Redefining CABNR through innovation and collaboration

As many of you know, following the curricular review process last year our College sustained a serious budget cut that caused the loss of administrators, faculty and staff. This resulted in the closing of two of our departments, Animal Biotechnology and Resource Economics, leaving the departments of Biochemistry and Molecular Biology, Natural Resources and Environmental Sciences (NRES) and Nutrition.

Since then, with extensive participation from CABNR's Advisory Board and the Dean's Range Advisory Committee, the College underwent a judicious self-analysis and strategic planning modification process. Through an unprecedented spirit of collaboration and dedication to the Land Grant mission, our faculty then worked diligently to create and propose a new department of Agriculture, Nutrition and Veterinary Science (ANVS) and three new undergraduate programs stemming from ANVS and NRES.

The newly proposed majors include: Agricultural Science, Range Ecology and Management, and Forestry Management.

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Walker wins award for water tests conducted on Navajo reservations

Mark Walker, a professor and chair of the Department of Natural Resources and Environmental Sciences, received a 2010 Project of Excellence award in January from the National Water Program for his research testing unregulated water supplies in the Navajo Nation.

The recognition Walker received for testing Navajo water supplies in New Mexico and Arizona has led to invitations to do research work in other parts of the world, including Samoa, where he recently spent 10 days researching the parasite leptospira and leading a workshop on preventing water supply contamination.

Walker’s work with the Navajo Nation focused on the 25 percent of Navajo dwellings using domestic water that isn’t regulated due to the high cost of delivering clean water to remote areas. These areas not served by the Navajo Tribal Utility Authority rely on windmill-driven pumps that store water in tanks designed for stock watering.

His project paired faculty and students from the University of Nevada with Dine College, a community college system in the Navajo Nation.

Walker said the project involved sampling unregulated water supplies for E. coli, uranium, Continued on page 5
FACULTY FOCUS

Ashley named outstanding educator by American Dietetic Association

Prof. Judith Ashley has been selected as the “Outstanding Dietetics Educator” by Region 4 of the American Dietetic Association.

Each year, each of the seven regions select one person to receive this award. Region 4 is made up of the states of Arizona, Colorado, Kansas, Nevada, New Mexico, Oklahoma, Texas and Utah.

Ashley’s classes include Nutrition 426/626 (Medical Nutrition Therapy I) and Nutrition 427/627 (Medical Nutrition Therapy II).

In 2009, Ashley helped develop a guide to help medical practitioners successfully diagnose and treat celiac disease, which is the malabsorption of nutrients as a result of ingesting gluten and is more common than previously thought.

In 2005, Ashley received a $1.38 million federal grant to create a program to increase the nutritional knowledge of Nevada’s doctors. The goal was to create a link for doctors to provide to their patients quick, reliable information about nutrition and medical conditions, including cancer. The purpose was to integrate nutrition into the practice of these doctors who serve as role models for the medical students they train in their medical offices.

Dean’s message

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and Ecology. Agricultural Science is an innovative major that enables students to “design” a curriculum to either emphasize ag business and economics OR ag production and science. The new interdepartmental Range Ecology and Management program was developed between the new ANVS department and the Department of Natural Resources and Environmental Sciences. This curriculum was specifically designed to meet accreditation standards of the Society of Range Management. The third new program in Forestry Management and Ecology within NRES will allow students to specialize in Sierran forests with emphasis in ecology and restoration.

In a related action, a multi-state Range Education program has been proposed for the western region that includes contributions from CABNR and possibly hands-on learning experiences at the Gund Ranch.

At this point, the new department name and its structure along with the three proposed majors have been submitted to the Board of Regents for consideration at their June meeting. Pending approval from the BOR, we anticipate accepting students into these new programs for the 2011 Fall semester. The multi-state Range Education proposal has been submitted to the Western Deans and Directors for consideration at their summer meeting in July, and following approval an organizational meeting will be scheduled to implement the multi-state Range Education program.

Thus, through the commitment, creativity and collaborative spirit of our faculty and visionary departmental leadership, we’ve positioned CABNR/NAES to serve the future agricultural and natural resources interests in the Great Basin.

