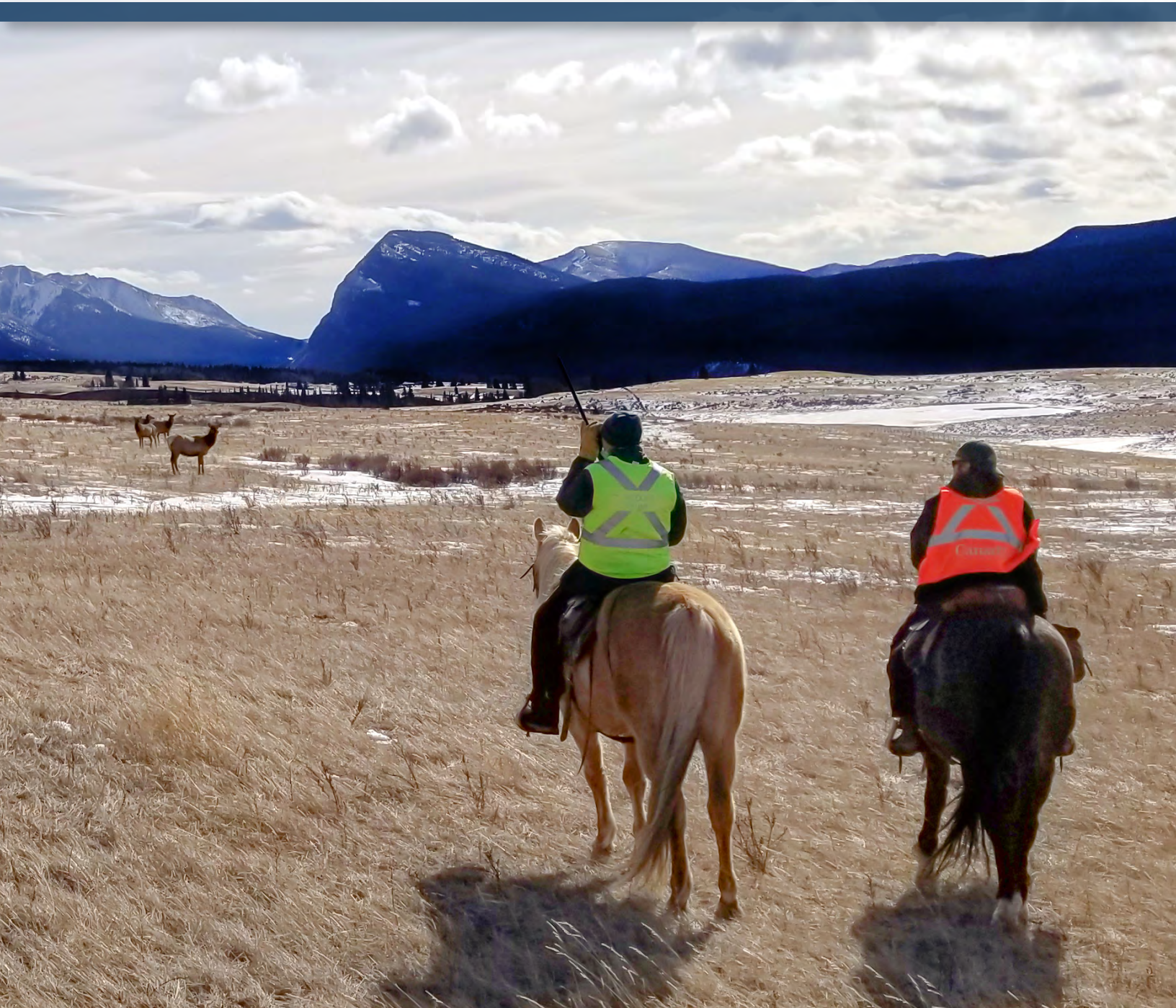


Grants Fund Annual Report 2020/21

For the period of April 1, 2020 to March 31, 2021



wildlife | fish | habitat





ACA's Mission

ACA conserves, protects, and enhances fish and wildlife populations and their habitats for Albertans to enjoy, value, and use.

ACA's Vision

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

Alberta Conservation Association

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Front Cover Photo: Elk captures from horseback using darts
Photo provided by: Madeline Trottier

From the project: Bull Elk Recruitment, Survival, and Harvest in a Partially Migratory Elk Herd in the Ya Ha Tinda (030-00-90-281)

Grants Program 2020/21

KEY PROGRAM HIGHLIGHTS for the Grants 2020/21:

ACA Conservation, Community, and Education Grants received 132 funding applications requesting a total dollar value of just under \$1.8 million. A total of \$961,652.90 was allocated to 69 projects.

ACA Research Grants received 35 funding applications requesting almost \$1 million. A total of \$329,587 was allocated to 15 projects.

ACA Grants in Biodiversity received 45 funding applications requesting just under \$700,000. A total of \$207,000 was allocated to 19 student projects (13 master's and six doctorate degree programs). This program is funded by ACA and Syncrude Canada Ltd.

COVID Relief Fund for Conservation Organizations distributed 16 one-time grants totalling \$40,000.

Project budgets for all grants programs ranged from \$1,000 to \$40,278.

Executive Summary

Funded mainly by the province's hunters and anglers, Alberta Conservation Association's (ACA) Grants Program annually supports a variety of both small and large projects; these projects benefit Alberta's wildlife and fish populations, as well as the habitat they depend on. Operational since 2002, the ACA Conservation, Community, and Education Grants (CCEG) and ACA Research Grants (RG) [CCEG and RG combined were formerly known as the Grant Eligible Conservation Fund (GECF)] has provided approximately \$20.6 million to 1,360 projects carried out in Alberta by the conservation community as of the 2020/21 funding round. The ACA Grants in Biodiversity (GiB), which since March 2020 is administered from the ACA headquarters, has been awarding grants for 26 years and has now allocated a total of \$5.6 million dollars to 548 student researchers as of the 2020 funding competition. Furthermore, the funding provided by the grants continues to leverage more than five times its value in conservation dollars, estimated at approximately \$113.6 million—money that has been directly used for conservation work and more recently to support the recruitment and retention of hunters, anglers, and trappers in Alberta. This year, the GiB will be reported on in this document, as the program administration has been transferred from the University of Alberta to ACA.

These popular grant programs received 212 applications (132 to the CCEG, 35 to the RG, and 45 to the GiB) requesting a total of just under \$3.5 million in 2020/21. Just under \$1.5 million was allocated to 103 projects (69 CCEG projects, 15 RG projects, and 19 GiB projects). In addition, due to the COVID-19 pandemic, this year ACA's Board of Directors set in place a few ways to provide some COVID-19 relief funds for ACA's conservation partners. A COVID Relief Fund for Conservation Organizations (CRF) was set up and a total of \$40,000 was distributed to 16 partner organizations. This fund was to help cover organization running costs during this difficult period of lockdowns and strict public health restrictions.

The aim of this report is to document the procedures for 2020/21 and to provide an overview of activities and results of projects financially supported through ACA's Grants Program in 2020/21.



Listening for collared mule deer out on the Cresthill Grazing Lease

Photo provided by: Maria Dobbin

Relating to the GiB project: Analysis of Mule Deer Contacts and Transmission of Chronic Wasting Disease

Annual Report of Activities and Synopsis of Funding Recipient Projects

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 ACA Grants Program is widely known among the conservation community operating in Alberta. Applications were received from a diverse cross-section of the population including community groups, grassroots organizations, provincial and national institutes, as well as leading scientific researchers and graduate students.

The projects supported by ACA's grants 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 Grant Eligible Conservation Fund (GECF) process starting in 2002/03. As of the 2020/21 funding round, the ACA Conservation, Community, and Education Grants (CCEG) and ACA Research Grants (RG) programs granted approximately \$20.6 million dollars to 1,360 projects implemented across Alberta. These projects have leveraged an estimated \$113.6 million in conservation work across the province.

The administration of the ACA Grants in Biodiversity program (GiB) was moved to ACA's headquarters from the University of Alberta in March 2020. This student grant program has been funding master's and doctorate degree projects since 1994! Since then, \$5.6 million dollars has been awarded to 548 student researchers as of the 2020 funding competition.

After the 2020/21 project selection process, a total of \$961,652.90 was granted to 69 CCEG projects, \$329,587 to 15 RG projects, and \$207,000 to 19 students' GiB projects. This document provides an overview of the activities of ACA's grant programs for the 2020/21 funding cycle.

This year presented a challenge we have not had to face before: the COVID-19 pandemic. ACA recognized the hardships that our conservation partner organizations were facing and provided some COVID-19 relief for both current grant holders

and those who have held ACA grants in the past. For the 2020/21 grant recipients, up to 20 percent of their total grant could be reallocated for administration costs, and all projects requiring an extension due to the COVID-19 pandemic would get one. For other ACA partners, those who had had an ACA grant in the past five years, a small grant fund, the COVID Relief Fund for Conservation Organizations (CRF), was set up to cover \$2,500 of administration costs for conservation groups experiencing financial hardship. In total \$40,000 was granted to 16 organizations.

Despite the hardships and difficulties of working through a pandemic, the grants showed resilience and creativity to achieve results and revise plans to move forward with projects. Many conservation education projects moved online, and these offerings often had surprisingly good reach with people attending online presentations and meeting in larger numbers than expected. For example, the Calgary Hook and Hackle Club moved their fly tying demonstrations onto the Zoom online meeting platform and regularly had up to 50 participants attending twice a month, which increased club membership. Inside Education turned to producing Forest and Wildlife Field Trip kits and sent these to 84 schools, with an estimated reach of 8,400 students, and they proved to be very popular. In addition, Inside Education's teacher profession development sessions were moved online, and they were accessed by a broad spectrum of teachers from areas not ordinarily reached, including teachers from Alberta's Indigenous communities. Of course, events involving gatherings, such as youth camps, were heavily impacted during the spring and summer of 2020, and these grants were extended to allow groups to use the funding when possible. Some projects managed to find windows when restrictions eased somewhat to carry out some group activities with reduced numbers and COVID-19 safety plans in place, such as Alberta Hunter Education Instructors' Association's (AHEIA) Provincial Hunting Day events, and some mentored hunts with Calgary Pheasants Forever and Lethbridge Fish & Game Association. Stewardship and restoration projects, for the most part, managed to go ahead with some delays and changes to safely work during the COVID-19 pandemic; many habitat and riparian restoration projects, as well as fisheries evaluations

were completed, for example the Alternative Land Use Services (ALUS) programs of various counties.

The RGs continued to support several long-term research programs looking at wildlife diseases threatening Alberta wildlife, such as chronic wasting disease (CWD) in deer and *Ambystoma tigrinum* virus (ATV) in tiger salamanders. Another long-term wildlife research project studying bull elk population dynamics of the Ya Ha Tinda elk herd, led by researchers from the University of Montana, continued with RG funding. ACA has an interest in social science research relating to the demographics, attitudes, and practices of hunting and angling. This year, two RG projects focused on that topic, researchers from the University of Alberta looked at hunting data generation via the iHunter app and another project began studying conflicts between hunters and non-hunters at the Cooking Lake-Blackfoot Provincial Recreation Area.

From the 2020 competition, the GiB funded, with co-funding from Syncrude Canada Ltd., 13 master's and six doctorate degree candidates from the University of Alberta, University of Lethbridge, University of Calgary, University of Saskatchewan, University of Manitoba, Western University, and out of country, to the University of California, Riverside. Measuring impact and adapting to change were two important themes among the projects that will be funded by the GiB program this year. *How are insects affected by the ever-increasing artificial light humans bring? Can species living on mountaintops adapt to climate change? Are Columbian ground squirrels adapting their hibernation practices? How are fish reacting to emissions in the oil sands?* These questions, and more, will be closer to being answered through the work of our funded graduate students.

These are just a few examples—read about the achievements of each of the projects that received funding in 2020/21 in the Project Summaries section of this report.

The Funding Cycle

The GiB guidelines and application forms were made available on the GiB website on Sept. 3, 2019, and applicants could apply from that date until the deadline of Dec. 1, 2020. The RG and CCEG made the funding guidelines and application forms available to the public on Oct. 7, 2019, via ACA's website, and by email to existing contacts. Full details of the 2020/21 funding cycle are in the table below:

2020/21 FUNDING CYCLE DATES

Deadline to receive completed GiB applications	Dec. 1, 2019
Window to receive completed RG applications	Nov. 1–Dec. 1, 2019
Window to receive completed CCEG applications	Jan. 1–24, 2020
GiB adjudication meeting	Feb. 8, 2020
RG adjudication meeting	Feb. 9, 2020
CCEG adjudication meeting	Feb. 27, 2020
ACA Board approval and notification of applicants as to funding status	End of March 2020
Cooperative Project Agreements signed, initial payments made, and project work begins	From April 1, 2020
Interim reports due and second payments made (if required) for CCEG & RG	Sept. 1, 2020
Window open to receive CRF applications	Sept. 8, 2020
Final "Impact Statement" report due for CRF	March 1, 2021
Final reports due for CCEG & RG	March 15, 2021
Projects end and final payments made (if required)	March 31, 2021
Progress reports (funded 2020) and final reports (funded 2019) due for GiB	April 15, 2021

Funding Eligibility

Funding Eligibility CCEG

The CCEG supports a wide variety of applicants and project types. Anyone with a suitable project working in Alberta can apply for funding, except for ACA staff, Alberta Environment and Parks (AEP), and individuals without the proper insurance. Certain project types and budget items are not covered by the CCEG, such as land acquisition, emergency funding, or overhead costs.

Since 2009/10, funding priorities have been used by the CCEG to guide applicants in drafting their applications. There were no changes to the funding priority list for CCEG in 2020/21. See Major Funding Priorities Grants 2020/21 section for the full list. CCEG does accept applications that do not relate to the suggested areas; however, projects that address one or more of these priority areas should have a better chance of being funded than those that do not. The eligibility criteria and funding priorities are provided in full in the documents “Project Submission Guidelines for Funding in 2020–2021: ACA Conservation, Community, and Education Grants” (this document was available on the ACA website, and can be requested from the Grants Project Administrator).

The CCEG 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.

Funding Eligibility RG

Anyone qualified to carry out high quality research can apply to the RG via their organization, with the following exceptions: ACA and federal and provincial government employees. For applications from universities, faculty staff/research supervisors (rather than students and post-docs) must be the applicant. Graduate students can, however, apply directly to the GiB, see Funding Eligibility GiB section. RG applicants cannot apply with the same project to both the RG and GiB. The RG has also used funding priorities to guide applicants since 2009/10. There were small changes to the wording of RG funding priorities #11 and #12 to increase the scope and clarity in 2020/21. See Major Funding Priorities Grants 2020/21 section for the full list. The RG do accept applications that do not relate to the suggested areas; however, projects that address one or more of these priority areas should have a better chance of being funded than those that do not. The eligibility criteria and funding priorities are provided in full in the document “Project Submission Guidelines for Funding in 2020–2021: ACA Research Grants” (this document was available on the ACA website, and can be requested from the Grants Project Administrator).

Funding Eligibility GiB

The GiB supports graduate student research in Alberta with up to \$20,000, to be spent over two years. The GiB is open to master’s and doctorate degree students internationally for projects carried out in Alberta. The GiB program is intended to increase knowledge of Alberta’s heritage of living resources, specifically the flora, fauna, and habitat; promote the development of highly qualified, Alberta-based conservation biologists; and support research and study in Alberta by graduate students. The GiB supports research in biodiversity, conservation biology, ecology, and related social science approaches that relate to flora, fauna, and habitat in Alberta. The GiB does not have a funding priority list.

Funding Eligibility CRF

The one-time CRF was for organizations that had received a grant in the previous five years (April 2015 to April 2019) from the ACA Grants Program or that had worked directly with ACA as a project partner, providing funding, or in-kind support. The maximum grant was \$2,500. The application process involved submitting financial statements demonstrating a decline in revenue between March and July 2020 (combined) of a minimum of 15 percent compared to the same period in 2019.

Major Funding Priorities 2020/21 Grants

This text is taken from Section C of the *Project Submission Guidelines for Funding 2020-2021*.

Funding Priorities for the Conservation, Community, and Education Grants

All applicants to the ACA Conservation, Community, and Education Grants 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 ACA Conservation, Community, and Education Grants 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, fishing docks, etc.).

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).
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. Impacts of non-native species on the persistence of native species.
5. Projects related to the retention, recruitment and education of hunters, anglers or trappers (including attracting new mentors, training mentors and providing mentors for new hunters/ anglers/trappers; sharing information in schools and with the general public about the link between conservation and hunters/ anglers/trappers; this category also includes educating new hunters/anglers/trappers; 'Kids Can Catch' and archery events for kids). Generate awareness of the hunting/angling/trapping opportunities available to the public.
6. Projects related to outdoor conservation education.

Funding Priorities for ACA Research Grants

All applicants to the ACA Research Grants 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 ACA Research Grants 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. Research activities specifically listed on provincial recovery plans for Alberta's endangered species (to be done in cooperation with recovery teams).
2. Impacts of non-native species on the persistence of native species.
3. Develop and validate inventory tools to determine the relative density and range of wildlife and fish species using innovative detection technologies (e.g., DNA/eDNA, camera traps, drones, etc.).
4. Evaluate the effect of agricultural runoff, pesticides, herbicides or pharmaceuticals on fish or wildlife species' food availability and/or quality in agricultural landscapes.
5. Evaluate the effect of recreational access (mode, timing, duration) on wildlife & fish populations and habitat.
6. Investigation of methods for reducing the spread and/or impact of wildlife or fish related diseases.
7. Evaluate the impact of various harvest management regimes on fish or wildlife genetics or demography (e.g. fish size limits, three-point or larger elk requirements, etc.).
8. Social Science studies of hunting and angling related to demography, attitudes, norms and practices.
9. Evaluate the effect of biological solutions of carbon sequestration on grasslands and treed lands.
10. Evaluate approaches for improving the abundance of pollinators in agricultural landscapes.
11. Work towards clarifying status of formally designated data deficient species.
12. Efficacy of alternative wetland restoration and mitigation techniques.

Proposal Review Process

CCEG Adjudication

The ACA Board of Directors appointed the Adjudication Committee for the CCEG program. The CCEG adjudication committee in 2020/21 consisted of seven citizens of Alberta representing the province's conservation community, one Public-at-Large member from the ACA Board of Directors, and one ACA staff member; and was chaired by a member of the ACA Board of Directors. Adjudicators were tasked with providing rankings and making funding recommendations for all CCEG applications based on the funding priorities and guidelines provided by ACA.

The CCEG ranks applications with a 0 – 5 ranking system, as outlined below.

5. **Outstanding application.** Must fund. Highest priority for support. This category reserved only for truly outstanding proposals.
4. **Very good application.** Should be supported.
3. **Good application.** Worthy of support. Do your best to fund.
2. **Fair application.** Possibly worthy of support.
1. **Poor application.** Not worthy of support.
0. **Do not fund.** This application should not get funding.

In this system, the 4s and 5s normally all get funded, some of the 3s are funded, and 0 – 2 are usually not funded. Partial funding can also be assigned to applications with a high ranking if there is a padded budget or budget items that are ineligible. After the ranking, the funding level for each application is determined.

Due to the large volume of CCEG applications, the adjudicators were sent approximately half of the applications at random (excluding any applications for which they had obvious conflict of interest) and were asked to electronically submit their rankings ahead of the adjudication meeting. A compilation of application scores was presented at the meeting, leaving time to focus discussions on those projects with mixed rankings.

The CCEG adjudication meeting was held on February 27, 2020, at ACA's office in Sherwood Park, Alberta. The list of funding recommendations made by the Adjudication Committee was then approved by the ACA Board at the March 2020 Board of Directors Meeting.

RG and GiB Review Process and Adjudication

The application deadline, December 1, 2019, for the RG and GiB was earlier than that of the CCEG to allow for a rigorous academic review procedure. All applications were sent out for review by experts in the subject of the research application. The academic review process was coordinated by the administrator of the GiB. 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), an industry representative, ACA's Wildlife Program Manager, ACA's Fisheries Program Manager, and the Chair of ACA's Research Adjudication Committee. Two adjudicators were assigned to review (using the application and academic reviews) and rank a selection of the applications. The adjudicators used a five-tiered numerical ranking system (see below), which is the same ranking scale used by the reviewers.

1. **Outstanding proposal.** Must fund. Highest priority for support. This category reserved only for truly outstanding proposals.
2. **Very good proposal.** Should be supported.
3. **Good proposal.** Worthy of support. Do your best to fund.
4. **Fair or poor proposal.** Possibly worthy of support.
5. **Poor proposal.** Do not fund.

Applications ranked by the adjudicators with 1 and 2 are usually all funded, those ranking a 3 are sometime funded, and those ranking 4 and 5 are generally not funded. Funding recommendations were then made after the ranking process. The research adjudication meetings were held on the weekend of February 8, 2020 (GiB) and February 9, 2020 (RG) at the University of Alberta.

Funding Allocations

For the 2020/21 funding cycle, a total of \$1,507,000 was made available for project funding via the Grants: \$970,000 for CCEG, \$330,000 for RG, and \$207,000 for GiB.

Of the 132 applications requesting just under \$1.8 million to CCEG, 69 were funded (a 52 percent success rate for applications receiving full or partial funding). Of the 69 CCEG projects funded in 2020/21, 42 (61 percent) had been funded by ACA in previous years and 27 (39 percent) were new projects.

The RG received 35 applications requesting just over \$980,000 for the 2020/21 competition. Of these, 15 were funded (a success rate of 43 percent for applications receiving full or partial funding). Three (20 percent) of the funded research projects had been funded in previous years, and the rest were new projects.

The GiB received 45 master's and doctorate degree student applications requesting just under \$700,000 for the 2020 competition. 19 student projects were funded as follows: 13 master's and six doctorate degree candidates from the University of Alberta, University of Lethbridge, University of Calgary, University of Saskatchewan, University of Manitoba, Western University, and out of country, to the University of California, Riverside. This represents a success rate of 42 percent for applications receiving full or partial funding. These are all new projects, as the GiB gives one 2-year grant per student project, so there is no repeat funding.

The CRF received 18 applications, and 16 met the criteria. All recipients requested and received a one-time \$2,500 grant. The recipients provided a one-page "impact statement" report outlining how the funds were used to help the organizations through the uncertain times; the reports were due by March 1, 2021.

To receive an ACA grant (except for the CRF), the grant recipient must sign the ACA Cooperative Project Agreement, which has the approved application and budget appended. The ACA Cooperative Project Agreement outlines the reporting and payment schedules and other contractual obligations between ACA and the grant recipient. CCEG and RG recipients provided two project reports, an interim report due by September 1, 2020, and a final report due by March 15, 2021. If the project was completed at the time of the interim report (September 1), then applicants could submit a final report. GiB recipients submit a scientific progress report at the end of the first year of their grant term, and a scientific final report at the end of year two. Their university sends a financial report upon closure of the student's research account.

One CCEG recipient did not accept the grant money and did not sign the ACA Cooperative Project Agreement, as the funds were no longer required to carry out the project. Another CCEG project decided not to proceed due to staffing issues related to the COVID-19 pandemic, and these funds were not dispersed. In total 49 projects (31 CCEGs, ten RGs, and eight GiBs with the end date of March 31, 2021) were granted extensions due to unforeseen circumstances mainly arising from the COVID-19 pandemic. The decision was taken to extend all grants that required an extension due to the Public Health Orders put in place to control the COVID-19 pandemic. To be granted a project extension, CCEG and RG recipients submitted a Request for Extension Form before the grant end date. If a project received an extension, it is mentioned in the project status of the Project Summaries section of this report.

Synopsis of Approved Projects for 2020/21

A summary description of each of the CCEG, RG, and GiB projects ending March 31, 2021 containing the project's objectives, activities, and deliverables can be found on page 15 of this report. CCEG and RG projects are listed alphabetically by organization and GiB projects are listed alphabetically by recipient name.

ACA Conservation, Community, and Education Grants

Small Grants (\$3,000 and under)

Alberta Hunter Education Instructors' Association (AHEIA); AHEIA's Army Cadet Program; \$3,000

AHEIA; AHEIA's Field to Table Seminar; \$1,500

AHEIA; AHEIA's Rifle Sight-In Seminar; \$2,000

AHEIA; New Firearms Acquisition for Alford Lake; \$3,000

Becoming an Outdoors Woman; Becoming an Outdoors Woman Camp; \$1,700

Calgary Hook and Hackle Club; Beginner Fly Tying and Tying in the Community; \$3,000

Helen Schuler Nature Centre; Community Engagement in River Valley Conservation; \$2,100

Innisfail Fish & Game Association; Waterfowl Nesting Habitat Enhancement; \$1,500

Isabelle Sellon School; Place-based Learning and Archery; \$2,500

Junior Forest Wardens – Yellowhead Regional Council; Trailblazer Advanced Camp; \$2,900

Kneehill Bowhunters and Archers; Public Awareness & Education through Mentorship Project; \$2,000

Lesser Slave Watershed Council; Kids Can Catch Family Day 2021 Event; \$2,130

Lethbridge Fish & Game Association; Mentored Hunts; \$3,000

Marshall Springs School; Outdoor Education: Wildlife Identification and Safety; \$1,000

Onoway & District Fish & Game Association; Wild Bird & Bee Houses; \$2,500

Southern Alberta Bible Camp (SABC); Archery Program; \$3,000

SABC; Pelletty Program; \$1,500

SABC; Walleye – Pike Fishing; \$2,500

Sturgeon County; Dock System – Cardiff Park; \$3,000

Sturgeon County; Habitat Heroes Day Camp; \$2,100

Town of Cochrane; Kids Can Catch 2020; \$3,000

Town of Redcliff; Redcliff Landfill Wetland Enhancement; \$2,500

Large Grants (over \$3,000)

Alberta Fish & Game Association (AFGA); Increasing Habitat for Species at Risk in Alberta's Grassland Region through Promotion and Implementation of Best Management Practices; \$29,000

AFGA; Pomrenk Property Wildlife Friendly Fencing; \$9,000

AFGA; Pronghorn Antelope Migration Corridor Enhancement; \$40,278

AHEIA; AHEIA's 27th Annual Outdoor Woman's Program; \$15,000

AHEIA; AHEIA's National Archery in the Schools Program (NASP); \$40,000

AHEIA; AHEIA's Outdoor Bound Mentorship Program; \$6,000

AHEIA; AHEIA's Provincial Hunting Day Initiatives; \$20,000

AHEIA; AHEIA's Teachers' Workshop; \$6,000

AHEIA; AHEIA's Youth Hunter Education Camps (Weeks 1, 2, 3, and 4); \$32,000

Alberta Hunters Sharing the Harvest; Wild Game for the Food Bank Program; \$8,000

Alberta Riparian Habitat Management Society – Cows and Fish; Implementing Riparian Habitat Management Improvements for Westslope Cutthroat Trout; \$11,500

Alberta Trappers Association (ATA); Trapper Education in Schools; \$25,100

ATA; Youth Camp and Mentoring Program; \$30,730

Alexis Nakota Sioux Nation; ANSN Hunting and Fishing Knowledge Transfer Youth Project; \$30,000

Ann & Sandy Cross Conservation Area; Fencing to Improve Wildlife Movement and Harvest on and Near the

ASSCA; \$36,676

Bow River Trout Foundation; Bow River Policeman's Flats River Access Update; \$21,500

Calgary ATV Riders Association; Meadow Creek Trail Rehabilitation Project; \$16,500

Calgary Chapter Pheasants Forever Canada Society; Post-secondary First Pheasant Mentor Hunt Program; \$5,000

Camrose & District Fish & Game Association; Habitat Improvement, Protection, and Inventory Project; \$10,822.50

Castor Fish & Game Club; Evaluation of Parr Reservoir (Castor Creek) for Fish Stocking Suitability; \$11,000

Devon Fish & Game Club; Jim Nelson Memorial Trout Pond Dock Replacement; \$20,000 – Grant not accepted

Ghost Watershed Alliance Society; Watershed Education, Literacy, and Restoration Project; \$20,400

Grassy Lake Recreation Association; Sherburne Reservoir Boat Launch Rehabilitation; \$24,000

H.A. Kostash School; H.A. Kostash Youth Mentorship Program; \$8,200

Inside Education Society of Alberta; Wildlife Education in Alberta Schools; \$20,000

Kimiwan Lake and Wildlife Preservation Society; Kimiwan Birdwalk Outdoor Classroom; \$15,000

Lesser Slave Lake Bird Observatory Society; Avian Monitoring and Outreach Education Programs at Lesser Slave Lake; \$20,250

Lethbridge Fish & Game Association; LFCA Community Recruitment and Education Fund; \$13,500

Mountain View County; Riparian & Ecological Enhancement Program; \$25,000

Northern Lights Fly Fishers – Trout Unlimited Canada Edmonton Chapter (NLFF TUC); Aeration of Hasse Lake; \$20,126

NLFF TUC; Dogpound Riparian Protection – Mader Property; \$39,434

NLFF TUC; Conserving and Restoring Arctic Grayling in the Upper Pembina River Watershed – Habitat Restoration Planning; \$7,000

Northern Sunrise County; Skwarik Riparian Enhancement Project; \$28,000

Oldman Watershed Council; Measuring Success of Oldman Headwater Education and Restoration Efforts; \$25,000

Partners in Habitat Development c/o Eastern Irrigation District; Partners in Habitat Development; \$5,000

Pheasants Forever Chinook Chapter; Sauder Reservoir Habitat Project; \$30,510

Red Deer County; Wildlife and Native Habitat Enhancement in Red Deer County via ALUS (2020); \$40,000

STRIX Ecological Consulting Ltd. (Strix Eco); American Kestrels - Using Nest Boxes and Technology to Increase Awareness and Promote Conservation; \$14,956.40

Taber Fish & Game Association (Taber FGA); Taber Fish & Game and ACA Youth Fishing Recruitment Day; \$15,000

Taber FGA; Winter Family Fun Fishing Day; \$8,100

Town of Hanna; Helmer Dam Revitalization Project – Phase 1; \$10,000

Trout Unlimited Canada (TUC); Alberta Eastern Slopes Strategic Watershed Action Team (SWAT) 2020; \$30,000

TUC; Pinto Lake Recreational Fishery Development Project; \$15,000

TUC; Yellow Fish Road/Water Edu-Kits; \$21,040

Valhalla School Foundation; DEKER (Developing Environmental Knowledge and Respect); \$15,000

Wetaskiwin County; Wetaskiwin/ Leduc Alternative Land Use Services (ALUS); \$5,600

Wild Sheep Foundation Alberta; Evan Thomas and Bow Valley Vegetation Management: Mountain Sheep and Ungulate Prescribed Burn Habitat Enhancement Planning; \$10,000

ACA Research Grants

Athabasca University (Dr. Glover); Algae as Modifiers of Fish Health in Agriculture-Impacted Waters; \$9,750

fRI Research (Dr. Finnegan); Predator-Prey Dynamics and Habitat Disturbance: Are all Disturbances Created Equal; \$18,500

University of Alberta (Dr. Adamowicz); Evaluating Activity Survey Apps for Conservation and Economic Valuation from Recreation; \$33,700

University of Alberta (Dr. Aiken); Chronic Wasting Disease Inactivation by Humic Substances; \$25,000

University of Alberta (Dr. Cassidy St. Clair); Wildlife Monitoring to Support Urban Ecological Planning; \$21,500

University of Alberta (Dr. Frost); Interactive Effects of Landscape Diversity and Local Flower Abundance on Wild Pollinator and Other Beneficial Insect Abundance, Diversity, and Interactions in Agricultural Landscapes; \$29,500

University of Alberta (Dr. Harshaw); Sustaining Access and Social License for Hunting in a Mix-Use Conservation Site: A case study in the Cooking Lake-Blackfoot PRA; \$27,000

University of Alberta, Augustana (Dr. Hood); Distribution and Habitat Associations of Semi-Aquatic Furbearers in the Beaver Hills Biosphere; \$28,750

University of Alberta (Dr. Merrill); Chronic Wasting Disease in Deer: Modeling transmission from contact rates; \$11,000

University of Alberta (Dr. Olefeldt); The Changing North: How will thawing and burned permafrost peatlands impact habitat for woodland caribou and moose?; \$34,000

University of Calgary (Dr. Poissant); Causes and Consequences of Gut Microbiome Diversity in Bighorn Sheep; \$21,000

