



THE ASEAN **WILDLIFE** FORENSICS NETWORK

A Darwin Initiative Project





CREDITS

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MESSAGES FROM THE PROJECT PARTNERS

Message from the lead partner, TRACE Wildlife Forensics Network

The illegal trade in wildlife is one of the key issues threatening biodiversity conservation and the sustainable management of natural resources. Detecting, investigating and prosecuting wildlife crime requires coordinated action by many different agencies. Police, customs, government departments, and non-government organisations are often involved in the same investigation. When examining a crime scene or seizure, they are also often asking the same questions: What species is it? Where did it come from? Is it really captive-bred? Wildlife forensic analysis is increasingly being used to answer these questions and help secure convictions around the world.

The **ASEAN Wildlife Forensics Network** has been established over the past three years to support **ASEAN** member states, particularly Malaysia and Thailand, develop their own capacity to undertake wildlife forensic analysis. The project examined existing capacity and specific needs for identifying traded wildlife, before implementing a programme of training for enforcement and scientific officers, developing new forensic techniques and advising on laboratory processes. As lead partner on the project, **TRACE** has been very fortunate to work alongside the **ASEAN WEN PCU** (Programme Coordination Unit) and **TRAFFIC** Southeast Asia to deliver the project activities and begin a regional network of wildlife forensic practitioners and end-users. The history of the project dates back to a meeting held at **CITES CoP14**, in 2007 in the Netherlands, where **TRACE**, **TRAFFIC** and representatives of **ASEAN** country **CITES** Management Authorities came together to discuss the needs and potential for wildlife forensics in the region. Five years on, we are very proud to see how much has been achieved on the ground.

The **ASEAN Wildlife Forensics Network** has been core funded from 2009-2012 by the **UK Darwin Initiative** and we are extremely grateful for their support. In addition, significant funding has been received from the Royal Zoological Society of Scotland. While we hope these donors consider continuing their support, the time has come to hand over the network to **ASEAN-WEN**. We are confident that the core structures are now in place to maintain the development of wildlife forensic capacity in Thailand and Malaysia. Still, there remains a significant amount to do. Forensic techniques evolve to meet changing needs; other countries are keen to develop laboratories and there is a constant need for training to ensure that forensic best practice is achieved.

On behalf of Dr Ross McEwing, Dr Jen Mailley and the rest of **TRACE**, I would like to thank everyone who has worked so hard to make the **ASEAN Wildlife Forensics Network** a reality and look forward to continuing our collaboration on this very worthy project.

MESSAGES FROM THE PROJECT PARTNERS

Message from the principal funder, the UK Darwin Initiative

Conservation of biodiversity is a global issue. This is clearly demonstrated by the illegal wildlife trade which occurs at an international scale and is increasingly recognised as a major threat to species survival. However, global problems do not necessarily require global solutions. In conservation, it is now widely accepted that local solutions are often the best way to address problems in countries that are already working hard to manage their natural resources. In such cases, it is important that range states receive the support required to develop local capacity in state-of-the-art science.

The United Kingdom government's Darwin Initiative assists countries that are still rich in biodiversity to meet their objectives under one or more of the three major biodiversity Conventions: the Convention on Biological Diversity (**CBD**); the Convention on International Trade in Endangered Species of Wild Flora and Fauna (**CITES**); and the Convention on the Conservation of Migratory Species of Wild Animals (**CMS**). This is achieved through the funding of collaborative projects which draw on **UK** biodiversity expertise.

We have been very happy to support the establishment of the **ASEAN Wildlife Forensics Network**. The project takes a novel approach to the conservation of biodiversity by enhancing the host countries' ability to enforce national legislation. **UK** scientists have pioneered the field of forensic **DNA** testing and are now leading the way in transferring these techniques to wildlife crime investigation. The success of the project, led by **TRACE**, is evident from both the increase in laboratory capacity and the use of forensic analysis in investigations. On behalf of the Darwin Initiative I would like to thank all of the project partners for their hard work and look forward to seeing the network continue to develop throughout the **ASEAN** region.



MESSAGES FROM THE PROJECT PARTNERS

Message from the Chairman of the ASEAN Wildlife Enforcement Network

The Association of Southeast Asian Nations Wildlife Enforcement Network (**ASEAN-WEN**) is the world's largest wildlife law enforcement network, involving police, customs and environment agencies of all 10 **ASEAN** countries. Formed between 2004 and 2006, the network has since worked to foster and disseminate best practice in wildlife law enforcement, particularly in relation to national legislation on **CITES** (Convention on the International Trade in Endangered Species of Wild Fauna and Flora). In 2007 **ASEAN-WEN** developed a Strategic Plan of Action in which the capacity to forensically identify traded animals and plants was seen as a requirement throughout the region. **ASEAN-WEN** has provided its support to the **ASEAN Wildlife Forensics Network** project, initially alongside **TRACE** and **TRAFFIC** as a project partner. During the three years since the project began, scientific capacity, together with a growing awareness and application of forensic techniques in wildlife crime investigations, has developed.

