

# Wildlife Forensic Science

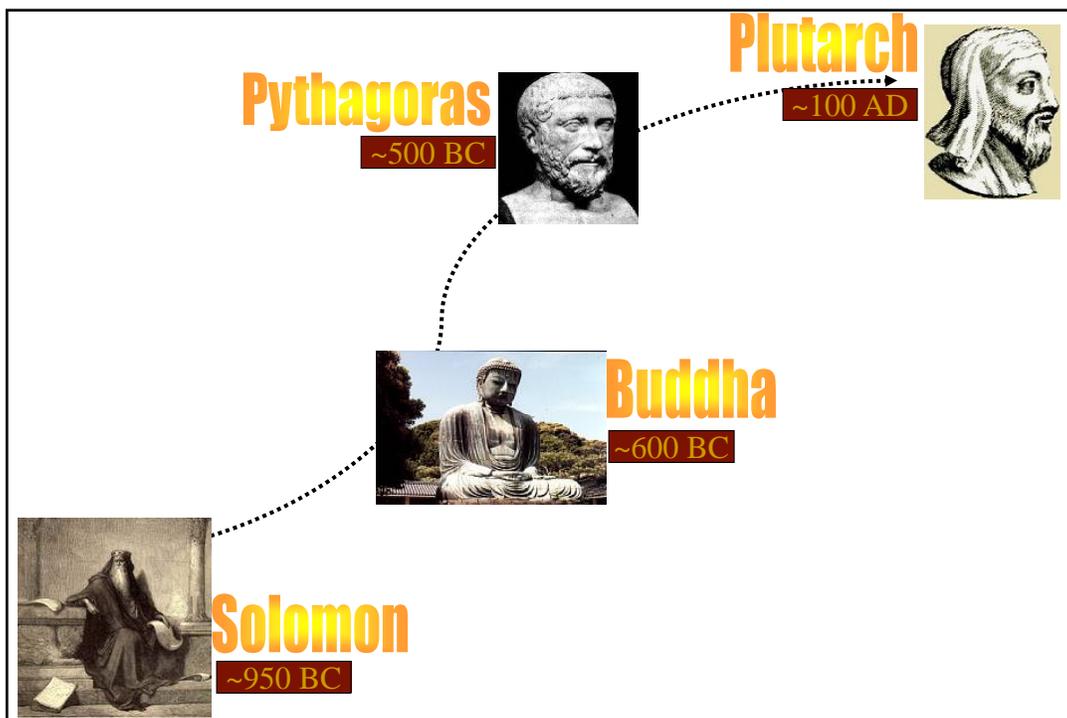


## The Role of the National Fish and Wildlife Forensic Laboratory in Wildlife Prosecutions

*Thursday Oct. 20, 2011*



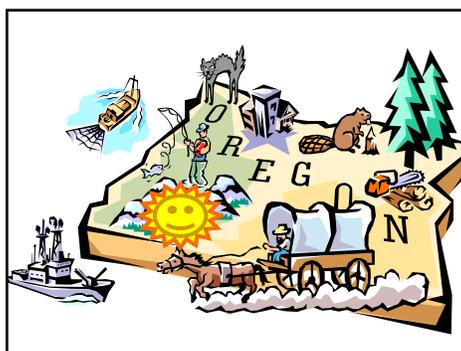
**Ken Goddard and Edgard Espinoza**  
National Fish and Wildlife Forensic Lab., Ashland, OR



# Raison d'être



The collage features four distinct images. At the top left, the text "Raison d'être" is displayed in white. Below it, a photograph shows a herd of bison grazing in a field. To the right, a photograph of a dead elephant seal on a beach is shown with a yellow evidence marker labeled "7". Below the seal, a globe highlights the Pacific Northwest region of the United States. In the bottom left corner, there is a small logo depicting a mountain, a tree, and a sun.



## Forensic Lab

Established in 1989  
Accredited since 1995



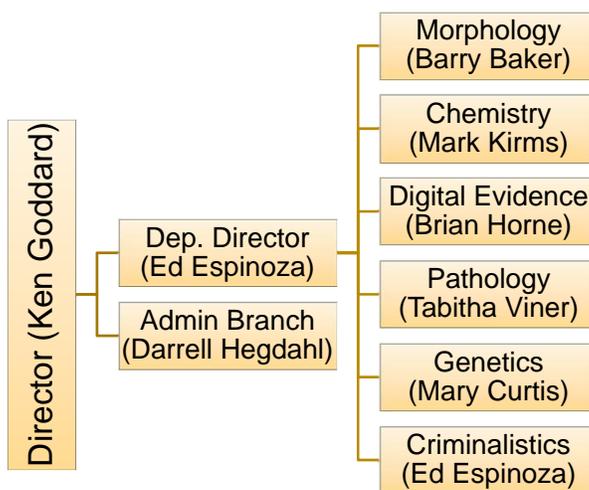
The slide features a stylized map of Oregon with various icons representing different aspects of the state, including a ship, a horse, a bear, a tree, a sun, a plow, and a cow. To the right of the map, the text "Forensic Lab" is displayed in large yellow letters, with "Established in 1989" and "Accredited since 1995" in blue below it. At the bottom, a photograph shows the William Paul Jack Wilson Forensic Laboratory building, a modern white structure with large windows, set against a cloudy sky. A small logo is visible in the bottom left corner of the photograph.