University of Lethbridge (Dr. Goater); Ecological Epidemiology of Emerging Ambystoma tigrinum Virus (ATV) in a Population of Tiger Salamanders in Southwestern Alberta; \$9,387

University of Lethbridge (Dr. Lee Yaw); Wildlife Effects on Genetic Diversity and Population Connectivity in the Long-toed Salamander; \$34,000

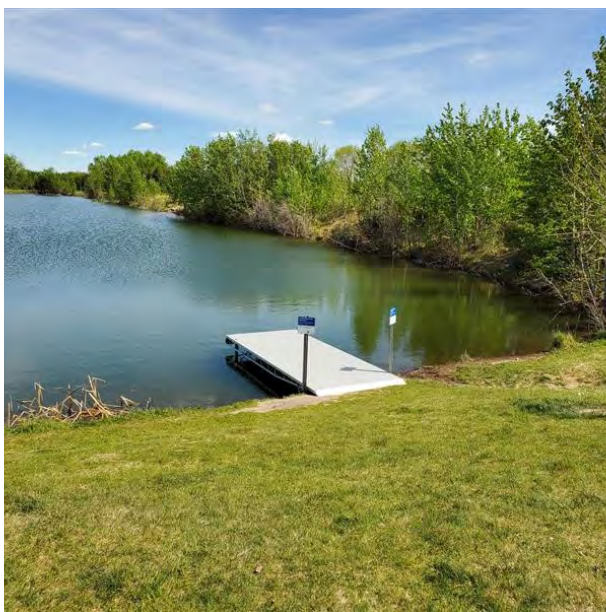
University of Lethbridge (Dr. McCune); Testing the Effects of Recreational Trails on Plant Communities and the Spread of Invasive Plant Species; \$11,500

University of Montana (Dr. Hebblewhite); Bull Elk Recruitment, Survival, and Harvest in a Partially Migratory Elk Herd in the Ya Ha Tinda; Year 4 (Final); \$15,000

ACA Grants in Biodiversity

2020 Award Recipients for projects starting April 1, 2020 and ending March 31, 2022.

Recipient (Program)	Institution	Supervisor(s)	Project Title	Award
Carrie Ann Adams (PhD)	University of Alberta	Erin Bayne and Colleen Cassidy St. Clair	The Effects of Artificial Light at Night on Habitat use by Aerial Insectivores in Alberta	\$15,870
Jared Anderson-Huxley (PhD)	University of California, Riverside	Marko Spasojevic	Adapt, Move, or Go Extinct: Will species on the tops of mountains survive climate change?	\$11,450
Monica Ayala-Diaz (PhD)	University of Alberta	Heather Proctor and Clement Lagrue	Division of Labour in Trematode Parasites and its Effects on Trematode Ecology	\$11,555
Charity Blaney (MSc)	University of Calgary	Steven Vamosi	Impacts on Long-toed Salamander Habitat in Southwestern Alberta	\$5,495
Lindsey Dewart (MSc)	University of Alberta	Scott Nielsen and Mark Edwards	Influence of Wolf (<i>Canis lupus</i>) Predation on Wood Bison (<i>Bison bison athabasca</i>) in the Alberta Oilsands	\$10,400
Raiany Dias de Andrade Silva (PhD)	University of Alberta	Barb Thomas	Patterns and Mechanisms Driving Clone Size and Gender Performance in Trembling Aspen in Alberta	\$8,000
Justin Dubiel (MSc)	University of Lethbridge	Steve Wiseman	Characterization of the Sensitivity of Three Fish Species Inhabiting the Alberta Oil Sands Region to PAHs and Alkyl PAHs	\$4,335
Elène Haave Audet (MSc)	University of Alberta	Kimberley Mathot	Individual Differences in Information Sampling and its Correlation with Survival in the Blackcapped Chickadee (<i>Parus atricapillus</i>)	\$12,615
Gabriela Heyer (MSc)	University of Saskatchewan	Jeffrey Lane	Local Adaptation in Hibernation Phenotypes of Columbian Ground Squirrels (<i>Urocitellus columbianus</i>)	\$14,820
Sarah Hirtle (MSc)	University of Lethbridge	Cameron Goater	Causes and Consequences of Multiparasitism in Wild and Experimental Populations of Fathead Minnows	\$9,165
Emily Holden (MSc)	University of Alberta	J.C. Cahill	Trait Similarity's Impacts on Plant Establishment: General effects among communities	\$17,200
German Lagunas-Robles (PhD)	University of California, Riverside	Alan Brelsford	Environmental, Genetic, and Social Influences on Sex Ratio in the Boreal Ant <i>Formica podzolica</i>	\$15,460
Keon Park (MSc)	Western University	Nusha Keyghobadi	The Genetic Basis of Dispersal and Recolonization in a Butterfly Metapopulation	\$13,000
Emily Purvis (MSc)	University of Calgary	Paul Galpern	The Reassembly of Plant-pollinator Interaction Networks following Wetland Habitat Restoration in Alberta Croplands	\$7,710
Garrett Rawleigh (MSc)	University of Alberta	Scott Nielsen	Winter Responses in Wood Bison (<i>Bison bison athabasca</i>) to Seasonal Dynamics in Water and Factors Influencing Forage Availability in Wetlands	\$12,475
Jessica Serbu (PhD)	University of Alberta	Vince St. Louis	Impacts of Rapid Glacial Melt on Downstream River Freshwater Quality and Food Webs in Banff and Jasper National Parks	\$12,740
Lee Sutcliffe (MSc)	University of Manitoba	Nicola Koper	Effects of Oil Well Drilling Noise on Parental Breeding Behaviour of Chestnut-collared Longspurs (<i>Calcarius ornatus</i>)	\$13,615
Molly Tilley (MSc)	University of Lethbridge	Cameron Goater	Life Cycle, Intra-host Development and Consequences of an Emerging New Pathogen of Minnows in Southern Alberta	\$8,665
Zoey Zapisocki (MSc)	University of Alberta	Viktoria Wagner	Local Adaptation of Plains Rough Fescue (<i>Festuca hallii</i>) to Kentucky Bluegrass (<i>Poa pratensis</i>) Invasion	\$2,430



New dock at Cardiff Park
Photos provided by: Sturgeon County
Relating to the project: Dock System - Cardiff Park (002-00-90-327)

The COVID Relief Fund for Conservation Organizations

The following organizations all received a \$2,500 grant:

- Alberta Invasive Species Council
- Alberta Prairie Conservation Forum
- Beaverhill Bird Observatory Society
- Calgary Fish & Game Association
- Canadian Parks and Wilderness Society Northern Alberta Chapter
- Edmonton Valley Zoo
- Elbow River Watershed Partnership
- Friends of Fish Creek Provincial Park Society
- Glenbow Ranch Park Foundation
- Lacombe Fish & Game Association
- Land Stewardship Centre of Canada
- Narrow Lake Conservation Centre
- Nature Alberta
- Red Deer Fish & Game Association
- Spruce Grove Fish & Game Association
- Weaselhead/Glenmore Park Preservation Society

Grant Projects' Contribution to the Funding Priorities

In total, 103 projects were approved for funding in 2020/21: 69 CCEG projects, 15 RG projects, and 19 GiB projects. All projects selected were to support ACA with meeting its mission of conserving, protecting, and enhancing wildlife, fish, and habitat for all Albertans to enjoy, value, and use.

Funding priorities were used to further guide and direct CCEG and RG applicants by providing priority areas of specific interest to ACA. The GiB does not use a funding priority list. The funding priorities for CCEG and RG were set by ACA staff and approved by the ACA Board of Directors. Two lists of funding priorities were produced: one for the CCEG, and another one for the RG. The CCEG funding priority list remained unchanged with six funding priorities for 2020/21. A couple of wording changes were made to the 2020/21 RG funding priority list. The focus of funding priority #3 was broadened from ungulate species to wildlife and fish species: "Develop and validate inventory tools to determine the relative density and range of wildlife and fish species using innovative detection technologies (e.g., DNA/eDNA, camera traps, and drones, etc.). Mitigation was added to funding priority #12: "Efficacy of alternative wetland restoration and mitigation techniques." For the full list of funding priorities for 2020/21, see page 13.

Applications did not have to relate to the funding priorities, but applications that address one or more of the funding priorities should fare 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, while others only indirectly related to a funding priority. Applicants were asked to specify how their projects related to ACA's mission and funding priorities in their applications. This information was used to determine which of the selected projects for 2020/21 contributed to ACA's funding priorities. All the CCEG and RG funded projects mentioned a link to one or more of the funding priorities. For a complete overview of which funded projects link to the various ACA funding priorities in 2020/21, see the Appendix: Projects in Relation to Grants Funding Priorities 2020/21 page 57.

This year the three most cited CCEG funding priorities were (in order): funding priority #6 "Projects related to outdoor conservation education" (with 66 percent of projects citing this funding priority); funding priority #5 "Projects related to retention, recruitment, and education of hunters, anglers, or trappers..." (62 percent); and funding priority #2 "Site specific enhancement of habitat... & Stewardship initiatives..." (41 percent). For an overview of how CCEG projects relate to the funding priorities, see Figure 1.

Figure 1: Percentage of CCEG projects per Funding Priority since 2016/17

FP1: Endangered Species

FP2: Site Specific Enhancements/Stewardship Initiatives

FP3: Urban Fisheries Development

FP4: Non-native Species

FP5: Recruitment and Retention

FP6: Outdoor Conservation Education.

Percentage of projects addressing Funding Priorities

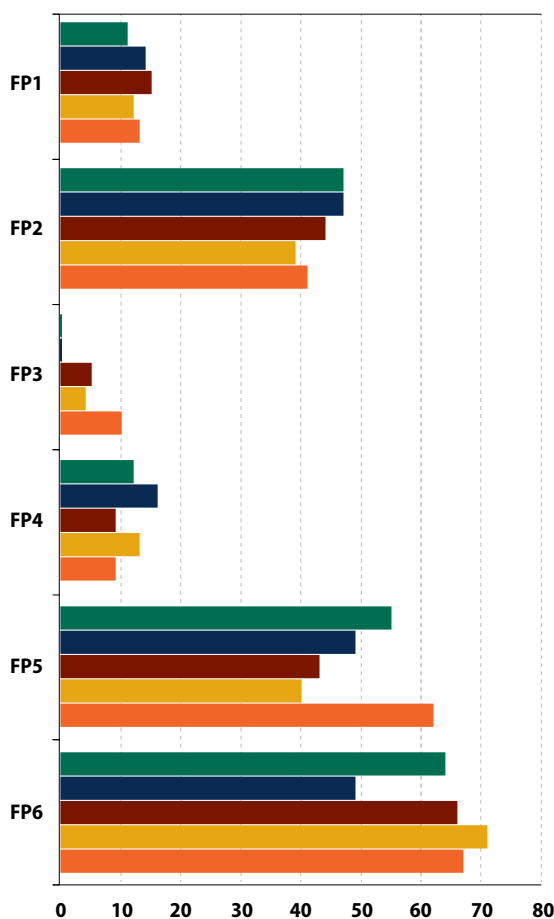
2016/17

2017/18

2018/19

2019/20

2020/21



The most cited RG funding priorities for 2020/21 funded projects was funding priority #5 “Evaluate the effect of recreational access...” (33.3 percent of projects mentioning a link with this funding priority). Funding priorities #2 “Impact of non-native species on persistence of native species”; #3 “Develop and validate inventory tools to determine the relative density and range of wildlife and fish species...”; and #6 “Investigation of methods for reducing the spread and/or impact of wildlife- or fish-related diseases” were mentioned by four of the 15 funded projects (26.7 percent). One funding priority was not mentioned by any of the funded projects that went ahead this year: funding priority #9 “Evaluate the effects of biological solutions on carbon sequestration...”. For an overview of how the 2020/21 RG projects relate to the funding priorities, see Figure 2.

FP1: Endangered Species

FP2: Non-native Species

FP3: Inventory Tools Relating to Wildlife and Fish

FP4: Effect of Agricultural Runoff, Pesticides, Herbicides or Pharmaceuticals.

FP5: Effect of Recreational Access

FP6: Reduction of Disease

FP7: Impact of Harvest Management

FP8 (Old): Human Dimension of Wildlife and Fish Management

FP8 (New): Social Science Studies of Hunting and Angling

FP9: Biological Solutions of Carbon Sequestration

FP10 (was FP11, is now FP10): Improving Pollinator Abundance

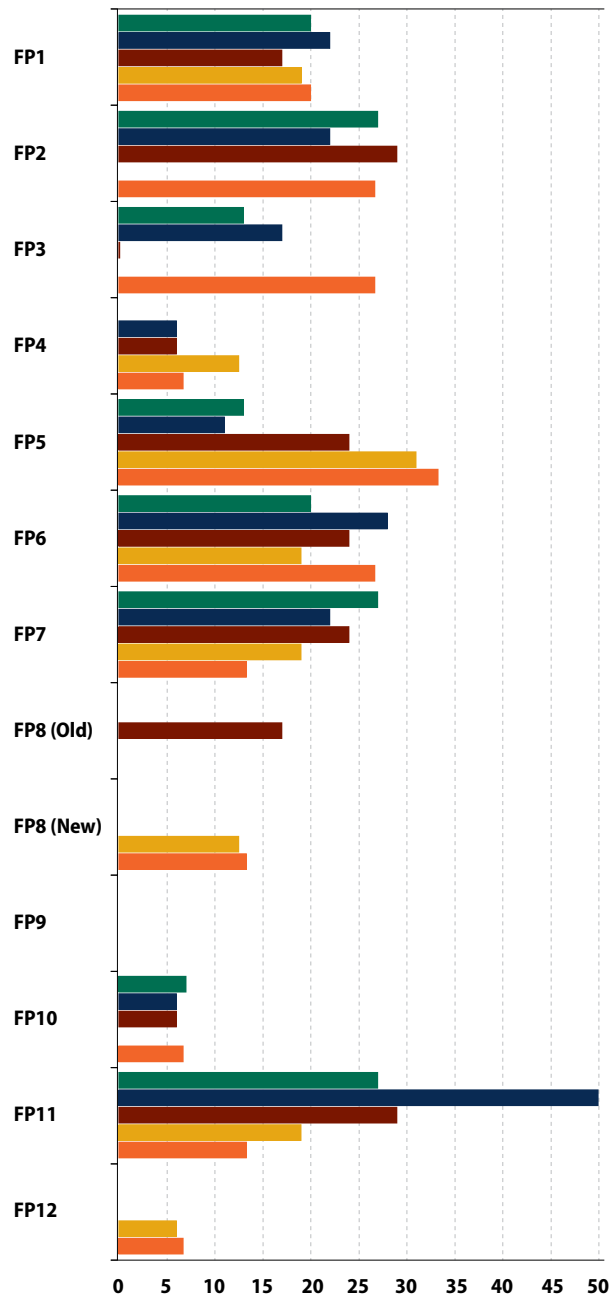
FP11 (was FP12, is now FP11): Status of Data Deficient Species

FP12: Alternative Wetland Restoration.

Percentage of projects addressing Funding Priorities

2016/17 2017/18 2018/19
2019/20 2020/21

Figure 2: Percentage of RG projects per Funding Priority since 2016/17



ACA Grants Program Project Summaries

ACA Conservation, Community, and Education Grants

Increasing Habitat for Species at Risk in Alberta's Grassland Region through Promotion and Implementation of Best Management Practices

Alberta Fish & Game Association (AFGA)

Grant: \$29,000

Project Code: 030-00-90-127

Project Status: Funded since 1999 as Operation Grassland Community;
Completed

Project Website: www.grasslandcommunity.org

Operation Grassland Community (OGC) collaborates with stakeholders across Alberta's prairie region to develop, implement, evaluate, and adapt management actions to protect and enhance wildlife habitats, and support diverse socio-economic interests. The OGC vision is a sustainable prairie landscape where communities thrive, diverse interests are balanced, and wildlife and their habitats are in abundance. The main OGC objective is to enhance wildlife habitat through sustainable practices by addressing the proximate causes of habitat loss and degradation; this was done by implementing one new ranch-wide monitoring and adaptive grazing management project and assessing the 16 existing members who implemented monitoring projects in 2013 through 2020. The project collaborates with OGC members to enhance and/or increase wildlife habitats in areas of high species at risk (SAR)/biodiversity values and to develop and implement habitat quality indicators for focal SAR, like loggerhead shrike, burrowing owl, and/or ferruginous hawk. The project also monitors population trends in burrowing owls and loggerhead shrikes. The final project objectives are 1) to increase awareness of the value of wildlife and their habitats, and the interrelationship between a sustainable environment and sustainable economy; 2) to increase and maintain strong connections with land managers and program partners through one-on-one/group meetings, presentations, participation in community grazing schools, stewardship councils/groups, and agricultural trade shows; and 3) to compliment the one-on-one approach with timely e-news bulletins, print materials, targeted news media, and an interactive website.

Results/Deliverables:

- One new ranch-wide monitoring and adaptive grazing management project has been implemented and installation was completed in October 2020.

- All 16 ranches have been assisted on site with this year's monitoring and data entry procedures. Due to OGC's continued support through one-on-one assistance, ranching members have expressed that they feel more confident in the application of these techniques.
- Ferruginous hawk habitat enhancements this year included completed refurbishments of one new artificial nesting structure with assistance from FortisAlberta.
- One habitat enhancement project was completed in Cypress County for the removal and disposal of invasive shrubs (Russian olive) on 160 acres of grassland.
- Data previously recorded to determine spatial and temporal differences in bird numbers as well as site-specific measurement of the habitat indicators were recorded for all inspected sites in 2020. The habitat indicators assessment was completed by March 31, 2021. A summary report was completed and shared with all landowner partners of this habitat indicators project.
- Wildlife observations were completed at all monitoring sites.
- Protect wildlife habitats through five-year voluntary stewardship agreements and renew expiring agreements: ten new members and 20 renewals were made. New members are stewards to several thousand acres of native prairie grassland.
- One Species At Risk Conservation (SARC) plan was completed and delivered to a new member.
- Annual trends and distribution were monitored in burrowing owls and loggerhead shrikes by involving OGC members in annual census (Note: The next loggerhead shrike census is scheduled for 2021). The 2020 burrowing owl numbers are down slightly, indicating this population is somewhat stable, albeit at low numbers. Mailout of census cards was not completed due to staffing issues at the AFGA office in Edmonton. Phone census was conducted instead, with the assistance of volunteers.
- OGC website communications have been updated, including information on projects and updating social media links. Website updates were completed in September 2020.
- Meetings/conferences: Meetings were virtual in 2020 due to the COVID-19 pandemic. Calgary and Medicine Hat Stampede and trade shows were cancelled. However, staff were able to participate in the review by Canadian Forage and Grassland Association conference, which included virtual discussions and data on a wide variety of grazing and grassland issues.

Pomrenk Property Wildlife Friendly Fencing

Alberta Fish & Game Association (AFGA)

Grant: \$9,000

Project Code: 030-00-90-310

Project Status: New; Completed

The Pomrenk property is a 160-acre habitat property owned jointly by AFGA and ACA that provides critical winter forage and thermal cover for mule deer, white-tailed deer, elk, and moose, and is home for a variety of small mammals and bird species. There is no domestic livestock grazing permitted on the property. The current year (2020) was the final year for cereal cropping. The property will now be established with permanent cover to serve as winter forage for area ungulates. The current fence along Range Road 124 on the west boundary of the property was in severe disrepair, did little to prevent vehicle trespass, and posed a hazard to area wildlife. Vehicular trespass has become a serious issue. The west fence was removed and replaced with a 1/2 mile, four-strand smooth wire fence to prevent vehicle trespass while providing easy passage by ungulates. A 44-inch gate was installed to permit access for large farming equipment, and a V-style gate was installed for recreational access for people. The fence was installed using wildlife-friendly spacing: 18, 23, 28, and 40 inches with smooth wire to serve as an example and a demonstration site for proper fencing on habitat properties, and as an alternative fencing strategy for area cattle ranchers.

Results/Deliverables:

- The primary results of the project were providing safe access for area ungulates and easy foot access for recreationalists, while preventing illegal vehicle trespass. One of the unexpected results was explaining wildlife friendly fencing to numerous neighbours, as they were driving by while the work crew was there. This site is well-known in the area, and neighbours are pleased with the way it is being managed, portraying both AFGA and ACA in a positive light that will hopefully lead to future property donations.
- Old fence that was a wildlife hazard was removed and replaced with a new wildlife-friendly fence as described in the new ACA publication, *Alberta Landholder's Guide to Wildlife Friendly Fencing*. This fence is adjacent to a major range road, and signage explains the value of wildlife-friendly fencing and who to contact to obtain the new guide.
- The fenceline was surveyed. Volunteers were recruited and trained to remove the existing fence and post (completed June 16 and 17, 2020 with four volunteers). The contractor installed posts, spooled out the wire, and installed the metal gate (completed by July 5 – 6, 2020). The contractor and volunteers stapled wire at wildlife-friendly spacing (completed July 7, 2020 with three volunteers).
- Completed articles were submitted for publication in *Outdoor Canada* and *Alberta Outdoorsmen*.

Pronghorn Antelope Migration Corridor Enhancement

Alberta Fish & Game Association (AFGA)

Grant: \$40,278

Project Code: 030-00-90-160

Project Status: Funded since 2009/10; Completed

Project Website: www.afga.org/pronghorn-corridor-enhancement

As pronghorn are at the northern edge of their range in Alberta, migratory corridors are important in ensuring pronghorn remain at sustainable populations. Livestock fences can create impenetrable barriers to pronghorn movement if improperly constructed, impacting both pronghorn movement and predator and vehicle avoidance, as pronghorn are typically unwilling to jump fences but prefer to crawl beneath the bottom wire. Traditional barbed-wire fences used for cattle, typically have bottom wires set too low to facilitate pronghorn crawling underneath them or, in the cases where they can find a crossing, barbed wire can cause severe wounds and hair loss on their backs, which may ultimately impact winter survival rates. This project mitigates the problem of barbed-wire fencing by replacing the lower strand of barbed wire with smooth wire set at 18 inches, so it is easily passed under by pronghorn without injury or hair loss. Much of the work completed on this project is done by volunteers. The COVID-19 pandemic forced AFGA to reduce the number of volunteers per project to ten, but by working additional days, they were able to exceed their mileage goals. This project takes place in prime pronghorn migration routes as identified by radio collar studies conducted by ACA.

Results/Deliverables:

- The project was completed, and the goals were exceeded. The project expanded into new areas of the province with the 2020 projects and, by working with new landowners, awareness was raised in new regions of pronghorn range regarding the importance of pronghorn-friendly fencing. Two of the landowners are now planning to include pronghorn-friendly standards into future fencing, and requests have been received from neighbouring landowners to do future projects on their properties.
- Four fencing projects in 2020 brought approximately 42.6 km (170.6 km of actual wire) up to pronghorn and wildlife-friendly standards. In addition, several kilometres of barbed wire have been permanently removed from the landscape.

- Approximately 80 percent of volunteers this year are hunters and AFGA members. They are interacting with landowners and non-hunting volunteers. The participation of hunters is also highlighted in social media posts and magazine articles.
- Several social media posts promoting this project and the new *Alberta Landholder's Guide to Wildlife Friendly Fencing* have been posted online by AFGA, FenceFast Ltd., and T.J. Schwanky.
- An article appeared in the September 2020 *Alberta Outdoorsmen Magazine*. An article was also written and submitted to *Outdoor Canada West* for publication in October 2020.
- The project contact met with Jason Nixon, Minister of Alberta Environment and Parks, and discussed wildlife-friendly fencing; he plans to attend an event this year.

AHEIA's 27th Annual Outdoor Woman's Program

Alberta Hunter Education Instructors' Association (AHEIA)

Grant: \$15,000

Project Code: 002-00-90-219

Project Status: Funded since 2013/14, except 2018/19; Extended until Sept. 1, 2021

Project Website: www.aheia.com/outdoor-womens-program

The 27th Annual Outdoor Women's Program was to host 150 women for five days of learning, camaraderie, and fun. This opportunity for women to begin to master the outdoors was planned for August 2020. The Alford Lake Conservation Education Centre for Excellence in Caroline, Alberta, is an overnight program facility and was forced to close due to COVID-19 restrictions.

Results/Deliverables:

- This program was postponed due to the COVID-19 restrictions forcing the closure of overnight camps. This program is expected to run in 2021.

AHEIA's Army Cadet Program

Alberta Hunter Education Instructors' Association (AHEIA)

Grant: \$3,000

Project Code: 002-00-90-213

Project Status: Funded in 2016/17, 2018/19 – 2020/21; Extended until Sept. 1, 2021

This program provides the Hunter Education Certification course and Canadian Firearms Safety Course to the Army Cadet League. Course offerings were also to include all practical/hands-on activity related to these programs at AHEIA's Alford Lake Conservation Education Centre for Excellence.

Results/Deliverables:

- This program was postponed due to the COVID-19 restrictions forcing the closure of overnight camps. This program is expected to run in 2021.

AHEIA's Field to Table Seminar

Alberta Hunter Education Instructors' Association (AHEIA)

Grant: \$1,500

Project Code: 002-00-90-318

Project Status: New; Extended until Nov. 30, 2021

This was to be a new initiative for AHEIA this year. This three-hour seminar was designed for hands-on training on how to field dress and prepare waterfowl into a tasty meal. The purpose of the seminar was to enhance the waterfowl hunting experience bringing it to its natural conclusion of the meal shared together.

Results/Deliverables:

- This program was postponed due to the COVID-19 restrictions, but it is expected to run in the fall of 2021.

AHEIA's National Archery in the Schools Program

Alberta Hunter Education Instructors' Association (AHEIA)

Grant: \$40,000

Project Code: 002-00-90-239

Project Status: Funded since 2015/16 (except 2017/18) and previously by the R&R Fund; Extended until Sept. 1, 2021

Project Website: www.aheia.com/nasp

AHEIA's National Archery in the Schools Program (NASP) promotes instruction in international-style target archery as part of the in-school curriculum. It provides students the opportunity to improve educational performance and participate in archery shooting sports for Grades 4 to 12. AHEIA's NASP instructor training is being offered to teachers who are certified Conservation Education instructors so that they may include archery into their teaching format for the Career and Technology Studies (CTS) Wildlife Strand. Thereby introducing students to archery at an early age in both the public and separate school systems. In addition, all physical education department heads and teachers from those schools are invited to the training sessions, thus opening a whole new audience to archery. The introduction of these training courses is proving to be a gateway to additional recruitment opportunities in hunting and fishing certificate programs offered by AHEIA. AHEIA's NASP program has become the fastest growing element in Conservation Education in North America.

Results/Deliverables:

- This project was partially conducted but ended in the spring of 2020 due to the COVID-19 restrictions in the schools, which affected the NASP program and tournaments. This project has been pending, waiting for the reopening of the programs in the schools. The program is expected to run again in 2021.

AHEIA's Outdoor Bound Mentorship Program

Alberta Hunter Education Instructors' Association (AHEIA)

Grant: \$6,000

Project Code: 002-00-90-222

Project Status: Funded since 2014/15 and previously by the R&R Fund; Completed

The "Outdoor Bound!" program creates a series of opportunities for youth and adults to participate in a formal wilderness mentorship

program that provides a greater understanding and respect for wildlife and wild places. This mentorship program focuses on interpersonal support and growth, guidance, material exchange, sharing of wisdom and experience, coaching, and role modelling. The “magic of mentoring” has proven results in conservation education and again has continued to show great success in the development and progression of future hunters/anglers and respectful outdoor users. Despite the additional precautions necessary to meet all the COVID-19 restrictions, AHEIA was able to run a very successful mentored hunt program in 2020.

Results/Deliverables:

- The program had 174 novice hunter participants with 122 mentors in the field for 151 separate hunts during Alberta's hunting season.

AHEIA's Provincial Hunting Day Initiatives

Alberta Hunter Education Instructors' Association (AHEIA)

Grant: \$20,000

Project Code: 030-00-90-245

Project Status: Funded since 2014/15 and by the R&R Fund; Completed

The fourth Saturday of September has been designated as Provincial Hunting Day by the Government of Alberta. On this day, Albertans of all ages are invited to try their hand at outdoor sports such as hunting, fishing, trapping, shooting, and/or archery. Provincial Hunting Day was Sept. 26, 2020. AHEIA hosted events at the AHEIA Calgary Firearms Centre in Dewinton as well as numerous areas throughout the province. The facility is large and allows for a great training atmosphere with plenty of opportunities for practical hands-on experiences. The program was well-received with 100 participants enjoying numerous hunting-related activities at the AHEIA Calgary Firearms Centre.

Results/Deliverables:

- The Provincial Hunting Day events were attended by 100 participants, which was the maximum capacity allowed under the COVID-19 Alberta Public Health Orders.

AHEIA's Rifle Sight-In Seminar

Alberta Hunter Education Instructors' Association (AHEIA)

Grant: \$2,000

Project Code: 002-00-90-321

Project Status: New; Completed

The day-long seminar consisted of a range orientation followed by some classroom theory about how to check scope and its mounts. This was followed by instruction on how to bore sight the rifle using a bore sighting tool as well as matching the bore and the scope. Next, participants experienced the 25-yard shooting range to start adjusting the scope, then advanced to the 100-yard range, then finally up to the 300-yard range. The seminar was conducted at the Alford Lake Conservation Education Centre for Excellence in Caroline, Alberta, on Oct. 17, 2020. In all, 32 people registered; of those registered, 20 people attended despite the inclement weather. It was a very successful day of sighting in rifles, learning the technique, and generally preparing for the fall rifle hunting season.

Results/Deliverables:

- In all, 20 participants with three instructors spent the day learning how to sight-in rifles, ensuring that each participant had enough opportunity to learn how to sight-in their rifles, and learn the relevant culture and philosophy of an ethical rifle hunt.

AHEIA's Teachers' Workshop

Alberta Hunter Education Instructors' Association (AHEIA)

Grant: \$6,000

Project Code: 002-00-90-248

Project Status: Funded since 2016/17; Completed

The Conservation Education Courses are a requirement of the Government of Alberta to instruct the Career and Technology Studies (CTS) Wildlife public education curriculum. The Teachers' Workshop is designed to certify teachers in these required courses. The Teachers' Workshop encourages those currently involved in Alberta hunting activities to increase their depth of knowledge by offering an all-in-one weekend package to receive certification as an Alberta Conservation and Hunter Education Instructor, Alberta Fishing Education Program Instructor, International Bowhunter Education Program, and Boating Safety Instructor. Through a series of workshops, teachers also received training in the following programs: survival and camping, shooting, using a compass, fishing, and archery.

Results/Deliverables:

- The Teachers' Workshop was conducted from July 16 to 19, 2020, at the Alford Lake Conservation Education for Excellence Centre in Caroline, Alberta, with 12 current teachers achieving certification to teach the “Natural Resources (NAT) Course – Wildlife” program. They were instructed by three staff and three volunteers.

AHEIA's Youth Hunter Education Camps (Weeks 1, 2, 3, and 4)

Alberta Hunter Education Instructors' Association (AHEIA)

Grant: \$32,000

Project Code: 002-00-90-224

Project Status: Funded since 2014/15 and by the R&R Fund; Extended until Sept. 1, 2021

Project Website: www.aheia.com/outdoor-youth-program

The Youth Hunter Education Camps are designed to target and attract youth to hunting- and angling-related activities, which in turn provide introductory opportunities to become hunters, anglers, and responsible outdoors people. These are four week-long camps that take place at the Alford Lake Conservation Education Centre for Excellence in Caroline, Alberta. A full week of training is provided with meals, accommodations, and all necessary course equipment. The week immersion into the outdoor training provides a perfect opportunity to entice youth to choose outdoor recreation, especially the pursuit of hunting and angling, with their time and energy.

Results/Deliverables:

- This program was delayed due to the COVID-19 restrictions forcing the closure of overnight camps. The program is expected to run in 2021.

New Firearms Acquisition for Alford Lake

Alberta Hunter Education Instructors' Association (AHEIA)

Grant: \$3,000

Project Code: 002-00-90-319

Project Status: New; Completed

The purpose of this project was to replace aging training firearms for Alford Lake Conservation Education Centre for Excellence in Caroline, Alberta. These firearms are used for the instruction of the Conservation Education programs conducted throughout the year at the Alford Lake Centre, the many summer youth camps and seminars, and the Outdoor Women's Program. It has been many years since these firearms have been updated or replaced and is a much-needed addition to the shooting program. Firearms were purchased and put to use at the Alford Lake Conservation Education Centre for Excellence.

