data exploring response of burrowing owls to petroleum development has been accomplished, but more detailed analysis is ongoing.

Partnership development has been every effective and a team has been developed that engages many different partners.

Lynx cycles and barriers: Evaluating disperal versus climate change in flatlining populations

University of Alberta (Dr. M. Boyce)

Grant: $27,500

Project Code: 030-00-90-155

Project Status: Funded in 2009-10; Extended until September 30, 2011.

This proposal focuses on mechanisms driving the ten-year population cycles of the Canada lynx (*Lynx canadensis*) in southern portions of their range by evaluating the predator dispersal versus the seasonal-forcing hypothesis. The predator dispersal hypothesis presumes that southern cycles were not locally driven, but rather were the effect of swamping by immigrating individuals. As a result, the disappearance of cycles in the southern range could be a product of barriers to dispersal produced by human-induced habitat fragmentation. An alternative hypothesis, the seasonal-forcing hypothesis, depicts key aspects of seasonality as sustaining the ten-year oscillator. Consequently, weakened seasonality resulting from climate change could be reducing the seasonal forcing that sustains regular ten-year cycles in the southern portions of the range of lynx. The project objectives are to: document quantitatively using trapping records the details of how the ten-year cycle breaks down at southern latitudes; 2) evaluate barriers to gene flow (hence dispersal) on a latitudinal gradient using genetic data from harvested pelts and tissue samples from live captures; use radiocollared lynx in Nordegg, AB, together with the lynx movement datasets in two concurrent U.S. lynx projects on the Washington and Montana border to create a GIS-based model of habitats that facilitate dispersal into the southern portions of the species' range, and examine fur harvest records relative to climate data over 50 years to evaluate the seasonal-forcing hypothesis.

Deliverables/Results:

This information is based on the interim report as the final project report has not been received to date due to unforeseen circumstances. The project, however, has been progressing as planned. Seven lynx have been radiocollared, over 700 tissue samples for DNA analysis collected, most of the DNA sequencing completed, and a small sample of DNA (n=91) analyzed for preliminary DNA results.

Five collaborative meetings have been conducted with the Alberta Trappers Association locals, three collaborative meetings with ASRD, three formal presentations at Trappers' Conventions, several informal presentations at Red Deer River Naturalists and other local outreach venues, three educational articles in Trapper's magazines and the Alberta Outdoorsmen magazine, and uploading of the project website.

Other project deliverables include: technical reports (December 2010), interactive features and project updates on the project website, and access to the project's compiled fur harvest database documenting detailed lynx harvest from the pre-1920s via the Alberta Fisheries and Wildlife Management Information System, which will assist in the statistical analysis of furbearers (December 2010). Ultimately peer-reviewed publications are planned.

Ecology and behaviour of grizzly bears (*Ursus arctos horribilis*) in response to open-pit mining and implications for management and conservation

University of Alberta (Dr. M. Boyce)

Grant: $31,000

Project Code: 030-00-90-154

Project Status: Funded since 2008-09; Completed

The goal of this project is to investigate the effects of open-pit mining on grizzly bear ecology and behaviour, by focusing as case study on active (Cheviot) and reclaimed (Luscar and Gregg River) open-pit coal mines in west-central Alberta, south of Hinton. The objectives of this study are to understand bear movement (through GPS radiocollars), foraging (through investigations of GPS location clusters and bear scat analysis) and resting habitat selection (through visits at bear bedding sites identified from GPS clusters). Comparisons are carried out for bear behaviour on vs. around mines to assess how bears use industrially modified landscapes and undisturbed areas. Effects of mining on bears are analyzed during different mining phases: before vs. during active mining, and separately for reclaimed mines, because bears are likely to respond differently to these stages of development. Before mining data for Cheviot mine (1999-2003) are provided in-kind by the Foothills Research Institute Grizzly Bear Program whereas during Cheviot mining data (2008-2010) were acquired by the University of Alberta. The project uses pioneering technologies (camera and pedometer devices attached to GPS radiocollars) to acquire unprecedented fine-scale data that allows understanding of bear behaviour on and around mine sites. These technologies will allow informed decisions on bear and habitat conservation and restoration through environmental mitigation, management and planning of open-pit mining activities.

