

The newsletter of the Society for Wildlife Forensic Science

Vol. 4, No. 1 | January 2019

SWFS NEWS

Inside this edition: Eel PCR / Denver meeting / ESE Asian WFN / Iberian lynx case

Eel Species Identification Screening Method

Environment and Climate Change Canada's (ECCC's) Science & Technology Branch (STB) provides laboratory services to ECCC's Enforcement Branch. ECCC's Enforcement Branch mandate is to enforce Canada's environmental and wildlife acts and related regulations. Enforcement officers conduct formal inspections to verify compliance with these acts and regulations. If there are reasonable grounds to believe that non-compliance with the legislation has occurred, an investigation is initiated for the purposes of gathering evidence to take appropriate enforcement measures against alleged offenders.

The Enforcement Branch is comprised of two enforcement arms: the Environmental Enforcement Joy Bruno, Heather Bryant, Rachel Miliano

Directorate (EED) which enforces federal legislation dealing with risks to the environment and its biodiversity; and the Wildlife Enforcement Directorate (WED) which enforces Canadian wildlife legislation, protecting species in Canada, as well as legislation aimed at conserving threatened or potentially threatened species nationally and internationally. In Canada the Wild Animal and Plant Protection and Regulation of International and Interprovincial Trade Act (WAPPRIITA) is the domestic legislation that implements the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES).

Welcome from the SWFS President

Dear SWFS Members

Welcome to the January 2019 edition of SWFS News.

As another year gets going we can look back on a lot of activity among SWFS partners during the past six months, as well as look forward to a busy 2019.

Highlights for me have been two large regional wildlife forensic network meetings. The first was held in Kuala Lumpur, Malaysia, in September 2018, where representatives from 10 countries came together for the East and Southeast Asian Wildlife Forensics Network Meeting. You can read more about this on page 4; special thanks to the Malaysian Department of Wildlife and National Parks for hosting the event. Rest assured that any rumours of presidential karaoke singing abilities are grossly exaggerated – descriptions of suffering the morning after less so!

At the end of November it was the turn of the African Wildlife Forensics Network to get together on Pretoria, South Africa, hosted by Antoinette Kotze's team in the National Zoological Garden. We enjoyed a fantastic get together of representatives from across the continent discussing the development of wildlife forensic science. For more details see the report on page 11.

Global efforts to combat the illegal wildlife trade are increasingly turning towards the forensic science community to play a role in supporting law enforcement, particularly in Africa and Southeast Asia. Significant funding from the US, UK and EU has seen projects starting in 2018 that are set to spread the development of wildlife forensic capacity and directly support investigations over the coming years.

The next major Society event on the horizon is Denver 2019 (see page 3), which is shaping up to be another great meeting. The website is live, registration is open and submissions are being received, so don't hesitate in getting abstracts and applications in!

At this meeting the Society will go through its first significant board turnover, in line with the new policy of fixed term board appointments. We will be looking for an additional three board members to start in June, so please consider applying and look out for more information soon about how to put your name forward.

Lastly, this will be my final SWFS News message as President of the Society, so I'd like to take the opportunity to thank all of those who have volunteered their time to help establish SWFS News over the past three years, from editors to contributors. I hope you as readers have enjoyed hearing about what's been going on in the world of wildlife forensics. I firmly believe that the more we communicate, the stronger our community becomes, so I look forward to reading SWFS News for many years to come.

Best wishes to all, Regards



Officers

2015-2019 President: Rob Ogden 1st Vice President: Mary Burnham-Curtis 2nd Vice President: Tasha Bauman Treasurer: Dee Dee Hawk Secretary: Dianne Gleeson

Board of Directors:

Audit/Assessment: Edgard Espinoza Certification: Kim Frazier Communications: Brandt Cassidy Daniel Xu Membership & Outreach: Rebecca Johnson Proficiency Program: Dyan Straughan Professional Development: Kathy Moore

Newsletter Editor: Sherryn Ciavaglia

Society for Wildlife Forensic Science www.wildlifeforensicscience.org

IN THIS ISSUE

Eel species identificationpg 1
President's messagepg 2
Comms director's messagepg 3
Denver 2019 meeting
announcementpg 3
ESE Asian WFN meetingpg 4
SWFS Certificationpg 5
Belarus visit to Edinburghpg 7
ANZFSS 2018, Perth report pg 8
TWG S&G updatepg 10
African meeting reportpg 11
Meet the board –
Tasha Baumanpg 12
Iberian Lynx Case Studypg 14
Illegal lion trade meetingpg 22
OSAC updatepg 23
Classifiedspg 23
Recent publicationspg 25

copyright SWFS 2019 To reproduce content from this newsletter please contact Brandt Cassidy: bcassidy@dnasolutionsusa.com.

Rob Ogden

Letter from the Director of Communications

Welcome to the 7th issue of our SWFS newsletter. As always, I believe you will find interesting and informative information within the pages of this newsletter. Articles are written by members of the Society for Wildlife Forensic Science describing the scope and depth of the work they do in the battle against perpetrators of wildlife crimes.

As an international organization it is critical to our success that our members communicate their accomplishments, successes, improvements, even failures to the rest of our community. Our newsletter is here for you to highlight your efforts and potentially seek partners to strengthen our ability to fight wildlife crime. Please consider putting an article together for the next newsletter due out in August of this year. If you have written something for the newsletter just send it along to me at to me at <u>bcassidy@uco.edu</u> or Sherryn at <u>sherryn.ciavaglia@wildlifeforensicscience.</u> org. Additionally, plan to come to the SWFS meeting in Denver Colorado this year, June 10th -14th. Participate in the training and share stories of your toughest cases with others across the spectrum of wildlife crimes. Registration is open now!

You can also support the Society for Wildlife Forensic Science (<u>www.wildlifeforensicscience.org</u>) through your donations or by becoming a member. Enjoy this newsletter and we hope to see you at one of the several international wildlife forensic science meetings coming up in the future. I'll see you in Denver. And as always – Keep It Wild.

Brandt Cassidy, Ph.D.

Register NOW for the Wildlife Forensic Science Meeting: Denver 2019 Tasha Bauman

The Society for Wildlife Forensic Science is pleased to announce that registration for the 2019 SWFS meeting in Denver, Colorado from 10th-14th June 2019 is now open.

This is the 5th meeting of the Society and marks the 10-year Anniversary. The meeting will provide an opportunity for wildlife forensic scientists from around the world to come together and discuss the latest developments in our field.

The meeting will be a combination of workshops, presentations, discussions and social events designed to allow wildlife forensic practitioners, students, academics and those who impact the wildlife forensics community to meet, communicate and share information. Our keynote speaker for this event will be Dr. Bonnie Yates, retired Forensic Morphologist, US Fish & Wildlife Service, who has a wealth of knowledge and experience in addressing wildlife crime across the world, as well as a keen interest in the application of forensic science.

Workshops:

The following workshops are being offered, a detailed description of each workshop can be found on the

SWFS website under each workshop listing. <u>https://</u><u>www.wildlifeforensicscience.org/swfs-2019-colorado-</u><u>meeting/#1538285583767-ea426931-43ca</u>

- Two Day Ivory ID with certification ** this workshop is limited to 30 participants on a first come first serve basis.
- Verifying Perfection in your Wildlife Forensic Laboratory.
- Effective Communication between Prosecutors and Wildlife Forensic Scientists.
- Population genetics.
- High throughput (NGS) sequencing in wildlife forensics: where are we and where are we going?
- Hair ID .
- Feather Identification.

Early Bird registration closes: 15th March 2019

We hope that you can join us for the full week. Registration is open and early-bird pricing ends soon, so don't delay!

Southeast and East Asian Wildlife Forensic Network meeting

Scientists working in the field of (LIPI) was actively focusing on wildlife forensics across Southeast and East Asia were brought together in a transnational wildlife forensic network meeting to discuss national and regional developments in forensic capacity, current challenges and collaborative project opportunities. The network meeting was organised as part of a wider wildlife forensics event held from 24th – 28th September in Kuala Lumpur, hosted by the Malaysian Department of Wildlife and National Parks, which included a number of seminars and training wildlife for forensic sessions scientists and enforcement officers. The meeting was chaired by the President of SWFS, Dr Rob Ogden (TRACE), and included participants from Malaysia, Indonesia, Thailand, Vietnam, South Korea, and Hong Kong SAR. In addition, the Gabon National Parks Authority (ANPN) was represented as an international stakeholder with specific interest in the international elephant ivory trade. Each country discussed updates, current projects, and sharing of data and protocols.

