

Natural Resource Challenge
FY 2004 Annual Report
Research Learning Center Park Base Increase

Crown of the Continent Research Learning Center (CCRLC)
Waterton-Glacier International Peace Park

1. Summary Description:

The Crown of the Continent Research Learning Center (CCRLC) received its first Challenge funding in FY 2002. The Director, Dr. Leigh Welling, was hired December 2002, the Resource Education Specialist, Dr. Sallie Hejl, began work in August of 2003, and Billie Thomas, the Center's Administrative Assistant was hired in April 2004.

Aside from permanent staff salaries that are entirely base funded, the CCRLC must acquire support from programs outside the Natural Resource Challenge (NRC) to function. In some cases operational support can be written into proposals we submit for specific research and educational projects. This year we received some operational funds from Joint Fire Sciences, NPS Green Parks Partnership, and the Intermountain Region Office of International Affairs. However, most of the funds we receive through outside grants cannot be applied toward general operations but are targeted for a particular purpose such as salary for a student intern, supplies and equipment for field work, or specific educational products.

The CCRLC serves three parks in Montana: Glacier National Park, Grant Kohrs Ranch National Historic Site, and Little Bighorn Battlefield. We also serve Waterton Lakes National Park in Canada because we share a boundary with the park and together, Waterton-Glacier has been designated the world's first International Peace Park. Through our involvement with the Rocky Mountain Network (Dr. Welling serves on the I&M Program Technical Committee and the SEPAS review panel), the CCRLC also serves three parks in Colorado: Rocky Mountain National Park (ROMO), Great Sand Dunes National Park and Preserve, and Florrisant Fossil Beds National Monument. Because the CCRLC is one of two Research Learning Centers in the Rocky Mountain Network, we also collaborate closely with the Continental Divide Research and Learning Center located at ROMO.

Basic facilities for the CCRLC include two renovated Mission 66 3-bedroom houses located in the Glacier National Park (GLAC) headquarters area. One building has been converted for office space, providing staff offices, an internet accessible conference/presentation room that can accommodate up to 12 people, and a computer lab that currently has 3 workstations with software to support a wide range of research and educational activities. The computer lab is used by students and faculty and also serves as a teaching/training area. The second house has been converted to bunkhouse style accommodations that will sleep up to 8 adults and serves as a residence for visiting scientists, students, and other collaborators.

Activities and projects of the CCRLC are organized around three major goals: 1) facilitating research in and around the Crown of the Continent Ecosystem, 2) supporting the use of science to inform management decisions, and 3) coordinate educational and outreach initiatives that transfer up-to-date knowledge about park resources to the public.

2. Summary of FY 2004 Accomplishments

Research Hosted

Efforts to attract and facilitate research in Waterton-Glacier International Peace Park and the surrounding Crown of the Continent Ecosystem are accomplished in three key ways: 1) building and strengthening partnerships with universities and other science organizations, 2) encouraging the use of parks as research laboratories by providing visiting researchers with necessary accommodations, and 3) identifying gaps in existing knowledge and soliciting research to fill them.

Research partnerships are established and maintained through personal contact, attending science meetings and inviting scientists to participate in workshops and round table discussions. We also collaborate directly with research partners on proposals to seek funds for research and educational projects. Both the CCRLC Director and Resource Education Specialist have research experience and expertise and maintain active collegial relationships with scientists in the region. Because connecting with the research community is an essential commonality among all NRC programs, many of our projects and activities are accomplished in cooperation with other Challenge initiatives, such as the Cooperative Ecosystem Studies Units (CESU), the Inventory and Monitoring (I&M) Program, and Exotic Plant Management Teams (EPMT).

Another way the CCRLC helps to facilitate research is by providing housing to scientists at minimal costs. Glacier is a highly seasonal park and most scientists need to get into the field during the same three summer months that many tourists are visiting the region. This often means accommodations are difficult for researchers to find as well as cost-prohibitive. The CCRLC residence helps to alleviate that pressure and offers scientists affordable housing in the park. The residence can house up to 8 adults per night and is charged at standard dormitory rates, which are under \$8/person/night.

The CCRLC helps to identify gaps in our knowledge about park resources and encourages scientists to conduct research projects to fill those gaps. In 2004, we constructed a list of research needs and posted it on the web for prospective researchers. The list was generated by reviewing past and present research and through conversations with park staff and scientists. It represents an extensive survey of current, high priority research areas that ranges across natural and cultural resources issues and social science questions. The assembled list of research needs is available on the public web site at: <http://www.nps.gov/glac/research/researchneeds.htm>. In 2005 we will work with park managers to prioritize the list of research needs and develop these ideas into a Research Plan for the park that places park needs into the broader context of ecosystem research.