Results/Deliverables:

- Six new Browning BT99 shotguns and six new Anschutz .22 rifles; identifying labels and decals for shotgun safety training were purchased. These firearms will be used in the upcoming summer programs at the Alford Lake Centre by the many Conservation Education students who attend AHEIA's many camps offered.

Wild Game for the Food Bank Program

Alberta Hunters Sharing the Harvest

Grant: \$8,000

Project Code: 030-00-90-255

Project Status: Funded 2002/03, 2003/04, 2008/09, 2009/10, 2015/16, 2017/18 to 2020/21; Completed

Project Website: www.edmontonsfoodbank.com/about/programs/alberta-hunters-sharing-harvest

The Wild Game for the Food Bank program's primary objective is to provide a high-quality food source to those in need. It does this by encouraging hunters to participate by harvesting deer, moose, or elk in dozens of wildlife management units (WMUs) including several where control is needed to reduce crop and habitat damage. Hunters are specifically asked to donate game, not only taken with their general tags but to also fill supplemental tags issued in high density game areas. This program has expanded over the years to include several of those areas through consultation with Alberta Environment and Parks (AEP). The program runs through each hunting season, and the project activities include notifying hunters about the program and then administering the program with the Edmonton and Calgary Food Banks and the various meat processors. The program deliverables are threefold: 1) those in need get fed; 2) it is a very positive program for hunters to show up strong in supporting those most vulnerable in the community; and 3) it encourages hunters to harvest game to meet AEP's harvest goals. This was the 24th year of this successful program that has provided the protein portion for over a half million meals to those in need. This season over 4,000 pounds of wild game was donated to the program, which will again help those in need through the Edmonton and Calgary Food Bank distribution systems.

Results/Deliverables:

- The information phone line is up and running. Instagram account is in place.
- Advertisement was placed in the Alberta Hunting Regulations.
- The main result from the project is that the hunting community, including ACA, generously participated in supporting this project with another successful season providing a very valuable food source to help the Food Banks feed Albertans. The wild game donated by hunters is processed and packaged and then delivered to the Food Banks. An estimated 4,000 pounds of wild meat was donated this season.

Implementing Riparian Habitat Management Improvements for Westslope Cutthroat Trout

Alberta Riparian Habitat Management Society - Cows and Fish

Grant: \$11,500

Project Code: 020-00-90-167

Project Status: Funded 2011/12, 2015/16, 2017/18 to 2019/20; Completed

This project promoted stewardship and led to site-specific enhancements that improve overall riparian habitat and sport-fishery habitat, focused on areas where westslope cutthroat trout (WSCT) populations remain. In Alberta, WSCT are listed as *Threatened*, and Cows and Fish have been working to address impacts to this important sport species, which are identified in the recovery plan. Specifically, this work will reduce the following threats to WSCT: sedimentation, habitat loss and degradation resulting from off-highway vehicles (OHVs), linear disturbance, and poorly managed riparian grazing. Cows and Fish worked with partners, such as Oldman Watershed Council, Trout Unlimited Canada, Crowsnest Pass Quad Squad, Alberta Environment and Parks (AEP), to help prioritize and select sites, participate in workshops and meetings, and work collaboratively to improve riparian habitat. The priority areas for WSCT habitat improvement were Beaver, Dutch, South Racehorse, and O'Hagen creeks. Detailed plans were developed or completed for Beaver Creek (six sites) and O'Hagen Creek (one site). Cows and Fish implemented, or helped partners implement, changes at Beaver and O'Hagen creeks, including live willow staking, soil de-compacting, and native grass seeding. Lastly, knowledgeable stakeholders were engendered as part of the first online session of the Native Trout Workshop, which 158 people attended.

Results/Deliverables:

- Planning work was carried out based on recommendations and approvals for possible restoration sites, which included collecting riparian health monitoring information at O'Hagen and South Racehorse creeks and planning the restoration work at O'Hagen Creek.
- Summaries of the enhancements and improvements have been created and the short tallies are below:
 - Beaver Creek (six sites): Restoration was completed on 840 m² plus additional 30 m² with restricted access. This includes a considerably large area that has been rough and loosened; 281 plugs were installed; over 176 live willow were staked; 28 live willow fascines were set; much of the restoration area was seeded to native grasses; 13 straw wattles were installed throughout the sites; and one sign was installed to redirect users away from prior stream ford.

- O'Hagen Creek: The team returned to the site that had rough-and-loose work done in fall 2018; native grass and alder seeding were planted, along with building two live silt fences (approximately 4 m length in total) made of willows and live willow staking (75 live stakes, covering a minimum of 10 m²). Grass seeding covered at least 521 m². Alder seed was planted densely in a narrow band of band (3 m²) as well as scattered in many other areas. Additional maintenance was carried out at the site as well, such as removing silt fencing and hand-pulling weeds.
- Stakeholder workshop: The online Native Trout Workshop was held on March 10, 2021, which included 158 attendees (plus seven Cows and Fish staff from across the province). 237 people registered, and numerous have requested access to the recording because they could not attend in person. The native fish identification polls done during the session led to numerous comments in the chat about the usefulness. It appeared that many of the audience did get the quiz questions correct and were improving their knowledge (based on the percentage of respondents getting the answers correct).
- As the workshop moved to an online format, the March 10th meeting was just the first of a series of four sessions, with the remainder of the sessions occurring after March 2021. Cows and Fish know their cumulative reach will be much larger than prior years, given the numbers from the first session was already quite large, and there are 288 registrants for the series.

Trapper Education in Schools

Alberta Trappers Association (ATA)

Grant: \$25,100

Project Code: 002-00-90-288

Project Status: Funded since 2018/19; Extended until March 15, 2022

Project Website: www.albertatrappers.com

Over the last several years ATA's education programs have changed and become more evolved. Different methods of delivering the education, including live presentations by volunteers, as well as DVDs. ATA has found that the live presentations are not only the most effective, but there is also highest demand for in-person presentations from the schools and other groups. The original proposal was to expand ATA's education programs in the Alberta schools to enhance the Grades 4 and 5 curriculum that includes the fur trade. Students have responded very well to "A classroom visit from a Trapper". ATA will continue to update and maintain the number of fur kits available for school use. In addition to this, ATA will be working to train more of instructors and staff to do live presentations to Alberta's students. The long-term goal is to be able to reach as many schools in Alberta as possible and to also have educational tools available at the ATA office for students to visit.

Results/Deliverables:

- Since September 2020, ATA has done mostly virtual presentations due to COVID-19 restrictions. The goal was to be able to get into the schools to let the students get to know a real trapper and be able to touch and see the many examples of pelts, etc. Since most schools in Alberta have been under very strict COVID-19 restrictions, instructors have not been able to attend in person. The interest has been phenomenal and close to 1,000 students have attended virtual presentations. The goal is to return to doing face-to-face presentations and anticipate this will be possible by September 2021.

Youth Camp and Mentoring Program

Alberta Trappers Association (ATA)

Grant: \$30,730

Project Code: 002-00-90-252

Project Status: Funded since 2018/19; Extended until March 15, 2022

Project Website: www.albertatrappers.com/youth-camps

ATA has offered the Trapper Education Youth Camp for the last three years. Their goal was to have 90 students successfully complete camps, covering a variety of topics with three levels of skills. The objective is to teach youth about the trapping industry while they learn to respect and enjoy spending time in the bush. After rescheduling the youth mentoring program three times due to the COVID-19 pandemic, the window of opportunity for trapping season was missed. By the end of April 2020, all three camps were filled, so cancelling involved many phone calls.

Results/Deliverables:

- Unfortunately, ATA had to cancel all youth camps this summer due to the COVID-19 pandemic, but they are gearing up and looking forward to offering the camps in the summer of 2021.

ANSN Hunting and Fishing Knowledge Transfer Youth Project

Alexis Nakota Sioux Nation (ANSN)

Grant: \$30,000

Project Code: 002-00-90-320

Project Status: New; Completed

The project objective was to provide traditional knowledge and responsibilities to ANSN (or the Nation) young men in acquiring their firearms certificate, but also the expectations for young men of the Nation to provide food to their relatives. They would also learn about respecting the environment, where animals roam on, and keeping that environment healthy. A local campout was held by the community of Alexis, which gave the elders a chance to engage with the students and gain more knowledge on the purpose of hunting and the ANSN people's knowledge on trapping and hunting. The young women played a part in looking after the game and drying the game and discussions were held on the usage on all parts the animal. Food sovereignty was a big discussion, and families gained more knowledge on what to do to gather and preserve their foods. Most of the students were under the age of 18, and local elders played a part in ensuring that their information on safety at home when having a firearm was presented to the students. This also included the gun safety training by Outdoor Safety Organization Inc. A language book was created by one of the elders of the project to give to each student naming all the animals of other language words dealing with the environment and what ANSN people called these areas, especially where these animals migrated during different seasons.

Results/Deliverables:

- The COVID-19 pandemic affected the ANSN community and events were scheduled around the changes that the province had implemented because of safety. Masks and other health products were purchased to support the group in the program delivery. The delay was rescheduling the course that was provided by Outdoor

Safety Organization Inc., but the Nation was able to reschedule classes to meet the program outline. Along with the Nation's support, the group was able to provide more room for the firearms test. The only change was the timing and dates of the project delivery, and the filming of the hunters and their knowledge was briefly delayed.

- In all, 15 students acquired their Firearms Certificate and the transfer of Indigenous knowledge from the local hunters. There are about 700 people in the 12 – 30 age group in ANSN, and the ANSN plan to do more courses each year, as this is something that would benefit the Nation as well as the province.

Fencing to Improve Wildlife Movement and Harvest on and Near the ASSCA

Ann & Sandy Cross Conservation Area (ASSCA)

Grant: \$36,676

Project Code: 015-00-90-268

Project Status: Funded 2011/12, 2013/14 to 2015/16, and 2018/19; Completed

Over the past several years, the ASSCA has taken an active role in updating fencing on the property to protect sensitive areas and improve the ability for wildlife to move safely through the area. ASSCA have removed old fencing and installed wildlife-friendly fencing wherever new fencing is required. An important purpose for fencing at the conservation area's boundary lines is to deter human and vehicle access while allowing wildlife to move freely in and out of the area. Signs are put up along the fenceline to inform people that the ASSCA is a protected area, a Habitat Conservation Area under the *Alberta Wildlife Act*. Motion-sensing cameras have been installed to monitor human activity and dissuade those attempting to enter the ASSCA without permission. On an ongoing basis wildlife-friendly fencing has been installed wherever fencing is required, and damage is repaired as needed. Wildlife-friendly fencing not only greatly decreases the likelihood of wildlife injuries or fatalities caused by fences, but it also allows wildlife to move on and off the conservation area more freely. Approximately 3.6 km of fencing along public roads in section four of the ASSCA was replaced with four-strand wildlife-friendly fencing.

Results/Deliverables:

- 3.6 km of old fence and posts were removed and hauled away.
- 3.6 km of four-strand wildlife-friendly fencing has been completed.

Becoming an Outdoors Woman Camp

Becoming an Outdoors Woman (BOW)/Alberta Fish & Game Association (AFGA)

Grant: \$1,700

Project Code: 002-00-90-322

Project Status: New; Extended until March 15, 2022

The BOW program is an all-inclusive camp that gives 20 women per camp the opportunity to experience activities such as trap shooting, target shooting, outdoor cooking, basic survival, fishing skills, and much more. Each year, BOW runs two camps.

Results/Deliverables:

- The camps were cancelled in 2020 due to COVID-19 restrictions. It is anticipated the BOW camps can be held later in 2021 or 2022, depending on Alberta's COVID-19 Public Health Orders.

Bow River Policeman's Flats River Access Update

Bow River Trout Foundation (BRTF)

Grant: \$21,500

Project Code: 020-00-90-263

Project Status: Funded since 2018/19; Completed

Project Website: www.bowrivertrout.org

The BRTF has carried out upgrades to the Bow River Policeman's Flats river access area in 2018 and 2019. Following these projects, further deficiencies remained, most notably with respect to road access to the site. Accordingly, further site improvements were completed in 2020, most notably regrading and excavating the access road to the Policeman's Flats parking lot, boat launch, and staging area. Following regrading, excavation, and slope stabilization, concrete mats were installed and tied into the re-formed road base and upstream-facing edge of the road, providing additional protection against potential high-water events. Finally, the mats and road surface were topped with a gravel surface and levelled for ease of access. The BRTF has also committed to maintain the site, with contracted waste disposal services and port-a-potty services, throughout 2020. In conjunction with this work, BRTF volunteers carried out various ongoing site maintenance, including watering and maintaining willows previously planted for erosion control, site clean-up, and maintenance. With the support of this grant, the main earthworks components of the project were completed within budget by spring 2020, with ongoing maintenance stewarded throughout the year by the BRTF. The objective to enhance river access for the fishing community was met, and the improvements and ongoing maintenance continue to benefit the public's use and enjoyment of this site.

Results/Deliverables:

- The Policeman's Flats road upgrades, including regrading, installation of concrete interlocking structural mats, and road resurfacing were completed from June 10 to 12, 2020. This provided much-needed improvements in access conditions throughout 2020, which should endure into the future as this site is frequented by recreational users and is a critical river access point for the river user community. It was a very well-received project delivered by the fishing community and local residents.

Meadow Creek Trail Rehabilitation Project

Calgary ATV Riders Association (CARA)

Grant: \$16,500

Project Code: 015-00-90-290

Project Status: New; Completed

Project Website: www.calgaryatvriders.com/2020-stewardship-days.html

The Lesueur Creek Trail is part of the designated trail system within the Ghost Public Land Use Zone (PLUZ), northwest of Cochrane, Alberta. The current legal trail from Waypoint 85 to 91 is situated in an open meadow in a valley that has four identified problem areas where trail segments are delivering sediment to Meadow Creek or tributaries of Meadow Creek. These sites have been identified using the Road Erosion and Delivery Index (READI) developed by Alberta Agriculture and Forestry, and field-verified by Alberta Environment and Parks (AEP) staff and CARA members. CARA has identified this portion of the trail as

having an impact on westslope cutthroat trout and bull trout habitat. The overall objective of the Meadow Creek Trail Rehabilitation Project was to implement habitat rehabilitation and protection activities along Meadow Creek in the Waiparous Creek watershed, as part of a trail realignment project to protect WSCT and bull trout habitat while improving access conditions on the Lesueur Creek Trail for hunters, anglers, and outdoor recreationalists. CARA completed a reroute of this portion of the trail to higher ground and approximately 726 m of new trail was created to join the ridge near Waypoint 85, this section had no READI identified high priority problem zones and had a strong rock base. By rerouting this trail and diverting off-highway vehicle (OHV) traffic to the higher ground, this resulted in habitat improvement in the meadow by preventing the delivery of sediment to the creek. The project objective was achieved by implementing access control and “rough-and-loose” soil compaction techniques at key sites along the Lesueur Creek Trail where vehicle traffic is being diverted onto the new improved trail segment.

Results/Deliverables:

- Approximately 4 km of rerouted sustainable trail was developed, in conjunction with closure of the existing valley bottom trail segment.
- Access control and rehabilitation activities (rough-and-loose, planting, and woody debris) were completed at sites along Meadow Creek and tributaries.
- A rehabilitation workday was held to host six volunteers at in-class lecture and an additional 12 volunteers for the on-site workday.
- Approximately 500 live willow stakes were planted at reclamation sites.
- A total of 375 hours of work was carried out by 22 volunteers.
- Publication was on CARA's main website and obtained over 25,000 hits.
- CARA spent seven hours working alongside AEP, who had four staff members out.
- CARA spent seven hours working alongside Trout Unlimited Canada and the Ghost Watershed Alliance Society.

Beginner Fly Tying and Tying in the Community

Calgary Hook and Hackle Club

Grant: \$3,000

Project Code: 002-00-90-314

Project Status: New; Completed

Project Website: hookandhackleclub.org/

The Calgary Hook and Hackle Club's goal was to acquire new fly-tying equipment for use at their Beginner Fly Tying Program offered at meetings and during their “Tying in the Community” projects. Nine new fly-tying vices and sets of tools were acquired on Sept. 16, 2020. Related tying equipment including a camcorder and a small monitor were also purchased. The new tying equipment was immediately put to use at Club meetings in September and October of 2020. However, due to COVID-19 restrictions, all community tying programs were suspended until Alberta Public Health Orders allow for in-person gatherings. Club meetings were shifted from live events to virtual Zoom meetings at that time, and the Club has continued with that program. The camcorder and tabletop monitor allowed club members to demonstrate at live sessions while keeping in-line with new social distancing protocols. These tying and teaching programs will continue to run throughout 2021 and

beyond using the new equipment. The Club expects to be able to return to tying and teaching at live meetings and with the public in the future, and the new devices and tying tools will be of benefit for years to come.

Results/Deliverables:

- The COVID-19 pandemic had a direct effect on meeting in-person, which was the primary way the Club taught fly tying in the past. Virtual meetings on Zoom have become a very successful substitute and allowed the Club to continue with teaching and demonstrating fly tying. Both beginner and intermediate fly-tying sessions were held at the online Zoom meetings.
- The online format has proven to be quite popular, with log-on attendance averaging at about 48 individuals (and sometimes family groups) on each of the twice-a-month sessions and growing. Despite COVID-19 restrictions and being unable to meet in person, the Club's membership has grown.
- The Club looks forward to starting up again with their “Tying in the Community” projects, with in-person groups at schools, the Bow Habitat Station, the Sportsman show, and other events, as soon as Alberta Provincial Health Orders allow for it.

Habitat Improvement, Protection, and Inventory Project

Camrose & District Fish & Game Association (CDFGA)

Grant: \$10,822.50

Project Code: 015-00-90-287

Project Status: A related project funded in 2018/19; Completed

This project took place on a 112-acre parcel of property known as the Camrose Habitat Property. This is the location of the 5-acre “Pleasure Island” fish pond, which is known for its great trout fishing. It is a Wildlife Trust Fund Property of the Alberta Fish & Game Association (AFGA), in partnership with the CDFGA. The property surrounding the pond consists of five marshes and wetlands along with native parkland, hayland, and native forested lands. This project's goal was to improve wildlife habitat, water quality, and riparian health at the site, which in turn benefits the numerous outdoor conservation education programs, recreational fishing opportunities, and other outdoor activities that are offered at the site. Habitat and infrastructure enhancement activities were carried out at the Camrose Habitat Property. Enhancement activities included perimeter fencing, a riparian health inventory, and an Agroforestry & Woodlot Extension Society study along with the planting of native vegetation.

Results/Deliverables:

- Approximately 2 km of perimeter fencing was completed by Straightline Fencing during the week of Sept. 13 – 19, 2020.
- A riparian health inventory was completed by Cows and Fish. The report suggests which native vegetation planting component should be used on the project, as well as the ongoing management of non-native and invasive species on site.
- Over 260 native trees were planted in various riparian and upland locations throughout the site. COVID-19 delayed some of the tree planting into spring 2021. In all, 24 more trees were planted in May 2021. More planting is planned for fall or early 2022 with funding from the Battle River Watershed Alliance.
- Agroforestry & Woodlot Extension Society attended the site, completed a study in June 2021, and submitted a report to CDFGA with information on suitable trees and shrubs for the site.

Evaluation of Parr Reservoir (Castor Creek) for Fish Stocking Suitability

Castor Fish & Game Club

Grant: \$11,000

Project Code: 020-00-90-269

Project Status: Funded in 2018/19 and 2019/20; Completed

The Castor Fish & Game Club has been conducting a fish suitability study at the Parr Reservoir (locally known as Castor Creek) since 2018. The goal of the project was to evaluate the fish habitat suitability to determine if a multi-season fishery could be established. This was determined through monitoring of dissolved oxygen, water temperature, chemical and biological water properties, as well as shoreline and aquatic habitat features. The study found that dissolved oxygen values were generally below the survival limit for sport fish survival in the winter. All other parameters assessed in the study did show good habitat potential including safe water chemical make-up, suitable shoreline and open aquatic habitat, and available food sources. Data collected was summarized into a report and included recommendations for improving dissolved oxygen. The difficulty in sourcing yellow perch, the preferred fish stocking species was also addressed in the report. Data was shared with the public by submitting the data collected to Fisheries and Wildlife Management Information System (FWMIS) and sharing the report with all interested parties. Going forward, the Castor Fish & Game Club will use the recommendations and data provided in the report, and consult with stakeholders and regulators to determine the next steps in bringing year-round fishing to the Parr Reservoir.

Results/Deliverables:

- The main results of the study indicated that habitat of the Parr Reservoir including food availability, shoreline type, and aquatic habitat is suitable for sport fish such as yellow perch. Depth could be improved, particularly in some of the shallower southern areas, but deep pockets are present to the north. Water parameters (which included chemical parameters, temperature, and dissolved oxygen) were found to be acceptable, except for dissolved oxygen levels, which were generally at lethal levels in the winter. Summer dissolved oxygen was acceptable, but several areas of the reservoir showed poor dissolved oxygen in winter. The results are slightly disappointing as it was hoped the Parr Reservoir could support multi-year fishing. However, recommendations for improving dissolved oxygen were also provided in the report and will be discussed and hopefully pursued in the future.
- Report with final recommendations based on all three years of study: completed and available.
- Data collected uploaded to FWMIS: completed by Basin Environmental & Engineering.

Jim Nelson Memorial Trout Pond Dock Replacement

Devon Fish & Game Club

Grant: \$20,000 (*grant not accepted, funds not dispersed*)

Project Code: 020-00-90-286

Project Status: New; Grant not accepted

Many years ago, the Devon Fish & Game Club secured funding, volunteers, and a lease to turn an old borrow pit into a stocked trout

pond for the public to use. The pond is formally called the Jim Nelson Memorial Trout Pond. Since then, the club has maintained the pond, including the dock, picnic tables, and aerators. Also trash removal and stocking the pond with trout was organized by the club. The pond required a new wheelchair accessible dock and CCEG funding was allocated. However, the club received another grant for the dock and the ACA funding was no longer required.

Results/Deliverables:

- There were no results or deliverables, as the ACA funding was no longer required.

Watershed Education, Literacy, and Restoration Project

Ghost Watershed Alliance Society (GWAS)

Grant: \$20,400

Project Code: 015-00-90-289

Project Status: Funded a bioengineering workshop in 2018/19; Completed

Project Website: www.ghostwatershed.ca

The goal of the project was to increase watershed literacy and awareness, as well as to restore eroded streambanks impacted by motorized recreational use in the Ghost Watershed. The objectives of the project were to achieve these goals by engaging people of all ages in hands-on learning experiences, improving fish habitat and water quality. This included restoring one site in the Ghost Watershed as part of a bioengineering workshop, field trips, and the creation of engaging online educational content. The two-day bioengineering workshop with Dave Polster was attended by 26 people including motorized recreational users, First Nations, consultants, municipal staff, non-governmental organization staff, and recreational users. As part of this workshop and in partnership with Trout Unlimited Canada (TUC), the Calgary ATV Riders Association (CARA) and Alberta Environment and Parks (AEP), about 2,000 m² of riparian habitat in the Ghost Watershed was restored, planting over 1,500 willow stakes along a stream designated as critical habitat for westslope cutthroat trout (WSCT).

The GWAS adapted to the COVID-19 pandemic by creating a virtual field tour video of the Ghost Watershed, presenting a slideshow on the topic of WSCT and freshwater ecosystems for schools, and conducting field tours of the watershed with small groups of families with their children (instead of school field trips, which had to be cancelled). Tremendous, positive feedback was received from participants of both the bioengineering workshop and the educational program.

Results/Deliverables:

- Despite the COVID-19 pandemic, this project has been very successful. It opened new doors for GWAS and its partners, increased awareness and volunteer capacity, and restored important fish habitat at the same time.
- Restoration site was selected in collaboration with AEP, TUC, and Cows and Fish. The work plan was approved by AEP (May 2020).
- Site visits to 2019 and 2017 restoration sites to evaluate survival of willow stems planted were completed (2017 site in excellent shape; 2019 site was in good shape, but unfortunately showed some damage caused by target shooting).

- GWAS members took a full day training course through AEP to learn how to use two apps provided by AEP and fRI Research to assess and document high sedimentation sites within the Ghost Public Land Use Zone (PLUZ) (Summer 2020).
- Workshop was promoted through partners (TUC, Bow River Basic Council (BRBC), CARA, and Trails 4 Tomorrow), newsletters (120 subscribers), and GWAS website and Eventbrite (August/September 2020).
- Willow harvesting permit was applied for and received (August/September 2020).
- Two-day bioengineering workshop was held with Dave Polster with 26 participants (September 2020).
- In all, 500 willow stems were harvested and planted during the bioengineering workshop field day. All stems were cut into two or three stems, resulting in 1,500 stems planted on site. Restored about 2,000 m² of land (September 2020).
- Web page about the project was launched (Fall 2020).
- Additional high sedimentation sites were identified within the Ghost PLUZ trail system for future restoration. Working with partners to plan future restoration events (Fall/Winter 2020/21).
- Online educational content (two videos and two slideshow presentations) was created for the School Outdoor Conservation Program (reach approximately 500 students).
- Three Community Water Walks along the Ghost River in October and November 2020 with 41 people attending. These were family-oriented hands-on learning experiences adapted to COVID-19 restrictions.
- Virtually participated in Calgary Mayor's Environment Expo and Creekfest Reimagined 2020 (June 2020).
- Education-related outreach materials were created with a focus on hands-on learning.
- A slideshow presentation, including information on WSCT, is now available to teachers by request to GWAS. This presentation and the one on freshwater ecosystems are posted on the websites of the Alberta Council for Environmental Education and Alberta Tomorrow.
- Reports were written, including an analysis/evaluation of the education and outreach program considering achievements, suggestions for improvement, and lessons learned.
- The Source Water Stories video demonstrated both the EnviroScape and tank watershed models. The number of views of this video approximated ten classes.
- GWAS Education Coordinator worked with three student groups from St Mary's University assisting with their science projects focused on the Ghost Watershed. A virtual presentation of the student projects was hosted by GWAS on March 30, 2021.
- Presented at Calgary City Teachers' Convention (February 2021).
- Educational video on GWAS Water Monitoring Program. This 20-minute video shows the field monitoring activities undertaken by GWAS highlighting the connections between fish, aquatic invertebrates, water quality, and overall watershed health. The video raises awareness and explains the importance of water quality monitoring in the watershed.

- Presented the project at GWAS AGM (virtual) in November 2020 and BRBC Stewardship Forum (virtual) in January 2021. These presentations reached about 100 people. The presentation slides shown at the AGM are available on the GWAS website for download.

Sherburne Reservoir Boat Launch Rehabilitation

Grassy Lake Recreation Association

Grant: \$24,000

Project Code: 002-00-90-323

Project Status: New; Completed

Project Website: grassylakerec.ca/whats-happening/f/sherburne-reservoir-got-a-new-floating-dock-and-boat-launch

Sherburne Reservoir is a popular fishing destination for many anglers in southern Alberta. Anglers from afar come to enjoy pike, perch, walleye, and burbot fishing. Unfortunately, the current boat launch had several functional and safety issues. Several concrete pads were broken with rebar exposed, or completely missing, leaving hazards underwater that are not visible, and a large gap where pads are missing. These missing pads created a situation where anglers attempting to launch a boat faced the risk of flat tires on vehicles and risk of puncturing boats. Anglers turned to using an area adjacent to the current concrete launch to load and unload boats, risking erosion and shore degradation. Combined with no dock, boats were forced to beach to allow operators and passengers to load and embark. The repair of the launch and addition of a floating dock allows users of Sherburne Reservoir to launch and load boats safely, securely, and protect the shoreline of the reservoir. The project was delayed due to COVID-19 Alberta Public Health Orders, with volunteers unable to meet and organize the assembly and installation of components for the rehabilitation. Dock components arrived in early October 2020. After several delays, arrangements were made with St. Mary River Irrigation District (SMRID) to ensure the level of water would be as low as possible in spring of 2021, and ramp pads were delivered mid-April. SMRID was able to lower the lake level to as low as possible without negatively affecting irrigation operations. The MD of Taber organized a crew and installed the ramp pads and users organized assembly and installation of the dock components. The project is complete with all objectives met.

Results/Deliverables:

- Anglers will have better access to this fishery, with reduced risk to damaging their property or the surrounding environment while launching a boat. With safe launching and embarking, older, less mobile, and young anglers are better able to enjoy fishing in this productive fishery. This project is of particular importance to not only local users, be it anglers or recreational boaters, but to boaters from across southern Alberta, and the surrounding area.
- SMRID facilitated lowering the level of the Sherburne Reservoir to make installation of ramp pads easier on April 20, 2021.
- Impacted ramp pads were removed and new ramp pads were installed to bridge gap of ramp pads missing or replaced. It took eight hours to complete the project on April 23, 2021.
- The floating dock was installed: one telehandler to facilitate movement of dock and anchors, and ten volunteers to assemble and install dock on April 24, 2021.
- A large sign was installed at the launch with ACA logo, and other contributing parties.

H A Kostash Youth Mentorship Program

H.A. Kostash School

Grant: \$8,200

Project Code: 020-00-90-209

Project Status: Funded in 2014/15, 2016/17 to 2019/20 and previously by the R&R Fund; Completed

The plan for the project was to introduce students to various outdoor programs, in hopes of them gaining an appreciation for fishing, camping, hunting, and archery. Unfortunately, due to the COVID-19 pandemic the school was closed in the spring, and online learning was introduced. When students returned in September, all field trips were suspended until further notice and many guidelines were introduced regarding cleaning and sharing of equipment. Although this year has been challenging, with restrictions slowly being removed, time was spent on planning and buying supplies in hopes that trips could eventually proceed. As part of the school's fishing program, students were introduced to fly tying and making jig hooks, as this can be done in the classroom environment. Virtual presentations have become the norm, students have been able to interact with guest speakers and watch online outdoor videos during class. Archery is being taught in Phys. Ed. class to the junior and senior high school students, and students were provided with the opportunity to obtain their boating licences and hunter education course in wildlife class. Teachers and staff have become creative in the way outdoor pursuits are taught, but the best experience is gained when you can actually be outdoors and trying out these activities. They are hopeful that someday soon they will be able to take the students out on the North Saskatchewan River and try some river fishing.

Results/Deliverables:

- The COVID-19 pandemic has forced the teachers and staff to explore different ways of teaching and engaging students, as students were forced into sitting in front of computer screens for great lengths. Opportunities were taken to explore a more hands-on way of teaching outdoor programs in a classroom environment.
- Jig head molds and fly-tying supplies were purchased, and students were taught how to make various types of fishing hooks.
- Students were also taught the proper maintenance of fishing and camping gear and held discussions about how to properly use the equipment.
- Some students had the opportunity to take the boating course and obtain their boating licence. They also learned how to score big game, tie knots, and learn fur identification.
- Planned and purchased the supplies needed for field trips.
- When restrictions were lighter, a handful of students had the opportunity to participate in some shooting activities and were able to go on a migratory bird hunt.
- Potential hunter mentorship students were certified with the intention of them joining the next mentorship hunt.
- Some aquariums were purchased to bring a pond environment into the classroom.

- In all, 70 students completed the Alberta Hunter Education Instructors' Association (AHEIA) online Fishing Education Program.
- Students watched online outdoor cooking and smoking demos.
- Virtual guest speakers presented to the students on outdoor pursuits (i.e., Brad Fenson and Jim Shockey).
- During this time, the school also focused on producing new leaders by bringing other teachers into presentations, so they can gain a better knowledge and understanding of the outdoors and incorporate it into their classrooms.

