

Inside this edition: Freshwater Eel Test / African Wildlife Forensics / Denver Recap / Wildlife Poisoning

### Researching the Development of Wildlife Forensic Science

I research efforts to address commercial poaching and wildlife trafficking, largely in source countries in southern Africa. Most of my research time is spent in the rhino and elephant poaching hotspots in Mozambique and South Africa where I have regularly spent time since 2012 to research these commercial poaching economies and the efforts to address them.

For my research I have lived with rangers and frontline conservation law enforcement personnel to understand the day to day realities of anti-poaching, law enforcement efforts and related challenges. In a country like Mozambique that is severely under resourced and is mired with problems related to poverty, governance, law enforcement capacity, and the rule of law, stopping poaching and wildlife trafficking is no easy task. It was only in 2014 that illegal hunting of rhino and other species, for example, being codified in law as a crime. At the same time, Mozambique created a new environmental police force to specifically take charge of conservation and environment related

#### Francis Massé (PhD), University of Sheffield

law enforcement. This has been followed by a suite of training and capacity building work with police, criminal investigators, prosecutors and judges to effectively apply new wildlife-related law aimed at tackling poaching and wildlife trafficking. We also see customs officials at ports of entry and exit trained on detecting wildlife and wildlife products. While not perfect and with a lot of work to do, these initiatives are all part of developing and strengthening wildlife and conservation law enforcement along the enforcement or supply chain of illegal wildlife trafficking.

Wildlife forensics is an increasingly important part of the enforcement chain and suite of practices and knowledge used by law enforcement. From laboratories to frontline customs and law enforcement to expert testimony in the court room, wildlife forensics is part of an ever-growing array of spaces, actors, and institutions that biodiversity conservation increasingly intersects with. I'm conducting research on the topic, and especially how wildlife forensics is developing and

### Welcome from the SWFS President

Dear SWFS Members,

Welcome to the Eighth edition of the SWFS Newletter.

First things first, I would like to recognize and thank Rob Ogden for his successful reign as SWFS President for the last four years. He skillfully helped shape many of the programs the society has to offer today, including the small grants application and the student mentor program. He has also spent many hours building relationship with the wildlife forensic science community and growing our membership.

I would also like recognize Brandt Cassidy, Dyan Straughan, Dianne Gleeson, Mary Burnham Curtis and Christina Lindquist for the dedication, involvement and expertise they brought to the SWFS board over the last several years. Thank you for the role you played on the SWFS board. This is the first significant board turnover that comes from the new policy of fixed term board appointment. We would like to introduce you to the new SWFS Board members. Please read on page 17 the SWFS Board Composition for 2019-2021.

For those of you who do not know me I am the Forensic Program Manager for the Wyoming Game and Fish Wildlife Forensic Laboratory and the new SWFS President. I have been a member of the Society since its inception in 2009 and have served in several Board positions. I look forward to this new challenge and I look forward to meeting many of you over the next four years.

We just wrapped up the 5th SWFS one-week scientific meeting in Denver, Colorado this past June. The conference was a roaring success which I invite you to read about on page .... The Denver Organizing Committee deserves a pat on the back for organizing a wonderful meeting. Please recognize; Rob Ogden, Dee Dee Hawk, Kim Frazier, Trey Knott, Lucy Webster and Adrian Linacre. The announcement of the 2021 meeting was made at the Denver meeting.



Officers 2019-2021 President: Tasha Bauman Past President: Rob Ogden Treasurer: Dee Dee Hawk Secretary: Nadja Morf

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### Welcome from the SWFS President

SWFS will be hosting the next conference at the Skukuza Rest Camp in Kruger National Park, Skukuza South Africa in June of 2021. Professor Antoinette Kotze of the South African National Biodiversity Institute (SANBI) has volunteered her laboratory to help host the meeting. The exact dates of the 2021 conference will be announced in 2020, however we currently expect it to be held around the second week in June of 2021.

The SWFS board has recently discussed several changes to the by-laws. The major changes that are currently under review are under the section 5.10: Vice Presidents. With the composition of the board changing there is a need for these roles to change as well. This position will be split into two separate roles. One Past-President that will serve a two-year term and one President-Elect that will serve a two-year term before ascending into the President role. The by-law changes are in their infancy at this time, they will be distributed for a vote later this year.

We've received the sad news the Hector Cruz-Lopez passed away in August. Hector was a great supporter of SWFS. He spent a full career with Florida Fish and Wildlife Conservation Commission (FWC), as part of the Institute and in the Division of Law Enforcement, pioneering wildlife forensic techniques used in the field today. Many of you may remember Hector as quite the dancer as the leader of the conga line at the Jackson Hole Banquet. His spirited involvement and devotion to wildlife will be missed.

