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United Nations
Office on Drugs and Crime



GWP Knowledge Exchange: From Evidence to Action: What's Working in Wildlife Forensics?

24 June 2025



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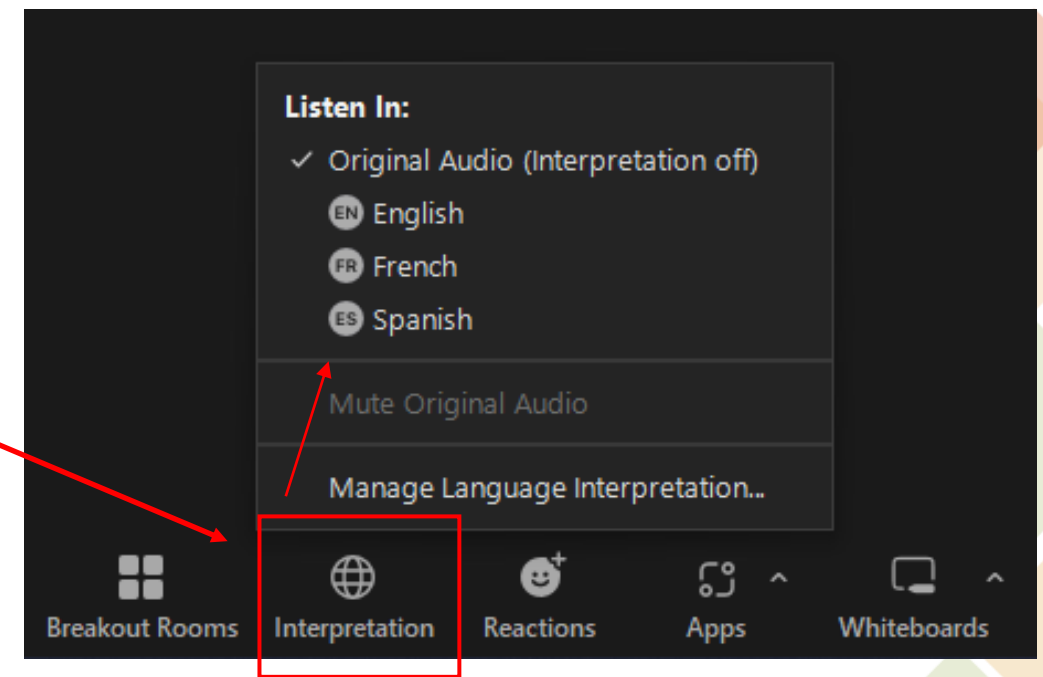


Join in English, Spanish or French

Interprétation en français // Interpretación en español

1. Pulse sobre el símbolo del globo terráqueo.
2. Seleccione **Español**.

1. Cliquez sur le symbole du monde.
2. Sélectionnez l'audio **français**.





**GWP Knowledge Exchange: From Evidence to Action:
What's Working in Wildlife Forensics?**

Part 1



Session Facilitator



Ross McEwing

Forensics lead, UNODC Global
Programme on Crimes that Affect
the Environment
(Thailand)

Presenters:



Greta Frankham

Scientific Officer,
Australian Centre for
Wildlife Genomics



Samuel Wasser

Executive Director,
Center for Environmental
Forensic Science (CEFS),
University of Washington



Armand Biko'o

Head of Africa
Programme, TRACE
Wildlife Forensics
Network, South Africa

Part 2



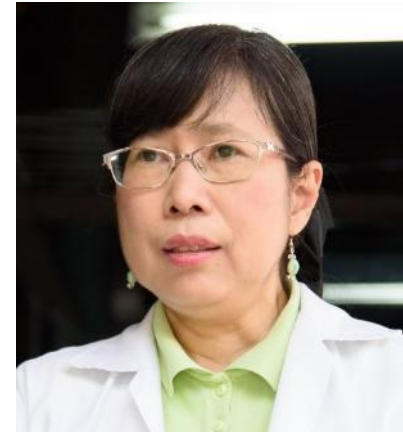
GWP Country Case Studies & Facilitated Exchange



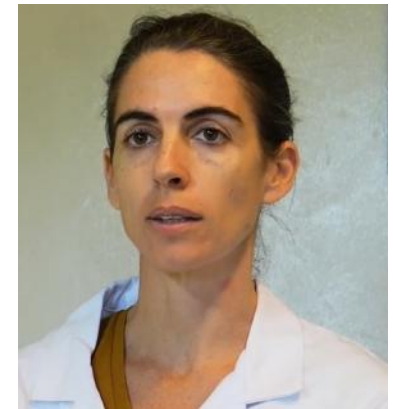
**Nurhartini Kamalia
Yahya**, Forensic Unit
Technical Manager,
Wildlife Health, WHGFL
(Malaysia)



Marli de Bruyn
Head of the Genetics
Services Unit and
Senior Scientist,
SANBI (South Africa)



Kanita Ouitavon
Wildlife Forensics
Principal, WIFOS
Laboratory, DNP
(Thailand)

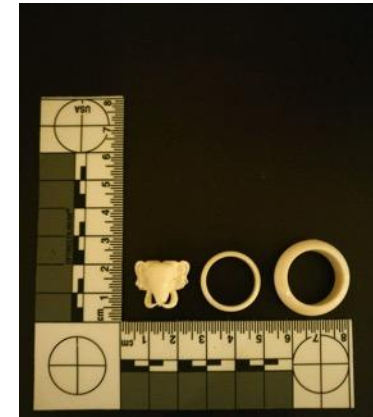
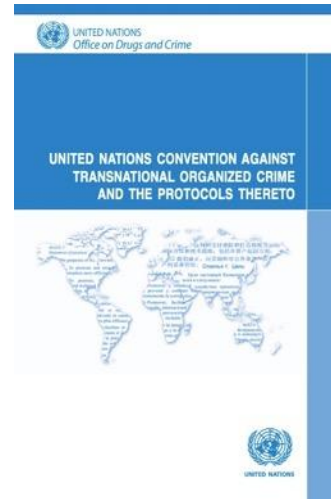
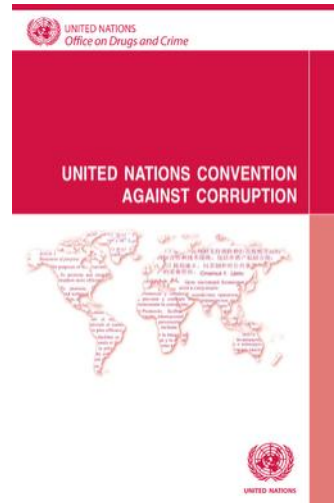


Stephanie Bourgois,
Head, Wildlife
Genetics Laboratory,
National Parks
Agency (Gabon)



Ross McEwing,
Technical Lead – Forensics
UNODC Global Programme on
Crimes that Affect the Environment
(Thailand)

Understanding Wildlife DNA Forensics



- CITES APPENDICES
- NATIONAL LEGISLATION (CITES)
- NATIONAL LEGISLATION (OTHER)
- LISTS OF SPECIES
 - IDENTIFY / VERIFY / DISPROVE



WILDLIFE CRIME / FORENSICS:

- Application of typical forensic techniques to wildlife crime cases.

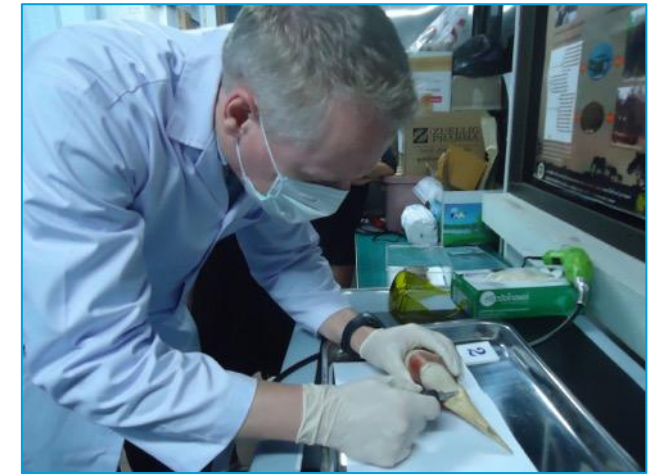


WILDLIFE FORENSIC TESTING:

- Scientific examination of non-human biological samples derived from a wildlife species



1. CRIMINAL JUSTICE RESPONSE /



WHY THIS MATTERS ?



Wrongful Conviction

Miscarriage of Justice



Procedural Errors



Rightful Conviction



Border Security

Thirty years jail for Kruger rhino poacher

defenceWeb - 10th October 2023

f

t

in

e



A convicted poacher will spend the next 30 years behind bars, the regional court in Skukuza has ruled.

Sidney Sibuyi was, according to a SANParks statement, one of three armed men who illegally entered the Kruger National Park on 26 September 2020 to "hunt rhino".