Progressing through 2012, the first phase of the project under UK Darwin Initiative funding is drawing to a close. This is viewed as an opportunity to strengthen the initiative started in the **ASEAN Wildlife Forensics Network** through **ASEAN-WEN**, by ensuring that the good work begun under this project can be sustained. Looking forward, it is seen that the **ASEAN** region can continue to benefit from the development of wildlife forensic capacity and wider law enforcement activities that are important to the conservation of the region's biodiversity and environment.



MESSAGES FROM THE PROJECT PARTNERS

Message from TRAFFIC Southeast Asia

TRAFFIC is delighted to be working with **TRACE** in Southeast Asia. The wildlife forensics work they are carrying out fills a vital need. It is also a model project. By working with local centres of technical expertise and building scientific capacity on the ground, **TRACE** is assisting the development of a robust wildlife forensics network in Southeast Asia. Going forward, **TRAFFIC** anticipates this network will be a vital part of this region's solution to the illegal wildlife trade problem. Due to this project, **the ASEAN Wildlife Enforcement Network** now has improved capabilities in the region for applying wildlife forensics to investigations which historically might have relied on external expertise. We very much look forward to seeing this increased capacity contributing to more successful convictions of wildlife traffickers and a resultant reduction in wildlife criminality throughout **ASEAN**.





British
High Commission
Kuala Lumpur

Muru Loganathan
British High Commission,
Kuala Lumpur

MESSAGES FROM THE PROJECT PARTNERS

Message from the the British High Commission, Malaysia

The British High Commission in Kuala Lumpur, Malaysia has observed with pride the progress made during this groundbreaking project. The **UK Darwin Initiative** always seeks to fund projects which have an impact on the ground, and **the ASEAN Wildlife Forensics Network** has certainly achieved this. We are also pleased to see that the project has taken off in one of the most important biodiversity hotspots in the world – the **ASEAN** region. From increased laboratory capacity in Malaysia, Thailand, Vietnam and Indonesia, to increased enforcement awareness about what forensics is capable of, the project promises to leave a genuine legacy for the **ASEAN** region.

The ASEAN Wildlife Forensics Network comprises both specialist scientists and enforcement personnel- people who were not in touch with each other before project launch in 2009. I sincerely look forward to seeing the criminal justice systems of host countries processing the cases investigated by **the ASEAN Wildlife Forensics Network**, and handing down the most severe punishments possible. **ASEAN** should be proud of its increased wildlife forensics capacity and send a clear message: the **ASEAN** region is now better equipped to detect wildlife criminals, and will bring to bear the latest technologies and the strongest punishments under our laws, against those who perpetrate wildlife offences.

SECTION 01

Wildlife Trade Issues in Southeast Asia



1:1 | THE TRADE IN WILDLIFE

There has always been trade in wildlife resources in Southeast Asia, as in the rest of world. The collection of animals and plants for the pet trade, food, medicine, decorative items or timber, have a long history and remain important components of indigenous local economies. However, in the recent past, our appetite for natural resources combined with globalization of the wildlife trade has led to a massive increase in the exploitation of species throughout the Southeast Asian region, driving an entire industry dedicated to the commercial sale of the area's biodiversity.

1:2 | BIODIVERSITY AND SUSTAINABILITY

While the sustainable harvest of some species is possible, for the vast majority, current levels of exploitation are leading to the decline of species throughout their ranges. From an economic perspective alone, such over-exploitation makes no sense as the trade in wildlife is doomed to collapse. However more importantly, excessive trade is also destroying biodiversity, one of the most valuable natural resources available to any country. While arguments can be held over ethical aspects of the wildlife trade, there can be little debate over the need for the exploitation of natural resources to be sustainable over the long-term.



1:3 | CONSERVATION AND WILDLIFE LAW

To ensure the conservation of biodiversity and the sustainable trade in wildlife, Southeast Asian states have created legislation to support the implementation of two key international conventions, **CITES** (the Convention on the International Trade in Endangered Species) and **CBD** (the Convention on Biological Diversity). Each **ASEAN** member state has national laws that control the exploitation of wildlife both within and between countries. However compliance with these laws has in many instances been relatively poor. The level of the illegal wildlife trade is large and increasing, requiring strong enforcement of existing legislation throughout the **ASEAN** region.

1:4 | ASEAN-WEN

The challenges of enforcing wildlife laws in Southeast Asia are well-recognized. Work at a regional level to develop a coordinated response to tackle wildlife crime has been underway since 2004, when **ASEAN** issued a joint statement on its commitment to CITES. This led to the formation of the **ASEAN Wildlife Enforcement Network (ASEAN-WEN)** in 2006 and its implementation through the Programme Coordination Unit (PCU) in 2007. **ASEAN-WEN** is a regional intergovernmental law-enforcement network and includes governmental agencies of all ten **ASEAN** countries – Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Vietnam and Thailand. As such, it was a fundamental project partner on the Darwin Initiative project to develop an **ASEAN Wildlife Forensics Network**. The **ASEAN-WEN PCU** has worked very effectively since the project began to coordinate the involvement of member states in the forensics network and to support the operational activities of **TRACE** in the region.



