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GUIDELINES FOR THE SAFE HANDLING OF WILDLIFE AND WILDLIFE PRODUCTS DURING COUNTER WILDLIFE TRAFFICKING ENFORCEMENT OPERATIONS IN VIET NAM

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WCS has worked in Viet Nam since 2006 with a focus on supporting to reform national laws and policies and building capacity of law enforcement for Vietnamese authorities to combat wildlife crime. We prioritize several key activities to influence wildlife trafficking networks, with the ultimate goal of supporting Vietnamese law enforcement agencies to effectively prevent and combat wildlife trafficking.

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Contents

1. Introduction

During the course of counter wildlife trafficking enforcement operations, government officers often come into contact with live wildlife and wildlife products. There is a risk to the enforcement officers through this contact with wildlife, from potential injury through scratches and bites and also from infection with zoonotic pathogens carried by the wildlife. Likewise, humans carry diseases that can infect animals and if those animals are then reintroduced to the wild, such diseases could spread to wider wildlife populations. In addition, wildlife species that have been traded are often in poor health due to a lack of care while being traded. Proper handling can prevent further illness or death.

The global COVID-19 crisis has brought attention to the potentially devastating impacts of zoonotic pathogens. Governments are responding in a variety of ways to prevent future transmissions, but there have also been reports of reduced action by enforcement officers due to a fear of contracting COVID-19 or other zoonotic diseases during an operation. These guidelines have been developed for use by law enforcement officials across Asia to provide practical recommendations that minimize the health risks to humans and wildlife during a counter-wildlife trafficking operation.

In addition, law enforcement officials may not currently meet bio-safety standards in handling whilst performing their duties due to insufficient means of personal protective equipment, wildlife handling equipment, or training.

Therefore, this guideline was developed to:

- Provide practical guidance and recommendations to law enforcement officers to reduce health risks for humans as well as wildlife animals in the process of implementing legal duties against illegal trafficking;
- Indicate which necessary equipment and training needs should be added, in order to achieve the standard health protection for law enforcement officers whilst performing duties;
- Provide a list of rescue centers, and experts who can support, and coordinate with law enforcement agencies in handling wildlife cases.

The ability of enforcement staff to achieve the biosecurity and wildlife handling standards outlined in this document may at the current time be limited by the lack of access to personal protective equipment, wildlife handling equipment, or appropriate training. However, this document can act to highlight where additional equipment and training needs lie and provide a starting point for achieving the standards necessary to properly protect the health of enforcement staff.

2. Pre-operation Planning and Preparation

2.1. Assessing health risks

The law enforcement officers may come into contact with wildlife at different types of operations, including:

- When staying in the same room as wildlife during an operation: during a routine inspection of a wildlife trading facility, market, or breeding farm, or at customs;
- When searching the residence, transportation of a suspected wildlife criminal: wildlife products (e.g. skins, meat, bones, organs, claws) or live animals can be detected and immediately seized as evidence.

For each situation the level of health risk varies and precautions that need to be taken change accordingly. The key factors influencing health risks that need to be considered prior to the operation are (i) the type of operation, (ii) the environment in which the wildlife is present, and (iii) the species of wildlife present.

- **Type of operation**:
  a. With live wildlife: When an operation involves handling or close contact with live wildlife, then the level of risk is high due to the risk of injury and disease transmission through bites, scratches, splashes to the face with urine, feces, or saliva and aerosols (e.g., exhaled air or coughs/sneezes from the animal)**.**
  b. When dead wildlife that is fresh (i.e., no color changes of the skin or putrid odor is present) is handled during an operation, there is still a disease risk however the risk of injury and disease transmission is lower.
  c. With dry wildlife products (i.e., those no longer containing tissues or secretions): such as ivory, rhino horn, tiger bones, pangolin scales, etc., the health risk is low.

- **The environment in which the wildlife is present**.
  d. Indoor spaces: especially those with limited airflow (e.g., a trader's house, restaurant, airport, or warehouse) are considered environments that are at high risk for transmission of airborne pathogens.
  e. Outdoor environments are usually at lower risk for transmission of airborne pathogens if there is a good airflow (e.g., border crossings, and road checkpoints). If an outdoor area is crowded and staff are likely to frequently come within 2 meters of animals or people, the risk increases (e.g., crowded markets).

- **The species of wildlife likely present**. Certain species pose a higher risk for either causing injury or carrying serious diseases that can infect humans. Enforcement staff must assess when a situation poses or represents a higher risk by understanding which species are most likely to cause injury or carry serious zoonotic diseases, and how the diseases are transmitted. Potential risks include:
  f. Risk of injury: All wild animals have the potential to cause injury to people who handle and/or have close contact with them. Large (weighing more than 15kg) or venomous wildlife species are most likely to cause injury. This includes venomous snakes, medium to large felids and bears. All primates and carnivores over 3kg are considered high risk due to their speed, dexterity or potentially aggressive nature. Birds of prey, and owls are also highly likely to cause injure with sharp claws and beaks. Expert assistance from a rescue center or zoo is a requirement for confiscation of these species, to allow experienced handling and potentially chemical immobilization. If the species of snake cannot be identified, treat it as venomous.
  g. Risk of disease: All mammals and birds pose a risk of carrying serious diseases that can infect humans. Primates, bats, rodents and carnivores are mammals of particular concern. Although reptiles (turtles, lizards, non-venomous snakes) can also carry zoonotic pathogens, human infections can usually be treated and the diseases are rarely fatal.

It is important to understand some key diseases of concern that can be carried by mammals and birds and how they are transmitted. Table 1 outlines some examples of serious zoonotic diseases (not intended to be exhaustive) and further information on these diseases can be found in Appendix A, D. Numerous emerging infectious diseases originate in wildlife, so there is a real possibility of new unknown viruses or serious pathogen being present.

Table 1. Examples of serious zoonotic diseases that can be found in wildlife species. These diseases can be fatal in humans and transmitted through bites, scratches, facial splashes, or inhalation of aerosols.

