



The newsletter of the Society for Wildlife Forensic Science

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SWFS NEWS

Inside this edition: WCSI, FOGS Biobank, Wood ID Centre, Tortoiseshell Amnesty

Wildlife crime scene investigation getting forensic evidence right from the start

Author: Rob Ogden, TRACE Wildlife Forensic Network

Wildlife forensic scientists spend a lot of time focusing on quality management, from the moment evidence arrives at the lab, to the communication of forensic test results in court, but ultimately the success of all this work depends on what happens upstream of our involvement. The way in which evidence is collected, stored and transported determines the admissibility of evidence in court and is usually the key focus of courtroom defense lawyers.

As international wildlife laboratory capacity develops and wildlife crimes attract stronger penalties, attention has started to turn to wildlife crime scene investigation and evidence management. While outside the scope of most SWFS member roles, forensic scientists can offer support to wildlife CSI and if we don't want our analytical efforts to go to waste, it's in our interests to do so. Here we take a look at the emerging area of wildlife crime scene training: what's involved, where's it happening and how can the wildlife forensics community contribute?

Crime scene investigation is a well-established discipline in its own right, with its own specialist departments, professional roles and ISO standards. However, just as wildlife crime often struggles to attract anywhere near the level of forensic resources provided to human victim investigations, so wildlife crime scenes are also a much lower priority for scenes of crime experts. In fact, as wildlife crimes are often investigated on the ground by wildlife protection agencies, it's fairly unusual for these organizations to have any dedicated crime scene staff.

This challenge has long been recognized in wildlife law enforcement. In the UK, the lack of specialist crime scene support in wildlife cases led to initiatives to start providing police wildlife crime officers with their own kits to collect evidence in 2007. In the U.S., Federal wildlife officers receive a comprehensive CSI kit once they graduate from the wildlife officers' academy. Such kits are now produced and distributed

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Welcome from the SWFS President

Dear SWFS Members,

Welcome to the tenth edition of the SWFS Newsletter.

Happy New Year. I hope everyone found a way to celebrate the holidays with cheer and happiness.

The year 2021 started with difficulties as the SWFS board of Directors made the decision to postpone the SWFS 2021 meeting in Kruger National Park. The new meeting date has tentatively been set for 11-14 July 2022. This decision was not made lightly. Many members of the board and the planning committee have been carefully monitoring the COVID-19 situation. The decision ultimately came down to what was best for our membership's health, safety, and well-being. Though we are disappointed we will not have the chance to network, share our passion for wildlife forensic science or see the amazing site that Kruger has to offer in 2021, we are excited that the opportunity will still be available to us in 2022.

For now, the Society would like to take the time afforded us by the travel restrictions and the postponement of the 2021 meeting to begin the SWFS Webinar Series this June or July. As you will remember, we introduced this concept and requested feedback concerning it in the July edition of this newsletter. The plan is to take the ideas received and focus our outreach to start the mini-series. Future information about the series will be circulated through email and on the SWFS website. If you are interested in filling one of the available slots as a presenter, please reach out to Lucy Webster at lucy.webster@sasa.gov.scot.

The board has two Board of Director position opening up in July of this year and one President-Elect position. The only qualification to apply for a Board Director role is that you must already be a commit to regular participation for at least one year. You can apply by sending a letter or email to Tasha Bauman at Tasha.bauman@wyo.gov expressing your interest in a board position, as well as submitting a brief bio covering



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Welcome from the SWFS President

your wildlife forensic expertise. To be considered for the President Elect role, you must have held a board position at one time and be a current regular participant for at least one year, otherwise the application process for President-Elect is the same as any other position. Please review the SWFS By-laws to see the terms and roles of the board positions. The By-laws can be found at <https://www.wildlife Forensics Science.org/mission/bylaws/>. The President-Elect position is not listed in the By-laws at the moment. This role actively prepares to carry out the duties of the office of President and works with the current President to ensure a smooth transition of all presidential responsibilities. The President-Elect will serve a two year term then will assume the position of President.

As always, I would like to extend my gratitude and thanks to all of you that have contributed to the SWFS Newsletters, as well as to the production team that puts this wonderful periodical together.

Cheers,

Tasha Bauman

Editorial note

In the June 2020 edition of the newsletter, the article titled “Capacity Building in Zimbabwe yields successful results for Wildlife Forensics in Africa” was incorrectly attributed to “AWFN News”. The correct authorship should have appeared as “Jessica Dawson, Victoria Falls Wildlife Trust, Zimbabwe”. We apologise to the author for this error.

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Wildlife crime scene investigation – getting forensic evidence right from the start

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Crime scene approach, Zimbabwe © AWFN

in many different countries and the provision of training in how to use the kits has gradually expanded into crime scene training to ensure that crime scenes are not contaminated, evidence is properly secured and preserved, and the entire process is thoroughly documented. These principles have been incorporated into a series of publications on wildlife crime scene investigation by UNODC the US Fish and Wildlife Service and Interpol, among others.

Undertaking a full crime scene investigation is a complex and involved process, requiring experienced specialists with significant training. However, the initial steps of recognizing and securing a crime scene (often termed 'crime scene awareness') and approaches to searching and documenting a crime scene as part of more advanced crime

scene management can be taught relatively quickly to wildlife law enforcement officers. Furthermore, in situations where officers find themselves isolated from any central support, for example on remote anti-poaching patrols, knowledge of how to collect evidence can be essential. Within this investigative framework, wildlife crime scene training is now being designed and delivered around the world, particularly in countries where the investigating agencies have no existing capability in the area of forensic evidence management.

In Africa, the US government and UNODC both have ongoing programmes to develop wildlife crime scene capacity in multiple countries. During the past five years, the USFWS has delivered trainings in Botswana (2014), Malawi (2016), Tanzania (2017),

Uganda (2017) and Kenya, (2018), targeting both wildlife and customs departments in order to increase their awareness of forensic evidence and establish basic capacity for its collection. Other initiatives funded by USAID, UNODC and the European Commission have supported TRACE and the Netherlands Forensic Institute to deliver training in Botswana, Malawi, Tanzania, Zambia and Zimbabwe, working alongside a variety of national NGOs and government partners. The overlap in countries tends to reflect differences in the agencies being trained, but also re-emphasizes the need for donor and implementation partner coordination. While such training opportunities are always positive, it's equally important to assess whether or not such efforts are effective and how they should be developed.