SECTION 02

Wildlife Forensics

2:1 | WHAT IS WILDLIFE FORENSICS?

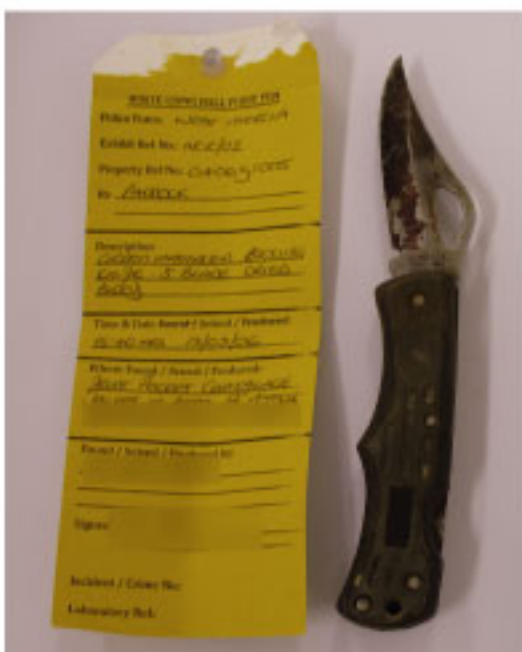
Simply speaking, wildlife forensics is the application of scientific analysis to support wildlife crime investigations. In some cases, forensic analysis is used to identify items used by the suspects, such as bullets or vehicles; however wildlife forensics is usually concerned with identifying biological evidence from the plant or animal involved. As with human forensics, the results of wildlife forensic tests should be carried out in a scientifically robust manner, using validated techniques, so that the results are admissible in a court of law. The high level of quality control distinguishes forensic casework from what is commonly called forensic research. So, wildlife forensics is not just about what tests are used, it is about how they are performed, where they are run and who is doing the analysis.

2:2 | INVESTIGATIVE QUESTIONS

Wildlife forensic scientists support enforcement officers who investigate wildlife crime. In some cases, the officer will want to identify evidence to prove that a crime has been committed. At other times, they may want to link evidence from a crime scene to a suspect. Whatever the case, the investigating officer will usually ask one of four questions:

- What is it?
- Where did it come from?
- Which individual did it come from?
- Was it captive bred?

Different methods for answering these questions are constantly being developed, with **DNA** analysis being the most popular approach.



2:3 | WILDLIFE FORENSICS IN SOUTHEAST ASIA

At a global scale wildlife forensics has developed over the past 30 years in parallel with increasing conservation legislation, analytical technology and, sadly, the spread of wildlife crime. Within Southeast Asia the capacity to include forensic analysis in wildlife crime investigations began to emerge around 10 years ago and has steadily expanded ever since. As with most regions around the world, wildlife casework has historically been performed in a variety of facilities, ranging from human forensic labs, through food testing labs to university research labs; none of which are ideal. One of the key objectives of the **ASEAN Wildlife Forensics Network** has been to optimize where and how wildlife forensic analysis is performed in the ASEAN region.