Data and statistical inferences from this project will allow formulation of management/planning strategies that enable a decrease in probability of human-bear conflict around industrial sites, and ensure bear population recovery. Notably, this study quantifies bear impact on ungulates and thus will allow application of ungulate harvest quotas that recognize the important role of bears as predators. Close

collaboration with mining companies and direct relevance of this research to the Alberta Grizzly Bear Recovery Plan will ensure the data, statistical models and suggestions from this study will influence mine mitigation and future planned development in the province, to accommodate the interests of Alberta hunters and other outdoors people. The project has generated substantial interest from a variety of organizations many of which have decided to join the project as partners.

The fieldwork component of the project is for the most part complete, and current focus is on updating the databases and descriptive statistical analyses, with more advanced statistical modeling scheduled for summer 2011-spring 2012 with the final products available in summer 2012. The only fieldwork to be carried out in 2011 is remote drop-off of collars from bears.

Deliverables/Results:

Even though definitive analyses have not been carried out yet, data acquired during the Cheviot mine active phase (2008-2010) have revealed some interesting patterns listed briefly below:

Active mining operations were avoided by bears in contrast with high preference for reclaimed mines where bears killed ungulates and grazed grasses and forbs.

Most radiocollared bears used reclaimed mines in spring/early summer.

Individuals varied in number and biomass of ungulates consumed (some bears made many kills but exclusively calves, other bears made fewer kills but predominantly adult ungulates, whereas a few bears were almost exclusively vegetarian).

Bears crossed active mining roads which suggest that speed limits should continue to be enforced along these roads.

Uncollared grizzly bears were photographed by trail cameras on mine trails that received heavy use by people, suggesting that human-bear conflict potential may be high at certain times of the year.

In 2010, most effort was invested into data collection therefore the most significant deliverables are represented by data collected during the study. Statistical analyses for are currently underway, so the bulk of publications will occur in summer 2011-2012.

Conference presentations:

Cristescu B., Northrup J., Larsen T., Stenhouse G.B. & Boyce M.S. Human disturbances influence bed-site selection and timing of bedding by grizzly bears. The Wildlife Society Annual Meeting and Conference, Snowbird, Utah, USA (October 2-6, 2010)

Boyce M.S., Cristescu B., Knopff K., Morehouse A., Northrup J.M, Pitt J., & Stenhouse G.B. Autocorrelation patterns determined by ecology and behaviour. International Behavioral Ecology Congress, Perth, Australia (September 26 - October 1, 2010)

Cristescu B. Tackling the conservation challenge through ecological research: 2 case studies. Annual Meeting of Alberta Fish & Game Association, Edmonton, Alberta, Canada (February 24-26, 2011)

Cristescu B. Grizzly bears and open-pit mining. Insights into behaviour and conservation implications. Annual Meeting of Fort Saskatchewan Fish & Game Association, Fort Saskatchewan, Alberta, Canada (September 15, 2010)

Poster presentations:

Cristescu B., Northrup, J., Stenhouse G.B. & Boyce M.S. The influence of landscape characteristics on seasonal movements of female grizzly bears. Richard E. Peters Biology Conference, University of Alberta, Edmonton, Alberta, Canada (March 17-18, 2011)

Cristescu B., Stenhouse G.B. & Boyce M.S. Grizzly bear use of ungulates on and around open-pit mines. Alberta Chapter of the Wildlife Society Annual Meeting and Conference, ACTWS, Red Deer, Alberta, Canada (March 12- 13, 2010); prize for best scientific poster.

Scientific publications:

Schwab C., Northrup J.M., Cristescu B. & Stenhouse G.B. Influence of diet and environment on fecal bacterial populations and intestinal microbial metabolic activity of wild and captive grizzly bears. In review

Cristescu B. & Boyce M.S. (2010) Grizzly bears and mining: rationale and objectives of a study on the effects of industry on bears. *International Bear News*, 19, 20-22

Boyce M.S., Pitt J., Northrup J.M, Morehouse A.T., Knopff H.K., Cristescu B. & Stenhouse G.B. (2010) Temporal autocorrelation functions for movement rates from global positioning system radiotelemetry data. Philosophical Transactions of the Royal Society B., 365, 2213-2219

At least five manuscripts to High Impact Factor Journals are planned for 2010-2012.

Popular articles:

Cristescu B. & Boyce M.S. Grizzly bear consumption of meat on and around open-pit mines. Safari Club International - Northern Alberta Chapter Newsletter. In press.

Media coverage:

Ph.D. project featured by Edmonton Sun: 'U of A researchers attach cams to bears' (August 3, 2010)

The project-dedicated website (www.ualberta.ca/~cristesc/grizzly_project.htm) will be further updated in 2011.