Thailand started off by introducing their laboratory (DNP-WIFOS) and explained that a new and larger lab facility was under construction and nearing completion early 2019. Their recent successes include the completion of the domestic elephant DNA database, and current efforts to create a national DNA database for captive tigers. Indonesia confirmed that the Indonesian Institute of Sciences

building capacity as part of their wildlife law enforcement, and that a proposal was being developed concerning an ASEAN-wide data-sharing protocol for wildlife crime investigations. This protocol would facilitate regional sharing of enforcement information and could improve the communication of data relating to wildlife forensic capacity and casework. Malaysia introduced their recent work on mitochondrial whole-genome sequencing of pangolins from Southeast Asia, which was originally performed as part of the "ForCyt" reference database project (see Ahlers et al. 2017 For. Sci. Int). The results from this research provide an improved level of phylogenetic resolution for phylogeographic studies, with interesting results that indicate the need for a possible revision of the genus Manis. The Hong Kong University Conservation Forensics lab then introduced their research and capacity for identification and traceability of wildlife products in the trade, using machine learning, morphological, genetic and stable isotope approaches on species like helmeted hornbills, white-bellied pangolins, yellow-crested cockatoos, and shark fin. The representatives of the South Korean National

Author: Chloe Webster

Institute for Biological Resources, and representatives from the IBER lab in Vietnam introduced their respective facilities and ongoing development for wildlife forensic capacity building in the fields of morphological and genetic analysis.

Group discussions then turned to the need for lab knowledge exchange, training, and support in the implementation of Quality Management Systems required for SWFS Standards and Guidelines and for laboratory ISO17025 accreditation. Malaysia offered to organise a training workshop to discuss regional standardised practices, and share expertise in reference database development. In addition to this, the need for proficiency testing schemes and regional validation studies was discussed, in which all participants recognised this as an important step towards demonstrating good practice within wildlife forensic laboratories. The meeting was overall a great success in providing an official platform where projects, practices and future collaborations could be discussed and implemented, with the future view for regular communication between laboratories.



Meeting delegates

SWFS Certification

In 2012, the Scientific Working Group for Wildlife Forensic Science (SWGWILD) developed a certification program for practicing wildlife forensic scientists. This program was adopted and is under the prevue of the Society for Wildlife Forensic Science (SWFS). Currently, we have one general scheme for certification, with the possibility of creating new schemes, pertaining to wildlife forensic science, if necessary. At this time, there are twenty-eight certified wildlife forensic scientists from various countries.

Certification offers documentation of your expertise and is beneficial in court, for your employer and for the public. Each applicant is assessed by two assessors pulled from the pool of SWFS members (many thanks to past and current assessors). Certification is based on: A minimum requirement of a bachelor degree (or equivalent degree) in any related field such as biology, chemistry, environmental science, forensic science or equivalent as evidenced by transcripts or diploma; an annual proficiency test as applied to wildlife forensic

Kim Frazier

science (external or internal); one year of casework experience (if extensive casework training is completed prior to conducting actual casework, mock casework may be used for a portion of the one-year requirement); assessment of competent performance in forensic practice (the assessment will be conducted primarily by review of recent casework); agreement to follow the Ethics and Standards & Guidelines of SWFS; and a satisfactory Letter of Recommendation from a supervisor or professional familiar with the applicant and his/her abilities and experience subsequent to being declared competent to undertake casework.

Recently the certification application process on the Society's website was revamped to simplify the process. Please visit the new application page at <u>https://www.wildlifeforensicscience.org/apply-for-certification/</u>. The cost is US\$250. Please contact Kim Frazier at <u>kim.frazier@wyo.gov</u> with any questions.

Eel Species Identification Screening Method

ECCC's Pacific and Yukon Laboratory for Environmental Testing (PYLET) provides DNA-based species identification services to WED nationwide using PCR amplification of common DNA barcode genes coupled with DNA sequencing using Next Generation Sequencing (NGS) technology. The PYLET species identification method relies on amplification and sequencing of the mitochondrial genes: cytochrome oxidase I, 16S and cytochrome B for identification of animal materials. These amplicons are pooled and sequenced using an Illumina NGS instrument and sequence results are compared to vouchered sequence data from online databases. PYLET's turnaround time for analysis following receipt at the laboratory is 30 days, but results can be obtained in two weeks for priority samples.

When WED officers informed the laboratory that they would be submitting a large number of eel samples for identification it became imperative to develop a faster

method of analysis to meet established turnaround times. Of particular importance were the shipments of fresh eel meat, which required costly refrigeration; lengthy analysis times could jeopardize the quality of the meat, impacting the value of the commodity. Fresh and broiled/smoked eels (known as Unagi Kabayaki) are imported into Canada primarily for use in sushi. With the growing demand for eel meat as a food product some eel populations have declined considerably over the last few decades. This demand is complicated by the fact that eels cannot be bred in captivity; immature eels (glass) are wild-captured and reared for processing. Growing concerns about European eel (Anguilla anguilla) populations led to their inclusion in the CITES Appendix II in 2007 followed by addition to the IUCN red list in 2010. Trade in CITES Appendix II-listed species is regulated, requiring export permits issued based on harvest quotas. European eels are found in Europe and North Africa. Domestic trade of

Eel Species Identification Screening Method

continued from page 5

European eel is allowed within the European Union but export has been banned since 2010. Harvest and trade of the European eel in North Africa has been banned since 2015.

In order to meet the eel species identification demands and provide evidence for enforcement measures, PYLET scientists recently developed a rapid Polymerase Chain Reaction (PCR) method to differentiate between two commonly identified commercial eel species the American eel (*Anguilla rostrata*), and the European eel.

This new method is significantly faster than the sequencing-based method and can yield a result in one quarter of the time at approximately one tenth of the cost of the sequencing-based method. The rapid screen PCR assay uses two common barcode genes, 16S and cytochrome B, and relies on sequence differences between the two species of interest at the 3' end of the primers, resulting in differential amplification depending on the specific primers and the species. Single nucleotide polymorphisms (SNPs) at this key position result in failure of primer annealing and lack of amplification for the species with the non-complementary sequence. This new method has been used successfully in many eel identification submissions

from ECCC WED officers, including those from Interpol's Operation Thunderstorm conducted in May of 2018. Among the detained shipments, a shipment from Asia held at the Port of Vancouver contained over 18 tons of European eel meat. ECCC's WED officers are pleased by the development of this rapid screen method and are hoping for the development of a similar method for identification of another commonly detained commodity: shark fin. If anyone can offer suggestions for a similar rapid screen method to identify shark species' we would be more than pleased to entertain the ideas!



Left to right: Rachel, Heather, Lorraine, Michelle, Joy, Brooke and Melanie

A project to foster collaboration and develop an individualisation method for fox

Alexandra Grebenchuk

I am a Junior Researcher at the Scientific and Practical Center of the State Committee of Forensic Examinations of the Republic of Belarus, and I recently carried out a one month internship at Rob Ogden's lab at the University of Edinburgh. During the internship, a series of experiments were conducted, in conjunction with the Wildlife DNA Forensics lab at SASA, to identify suitable STR markers for individualisation of the fox, Vulpes vulpes. Samples of foxes from both Belarus and Scotland were used to identify a panel that would be suitable for use in both countries.

The Short Tandem Repeat (STR) markers tested during this project were originally developed for use with dogs, and tetrameric repeat STRs were preferred, following ISFG guidelines [1]. A starting point for the selection of markers was taken from a preliminary study on foxes in the Netherlands Some markers were quickly [2]. discarded due to a lack of variation in foxes, and others were identified as problematic due to deviations from Hardy-Weinberg equilibrium in one or both of the populations tested.

At the end of this short project, 17 STR markers have been tested with population samples from Belarus and Scotland and eight markers have been identified that are suitable for further optimisation into an individualization panel



Left to Right: Lucy Webster, Rob Ogden, Alexandra Grebenchuk

for validation. I will continue this work in Belarus, adding additional markers and validating a final panel for use in forensic casework, which will be submitted for publication in due course.