Community Engagement in River Valley Conservation

Helen Schuler Nature Centre (HSNC)

Grant: \$2,100

Project Code: 015-00-90-254

Project Status: Funded since 2017/18; Extended until Sept. 1, 2021

Project Website: www.naturecentre.ca

The Lethbridge river valley is home to hundreds of species of birds, animals, and flowering plants. Each year, garbage and debris get caught in the coulees turning these unique, naturally formed features into unsightly spots that have the potential to injure wildlife species that call them home. Shoreline litter affects water quality for everyone living downstream. Invasive species also pose a threat to the river valley's biodiversity with the potential to negatively impact local native plant communities. HSNC's conservation projects demonstrate positive action in protecting our natural landscape through education and focusing volunteer efforts on improving the local ecosystem: by removing garbage from the river valley coulees (Coulee Clean-Up), by tracking types of garbage found along shorelines (Shoreline Clean-Up), and through early detection and rapid response in the removal of invasive species (Weed Pulls). Through the coordination and training of volunteers, HSNC teaches the local community the values of habitat protection and environmental stewardship by enhancing their awareness of nature and by giving them the educational tools to recognize and incorporate these values into their day-to-day lives. River valley conservation projects were suspended and postponed in 2020 due to the COVID-19 pandemic. In March 2020, the coordinator of the river valley conservation projects was seconded from their position to assist with the Emergency Social Services community response. This resulted in a significant loss of planning and organizational capacity for this project during a critical time. Furthermore, given the relative unknowns of the coronavirus at the time, and the fact that this project relies on volunteers picking up/removing objects that are inherently personal in nature (discarded coffee cups, cigarette butts, etc.), it was determined they could not safely host this project or encourage such activities.

Results/Deliverables:

- HSNC launched a modified program in April 2021 with an emphasis on solo, household, and small team cleanups that comply with COVID-19 Alberta Public Health Orders. Some Coulee Cleanups were planned between Apr. 22 and May 31, 2021.

Waterfowl Nesting Habitat Enhancement

Innisfail Fish & Game Association (IFGA)

Grant: \$1,500

Project Code: 030-00-90-282

Project Status: Funded in 2017/18; Completed

The goal of this project is to enhance the nesting cycle for waterfowl in the Innisfail area. This project is a continuation of the 2017 waterfowl nesting tunnel project where tunnels were built, installed, and maintained by IFGA. IFGA intends to build, install, and make available to the public 25 more nesting tunnels for installation on private lands. With the success rates of using the current nesting tunnels (100 percent), the IFGA increased the number of tunnels in some bodies of water and introduced the nesting tunnels into new areas. All the materials were purchased, and construction of the tunnels was completed on Feb. 27, 2021.

Results/Deliverables:

- The project has been completed as planned: 28 duck nesting tunnels and 22 cradles were constructed on Feb. 27, 2021.
- Twelve volunteers helped with the construction and built.
- IFGA plan to put three more tunnels at the Raven Ridge property. Six tunnels were donated to Stettler Ducks Unlimited, and several landowners are interested in placing nests. Information will be posted on social media to donate the other nesting tunnels.

Wildlife Education in Alberta Schools

Inside Education Society of Alberta

Grant: \$20,000

Project Code: 002-00-90-211

Project Status: Funded in 2016/17 and 2017/18; Completed

Project Website: www.insideeducation.ca

Inside Education's 2020 wildlife education project, largely supported by ACA, was significantly impacted by the COVID-19 pandemic. The closure of in-person student learning in spring 2020, and the continued inability to provide student field experiences placed substantial program challenges on the regular delivery model. At the same time, Inside Education are extremely proud of their program pivot, a series of changes that produced extremely valuable and successful wildlife education for teachers and students across Alberta. The program pivot to online learning (student and teacher programming), multi-community (one day) teacher professional development and learning resource kit development cast their "net" wider than predicted and ultimately impacted more students than initially expected while still maintaining the key wildlife themes intended in the original plan. Wildlife learning resources, including the new "Alberta's Native Trout" poster, were developed and delivered as planned. Ultimately the program changes, growth, and diversification fully met the goals and outcomes anticipated in the original program proposal. More than 25,000 students across Alberta will ultimately be the beneficiary of the learning resources and teacher professional development programming enabled by this grant. Inside Education extends their thanks for the support and for the ability to pivot so successfully through an extremely challenging 2020/21.

Results/Deliverables:

- A new approach was developed to teacher professional development (PD) using Zoom webinars to engage teachers with wildlife experts. While certainly not as engaging as the live PD workshops, since everyone was in the same pandemic-situation the webinars were popular and very well received. It enabled Inside Education to reach a broad spectrum of teachers from areas not ordinarily reached, including teachers from Alberta's Indigenous communities. In-person teacher PD programming changed from one three-day program, to six one-day programs in Edmonton (two), Kananaskis, Rocky Mountain House, Whitecourt, Fort McMurray, an online workshop for Grande Prairie teachers, and a webinar for B.Ed. students across Alberta.
- Teachers from 84 schools across Alberta participated in these workshops, and all received a Forest and Wildlife Field Trip Kit, enabling teachers to lead local field trips of their own. It is expected that each school will deliver programs to on average 100 students per school, meaning 8,400 students will benefit annually. These kits, given that they were not on the original program plan, certainly were unexpected and extremely popular: "It's a fantastic kit! Really well laid out and easy to use." ~ Christina Reid, Connections for Learning, Stony Plain. Inside Education also did not anticipate a second print run of the "Woodland Caribou" poster. Its popularity, combined with assessment that it would be a great addition to the Forest and Wildlife Field Kit, meant that an additional run was valuable. These posters, combined with the development and delivery of the "Alberta's Native Trout" poster, have been a hugely popular addition to the wildlife education poster project.
- Online wildlife education presentations to 887 students in the spring 2020.
- Online wildlife education presentations to 374 students in the fall 2020.
- "Webinar Wednesday" wildlife webinars to 66 teachers.
- One-day PD workshops to 84 teachers (October 2020).
- The B.Ed. Wildlife Webinar to 42 teachers.
- The Grande Prairie Webinar to 17 teachers
- Each teacher impacts lives and learning of approximately 75 students/year = 15,675 students impacted.
- Field trip kits (79) were distributed at the October PD sessions, six distributed to Indigenous schools, and 15 reserved for future distribution.
- Alberta's Native Trout posters: 1,000 were printed.
- Woodland Caribou posters: 1,000 were printed.

Place-based Learning and Archery

Isabelle Sellon School

Grant: \$2,500

Project Code: 002-00-90-325

Project Status: New; Extended until Feb. 28, 2022

Isabelle Sellon School is a middle school of Grades 4 to 6 in Blairmore, Alberta. The project planned to purchase youth archery equipment to start an archery club. This is supported with a teacher-leader, and an additional grant from the Alberta Health Services Wellness Funds grant.

In addition, the school planned several field trips to learn from experts and be in settings where Grades 4 to 6 will expand knowledge/interest of wetlands, grasslands, trees and forests, fish habitat and fishing, riparian health, ice fishing, river ecosystems, etc. The school has been in contact with Alberta Hunter Education Instructors' Association (AHEIA), and the teacher-leader has become recertified by National Archery in the Schools Program (NASP). An order has been placed for youth archery equipment from a NASP-approved dealer. Planning has started for students to participate in the new archery club. Priority will be given to students in Grade 6, then 5. According to Alberta Public Health Orders, the school cannot have community volunteers in person in the school building. Due to Livingstone Range School Division insurance requirements outlined this academic year, archery instruction indoors has to take place indoors. Thus, only staff volunteers can be utilized at this time.

Results/Deliverables:

- While classes have been participating in some place-based learning, due to COVID-19 restrictions regarding school transportation and reduced staffing due to quarantining the place-based learning events have been postponed. The school anticipates being able to organize more school field trips before February 2022.

Trailblazer Advanced Camp

Junior Forest Wardens – Yellowhead Regional Council

Grant: \$2,900

Project Code: 002-00-90-303

Project Status: Funded in 2019/20; Extended until Nov. 30, 2021

The Yellowhead Regional Council of the Junior Forest Wardens had planned to host a three-day weekend camp, inclusive of skills training, accommodations, and food for up to 45 youth and their parents. The camp was to teach the fundamentals of outdoor education, including how to responsibly camp and survive in the wilderness without disturbing natural environmental areas, teaching shelter building without using live wood, teaching proper food storage to keep wildlife away, identifying signs of animals and how to protect yourself and them from an encounter, and safe fire practices with a strong emphasis on preventing forest fires. There is a water safety and education component. As well, a general education around respect for our wildlife and natural areas is taught throughout the event.

Results/Deliverables:

- The camp was cancelled due to COVID-19 Alberta Public Health restrictions. They plan to organize the camp for October 2021.

Kimiwan Birdwalk Outdoor Classroom

Kimiwan Lake and Wildlife Preservation Society

Grant: \$15,000

Project Code: 002-00-90-316

Project Status: New; Extended until May 31, 2021

Project Website: www.kimiwanbirdwalk.ca/

The Kimiwan Lake and Wildlife Preservation Society identified a desire to replace an aged and small viewing platform with a covered outdoor classroom along the Kimiwan Birdwalk. The new facility, located in immediate vicinity to the wetlands, facilitates learning opportunities for people of all ages, and provides a location for enhanced wildlife viewing

and display of interpretive materials. The Outdoor Classroom project has now been completed. The facility can accommodate larger groups of visitors and students in a field setting and increases the capacity of staff interpreters to share a diversity of information and activities right at the wetlands. Located immediately adjacent to a seniors' assisted facility and connected with a trail network that runs for 1.2 km, the fully-accessible facility can accommodate mobility-impaired visitors and families with young children. The completed project involved the removal of the old viewing platform, design and engineering of the new structure, followed by construction of the new outdoor classroom and wheelchair ramps. Realignment of the surrounding trail network to accommodate the new structure and join it to the trails was required.

Results/Deliverables:

- The completion of the Outdoor Classroom project really improves the accessibility and attractiveness of the wildlife viewing site at the Kimiwan Birdwalk. Already, hundreds of visitors to the site are using the new outdoor classroom. People with mobility impairments and families with young children have been observed in the structure taking advantage of the easily viewed wildlife resources from the new vantage point. Walkers and joggers are taking advantage of the newly connected trail system, which incorporates the outdoor classroom and are making the Kimiwan Birdwalk a part of their regular exercise route. The public health restrictions in place have resulted in high visitation rates at the new outdoor classroom and the interpretive trail network at the Kimiwan Birdwalk.
- The old viewing platform was removed.
- The required development approvals were received.
- Design and engineering were completed.
- Foundation structure was completed.
- The outdoor classroom was constructed.
- The access ramps were constructed.
- The trail was realigned to match the new outdoor classroom.

Public Awareness & Education through Mentorship Project

Kneehill Bowhunters and Archers

Grant: \$2,000

Project Code: 002-00-90-317

Project Status: New; Completed

This project consisted of several parts: one was purchasing bows and targets for those that did not own their own equipment; and the other was to provide the opportunity for people to try out the sport of archery and to prepare lesson plans to formalize the mentorship and raise awareness of the group. The plan was to present the sport and love of archery to 15 new people, and to attract and retain six new members, three of them being youth. The club was able to purchase bows (that can be used by people of all ages), arrows, and 3-D targets. Sessions could not be held due to COVID-19 Alberta Public Health Orders. The club has a strong, interested base of volunteers ready to jump in and move forward as soon as it is possible to gather again.

Results/Deliverables:

- The club purchased three new bows, arrows, and 3-D targets.
- An article was submitted about the project to the local newspaper: The Capital.

Avian Monitoring and Outreach Education Programs at Lesser Slave Lake

Lesser Slave Lake Bird Observatory Society (LSLBO)

Grant: \$20,250

Project Code: 030-00-90-128

Project Status: Funded since 1999; Completed

Project Website: www.lslbo.org

Dedicated to bird conservation through research and education, the LSLBO is a member of the Canadian Migration Monitoring Network (CMMN), and it has been operating an avian monitoring station at Lesser Slave Lake since 1994. The first goal of this project was to assess the population status of migratory and breeding bird species at Lesser Slave Lake using the following avian monitoring programs: 1) Spring and Fall Migration Monitoring Program, 2) Monitoring Avian Productivity and Survivorship (MAPS) Program, and 3) Owl Fall Migration Monitoring Program. The LSLBO also supported three collaborative research projects on boreal bird species with forest industry and academics. Final reports were completed for all projects and provided to stakeholders and funders. Despite the COVID-19 pandemic, all fieldwork was completed as planned. The second goal of this project was to deliver innovative, hands-on education programs that promote a greater understanding of the importance of the boreal forest for Alberta's wildlife. The COVID-19 pandemic had a significant impact on the delivery of all education and outreach programs as schools were unable to travel, and in-person programs were limited. All programs were adapted for virtual or alternate delivery formats. Over 125 programs were delivered to almost 5,500 participants. Six new virtual school programs were developed, as well as a wide range of online resources and activities for teachers. Over 2,200 visitors also learned about birds and boreal forest ecology by experiencing the Boreal Centre for Bird Conservation this summer.

Results/Deliverables:

- When some CMMN stations across Canada were unable to operate last spring, the LSLBO was one of the few stations that successfully completed their spring migration program with minimal data collection loss. All other monitoring and research programs were completed as planned. Although banding lab tours were unable to take place this season, LSLBO hopes to provide some adapted on-site tours in 2021.
- An unexpected result of the project was the tremendous response to the LSLBO new winter interactive programs! Although in-person programs for schools were not possible this winter, LSLBO were able to reach new schools across the region with engaging virtual and self-directed school programs and were able to reach many more students in more schools across the Slave Lake region who typically cannot travel to Slave Lake during the winter. Combined with social media and online learning programs, LSLBO provided valuable learning opportunities for students and teachers across the Slave Lake region. Lessons learned will be taken from this process and more of these programs will be provided in future.
- Spring and fall migration monitoring operated for the 27th consecutive season: 4,579 birds were banded from 66 species.
- MAPS operated for the 27th consecutive season: 505 birds were banded over the season.
- Northern saw-whet owl monitoring operated for the 17th consecutive season: 82 saw-whets and one boreal owl were captured.

- Fieldwork for two collaborative research projects was completed, and a national Natural Sciences and Engineering Research Council (NSERC) project is being planned.
- Year-round curriculum-based education programs (53) delivered to over 1,000 students and teachers, including six new virtual programs developed for our COVID world.
- Community outreach programs (26) delivered to over 500 participants with a focus on self-directed and virtual programs.
- Over 2,200 visitors came to the Boreal Centre for Bird Conservation to learn about birds and boreal forest ecology.
- The 2020 LSLBO Annual Report was completed.
- Summary of all 2020/2021 Education and Outreach programs including new virtual program promotion and New Winter Programs at the Boreal Centre for Bird Conservation document.
- Four peer-reviewed papers were published with LSLBO data and/or staff collaboration this year:
 - Covino, K. M., Morris, S. R., Shieldcastle, M., & Taylor, P. D. (2020). Spring migration of Blackpoll Warblers across North America. *Avian Conservation and Ecology*, 15(1), 17.
 - Ma, Y., Hobson, K. A., Kardynal, K. J., Guglielmo, C. G., & Branfireun, B. A. (2020). Inferring spatial patterns of mercury exposure in migratory boreal songbirds: Combining feather mercury and stable isotope measurements. *Science of the Total Environment*, 116544.
 - Oliver, R., Mahoney, P., Gurarie, E., Krikun, N., Weeks, B., Hebblewhite, M., ... Boelman, N. (2020). Behavioral responses to spring snow conditions contribute to long-term shift in migration phenology in American Robins. *Environmental Research Letters*, 15(4), 045003.
 - Roberto-Charron, A., Kennedy, J., Reitsma, L., Tremblay, J. A., Krikun, R., Hobson, K. A., ... Fraser, K. C. (2020). Widely distributed breeding populations of Canada Warbler (*Cardellina canadensis*) converge on migration through Central America. *BMC Zoology*, 5(10), 1–14.

Kids Can Catch Family Day 2021 Event

Lesser Slave Watershed Council (LSWC)

Grant: \$2,130

Project Code: 020-00-90-267

Project Status: Funded in 2018/19; Completed

The LSWC did not let the COVID-19 pandemic stop them from promoting the sport of ice fishing and engaging families in the local watershed to get out and try the sport on Alberta's free fishing weekend in February 2021. In lieu of being able to host an event and bring people together for a day of fun on the lake, the LSWC changed it up and prepared 20 family ice fishing kits that families applied to receive so they could safely go out together and enjoy family time on the lake.

Results/Deliverables:

- In all, 20 families were provided with basic equipment (a bucket, an ice scoop, two rods, a mini tackle box with hooks and jigs, a pair of pliers, cotton gloves for fish handling, handwarmers, and some fun swag from the LSWC and ACA) to get out on the ice to try ice fishing as a family. Safe and legal angling was promoted by including copies of the 2020 *Alberta Guide to Sportfishing Regulations*, and stewardship was promoted by including the Lesser Slave Lake Stewardship Handbook in the fishing kits.

LFGA Community Recruitment and Education Fund

Lethbridge Fish & Game Association (LFGA)

Grant: \$13,500

Project Code: 002-00-90-217

Project Status: Funded 2014/15 to 2016/17 and 2019-20 and previously by the R&R Fund; Extended until June 30, 2021

Project Website: www.lfga.club

LFGA uses its range to reach into the community to teach individuals, community groups, and classes from schools, how to use archery and firearms to recruit hunters to complementary hunter education, firearms safety, reloading, and firearms cleaning courses. The primary objective of this project is to replace and repair equipment used in the outreach programs. LFGA hosts the following activities: sight-in clinics, firearms training for minors, archery instruction for groups, and introductory firearm courses. The COVID-19 Alberta Public Health Orders reduced LFGA's reach to 98 participants, mainly because the volunteers offered much smaller groups and extended new and junior range programs for those who participated.

Results/Deliverables:

- Most of the project has been completed although there is other equipment that LFGA will be purchasing to support the various programs and ranges.
- This year was very busy with range construction and development.
- The outdoor ranges were able to remain open following COVID-19 Alberta Public Health Orders, and the new classroom/airgun range was closed for several months, which had a negative effect on the youth rifle programs in the summer.

Mentored Hunts

Lethbridge Fish & Game Association (LFGA)

Grant: \$3,000

Project Code: 002-00-90-313

Project Status: New; Extended until Dec. 31, 2021

For about ten years the LFGA has been supporting mentored hunts with the goal of recruiting hunters. This year LFGA attempted to expand the program by training and certifying mentors so they qualify for insurance coverage and taking novice hunters on a mentored hunt to spot, stalk, shoot, field dress, retrieve, and skin their deer. The project plan was to take 30 novice hunters on mentored deer hunts. Two additional mentors were recruited. In all, 21 hunters were recruited and five were able to complete at least one day of hunting; two participants had two-day hunts.

Results/Deliverables:

- The COVID-19 Alberta Public Health Orders required that the other 15 hunts were cancelled. The remaining hunts will take place next hunting season.

Outdoor Education: Wildlife Identification and Safety

Marshall Springs School

Grant: \$1,000

Project Code: 002-00-90-315

Project Status: New; Completed

For this project, wildlife artifacts (track casts, fur samples, claws, scat replicas, skulls, etc.) were purchased for use with the Marshall Springs School's Outdoor Education classes (Grades 7 – 9) during the Wildlife Identification and Safety unit. With these items, students will have hands-on experiences where they can see and touch the items in a safe way. Having the ability to hold an elk antler and feel its weight or measuring your own hand against the paw of a grizzly bear makes the learning more meaningful. These items will be used as an extension of the learning material that is presented in the classroom.

Results/Deliverables:

- The main results of this project will be a deeper understanding of Alberta's native wildlife, how to identify them, and how to safely recreate in wild places. Students get to touch, feel, and hold these artifacts while learning about them in a classroom setting. The best part is these artifacts can be used time and again with students in future Outdoor Education courses.
- A variety of wildlife artifacts were purchased, including track casts, fur samples, replica claws, skulls, and scat. So far, the items have been used with one Grade 7 Outdoor Education class (approximately 25 students).

Riparian & Ecological Enhancement Program

Mountain View County (MVC)

Grant: \$25,000

Project Code: 015-00-90-102

Project Status: Funded since 2005/06; Completed

Project Website: www.mountainviewcounty.com/agriculture-environment/agriculture-environmental-funding

MVC has been in partnership with ACA since 2000 and has received an ACA grant since 2005 toward the delivery of a Riparian and Ecological Enhancement Program (REEP). Funding is offered to producers who want to protect, restore, and maintain the health of their riparian and sensitive areas, encourage biodiversity, and maintain fish and wildlife habitat. REEP uses the following means: providing a permanent riparian and sensitive area, wildlife-friendly fencing; native grass, tree, and shrub protection and establishment; off-site watering system installation; and approved creek crossings. The funds received from ACA are used to contribute up to 100 percent of the material costs for constructing fences, creek crossings, or the purchase of native seed or seedlings. Off-site watering systems will be funded at 25 percent of the material costs. A riparian or rangeland health assessment is performed on each project in the year of completion and again in five years once contract commitments are completed. The contract with MVC also allows the site to be used for demonstration purposes and a road-side sign describing the project to be posted. This program encourages beneficial management practices including controlled/rotational grazing, an accessible off-site water supply, nutrient management,

noxious and prohibited noxious weed control, chemical application setbacks, and habitat protection and enhancement. The health of the watersheds within MVC are improved through this program and there is an increased awareness regarding the importance of riparian and sensitive areas for biodiversity, native plant life, wildlife habitat, and fish distribution and productivity. Ongoing partnerships with technical advisors, extension-focused non-profit specialized groups and government agencies in the environmental and agricultural fields ensure that projects implemented under REEP are beneficial and lasting. This past year 19 projects were funded through REEP.

Results/Deliverables:

- In 2020/21, 19 projects were funded through REEP: ten fencing projects, seven off-site watering systems, one creek crossing, and one planting project. The total area surrounding waterbodies and sensitive upland areas that has been fenced off this year is 122.71 ha and 9.4 kms of new riparian fencing has been installed. This results in 12 more producers who are aware of the importance of beneficial management practices and sustainable agriculture. Of these projects, ten producers have also signed new conservation agreements with Alternative Land Use Services (ALUS) for projects focused on the enhancement of waterbodies and the adjacent uplands. Two multi-year ALUS projects were completed, it is common that projects take longer due to the larger scope of ALUS projects, funds are paid out once projects are completed.
- Focusing on specific watersheds and partnering with other organizations doing work in the watershed has become an important aspect of the program, and MVC will continue to build on this momentum in the coming years. MVC is excited to continue to partner with ACA on their riparian conservation project on Dogpound Creek; two joint meetings have been completed with landowners, which resulted in one signed agreement and the other one is still in progress. A workshop is being planned this spring where this ACA initiative will be highlighted along with a new fencing opportunity and invasive species management alternatives.
- Project profile sheets are completed for each project that is funded and are available upon request.
- Riparian Health Assessments (RHAs) on 2020/21 projects were complete and are available. All multi-year projects were visited to take completion photos. Three additional ALUS sites were visited with a professional photographer in 2020, and he was also able to capture some great drone footage of the projects. MVC are currently working to create additional producer profiles to be shared through various media channels.
- Five-year follow-up RHAs on 2015 projects were completed; landowners were encouraged by the visible improvements resulting from their projects sparking renewed interest in building on this success and sharing it with others.
- Seven ALUS participants had their contracts come up for renewal this year; sites were visited, a project monitoring report card was completed with the producer at each site, and renewal agreements were completed. It was exciting to visit participants up for renewal and see their pride in the positive changes on the landscape, of special note was the increase of wildlife in the project areas.
- REEP projects are available for tours and road-signs may be posted; this year MVC again supported Open Farms days but did not host a bus tour and the MVC Agricultural Service Board was not able to tour sites due to COVID-19 restrictions, hopefully these opportunities will resume in the coming year.
- One-on-one conversations were held with an estimated 75+ landowners around beneficial management practices.
- REEP ads ran in the newspaper regularly, and the program was promoted on the MVC website: www.mountainviewcounty.com/content/applications-sought-reep-alus-projects
- Olds Albertan article was published on review of REEP and ALUS in MVC in 2020: www.mountainviewtoday.ca/mountain-view-county-news/ag-service-board-updated-on-ecosystem-riparian-preservation-programs-3189698
- MVC ALUS Video was posted on YouTube: www.youtube.com/watch?v=uwnwiRbIbXg
- The ALUS website posted two MVC producer profiles completed in 2020 and an article on the ALUS five-year celebration: alus.ca/alus_community/alus-mountain-view/
- One presentation was delivered to 30 students at Olds College in December 2020 to the Rural Development Practices Class, and the REEP program was highlighted. Also, a presentation was delivered on MVC's REEP program, with an Olds College professor, at the Canadian Association of Certified Planning Technicians Virtual Conference in November 2020 to approximately 200 attendees.

Aeration of Hasse Lake

Northern Lights Fly Fishers – Trout Unlimited Canada Edmonton Chapter (NLFF TUC)

Grant: \$20,126

Project Code: 020-00-90-283

Project Status: New; Completed

The goal of this project was to support ACA's Hasse Lake Reclamation project and thereby re-establish a viable trout fishery at Hasse Lake in Parkland County. The objectives were: to further improve the water quality and oxygenation of Hasse Lake by providing surface aeration equipment and assisting in monitoring its operation; to assist with communicating the availability of an additional recreational angling opportunity and of the associated social, recreational, health, and economic benefits it brings to the community; and to encourage financial support from local authorities and businesses for the Hasse Lake Reclamation project and ongoing maintenance of water quality in the lake.

The pricing of five surface aerators and five 400-foot submersible electrical cables were researched from different suppliers in Canada and the USA. The equipment was purchased and delivered to ACA in May and June 2020. Meanwhile NLFF TUC provided the Mayor and Council of Parkland County and its administration with information on the project and of the benefits to the community of re-establishing the Hasse Lake fishery. Discussion was also held with some business owners in the community about the pros and cons of requesting donations toward the project given the pandemic and current economic downturn. The project was also communicated publicly by NLFF TUC through fishing-related forums. Alberta Fish and Wildlife agreed to a trial stocking of Hasse Lake in May 2020 with 5,000 rainbow trout based on ACA's commitment to continued improvement of water quality.

The availability of this angling opportunity was made public by NLFF TUC and ACA on various forums. However, ACA's efforts to get electric power provided to lakeside were unfortunately delayed resulting in a decision to delay the start-up of aeration to October 2020, thus losing the ability to determine the viability of Hasse Lake as an aerated trout fishery for this year. Parkland County cooperated with ACA in planning for power installation to the lake but was unable to contribute financially to the project in 2020. The County agreed to reconsider financial support in 2021 budget deliberations. Based on advice from business owners contacted and in discussion with ACA, it was decided that requests for financial support should be temporarily delayed and reconsidered in 2021.

Results/Deliverables:

- Five Aquarian Pro surface aerators (1hp 230V) complete with disconnect kit and bulgin connectors were purchased and delivered.
- In all, 610 m of submersible cable (550w 600v) were purchased and delivered.

Conserving and Restoring Arctic Grayling in the Upper Pembina River Watershed – Habitat Restoration Planning

Northern Lights Fly Fishers – Trout Unlimited Canada Edmonton Chapter (NLFF TUC)

Grant: \$7,000

Project Code: 020-00-90-197

Project Status: Funded since 2012/13; Completed

Project Website: www.nlff.org/grayling

In 2020, NLFF TUC continued to collect data in support of a multi-year initiative that started in 2011 to study Arctic grayling populations and habitat conditions in the Upper Pembina River watershed. The data collected will be used to identify habitat concerns and conservation opportunities to help re-establish Arctic grayling populations and angling opportunities for future generations. The following activities were completed in 2020: 1) monitored water temperature at 20 sites in the Upper Pembina River watershed; 2) shot aerial videography using a quadcopter; 3) installed trail cameras at selected sites to collect data about angling non-compliance or damage to habitat caused by off-highway vehicle (OHV) traffic as well as tracking seasonal high-water events; 4) assisted in identifying young-of-the-year/yearling rearing areas (as surrogates of spawning locations) using backpack electrofishing; 5) assisted Alberta Environment and Parks (AEP) with volunteer angling survey to evaluate effectiveness of five-year angling closure on the Upper Pembina system. NLFF TUC findings based on data collected since 2011 confirm that Arctic grayling numbers in the watershed have declined drastically from historic levels. Many stream populations appear to be extirpated, but there are remnant populations in Dismal Creek, Rat Creek, and Nelson Creek. Many streams that formerly supported grayling are no longer suitable due to high water temperatures and other factors. However, Dismal Creek still provides suitable water temperatures and habitat for Arctic grayling. NLFF TUC are supportive of the current AEP management initiatives and will continue to work with AEP in a stewardship role regarding opportunities for habitat restoration or other activities to help conserve and restore Arctic grayling populations in the Upper Pembina watershed.

Results/Deliverables:

- Water temperature data was recorded and provided to AEP for input into the provincial database.
- Photos (over 56,000 images) were captured at 15-minute intervals at each wildlife camera site. Several instances of non-compliance with angling regulations (total closure of the Upper Pembina River) were recorded. The data was shared with AEP.
- Additional video data was recorded at several sites at Dismal Creek and one site on the Pembina River.
- Volunteers accompanied AEP biologists during angling surveys in Dismal Creek and Rat Creek. A total of 157 grayling were captured in Dismal Creek this year (2020) compared to 130 in 2018 and 66 in 2014.
- Backpack electrofishing was conducted on Dismal Creek and Rat Creek. A total of 49 fish were captured, including six species. Sampling in Dismal Creek captured spoonhead sculpin and burbot. In Rat Creek, northern pike, longnose sucker, white sucker, and lake chub were captured. Arctic grayling were not encountered in either Dismal Creek or Rat Creek. A report from the electrofishing trip is available.
- A PowerPoint presentation, including water temperature analysis, was updated and delivered to the club in April 2021.

Dogpound Riparian Protection – Mader Property

Northern Lights Fly Fishers – Trout Unlimited Canada Edmonton Chapter (NLFF TUC)

Grant: \$39,434

Project Code: 020-00-90-284

Project Status: New; Completed

The NLFF TUC has a long history of helping to protect and enhance the riparian zones of trout streams in Alberta. Dogpound Creek is recognized as a prime recreational fishery, especially for brown trout, and is visited by anglers from all areas of the province. Essential to its long-term survival is protection of the riparian land along the length of the creek. Its banks consist of non-cohesive, fine alluvial materials and, especially where frequented by cattle, are subject to de-vegetation and erosion. Most of the existing fencing, installed over 30 years ago through the Buck for Wildlife program is broken and flattened. When Mader Ranches agreed to the terms of the ACA Riparian Conservation Program, including upkeep of new fencing, NLFF supported that partnership by fencing off the riparian land on the Mader property from access by livestock and by providing alternative watering for the cattle. The old, damaged fence was removed, and 5.2 km was repaired or replaced along 3.8 km of Dogpound Creek flowing through Mader Ranches. Sixteen access gates were provided to the riparian area and creek for the use of anglers and others. In all, 20 hectares of riparian land was protected from degradation by cattle ranching and siltation and effluent will be reduced into the creek. Two off-site watering facilities for livestock were repaired, one permanent and the other portable. A project sign was placed on site with partner logos. This project serves as a model for other landowners along the creek of effective and achievable riparian protection and increases local knowledge of the importance and benefits of riparian zone conservation.

Results/Deliverables:

- 5.2 km of exclusion fencing was completed with 16 access gates.
- In all, 20 hectares of protected and healthier riparian land and the associated benefits for Dogpound Creek water quality and temperature.
- Two solar-powered livestock watering stations, one permanent and the other portable, were repaired.
- Twenty members of NLFF provided input to the project.
- An article on riparian protection based on the project has been submitted for publication on TUC's "News Room" and will be posted on the NLFF website.
- The NLFF project manager is available to assist ACA staff, if needed, in promoting the Riparian Protection Program.

Skwarik Riparian Enhancement Project

Northern Sunrise County

Grant: \$28,000

Project Code: 015-00-90-286

Project Status: New; Extended until Oct. 31, 2021

The Skwarik family own property on an unnamed waterway that is a direct contributor to the Heart River within the Heart River Watershed in Northern Sunrise County. This land is currently used for agricultural production and supports livestock. This waterway is being utilized by livestock for watering purposes and after years of use, there is little to no riparian buffer. To protect the riparian area, exclusion fencing (four-strand wildlife friendly) was erected along the 770 m of waterway, leaving a 15 m buffer on each side of the stream. In excluding livestock from the channel, a livestock crossing was installed for movement between pastures. In addition, the project consists of seeding native grasses and planting ~4,700 one-year-old native seedlings and shrubs within the riparian zone, resulting in a more robust buffer along the waterway. The planting area is 4.17 hectares, which includes 770 m x 30 m of riparian buffer. This will be an understory planting with minimal disturbance to the current vegetation and habitats. Hemp weed suppression mats will be used to assist with vegetation competition. The project will provide associated improvements in water quality and flood mitigation that will positively impact downstream areas.

