

Do You Need Pathology Support?

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Davis-Thompson
Foundation



WCN
Wildlife Conservation Network



Rhino
Recovery
Fund

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The
Pandemic
Fund
FOR A RESILIENT WORLD



MARIO EINAUDI
Center for
International
Studies

1

About Me



- Carmen Smith, DVM, DACVP
- Free-Ranging Wildlife Pathology Fellow, Cornell K. Lisa Yang Center for Wildlife Health

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2

Pathology in Conservation and One Health

- Mortality investigations of threatened species
- Identify anthropogenic causes of death
- Zoonotic disease, food systems, and public health risks



Pathology

- Pathology is not targeted at specific pathogens
- Complicated set of skills, including hands-on technique as well as interpretation of lesions
- NOT skills built overnight



Collaborations in Pathology: The Old Way

- “Parachute science”
- Primarily utilizes sample export
- Processing, review, analysis out-of-country



5

The Old Way – The Problems

- Delays and cost of export
- Strips local researchers of ownership
- Does nothing to ensure long-term sustainability
- Less integrated into full system



6

A Different Approach

- Local capacity and expertise
- Training costs covered by Cornell University

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7



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8



9



10

Technology to Overcome Some Barriers

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- Field digital microscope slide scanner
- Allows us to quickly connect investigators to global expertise
- Digital slides also serve as a teaching tool



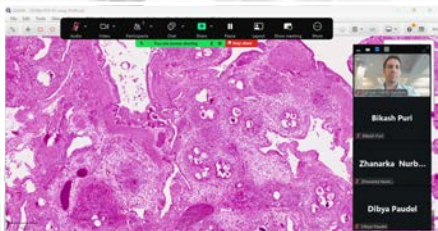
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11

Pathology Training

- Training of government staff, and supporting trainees in their graduate projects
- Answer important wildlife/One Health questions AND build skills over years



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12

Building this network

- Virtual connection and cross-fertilization
- In-person workshops, meetings
- End goal: create an international conservation pathology community

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13

Examples from the field

14

Greater one-horned rhinoceros in Nepal

- Near Threatened (IUCN)
- 752 in Nepal
- 694 (92%) in Chitwan National Park
- Great success of anti-poaching efforts
- Despite increasing population, persistent elevated mortalities



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15

Mortality Review

- 332 mortalities between 2004 and 2024
- Mortalities separated into categories:
 - Fighting
 - Anthropogenic
 - Predation
 - Open

