

SWG WILD



Scientific Working Group for Wildlife Forensic Science:

Providing essential standardization for the scientific analysis of evidence in cases involving wild and domesticated fauna and flora



Wildlife forensic scientists are at the forefront of domestic and global investigative initiatives targeted at wildlife crime, and the detection, identification, and prevention of national security and public health threats.

Bio-Terrorism and Domestic Security

At JFK, inspectors from the Fish and Wildlife Service open the luggage of a passenger arriving from West Africa. Inside, they find the butchered carcasses of eight monkeys - potential sources of AIDS-related diseases and other critical threats to public health.

Organized Crime

Federal wildlife investigators disrupt a multi-million dollar black market caviar operation directed by international organized crime syndicates in violation of federal law and global treaties.

Animal Abuse

Veterinary forensic scientists assist in bringing down brutal dog-fighting rings around the country through the establishment of canine DNA databases.

International Terrorism

Terrorist groups in Africa are financing their weapons purchases and operations by selling the tusks and horns of slaughtered elephants and rhinoceros.

Poaching

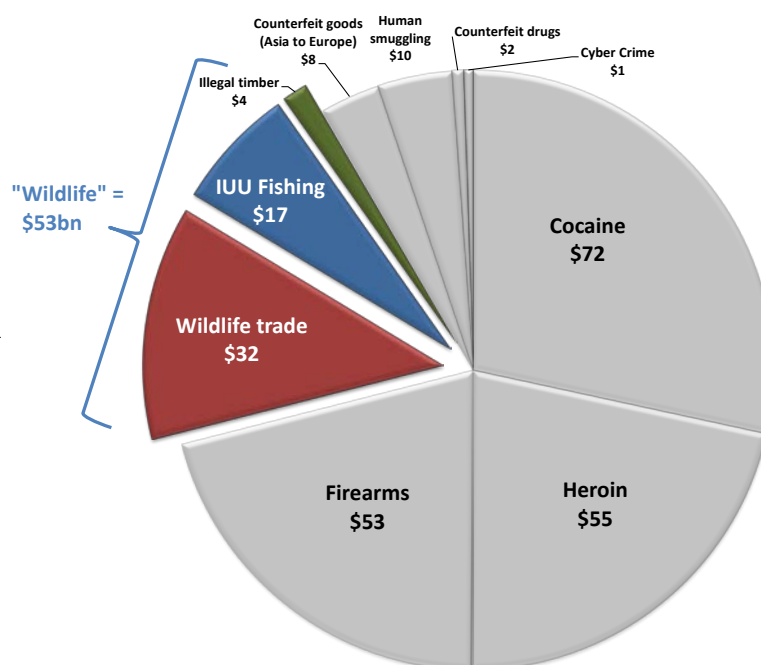
Wyoming Game and Fish breaks up a ring of poachers who have killed more than 30 elk, denying hunting opportunities to licensed and ethical hunters - and the economic resources they provide to local communities.

Food Security

NOAA Special Agents discover half a million pounds of fraudulently labeled seafood destined for US markets, threatening public health and consumer confidence in this multi-million dollar industry.

Estimated Value (USD billion) of Major Categories of Transnational Organized Crime

(Agnew et al. 2009, EUROPOL 2011, UNODC 2010)



Executive Summary

SWGWILD's mission is to provide a certification pathway and rigorous consensus-based standards for the unique needs of wildlife forensic science.

Wildlife forensic science applies an array of scientific sub-disciplines to legal cases involving non-human biological evidence. These disciplines include genetics, morphology, chemistry, pathology, and veterinary sciences. The diverse array of wildlife forensic practitioners' disciplines worldwide is represented in the Society for Wildlife Forensic Science (SWFS).