Wildlife CSI Train-the-Trainer workshop, Zambia © TRACE

Wildlife crime scene investigation – getting forensic evidence right from the start

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A significant difference between wildlife forensic training and wildlife crime scene training is in the number of individuals we need to reach. Even considering multiple forensic disciplines, lab based training in any one country could be achieved through training around a dozen people, but there may be as many as 3,000 rangers in a single country who need to be aware of how to approach a wildlife crime scene. A two-week training course of twelve officers is therefore likely to have little or no immediate impact. Institutionalising crime scene practices into an organisation's existing training programme is the only realistic way to cascade these new skills down to the ground. This in turn requires the establishment of national training capacity and a train-the-trainer model; several projects along these lines are now underway.

One example can be found in Tanzania at the College for African Wildlife Management, where each year hundreds of trainee rangers graduate and join wildlife authorities in Tanzania and beyond. College tutors, most of whom are field experienced rangers, are now being taught crime scene management, and how to train the basics, so that wildlife crime scene awareness courses can be incorporated into the college curriculum. Through a newly established partnership with Tanzania's Government Chemist Laboratory Authority, this training is supported by laboratory forensic specialists who provide training in chain of custody, evidence storage and submission, and the types of forensic analysis available in country.

Such integration of lab forensics and crime scene investigation provides real advantages to both communities,

enabling mutual understanding of each other's challenges when it comes to forensic evidence and ensuring that personal relationships are established to support inter-agency communication. Reflecting this model, membership of the African Wildlife Forensics Network is comprised of both communities, bringing everyone together for discussions about common problems and joined-up thinking. In this environment, there are always valuable lessons to be learned from our crime scene cousins, as well as the opportunity to share forensic expertise.

With this in mind, we encourage everyone involved in wildlife forensics to engage with crime scene practitioners in your own countries. The extra effort will probably go a long way to making everyone's work have more impact.



Malawi-Zambia senior investigator training, Zambia ©

Forensic Genetics for Species Protection at the Research Museum A. Koenig in Bonn

Author: Annika Mozer, Albia Consul, Jonas Astrin

According to INTERPOL, illegal wildlife trade accounts for USD 20 billion per year. Mostly reptiles and birds but also some amphibian and mammal species are traded illegally and then sold as extravagant pets. Often illegally obtained animals are passed off as offspring from private breeding projects. Many of the affected wildlife populations suffer strongly. To effectively combat illegal trade with protected species, the authorities lack molecular marker sets for many species that can be used in lawsuits.

In Germany alone, almost 10,000 living specimens have been confiscated by customs authorities in 2019. Over the last two decades, approximately 6,000 species have been seized. This calls for action. The Forensic Genetics for Species Protection (FOGS) project aims at developing a novel validated marker system and publishing its results in an online reference database. The FOGS project, financed through the German Federal Ministry of Education and Research, plans to develop markers for 150 species, mostly birds and reptiles, all of them endangered and of considerable relevance in wildlife trafficking. Those 150 species will cover some 'exotic' species like snakes, geckos, and parrots but will mostly focus on endemic European species like the Hermann's tortoise (*Testudo hermanni*) and the Emerald lizard (*Lacerta viridis*).

FOGS will rely on SNPSTR technology; our markers will be fragments of up to 500bp, each containing a microsatellite/short tandem repeat (STR) in the middle and at least one single nucleotide polymorphism (SNP) in the flanking region. SNPSTRs were first described by Mountain et al. (2002; *Genome Res* 12/11) and provide significant benefits. Since SNPs and STRs, both with different mutation rates, are used within one marker to generate a haplotype, SNPSTRs are highly informative. Additionally, according to Mountain et al. (2002), 50% of all STRs have at least one SNP enclosed within a range of 400bp. This makes SNPSTRs abundant and therefore a versatile new tool. In the human forensic field, several studies regarding SNPSTRs already exist (see for example Wei et al. (2018; *PLoS ONE* 13/7); Wang et al. (2015; *Forensic Sci. Int.: Genet. Suppl. Ser.* 5)), as well as some studies about SNPSTRs with domesticated animals (e.g. Yu et al. (2015; *Genet. Mol. Res.* 14/1)).



The reference database will be hosted by Zoological Research Museum Alexander Koenig, Bonn, Germany, and will be accessible to the public after registration. Users will be able to search by species and access established loci and validated primers. Furthermore, recorded populations will show up along with other metadata.

The most common and relevant issues wildlife crime authorities face are to prove alleged kinship, hybrid status, or geographic/population origin. FOGS will support the authorities in their work since the informative SNPSTR system in combination with the reference database are developed from the aspect of providing legal evidence. All markers are validated (e.g. primer specificity). Moreover, all database entries are quality controlled and have a distinct and reliable point of origin. Therefore, the data and marker will hold up to the requirements in court. Customs and nature conservation authorities will be able to access the database to check for illegal trade but also, for example, if breeders request a voluntary ancestry certification that demonstrates their animal is not a hybrid or illegally obtained, FOGS can be of assistance.

The FOGS project focuses mainly on establishing the markers themselves, adding individuals to the dataset will remain an important task also after the project, for example, to gather enough specimens to enable the individual population of origin to be traced. Therefore, FOGS collaborates with many research groups and works together with bird banding stations, breeders,

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Forensic Genetics for Species Protection at the Research Museum A. Koenig in Bonn

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research museums, biobanks, zoo repositories, regional environmental authorities, and wildlife conservation services to gain specimens. Additionally, many samples worldwide need to be collected specifically and only specimens with reliable origins can be used. For this reason, and because FOGS is the first project using SNPSTRs on a broad basis in wildlife forensics, we are always looking for new collaborations and open to any discussions. We would very much appreciate your feedback!

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Zoological Research Museum Alexander Koenig

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A Matter of Interpretation: Wildlife Law Enforcement and the U.S. Migratory Bird Treaty Act

Pepper W. Trail, Senior Forensic Scientist / Ornithologist, OLE NFWFL

Wildlife forensic casework goes through cycles, with new enforcement priorities emerging and formerly important ones dwindling. Sometimes casework dries up due to the near extermination of the resource, as in the case of Russian caviar. Other times, surging demand requires increased enforcement attention, as with the illegal pangolin trade. More positively, the development of a new analytical technique may spur casework. That has happened with the capability to identify protected tropical hardwoods through chemotyping.

Law enforcement priorities are ultimately determined by legal and policy decisions. Changes often occur when new protections are put in place in response to threats to a wildlife resource. For example,



An example of incidental take: remains of a Northern Mockingbird recovered from an exposed oil pit and submitted for forensic identification.

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A Matter of Interpretation: Wildlife Law Enforcement and the U.S. Migratory Bird Treaty Act

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the CITES listing of many shark species increased casework involving the burgeoning shark fin trade. Recently, however, federal wildlife law enforcement in the U.S. has experienced the opposite situation: a reinterpretation of the Migratory Bird Treaty Act has led to drastically decreased casework.

