



# Singapore's Efforts in Combating Illegal Trade in Sharks and Rays

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**NATIONAL  
PARKS**  
NATIONAL  
PARKS  
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SINGAPORE



# Outline



- Singapore's measures in combatting illegal wildlife trade including sharks and rays
- Trade in sharks and rays in Singapore
- Meet Fin Finder – an AI tool to combat illegal trade in sharks and rays

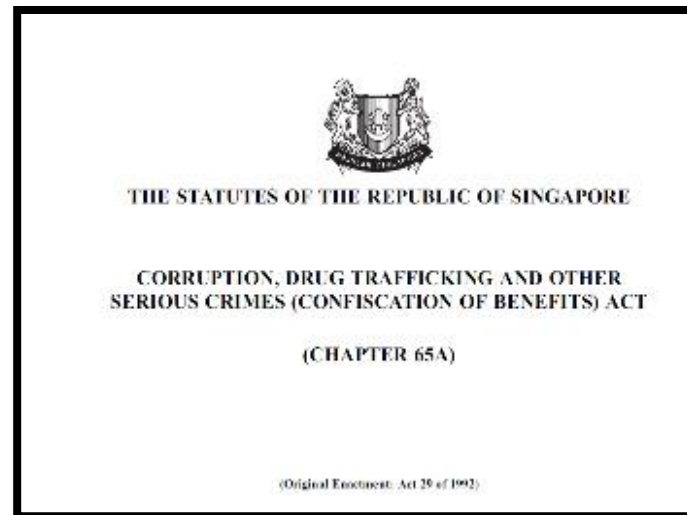
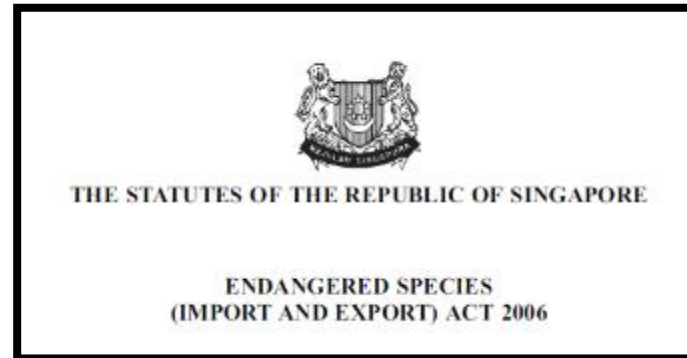


# Singapore and CITES

- National Parks Board of Singapore is the CITES authority of Singapore
- We adopt a whole-of-government approach in implementation and enforcement of CITES
- Comprehensive, multi-pronged 'network'
  - National law enforcement agencies
  - Regional and international partners
  - Members of the public

# Legal Framework

- The Endangered Species (Import and Export) Act (ESA) is the principal legislation that gives effect to CITES
- ESA is recognised by CITES as Category 1 legislation i.e. meets all CITES requirements
- The Corruption, Drug Trafficking and other Serious Crimes (Confiscation of Benefits) Act to investigate financial crime and confiscate benefits derived from the illegal wildlife trade.



# Whole-of-Government approach



# Centre for Wildlife Forensics (CITES Registered Laboratory)



Wood Identification & formation of Xylarium



Aims to become an international centre of excellence in wildlife forensic research and collaboration.

Anchored by International Panel of Advisors



ISO 17025 certified  
Recognised as CITES registered laboratory



Genetics, Spectrographic & Chemical Analysis



Expert sharing at the CITES timber workshop



Research collaborations



# Enhancing our capabilities



- Launched in Aug 2020
- Draw upon expertise across NParks to build, deepen expertise in wildlife forensics
- Identify and analyse specimens involved in illegal wildlife trade
- Strengthen NParks' detection and diagnostic capabilities
- Panel of advisors to collaborate on seizure analysis and forensics work.
- ISO 17025 certified
- Recognised as CITES registered laboratory (1<sup>st</sup> Asian country to be approved)



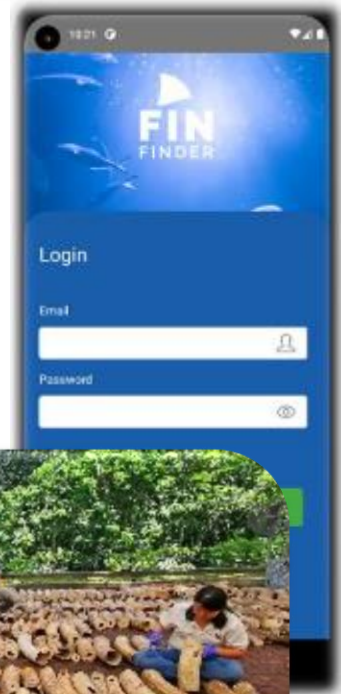
# Advanced investigation – *Centre for Wildlife Forensics*



Aims to become an international centre of excellence in wildlife forensic research and collaboration.

