Dear Friends,

Each and every day I come to work, I am amazed at the number of people at The Raptor Center who are actively engaged in helping to advance One Health medicine.

In this issue of Raptor Release, you’ll read about several projects being conducted by veterinary students—or soon-to-be veterinary students—that could eventually contribute to our scientific understanding of how changes in the environment affect the health of raptors and other animals.

The Raptor Center is probably best known for its pioneering and ongoing work in rehabilitating sick and injured raptors. However, as part of the University of Minnesota College of Veterinary Medicine, The Raptor Center also plays a major role in veterinary research, discovering links between environmental health and the health of humans and wildlife—also known as the One Health initiative.

Research can occur in the lab, clinic, or field. It can be quick and focused like our summer student projects or it can be more encompassing and occur over decades. For more than 30 years, for instance, we have participated in bird-banding programs that provide information about changes in the environment and the health of entire populations of birds over time.

Other ongoing research—developing new and innovative ways to spread our message and improving protocols for the care and management of captive raptors—occurs as part of our daily work. And some global opportunities such as the Galápagos project come along only once in a lifetime.

The field of One Health is still in its infancy. Countless discoveries are yet to be made, including further findings about the role raptors play as sentinels of One Health. Your support allows us to continue to build on important discoveries that will help improve the health and well-being of humans, animals, and the environment.

Thank you for believing in our One Health efforts. After all, we are all in this together.

Best regards,

Julia Ponder, D.V.M.
Executive Director
Working to advance One Health

By Fran Howard

Instead of enjoying well-deserved downtime this past summer, five dedicated students spent six to ten weeks at The Raptor Center (TRC) peering through microscopes, testing serum samples, examining radiographs, developing mathematical formulas, and conducting surveys. The results of their projects could eventually help One Health scientists discover better ways to manage the environment for the health of raptors, humans, and other wildlife.

Third-year veterinary student Carrie Robbins recently completed her second project in the Summer Scholars program, which provides experiential learning opportunities for first- and second-year veterinary students. In 2012, Robbins tested 400 serum samples to see whether red-tailed hawks, great-horned owls, bald eagles, and peregrine falcons develop antibodies to Newcastle disease, a highly contagious avian virus affecting poultry and some wild birds. She found that great-horned owls and bald eagles showed evidence of exposure to Newcastle disease.

Die-offs have not occurred in raptors like they have in double-crested cormorants and American white pelicans. Learning that some raptors develop antibodies to the disease, however, helped to confirm that the virus persists in the environment outside of known outbreaks. That, however, brought up another question.

“Every other year, epizootic outbreaks occur in several waterbird species,” says Robbins. “Why are these birds only dying off every other year?”

This year, while working to answer that question, Robbins discovered that surviving adult cormorants exposed to the virus pass antibodies through their eggs to their offspring. The following year, these birds with passive immunity are able to fend off the virus but apparently do not pass immunity to their offspring.

Mathematical formulas

Miranda Shaw, a senior at Florida A&M University, spent 10 weeks this past summer developing reference values for the normal cardiac size of bald eagles and peregrine falcons. She also used a mathematical model to predict the normal heart size of raptors. To accomplish her task, she examined radiographs of 48 bald eagles and 18 peregrine falcons, measuring their heart width, sternum width, and the width of their thoracic cavities.

Each species of bird has a distinctive cardiac ratio.

“‘We can’t use the ratio used on a Canada goose to determine the heart size of a hummingbird, which has a heart rate...’

Third-year veterinary student Carrie Robbins tests for antibodies to Newcastle disease, a highly contagious avian virus.
as high as 1,200 beats per minute,” she explains. “In comparison to body size, a hummingbird’s heart would be much larger than the heart of a Canada goose.”

Cardiac size can be affected by many conditions, including lead toxicity. Nearly all eagles—more than 90 percent—presented to TRC have some level of lead exposure. Once ingested, lead toxicity causes neurological problems, often culminating in death, and likely contributes to depression of the immune system, which can lead to trauma.