Disease	Common wildlife hosts	Route of transmission
Cercopithecine herpes-1 (B virus)	Macaques or other primates housed with macaques	Bites, scratches, facial splash with saliva, urine or faeces
Rabies	All mammals but particularly bats and carnivores	Bites, scratches, facial splash with saliva or urine
Hantaan virus	Rodents	Inhalation of aerosols, less commonly through rodent bites
Highly Pathogenic Avian Influenza (H5N1)	Birds	Contact with saliva, nasal secretions or blood
Coronaviruses responsible for Severe Acute Respiratory Syndrome SARS-CoV-1 and SARS-CoV-2	Bats*, mustelids, pangolins	Bites, scratches, facial splash with saliva, urine or faeces

* The origins of SARS-CoV-2, the causative agent of COVID-19, remain unknown, but its genome indicates a strong likelihood that the reservoir species is a bat (McIver et al., 2020). Other wildlife species may act as intermediate hosts as civets did with SARS-CoV-1

2.2. Minimizing wildlife contact

Wildlife capture and handling have the potential to result in serious injury to both the handler and the animal. It should only be undertaken if necessary. In all operations, handling of live wildlife should be minimized by doing the following:

- Confiscate the animal without handling it directly e.g., if it is already in a cage that can be moved, use this rather than moving the animal into another transport cage. It is important to note that the cages mentioned above are at minimum standards for transportation in order to minimize risks during transportation. Special attention should be paid to the floor of the transport cage, if the floor of the cage has holes too large, wildlife's feet or hands could be jammed causing serious bone damage.
- Enlist external expertise to assist e.g., zoo/rescue center personnel or other experienced personnel familiar with handling the species (e.g., pet shop owner, wildlife trader or wildlife farm staff)
- If external expertise is not available on the day of the operation, maintain the animal on site (i.e., at the point of seizure) until assistance is available from experienced personnel
- Each animal species has a different approach, however, should avoid physical/direct capture of animals by encouraging an animal to enter a transport crate using patience/appropriate tools or food as enticement

2.3. Minimum requirements for handling wildlife during an enforcement operation

STOP! If enforcement personnel feel that there is no option but to handle the wildlife, the following criteria must be met, before the operation begins. The officers who will handle the wildlife should:

- Keep silence, do not tease or perform actions that affect animals if not for animal transportation purposes;
- Understand the potential risks posed by the environment in which the operation is occurring, especially health risks to the law enforcement officers along with wildlife, prepare a list of potential

risks and require officers to read and have a clear understanding of these risks and preventive measures whilst handling the operation;

- Understand the potential disease and injury risks from and to the wildlife on site;
- Have the appropriate training and experience to handle the species of wildlife present, and have access to appropriate wildlife handling equipment. There should be clear assignments among the officials involved in animal transportation, clarifying who does what, with what tools, and participates in what stages, all steps need to be coordinated. A joint leader is responsible for coordinating the group;
- Have access to, and understand how to use appropriate Personal Protective Equipment (PPE);
- Prepare necessary and equipment, tools that are appropriate to the species that need to be handled;
- Prepare the first aid kit and disinfectant solution;
- Understand how to manage, and treat bites/scratches from wildlife;
- Evaluate the state of the animal, the captive breeding environment, the structure of the crate, etc. to prepare for the most appropriate equipment.

Special notes:

- **If the above criteria are not met, then the operation involving wildlife should not proceed. If enforcement staff are not properly trained, live animal handling should not be attempted.**
- Under no circumstances should confiscations of any wildlife over 15 kg (medium to large felids, bears) be undertaken without expert assistance, to allow for experienced handling and chemical immobilization if needed. If primates or carnivores 3-15 kg cannot be confiscated without handling (eg by encouraging an animal to enter a transport crate using patience or food as enticement), expert assistance for handling should be sought.
- Under no circumstances should confiscations of venomous snakes occur without the assistance of trained, expert snake handlers.
- In cases when an advisor is needed, the entire process of animal transportation should be clarified, including risks for both humans and animals. Especially if anesthesia is to be performed on the animals (e.x.: what conditions should be guaranteed prior to anesthetizing, the after treatment, how long before the animal can be transported in a suitable vehicle).

2.4. Contact details of experts for assistance with animal confiscations

Table 2: Zoo, rescue center, and expert personnel that can be called to assist with live wildlife confiscations

No.	Name	Expert Contact information	Priority species
1	Ha Noi Wildlife Rescue Center, Department Of Agriculture And Rural Development Of Ha Noi City	Address: Dong Doi, Tien Duoc, Soc Son, Ha Noi Phone number: 024 3885 0294 • Director: Luong Xuan Hong. Phone number: 0985142188 • Veterinarian: Trinh Thi Hang. Phone number: 0914 765 492	Wildlife
2	The Cuc Phuong organism Development, Conservation,	Endangered Primate Rescue Center Phone number: 030 3848 002	Langurs, apes, loris

No.	Name	Expert Contact information	Priority species
	and Rescue Center – Cuc Phuong National Park, Ninh Binh province	• General manager: Do Dang Khoa - Phone: 0977 714 836; Email: khoa.eprc@gmail.com • Veterinarian: Ho Ngoc Phuong Khanh - Phone number: 0937 508 040.	
3		Carnivore and Pangolin Conservation Program. Save Vietnam's Wildlife – SVW Rescue • Program manager: Hoang Van Thai, Phone number: 0344791074; Email: hoangthaiak44@gmail.com	Small carnivores and Pangolins
		Turtle Conservation Center Tel: 030 3848 090 • Animal group leader: Trinh Van Nguyen, Phone number: 037 5394117 • Animal Manager, The Asian Turtle Program (ATP): Nguyen Thu Thuy, Phone number: 0989 524 950, Email: Ntthuy@asianturtleprogram.org	Turtles
3	Cu Chi Wildlife Rescue Center, Ho Chi Minh City Forest Protection Department	Cho Cu II Hamlet, An Nhon, Cu Chi, Ho Chi Minh City Tel: 028 3794 7045; 028338552501	Wildlife
4	Sai Gon Zoo, Ho Chi Minh City	No. 2 Nguyen Binh Khiem, Ben Nghe, District I, Ho Chi Minh city Tel: 028 3910 1438 • Head of the zoo's animal division: Mai Khac Trung Truc. Phone number: 0902 658 118	Wildlife
5	Cat Tien National Park (Including The Organism Rescue, Conservation and Development Center Dao Tien Endangered Primate Rescue center, Bear and Wild cat Rescue Station	Cat Tien National Park, Tan Phu District, Dong Nai of Dong Nai Tel: 025 1366 9228 • Director of the Biological Development, Conservation, and Rescue Center: Nguyen The Viet, Phone number: 0989 925 637, Email: vietvetctnp@gmail.com ; • Veterinarian: Nguyen Van Cuong. Mobile: 0973 125 787.	
6	Me Linh Station for Biodiversity; Institute of Ecology and Biological Resources	Hoang Hoa Tham, Ngoc Thanh, Phuc Yen, Vinh Phuc. Phone: 083 320 3388 Head of Station: Dang Huy Phuong. Phone number: 0904203388	Reptiles

