

Wildlife Forensics-- Society for Wildlife Forensic Science

Midwest Association of Fish and Wildlife
Agencies
June 2012

Dee Dee Hawk--Laboratory Director-President Society for Wildlife Forensic Science



- **Education:** M.S. in Pathobiology; B.S. in Microbiology & Medical Technology
- **17 years with Wyoming Game and Fish Department**
- **Specialty Training:** AFS Aquatic Animal Health Inspector, certified expert in wildlife forensics in five states & federal court

Thank you



Additional Thanks to WGFD Staff



Gary Amrine-
Assistant Division Chief of
Services

Scott Talbott
DIRECTOR



John Kennedy
DEPUTY DIRECTOR
INTERNAL OPERATIONS





Kim Frazier-
Forensic Specialist

The Forensic Team at WGI Forensic Laboratory

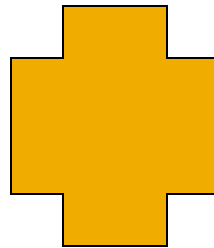
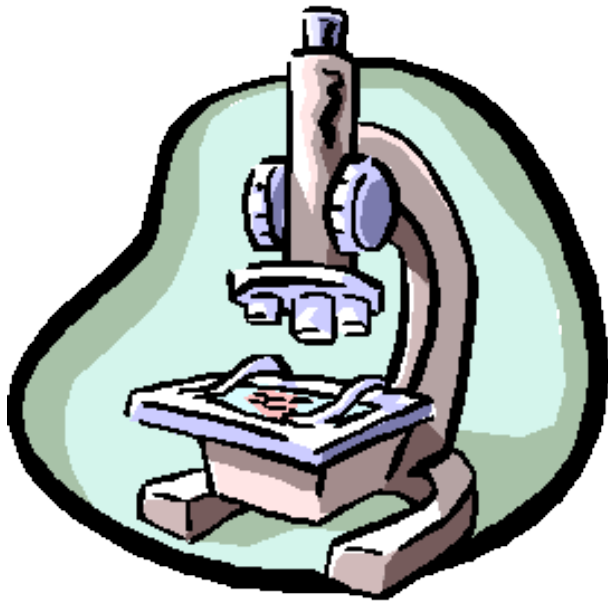


Tasha Bauman-
Forensic Analyst

Agenda

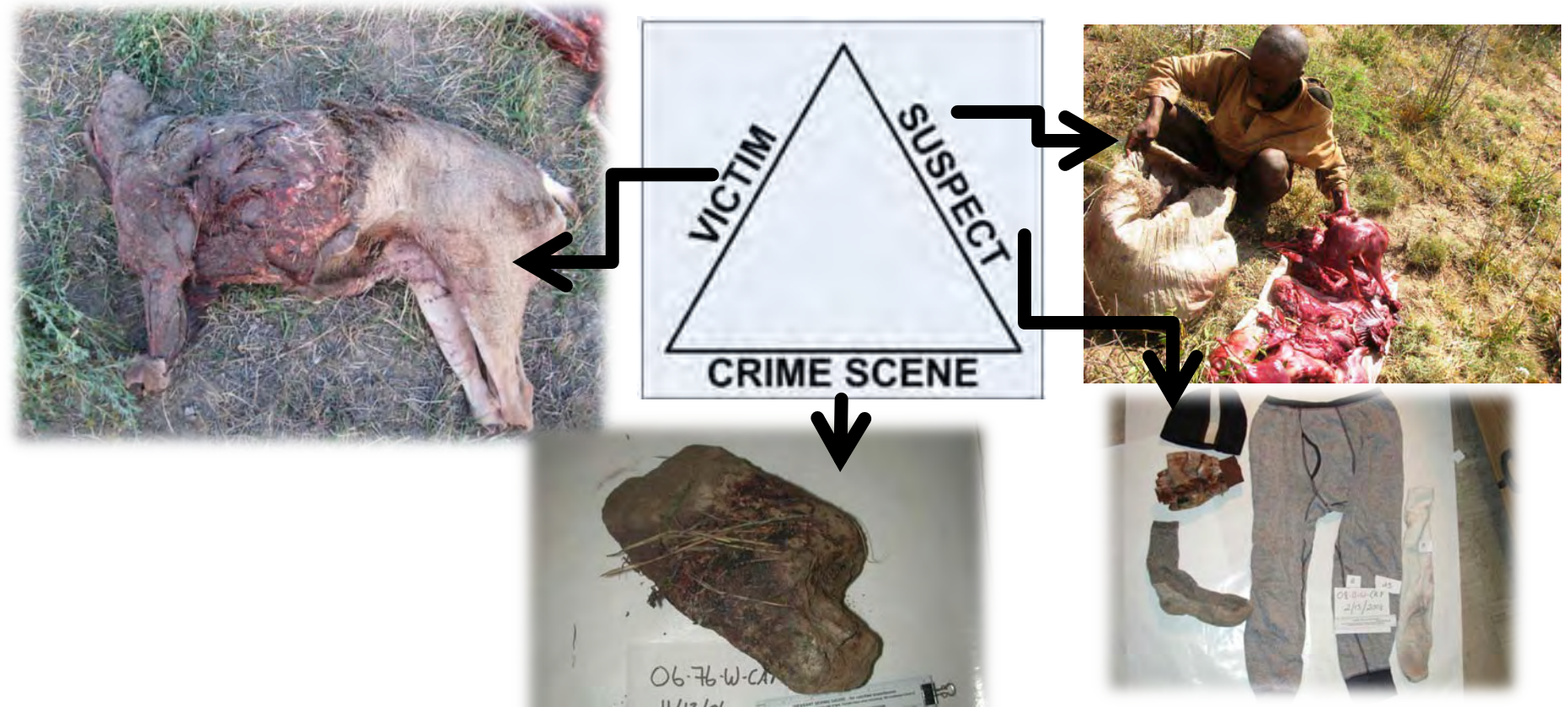
- Overview
- What is the Society for Wildlife Forensic Science (SWFS)? Their roles in forensics?
- Anticipated changes in the way Forensic Science/Scientists do business and the Scientific Working Group for Wildlife Forensics (SWGWILD)
- Capabilities
- Collaboration & training ideas, increased court credibility

Forensics-Application of Science to Law Enforcement



Wildlife Forensics

- Match the victim (the animal) to the crime scene and the suspect using science



Wildlife Forensic for Big Game/ Trophy Game

- Protein and DNA based analysis to determine species, gender, matching and minimum number of animals
- Deer family, sheep, bears, cats etc.



Or Was a Crime even committed? Species Identification for CITES Listed Animals



Wildlife forensics -prominently figured in high profile poaching, trafficking & animal cruelty cases

DNA testing bad news for wildlife traffickers

The World Today Timothy McDonald

Updated September 06, 2010 17:56:00

Despite strict federal and state laws, the illegal wildlife trade is lucrative enough to persist in

HOME DNA TESTS & PRICES ANCESTRY BY DNA ABOUT DNA TESTS HOW TO DO A DNA TEST WHY ARE WE DOING THIS?

DNA Testing - Saving Endangered Animals

DNA testing is being used to fight trade in endangered species

The illegal trade in endangered animals has had a devastating impact on many species. From elephant ivory to

Press Release

Dog-Fighting DNA Database Breaks New Ground In Crackdown on Animal Cruelty

"Canine CODIS" Technology Unveiled by ASPCA, Humane Society of Missouri, Louisiana SPCA & University of

Repeat Poacher Sentenced

Adapted from Idaho Fish and Game's Arrest Log
By Evin Oneale, Idaho Department of Fish and Game

Less than a month after his hunting privileges were reinstated following a previous conviction,

And this time, it really cost him.