"Shots were heard by field rangers attached to Kruger's Stolznek section who reacted and gave chase. Sibuyi was arrested but his two accomplices managed to evade arrest and are still at large. A bag containing five fresh rhino horns and a heavy calibre rifle silencer were recovered close to the convicted poacher," the statement continues, adding: "the rifle and other poaching equipment were not found on him, indicating the escapees had those in their possession".

Sibuyi appeared in the Skukuza court in September – three days short of three years – after he was arrested and pleaded guilty to five charges, including three of "hunting rhinoceros" with another trespassing. Sentences will run concurrently with Sibuyi to serve an effective 30 years in jail.

The "heavy sentence" was welcomed by Kruger Managing Executive Oscar Mthimkhulu who hoped it sent "a strong message that wildlife crime is serious".

BBC

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InDepth

Israel-Gaza war

War in Ukraine

Climate

UK

World

Business

Politics

Culture

World

Africa

Asia

Australia

Europe

Latin America

Middle East

US & Canada

Ugandan ivory trader sentenced to life in prison

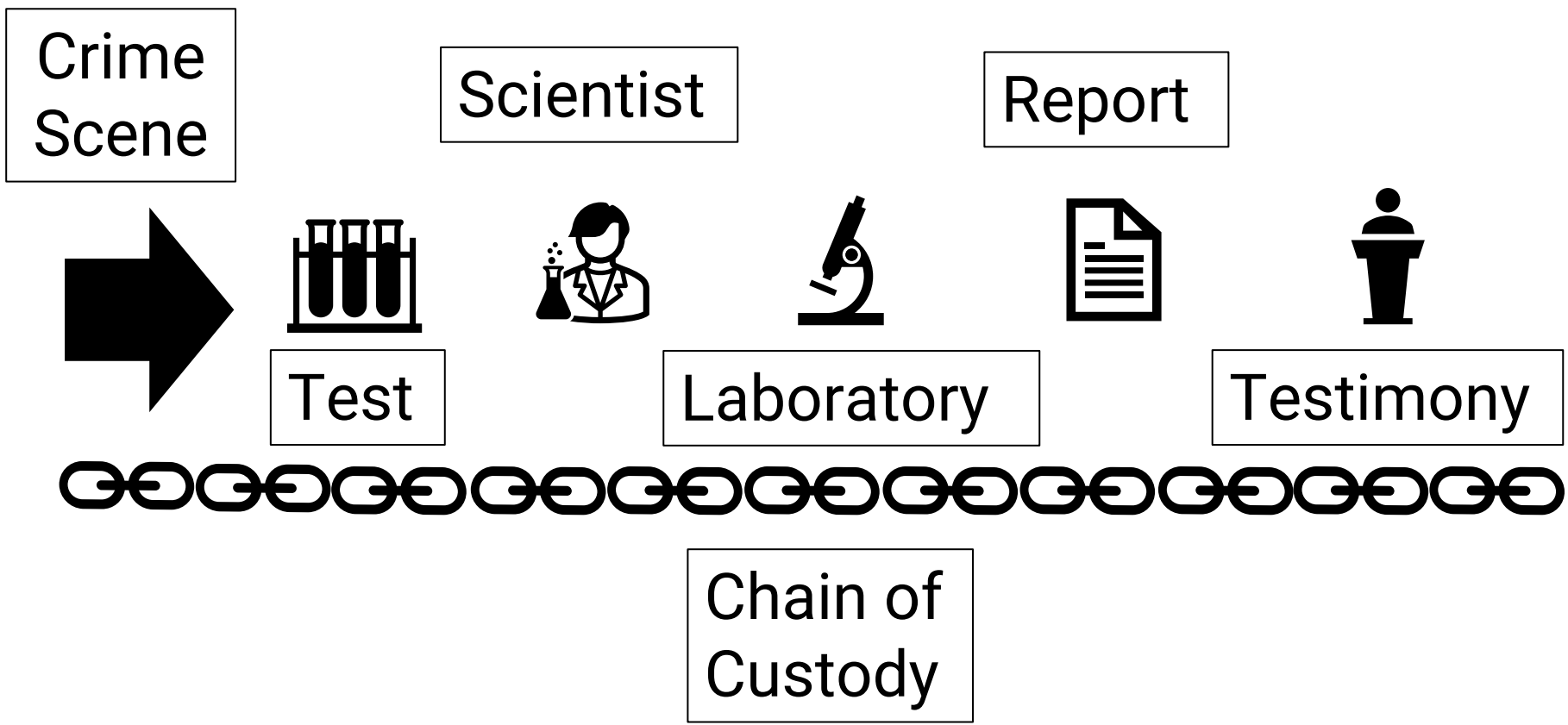
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GETTY IMAGES

Uganda's elephant population has been rising since the 1990s, but it still faces poaching and trafficking threats

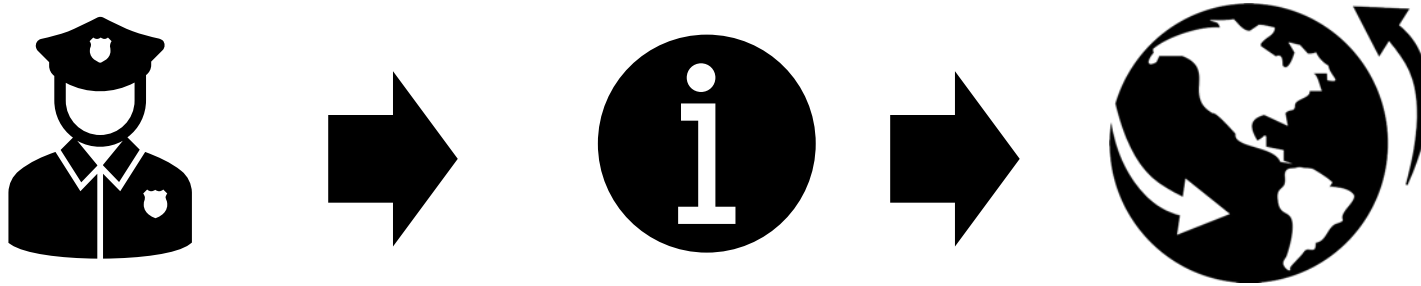
CRIMINAL JUSTICE RESPONSE:



CRIMINAL JUSTICE RESPONSE – LIMITATIONS?



2. CRIME DISRUPTIVE RESPONSE





United Nations
Office on Drugs and Crime



- COORDINATE & CONVENE
- IDENTIFY NEEDS / SUSTAINABILITY
- CAPACITY BUILDING
- DEVELOPING NEW TECHNIQUES
- MENTORING, TRAINING & SUPPORT
- PORTABLE LABORATORIES (PELTS)