Finally I would like to extend a vote of thanks to all of you that have contributed to the SWFS Newsletters, as well as to the production team that puts this wonderful work together.

Best wishes

Tasha Bauman

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### **Researching the Development of Wildlife Forensic Science**

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being used in source countries like Gabon, Tanzania, and Vietnam, for example, where organizations like TRACE Wildlife Forensics Network and USAID fund and support the development of wildlife forensics lab and related capacity building. Indeed, the strengthening of wildlife forensics in source and transit countries is part of efforts to develop the capacity of legitimate and effective investigatory and enforcement efforts. Without legitimate investigative capacities, effort to address wildlife trafficking in southern Africa risk remaining at the level of the poacher and marred in violence, corruption, and resistance from local people. Moreover, support to forensics can help shift focus to other parts of the supply and enforcement chain that are much needed to addressing trafficking and itself.

While wildlife forensics in contexts like Sub-Saharan Africa is rather new, the field as a whole is not. It is part of a long and evolving history of efforts to conserve biodiversity and help address the illicit use and trade of flora, fauna, and their parts. This is of course, well-known to those reading this newsletter. But, wildlife forensics isn't something that much of the general public or even the conservation and law enforcement world are familiar with. This is why I attended the SWFS annual meeting and related two-day Ivory Identification workshop in June in Denver, Colorado.

The workshop was run by forensic scientists from the United States Fish and Wildlife Service (USFWS) Forensic Lab. It was attended by a variety of forensic and law enforcement personnel, among many others who wanted some training on ivory identification and a certificate of competency in the morphological identification of ivory. I learned a lot about ivory, morphological identification and the developments and applications of wildlife forensic science, a truly fascinating field.

While I remain focused on research in Southern Africa and broader research on efforts to improve wildlife and conservation law enforcement, I am also interested in the history of the ideas, practice and science of conservation law enforcement, and wildlife forensics. Apart from learning about the state of the field, a primary reason for attending the SWFS annual meeting was to speak with people about their experiences of working in wildlife forensics and related law enforcement efforts. I hope to continue with this work and speak to more people about their work and how they have experienced the changes and developments in law enforcement and wildlife forensics. This will form part of research that I am conducting for a book on the history of conservation law

enforcement, a project that has received support from the USFWS history team and archives. I very much welcome your insights as part of this research.

It is important to record the development and history of science and practice, especially from the perspective of those working in it. Forensic science is often quoted as being able to bring justice to victims of crime because it gives a voice to the victims rendered voiceless by telling their story of what happened. While I am not a forensic scientist, I hope that communicating the history of wildlife forensics and how it fits into the broader enforcement efforts of addressing wildlife crime and wildlife trafficking can contribute to overall awareness about wildlife crime and related law enforcement efforts to a broader audience.

I end with a call for participants: If anyone would like to participate in this research by speaking with me about their experiences working in wildlife forensics and/ or conservation and wildlife law enforcement, or if you would like any more information, please send me an email at <u>f.masse@sheffield.</u> <u>ac.uk</u>.



# Will one of the world's favourite foods go extinct? Development of a validated test to monitor international trade in freshwater eels.

Author: Rebecca Johnson



Kyoto University 'team unagi' LHS Murayama-sensei and Rebecca Johnson with the KU first year students.

Human populations across the world have enduring relationships with freshwater eels. First peoples from Australia and the Torres Strait caught them in specially designed traps dating back over 50,000 years, and eel bones have been found in archaeological remains in ancient Japanese sites dating back as early as the middle Joman period (approximately 5,000 years ago). Freshwater eels have a global distribution with 16 described species (plus three subspecies) of freshwater eels (genus Anguilla) [REF] however largely due to overfishing pressures freshwater eels have become increasingly endangered, including the European eel (species Anguilla Anguilla) listed for protection as under the CITES convention as appendix II in 2007.

Species from the genus Anguilla represent one of the most extensively traded fish groups for human consumption. This product is frequently transported in juvenile form (as glass eels) which can ambiguous morphological have characteristics, and most often as processed pre-packaged highly fillets, making visual identification to species impossible. This is particularly important given the European eel (A. anguilla) is CITES II listed and there is recent evidence it is still common in trade REF [Cardeñosa et al 2019].

The humble freshwater eel might seem an unlikely target for the illegal wildlife trade. However, when quantified by the number of animals trafficked, the European eel is considered to be the most highly trafficked species on the planet (it has been recently estimated that ~1/4 of the annual spawning production is illegally harvested to be grown and later sold as eel product. Thus, there is a pressing need for a robust validated DNA- based species identification test.