Cougar distribution and prey selection in southwest Alberta

University of Alberta (Dr. M. Boyce)

Grant: $32,700

Project Code: 030-00-90-166

Project Status: New; Completed

The project's first objective was to determine what impact if any cougars had on local livestock. By visiting kill sites of collared individuals, detection if any livestock depredation that occurred from cougars would be possible. In addition to this a picture of cougar prey composition can be developed. The second objective was to develop criteria to describe spatial interactions between cougar and elk. Few studies have examined interactions between collared predator and collared prey. By analyzing fine scale movements the Boyce lab hopes to provide a clearer understanding of how elk respond to cougar presence. Between January and May 2010 seven cougars were captured and collared. During the summer of 2010, three of the seven cougars were lost due to collar failure or dispersal. The remaining four were monitored, recording movements and visiting kill sites after

the cougars had left. Between April and December 2010, 367 clusters were visited and 81 kills identified. Fifty-five per cent of the kills were deer, followed by moose at 16%. Mountain goat and porcupine were found 6% of the time and bighorn sheep, elk, beaver, coyote and other small prey made up the remainder. No livestock were killed by any collared cougars thus far; however it was determined that five of the seven cougars scavenged on dead cattle via bone piles. The majority of this scavenging occurred in the late spring and early summer coinciding with the calving season. To date an additional three cougars were captured and they hope to collar two more. They will continue to visit kill sites to increase the sample size and gain more insight into prey composition. Analysis of cougar movements has begun in an effort to understand elk response to cougar presence, but this analysis will not be complete until August 2012. Initial results show a daily peak in cougar movement at dusk, followed by a plateau through the night-time hours with least amount of movement occurring at midday. This peak coincides with a peak in elk movement.

Deliverables/Results:

Conference presentations:

Cougar behaviour and movement metrics: Poster presented at the Society for Conservation Biology Annual Conference, July 2010.

Cougar biology and natural history: Presentation given at Waterton Lakes National Park, September 2010.

Edmonton urban coyote project

University of Alberta (Dr. C. Cassady St. Clair)

Grant: $35,952

Project Code: 030-00-90-168

Project Status: New; Extended until July 31, 2011

This project provides a detailed assessment of movement, habitat selection and diet of urban coyotes with unprecedented spatial and temporal resolution. By employing remotely-downloadable GPS collars supplemented with frequent relocation by VHF beacons, clusters of coyote activity can be identified and these sites visited to determine sources of attractants. Simultaneously, a large-scale diet analysis has been conducted to determine both the ingested (via scats) and assimilated (via stable isotopes) components of coyote diets. Finally, a repeated survey of public knowledge and opinion concerning coyotes has been conducted that will help to both inform and assess the efficacy of a public education campaign planned by the City of Edmonton with use of the data provided by this project. Over the past year, 13 urban coyotes have been collared and between two and seven months of location and movement data from nine of these coyotes have been collected. For these nine coyotes, home range size, daily activity patterns, and home range selection were determined. To determine microhabitat selection over 100 high use sites were visited. Over 200 scats were collected in natural areas and 50 of these have been analyzed. Preliminary results indicate that individual coyotes seem to differ in their use of residential habitat, but overall rest and forage at sites with high vegetative cover and anthropogenic food. Also, urban coyotes appear to prey mainly on small rodents and hares but they consume more cats in the winter months.

Deliverables/Results:

Presentations:

ACA has been recognized in two public talks, one conference presentation at the Alberta Chapter of The Wildlife Society 2011 conference, and on the project website (www.edmontonurbancoyotes.ca). In addition, ACA has been recognized in three research posters presented at annual meetings of the Society for Conservation Biology (July 2010) and the Alberta Chapter of The Wildlife Society (2011). At the second conference, M.Sc. student Maureen Murray won the best student paper award for her talk on the project.

