

Wildlife Toxicology Working Group Newsletter

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From the Chair

Jeff Levensgood

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Greetings WTWG members. I hope that spring has sprung where you are located. Winter can't quite seem to let go here in the upper Midwest; some cities will see one of the coldest baseball openers on record today, April Fool's Day. Weather aside, one of the biggest news items of the year to date has of course been sequestration and federal budget

woes. As far as I can tell much is still in flux, but it seems clear that all of us will be impacted personally and/or professionally to one degree or another. Environmental protection will be one of many critical programs to suffer. Furloughs mean reductions in active workforce in EPA, DoI, DoA and other agencies. EPA is facing a budget reduction of \$472m. Cuts to NIH and NSF were expected to be \$2.3957b and \$538m, respectively; such cuts will of course trickle down to scientists. Some may lose research funding in "mid-stream". States, local governments, colleges and universities stand to lose many billions on federal funding. Environmental monitoring, investigation and cleanup efforts will likely suffer. I could go on and on, but you get the point. We can expect to do more with less (haven't we been??) for the foreseeable future. Wildlife toxicologists and others of similar ilk are at the forefront of environmental protection. We must strive to move forward and drive change for the greater good in spite of these challenges. It is during such times as these that the leadership role of groups of dedicated professionals such as TWS WTWG in the education of professionals, policy makers and citizen-conservationists is magnified. In this newsletter we have highlighted some of our ongoing efforts. And we are always open to suggestions for new initiatives. Etiam progredieris!

Member Profile - Luis Cruz-Martinez

Who are you and by whom have you been employed (employer, job title/description, degrees, etc.)?

I obtained my veterinary degree from Costa Rica, upon graduation I moved to Minnesota where I did a 2-yr internship at The Raptor Center (TRC) of the U of MN. I then completed a 3-yr clinical residency in raptor biomedicine and concurrently I obtained a MSc degree on veterinary medicine infectious disease. To date I'm in the 3rd year of a PhD program at U of Calgary, focusing on wildlife toxicology, specifically assessing the effects of emissions from the oil sands on wild birds.

What sparked your interest in wildlife and/or wildlife toxicology? Any specific issues or species?

My interests in wildlife started during vet school in Costa Rica. I was puzzled by the lack of opportunities to study wildlife medicine in Costa Rica despite its biodiversity richness so I decided to leave the country to find learning/training opportunities. I was introduced to wildlife toxicology by working closely with Dr. Pat Redig, cofounder of TRC. For over 30 years he had been researching and treating bald eagles with lead poisoning and I absorbed his passion about this topic and decided to continue his work and use it as a basis for my future career path.



Luis holding a lead poisoned bald eagle

Who were/are some of your role models/mentors in wildlife and/or wildlife toxicology? Why?

Carrol Henderson, a biologist and well-known wildlife photographer from Minnesota because when I was a child, he showed me to appreciate and care about all the different creatures that were living in my own backyard and the importance of conserving them.

Pat Redig, cofounder and director Emeritus of The Raptor Center because he passed to me one of his life-work projects (lead poisoning in raptors) and showed me the importance of sound scientific research.

What was a project you've worked on that you think had the best outcome/biggest success? (Or, what is a project you're proud of having worked on?)

The project of potential sources of lead exposure and poisoning in bald eagles. We figure out that a key component to this project, in addition to the research findings, was to customize our scientific findings into simple, visual and straightforward messages to share with other scientists, wildlife managers, the media and the general public. I developed a keen interest and gain experience in giving oral presentations and making those presentations effective. Through this component, although not entirely related to my MSc graduation projects, we sent out the message about the continuing problem of lead poisoning in bald eagles after ingesting lead bullet fragments present in residues of game animals shot with lead-based ammunition; and that there are non-toxic bullets available and we were encouraging hunters to do a voluntary switch to such lead-free bullets. Overall, we received positive feedback from the public, many hunters and the public.