Gregory Wayne Powell, 44, of Horseshoe Bend, recently was sentenced in Butte County to 180 days in jail for possession of two or more big game animals within a 12 month period.

Powell, initially charged with unlawful possession and waste of two cow elk, was also charged with possession of two or more big game animals within a 12 month period.

In December 2007, Powell trespassed onto private land, shot and killed two cow elk.



ELSEVIER

SCIENCE @ DIRECT®

Forensic Science International 153 (2005) 218–221

Short communication

DNA forensics and the poaching of wildlife in Italy: A case study

Forensic
Science
International

www.elsevier.com/locate/forensicint

Campo Boario, I-64100 Teramo, Italy

5; accepted 21 April 2005

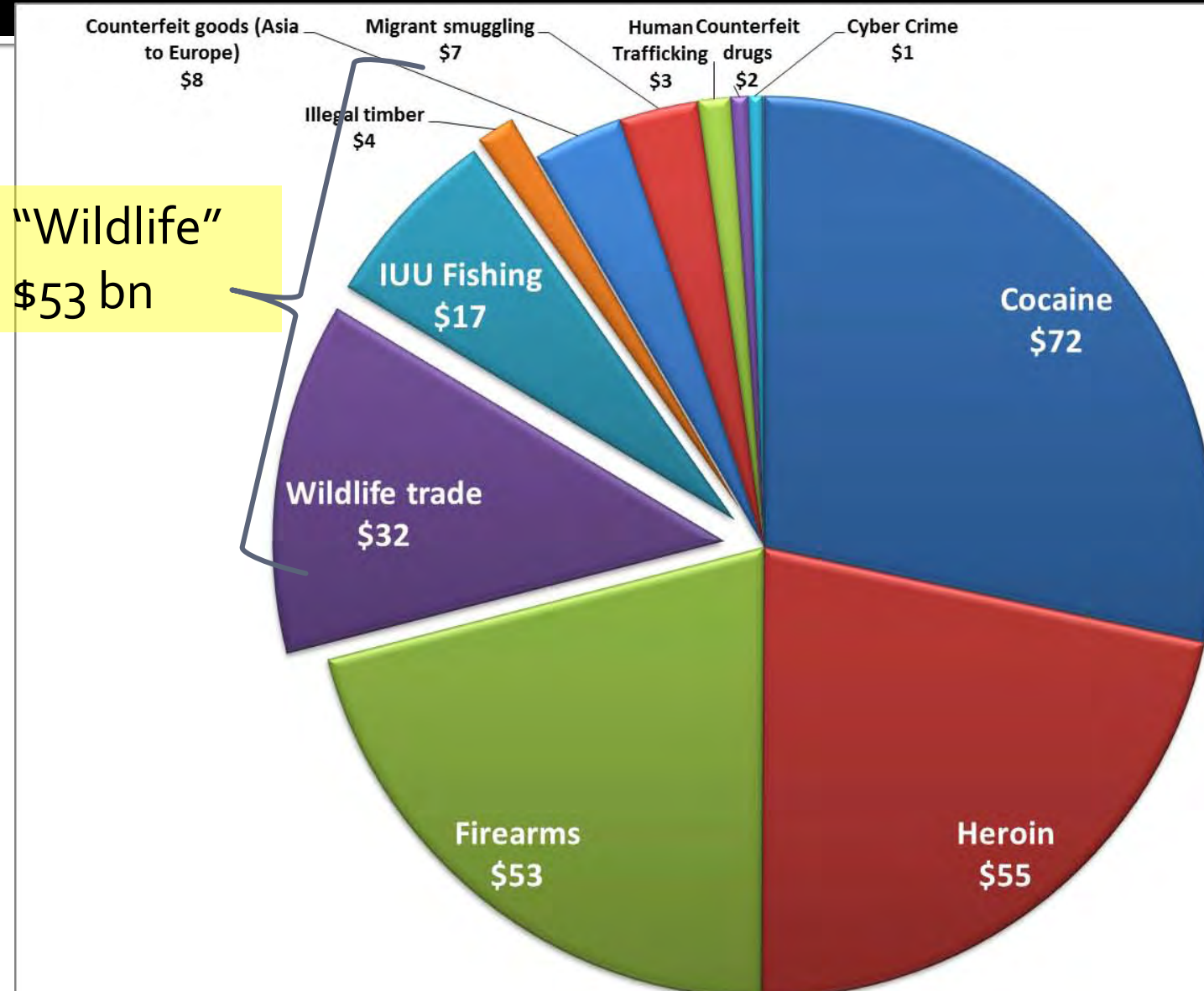


Genetic Pawprints Are Leading Game Wardens to the Poachers

By MINDY SINK
Published: May 26, 1998

THERE was not much of a crime scene left by the time the game warden arrived -- just some blood and hair in the dirt of a windswept patch of Wyoming range. But through the use of DNA tests, the evidence may be enough to link an accused poacher to the site.

Estimated value of major categories of transnational organized crime, in \$US bn





Ivory Smuggling

- Increased Demand
 - High paying industrialized nations:
 - China, Thailand, US and Japan
- Huge Price Increase of High Quality Ivory
 - Late 1990's \$100/kg
 - 2006 \$750/kg (China and Japan)
 - 2007 \$850/kg (Japan)
 - 2009 \$1,200-\$1,500 (Vietnam)
- High profit/low risk
- The volume of material shipped daily made it economically and logistically impossible to control once the ivory leaves the country (120 million TEUs (twenty foot equiv) shipped annually (\$4.6 trillion in merchandise))



Illegal trafficking

The trafficking of endangered species
is worth \$32 Billion/year



Ounce for ounce, rhino horns sell
for more than gold



Dead





Or Alive





Animal Cruelty Cases

Murder Investigations

CAT FUR PUTS CRIMINALS BEHIND BARS

A DNA database has been established that uses cat fur as forensic evidence.



By Jennifer Viegas
Fri Mar 19, 2010 07:00 AM ET
(2) Comments | [Leave a Comment](#)

Print

Email



704 likes. Sign Up to see what your friends like.



THE GIST:

- A DNA database has been established that uses cat fur as forensic evidence.
- Cat hair found on a jacket has already helped to convict an individual of second-degree murder.
- Dog and other animal fur may also be useful in forensic applications.

Homeowners buy expensive alarm systems, tamper-proof locks and other items to protect their property, but a new study points to a less obvious crime-buster: cat fur shed by fastidious felines that might be living in the home.

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Inception of the Society

- Formed in Nov 2009 in response to ever increasing challenges in the discipline
- Membership is international & open to those who will impact the wildlife forensic community.



Mission of SWFS

- To develop wildlife forensic science into a comprehensive, integrated and mature discipline
- Provide Standards, Education and Certification

Vision of SWFS

- To become the pre-eminent professional organization in the world representing wildlife forensic scientists
- To promote the exchange of scientific and technical information
- To encourage research in wildlife forensics
- To promote professional competence, uniform qualifications, certification and ethical behavior among wildlife forensic scientists