The Migratory Bird Treaty Act (MBTA) was originally passed in 1918, and has been revised numerous times over the years. It currently protects 1,093 species of birds native to the United States and U.S. territories. The language of the statute states: “...it shall be unlawful at any time, by any means or in any manner, to pursue, hunt, take, capture, kill, attempt to take, capture, or kill, possess ... any migratory bird, any part, nest, or egg of any such bird, or any product ... of any such bird ...”.

For decades, the U.S. Fish and Wildlife Service (FWS) took the position that the MBTA prohibits the unintentional, incidental take of protected birds, not just intentional killing. As a result, electric utilities were prosecuted when their power transmission lines electrocuted eagles, and oil companies were fined when oil spills killed protected birds. Following the 2010 Deepwater Horizon oil spill, for example, British Petroleum paid \$100 million in environmental fines, due in part to the deaths of an estimated 600,000-800,000 MBTA-protected birds¹. Other

sources of incidental take that were investigated for MBTA violations include wind turbine arrays, solar power facilities, and exposed oil pits where birds are trapped in waste fluids from oil extraction.

To verify violations of the MBTA, carcasses and other bird remains were routinely submitted to the National Fish and Wildlife Forensic Laboratory (NFWFL) for species identification and cause-of-death determination. Until 2017, cases involving such incidental take investigations accounted for approximately 30% of evidence analyzed annually by ornithologists at NFWFL. This work led to a better understanding of the scope of incidental take. For example, analysis of oil pit mortality based largely on Lab casework² resulted in an estimate of 500,000-1 million bird deaths a year from this source, an estimate that is still widely cited. Formatting note: can the mockingbird picture be situated around this section of the text?

Over the years, the incidental take interpretation of the MBTA has been challenged in court a number of times, resulted in mixed decisions. The U.S. Courts of Appeals for the Second and Tenth Circuits upheld the incidental take interpretation, while those for the Fifth and Eighth Circuits held that the MBTA applies only to intentional actions. Near the end of the Obama administration, in January 2017, the U.S. Department of the Interior's Office of the

Solicitor issued Memorandum M-37041, explicitly stating that the MBTA prohibits incidental take. However, in December 2017, under the Trump administration, the DOI Solicitor's Office declared the opposite, issuing M-37050, “The Migratory Bird Treaty Act Does Not Prohibit Incidental Take.”

Since that opinion was issued, no oil pit investigations have been undertaken by FWS, and ornithology casework at NFWFL has decreased by 50%. From 2000-2017, the average number of ornithology cases was 108/year. From 2018-2020, the average was 55, and in 2020 only 29 ornithology cases were received.

The future of MBTA enforcement is uncertain. In August 2020, Judge Valerie Caproni of the U.S. Second Circuit District Court in New York invalidated the M-37050 opinion and reaffirmed that the MBTA does prohibit incidental take³. However, that ruling is being appealed, and in January 2021, the Department of Interior published a “final rule” in the Federal Register declaring “We determine that the MBTA's prohibitions on pursuing, hunting, taking, capturing, killing, or attempting to do the same, apply only to actions directed at migratory birds, their nests, or their eggs” and thus not to incidental take⁴. Meanwhile, a group of Congressional Representatives has drafted a bill “To amend the Migratory Bird Treaty Act to

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A Matter of Interpretation: Wildlife Law Enforcement and the U.S. Migratory Bird Treaty Act

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affirm that the Migratory Bird Treaty Act's prohibition on the unauthorized take or killing of migratory birds includes incidental take by commercial activities, and

to direct the United States Fish and Wildlife Service to regulate such incidental take..."

As long as uncertainty remains

concerning the legal interpretation of the Migratory Bird Treaty Act, it is unlikely that any enforcement actions related to incidental take will be taken.

1 Haney, J.C, H. Geiger, and J.W. Short. 2014. Bird mortality from the Deepwater Horizon oil spill. II. Carcass sampling and exposure probability in the coastal Gulf of Mexico. *Marine Ecology Progress Series* 513: 239-252.

https://www.researchgate.net/publication/278196709_Bird_mortality_from_the_Deepwater_Horizon_oil_spill_II_Carcass_sampling_and_exposure_probability_in_the_coastal_Gulf_of_Mexico

2 Trail, P.W. 2006. Avian mortality at oil pits in the United States: a review of the problem and efforts for its solution. *Environmental Management* 38: 532-544.

https://www.researchgate.net/publication/6805311_Avian_Mortality_at_Oil_Pits_in_the_United_States_A_Review_of_the_Problem_and_Efforts_for_Its_Solution

3 Caproni, V. Judge, U.S. District Court, 2nd Circuit. Decision in Plaintiffs vs. U.S. Department of the Interior, August 11, 2020.

<https://www.courthousenews.com/wp-content/uploads/2020/08/mockinbirds.pdf>

4 Federal Register 86 (4): 1134 -1165 (January 7, 2021). Regulations Governing Take of Migratory Birds.

<https://www.huntonnickelreportblog.com/wp-content/uploads/sites/30/2021/01/Final-MBTA-Rule-Jan-7-2021.pdf>

The findings and conclusions in this article are those of the author and do not necessarily represent the views of the U. S. Fish and Wildlife Service.

Meet the Board: Ed Espinoza

What's your current position?

I am a chemist who oversees the Criminalistics Section at the National Fish and Wildlife Forensic Laboratory, in the US.

How long have you been in this position?

Since 1995.

Can you give me a brief overview of what it is you do in your work?

As a chemist I am focused in using chemical approaches to the analysis of biological macro-molecules. But the real reason the Lab has a chemistry section is that when the evidence type is difficult to analyze non-destructively by genetics, or impossible to reach a conclusion with morphology, then we explore if chemistry can assist. Examples include timber, ivory, black coral, sea turtle scutes, etc.

Tell me how you first got involved in Wildlife Forensics?

I got hired when I finished grad school for what I thought was going to be a 1-year stint. But the work turned out too exciting and... I am still here.

What was your first impression of Wildlife Forensics?

Back in 1989, wildlife forensic was at its infancy. There had been a few Labs that performed wildlife forensic analysis as part-time tasks in addition to other duties, but there were no "full time" labs focused only in wildlife forensic. Therefore, there were no protocols, no guidelines, no best practices, no proficiency testing... those were the days.

What has surprised you most about working with Wildlife Forensics?

The diversity of the questions and the difficulty associated with apparently simple questions. For example, I remember an investigator asking "where did this elephant ivory come from" when we did not even know if the item was ivory.

What do you find most challenging about Wildlife Forensics?

The nature and type of evidence in wildlife forensic. For example any college biology Lab can use mtDNA to determine the species source of a bloody tissue, but its 100 times more difficult to determine the species source of a \$100,000.00 libation cup from the 18th century suspected of being rhinoceros, but the subject declares it to be bovid keratin. How much destructive analysis can you afford before you get the correct answer?