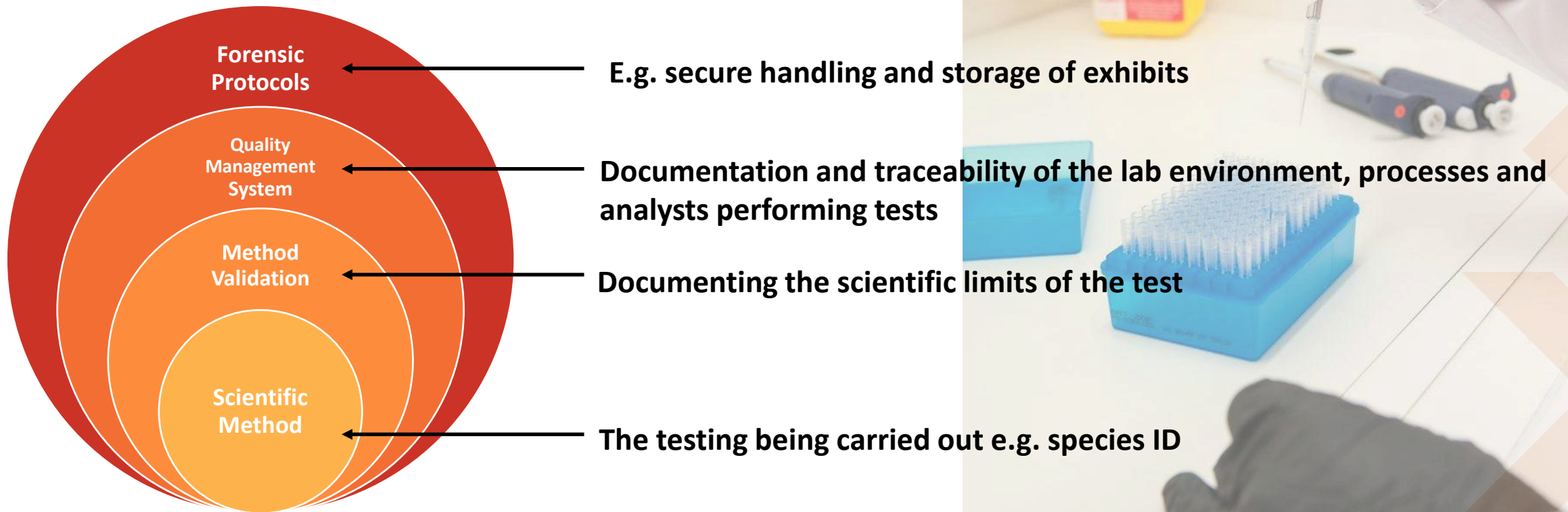


Greta Frankham,
Scientific Officer,
Australian Centre for
Wildlife Genomics

Wildlife Forensics: Criminal Justice Response

Wildlife Forensics: The Criminal Justice Response

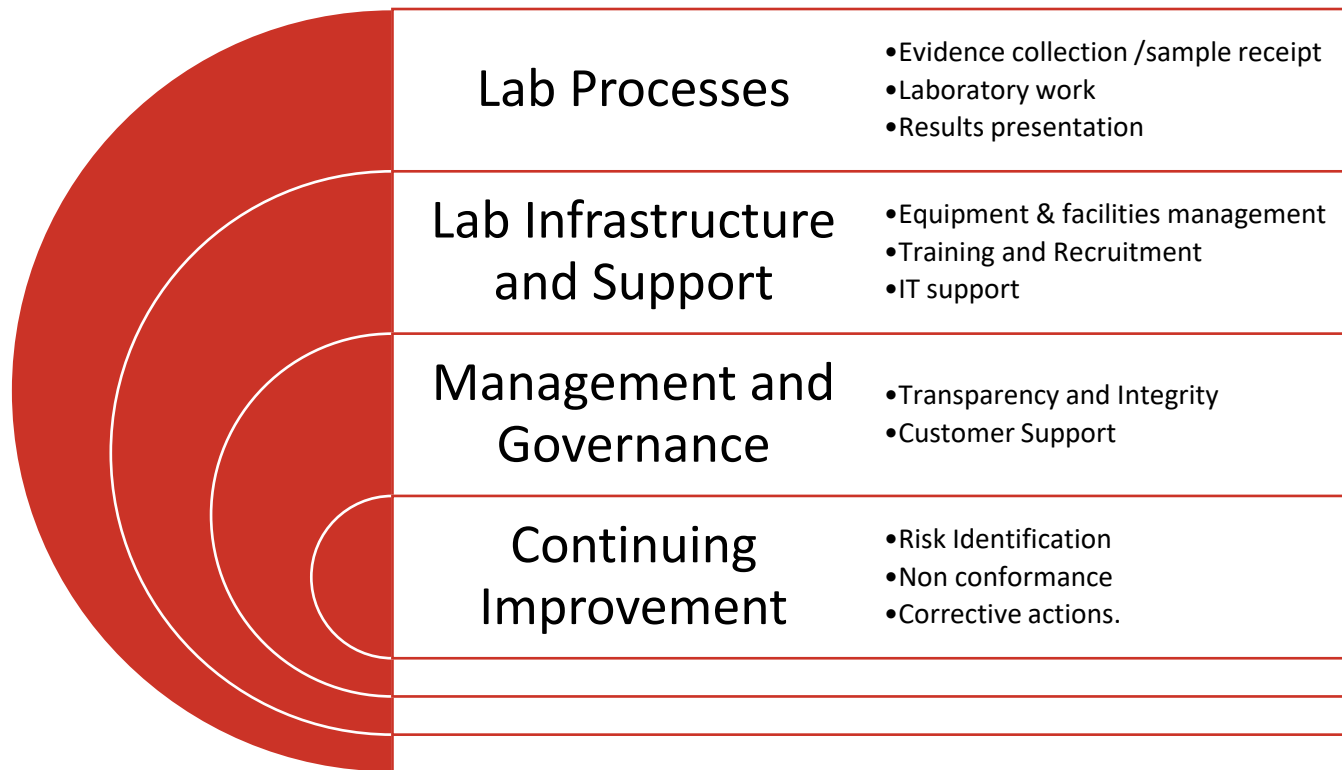
What is needed to produce admissible evidence?



Wildlife Forensics: The Criminal Justice Response

Quality Management Systems

- Ensure confidence that correct and complete evidence is presented in court



Implementing a QMS in your lab

Things to consider

- Identify scope of testing required
- Identify applicable standards and guidelines
- Identify training required to upskill staff
- Carry out gap analysis (existing system vs requirements outlined in standards and guidelines)
- Develop plan to:
 - Identify resources required (equipment, staff, systems etc)
 - Establish quality policies and objects
 - Write documentation (SOPs, manuals, guides)
 - Carry out validations
 - Establish and carry out audits/continuing improvement/management review processes
 - Establish review process



Wildlife Forensics: The Criminal Justice Response

Accreditation

- Considered the “Gold Standard” for laboratories

 International Organization for Standardization	 International Laboratory Accreditation Cooperation
• ISO/IEC 17025: Testing and Calibration • ISO/IEC 9001: Quality Management Systems Requirements • ISO/IEC 21043 Forensic Sciences (in development)	• ILAC-G19:06/2022 – <i>Modules in a Forensic Science Process</i>

Pros:

Considered best practice and conveys confidence in laboratory results

Cons:

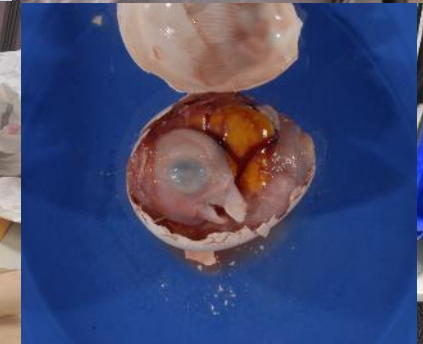
Extremely time/resource/cost intensive
Not specific to wildlife forensics

Wildlife Forensics: The Criminal Justice Response

Other resources to guide implementation of a Quality Management System

		
Animal, Plants and Soil Group	Wildlife Forensic Biology Sub-committee	Technical Working Group, Assessment Program, Proficiency testing, Certification
Organisation & Laboratory: - Best practice manual for the application of molecular methods for the forensic examination of non-human biological traces Analyst: - Proficiency Test	Organisation & Laboratory: - ANSI/ASB Standard 019 Wildlife Forensics General Standards, 2019. 6 other standards covering morphology, report writing, validation, sample collection, used of GenBank, and multilocus databases	Organisation & Laboratory: - SWFS Standards and Guidelines v 3 - SWFS Assessment Program - Quality Manual Template Analyst: - Proficiency Test - Certification

The Australian Centre for Wildlife Genomics at the Australian Museum.



Wildlife Forensics at the Australian Museum

Our timeline.

Pre 2004 (ad-hoc IDs)

Museum collection, 1827

Tissue/DNA reference
collection, 1988



2009 -2010

Formation of Society for Wildlife
Forensic Science

2004 onwards

Identified the need for a wildlife
forensics laboratory in Australia

Formalisation of forensic and
molecular services



Wildlife Forensics at the Australian Museum

Our timeline.

2011

Began ISO/IEC 17025 accreditation process



2023

Hired a dedicated Quality Officer



2013

Achieved ISO/IEC 17025 accreditation

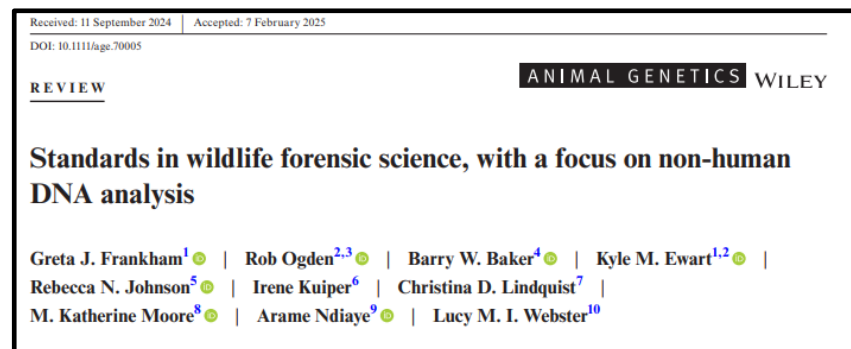
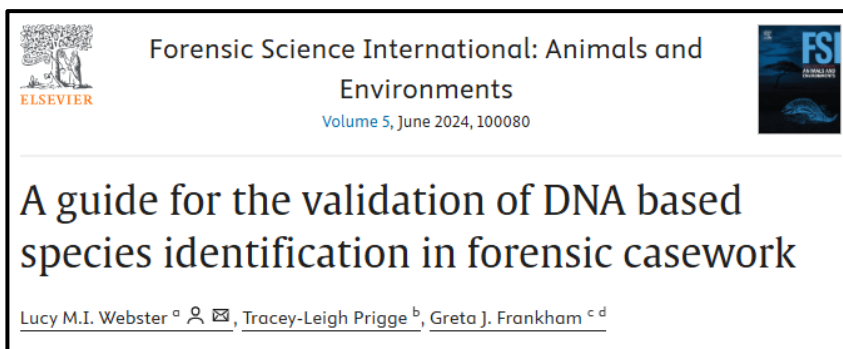