Together with collaborators from Australia, Japan, the United States and Scotland (Rebecca Johnson, Australian Museum: Miho Murayama, Kyoto University; Yoshinaga Tatsuki Kitasato Mary University; Burnham-Curtis USFWS and Rob Ogden, University of Edinburgh) we have commenced a project to generate both mtDNA reference data for the genus Anguilla (to enable reliable robust species identification from the type of product seen in casework) including a validated species ID test. In parallel we are also conducting a preliminary market survey for Kyoto Japan, one of the world's largest 'unagi' markets and the first ever market survey data for western Japan (unagi is the Japanese word for eel). One exciting aspect of this work was involving some first year biology students from Kyoto university who assisted with

# Will one of the world's favourite foods go extinct? Development of a validated test to monitor international trade in freshwater eels.

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some of the laboratory work and incorporated Anguilla taxonomy and conservation into their special research project led by Murayamasensei of the Wildlife Research Center at Kyoto University.

There are many previous projects that demonstrate the utility of DNA barcoding in species identification, particularly of processed fish products but our focus is to ensure there is a forensically validated test available for use in case work. Further, given the broad distribution of freshwater eels, and the endangered status of many Anguilla species, we hope the data generated will support the need for international cooperation required for management and conservation of this genus, with particular attention given to the species that are commonly observed in commercial trade so that their sustainability can be understood and managed.

The resultant reference dataset that will be made available to SWFS members. We encourage any SWFS members to reach out to us if this if this is work or these data are of interest or relevance to your work.



Some of the market survey 'unagi' samples and information included on label for sale

Author: Rob Ogden

### Interpol promotes wildlife forensic science

Interpol headquarters in Lyon, France, hosted the 19th International Forensic Science Managers Symposium in October 2019, with wildlife forensics featured at the three-day event through a dedicated themed-session on the first day. Chaired by Prof Niamh NicDaéid of Dundee University, UK and Dr Paul Ludik of the Namibian National Forensic Science Institute, the session was led-off by Rob Ogden (TRACE) who gave an introductory paper on wildlife forensics, SWFS and the role of non-human biological identification to help combat the illegal wildlife trade. The Symposium then heard from Ken Goddard, Director of the US National Forensics Laboratory of the Fish and Wildlife Service, who described US support for wildlife forensics on Africa; Rodrigo Mayrink from the Federal Police in Brazil, who presented work on environmental forensics; and Henri Fournel, the Interpol lead on wildlife crime who explained their perspectives on the role of forensics in investigating wildlife crime globally.

The International Forensic Science Managers Symposium is held at Interpol every three years, covering all aspects of forensic science; the decision to dedicate half a day of their three-day event to wildlife forensics should be viewed as a very encouraging demonstration of how our field is now recognised within mainstream global forensic science.



### **African Wildlife Forensics Flourishing**



November saw the annual gathering of wildlife forensic scientists and crime scene practitioners from across Africa, at the 4th African Wildlife Forensics Network meeting. This year the event was hosted by the Zambian Department of National Parks and Wildlife at the Avani Hotel in Livingstone, on the edge of Victoria Falls. With 54 participants from 13 different countries this was the largest meeting to date and for the first time included representatives from Senegal, Cameroon and Ethiopia.

The main meeting was set over two days, starting with a plenary session of introductions and national updates, and a number of keynote presentations. Kalipus Sem from the Namibian National Forensic Science Institute gave a talk on the use of ballistics in wildlife law enforcement and Tracy Alexander from the UK's City of London Police presented options for collecting and processing of fingermarks to support investigations. The first session also saw the launch of the UNODC Wildlife Crime Scene Guide, first planned at AWFN 2017 and developed between the 2018 and 2019 meetings. Rapidly becoming known as the 'yellow' guide, it provides a comprehensive introduction to wildlife crime scene approach, security, documentation and evidence collection.

The first afternoon saw the meeting split into two breakout groups focusing on technical discussions

#### Author: Rob Ogden

relating to laboratory analysis and crime scene investigation. Chaired by participants from Malawi, Namibia, Netherlands, South Africa, the UK and Zambia, the aim of these groups was to address current issues faced in delivering forensic evidence to support wildlife crime investigations across the continent.

In keeping with the overall aim of networking, the first day's formal sessions drew to a close early enough to head down to the Zambezi River and take a sunset cruise up river from the Falls. Cruising slowly on the African Queen, we were treated to views of elephants swimming the river, as well as spectacular birds and a beautiful sunset; all accompanied by a flow of liquid refreshments to rival that of the river. It was a great chance for everyone to mingle, share experience and make plans at the end of a very enjoyable first day. Then it was back for dinner outside at the Avani Hotel, a bit of dancing and for the very late night owls,



4th African Wildlife Forensics Network meeting

### **African Wildlife Forensics Flourishing**

even time for a midnight dip (you'll be proud to know that our SWFS president stayed the course until the very end!).