## 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



## Scientific Disciplines at the Lab



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



## All Crime Labs:

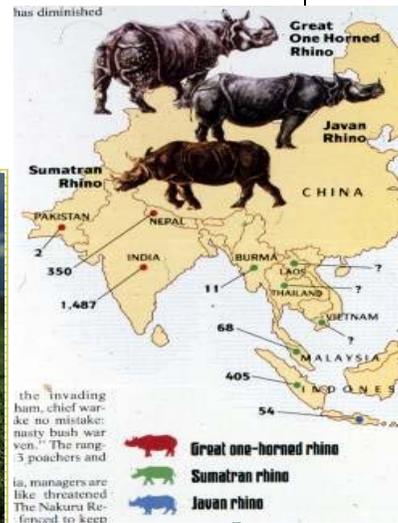


- ➔ Identify evidence
- Link:
  - Victim
  - Suspect
  - Crime Scene



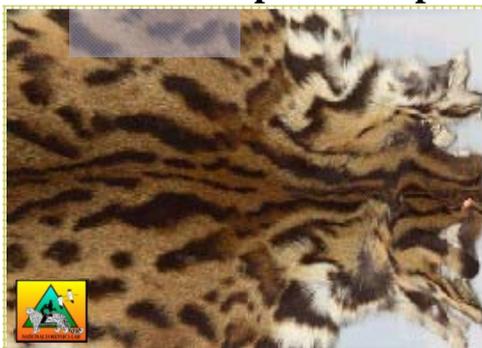
# Species are usually defined

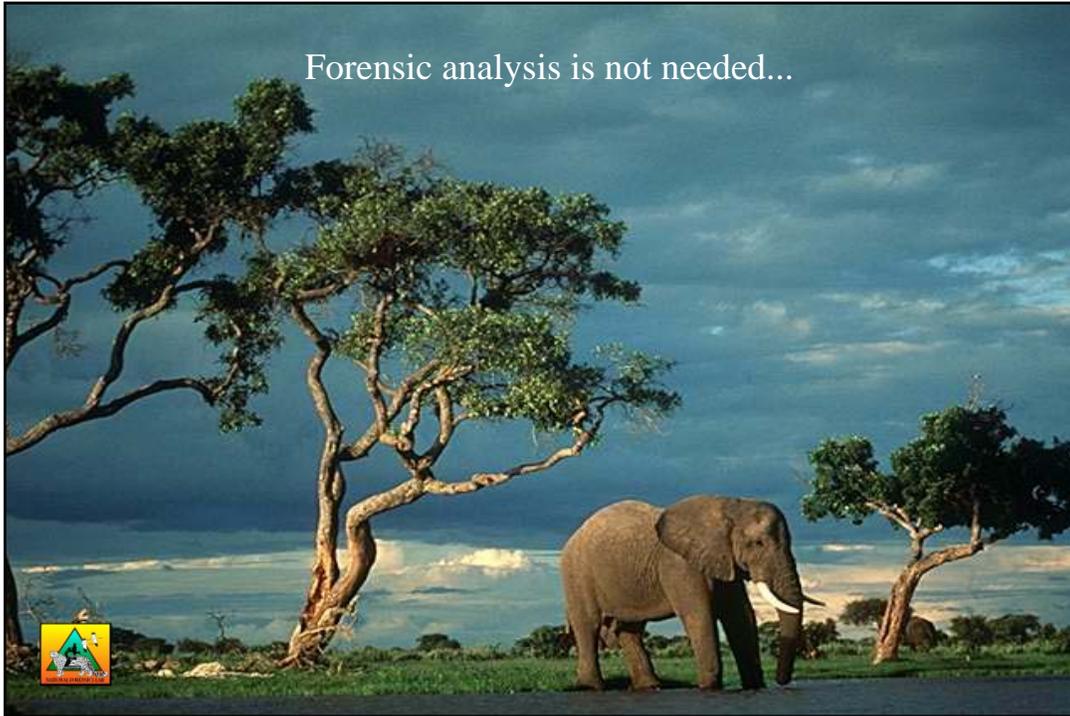
- By country of origin
- and characteristics found on the entire animal