We know the park is being used for research as forty-five (45) research permits were issued in 2004. In that time, twenty-eight (28) individuals used RLC housing for a total of four hundred fourteen (414) people-nights. Perhaps a more direct metric of CCRLC involvement in research activities is the number of projects the CCRLC either took the lead on initiating or are playing a strong role in implementing; RLC staff wrote, co-wrote, or were significantly involved in implementing, eight (8) proposals that were funded in 2004. Projects range from wildlife surveys across burn areas, to assessing greenhouse gas emissions in the park, to evaluating the cultural significance of certain landscape features in the park. Highlights from some of these projects follow.

Research Highlights:

Survey of Black-backed Woodpeckers across burned forests within different classes of fire severity and fuel reduction to understand how local landscape conditions influence the occurrence and abundance of this fire-dependent species. Funded through Joint Fire Science. PI: Dr. Richard Hutto, University of Montana.

Assessing atmospheric deposition in surface water of alpine lakes. The project is to determine evidence of air pollution impacts to the park. Funded through USGS Water Resources Division. PI: Leora Manus, USGS.

Establishing and conducting bird point counts throughout the park. The purposes of this project are to understand bird-habitats in the park and establish potential sites for long-term monitoring of landbirds. Funded through the RM CESU and The Glacier Fund. PI: Dr. Richard Hutto, University of Montana.

Quantifying the effects of 2003 fires on fire-dependent bird species. 2003 fires in Glacier burned nearly 150,000 acres. Many species are dependent on fire for their habitat and the mosaic of different burn intensities over different types of vegetation allowed a unique opportunity to study the response of birds across the landscape. Funded through the NPS service-wide comprehensive call, BRMD. PI: Dr. Richard Hutto, University of Montana.

Impacts on water quality from 2003 fires. Severely burned areas, especially near streams, may increase the amount of sedimentation in the streams and thereby affect water quality. The study surveys water quality in several burn areas for 5 years following the 2003 fires. Funded through USGS NRPP and RM CESU. PI: David Clow, USGS Water Resources Division.

Harlequin duck population status and trends. Glacier has the highest density of this species of special concern in any mountain stream habitat. They live here at the eastern extent of their northwest range. Funded through the Montana Heritage Program.

Vegetation Mapping Project. This was the final year of the vegetation mapping project to yield high resolution land cover maps for the park. Funded through NRC Inventory & Monitoring Program. Conducted through the USGS

Baseline monitoring for assessing the impacts of Going-to-the-Sun Road reconstruction to large carnivores over next 10 years. The park is embarking on a major rehabilitation project of the 50 mile highway that bisects the park and crosses over the continental divide. Monitoring will provide critical information to park managers about the impacts that construction activities may have on wildlife. PI: Steve Gniadek, Glacier National Park

Black Swift surveys to determine population status and trends. The study will develop and implement monitoring protocols for this species of concern. Funded through Parks Canada.

Greenhouse Gas (GHG) Emission Assessment for Glacier National Park. As part of the Climate Friendly Parks Program, we assessed the amount of GHGs that are emitted annually by Glacier Park employee, concessioner, and visitor activities so that emission reduction targets can be established and monitored. Funded through the NPS Green Parks Partnership. Conducted by ICF Consulting, Washington, DC.

Research Information to the Public

Research information is delivered to the public in three primary ways: 1) directly to park audiences through public talks and conferences, 2) by providing information to park interpreters and developing exhibits and brochures for distribution inside the park, and 3) through collaboration with educators and journalists to develop materials for distribution outside the park. The following provide examples:

Waterton-Glacier Science Conference: The CCRLC helped to organize and facilitate a one-day science conference for the public in August 2004 held at Lake McDonald Lodge. Eighteen scientists and resource managers presented research, monitoring, and survey results to an audience of more than 200 people. In addition being highly attended, the conference was covered by several local and regional newspapers. The Great Falls Herald did a double page spread on the conference highlighting many of the talks. The article is available as a pdf file on the CCRLC website.