I want to thank the MOST project who funded this internship. Thanks MOST, new experimental to results and new knowledge in STR data analysis were transferred, professional contacts were expanded and the foundations for longterm scientific cooperation were laid. From the Belarusian side, this makes it possible to form a methodological base for a new direction - forensic DNA analysis of wild animals - taking into account the established approaches of the Society for Wildlife Forensic Science community.

- Linacre, A. et al. (2011) 'ISFG: Recommendations regarding the use of non-human (animal) DNA in forensic genetic investigations', Forensic Science International: Genetics, 5(5), pp. 501–505.
- Wesselink, M. and Kuiper, I. (2011) 'Individual identification of fox (*Vulpes vulpes*) in forensic wildlife investigations', Forensic Science International: Genetics Supplement Series, 3(1), pp. 2010–2011.

Australian and New Zealand Forensic Science Society's 24th International Symposium Wrap up

Greta Frankham, Australian Centre for Wildlife Genomics, Australian Museum Research Institute

In September 2018, over 800 delegates from all corners of the globe descended on the most isolated capital city in the world, in the largest police jurisdiction in the world, Perth, Western Australia*, for the Australian and New Zealand Forensic Science Society's (ANZFSS) 24th International Symposium on the Forensic Sciences. ANZFSS put on yet another jam-packed week of forensic science and socialising and here is my wrap up.

Wildlife forensic scientists are still a rare species at ANZFSS and as such we shared our session with forensic entomology and forensic taphonomy, which made for quite a varied and interesting selection of talks, with SWFS represented by members from both Australia and the US. I was lucky enough to attend the 2017 SWFS conference in Edinburgh on a travel scholarship funded by ANZFSS, and thus was asked to present on the 'lessons learned' from attending the SWFS conference and the labs I visited while I was in Europe. My presentation focused on the development of standards within our field and how the travel I did helped me benchmark the work we are doing in Australia. I also gave updates on some of the research projects I'm involved with aimed at improving standards, including the ForCyt

* for the trivia buffs, WA police are responsible for 2.5 million square kilometres of Australia.

Greta Frankham, Rebecca Johnson and Stewart Fallon at ANZFSS

FORENSIC

Wildlife &

Forensic

Taphonomy

Date: 12/09/2018 Start Time: 1200 Finish Time: 1300

Project, and the development of a non-indigenous animal reference biobank for biosecurity monitoring in Australia. As a result of this talk, I was volunteered into the Wildlife Forensic sub-committee of the Organization of Scientific Area Committees (OSAC) for Forensic Science as a bit of a standards nerd, and in December 2018 spent a week in Arizona, USA as an OSAC guest helping to develop US wildlife forensic standards. These unexpected collaborations are what going to these sorts of conferences is all about and help strengthen the networks in our community. Other topics presented during the wildlife forensic session were on the retrieval of Human DNA from poaching



Indigenous Dancers opening ANZFSS 2018

page 8

Australian and New Zealand Forensic Science Society's 24th International Symposium Wrap up

continued from page 8



SWFS member Greta Frankham presenting at ANZFSS

snares by Georgina Meakin from the University College London; The development of forensically informative markers to determine paternity in short beaked echidnas by Alexandra Summerell from the Australian Museum; the use of barnacles for investigations in the marine environment by Paola Magni from Murdoch University and the use of drones and thermal imaging to detect larval aggregations by Megan Descalzi from the University of New Haven.

The rest of the scientific program included high quality talks around the conference theme "Forensic Science without Borders". Plenary talks included topics such as Humanitarian Forensics, DNA, Toxicology, Military Forensics, Fingerprints, Digital Forensics and Forensic Science from the perspective of the victims of crime.

Additionally, there were over 300 talks and 200 posters presented by academics, students, practitioners, law enforcement agents, military personal, lawyers and policy makers. To hear from such a diverse array of people involved in the forensic sciences is a hallmark of ANZFSS. The social program at ANZFSS is one of its big draw cards, and this year's events did not disappoint. The social night gets more extravagant with each symposium, and there were some magnificent costumes at this year's Alice in Wonderland themed event that was held overlooking Perth's famous Kings Park. The week was closed out by an insanely lavish Game of Thrones themed Gala dinner which even impressed me, dare I admit it, a non-GoT fan!!

The next ANZFSS will be held in conjunction with the International

Association of Forensic Sciences between the 21st-25th of September 2020 in Sydney, Australia. We have a commitment from the conference organisers to have a dedicated 'Wildlife Forensics and Environmental Crime' session if we have the numbers. So, to all the SWFS members reading this, 2020 is a non-SWFS conference year, so why not block out September 2020 for a trip to Sydney and let's show the world what Wildlife Forensic Science is really all about! <u>https://</u> iafs2020.com.au/



SWFS members Greta Frankham, Rebecca Johnson and Alex Summerell at the Game of Thrones inspired Gala dinner at ANZFSS 2018

Standards and Guidelines v3.0 – Revenge of the TWG

All quality documents need to be revised from time to time, to take into account new methods or equipment, improved procedures, or even just to correct that typo that you didn't spot before the last issue...

Standards are no different, the ISO/ IEC 17025 testing standard was revised in 2017 [1] and conformance to this revised standard will be expected from accredited labs from early 2019. A new "forensic" ISO standard is also in development, so the international standards relevant for wildlife forensic labs are likely to change again in the not-too-distant future (I can hear the whoop of joy as you read this).

But accreditation is not for everyone, as it is expensive and the funds to achieve and maintain this level of quality assurance are not always available. However, it is important for a developing wildlife forensic laboratory to work towards compliance with a set of standards that demonstrate the level of quality assurance required for the court. An excellent set of standards and guidelines (S&G) were developed for this purpose from within the Society for Wildlife Forensic Science. Version 2 of the S&G were issued in Dec 2012 by SWGWILD, and in 2018 the SWFS Technical Working Group (TWG) has revised this document.

The new S&G was issued in November [2], and is available in the "Resources" section of the SWFS webpages. Here are some of the highlights in v3.0.

- New S&G for SNP analysis (section 4.5)
- Botany Incorporated standards for wood anatomy (within Morphology section 5) and chemical analysis for timber identification (section 6).
- Removed a section on SOPs in the General S&G (section 3) and instead have lists of SOPs required within every section
- Changes to help harmonise with the ENFSI Best Practice Manual [3].
- Updated reference section

The revised S&G will now form the basis of assessments by the SWFS Audit team. If you are looking for a friendly external audit to see how your lab is developing, it is worth using the revised S&G to see where there may be gaps in your system. If you are keen to find out more about quality management, sign up for the "Verifying perfection in your wildlife forensic laboratory" oneday workshop at the SWFS 2019 meeting in Denver which will be run by the TWG. We hope the revision provides additional support to SWFS members, with new areas covered, and that it is a useful resource for labs that do not want to go down the accreditation route. If you have any comments about the revised S&G, or have other fields that you would like to see covered, please contact the TWG and we will bear these in mind for the next revision!

- International Organization for Standardization. (2017). ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration Laboratories.
- SWFS Technical Working Group (2018) Standards and Guidelines for Wildlife Forensic Analysis, Version 3. Ed. Lucy M.I. Webster. Published by the Society for Wildlife Forensic Science, 19th November 2018, pp.21.
- 3. ENFSI APST. (2015). Best Practice Manual for the Application of Molecular Methods for the Forensic Examination of Non-Human Biological Traces. Retrieved from <u>http://enfsi.eu/documents/</u> <u>best-practice-manuals/</u>



African Wildlife Forensics Network Meeting, Pretoria, November 2018

Sinead Brophy



The African Wildlife Forensics Network has just concluded its most recent meeting, hosted by the National Zoological Gardens in Pretoria, South Africa on 27-28 November 2018.

This event built on two successful meetings held in 2017 to discuss the development of wildlife forensic science in Africa. The first meeting took place at the Society for Wildlife Forensic Science conference in Edinburgh, in June 2017. This was followed by a Harmonisation Workshop held in the Hague in November 2017.

The Pretoria meeting was the largest yet with over 40 attendees spanning 8 African countries. The workshop brought together African wildlife forensic laboratory stakeholders and wildlife crime scene investigators, in order to meet each other, discuss past and current activities within the field, and to work towards the development of a 3-year African Wildlife Forensics Network workplan, designed to support the delivery of wildlife forensic services at national and regional levels.