# The Central Problem ...

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



## All Crime Labs:



Identify evidence

Link:

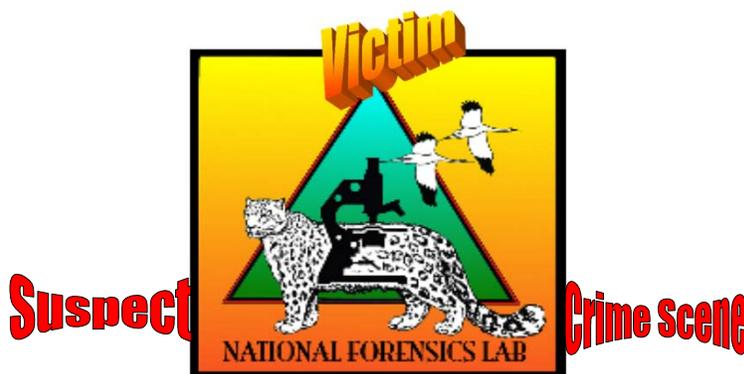
- Victim
- Suspect
- Crime Scene

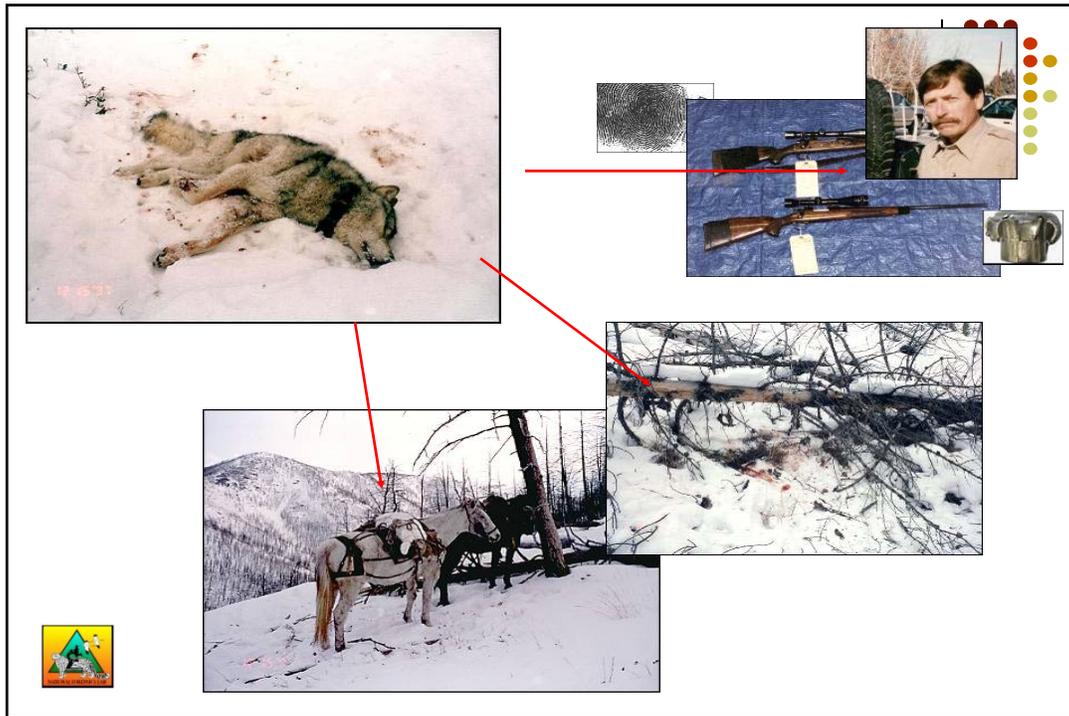
• Also known as Individualization



## At the crime scene there is a contact between

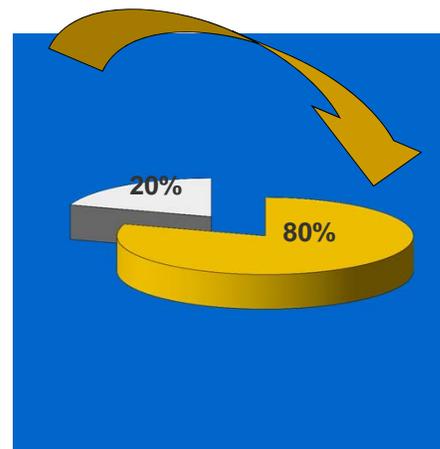
(Locard's Exchange Principle)