Call for WTWG Officer Nominations

This year's Nominations and Elections Committee is asking for nominations or self-nominations for the following available positions: Chair-elect, Vice Chair, and Secretary. Email nominations, including self-nominations, or inquiries of interest to Brian Hiller, Chair-Elect at bhiller@bemidjistate.edu by May 15th. Elections will occur this summer and newly-elected officers will officially take office at the national TWS meeting in October.

Duties of Chair-Elect:

- Three-year term, with one year in each of the roles as chair-elect, chair, and past chair
- Chair-Elect (1 year) - Chairs the Nominations and Elections Committee
- Chair (1 year) - General supervisory responsibility for the Executive Board
 - Preside at all meetings of the Executive Board and membership
 - Appoints chairs of committees responsible for business of the WTWG
 - Submit an annual report of WTWG business to TWS Council
- Past Chair (1 year) - Perform any duties the Chair delegates

Duties of Vice Chair:

- Two-year term
- Provides the editor of the newsletter with news and item of interest
- Helps recruit new members
- Performs duties as assigned to help the Chair conduct WTWG business

Duties of Treasurer:

- Two-year term
- Responsible for the bank account of the Working Group
- Prepare and submit an annual fiscal-year financial report

WTWG Workshop at TWS Annual Meeting

From settling of airborne pollutants to movement of contaminated groundwater and surface water, chemical pollutants can be important stressors to wildlife and liabilities on wild lands. But not all pollution is a wildlife management problem. Have you ever wondered how issues of pollution are managed? Worried about contamination on properties you manage? Want to know when it's necessary to call in an expert and want to be better able to direct that expert's work toward your management needs? We will answer these questions and more in a workshop entitled, "Pollutants and Wildlife Management: Ecotoxicology for Biologists and Land Managers" at the upcoming annual meeting of The Wildlife Society in Milwaukee, Wisconsin. The workshop is intended for students, wildlife biologists, and land managers who want to have a basic understanding of approaches, methods and data interpretation of potential pollution issues they may encounter. We will explain basic pollution risk assessment concepts such as exposure (i.e., "how much pollution is at my site?"), effects levels (i.e., "how do I know how much is OK, or how much is bad?"), types of contaminants, effects of contaminants, safety considerations, and techniques and tools you can use to conduct pollution assessments or better interact with wildlife ecotoxicologists. Throughout, we will use case studies to illustrate concepts and provide real-world examples that other wildlife biologists and land managers have faced. Intended as an introductory to intermediate discussion of ecotoxicology, this workshop will be a repeat of the workshop that was presented at the past two TWS meetings. However, this year it will be a full day workshop, from 8 am to 5 pm on October 5th to allow more time for more in depth discussion of the covered topics and case studies. If anyone would like to help prepare or teach the course, please let Tim Bargar know: tbargar@usgs.gov

Toxicology, Conservation and A Famous Peregrine Falcon

By Luis Cruz-Martinez

One thing that we might all agree on is the value of wildlife in understanding ecotoxicology. Here I provide an example how historic toxicological research combined with conservation efforts provide opportunities that go beyond geographical borders.

Historical perspectives: Peregrine falcon populations along with other predatory and fish eating bird populations plummeted from the sublethal effects of DDT. This persistent organochlorine insecticide was intensively used during and after World War II. Early research documented the toxicity and lethality of this compound on a variety of non-target species, particularly songbirds. Further fieldwork described the widespread phenomenon of reproductive failure, eventually discovered to be due to DDT's metabolite p-p'-DDE. In birds, this metabolite interferes with the enzymes required for transporting calcium ions into the eggshell. The resulting eggshells were thin and weak.

In addition to research findings, important conservation efforts were also undertaken. Probably one of the best examples is Rachel Carson's "Silent Spring", which despite its controversy, brought to light the human impact on the environment and created an impact on politics, business, research and society ever since.

