



CENTRE FOR
**CONSERVATION
FORENSICS**
THE UNIVERSITY OF HONG KONG

Reduction of illegal global wildlife trade through novel conservation forensics research

Dr Caroline Dingle, Dr Timothy Bonebrake, Dr David Baker, Professor
David Dudgeon, Dr Sung Yik Hei

School of Biological Sciences, Faculty of Science

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Student and Postdoctoral Team Members

- Cheng Wenda, Postdoc
- Xing Shuang, Postdoc
- Astrid Andersson, PhD student
- Chloe Emma Ruth Webster, PhD student
- Vicki Sheng, PhD student
- Johnny Richards, Research Assistant
- Tracey Prigge, Research Assistant
- Hannah Tilley, Research Assistant (former)



Summary of the Impact

- Conservation research undertaken at the Centre for Conservation Forensics (CCF) at the University of Hong Kong (HKU) has contributed to the enforcement of national and international laws protecting endangered species and supporting illegal wildlife trade reduction.
- Conservation actions stemming from this research include increased protection of turtles, pangolins, birds, and fish under the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and via the International Union for Conservation of Nature (IUCN).
- Newly developed forensics techniques have and continue to uncover extensive criminal activities and supported successful prosecutions.
- As Hong Kong is a global hub for wildlife crime, our research has led to significant reductions in illegal wildlife trade.



Hong Kong: a wildlife trade hub

Free trade laws allow import, export and re-export of wildlife products into the rest of Asia for purposes such as Traditional Chinese Medicine and the pet trade.

Three arrested after Hong Kong customs seizes 7.2 tonnes of ivory from 'frozen fish' container in record HK\$72 million bust

Male proprietor and two female staff members of trading company in Tuen Mun nabbed



NEWS, ANIMALS, ENVIRONMENT

CUSTOMS SEIZE 7.2 TONS OF SUSPECTED PANGOLIN SCALES, WORTH HKD4.6 MIL., SMUGGLED FROM NIGERIA

By Coconuts Hong Kong May. 31, 2017



COMMENTS: 10

More than 580 people arrested, HK\$53 million in illicit goods seized by Hong Kong customs over Lunar New Year

The confiscated items ranged from counterfeit products to drugs and wildlife parts from endangered species

2018, 7:01am

HK\$2.7 million worth of ivory seized by Hong Kong customs in joint operation with mainland Chinese authorities