No.	Name	Expert Contact information	Priority species
7	Hon Me Wildlife Rescue Center, Kien Giang Forest Protection Department	Hon Me Hamlet, Tho Son, Hon Dat, Kien Giang Phone number: 02973 787 540	Wildlife
8	Hanoi Zoo Member Limited Liability Company	Thu Le, Ba Dinh, Hanoi Phone number: 0243 766 3439/ 0243 8347395	Wildlife
9	Tam Dao Bear Rescue center, Vinh Phuc province	2B Highway, Hop Chau, Tam Dao, Vinh Phuc Phone number: 0211 353 9279/024 3928 9264	Bears
10	Bear Rescue center, Four Paws International, Ninh Binh	Ban Sam, Ky Phu, Nho Quan, Ninh Binh Phone number: 0229 3666 388	Bears
11	The Organism Rescue, Conservation and Development Center, Phong Nha – Ke Bang National Park	Son Trach, Bo Trạch, Quang Binh Phone number: 091 507 4036 Phone number: 0523 677 278 Veterinary doctor: Tran Ngoc Anh. Number: 0915 659 417	Wildlife
12	Dak Lak Elephant Rescue center	Ae Wer, Buon Don, Dak Lak Phone number: 026 2378 978	Elephants
13	Animal Rescue center, Pu Mat National Park	Chi Ke, Con Cuong, Nghe An Number: 023 8387 3154/ 038 3873374 • Vice Director: Tran Xuan Cuong, Phone number: 0904.213.202 • Manager, Science and International Relations: Vo Cong Anh Tuan, Phone number: 0984 545 069, Email: anhtuanpm@gmail.com	Wildlife
14	Nui Chua Sea Turtle And Sea Creatures Rescue Center	Thai An, Vinh Hai, Ninh Thuan Number: 025 9387 3444 Email: bqlvqgnc@ninhthuan.gov.vn	Sea Creatures
15	The Organism Rescue, Conservation and Development Center, Bu Gia Map National Park	Bu Lu, Bu Gia Map (Commune), Bu Gia Map (District), Binh Phuoc Phone number: 098 862 4258	Primates, reptiles, small carnivores
16	The Organism Rescue, Conservation and Development Center, Bach Ma National Park	Group 9, Phu Loc Town, Phu Loc District, Thua Thien Hue • Director: Ngo Minh. Phone number: 0988683172 • Vice Director: Phan Ve. Phone number: 0917611155	Wildlife in the list of Bach Ma National Park
17	The Organism Conservation, Development Center and Forest Environment Service, Ben En National Park	Xuan Lai, Ben Sung Town, Nhu Thanh Commune, Thanh Hoa • Director: Le Thanh Hai. Phone number: 0915171789	Wildlife in the list of Ben En National Park

No.	Name	Expert Contact information	Priority species
18	The Organism Rescue, Conservation, and Development Center, Hoang Lien National Park	Group 4, Phan Si Pang Ward, Sa Pa, Lao Cai Phone number: 02143 871 009 • Director: La Van Toi. Phone number: 0915 266 161	Endangered, rare and precious species of forest fauna and flora in Decree No.84/2021/ND-CP, and prioritize species in the Northwest region

2.5. Health status of staff carrying out wildlife handling operations

- In appropriate condition, staff carrying out live animal confiscations should be vaccinated for a minimum of rabies and tetanus, vaccinated against tuberculosis and influenza.
- Any staff participating in primate confiscations must be free of tuberculosis (TB). Staff participating in primate confiscations should be tested for TB every 6 months, typically by an intradermal tuberculin skin test.
- No persons with any current or recent (within a few days) clinical signs of illness (coughing, sneezing, fever, diarrhea, rash, cold sores, etc.) should participate in a confiscation
- Staff with compromised immune systems will be at higher risk of catching diseases and should not be involved in confiscations.

2.6. Personal Protective Equipment (PPE)

Why use PPE?

If employed correctly, PPE forms a barrier between you and the animal that you are confiscating. Zoonotic viruses or bacteria can be transmitted from animals to humans in the air an animal breathes out, in splashes of saliva, urine or faeces, and via bites or scratches. Therefore, it is important that the air you breathe is filtered, that your skin, eyes and mouth are covered to protect from splashes, that you have a layer of clothing that can be removed at the operation site once the operation is complete, and shoes that can be washed. Table 3 explains how the different elements of infectious disease PPE work.

PPE such as gloves, steel toe capped shoes and long trouser legs and sleeves can also offer some protection from bites and scratches but should be combined with careful and correct wildlife handling to avoid injury. Further information on gauntlet gloves is given in Section 2.7.

Choosing the correct level of PPE for an operation

In order to assess risks, it is preferable to find out as much information about the species of wildlife, environment and type of activity before an operation begins. However, this will not always be possible. The law enforcement officers have to equip a minimum PPE, including **masks, nitrile gloves, washable shoes and 80% + handwash alcohol gel ready for any operation** which will allow an operation site to be entered and for further risk assessment to be made. **Both surgical masks and respirator masks should be carried**.