Legacy and further research and conservation: Thanks to the early toxicology-based research, the banning of DDT and similar compounds plus continued habitat restoration and reintroduction of threatened species, we can now enjoy and study many wildlife species that recovered from near extinction. For example, a peregrine falcon wintering in a Costa Rican city has attracted the attention of locals and is becoming an icon of the city. Her name "Inmaculada" or as the locals are calling her: "the immaculate peregrine", refers not to her color pattern or to a religious connotation but to the name of the Church where she likes to linger while preying upon pigeons.

Staff from The Costa Rican Raptor Foundation traced her origins based on her leg bands. This female peregrine falcon hatched over 2200 miles from her current location in Whiting Lake, Indiana, in 2012. She is inspiring great enthusiasm and acceptance among the city's inhabitants for her role as a "migratory biological control". In Costa Rica as in other countries, some species of pigeons and doves are considered pests because of their great numbers and the structural damage their feces cause. "Inmaculada" has been depending on this plentiful food source and on occasion, she has eaten 3 pigeons in a single day.

For wildlife conservation to occur, a variety of factors must occur together; scientific research, environmental education and public and political support. This story serves as a reminder of the efforts contributed by many scientists, conservationists, the general public and politicians that contributed directly or indirectly to the restoration of peregrine falcons and invites opportunities for continuing research.

Please follow these links for pictures, videos, stories and updates on this falcon:

<https://www.facebook.com/rapacesdecostarica>

<https://www.facebook.com/pages/Midwest-Peregrine-Society/354352871260525>

References:

1. Blus LJ (2003) Organochlorine pesticides. In: Hoffman DJ, Rattner BA, Burton GA Jr, Cairns J Jr (eds) Handbook of ecotoxicology, 2nd edn. Lewis, Boca Raton, FL, pp 313–339.
2. Rattner, BA 2009. History of wildlife toxicology. *Ecotoxicology*, 18: 773–783.
3. Smits JEG, Fernie KJ. Avian wildlife as sentinels of ecosystem health. *Comp Immunol Microbiol Infect Dis* (2012), <http://dx.doi.org/10.1016/j.cimid.2012.11.007>



Credit:
Pablo Camacho

First Generation Anticoagulant Rodenticides are a Greater Hazard than First Thought

By Barnett Rattner and Nimish Vyas (Previously published in USGS GeoHealth Newsletter)

Anticoagulant rodenticides are used for the control of vertebrate pest species in urban and suburban settings, agriculture, and in island restoration projects that include DOI properties. Despite widespread use, there is growing concern of their risk to children, companion and domestic animals, and non-target wildlife. Recently, the USEPA placed new restrictions on the use of some second generation anticoagulant rodenticides (SGARs) which will probably result in expanded use of first generation compounds (FGARs) that are considered to be less hazardous. Nonetheless, FGARs have been implicated in non-target wildlife mortality incidents. For example, diphacinone and chlorphacinone exposure has been linked to over 25 unintentional avian mortality events involving owls (barn owl, *Tyto alba*; great horned owl, *Bubo virginianus*; snowy owl, *Nyctea scandiaca*), hawks (Cooper's hawk, *Accipiter cooperii*; ferruginous hawk, *Buteo regalis*; red-tailed hawk, *Buteo jamaicensis*), scavenging birds (turkey vulture, *Cathartes aura*; bald eagle, *Haliaeetus leucocephalus*), and granivorous species (wild turkey, *Meleagris gallopavo*; western meadowlark, *Sturnella neglecta*). The number of incident reports reflect limited monitoring efforts, and these mortality events are likely just the "tip of the iceberg".

Controlled exposure studies with diphacinone demonstrated that it is about 20 to 30 times more acutely toxic to raptors than to traditionally tested wildlife species (mallard, *Anas platyrhynchos*; Northern bobwhite, *Colinus virginianus*). Sublethal diphacinone exposure of American kestrels (*Falco sparverius*) and Eastern screech-owls (*Megascops asio*) resulted in prolonged clotting time, reduced hematocrit, and gross and histological evidence of hemorrhage at doses as low as 0.16 mg/kg body weight/day. Incorporating these data into deterministic and probabilistic risk assessments indicate that the hazards associated with diphacinone are much greater than predicted by analyses using only mallard and bobwhite data.