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Meet the Board: Ed Espinoza

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

Two things: 1) the conservation outcome keeps me focused on the big picture. Many times the success of a single prosecution can discourage the bad guys and protect the taxa; 2) the science questions are challenging yet fun for a science researcher.

What were you doing before you began your current position?

I was teaching forensic science at two different universities: UC Berkeley and Sacramento State University, which really meant I wasn't good enough to work full time at either one.

Tell me about some of the people you've met while working in Wildlife Forensics?

First and foremost, I have met the most dedicated wildlife officers anyone can imagine, many of them in circumstances that endanger their lives and the lives of their families. Officers in the US, Canada, Mexico, Kenya, Botswana, Namibia, Uganda, South Africa, Tanzania, Malawi, China, Taiwan, Chile, Colombia, Peru, etc, to name a few. They are the front line in the conservation battle, that in each case, their commitment and life goal is to be stewards of the natural resources under their responsibility. I have also met many species – specific personalities who are able to elevate their focused species concerns at a global level, such as CITES, etc.

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

Kan Goddard, the director of the National Fish and Wildlife Forensic Lab because he hired me.

Where did you grow up?

Temuco, Chile.

What was it like to grow up there?

This is a story best served with a pint.

Did you go to college?

Yes.

If so, where did you go, and what was that like?

I have an undergraduate degree in Medical Technology and a master and doctorate degree in Forensic Chemistry from the University of California, Berkeley Campus (commonly known as UC Berkeley).

What might someone be surprised to know about you?

That my name is Edgard (not Ed). That I have been involved in three airplane accidents and 1 ship floundering, and still survived.

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

This is absolutely awesome news!!!! IMHO, I believe the interest is a natural consequence of the global awareness that the species our grandparents grew up with are slowly disappearing, and if nothing is done, our grandchildren will learn of extinct taxa by looking at them in

books, the way we look at pictures of mammoths and mastodons.

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

It's tough to find a job, because there are very few Labs that perform wildlife forensic analysis as 100% of their duties. But the key to get a wildlife forensic job is to have a skill set that can be applied at the bench.

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

-Worldwide capacity to analyze wildlife evidence will keep increasing, since genetic techniques can be low cost and implemented in low tech labs.

-Since organized crime commingles illicit trade with wildlife, there is a new focus on wildlife crime in order to disrupt illegal trade.

How would you describe yourself?

As an old chemist who loves the energy and enthusiasm of young scientists.

What do you do when you aren't working?

Still skiing, rock climbing, mountain biking, hiking and drinking a pint... or two.

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

Exploring the limits of ambient ionization for mass spectrometry and determine if chemotype signatures can reveal epigenetic influences.

LC/UV Spectral Method to Identify the Manufacturer of a Pesticide Formulation or Show that it is a Forgery

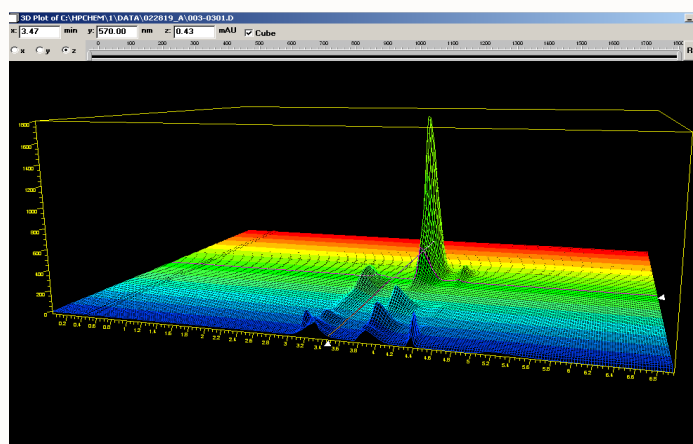
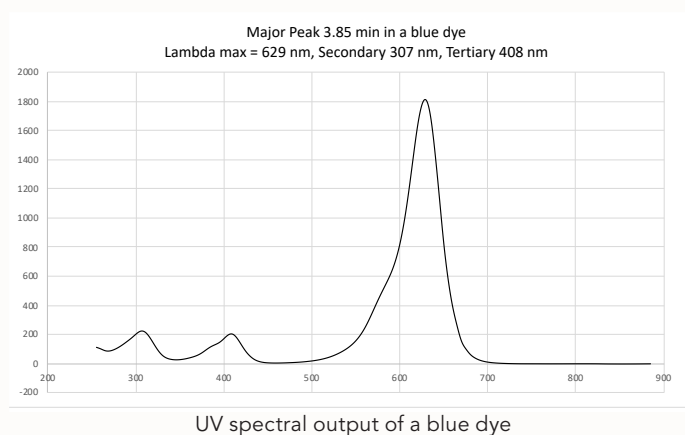
Author: Stephen Donovan

Our laboratory has been providing free LC/MS/MS analysis to identify the pesticides used to kill wildlife in Southern Africa. We would like to extend this effort by being able to identify the manufacturer of the pesticide or determining if the pesticide formulation used is a forgery. It is hoped that by improving the product stewardship of toxic pesticides that their illicit use to poison wildlife can be reduced.

As you may know, there are many counterfeit samples of legitimate pesticides being sold in Africa. An agrochemical manufacturer cannot carry out its due diligence of good product stewardship effectively without knowing that a sample is theirs or a forgery. With rampant pesticide forgeries, governments cannot address adherence to its laws by the manufacturer of a pesticide without clear indication that the manufacturer actually made that pesticide. This is a win-win situation for responsible agrochemical manufacturers, they get bad public relation press when poisonings are attributed to them, when it might be due to a counterfeit pesticide. If it is shown to be their product, they can take measures to improve their product stewardship. There is no general laboratory method available for this task that I am aware of that can be used in this effort.

As some of you may be aware, the coloured dye used in solid pesticide formulations is unique to each manufacturer, having its own chemical fingerprint, so to speak. This information can be used to unambiguously link a pesticide sample found in field-gathered evidence to a particular manufacturer, or show that it is a forgery.

Our team at The Center for Forensic Science Research & Education (Pennsylvania, USA) would like to build a LC/UV spectral library to characterize dyes used in coloured solid pesticide formulations including: Furadan 3G, 3GR, 5G or 5GR (carbofuran, purple), Marshal 5G or 5GR (carbosulfan, pink), Temik 15G (aldicarb, dark grey-black), and any other coloured solid formulations of carbamates or any colored solid formulations of organophosphate (OP) formulations in use in Africa. We have developed a method to generate the UV/LC spectral data, and now only need formulation samples to build the UV/LC spectral library.