Innovation is forward thinking and we have redesigned CABNR through forging inter-departmental, inter-collegiate and multi-state partnerships to build resources and expertise to carry our education into the future. It is envisioned that this collaborative approach is a futuristic view of agricultural and natural resources education across the country.
RESEARCH

Nutrition specialist tests antioxidants for injury treatment

By Robert Mills

Hemorrhagic shock is responsible for 50 percent of early deaths in the U.S. military. Professor Stanley Omaye is looking to lower that number. The nutrition specialist is working with antioxidants to develop emerging treatments for severely injured soldiers suffering from hemorrhagic shock and subsequent ischemia-reperfusion (IR) injury.

IR injury is an acute inflammatory response that occurs after blood flow has been restricted and later restored.

“If you tie a tourniquet and you cut off the flow to a body part, and then you forget about it and come back and let it loose, you get a burst of blood to the tissue with a lot of oxygen, which can cause damage to tissue,” Omaye said. “A lot of this research is to prevent such damage. That’s just one example.”

IR injury is one of the most common types of cell injuries that occur in response to a variety of clinical and military field conditions such as coronary arterial disease, cardiopulmonary bypass, occlusive arterial disease, stroke, re-plantation of amputated parts and tourniquet application.

This overflow of oxygen, known as oxidative stress, results in a burst of reactive oxygen and nitrogen, causing organ and tissue damage.

One science-based approach to this problem is the early intervention of the antioxidant glutathione (GSH), a naturally occurring body chemical.

“Through early intervention with GSH or similar chemicals, we would have the potential of preventing injury, morbidity and mortality,” Omaye said.

However, Omaye is taking research one step further -- to determine the feasibility of using a precursor chemical to GSH.

“It’s called gamma-glutamylcysteine (GGC), and scientists in Australia are using it as a health-food supplement,” Omaye said. “This precursor is a naturally occurring antioxidant, and it might be better at getting into the bloodstream and treating IR injury.”

By preloading tissues with this GSH precursor chemical, Omaye and fellow researchers should be able to stimulate tissue to synthesize GSH, preventing IR injury.

Once initial research is completed, Omaye said his work may be applied on a wider scale.

“In addition to potential usefulness for the military, there is potential for civilian trauma situations,” Omaye said.

Clean Indoor Air Act having impact, CABNR researcher finds

An impact study by researchers at the University of Nevada, Reno has found that the Nevada Clean Indoor Air Act is not only good public policy but also good for the economy.

In the study, hospital admissions in Nevada for second-hand smoke-sensitive health problems declined between 2007, when the NCIAA was implemented, and 2009. The researchers – Chris Pritsos, chair of the nutrition department in the College of Agriculture, Biotechnology and Natural Resources, Wei Yang of the University of Nevada, Reno and John Packham of the University of Nevada School of Medicine – also found that hospital-billed charges for treating acute myocardial infarction (AMI) and stroke significantly decreased from 2007 to 2009.

“The Nevada Clean Indoor Air Act is not only having a positive health effect on Nevadans but is reducing health care costs for the state and federal governments,” Pritsos, the study’s lead author, said. “Imagine the lives and costs savings to Nevada if this ban were expanded to cover all segments of the population.”

Since the NCIAA started in 2007, hospital admissions in Nevada for AMI decreased an average of 346 per year while admissions for stroke decreased an average of 315 per year.

Hospital bills decreased an annual average of $23.5 million for AMI (including about $900,000 for Medicaid and $7.5 million for Medicare) and $9.8 million for stroke (including $600,000 for Medicaid and $4 million for Medicare).

The research was discussed at the first-ever National Smokefree Gaming Symposium in Las Vegas. Pritsos talked about his research with other anti-smoking activists and casino workers lobbying the state to pass a statewide ban on smoking inside casinos. Casinos are one of the few places where the NCIAA did not ban public smoking. Pritsos has also appeared on “Jon Ralston’s Face to Face” Bill Brown’s “Face the State” to discuss his findings on smoke-free laws in Nevada.
CABNR students earn silver medal at iGem conference during premier synthetic biology competition at MIT

By Mike Wolterbeek

A team of 10 biochemistry and bioengineering students from the University of Nevada, Reno received a silver medal at the International Genetically Engineered Machine Competition (iGem) in November for their work on plant biosensors.

The team traveled to the Massachusetts Institute of Technology where 117 university teams from around the world gathered for the annual competition.