Eight people are arrested including alleged mastermind of the scheme

PUBLISHED : Wednesday, 04 July, 2018, 7:31am
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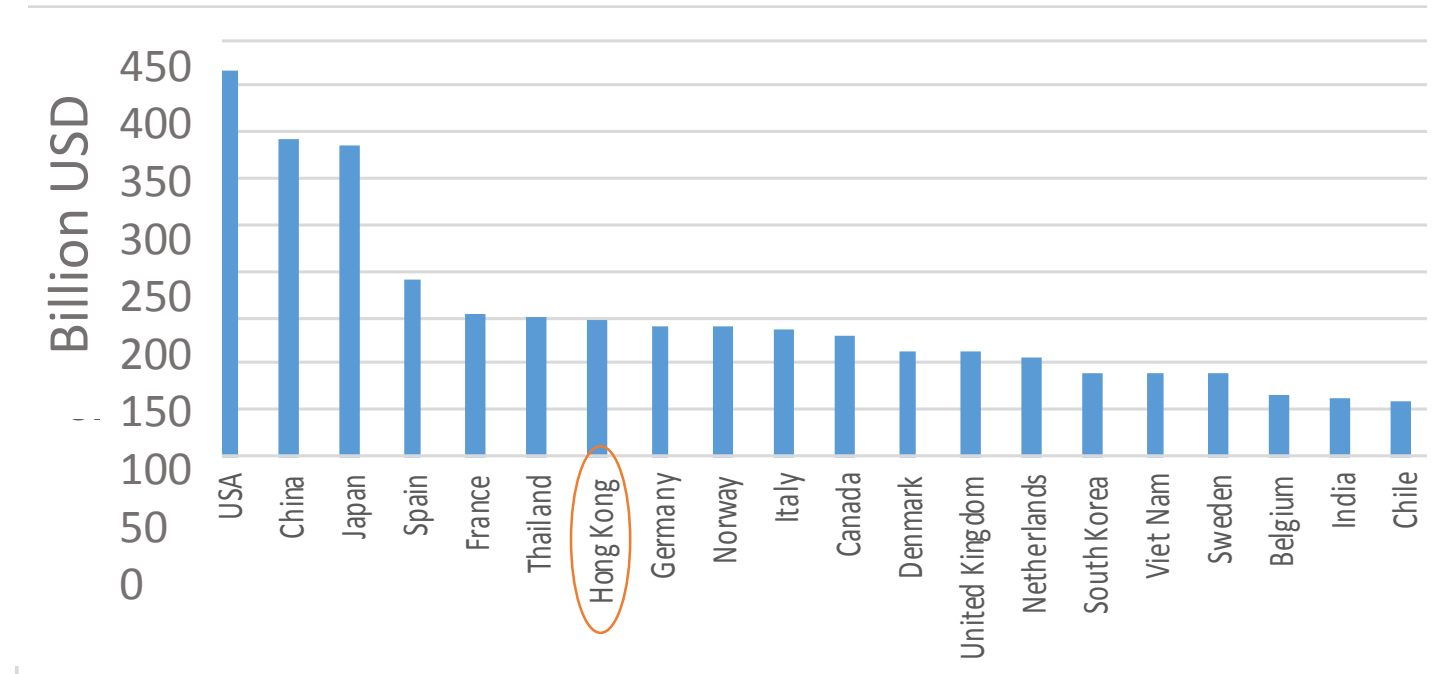
COMMENT: 1





Hong Kong: a wildlife trade hub

The annual illegal trade of protected wildlife is estimated to be worth 5 to 20 billion (US Dollars) globally, with demand originating largely from Asia. As many of these illegal wildlife activities have been linked to other criminal activity, identifying and restricting this trade is of global concern.



The top 20 countries for total, global wildlife trade in USD between 1997 and 2016. (Andersson et al., in prep., in collaboration with TRAFFIC)



Key Issues: What, Where From, Why

- Volume of trade:
 - Difficult to monitor and enforce
 - Facilitates laundering of wild caught individuals
- Species identification
- Species origin
 - Where from?
 - Captive vs wild caught
- Market dynamics
 - Who is buying
 - Trade routes





Conservation Forensics Lab @HKU

- Academic and forensics research
- Contract work with government and NGOs
- We have developed a range of molecular and isotopic forensics along with data analytical tools for countering wildlife crime.