Trumpeter swan population recovery in Alberta: Distribution, land-use and response to disturbance

University of Alberta (Dr. L. Foote)

Grant: $37,000

Project Code: 030-00-90-169

Project Status: New; Extended until July, 2011

This project has three study components: Component 1) to re-evaluate known trumpeter swan demography in Alberta by repeating a subset of the extensive five-year aerial survey of trumpeter swan breeding distributions on historical breeding lakes; Component 2) to examine trumpeter swan expansion into swan-type lakes in unsurveyed areas of northern Alberta; and Component 3) to conduct manipulative field experiments to test swan awareness and possible susceptibility to disturbance. Activities included coordinating with ASRD in helping complete the 2010 five-year continental breeding survey for trumpeter swans. Also during these surveys the periphery of the known swan nesting range was surveyed to monitor for swan breeding range expansion. Field experiments were conducted in which a pedestrian was used to test swans threshold to human disturbance. During the five-year aerial surveys swans were found to be continuing their breeding range expansion. The data from this year's surveys will be used to create swan breeding range expansion models to help predict future expansion areas. Preliminary results for testing thresholds of human disturbance on remote nesting swans have found them to be highly sensitive, with a large escape distance, 922.5 m. However further experiments will be conducted this summer because of the small sample size collected in 2010 (n=6).

Deliverables/Results:

The five-year survey data will be given to Mark Heckbert, the coordinator of the five-year survey, as soon as they are entered into an acceptable database.

The refereed journal article will be submitted for publishing in the fall of 2011.

Recommendations on future buffer zones for land use guidelines surrounding swan nesting lakes will be made after the summer of 2011 after further disturbance experiments have been carried out.

Ecological effects fo sportfish stocking and aeration in Boreal Foothills lakes (the FIESTA project)

University of Alberta (Dr. W. Tonn)

Grant: $24,640

Project Code: 020-00-90-140

Project Status: Funded since 2006-07; Completed

The central goal of this study is to apply principles of impact assessment to the basic questions: What are the consequences of trout stocking on invertebrate, fish, and amphibian communities in small boreal foothills lakes? How does the addition of trout affect the food-web structure of the stocked lakes? What ecological and environmental characteristics of these lakes affect the impact of trout, relative to better-studied systems, e.g., naturally fishless alpine lakes. Does overwinter aeration alter impacts of stocking? To address these questions, Dr. Tonn's lab is employing replicated "control-impact" and partially replicated "Before-After-Control-Impact" (BACI) study designs at the whole-lake level, together with a mesocosm experiment. They are also examining how aeration influences these relationships. Results from this research will help guide provincial stocking and aeration program and contribute to the larger goal of enhancing Alberta's recreational fishery, while maintaining the native biodiversity the province's lake ecosystems.

Deliverables/Results:

Presentations:

Annual presentations to ACA/ASRD staff: March 17, 2011 in Sherwood Park.

Presentations at provincial, regional, national, and international conferences: An invited presentation to ACA fisheries biologists in September, 2010 (Sundre, AB) featured the FIESTA project. An oral presentation on FIESTA was given at the American Fisheries Society North Central District meeting in December, 2010 (Minneapolis, MN).

Scientific publications:

Hanisch, J.R., W.M. Tonn, C.A. Paszkowski, and G.J. Scrimgeour. 2010. δ13C and δ15N Signatures in Muscle and Fin Tissues: Non-lethal Sampling Methods for Stable Isotope Analysis of Salmonids. N. Amer. J. Fish. Mgt. 30:1-11.

Nasmith, L.E., W.M. Tonn, C.A. Paszkowski, and G.J. Scrimgeour. 2010. Effects of stocked trout on native fish communities in boreal foothills lakes. Ecol. Freshw. Fish 19: 279–289.

Schank, C.M.M., C.A. Paszkowski, W.M. Tonn, and G.J. Scrimgeour. 2011. Stocked trout do not significantly affect wood frog populations in boreal foothills lakes. Can. J. Fish. Aquat. Sci.: in review.

Nasmith, L.E., W.M. Tonn, C.A. Paszkowski, and G.J. Scrimgeour. Effects of stocked trout on littoral invertebrates in boreal foothills lakes. Can. J. Fish. Aquat. Sci.: in review.

The project has regular interactions with anglers, explaining this project and how it assists ACA and ASRD to manage lakes. In addition to discussions with anglers during the 2010 field sampling, an article has been submitted about the FIESTA project to Alberta Outdoorsman magazine.