The meeting was very productive with practical, actionoriented, time-bound goals agreed for both groups. For example, each partner lab is aiming to have the capacity to perform and report on wildlife DNA forensic casework under a Quality Management System that is compliant with recognized standards by end 2021, while on the crime scene side, experts aim to develop a Wildlife Crime Scene Investigation Manual for First Responders by June 2019.

In January, partners will begin recruitment of a coordinator for the African Wildlife Forensics Network to support the work of its members and maintain the current momentum. 2019 looks to be a busy year for the Network, with the next meeting to be held at SWFS 2019 in Denver and a follow up in Zambia in November.

The Pretoria meeting represents a collaboration between the European Commission's Forensic Alliance Against Wildlife Crime initiative, the USAID Wildlife TRAPS and VukaNow Projects, and the UK People's Postcode Lottery Project. It was organized by the Netherlands Forensic Institute, TRACE Wildlife Forensics Network, SANBI and UNODC, with the support of TRAFFIC and VukaNow.

Meet the Board: Tasha Bauman

What's your current position? How long have you been in this position? Can you give me a brief overview of what it is you do in your work?

I am the Forensic Program Manager for the Wyoming Game and Fish Wildlife Forensic and Fish Health Laboratory in Laramie, WY. I have been in this position for ten months.

The Wyoming Game and Fish Forensic Lab primarily sees cases for species identification, sex identification, DNA matching, and minimum number of animals. Currently, my lab is capable of analyzing mule deer, white-tailed deer, elk, moose, pronghorn, mountain lion, bobcats, mountain goats, bighorn sheep, barbary sheep, turkeys, grizzly bear, black bears and wolves for genotyping. We have contracts to run casework for twelve states, including Wyoming, and the cases we analyze pertain to each state's laws.

Tell me how you first got involved in Wildlife Forensics (WF)?

My journey to a career in wildlife forensics is not a grand one, I was a lost undergraduate college student studying biology and chemistry with the end goal to become a physical therapist. I then interned with the Department's forensics laboratory and I fell in love with the science and the people. I started with the basics by processing and running a research project on chytrid fungus, which is a fungus that affects the Wyoming toad. As an intern, I could only observe the genetic



forensic casework going on around me. The interest I took in the work quickly developed into a passion that would guide my career path. I then decided to obtain my Masters in Forensic Science with a focus on genetics in 2009, and I've been working in the field ever since.

What was your first impression of Wildlife Forensics?

My first impression was, "Wow people get paid to do this?" I was excited to see a field in which my love of science and wildlife could be put to a practical use.

What has surprised you most about working with Wildlife Forensics?

There are a couple of things that surprise me about working with WF. First, the diversity of evidence we receive for testing is extreme. We may receive a swab of blood or a few hairs for one case and then be processing an entire truck for the next one. Second, is the large number of presentations and training sessions that we are called upon to do.

What do you find most challenging about Wildlife Forensics?

There are many challenges with WF. One that I have been readily involved in is standardizing WF across the United States. As SWFS members know each WF lab works with their own set of species, and they have their own inhouse markers and protocols. This makes standardizing challenging in many ways, it can be expensive to change up protocols, it can be time consuming, and it may not work for everyone.

What would you say most motivates you to do what you do?

There are several things that motivate me to do what I do. First, I love the lab work. I am generally most comfortable when I can work a case from beginning to end, locked in my lab with as few distractions as possible. Second, I feel a sense of responsibly to produce the best result possible for the evidence received. Doing my very best has always been a goal I set for myself.

Meet the Board: Tasha Bauman

What were you doing before you began your current position?

I was the Wildlife Forensic Analyst for ten years before my current position.

Tell me about someone who has influenced your decision to work in Wildlife Forensics?

I have met some of the most loyal, dedicated and inspiring scientists while working in WF. However, none of them compare to DeeDee Hawk our Services Division Chief, and Kim Frazier our Laboratory Director. I started interning with the Wyoming Game and Fish Forensics laboratory in 2006. They took time out of their busy schedules and taught me everything they knew about wildlife forensics. This is where my passion for wildlife forensics and my career started.

Where did you grow up?

I grew up in a small Wyoming town called Lyman.

What was it like to grow up in Lyman, WY?

In my youth, I spent summers hiking, fishing and boating the Uinta Mountains and Flaming Gorge Reservoir. It was a wonderful place to grow up and I made lifelong friends there.

Did you go to college?

Yes, I attended college.

Where did you go, and what was that like?

I attended the University of Wyoming (UW) and National University. My experience at UW was the most memorable as it is home of the Wyoming Cowboys and there is a great sense of pride that comes with being part of the alumni.

What might someone be surprised to know about you?

I have three miniature dachshunds Nibbler, Dash, and Penny, although no one who knows me for very long would be unaware of this.

The interest in Wildlife Forensics seems to be growing. Why do you think that is?

Yes, interest does seem to be growing. I think this is because wildlife crimes are gaining global recognition. The awareness of poaching and trafficking of wildlife has been linked with other crimes such as illegal drug and weapons trade making the issue prominent in the law enforcement world as well.

What would you tell someone who is thinking about starting in Wildlife Forensics?

I would tell them that if they are truly interested in WF, they should intern with a forensics lab (human or wildlife) to get a true sense of what the job entails. Forensics is not necessarily always as exciting as television usually portrays it to be. continued from page 12

What do you think will change about Wildlife Forensics over the next five years?

I believe WF will become a more collaborative and standardized field over over the next five years. With the development of SWFS and the TWG group, the efforts being made to standardize laboratories of all sizes will allow better collaboration through shared data, samples, and reference materials.

How would you describe yourself?

I believe I am a well organized, hard working, happy individual.

What do you do when you aren't working?

When I am not working I enjoy traveling with my husband, Greg. My life goal would be to visit all 50 states and each country at least once in my lifetime. I enjoy playing with my three dogs. Lastly, when time allows, I like to snow shoe, read books and work on home improvement projects

What's next for you in your work? What are you looking forward to?

I am working to move our lab into the accreditation world. We just recently moved into a brand new laboratory that give us the security and space we need to go through the accreditation process. I'm also looking forward to becoming the new SWFS President.

Lieutenant José Antonio Alfaro Moreno, specialist in environmental crime, EUROPOL HQ, The Hague



Senior officers of Spain's Guardia Civil are on duty 24/7 to provide an immediate response to wildlife and environmental emergencies. Late one Sunday evening in July of 2011, staff leading the Project Life+ IBERLINCE¹ called in to report the discovery of a subadult Iberian lynx (Lynx pardinus) carcass adjacent to Doñana National Park², having immediately preserved the area as per our training. Swiftly dispatching to the crime scene for a preliminary investigation, we observed several important bits of evidence, namely the unnatural position of the (mummified) carcass, which had been deliberately concealed beneath a huge amount of grass, and its location between two separately-owned orange groves (hereto: Farms A and B). The carcass, soil samples beneath it and insect specimens associated with it, were collected and immediately delivered to the CAD^{3} for cause and date of death determination. We

returned again at first light, then twice more, once with the poison detection dog unit. X-rays taken during the preliminary necropsy showed 32 shotgun projectiles, of the type regularly used in rabbit hunting, all embedded on the animal's right side. Time of death was estimated at 11-12 days prior to discovery.

Stage I of the criminal investigation:

From our first arrival on the scene, we knew this would be a challenging case. But giving up could never be an option. Initially, the apparent lack of witnesses made the recovery of clues even more critical to the success of the case⁴.

Both farms had a 24 hour security patrol and entry checkpoints. Background information on poaching activities was sought from the Andalusian environmental authorities and within Guardia Civil. A preliminary report and in-depth analysis of the available data confirmed no poaching incidents had been registered for either Farm.

Farm A served as a private hunting club for the staff. Approximately 12 hunters were authorized that season, and up until the lynx carcass was found, only 5 hunters had been out. And, within the time of death period established by CAD⁵, only 2 individuals were known to have been hunting, both had been hunting separately 11 days before in the afternoon. Nobody else was known to hunt on the days prior to or after. No hunting permissions were issued at Farm B for this season.