Results/Deliverables:

- The livestock crossing and fencing was completed in November 2020 by a local contractor, and the reforestation with seedlings is scheduled for late September 2021.

Measuring Success of Oldman Headwater Education and Restoration Efforts

Oldman Watershed Council (OWC)

Grant: \$25,000

Project Code: 015-00-90-240

Project Status: Related project funded in 2016/17 and 2017/18; Extended until March 15, 2022

Project Website: oldmanwatershed.ca/recreation-overview

Since 2016, OWC's work in the Oldman headwaters has aimed to engage backcountry users in restoring places where they recreate, changing

behaviour to reduce their impacts, and becoming environmental stewards. The following are the project goals:

1. Continue to educate backcountry users about the watershed, native fish, invasive species, etc. and to encourage the adoption of positive behaviours like steering clear of water and cleaning gear. This involves attending public outreach events, setting up pop-up education activities, and communications both off- and online.
2. Work with partners, contribute to the implementation of the Livingstone/Porcupine Hills Land Footprint and Recreation Management Plans by restoring old trails and streambanks, and supporting other stewardship activities like bridge-building and invasive weed removal.
3. Assess this program, both socially, by conducting follow-up backcountry surveys to assess any changes in knowledge and behaviour, and ecologically, by doing Riparian Health Assessments, as well as starting a new community-based monitoring project, Sequencing the Rivers for Environmental Assessment and Monitoring (STREAM) to assess stream health at restoration sites.

Due to the restrictions and uncertainty caused by the COVID-19 pandemic in spring 2020, OWC made the difficult decision not to hire seasonal staff to conduct follow-up backcountry surveys and attend public education events. Early in the season, access to these backcountry sites were closed, and most public events were cancelled. In addition, as people were getting used to new restrictions and norms such as wearing masks and physical distancing, OWC felt it was not fair or safe to ask summer students to approach strangers for face-to-face interactions.

Results/Deliverables:

- In the fall, OWC planted 450+ willows at two sites along Dutch Creek in the headwaters together with their partners.
- Canadian Aquatic Biomonitoring Network (CABIN)/STREAM field training was hosted, and two of OWC permanent staff were CABIN field certified. Equipment was put together for one CABIN kit and seven restoration sites were sampled in the Oldman headwaters.
- Three videos were created about the restoration work, a three-part restoration blog series was published, and presented at an in-person outdoor workshop and two virtual conferences/webinars. Two more virtual presentations took place in March and April 2021.
- Deliverables and activities related to hiring seasonal Outreach Assistants, such as completing backcountry surveys, setting up pop-up education stations, attending public outreach events, taking "For the Love Of" photos, engaging people in face-to-face conversations, tours, and attending stewardship events have all been delayed until 2021 due to the COVID-19 pandemic.

Wild Bird & Bee Houses

Onoway & District Fish & Game Association (OFGA)

Grant: \$2,500

Project Code: 030-00-90-102

Project Status: Funded 2006/07 to 2009/10, 2013/14, 2016/17 to 2020/21; Extended until Sept. 1, 2021

Project Website: www.ofga.ca

The goal of this project was to build 500 birdhouses and 50 to 100 native bee "hotels" for distribution to members of the community to provide safe spaces for birds and wild bees, as well as educate and provide

awareness to OFGA members and the public about the importance of safe habitat for birds in the wild.

Results/Deliverables:

- Due to the COVID-19 pandemic, members have been unable to hold any indoor gatherings for wood cutting, which is the starting point for building the houses. Should outdoor gatherings be increased, there may be opportunities over the spring/summer to do some outdoor cutting/building, weather depending.

Partners in Habitat Development

Partners in Habitat Development (PHD), Eastern Irrigation District (EID)

Grant: \$5,000

Project Code: 015-00-90-103

Project Status: Funded since 2005/06 to 2018/19 and 2020/21; Completed

The PHD program, founded in 1998, is a long-term habitat program that was developed to create, restore, and protect wildlife habitat within the farming region of southern Alberta. This initiative was developed to mitigate the loss of wildlife habitat in the agricultural areas of southern Alberta due to irrigation infrastructure improvements, agricultural intensification, and industrial activities. The PHD program works with landowners to create and, when possible, preserve wildlife habitat. The program's focus is on the creation of shelterbelts and block plantings to provide critical winter habitat to upland game birds. In 2020, 7,983 trees and shrubs were planted in the EID on six new habitat sites and ten existing habitat sites. The program also assists with fencing livestock out from existing and newly created habitat sites. In 2020 1.8 km of fencing materials was distributed to fence out three new habitat sites.

Results/Deliverables:

- 2020 went well but had its challenges. Those challenges were related to accommodations for COVID-19 restrictions, working with a new skid-steer loader operator, minor changes to site size due to pipeline issues or landowner requests and watering issues at two of the planting sites. Those watering issues brought seedling survival down to an average of 68 percent across all six sites. All things considered, PHD was still successful in planting all the planned sites for 2020.
- In all, 6,488 trees and shrubs were planted, and fabric and mulch were applied on six new tree/shrub planting projects in 2020/21.
- Another 1,223 replacement trees and shrubs were planted on eight project sites from 2019 where they failed to survive, and 272 replacement trees and shrubs were planted on two project sites from 2018. Maintenance (weeding and mowing) took place on eight tree/shrub planting projects from 2019.
- Three fencing projects (1.8 km in total) were completed on three new tree/shrub planting projects. Materials were supplied by the PHD, and fencing was installed by the landowners.
- PHD staff met with landowners interested in new, or additional, PHD projects and inspected the potential sites. Plans for the 2021 seasons were formalized.
- Publication of 2020 PHD Annual Report (completed in April 2021).
- Sharp-tailed grouse surveys were completed as planned in April. COVID-19 restrictions stopped the spring crowing counts from being completed in April/May. Time constraints meant only three of 14 late summer brood surveys were completed.
- Planning for the 2021/22 PHD program is underway.

Post-secondary First Pheasant Mentor Hunt Program

Pheasants Forever Calgary Chapter (Calgary PF)

Grant: \$5,000

Project Code: 030-00-90-296

Project Status: Funded in 2019/20; Completed

Calgary PF embarked on recruiting and training up to 48 post-secondary students from the cities of Calgary and Lethbridge on how to hunt upland game birds, with a focus on pheasants. Due to the COVID-19 pandemic, Calgary PF were unable to host the Lethbridge College/University of Lethbridge event. They were, however, successful in hosting the Calgary/Spruce Creek event. A full day of professional development was provided to 18 students. The students enjoyed seminars on upland game bird biology, hunting upland game birds, and cleaning and preparing upland game birds. The students were then personally trained for improved shooting by professional instructors followed by a mentored hunt with expert coaches, dogs, and dog handlers. The hunt is as close to being a live hunt as any trip afield could be.

Results/Deliverables:

- Education was provided to 18 post-secondary students on all aspects of upland game bird hunting in Alberta. The students were put through the comprehensive one-day program held at Spruce Creek Upland Club on Sept. 5, 2020. Most of the students were eager to learn where they would be able to go upland hunting that fall. It was a very keen crew that was very eager to cook and eat wild game.
- The students were provided the following professional instruction:
 - Life history and conservation of upland game birds
 - Strategies and tactics for hunting upland game birds
 - Safety instruction and upland game bird simulated shooting with professional coaches
 - Simulated pheasant hunts with mentors' professional dog handlers and experienced pointing dogs
 - Cleaning and cooking seminar.

Sauder Reservoir Habitat Project

Pheasants Forever Chinook Chapter (Chinook PF)

Grant: \$30,510

Project Code: 015-00-90-274

Project Status: Funded 2019/20; Completed

Project Website: www.pheasantsforeverchinook.ca/projects/sauder-peninsula-project/

This is year two of a collaborative project between St. Mary River Irrigation District (SMRID), ACA, and Chinook PF to enhance approximately 156 acres of land that borders Sauder Reservoir by establishing several multi-row shelterbelts on land owned by SMRID. This is an ecologically significant riparian and upland buffer along Sauder Reservoir, which will improve water quality, re-establish riparian buffers, improve fish and wildlife habitat, and increase recreational opportunities. This land has been used for several years by the agricultural community, and these shelterbelt plantings will be the first stage in rehabilitating the landscape by creating a buffer and filter

strips, which will help to capture chemicals and fertilizer before entering the lake. These buffers will also help to reduce soil erosion and provide habitat for multiple species of wildlife. The land was prepared for planting in May. Over 10,000 shrubs were planted, and several hundred metres of landscape fabric was installed in June. Twice a week starting in July, a tank truck hauled water to the site and watered the shrubs through the summer. Weeds were controlled by mechanical means. In September, approximately 275 m of old fencing was replaced with wildlife-friendly fencing, and a public parking area was fenced also.

Results/Deliverables:

- The main result was the planting and establishing of a multi-row shelterbelt on time and under budget. There was great cooperation between SMRID, ACA, and Chinook PF allowing for work to be done in a safe and timely manner.
- 10,000 shrubs were planted by June 2020.
- 275 m of wildlife-friendly fencing was installed by Sept. 2020.
- 156 acres of lakeshore buffer were created and managed by Oct. 2020.
- Several hundred meters of landscape fabric was installed by June 2020.
- Many hundreds of people viewed this project on Chinook PF's and Calgary PF's social media sites.
- 156 acres of habitat was enhanced habitat for wildlife.
- Approximately 4 km of shoreline and riparian area is now protected.
- A public parking area was built in Sept. 2020.

Wildlife and Native Habitat Enhancement in Red Deer County via ALUS (2020)

Red Deer County (RDC)

Grant: \$40,000

Project Code: 015-00-90-128

Project Status: Funded similar projects since 2006/07; Completed

Project Website: www.rdcountry.ca/207/conservation

The project goal is to work with landowners who wish to implement actions on their land, to conserve or improve riparian and native range habitat in RDC. The project objectives are as follows: support RDC landowners in enhancing and stewarding riparian and/or native range habitat on their land by providing financial and technical resources for their on-the-ground projects; enhance riparian and native range habitat through fencing, off-stream watering, establishing buffer zones, and other riparian and native range management projects completed by participating landowners; and assist landowners in developing an informal "Management Plan" for each of the completed projects. RDC conduct a "call for participants" and ask interested landowners to contact the RDC's Conservation Coordinator. Project plans are developed for each project. RDC then reviews submitted project plans to make decisions regarding funding for projects. With the Alternative Land Use Services (ALUS) Program, projects are reviewed by RDC's staff and the County's ALUS Partnership Advisory Committee, made up of producers and technical advisors with expertise in enhancing habitat in agricultural areas. ACA funding goes toward a portion (up to 85 percent for highest priority projects, more commonly 75 percent) of the

cash costs associated with each project. The individual landowners are responsible for any other costs to construct, and subsequently maintain/repair their project(s). RDC, and other partners as appropriate, contribute technical expertise to planning the projects, developing ongoing project management plans, etc.. For project monitoring and evaluation purposes, RDC (via Cows and Fish) conducts Riparian or Range Health Assessments, and/or establishes formal Photo Monitoring Points, at the beginning of the on-the-ground project. Follow-up assessments come four to five years later, to compare to the baseline condition. RDC works with the landowners during project planning, project construction/installation, and regularly afterwards, to develop, evaluate, and adapt the landowners' project management plans over time. With additional funding and the ongoing growth of the ALUS Program in RDC, this project has far exceeded the project goals.

Results/Deliverables:

- A total of 348 new riparian or native range habitat enhancement projects were initiated by 21 landowners in RDC, conserving and/or enhancing 1,111 acres of riparian and/or native range habitat, approximately 8.7 km of river and stream, and 406 acres of waterbody through sustainable management. Approximately 1,530 animal units will be impacted in the new livestock management regimes provided by the 348 projects.
- Eleven articles in the Red Deer County News mentioned or were about the ALUS Program (each edition has about 10,000 copies produced and distributed). Most of these articles were also reprinted in the Grey Wooded Forage Association's monthly newsletter (distribution unknown but estimated at several hundred).
- With COVID-19, RDC could not do "live" / face-to-face mass communications. Instead, they focused on digital presentations and social media. Since April 2020, RDC have:
 - hosted three "What is ALUS?" webinars (total attendance: eight)
 - posted a recording of the ALUS Webinar on the County's YouTube page for people to see at their convenience (views to date = 56)
 - posted a "virtual tour" of an ALUS Project: LK Alternative Livestock Watering project (views to date: 110)
 - completed a "social media blitz" called "30 Days of ALUS." Statistics include the following: Facebook engagements (number of times a post was liked, commented on, shared, or links clicked on): 463, Twitter engagements: 230, Visits to County's Conservation web page during the campaign: 95.

Archery Program

Southern Alberta Bible Camp (SABC)

Grant: \$3,000

Project Code: 002-00-90-216

Project Status: Funded in 2014/15, 2015/16, 2016/17, 2019/20 and 2020/21; Extended until Sept. 30, 2021

Project Website: www.sabc.ca

The main goal of SABC's archery program was to provide an engaging and challenging experience in a safe and fun context with the result of a general appreciation of the outdoors and outdoor activities. Grant funds were requested to refresh SABC's outdoor range by adding proper target stands, adding bushes and shrubs to replicate hunting scenarios and

to replace/repair and upgrade bows and targets. The campers develop their skills year after year through the progressive Alberta Hunter Education Instructors' Association (AHEIA) and National Archery in the Schools Program (NASP)-based curriculum, which includes basic archery safety, shooting techniques, hands-on instruction, demonstration, correction, and ongoing encouragement. The curriculum is delivered in a fun and educational way.

Results/Deliverables:

- The 2020 camps were cancelled due to the COVID-19 pandemic. SABC are running their camps during the summer of 2021.
- Changes to the number of participants and the frequency participants take part in the program are likely due to COVID-19 protocols. Regardless of numbers or how many times participants take part, the program will be available for 4 one-hour time blocks a week where ten minutes will be classroom teaching about deer identification, behaviour, and habitat, while the remaining 50 minutes will be for archery safety, aiming, and shooting. Each participant will still receive a report card of skills and progress, and the outdoor range will be operational and SABC will provide an instructor.

Pelletry Program

Southern Alberta Bible Camp (SABC)

Grant: \$1,500

Project Code: 002-00-90-236

Project Status: Funded in 2015/16, 2016/17, 2019/20 and 2020/21; Extended until Sept. 30, 2021

Project Website: www.sabc.ca

The main goal of SABC pelletry program was to provide an engaging and challenging experience in a safe and fun context resulting in a general appreciation of the outdoors and outdoor activities. SABC believes that this was accomplished by better equipping their range with new pellet guns and targets, and in general, refresh the outdoor pelletry experience and attract more participants. The campers develop their skills year after year through SABC's progressive pelletry curriculum, which includes basic firearm safety, shooting techniques, hands-on instruction, demonstration, correction, and ongoing encouragement. The curriculum is delivered in a fun and educational way. Each camper leaves with a report documenting their skills and achievements in their use of firearms and understanding of wildlife habitats.

Results/Deliverables:

- The 2020 camps were cancelled due to the COVID-19 pandemic. SABC are running their camps during the summer of 2021.
- Changes to the number of participants and the frequency participants take part in the program are likely due to COVID-19 protocols. Regardless of numbers or how many times participants take part in the program, the program will be available for 4 one-hour time blocks a week where ten minutes will be classroom teaching about bear identification, behaviour, and habitat, while the remaining 50 minutes will be for firearm safety, aiming and shooting. Each participant will still receive a report card of skills and progress, and the outdoor range will be operational and SABC will provide an instructor.

Walleye - Pike Fishing

Southern Alberta Bible Camp (SABC)

Grant: \$2,500

Project Code: 020-00-90-217

Project Status: Funded in 2014/15, 2015/16, and 2020/21; Extended until Sept. 30, 2021

Project Website: www.sabc.ca

The goal of SABC's fishing program was to empower campers with the proper knowledge and skills that will allow them to fish anywhere and develop a greater appreciation for fishing and other outdoor activities and conservation. This grant was to help SABC acquire teaching resources, update/replace/upgrade fishing rods, lures, and fishing supplies. Every camper in the summer camp program will have activity blocks where they are taught the basics of fishing like knot tying, casting, jigging, and reeling. SABC teaches a curriculum that teaches campers fish identification, habitat of the fish, landing a catch and safe release techniques, and the role irrigation has on our reservoir. Each camper will go home with a report card documenting the different skills they learned and will also go home with a picture of a fish they caught if they caught one.

Results/Deliverables:

- The 2020 camps were cancelled due to the COVID-19 pandemic. SABC are running their camps during the summer of 2021.
- Changes to the number of participants and the frequency participants take part in the program are likely due to COVID-19 protocols. Regardless of numbers or how many times participants take part in the program, the program will be available for 4 one-hour time blocks a week where ten minutes will be classroom teaching about fish identification, behaviour, and habitat, while the remaining 50 minutes will be for teaching the fundamentals of fishing. Each participant will still receive a report card of skills and progress, and the outdoor range will be operational and SABC will provide an instructor.

American Kestrels - Using Nest Boxes and Technology to Increase Awareness and Promote Conservation

STRIX Ecological Consulting Ltd. (Strix Eco)

Grant: \$14,956.40

Project Code: 030-00-90-311

Project Status: New; Completed

Reasons for the continent-wide declines in American kestrel populations remain unclear. Additional monitoring and research are required to better understand this. For that to happen, increased public awareness of kestrels and their conservation concerns are needed. Conservation efforts made for kestrels would benefit a range of wildlife including ungulates, upland game birds, and many others. The project objectives are to increase awareness of kestrels and their conservation needs; to use camera monitoring at kestrel nest boxes and GPS trackers to engage people; to promote landowner habitat conservation such as maintaining forest patches and hedgerows in agricultural areas; and to promote

citizen science participation. The project activities were to use cameras to monitor kestrels, to fit eight GPS trackers to kestrels during the 2020 breeding season, and share information with Albertans about where the local kestrels travel during migration and winter. In addition, Strix Eco planned to reach out to communities where kestrels were found during migration and winter to share information about this project and to request photos from the areas where the kestrels spent time. Unfortunately, in-person visits to schools were not possible during 2020/21 due to COVID-19 restrictions. Instead, Strix Eco was able to visit schools virtually to deliver curriculum-based presentations about kestrels and their conservation needs. Included were the roles that hunting/angling/trapping communities play in the conservation and management of wildlife and wild places. Presentations were delivered to classes at Bawlf School, Forestburg School, Tofield School, and Viking School (multiple classes received individualized presentations at each school). Presentations, banding demonstrations, and nest box building at public events were not possible due to COVID-19 restrictions. Instead, Strix Eco were able to present virtually to the Camrose-based Wildrose Outdoor Club. Many discussions were held with landowners about kestrels and their needs have increased awareness and conservation potential. More than 30 new landowner partners started supporting this project this year!

Results/Deliverables:

- A camera monitoring system was obtained that will provide audiences with video footage of kestrel behaviours at their nests.
- Eight adult kestrels were fitted with satellite trackers during the 2020 breeding season. Data from these will be retrieved during the 2021 breeding season. Data are stored on-board the devices. The units were programmed to obtain locations every eight days during the breeding season, every five days during autumn migration, every eight days during winter, and every four days during spring migration. Once data are retrieved, Strix Eco will reach out to local fish and game groups to share information about kestrels and this project, and to request photos of the places where satellite trackers indicated kestrels were found.
- More than 30 new landowner partners started supporting this project this year. Conversations with landowners are always energizing. They are usually very interested in this work and keen to support wildlife conservation efforts.
- An Instagram account was started @alberta_kestrel_project to reach a wider audience and check-in with partners and participants throughout as this project develops. We anticipate that the Instagram followership will grow as Strix Eco participate in more outreach events.
- Public visits to nest boxes did not happen due to COVID-19 restrictions. Visits will be organized for spring/summer 2021.
- School events: Unfortunately, in-person visits to schools were not possible during 2020/21 due to COVID-19 restrictions. Instead, curriculum-based presentations about kestrels and their conservation needs were delivered virtually. Included were the roles that hunting/angling/trapping communities play in the conservation and management of wildlife and wild places. Presentations were delivered to classes at Bawlf School, Forestburg School, Tofield School, and Viking School (multiple classes received individualized

presentations at each school). Despite COVID-19 limitations, Strix Eco were able to reach more than 200 people online in their classrooms and nature club events before the end of March 2021.

- The Tofield Nature Centre event did not happen due to COVID-19 restrictions. Rather than meeting in person, a presentation was made online for the Wildrose Outdoor Club.

Dock System - Cardiff Park

Sturgeon County

Grant: \$3,000

Project Code: 002-00-90-327

Project Status: New; Completed

The dock system was installed in the large, open-water pond in Cardiff Park, Sturgeon County's county-wide park, open to the public to enjoy. Numerous visitors use Cardiff Park on any given day. The pond originally had one dock, and via this project, now has two docks, so that both the fishing community and the canoe/kayak community can enjoy accessing the pond without impeding one another. By installing a fishing dock, the fishing community patrons can enjoy the stocked trout and perch fishing experience fully. The dock will enhance this recreation opportunity for anglers (specifically those with small children as they can safely access the pond) and reduce environmental damage to the riparian area around the pond.

Results/Deliverables:

- The dock system was purchased and was installed in June 2021. The new dock allows anglers (specifically those with small children as they can safely access the pond) to use the lake from spring to late fall of this year and many years to come. It will also reduce environmental damage to the riparian area around the pond.
- ACA's logo was included on signage at the dock access in Cardiff Park.

Habitat Heroes Day Camp

Sturgeon County

Grant: \$2,100

Project Code: 002-00-90-324

Project Status: New; Extended until Sept. 1, 2021

The Habitat Heroes Day Camp is a one-day event at Sturgeon County's county-wide park: Cardiff Park. This project is a collaboration between Sturgeon County's Family and Community Support Services department and Agriculture Services department. This free event was to be part of the summer outreach program directed at children and youth aged three to 16.

Results/Deliverables:

- The project has been postponed until July 2021 due to the COVID-19 pandemic. This event will take place in July 2021 with slight changes to the scheduling to accommodate for COVID-19 guidelines, such as smaller rotating groups of children for each station and lunch will not be prepared by participants over the fire. Instead, a caterer will be hired to prepare and serve lunch to the rotating groups.

Taber Fish & Game Association and ACA Youth Fishing Recruitment Day

Taber Fish & Game Association (Taber FGA)

Grant: \$15,000

Project Code: 020-00-90-207

Project Status: Funded 2018/19, 2019/20, 2020/21 and previously funded via the Lethbridge Fish & Game Association; Extended until June 30, 2021

The goal of this project is to host a youth fishing day geared toward youth in southern Alberta to get them on the water fishing, teaching the participants about angling, safe fish handling, and the proper way to use gear.

Results/Deliverables:

- The event was set to take place in June 2020 and was cancelled due to the COVID-19 pandemic and the resulting Alberta Public Health Orders. The event did take place in June 2021 with some changes to the planning, such as less participants, holding it over two days, etc.

Winter Family Fun Fishing Day

Taber Fish & Game Association (Taber FGA)

Grant: \$8,100

Project Code: 020-00-90-272

Project Status: Funded 2019/20; Extended until March 15, 2022

For the last eight years, Taber FGA has hosted a family fun fishing day yearly for youth under the age of 18 in southern Alberta. It is a free event, and no club affiliation is required to attend. Youth are provided the gear required to fish, and mentorship to launch their fishing careers. Youth are set out on the lake to catch northern pike, lake whitefish, burbot, and perch. Catch and release is promoted. The day is centered around fun, being outdoors, away from electronics and distractions, all while learning a new skill, and spending time with family. This event gets an average of 50 youth, 200 parents, guardians, and volunteers attending. The event is advertised, featuring all funding partners, on Facebook, Instagram, the Taber Times, and via club members email list and club events.

Results/Deliverables:

- The winter family fishing event was cancelled in 2021 due to the COVID-19 pandemic. Taber FGA plans to hold the event on Feb. 4, 2022.

Kids Can Catch 2020

Town of Cochrane

Grant: \$3,000

Project Code: 020-00-90-278

Project Status: Funded in 2019/20; Grant funds not dispersed – event cancelled

This Kids Can Catch event was planned for June 2020 at Mitford Pond in Cochrane, Alberta.

Results/Deliverables:

- There are no results or deliverables for this grant. The event was cancelled due to the COVID-19 pandemic. The Town of Cochrane was not able to put on the event in 2021; therefore, the grant funds were not dispersed.

Helmer Dam Revitalization Project – Phase 1

Town of Hanna

Grant: \$10,000

Project Code: 020-00-90-285

Project Status: New; Completed

The overall objective of the Helmer Dam Revitalization Project was to create an all-season fishing area on the Helmer Dam. The Town of Hanna requested funding for Phase 1 of this project, which is the initial fish suitability and wildlife habitat study for Helmer Dam and area. The study entailed water quality and fish habitat data collection for both summer and winter fish habitat assessment to determine if the reservoir can support various species such as rainbow trout (*Oncorhynchus mykiss*) or yellow perch (*Perca flavescens*) throughout the year. The information collected during Phase 1 is intended to determine if further development is feasible for the Town of Hanna and partners to move forward with the information given in the study. While Helmer Dam would not be considered a perfect location to establish a year-round fishery, the Phase 1 report provides scientific data that supports exploring further solutions and recommendations to establish a sustainable long-term solution. One possible solution identified from the Phase 1 report is the installation of an aeration system capable of maintaining ice free area(s) during the winter months to promote re-oxygenation of the reservoir. In addition, it indicates the water levels should be maintained at capacity to reduce heat stress for trout. Fulsome seasonal information related to the water quality and habitat characteristics of the Helmer Reservoir may inform a review of other complementary methods that may be beneficial to improve fish habitat and ensure long term viability of the project.

Results/Deliverables:

- The project proceeded as planned for the most part, with a slight delay to the summer sampling due to COVID-19 restrictions. Initial sampling provided a base and indicated that some form of recreational fishing is plausible. Winter testing was delayed to ensure there was good ice cover on the waterbody; it was completed without any issues. The deeper section of the reservoir showed dissolved oxygen (DO) concentration well below the preferred DO concentration of greater than 9.0 mg/L, and sometimes below the

incipient lethal concentration of 3.0 mg/L. This is likely exacerbated during the winter months when oxygen levels decline farther up the water column, resulting in winter kills. The area does support a healthy population of lake chubb (*Couesius plumbeus*) and fathead minnows (*Pimephales promelas*). Trout that was netted was found to be in fair to good condition. This was both surprising and encouraging for future development prospects.

- A detailed technical report was completed, including data on water quality, wildlife habitat, fish suitability information, and recommendations for future steps.
- Observations and data collected during Helmer Dam studies was shared with Albertans through the completion of Fisheries and Wildlife Management Information System (FWMIS) load forms.

Redcliff Landfill Wetland Enhancement

Town of Redcliff

Grant: \$2,500

Project Code: 015-00-90-288

Project Status: New; Extended until July 1, 2021

The project goal was to develop two functioning wetland ecosystems that would support and enhance wildlife populations while creating educational opportunities to local youth and school groups. The objectives were to plant saskatoons along the shorelines of both riparian ponds; 163 saskatoons were planted in total. Town of Redcliff landfill staff restored 146 m of saskatoon habitat and 626 m of shoreline habitat consisting of willows and other small trees that were planted from cuttings. The main activities were pre-drilling the holes and planting the trees, along with the development of a water well in April 2021 for watering the trees. The project was completed the week of June 21, 2021, with the planting of the remaining 110 saskatoons. So far, there is a 100 percent survival rate of the saskatoons, and the shorelines consisting of willows are growing well and are around six feet in height. Unfortunately, the large riparian pond did not hold enough water to support fish, but it did hold enough water to support leopard frogs. Also, youth or school groups could not attend the project to help plant trees due to COVID-19 restrictions, but once the restrictions are lifted in July 2021 the Town of Redcliff landfill will invite them to visit in the new school year for field trips around the two riparian ponds.

Results/Deliverables:

- This project was extended, as the Town of Redcliff wanted to involve youth groups in the project. With tree planting a seasonal activity, they held off until June 2021 to plant the remaining saskatoons, but COVID-19 restrictions were not lifted until July 2021. Due to this, Town staff planted the remaining saskatoons the week of June 21, 2021.
- Ten Town employees helped on the project, whether it was digging or planting.
- The project created 146 m of saskatoon habitat.
- In all, 626 m of shoreline habitat was restored. All the banks were restored, native grasses were planted above the wetlands, and a water well was developed for irrigation as Redcliff Landfill's contribution.

Alberta Eastern Slopes Strategic Watershed Action Team (SWAT) 2020

Trout Unlimited Canada (TUC)

Grant: \$30,000

Project Code: 015-00-90-270

Project Status: Funded in 2018/19; Extended until March 15, 2022

To address the issue of declining salmonid populations along Alberta's eastern slopes region, TUC continues to build on their growing partnerships and momentum in habitat rehabilitation for native trout, char, grayling, and whitefish in 2020. Through SWAT, TUC will work with partners, TUC chapters, and volunteers to achieve the following objectives: restore degraded habitat and/or improve connectivity of fragmented habitat to benefit native salmonids; engage and educate the angling community and the public at large in the recovery of eastern slopes salmonids. To achieve these objectives, TUC planned the following activities: volunteer involvement fish sampling and bioengineering efforts to engage citizens; habitat rehabilitation to restore riparian habitat and prevent sedimentation; fisheries and habitat assessment to plan and prioritize habitat rehab; and communications and outreach through social media. The project experienced significant delays due to the COVID-19 pandemic, specifically relating to the largest project component (Mackenzie Creek Project), which was where most of the ACA funding was to be allocated. The field season was delayed by around two months, and hiring of field staff was not possible until July—three months later than usual. Further, TUC partners at Alberta Environment and Parks (AEP) experienced similar challenges relating to fieldwork. Without the ability to travel to the site in a single vehicle or to meet on site with partners or volunteers, these delays meant that postponing 2020 activities for this project component was the most sensible option. Given the reduced capacity, TUC staff had to triage which activities could still be reasonably accomplished in a condensed and altered field season.

Results/Deliverables:

- Progress on this project was still significant in 2020 with several of the deliverables being met or exceeded; however, without the need to hire contractors for the Mackenzie Creek work, the ACA portion of the project budget was not spent. This project was extended to allow TUC to use these funds in 2021 for habitat rehabilitation work along Mackenzie Creek and Girardi Creek as part of the Eastern Slopes SWAT project. TUC expect that all the proposed deliverables will be completed by March 2022 as many of them have already been achieved in part or whole.
- The current status of project deliverables is as follows: three volunteer workdays with 17 volunteers engaged; 1,750 willow stakes planted at riparian rehabilitation sites; 550 m of riparian habitat rehabilitated; and two electrofishing inventories conducted.

Pinto Lake Recreational Fishery Development Project

Trout Unlimited Canada (TUC)

Grant: \$15,000

Project Code: 002-00-90-326

Project Status: New; Completed

Pinto Lake is an alpine lake that forms the headwaters of the Cline River near Nordegg, Alberta, and contains an isolated, native population of bull trout (*Salvelinus confluentus*). The lake has been closed to fishing since 1989 due to declining bull trout populations. A recovery plan was initiated in 2015, which included intensive efforts to suppress non-native cutthroat trout (*Oncorhynchus clarkii*). Prior to reopening this special fishery, the recovery plan must be completed, and a report produced that synthesizes recent and historic fishery data to determine whether bull trout have recovered. The objectives of this project were to complete the final year of the five-year Pinto Lake Recovery Program; synthesize all available information to evaluate the effectiveness of the suppression program and determine if the recovery goal was achieved and if not, provide recommendations on future recovery activities; and educate anglers, lake users, and other stakeholders about bull trout recovery efforts and the outcome of the Pinto Lake Recovery Program. In 2020, TUC hired a contractor to review and synthesize fishery information collected at Pinto Lake, provided by Alberta Environment and Parks (AEP) from 1982 to 2019. Although AEP crews had planned to install and monitor a spring fish trap at the outlet of Pinto Lake (to suppress cutthroat trout), this was not completed due to COVID-19 restrictions. However, crews were able to conduct sampling and suppression in August 2020, and the data collected was also included in analysis. Based on the data analysis, the results suggest bull trout in Pinto Lake are recovering well and non-native cutthroat trout are likely not impeding bull trout recovery. Additional monitoring is recommended to continually validate these findings.