genetics



isotopes



elements



data analysis

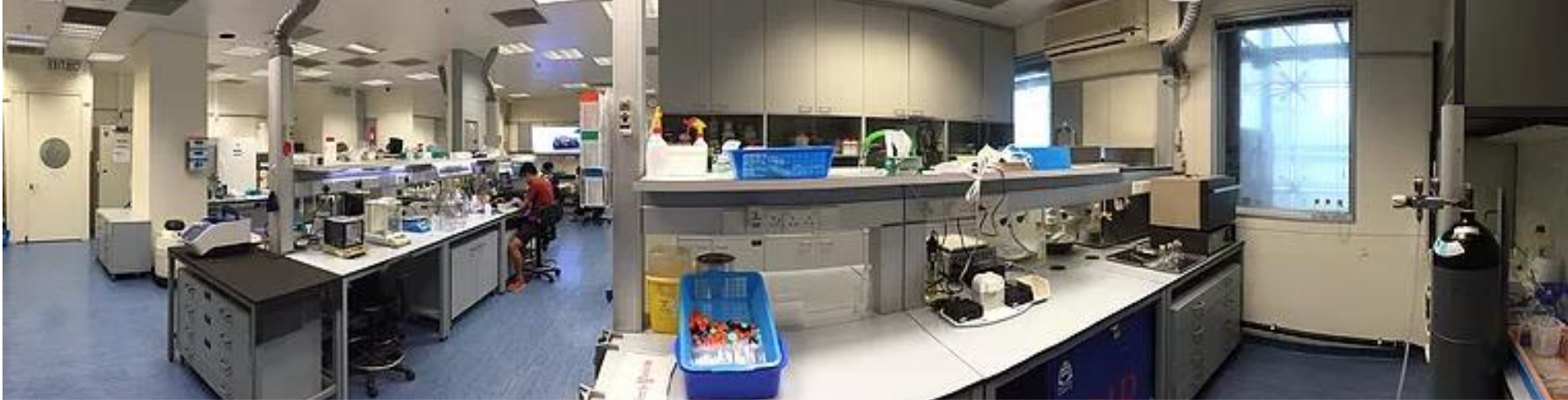
(some of) the team*

*faculty are not to scale





Conservation Forensics Lab Facilities



Molecular Lab

- Barcoding
- Population genetics
- Genomics
- Sequencing...



Stable Isotope Lab

- C, N, H, O, S
- Bulk/compound analysis
- Diet analysis
- Food adulteration...



Underpinning research: Overview

Summary of ongoing research projects in the lab:

- Glass eels – molecular techniques to identify species
- Pangolins – trade network analyses to identify trade routes and trading hotspots
- Live pet trade – analysis of trends in the live trade of birds and reptiles through Hong Kong
- Shark fins – identification of species in trade to determine legality
- Live reef fish trade
- Trade of animal products for ornaments, including hippo teeth and helmeted hornbill casques.

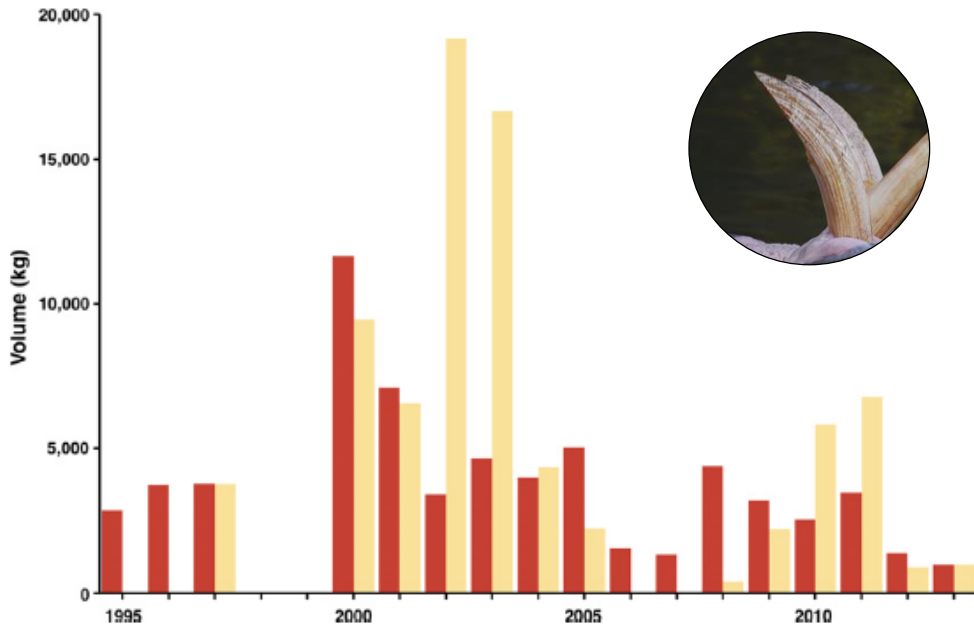
Research Grants

11 internal and external grants including National Geographic, Ocean Park Conservation Fund, USAID