- 1. <u>http://www.iberlince.eu/index.php/esp/</u> Responsible of the reintroduction of Lynx pardinus in Spain and Portugal. Red list of IUCN. CITES listed (Appendix I).
- 2. Doñana is an icon for the wildlife conservation in the EU and constitutes the main wetland protected area in Europe.
- Dedicated state of the art wildlife forensics laboratory in Andalucía <u>http://www.juntadeandalucia.es/medioambiente/site/portalweb/menuitem.7e1cf46ddf59b-b227a9ebe205510e1ca/?vgnextoid=02d7caf72d159110VgnVCM1000000624e50aRCRD&vgnextchannel=c74666edf6e77310VgnVCM2000000624e50aR-CRD
 </u>

4. "In dubio pro reo" is a legal principle which aims to avoid punishment to innocent persons due to procedural mistakes: it is preferable that one thousand guilty persons be free than one innocent person be punished.

5. CAD received the carcass and carried out the necropsy and related investigation on 01/08/2011. Thus, 10 days after Day ZERO: 23/07/2011.

continued from page 14

Further questioning of potential witnesses and consideration of background information led to the arrest of two Farm A employees whose hunting weapons were also confiscated. Suspect A, a retiree in his early sixties with over 20 years of hunting experience owned 2 shotguns which he regularly used. Suspect B, a hunter for more than a decade, was a current employee in his early forties who possessed 4 regularly-used shotguns. Neither man held criminal records.

During questioning, Suspect A agreed he had been hunting during the timeframe of interest, but maintained he did not see any lynx. The body language of suspects is something we pay very close attention to, and hold considerable expertise of within our unit. To our experienced eyes, this man appeared anxious and uncomfortable while being interrogated. In contrast, Suspect B stated firmly that while hunting he heard 2 shots then, a few minutes later encountered Suspect A, who carried no rabbits, though he would have ostensibly been hunting for them. At day's end when both departed, he briefly chatted with Suspect A, who repeated his prior claim that he had been unlucky in his hunting despite having killed a couple of rabbits. Suspect B retained a calm demeanor throughout questioning, only expressing slight consternation over the probable length of time his weapons would be seized.

Stage II:

In the time we attended to the most pressing issues around the case, 92 days from the estimated time of death had elapsed. At this point the investigation entered a new, challenging phase. To continue building the case, we formally requested additional reports through the court, from:

Reserva Biológica de Doñana⁶, charged with gathering and managing genetic information on the Iberian lynx population, they receive samples from carcasses and newborn animals for genetic analysis. While no microchip was found at necropsy, the report confirmed the lynx's DNA⁷ comprised a mixture of (at the time)⁸ the only 2 populations of Iberian lynx in the world, stemming from reintroduction programs.

Project LIFE+ IBERLINCE⁹: we asked managers of this project to describe the role of this lynx and significance in the conservation of the species, based on its particular characteristics outlined in the Reserva Biológica de Doñana report. As a sibling of a Doñana population female and an Andújar (Sierra Morena) population male, our lynx would have reinforced the species' genetic diversity and its interchange among the two isolated populations. We also sought its estimated monetary value as guidance for authorities to seek compensation from the alleged author of the crime. Factoring in the Spanish legal framework, EU investment in the project, the impact of the lynx's death within the area, among others, a value of €135.000¹⁰ was determined.

Guardia Civil Ballistics Laboratory: the ballistics report was crucial to proving the provenance of the cartridges as well as the authorship of the crime. The lab received: 6 shotguns confiscated from the two suspects, 9 cartridge cases found at the crime scene, 2 wads and 20 projectiles¹¹. The aim of the report was

^{6. &}lt;u>http://www.ebd.csic.es/icts-donana</u>

^{7.} Due to the critical situation of the only two populations of Iberian lynx almost all the specimens were GPS tracked with collars in the 1980s. Fortunately the number of lynx has been increasing (400-500 individuals so far) and tracking all of them is not possible. Nevertheless, as many are fitted with microchips at birth as possible.

^{8.} In 2011 only two populations of Iberian lynx remained in the Iberian peninsula (Doñana and Andújar). Currently there are more populations in Portugal, Castilla-La Mancha and fortunately the species is recovering its former domains.

^{9.} Report available previous request to Project+ IBERLINCE.

^{10.} Report available previous request to Guardia Civil-SEPRONA.

^{11. 32} projectiles had been detected embedded in the carcass but only 20 could be retrieved.

continued from page 15

to determine whether any of the weapons seized shot some of the cartridges found AND if one or several of the recovered cartridge cases, wads and projectiles corresponded to one or several of the cartridges that killed the lynx.

The heavy workload of this lab delayed the ballistics report for several months¹². But when it came out in October 2013, more than 2 years after the discovery of the lynx carcass, its conclusions were absolutely enlightening¹³. Two of the cartridge cases found at the scene were a match with the two canyons of one of the shotguns seized. The powder embedded on the wads and projectiles was verified against that embedded on the cartridge pods. Unfortunately, at that point, the techniques developed worldwide were insufficient to enable cross-verification of powder. Still, the report revealed several key details:

The wads were of the same model, and manufactured by the same company, as the cartridges, thus making them fully compatible with the cartridge cases. The projectiles in turn were fully compatible with the cartridge cases and therefore with the wads. In conclusion: all three components matched. This, taken with the match between one shotgun and the cartridge cases revealed the authorship of the crime: the shotgun belonged to Suspect A.

Far from signaling the end and closure of the case, however, we still had a long road ahead. Remember, we had to uphold the principle of: "in dubio pro reo".

Stage III:

Back in July 2013, given the amount of time elapsed

and corresponding absence of any new clues, the court and prosecutor had officially declared this to be a cold case. According to the legal framework of the Spanish penal procedure, this status can be revoked should new lines of investigation emerge. Following the reception of the ballistics and other expert reports, a new report, including the emerging conclusions, was drafted and submitted. The court revoked the 'cold case' status and we could follow up with our investigation. But while the conclusions of the report merited the reopening of the case, the evidence itself remained insufficient to compel the court and the prosecutor to go to trial. We needed more evidence of higher value. This we hoped to obtain through a reconstruction of the facts.

To do this, we contacted UFOA¹⁴ - an elite fielddeploying support unit launched by the Andalucían environmental administration that Guardia Civil had cooperated with on a regular basis - to provide an 'external vision' to our case and assist with the on the ground/in-situ reconstruction. The court authorized our partnership and research in November 2013.

In January 2014, the joint Guardia Civil-UFOA team attended the crime scene and signposted the exact locations where the carcass and the different parts of the cartridges were found in order to examine what might actually have transpired. When cross-checked, the distances obtained during our battery of tests coincided with the core evidence as it was found on the ground. Our approach centered around the target shotgun, i.e., that killed the lynx. We purchased the same cartridges as the author of the crime and shot several times from selected distances to confirm the eventual disposition of the various cartridge components after firing, and the distance and distribution of the projectiles as observed

^{12.} The lab of reference for ballistics in Spain belongs to the Police bodies. Due to internal procedures the cases involving serious crimes against persons such as murders, serious robberies, etc. are prioritized.

^{13.} References available previous request to Spanish Guardia Civil-SEPRONA (dg-jefatura-seprona@guardiacivil.org).

^{14. &}lt;u>http://www.juntadeandalucia.es/medioambiente/site/portalweb/menuitem.7e1cf46ddf59bb227a9ebe205510e1ca/?vgnextoid=58424aab83137310VgnVC-M2000000624e50aRCRD&vgnextchannel=631cb2c42f207310VgnVCM2000000624e50aRCRD</u>

continued from page 16

(at necropsy) along the carcass. These steps yielded the following conclusions regarding disposition, distance and amount of projectiles¹⁵:

The projectiles were observed along the right side of the carcass in two different areas, A (back legs) and B (legs-neck) necessitating a) the movement of the lynx from left to right when the hunter shot and b) two shots having been fired. In summary, only a few projectiles lodged in the lynx's body.

Next, as the carcass degraded in the heat, projectiles lodged in the animal's tissues may have fallen to the ground, meaning that additional projectiles, beyond the 32 detected within the carcass at necropsy, could have struck the animal. The different tests we ran indicated that shots would have come from a distance of 25 meters.

The shotgun was more than 20 years old and imprecise, requiring manual extraction of cases. After firing, the spent cases are immediately extracted so that new cartridges can be loaded. Focusing on the position of the parts, the lineup of cases-wads-projectiles in the target shotgun was constant along the different shots.