## 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

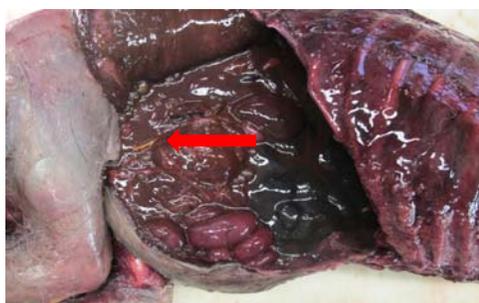


Ventral-dorsal (VD) view

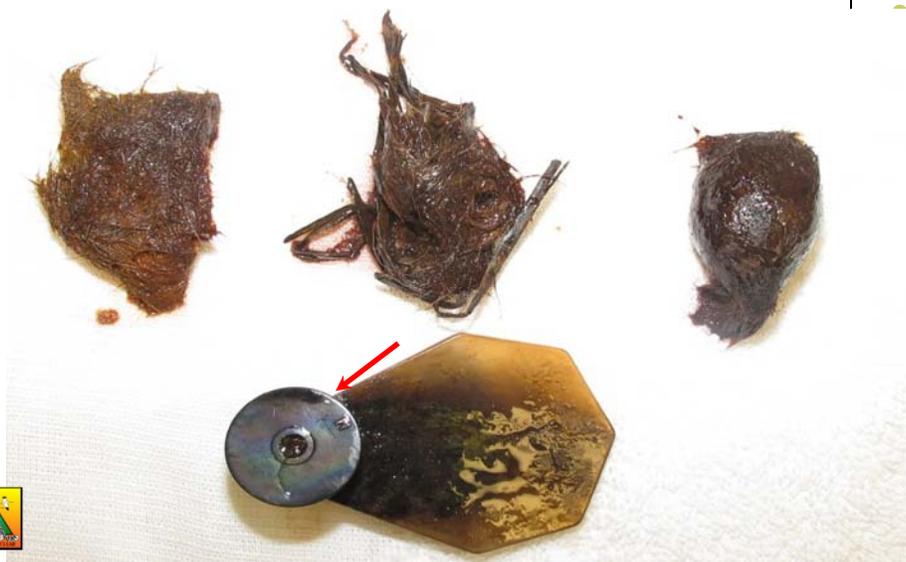
Lateral view



## Internal Exam Findings

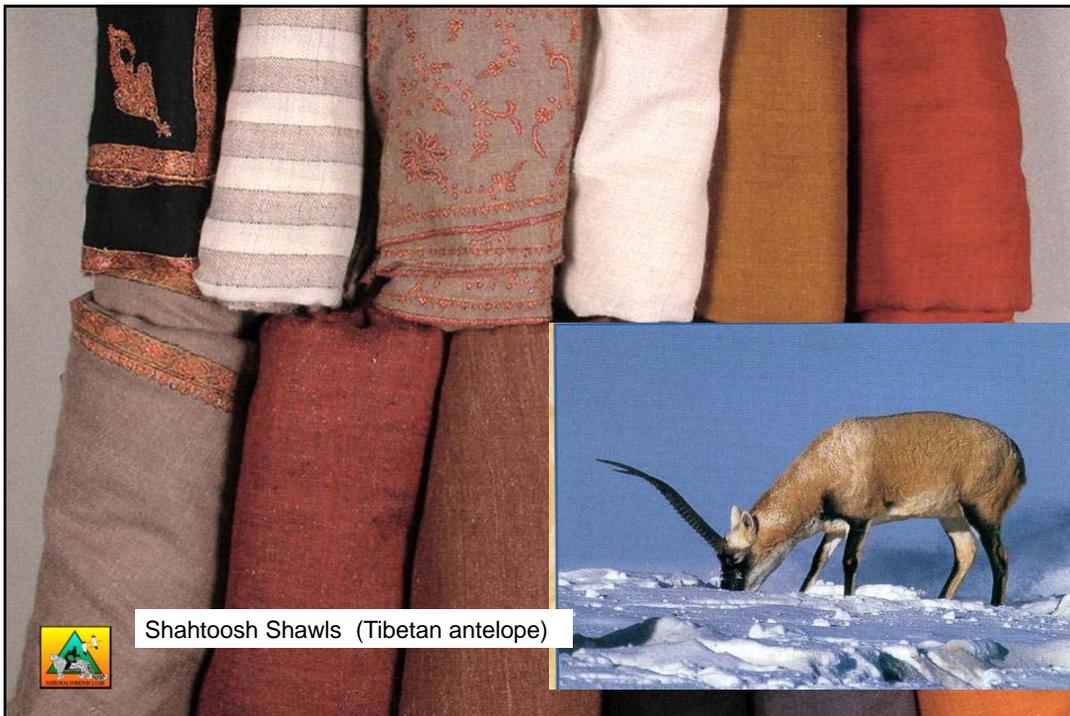