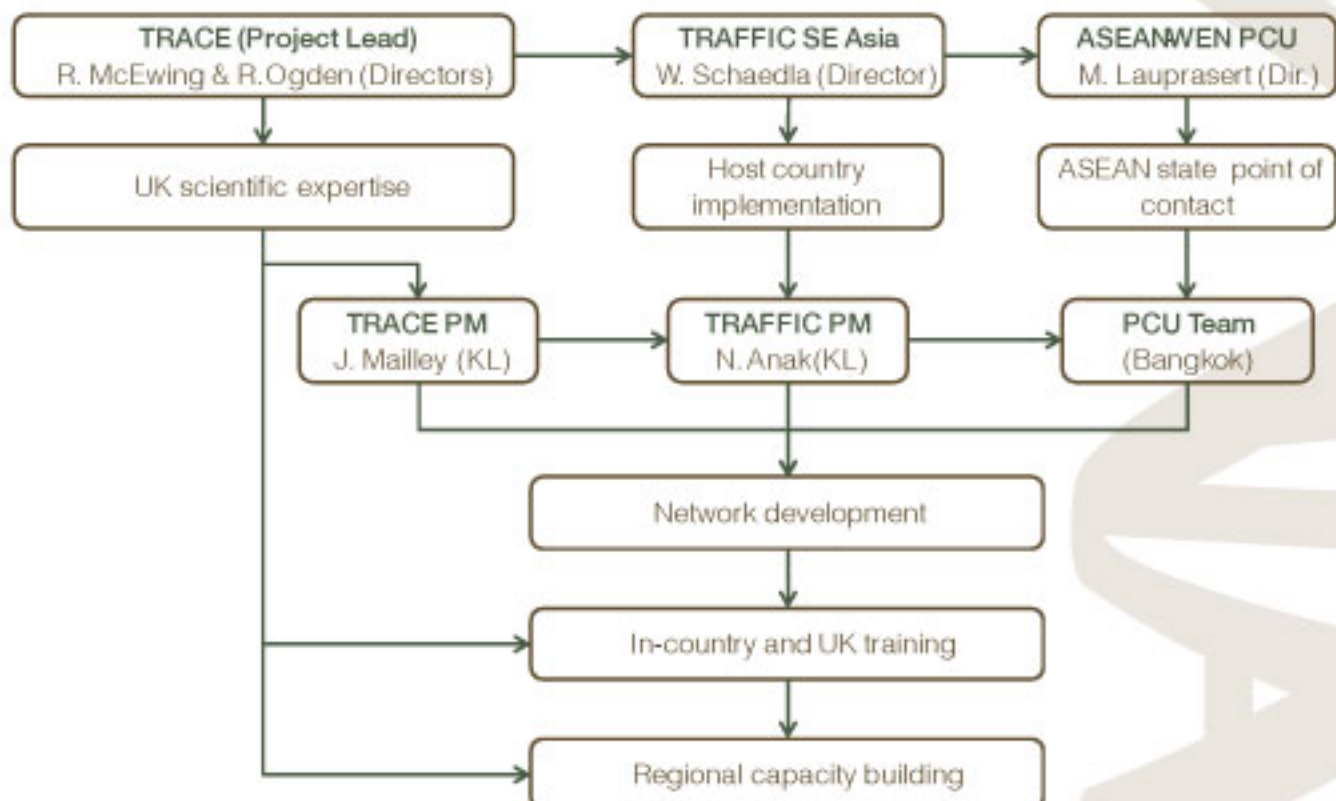
SECTION 03

The ASEAN Wildlife Forensics Network Project

3:1 | PROJECT BACKGROUND

The need for wildlife forensic capacity in Southeast Asia was identified in the first **ASEAN-WEN** Strategic Plan of Actions (2007-12), in which many of the ten member states specifically requested support in wildlife forensic analysis. This coincided with ongoing discussion between **TRACE** and **TRAFFIC** Southeast Asia concerning the problems of identifying wildlife products in trade. **ASEAN** country **CITES** representatives, **TRACE** and **TRAFFIC** met in 2007 and agreed to collaborate on a successful application to the **UK Darwin Initiative**, leading to the start of the project in September 2009. **TRACE** Wildlife Forensics Network took the lead in the project, partnering with **TRAFFIC** Southeast Asia and the **ASEAN-WEN PCU** (Figure 1 below), with the initial focus of the work being shared between Malaysia and Thailand. Within Malaysia, strong support for the project was received from Perhilitan, the Department for Wildlife and National Parks; in Thailand, the Department of National Parks, Wildlife and Plant Conservation (**DNP**) took the leading role. While the intention was always to develop an **ASEAN-wide network**, it was important to target resources during the first years of the project.

3:2 | FIGURE 1 - STRUCTURE OF PROJECT MANAGEMENT



SECTION 03

The ASEAN Wildlife Forensics Network Project

3:3 | THE CHALLENGE

Forensic analysis may be crucial to a successful prosecution, but it is only one small part of any wildlife crime investigation. To perform effectively, forensic scientists have to be integrated into the investigative team and communicate with enforcement officers from different government agencies, with state prosecutors and other scientists. As wildlife crime is transnational, this often means establishing international relationships, as well as a network of national contacts. With finite resources, the greatest challenge faced by the project was therefore to balance the delivery of training and capacity on the ground, with the development of a forensic framework within and between countries. With this in mind, two broad aims were established for the project:

- To enhance wildlife forensic capacity throughout the ASEAN region
- To develop forensic awareness within national wildlife law enforcement authorities

3:4 | ACTIVITIES

To achieve the aims of the ASEAN Wildlife Forensics Network, a series of activities was planned and implemented, focusing on different aspects of forensic capacity building in Southeast Asia:

• Needs analysis	An assessment of the wildlife forensic training and capacity requirements in each country, focusing on Thailand and Malaysia
• Scientist training	Training laboratory scientists how to conduct analysis for the production of forensic evidence
• Enforcement officer training	Educating enforcement officers about the potential of forensic evidence and how it can be obtained
• Research and Development	Building capacity for scientists to develop their own forensic techniques to address investigative questions as they arise
• Network development	Linking scientists to each other and to wildlife crime investigators to support communication and coordination
• Policy advice	Advising government departments on possible strategies for wildlife forensic implementation

SECTION 04

Scientist Training

The primary objective of the project was to transfer UK expertise in wildlife forensics to organizations responsible for performing wildlife forensic investigations in the **ASEAN** region. Training scientists in the forensic identification of wildlife was highlighted as a need by **ASEAN-WEN** and formed the largest single activity in the project. During the Needs Analysis, laboratories, scientists, species and techniques were identified as targets for scientific training. The training was delivered through a combination of formal training workshops, an advanced UK training course and informal visits by **TRACE** scientists to laboratories in the region. The highlights of these activities are described here.