A multi-year field study examined the adverse effects on non-target wildlife of operational applications of Rozol Prairie Dog Bait (0.005% chlorophacinone) at black-tailed prairie dog (*Cynomys ludovicianus*) colonies. While concerns about avian poisonings from FGARs and SGARs have traditionally focused on secondary poisoning of raptors, it was discovered that ground foraging songbirds are directly poisoned by feeding on the Rozol bait. In addition, dead and dying chlorophacinone-exposed prairie dogs are easy prey for raptors, and rodenticide residues in prey animals are of biological significance to both predators and scavengers. Signs of exposure and adverse effects in wildlife remained apparent for over a month.

These findings have brought to light the hazards of FGARs to non-target wildlife, and have already been cited in public hearings and litigation. Clearly, natural resource managers must carefully weigh the costs and benefits of pest control and eradication activities.

References

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- Vyas. 1999. Factors influencing the estimation of pesticide-related wildlife mortality: *J of Toxicology and Industrial Health* 15:186-191.
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Release of model for estimating pesticide effects on avian reproductive success

A challenge in the regulation of pesticides is to improve methods for quantifying ecological risk estimates in higher-tier risk assessments with the goal of addressing “so what” questions about potential changes to wildlife populations. The current assessment of pesticide effects on avian reproduction is based on a deterministic risk quotient approach that can classify the level of risk, but cannot quantify the magnitude of risk. The Markov Chain Nest Productivity Model (or MCnest) is being released that integrates existing toxicity information from three standardized avian toxicity tests with information on species life history and the timing of pesticide applications relative to the timing of avian breeding seasons to quantitatively estimate the impact of pesticide-use scenarios on the annual reproductive success of bird populations. MCnest provides risk assessors with a tool to go beyond the current screening-level quotient method approaches for assessing reproductive effects by estimating the proportional change in reproductive success, which can be used in population-level assessments of pesticide risks.

Currently, MCnest uses an exposure profile for each species based on the approach in the USEPA Office of Pesticide Program’s (OPP) T-REX model, but work is underway on a version of MCnest that integrates the more comprehensive exposure profile calculated in OPP’s Terrestrial Investigation Model (TIM). The model and supporting materials can be downloaded at http://www.epa.gov/med/Prods_Pubs/mcnest.htm.

Contact: Rick Bennett 218-529-5212 bennett.rick@epa.gov

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## Whole Wildlife Toxicology Catalog

Whole Wildlife Toxicology Catalog (<http://www.pwrc.usgs.gov/wwtc/>) has been updated! In 2007, nearly 50 scientists and administrators from the U.S. and Canada participated in a Smithsonian-sponsored Wildlife Toxicology Workshop. One of the many action items from the workshop included the creation of a web portal for wildlife toxicology-oriented websites and databases. The Whole Wildlife Toxicology Catalog was created, recently updated, and now contains links to over 30 sites.

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Member Publications

Anderson, TA, CJ Salice, RA Erickson, ST McMurry, SB Cox, and LM Smith. 2013. Effects of landuse and precipitation on pesticides and water quality in playa lakes of the southern high plains. *Chemosphere*, <http://dx.doi.org/10.1016/j.chemosphere.2013.02.054>

Levengood, JM, DJ Soucek, CA Taylor, and DA Gay. 2013. Mercury in small Illinois fishes: historical perspectives and current issues. *Environmental Monitoring and Assessment* <http://dx.doi.org/10.1007/s10661-012-3040-z>

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## Environmental Toxicologist Job

The Wisconsin Department of Natural Resources is seeking an experienced water quality scientist to help develop and implement water quality criteria for the protection of lakes, rivers and streams. This position is classified as an Environmental Toxicologist. Well qualified candidates will have a bachelor's level or higher degree in Aquatic Toxicology, Water Chemistry or a closely related field.