The second day began with more breakout discussions, including decisions regarding wildlife DNA evidence collection kit design and the development of an African elephant DNA profiling system. We returned to a plenary session in the afternoon for a broad conversation about the development of the Network, including the drafting of Vision and Mission statements, led by Armand Biko'o, the AWFN's new full-time coordinator.

The meeting ended with commitments to work through the updated AWFN workplan and to continue developing forensics and crime scene investigation in support of African wildlife conservation; we look forward to meeting again in 2020.







Expert testimony training group



Arame Ndiaye

Giving evidence in court is often the last thing that wildlife forensic scientists and crime scene officers consider they'll be doing when they join their professions; but as we all know, it's a crucial part of the job. So the day after the AWFN meeting a group of 15 brave volunteers took part in expert witness training provided Kevin Pretorius, a renowned South African lawyer committed to supporting the successful prosecution of wildlife crime.

Participants learned the dark arts of cross examination and evidence presentation and practiced preparing witness statements, before taking turns to deliver their testimony in a moot court, presided over by Judge Dawson-Faber of the UNODC. A fair number of painful lessons were learned, but a great deal of fun was had by all!

### Jolene Strand, SWFS Student Outreach Grant Recipient, graduates from the University of New Haven with Masters of Science in Forensic Science

#### Author: Chris O'Brien

In May 2019, Jolene Strand graduated from the University of New Haven with a Masters degree in Forensic Science and began her new career as a Wildlife DNA analyst with the state of Montana. Her thesis, titled 'Construction of A Reference Allelic Ladder for an Odocoileus STR Multiplex', was a collaborative research project between University of New Haven, USFWS Forensic Lab, California Department of Fish and Wildlife and other state and private agencies. Her research involved the determination of allelic frequencies across 13 designated Odocoileus STRs in an effort to assess which may provide an acceptable level of discrimination potential for ladder construction. Once suitable loci/alleles were chosen for this purpose, a prototype allelic ladder was constructed. By utilizing polymerase chain reaction (PCR) technology, working solutions of these loci and their corresponding alleles were constructed. Utilizing a streamlined procedure to allow for quick and effective ladder preparation, it was shown to have promise for possible future casework purposes, across several agencies. A manuscript is being created from the work to be submitted and will hopefully be used by labs that are actively working on cases that involve white-tailed deer.

This project was made possible through the SWFS Student Outreach program as it allowed Jolene to work with members of the wildlife forensic community in particular she spent the summer of 2018 at the USFWS Forensic Lab in Ashland Oregon. During her time there she worked on her Odoplex project but was also able to experience how a functioning wildlife forensic lab operates. Along with her experiences that she gained during her time in the program she was also able to obtain funding to assist in her project. This was the first time that a student was funded through the Student Outreach program. The precedent setting project will allow students to follow in her footsteps and apply for funding from the Society for projects what can have impacts on the wildlife forensic field.

Jolene worked under the supervision of David San Pietro (UNH), Brian Hamlin (USFWS), Mary Burnham Curtis (USFWS), Erin Meredith (CDFW), and R. Christopher O'Brien (UNH). We wish Jolene all the best in her new role in wildlife forensics.

The SWFS Student Outreach program is designed to engage students in meaningful research that is applicable to the field of wildlife forensic science by connecting driven students with working scientist. As a participant in the program students are able to become involved in network of scientist who are actively working on wildlife forensic issues and casework. If you are interested in joining the program please contact the Student Outreach Coordinator at swfsstudentoutreach@gmail.com.



### Meet the Board: Kathy Moore

#### What's your current position?

I am a forensic biologist with the Northwest Fisheries Science Center, which is within the US National Oceanic and Atmospheric Administration. Though my organization is based in Seattle, WA, I work in Charleston, SC.

### How long have you been in this position?

I have been doing forensic work of some kind--either casework or research and development of forensic methods--for NOAA for about 25 years. I started out in a research lab that did R & D for casework as part of their mission, but I also worked on population genetics of various marine organisms. For the last 12 years, I have been working in the Forensic Lab, with casework and case-related methods-development as my full-time job.

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

Our lab does the majority of the forensic casework for NOAA, focusing on genetics and morphology. We also work a few cases for other federal agencies when there are joint investigations, and for state game agencies when there is a significant Federal nexus. Most of our work is species identification, though we can also do geographic origin and individual matching for some taxa. Most of our cases involve suspected violations of the Magnuson-Stevens Fishery Conservation and Management the Endangered Species Act, Act, the Lacey Act, and various regulations aimed at ensuring safe and sustainable seafood.