## Technology streams

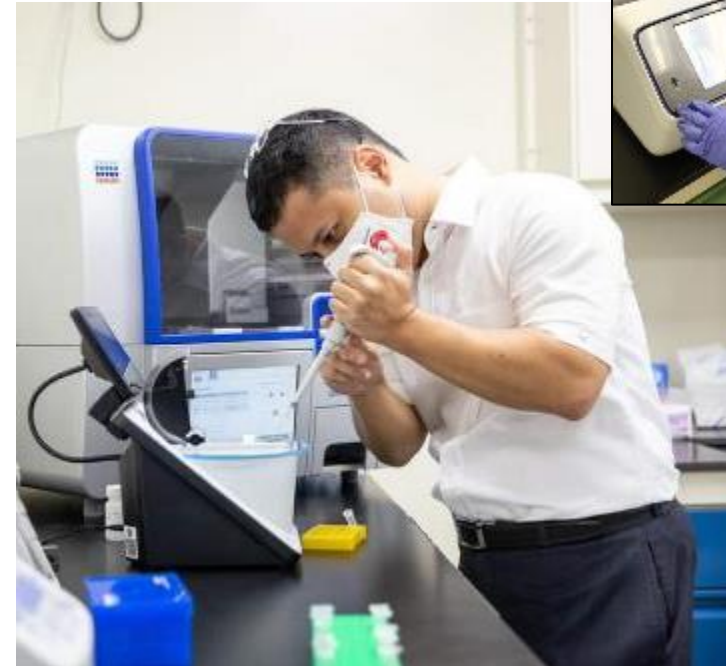
- DNA analysis (Identification and Geographic analysis of illegal trade and poaching)
- Vision-based/AI-assisted identification (Fin Finder)
- Spectrographic and Chemical Analysis (DART)





# Molecular Diagnostics Identification and Analysis

- Develop and validate molecular protocols using DNA barcoding technology to identify wildlife species e.g. elephant ivory, pangolin scales, sharks & rays, seahorses, sea cucumbers, rhinoceros, saiga, etc.
- Build and curate reference genetic libraries of various wildlife species with advanced molecular technologies
- Analysis of genomic data to establish familial matching, origin assignment, parentage testing, and population studies



# DNA analysis of ivory seizures

nature  
human behaviour

ARTICLES

<https://doi.org/10.1038/s41562-021-01267-6>

 Check for updates

## Elephant genotypes reveal the size and connectivity of transnational ivory traffickers

Samuel K. Wasser <sup>1</sup>✉, Charles J. Wolock <sup>2</sup>, Mary K. Kuhner<sup>1</sup>, John E. Brown III<sup>3</sup>, Chris Morris <sup>4</sup>, Ryan J. Horwitz <sup>5</sup>, Anna Wong<sup>6</sup>, Charlene J. Fernandez<sup>6</sup>, Moses Y. Otiende<sup>7</sup>, Yves Hoareau <sup>1</sup>, Zofia A. Kaliszewska <sup>1</sup>, Eunjin Jeon <sup>1</sup>, Kin-Lan Han <sup>1</sup> and Bruce S. Weir <sup>2</sup>

- Collaboration with Dr Sam Wasser, University of Washington
- Published in Nature Human Behaviour
- Analyse ivory seizures globally including SG's seizures
- Reveal wildlife crime networks
- Importance of international cooperation