**Every individual a data point**

Another long-term research project in which TRC is involved is the Clinical Wildlife Health Initiative, a network of professionally staffed wildlife rehabilitation centers. This project uses an Internet-based data management program to track population and health data of animals seen in wildlife hospitals, helping researchers to better understand the link between changes in the environment and patterns in disease outbreaks in wildlife.

Natalie Watson spent six weeks at TRC in July and August as a Summer Scholar working on three projects. A second-year veterinary student at Saint George’s University in Grenada, Watson conducted a literature search to see what type of information is currently coming out of wildlife rehabilitation facilities.

“That information will be used to support the hypothesis that wildlife rehabilitation centers are a dependable source to use to track animal diseases,” says Watson.

Watson’s second project was to determine which organizations collect information on injured and ill bald eagles. She developed and implemented a survey asking wildlife rehabilitation and diagnostic facilities and federal and state agencies whether they see bald eagles; if so, what information they collect; and whether they would be willing to share their information. Her third fact-finding mission looked at U.S. Fish and Wildlife permit reporting forms under the Migratory Bird Treaty Act to determine what challenges prevent easy harvest of information from that database.

**The risks and rewards of taking action**

Field research and wildlife management, particularly of endangered and threatened species, poses many challenges, but the rewards can be great. With several phases of the rat eradication project in the Galápagos Islands nearly complete, several important findings have come to light.

As hoped, rare giant tortoise hatchlings have been observed emerging from nests on the island of Pinzón for the first time in more than five decades, and Galápagos National Park has returned 118 hatchlings to their native island. Following thorough searches of Rábida, Galapagos National Park has declared the island free of rats. An endemic land snail (*Bulimulus rabidensis*), which was thought to be extinct, was unexpectedly rediscovered more than 100 years after it was last observed. Rangers also came across a live gecko that may turn out to be the endemic Rábida gecko, known only from fossil material and long presumed extinct.

TRC’s role in the collaborative project has been to develop and implement a captive management plan to keep Galápagos hawks safe during rat eradication, and TRC staff continue to be involved in post-eradication monitoring of the Pinzón ecosystem. Unfortunately, recent field studies have shown that the rodenticides used in the project may have persisted in the environment longer than expected. Native lizards, which refused the poison in captive tests in early field studies, unexpectedly took the bait in the wild without showing signs of toxicity. The death of several hawks after their release is suspected to be linked to the ingestion of these lizards.

As unfortunate as the mortalities have been, project scientists are now armed with valuable information that will guide future island rodent eradication efforts.

“I learned that there is a significant amount of data coming out of wildlife rehabilitation facilities, but there is no standard of reporting,” says Watson. “There are many organizations that collect similar information, but they don’t share it.”

Other Summer Scholars, Elizabeth Schnabel and Peter Sebastian, worked on projects to establish baselines on the immune system of bald eagles and coagulation parameters in red-tailed hawks to determine dangerous levels of rodenticide ingestion.

As these research projects demonstrate, each raptor brought to the clinic provides valuable information in what has become one of the world’s most comprehensive databases on raptor health.

Fran Howard is a Saint Paul-based freelance writer.
Tales from the trauma center

By Lori Arent

In late July, the clinic was receiving eight to 10 new patients a day, the majority of which were young Cooper’s hawks, bald eagles, and broad-winged hawks. Due to sprawling urban development over the past several years, these species are now nesting in closer proximity to people. As a result, the birds, particularly the youngsters, face unique challenges once their wings carry them from the nest. As of late August, the clinic had already seen 150 more patients this year compared to last year. The top five species seen at the clinic have been red-tailed hawks (126), Cooper’s hawks (109), great horned owls (107), bald eagles (75), and barred owls (55).

The causes of admission for these youngsters included malnutrition after being separated from their parents; diseases such as West Nile virus and trichomoniasis (a protozoan parasite that most commonly affects the mouth); fractures (mostly from unknown causes); and injuries resulting directly from the actions of people. In early July, TRC received two recently fledged red-tailed hawks—not yet capable of sustained flight—that had been shot. Both suffered wing fractures. One bird was so severely damaged it could not be saved. The other is still undergoing rehabilitation.