Existing forensic Scientific Working Groups (SWGs) do not adequately address the complex issues facing wildlife forensic practitioners. For that reason, experts formed the Scientific Working Group for Wildlife Forensics (SWGWILD) in 2011. The mission of this group is to provide a certification pathway and rigorous consensus-based standards for the unique needs of wildlife forensic science. Without such leadership, development of wildlife forensic science will be hindered and existing laboratories could be threatened with closure, resulting in the loss of those resources to the law enforcement community. The US Fish and Wildlife Service (USFWS) and the National Oceanic and Atmospheric Administration (NOAA), as well as various state and international agencies, maintain forensic laboratories dedicated to wildlife crimes. The USFWS National Fish and Wildlife Forensics Laboratory (NFWFL) also acts as the designated analytical facility for the International Criminal Police Organization (INTERPOL) and the Convention on International Trade in Endangered Species (CITES).

SWGWILD is seeking a reliable source of federal support.

Wildlife forensic scientists are at the investigative forefront of emerging threats to

- Homeland security
- Sustainable use of international resources
- Public health
- International commerce
- Animal welfare
- Threatened and endangered species
- Domestic food supplies
- Legal hunting of game species

Crimes involving non-human evidence encompass virtually the entire biodiversity of the planet. Wildlife forensic scientists must develop, validate, and apply tools to identify an increasing variety of species in a manner that will withstand judicial scrutiny. These analysts are commonly called upon to perform species identification, cause of death determination, the identification of pesticides and poisons, and to link individual animals to wildlife crime scenes. Cases range from the taking of protected plant and animal species, to oil spills, animal cruelty, and bio-terrorism, to the analysis of animal hairs and other trace evidence in crimes such as rape and homicide (Appendix I).

Stakeholder groups related to wildlife forensics (Appendix II) are also extremely varied. Law enforcement agents for state and federal management agencies comprise the largest group, and many wildlife forensic laboratories also work with local law enforcement, natural resource officers, and animal welfare organizations. Prior to NFWFL's founding in 1988, wildlife law enforcement officers had limited or no access to wildlife-specific forensic services. Wildlife crime laboratory analytical services and expert witness testimony for wildlife and natural resource-related crimes have enabled successful prosecutions of serious violations of wildlife laws (Appendix I).

All fields of forensic science are currently receiving increased scrutiny as a result of the critical National Academy of Sciences report in 2009. Although wildlife forensic science was not directly addressed in the report, this field, along with other forensic disciplines, will undoubtedly face increasingly stringent requirements imposed by the courts and the Federal Government. SWGWILD is committed to anticipating these requirements and developing rigorous best practices for the array of disciplines included under wildlife forensic science.

Scope of the Problem

Wildlife forensic science deals with activities whose potential value has been estimated to total up to **\$53 billion a year** – including illegal traffic in protected wildlife, illegal, unregulated, and unreported fisheries, and the illegal timber trade. Taken together, these activities comprise the third largest form of illegal international trade, after drugs and weapons. Some wildlife crime activities are also known to be linked with other forms of organized crime.

The variety of wildlife forensic cases is vast, with evidence potentially encompassing the entire biodiversity of the planet. It can range from a van full of boots made from the hides of endangered sea turtles, to shipments of elephant tusks, coral jewelry, and shark fins, to trophy elk, oil-soaked birds, wild ginseng, or blood from a dog fighting pit. In cases of seafood fraud, evidence can consist of an entire vessel-load of frozen fish. Some common areas of wildlife forensic casework are examined in more detail below.

"It is our task in our time and in our generation, to hand down undiminished to those who come after us...the natural wealth and beauty which is ours." – U.S. President John F. Kennedy

Illegal Wildlife Trade

The legal trade in wildlife is estimated to be a \$300 billion dollar industry (Engler and Parry-Jones 2007) with the majority of its value in timber and fisheries products, but it is the illicit trade that is decimating wild populations and funding illegal activities. Illegal, unreported and unregulated (IUU) fishing is estimated to account for an additional **\$10-25 billion a year** (Pauly et al. 2002, MRAG 2005, Agnew et al. 2009). Furthermore, the endangered species trade fuels organized crime and the illicit drug and arms trades, and is alleged to fund terrorist activities (Zimmerman 2003, Warchol 2004, U.S. Department of State 2009). Links between human trafficking, public corruption and illegal fishing have also been reported (US Senate Foreign Relations Committee 2009). Forensic science is critical for the successful monitoring, control, surveillance, and enforcement of the illegal harvest and trade in wildlife products.