- Surgical masks should comply with the standards of the region from which they are purchased (European standard EN14683, US standard ASTM, Chinese standard YY 0469).
- Respirator masks are graded according to their filtration performance. The following grades of mask would be suitable for enforcement operations as they all significantly reduce the risk of inhaling an infectious aerosol (by >93%). The masks should comply with the standards of the region from which they are purchased:
    - **N95** (US standard NIOSH 42CFR84)
    - **FFP2** (European standard EN149)
    - **KN95** (Chinese standard GB2626)
    - **Korea 1ST Class** (Korean standard KMOEL-2017-64)
    - **DS2** (Japanese standard JMHLW-2000)
    - **P2** (Australian standard AS/NZS1716)

- For indoor sites (e.g., traders house, restaurant, airports, warehouse), a **respirator mask** must be worn. For crowded outdoor sites where enforcement staff are likely to frequently come within 2 meters of animals or people (e.g., crowded markets), a **respirator mask** must be worn.
- For outdoor sites with good airflow (e.g., border crossings, road check points), a **surgical mask** can be worn.

If any wildlife product needs to be seized (live, fresh dead or dry), the following additional PPE must be used to allow the operation to continue safely.

- For **SEIZURE of mammals or birds (live or fresh dead), full PPE should be worn by the personnel handling the wildlife or personnel coming within 2 meters of the wildlife**. Full PPE includes a respirator mask, face shield or goggles, long sleeved fluid repellent gown or coveralls with hood, nitrile gloves, washable closed toe shoes and shoe covers (see Figure 1).
- For **SEIZURE of reptiles or amphibians (live or fresh dead) or dry wildlife products (those no longer containing tissues or secretions) basic PPE can be worn by the personnel handling the wildlife or personnel coming within 2 meters of the wildlife**. This consists of a surgical mask, nitrile gloves, disposable apron or dedicated clothing (that can be removed at the end of the confiscation), and washable closed-toe shoes (see Figure 1).

Adapted from NHS illustration by James Fox Creative

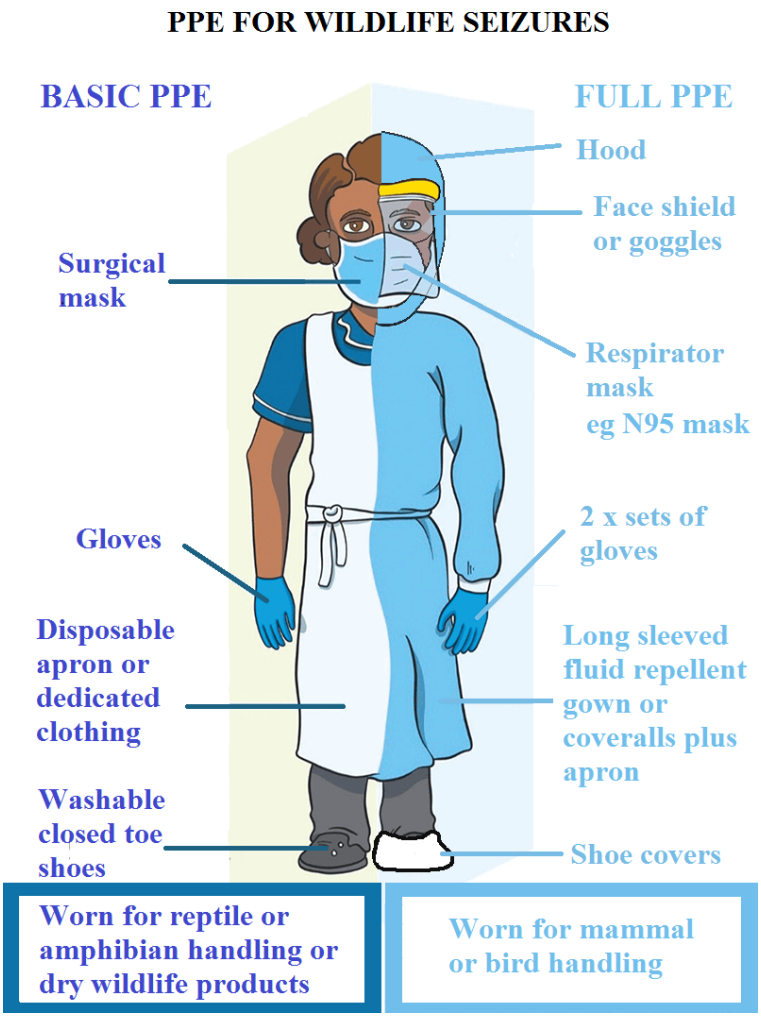


Figure 1. Full and basic PPE to be used in wildlife seizures

Table 3: Types of infectious disease PPE and how they work

Respirator mask		Types include N95, FFP2, KN95, Korea 1st Class, DS2, P2. These masks **filter the air you breathe** to reduce the risk by >93% of breathing in a virus. They will only work if properly fitted. Several different models, styles, and sizes of masks fit a variety of face shapes and sizes. Each person requiring a respirator mask should be individually fit-tested to identify a respirator that appropriately fits her or his face. See Appendix B for more information on fit testing. Single-use only – must be disposed of in a biohazard bag after confiscation. If there is a severe shortage of PPE in crises, respirator masks can be cleaned and reused as detailed later. The following 3 protocols for reusing masks have been trialed for COVID-19 however their effectiveness against novel pathogens is unknown: ● Store the used mask for 3 days at room temperature (21–23°C) and 40% humidity. All SARS-CoV-2 viruses on the mask will be dead in 3 days (Van Doremalan et al, 2020); ● Heat the mask for 60 min at 70°C by hanging the mask in an oven using plastic or wooden clips. Masks need to be > 6" (15.24 cm) from the wall sides of the heater to prevent mask degradation (Juang and Tsai, 2020); ● Boil masks for 5 minutes and then air-dry. The elastic band should not be immersed in boiling water. Do not stir while boiling to avoid disturbing the physical structure of the mask (Juang and Tsai, 2020). Please ensure that reusing masks still fit the user's face.
Surgical mask		**SURGICAL MASKS WILL NOT STOP YOU BREATHING IN A VIRUS.** They will stop any large airborne droplets or splashes of animal saliva/urine/faeces getting into your mouth. They help reduce the risk of passing on diseases to wildlife by providing a barrier to aerosols coming out of your mouth. Single use only – must be disposed of in a biohazard bag after confiscation.
Nitrile gloves		Nitrile gloves will stop splashes of animal saliva/urine/faeces from getting onto your skin. Gloves should be pulled over the cuffs of coveralls. Single use only – must be disposed of in a biohazard bag after confiscation.
Goggles or face shield		Goggles or a face shield are used to stop splashes of animal saliva/urine/faeces getting on your face and in your eyes. Can be disinfected and reused.
Gown or Coveralls		The gown or coverall acts as a single use barrier that you can throw away at the end of the confiscation so you don't risk taking pathogens back to the office or home. Long sleeves protect arms from being bitten by parasites, such as fleas, that may have come off the animal. Single use only – must be disposed of in a biohazard bag after confiscation.