## Trace Evidence





## Examples of class character analysis

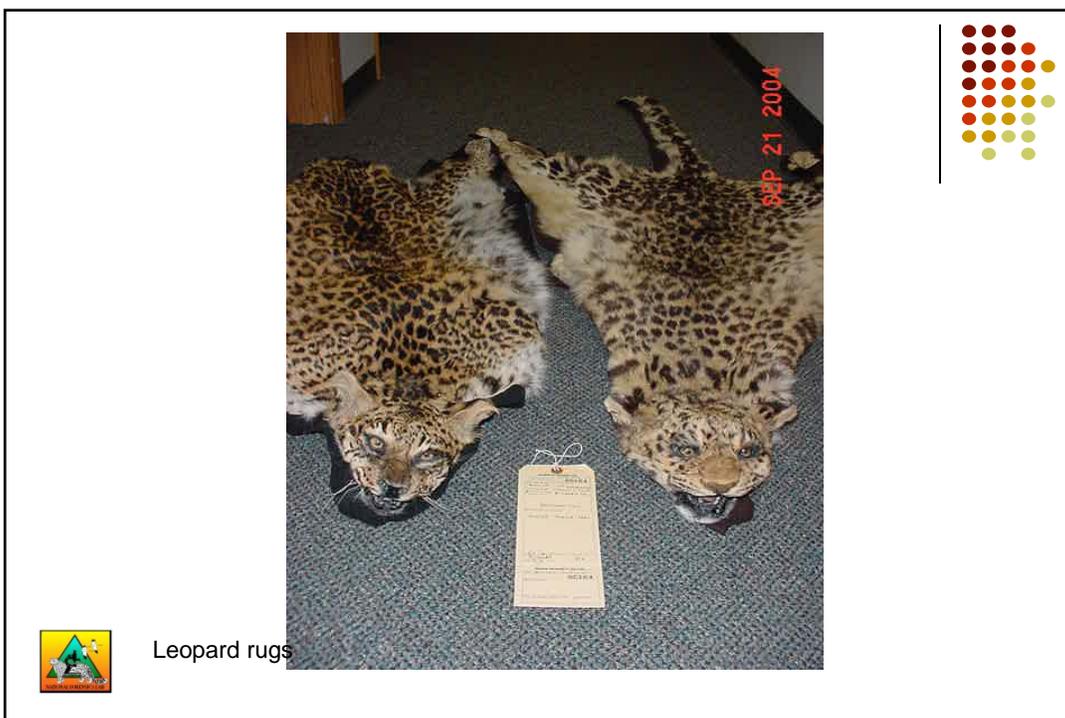


Shahtoosh Shawls (Tibetan antelope)





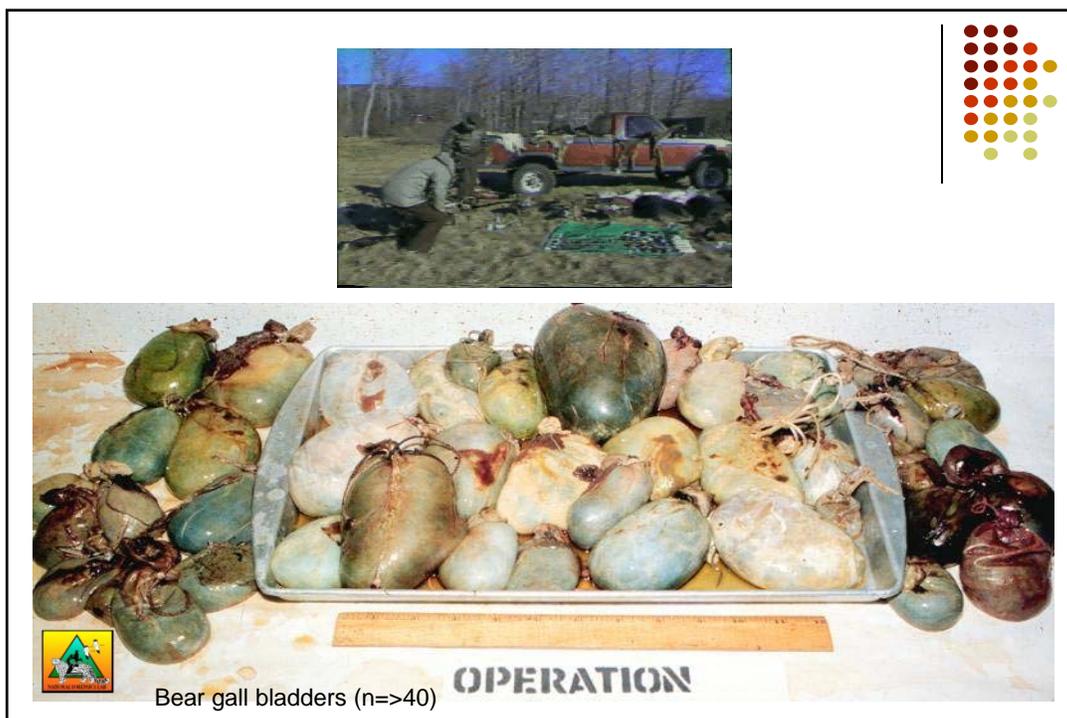
Seal coat (n > 8)