“This was the first time many of these students attended an international conference. It was great for them to be exposed to the international community, and to see some truly impressive research,” said David Shintani, one of the Nevada team’s advisors and a professor in the biochemistry department.

The event is the premiere undergraduate synthetic biology competition. Synthetic biology is an area of biological research that combines science and engineering in order to design and build novel biological functions and systems. This is the second team from Nevada to participate in the six-year-old competition.

“Plants are able to sense the environment around them, and create signals indicating stress,” Matt Polasko, a team member, and a biochemistry and molecular biology major, said. “Usually these early signals are not easily recognizable by humans so we’ve taken the genes that detect the environment and have created a signal that a human can understand, such as having the cells glow in response to stress inducers, such as cold.”

“The students have successfully engineered the tobacco to show a bright red fluorescence when put under cold stress,” Christie Howard, faculty advisor and professor in the College of Agriculture, Biotechnology and Natural Resources, said. “We’re excited and quite happy with the results.”

During the competition, Nevada organized and held the first iGem plant summit. This summit informed others at the competition and held the first iGem plant summit. This summit informed others at the competition of the benefits of using plants in iGem competitions.

“About 70 people attended the plant summit. It gave Nevada a big presence at the jamboree,” said Randy Pares, an iGem team member. “It was great to represent and promote Nevada at such an important competition.”

In all, there were 60 gold medals awarded, 16 silver medals awarded and 27 bronze medals awarded. Last year the Nevada team took home a bronze medal.

Most of Nevada’s team is graduating this year. The remaining students will be around next year to mentor new students, and compete in the summer-long iGem competition again.

“It’ll be great to see newer students having mentors to look up to. Our team has never had that before, and I think it’ll be very beneficial,” team member Elaine Bersaba said.

“The students did extremely well. They planned everything, and really took control.” Shintani said. “They deserve a lot of credit. iGem is one of the best learning experiences at the University.”

Team members are Elaine Bersaba, Christian Copley, Bryson Wheeler, Matt Polasko, Samantha Lee, Hilary Allen, Richard Hilleary, Vadim Gladwill, Randy Pares and Nicholas Noel.

The team has received support from the biochemistry department, the College of Agriculture, Biotechnology and Natural Resources, the Nevada IDeA Network of Biomedical Research Excellence Program and the VP of Research’s office.

Zeb Hogan named National Geographic Society Fellow

Big fish expert Zeb Hogan, a research biologist for CABNR, has been named a National Geographic Society Fellow. Hogan was featured in the March issue of National Geographic Magazine in the “Explorer’s Profile” – a three-page spread at the front of the magazine.

Hogan, who is often photographed in murky water holding extremely large freshwater fish, has been in National Geographic Adventure magazine and National Geographic for Kids as well.

Hogan once explained that he often needs to get in the water and embrace a large fish in order to determine if it’s strong enough to swim before it is released. Some fish, such as the 10-foot, 600-pound catfish caught from the Mekong River in Cambodia, get tired when they are caught in a net.

Last summer, Hogan hosted a five-part series on the National Geographic Channel about large fish, including fast-growing “flying” carp that have invaded the Mississippi River.

But much of Hogan’s research focuses on big freshwater fish that are vulnerable because they are old when they start reproducing and often require large habitats to survive. They also feel pressure from fishermen, although Hogan has done what he can by paying twice as much per pound for large fish than what a Cambodian fishermen would get from the village fishmonger. He buys them and then sets them free.

Hogan was also recently named Young Alumni of the Year at University of California, Davis.
Benedict to roll out ‘Rethink Your Drink’ program

By Robert Mills

CABNR Nutrition Professor Jamie Benedict is prepared to roll out the beginning phases of a statewide “Rethink Your Drink” program. Across the nation, organizations, nutritionists and health professionals are spreading the word that the road to a healthy bodyweight begins with an easy step – reducing the intake of calories from sugary drinks.

The message comes at a time when childhood obesity is a national health crisis.

Benedict said nutritionists and diet professionals recognize the need to reduce the intake of sodas, juices and other sugary drinks.

“This whole thing about sugary drinks is just enormous,” Benedict said. “New dietary guidelines continue to hammer home the point that we have to reduce these consumption rates of sugary beverages.”