Effects of environmental change on stream temperature: implications for native salmonid species

University of Lethbridge (Dr. S. Boon)

Grant: $30,000

Project Code: 020-00-90-158

Project Status: New; Completed

The goal of this project is to develop a spatial stream temperature model that accounts for atmospheric, hydrologic and biophysical controls and can be applied to assess the possible effects of environmental change on salmonid habitat. The project objectives are to: define key atmospheric and hydrologic variables controlling stream temperature at the reach-scale through a detailed field study; incorporate reach-scale stream temperature mass and energy balance into a watershed scale spatial model (GENESYS) using both existing algorithms and field measurements; use the resulting model to assess how environmental change (landscape disturbance and climate change) will affect stream temperatures in headwater streams relative to tolerable levels for native salmonid species. Extensive fieldwork was conducted from May-Sept. 2010, with additional smaller trips from Oct. 2010-Jan. 2011. Fieldwork was focused on instrumenting three stream reaches in the Star Creek watershed, Crowsnest Pass, to quantify the mass and energy balance components contributing to stream temperature. The 2010 field data were collated and quality controlled, and used along with existing data from a larger study underway in the region (Southern Rockies Watershed Project) to initialize and run the GENESYS model for the Star Creek watershed. The GENESYS model was also modified to incorporate the two main components of subsurface flow: soil moisture and groundwater. The soil moisture component was parameterized based on 2010 field data. A stream flow routing routine is also under development to be added as a module to the GENESYS model. 2010 field data were also used to calibrate and run a reach-scale stream temperature model originally developed by Leach and Moore (2010). This model has been conceptually incorporated as a module in the GENESYS modelling framework; physical coding to fully incorporate this module is underway.

Comparison of modelled and measured stream temperature indicates that the three instrumented stream reaches are hydrogeomorphically distinct, thus results from each reach are representative of different stream types. Unlike in other stream temperature studies, stream and air temperature are not linearly related at these sites, thus further justifying the application of a more detailed, process-based modelling approach to quantifying this major driver of aquatic habitat suitability. Stream temperature is also highly sensitive to hydrologic events (snowmelt, rainfall), the timing and magnitude of which likely play a major role in governing stream thermal regimes. Groundwater contributions to stream temperature in the Star Creek stream reaches are highly significant, but are not well represented in the original model. The model is currently being modified to better represent these groundwater inputs, and are altering and expanding their monitoring program to incorporate more variability in vegetation cover and groundwater contributions to stream flow, and to provide data from larger scale watersheds.

Deliverables/Results:

Conference Presentations:

MacDonald RJ, Boon S, Byrne JM. 2011. Simulating stream temperature in a mountain environment. *CGU Hydrology Section Prairie Student Conference*. Calgary: 28 Jan.

MacDonald R, Boon S, Byrne J. 2010. Assessing stream temperature response to environmental change. *Eos Trans. AGU*, 91(52), Fall Meet. Suppl., Abstract GC51D-0787.

MacDonald R, Boon S, Byrne J. 2010. Stream temperature response to environmental change. *Oldman Watershed Council Science Forum*. Lethbridge: 20 Oct.

MacDonald R, Boon S, Byrne J. 2010. Stream temperature response to environmental change. *MTNCLIM Mountain Climate Research Conference*. Blue River, OR: 7-10 Jun.

MacDonald R, Boon S, Byrne J. 2010. Stream temperature response to environmental change: Background and methods. *CGU Hydrology Section Prairie Student Conference*. Edmonton: 31 Jan.

Through the funding from ACA, Dr Boon was able to secure an NSERC Industrial Postgraduate Scholarship for Ryan MacDonald (PhD student) for Jan 2011- Dec 2012, as well as securing funding from Trout Unlimited Canada and the Southern Alberta Water Hub to continue this work in 2011. This research has also resulted in a proposed collaboration with Dr. Joe Rasmussen and Mike Robinson (Lotic Environmental, BC), to relate stream temperature in a range of reaches to aquatic ecosystem structure. Helpful discussions were held with researchers at the National Oceanic and Atmospheric Administration (NOAA) to further develop the modelling aspect of the research.

Scientific publications:

Silins U, Boon S, Bladon K. Stream temperature response to wildfire in a montane watershed. In preparation.

MacDonald RJ, Boon S, Byrne J. Quantifying the influence of hyporheic exchange on stream temperature in a mountain watershed. In preparation.

MacDonald RJ, Boon S, Byrne J. Simulating stream temperature over varied spatiotemporal scales - from stream reach to watershed. In preparation.