Leopard rugs







Bear gall bladders (n=>40)

**OPERATION**







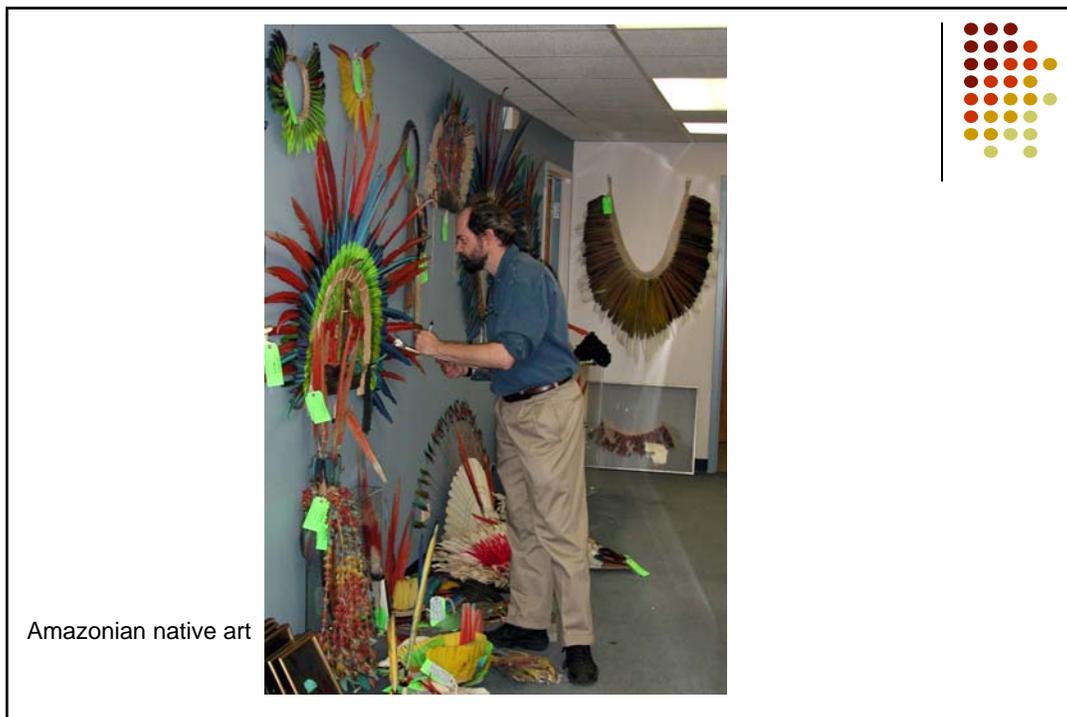




Hornbill skulls (n=40)