Board and Officers



Web Site

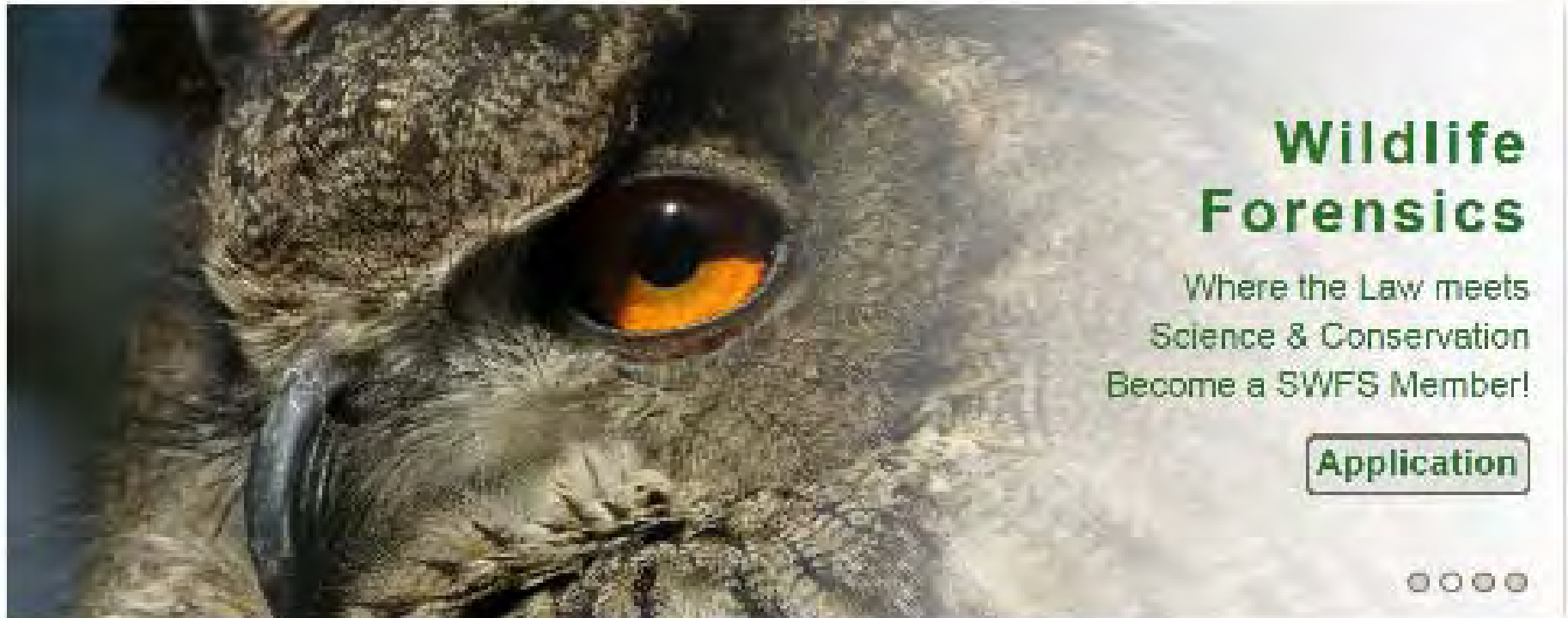


SOCIETY FOR

WILDLIFE FORENSIC SCIENCE

Providing Standards • Education • Certification

home	mission	events	certification	news	contact	membership	donate	commissioner's license
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Wildlife Forensics

Where the Law meets
Science & Conservation
Become a SWFS Member!

[Application](#)

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Inaugural Meeting-Ashland, OR June 2010

- Inaugural meeting--104 participants representing 52 laboratories, 13 states and seven countries
- 40 papers by participants
- Three continuing education workshops including national renown forensic statistician
- Enforcement Assistant Chief of CITES
- Department of Justice Senior Trial Attorney

Inaugural meeting

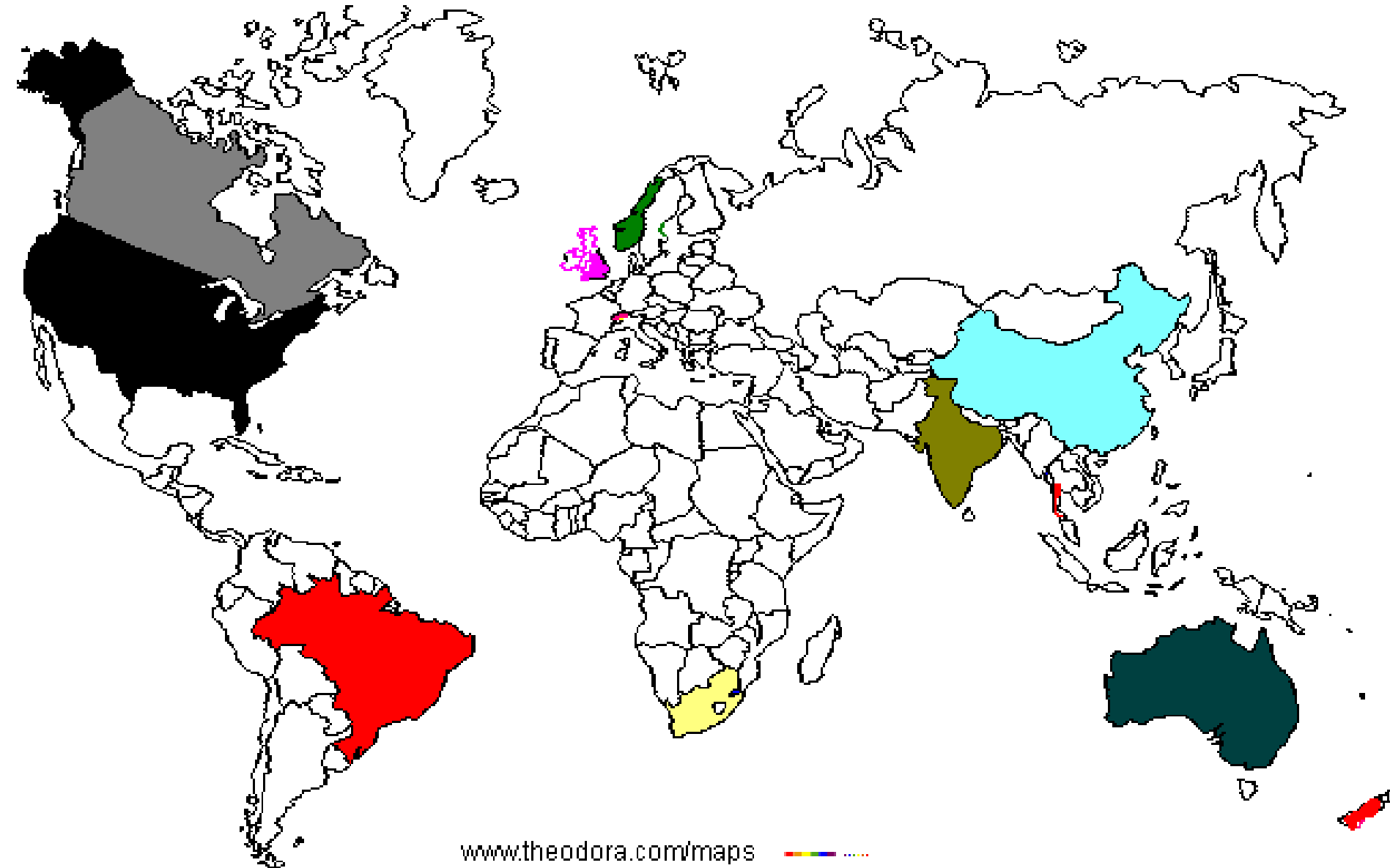


2012 Triennial Meeting

- Jackson Lake Lodge
- 91 participants from nine countries
- Two days of workshop and two days of presentations from scientists
- Banquet which raised \$1000 for student scholarships and \$1,500 for the Society



12 countries and 59 labs



Location of US SWFS member laboratories-25 States



A pair of black metal scales of justice hanging from chains against a dark blue background with faint, illegible text.