To treat all of these patients, the clinic relied on help from several visiting veterinarians and students. Dr. Julia Lee, a veterinarian from Brazil, began a four-month externship in June, and Dr. Kimvi Le, a veterinarian from Australia, spent an extremely busy three weeks at the clinic in July. In addition, four summer scholars and a student intern each had clinic duty one day a week.

Paying it forward

Raptor rehabilitation is definitely a team effort. It takes many people working in a variety of capacities to provide expert care to the large number of raptors admitted to the clinic each year. Sometimes, however, patients also help each other out.

Red-tailed hawk 12-216, a healthy adult female that had recovered from a wing fracture, was chosen to donate blood. The transfusion went smoothly, and three days later, 13-290’s blood showed marked improvement. She was starting to generate red blood cells on her own.

While we know that birds have different blood groups, blood types have not been identified in most species of birds. Clinic research has shown that it is best to give blood from the same species or genus, which prevents rejection and also results in the transfused cells lasting longer.

Almost two months after 13-290’s lifesaving procedure, the clinic received a young broad-winged hawk that was also anemic, ironically from the same problem—a broken blood feather. Red-tailed hawk 13-290, now healthy and ready to undergo pre-release conditioning, “paid it forward” by donating a little of her blood to help save the life of this young hawk.

Lori Arent is the clinic manager at TRC and author of Raptors in Captivity, Guidelines for Care and Management, available at www.TheRaptorCenter.org.
The Raptor Center (TRC) owes its establishment and existence to many generous people who felt its mission and vision reflected their own view of the world. Douglas Dayton was one of these people. His recent passing presents an occasion to reflect on the nature and deeds of an individual who was instrumental in helping to establish and maintain the operational success of The Raptor Center.

It all began innocently enough, sometime back in the mid-1980s, when Mr. Dayton appeared at TRC with two black swans in tow. He had intended to add these birds to his small waterfowl collection, but they had been attacked and severely injured by an unknown predator. Treatment, which consisted of cleaning and suturing wounds, fending off infection, and providing supportive care, was successful, and within a few days, the birds were ready to go home.

When Mr. Dayton asked what the bill was going to be, the reply was, “No charge, but would you like a tour?” That started a long and mutually satisfying relationship that Mr. Dayton later described, all in good humor, as the most expensive vet bill he’d ever had. In time, that “vet bill” grew to encompass large annual gifts, the establishment of a permanent University professorship in avian medicine and surgery, service on TRC’s board of advisors, and connection to many resources at the Target Corporation. Mr. Dayton, a reserved man with a keen sense of how to get things done, founded Target as a subsidiary of his family’s Dayton Hudson Corporation.

One of my fondest memories is enjoying a game of “reverse” cribbage with Mr. Dayton at his home in Wayzata, which overlooked his 40 acres of restored prairie, a pond with waterfowl (though, by then, the black swans were no longer there), and an osprey nest platform on the shoreline, holding two young ospreys.

Thank you, Doug.

Dr. Patrick T. Redig, the co-founder of TRC, considered Douglas Dayton a close friend.

Help max the match in November

Mark your calendar for Give to the Max Day on Thursday, November 14. Two very generous donor families, Rachel and Dennis Hollstadt and the Sarah J. Andersen Fund of the Hugh J. Anderson Foundation, have again agreed to provide $52,000 in matching gifts. This means that every gift The Raptor Center receives during the 24-hour period will be doubled, up to $52,000.

Plan to join other supporters of TRC to help keep eagles like Max soaring! Go to http://tinyurl.com/TRCGiveMN2013.

In memory: Mary Lee Dayton

As this issue of Raptor Release went to press, we were saddened to learn of the death of Mary Lee Dayton, community leader, philanthropist, and distinguished supporter of The Raptor Center. In this photo, she prepared to release a rehabilitated northern saw-whet owl in Wayzata on November 23, 2011. Photo by Dr. Julia Ponder.
As The Raptor Center approaches its 40th anniversary in 2014, visitors will begin seeing some improvements that will make life better for TRC’s raptors, volunteers, and guests.

Planning for the renovations began in 2010, when leaders of The Raptor Center and College of Veterinary Medicine reviewed the condition of TRC’s building and concluded that renovations were needed. After receiving architectural input, TRC quietly began a $1.5 million capital campaign in late 2010.