2025

12 years of ISO/IEC 17025 forensic service delivery

References and Resources

- General Information websites:
 - SWFS: <https://www.wildlifeforensicscience.org/>
 - ENFSI: <https://enfsi.eu/about-enfsi/structure/working-groups/animal-plant-and-soil-traces/>
 - OSAC: <https://www.nist.gov/osac/subcommittees/wildlife-forensic-biology>
 - ILAC G19 <https://ilac.org/?ddownload=124605>
- Useful publications :
 - Validation: <https://www.sciencedirect.com/science/article/pii/S2666937423000185>
 - General Standards overview: <https://onlinelibrary.wiley.com/doi/full/10.1111/age.70005>
 - SWFS standards and guidelines: <https://www.sciencedirect.com/science/article/pii/S2666937421000147>





Samuel Wasser,
Executive Director,
Center for Environmental
Forensic Science (CEFS),
University of Washington

Wildlife Forensics: Crime Disruptive Response



CEFS

**CENTER FOR
ENVIRONMENTAL
FORENSIC SCIENCE**

Evolution of the largest ivory trafficking networks in Africa

**Samuel K Wasser
Center for Environmental Forensic Science
University of Washington
Seattle, WA USA**

Slides not available
Permission for sharing not granted



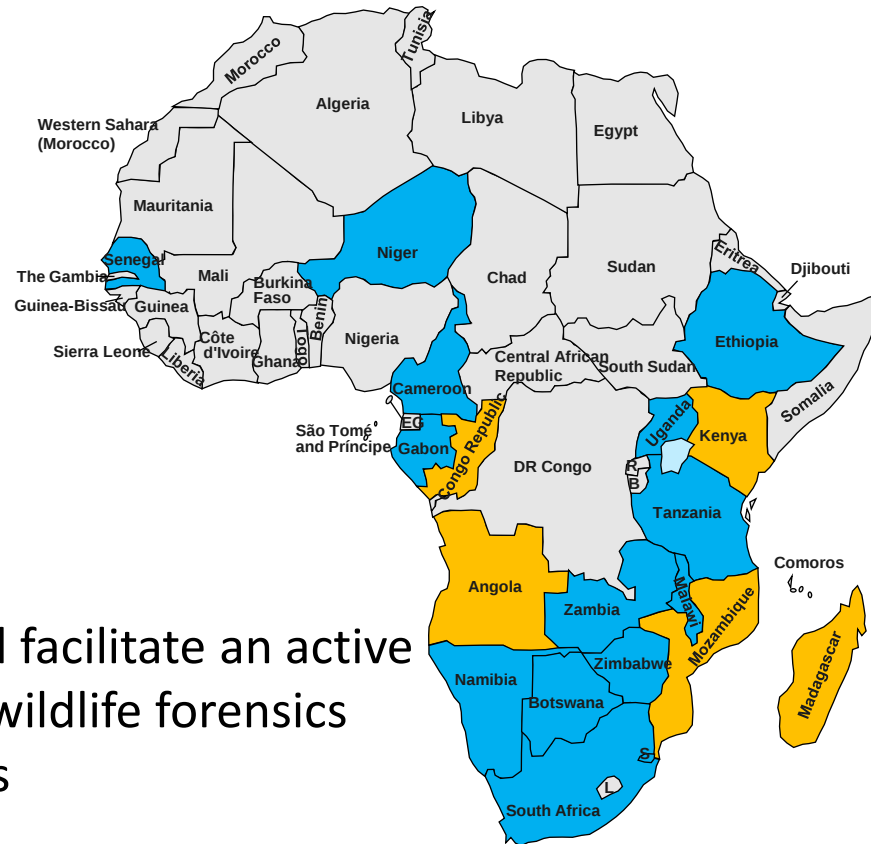
Armand Biko'o,
Head of Africa
Programme, TRACE
Wildlife Forensics
Network (South Africa)

Crime Scene Investigation (CSI) for Wildlife Crime

African Wildlife Forensics Network



Collective of practitioners working in the fields of WCSI, WLA & WP.



Mission:

- Develop and facilitate an active network of wildlife forensics stakeholders
- Support access to forensic science and crime scene services across the African continent.

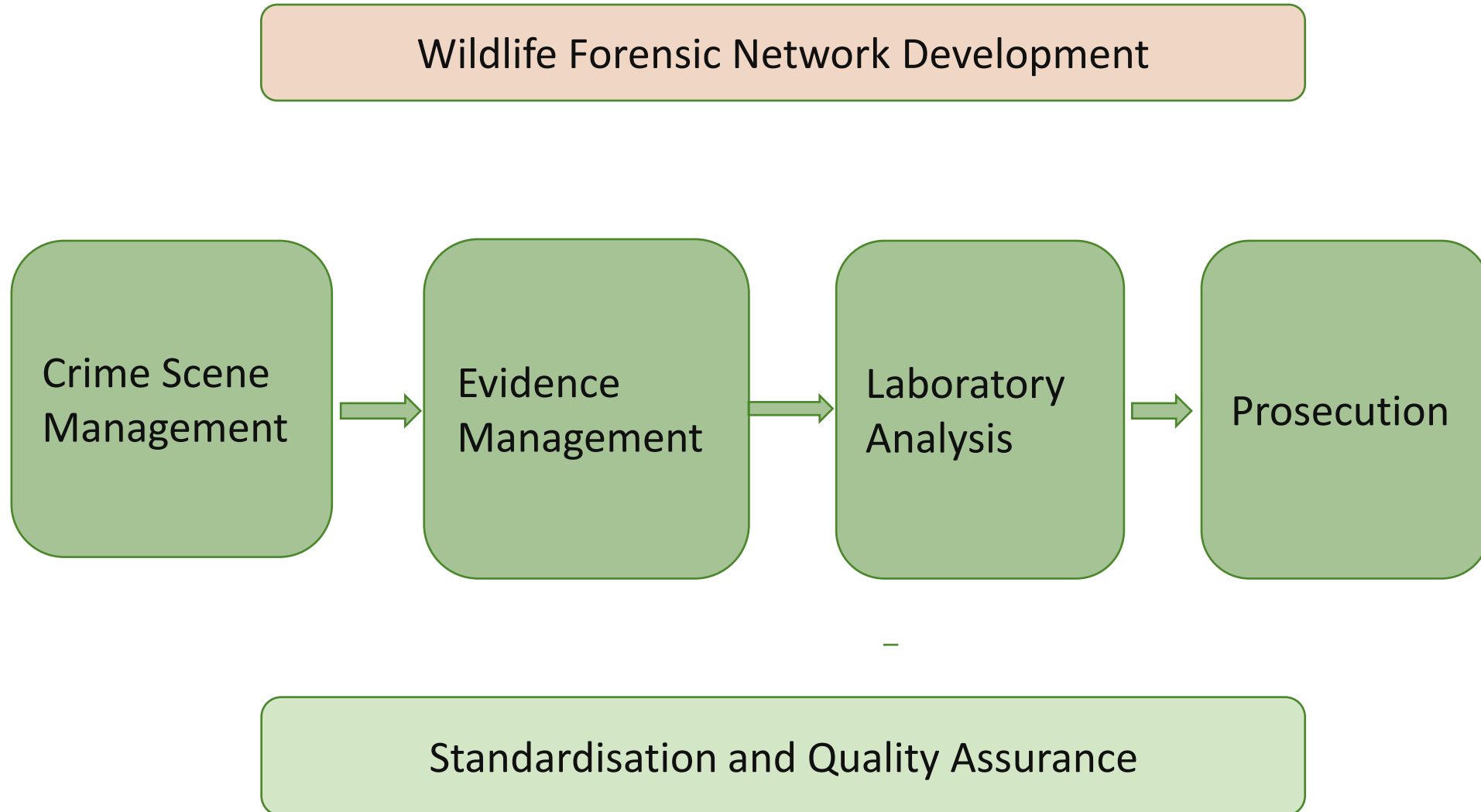
TRACE Wildlife Forensics Network



- UK based NGO, global remit
- Promotes forensic science for wildlife law enforcement
- Supports governments develop WF capacity
- Currently operates in 5 Southeast Asian and 14 African countries
- Helped establish 12 wildlife DNA forensic laboratories
- Trainees from >25 countries