### How did you first get involved in Wildlife Forensics?

I was hatched as a sea turtle biologist, by way of several summer internships in college. After I graduated, I ended up at the NOAA lab in Charleston, and it turned out that a lipid chemist there, Gloria Seaborn, was trying to develop a species ID method for sea turtle eggs using lipid chemistry. This was back when PCR was still making its way out of the ivory tower, and most species ID was done with isoelectric focusing (IEF). IEF worked best on fresh frozen muscle, and didn't easily translate to other tissues, like eggs. Gloria had all the chemistry knowhow, but needed the organismal piece, so I started working for her, and we got to where we could ID most sea turtle species from egg lipids, but certain species weren't very well separated. After the lab down the hall started working with DNA, I transferred there to develop a DNA based method, which would work for eggs as well as cooked and raw meat. I also got my MS working in that lab, on paternity in loggerhead sea turtles.

### What was your first impression of Wildlife Forensics?

That it was the coolest job ever!

#### What has surprised you most about working with Wildlife Forensics?

Decades later, it still isn't routine. I am never bored! I am also amazed at what people will eat or decorate their house with. Honestly, elephant foot stools are ugly, and whale sushi is gross.

### What do you find most challenging about Wildlife Forensics?

developing Constantly new databases! In recent years, we have started seeing a lot of seafood species that fall under NOAA's Seafood Import Monitoring Program (SIMP). Before SIMP, we saw mostly high-dollar species like tuna and salmon, and they are wellcharacterized. Now, we're seeing whiskered velvet shrimp, rohu, painted sweetlips, and a bunch of things with no English common Assembling name. databases and learning the phylogeny and biogeography of new taxa is very time-consuming.

#### What would you say most motivates you to do what you do? Every day I come to work, it's my drop in the bucket for the environment. I believe in protection of species in peril, and support

## sustainable seafood.

### What were you doing before you began your current position?

I've spent my whole career at NOAA. Before I started doing forensic work, I spent a short stint researching the biotoxins associated with harmful algal blooms.

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

Well, the SWFS community is pretty small, and I don't think there are ever more than two degrees of separation between any two SWFS members, so I'm sure the readership knows who I know in that community. Which is great-we all get along so well, and support

### Meet the Board: Kathy Moore

#### each others' work. Outside of my lab, the other folks I work with a lot are the NOAA Special Agents and Enforcement Officers. They are a sharp and dedicated group, and I really enjoy working with them.

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

Well, I've talked about my second boss at NOAA, Gloria Seaborn. I didn't even know Wildlife Forensics was a thing before I worked with her. Another major influence was Ann Colbert. She was the first full-time forensics person at the Charleston lab, and elevated forensic work from a part-time ad-hoc duty to a real program. Ann went on the FBI after she left NOAA, but we're still friends to this day.

#### Where did you grow up?

Spartanburg, SC

### What was it like to grow up in Spartanburg?

Boring. Those of us who grew up there call it "Sparkle City", or (my favorite) "Importantburg", because it's not. But my family always vacationed at the beach, either Garden City Beach or Hunting Island, SC. My family says I imprinted on the beach as a child.

#### Did you go to college?

Yes, I went to Smith College in Northampton, MA.

### Where did you go, and what was that like?

It was cold, snowy, and much more liberal than Spartanburg,

SC. Spartanburg is pretty much the buckle of the Bible Belt, and I wanted to go somewhere else! I loved my time at Smith, but needed warmer weather after I graduated.

### What might someone be surprised to know about you?

I used to be a community activist. I co-founded and became president of a local feminist organization in Charleston in the 1990's, and was involved in a number of social justice campaigns throughout the state. And then I had children...

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

Because it's the coolest job ever!

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

Get a broad education, incorporating Vert and Invert Zoo, Anatomy, Conservation Biology, Biogeography, Population Genetics, and courses that talk about taxonomy and general evolutionary theory. Once you have the theoretical background in biology, It's easy to learn the QA/QC aspects of wildlife forensics.

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

I think we'll see the emergence of more shared, quality-controlled databases and standardized methods for heavily-trafficked charismatic megafauna like elephants, rhinos, and pangolins. In the US, we're also starting to standardize STR panels

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for deer and bear so that labs can share databases. I also expect we'll see development and validation of SNP panels (which are easier to standardize between labs than STRs), and see next-generation sequencing technology applied to more casework.

#### How would you describe yourself?

Scatterbrained. I'm interested in a lot of things, and it's sometimes hard for me to focus on any one of them. I guess that's one reason I'm in this field--I get to do a lot of short research projects, but I don't stay on any one species for very long.

### What do you do when you aren't working?

At this stage of my life, my husband and I tag-team to ferry our two kids, Sam (15) and Lucille (13), to soccer and gymnastics meets. When I am not doing that, I love to go paddleboarding or comb the beach for fossils (mostly sharks' teeth, but I have found horse and mammoth before).