Violent Crimes

Crime-scene evidence such as shed hair, saliva and feces from house pets has been used successfully in the prosecution of individuals charged with murder, rape, burglary, and terrorist threats. There are approximately 78 million dogs and 94 million cats in the United States. With 62% of homes having one or more pets, domestic animal biological evidence is frequently present at human crime scenes. This evidence is now being used to solve “cold case” investigations when other investigative leads have been exhausted. Domestic animal DNA has been analyzed for the Innocence Project, an organization responsible for the exoneration of over 200 wrongfully convicted prisoners.

Animal Cruelty

When animals are the victims of human cruelty, the investigation and prosecution of those cases identifies people who may pose a danger to others. There is an established link between animal cruelty and domestic violence, with more than 80% of women arriving at domestic violence shelters reporting animal abuse in the home¹. Serial killers have long been known to experiment with torturing and killing animals as children or adolescents (Ressler *et al.* 1988; Langevin 2003),

¹ <http://www.aspca.org/fight-animal-cruelty/domestic-violence-and-animal-cruelty.aspx>

so the early identification of those individuals through forensic science can help to bring them into the justice system.

The crime of dog fighting is now a felony in every U.S. state, and rings—such as Michael Vick’s Bad Newz Kennels—are another significant target for investigators using veterinary forensic testing. Dog fights are commonly associated with the exchange of large amounts of money from gambling and the sale of illegal drugs and weapons.

Illegal Hunting: Poaching an American Pastime

While the illegal wildlife trade and dog fighting often make the front page of the newspaper, the effects—both financial and ecological—of poaching game species should not be underestimated. Many western States rely upon hunting opportunities to provide jobs and income to their communities. Hunting is much more than a traditional American pastime; it creates more than 700,000 jobs nationwide. New studies show that annual spending by America’s 14 million hunters amounts to **\$25 billion**. Hunting generates an additional **\$17 billion** in salaries and wages as well as creating sales and state and federal income tax revenues for government agencies and the people they serve. If it were hypothetically ranked as a corporation, these figures would put hunting in thirty-fifth place on the Fortune 500 list of America’s largest businesses².

Poaching diminishes fish and game resources and decreases opportunities for legitimate hunters to draw a license and participate. Poaching can take various forms, but in general it is the illegal hunting, killing or capturing of animals. This can occur in a variety of ways including taking without a license or permit, taking over the limit, trespassing, use of a prohibited weapon or trap, taking outside of the designated time period or inside of a park, and taking of a prohibited sex or life stage. This results in a loss of revenue to the community and to the management agency responsible for the license sales.

Beyond local poaching, professional poachers can be associated with the international trade of animal parts. Although statistics on poaching can be dated and are not well documented, it has been estimated “about 60 percent of poachers are people who are involved in other criminal activities such as trafficking in drugs and smuggling contraband” (Canadian Geographic 1999).

Exploitation of Rare and Endangered Plants

Non-human crimes are not limited solely to wild and domestic animals, but also include thefts of rare plants (including orchids and cacti) and commercially, ecologically, and culturally important timber species. The high profit and low fines associated with this type of crime has drawn the attention of organized crime. It is believed that organized crime is responsible for the growing sophistication of the operations and distribution systems.

² <http://www.dfg.ca.gov/wildlife/hunting/econ.hunting.html>

SWGWILD Budgetary Considerations

SWGWILD is seeking a reliable source of federal support to fund two annual meetings. To date, SWGWILD has operated at the expense of the participating agencies and through a grant administered by the Wyoming Game and Fish Department, but these funds are now exhausted. This funding covered the first year of meetings which produced a vast amount of consensus-based guidance concerning best practices and certification. However, additional funding is critical to sustain and expand these efforts. Meetings will occur twice annually over a 3-day period at cost-effective locations agreed upon by attendees. Between meetings, information is exchanged electronically, but in-person attendance has proven to be the most efficient and cost-effective means of achieving SWGWILD goals and mandates.