# Trade of Sharks and Rays in Singapore





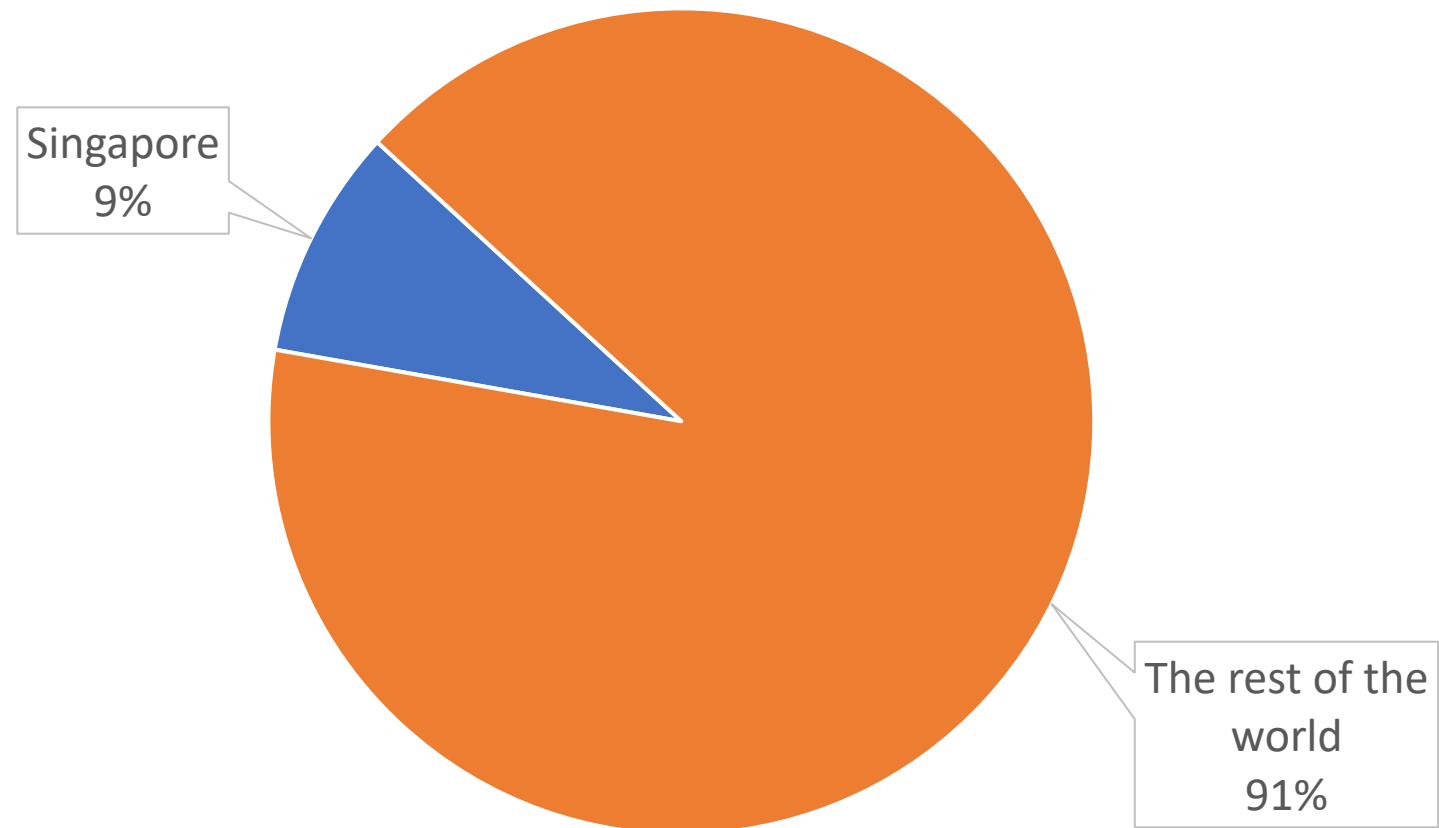
Approximately 1,000  
species of sharks and  
rays – more than 100  
are listed under CITES\*  
Appendix II

\*The Convention on International Trade in Endangered Species of Wild  
Fauna and Flora (CITES)

More than  
160,000 kg of  
fins from sharks  
and rays  
between 2012  
and 2020

Data extracted from the  
CITES trade database

Global trade of sharks and rays





CONSERVATION  
INTERNATIONAL

Singapore



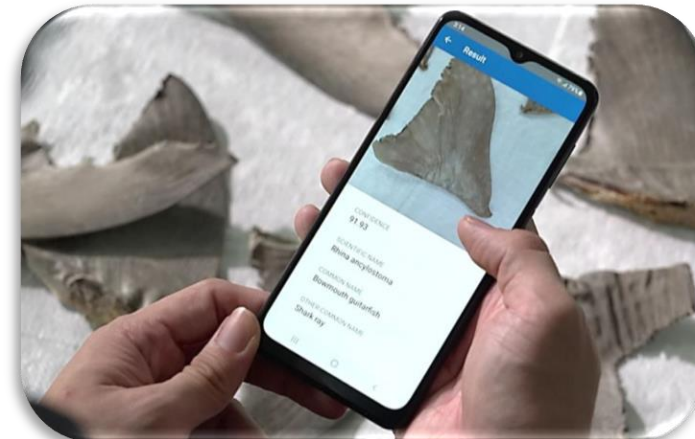
Microsoft

## Meet Fin Finder

A collaboration between Microsoft,  
Conservation International and the National  
Parks Board

# Vision-based/ AI-powered identification

- Fin Finder is Asia's first mobile application that employs **artificial intelligence** (AI) to visually identify illegally traded shark and ray species, up to **89.4% accuracy**.
- Empower officers to quickly identify shark species and **flag suspicious fin shipments** for further DNA testing to stop the illegal trade of shark and ray fins.