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

It's casework as far as the eye can see! I am rolling off the Organization of Scientific Area Committees' Wildlife Forensics Subcommittee this year, and my term on the SWFS board is up in another couple of years. I am looking forward to using that time I've regained to focus on chipping away at my casework backlog and writing documentation for future accreditation of our lab.

# Invitation to join global wildlife poisoning and multi-disciplinary conservation forum



The use of indiscriminately toxic pesticides to poison wildlife continues to cause extensive harm, exacerbated by overlapping threats like human-wildlife conflict due to increased resource competition and the loss or constriction of viable habitat.

Wherever poisoning occurs, vultures bear the brunt of this practice. The past few years have seen an increase in mass mortality and poisoning events, in tandem with adapted poisoning habits. Recently, within the space of about a month, nearly 1000 dead vultures (and several other scavenging species) were found in Nigeria, South Africa and Botswana following a comparatively small spate of poisoning incidents. The actual tally of vulture casualties can only be estimated.

The use of poisons to subdue

and harvest animals for human sustenance, or to nourish the illegal trade in vulture parts for traditional based beliefs, also pose a severe threat.

The situation is dire, but we absolutely cannot allow vultures to be extinguished. Around the world, people are tirelessly working to safeguard these and other species from poisoning and the many other threats they face. Working right alongside them, others in related disciplines are engaging with local communities and stakeholders. conducting ecological surveys, examining human-livestockwildlife interfaces, documenting and combatting non-pesticide forms of poisoning (e.g., lead, veterinary pharmaceuticals), and monitoring disease prevalence and transmission, among others. All these efforts are supported by a vast network of information-gathering, intelligence sharing, forensic investigations and enforcement operations.

These topics are regularly discussed via an online collaborative forum with a membership of nearly 200 researchers, conservationists, ecologists, toxicologists, policymakers and scientists from around the world whose expertise spans the field, laboratory, and lawenforcement sectors. Calls for collaboration and sample requests are often made, casework is routinely consulted upon and recent developments are shared via email and in an extensive reference

#### Author: Ngaio Richards

library. Members are welcome to actively participate, but there is no expectation or requirement that participation take a particular form – the aim of the forum is for members to derive benefit according to their own needs and circumstances.

For more information about the forum, or to become a member, contact moderator Ngaio Richards, Forensics & Field Specialist with Working Dogs for Conservation: ngaio@wd4c.org

The first Saturday in September is Vulture Awareness Day! This year it falls on September 7. Find out how these extraordinary creatures are being celebrated near you, or how you can host an event here: <u>https://</u><u>www.vultureday.org/</u>



### The National Fish and Wildlife Forensic Laboratory



The National Fish and Wildlife Forensic Laboratory's Genetics Team, led by Dr. Mary K. Burnham Curtis, was recently recognized by Special Agents of the US Fish and Wildlife Service, Office of Law Enforcement with a Distinguished Service Award for the forensic analysis work they performed to support Operation Eel-Licit Trade, an international wildlife law enforcement operation targeting the shipping and distribution of CITES protected eels, Anguilla anguilla. The Distinguished Service Award is one of the US Department of Interior-US Fish and Wildlife Service's highest honorary awards. Congratulations to the team for their hard work!

#### Also –

The USFWS National Fish and Wildlife Forensic Laboratory would like to welcome two new members of the Genetics Team - Teagen Gray Partin and Darren J. Wostenberg. Teagen received her MS from Nova Southeastern University (Global Population Structure of Dusky shark in Trade), and worked with the Salk Institute and the San Diego Zoo prior to joining the team in Ashland, Darren received his MS from San Jose State University (Investigation of Population Structure and Distribution of the Invasive Bryosoan Watersipora Species along the California Coast using Nuclear and Mitochondrial DNA), and worked with Pacific EcoRisk, the San Mateo County Pulbic Health Laboratory, and was most recently stolen from the USDA APHIS Laboratory in Fort Collins, CO. We are thrilled to have acquired Teagen and Darren's expertise and look forward to having them on board as full time analysts at the NFWFL!!

### **Recap of the Denver 2019 SWFS Meeting**

#### Author: Tasha Bauman

The Society for Wildlife Forensic Science has wrapped up its 5th conference this past June in Denver, Colorado.

On behalf of the SWFS board I would like to thank all of you for your attendance, the time and effort you put into presentations, the workshops and for traveling to Denver. Your participation made this meeting exceptional.