Estimated costs

| ITEM | | AMOUNT |
|----------------------------------|---------|-----------------|
| Airfare | | \$600 |
| Lodging | 3 days | \$450 |
| Per diem | 3 days | \$180 |
| Total, per attendee | | \$1230 |
| SWGWILD Members | 16 | \$19,680 |
| Subject Matter Experts | 4 | \$4,920 |
| Total travel, per meeting | | \$24,600 |
| Incidentals (room, A/V rental) | Per mtg | \$300 |
| Meetings per year | 2 | \$49,800 |

Summary

The field of wildlife forensics is essential to effective enforcement of laws protecting wildlife, fisheries and the public. Without such scientific support, many cases simply could not be pursued. Sound forensic science is based on valid standardized practices performed by highly trained and experienced practitioners. The Society for Wildlife Forensic Sciences (Appendix III) relies upon SWGWILD to provide the structure necessary for guidance and standardization in an extremely diverse discipline that has previously not been covered by other SWGs.

A reliable source of Federal funding is essential to continue SWGWILD's work in support of wildlife forensic science. SWGWILD held its first three meetings in 2011. In this time, the SWG drafted standards and guidelines for both DNA and morphology – its two major sub-disciplines - a certification program for wildlife forensic scientists, and two major publications. SWGWILD's grant funding has now been exhausted, and without Federal support, the work of the SWG will not be able to continue. SWGWILD has demonstrated significant initiative in the absence of official recognition and support, establishing the value of this organization to the scientific community, stakeholders, and the national interest. Federal sponsorship will allow SWGWILD to continue this essential work.

Appendices

Appendix I. Examples of cases involving wildlife and non-human forensics cases.

Lacey Act (Wildlife Trafficking)

- A US Virgin Islands company was sentenced in federal court for knowingly trading in falsely-labeled, protected black coral in violation of the Endangered Species and Lacey Acts. The company was sentenced to pay a criminal fine of \$2.3 million in fines and community service payments, and ordered to forfeit dozens of worked items and over 13,655 pounds of raw black coral (valued at more than \$2.17 million). The aggregate financial penalty of \$4.47 million made this the largest for the illegal trade in coral, the largest non-seafood wildlife trafficking financial penalty, and the fourth largest for any US case involving the illegal trade of wildlife. [Department of Justice](#)
- A South Dakota man was sentenced in federal court to pay a \$20,000 fine and serve six months of home confinement for smuggling the hide of an illegally-killed leopard into the United States in violation of CITES. [Department of Justice](#)
- Operation Central, a multi-year (2004-2010) undercover investigation of unlawful international trafficking in sea turtle parts and products, remains the largest probe ever of the unlawful commercial exploitation of highly endangered sea turtles. Operation Central documented the smuggling of more than \$1 million worth of sea turtle parts and products into the United States. The seven defendants arrested at the time of takedown all pleaded guilty to felony violations and served Federal prison sentences of up to two years. [US Fish and Wildlife Service](#)
- Scientists in the UK develop a method for distinguishing the CITES-protected Brazilian rosewood from other non-regulated species in trade, preventing its overexploitation. [Kew Botanical Gardens](#)

Marine Mammal Protection Act Violations

- A forensic scientist identifies the origin of smuggled sperm whale teeth (for scrimshaw), resulting in a sentence of nine months in prison and the deportation of a Ukrainian national, in addition to 30 days confinement and probation for another defendant. [Department of Justice – Mikhalyov](#) or [Department of Justice - Manghis](#)
- Forensic identification of suspect whale meat enabled a search warrant and subsequent investigation of the illegal sale of endangered Sei whale in a US sushi restaurant. [Department of Justice](#) or [NY Times](#)

Dog Fighting

- The Canine Combined DNA Index System, generated by wildlife forensic scientists, is used to help track dog fighters and breeders. [National Public Radio](#) or [UC Davis website](#)

Human crime

- DNA from pet hairs provides additional evidence in decades-old Wayne Williams serial murder case. [UC Davis website](#)