Examining resiliency of bull trout populations to brook trout invasiveness

University of Lethbridge (Dr. J. Rasmussen)

Grant: $20,000

Project Code: 020-00-90-156

Project Status: Funded in 2009-10; Completed

Examining resiliency of bull trout populations to brook trout invasiveness is an ongoing project that is so far on schedule. Preliminary analysis from 2009 and 2010 field seasons correlate substrate size, in-stream boulder cover and migratory life history with bull trout resistance to brook trout invasion; however, additional data from additional sites is required to strengthen the analyses. Habitat features of streams were sampled and relative abundance estimates of brook trout bull trout have been compiled. This objective is ahead of schedule, as 41 sites were sampled in 2010, bringing the total sampling effort to 74 sites out of a target goal of 100 for this three year project. Unlike the 2009 sampling season, several streams containing resident bull trout were sampled in 2010, but have not been analyzed as of yet. Whether or not there is sufficient data to answer this question yet is questionable, but more data relevant to this aim will be collected in 2011. Like the 2009 season, there was short opportunity to collect data due to high summer stream flows owing to rain and extended snow melt period due to below average temperatures; nevertheless, by being mobile, the researchers were able to sample 45 out of a target of 47 sites this season, and 41 contained data relevant to the study, making the project ahead of schedule.

Deliverables/Results:

Preliminary linear regression models indicate that substrate size, temperature and in-stream boulder cover do indeed predict a gradient of brook trout invasiveness in mountain streams containing, or that once contained, native bull trout. A more sophisticated set of logistic regression models will be constructed in fall 2011 when the full dataset is available.

An abstract has been submitted to present this project at the American Fisheries Society annual meeting in Seattle for 2011.

APPENDIX A

Projects in relation to GECF Funding Priorities 2010-2011

Alberta Conservation Association
Conserving Alberta's Wild Side

FUNDING PRIORITY #1 — 10 Projects

Habitat enhancement activities specifically listed on provincial recovery plans for Alberta's endangered species (to be done in cooperation with recovery teams).

Alberta Fish and Game Association, *Operation Grassland Community*, $39,670.00

Nature Alberta (Formerly Federation of Alberta Naturalists), *Public and volunteer engagement with Alberta's Important Bird Areas*, $34,073.00

The Calgary Zoo, *Preservation and propagation of whooping cranes and sage grouse*, $8,500.00

Trout Unlimited Canada, *East Slopes creek conservation initiative,* $28,600.00

Calgary Zoo, *Using meta-population modeling to insure the effective conservation of northern leopard frogs,* $21,194.00

King's University College, *Conservation genetic analysis of Alberta peregrine falcons,* $11,700.00

King's University College, *Reproductive ecology of endangered populations of limber and whitebark pine in Alberta,* $15,000.00

University of Alberta, *Does petroleum development affect burrowing owl survival, nest success, fledging rate or habitat use?,* $23,520.00

University of Alberta, *Ecology and behaviour of grizzly bears (Ursus arctos horribilis) in response to open-pit mining and implications for management and conservation,* $31,000.00

University of Alberta, *Trumpeter swan population recovery in Alberta: Distribution, land-use and response to disturbance,* $37,000.00

FUNDING PRIORITY #2 — 25 Projects

Site specific enhancements of habitat, structures and facilities aimed at increasing recreational angling or hunting opportunities, improving habitat or increasing wildlife/fish productivity on the site (i.e. planting/seeding vegetation, development of new fisheries access sites, nest box initiatives, food plot trials and cover plot trials, spawning bed enhancement, etc.).

Andrew Stiles, *Nest box deployment with youth to inspire stewardship,* $2,500.00

Bow Valley Habitat Development, *Willow and tree planting on Millennium Creek (Cochrane Scout Troop),* $2,182.95

Nose Creek Watershed Partnership/Trout Unlimited Canada, *Nose Creek rehabilitation project,* $3,000.00

Sylvan Lake Fish and Game Association, *Niemela Reservoir 2010 project,* $2,975.00

Town of Taber, *Taber trout pond,* $2,200.00 (not completed)

Trout Unlimited Canada, *Aquatic invasive awareness campaign,* $2,838.00

Weaselhead/Glenmore Park Preservation Society, *Weed management in the Weaselhead,* $3,000.00

Alberta Fish and Game Association, *Operation Grassland Community,* $39,670.00

Alberta Fish and Game Association, *Pronghorn antelope migration corridor enhancement,* $44,077.00

Alberta Fish and Game Association, *Volunteer habitat lands stewardship,* $11,100.00

Bow Valley Habitat Development, *Modifications to a section of stream channel on Ranch House Spring 2010,* $3,385.72