By July 2013, more than 20 of TRC’s dedicated supporters had donated $1.2 million toward the $1.5 million goal. With only $300,000 left to raise, a tentative date of late spring 2014 has been selected to begin renovations of the clinic and education mews.

The renovated Raptor Center will be an attractive and innovative space that showcases original and engaging exhibits for visitors of all ages, comparable to those found at top local museums and zoos. It will display basic raptor information and share current research projects conducted at the University of Minnesota. It will be the best possible space for raptors to heal.

To learn more or make a gift to help TRC raise the remaining $300,000, please call development officer Ellen Orndorf at 612-624-8487, visit http://tinyurl.com/TRCGiving, or go to www.raptor.cvm.umn.edu and click “Support/Get Involved.”

Bill Venne is chief development officer for the University of Minnesota College of Veterinary Medicine.
Sharing knowledge in new ways

By Gail Buhl and Amber Burnette

The Raptor Center (TRC) excels at teaching the world about raptors. During its nearly 40-year history of research and working with sick and injured birds on a daily basis, TRC has built a tremendous repository of knowledge about raptor health and its link to the environment. This knowledge is disseminated through TRC's education programs, many of which use birds that have sustained injuries so severe they will never be released back into the wild.

News about TRC's educational ambassadors

As part of National Volunteer Week in April, TRC asked its volunteer crews to anonymously submit suggestions to name TRC’s newest ambassador, a barred owl. The winning submission, Strix, was taken from the scientific name for the species, *Strix varia*. Strix was found along a roadside during his second year of life, unable to fly due to a wing fracture. The fracture healed, but his eyesight was permanently impaired from the original trauma. As an education bird, Strix will teach others about his species and the challenges barred owls and other raptors face in the wild.

Cinnamon, an American kestrel who was part of TRC’s education program for 15 years, has passed away. Since 2010 alone, Cinnamon helped reach more than 12,400 people through more than 400 programs. At least 50 staff members and volunteers learned how to care for and correctly handle Cinnamon so she could live a long, healthy life while spreading TRC’s message of conservation and hope.

Innovative learning opportunities

TRC is currently researching different ways to reach wider audiences with its educational programs. As one of the world’s leading raptor rehabilitation centers, TRC is well-positioned to deliver some of the world’s most cutting-edge knowledge about the role of raptors as environmental sentinels. Currently, TRC is putting some of this knowledge to work by integrating it into new content for distance-learning programs, which eventually could be available to audiences across the country and around the world. These real-time, interactive programs are still in the development stage and will incorporate recent advances in videoconferencing technology.

TRC believes that teaching children early to appreciate and care for the environment is crucial to the health and well-being of humans, raptors, and all wildlife. Raptor Tails, an activity-oriented learning experience, teaches children ages 3 to 5 about raptors and their habitat. Children listen to stories, take part in activities, and get to meet a live raptor during each of three optional lessons. For details, see Upcoming Events on page 11.

Through years of research and experience, TRC has developed a unique expertise in caring for captive raptors. Its popular Care and Management of Captive Raptors workshop is a four-day intensive workshop that orients both novice and expert bird managers to the finer points of caring for and maintaining captive raptors for educational purposes. Highlights include hands-on learning with TRC staff at TRC’s internationally renowned clinic and training with live education birds. Scheduled for October 8-11, the next Care and Management workshop is already full. To learn more, visit www.TheRaptorCenter.org and click on Educate and Learn.

Gail Buhl is the education program manager at TRC. Amber Burnette is TRC’s program associate.
Bird banding: a long-term research tool

By Amber Burnette

For nearly 40 years, The Raptor Center (TRC) has been banding rehabilitated raptors prior to releasing them back into the wild. Over the past four decades, some bands—each encoded with numbers specific to an individual bird—have been returned, and some banded birds have been readmitted to the clinic. These bands and readmitted birds have helped TRC build on its knowledge of raptors.

Due to its location on the Mississippi flyway and close proximity to the Great Lakes, TRC is uniquely positioned to advance raptor research, particularly on bald eagles. TRC rehabilitates and releases 30 to 40 bald eagles a year and has banded more than 530 bald eagles since 1989, contributing to a growing body of critical information about this species.