In terms of intent, the hunter could claim he simply confused the lynx with another animal (e.g., a rabbit or fox). However, the UFOA final report concluded that such a claim would be inconsistent with a veritably experienced hunter. In parallel, the shotgun safety mechanism automatically kicks in once a cartridge is introduced, meaning that no shot can be fired without manually deactivating the safety. Ultimately though, intent hinges around the fact that two shots were fired. The first shot would have wounded the lynx, whereas the second shot would have killed it. The animal's left to right movement matches the species' known flight reaction to perceived threats, in this case a human presence.

Stage IV - moving towards judicial procedure:

At this point we should pause in order to point out several remarkable facts - not in terms of the investigation itself, but in terms of procedure. First, in 2011, the death of a lynx in Spain became immediate news. Typically associated with car strikes, the public takes the death of an Iberian lynx due to criminal activity (e.g., poaching, poisoning) even more to heart because this species is a conservation and cultural icon for Spanish people.

Unable to interfere in the investigation, our regional government - the Junta de Andalucía – sent us an emergency request for a report to take provisional measures, in this case drawing on an administrative procedure included in the hunting regional legal framework, against the hunting club run by Farm A. As a result, the club was temporarily closed.

In parallel, after the news spread, the World Wildlife Federation (WWF) immediately requested that the court intervene in the procedure as *private accusation*¹⁶. This enabled the NGO to nudge the procedure along, so long as the case remained open.

From our perspective, in 2014, the work was done: we had gathered all the possible physical evidence, carried out the research technically available (via the multidisciplinary work of all the institutions mentioned) and reported their outcomes following an

^{15.} References available previous request to Guardia Civil-SEPRONA.

^{16.} The Spanish penal procedure establishes the possibility of private accusation for persons or institutions with a particular interest in the case and the popular accusation for institutions with general interests. In this case WWF played the role of private accusation due to its role as partner in the Life+ Project IBER-LINCE. Tight conditions are required for a private accusation and its role does not substitute the Prosecutor; otherwise both actions are complementary.

continued from page 17

in-depth analysis. On one hand, the lawyer representing Suspect A did his best to stress the weaknesses of our investigation¹⁷. On the other, our colleagues at WWF did their utmost to highlight the huge amount of clues which, according the jurisprudence of the Spanish Supreme Court, could compel a trial and a possible further guilty verdict.

Nonetheless the prosecutor in charge considered that the evidence as presented was insufficient to compel a trial. Similarly, the judge deemed that the case could not go ahead solely on the accusation of WWF as a private accusation, and, as requested by the prosecutor, duly reinstated it as a cold case.

The outcome so far

Criminal investigators must be ready to face disappointment as a matter of course. Naturally, our work must be done within the confines of the legal framework and under the supervision and direction of prosecutors and judges. Environmental crimes and, particularly, wildlife crimes can be especially challenging to resolve not only due to the lack of witnesses but also to the fact that complex and complementary techniques are typically reserved for serious (i.e., against human) crimes and not always made available for wildlife crimes, particularly those which mean an invasion of privacy, e.g., wiretapping. From a conservation and even financial perspective, the killing of the lynx carried tangible repercussions for the species and for related projects and efforts underway for its survival. However, in terms of gradation¹⁸, it was not considered a serious crime in Spain¹⁹.

So that was that. Or was it? Despite the case officially remaining unresolved, having been declared 'cold' since 2014, it was actually a ground-breaking milestone in the investigation of wildlife crimes in Spain and beyond. We consulted forensics experts in the autopsies of human cadavers and they confirmed that the techniques used by CAD mirrored their own standards. DNA, ballistics, and fingerprinting techniques had been used sporadically in a few successful cases and structured CSI procedures between 2010 and 2012. However, this was the first time in which all this multidisciplinary work came together within a concrete case including the criminal investigation led by Guardia Civil-SEPRONA and counting on the active participation of several external teams. The lessons learned along the four years in which the case was open became the basis for current procedures of investigation. In addition this case study has been presented in trainings beyond Spain in countries such as Portugal, Italy and CEPOL²⁰.

And, finally, techniques may one day advance to the point where we can cross-verify the powder embedded on the wads and projectiles against that embedded on the cartridge pods. On that, we never give up hope.

Special thanks to Sergeant Carlos Jaén, Corporal Francisco Velasco and Officer Pedro Jiménez from SEPRONA; officer Dani Garrido and his colleagues from the Guardia Civil Anti Poison Dogs Unit; Irene Zorrilla and Isabel Fernández from CAD; Íñigo Fajardo, Antonio Ruiz, Antonio Valero, Laureano Infantes and Alfredo Lineros from UFOA Junta de Andalucía; Juan José Carmona from WWF and Pablo Ayerza (lawyer private accusation).

Thanks for your work, enthusiasm and loyalty those years and most importantly, thanks for trusting me.

- 19. Spanish Penal Code, art. 334.
- 20. CEPOL is the EU Police College Agency.

^{17.} Mainly lack of methodology to analyze and cross-check the powder embedded on the parts of the cartridges.

^{18.} In Spain the crimes are divided into serious, minus serious and minor. The key indicator is the prison penalty in the penal code. In general terms a 5-year penalty of prison is required to be considered a serious crime.

continued from page 18

About the author

José Antonio Alfaro Moreno joined the Guardia Civil in 1999 after a 3-year period in the Spanish Army. In 2007 he was promoted to Senior officer (Lieutenant) as head of a regional investigation unit in Huelva (SEPRONA) specialized in environmental crimes. Since 2010, he has actively cooperated with SEPRONA HQ in planning and developing national plans and international cooperation. Since 2016, he has been deployed at EUROPOL HQ as a specialist in environmental crime investigation and coordination of worldwide operations and strategic and operational plans.

Note from the editor: Special thanks to Ngaio Richards for facilitating the inclusion of this article in the newsletter.

Timeline

- » July 2011: Guardia Civil receives a late-night call from personnel at Doñana, the scene is immediately attended and they find the mummified carcass of a lynx with attempts made to conceal it
- » January 2012: reports received from Reserva Biologica Doñana, Project LIFE + IBERLINCE
- » *July 2013*: the 'cold case' status is revoked, the investigation is re-opened
- » October 2013: ballistics report received
- » *November 2013*: the court authorizes research for a visual reconstruction, in collaboration with UFOA
- » *January 2014*: joint Guardia Civila and UFOA team return to the scene for on-the ground tests and reconstruction of facts



Picture 1. Carcass of the Iberian lynx (*Lynx pardinus*) before being isolated and delivered to the laboratory (CAD) and concrete place of the find. Notice the strange posture of the carcass, mainly its forward right leg. It indicates manipulation "post-mortem".

Appendix

continued from page 19



SEPRONA officer taking pictures of the cartridge cases in the crime scene during the CSI.



Sketch of the crime scene including the placing of the evidence found during the CSI.



Disparo 1

Distribution of the projectiles which reached the lynx. Notice the clear separation of the 2 shots (shot 1 done with the right canyon of the shotgun and shot 2 done with the left canyon).



Several pictures of the incrustation of the projectiles in the bones of the lynx as well as the size of the projectiles.



Recreation done with the real shotgun from the approximate shot place (in red) the impact sites of the two shots that hit the lynx.



Recreation of the movement of the lynx (from left to right) in the crime scene.

continued from page 20



Hypothesised moving of the carcass by the hunter towards the place where it was hidden. The right one is the most likely hypothesis due to the final position of the carcass.



Test done with the real shotgun and same brand and size of cartridges in order to verify the distances accordingly, the projectiles found in the carcass and the distribution of the evidence (parts of the cartridges) along the crime scene.

Rob Ogden

Tackling the illegal lion trade with traceability tools

The international trade in lion parts and products is strictly controlled, but is still legal and widespread. The movement of hunting trophies and the sale of bones from captive bred individuals, particularly via export from South Africa, meets an international demand for these products and generates considerable revenues for local economies. However, there is mounting evidence that these markets are also being supplied by illegally sourced lions from the wild, potentially from across Africa.

On the 29th and 30th November a meeting was held in Pretoria, South Africa, to bring together over 30 leading lion researchers, lion conservationists and national conservation authorities to discuss the potential use of scientific tools for tracing the origins of traded lion parts. The primary method discussed was DNA analysis, with a number of members of the Society for Wildlife Forensic Science involved in steering the discussions towards the development of a collaborative, international framework for a single shared traceability system.