Dickson Fish and Game Association, *Dickson Dam Site #7 Conservation Property - Habitat improvements,* $5,240.00

Eastern Irrigation District, *Partners in Habitat Development,* $25,000.00

Lac La Biche County, *Lac La Biche watershed project,* $5,000.00

Lesser Slave Lake Bird Observatory, *Monitoring migratory and breeding birds in Alberta's Boreal Forest,* $25,000.00

Mountain View County, *Riparian area management improvements,* $20,000.00

Nature Alberta (Formerly Federation of Alberta Naturalists), *Riparian water quality improvement project,* $34,000.00

Northern Alberta Institute of Technology (NAIT), *Sturgeon River watershed habitat improvements,* $20,000.00

Red Deer County, *Off the Creek Program 2010,* $25,000.00

Trout Unlimited Canada, *Crowsnest River channel reactivation project,* $24,000.00

West Central Forage Association, *Paddle River enhancement project - Phase 1,* $14,540.00

Woodlot Extension Program/Woodlot Association of Alberta, *Riparian reforestation and wildlife habitat enhancement of Beaverlodge Watershed - Phase III,* $40,000.00

Calgary Zoo, *Using meta-population modeling to insure the effective conservation of northern leopard frogs,* $21,194.00

University of Alberta, *Lynx cycles and barriers: Evaluating dispersal versus climate change in flatlining populations,* $27,500.00

University of Alberta, *Ecological effects of sport fish stocking and aeration in Boreal Foothills lakes (the FIESTA project),* $24,640.00

FUNDING PRIORITY #3 — 4 Projects

Urban fisheries development, including : initial evaluation of water quality aspects of existing ponds to determine their suitability for fish stocking; purchase of equipment required to ensure suitable water quality for fish stocking (e.g. aeration equipment); fish stocking in public ponds; promotion of an urban fishery (including natural water bodies).

Town of Taber, *Taber trout pond*, $2,200.00 (not completed)

Lac La Biche County, *Lac La Biche watershed project,* $5,000.00

Trout Unlimited Canada, *Crowsnest River channel reactivation project,* $24,000.00

Trout Unlimited Canada, *East Slopes creek conservation initiative,* $28,600.00

FUNDING PRIORITY #4 — 24 Projects

Stewardship Initiatives (e.g. on-going maintenance of conservation sites or fisheries access sites; adopt a fence; property inspections for invasive weeds; manual weed control; grass mowing).

Andrew Stiles, *Nest box deployment with youth to inspire stewardship,* $2,500.00

Nose Creek Watershed Partnership/Trout Unlimited Canada, *Nose Creek rehabilitation project,* $3,000.00

Sylvan Lake Fish and Game Association, *Niemela Reservoir 2010 project,* $2,975.00

Weaselhead/Glenmore Park Preservation Society, *Weed management in the Weaselhead,* $3,000.00

Alberta Fish and Game Association, *Operation Grassland Community,* $39,670.00

Alberta Fish and Game Association, *Volunteer habitat lands stewardship,* $11,100.00

Beaverhill Bird Observatory, *Beaverhill Lake stewardship and monitoring,* $10,200.00

Castle-Crown Wilderness Coalition, *Maintaining and restoring natural habitat in the Castle Wilderness,* $9,500.00

Delta Waterfowl Foundation, *ALUS demonstration project in the County of Vermilion River,* $15,000.00

Eastern Irrigation District, *Partners in Habitat Development,* $25,000.00

Ghost Watershed Alliance Society, *Riparian and wetlands health assessment and inventory by Cows and Fish of critical areas in the Ghost Watershed,* $35,500.00

Lac La Biche County, *Lac La Biche watershed project,* $5,000.00

Lesser Slave Lake Bird Observatory, *Monitoring migratory and breeding birds in Alberta's Boreal Forest,* $25,000.00

Nature Alberta (Formerly Federation of Alberta Naturalists), *Public and volunteer engagement with Alberta's Important Bird Areas*, $34,073.00

Nature Alberta (Formerly Federation of Alberta Naturalists), *Riparian water quality improvement project,* $34,000.00

Red Deer County, *Off the Creek Program 2010,* $25,000.00

Trout Unlimited Canada, *Crowsnest River channel reactivation project,* $24,000.00

Trout Unlimited Canada, *Late fall fisheries investigation in diversion canals of Southern Alberta,* $7,000.00

Willmore Wilderness Foundation, *Willmore Wilderness Park clean-up and stewardship initiative,* $18,360.00