Opening ceremony of the 2010 training workshop at DWNP, Kuala Lumpur, Malaysia

4:1 | 2010 TRAINING WORKSHOP, KUALA LUMPUR, MALAYSIA

The first major training activity of the project was hosted by Malaysia's Department for Wildlife and National Parks (**PERHILITAN**) at their headquarters in Kuala Lumpur. Scientists from Malaysia, Thailand, Indonesia, Viet Nam, Singapore and the Philippines attended the week-long course that covered all aspects of **DNA** forensic analysis, from receiving evidence items, through all aspects of forensic laboratory work, to the presentation of evidence in court. The aim of the course was to provide a comprehensive introduction to the application of **DNA** identification techniques to wildlife crime investigation, focusing on species identification via **DNA** sequencing. Feedback from participants was very positive, with everybody learning a lot of new skills.



Dr. Kanits Oubavon (Thailand) examining a tiger rib at the 2011 UK training course

4:2 | 2011 ADVANCED WILDLIFE DNA FORENSIC TRAINING, EDINBURGH, UK

A year later, the project was able to support the visit of two leading scientists, one from Malaysia, one from Thailand, to visit the UK for an advanced wildlife **DNA** forensics course. The two nominated participants were joined by an additional scientist from the Malaysian laboratory and a scientist from the Eijkman Institute in Indonesia, both being funded directly by their respective organisations. The project partners were delighted at this demonstration of investment in wildlife forensic capacity and in the **ASEAN Wildlife Forensics Network**.

During their three-week stay at **TRACE** headquarters in Edinburgh, the four scientists undertook training in the development of new forensic tests, learnt about **DNA** profiling, were introduced to forensic genetic statistics and got involved in the production of a peer-reviewed publication. The laboratory work focused on the identification of tigers, an issue that is faced by all three countries represented on the course.

SECTION 04

Scientist Training

4:3 | 2012 TRAINING WORKSHOP, BANGKOK, THAILAND

The final formal scientist training takes place in July 2012, hosted by the Department of National Parks (DNP) in Bangkok, Thailand. During this week, scientists from across **ASEAN** have been invited to receive training in forensic casework management and documentation, as well as meeting to discuss the future of the network and to take the opportunity to present their work at the regional wildlife forensics seminar being held in the same week.



Learning to extract DNA from Ivory, WIFOS lab, Bangkok, 2011

4:4 | ASEAN LABORATORY VISITS

Formal training events are an excellent way to introduce people to wildlife forensics and to establish the personal relationships that are key to ongoing collaborations among scientists. However, they often lead to more questions being raised than can be answered in a limited timeframe. Given the diverse range of laboratories, scientific experience and wildlife crime issues within the project, it was always planned for **TRACE** scientists to spend a considerable amount of time on informal visits to laboratories. This provided the opportunity to address specific questions, advise on technical details and ensure that issues could be solved on a case-by-case basis.

Led by Dr Ross McEwing, **TRACE** staff have spent over twelve weeks in Southeast Asia consulting with laboratory scientists in Thailand, Malaysia, Indonesia and Viet Nam. This was considered to be time well spent, leading to increased capacity within each laboratory to undertake forensic analysis relating to national priorities. In Thailand, this work coincided with the development of **WIFOS**, a brand new Wildlife Forensic Science Unit within **DNP**. The support provided by the project enabled Dr Kanita Ouitavon and her staff to access advice on the ground for setting up the laboratory and undertaking several high profile cases during the first few months of operation.



WIFOS staff outside their new laboratory, Bangkok, Thailand

SECTION 04

Scientist Training



Jeffrine Rovie Ryan Japning at work in the Malaysian wildlife DNA forensics lab

4:5 | INTERVIEW WITH A WILDLIFE FORENSIC SCIENTIST

Jeffrine Rovie Ryan Japning has worked at Malaysia's wildlife **DNA** forensic laboratory at the Department for Wildlife and National Parks since 2006. He has recently stepped back from forensic casework to undertake a PhD in wildlife genetics. Here, Jeff tells us what it is like to be a wildlife forensic scientist and about his involvement in the **ASEAN Wildlife Forensics Network**.

Interview by Dr Jen Mailley.

Q. You've been running the wildlife forensics lab in Kuala Lumpur for several years, what types of crime do you normally help to investigate?

A. The illegal trade in wildlife, either products seized by customs and our enforcement agents or found on sale within Malaysia. A lot of our work involves identifying the species of animal that a sample comes from, because that tells us whether it is illegal or not. We also get involved in some poaching cases.

Q. What's the biggest challenge you face in your job?

A. Wildlife forensics is a pretty new field in Malaysia. There aren't many other people doing the same kind of work, so it can sometimes be difficult to get advice or discuss your ideas with people. I'm lucky to have a really good group of people to work with at **PERHILITAN (DWNP)**, but we can still feel isolated sometimes. Apart from that, the biggest challenge is getting DNA out of old, rotten samples!

Q. Have you ever had to give evidence in court?

A. Yes, in two recent cases involving species identification using **DNA** sequencing. As I had already provided a witness statement it was fairly straightforward, but you always get nervous, even if you are absolutely sure of your evidence.