Seafood Fraud

- Forensic analysis reveals that lower quality Coho salmon was being substituted for the more valuable Chinook salmon, resulting in a guilty plea that involved a year in prison and a community service payment of \$347,202. [Department of Justice](#) or [Bellingham Herald](#)
- Fisheries forensics shows that Lake Victoria perch and farm-raised Vietnamese catfish were being sold as many other higher-value species. The plea agreements resulted in a total of 70 months in prison for the three defendants. [Department of Justice](#)

Endangered Species Act Violations

- Endangered Species Act violations involving steelhead are substantiated with forensic analyses and violations are prosecuted. [Department of Justice](#)

Black Market Caviar Trade

- Forensic DNA testing revealed that eggs from the protected American Paddlefish were being sold as the more valuable *Sevruga* caviar, resulting in a two year prison term and over \$136,000 in fines. [Department of Justice](#)
- A two-year undercover investigation and forensic analysis reveals poaching of protected white sturgeon for the black market caviar trade. [LA Times](#) or [Seattle Times](#)

Big Game Poaching

- Forensic scientists work with investigators to unravel tough cases of moose and deer poaching. [Canadian Geographic](#) or [Aberdeen News](#)

Migratory Bird Treaty Act

- Exxon-Mobil Corporation pleaded guilty to violating the federal Migratory Bird Treaty Act (MBTA) in five states between 2004-2009. Forensics identified approximately 85 protected birds, including waterfowl, hawks and owls, that died at Exxon-Mobil drilling and production facilities. The company has agreed to pay fines and community service payments totaling \$600,000 and has already spent over \$2.5 million to begin implementation of a plan aimed at preventing bird deaths. [Department of Justice](#)
- Investigation of an aquaculture business by Special Agents of the USFWS recovered the remains of approximately 90 brown pelicans, as well as other birds. Identification and cause-of-death determinations were made by forensic scientists, resulting in fines of over \$40,000 paid to the Texas Parks and Wildlife Foundation. [Department of Justice](#)

Bald and Golden Eagle Protection Act

- Forensic identification of eagle remains enabled prosecution and subsequent sentencing of a British Columbia man. He was sentenced to 24 months in prison, three years of supervised release, and a payment of a total of \$147,000 in restitution for wildlife smuggling and violations of the Bald and Golden Eagle Protection Act. [Department of Justice](#)

Appendix II. Representative stakeholders.

| DOMESTIC | |
|---------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------|
| Society for Wildlife Forensic Science | US Department of Agriculture |
| Federal Bureau of Investigations | US Customs & Border Protection |
| State Natural Resource Officers | US Department of Homeland Security |
| Forestry Officers | US Department of Justice |
| Environmental Protection Agency - Environmental Officers | US Department of State |
| Wildlife Officers: USFWS Special Agents and State Conservation Officers/Game Wardens | US Fish and Wildlife Service Conservation Genetics Community of Practice |
| National Oceanic Atmospheric Administration (NOAA) Special Agents and Marine Conservation Officers | Animal Welfare Agencies: ASPCA, Humane Society, Animal Control Officers, Humane Officers |
| Domestic Breed Registries | Police and Sheriffs |
| Horse Racing and Livestock Boards/Investigators | Veterinarians |
| INTERNATIONAL | |
| INTERPOL | Metropolitan Police (Scotland Yard) |
| TRACE Network | Royal Canadian Mounted Police |
| The approximately 150 countries that have signed the United Nation's CITES (Convention on International Trade in Endangered Species) Treaty | International Laboratories: Canada, United Kingdom, South Africa, Brazil, Malaysia |
| NON-GOVERNMENTAL ORGANIZATIONS | |
| American Bird Conservancy | Rocky Mountain Elk Foundation |
| Foundation for North American Wild Sheep | Safari Club International |
| Innocence Project | Sierra Club |
| International Game Fish Association | The Animal Defense League |
| International Union for the Conservation of Nature | The Nature Conservancy |
| | WildAid |
| Mule Deer Foundation | Wildlife Conservation Society |
| Natural Resources Defense Council | World Society for the Protection of Animals |
| Oceana | World Wildlife Fund/TRAFFIC |