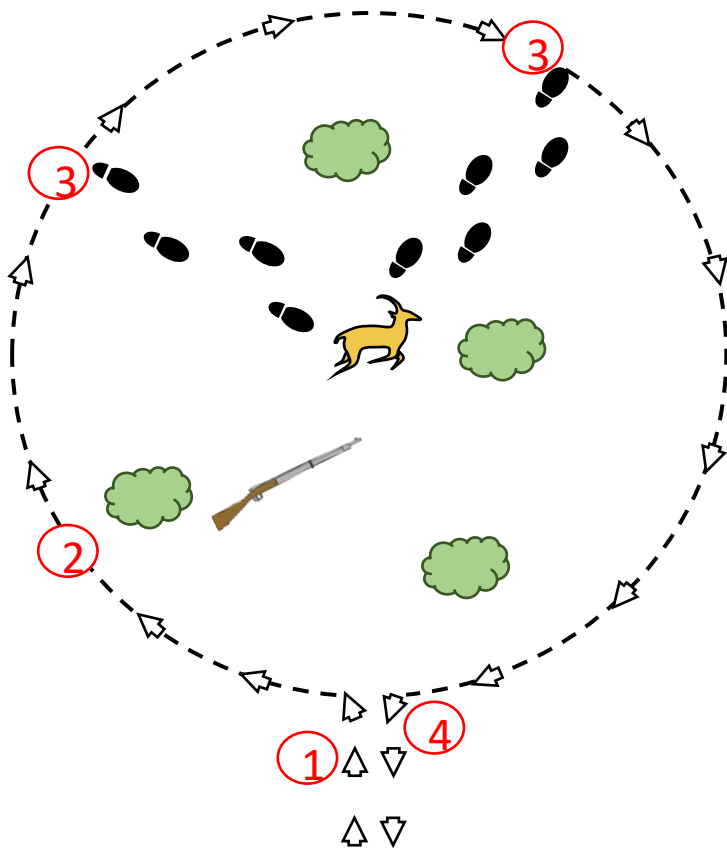
Capacity Building Model: Pillars of the WF process



Initial Response & Scene Security

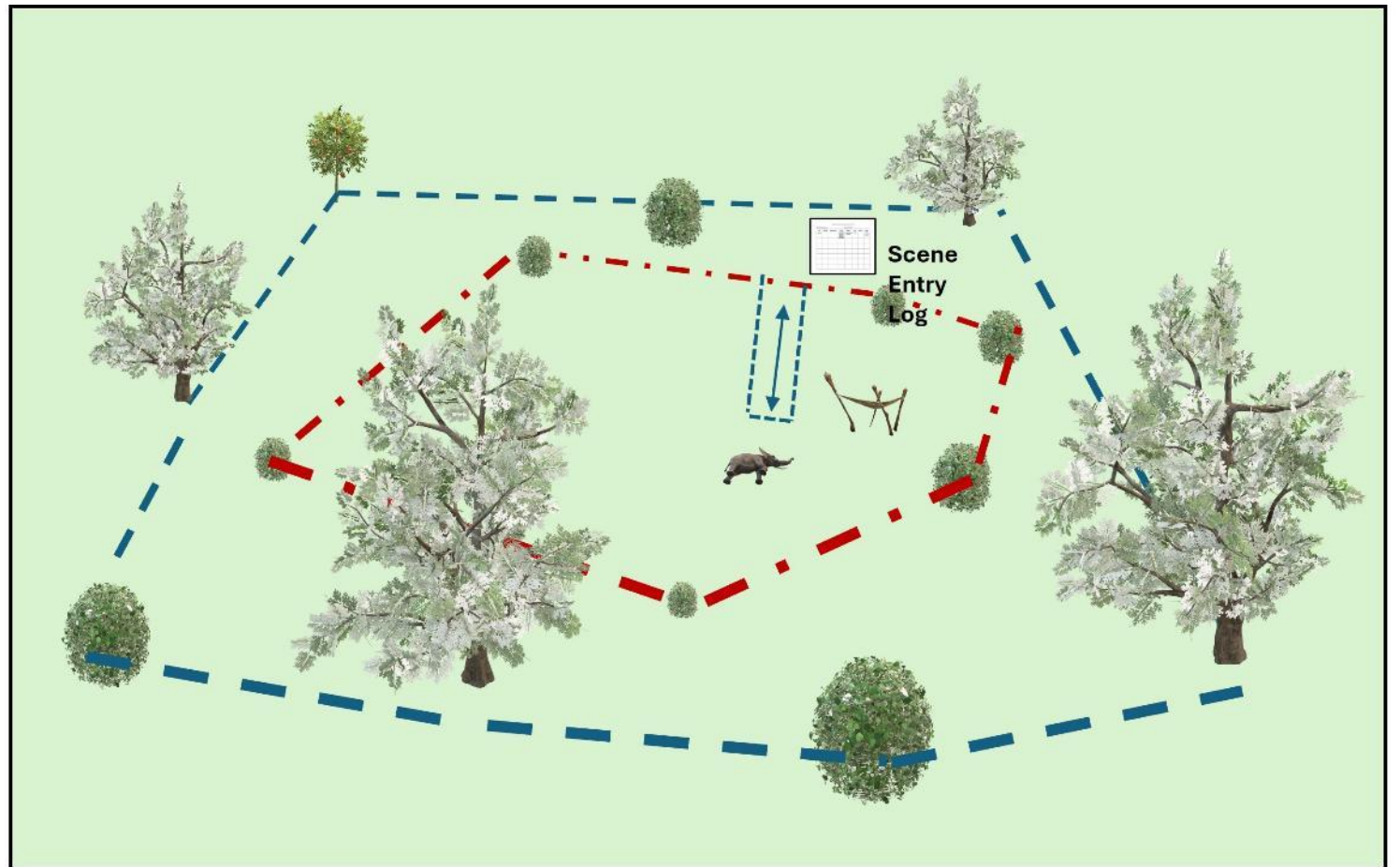
(1) Prioritize safety & secure the scene

(2) Preliminary assessment or take over



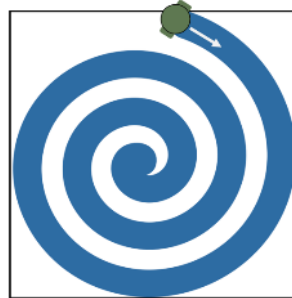
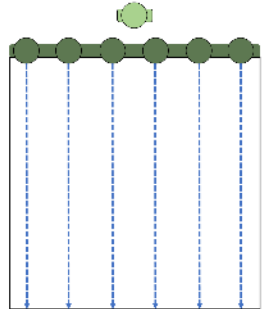
(3) Implement scene controls

- Cordons; Scene Entry Log; CAP; Additional cordon control resources

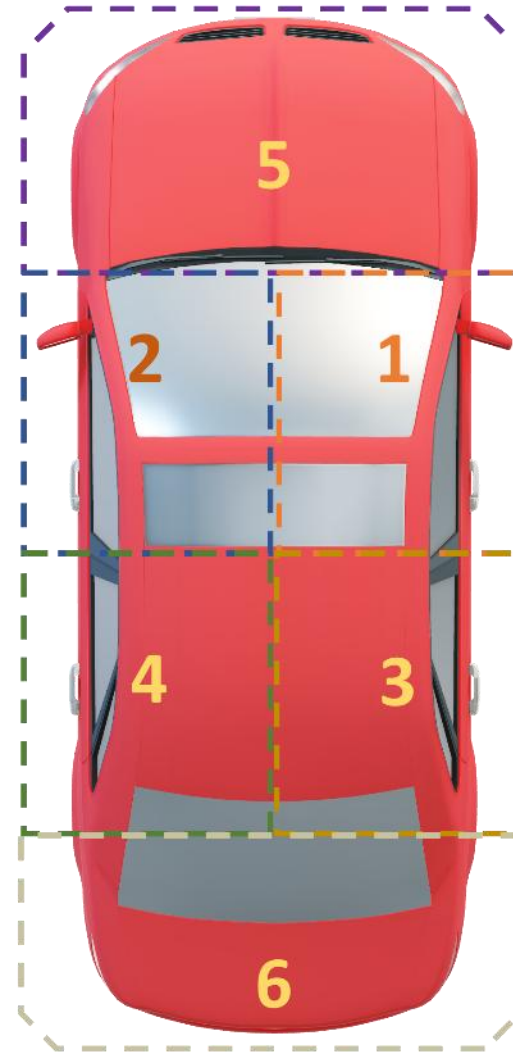


Crime Scene Search & Evidence Identification

- (1) Choose and apply a search method
- (2) Identify and mark potential evidence
- (3) Special consideration for perishable evidence



Zone 1	Zone 2
Zone 4	Zone 3



Evidence Collection and Documentation

Detailed Documentation

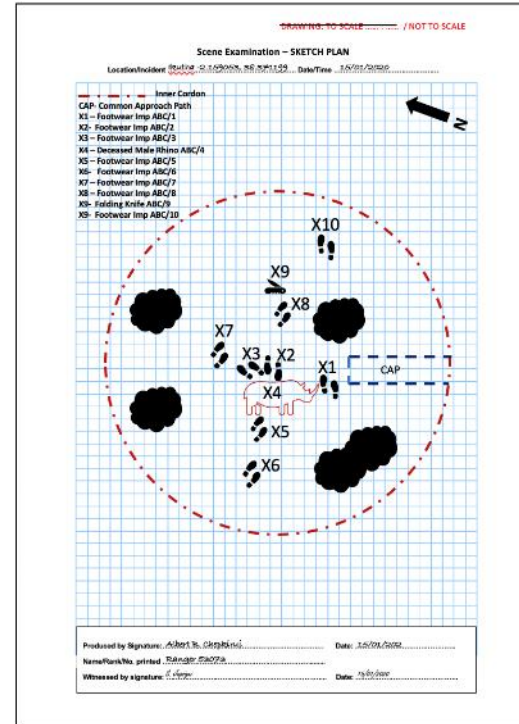
- Comprehensive Notes
- Photography (Detailed)
- Sketches

Evidence Collection & Packaging

- Complete the Exhibit Label
- Collect the evidence
- Close and seal the bag.
- Record details: Exhibit Log

Maintain Chain of Custody

- Integrity
- Continuity



Label No.