The idea is to pool existing data and established protocols for testing seized lion products in country, rather than relying on overseas testing services. This approach ensures that the information is delivered at a local scale, national capacity can be supported and the initiative can be designed to best ensure compliance with the Nagoya protocol on access and benefit sharing for genetic material (Nagoya ABS). The framework for delivering the traceability system is designed to be scalable, allowing development the international of high-resolution geographic assignment methods based on population genomic techniques to be transferred into the field, when appropriate applied tools become available.

The meeting was organised by TRACE Wildlife Forensics

Network and TRAFFIC, under funding from the USAID's Wildlife TRAPS and Vuka-Now illegal wildlife trade programmes.



Lion traceability meeting in progress. Photo: L. Bertola

Organization of Scientific Area Committees (OSAC) - Wildlife Forensic Subcommittee

An in person meeting was held December 10th through the 14th for the U.S. based OSAC wildlife forensic subcommittee. This subcommittee has been tasked with writing standards for wildlife forensics that will go through a Standard Developing Organization (SDO) process and eventually be listed on the National Institute of Standards and Technology (NIST) Registry for Forensic Please visit their Standards. website https://www.nist.gov/ topics/organization-scientific-areacommittees-forensic-science for more information on the OSAC. The wildlife forensic subcommittee

has been working on several standards with many currently in the SDO process. These standards include: general standards, report writing standards, morphology standards, validation standards for adding new STRs to an existing panel, validation standards for adding a new sequencing primer, serology methods for taxonomic identification, DNA standards, and a training standard for mtDNA for taxonomic identification. Currently, the subcommittee is working on standards for geographic assignment, public sequence validation for taxonomic identification. maintaining a reference collection,

Kim Frazier, SWFS Director of Certification reference sampling of live mammals and morphology validation. The subcommittee plans to start writing standards for best practices for building new STR panels in wildlife forensics, genetic methods to determine an individual of potential hybrid origin, a standard for the development and use of allele frequency population genetics databases and in-house validation of sequences and incorporation of public database sequences.

The subcommittee has invited several international guests to various meetings and we appreciate the time commitment and insight these guests have provided.

Classifieds

A new section advertising courses and opportunities in wildlife forensic science. Please contact the newsletter editors to include your advert in future editions. These are listings only and do not infer endorsement by SWFS.



THE UNIVERSITY of EDINBURGH

Applied Conservation Genetics with Wildlife Forensics

Masters/PgDip/PgCert by online learning

A new online degree, designed for professionals from a range of conservation science, wildlife management and veterinary occupations.



Applied Conservation Genetics with Wildlife Forensics

The need to include genetic data to support population management is increasingly recognised in conservation science, however there remains a lack of scientists with the skills and knowledge to apply population genetic theory to conservation practice. Within this arena, wildlife forensics is an emerging field that delivers forensic evidence to support law enforcement agencies tackle poaching, animal persecution and the illegal wildlife trade. This new online Masters at The University of Edinburgh is a unique scientific programme that equips current and future wildlife professionals with the knowledge, skills and global networks to address modem challenges in conservation management and law enforcement.

Courses

- Essential Population Genetic theory and techniques
- Introduction to Applied Conservation Genetics
- Introduction to Wildlife Forensics
- Genetic Data Analysis for Conservation Management and Wildlife Forensics
- Applied Conservation Genetics and Wildlife Forensics
- Quality Management in wildlife forensic science
- Reporting forensic evidence
- Population genetics for conservation breeding
- Conservation genetics for reintroductions, translocations and population monitoring
- The role of wildlife genetics in global conservation challenges.

Visit our website: www.ed.ac.uk/vet/conservation-genetics Contact us: conservation.genetics@ed.ac.uk Find more information about online learning at The University of Edinburgh at: edn.ac/online-learning

The programme is delivered in partnership between the Royal (Dick) Vet School of Veterinary Science and the Scottish Government's SASA Wildlife DNA Forensics Laboratory



Classifieds

continued from page 23



Master of Science in Wildlife Forensic Sciences & Conservation, University of Florida

Rise to the challenge of wildlife conservation, ecology and animal protection. The University of Florida is proud to offer the first 100% online Master of Science in Wildlife Forensic Sciences & Conservation with options for thesis and non-thesis tracks. This program gives working professionals the opportunity to learn new techniques in investigating wildlife crime, such as poaching and trafficking. The graduate program is a part of the forensic studies provided by the William R. Maples Center for Forensic Medicine in partnership with the Institute of Food and Agricultural Sciences department of Wildlife Ecology and Conservation.

Graduate (master) position: ULaval.CaribouGenomics

» Caribou SNP-Chip validation for wildlife forensics

This project aims to validate a new genomic tool for population assignment of caribou in a wildlife forensics context. The validation of the tool implies the population genomic characterization of regional and fine scale groupings as well as assessing the power of assignment and the strength of evidence provided to court. In order to complete a proper wildlife forensics validation, the candidate will test the tool for sensitivity, reproducibility and specificity.

The candidate will be based in Dr. Claude Robert's Lab at University Laval in the health science department and co-supervised by Dr. Vincent Bourret and Dr. Steeve D. Côté. University Laval is a French speaking institution, so candidates should be ready to learn French in order to complete the Masters program. The University offers a great opportunity to learn or perfect a second language in a magnificent environment. University Laval is located in beautiful Québec city, the only fortified city north of Mexico and a UNESCO World Heritage treasure. Spectacular landscapes are just minutes from town.

We are looking for a highly motivated student interested in mastering skills in population genetics, bioinformatics, molecular ecology and wildlife forensics. Interested candidates are invited to send a motivation letter and curriculum vitae to:

Claude.Robert@fsaa.ulaval.ca or Vincent.Bourret@mffp.gouv.qc.ca The project could start as early as January 2019.

Recent publications:

The following recent wildlife forensic publications have been compiled using searches of the online database, Web of Science. This list covers the period from August 2018 to January 2019. We aren't commenting on their quality or advocating their application, hopefully you will have you own opinions about them. Please contact us if you know of papers that have been missed (particularly your own publications!) so we can include them in the next edition.

Wildlife Forensics:

Brandis, Kate J, Phoebe J B Meagher, Lydia J Tong, Michelle Shaw, Debashish Mazumder, Patricia Gadd, and Daniel Ramp. 2018. "Novel Detection of Provenance in the Illegal Wildlife Trade Using Elemental Data." SCIENTIFIC REPORTS 8.

Cardenosa, Diego, Andrew T Fields, Elizabeth A Babcock, Huarong Zhang, Kevin Feldheim, Stanley K H Shea, Gunter A Fischer, and Demian D Chapman. 2018. "CITES-Listed Sharks Remain among the Top Species in the Contemporary Fin Trade." CONSERVATION LETTERS 11 (4).

Carroll, Emma L, Mike W Bruford, J Andrew DeWoody, Gregoire Leroy, Alan Strand, Lisette Waits, and Jinliang Wang. 2018. "Genetic and Genomic Monitoring with Minimally Invasive Sampling Methods." EVOLUTIONARY APPLICATIONS 11 (7, SI): 1094–1119.

Chesson, Lesley A, Janet E Barnette, Gabriel J Bowen, J Renee Brooks, John F Casale, Thure E Cerling, Craig S Cook, et al. 2018. "Applying the Principles of Isotope Analysis in Plant and Animal Ecology to Forensic Science in the Americas." OECOLOGIA 187 (4, SI): 1077–94.

Gao, Xue, Hongge Li, Hui Li, Shuai Dong, Junhao Chu, Hao Guo, and Qingbiao Zhao. 2018. "Sensitive Determination of Nine Anticoagulant Rodenticides in Blood by High Resolution Mass Spectrometry with Supported Liquid Extraction Pretreatment." FORENSIC SCIENCE INTERNATIONAL 292: 39–44.

Ghosh, Avijit, Sambadeb Basu, Hiren Khatri, Kailash Chandra, and Mukesh Thakur. 2019. "Ascertaining Species of Origin from Confiscated Meat Using DNA Forensics." MITOCHONDRIAL DNA PART B-RESOURCES 4 (1): 329–31.

