Wildlife Forensic Science

The Role of the National Fish and Wildlife Forensic Laboratory in Wildlife Prosecutions

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Raison d'être

Forensic Lab
Established in 1989
Accredited since 1995
The F&W Forensic Lab:

- Determine cause of death
- Identify evidence
  - Wildlife parts, bullets, latent prints, etc.
- Link:
  - Victim
  - Suspect
  - Crime Scene
- Search digital evidence

Lab Organization

Director (Ken Goddard)
  - Dep. Director (Ed Espinoza)
  - Admin Branch (Darrell Hegdahl)

Morphology (Barry Baker)
Chemistry (Mark Kirms)
Digital Evidence (Brian Horne)
Pathology (Tabitha Viner)
Genetics (Mary Curtis)
Criminalistics (Ed Espinoza)
Scientific Disciplines at the Lab

- Veterinary Pathology
- Morphology
- Genetics
- Chemistry
- Criminalistics
- Digital Forensics

All Crime Labs:

- Identify evidence
  - Link:
    - Victim
    - Suspect
    - Crime Scene
Species are usually defined

- By country of origin
- and characteristics found on the entire animal

The commonly occurring species-defining characteristics are typically not present on wildlife parts and products seized as evidence.
Forensic analysis is not needed...

But wildlife officers typically seize wildlife parts and products
All Crime Labs:

- Identify evidence
- Link:
  - Victim
  - Suspect
  - Crime Scene
- Also known as Individualization

At the crime scene there is a contact between

(Loead's Exchange Principle)
Wildlife Forensic Analysis:

- Class Characteristics (~80%)
  - ~4629 Mammal species
  - ~9600 Bird species
  - ~12000 Reptile and amphibian species

- Individualization (~20%)
Examples of Cause of Death Determinations

Veterinary Necropsy Protocol

- Whole body x-rays, two views
- Photograph evidence as received with identification numbers and scale
- External examination, +/- alternative light source
- Partially or completely skin carcass
- Internal examination
- Compose report of findings
External Exam
Radiographs

Ventral-dorsal (VD) view

Lateral view

[Images of radiographs and anatomical structures]
Internal Exam Findings

Trace Evidence
Examples of class character analysis

Shahtoosh Shawls (Tibetan antelope)
Seal coat (n> 8)

Leopard rugs
Colobus Monkey (n=12) & Leopard (n=2)
Bear gall bladders (n=>40)
Elephant toe nails

Pesticide misapplication
Hornbill skulls (n=40)

Eagle Radius (n > 50 eagles)
Amazonian native art

Vulture skulls

Bear claws
Bush meat (fish and rodents on a stick)

Bush meat (crocodilian)
Bush meat (cane rats and monkeys)

Bush meat (monkeys)
Primate and pig skulls (n>25)

Caiman skins (n>60)
Lorises (n>7)

Bush meat (Baby chimp)
Bush meat (loris)

Smuggled baby macaque
Examples of individualization

Cause of Death: Bullet Wound
Bullet Matches Suspects Weapon

Individualization using firearms tool marks
Comparison of an Expended Bullet against a Known test fire
Individualization using latent prints

Visualizing and Matching Latent Fingerprints

- Determination of individuality (i.e. crime scene sample and clothing stain are from the same individual)

Individualization using Genomic DNA
Carcass at Crime Scene

DNA

Results: Match

Tissue to Lab

Head taken from Suspect

To Lab

Current Individualization Capabilities

- Black Bear
- Brown Bear
- Elk
- White-tailed Deer
- Mule Deer
- Moose
- Wolf
Example of Digital Evidence

Raw Footage of Seized Video
Video Enhancement for Grand Jury

OUTREACH:
Over 7 million web hits in FY2011
The End

541 482 4191

www.lab.fws.gov