We need a very small amount of each coloured formulation for the LC/UV spectral analysis, (less than a gram), along with a photo of the product label showing the lot number. We have identified and will be conforming to the legal requirements for sending small samples of pesticides (one gram or less) to the United States as covered under the de minimis requirements.

We are contacting the manufacturers, and some agricultural schools in the United States for samples. We also want to get samples from people in the field. Regarding duplicate samples, we would be quite happy to have 5 different samples of the same formulation, they would likely have different lot numbers, years of manufacture, etc. Then by looking at the LC/UV spectra profiles, we can see what normal legitimate sample looks like, and then when a counterfeit sample comes through, it will be obvious, and we can then make a determination with a high degree of confidence.

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LC/UV Spectral Method to Identify the Manufacturer of a Pesticide Formulation or Show that it is a Forgery

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This LC/UV spectral method will generate authoritative actionable information to help better address the poisoning problem. Once this method is established and published, we plan on making the LC/UV spectral profiles available online for anyone to use.

If anyone is aware of any similar UV spectral characterization of dyes used in coloured pesticide formulations that is published or currently being carried out, please let us know.

If you can send us 1 gram samples of formulations, or know of someone who can, please get in touch with us for detailed information for shipping such samples.

If necessary, we can cover the cost of shipping the samples.

A link to our webpage on Southern African Wildlife Poisoning can be found at: <https://www.forensicscienceeducation.org/forensic-research/toxicology/africanwildlife/>

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Fifth annual meeting of the African Wildlife Forensics Network

Author: Armand A. Biko'o, Coordinator of the African Wildlife Forensics Network

The African Wildlife Forensics Network (AWFN) held its fifth annual meeting in October 2020, online via Zoom due to the COVID-19 pandemic. The meeting was organized by the TRACE Wildlife Forensics Network, the South African National Biodiversity Institute (SANBI), the United Nations Office on Drugs and Crime (UNODC) and the Netherlands Forensic Institute (NFI), with the support of the United States Agency for International Development (USAID) VukaNow program, the European Union, TRAFFIC and the UK People's Postcode Lottery Project. The meeting aimed to update members of the network on its activities since the 2019 Livingstone meeting, provide members with a networking opportunity, follow up on the current status of agreed network activities and provide members with a platform for sharing knowledge. The meeting spanned a four-day period comprised of four



Selected participants' photo during the 2020 AWFN meeting

90–120-minute sessions.

The first day of the meeting was a plenary session, open only to members of the network and a few guests. It was attended by 61 participants from 17 countries (Picture 1). A review of activities since the last meeting was given, followed by two keynote presentations.

Mr. Edward Phiri, the Director of Lusaka Agreement Task Force (LATF), delivered the first keynote presentation on the Lusaka Agreement, a regional multilateral environmental agreement that promotes law enforcement cooperation in combating illegal trade in wild fauna and flora in Africa. LATF's overall aim is to reduce and ultimately eliminate

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Fifth annual meeting of the African Wildlife Forensics Network

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the illegal trade in wild flora and fauna in Africa. More information on LATF can be found at: www.lusakaagreement.org.

Ms Aissatou Boubacar Diallo, UNODC, who has been involved in setting up the West African Forensics Network (WAFNet) presented about their experiences, challenges and lessons learned. The priority of WAFNet is to address the systematic problems faced by forensic services in West Africa and to propose realistic and sustainable solutions to decision-makers.

The day ended with an interactive session facilitated by Dr Rob Ogden (TRACE). He explored the impact of the COVID-19 pandemic on the professional lives of the AWFN members and ways to adapt to challenges and opportunities posed by new working realities. This session used polls to get feedback from participants, which helped to understand each other's situations and use this information to design future capacity building and training opportunities.

The wildlife forensic video pitch session was held on day 2 and was attended by 63 participants from 18 countries. The session hosts were Prof. Antoinette Kotze from SANBI and Dr Stephanie Pietsch from TRACE (Picture 2). This 90-minute session was aimed at providing a relaxed networking atmosphere and encouraging lively and active participant interactions. AWFN members were requested



Hosts of this Session



Prof Antoinette Kotze

Director Foundational Research & Services
South African National Biodiversity Institute (SANBI)
South Africa



Dr Stephanie Pietsch

Southern Africa Programme Coordinator
TRACE WILDLIFE FORENSICS NETWORK (TRACE)
Germany

Hosts of the wildlife forensics video pitch session: Prof A. Kotze and Dr S. Pietsch



Video Overview



Video 1



Video 2



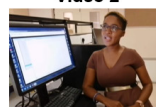
Video 3



Video 4



Video 5



Video 6



Video 7



Video 8



Video 9



Video 10



Video 11



Video 12

Overview of the twelve videos received for the wildlife forensics video pitch session

to produce an amateur video of their experience with wildlife crime cases that will enthuse their AWFN colleagues. Twelve amazing videos were received (Picture 3) from Namibia, South Africa, Botswana, Zimbabwe, Senegal, USA, UK and the Netherlands. After watching the videos, a live Zoom voting poll was organised to identify the most creative, informative, innovative and entertaining video pitch. The

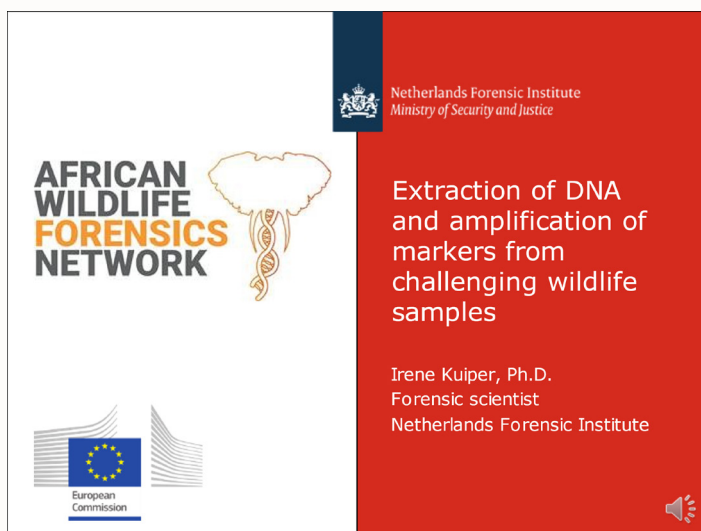
video pitch of Ms. Marli de Bruyn, SANBI, on Scaling Pangolins was the overall winner (Picture 4). Our sincere congratulations to her with this achievement. Videos received for the wildlife forensics video pitch session.

The third day had two parallel breakout sessions for Wildlife Laboratory Analysis (WLA) and Wildlife Crime Scene Investigation

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Fifth annual meeting of the African Wildlife Forensics Network

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Opening slides of the presentations by Dr Irene Kuiper (NFI) and Ms Marli de Bruyn (SANBI) during the WLA breakout session

(WCSI). In the WLA session, discussions centred on two key issues: (1) Forensic report writing and (2) DNA Extraction from challenging exhibits and marker amplification.