Q. You've been involved in the ASEAN Wildlife Forensics Network since the start. Has it helped, and if so, how?

A. The project has helped in a number of ways. First it has helped us to make sure our lab is following best practice, which is really important for forensic casework. We have also learnt lots of new techniques, like **DNA** profiling, and had the chance to use new kinds of software for handling data. Apart from technical help, the **ASEAN Wildlife Forensics Network** has been important for communicating what our lab does, both inside Malaysia and internationally. For us, the project has been brilliant.

Q. How do you see the future of wildlife forensics in Malaysia and the ASEAN region as a whole?

A. It's a really exciting time to be doing wildlife forensics; the illegal trade in wildlife is, unfortunately, not going away, but we have a great opportunity to use modern techniques to help fight it. In Malaysia our lab is going from strength to strength as we learn more and develop new techniques. I can't speak for other countries about their development, but I now know quite a few of the other scientists working in the region and we are all getting busier every year.

SECTION 04

Scientist Training

4:6 | CASE STUDY–WILDLIFE DNA FORENSICS IN ACTION

How do you identify a freezer full of body parts? That was the question faced by Jeffrine Rovie Ryan Japning and his team at the wildlife **DNA** forensics laboratory of the Malaysian Department for Wildlife and National Parks. The freezer in question belonged to a restaurant in the state of Johor, Malaysia, where officers were investigating the suspected illegal sale of wildlife parts for human consumption.

Some of the samples could be visually identified to some extent, but with most of the normal identifying features missing, it was impossible to prove which species all of the samples belonged to. In one of the first cases of its type in Malaysia, the scientists received ten representative samples from the freezer and used **DNA** analysis to provide forensic evidence for wildlife law enforcement.

First, **DNA** was recovered from each sample using enzyme digestion and filtration to remove all of the non-genetic material. The purified **DNA** was then analysed, targeting a single gene, known as 'cytochrome b', which usually varies from species to species. The gene was sequenced, allowing the scientists to examine its genetic code (a string of ~350 ACGT letters). The **DNA** sequence from each sample was then compared against a reference data base containing the **DNA** sequences of thousands of different wildlife species, to identify the unknown restaurant meat samples.

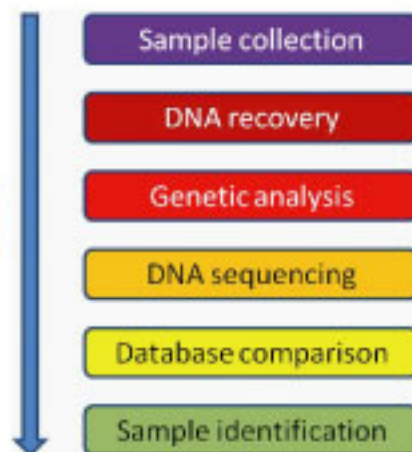
The **DNA** sequences clearly showed that the samples came from *Varanus bengalensis*, the clouded monitor lizard. These results demonstrated the illegal sale of wildlife and provided enforcement officers with the evidence required to prosecute the offenders.



Meat found in restaurant freezer



Monitor lizard prior to cooking



Flowchart of the DNA analysis process

SECTION 05

Enforcement Officer Training

The beginning of any forensic investigation happens when the evidence is collected. Evidence collection and the management of an investigation are not normally performed by a forensic scientist. It is therefore essential that enforcement officers are trained to collect, store and transfer forensic evidence correctly and that senior investigators are aware of the strengths and limitations of modern forensic science.

The **ASEAN Wildlife Forensics Network** project included training specifically designed for enforcement officers who might benefit from using wildlife forensic techniques. Importantly, this was done in conjunction with the scientific training, to ensure that working relationships could be established between individuals from different government agencies. A summary of the enforcement training is provided below.



Collecting crime scene evidence, Malaysia, 2010



Vietnamese enforcement officer training, Ho Chi Minh City, 2011

5:1 | FIELD OFFICER TRAINING

In August 2010, an enforcement officer training workshop was held in Kuala Lumpur, Malaysia, in parallel to the forensic **DNA** training for laboratory scientists. 20 enforcement officers from nine **ASEAN** countries attended, representing their various government agencies responsible for investigating wildlife crime. Participants learnt about what samples to collect for forensic analysis, how to use a wildlife **DNA** sampling kit and how to store and transfer evidence under a controlled 'chain of custody'. The training was designed to encourage techniques learnt on the course to be shared with other officers when participants returned home.



Vietnamese enforcement officer training, Ho Chi Minh City, 2011

In December 2011, a specialist enforcement officer training course was run in Ho Chi Minh, Viet Nam, which included theory and practical sessions run by **TRACE** on the collection of forensic evidence. Organized by the Vietnamese **CITES** Management Authority, the course was attended by 26 officers from southern Viet Nam.