The Wyoming Game and Fish Laboratory staff hosted the meeting in Denver, so I would like to recognize their efforts. Please applaud Kim Frazier for organizing all of the continuing education workshops, Dee Dee Hawk for covering the meeting registration and to Lauren Schumacher and Zuzzanna Kazmierczyk for running the registration table during the meeting. Throughout the meeting we had 139 registered delegates from 29 different countries, this truly demonstrates that SWFS is now expanding and is leading as an international organization in the realm of wildlife forensic science.

The week consisted of seven highly attended workshops covering many different areas of expertise, these include: Ivory Identification, Verifying Perfection in the Laboratory, Effective Communication between Prosecutors and Scientist, Population Genetics, NGS, Feather and Hair Identification. There were 26 posters and 45 oral presentations covering everything from the progress being made by newly developed laboratories and the challenges faced by the wildlife forensic communities in Africa, genetic studies to law enforcement

database challenges and large container sampling. Great job to the SWFS community in demonstrating the progress that has been made in wildlife forensics since the Edinburgh meeting.

Many evening hours were spent building relationships and conversing about research and projects. There was plenty of time for this while walking through the Buffer fly Pavilion, visiting at the Poster and Vendor session and gambling at the banquet.

We invite you to start planning your attendance at the 2021 SWFS conference in Kruger National Park in Sukuza South Africa in June.



### **Recap of the Denver 2019 SWFS Meeting**

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### **Recap of the Denver 2019 SWFS Meeting**

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### **Current SWFS Board Plan**

#### **President:**

Tasha Bauman, Forensic Program Manager Wyoming Game & Fish Wildlife Forensic and Fish Health Laboratory Term: 2019-2023

#### Past President:

Rob Ogden, Program Director Trace Wildlife Forensic Network Term: 2019-2021

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Dee Dee Hawk, Services Division Chief Wyoming Game & Fish Department Term: 2019-2023

#### Secretary:

Nadja Morf, Forensic Genetics Institute of Forensic Medicine in Zurich Term: 2019-2023

#### Director of Certification:

Kim Frazier, Laboratory Director Wyoming Game & Fish Wildlife Forensic and Fish Health Laboratory Term: 2019-2023

#### Director of Communications:

Daniel Xu, Professor College of Wildlife Resources, Northeast Forestry University Term: 2019-2023

#### Director of Policy and Partnership:

Kathy Moore, Forensic Biologist National Ocean Service Marine Forensic Laboratory Term: 2019-2021

#### Director of Membership & Outreach:

Rebecca Johnson, Director Australian Museum Research Institute, Science & Learning Term: 2019-2021

#### Director of Proficiency Program:

Brian Hamlin, Forensic Scientist-Genetics National Fish and Wildlife Forensic Laboratory Term: 2019-2023

#### Director of Audit/Assessment:

Ed Espinoza, Deputy Director National Fish and Wildlife Forensic Laboratory Term: 2019-2023

#### **Director:**

Frankie Sitam, Forensic Analyst/Researcher/Technical Manager Department of Wildlife and National Parks, National Wildlife Forensic Laboratory, Malaysia Term: 2019-2023

#### Director:

Antoinette Kotze, Manager South African National Biodiversity Institute Term: 2019-2023



### Society for Wildlife Forensic Science Assessment Service of the "SWFS Standards and Guidelines v.3"

#### What is the SWFS assessment program?

The Society for Wildlife Forensic Science (SWFS) Assessment Program is a benefit that the society provides to its members who wish to demonstrate that they adhere to the best practices in wildlife forensic sciences. The SWFS Assessment Program provides objective, third party verification, that a laboratory adheres to the "SWFS Standards and Guidelines v.3" SWFS has developed a comprehensive set of Standards and Guidelines that describes the necessary practices associated with the analysis of wildlife flora and fauna evidence. The purpose of the "SWFS Standards and Guidelines v.3" is to notify individuals or institutions of all the practical criteria needed in order to conduct forensic analysis for court proceedings. The "SWFS Standards and Guidelines v.3" consists of roughly 150 criteria ranging from ethical criteria, personnel education, facility infrastructure, and detailed technical criteria for genetic and morphology analysis of flora and fauna. A copy of the "SWFS Standards and Guidelines v.3" can be downloaded at https://www. wildlifeforensicscience.org/documents/

### What is the benefit to the Lab of having a SWFS assessment?

- Third party verification that the Lab adheres and complies with the best practices for wildlife forensic science.
- If applicable, an assessment identifies infrastructure needs, and the resulting report can be used to solicit grants and funding to bring facility up to international standards.
- Demonstration that the Lab participates in a demanding quality control system that will standup against a rigorous cross examination in court.

#### Who can apply for an assessment?

The assessment service is offered to SWFS members who comply with the "SWFS Standards and Guidelines v.3" and adhere to the SWFS Code of Ethics and Conduct (https://www.wildlifeforensicscience.org/wp-content/uploads/2011/11/code-of-ethics.pdf).