Jointly administered through the U.S. Geological Survey and the Canadian Wildlife Service, the Bird Banding Laboratory is located at the Patuxent Wildlife Research Center in Laurel, Maryland. The Bird Banding Laboratory has identified several main interest areas to which returned bands contribute valuable information about this species.

These examples and others are part of a much larger North American database. The information derived from banded birds is instrumental in helping scientists monitor populations of raptors over time, and if necessary, take appropriate steps to head off developing problems within a species or population of birds.

Amber Burnette is TRC’s program associate.
Research
Drs. Julia Ponder and Irene Bueno returned to the Galápagos in June and July for follow-up monitoring of Pinzon’s Galápagos hawks. A feature article on the Galápagos rodent eradication efforts, including TRC’s work with the hawks, appeared in the May issue of the prestigious journal Nature.

The Clinical Wildlife Health Initiative (CWHI) is working with the U.S. Fish and Wildlife Service on an eagle morbidity and mortality database and preparing to host a workshop that will look at the feasibility of integrating wildlife health data from a variety of sources into a common system.

Ponder and Dr. Michelle Willette wrote a chapter on owls for Fowler’s Zoo and Wild Animal Medicine.

TRC hosted four student researchers through the College of Veterinary Medicine’s Summer Scholars program, which offers first- and second-year veterinary students an opportunity to participate in research projects related to veterinary, animal, and human health initiatives.

- Carrie Robbins continued her work from last summer with Dr. Patrick Redig studying Newcastle virus in wild birds and eggs.

- Elizabeth Schnabel worked to establish normal coagulation parameters in red-tailed hawks in preparation for continued research on rodenticide studies (anticoagulant toxicity).

- Peter Sebastian worked to establish baseline values for immune function in raptors as pilot work for studying the effects of contaminants on the immune system.

- Natalie Watson conducted a comprehensive literature review of research-based data from wild animals in rehabilitation centers and gathered preliminary information for CWHI’s eagle morbidity/mortality database.

TRC also hosted Miranda Shaw, the first student admitted to the College of Veterinary Medicine’s Veterinary Leadership through Early Admissions for Diversity (VetLEAD) program. Shaw’s time was divided between a research project that developed a formula to measure heart size in raptors and experiential learning in the clinic and education departments.

Staff news
Veterinary resident Dr. Irene Bueno was accepted into a PhD program at the University of Minnesota College of Veterinary Medicine starting in September.

On the road
Ponder and Redig attended the European Association of Avian Veterinarians conference in Wiesbaden, Germany. Ponder kicked off the conference with a keynote talk, “Ethical Considerations in Species Conservation from the Veterinary Perspective,” and presented the paper “Evaluation of a Sustained-Release Formula of Vitamin K.” Redig and Ponder also taught an advanced avian orthopedics laboratory.

Willette traveled to Baltimore in July for the Society of Conservation Biology conference. She made the presentation “Environmental Lead and Wildlife Health Monitoring from Sentinel Species to Public Policy.”

Bueno presented two posters at the Wildlife Disease Association conference held in July and August. The topics were “Socio-economical and Political Aspects of Spent Lead Ammunition” and “A Tool to Assess the Public Health Risks of Wildlife Importation into the United States: The Case of Rodents from Latin America.”

Events and workshops
The Basic Raptor Rehabilitation workshop was held April 30 to May 3. Fourteen participants from nine states learned the practical steps involved in raptor rehabilitation.

The annual Spring Raptor Release was held May 4. Steve Kelley, senior fellow at the Humphrey School of Public Affairs, admired a rehabilitated broad-winged hawk before releasing it back to the wild at the Spring Raptor Release at Hyland Lake Park Reserve in May. Photo by Sue Kirchoff

Approximately 2,000 people attended the event, which was held at Hyland Lake Park Reserve in Bloomington, Minnesota.