Results/Deliverables:

- The main result from the extensive analysis of Pinto Lake fishery data suggests that bull trout in Pinto Lake are recovering well and non-native cutthroat trout are likely not impeding bull trout recovery. Additional monitoring is recommended to continually validate these findings: cutthroat trout are not impeding bull trout recovery was an unexpected result.
- Although spring sampling and suppression had initially been planned it could not be carried out due to COVID-19 restrictions. However, this did create a unique opportunity for August sampling and suppression, which provided valuable data to include in the analysis.
- A report summarizing findings of the Pinto Lake Recovery Program and providing recommendations for future recovery activities and/or management: The initial findings were presented to TUC and AEP during via teleconference in January 2021; the final report was delivered to TUC on March 19, 2021.

- Updated educational signage installed at Pinto Lake and access points summarizing program findings and the future of the recreational fishery were not completed: the decision was made to drop the signage component from the project scope in 2020-21. TUC will explore signage opportunities using other sources of funding in 2021 and may incorporate messaging/learnings from this project.
- An article to be published on TUC's website, social media posts summarizing outcomes of the project, and presentation slides that can be delivered to user groups and stakeholders will be completed in spring 2021.

Yellow Fish Road/ Water Edu-Kits

Trout Unlimited Canada (TUC)

Grant: \$21,040

Project Code: 020-00-90-211

Project Status: YFR funded since 2014/15 and WEK funded since 2017/18; Extended until Dec. 31, 2021

Project Website: www.tucanada.org/yellow-fish-road and www.tucanada.org/water-edu-kits

Yellow Fish Road (YFR) and Water Edu-Kits (WEK) are TUC's primary offerings for kindergarten to Grade 12 classrooms, both offering an experience that blends learning with science and individual action toward supporting the preservation of Canada's freshwater resources. These programs have transitioned over the years, and prior to the COVID-19 pandemic TUC had plans to pivot both programs to offer more in-person delivery. This would allow teachers and students to receive learning around the impact of human activities on water sources that transcended what was previously available through self-directed learning that was not able to provide the same depth of learning as guided experiences. A new face-to-face model was created in the hopes that TUC would be able to reach out to both urban and rural centres with local community members. The COVID-19 pandemic has negated the viability of TUC's in-person delivery model, and the absence of an education lead due to retirement has meant delays to the 2020 projects. All of TUC's education programs were reassessed in late 2020, and TUC now have a more definitive direction that allows for learners in any part of Alberta to receive programming through virtual interaction and kits that have been reimagined to have greater alignment with the Alberta curriculum and decreased reliance on local in-person resources. The COVID-19 pandemic has caused TUC's plans for this project to change dramatically.

Results/Deliverables:

- TUC has continued planning for the future of YFR and WEK and has decided to pivot to virtual or online learning and therefore has been increasing and developing competency in the use of digital tools and development of video and virtual reality (VR) environments to support learners.
- By mid-April, TUC will finish piloting a series of 360 VR environments that support students in experiencing a stream from their classroom and learning how to inquire about the state of the stream based on what is visible. This will dovetail with a revamp of WEK to ask learners to contextualize and deepen their learning.

DEKER (Developing Environmental Knowledge and Respect)

Valhalla School Foundation

Grant: \$15,000

Project Code: 002-00-90-328

Project Status: New; Extended until March 15, 2022

The goal of this project is to teach various conservation courses, such as outdoor/wilderness safety, understanding habitat and big game breeding seasons, ethics of hunting, etc., to the Valhalla junior high students to increase their knowledge and respect for the environment and wildlife surrounding them. The charter goal for the Valhalla Community School is to develop community-minded leaders, and this project would make sure all the youth coming from this school had invaluable knowledge about the environment around them. The school has been in contact with Hunt Ready and are getting organized to run an Alberta Hunter Education Instructors' Association course for all the kids starting shortly. The plan is to teach 22 – 32 youth in the first year of this program, depending on registration in this public charter school.

Results/Deliverables:

- This project has had delays with setting up the field trips due to the COVID-19 pandemic and delays with organizing the grant. Field trips have been organized for the junior high students with Hunt Ready for fall of 2021.

Wetaskiwin/Leduc Alternative Land Use Services (ALUS)

Wetaskiwin County

Grant: \$5,600

Project Code: 015-00-90-261

Project Status: Funded since 2018/19; Completed

Project Website: www.county.wetaskiwin.ab.ca/526/ALUS

The goal of this project is to engage Wetaskiwin and Leduc County farmers through the ALUS program to conserve, enhance, and restore wetland and upland habitats, which restore and conserve species and habitats on private land. The project supports voluntary actions on private land through the Wetaskiwin/Leduc ALUS program. Targeted outreach to agricultural producers with environmentally significant areas (ESA), as those identified in the Leduc County ESA study (2015), along waterbodies, including but not limited to the Modeste subwatershed, the Pigeon Lake and Wizard Lake watersheds. Both counties border on these important recreational lakes. The project objectives are to increase the number of acres enrolled in wildlife habitat stewardship (reforestation, riparian area enhancement, and pollinator habitat); raise the profile of the ALUS program and raise awareness of the benefits of ALUS to all of society; to increase wildlife habitat/ecosystem services education among the

farmer and rancher community and public; to increase awareness of the benefits of working with private landowners to improve wildlife habitat conditions for the enjoyment of the public; and to provide multiple ecological benefits including habitat for fish and wildlife, flood mitigation, erosion control, biodiversity, and cleaner water.

Results/Deliverables:

- Two new ALUS projects were supported with a new participant: projects located at Weed Creek, a Leduc County ESA, and Batter River Watershed, above Pipestone Creek.
- In all, 11.25 hectares associated with enhanced wetland and creek riparian areas were protected.
- Just over 400 m of permanent riparian fencing was installed.
- Approximately 1.6 km of electric fencing was provided – Razer Grazer, flexible tool for adaptive, multi-paddock grazing.
- Gate signs, which include ACA's logo, were provided to participants upon project completion.

Evan Thomas and Bow Valley Vegetation Management: Mountain Sheep and Ungulate Prescribed Burn Habitat Enhancement Planning

Wild Sheep Foundation Alberta

Grant: \$10,000

Project Code: 030-00-90-312

Project Status: New; Extended until Sept. 1, 2021

The goal of this project was to make amendments to the current Evan Thomas Vegetation Management Strategy to enlarge the proposed hectares of prescribed burns to greater enhance bighorn sheep habitat. If this project goes well, the Wild Sheep Foundation can see this model being used on other current vegetation management strategies in Sheep Management Areas throughout the province.

Results/Deliverables:

- The proposed amendments have been made and the consultation with Alberta Environment and Parks (AEP) and Alberta Forestry has been completed. The plan will be approved after First Nations' consultation.



Campers practicing firearm skills at the Southern Alberta Bible Camp range
Photos provided by: Southern Alberta Bible Camp
Relating to the project: Pelletry Program (002-00-90-236)

ACA Research Grants

Algae as Modifiers of Fish Health in Agriculture-Impacted Waters

Athabasca University – Dr. Chris Glover

Grant: \$9,750

Project Code: 020-00-90-282

Project Status: New; Extended until Dec. 31 2021

Nutrient enrichment in waterbodies may lead to harmful algal blooms, which release toxins that pose substantial risks to human and environmental health. Fish are particularly sensitive to algal toxins; however, the exact cause of toxicity remains controversial. This research aims to examine effects of exposure to the blue-green algae toxin microcystin in rainbow trout. In addition to laboratory fish exposure studies, a probabilistic aquatic hazard assessment will be conducted using environmental exposure distributions of measured toxin water concentrations to examine whether toxicological thresholds or surface water quality values are being exceeded in Alberta waterbodies. This project will inform water quality assessment and management for the protection of an important recreational fish species: the rainbow trout.

Results/Deliverables:

- The hazard assessment is almost complete. The research team is currently seeking some additional data sets that will allow them to broaden the final analysis. They are in the final stages of preparing the hazard assessment for publication.
- The acute rainbow trout study was not conducted because of the lack of an affordable source of microcystin. The chronic microcystin exposure study has been completed, but there are still a few outstanding laboratory analyses that remain to be finished. They anticipate these will be completed by the end of 2021, assuming that laboratory access restrictions ease.

Predator-Prey Dynamics and Habitat Disturbance: Are all Disturbances Created Equal?

fRI Research – Dr. Laura Finnegan

Grant: \$18,500

Project Code: 030-00-90-305

Project Status: New; Extended until May 31, 2021

Project Website: friresearch.ca/program/caribou-program

Anthropogenic habitat disturbance has altered predator-prey dynamics, resulting in declines in caribou populations in Alberta. Identifying the attributes of disturbed areas associated with the highest overlap between caribou, primary prey, and predators could help to inform habitat restoration priorities and forest management practices to decrease the spatial overlap between caribou, their apparent competitors, and their predators, and will also contribute valuable information that could be used to determine when disturbances are no longer impacting ecosystem function for caribou. Existing camera data were used, collected on seismic lines during 2013 – 2018 and in cutblocks during 2018 – 2020 from four west-

central Alberta caribou, to model the occurrence and co-occurrence of alternate prey, predators, and caribou within seismic lines and cutblocks in relation to disturbance characteristics, season, and the surrounding habitat matrix.

Results/Deliverables:

- Low detection and occupancy were found for caribou on seismic lines, and no caribou were detected at any cameras in cutblocks. In seismic lines and in cutblocks, higher detection and occupancy was observed during summer than during winter for a number of primary prey species. Disturbance age was not a significant predictor of occupancy for cutblocks, instead, occupancy of individual prey and predator species were predicted by site-level vegetation characteristics, as well as the habitat and anthropogenic disturbance densities in the surrounding area.
- For seismic lines, regeneration height was a significant predictor of moose and white-tailed deer occupancy but was not a significant predictor for other species, instead, like cutblocks, occupancy of predators and other ungulates were predicted by site-level vegetation characteristics and anthropogenic disturbance densities in the surrounding area. Combined, these results indicate it is important to include the characteristics within and surrounding anthropogenic disturbances when considering predator and prey distribution, and that for cutblocks, disturbance age may not be a good indicator of when disturbances are no longer impacting predator-prey dynamics within caribou ranges.
- Considering multi-species models, occupancy of black bears and grizzly bears was found to be higher when deer were present. These results illustrate that higher local occupancies of prey species could directly increase spatial overlap of bears and caribou, resulting in increased caribou predation risk. Understanding the interrelationships between caribou, primary prey, predator occurrence, predator-prey co-occurrence, and disturbance characteristics will inform a balanced management and restoration approach. Limiting the overlap of caribou, alternate prey, and predators within caribou ranges is likely to be a key measure of the success of habitat restoration for caribou.
- Field data collection: completed August 2020.
- Progress report: completed September 2020.
- Camera trap data entry: completed November 2020.
- Analysis of species occurrence on regenerating seismic lines and regenerating cutblocks: completed May 2021.
- Models of animal occupancy and species co-occurrence: completed May 2021.
- Maps of predicted animal occupancy and species co-occurrence: in progress.
- Submission for publication in peer-reviewed journal is anticipated September 2021.
- Presentation of research at Alberta Chapter of the Wildlife Society meeting is anticipated March 2022.

Evaluating Activity Survey Apps for Conservation and Economic Valuation from Recreation

University of Alberta – Dr. W.L. (Vic) Adamowicz

Grant: \$33,700

Project Code: 015-00-90-283

Project Status: New; Completed

This project, also known as the University of Alberta Value of Hunting Project, spearheaded the development and pilot of an activity survey app designed specifically for hunting. Funding from Alberta Innovates' Ecosystem Services and Biodiversity Network made it possible to add activity survey functionality to the popular iHunter app. Following on from that, this grant funded a pilot study to test the augmented iHunter app during the 2020 spring hunting season. The development of the augmented iHunter app has been a success based on: 1) the quality of the data generated by the app during the pilot study, 2) the generally positive feedback obtained during the debriefing meetings, and 3) the responses to the following questions from the pilot study exit survey. After the pilot, debriefing meetings were held with pilot study participants to collect feedback on how to improve the augmented iHunter app. During meetings with ACA representatives, there was interest in implementing some of these improvements and holding another pilot study during the 2021 spring hunting season. Once these app improvements are implemented and tested this spring, the research team hopes to recruit hundreds of hunters to use the app and begin collecting data on wildlife populations and travel costs in 2021/22. The richness and quality of these data will enable cutting-edge research on the relationships between three critical wildlife themes: habitat quality, population dynamics, and the economics of hunting. Indeed, given the success of this work thus far, a major benefit will be the legacy of discoveries made possible through the long-term use of the augmented iHunter app.

Results/Deliverables:

- The main result of the pilot study was showing that the augmented iHunter app can quickly and easily collect high quality activity survey data. These data can then be used to assess wildlife population dynamics, the economic value of hunting, and the impact of policy changes affecting hunting.
- The pilot study also showed that survey questions are easily embedded in the augmented iHunter app to assist with wildlife population monitoring.
- The responses to the pilot study exit survey were very positive, with the following results:
 - On a scale from 0-10, how would you rate your experience taking part in the University of Alberta Value of Hunting Project? Average = 8.3; range = 5 – 10.
 - On a scale from 0-10, how easy was it to complete the requirements of the Value of Hunting Project using the iHunter app? Average = 8.8; range = 7 – 10.
 - If the University of Alberta Value of Hunting Project was to continue in the future, would you participate again? "Definitely yes" (42

percent of responses); "Probably yes" (50 percent of responses); "Might or might not" (8 percent of responses); "Probably not" (0 percent of responses); and "Definitely not" (0 percent of responses).

- Two pilot study wrap-up meetings with 15 participants were held on June 15, 2020 using the Zoom digital meeting platform collected feedback on how to improve the augmented iHunter app. During meetings with ACA, there was interest in implementing some of these improvements and holding another pilot study during the 2021 spring hunting season.
- Academic publication: A journal article is being finalized that will detail the enhancements made to the app and the insights gained from the pilot study. Given that there are few examples of the use activity survey apps in recreation (and as far as we know, none are designed specifically for hunting) the researchers feel there is a good chance that this article will be published in a peer-reviewed academic journal.

Chronic Wasting Disease Inactivation by Humic Substances

University of Alberta – Dr. Judd Aiken

Grant: \$25,000

Project Code: 030-00-90-307

Project Status: New; Extended until Oct. 31, 2021

Chronic wasting disease (CWD) is a contagious, always fatal, prion neurodegenerative disease of elk, deer, moose, and caribou, occurring in wild and farmed cervids. Infected cervids shed CWD prions into the soil, contributing to disease spread and resulting in a long-lasting risk with vast ecological and economic consequences. The research team have recently shown that humic acids, one of the major compounds of soil organic matter (SOM), can inactivate prions reducing infectivity and hypothesize that humic acids and related SOM compounds can be adapted to be an environmentally friendly method of prion inactivation. If successful, this technique not only decontaminates the lands but also may improve soil properties as humic acids commonly used as a fertilizer. This research has two objectives: to delineate the biochemical properties of humic substances responsible for prion inactivation, and to validate humic acid inactivation of prions in natural soils. Both objectives are unchanged and being pursued with the production of positive results.

Results/Deliverables:

- So far progress has been made on understanding the mechanism of humic acid inactivation. A prototype environmentally friendly humic acid formulation is progressing and is being tested for efficacy. Some progress has been made with identifying the most promising additives that enhance humic acid properties to degrade CWD prions.
- Also, relating to the second objective, a method for extracting and detecting infectious CWD prions from natural soils is being developed. This method will be used to validate inactivation of prion-bound soils treated with humic acids.

Wildlife Monitoring to Support Urban Ecological Planning

University of Alberta – Dr. Colleen Cassady St. Clair

Grant: \$21,500

Project Code: 030-00-90-306

Project Status: New; Extended until March 15, 2022

Habitat loss and fragmentation threaten biodiversity globally, particularly in urban areas where over 80 percent of Albertans reside. Retaining species and biological processes that are sensitive to urban development is dependent on identifying and protecting areas with high value to biodiversity that also retain functional connectivity via the movement of individuals within an ecological network. The City of Edmonton attempts to support these networks explicitly in the planning process with guidance to developers that rely on ecological indices of *biodiversity potential* and *ecological connectivity* that are derived from remote-sensing data. Other planning employs models of animal movement derived via circuit theory, but none of these tools has been verified with ground-based information. This project uses remote cameras in natural areas and parks to test the estimation capacity of two indices and two circuit models across a range of urban density, while collecting broader public information about the distribution and relative habitat use of wildlife species in Edmonton. Camera placement began in spring 2018 and data collection continues into 2021. Images are being collected from approximately 60 camera sites, and the data processed to obtain visitation rates for several species and guilds. Data will be analyzed to support use in civic planning, public information, and international collaboration. These products will improve the City's capacity to plan future development to support biodiversity in Edmonton and the broader capital region, while lending insights that might be generalized to other urban areas and urban wildlife conservation initiatives. A couple of new project objectives were added to the scope of the project, one of which is developing an artificial intelligence (AI) tool to remove human images from the image database and enable at home image tagging by volunteers (a response required to address unforeseen COVID-19 restrictions).

Results/Deliverables:

- COVID-19 restrictions resulted in significant delays with the planned work. Positions for a co-op student and sustainability scholar with the City of Edmonton were cancelled. This situation contributed to the AI-based approach the researchers explored with the City of Edmonton Analytics Center of Excellence. Although it required start up time to build and refine this system, it is now working well; photos are being processed at a rate that has allowed for complete tagging through the January 2021 camera check.
- Since November, the team has completed tagging for 185,160 photos (195 hours) and verification of 206,575 photos (89 hours).
- In keeping with the COVID-19 delays, the completion of Cassie Stevenson's master's degree has been delayed from Spring 2021 to late summer.
- In the coming months, the research team will complete the analytical part of this work to support the comparison with the city's existing metrics for biodiversity value and ecological connectivity, advancing each of the objectives as originally planned.

Interactive Effects of Landscape Diversity and Local Flower Abundance on Wild Pollinator and Other Beneficial Insect Abundance, Diversity, and Interactions in Agricultural Landscapes

University of Alberta – Dr. Carol Frost

Grant: \$29,500

Project Code: 015-00-90-285

Project Status: New; Extended until March 15, 2022

Understanding factors affecting wild pollinator abundance and diversity in agricultural landscapes, both in crops and in remnant natural habitats, is critical to managing these landscapes for both agricultural sustainability and conservation of natural habitats and the wildlife that they support. Landscape diversity and local flower abundance have been suggested in other places to increase wild pollinator abundance, but a detailed understanding of which variables are most important in Alberta landscapes is lacking. Alberta's Aspen Parkland is an ecoregion that has been extensively converted to agriculture, with only 5 percent of the region's natural vegetation remaining, and which contains a large gradient of landscape diversity: some areas have large proportions of the landscape with natural vegetation, and other areas are very intensively cropped. In this study, by measuring large numbers of landscape variables and local flower abundance and diversity, and by collecting detailed information on wild pollinator abundance, diversity and flower visitation, this research aims to determine the most important variables affecting pollinators in both crops and remnant natural areas in Aspen Parkland. As a part of this study, the researchers also aim to better understand the ecological role of non-native weedy plants in these landscapes—whether they may provide important floral resources for wild pollinators at times when native flowers are scarce and crops are not flowering, or whether they may draw pollinators away from less showy native plants, and thus compete for pollinators with native species. This work will help inform land-use decisions, conservation planning, and agricultural practices.

Results/Deliverables:

- This project has not yet been completed as planned, because the provincial and University of Alberta COVID-19 pandemic precautions did not allow fieldwork in April and May 2020, and after that, required a maximum of two persons per field vehicle. Both restrictions prevented this project from being possible in summer 2020. To thoroughly answer the questions outlined in this project's objectives, it is important to measure insect biodiversity, flower visitation, and movement throughout the whole growing season, which in addition to giving a more complete picture of the biodiversity supported by non-crop vegetation, will allow us to investigate temporal fluctuations in insect abundance, diversity, and movement between crop and non-crop vegetation throughout the season.
- The research team are starting fieldwork in 2021, after having to postpone the project by one summer due to COVID-19. Communication with land owners about visiting their land to find field sites has already started, and bi-directional malaise traps have been ordered, which will be used to measure movement of pollinators and other beneficial arthropods into and out of non-crop vegetation.

Sustaining Access and Social License for Hunting in a Mix-Use Conservation Site: A case study in the Cooking Lake-Blackfoot PRA

University of Alberta – Dr. Howie Harshaw

Grant: \$27,000

Project Code: 015-00-90-284

Project Status: New; Completed (Research delayed, continues with 2021/22 Research Grant)

The potential for conflict between hunters and non-hunters poses threats to the continued access for hunting at public mixed-use sites in the province. Understanding and characterizing the potential for conflict at the Cooking Lake-Blackfoot (CLB) Provincial Recreation Area (PRA) will help to identify sources of conflict before they become major issues. This research proposes to investigate the ways that hunters and non-hunters are sharing the landscape in the CLB PRA east of Edmonton. This research has three objectives: 1.) investigate how hunters and non-hunters share the landscape at CLB PRA, and the current state of, and potential for, interpersonal and social values conflict between hunters and non-hunters in the PRA; 2.) understand the underlying drivers of conflict at the CLB PRA using an established framework that has been consistently applied to recreation conflicts, including hunting; 3.) determine whether site users' and managers' perceptions of site use levels and concerns for safety are supported by sites users' personal experiences, empirical data of recreation effort, and intensity of firearm use. This research investigates the ways that hunters and non-hunters are sharing the landscape in the CLB PRA east of Edmonton. Due to challenges associated with the COVID-19 pandemic, data collection was delayed and did not take place within the 2020/21 grant year. However, all survey materials, permissions, and permits have been finalized and data collection will begin in May 2021.

Results/Deliverables:

- Two web-based questionnaires have been developed to measure CLB PRA visitors' participation in outdoor recreation activities and their experiences while in the PRA: a questionnaire for people who hunt in the PRA, and a questionnaire for people who do not hunt in the PRA. These questionnaires have been pilot-tested and reviewed by managers. The web-based surveys can be found here: www.blackfoot-pra-survey.ca.
- The two questionnaires, participant consent forms, and sampling procedures received approval from the University of Alberta Research Ethics Board.
- An Alberta Environment and Parks (AEP) Research and Collection Permit has been approved and secured.
- Permission has been received from AEP to distribute invitations to participate in the hunter survey to 2020 Firearms Discharge Permit applicants. This allows for a census of all Discharge Permit applicants in WMU 936. Invitations to participate in the hunter survey will be sent out.
- A list of organizations that have activities, interests, and/or associations with the CLB PRA has been compiled. Organizations on this list will be contacted and asked to distribute an invitation to participate in the non-hunter or hunter survey to their members. These organizations will be contacted after the hunter survey has been administered.

Distribution and Habitat Associations of Semi-Aquatic Furbearers in the Beaver Hills Biosphere

University of Alberta, Augustana – Dr. Glynnis Hood

Grant: \$28,750

Project Code: 030-00-90-309

Project Status: New; Extended until Sept. 1, 2021

The semi-aquatic mammal project investigates factors influencing distribution and habitat selection of semi-aquatic mammals (i.e., beaver, muskrat, river otter, mink, American water shrew, and northern bog lemming) within Alberta's Beaver Hills Biosphere reserve. The project goals are to measure semi-aquatic mammal diversity, determine relationships between species occurrence and habitat composition, including aquatic connectivity, and test for interspecies associations. Since late July 2020, the researchers have used a multi-method approach to sample the occurrence of semi-aquatic mammals within the Beaver Hills, by using various camera trap configurations (e.g., box, raft, and dam), field sign surveys, environmental DNA (eDNA), and local knowledge. Winter beaver lodge occupancy surveys, and winter sign surveys (e.g., tracks, muskrat huts) are continuing until April 2021. The specific project objectives are as follows: 1) identify current and past distributions of semi-aquatic furbearers in Beaver Hills through Public Participation Geographic Information Systems (PPGIS) and trapping records to indicate potential survey sites for river otters and mink; 2) use multi-method surveys (i.e., sign surveys, camera trapping, eDNA) to determine distributions of semi-aquatic furbearers occupying aquatic habitats within the Beaver Hills; 3) facilitate development of eDNA assays for focal species with InnoTech Alberta; 4) analyze GIS data to quantify land-use and aquatic connectivity; 5) develop and select candidate models to determine which landscape features relate to species occurrence; and 6) engage local landowners and other groups through outreach opportunities. Identification of the wildlife camera photos ($n = 28,244$ photos; 58 species) has been completed, and beaver lodges and muskrat sites mapped the surveyed in GIS ($n = 2,626$ lodges, 251 muskrat sites). Assay development for eDNA sampling is in progress, and InnoTech Alberta already has extracted DNA from project samples. Once assays are ready, these samples can be assessed for species occurrence. Once complete, the effects of different landscape features on species occurrence will be quantified. This multi-faceted approach to landscape-scale ecological questions incorporates opportunities for citizen scientists (26 volunteers), informs effective wildlife and habitat management in Alberta, will validate eDNA methods to detect semi-aquatic mammals, and improves methods to detect riparian mammals with wildlife cameras.

Results/Deliverables:

- The 2020 Annual Project Report including current analysis and interpretation of all occurrence data and GIS analysis conducted to that date.
- The 2021 Final Report will include conclusions regarding i) semi-aquatic furbearer diversity within the Beaver Hills Biosphere, ii) habitat selection by semi-aquatic furbearers, iii) land-use influences on aquatic connectivity, and iv) interspecific distribution and associations relative to habitat type and land use: Preliminary analysis has been conducted of the wildlife photos (spreadsheet finalized on March 12, 2021; new photos will be collected in

2021). GIS data files for the beaver lodge occupancy surveys and other sign surveys are updated as required. Updated maps have been provided to all land management organizations (i.e., Nature Conservancy of Canada, Alberta Environment and Parks, and Elk Island National Park). All data files (e.g., beaver lodge locations, and camera data) will be provided to these agencies at the end of the project.

- Publications:
 - There will be at least one journal publications resulting from this project. Target journals include *Biological Conservation*, the *Journal of Wildlife Management*, and a small methods paper for the journal *Wildlife Research* because of the great success obtained with the camera boxes relative to detecting small mammals, and the extensive coverage of the beaver lodge occupancy surveys.
 - Two popular articles were published: one for the *Beaver Hills Bulletin*, and the other for the spring edition of *Nature Alberta*.
- The project is listed on Dr. Hood's university website.
- Presentations:
 - Preliminary results were presented at the virtual Alberta Chapter of The Wildlife Society (ACTWS) conference on March 26, 2021.
 - Given the pandemic and the amount of work required for fieldwork, there have not been any public talks in person, but interest is increasing as people learn about the project.

Chronic Wasting Disease in Deer: Modeling transmission from contact rates

University of Alberta – Dr. Evelyn Merrill

Grant: \$11,000

Project Code: 030-00-90-228

Project Status: New; Extended until May 31, 2021

Project Website: abchronicwasting.biology.ualberta.ca/

Chronic wasting disease (CWD) is the most significant issue in wild cervid management in North America. Recent studies from Wyoming and Colorado now demonstrate population-level declines in deer related to CWD. Alberta is one of two provinces in Canada with CWD in wild cervids, with over 2,000 cases (~85 percent in mule deer) in Alberta since its detection in 2005. At present, we do not know major routes or factors influencing animal-to-animal or environment-to-animal transmission, necessitating small-scale behavioural studies for justifying cost-effective control. January 2021 marked the end of this four-year, collaboratively funded field study (the first of the four years being a pilot study). Field studies at Canadian Forces Base Wainwright (CFBW) in 2016 – 2017 were expanded to Cresthill Grazing Lease (CGL), near the CFBW. On CFBW, 35 deer were captured and collared in 2017, with additional deer captured on CGL from 2018 to 2020 (25 deer in 2018, 32 deer in 2019, and 39 deer in 2020). Supplementing the data from GPS locations of collared mule deer, monthly density surveys were conducted, and 35 game cameras were deployed throughout the CGL. Data analysis will be completed by March 31, 2022; however, preliminary analyses are available. Results from this field study provide inputs into models for predicting changes in CWD prevalence rates to improve targeted surveillance and control.

Results/Deliverables:

- Project website has been updated with information regarding the 2020 mule deer captures.
- Blood (pregnancy), ear tissue (genetic), and tonsil (CWD-test) samples were collected and sent to labs for respective analyses.
- Grants have been secured for the final year of this study (i.e., 2021-2022 from the Alberta Prion Research Institute, and the Wildlife Management Institute [USA]).
- Project Annual Report submitted to five funding agencies.
- The Manual for the CWD Risk and Spread Model and Shiny app was completed.
- Presentations:
 - Proposed analysis for CWD risk in white-tailed deer, Edmonton, Alberta (virtual), May 21, 2021 (L. Put)
 - Proposed analysis for CWD risk in white-tailed deer, Merrill Lab Meeting, Edmonton, Alberta (virtual), May 18, 2021 (L. Put)
 - Modeling CWD spread: CWD research update, Alberta Prion Research Institute, Edmonton, Alberta (virtual), April 27, 2021 (Invited, E. Merrill)
 - CWD risk and spread model and shiny app, Alberta Chapter of The Wildlife Society (ACTWS) 2021, Edmonton, Alberta (virtual), March 26, 2021 (Put)
 - Modelling the spread of chronic wasting disease in mule deer based on their home range behaviour, ACTWS 2021, Edmonton, Alberta (virtual), March 26, 2021 (J. Xu)
 - Individual-based modelling of chronic wasting disease, ACTWS 2021, Edmonton, Alberta (virtual), March 26, 2021 (K. Gritter)
 - Relating risk of direct contact and risk of CWD infection in mule deer (*Odocoileus hemionus*), ACTWS 2021, Edmonton, Alberta (virtual), March 26, 2021 (M. Dobbin)
 - Modelling the spread of chronic wasting disease in mule deer based on their home range behaviour, Lewis Lab Meeting, Edmonton, Alberta (virtual), March 8, 2021 (J. Xu)
 - Delineating group membership using pairwise movement metrics, CWD group meeting, Edmonton, Alberta (virtual) February 21, 2021 (M. Dobbin)
 - Alberta CWD risk modeling: Final application demonstration. Alberta Environment and Parks (AEP). Edmonton, Alberta (virtual) January 21, 2021 (Invited, E. Merrill)
 - How to use the CWD risk and spread prediction shiny app, U. of Alberta - AEP Workshop, Edmonton, AB. (virtual), January 21, 2021 (L. Put)
 - Alberta CWD risk and spread modeling, Alberta Environment Scientific Series, Edmonton, AB. (virtual), December 6, 2020. (E. Merrill)
 - Relative contact risk: Model structure and proximity logger data, Merrill Lab Meeting, Edmonton, Alberta (virtual), October 23, 2020 (M. Dobbin)

- Modelling the spread of chronic wasting disease in mule deer based on their home range behaviour, Wang Lab Meeting, Edmonton, Alberta (virtual), September 22, 2020 (J. Xu)
- CWD risk and spread model and shiny app, AEP, Edmonton, Alberta (virtual) July 24, 2020 (L. Put)
- Alberta CWD risk modeling: Progress and update. AEP. Edmonton, Alberta (virtual), June 18, 2020. (E. Merrill)

The Changing North: How will thawing and burned permafrost peatlands impact habitat for woodland caribou and moose?