Apron		The apron acts as a single use barrier that you can throw away at the end of the confiscation so you don't risk taking pathogens back to the office or home. Single use only – must be disposed of in a biohazard bag after confiscation.
Dedicated clothing (cotton coveralls)		Dedicated clothing is used so that if you become contaminated during the confiscation, you have a layer that can be removed after the confiscation so you don't risk taking pathogens back to the office or home. Can be washed (at a designated work facility, separate from other laundry) and reused.
Washable closed-toe shoes		Boots or shoes should be closed-toe to avoid bites or scratches to the feet and should be washable so that you don't risk taking pathogens back to the office or home. Can be cleaned, disinfected and reused.

It is vital officers put on and remove PPE correctly to ensure they are properly protected. All law enforcement officers working with wildlife should have attended training on the correct use of PPE prior to any operation. The following video shows how to put on and take off PPE safely, including hand hygiene and is essential viewing. However, this is not a replacement for training:

https://www.cdc.gov/vhf/ebola/hcp/ppe-training/n95Respirator_Coveralls/donning_01.html

PPE alternative solutions:

If law enforcement officers cannot access the PPE outlined above, there are some alternatives:

- Where gowns/coveralls are not available, a plastic rain poncho that covers the body, arms, legs and head can be used and disposed of at the end of the operation. Must be careful when taking off/pulling over the head to avoid contamination.
- If dedicated clothing/cotton coveralls are not available, any normal clothing with long sleeves and trouser legs can be worn. At the end of the operation, the clothes must be removed from the PPE removal area and washed in a work washing machine. Care must be taken not to wear the clothes away from the enforcement operation sites.
- If goggles are not available, sunglasses can be used to protect eyes from splashes.
- If aprons are not available, plastic bags can have a hole cut out for the head and arms and worn over dedicated clothing. It must be disposed of at the end of the operation.

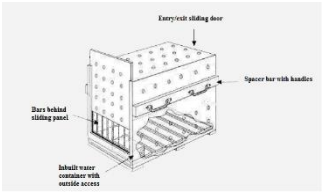
2.7. Wildlife capture/handling equipment

The goal in enforcement operations should always be to minimize contact with wildlife. If the handling of wildlife can be avoided, this is always the preferred option. If handling is necessary, getting help from experienced handlers is strongly recommended. However, there may be situations where wildlife handling by enforcement staff cannot be avoided.

- Need to have support from experienced people.
- **To safely use the wildlife handling equipment and perform the handling techniques described in this document, training and experience are needed.**
- **Handling of wildlife should not be attempted by inexperienced staff.**

The minimum equipment that should be available for use in the event of capture/handling of wildlife (as outlined in Table 4). Details of all of the equipment can be found in Appendix C. The equipment recommended here can often be made or bought locally.

Table 4: Minimum wildlife capture/handling equipment

Equipment	Example	Key features
Gauntlet gloves		• Ensure the fit is loose enough so the finger slips to the side inside the glove if bitten, soft, and not too thin to get a good feeling when handling the animal but difficult for animals to bite through gloves. For birds in particular, commercially available gloves used in training birds of prey can alternate specialized gloves. • Protect from small animal bites/scratches, not necessarily from medium sized carnivore or primate bites.
Hoop nets		• Ensure the hoop is big enough to go over the animal without touching the animal and the net deep enough to be folded over with the animal inside. • The frame needs to be covered with soft material to avoid hurting the animal. • Ensure holes in the net are small enough so the animal's head/legs can't come through. • Ensure soft mesh for small animals, non-knotted mesh for birds, and thick mesh for larger animals.
Transport crates*		• A sliding door is essential. • Ensure 25% of the surface is ventilation holes. • Mesh or bars at one end allow access to provide water without opening the door. Cover with a solid sliding door. Or an in-built water container makes overnight care easier. • Crates should be large enough for an animal to stand up and turn around. • The crate floor should be lined with rubber or wood to increase friction while transporting. • For hoofed animals, to prevent the animal from rushing into the sides of the cage and causing injury, all sides of the cage need to be lined with foam rubber. • Ensure the holes on the bottom of the crate are a minimum of ¼ the animal's foot size. • The bottom of the cage must have a metal or plastic tray to collect animal faeces, and urine. • Standards for materials, sizes, etc. of transport crate sides for each type of wildlife to ensure that animals do not escape.
Shield		• Consists of a piece of strong clear plastic with a handle. • Use to encourage small animals to move into a transport crate.

Equipment	Example	Key features
Cage door barrier		• Any strong solid barrier can be used e.g., a strong piece of plywood. • Use to cover cage opening if the animal needs to be transferred from a cage with a swing door to a transport crate. • Only works for animals that are not strong enough to push the barrier away. • Transport animals using crates with firmly sealed sliding doors to reduce the risk of damaging the door/barrier if possible.
Cage divider	 	• Consists of a comb made of metal rods • Insert down through a cage to keep the animal at one end of the cage and prevent escape if opening door to place in food/water.
Self-closing cage		• Good for avoiding direct handling of animal • Bait trap with food and wait for the animal to enter, triggering the door to close.
Equipment for non-venomous snakes		• Snake hooks and clear plastic tubes or hessian bags are used to move snakes while minimizing touching snakes' heads. • Snake tongs are only for holding plastic tubes, removing dishes, and feeding, not for grasping snakes. • Plastic transport box: Should be at least 1/3 the width of the body-wide and 1/2 the length of the body long, at least 40cm in depth but less than 100cm. Sides must have holes equivalent to 5% of the lid surface area, and 4 drainage holes in the bottom. The bottom needs to be lined with rubber cloth, and paper (any material to increase friction, the lining should not be too thick to avoid affecting observation). • Fabric bags: Cotton fabric is recommended, e.g. Canvas 240, the width of the bag should be 1/3 of the body and the length should be between 60 to 120cm long, A draw-string should be added to secure the bag at least twice when a snake is inside. See- through net bag can be used, although this type of bag may stress the snake.