Code of Ethics

- To promote the highest standards of professional and personal conduct ..is endorsed by all members and affiliates of the Society for Wildlife Forensic Science

- *Professionalism*
- *Competency and Proficiency Testing*
- *Provisions for Disciplinary Action*



Proficiency Program

- Started in 2004 by US Fish and Wildlife National Forensic Laboratory in Ashland, OR
- Turned over to the Society for Wildlife Forensic Science in February 2010
- Must be a member of the Society to participate



Proficiency Program Continued

- Mammals genetics program where participants analyze samples to identify species, gender, and individual identification, prepared from four different taxa; including North American black bear, North American elk, white-tailed deer and mule deer.
- Fish genetics to be on-line soon



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US judge urges skepticism on forensic evidence

Gertner says she'll expect defense lawyers to challenge its validity

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Specials [See all specials](#)

Science in court

Forensic science evolved less as a conventional academic discipline and more as a service driven by the needs of law enforcement. As a result, the vast majority of its day-to-day tools — from fingerprint analysis to hair- and fibre-matching — have developed without the influence and scrutiny of conventional academic research. In this special, *Nature* examines the gap between academia and the forensic lab, and explores ways in which the two areas can come together to put science in court on a stronger footing.

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nature chemical biology

...publishing research on the small molecules and molecular mechanisms

U.S. Supreme Court Ends Confrontation Clause Challenge - Upholds Forensic Expert Ruling in Melendez-Diaz case.

National Association of Criminal Defense Lawyers

Principles and Recommendations to Strengthen Forensic Evidence and Its Presentation in the Courtroom



Adopted by the Board of Directors
February 27, 2010
Austin, Texas

Newsweek

But it Works on TV!
Forensic 'science' often isn't.

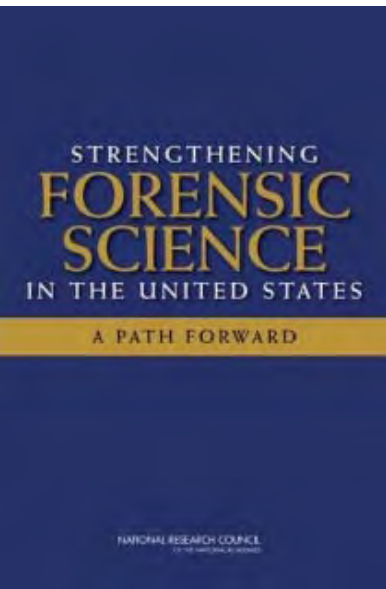
Home » Columns, Science Policy

Weak Forensic Science Has High Cost

National Research Council (NRC)- “Strengthening Forensic Science in the United States: a Path Forward”

- The congressionally mandated report finds “serious deficiencies in the nation's forensic science system and calls for major reforms and new research. Rigorous and mandatory certification programs for forensic scientists are currently lacking....”
- National Academy of Science (NAS)-
'BADLY FRAGMENTED' FORENSIC SCIENCE SYSTEM NEEDS OVERHAUL'

NAS report—the problems



- Fails to consider wildlife forensics at all.
- Focuses on standardization, which is easier if:
 - You work on one species
 - That species is extremely well-studied
 - Commercial companies manufacture widely available “kits” for analysis
 - Everyone uses the same “kits”
- Non-standard ≠ “junk science”

NAS report on Forensic Science

7. Mandatory laboratory accreditation and individual certification of forensic science professionals

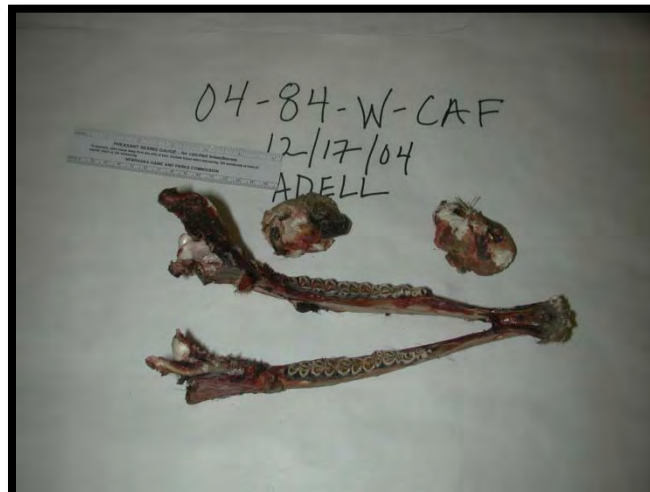
- No program for certification currently exists for wildlife forensic practitioners.
- No program for accreditation exists specifically for wildlife forensics, though Texas Parks and Wildlife, UC Davis's Veterinary Genetics Lab, and USFWS-Ashland are accredited.

STRENGTHENING
WILDLIFE FORENSIC
SCIENCE
IN THE UNITED STATES

A PATH FORWARD

Implications of the Report

- While the report focused its entirety on human forensics, its call for increased scientific rigor, standardization, accreditation of forensic labs and certification of practitioners will reach to encompass non-traditional disciplines like Wildlife Forensics



Criminal Justice and Forensic Science Reform Act of 2011

- **Leahy Bill- A BILL** to establish an **Office of Forensic Science and a Forensic Science Board**, to strengthen and promote confidence in the criminal justice system
- **“Among other things, ... will require that all forensic science laboratories that receive federal funding require all relevant personnel who perform forensic work for any laboratory..... become certified in their fields, which will mean meeting standards in proficiency, education, and training.”**

Differences in human vs. non-human forensics-Major Goal



Why do we need our own SWG?

Differences of human/wildlife labs

- Potentially thousands of species (not just one) & none are as well studied as humans
- Work with animals that have very different/unknown numbers
- Question can be whether a crime has occurred, not who did it
- The victim is usually an animal and perpetrator is a human
- Practice is hard to standardize because
 - No commercial interest in developing “kits,” so each lab develops their own
 - Many species, many questions
- Much smaller staff and a lot less \$\$

Scientific Working Group for Wildlife Forensics

SWG-WILD

- Created in 11/2010
- Hand picked international group representing private, state, and federal wildlife forensic laboratories as well as the National Institute of Justice
- Three sub committees
 - ✓ **White Paper**
 - ✓ **Certification**
 - ✓ **Best Practices/Guidelines**
- Only part of federal mandates not addressed by the group is accreditation and research

Members

- Kathy Moore (M)-Chair, NOAA NOS Marine Forensic
- Dr. Irv Kornfield (M)-Vice Chair- University of Maine
- **Dee Dee Hawk (M)- Chair of White Paper- Wyoming Game and Fish Dept. and Society for Wildlife Forensic Sciences-President**
- Kim Frazier (M)-Secretary-Wyoming Game and Fish Dept.
- Mary Curtis (M)-USFWS National Forensic Lab
- Dr. Paul Wilson (M)- Trent University, Canada
- Christina Lindquist (M)-UC Davis Veterinary Genetics Lab
- Carolyn Ferrell (M)-Society Secretary
- Piper Schwenke (M)- NMFS Northwest Fisheries Science Center
- Rob Ogden (M)-TRACE Network, UK

Members

- Pepper Trail (M)-USFWS National Forensic Lab (Morphology)
- Bonnie Yates (M)-USFWS National Forensic Lab (Morphology)
- Jenny Giles (M)-University of Queensland, Australia (Morphology)
- Dr. Ed Espinoza (SME)-US Fish and Wildlife
- John Paul Jones (SME)-NIST Office of Law Enforcement Standards/NIJ
- Trey Knott (SME)-NOAA NOS Marine Forensic Lab
- Dr. Wayne Lord-University of Central Oklahoma
- Christopher O'Brian-University of Central Oklahoma
- Dr. Danny Walker-University of Wyoming

Meetings

- Initial meeting in South Carolina in November of 2010- Genetics Contingency-Paid for by agencies involved or individual participants
 - By-laws and established three working groups with leaders
 - Established officers
 - Started on drafting documents
 - Hosted by NOAA



Additional Meetings

- 2nd meeting in July 2011 in Denver-Paid in part by Wyoming Game and Fish Department for some participants and others had their agencies paying their way
 - Developed Certification Scheme/Started on a certification test
 - Started a Morphology Group
 - Work on Best Practices and Guidelines document for /started those for
 - White paper
- 3rd meeting-Lake Tahoe –December Wyoming Game & Fish Department individual agencies paying