Ms Marli de Bruyn, SANBI, presented on forensic report writing using the established procedures in South Africa as an example. Dr Irene Kuiper, NFI, thereafter presented on the extraction of DNA and amplification of markers from challenging wildlife samples (Picture 5). The presentation emphasized key aspects of DNA extraction and included examples of challenging wildlife samples and troubleshooting for DNA extraction. The session delivered on active learning and sharing of practical lab experiences. WLA practitioners from other African forensics laboratories shared additional challenges that they experience with wildlife samples.

The WCSI breakout session was

divided into two parts. The first part focussed on two case studies from Malawi and eSwatini where successful prosecutions of wildlife crimes have been recorded recently. The second part focussed on WCSI training assessment. Mr Rod Potter presented on WCSI assessment from the perspective of a trainer, followed by a presentation from Mr Boris Vos on training assessment from an organisational perspective. Following these two presentations, Mr Marcel van Beest, NFI, gave a presentation on the results of a previously circulated questionnaire to determine the AWFN members' perception of training assessment and content. Finally, there was an extensive discussion on how the AWFN can help implement standardised assessment of wildlife crime scene investigation training across Africa, particularly for first responders.

The last day of the meeting was an open webinar designed to give our external stakeholders an

introduction to the network. A full video of the webinar can be viewed on YouTube [here](#). This open webinar had 4 sessions of 2-3 presentations each, followed by a Q&A session. AWFN members presented about their work in wildlife forensics and their involvement with the Network.

The network is expanding geographically in Africa with increasing levels of engagement, coordination and, importantly, impact. The annual AWFN meeting is a cornerstone of the network's activities and this 2020 online meeting was considered a great success with lots of fruitful discussions and knowledge sharing, despite the lack of face-to-face encounters. Overall, the aims of the meeting were met and, in many instances, exceeded. We look forward to the AWFN 2021 annual meeting, being planned for November, when we hope to meet in person!

SWFS Technical Working Group Update: New TWG members and resources!

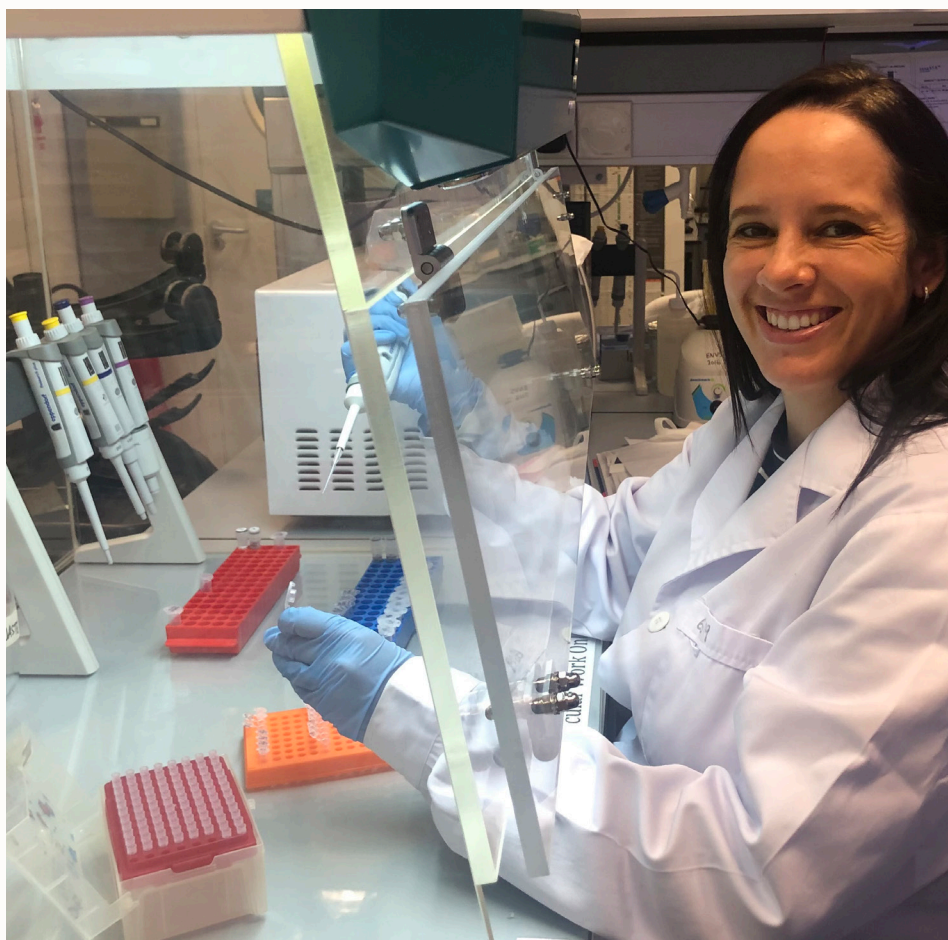
Authors: Lucy Webster and Kelly Morgan

Since the last SWFS newsletter we have recruited TWO new members to the SWFS Technical Working Group. A big welcome to Greta Frankham from the Australian Museum in Sydney and also Tracey Prigge from the University of Hong Kong. They both bring experience in DNA analysis and additional expertise in morphology and stable-isotopes respectively to our team, as well as representation from two more countries! The TWG is now at full capacity but should other openings arise we will advertise vacancies here in the newsletter. One of the main requests from our

last member-requirements survey was that the SWFS Standards and Guidelines be made available in other languages. We are very grateful to Armand Biko'o and Arame Ndiaye for carrying out the translation into French, to Hannah Du and Daniel Xu for carrying out the translation into Mandarin and to Ed Espinoza for translating into Spanish. These three translations are available on the SWFS website in the "Resources" section. Look out for more languages coming soon! We have also been working on an update of the SWFS Quality Manual Template – to take into



Greta Frankham



Tracey Prigge

account changes to "ISO /IEC 17025:2017, General requirements for the competence of testing and calibration laboratories" as well as version 3 of the Standards and Guidelines. This Quality Manual Template is available to SWFS members – please get in touch if you would like to receive a copy.

We are working on several other guidance documents for members, relating to conclusion statements, using BOLD for species identification, and Biosafety. This year we will continue to meet online to progress these activities and support preparations for our next SWFS meeting. In the meantime, stay safe and if you have any queries or suggestions for the TWG let us know (Kelly Morgan, TWG Co-ordinator - kellyirene26@gmail.com).