Lastly at the training event in Bangkok in July 2012, over 100 Thai enforcement officers are scheduled to attend a full day of training in **DNA** forensic evidence handling. In addition to increasing skills and raising awareness of Thai field officers, the training will provide Thai wildlife forensic scientists with the opportunity to gain experience of training course participants themselves. This model of 'training the trainer' is part of the legacy that the **ASEAN Wildlife Forensics Network** project hopes to establish.

SECTION 05

Enforcement Officer Training



5:2 | WILDLIFE DNA SAMPLING KITS

The secure collection of evidence is the most important part of any forensic investigation, but knowing what samples to collect, how to collect them and where to store them is not always obvious. As part of the enforcement officer training, **TRACE** has provided Wildlife **DNA** Sampling kits to all enforcement officers receiving training under the project. The kits were first designed for UK police and customs officers, but have since been adapted to **ASEAN** requirements, including the translation of the instructions and guidelines into Thai, Malay, Indonesian and Vietnamese. The kits and guidelines are supplied without restriction and the production of similar kits by **ASEAN** member states is strongly encouraged.

5:3 | INVESTIGATOR TRAINING

The decision to involve forensic analysis in an investigation usually rests with the investigating officer. It is important that good communications are established between investigators and forensic scientists and that investigators have a working knowledge of forensic techniques. With this in mind, the project has also included wildlife forensic Investigator Training. This involved a series of presentations and practicals covering the basics of wildlife forensic science, the questions and decisions involved in applying forensics and how the resulting data can be presented to support a case in court. Additionally, scientists, enforcement officers and investigators on the 2010 training workshop received presentations by a Malaysian government wildlife crime prosecutor on the use of forensic evidence in investigations.

SECTION 06

Research and Development



The **ASEAN Wildlife Forensics Network** is not just about investigations and casework. While many of the forensic techniques used have been established by other scientists across the globe, Southeast Asia has species and trade issues not found anywhere else meaning that new forensic techniques are frequently required. So, alongside direct support for law enforcement, the project has trained scientists how to develop new forensic identification techniques to address problems within their own countries.

6:1 | BRIDGING THE GAP FROM RESEARCH TO FORENSICS

The techniques we use to identify samples as part of a wildlife crime investigation are no different to those we use when conducting wildlife research; however a research laboratory cannot produce forensic evidence. Why not? Part of the reason is that in order to transfer a technique from a research study to a forensic investigation it is necessary to conduct additional experimental studies, known as 'validation' studies. Validation studies allow scientists, lawyers and judges to have confidence in the technique being used. Scientists from Malaysia, Thailand and Indonesia have been trained in how to perform validation studies as part of the project, so that they can develop forensic **DNA** identification methods for the species that need them.



6:2 | SCIENTIFIC PUBLICATIONS

The scientific peer-review process, where scientists approve each other's work before it can be published, is an important part of developing forensic techniques and processes. The **ASEAN Wildlife Forensics Network** has directly led to two peer-reviewed publications to date. The first paper examined different models for establishing wildlife forensic capacity in a country or region and specifically refers to the project as an example of the decision making processes involved (Ogden 2010). The paper is becoming established as a standard reference for the wildlife forensics community and highlights the progress made in the **ASEAN** region. The second publication was co-authored by all of the **ASEAN** and **TRACE** scientists involved in the UK training in June 2011. The work focuses on a method for sex determination in tigers (McEwing et al. 2011). Aside from the future use of the test in forensic casework, the production of paper enabled **ASEAN** scientists to gain further experience of the scientific peer-review process which is essential for local development of wildlife forensic capacity.

Ogden R (2010) Forensic science, genetics and wildlife biology: getting the right mix for a wildlife DNA forensics lab. *Forensic Sci. Med. Pathology*, 6(3): 172-179

McEwing R, Ouitavon K, Rovie-Ryan JJ, Wulansari, Sitam FT, Ogden R (2011). Molecular sexing of tigers, *Panthera tigris*. *Conservation Genetics Resources*, doi 10.1007/s12686-011-9529x

6:3 | BACKGROUND DATABASE DEVELOPMENT

The way we identify plant and animal samples is to compare them to reference information that we already have. This is the same for all methods, whether they are morphological, genetic, chemical, or physical. Reference data is therefore very important to the development of new forensic identification techniques. Within the **ASEAN Wildlife Forensics Network**, we have worked to create a reference database of **DNA** sequences produced by laboratories within **ASEAN** and linking back to known reference samples. This **DNA** sequence database is now available for scientists to add to and use as a reference database in future forensic investigations. Alongside this database, the project has provided host country laboratories with **DNA** sequence software for storing, editing and searching **DNA** sequences for species identification.

SECTION 07

Making a Difference? Measuring the Impact of the ASEAN Wildlife Forensics Network

The rationale for the **ASEAN Wildlife Forensics Network** project was that by increasing the capacity of countries to enforce compliance with national **CITES** and **CBD** legislation, there would be a subsequent increase in the prosecution of illegal wildlife traders, creating a deterrent to others involved in wildlife crime. This would ultimately reduce the illegal exploitation of Southeast Asian animal and plant resources and have a positive impact on the conservation of biodiversity in the region.