# Fin Finder

- Fin image collection
  - ~15,000 fin images, collected locally and externally
  - 35 species identified, with 14 species listed in CITES
  - Available in Singapore, support Spanish, French and Mandarin

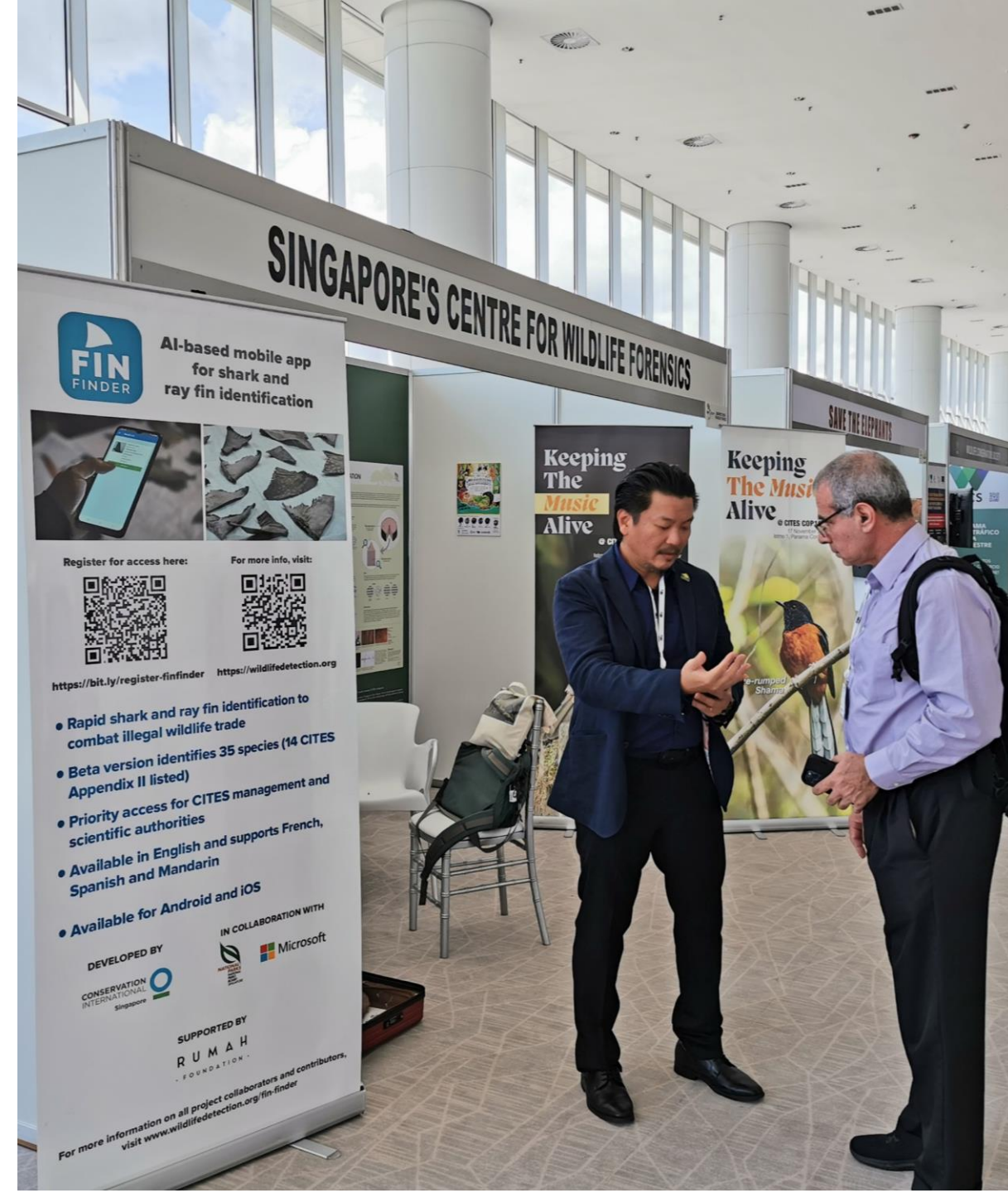
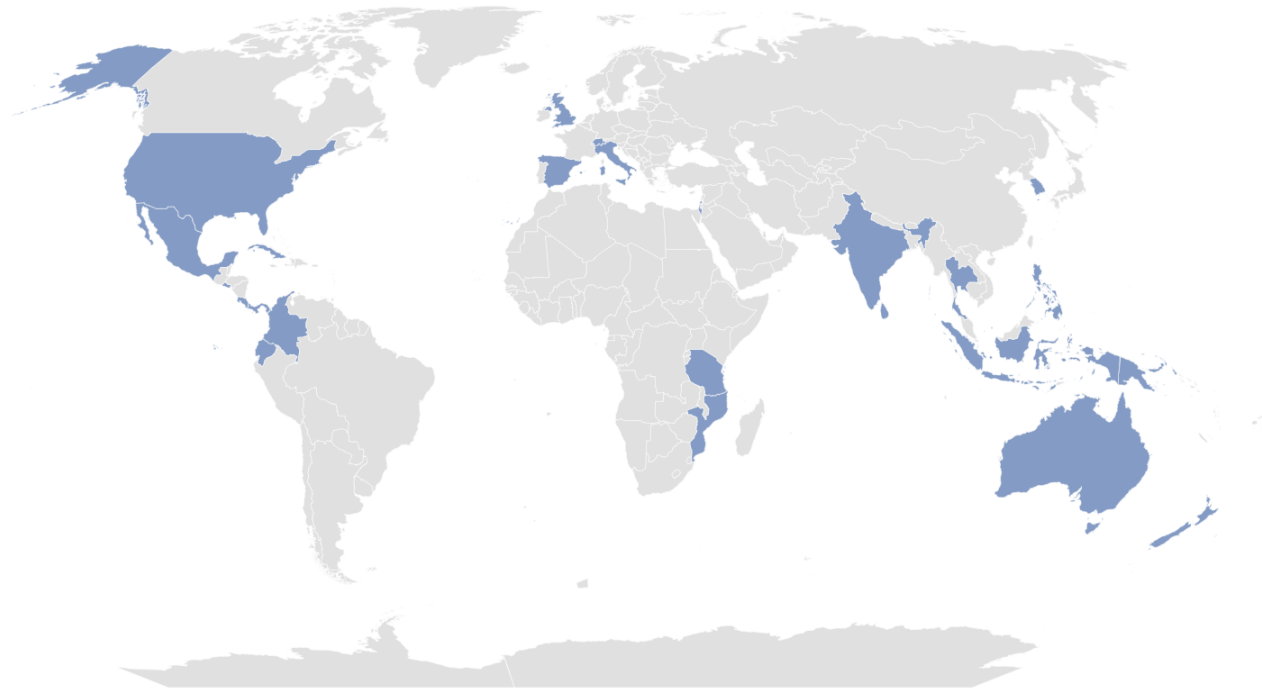