Case Against or Incident

Description of Article

Where Found On 20

Signature(s) of Person(s) Identifying Article

1	5	9
2	6	10
3	7	11
4	8	12

Evidence Label



Wildlife Crime Scene Management: Capacity if Africa

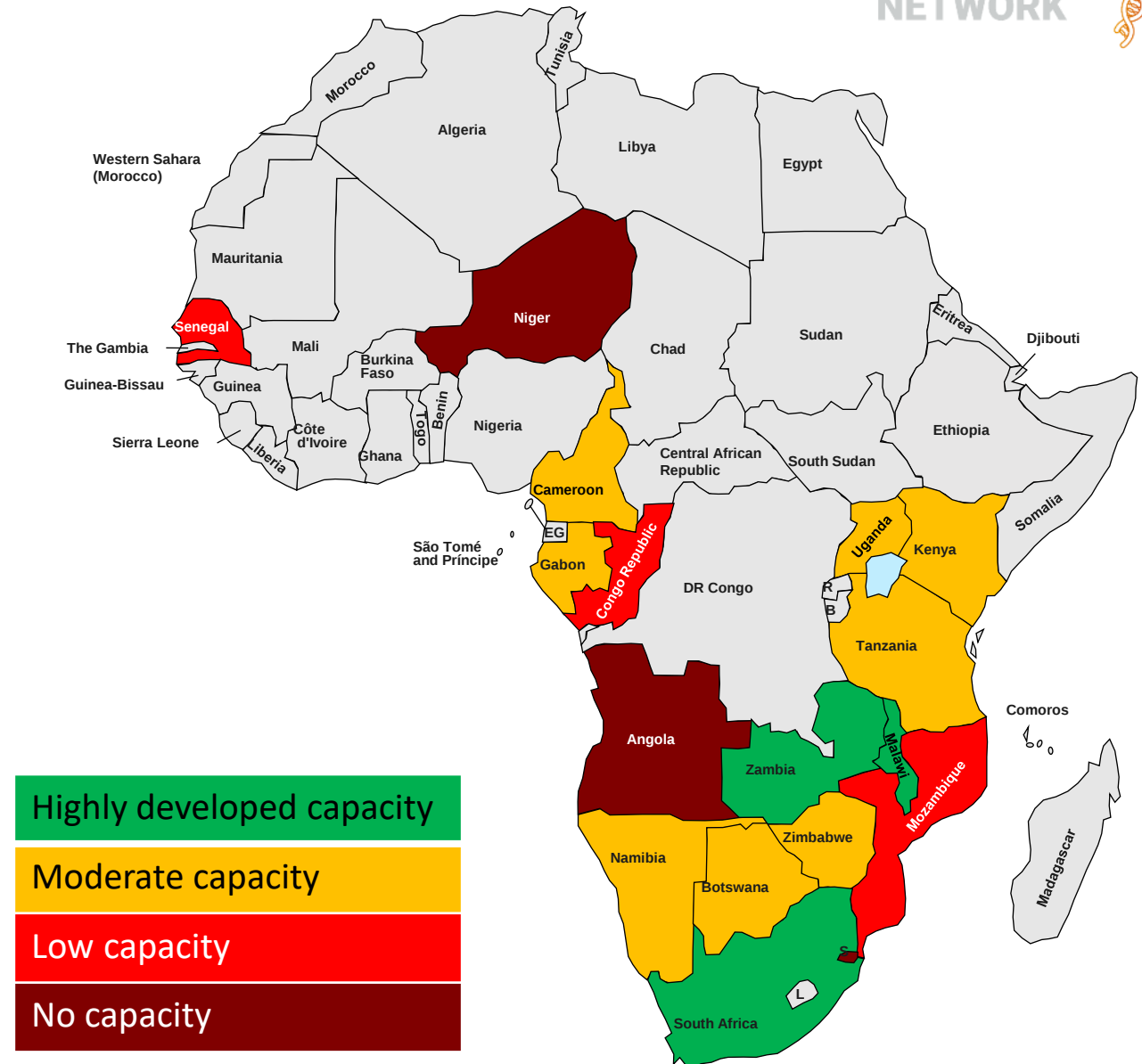


Existence of:

- WCS awareness trainers
- Regular WCS awareness training
- WCS Investigations training
- Evidence Management SOPs
- Expert Witness training
- Impact statement writing capacity

Capacity building challenges:

- Resource & funding deficiencies
- Corruption & lack of political will
- Limited inter-agency & international cooperation



More information:

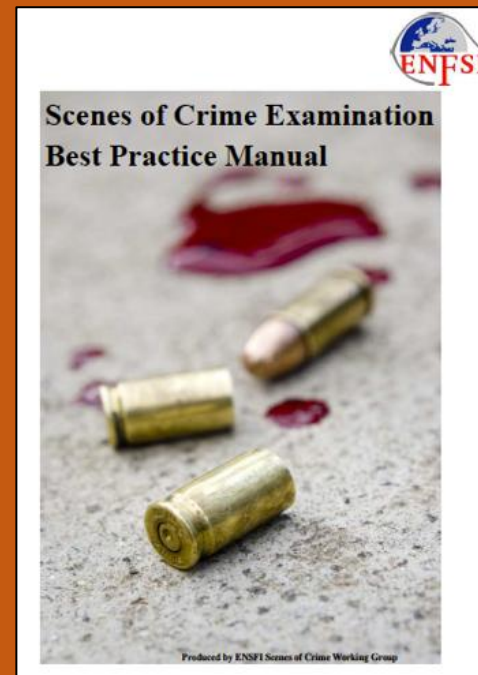
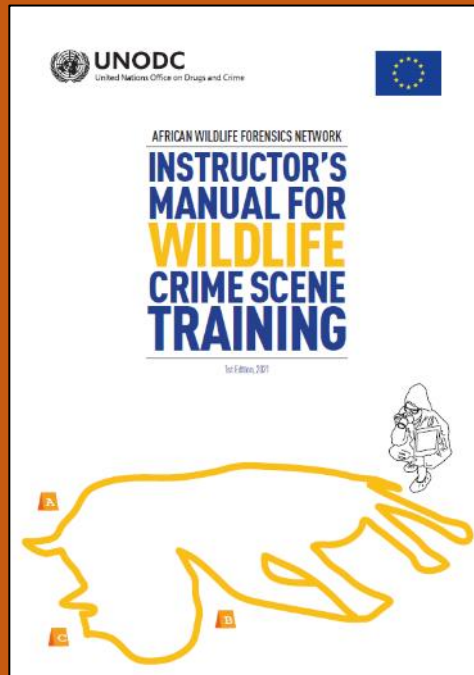
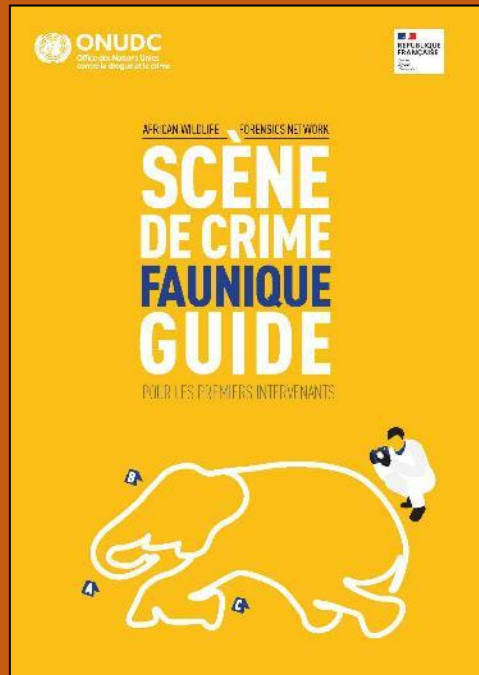
www.tracenetwork.org

www.africanwildlifeforensics.org

www.wildlifeforensicscience.org



Thank you!