Wood Identification & Screening Center Relocates to Oregon State University in Corvallis

Author: Beth Lebow, Kristen Finch, Cady Lancaster, Erin McClure-Price

As part of its global program to combat illegal logging and associated trade, The US Forest Service International Program's Wood Identification & Screening Center (WISC) supports Lacey Act enforcement by providing wood identification services to the US government, conducting trainings in wood identification, and furthering wood identification technologies to be most efficient for meeting law enforcement needs. WISC began in 2017 as a partnership with the National Fish and Wildlife Forensic Lab (NFWFL) in Ashland, Oregon. In May 2020, WISC expanded

and moved to Corvallis, Oregon as a partnership with Oregon State University's College of Forestry in the Department of Wood Science and Engineering.

With an expanded team, the new location within OSU's College of Forestry, is now fully operational to conduct wood species identification using Direct Analysis in Real Time-Time of Flight Mass Spectrometry (DART-TOFMS). WISC also uses a Video Spectral Comparator for high resolution wood imaging and wood fluorescence to complement DART-TOFMS for species ID.

WISC offers wood identification

services free of charge to US government law enforcement colleagues for Lacey Act and CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora) enforcement, as well as fee-for-service exams for non-government and private sector partners. To inquire about wood ID services, please contact WISC Director Beth Lebow at elizabeth.lebow@usda.gov.



The WISC team with the newly installed JEOL AccuTOF-Direct Analysis in Real Time (DART) 4G. From left: Beth Lebow, Erin McClure-Price, Kristen Finch, and Cady Lancaster

Surrender Your Shell: Helping the Hawksbill Turtle

Author: Greta Frankham, Australian Museum and Michael Jensen, WWF

Tortoiseshell from Hawksbill turtles (*Eretmochelys imbricate*) has been used to create decorative and functional ornaments for thousands of years. Over the last 150 years, it is estimated that nearly 9 million Hawksbill turtles have been harvested for the tortoiseshell trade. Even with their listing on CITES Appendix I in 1977 poaching has continued, and in just the last few years several large confiscations of Hawksbill turtles have occurred in a number of south-east Asian countries. In many instances, the scutes are turned into souvenirs and sold at tourist markets where the general public is often unaware that the tortoiseshell they buy was made from critically endangered sea turtles.

To raise public awareness of the plight of Hawksbill turtles and to generate valuable scientific data aimed at better understanding the tortoiseshell trade, WWF-Australia has partnered with the Australian Centre for Wildlife Genomics at the Australian Museum and Royal Caribbean International on the Surrender Your Shell and ShellBank programs.

The World Wildlife Fund for Nature (WWF) established the ShellBank database as part of their Marine Turtle Use and Trade in Asia-Pacific Initiative to improve the tracing of turtle trade from sale to source. The ShellBank database includes genetic samples from Hawksbill turtle nesting sites across



Tortoiseshell earrings, copyright Christine Hof, WWF

the species distribution and aims to build a baseline understanding of genetic diversity and stock structure. To date, this includes samples from more than 20 rookeries, across 10 countries with additional samples currently being collected and analyzed. Mitochondrial Control Region haplotypes generated from this database demonstrate that the natal homing behavior of Hawksbill turtles to return to the regions that they hatched from to mate and breed has generated phylogeographic structure similar to that seen in other sea turtles and thus can be used to identify source region of illegally traded tortoiseshell.

To this end, Surrender Your Shell was launched supported by the Australian Government who have

adopted a policy for a six month period that tortoiseshell products surrendered by Australian residents to WWF-Australia will not be subjected to compliance action under the Environment Protection and Biodiversity Conservation Act 1999, the legislation under which CITES listed species are protected in Australia. Surrendering items is done so via an online form and questionnaire which aims to gather as much detail about how the item was acquired (date, location etc.). Packing and postage instructions are provided, and postage for the first 100 surrendered items is being supported by WWF-Australia.

Surrendered items are curated by WWF-Australia and tortoiseshell items are sent to the Australian

Surrender Your Shell: Helping the Hawksbill Turtle

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Centre for Wildlife Genomics at the Australian Museum for DNA extraction and sequencing, using methods optimized by WWF and NOAA (LaCasella et al. in press). Control region haplotype data will be compared to the ShellBank database to determine the source region of the surrendered items and build a better understanding of Hawksbill populations targeted by the illegal wildlife trade.

Surrender Your Shell is a rare example of collaboration between

non-government, private and scientific sectors with government support to improve the conservation outcomes of a critically endangered species impacted by the illegal wildlife trade. This project will generate valuable scientific data through public engagement and a citizen science approach. The project model could be replicated across the Asia-Pacific and globally to build a network of countries contributing to this database to further develop its utility as a conservation management and wildlife forensic tool.



Hawksbill turtle, copyright Jürgen Freund, WWF

Classifieds & Notices

An opportunity to list courses, opportunities and notices relevant wildlife forensic science. Please contact the newsletter editors to include a listing in future editions. Advertisements are for information only and do not infer endorsement by SWFS.



JOURNAL OF VETERINARY FORENSIC SCIENCES

Research and analysis of wild and domestic species

The Journal of Veterinary Forensic Sciences (JVFS) is an open access journal focusing on the application of forensic science and medicine to the investigation of animal crime. It was incorporated by a group of internationally recognized forensic scientists who felt that there was a need for a publication specifically devoted to forensic science as applied to domestic animals, livestock and wildlife. The journal publishes peer-reviewed articles in an online, open-access format on the principle that making research freely available to the public supports a greater global exchange

of knowledge. The JVFS will accept manuscript submissions in the areas of original research, case analysis, investigations, industry standards and guidelines, technical notes, book reviews, and opinion articles. It is free to submit abstracts.

JVFS is currently in the process of reviewing submitted abstracts for its third issue. It also welcomes new reviewers. Register to be a reviewer or submit your article on the website: <http://jvfs.net/>.