Benedict began formative research in May by developing focus groups with limited-resource families in the Supplemental Nutrition Assistance Program (SNAP) – formerly the Food Stamp program.

“What we’ll do is have interviews with SNAP parents to find out what it’s like in the home,” Benedict said. “Part of the research suggests that families with limited resources have more access to sugary drinks. Is it cost? Is it preference? These are questions we hope to answer.”

Cutting back on the intake of sugary drinks starts by limiting access, Benedict said. Since data suggests most sugary drinks are consumed in the home, Benedict will aim Rethink Your Drink at parents.

After completing formative research, Benedict will shift gears and start spreading the word. With the help of dentists, nurses and family practitioners, she hopes to deliver a message that can compete with the powerful soft-drink advertising industry.

If all goes well, and solid research meets with a strong campaign, Benedict hopes the Rethink Your Drink program will improve the lives of Nevadans, particularly Nevada youth.

“It’s a hard message not to get behind,” Benedict said. “If it’s as easy as limiting it in the household, we could have a real, positive impact on the health of children.”

Continued from page 1

arsenic and fluoride. Students from the two schools traveled throughout the northern region of the Navajo Nation to locate the water supplies, measure the physical characteristics of the water and inspect each site. The work began in 2007, and 98 wells have been sampled over three seasons.

The sample showed that 30 percent of the unregulated supplies exceeded federal standards for arsenic, 11 percent for uranium and 3 percent for fluoride. Fifteen percent tested positive for E. coli.

The information supported educational efforts, further testing and efforts to extend public water supplies.

“However, the most profound impact has been on the Navajo students involved in the program who have developed interests in STEM disciplines and skills that qualify them for technical work focused on water quality,” Walker said.

The National Water Program is funded by the U.S. Department of Agriculture and the National Institute of Food and Agriculture. It acknowledges water resource professionals working with citizens, communities and agencies on water resource problems in the U.S.

Walker spent years in Churchill County testing private wells, whose owners often don’t know if the water is safe.

Walker will continue testing Navajo water supplies this summer.
Researchers investigating EBA disease in cattle herds

By Andrew Church

Epizootic Bovine Abortion (EBA), also known as Foothill Abortion, is a disease responsible for reducing calf production on ranches in western and northern Nevada, California, southern Idaho and southern Oregon. Ongoing research by the University of Nevada’s College of Agriculture, Biotechnology, and Natural Resources and the University of California Davis School of Veterinary Medicine has worked to investigate this disease as well as develop strategies to mitigate its damages.

EBA is caused by infection through the bite of Ornithodoros coriaceus, a species of tick that cohabits areas used for livestock production. The pathogen carried by the ticks cause pregnant cows to either abort their calves late in term (six to nine months), or results in the birth of weak calves that die soon after. The prominence of the disease in these regions raises herd death tolls, and is detrimental to livestock producers. In some areas, the estimated loss of life to EBA can be in upwards of 50 to 60 percent of a calf crop.

Much like the relationship between malaria and mosquitoes, the ticks serve as a vehicle for the transference of the pathogen. When ticks bite the host, the host is infected with the pathogen, causing it to multiply. Other ticks that bite the infected host will receive the pathogen as well, and continue the cycle. Although it has been known for 40 years that ticks carry the disease, the specific organism responsible for causing EBA was largely unknown until recently.

“The EBA pathogen is relatively susceptible and can be treated with antibiotics,” said Michael Teglas, assistant professor in the Department of Animal Biotechnology. “However, most of these cattle are turned out on the range where it is difficult for ranchers to administer treatment.”

In response to this dilemma, researchers at UNR have initiated several projects to uncover more about EBA, with support from the California and Nevada Cattlemen’s Association. The first of these projects was to establish the correlation between EBA outbreaks and tick-infested regions. To determine whether or not ticks were the culprits, researchers devised a series of “tick traps” to determine if tick populations were present in certain regions of Nevada. Ticks are naturally attracted to carbon dioxide, which is expired by all mammals. Using dry ice as bait (which emits carbon dioxide), researchers were able to record tick populations throughout Nevada. This research concluded that cases of EBA were limited to regions with a presence of Ornithodoros coriaceus.