Fire Ecology Education: Glacier National Park has a history of large forest fires; the 2003 season was especially active, with a total burn area of nearly 150,000 acres (13% of the park). Helping the public to understand the benefits of fire to forest ecosystems is a priority for the park and the CCRLC participated with Glacier's fire management and interpretation staff to develop an educational strategy with fire tours, brochures, and wayside exhibits. The CCRLC Resource Education Specialist, in collaboration with research scientists at the University of Montana and the Lolo National Forest, received a grant from Joint Fire Science to develop a suite of public education products, in conjunction with a research project, over the next 3 years. Products will

include self-guided tours, interpretive signs, and hosted field trips for school children and the public.

Resource Bulletins for Park Interpreters. Kristy Segal, an ecology student at Montana State University completed a two-month internship with the CCRLC to develop “resource bulletins” for the Division of Interpretation and Education. This was a pilot project to provide seasonal park staff with one-page descriptive references of current research topics that they can use as to inform park visitors. Kristy completed 11 bulletins during summer 04 on a range of research topics currently under investigation at the park. In summer 05 will plan to continue this position to develop more bulletins and to distribute last year’s information to park interpretive staff.

Climate Change Communication. The impacts of climate change to park resources are a critical area of concern for Glacier, which is home to a world-class climate change research program conducted through the USGS by Dr. Daniel Fagre. Results from this research at Glacier have implications that go far beyond the park itself. Besides providing topics for several of the interpretive Resource Bulletins mentioned above, public education activities on climate change included public talks, discussions with a national production company (K2 Productions) about development of an IMAX film, and securing of funds to develop a wayside exhibit on climate change at Many Glacier on the east side of the park.

CCRLC Director, Dr. Leigh Welling is also editing a major document for the public and decision makers that will summarize impacts of climate variability and change in the northern Great Plains and Rocky Mountains regions. The document, which will undergo peer review in 2005, was developed as part of the National Assessment on Climate Variability and Change through the US Global Change Research Program. Funding for this project was provided by NASA through the through the Upper Midwest Aerospace Consortium, University of North Dakota.

Citizen Science

The CCRLC does not currently have a citizen science program. This is something that has been discussed and is under consideration as the Center develops its Educational Strategic Plan during 2005.

Science Education for Younger Students

While educational products developed through the CCRLC are not specifically directed toward younger students, we do participate in a number of committees and organizations that serve younger audiences. In this way, our primary mechanism for reaching younger students in a formal setting takes place by providing guidance to and content for teachers, park interpreters, and other educators. For example, we have hosted or participated in several workshops and seminars for K-12 teachers. We have also participated in a number of meetings organized by the Interpretive Division to engage local schools (including those on the neighboring Blackfeet Indian Reservation) in exploring the ways

in which teaching students about park resources can fulfill state curriculum standards. The CCRLC is also a member of the regional Crown of the Continent Ecosystem Education Consortium, which is active in developing ecosystem-focused curricula, workshops, and projects. We also assist the park-based Glacier Institute in identifying themes, topics, and approaches for their youth classes and camps.

3. Additional information highlighting partnership accomplishments, leveraging of funds or other types of accomplishments not captured above.

Important accomplishments not well captured above fall into two general categories: 1) Decision Support (supporting the use of science to inform management decisions), which is one of three overall goals of the CCRLC, and 2) Student Internships, an important component of our educational strategy. Summer internship project highlights are given in Section 4.

Decision support activities include organizing and hosting workshops, writing documents for resource managers and interpreters, writing and providing summaries of research, and initiating research applications projects relevant to park functions and decision making. All activities are aimed to inform resource managers and other staff about topics of special significance using up-to-date research results. Highlights of decision support activities are listed below.

Glacier National Park Fire Atlas. Fire managers are required to input, update, and maintain fire information in multiple local and national databases. This information is also integrated into various decision support models. Several inefficiencies exist in the current data infrastructure. The National Center for Landscape Fire Analysis (NCLFA) is designing and developing an “enterprise geodatabase”, using ArcSDE, that models fire history and integrates other data such as vegetation, weather, and fuels and defines their relationship with fire history. The project is funded through the National Center for Landscape Fire Analysis at the University of Montana.

Climate Friendly Parks: Moving from Knowledge to Action. This 2 day workshop held in December 2003 was aimed at park staff, concessionaires, and park partners; 80 people attended. Goals were to provide baseline information about climate change and the particular impacts we are measuring in Glacier. The Greenhouse Gas Emission Assessment described in Section 1 was undertaken as part of this project. Funding for the workshop was provided by the NPS Green Parks Partnership and the Environmental Protection Agencies Global Change Communication Program.