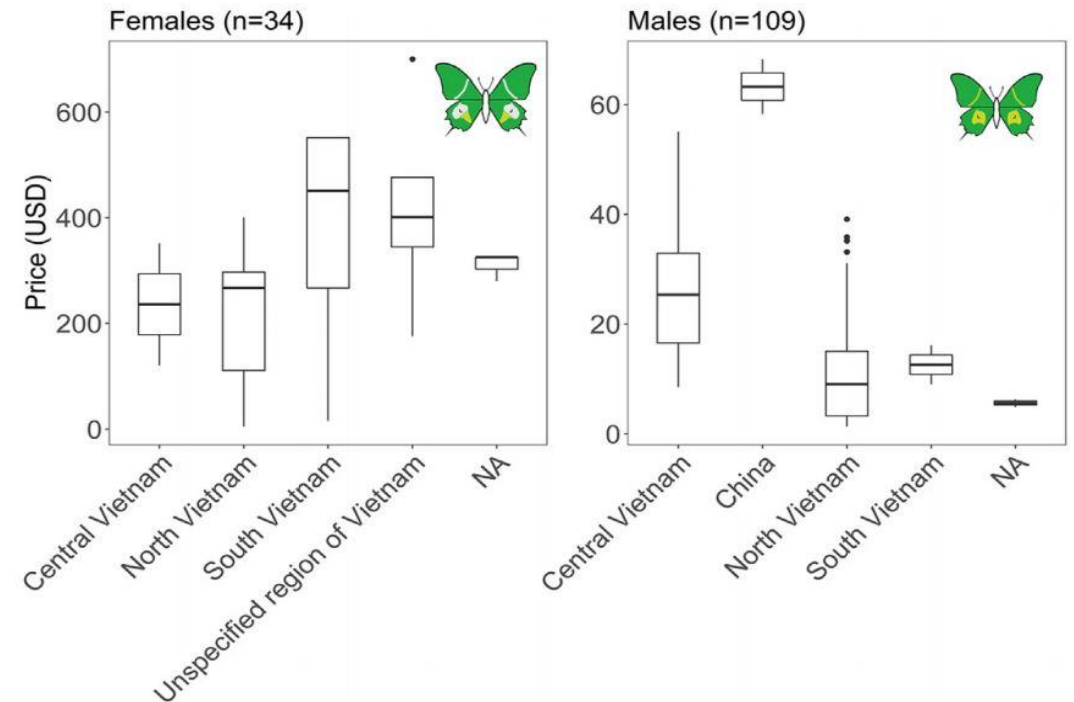




Underpinning research: trade analyses



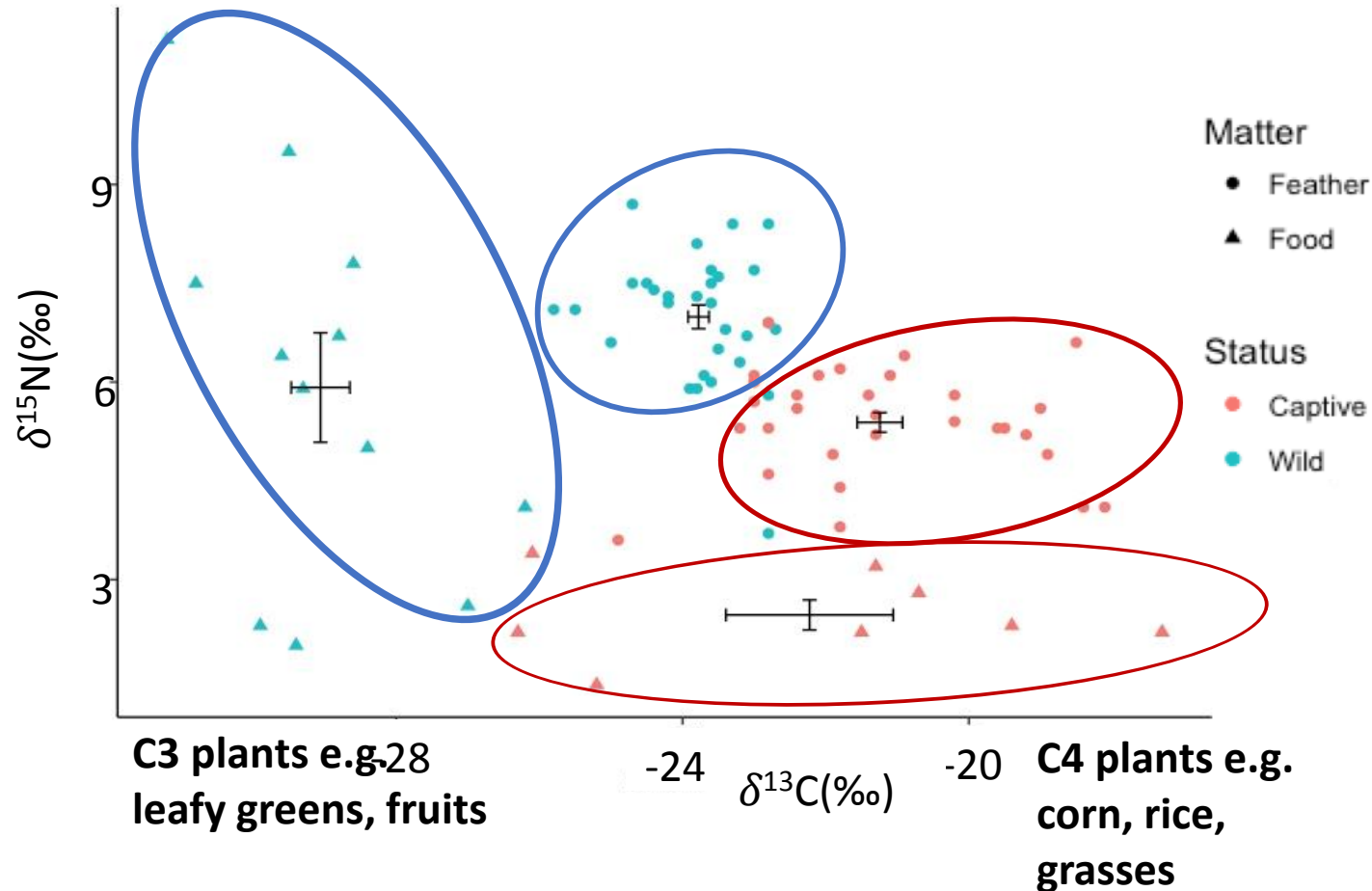
Analysis of CITES trade data indicated high levels of trade in hippo teeth between Uganda and Hong Kong, 1995–2013, and a mismatch between import and export records. Yellow indicates export volume declared by Uganda, and red indicates import volume declared by Hong Kong (from Andersson & Gibson 2017)



CCF research revealed that a butterfly species is facing multiple interacting threats, including overharvesting for the wildlife trade (from Xing et al. 2019 Biological Conservation)