The second phase of research deals with analyzing immunity and developing strategies towards preventing EBA from occurring. A curious aspect about infected cattle is that they develop a short-term immunity to the disease following an abortion. Using mice as a surrogate host, researchers were able to record tick populations throughout Nevada. This research concluded that cases of EBA were limited to regions with a presence of Ornithodoros coriaceus.

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Through these studies, researchers were able to determine the length of time the pathogen lived within the host’s bloodstream. In doing so, they gained insight into how long cattle would have temporary immunity to EBA, as well as to the time period in which EBA could be transferred to other ticks. Additionally, by studying the blood of infected cattle, researchers were able to identify the pathogen itself.

“It’s taken us a very long time to figure out what this organism is,” Teglas said. “At first it was thought to be a virus, or a form of bacteria. In 2005 UC Davis researchers discovered it was a slow-growing intercellular bacteria.”

Utilizing this knowledge, researchers have developed an experimental vaccine to inoculate against the disease. While still being tested, the vaccine has been successful in protecting heifers exposed to EBA.

“The vaccine is still in the testing phase, but so far we have had no EBA abortions in treated heifers,” Teglas said. “We are still testing to make sure there are no adverse effects. It’s our policy at UNR to develop treatments that are safe for livestock.”

According to CABNR, results from this project have already been disseminated to cattle producers through educational programs such as the annual Nevada Cattlemen’s Update and University of Nevada Cooperative Extension.
Research increases cheatgrass grazing options for cattle

By Andrew Church

In a state plagued by rangeland wildfires, research conducted by the University of Nevada, Reno’s College of Agriculture, Biotechnology and Natural Resources is working towards developing preventative fire strategies. The solution? Livestock grazing.

Bromus tectorum, or cheatgrass, is an invasive plant species to Nevada, having originated in Eurasia. Its dispersion across Nevada is due in part to its off-season growth pattern and rapid development.

According to University of Nevada Cooperative Extension, cheatgrass covers nearly 17 million acres in the Great Basin. Cheatgrass seeds germinate in the fall and early winter, which provides it extra time to begin growing during early spring. The lifecycle of cheatgrass ends in early summer, when the plant begins to dry out and disperse its seeds.

The unique lifecycle of cheatgrass is what also makes it a fire hazard. Dry and dead cheatgrass found in the summer months provides an abundant source of fuel for rangeland fires. According to Barry Perryman, associate professor in the Department of Animal Biotechnology, the presence of cheatgrass increases the occurrence of rangeland fires from every 40 to 100 years to two to five years.

“As an annual grass, cheatgrass tends to reach peak production before native perennials,” Perryman said. “As a result, cheatgrass tends to dry out by early summer, which creates a fuel source and increases the frequency of fires.”

Repeated fire exposure also takes its toll on native plant species, destroying native flora and replacing it with cheatgrass. In turn, the removal of these native plants disrupts the ecology of affected areas. Animal species such as the sage grouse and the pygmy rabbit depend on sagebrush habitat, and are impacted negatively by its loss.

“As fires become more and more frequent, cheatgrass tends to grow and spread,” Perryman said. “Whereas an annual plant such as cheatgrass will replace itself, repeated fires inhibit the growth of perennial plants.”

The use of cattle to reduce the spread of cheatgrass is not a new strategy. However, it has been traditionally thought that livestock will only consume cheatgrass during the spring months when the plant is green and developing. Seeding plants seem to be avoided by grazing animals. Additionally, many thought that dry cheatgrass contained less nutritional value. Operating under these assumptions, livestock grazing strategies have been targeted towards reducing cheatgrass during the spring months.

However, Perryman argues that spring grazing poses several logistical challenges. As cheatgrass growth varies per year depending on weather and precipitation, it is often difficult to develop a detailed plan for spring grazing.

Secondly, it is also problematic to gauge how many animals are needed to reduce cheatgrass coverage to a desired amount, or how much time it would take to do so. Many cattle producers that operate on public lands are allotted a certain amount of time to graze, which impacts the effectiveness of these strategies.

In response, Perryman has worked to investigate the preconceptions about cheatgrass grazing, and has offered different conclusions. One observation he has made concerns the nutritional content of dry cheatgrass.

“Cheatgrass is quite nutritious in the spring, but when it sets seed it becomes unpalatable for livestock, and they stop consuming,” Perryman said. “We have discovered that dry cheatgrass still contains good protein and energy content. Just because animals quit eating it doesn’t necessarily mean it’s not nutritious.”