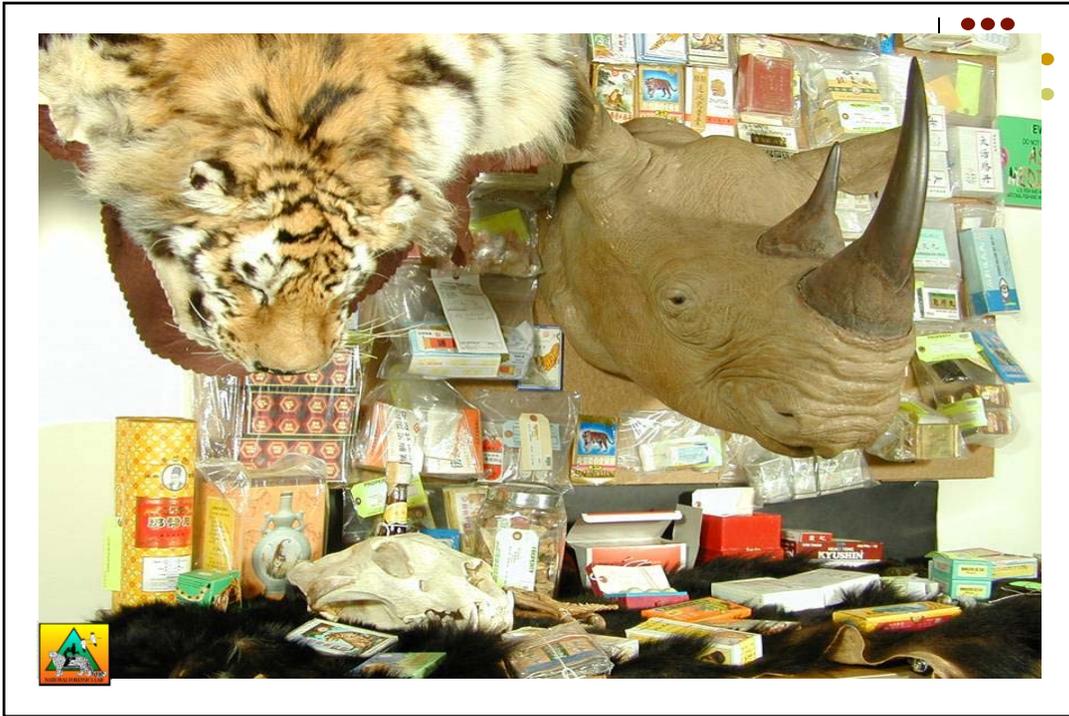


Eagle Radius (n > 50 eagles)





Asian snakes (n>10)





Bush meat (duiker)







Bush meat (cane rats and monkeys)



Bush meat (monkeys)





Primate and pig skulls (n>25)



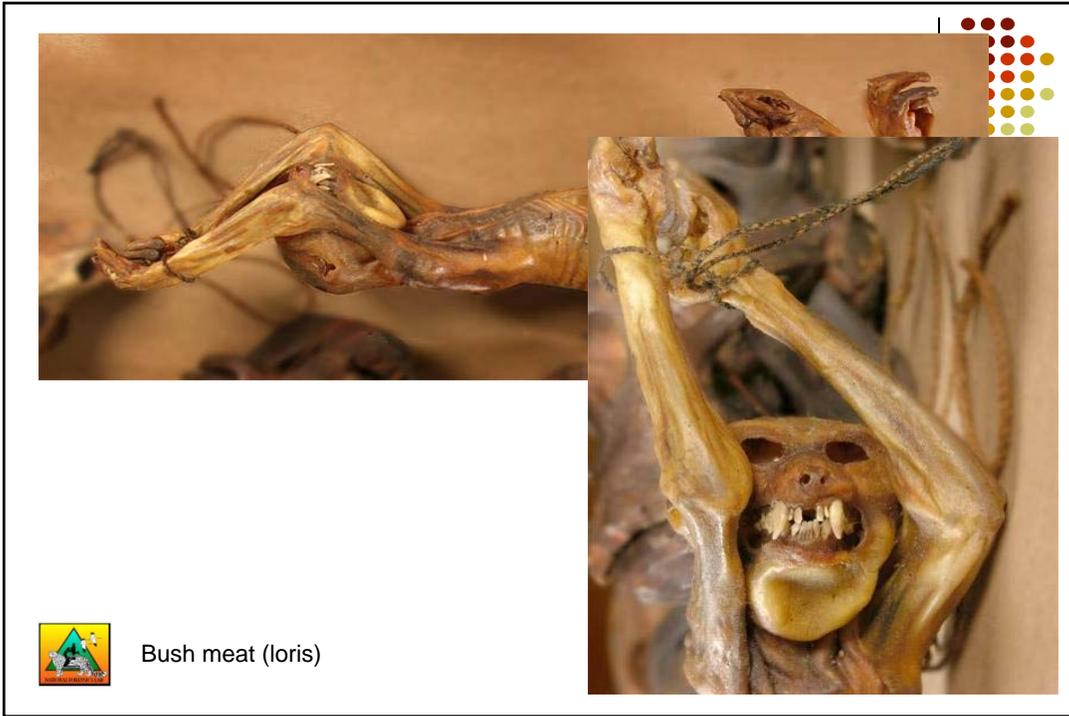
Caiman skins (n>60)



Lorises (n>7)



Bush meat (Baby chimp)



Bush meat (loris)