[http://wisc.jobs/public/job\\_view.asp?annid=65211&jobid=64726&org=370&class=41403&index=true](http://wisc.jobs/public/job_view.asp?annid=65211&jobid=64726&org=370&class=41403&index=true)

## Now Welcoming Proposals for The Wildlife Society Wildlife Toxicology Working Group 2013 Graduate Student Research Award

The Wildlife Toxicology Working Group is pleased to announce the availability of a competitive graduate student research award. Students pursuing graduate studies in the area of wildlife toxicology at a college or university in 2013 will be eligible for an award covering costs of travel and registration (up to \$500) to The Wildlife Society's 20th Annual Conference in Milwaukee (October 5-10, 2013). Applicants should prepare a research proposal, not more than two pages in length, including a brief introduction, statement of hypotheses being tested, description of methods and statistical design, and discussion of the wildlife management significance of the proposed work. In addition, a curriculum vitae of two-pages or less (name, address, telephone number, email address, academic background, honors, professional experience, presentations and career goals) and the names and addresses of two graduate faculty references are to be included with the submission. A cover letter should briefly describe the submission, and state how the award would further the professional development of the applicant. Applicants must be or become members of The Wildlife Society. Three members of the Wildlife Toxicology Working Group will judge the proposals based on potential significance of the contribution, feasibility, and originality.

Only complete applications (two-page proposal, two-page vitae, and cover letter) received by May 18, 2013 at the postal address or e-mail address below will be considered. Awards will be announced by June 30, 2013. Inquiries and submissions should be made to:

Jeff Levensgood  
Chair, TWS Wildlife Toxicology Working Group  
Illinois Natural History Survey  
University of Illinois  
1816 S. Oak St.  
Champaign IL 61820  
[levengoo@illinois.edu](mailto:levengoo@illinois.edu)

Please distribute this announcement to colleagues and students as appropriate. For more information on The Wildlife Society Wildlife Toxicology Working Group, please visit our website (<http://joomla.wildlife.org/toxicology/index.php>). We look forward to seeing your application for this award and having the chance to support your academic and professional development!

### WTWG Facebook Page

If you contributed photos to our Facebook page, please provide a short 1-2 sentence description of the photo. Also, if you're a member and would like to help promote the Facebook page or have ideas for the Facebook page, please contact Richie Erickson [raerickson@gmail.com](mailto:raerickson@gmail.com).

### WTWG Student Award Winner Publishes

WTWG Student Award recipient, Sarah E. Warner, recently published some of her work that the WTWG supported. The WTWG was recognized in the acknowledgements. The citation of the article is: Warner, SE, WG Shriver, BJ Olsen, RG Greenberg, and RJ Taylor. 2012. Mercury in wing and tail feathers of hatch-year and adult tidal marsh sparrows. *Archives of Environmental Contamination and Toxicology*. 63(4): 586-593. doi: 10.1007/s00244-012-9783-2



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- Tom Augspurger
- Tim Bargar
- Rick Bennett
- Luis Cruz-Martinez
- Richie Erickson
- Jeff Levengood
- Barnett Rattner

**WTWG Executive Board**

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**WTWG NEWSLETTER NOTES**

The WTWG newsletter is a quarterly publication. Email contributions such as citations, member news, research highlights, and conferences by June 30 to Louise at [lsvenne@gmail.com](mailto:lsvenne@gmail.com).

The WTWG is online. Archived newsletters, meeting minutes, and more are included at <http://joomla.wildlife.org/toxicology/index.php>

The WTWG is now on Facebook. Visit and/or “Like” us, even if you don’t have a Facebook account. [www.facebook.com/WildlifeToxicology](http://www.facebook.com/WildlifeToxicology)

*Louise Venne, Editor*