PART 2 – GWP Country Presentations and Facilitated Knowledge Exchange





AUDIENCE POLL #1

Is Wildlife Forensics Used Effectively in Your Country?

1. Yes – it's an integral part of our law enforcement response
2. Yes – but its use is limited to certain agencies or cases
3. It is currently under development
4. No – it is not yet used in our country
5. I'm not sure / I don't have this information



Case Study from GWP Malaysia

Nurhartini Kamalia Yahya

Forensic Unit Technical Manager,
Wildlife Health, Genetic and Forensic Laboratory –
WHGFL

Wildlife Health, Genetic and Forensic Laboratory

Location: Sabah, Malaysia



- Owned by Sabah Wildlife Department (SWD)
- Smallest, cost-efficient, and oldest wildlife lab in Malaysia
- Established in December 2013
- BSL-2 certified (11 years)
- ISO/IEC 17025:2017 accredited (2nd year)
- Following SWFS guidelines (since 2021)
- Have applied to be listed in the CITES Directory of Laboratories that conduct Wildlife Forensic Testing



Wildlife Forensic Unit operations



1. Produce DNA test report for cases



2. Produce intelligence report



3. Training SWD rangers on evidence management and sample collection



4. Research on wildlife species in Sabah



Example of prosecuted cases in 2025



Thank you for your attention!

- Nurhartini K. Yahya (Tini)
- nhkamalia@gmail.com /
tini.dgfc@gmail.com





Marli de Bruyn

Head of the Genetics Services Unit and Senior Scientist,
South Africa National Biodiversity Institute - SANBI

Case study from GWP South Africa



SOUTH AFRICAN POLICE SERVICE (SAPS)

BID 19/1/9/1/121TD (21): SUPPLY AND DELIVERY OF PLANT AND ANIMAL DNA ANALYSIS TO BE USED AT THE COMPONENT: FORENSIC SCIENCE LABORATORY: SECTION: SCIENTIFIC ANALYSIS PRETORIA FOR A PERIOD OF THREE (3) YEARS

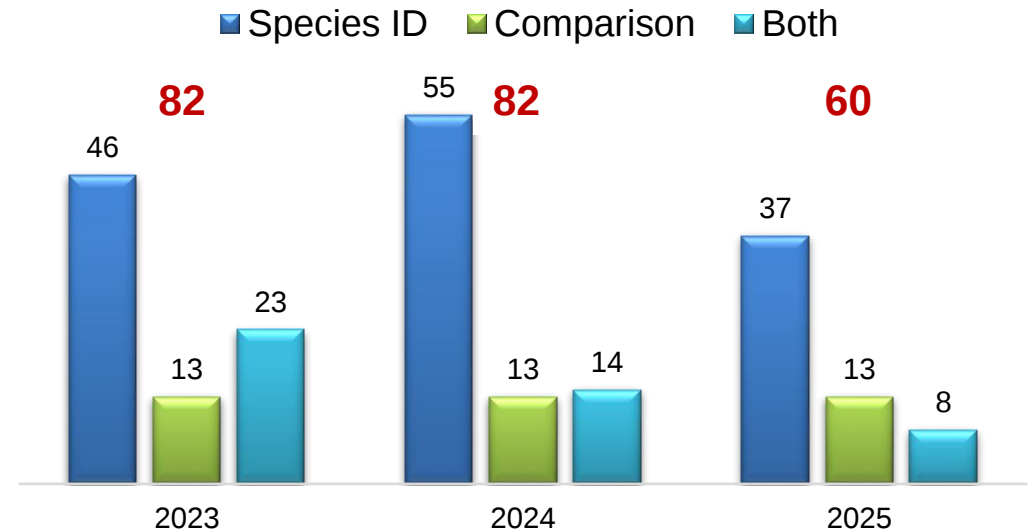
- **Species identification / comparison of stock theft cases**
- **Species identification / comparison of wildlife cases**
- **Training: Wildlife forensic DNA examination**

All fauna and flora (excl. rhino)

- Insects
- Amphibia
- Elephant
- Felidae
- Antelope
- Bird species
- Reptiles
- Marine animals
- Pangolin
- Abalone
- Cycad
- Succulents



Wildlife forensic cases analysed



Accurate identifications
Dependent on **reference data** available

GEF-7 South African Biodiversity Economy and Illegal Wildlife Trade:

Component 2 - Enhance Forensic and Scientific Support Services Linked to Wildlife Trafficking Investigations

Outcome 2.1. Increased successful use of forensic techniques in wildlife crime investigations and forensic evidence in prosecutions

- Outcome 2.1.1. Support provided for strengthening the wildlife crime forensic analysis capabilities
- Outcome 2.1.2. The DNA barcode reference library and analyses of poached and traded wildlife are expanded**



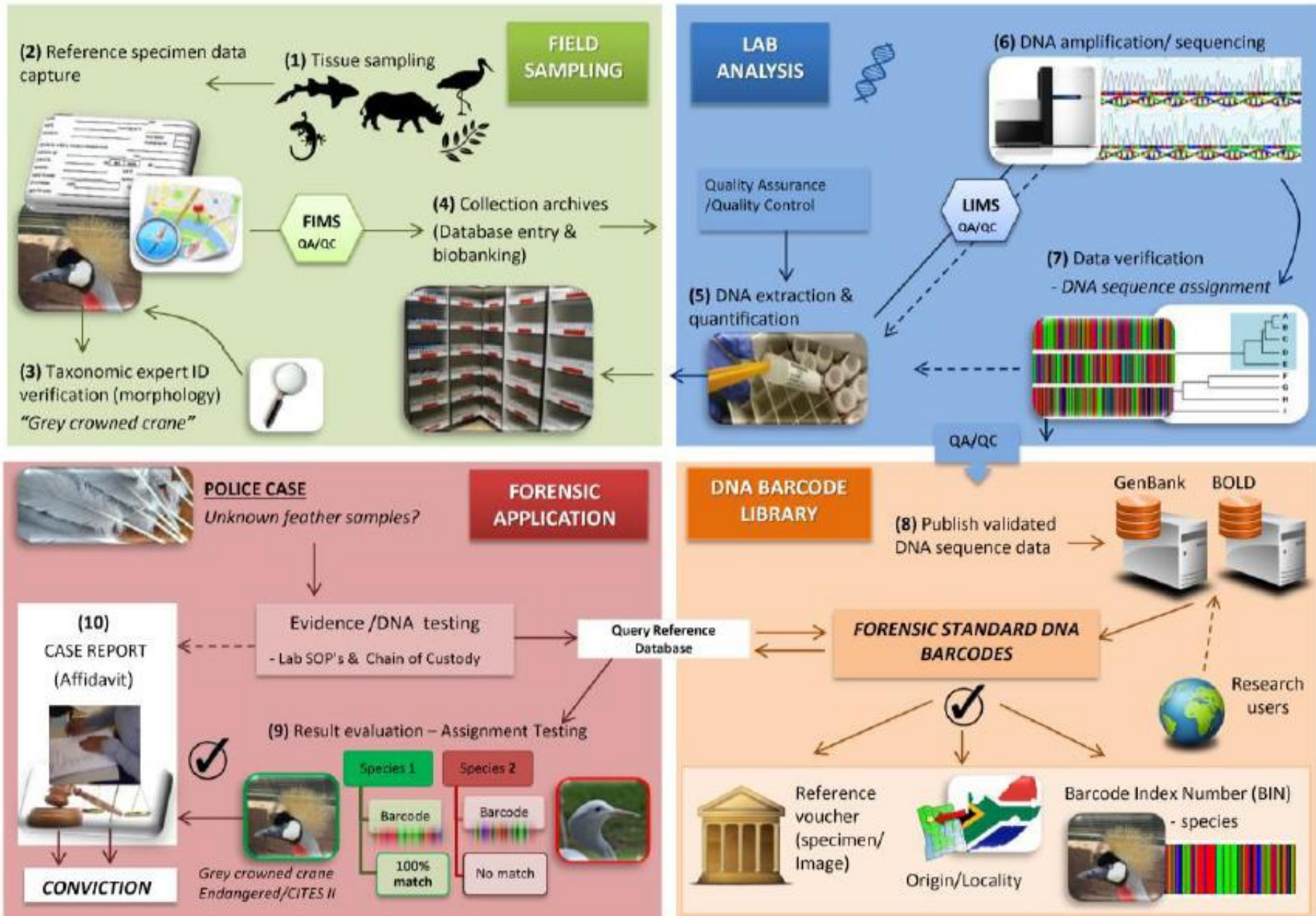
Maintaining Chain of Custody (COC)

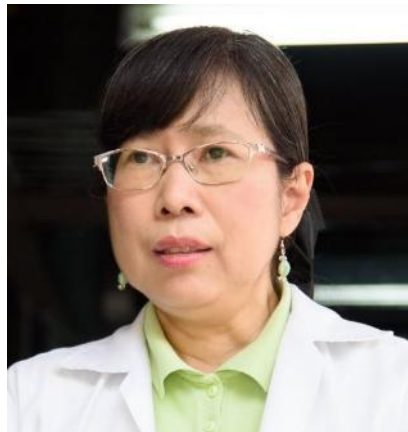
- Sample collection
- Extraction, PCR, Sequencing
- Producing DNA barcodes
- Building the reference database (SA-BOLD)

Taxon	GEF7	Legacy	
	SIK & CoC (species)	BWP (species)	Biobank (species)
Birds	194 (115)	272 (60)	66 (33)
Mammals	75 (46)	228 (59)	82 (48)
Reptiles	127 (60)	229 (54)	49 (19)
Others	11 (6)	-	-

GEF-7 South African Biodiversity Economy and Illegal Wildlife Trade:

Component 2 - Enhance Forensic and Scientific Support Services Linked to Wildlife Trafficking Investigations





Kanita Ouitavon
Wildlife Forensics Principal,
WIFOS Laboratory, DNP
(Thailand)

Case Study from GWP Thailand

GEF-6 Project

Achievement 1 : Equipment & infrastructure is appropriate.