What has been accomplished

- Recognition of the Group by the FBI-Invited to Scientific Working Group Meeting
- Consensus reviewed document-“Best Practice & Guidelines” for genetics and morphology–will meet new Federal Mandates
- Consensus reviewed Certification scheme modeling other professional organizations
- White-paper which has been distributed to stakeholder groups, NGOs and Congress members

Additional Accomplishments

- Recognized by one of the accreditation bodies as Wildlife Forensic experts and have been asked to assist with writing accreditation requirement specific to wildlife forensic laboratories
- This is very important and may be the saving grace of all the State Wildlife Forensic Laboratories in the United States.
- WGFD/Individual agency funded

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Forensic Laboratory Capabilities

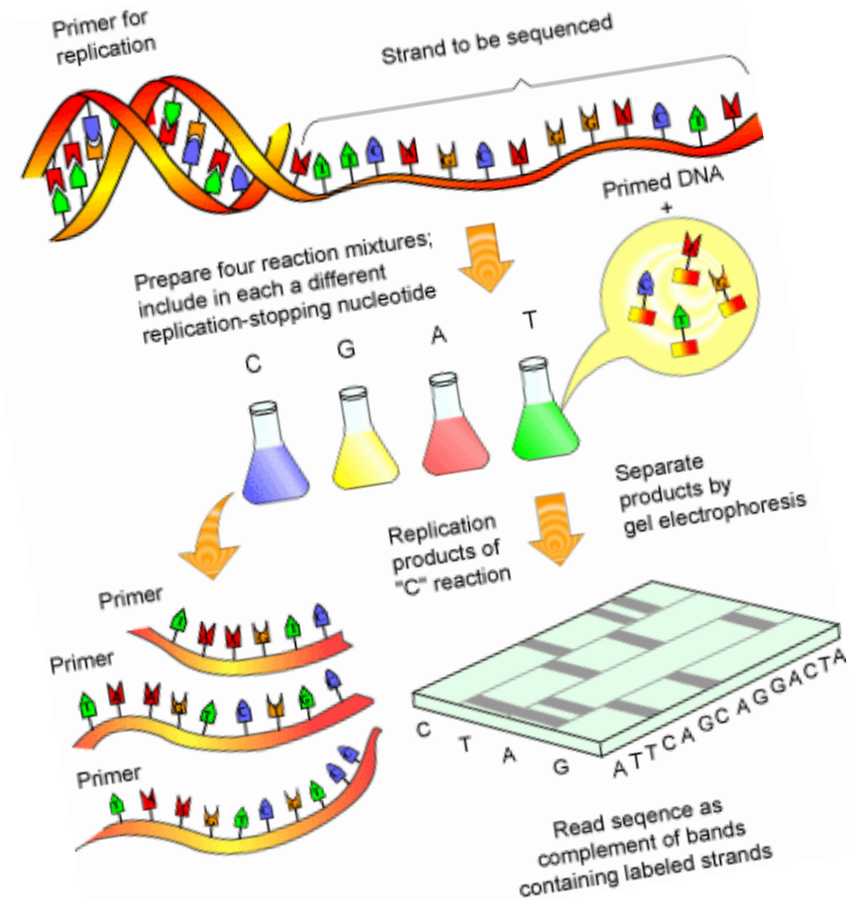


Using Science to test evidentiary items submitted by LE



Species Identification

- Proteins
- DNA Sequencing-
Used for degraded
samples &
identification of non-
traditional species



Species Identification-Big Game- Proteins and/or Sequencing



Species Identification for CITES Species- DNA Sequencing



- Spearguns are often seized in suspected poaching cases of endangered sea turtles.
- To identify the species, NOAA analysts examine trace evidence on the harpoons

One issue...

The commonly occurring species defining characteristics are typically not present on wildlife parts and products seized as evidence



But wildlife officers typically seize wildlife parts and products



Species Identification for CITES

Species-Chemical Analysis

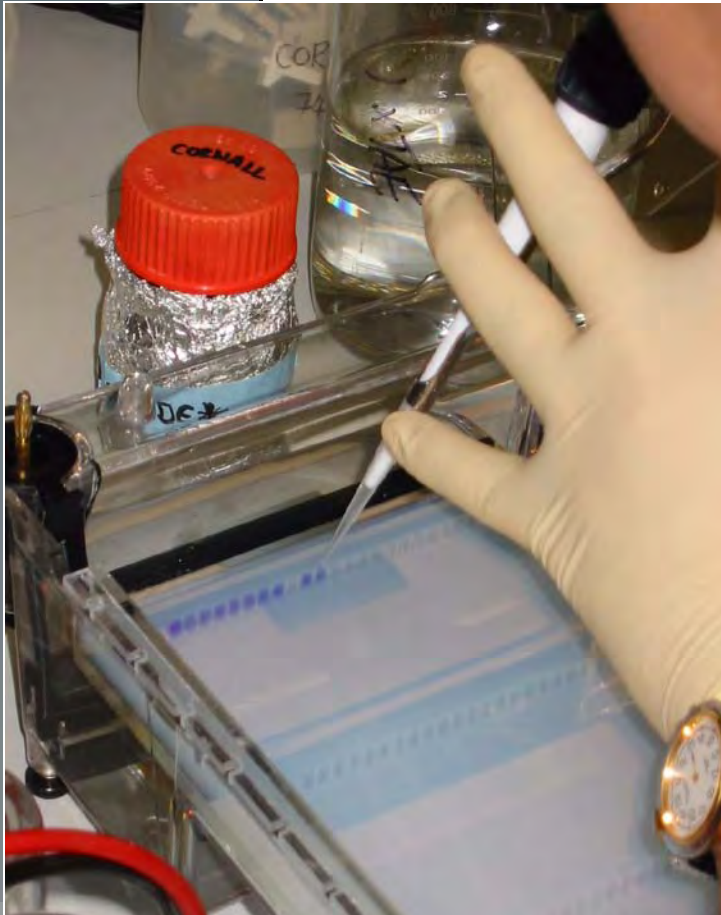
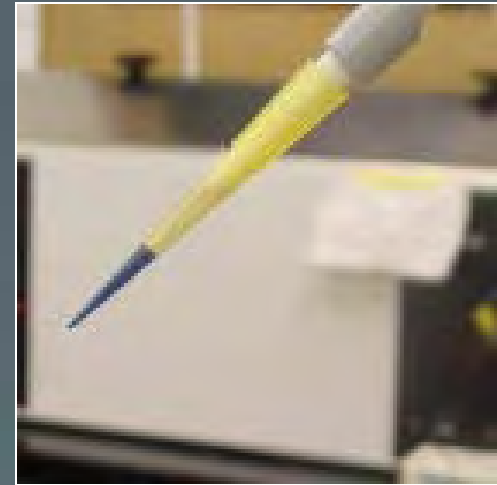


- **Black Coral**
- **To ensure that international black coral trade is not detrimental to the survival of wild populations, all Antipatharians were listed in Appendix II of CITES in 1981.**

Gender DNA Analysis

XX-Female

XY-Male



Example of a gender gel
One band pattern is XX-female
Two band pattern is XY-Male