Harner, Tom, Cassandra Rauert, Derek Muir, Jasmin K Schuster, Yu-Mei Hsu, Leiming Zhang, George Marson, et al. 2018. "Air Synthesis Review: Polycyclic Aromatic Compounds in the Oil Sands Region." ENVIRONMENTAL REVIEWS 26 (4): 430–68.

Jacobs, Rachel L, and Barry W Baker. 2018. "The Species Dilemma and Its Potential Impact on Enforcing Wildlife Trade Laws." EVOLUTIONARY ANTHROPOLOGY 27 (6): 261–66.

Karmacharya, Dibesh, Adarsh M Sherchan, Santosh Dulal, Prajwol Manandhar, Sulochana Manandhar, Jyoti Joshi, Susmita Bhattarai, et al. 2018. "Species, Sex and Geo-Location Identification of Seized Tiger (*Panthera Tigris Tigris*) Parts in Nepal-A Molecular Forensic Approach." PLOS ONE 13 (8).

Koehler, Geoff, and Keith A Hobson. 2018. "Effects of Tanning on the Stable Isotopic Compositions of Hair." FORENSIC SCIENCE INTERNATIONAL 292: 78–82.

page 26

Recent publications:

Wildlife Forensics continued:

Marin, Juan C, Romina Rivera, Valeria Varas, Jorge Cortes, Ana Agapito, Ana Chero, Alexandra Chavez, Warren E Johnson, and Pablo Orozco-ter Wengel. 2018. "Genetic Variation in Coat Colour Genes MC1R and ASIP Provides Insights Into Domestication and Management of South American Camelids." FRONTIERS IN GENETICS 9.

Maroso, Francesco, Adrian Casanova, Fernanda D do Prado, Carmen Bouza, Belen G Pardo, Andres Blanco, Miguel Hermida, Carlos Fernandez, Manuel Vera, and Paulino Martinez. 2018. "Species Identification of Two Closely Exploited Flatfish, Turbot (*Scophthalmus Maximus*) and Brill (*Scophthalmus Rhombus*), Using a ddRADseq Genomic Approach." AQUATIC CONSERVATION-MARINE AND FRESHWATER ECOSYSTEMS 28 (5): 1253–60.

Nash, Helen C, Wirdateti, Gabriel W Low, Siew Woh Choo, Ju Lian Chong, Gono Semiadi, Ranjeev Hari, et al. 2018. "Conservation Genomics Reveals Possible Illegal Trade Routes and Admixture across Pangolin Lineages in Southeast Asia." CONSERVATION GENETICS 19 (5): 1083–95.

Pankowski, Filip, Grzegorz Bogiel, Slawomir Pasko, Filip Rzepinski, Joanna Misiewicz, Alfred Staszak, Joanna Bonecka, Malgorzata Dzierzecka, and Bartlomiej J Bartyzel. 2018. "Fatal Gunshot Injuries in the Common Buzzard *Buteo Buteo* L. 1758-Imaging and Ballistic Findings." FORENSIC SCIENCE MEDICINE AND PATHOLOGY 14 (4): 526–30.

Schmidberger, Andreas, Bernhard Durner, David Gehrmeyer, and Robert Schupfner. 2018. "Development and Application of a Method for Ivory Dating by Analyzing Radioisotopes to Distinguish Legal from Illegal Ivory." FORENSIC SCIENCE INTERNATIONAL 289: 363–67.

Verzuh, Tana, David L Bergman, Scott C Bender, Maggie Dwire, and Stewart W Breck. 2018. "Intercanine Width Measurements to Aid Predation Investigations: A Comparison between Sympatric Native and Non-Native Carnivores in the Mexican Wolf Recovery Area." JOURNAL OF MAMMALOGY 99 (6): 1405–10.

Wisniewski, Kristopher D, Jamie K Pringle, Daniel Allen, and Gary E Wilson. 2019. "Wildlife Crime: The Application of Forensic Geoscience to Assist with Criminal Investigations." FORENSIC SCIENCE INTERNATIONAL 294: E11–18.

Zanden, Hannah B Vander, Abigail Reid, Todd Katzner, and David M Nelson. 2018. "Effect of Heat and Singeing on Stable Hydrogen Isotope Ratios of Bird Feathers and Implications for Their Use in Determining Geographic Origin." RAPID COMMUNICATIONS IN MASS SPECTROMETRY 32 (21): 1859–66.

Fish forensics:

Bourret, Samuel L, and Niall G Clancy. 2018. "Using Forensic Geochemistry via Fish Otoliths to Investigate an Illegal Fish Introduction." CANADIAN JOURNAL OF FISHERIES AND AQUATIC SCIENCES 75 (11): 1778–83.

Bunholi, Ingrid Vasconcellos, Bruno Lopes da Silva Ferrette, Juliana Beltramin De Biasi, Carolina de Oliveira

Recent publications:

Fish forensics continued:

Magalhaes, Matheus Marcos Rotundo, Claudio Oliveira, Fausto Foresti, and Fernando Fernandes Mendonca. 2018. "The Fishing and Illegal Trade of the Angelshark: DNA Barcoding against Misleading Identifications." FISHERIES RESEARCH 206: 193–97.

Canty, Steven W J, Nathan K Truelove, Richard F Preziosi, Simon Chenery, Matthew A S Horstwood, and Stephen J Box. 2018. "Evaluating Tools for the Spatial Management of Fisheries." JOURNAL OF APPLIED ECOLOGY 55 (6): 2997–3004.

Fotedar, Seema, Sherralee Lukehurst, Gary Jackson, and Michael Snow. 2019. "Molecular Tools for Identification of Shark Species Involved in Depredation Incidents in Western Australian Fisheries." PLOS ONE 14 (1).

Ge, Yuqing, Lingyan Zhu, Meng Chen, Guangji Zhang, Zhen Huang, and Rubin Cheng. 2018. "Complete Mitochondrial Genome Sequence for the Endangered Knysna Seahorse *Hippocampus Capensis Boulenger* 1900." CONSERVATION GENETICS RESOURCES 10 (3): 461–65.

Han, Yahong, Lin Jian, Yumei Yao, Xinlei Wang, Lujia Han, and Xian Liu. 2018. "Insight into Rapid DNA-Specific Identification of Animal Origin Based on FTIR Analysis: A Case Study." MOLECULES 23 (11).

Rubini, Silva, Paolo Frisoni, Chiara Russotto, Natascia Pedriali, Walter Mignone, Carla Grattarola, Federica Giorda, et al. 2018. "The Diatoms Test in Veterinary Medicine: A Pilot Study on Cetaceans and Sea Turtles." FORENSIC SCIENCE INTERNATIONAL 290: E19–23.

Shehata, Hanan R, Amanda M Naaum, Rafael A Garduno, and Robert Hanner. 2018. "DNA Barcoding as a Regulatory Tool for Seafood Authentication in Canada." FOOD CONTROL 92: 147–53.

Whan-Air, Wilawan, Karun Thongprajukaew, Tasneem Salaeharae, and Krueawan Yoonram. 2018. "Identification of Wild and Farmed Broadhead Catfish (*Clarias Macrocephalus Gunther*, 1864) Based on Morphometry, Digestive Indexes and Flesh Quality." JOURNAL OF OCEANOLOGY AND LIMNOLOGY 36 (5): 1788–97.

Timber forensics:

Dormontt, Eleanor E, Kor-jent van Dijk, Karen L Bell, Ed Biffin, Martin F Breed, Margaret Byrne, Stefan Caddy-Retalic, et al. 2018. "Advancing DNA Barcoding and Metabarcoding Applications for Plants Requires Systematic Analysis of Herbarium Collections-An Australian Perspective." FRONTIERS IN ECOLOGY AND EVOLUTION 6

Paredes-Villanueva, Kathelyn, Edgard Espinoza, Jente Ottenburghs, Mark G Sterken, Frans Bongers, and Pieter A Zuidema. 2018. "Chemical Differentiation of Bolivian Cedrela Species as a Tool to Trace Illegal Timber Trade." FORESTRY 91 (5): 603–13.

Horacek, Micha, Gareth Rees, Markus Boner, and Johannes Zahnen. 2018. "Comment on: Developing Forensic Tools for an African Timber: {[]...], by Vlam et Al., 2018." BIOLOGICAL CONSERVATION 226: 333–34.