The primary outcome of the workshop was to develop an Action Plan for the park to mitigate or adapt to the most undesirable consequences of climate change. The Action Plan is being implemented by the Glacier Park Green Team, which formed as a result of the interest in sustainable practices brought out at the workshop. Climate Friendly Park action items are also being integrated into Glacier’s Environmental Management System, the development of which is being led by the CCRLC Director.

In addition, the CCRLC was involved in several follow-on activities from the Climate Friendly Parks workshop to bring climate change science to bear on management decisions. In May, the CCRLC Director was invited to speak at the Zion National Park Climate Friendly Parks workshop on the difference between climate variability and climate change. Later that month she was also asked to give a talk at the Mountain Climate Sciences meeting in Lake Tahoe where she presented to climate change scientists some of the management challenges of climate change impacts.

Fire in the Crown Workshop. One day seminar was held in April 2003 that summarized the 2003 fires, described the impact the fires had on cultural and natural resources, and demonstrated the importance of fire as an ecological process across the landscape. Park staff, concessioners, and park partners attended. In addition to providing decision support, our goal was to increase the knowledge of park staff that would have direct contact with the public and those who would train seasonal staff in late spring. Support for the workshop was provided by the RM CESU.

The CCRLC also helped to organize and facilitate a session on fire at the 4th Annual Crown Managers Partnership (CMP) Forum in Cranbrook, British Columbia. The CMP is a partnership of land management agencies in the Crown of the Continent Ecosystem and is discussed in more detail below.

Crown Managers Partnership. The CCRLC Director serves on the CMP Steering Committee and supports various activities that make science and research available for land managers. The CMP consists of over twenty agencies that have jurisdictional responsibility for land in the Crown of the Continent Ecosystem. A central activity undertaken by the CMP is an annual forum that focuses on a challenging regional theme or topic; international experts are invited to speak at the forum and participants discuss how they might work better together across agencies to manage that particular issue. Dr. Welling is chair of the Forum Committee for 2005, the theme of which is exotic plant management.

Another project under the direction of the CMP is the Regional Landscape Analysis Project (RLAP). The project is implemented using a computer model known as ALCES, A Landscape Cumulative Effects Simulator, developed by Dr. Brad Stelfox of Forem Technologies. The model enables resource managers to explore and quantify landscapes subjected to human land use practices and to natural disturbance regimes such as fire; and to track changes in landscape over time. The project is funded through the partner agencies and is being carried out under the guidance of the CMP Steering Committee with assistance from the Miistakis Institute for the Rockies at the University of Calgary.

Flathead Landscape Assessment Project. This project aims to assess the ecological and economic impacts of future landscape change in Flathead County. By identifying desirable and undesirable conditions and determining the land use policies necessary to achieve them, stakeholders (including land managers and the public) can develop

best management practices. The project is being conducted through the Center for Agriculture, Resource, and Environmental Systems at the University of Missouri.

4. Two or three (or more) bullets (2-4 sentences each) highlighting specific projects or other accomplishments of particular interest (these may be included with the above summaries or may be included at the end.

Internships

The CCRLC hosted two summer interns in summer 2004. Student internships are an important part of our educational strategy because they provide help for the park resource staff or science partners as well as provide education and training for the student.

Kristy Segal, an ecology student from Montana State University, researched and wrote eleven 1-page Resource Bulletins that describe, in plain language, current research topics under investigation in the park that are of key importance to park managers. The CCRLC plans to continue this as an annual summer position. Aimed primarily at the park's interpretive staff, this dissemination of scientific information will provide seasonal employees with a reference library to support their interactions with the 2 million visitors who visit the park annually. After working at Glacier, Kristy is now considering a career as a science writer.

International intern, Maraile Goergen, a geography student from the University of Goettingen, Germany, assisted the Exotic Plant Management Team in 2004. Her work focused primarily in the burn areas from the 2003 and covered three broad categories: 1) Identification of invasive weed infestations at several trailhead and backcountry locations, 2) Mapping the location and extent of weed infestations using GPS, 3) Eradication of selected infestations, and 4) Data entry of collected field data into ArcView format. Maraile was able to hone her geospatial skills and to learn about exotic plants and fire ecology. See photograph on following page.

Photograph 1. German student Maraile Georgen helps park biologists study and map weed growth in the many burned areas throughout Glacier National Park. Fires burned nearly 150,000 acres in the park in 2003, around 13% of the total area. Concern about opportunistic nonnative weeds has prompted the park's Exotic Plant Management Team to carefully monitor the burn areas in order to treat weeds before they take hold.