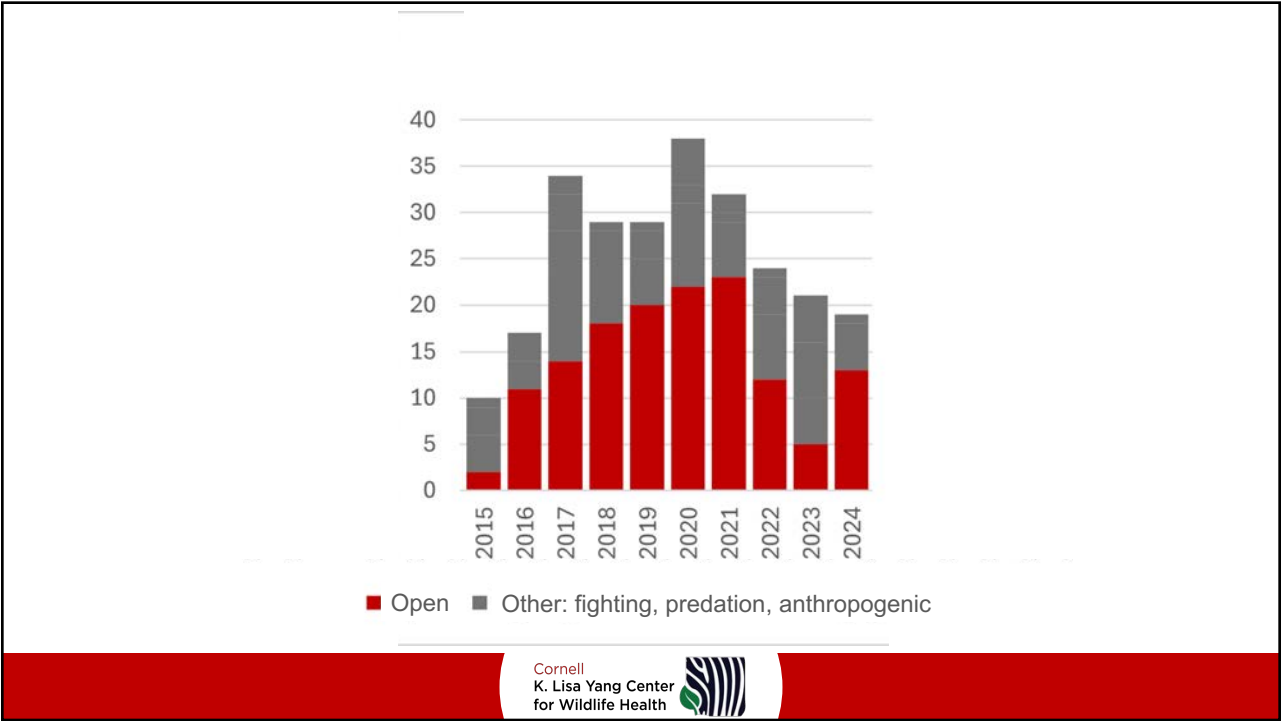


Paul Hilton/Earth Tree Images

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16



17

Trust for Nature Conservation
NEPAL, 1982

Ministry of Natural Resources and Environment

Agriculture and Forestry University
Chitwan, Nepal

INTERNATIONAL ZOO VETERINARY GROUP

UNIVERSITEIT VAN PRETORIA
UNIVERSITY OF PRETORIA
YUNIBESITHI YA PRETORIA

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18

Tissue Processing and Analysis

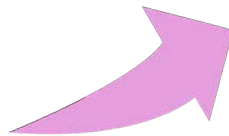
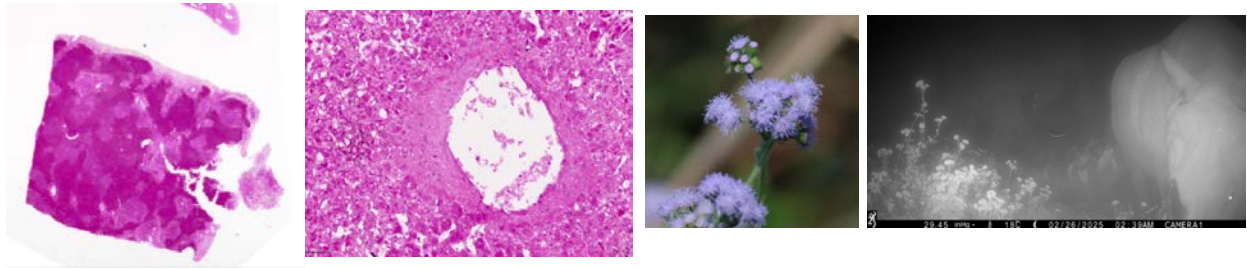
- Sought to solve “open” cases
- Postmortem examinations performed, with samples collected but not processed for histopathology
- Constraints of moving samples out of the country



Workshops for Diagnostic Enhancement

- Histopathologic preparation
 - “Grossing” or trimming
 - Tissue processing and embedding
 - Slide cutting and staining





21

Wildlife Pathology in Nepal

- As a result of this targeted pathology project, diagnostic pathway is streamlined
- Now new opportunities are available



22



23



24

Decline of more than 95% of species populations over 10 years

More than 50% decrease in individual populations every year



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25



VULTURES OF INDIA



IUCN
STATUS
Critically
Endangered

Long Billed Vulture/Indian
Vulture
(*Gyps indicus*)



IUCN
STATUS
Critically
Endangered

Red headed Vulture/King
Vulture
(*Sarcogyps calvus*)



IUCN
STATUS
Critically
Endangered

White Rumped Vulture
(*Gyps bengalensis*)



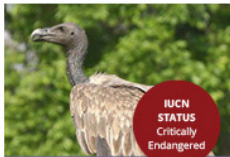
IUCN
STATUS
Endangered

Egyptian Vulture
(*Neophron percnopterus*)



IUCN
STATUS
Near
threatened

Himalayan Griffon Vulture
(*Gyps himalayensis*)



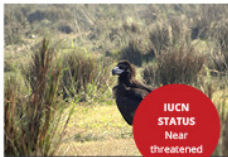
IUCN
STATUS
Critically
Endangered

Slender billed vulture
(*Gyps tenuirostris*)