Underpinning research: Stable isotope analysis



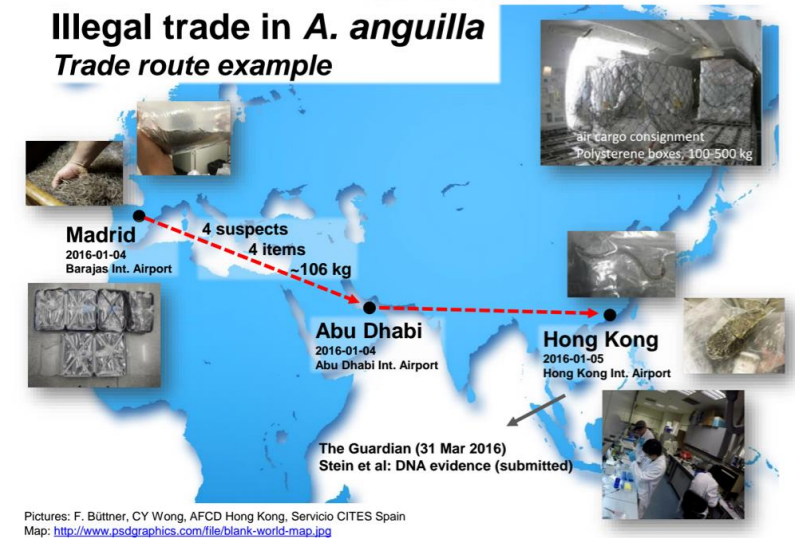
Andersson et al. *in review*

- Stable isotope ratios vary with diet.
- Our recent research reveals that dietary differences between captive and wild animals allow us to determine whether a seized animal was legally or illegally obtained.
- Provides information for enforcement about the source and legality of traded species



Impact: Wildlife Crime Law Enforcement

- A case of suspected European eel importation was referred to CCF by Hong Kong Customs, and samples provided to the CCF lab for analysis.
- Genetic analyses by CCF team members provided the first evidence to verify **importation of the CITES listed “Critically Endangered” European eel (*Anguilla anguilla*) into Hong Kong**
- This work highlighted the illegal global trade of the endangered European eel (*A. anguilla*) to Asia.
- Results were published in collaboration with members from the Sustainable Eel Group in Germany (Stein et al, 2016).
- The CCF lab now regularly provides analysis services for the HK Government agencies.



Critically Endangered European eels (*Anguilla anguilla*) in glass eel stage



Impact: Wildlife Crime Law Enforcement

- The rapid analysis of samples, with evidence provided to HK Customs by the CCF lab, and the resulting publication **led to a successful prosecution in 2016.**
- A group of 40 people in the EU were arrested on the basis of this work.
- These actions highlight the role that the CCF lab played in **improving the effectiveness of the enforcement of wildlife crime law in Hong Kong.**
- External partners: HK Customs, AFCD, Sustainable Eel Group
- Ongoing work with WWF Hong Kong to further monitor fish markets to identify illegal species mislabeled for sale in the trade.

[Conservation Genetics Resources](#)

pp 1-5

First genetic evidence of illegal trade in endangered European eel (*Anguilla anguilla*) from Europe to Asia

[Florian M. Stein](#), [Jane C. Y. Wong](#), [Victoria Sheng](#), [Calton S. W. Law](#), [Boris Schröder](#), [David M. Baker](#)

the **guardian**

Illegal eel: who is pilfering Europe's catch?

In part two of the eel saga, I take a more detailed look at how the pieces of the trade fit together, and what's being done to combat it.

Emma Bryce

Thursday 31 March 2016 13.21 BST

This is my second blog about the illegal trade of eel between Europe and Asia. In the first I wrote about the ecological plight of the eel and the scale of the trade. You can read that post [here](#).



Impact: CITES and IUCN Protection of Species

- Our studies were influential in contributing to the successful proposals of up-listing and increased protection for several species:
 - Two softshell, freshwater turtles in the Trionychidae family (*Cyclanorbis elegans* and *Cycloderma frenatum*) listed to Appendix II of CITES and increased protection of the big-headed turtle (family Platysternidae) from Appendix II to I.
 - Sunda and Chinese pangolins from Appendix II to I in the 17th Conference of Parties for CITES in 2016 .
 - All eight species of pangolin now listed on the International Union for Conservation of Nature (IUCN) Red List and are subject to trade regulation. All international trade of pangolin meat and scales is now illegal with increased enforcement and greater penalties for violation of the law.
 - Recent research on the taxonomy of song bird species are being used to make a case for including several songbird species on Appendix II of CITES at the next COP meeting.