*For pangolin and bird transport crates and snake transport boxes see Appendix C

2.8. Marking the animal

2.8.1. Purpose of animal marking

• To distinguish one individual from others in the same species.

• To support research purposes in many areas such as behavioral ecology, population ecology, genetics, medicine, conservation, evolution, etc., studies on habitat selection, survival, reproduction, population diffusion, etc.

2.8.2. Animal marking techniques

There are many ways to mark animals, we must choose the most appropriate marking method for specific animals, for specific purposes. To meet this request, we must answer the following questions before picking the method:

- Wildlife species being marked and their average size and weight.
- Number of animals being marked
- The advantages of marking: fast, easily applied,
- Method's durability: chip life-span, the discoloration of color rings, number cards
- The ability to identify animals being marked: distance, do they have to be recaptured after marking?
- Does the marking method affect the marked animal or individual?

These questions help minimize adverse effects on the survival of animals, life expectancy, behavior, and bias in the evaluation of research results…

For example, colored rings will affect the bird's ability to evade, affecting the bird's ability to reproduce due to a direct impact on its mate. Leg rings and neck rings can negatively affect animal health and possibly kill the animals.

a. Classification of animal marking methods

Methods are categorized according to whether it is invasive to the animal's body or not.

- Invasive marking methods: Using tools to injure a part of an animal's body creating characteristic signs, or introducing artificial objects into an animal's body to distinguish animal individuals. E.g.: tattooing the numbers, microchip, toe clipping, ear notches…
- Non-invasive marking methods: Using tools means of instruments to injure a part of an animal's body creating characteristic signs to distinguish animal individuals: Anklets, neck rings, hair dye.

Invasive marking methods often have longer durability on animals than non-invasive marking methods.

b. Types of wildlife marking method

- **Birds:** There are various marking methods: (i) Leg rings, (ii) Numbered bands, (iii) Colored band

Leg ring method:

- Commonly used on birds.
- Material for leg rings: Normally use plastic, non-rusting metal, durable, light.
- Types of leg rings: Number band, color band, flag band.

Numbered band method:

Numbered band methods are usually made of aluminum, or non-rusting metal, durable, light, numbered in the order specified by the manufacturer. Currently, rings made of plastic are also commonly used for smaller birds such as pigeons...

- Subject: All bird species, no size limits

- Equipment, tools: hoop nets, nets, bird's hood or soft cloth bag, gloves, ring holder, leg rings of all sizes, caliper for internal and external diameter measurements, medical cotton, medical alcohol.
- Procedure:
  - Banding position: On the left or right ankle, as per user's convention;
  - Capture the bird with a hoop nets or net;
  - If the bird is stressed, place the bird in a cloth bag, wear a bird hood or wrap it around the body with a soft cotton towel (Note: when handling the bird, it is necessary to place both wings in the same position as when the bird is perched, with one leg trailing along the body, the other slightly clasped between the index finger and middle finger);
  - Hold the bird, measure the diameter of the ankle with a caliper (measured at 1/3 of the leg length from the ankle, use a clamp to select the appropriate band size, not too wide or tight (the leg band diameter should be 1mm larger than the leg diameter for small birds (less than 100gm) or 2mm to 3mm for larger birds;
  - Record the band number on the animal information sheet;
  - Sanitize around the banding area with alcohol, and sterilize the band and the band-wearing equipment, The shall be checked on the inner surface of the ring, ensuring that the inner surface of the ring is smooth or free of any foreign matter and sharp edges;
  - Wrap a layer of sterilized medical cotton around the leg, around the banding position;
  - Put a bracelet on the leg with a pair of bracelets;
  - Remove the medical cotton, check the width of the leg rings to see if they are suitable, and avoid being too wide to lose or too tight to hurt birds.

*Note: The direction of the band, avoid wearing it backwards, difficult to read the numbers