University of Alberta – Dr. David Olefeldt

Grant: \$34,000

Project Code: 030-00-90-308

Project Status: New; Extended until April 30, 2021

Project Website: caws.ualberta.ca/research/

Permafrost peatlands in northern Alberta are vulnerable to rapid thaw over the next 50 years due to the individual and interacting effects of climate warming, wildfire, and linear disturbances (e.g., seismic lines). Shifts in land cover types due to thaw will affect the diversity of habitat available for wildlife, including *Endangered* woodland caribou and, increasingly, moose. As caribou populations continue to decline in Alberta, knowledge of both short-term and long-term losses in habitat is essential for the development of effective regional conservation plans. The goal of this research is to identify future land cover change and fragmentation across permafrost peatlands in northern Alberta. The project objectives are to determine shifts in ecosystem structure and function in thawing and burned permafrost peatlands; and assess spatial and temporal changes in the extent and type of landforms in permafrost peatlands to determine changes in habitat suitability for moose and caribou. Using existing available data and published research on permafrost peatlands with different thaw status and time since fire, a conceptual framework was developed for spatiotemporal changes in ecosystem state in thawing and burned permafrost peatland landscapes. These conceptual models for shifts in ecosystem state highlight the main controls and ecohydrological feedbacks for vegetation succession and the development of different peatland types and forests in different landscape permafrost and hydrological settings (e.g., permafrost vulnerability to thaw, drainage potential, groundwater connection). While the development of the final GIS-based model and spatial analysis is ongoing, the analysis of potential post-thaw and/or post-fire ecosystem development trajectories suggests limited opportunity for the recovery of lichens, a key winter food source for caribou. In locations with stable hydrology, wetter conditions may be optimal for peat accumulation and the recovery of black spruce forested peatlands, and eventually, lichens. In locations with increased drainage, drier conditions will favour the recovery of early successional forest (with deciduous trees and shrubs), and the slow recovery of black spruce forest (with lichens on drier, degraded peat). However, as the risk of fire is increased in drier conditions typical of black spruce forests, the slow growth of lichens will be constrained by more frequent and potentially severe wildfires in all settings. For moose, the post-thaw development of early successional forest in locations with better drainage will be an advantage, as will post-fire recovery of these species (e.g., aspen, birch, and other deciduous shrubs).

Results/Deliverables:

- Travel restrictions and university restrictions for fieldwork and lab/office access due to the COVID-19 pandemic have caused some changes and delays to this project. Fieldwork could not proceed as originally planned, so there is no new field data to support the resulting conceptual models. However, the research team decided it was possible to proceed with the project using existing available data and published research to complete the conceptual models, and as a result, a more detailed conceptual framework for spatiotemporal changes in ecosystem state has been developed in thawing and burned permafrost peatland landscapes. Final models were completed in late May/early June, with feedback and comments from colleagues. After the finalized conceptual models, work will be completed on the spatial analysis for habitat suitability using a GIS-based model. Initial results are anticipated from the model in mid-summer, with the goal to have the final results by the end of the summer.
- Two high impact publications and contributions to meetings and conferences:
 - Draft publications should be ready in late 2021, following the completion of the GIS-based model and spatial analysis for habitat suitability.
 - The conceptual framework and models for ecosystem change in thawing and burned permafrost peatland landscapes were presented at the “Mer Bleue and Beyond” Peatland Research meeting (online, hosted by McGill University) on May 20, 2021.
 - Opportunities to present the research at other conferences and meetings, particularly local or regional events, in late 2021 and through to early 2022, will be explored.

Causes and Consequences of Gut Microbiome Diversity in Bighorn Sheep

University of Calgary – Dr. Jocelyn Poissant

Grant: \$21,000

Project Code: 030-00-90-303

Project Status: New; Extended until December 31, 2021

The vertebrate gut bacterial microbiota (GBM) is one of the richest and most complex microbial communities on Earth. Links between the GBM and health in humans, livestock and experimental models suggest that the GBM may be key in explaining fitness variation in wild animals. Consequently, the importance of maintaining or promoting host-associated microbiome diversity in wildlife has emerged as a new paradigm in conservation biology. However, the idea of considering microbiome diversity in conservation remains contentious because of our limited understanding of the factors shaping GBM variation in natural environments and a scarcity of examples clearly linking microbiome diversity with health, fitness, and population dynamics in wildlife. This research will address these knowledge gaps by conducting a unique large-scale study of GBM diversity in Alberta bighorn sheep. This research will 1) describe province-wide GBM diversity using samples from 20 to 30 herds, and test if co-grazing with cattle impacts the GBM of bighorn sheep; 2) identify determinants and fitness correlates of individual-level variation in GBM using the Ram Mountain long-term individual-based study as a model; and 3) determine if translocations impact GBM diversity and fitness in recipient populations. This project

will yield important insights on the causes and consequences of GBM variation in bighorn sheep and provide critical information on the role of gut microbiome variation on the health and performance of wildlife populations. Results will benefit conservation and management by informing future efforts to promote or modify host-associated microbial diversity through animal translocations, probiotics, and fecal transplants.

Results/Deliverables:

- The project was delayed due to the COVID-19 pandemic. The laboratory was closed for much of the summer 2020, and they were unable to recruit a summer undergraduate student to conduct analyses as originally planned.
- Sampling could not take place at Cadomin in summer 2020. While no microbiome (sequencing) analyses were conducted in the first year of the project, collaborator Marco Festa-Bianchet was nonetheless able to complete a field season at the Ram Mountain site in summer 2020. Some of these samples will be included in this project to improve the scope of analyses. All samples required for the project have been transferred from the University of Alberta to the University of Calgary, and DNA extraction is underway.
- A B.Sc. student has been recruited to work on this project in summer 2021. Sequencing analyses are currently being planned and preliminary data should be obtained in April 2021. The rest of the sequencing will be done during the summer, and statistical analyses will be completed in fall 2021.

Ecological Epidemiology of Emerging *Ambystoma tigrinum* Virus (ATV) in a Population of Tiger Salamanders in Southwestern Alberta

University of Lethbridge – Dr. Cam Goater

Grant: \$9,387

Project Code: 030-00-90-285

Project Status: Funded since 2018/19; Completed

Epidemiologists do not understand the factors that lead to year-to-year variation in outbreak dynamics for emerging wildlife diseases. In extreme cases, high host mortality can be observed in one year, followed by undetectable mortality the very next year. This inconsistency can occur even in the face of high rates of transmission in both outbreak and non-outbreak years. One objective of this research is to monitor year-to-year variation in both demographic characteristics of *Threatened* western tiger salamanders and variation in transmission rates of a lethal emerging ATV. A long-term objective of this monitoring work is to test the hypotheses that variation in annual host mortality is associated with variation in host condition or in variation in ATV virulence. The research team has been monitoring salamander demography and ATV infection dynamics in Livingstone Lake in southwestern Alberta since 2012. Larval salamanders were collected in life traps during the start (mid-July), middle (end-July), and end (mid-Aug.) of the larval period. During each collection, individual rates of larval growth and development were assessed, as well as ATV-induced pathology, and then the larvae were released. Prior to release, a small section of the tail was removed. This tissue is analyzed in the lab with standard molecular procedures to diagnose ATV infection in each individual. This grant provided funding support to complete salamander population monitoring and ATV diagnostics work during the 2020 field season.

Results/Deliverables:

- ATV prevalence was relatively low in 2020, starting at zero and rising to 31 percent at the time of metamorphosis. The eight-year data set demonstrates a temporal pattern of transmission that is consistent with predictions from classical epidemiological models involving a highly pathogenic disease. Thus, a year in which ATV prevalence is 100 percent in the larval population (2014, 2017, 2019) is followed by a year (or two) in which prevalence does not exceed 50 percent. This pattern can be explained by ATV-induced host mortality that reduces host population size in subsequent years. This general interpretation is somewhat complicated by the results from 2020. Although the predicted pattern of relatively low prevalence following the 2019 mortality event held, larval population size was unexpectedly high.
- The 2020 objectives were met, despite important COVID-19 related constraints on access to the site and access to the lab at the University of Lethbridge.
- Sampling over four intervals at Livingstone Lake went as planned in summer, and each individual salamander (Total N = 234) was processed for weight, size, and condition. Molecular diagnoses on tail-clipped samples were completed for 129 of the 234 samples.
- Additional statistical analyses involving the full eight-year data set are ongoing.
- Conferences where Dr. Goater had anticipated presenting these data were cancelled in summer and fall 2020.
- These restrictions also delayed the development of a large-scale proposal to hire one or two graduate students to test for genome-level changes in the virus in outbreak versus non-outbreak years and to test the host condition dependent hypothesis to explain ATV-induced outbreak dynamics. They hope to develop this proposal in fall 2021 to start at the beginning of the 2022 field season.

Wildfire Effects on Genetic Diversity and Population Connectivity in the Long-toed Salamander

University of Lethbridge – Dr. Julie Lee-Yaw

Grant: \$34,000

Project Code: 030-00-90-304

Project Status: New; Extended until Dec. 31 2021

Project Website: julieeyaw.weebly.com/wildfire-project.html

Wildfires are increasing in frequency and severity and understanding their effects on animal populations is of urgent importance for wildlife conservation. Research in the Lee-Yaw lab is addressing the impacts of the 2017 Kenow Wildfire in Waterton Lakes National Park (WLNP) on the long-toed salamander (*Ambystoma macrodactylum*), a species of *Special Concern* in Alberta. Data is being used from WLNP's long-term amphibian monitoring program, as well as genomic data from tissue samples collected in 2009 and new samples collected since the fire, to address three objectives: 1) Evaluate the genetic uniqueness of populations in southwestern Alberta; 2) Determine whether the Kenow Wildfire led to population losses, and if so, whether such losses are associated with specific habitats. 3) Quantify the effects of the fire on genetic diversity and the amount of gene flow between sites. The project had several significant and unexpected delays associated with the COVID-19 pandemic. The necessary permits for this work from Parks Canada and the Province were delayed by two months as government offices closed. Campus shut down at the end of March, and time needed to apply for access, meant substantial delays in ordering the necessary

equipment for the molecular work. Restricted access and the need to focus on recovering the field season meant continued delays well into the fall. Due to delays and on-going restrictions, one trainee declined a key position (post-doc) and hiring a replacement meant additional delays. However, the equipment is now ordered, and all personnel are in place, so the molecular lab work has commenced. The lab is now in a good position to complete the remainder of the project in a timely fashion.

Results/Deliverables:

- All fieldwork for the project (all three objectives) has been completed.
- The analysis of population losses (Objective 2) is in its final stages, with a report for Parks Canada and Alberta Environment and Parks (AEP) completed by May 1, 2021.
- Tissue samples for Objective 3 have been collected. The necessary personnel for this part of the project have been hired, and the molecular lab work for this objective is expected to be completed over the summer, with analysis beginning in fall 2021.

Testing the Effects of Recreational Trails on Plant Communities and the Spread of Invasive Plant Species

University of Lethbridge – Dr. Jenny McCune

Grant: \$11,500

Project Code: 015-00-90-282

Project Status: New; Completed

The Castle region (Castle Provincial Park and Castle Wildlands Provincial Park) is a provincial hotspot for biodiversity. The region is home to approximately 100 of Alberta's provincially rare vascular plant species. It is also a popular area for recreation and resource extraction activities, which have resulted in the proliferation of linear features. A recent report estimated that there are 2,125 km of linear features in the Castle region, including trails, roads, pipelines, and powerlines. However, there has been no research into the effect of linear features on plant communities in the Castle region. The objectives of this project are to measure the effects of recreational trails on plant diversity and composition, and specifically on the presence and abundance of exotic species and provincially rare plant species. Stratified random sampling was used to select 191 sites along official trails in the Castle region, and 103 sites were surveyed successfully in the summer of 2020. At each site, a transect perpendicular to the trail was set up and plant species presence and abundance quantified in four 1 m x 1 m quadrats at zero, two, five, and ten metres away from the trail. Trail width, depth, and soil compaction was measured as an indication of usage type and intensity. Over 300 different plant species were recorded, including 85 provincially tracked rare plants and 33 exotic species.

Results/Deliverables:

- Preliminary results suggest that trails of all types benefit exotic species directly adjacent to the trail and have equal probability of passing near occurrences of provincially rare plant species. Multivariate modelling techniques will be used to confirm these effects and to assess the influence of vegetation type and topography in combination with usage type on the richness and composition of plant communities.
- Site locations, including maps, GPS points, and photos: completed and available.

- Report on preliminary data collection and progress, including broad patterns of species richness and range of trail widths/depths and soil compaction: completed.
- Report on data analysis results from summer 2020 fieldwork, including a discussion of where trail effects on vegetation are greatest and where exotic species are most abundant: in progress. More complicated statistical modelling will begin once all unidentified specimens are completed.
- Peer-reviewed publication in an open-access journal: on track.
- This work has not yet been presented at any public or university event.

Bull Elk Recruitment, Survival, and Harvest in a Partially Migratory Elk Herd in the Ya Ha Tinda; Year 4 (Final)

University of Montana – Dr. Mark Hebblewhite

Grant: \$15,000

Project Code: 030-00-90-281

Project Status: Funded since 2017/18; Completed

Project website: www.umt.edu/yahatinda

The Ya Ha Tinda elk herd declined from ~2,200 individuals in the early 1990s, stabilizing at ~400 – 500 individuals around 2012. This long-term research suggests that predation by wolves and grizzly bears was the leading cause of these declines. As the population declined, the migrant to resident ratio decreased, with decreasing numbers of elk migrating west to summer in Banff National Park and increasing numbers of elk residing year-round on the herd's wintering grounds. Additionally, a new migration pattern developed in the late 2000s where increasing numbers of elk migrate east in summer to take advantage of high forage quality. In 2011 – 2018, 30 percent of marked elk have followed this eastern migration route, and 17 percent in 2018 – 2021. Despite the contributions of this long-term research to understanding elk ecology and management, the ecology and management of bull elk had not yet been directly studied. Thus, there were four main objectives for this multi-year project on the Ya Ha Tinda elk herd: 1) continue the long-term population monitoring of the herd by monitoring pregnancy, mortality, and migratory behaviour of individually marked females; 2) determine migratory movements of bull elk in the herd; 3) determine cause-specific mortality, survival, age structure, and trophy potential of bull elk in the herd; and 4) develop an integrated population model based on the long-term female data that includes bull elk population dynamics and migration. During this last reporting period, 61 collared females and 44 collared males were monitored. The primary objectives of the four-year bull elk collaring project have been completed and the research team are now working on completing the integrated population model. Numerous scientific publications and presentations have been produced, and results appear in Hans Martin's PhD Dissertation in 2021.

Results/Deliverables:

- Over the four years of this study (2018 – 2021), wolf predation was skewed toward females, while hunting harvest was the leading cause of mortality for males. The male age structure was skewed toward younger animals (two to four years old) with no males reaching mature age classes (seven to ten years old). The primary driver of bull elk survival was antler size and distance to road. Males were more likely to migrate west and access higher quality forage, while females

were more likely to reside on the winter range year-round, but migratory males and females followed similar migration routes. The residency, and east and west migratory tactics did not affect survival rates of males nor females.

- Project report:
 - Hebblewhite M, Merrill EH, Martin H, Williams S, Trottier M, Normandeau J, Flowers M, MacAuley K, Smolko P, Coulombe GL, Hessami M, Gano B (2021) *Long-term monitoring of the partially migratory Ya Ha Tinda elk population, predators, and foraging resources – Final Report 2017–2021*. Prepared for Parks Canada and Alberta Environment and Parks. University of Montana, Missoula, MT, USA and University of Alberta, Edmonton, AB, Canada; 64 pp. www.umt.edu/yahtatinda/files/ya-ha-tinda-elk_final-report_2017-2021_small.pdf
- Scientific publications:
 - Merrill EH, Killeen J, Pettit J, Trottier M, Martin H, Berg J, Bohm H, Eggemann S, Hebblewhite M. (2020). *Density-dependent foraging behaviors on sympatric winter ranges in a partially migratory elk (Cervus canadensis) population*. *Frontiers in Ecology and Evolution*. 8: 269.
 - Normandeau J, Kutz SJ, Hebblewhite M, Merrill EH. (2020). *Living with liver flukes: Does migration matter?* *Int J Parasitol Parasites Wildl*. 12:76–84.
 - Normandeau, J., Martin, H., Merrill, E.H., Hebblewhite, M. (2020). *Potential case of Hermaphroditism in Elk (Cervus canadensis) in Alberta, Canada*. *Canadian Field Naturalist*. 12: 76 – 84.
 - Martin HW, Hebblewhite M, Merrill EH. (2021). *Large herbivores in a partially migratory population search for the ideal free home*. In *Revision at Ecology*.
- Completed undergraduate thesis:
 - Weeks, Trevor C. (2020). *Bottom-up Herbivore-Plant Feedbacks Trump Trophic Cascades in a Wolf-Elk-Grassland System*. University of Montana.
- Completed graduate thesis:
 - Martin HW (2021). *Ungulates Search for the Ideal Home: How Predation and Forage Differentially Affect Males and Females in a Partially Migratory Population*. PhD Dissertation, University of Montana.
- Presentations on the Ya Ha Tinda research:
 - Martin HW, Hebblewhite M, Merrill EH. Bull elk antler size and fitness: a balancing act between forage quality and vulnerability. The Wildlife Society, Remote Conference, October 2020.
 - Martin HW, Hebblewhite M, Merrill EH. Bull elk survival, vulnerability, and antler size in a transboundary elk population. Montana Chapter of the Wildlife Society Annual Meeting, Remote Conference, February 2021.
 - Hebblewhite M. The Ya Ha Tinda Elk Herd: Long-term Insights into Predator-prey Ecology and Conservation. Bow Valley Naturalist, February 2021.
 - Martin HW, Hebblewhite M, Merrill EH. Bull elk survival, vulnerability, and antler size in a transboundary elk population. Alberta Chapter of the Wildlife Society Annual Meeting, Remote Conference, March 2021.
 - Hebblewhite, M. 2021. The Ya Ha Tinda Elk Herd: Long-term Insights into Predator-prey Ecology and Conservation. Public talk to the Bow Valley Naturalists, February 24, 2021.



Building waterfowl nesting tunnels
Photos provided by: Innisfail Fish & Game Association
Relating to the project: Waterfowl Nesting Habitat Enhancement (030-00-90-282)

ACA Grants in Biodiversity

The project summaries listed here represent the of projects funded by GiB from April 1, 2019 to March 31, 2021, as the majority of these projects are completed. For the projects funded from April 1, 2020 to March 31, 2022, please see the listing in Section “Synopsis of Approved Projects for 2020/21” of page 11.

Assessing the Effects of Nutrient Loading on Stream Function across Agricultural Gradients in Three Ecoregions of Alberta

University of Alberta

Student (Program): Emily Barrie (M.Sc.)

Supervisors: Suzanne Tank and Rolf Vinebrooke

Grant: \$9,350

Project Status: Funded April 1, 2019 – March 31, 2021; Completed

Stream ecosystem functioning provides an integrated metric of biological structures and processes that can respond to changes in agricultural land cover such as removal of riparian areas and nutrient enrichment. Agricultural land cover is common in the Boreal Transition, Parkland, and Grassland ecoregions of Alberta, where streams are exposed to a range of land-use intensities and levels of nutrient concentrations. Two key indicators of ecosystem function that respond to agriculture are stream metabolism and organic matter decomposition, which incorporate carbon cycling and community structure. The objectives of my study were to (i) describe direct and indirect drivers of stream metabolism including local stream characteristics and watershed level variation, and (ii) examine how microbial and invertebrate decomposition rates and detrital quality respond to increased concentrations of stream water nutrients. I studied 34 streams along a gradient of nutrients over three years in spring, summer, and fall where I measured metabolism using diurnal oxygen concentrations and decomposition with leaf litter bags. Stream metabolism was driven primarily by water temperature and did not appear to be strongly influenced by nutrients but was indirectly influenced by land cover. Contrary to metabolism, decomposition was directly influenced by increasing concentrations of nitrogen, which enhanced microbial activity and increased leaf litter quality. This research showcases the diverse impacts of land cover on stream function and the importance of nutrient criteria and watershed management to preserve ecological integrity.

Quantifying the Effects of Forestry Harvest Residuals on Bird Communities

University of Alberta

Student (Program): Brendan Casey (M.Sc.)

Supervisor: Erin Bayne

Grant: \$5,100

Project Status: Funded April 1, 2019 – March 31, 2021; Completed

Variation in the pattern and volume of harvest residuals provides opportunities to evaluate their impacts on bird communities. Forest Resource Inventories (FRIs) include useful harvest related disturbance metrics for most forest tenures across Canada, however, they poorly

describe residual structures in recovering harvest blocks. Expanding covariates beyond the simple harvest severity classifications in most FRI to those derived directly from modern remote sensors, may reveal subtle relationships between the structure of harvest residuals and bird communities. Here, I used historical point count data, acoustics monitoring tools, Light Detection and Ranging (LiDAR), and multispectral satellite imagery to explore the effects of harvest residuals on species richness. Objectives were to (1) quantify the influence of harvesting on birds along a gradient of recovery, (2) examine the post-harvest structural conditions that drive community response, and (3) compare the predictive power of common sources of spatial covariates. I surveyed bird communities using autonomous recording units in harvest blocks across northern Alberta and gathered supplemental acoustic and point count data from the Boreal Avian Modelling Project and the Alberta Biodiversity Monitoring Institute. LiDAR and Landsat normalized burn ratio (NBR) were used to characterize the vertical structure and spectral recovery of harvest blocks. I used generalized linear mixed models to evaluate the power of spatial covariates to predict community responses to harvesting, and the QPAD approach (a method for calibrating indices of avian density from non-standardized survey data) to accommodate the effects of differential detection error between sampling methods.

Analysis of Mule Deer Contacts and Transmission of Chronic Wasting Disease

University of Alberta

Student (Program): Maria Dobbin (M.Sc.)

Supervisor: Evie Merrill

Grant: \$10,200

Project Status: Funded April 1, 2019 – March 31, 2021; Completed

Chronic Wasting Disease (CWD) is a fatal neurodegenerative disease that infects farmed and free ranging cervid populations throughout North America. Recent studies from Wyoming and Colorado now demonstrate population-level declines in deer related to CWD. Alberta is one of two Canadian provinces with CWD in wild cervids, with over 2,000 cases (~85 percent in mule deer) in Alberta since its detection in 2005. CWD is transmissible by direct contact of infected individuals or by contact with pathogenic prions in the environment but little is known about primary routes of transmission. From 2017 to 2020, we captured and collared 135 (46 males and 89 females) with GPS/proximity collars. We used collar data to investigate the seasonal effects of grouping patterns and landscape heterogeneity on direct, pair-wise contacts within and between sex-specific (same or mixed sex) groups of mule deer (*Odocoileus hemionus*) in eastern Alberta. Further, we related seasonal predictions of the spatial relative risk of contacts to the risk of deer being CWD-infected in an area based on hunter-harvest, CWD surveillance data. Preliminary results indicate contact rates varied by season and pair type with between-group contacts being greater in summer, whereas within-group were higher in winter. Compared to areas used in their overlapping home ranges, contacts were most likely to occur where there was woody cover, short distance to water, long distance to roads, and high edge density and ruggedness. These results can be used to inform management harvest strategies that target individuals and landscapes that are most likely to transmit CWD.

Can Fungal Communities Restore Native Trees on Reclaimed Substrates Containing Hydrocarbons?

University of Alberta

Student (Program): James Franklin (Ph.D.)

Supervisors: Justine Karst and Pedro M. Antunes

Grant: \$ 5,245

Project Status: Funded April 1, 2019 – March 31, 2021; Completed

Landscapes mined for bitumen must be reclaimed and revegetated to restore self-sustaining ecosystems in the boreal forest of western Canada. However, residual hydrocarbons can be present in reclaimed landforms, and to what extent this can negatively affect the establishment of native vegetation is unclear. In parts of this region, forests occur on natural surficial bitumen deposits, and some vegetation persists on abandoned ore piles. As such, these locations represent unique opportunities to investigate the factors that enable plants to persist. Interactions between soil fungi and plant roots are increasingly recognized as an important factor in primary productivity, but whether this enables trees to establish on reclaimed sites is unknown. To screen fungi potentially capable of promoting seedling growth on hydrocarbon-containing substrates, I first used DNA sequencing to compare soil fungal communities in natural forests with and without bitumen. Next, in a greenhouse experiment, I grew trembling aspen and jack pine, two native tree species commonly used in revegetation, in substrates used in reclamation campaigns either inoculated or not with field soils. I found that the fungal communities present in soil from reclaimed sites contained more pathogens and unknown taxa, and fewer ectomycorrhizal fungi compared with those present in naturally occurring soils with and without bitumen. In addition, in the greenhouse experiment, while hydrocarbons reduced the growth of aspen and pine, only pine responded positively to soil inoculum from bitumen-free forests. Conversely, inoculum from forests on natural bitumen deposits and abandoned ore piles had no effect on plant growth. My results show that soil inoculation may be an effective method to promote the establishment of pines on oil sand-reclaimed areas.

Nutrient Limitation of Stream Algae in Alberta's Agricultural Regions

University of Alberta

Student (Program): Sydney Huculak (M.Sc.)

Supervisor: Suzanne Tank and Rolf Vinebrooke

Grant: \$14,860

Project Status: Funded April 1, 2019 – March 31, 2021; Completed

Anthropogenic land use, such as agricultural developments, can threaten stream health through intensified nutrient loading. Since algal growth can be limited by nitrogen (N), phosphorus (P), or co-limited by both (N+P), increases in the supply of these nutrients can stimulate algal production, leading to eutrophication. Identifying the limiting nutrients of algae is critical for understanding how nutrient loading may promote stream eutrophication. Nutrient

limitation is poorly understood in streams within Alberta's agricultural regions and provincial nutrient management efforts focus primarily on controlling inputs of P, despite lack of empirical evidence that P is the primary limiting nutrient. I performed nutrient diffusing substrate (NDS) bioassays to experimentally identify the drivers of nutrient limitation (i.e., N, P, or N+P) and nutrient-driven shifts in algal community composition in small streams across the agricultural region of Alberta. NDSs were deployed in each of 30 streams, which were chosen to span three ecoregions, a gradient of land-use intensity, and ambient stream nutrient concentrations. I found that nitrogen, rather than phosphorus, was identified as the limiting nutrient driving algal growth. Yet, nutrient-driven shifts in algal community composition from diatoms to green algae occurred with P enrichment. I also found a lack of regional variation in nutrient limitation dynamics across ecoregions, suggesting that broad nutrient management efforts can be applied across Alberta's agricultural regions. Overall, a dual-nutrient management approach at controlling inputs of both N and P will likely be the most ecologically effective at averting eutrophication of streams within the agricultural regions of Alberta.

Earthworm Invasion in the Boreal Forest and Soil Carbon Dynamics

University of Alberta

Student (Program): Justine Lejoly (Ph.D.)

Supervisor: Sylvie Quideau

Grant: \$10,000

Project Status: Funded April 1, 2019 – March 31, 2021; Completed

Exotic species of earthworms are invading the North American boreal forest, which had been developing in their absence since the last glaciation. Compared to temperate forests, earthworm invasion in boreal forests is more recent and remains understudied. By mixing of surface organic soil with mineral soil, earthworms can greatly affect organic matter decomposition, governed by microorganisms, and thus soil carbon storage. My study focuses on understanding the implications of earthworm invasion in northern Alberta for (1) soil carbon stocks, (2) soil carbon dynamics, and (3) soil microbial communities. I sampled three forest sites with similar Luvisolic soils dominated by trembling aspen canopy and corresponding to different levels of earthworm invasion. My results show that 94 percent of the carbon found in the surface organic layer was lost at the most advanced stage of invasion. Although the total carbon did not change in the underlying mineral soil, the latter was reworked by earthworms, and its structure drastically changed. Moreover, the carbon found in the mineral soil became more available for microbial decomposition in the presence of earthworms. The composition of microbial communities also changed, earthworms favouring fungi over bacteria. These observations suggest that the ongoing invasion of exotic earthworms in the boreal is putting in jeopardy the large carbon reservoir found in the boreal forest soils of northern Alberta.

Vegetation Community Dynamics on Soil Islands in Oil Sands Reclamation

University of Alberta

Student (Program): Kaitlyn E. Trepanier (M.Sc.)

Supervisor: Brad Pinno

Grant: \$5,000

Project Status: Funded April 1, 2019 – March 31, 2021; Completed

Oil sand mining is a large-scale disturbance on Alberta's landscape. One objective in reclamation is to create a self-sustaining ecosystem, which includes native vegetation. I investigated different mechanisms of plant establishment, including soil seed bank, seed rain, vegetative expansion, and competition, on a new reclamation design known as "Islands". This technique integrates islands of rich plant diversity forest floor mineral mix (FFMM) within a matrix of poor plant diversity peat mineral mix (PMM). The initial vegetation community had greater cover on the FFMM compared to PMM but was dominated by non-native forbs. Initial differences were linked to the seed bank, with five times more seeds in the FFMM than the PMM. Over time, the vegetation community shifted toward native species and similar cover across soil types. This shift was due mainly to seed rain and biotic dispersal resulting in continuing plant establishment on both soil types. There is also some evidence of limited vegetative expansion out to 2 m of native forbs from FFMM into PMM. Finally, indirect competition is emerging with a decrease in non-native forbs over time associated with increasing total cover. Overall, it is clear that multiple factors are involved in structuring vegetation communities on reclamation sites, and all of these should be considered when developing reclamation plans.

Elk Behaviour on Sympatric Winter Ranges: Does Migratory Tactic Influence Interactions?

University of Alberta

Student (Program): Madeline Trottier (M.Sc.)

Supervisor: Evie Merrill

Grant: \$11,280

Project Status: Funded April 1, 2019 – March 31, 2021; Completed

The Ya Ha Tinda elk herd (*Cervus canadensis*) is a partially migratory population that winters on a sympatric range adjacent to Banff National Park in Alberta. Historically, the majority of elk migrated west into Banff National Park during the summer, with a small portion of the herd remaining on the ranchlands year-round. Over the past two decades, there has been a shift in the summer distribution of elk, with a decline in migrants and an increase in resident elk. Although migrants are exposed to higher forage quality in the summer, and thus return to the winter range in better condition than residents, small-scale behavioural trade-offs on the winter range may put residents at an advantage and play a role in the observed shift in migratory behaviour. Specifically, we looked at interaction and vigilance behaviour among elk on the winter range

following different migratory tactics. From GPS collar location data and behavioural observations of individual female elk during the winters of 2019-2020, we compared home range overlap, interaction rates, and vigilance patterns among tactics. Our results suggest that despite high overlap among all migratory tactics during the winter, differences in interaction rates and vigilance patterns may influence forage acquisition and exposure to predation risk on the winter range. Globally, ungulate migration is in decline, thus our study looking at small-scale trade-offs on a sympatric range contributes to our understanding of factors influencing shifts in migratory patterns in this partially migratory elk herd.

Correcting Survival Estimates to Account for Dispersal in Migratory Burrowing Owls

University of Alberta

Student (Program): Morganne Wall (M.Sc.)

Supervisor: Erin Bayne and Troy Wellicome

Grant: \$9,125

Project Status: Funded April 1, 2019 – March 31, 2021; Completed

The migratory population of burrowing owl in Canada has undergone significant declines over the past three decades. Annual survival estimates are obtained using capture-mark-recapture data where survival is calculated according to banded individuals resighted each year within study areas; however, such survival estimates do not differentiate emigration from mortality, and any individuals that disperse outside of the study area are considered dead. To better estimate survival, I compiled historical and recent records of dispersal distances observed by wild burrowing owls across Alberta and Saskatchewan. I used these distances to simulate dispersal events at known nest burrow locations within historical study areas. The simulations showed how many individuals were likely dispersing outside of these areas resulting in low survival estimates. The estimates were then corrected to account for those missed owls and compared to estimates obtained when using dispersal data from owls fitted with satellite trackers. I found that while simulating these events, using observed dispersal distance from the banded owls, did increase the estimates, survival remained unrealistically low and were likely still confounding mortality with long-distance dispersals. I compared these estimates to those produced from another commonly used model known as the Cormack-Jolly-Seber (CJS) model, which provided higher survival estimates and included a method to account for dispersal in the CJS model. While survival estimates remained low when accounting for observed dispersal in both methods, the CJS method provided more likely estimates while accounting for dispersal. I concluded that a better understanding of long-distance dispersal is needed to use the simulation technique to correct for burrowing owl survival. In studies where dispersal is well-understood, these methods could prove very informative and realistic estimates to wildlife managers.

How Do Managed Pollinators Impact Native Plant-Pollinator Network Interactions?

University of Alberta

Student (Program): Sydney Worthy (M.Sc.)