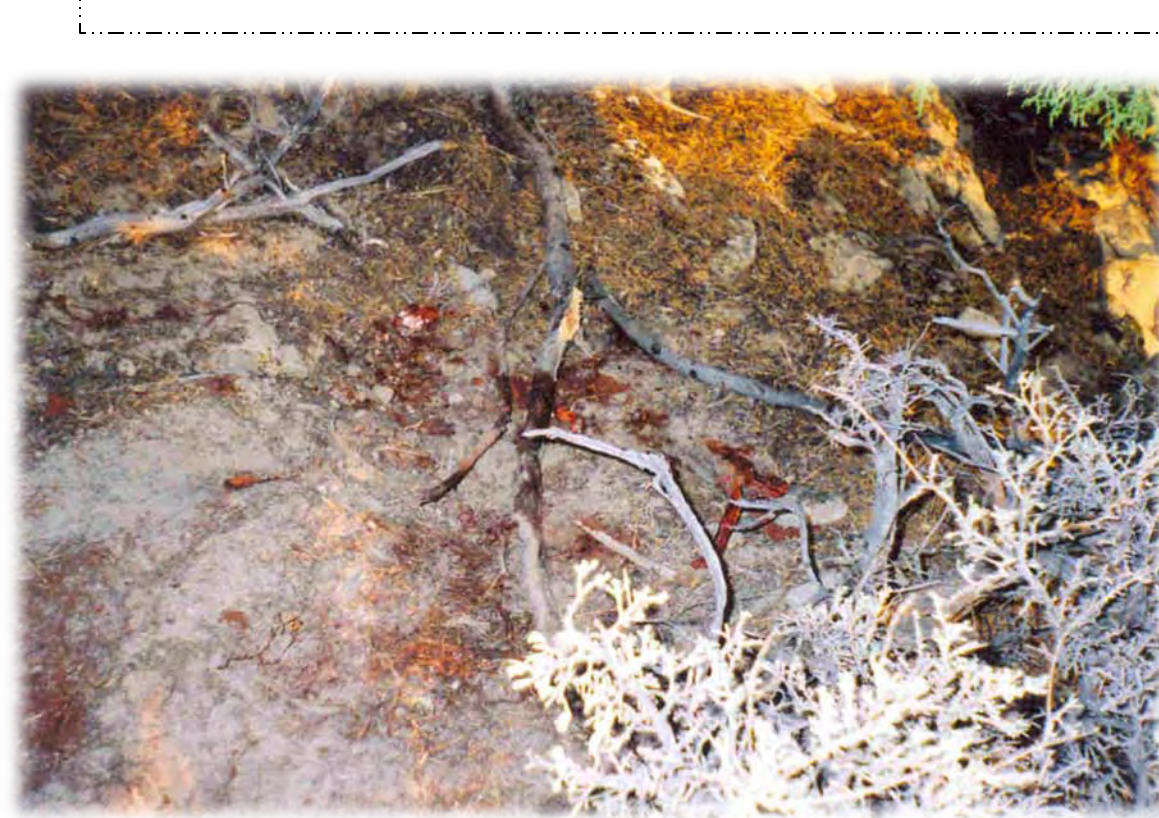
DNA Matching



The same DNA is found throughout the body

Making it possible to match a gut pile in a closed area to a carcass seized from the suspect poacher

What Can We Do With Forensic Analysis?



Freezer Search Case-Over Limit



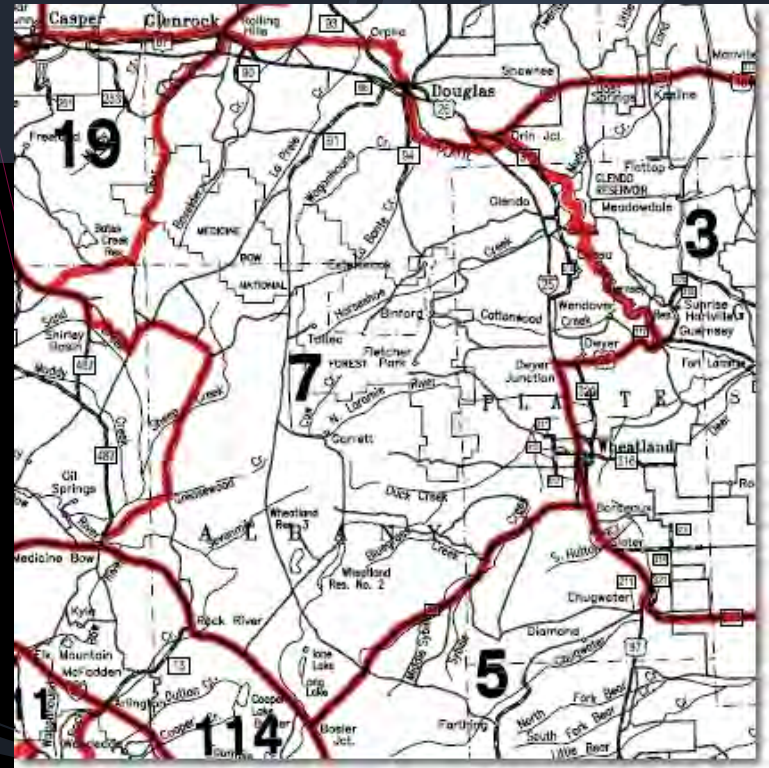
Wrong Gender



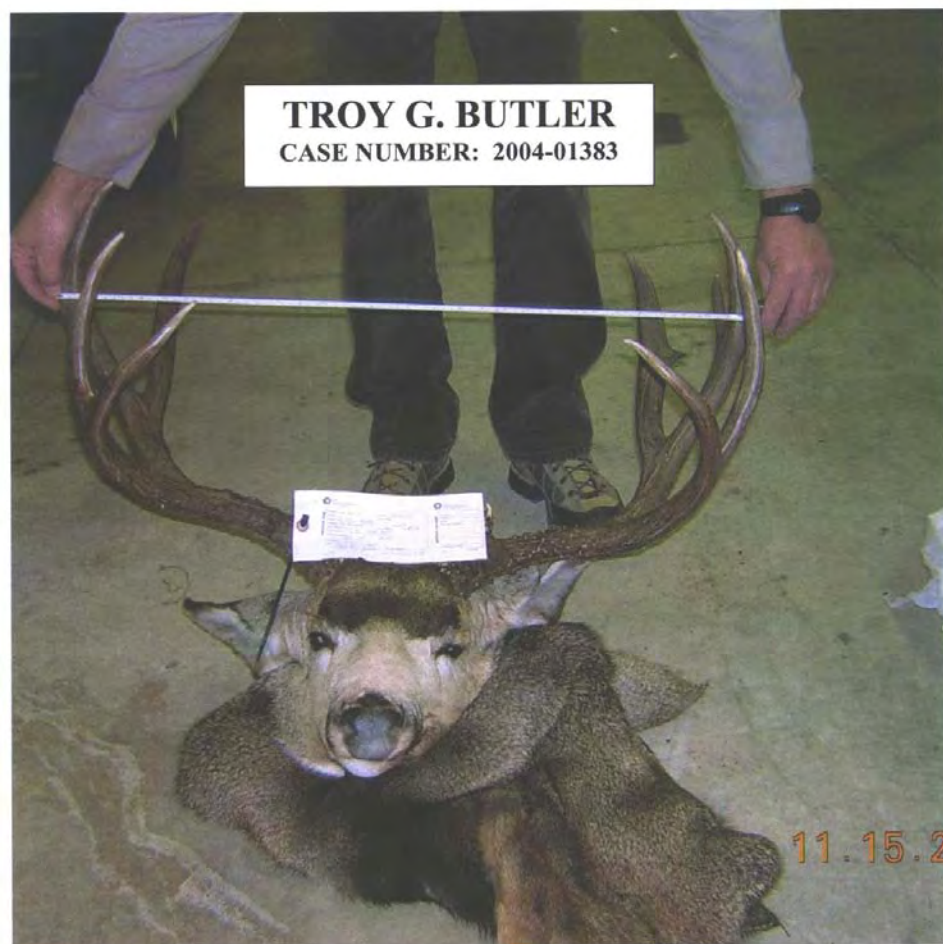
Trespassing Wrong Area

**PRIVATE
PROPERTY**

**NO HUNTING
NO TRESPASSING**



Abandonment/Waste of Edible Portions



Grizzly Bear vs. Human



Suggested Protocol for Forensic Evidence Collection in Aggressive Wildlife/Human Interactions