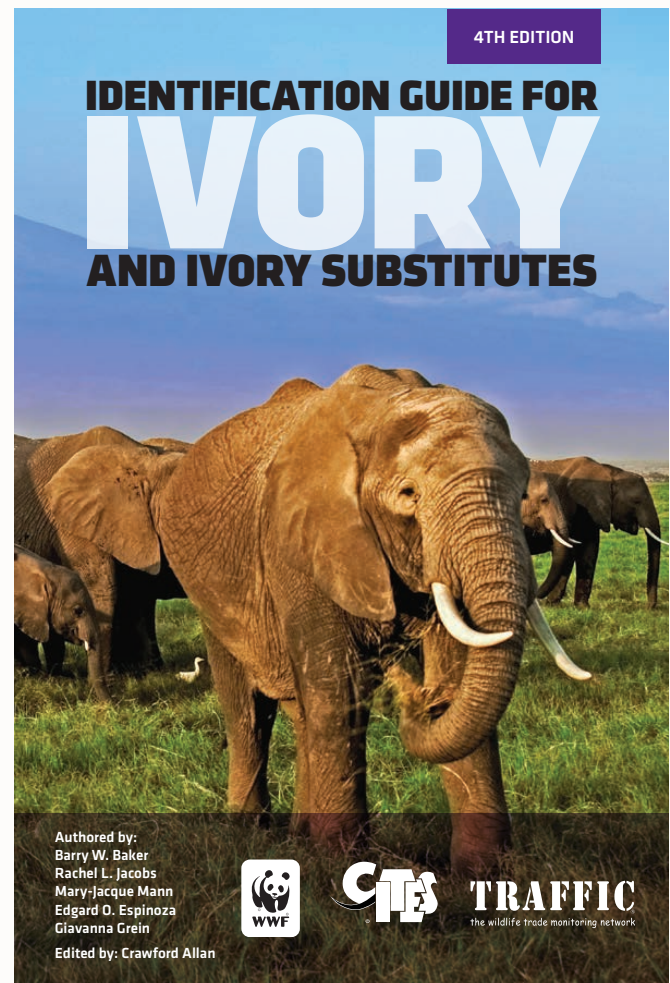
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Classifieds & Notices

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The 4th edition of the Identification Guide For Ivory and Ivory Substitutes has been released recently, co-authored by SWFS members. You can find the latest edition here, complete with full-colour examples of ivory and substitute exhibits:

https://cites.org/sites/default/files/ID_Manuals/R8_IvoryGuide_07162020_low-res.pdf



Where to from now? This has never been more relevant so mark the postponed date in your diaries and start planning for a trip of a life time to Sydney.

<https://iafs2023.com.au/>



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 July 2020 to January 2021. We aren't commenting on their quality or advocating their application, hopefully you will have your 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:

Acosta-Dacal, Andrea; Rial-Berriel, Cristian; Diaz-Diaz, Ricardo; et al. 2021. "Optimization and validation of a QuEChERS-based method for the simultaneous environmental monitoring of 218 pesticide residues in clay loam soil" *SCIENCE OF THE TOTAL ENVIRONMENT*, 753

Price, Erin; Larrabure, Dominique; Gonzales, Benito; et al. 2020. "Forensic identification of the keratin fibers of South American camelids by ambient ionization mass spectrometry: Vicuna, alpaca and guanaco" *RAPID COMMUNICATIONS IN MASS SPECTROMETRY*, 34(23)

Frank, Krisztian; Bana, Nora a.; Bleier, Norbert; et al. 2020. "Mining the red deer genome (CerElai1.0) to develop X-and Y-chromosome-linked STR markers" *PLOS ONE*, 15(11)

Psonis, Nikolaos; de Carvalho, Carlos Neto; Figueiredo, Silverio; et al. 2020. "Molecular identification and geographic origin of a post-Medieval elephant finding from southwestern Portugal using high-throughput sequencing" *SCIENTIFIC REPORTS* 10(1)

Andrade-Herrera, Kepler N.; Mello-Patiu, Catia A.; Nunez-Vazquez, Carolina; et al. 2020. "Flesh Flies (Diptera: Sarcophagidae) Attracted to a Snake Carcass (Boa constrictor) in Yucatan Peninsula, Mexico" *JOURNAL OF MEDICAL ENTOMOLOGY*, 57(6):2011-2015

Halbwax, Michel, 2020. "Addressing the illegal wildlife trade in the European Union as a public health issue to draw decision makers attention" *BIOLOGICAL CONSERVATION*, 251

Valverde, Irene; Espin, Silvia; Maria-Mojica, Pedro; et al. 2020. "Protocol to classify the stages of carcass decomposition and estimate the time of death in small-size raptors" *EUROPEAN JOURNAL OF WILDLIFE RESEARCH*, 66(6)

Suwanchatree, Nitchakamon; Thanakiatkrai, Phuvadol; Linacre, Adrian; et al. 2020. "Discrimination of highly degraded, aged Asian and African elephant ivory using denaturing gradient gel electrophoresis (DGGE)" *INTERNATIONAL JOURNAL OF LEGAL MEDICINE*, 135(1):107-115

Amorim, Antonio; Pereira, Filipe; Alves, Cintia; et al. 2020. "Species assignment in forensics and the challenge of hybrids" *FORENSIC SCIENCE INTERNATIONAL-GENETICS*, 48

Ushine, Nana; Tanaka, Aki; Hayama, Shin-ichi, 2020. "Investigation of causes of death in wildlife using veterinary molecular and wound analysis methods" *JOURNAL OF VETERINARY MEDICAL SCIENCE*, 82(8):1173-1177

Recent publications:

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Wildlife Forensics continued:

Moorat, G.; Reed, J.; Bleay, S.; et al. 2020. "The visualisation of fingermarks on Pangolin scales using gelatine lifters" *FORENSIC SCIENCE INTERNATIONAL*, 313

Khayat, Rana O. S.; Grant, Robyn A.; Ryan, Hazel; et al. 2020 "Investigating cat predation as the cause of bat wing tears using forensic DNA analysis" *ECOLOGY AND EVOLUTION*, 10(15):8368-8378

Kanokwongnuwut, Piyamas; Kirkbride, K. Paul; Linacre, Adrian, 2020. "Detecting latent DNA in wildlife forensic science investigations" *SCIENCE & JUSTICE*, 60(4):358-362

Olaleru, F.; Olugbebi, T. R.; Fasona, M. I., 2020. "Morphological Studies on the Guard Hair of the Mona Monkey (*Cercopithecus mona*) in Omo-Shasha-Oluwa Forest Reserves of Southwest Nigeria" *Egyptian Academic Journal of Biological Sciences B Zoology*, 12(2):15-23

Fish Forensics:

Ma, Haitao; Gao, Hongmei; Zhang, Yang; et al. 2021. "Multiplex species-specific PCR identification of native giant clams in the South China Sea: A useful tool for application in giant clam stock management and forensic identification" *AQUACULTURE*, 531

O'Bryhim, Jason R.; Parsons, E. C. M.; Lance, Stacey L. 2021. "Forensic species identification of elasmobranchs landed in Costa Rican artisanal fisheries" *FISHERIES RESEARCH*, 233

Timber Forensics:

Carmona, Rene J.; Wiemann, Michael C.; Baas, Pieter; et al. 2020. "Forensic identification of CITES Appendix I Cupressaceae using anatomy and mass spectrometry" *IAWA JOURNAL*, 41(4):720-739

Roman, Madeline G.; Gangitano, David; Figueroa, Alejandra; et al. 2020. "Use of Eucalyptus DNA profiling in a case of illegal logging" *SCIENCE & JUSTICE*, 60(6):487-494