Get your 2014 calendar
TRC’s 2014 calendar will be available for purchase starting September 28 at the Fall Raptor Release event. The calendar contains fun photos of TRC education birds, clinic stories, and quizzes to enjoy throughout the year. Calendars will also be available through TRC’s online gift shop and at the front desk after September 28. Visit www.TheRaptorCenter.org for details.
Upcoming events

**Fall Raptor Release**
The Raptor Center’s Fall Raptor Release will be held Saturday, September 28, from 10 a.m. to 3 p.m. at the Carpenter St. Croix Valley Nature Center, in Hastings, Minnesota. Witness rehabilitated raptors being released back into the wild and meet some of TRC’s winged ambassadors. No pets please. This is a zero-waste event.

Please bring your used ink-jet printer cartridges to support the Recycling for Raptors program. Call 612-624-4745 or visit www.TheRaptorCenter.org for more information.

**Raptor Tails**
Raptor Tails are activity-oriented learning experiences about raptors and their environment designed for children ages 3 to 5. Children hear stories, take part in activities, and meet a live raptor at each of the three optional sessions. Classes are held from 10:15-11:00 a.m. on Tuesdays at TRC. A parent or guardian must accompany each child. Call 612-625-0201 to register.

**Fall 2013 Session: Raptors in Fall and Winter**
- October 1: Fabulous Feathers and Flight
- October 15: All About Owls: Their Hearing and Eyesight
- October 22: All About Owls: Grossology

**Youth Raptor Corps**
Join TRC’s youth service-learning club, Youth Raptor Corps. Each meeting includes an opportunity to see live raptors and learn exciting facts about their environment, natural history, and positive ways to impact them. Participants will also engage in service-learning projects aimed at advancing TRC’s mission. Meetings will be held on Tuesdays, October 1, November 12, January 14, February 11, March 11, April 8, and May 13.

**Duke Lecture**
The annual Duke Lecture will be held Thursday, October 10, at 5 p.m. at the Bell Museum of Natural History on the East Bank of the University of Minnesota. Dr. Thor Hanson, author of Feathers: The Evolution of a Natural Miracle, is this year’s lecturer. The Duke Lecture Series began in 2006 with a gift from Dr. William H. and Mary E. Holleman, lifelong friends of Dr. Gary Duke, co-founder of TRC. The free event is open to the public and intended for those with a general to intermediate knowledge of birds. Registration required; this event fills quickly. For more information, visit www.TheRaptorCenter.org.

**Give to the Max**
Give to the Max day is November 14. Last year, gifts to TRC surpassed $2,000. Generous benefactors have offered matching gifts of $2,000 again this year, so each dollar received, up to $2,000, will be matched dollar for dollar. Each gift goes a long way. For example, a gift of $75 feeds The Raptor Center’s education birds for a day, and a $500 gift pays for anesthesia and surgery to repair a bald eagle’s broken wing. To support The Raptor Center on November 14, go to http://tinyurl.com/TRCGiveMN2013
The Raptor Release
The Raptor Center
College of Veterinary Medicine
University of Minnesota
1920 Fitch Avenue
St. Paul, Minnesota 55108

612-624-4745
www.TheRaptorCenter.org
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Celebrating nearly four decades of dedication to raptors

Fall
Raptor Release

Saturday, September 28
10 a.m.-3 p.m.

Carpenter St. Croix Valley Nature Center
Hastings, Minnesota

See rehabilitated raptors released back to the wild and meet some of The Raptor Center’s winged ambassadors!

No pets please.

This is a zero-waste event. Please bring your used ink-jet printer cartridges to support Recycling for Raptors.

For more information, call 612-624-4745 or visit www.TheRaptorCenter.org.

Duke Lecture

Feathers: The Evolution of a Natural Miracle
presented by Thor Hanson
Thursday, October 10
5 p.m.

Bell Museum of Natural History
10 Church Street SE
Minneapolis MN 55455
(East Bank, University of Minnesota)

Free and open to the public • Registration required
Register at www.TheRaptorCenter.org

"Feathers can conceal or attract. They can be vibrantly colored without using pigment. They can store water or repel it. They can snap, whistle, hum, vibrate, boom, and whine. They’re a near-perfect airfoil and the lightest, most efficient insulation ever discovered."

- Thor Hanson