Appendix III. SWFS Member Laboratories.

| FEDERAL | |
|----------------------------------------------------------------------------------|-----------|
| Fish and Wildlife Service, Conservation Genetics Laboratory | U.S. |
| Fish and Wildlife Service, National Forensic Lab* | U.S. |
| Lawrence Livermore National Laboratory, Center for Accelerator Mass Spectrometry | U.S. |
| NOAA, National Seafood Inspection Laboratory | U.S. |
| NOAA, Marine Forensic Laboratory | U.S. |
| NOAA, National Marine Fisheries Service, Northwest Fisheries Science Center | U.S. |
| Smithsonian Institution, Feather Identification Lab | U.S. |
| USDA Forest Service Rocky Mountain Region | U.S. |
| STATE | |
| Black Hills State University, CCBR/West Core | U.S. |
| California Department of Fish and Game Forensics Laboratory | U.S. |
| California State University, Fresno | U.S. |
| East Stroudsburg University, Northeast Wildlife DNA Laboratory | U.S. |
| Idaho Fish and Game, Wildlife Forensics Program | U.S. |
| Southern Oregon University | U.S. |
| Tennessee Wildlife Resource Agency | U.S. |
| Texas Parks and Wildlife, A.E. Wood Fish Hatchery* | U.S. |
| University of California, Berkeley, Napa | U.S. |
| University of California, Davis, Veterinary Genetics Forensic Laboratory* | U.S. |
| University of Central Oklahoma | U.S. |
| University of Colorado, Boulder | U.S. |
| University of Maine, Molecular Forensic Laboratory | U.S. |
| University of Washington, Biology | U.S. |
| University of Washington, Department of Biostatistics | U.S. |
| Washington State Department Fish and Game | U.S. |
| Wyoming Game and Fish Wildlife Forensic Laboratory | U.S. |
| PRIVATE | |
| Canorus Ltd. | U.S. |
| DNA Solutions Inc., Analytical Research Laboratory | U.S. |
| Microtrace, LLC | U.S. |
| Stoney Forensic | U.S. |
| * Accredited laboratories | |
| INTERNATIONAL | |
| Australian Museum, DNA Laboratory | Australia |

| | |
|------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| Murdoch University, School of Biological Sciences & Biotechnology, Wildlife Genetics Laboratory | Australia |
| University of Queensland, School of Biological Science | Australia |
| Laboratorio de Biologia Evolutiva e Conservacao de Vertebrados SOS, Fauna Cidade Universitaria, Fauna Cidade Universitaria | Brazil |
| Alberta Fish and Wildlife Forensic Unit | Canada |
| Environment Canada, Pacific & Yukon Laboratory for Environmental Testing | Canada |
| Environment Canada, Wildlife Enforcement Directorate | Canada |
| Lethbridge Community College | Canada |
| Pacific Biological Station, Dept. of Fisheries and Oceans | Canada |
| Research and Productivity Council, Fredericton, NB | Canada |
| Simon Frazier University | Canada |
| Trent University Wildlife Forensic DNA Laboratory | Canada |
| University of British Columbia, Cowan Vertebrate Museum, The Beaty Biodiversity Museum | Canada |
| WWF Canada | Canada |
| Hong Kong CITES Office, Fisheries and Conservation Department | Hong Kong |
| St. Xavier's College | India |
| EcoGene Lancare Research | New Zealand |
| University of Pretoria, Veterinary Genetics Laboratory, Equine Research center | South Africa |
| National Veterinary Institute | Sweden |
| CITES Enforcement Task Force | Switzerland |
| Forest and Plant Conservation Research Office Dept of National Parks, Wildlife and Plant Conservation, Forest Genetics and Biotechnology Group | Thailand |
| TRACE Wildlife Forensics Network c/o The Royal Zoological Society of Scotland | United Kingdom |