Dee Dee Hawk, Laboratory Director
Wyoming Game and Fish
Wildlife Forensic Laboratory
Laramie, WY



CHICK KIT training



Carnivore Human Interaction Collection Kit (CHICK kit)

- **Carnivore Carcass Collection Kit** - Collection of evidence and the carcass to be transported to the laboratory
- **Victim Collection Kit** -Collection of evidence from the human victim
- **Animal Sampling Kit** -To be used in emergencies only when the whole carcass of the suspected offending animal can not be sent to the laboratory and evidence must be taken in the field

Blajszczak Deer Case-Wyoming



- Thirty-three evidentiary items
- Packaged meat, blood/hair/tissue from the pick-up
- Carcasses
- Antlers



- Lab matched meat from the freezer and the samples from the truck to the two illegal mule deer
- Fines=\$22,000
- Restitution=\$8,000
- Lost privileges for 10 years

LOCAL U.S. WORLD BUSINESS SPORTS ENTERTAINMENT HEALTH LIVING TRAVEL OPINION SHOP

LAKERS CLIPPERS DODGERS ANGELS USC UCLA KINGS DUCKS SOCCER HIGH SCHOOLS BLEACHER REPORT



SPORTS BLOGS: FABULOUS FORUM | LAKERS | DODGERS | OUTPOSTS | VARSITY TIMES INSIDER

Search

Poacher hit with \$30,000 fine and 10-year hunting ban for killing two deer

November 23, 2009 | 12:39 pm

(o) (6) Comments (o)

Outposts

OUTDOORS, ACTION, ADVENTURE



A Wyoming man has been ordered to pay a \$30,000 fine and has been barred from hunting and from accompanying anyone else hunting for 10 years for shooting two mule deer from his pickup truck.

Adell/Scott Mountain Goat



- Joint investigation between WGFD Investigative Unit, Montana Investigators and USFWS
- Defendant had WY license. Killed two nanny goats in MT

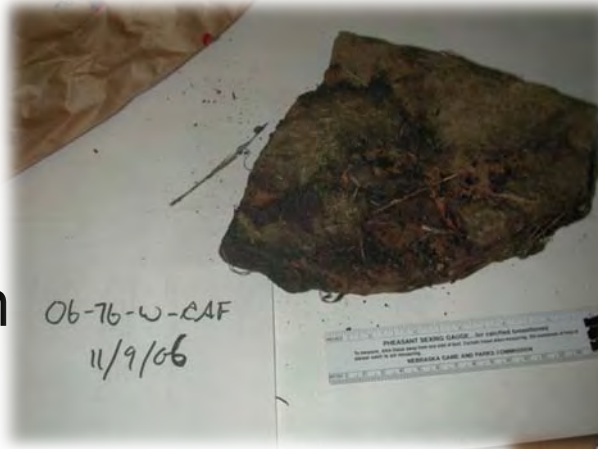


- Lab matched seized head to carcass and meat from the defendants freezer
- \$3,000 in restitution
- \$1,000 in fines
- Loss of privileges- 18 months



The Bear who solved the elk poaching case

- Paid over \$15K in fines and the Samson bull was seized by USFWS in Louisiana





NOAA Marine Forensics Program



Federal vs. state cases



- Federal cases are most often species ID, not individual ID
 - Federal law often governs “no take” species: ESA, MMPA, MBTA...
 - Sometimes the issue is season, bag or size limit, fishing gear, possession of permit (MSFMA)
- Federal databases are often smaller than states’
 - because “no take” species are difficult to sample
 - because of the enormous number of possible source species and populations
- 75% of USFWS work and 95% of NOAA work is species ID using mtDNA



US Fish and Wildlife National Forensic Laboratory



Sea Turtle

- Guitar picks
- Banjo picks
- Inlays in guitars
- Inlays in violin bows
- Jewellery
- etc.



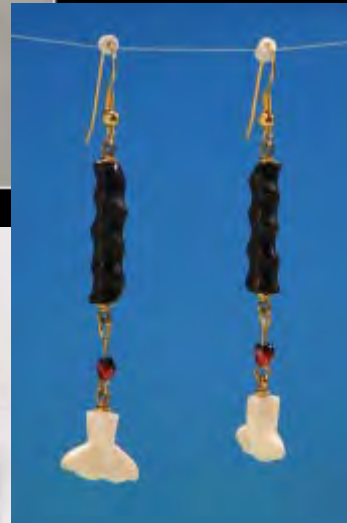
Horns



Black corals (Antipatharia)

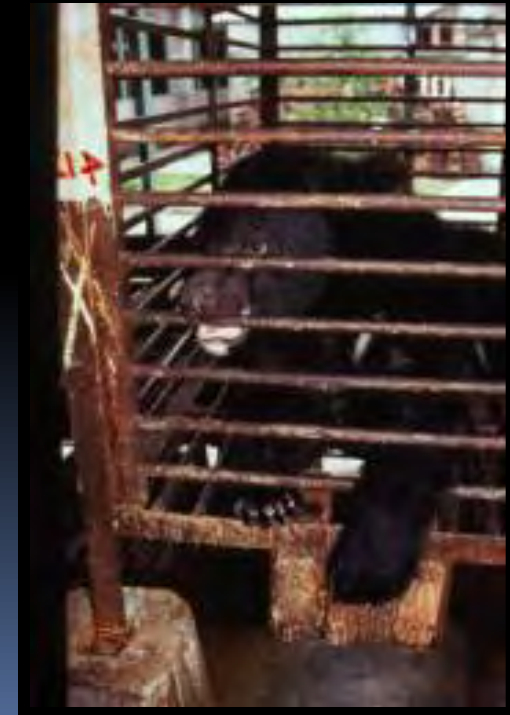
- deep water
- tree-like corals
- 42 genera
- 230 species
- CITES App II
- Longest living organisms
 - ~4000 years old





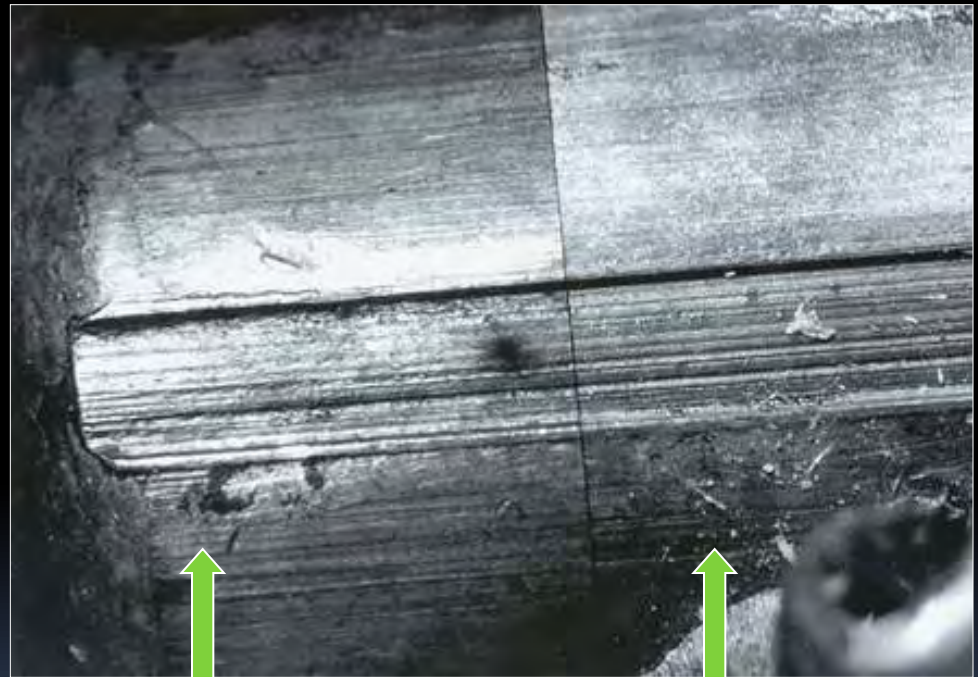
Bear Bile: Facts and Trade

- 1 million Black bears in North America
- 40,000 Gall bladders available each year in the U.S.A.
- 10,000 Kg of bile collected each year in China