The project therefore represents part of a gradual process towards crime reduction and enhanced conservation. From the outset, the work has been judged against a series of Measurable Indicators that can be used to gauge the success of the project and help to conclude whether or not the **ASEAN Wildlife Forensics Network** has had the desired impact. These Measurable Indicators are important for evaluating success; while other factors, such as host country feedback, must also be considered, it is worth critically examining project progress against initial expectations. From the results shown here, the summary evaluation clearly indicates that the **ASEAN Wildlife Forensics Network** project has, to date, met or exceeded expectations against all measures that were originally devised. For example, the number of wildlife crime investigations involving forensic **DNA** analysis in Malaysia has increased by 80% year-on-year since the start of the project and **WIFOS**, the new **DNP** laboratory in Thailand has processed 26 cases in its first 12 months of operation.

The project, while apparently successful, represents one small step in the process of reducing wildlife crime and conserving biodiversity in the **ASEAN** region. In the face of increasing human population size and a seemingly insatiable appetite in some regions of the world for collecting or consuming rare and endangered species, the effort spent on individual projects may seem almost meaningless. However, the combination of educational, economic, scientific, environmental and law enforcement programmes that are contributing to biodiversity conservation throughout Southeast Asia, should, collectively make the difference that individual projects aspire to. It is hoped that the establishment of the **ASEAN Wildlife Forensics Network** and its activities over the past three years have helped this wider cause. We look forward to continuing this contribution for years to come.

Measurable Indicator	Success?
1. Production of reference data and identification tools during the three years after project end.	Not yet measurable
2. Continued provision of regional wildlife forensic services three years after project end.	Not yet measurable
3. Inclusion of wildlife forensic approaches, where relevant, in CITES enforcement investigations.	Thailand <input checked="" type="checkbox"/> Malaysia <input checked="" type="checkbox"/>
4. Increased number of illegal wildlife trade prosecutions.	Thailand <input checked="" type="checkbox"/> Malaysia <input checked="" type="checkbox"/>
5. Laboratory facility operational in each country with trained staff in place.	Thailand <input checked="" type="checkbox"/> Malaysia <input checked="" type="checkbox"/>
6. A minimum of 3 national wildlife staff & 3 lab staff trained in each country.	Thailand <input checked="" type="checkbox"/> Malaysia <input checked="" type="checkbox"/>
7. Attendance at inter-agency seminars and development of multi-agency approaches.	Thailand <input checked="" type="checkbox"/> Malaysia <input checked="" type="checkbox"/>
8. Peer-reviewed research publications. National press coverage in host countries and the UK	Thailand <input checked="" type="checkbox"/> Malaysia <input checked="" type="checkbox"/>

SECTION 08

Future Directions


The first phase of the **ASEAN Wildlife Forensics Network** funding comes to an end in 2012 and this publication therefore marks a staging point in the development of forensic capacity to support **ASEAN-WEN** and its activities in the region. The project has been very well received by the host countries, Malaysia and Thailand, as well as other **ASEAN** member states who have engaged with the project on many different levels. There is certainly plenty more to do; in many ways the first three years of the network have revealed as many new project opportunities as they have addressed project objectives. It is certainly an exciting time to be involved in wildlife forensics in the region and it is a good time to consider what we should hope for and expect in the future..

One of the ongoing ambitions for the network should be to broaden its focus to more actively support forensic capacity in all **ASEAN** countries. In particular, Viet Nam and the Philippines are now on the verge of developing their own **DNA** laboratory capacity and it is hoped that the network, working under the umbrella of **ASEAN-WEN**, will be able to support these new initiatives. While several other countries may not yet be in a position to develop their own forensic facilities, more should be done to enable all **ASEAN** states to have access to wildlife forensics to support investigations, utilising strategic international partnerships where possible.

Within established wildlife forensic facilities there is still much work to be done in terms of developing staff expertise and diversifying the range of forensic tests available. Future plans to develop individual **DNA** databases for flagship species such as tigers and elephants are being discussed, in order to address issues of laundering wildlife through captive breeding facilities and to provide more detailed evidence on the exploitation and transport of individual animals.

Wildlife forensic scientists require time to validate and perfect new tests. The ability to undertake research and to integrate with the wider international scientific community is an essential component of the role, and needs ongoing support. It is hoped that all wildlife forensic scientists in the **ASEAN** region are given the opportunity to interact with and contribute to the global development of the field.

Lastly, it is recognised that wildlife forensics cannot be practised in isolation. The forensic analysis of evidence has to be fully integrated into investigations, requiring the development of strong communications between scientists and field officers, investigators, prosecutors and ultimately, the judiciary. For wildlife forensic analysis to be most effective, it must be understood and applied effectively by a wide range of agencies. Coordinating the correct implementation of wildlife forensic techniques is probably the biggest challenge facing the future of the **ASEAN Wildlife Forensics Network**.



FOR MORE INFORMATION

Further information on the ASEAN Wildlife Forensics Network
can be obtained from www.asean-wfn.org.

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