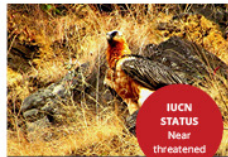
IUCN
STATUS
Least
Concern

Eurasian Griffon Vulture
(*Gyps fulvus*)



IUCN
STATUS
Near
threatened

Cinereous Vulture
(*Aegypius monachus*)



IUCN
STATUS
Near
threatened

Bearded Vulture
(*Gypaetus barbatus*)

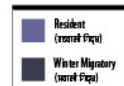
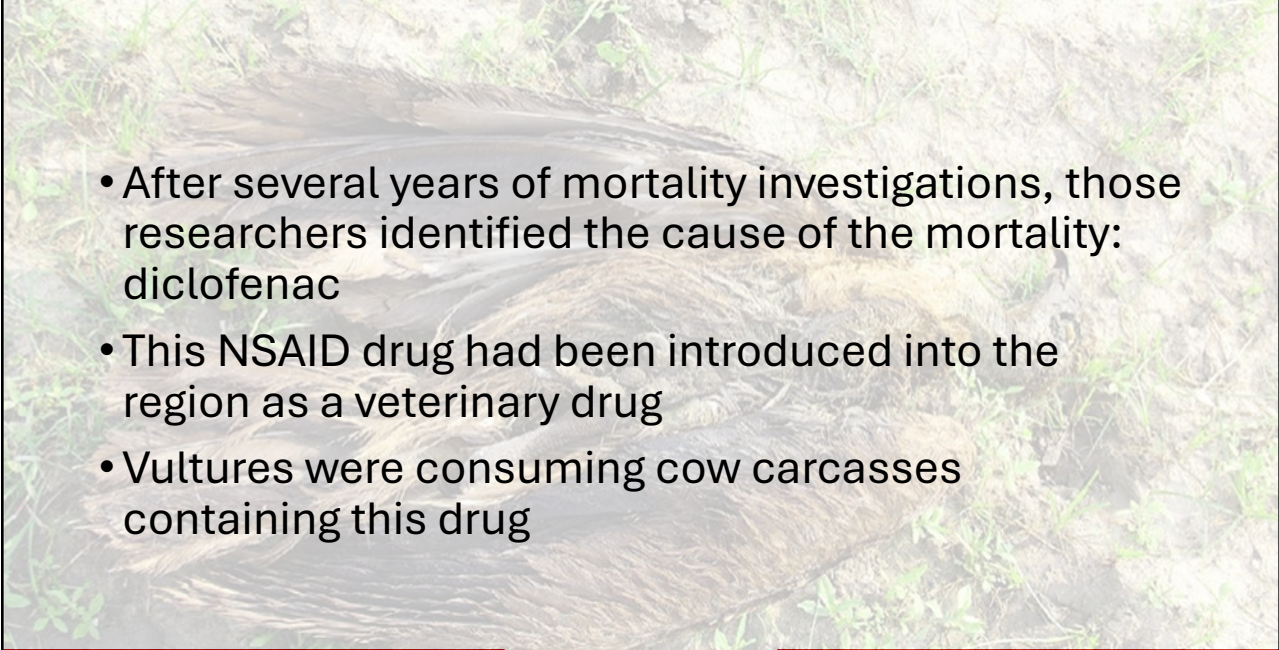


PHOTO CREDIT:
Soumen Dey, Sandeep Choudhary, Malika Colvin,
Abhijit Gandhi, Nirav Parekh, Yashpal Negi, Prajakta
Hushangabadkar

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26



- After several years of mortality investigations, those researchers identified the cause of the mortality: diclofenac
- This NSAID drug had been introduced into the region as a veterinary drug
- Vultures were consuming cow carcasses containing this drug

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Governments across the region decided to ban diclofenac

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Wildlife Pathology in Nepal

Bikash Puri

- Currently, vulture populations have not recovered as expected, and we do not know why
- Studying mortalities in vultures and poultry to understand this slow recovery
- This project keeps the histopathology laboratory operational



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29

What could this type of additional support look like in KAZA, acknowledging the critical role of Dr. Foggin and the Victoria Falls Wildlife Trust laboratory?

<https://www.peaceparks.org/tfcas/kavango-zambezi/>

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30

Acknowledgements



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31

Thank you!
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32