**ABI 12K Flex Real – Time
PCR System for SNPs
Marker Analysis.**



**Evidence Room &
Chemical Room were
constructed.**



**WIFOS Laboratory areas
was improved and has
enough space.**

Achievement 2 : New SNPs markers for tiger were developed.

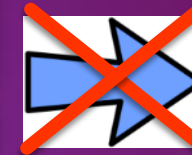
The captive tiger's DNA database in Thailand



~2,000 tigers in captivity



Wild tiger



Captive tiger



Methods

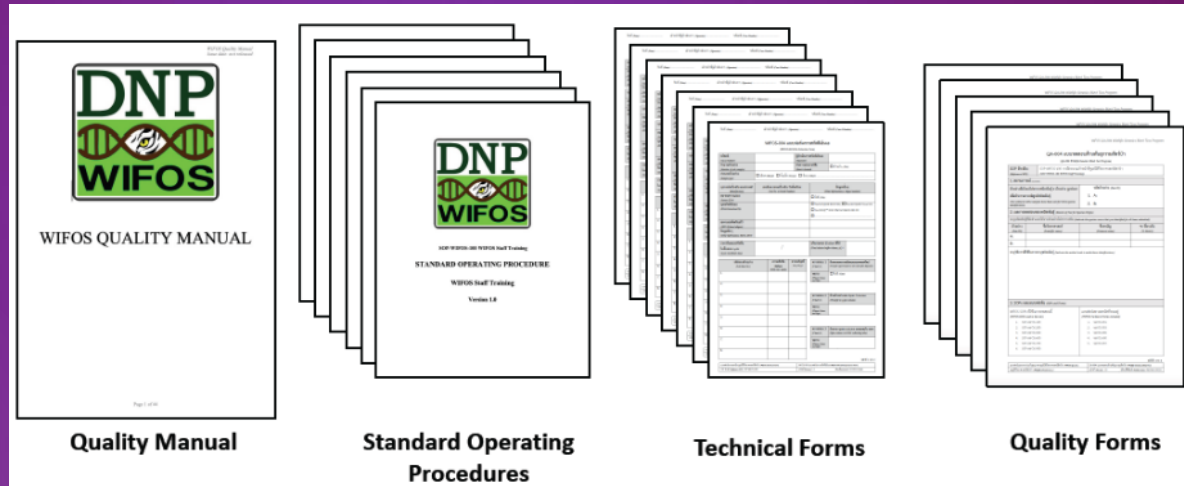
60 SNPs markers were tested & 54 were validated.

DNA Registers can control captive breeding and identify 1) each individuals, 2) parentage, 3) subspecies, and 4) sexing that may contribute to combat the illegal wildlife trade.

GEF-6 Project

Achievement 3 : Quality Management System (QMS) was developed with SOPs compliant to SWFS Standards.

QMS Practice



Released

SOP-200 Decontamination
SOP-900 BioSafety
All WIFOS Technical Forms
All Quality Forms
-New Quality Forms:
QA-006 Validation Control

DNA Extraction



PCR Amplification



Trained

QA - 001 Operator Signature log
QA - 003 Code of Ethics and Conduct
QA - 005 WIFOS Freezer form
SOP-200 Decontamination
SOP-900 BioSafety
All WIFOS Technical Forms

Pangolins Case

Aug. 17, 2023 : Thai police seized 1.4 tones of pangolin scales, worth around 50 million THB, from a truck in the north-eastern province of Kalasin, as it was heading for Mukdahan province to be smuggled through Laos and into China.



Aug. 21, 2023 : They were collected and sub-sampling by WIFOS Laboratory, DNP.



Stephanie Bourgois,
Head,
Wildlife Genetics Laboratory,
National Parks Agency of Gabon

Case Study from Gabon

DNA Analysis of Ivory and Pangolin Seizures

Scenario

- **7 tons** of pangolin scales, **900 kg** of ivory seized in Nigeria
- DNA testing for species identification and geographical origin

Key findings

- **Ivory:** Mainly from Gabon (Central Africa)
- **Pangolin:**
 - White-bellied – wide range, mostly West Africa
 - Suspected ground pangolin – non-native

Outcome

- Evidence not admissible in court
- Supported cross-border collaboration



DNA Analysis of Ivory and Pangolin Seizures

Scenario

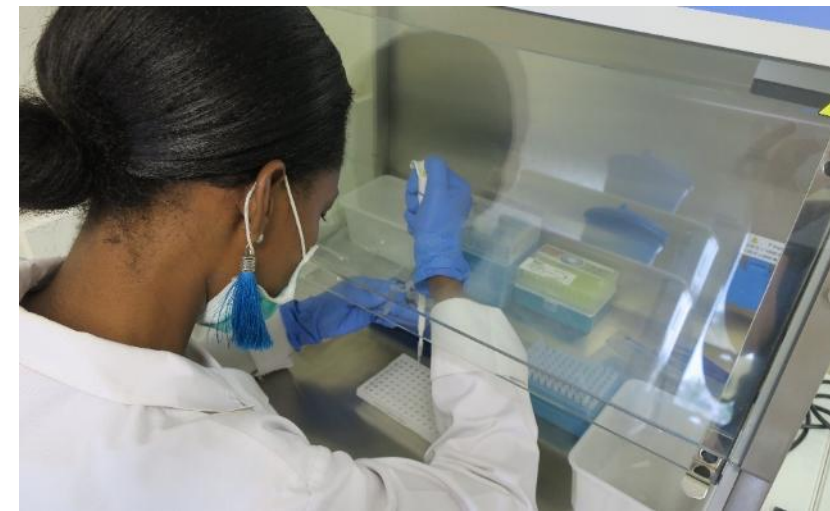
- **700 kg** of ivory seized in Cameroon (vehicle from Gabon)
- DNA testing to confirm Gabonese origin and trace source within Gabon

Key findings

- Confirmed origin from Gabon
- Enabled identification of likely source regions within Gabon

Outcome

- Supported cross-border collaboration
- Demonstrated value of national-scale origin tracing for enforcement



DNA Match Links Trophy to a Killed Elephant

- **Scenario:** Tail and trunk seized from suspect
- **DNA Match:** Poached elephant from a National Park
- **Results:** Tail confirmed as illegally sourced
- **Outcome:** Confirmed illegal killing inside a park → supported prosecution and increased charges



Forensic DNA Confirms Suspect's Statement

- **Scenario:** Suspect claimed he found the tusks
- **DNA Match :** Elephant killed in a truck collision
- **Results:** Ivory from accidental (non-poaching) death
- **Impact:** Testimony confirmed → case resolution and sentence reduced







AUDIENCE POLL #2:

What are the biggest challenges your agency/country faces in wildlife forensics?
(select all that apply)

- Lack of overall interest in using wildlife forensics
- Lack of trained personnel
- Insufficient lab facilities
- Chain of custody/legal evidence issues
- Cross-border collaboration
- Funding/resources
- Limited use of forensic science in prosecutions
- Other (please specify in the chat)



AUDIENCE POLL #3:

What are areas where more support is needed in your country/agency to advance wildlife forensics? *(select all that apply)*

- Training for enforcement officers
- Training for prosecutors/judges
- Technical assistance in lab design and operations
- Developing standard operating procedures (SOPs) and Quality Management Systems (QMS)
- Legal/policy framework updates
- Cross-border collaboration mechanisms
- Networks and study tours
- Access to forensic databases/tools
- Ensuring sustainability beyond donor funding



Feel free to reach out to
Ross Mcewing, UNODC
(ross.mcewing@un.org)
for additional technical advice
on Wildlife Forensics

Website:
<https://www.worldbank.org/en/programs/global-wildlife-program>

Email: gwp-info@worldbank.org
to sign up to our newsletters



Event in collaboration with:



United Nations
Office on Drugs and Crime