Appendix IV. List of SWGWILD members, advisory members, and contact information. Advisory members are designated with *, and members primarily responsible for producing this document are designated with †.

| SWGWILD MEMBERS | |
|--------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------|
| M. Katherine Moore, M.S. Chairperson | NOAA/NOS Marine Forensics Laboratory 219 Ft. Johnson Road Charleston, SC 29412 843-762-8514 kathy.moore@noaa.gov |
| Irving Kornfield, Ph.D. Vice-Chairperson | Univ. of Maine Molecular Forensics Laboratory 5751 Murray Hall Orono, ME 04469-5751 irvk@maine.edu |
| Kimberly Frazier, M.S. Secretary | Wyoming Game and Fish Forensic Laboratory 1000 E. University Ave, Dept. 3312 Laramie, WY 82071 307-766-5629 kimmsa@uwyo.edu |
| DeeDee Hawk[†], M.S. SWFS President | Wyoming Game and Fish Forensic Laboratory 307-766-5618 dhawk@uwyo.edu |
| Tasha Bauman[*], M.S. | Wyoming Game and Fish Forensic Laboratory 307-766-5616 tlarsen@uwyo.edu |
| Mary Burnham-Curtis, Ph.D. | USFWS National Fish and Wildlife Forensics Laboratory 1490 East Main Street Ashland, OR 97520 541-488-6522 mary_curtis@fws.gov |
| Edgard Espinoza[*], Ph.D. | USFWS National Fish and Wildlife Forensics Laboratory 541-488-6513 ed_espinoza@fws.gov |
| Carolyn Ferrell, M.S. | Black Hills State University, CCBR/West Core 1200 University St., Unit 9053 Spearfish, SD 57799 605-642-6854 carolyn.ferrell@bhsu.edu |
| Jenny Giles, BEnvSc(Hons)/BA | University of Queensland, School of Biological Science Goddard Bldg, Mansfield Place St Lucia QLD 4072 Australia Jenny.Giles@uq.edu.au |
| Trey P. Knott^{*†}, M.S. | NOAA/NOS Marine Forensics Laboratory 843-762-8621 trey.knott@noaa.gov |

SWGWILD MEMBERS (cont.)

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|---------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Christina Lindquist, M.S. | UC Davis Veterinary Genetics Forensics Laboratory One Shields Avenue Davis, CA 95616-8744 530-752-8798 cdlindquist@ucdavis.edu |
| Wayne Lord[†], Ph.D. | University of Central Oklahoma 100 N. University Drive, Box 89 Edmond, OK 73034 405-974-5729 wlord1@uco.edu |
| Chris O'Brien, Ph.D. | University of Central Oklahoma 405-974-6912 ROBrien2@uco.edu |
| Rob Ogden, Ph.D. | Trace Wildlife Forensics Network Royal Zoological Society of Scotland Edinburgh EH12 6TS Scotland, UK +44 (0)7746 421499 rob.ogden@tracenet.org |
| Piper Schwenke, B.S. | NOAA Northwest Fisheries Science Center 2725 Montlake Blvd E Room 342E Seattle, WA 98112 206-302-2456 piper.schwenke@noaa.gov |
| Pepper Trail, Ph.D. | USFWS National Fish and Wildlife Forensics Laboratory 541-488-6521 pepper_trail@fws.gov |
| Danny Walker, Ph.D., RPA | Wyoming Dept. of State Parks and Cultural Resources Dept. 3431, 1000 East University Avenue Laramie, WY 82071-3431 307-766-5565 dawalker@wyoming.com |
| Beth Wictum^{*†}, M.S. | UC Davis Veterinary Genetics Forensics Laboratory 530-754-9050 ejwictum@ucdavis.edu |
| Paul Wilson[†], Ph.D. | Trent University Wildlife Forensic DNA Laboratory 2140 East Bank Drive Peterborough, ON K9J 7B8 Canada 705-748-1011 ext. 7259 pawilson@trentu.ca |
| Bonnie Yates, M.S. | USFWS National Fish and Wildlife Forensics Laboratory 541-482-4191 Bonnie_Yates@fws.gov |

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