#### What is the process to request a SWFS assessment?

The first step to request an assessment is to write to the Director of the Assessment Program Ed Espinoza (Ed Espinoza@fws.gov). Once a request is received, the Director or an associate assessment auditor will commence a conversation with the Lab that will entail scope of the assessment, a review of the Labs quality control protocols and procedures, how to prepare for an assessment, and a description of logistical details. Once it is established that the Lab is ready for an assessment, there will be a site visit by two (2) assessors.

#### What is the cost of an assessment?

The assessment is free to SWFS members. Nevertheless, the cost of travel, lodging and meals need to be underwritten by the requesting Lab. Many Labs have had either US Governmental entities or NGO's underwrite the costs associated with logistical expenses.

#### What happens after the assessment?

At the completion of a site visit, the Assessment team conducts a debriefing of findings and recommendations, but a written final report will be issued approximately two weeks after the visit.

#### How is an assessment reported?

The final report does not report a pass or not pass on the assessment, but instead the results are reported as a percent compliance of the criteria that are applicable to the Lab. Of the roughly 150 criteria of the "SWFS Standards and Guidelines v.3", 70 describe infrastructure and personnel, 48 criteria focus on genetic analysis, 23 criteria are considered for Morphology and 10 criteria for the analysis of flora using chemical analysis. Therefore, the percent compliance determined by the auditors is calculated only for the criteria applicable to the Lab.

#### How can I get more information?

Contact the President of the President Tasha Bauman (<u>tasha.bauman@wyo.gov</u>), or the Director of Assessment Ed Espinoza (<u>Ed Espinoza@fws.gov</u>).

### **Development opportunity! TWG coordinator role**

Are you a junior wildlife forensic scientist keen to get more involved in the Society? The SWFS Technical Working Group (TWG) is looking for an enthusiastic new member to act as coordinator for the group. Duties will involve arranging meetings via teleconference and face-to-face, taking detailed minutes and keeping track of the activities of the group. You will work closely with the chair of the group, Dr Lucy Webster, to ensure we continue to provide outputs which are useful for the SWFS membership. We generally meet 3-4 times per year via teleconference with face-to-face meetings at least every other year. If you are interested in this position, please email Lucy directly (lucy.webster@ sasa.gov.scot) before the 14th March 2020, with some details of your experience in wildlife forensics and why you are interested in this role.



### 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, wildife 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

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**SWFS members** are encouraged to **submit abstracts** to the 22<sup>nd</sup> Triennial Meeting of the **International Association of Forensic Sciences** and the 25<sup>th</sup> Symposium of the **Australian & New Zealand Forensic Science Society** to be held in Sydney, Australia in 2020.

With an estimated attendance of 1500 academics and practicing professionals from all forensic science & medicine disciplines, the 2020 meeting will focus on the theme "Forensic Science 2020 – Where to from here?"

For the first time, IAFS/ANZFSS 2020 will feature a **"Wildlife Forensics & Environmental Crime"** discipline – perfect for SWFS members to participate in!

### See you in Sydney in 2020! 21-25 September.

(it's a non-SWFS year so there is no excuse not to come!)



- 🌐 www.iafs2020.com.au
- 📩 iafs2020@arinex.com.au

lafs2020

Abstract submission opens 23 Sept 2019



Australian and New Zealand FORENSIC SCIENCE SOCIETY

### New journal options for wildlife forensic sciences

The Elsevier publishing house, which includes Forensic Science International (FSI) and Forensic Science International: Genetics (FSI-GEN), has recently launched two new journals.

FSI: Synergy (<u>https://www.journals.elsevier.</u> <u>com/forensic-science-international-synergy</u>) Thisisanewinter-disciplinaryjournalpublishing original research on wildlife forensic research and review papers.

FSI: Reports (<u>https://www.journals.elsevier.</u> <u>com/forensic-science-international-reports</u>) This is a new soundscience journal, meaning that any paper will be accepted regardless of perceived citation impact so long as it is methodologically sound, meaning that it will accommodate case reports and validation studies. Both journals are open access with publication charges; SWFS members will be eligible for a 25% discount, meaning that SWFS members wishing to publish a fulllength article in FSI Synergy would pay \$1275 instead of \$1700. Similarly, in FSI Reports, papers could be published by SWFS members for \$485 instead of \$650.

If you are considering submitting an article would like to confirm the discounts, please contact Rob Ogden (<u>rob.ogden@tracenetwork.org</u>)

### **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 January 2019 to Febraury 2020. 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.

### **Recent publications:**

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#### Wildlife forensics continued:

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.

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.

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### **Recent publications:**

#### Wildlife forensics continued:

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 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).

### **Recent publications:**

#### Fish forensics continued:

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.