# Making it better

- Scale adoption of Fin Finder globally
- Increase awareness and engagement
- Adding more species

Fin Finder Global Reach (Jun – Dec 2022)

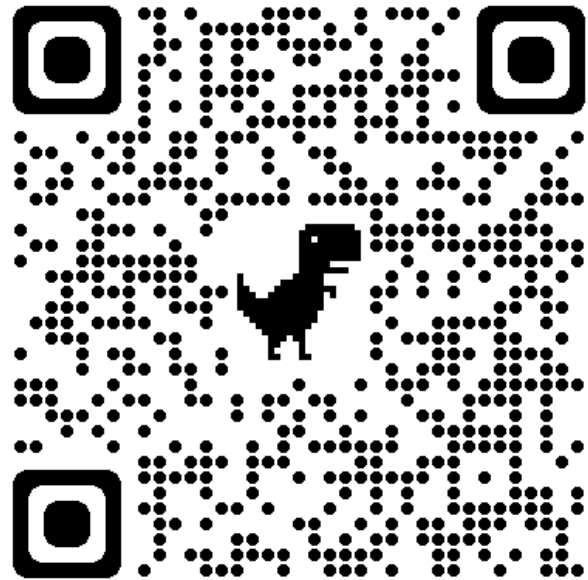




**AI-based mobile app for shark and ray fin identification  
to combat illegal wildlife trade**

# Thank you!

Register by scanning the QR code



Contact us on Singapore's work and Centre for Wildlife Forensics at:

[cites@nparks.gov.sg](mailto:cites@nparks.gov.sg)