Supervisor: John Acorn and Carol Frost

Grant: \$8,600

Project Status: Funded April 1, 2019 – March 31, 2021; Completed

Evidence has suggested that honey bees may alter wild pollinator diversity and abundance, and the structure and function of plant-pollinator network interactions in a wild pollinator community. Therefore, honey bees may be of conservation concern for Alberta's native pollinator communities. For this reason, we examined the effects of honey bee abundance on native grassland pollinator communities by experimentally introducing honey bee hives to grassland prairie near Brooks, Alberta. We measured pollinator and flower abundance and diversity, and compiled flower visitor interactions into plant-pollinator networks, from which network metrics related to network stability, structure, and resource use overlap, were analyzed. Findings indicate that honey bees did not affect wild pollinator abundance or diversity. Honey bees impacted network structure by decreasing interaction evenness, and affected resource use overlap by increasing plant and pollinator functional complementarity. However, these network structural changes were due to the added honey bee-plant interactions, and not to honey bees causing changes in native pollinator interactions with plants. We demonstrated that honey bees may not negatively impact native plant-pollinator communities in all contexts, and that, despite influencing interaction network structure by visiting so many flower species themselves, honey bees may not affect the diversity of wild insect pollinators or their interactions with plants.

Impact of Sulfur Dioxide Emissions on Lodgepole Pine Growth in Alberta, Canada

University of Calgary

Student (Program): Devon Earl (M.Sc.)

Supervisor: Mary Reid and Anne-Lise Norman

Grant: \$2,315

Project Status: Funded April 1, 2019 – March 31, 2021; Completed

It is important to understand the factors that affect tree growth to predict how the growth response of trees will be affected by changing climate. Emissions of sulfur dioxide (SO₂) are one such factor that may affect tree growth and alter the growth response of trees to climate. Sulfur dioxide may affect tree growth and climate-growth relationships directly by entering through stomata and altering photosynthetic rate, or indirectly by causing soil acidification. I used dendrochronological methods to assess how the growth and climate-growth relationships of lodgepole pine (*Pinus contorta*) changed with varying emissions intensity and distance from a source of emissions in Alberta, Canada. Tree growth response to key climate variables was stronger in a period of high SO₂ emissions compared to the periods of no emissions and reduced emissions, and farther from the source of emissions compared to nearer. Liming in stands near the source of emissions likely reduced the effects of SO₂ on tree growth and climate-growth relationships

in one study area. The effects of certain key climate variables, such as previous late summer precipitation, were opposite of expected in the high emissions period near the source of emissions, indicating that under heavy acidic deposition, increased precipitation may lead to soil nutrient leaching. In one study area, tree growth near the source of emissions was more strongly negatively affected by six-year and ten-year cumulative emissions than annual emissions, indicating that soil acidification may be a more important mechanism behind the effects of SO₂ on tree growth than direct effects.

Effects of Forest Fire on Bat Communities in Southwestern Alberta

University of Calgary

Student (Program): Erin Low (M.Sc.)

Supervisor: Robert Barclay

Grant: \$10,510

Project Status: Funded April 1, 2019 – March 31, 2021; Completed

Fire is arguably one of the most important natural disturbances shaping the landscape. However, it is unknown what the effects of rapidly changing fire regimes will be on forest biodiversity. Bats are diverse and play important roles in forest ecosystems. Past studies have suggested that most bat species respond positively to fires, as fires increase roosting and foraging opportunities. The Kenow Wildfire occurred in Waterton Lakes National Park in southwestern Alberta in September 2017. For my M.Sc., I am testing predictions regarding the effect of forest fire on bat communities by examining if fire alters species distribution and relative abundance, and if fire promotes roosting and foraging opportunities. From 2015 to 2020, bat acoustic surveys were conducted by Parks Canada staff, providing data from before and after the fire, as well as from burned and unburned sites. These data are still being analyzed. In 2019 and 2020, I radio-tracked little brown bats to their roosts. My results indicate that reproductive females show a strong preference for building roosts in the Waterton townsites, and males are generalists, roosting in both burned and unburned trees as well as rock crevices. As the townsites were not burned, and males will roost in both burned and unburned areas, it suggests that roosting habitat has not become limited following the fire. Climate change is causing the size, duration, and severity of wildfires to increase globally. My findings can inform management decisions and provide a better understanding and preparedness for the effects of wildfires on bats.

The Effect of Honey Bees on Alberta Native Bee Success

University of Calgary

Student (Program): Ronald Miksha (M.Sc.)

Supervisor: Lawrence Harder

Grant: \$7,185

Project Status: Funded April 1, 2019 – March 31, 2021; Completed

Honey bees (*Apis mellifera*) are efficient non-native foragers owing to their large colonies and ability to communicate the location of floral resources. As introduced livestock, their densities are determined by human intentions, rather than ecological processes, and can impose diverse effects on the local flora and populations of flower-visiting

insects. Concern has intensified with the tenfold expansion of urban beekeeping in Calgary during the past ten years. To assess the impact of urban honey bees on native bees in Calgary, I mapped the distribution of honey bee hives, measured density variation, and compared that with diversity of other pollinators and the reproductive success of solitary bees and bumble bees. The abundance of trapped native bees varied positively with honey bee density, but negatively with the extent of landscape urbanization. The 1,433 captured specimens comprised 44 bee species, including 13 bumble bee species. At 73 urban citizen-scientist locations, nest establishment and reproductive success by bumble bees and solitary bees varied negatively with honey bee density. Based on pollen from adjacent honey bee and bumble bee nests, honey bees largely foraged on different plant species than two common bumble bee species, *Bombus perplexus* and *B. rufocinctus*, during the peak foraging season of July and August. Specifically, nearly all pollen retrieved from honey bee nests derived from non-native clovers and canola, likely from agricultural landscape adjacent to the city, whereas the bumble bees collected from urban wild and exotic flora. My observations indicate only weak resource competition by urban honey bees on native bees in Calgary.

Assessing the Utility of Stable Isotopes as Biotracers to Estimate Diet in Sharp-tailed Grouse

University of Lethbridge

Student (Program): Sejer Meyhoff (M.Sc.)

Supervisor: Dan Johnson

Grant: \$1,595

Project Status: Funded April 1, 2019 – March 31, 2021; Completed

Sharp-tailed grouse and other grassland birds rely on insects and spiders as a high-protein food source during the summer months. Changes to weather and climate, and the influence of agricultural pest management, have the potential to alter the timing and availability of this important food resource. I investigated the relationship between plains sharp-tailed grouse and their arthropod prey using stable isotopes as biotracers to estimate diet. The isotope signal of an animal's tissue reflects the food that it eats and can be used as chemical tracer to estimate diet proportions. I used hunter-harvested grouse to analyse the isotope signals of primary feathers that were grown sequentially over the summer to assess their summer diet. I then compared the results to previous diets studies using esophageal crop contents. I found that the isotope signals from the feathers reflected a much higher consumption of insect prey, mostly grasshoppers, than found in crop studies. I believe the reason for this was that the nutrients gained from consuming insect prey, which are higher in protein than plant foods, are important for growing feathers. So even though the grouse were consuming mostly plant foods (shown from crop studies), the insects they consumed were providing grouse with the important nutrients needed to grow their feathers. Since I analyzed feathers and protein from insects used to grow the feathers, the signal I got reflected insects more than plants. Compound specific stable isotope analysis, which is more expensive, would be needed to definitively prove this hypothesis.

Causes and Consequences of Individual Heterogeneity in Bighorn Sheep

Université de Sherbrooke

Student (Program): Benjamin Larue (Ph.D.)

Supervisor: Marco Festa-Bianchet and Fanie Pelletier

Grant: \$5,330

Project Status: Funded April 1, 2019 – March 31, 2021; Completed

Why do some animals grow quickly, and others slowly? Why do some have lots of young, others die leaving no descendants? Understanding individual heterogeneity in life-history trajectories and the effect of this heterogeneity on population dynamics has recently become a central objective in animal ecology. Individual differences can have major implications in conservation and management. To better understand the causes and consequences of individual heterogeneity in morphological, behavioural, and life-history traits, I am analyzing long-term data on bighorn sheep and mountain goat growth, survival, and reproductive success. My research has highlighted strong heterogeneity in growth patterns between reproductive and non-reproductive female sheep and goats. I found that because growth decreases in years when females reproduce, annual horn growth increments provide insights on reproductive history of young females and could be used to assist conservation and management. I also found strong correlations between resource acquisition behaviours in bighorn sheep and resource allocation to growth and reproduction. This later result indicates that individual differences in life-history traits could partially originate from differences in foraging behaviour. I am now investigating the causes and consequences of individual heterogeneity in long-term costs of reproduction and in intra-seasonal growth patterns. Altogether, my study will make major contributions to our fundamental knowledge in animal ecology, evolution, and demography. It will also have a strong impact on species management and conservation as it could change the way demographers understand the influence of individual heterogeneity on population vital rates.

Female Mating Tactics in Mule Deer

University of Winnipeg

Student (Program): Cora Romanow (M.Sc.)

Supervisor: Susan Lingle

Grant: \$11,090

Project Status: Funded April 1, 2019 – March 31, 2021; Completed

When picturing the breeding season of deer, we typically imagine large-antlered males intensely battling for access to receptive females. Consistent with this image, most research has focused on male mating tactics, even though several researchers have suggested that female deer play a more active role in courtship than the current dogma implies. During the breeding season, mule deer form tending bonds, with one estrous female engaged in courtship with a single male at a time. To investigate female tactics, I observed and recorded videos of courtship in mule deer living on an open grassland habitat in southern Alberta. These data are being used to test the hypotheses that (1) females use specific tactics to solicit attention from males; (2) females respond differently to different sizes of males; and (3) females drive the movement of tending pairs. This study will help fill a substantial gap in our knowledge of the mating strategies of mule deer. A more complete understanding of these mating systems that includes the role of female deer will allow managers to properly assess the effects of management strategies and hunting pressures placed on these species.

The following eight projects were granted one-year extensions (until March 31, 2022) due to the COVID-19 pandemic.

**How many mites can dance on a pin-feather?
Correlating feather microstructure with orientation
of vane-dwelling feather mites and body size of
mites and their host birds**

University of Alberta

Student (Program): Andrew Cook (Ph.D.)

Project Status: Funded April 1, 2019 – March 31, 2021; Extended

**The diversity and abundance of predatory ground
beetles (Coleoptera: Carabidae) associated with
populations of the invasive Pea Leaf Weevil, *Sitona
lineatus* L. (Coleoptera: Curculionidae) in Canadian
prairie fabaceae crops**

University of Alberta

Maggie MacDonald (M.Sc.)

Project Status: Funded April 1, 2019 – March 31, 2021; Extended

**Habitat fragmentation and movement ecology of
cougars in north central Alberta**

University of Alberta

Student (Program): Alexa MacPherson (M.Sc.)

Project Status: Funded April 1, 2019 – March 31, 2021; Extended

**Effect of microsporidian infection on pheromone-
based communication of the forest tent caterpillar,
an important disturbance agent of aspen in Alberta**

University of Alberta

Student (Program): Flavio Preti (M.Sc.)

Project Status: Funded April 1, 2019 – March 31, 2021; Extended

Investigating stability of an avian hybrid zone

University of California, Riverside

Student (Program): David Pierce (Ph.D.)

Project Status: Funded April 1, 2019 – March 31, 2021; Extended

**The effects of chronic exposure to cadmium and
microplastics on serotonin levels and feeding
behaviour in the leech *Nephelopsis obscura***

University of Lethbridge

Student (Program): Lauren Zink (M.Sc.)

Project Status: Funded April 1, 2019 – March 31, 2021; Extended

**Mechanisms of climate-mediated effects on
intraspecific torpor profiles in Columbian ground
squirrels (*Urocitellus columbianus*)**

University of Saskatchewan

Student (Program): Rebecca Smith (M.Sc.)

Project Status: Funded April 1, 2019 – March 31, 2021; Extended

**The effect of habitat connectivity on genetic
rescue potential in the alpine butterfly *Parnassius
smintheus* Doubleday (Lepidoptera: Papilionidae)**

University of Western Ontario

Student (Program): Andrew Chaulk (Ph.D.)

Project Status: Funded April 1, 2019 – March 31, 2021; Extended

APPENDIX:

Projects in Relation to Grants Funding Priorities 2020/21

ACA Conservation, Community, and Education Funding Priorities

FUNDING PRIORITY #1: 9 CCEG 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 & Game Association (AFGA); Increasing Habitat for Species at Risk in Alberta's Grassland Region through Promotion and Implementation of Best Management Practices; \$29,000

Alberta Riparian Habitat Management Society – Cows and Fish; Implementing Riparian Habitat Management Improvements for Westslope Cutthroat Trout; \$11,500

Calgary ATV Riders Association (CARA); Meadow Creek Trail Rehabilitation Project; \$16,500

Ghost Watershed Alliance Society (GWAS); Watershed Education, Literacy, and Restoration Project; \$20,400

Lesser Slave Lake Bird Observatory Society (LSLBO); Avian Monitoring and Outreach Education Programs at Lesser Slave Lake; \$20,250

Northern Lights Fly Fishers – Trout Unlimited Canada Edmonton Chapter (NLFF TUC); Conserving and Restoring Arctic Grayling in the Upper Pembina River Watershed – Habitat Restoration Planning; \$7,000

Oldman Watershed Council (OWC); Measuring Success of Oldman Headwater Education and Restoration Efforts; \$25,000

Pheasants Forever Chinook Chapter (PF Chinook); Sauder Reservoir Habitat Project; \$30,510

Trout Unlimited Canada (TUC); Alberta Eastern Slopes Strategic Watershed Action Team (SWAT) 2020; \$30,000

FUNDING PRIORITY #2: 28 CCEG 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, culvert removals, fishing docks, etc.).

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).

AFGA; Increasing Habitat for Species at Risk in Alberta's Grassland Region through Promotion and Implementation of Best Management Practices; \$29,000

AFGA; Pomrenk Property Wildlife Friendly Fencing; \$9,000

AFGA; Pronghorn Antelope Migration Corridor Enhancement; \$40,278

Alberta Riparian Habitat Management Society – Cows and Fish; Implementing Riparian Habitat Management Improvements for Westslope Cutthroat Trout; \$11,500

Ann & Sandy Cross Conservation Area; Fencing to Improve Wildlife Movement and Harvest on and Near the ASSCA; \$36,676

Bow River Trout Foundation; Bow River Policeman's Flats River Access Update; \$21,500

CARA; Meadow Creek Trail Rehabilitation Project; \$16,500

Camrose & District Fish & Game Association (Camrose FGA); Habitat Improvement, Protection, and Inventory Project; \$10,822.50

Grassy Lake Recreation Association; Sherburne Reservoir Boat Launch Rehabilitation; \$24,000

Helen Schuler Nature Centre (HSNC); Community Engagement in River Valley Conservation; \$2,100

Innisfail Fish & Game Association; Waterfowl Nesting Habitat Enhancement; \$1,500

LSLBO; Avian Monitoring and Outreach Education Programs at Lesser Slave Lake; \$20,250

Mountain View County (MVC); Riparian & Ecological Enhancement Program; \$25,000

NLFF TUC; Dogpound Riparian Protection – Mader Property; \$39,434

NLFF TUC; Conserving and Restoring Arctic Grayling in the Upper Pembina River Watershed – Habitat Restoration Planning; \$7,000

Northern Sunrise County; Skwarik Riparian Enhancement Project; \$28,000

OWC; Measuring Success of Oldman Headwater Education and Restoration Efforts; \$25,000

Onoway & District Fish & Game Association (OFGA); Wild Bird and Bee Houses; \$2,500

Partners in Habitat Development; Partners in Habitat Development; \$5,000

PF Chinook; Sauder Reservoir Habitat Project; \$30,510

Red Deer County; Wildlife and Native Habitat Enhancement in Red Deer County via ALUS (2020); \$40,000

STRIX Ecological Consulting Ltd. (Strix Eco); American Kestrels – Using Nest Boxes and Technology to Increase Awareness and Promote Conservation; \$14,956.40

Sturgeon County; Dock System – Cardiff Park; \$3,000

Town of Redcliff; Redcliff Landfill Wetland Enhancement; \$2,500

TUC; Alberta Eastern Slopes Strategic Watershed Action Team (SWAT) 2020; \$30,000

TUC; Yellow Fish Road/Water Edu-kits; \$21,040

Wetaskiwin County; Wetaskiwin/Leduc Alternative Land Use Services (ALUS); \$5,600

Wild Sheep Foundation Alberta (WSFA); Evan Thomas and Bow Valley Vegetation Management: Mountain Sheep and Ungulate Prescribed Burn Habitat Enhancement Planning; \$10,000

FUNDING PRIORITY #3: 7 CCEG 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).

Castor Fish & Game Club; Evaluation of Parr Reservoir (Castor Creek) for Fish Stocking Suitability; \$11,000

LSLBO; Avian Monitoring and Outreach Education Programs at Lesser Slave Lake; \$20,250

NLFF TUC; Aeration of Hasse Lake; \$20,126

NLFF TUC; Conserving and Restoring Arctic Grayling in the Upper Pembina River Watershed Habitat Restoration Planning; \$7,000

Town of Hanna; Helmer Dam Revitalization Project - Phase 1; \$10,000

Town of Redcliff; Redcliff Landfill Wetland Enhancement; \$2,500

TUC; Pinto Lake Recreational Fishery Development Project; \$15,000

FUNDING PRIORITY #4: 6 CCEG PROJECTS

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

Camrose FGA; Habitat Improvement, Protection, and Inventory Project; \$10,822.50

LSLBO; Avian Monitoring and Outreach Education Programs at Lesser Slave Lake; \$20,250

HSNC; Community Engagement in River Valley Conservation; \$2,100

OWC; Measuring Success of Oldman Headwater Education and Restoration Efforts; \$25,000

Strix Eco; American Kestrels - Using Nest Boxes and Technology to Increase Awareness and Promote Conservation; \$14,956.40

TUC; Pinto Lake Recreational Fishery Development Project; \$15,000

FUNDING PRIORITY #5: 43 CCEG PROJECTS

Projects related to the retention, recruitment and education of hunters, anglers or trappers (including attracting new mentors, training mentors and providing mentors for new hunters/anglers/trappers; sharing information in schools and with the general public about the link between conservation and hunters/anglers/trappers; this category also includes educating new hunters/anglers/trappers; 'Kids Can Catch' and archery events for kids). Generate awareness of the hunting/angling/trapping opportunities available to the public.

Alberta Hunter Education Instructors' Association (AHEIA); AHEIA's 27th Annual Outdoor Women's Program; \$15,000

AHEIA; AHEIA's Army Cadet Program; \$3,000

AHEIA; AHEIA's Field to Table Seminar; \$1,500

AHEIA; AHEIA's National Archery in the Schools Program (NASP); \$40,000

AHEIA; AHEIA's Outdoor Bound Mentorship Program; \$6,000

AHEIA; AHEIA's Rifle Sight-In Seminar; \$2,000

AHEIA; AHEIA Teachers' Workshop; \$6,000

AHEIA; Provincial Hunting Day Initiatives; \$20,000

AHEIA; New Firearms Acquisition for Alford Lake; \$3,000

AHEIA; Youth Hunter Education Camp (Weeks 1, 2, 3, and 4); \$32,000

Alberta Hunters Sharing the Harvest; Wild Game for the Food Bank Program; \$8,000

Alberta Trappers Association (ATA); Trapper Education in the Schools; \$25,100

ATA; Youth Camp and Mentoring Program; \$30,730

Alexis Nakota Sioux Nation (ANSN); ANSN Hunting and Fishing Knowledge Transfer Youth Project; \$30,000

Becoming an Outdoors Woman (BOW); Becoming an Outdoors Woman Camp; \$1,700

Calgary Hook and Hackle Club; Beginner Fly Tying and Tying in the Community; \$3,000

Grassy Lake Recreation Association; Sherburne Reservoir Boat Launch Rehabilitation; \$24,000

H.A. Kostash School; H A Kostash Youth Mentorship Program; \$8,200

Inside Education Society of Alberta; Wildlife Education in Alberta Schools; \$20,000

Isabelle Sellon School; Place-based Learning and Archery; \$2,500

Junior Forest Wardens – Yellowhead Regional Council; Trailblazer Advanced Camp; \$2,900

Kimiwan Lake and Wildlife Preservation Society; Kimiwan Birdwalk Outdoor Classroom; \$15,000

Kneehill Bowhunters and Archers; Public Awareness & Education through Mentorship Project; \$2,000

LSLBO; Avian Monitoring and Outreach Education Programs at Lesser Slave Lake; \$20,250

Lesser Slave Watershed Council (LSWC); Kids Can Catch Family Day 2021 Event; \$2,130

Lethbridge Fish & Game Association (LFGA); LFGA Community Recruitment and Education Fund; \$13,500

LFGA; Mentored Hunts; \$3,000

NLFF TUC; Aeration of Hasse Lake; \$20,126

NLFF TUC; Dogpound Riparian Protection – Mader Property; \$39,434

NLFF TUC; Conserving and Restoring Arctic Grayling in the Upper Pembina River Watershed Habitat Restoration Planning; \$7,000

Pheasants Forever Calgary Chapter; Post-Secondary First Pheasant Mentor Hunt Program; \$5,000

Southern Alberta Bible Camp (SABC); Archery Program; \$3,000

SABC; Pelletry Program; \$1,500

SABC; Walleye - Pike Fishing; \$2,500

Strix Eco; American Kestrels – Using Nest Boxes and Technology to Increase Awareness and Promote Conservation; \$14,956.40

Sturgeon County; Habitat Heroes Day Camp; \$2,100

Taber Fish & Game Association (Taber FGA); Taber Fish & Game and ACA Youth Fishing Recruitment Day; \$15,000

Taber FGA; Winter Family Fun Fishing Day; \$8,100

Town of Redcliff; Redcliff Landfill Wetland Enhancement; \$2,500

TUC; Alberta Eastern Slopes Strategic Watershed Action Team (SWAT) 2020; \$30,000

TUC; Pinto Lake Recreational Fishery Development Project; \$15,000

Valhalla School Foundation; DEKER (Developing Environmental Knowledge and Respect); \$15,000

WSFA; Evan Thomas and Bow Valley Vegetation Management: Mountain Sheep and Ungulate Prescribed Burn Habitat Enhancement Planning; \$10,000

FUNDING PRIORITY #6:

46 CCEG PROJECTS

Projects related to outdoor conservation education.

AFGA; Increasing Habitat for Species at Risk in Alberta's Grassland Region through Promotion and Implementation of Best Management Practices; \$29,000

AHEIA; AHEIA's 27th Annual Outdoor Women's Program; \$15,000

AHEIA; AHEIA's Army Cadet Program; \$3,000

AHEIA; AHEIA's Field to Table Seminar; \$1,500

AHEIA; AHEIA's National Archery in the Schools Program (NASP); \$40,000

AHEIA; AHEIA's Outdoor Bound Mentorship Program; \$6,000

AHEIA; AHEIA's Provincial Hunting Day Initiatives; \$20,000

AHEIA; AHEIA's Rifle Sight-In Seminar; \$2,000

AHEIA; AHEIA's Teachers' Workshop; \$6,000

AHEIA; AHEIA's Youth Hunter Education Camps (Weeks 1, 2, 3, and 4); \$32,000

AHEIA; New Firearms Acquisition for Alford Lake; \$3,000

Alberta Hunters Sharing the Harvest; Wild Game for the Food Bank Program; \$8,000

ATA; Trapper Education in Schools; \$25,100

ATA; Youth Camp and Mentoring Program; \$30,730

ANSN; ANSN Hunting and Fishing Knowledge Transfer Youth Project; \$30,000

BOW; Becoming an Outdoors Woman Camp; \$1,700

CARA; Meadow Creek Trail Rehabilitation Project; \$16,500

Camrose FGA; Habitat Improvement, Protection, and Inventory Project; \$10,822.50

GWAS; Watershed Education, Literacy, and Restoration Project; \$20,400

H.A. Kostash School; H. A. Kostash Youth Mentorship Program; \$8,200

HSNC; Community Engagement in River Valley Conservation; \$2,100

Inside Education Society of Alberta; Wildlife Education in Alberta Schools; \$20,000

Isabelle Sellon School; Place-based Learning and Archery; \$2,500

Junior Forest Wardens – Yellowhead Regional Council; Trailblazer Advanced Camp; \$2,900

Kimiwan Lake and Wildlife Preservation Society; Kimiwan Birdwalk Outdoor Classroom; \$15,000

LSLBO; Avian Monitoring and Outreach Education Programs at Lesser Slave Lake; \$20,250

LSWC; Kids Can Catch Family Day 2021 Event; \$2,130

Marshall Springs School; Outdoor Education: Wildlife Identification and Safety; \$1,000

MVC; Riparian & Ecological Enhancement Program; \$25,000

NLFF TUC; Conserving and Restoring Arctic Grayling in the Upper Pembina River Watershed – Habitat Restoration Planning; \$7,000

OWC; Measuring Success of Oldman Headwater Education and Restoration Efforts; \$25,000

OFGA; Wild Bird and Bee Houses; \$2,500

PF Chinook Chapter; Sauder Reservoir Habitat Project; \$30,510

SABC; Archery Program; \$3,000

SABC; Pelletry Program; \$1,500

SABC; Walleye – Pike Fishing; \$2,500

Strix Eco; American Kestrels – Using Nest Boxes and Technology to Increase Awareness and Promote Conservation; \$14,956.40

Sturgeon County; Habitat Heroes Day Camp; \$2,100

Taber FGA Taber Fish & Game and ACA Youth Fishing Recruitment Day; \$15,000

Taber FGA; Winter Family Fun Fishing Day; \$8,100

TUC; Alberta Eastern Slopes Strategic Watershed Action Team (SWAT) 2020; \$30,000

TUC; Pinto Lake Recreational Fishery Development Project; \$15,000

TUC; Yellow Fish Road/Water Edu-kits; \$21,040

Valhalla School Foundation; DEKER (Developing Environmental Knowledge and Respect); \$15,000

Wetaskiwin County; Wetaskiwin/Leduc Alternative Land Use Services (ALUS); \$5,600

WSFA; Evan Thomas and Bow Valley Vegetation Management: Mountain Sheep and Ungulate Prescribed Burn Habitat Enhancement Planning; \$10,000

Research Grants Funding Priorities

FUNDING PRIORITY #1: 3 RESEARCH PROJECTS

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

fRI Research (Dr. Finnegan); Predator-Prey Dynamics and Habitat Disturbance: Are all Disturbances Created Equal; \$18,500

University of Alberta (Dr. Cassady St. Clair); Wildlife Monitoring to Support Urban Ecological Planning; \$21,500

University of Alberta (Dr. Olefeldt); The Changing North: How will thawing and burned permafrost peatlands impact habitat for woodland caribou and moose; \$34,000

FUNDING PRIORITY #2: 4 RESEARCH PROJECTS

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

University of Alberta (Dr. Cassady St. Clair); Wildlife Monitoring to Support Urban Ecological Planning; \$21,500

University of Alberta (Dr. Frost); Interactive Effects of Landscape Diversity and Local Flower Abundance on Wild Pollinator and Other Beneficial Insect Abundance, Diversity, and Interactions in Agricultural Landscapes; \$29,500

University of Calgary (Dr. Poissant); Causes and Consequences of Gut Microbiome Diversity in Bighorn Sheep; \$21,000

University of Lethbridge (Dr. McCune); Testing the Effects of Recreational Trails on Plant Communities and the Spread of Invasive Plant Species; \$11,500

FUNDING PRIORITY #3: 4 RESEARCH PROJECTS

Develop and validate inventory tools to determine the relative density and range of wildlife and fish species using innovative detection technologies (e.g. DNA/eDNA, camera traps, drones, etc.).

fRI Research (Dr. Finnegan); Predator-Prey Dynamics and Habitat Disturbance: Are all Disturbances Created Equal; \$18,500

University of Alberta (Dr. Cassady St. Clair); Wildlife Monitoring to Support Urban Ecological Planning; \$21,500

University of Alberta, Augustana (Dr. Hood); Distribution and Habitat Associations of Semi-Aquatic Furbearers in the Beaver Hills Biosphere; \$28,750

University of Lethbridge (Dr. Lee Yaw); Wildlife Effects on Genetic Diversity and Population Connectivity in the Long-toed Salamander; \$34,000

FUNDING PRIORITY #4: 1 RESEARCH PROJECT

Evaluate the effect of agricultural runoff, pesticides, herbicides, or pharmaceuticals on fish or wildlife species' food availability and/or quality in agricultural landscapes.

Athabasca University (Dr. Glover); Algae as Modifiers of Fish Health in Agriculture-Impacted Waters; \$9,750

FUNDING PRIORITY #5: 5 RESEARCH PROJECTS

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

University of Alberta (Dr. Adamowicz); Evaluating Activity Survey Apps for Conservation and Economic Valuation from Recreation; \$33,700

University of Alberta (Dr. Cassady St. Clair); Wildlife Monitoring to Support Urban Ecological Planning; \$21,500

University of Lethbridge (Dr. Lee Yaw); Wildlife Effects on Genetic Diversity and Population Connectivity in the Long-toed Salamander; \$34,000

University of Lethbridge (Dr. McCune); Testing the Effects of Recreational Trails on Plant Communities and the Spread of Invasive Plant Species; \$11,500

University of Montana (Dr. Hebblewhite); Bull Elk Recruitment, Survival, and Harvest in a Partially Migratory Elk Herd in the Ya Ha Tinda; Year 4 (Final); \$15,000

FUNDING PRIORITY #6: 4 RESEARCH PROJECTS

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

University of Alberta (Dr. Aiken); Chronic Wasting Disease Inactivation by Humic Substances; \$25,000

University of Alberta (Dr. Merrill); Chronic Wasting Disease in Deer: Modeling transmission from contact rates; \$11,000

University of Calgary (Dr. Poissant); Causes and Consequences of Gut Microbiome Diversity in Bighorn Sheep; \$21,000

University of Lethbridge (Dr. Goater); Ecological Epidemiology of Emerging Ambystoma tigrinum Virus (ATV) in a Population of Tiger Salamanders in Southwestern Alberta; \$9,387

FUNDING PRIORITY #7: 2 RESEARCH PROJECTS

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

University of Alberta (Dr. Merrill); Chronic Wasting Disease in Deer: Modeling transmission from contact rates; \$11,000

University of Montana (Dr. Hebblewhite); Bull Elk Recruitment, Survival, and Harvest in a Partially Migratory Elk Herd in the Ya Ha Tinda; Year 4 (Final); \$15,000

FUNDING PRIORITY #8: 2 RESEARCH PROJECTS

Social Science studies of hunting and angling related to demography, attitudes, norms and practices.

University of Alberta (Dr. Adamowicz); Evaluating Activity Survey Apps for Conservation and Economic Valuation from Recreation; \$33,700

University of Alberta (Dr. Harshaw); Sustaining Access and Social License for Hunting in a Mix-Use Conservation Site: A case study in the Cooking Lake-Blackfoot PRA; \$27,000

FUNDING PRIORITY #9: 0 RESEARCH PROJECTS

Evaluate the effect of biological solutions of carbon sequestration on grasslands and treed lands.

FUNDING PRIORITY #10: 1 RESEARCH PROJECT

Evaluate approaches for improving the abundance of pollinators in agricultural landscapes.

University of Alberta (Dr. Frost); Interactive Effects of Landscape Diversity and Local Flower Abundance on Wild Pollinator and Other Beneficial Insect Abundance, Diversity, and Interactions in Agricultural Landscapes; \$29,500

FUNDING PRIORITY #11: 2 RESEARCH PROJECTS

Work towards clarifying status of current data deficient species.

University of Alberta (Dr. Cassady St. Clair); Wildlife Monitoring to Support Urban Ecological Planning; \$21,500

University of Alberta, Augustana (Dr. Hood); Distribution and Habitat Associations of Semi-Aquatic Furbearers in the Beaver Hills Biosphere; \$28,750

FUNDING PRIORITY #12: 1 RESEARCH PROJECT

Efficacy of alternative wetland restoration and mitigation techniques.

University of Alberta, Augustana (Dr. Hood); Distribution and Habitat Associations of Semi-Aquatic Furbearers in the Beaver Hills Biosphere; \$28,750

NONE OF THE FUNDING PRIORITIES: 0 PROJECTS (0 CCEG; 0 RESEARCH)

Note: Projects can relate to multiple funding priorities.



wildlife | fish | habitat



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