Smuggled baby macaque

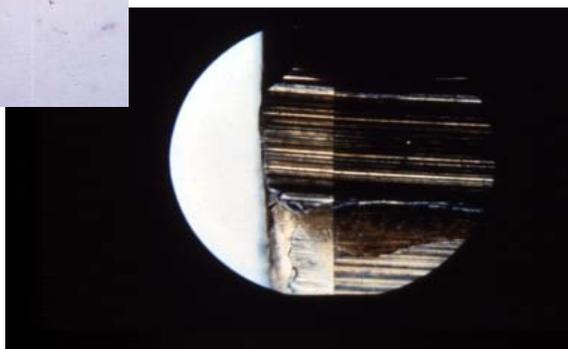
## Examples of individualization



## Cause of Death: Bullet Wound



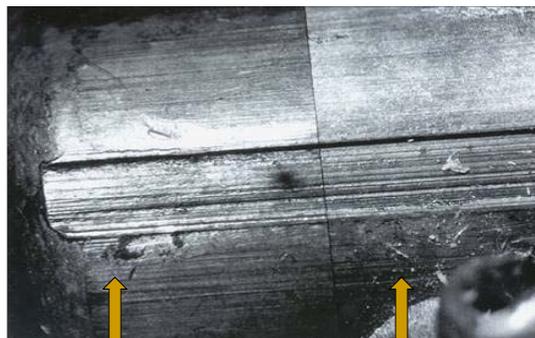
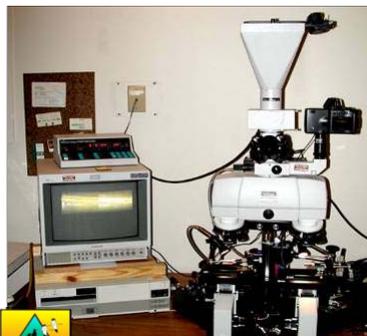
## Bullet Matches Suspects Weapon



## Individualization using firearms tool marks



Comparison of an Expanded Bullet against a Known test fire



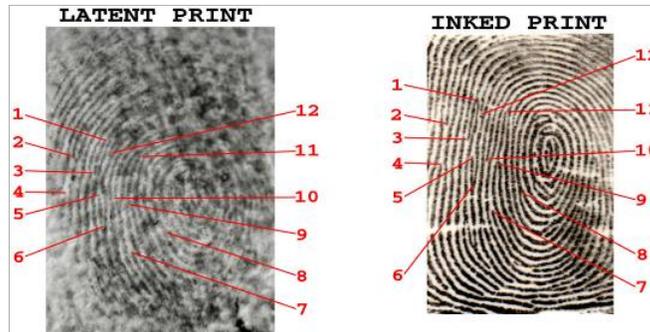
test-fired bullet from  
known weapon

expanded bullet  
from crime scene

## Individualization using latent prints



### Visualizing and Matching Latent Fingerprints

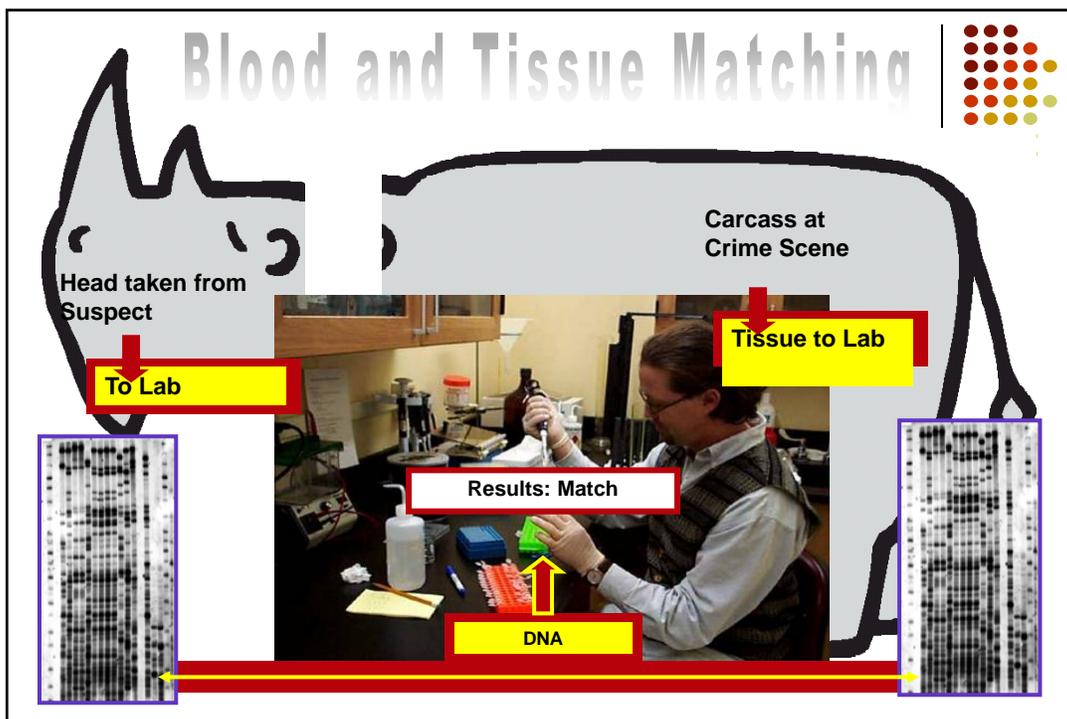


## Individualization using Genomic DNA



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





## 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