Calgary Zoo, *Using meta-population modeling to insure the effective conservation of northern leopard frogs,* $21,194.00

King's University College, *Reproductive ecology of endangered populations of limber and whitebark pine in Alberta,* $15,000.00

University of Alberta, *Lynx cycles and barriers: Evaluating dispersal versus climate change in flatlining populations,* $27,500.00

University of Alberta, *Edmonton urban coyote project,* $35,952.00

University of Lethbridge, *Examining resiliency of bull trout populations to brook trout invasiveness,* $20,000.00

FUNDING PRIORITY #5 — 11 Projects

Impacts of non-native species on persistence of native species.

Alberta Fish and Game Association, *Operation Grassland Community,* $39,670.00

Castle-Crown Wilderness Coalition, *Maintaining and restoring natural habitat in the Castle Wilderness,* $9,500.00

Ghost Watershed Alliance Society, *Riparian and wetlands health assessment and inventory by Cows and Fish of critical areas in the Ghost Watershed,* $35,500.00

Trout Unlimited Canada, *Aquatic invasive awareness campaign,* $2,838.00

Trout Unlimited Canada, *East Slopes creek conservation initiative,* $28,600.00

Trout Unlimited Canada, *Late fall fisheries investigation in diversion canals of Southern Alberta,* $7,000.00

Weaselhead/Glenmore Park Preservation Society, *Weed management in the Weaselhead,* $3,000.00

King's University College, *Reproductive ecology of endangered populations of limber and whitebark pine in Alberta,* $15,000.00

University of Alberta, *Ecological effects of sport fish stocking and aeration in Boreal Foothills lakes (the FIESTA project),* $24,640.00

University of Lethbridge, *Effects of environmental change on stream temperature: implications for native salmonid species,* $30,000.00

University of Lethbridge, *Examining resiliency of bull trout populations to brook trout invasiveness,* $20,000.00

FUNDING PRIORITY #6 — 0 Projects

Improvements and innovation in matching sportsmen with landowners (e.g. facilitating hunter access to depredating waterfowl, elk and deer).

FUNDING PRIORITY #7 — 1 Project

Develop and validate inventory tools to determine the relative density and range of ungulate species using innovative techniques such as trail cameras or passive DNA samples.

Laval University, *Ecology, conservation, and population demography of mountain goats in Alberta,* $19,826.00

FUNDING PRIORITY #8 — 0 Projects

Evaluate the effect of pesticides or herbicides on upland game birds (sharp-tailed grouse, pheasant, gray partridge) in agricultural landscapes.

FUNDING PRIORITY #9 — 3 Projects

Evaluate the effect of recreational access (mode, timing, duration) on wildlife & fish populations and habitat.

Ghost Watershed Alliance Society, *Riparian and wetlands health assessment and inventory by Cows and Fish of critical areas in the Ghost Watershed,* $35,500.00

Laval University, *Ecology, conservation, and population demography of mountain goats in Alberta,* $19,826.00

University of Alberta, *Trumpeter swan population recovery in Alberta: Distribution, land-use and response to disturbance,* $37,000.00

FUNDING PRIORITY #10 — 0 Projects

Investigation of methods for reducing the spread and/or impact of wildlife or fish related diseases.

FUNDING PRIORITY #11 — 1 Project

Evaluate the impact of various harvest management regimes on fish or wildlife populations (e.g. fish size limits, three-point or larger elk requirements, etc.).

Laval University, *Ecology, conservation, and population demography of mountain goats in Alberta,* $19,826.00

FUNDING PRIORITY #12 — 0 Projects

Evaluate the social demographics of hunting and angling to determine the factors influencing the decision to become involve in hunting or angling and the reasons why people opt out in a particular year.

NONE OF THE FUNDING PRIORITIES — 4 Projects

Baptiste, Island and Skeleton Lakes Watershed Management and Lake Stewardship Council (BISL), *Aerial videography - Riparian management area health and integrity assessment for Baptiste and Island Lakes,* $9,000.00

Wild Elk Federation, *Elk relocation,* $3,143.00

Canadian Wildlife Service, *Effects of oil and gas development on grassland birds in south-east Alberta,* $20,000.00

University of Alberta, *Cougar distribution and prey selection in south-west Alberta,* $32,700.00

Note: The link between the project and the funding priority is taken from the application form, projects can relate to multiple funding priorities.

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