Perryman also argues that once the grass has dropped its seed, animals will resume eating it. This creates grazing options for cattle producers in late summer and early fall.

“These new strategies can solve many of the logistical problems of spring grazing,” Perryman said. “Unlike in the spring, we can observe and measure cheatgrass growth more effectively in June and July. We can also analyze the nutrition content of the dry cheatgrass. This allows producers to develop better, more consistent strategies for late grazing.”

Ultimately, the use of these strategies not only provides livestock producers with additional grazing options, but also works to mitigate the damaging effects of rangeland fires.
Mediterranean diet advocate speaks at CABNR event

Dr. Michael Ozner, medical director for the Center for Prevention and Wellness at Baptist Health South Florida, was the featured speaker March 31 at the CABNR Nutrition Graduate Program Seminar Series.

Ozner’s presentation, titled “Bypass Surgery? No thanks. Pass the red wine!” focused on the benefits of the Mediterranean-style diet, which he told his Reno audience has proven to lower inflammatory markers, reduce metabolic syndrome and eliminate many risk factors that contribute to heart disease.

“This is a diet and a lifestyle that not only can make you look and feel great but can help you live a longer, healthier life at the same time,” Ozner said.

The diet Ozner has developed, called the my Miami Mediterranean Diet, not only helps people lose weight but actually saves lives, Ozner said.

The diet is characterized by whole grains and legumes, lean protein, fresh fruits and vegetables, and plenty of heart-healthy olive oil. The diet has been clinically proven to arrest the degenerative factors that lead to many lethal diseases.

“The Miami Mediterranean Diet is about preventing cardiovascular disease by reducing inflammation and neutralizing free radicals that lead to heart disease, cancer, and numerous other diseases,” Ozner told his Reno audience.

“Can we defeat cardiovascular disease and its manifestations (heart attack, stroke, peripheral vascular disease)? The answer is yes!”

Jamie Benedict, an associate professor in the Department of Nutrition, said Ozner also described his 10-step plan to achieving good health, which emphasizes characteristics of the Mediterranean diet but also the need for exercise, stress management and time with friends and family.

“The seminar was packed,” Benedict said. “Students, staff, faculty and members of the community attended. I think we had close to 100 people in attendance.”

If you missed Ozner’s presentation, visit his website (www.drozner.com), or pick up one of his bestsellers, “The Great American Heart Hoax,” or “The Miami Mediterranean Diet.”

Youth Range Camp planned for June in central Nevada

The 51st Nevada Youth Range Camp will be held June 19-25 at the U.S. Forest Service’s Big Creek Campground in central Nevada.

“Nevada Youth Range Camp is a teenager’s best opportunity to learn about Nevada’s desert and mountain rangelands,” said Jim Gatzke, youth camp coordinator. Students learn basic surveying and map reading, identification and importance of rangeland plants, evaluation of sagebrush and woodland ecosystems, wildlife surveying techniques, evaluation of stream health and many other topics related to rangelands.

Range Camp is educational and offers an enjoyable, outdoor experience with activities such as swimming, fishing, hiking, volleyball, horseshoes, campfires and photography.

The Society for Range Management operates the week-long camp for 14-18 year olds from Nevada and eastern California. Campers are taught by range management professionals knowledgeable in the ecology and management of the Great Basin’s desert and mountain rangelands. University of Nevada Cooperative Extension conducts the program with staff from various state and federal agencies including CABNR, Natural Resources Conservation Service, Nevada Division of Forestry, Nevada Division of Conservation Districts, Bureau of Land Management, U.S. Forest Service, U.S. Fish and Wildlife Service and Nevada Department of Wildlife. Financial sponsors include the Nevada Wildlife Federation, Nevada Conservation Districts, Nevada Bighorns Unlimited and Nevada Society for Range Management.

Camp is held every June at the U.S. Forest Service’s Big Creek Campground in central Nevada’s Toiyabe Mountain Range. The Toiyabes are one of Nevada’s most impressive mountain ranges with several peaks over 10,000 feet in elevation. June is an ideal time to be in the Toiyabes when numerous wildflowers are in bloom and the vegetation is green from the recent snowmelt.