Criminalistics

Comparison of an Expended Bullet against a Known Test-fire



test-fired bullet
from known
weapon

expended bullet
from crime scene

Pathology



Mammalogy



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Stakeholder groups

- As our most important stakeholder group, we wanted to inform you on the status of wildlife forensics on a national level
- We are asking for professional support
- Will also be asking for financial support from numerous other stakeholder groups: the Federal Government, and NGO's to continue the SWGWILD meeting and for the certification program

Collaboration

- Society can help assist a State Wildlife Agency/Officer with finding a laboratory that can perform the analysis needed
- Will be writing up a program/list of requirement an officer/agency should ask a laboratory before they utilize their services
- If you determine there is a need, will put together sampling kits that the Society will sell to Officers/Agencies using the expertise of the Society to determine best products
- With AWFA/WAFWA/Midwest on board, better chance of Federal Government listening to our requests

Benefit of the Society to LE

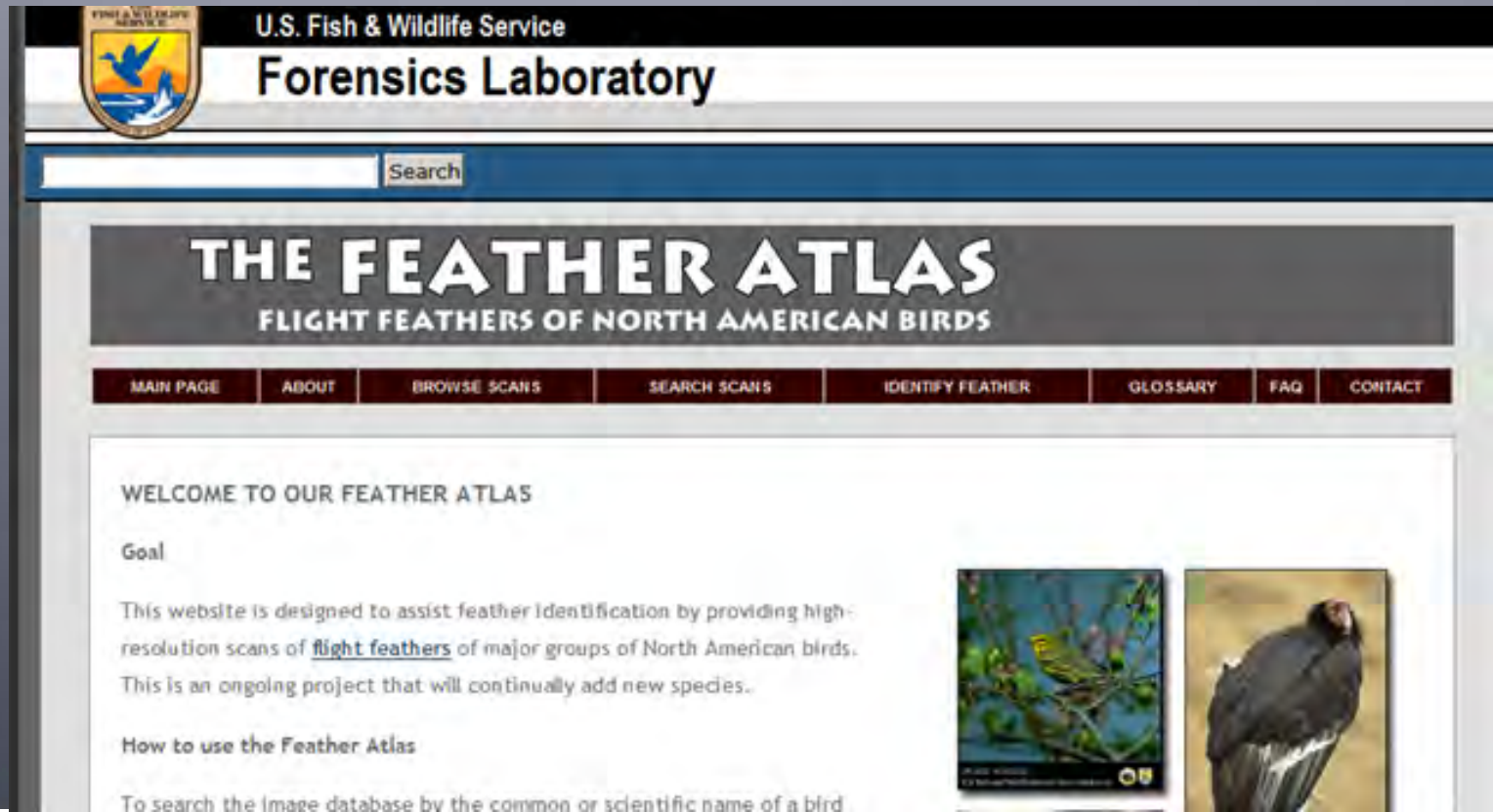
- There is a professional group that represent scientists that were concerned enough with best practices to put together a Society
- Work with LE to insure the field personnel are trained correctly; Sponsorship fee to assist with crime scene training
- We are only as strong a voice as our membership allows, need to have all the states with laboratories involved in the Society and the Proficiency Program

Increased Court Credibility

- Third Party Proficiency Program
- Ethics requirements
- Standardization of databases-make it available to all non/human wildlife forensic laboratories
- Standardization of statistical calculations
- Sharing of protocols
- Standardization of procedures and protocols

Training

Feather atlas <http://www.lab.fws.gov/fa/index.php>



The screenshot shows the homepage of the Feather Atlas website. At the top is the U.S. Fish & Wildlife Service logo and the text "U.S. Fish & Wildlife Service Forensics Laboratory". Below this is a search bar with the word "Search" inside. The main heading is "THE FEATHER ATLAS" in large, bold, white letters on a dark background, with the subtitle "FLIGHT FEATHERS OF NORTH AMERICAN BIRDS" below it. A navigation menu contains links: MAIN PAGE, ABOUT, BROWSE SCANS, SEARCH SCANS, IDENTIFY FEATHER, GLOSSARY, FAQ, and CONTACT. The main content area has a "WELCOME TO OUR FEATHER ATLAS" section, followed by a "Goal" section stating the website's purpose for assisting feather identification. To the right of the text are two images: a yellow bird on a branch and a close-up of a dark feather.

U.S. Fish & Wildlife Service
Forensics Laboratory

Search

THE FEATHER ATLAS

FLIGHT FEATHERS OF NORTH AMERICAN BIRDS

MAIN PAGE ABOUT BROWSE SCANS SEARCH SCANS IDENTIFY FEATHER GLOSSARY FAQ CONTACT



WELCOME TO OUR FEATHER ATLAS

Goal

This website is designed to assist feather identification by providing high-resolution scans of flight feathers of major groups of North American birds. This is an ongoing project that will continually add new species.


How to use the Feather Atlas

To search the image database by the common or scientific name of a bird



Future goals

- List of contact names-labs who do the work
- Additional training
- Store-evidence collection kits
- More secure funding-additional research
- Centralized laboratory for those states without resources



If we are unsuccessful, in our goals of standardization, certification and input on accreditation; the new upcoming federal mandates will shut down all most, if not all, of the state wildlife forensic laboratories in the country.



Questions??