Ongoing collaborative research:

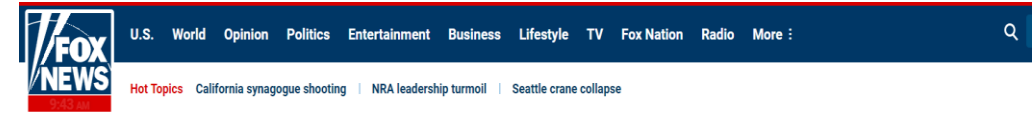
How much of the eel sold in HK supermarkets is *A. anguilla*?

- Team members are conducting DNA barcoding to continue to monitor markets for detection of illegal and/or mislabeled species
- This research is in collaboration with WWF Hong Kong



Knowledge Exchange Activities

- Invited talks
 - Café Scientifique
 - Wildlife Seminar 2.0
 - Rare and Endangered Marine Species Workshop
 - Workshop on Deploying Forensics to Fighting Illegal Wildlife Trade
- Press interviews:
 - RTHK, BBC, Reuters
 - BBC, New York Times, SCMP, The Guardian
- Others
 - HKU Knowledge Exchange Video
 - University of Exeter Field Course
 - IUCN Asian Songbird Trade Specialist Group
 - IUCN Hornbill Specialist Group
 - IUCN Pangolin Specialist Group

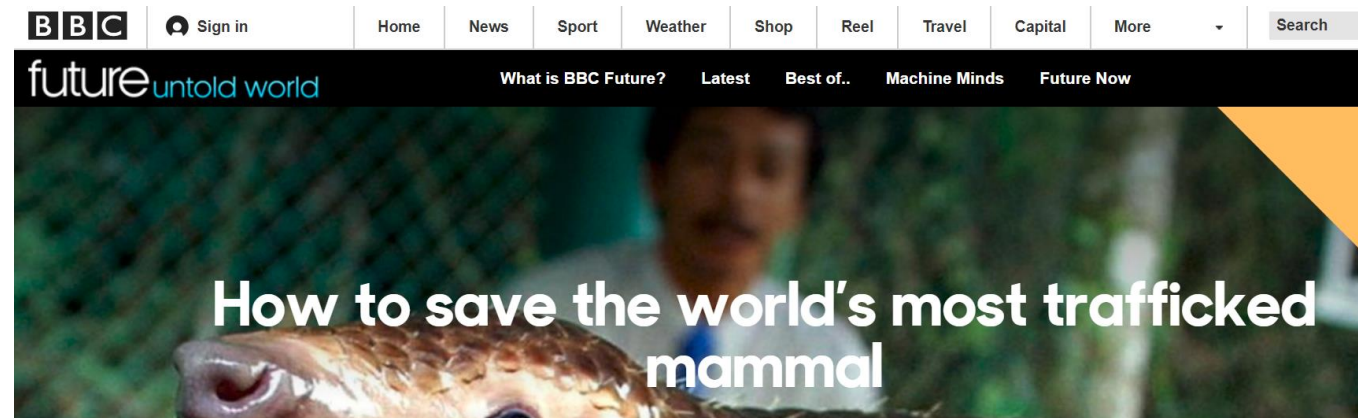


Hippos in danger because of desire for their teeth

Long Reads

Why Chinese demand for 'red ivory' dooms helmeted hornbill bird to extinction unless poaching can be stopped

Sought after on the black market for their casques, these strange-looking birds - native to Southeast Asia - are close to being wiped out to satisfy human greed





External Collaborators and Funders



漁農自然護理署
Agriculture, Fisheries and
Conservation Department



香港海洋公園保育基金
Ocean Park
Conservation Foundation
Hong Kong



Bureau of International Narcotics and Law Enforcement Affairs (INL)