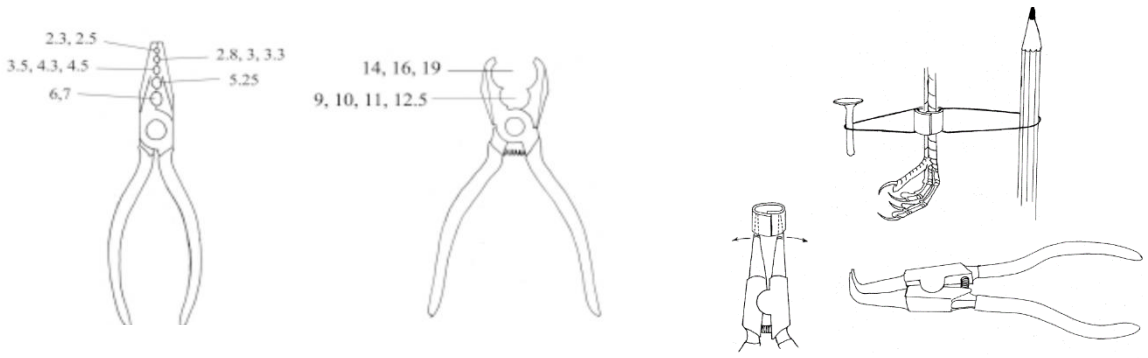


Figure 2. Tools for banding and removing the leg bands for birds

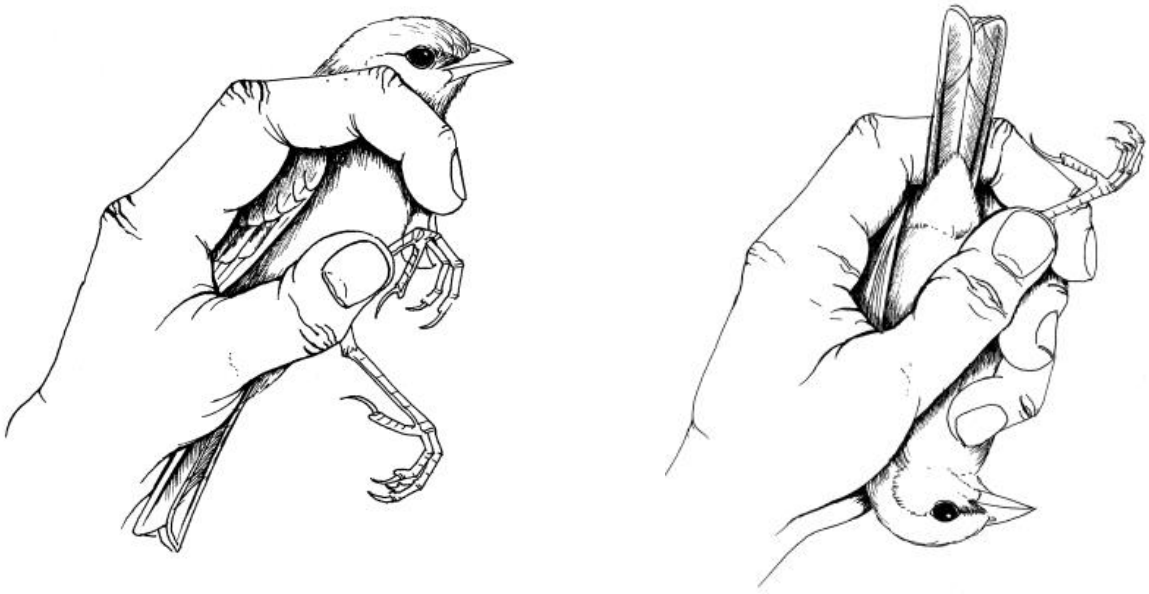


Figure 3. Bird restraining method

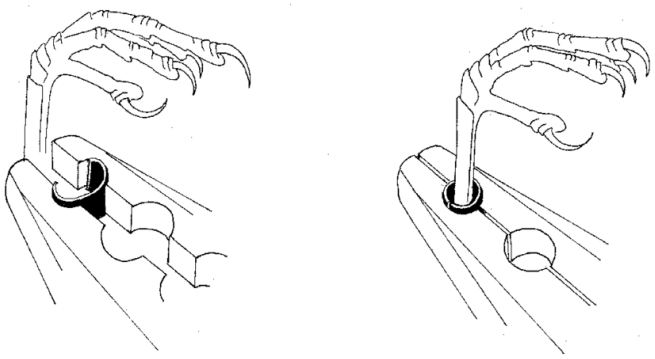


Figure 4. Identification band application procedure

Colored band method:

The colored band is usually made of metal, plastic-coated metal, or durable plastic, with high flexibility, and variations of 10 colors. Good color fastness.

- Subject: All species except hawks, eagles, hawks, and parrots. No size limits.
- Equipment, and tools: hoop nets, nets, bird's hood or soft cloth bag, gloves, ring holder, leg rings of all sizes, caliper for internal and external diameter measurements, medical cotton, and medical alcohol.
- Operation: Similar to the numbered band method
  - Wearing position: legs, 2 bands on each side;

- Numbering convention: Each color represents a number, the upper right foot band represents thousands, the lower right foot band represents hundreds, the upper left foot band represents tens, and the lower left foot band represents units. Record numbering convention and identification number on the bird's profile
- For example, white = 0, black = 1, red = 2, orange = 3, yellow = 4, green = 5, blue = 6, brown = 7, purple = 8, pink = 9

Left foot:	Right foot:
Orange	Yellow
Red	White

The bird's identification number is: 4032

Figure 5. Colored band method

- **Notes:**
  - The colored band method helps the examiner to recognize the bird's identification number without having to capture the bird.
  - Over time, the bands would have to be worn again for the discoloration made it difficult to read the numbers.
  - To ensure that the ring is re-branded as the original identification number, the colored band method is often combined with the numbered band method.
  - In the case that the two sides of the ring are not pressed closely, it will entangle and break the bird's feet.

- **Herbivorous hoofed animals:** A frequently used method is ear tagging
  - Subject: Herbivores, no size limitation, animals must be anesthetized, sedated or tied down
  - Equipment, tools: Nets, hoop nets, rope, or anesthetic, sedative, ear number tag set, pliers, gloves, medical alcohol, medical cotton.
  - Procedure:
    - Capture and secure animals by nets, hoop nets anesthesia, and sedation. If the animal is still in the transport crate, a cage divider can be used to force the animal into a corner for tagging;
    - Sanitize the ears of animals, sterilize the tagging equipment and ear tag;
    - Record the card number on the animal's identification;
    - Mark the tagging site (convention left or right ear depending on the user, site: portion of the ear without blood vessels passing through. For young animals with thin ears, tag closer to the ear canal, adult animals with thick ears can be tagged outward);
    - Hold the earlobe firmly, put the ear tag and the tag puncher in the right position (outside of the ear), and press firmly on the pliers to wear the ear tag. Check the durability of the tag;
    - Hemostasis, disinfect the wounded area around the tag, if the animal breeding area is damp and infested with insects, antibiotics injection for animals is recommended.
  - Caution:

- Anesthesia can paralyze the hoofed animal's rumen, causing fatalities, so low dose anesthesia is recommended;
- When fighting other animals, the ear tag may fall out, and inflammation around the tagged area, etc., or the tag is expired;
- The ear tag method allows the examiner to recognize the animal's identification number without having to get too close or capture the animal;
- Ear tagging is an alternative for the numbering on the ears of herbivorous hoofed animals;

Figure 6. Ear tags

- **Turtle: Two options can be used for marking on the turtle's shell:**

Option 1:

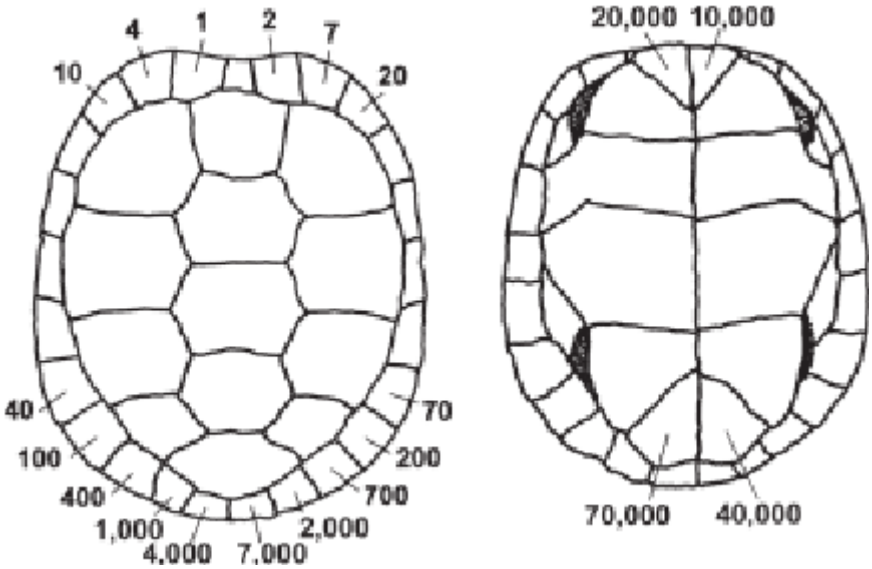


Figure 7. Turtle numbering system

Back side
Left side – decrease: 4000>1000>400>100>40>10>4>1
Right side - decrease: 7000>2000>700>200>70>20>7>2

- Subject: Adult turtles with a shell length of 20 cm.
- Equipment, tools: Triangular metal file, medical cotton, medical alcohol, marker
- Procedure:
  - Hold the turtle firmly in your hand so that the shell faces up, use medical cotton and alcohol to disinfect the turtle shell;
  - Use a marker to mark the covers of the turtle shell according to the individual identification number;
  - Recheck the number before filing the shell in the marking positions;
  - Re-sterilize with medical alcohol after marking;
  - Enter the numbering system and code on the animal information sheet.

* The method of numbering on the turtle shell is durable, but it cannot be done on a baby turtle due to their shell being small and soft. Some individuals with damaged shell edges cannot be numbered or may be confused when reading the code. Numbered areas can be infected with fungi if turtles live in contaminated environments.

Option 2:

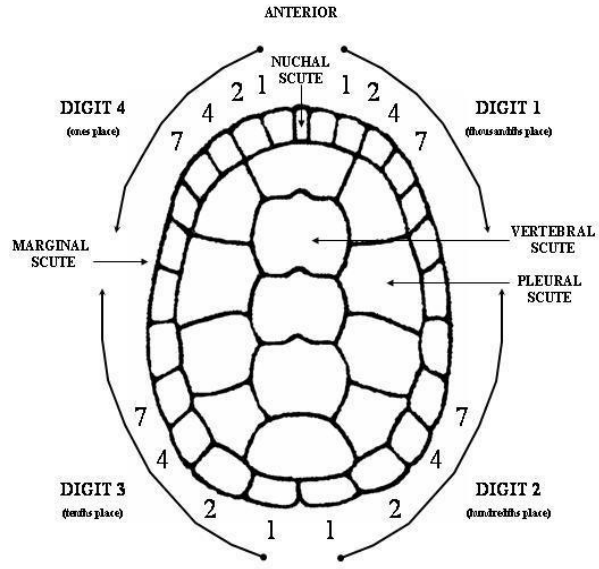
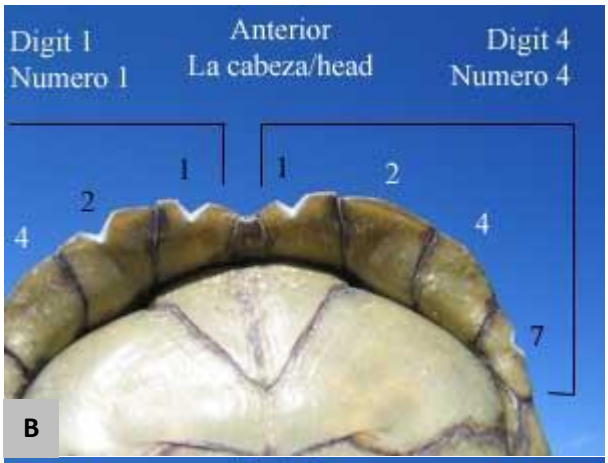


Figure 2. Dorsal view of *Terrapene* carapace with the Proximate Binary Coded Decimal (PBCD) scute-notching system (Siegrist, unpublished).

A



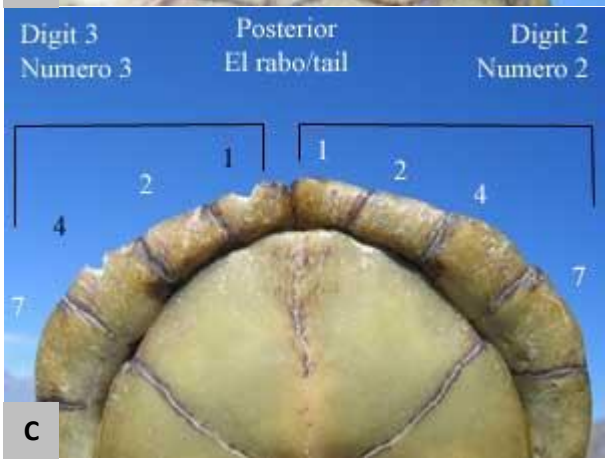


Figure 8. (A) DIGT 1 - thousands digit, DIGT 2 - hundreds digit, DIGT 3 - tens digit, DIGT 4 - ones digit. (B, C) E.g. number 3058 in Figure 8 (B and C).

- **Crocodile marking method: Cutting tail scutes**
  - Subject**:** Crocodiles of various sizes
  - Equipment, tools: Strings, nets, tape, and blindfold used to restrain crocodiles
  - Procedure:

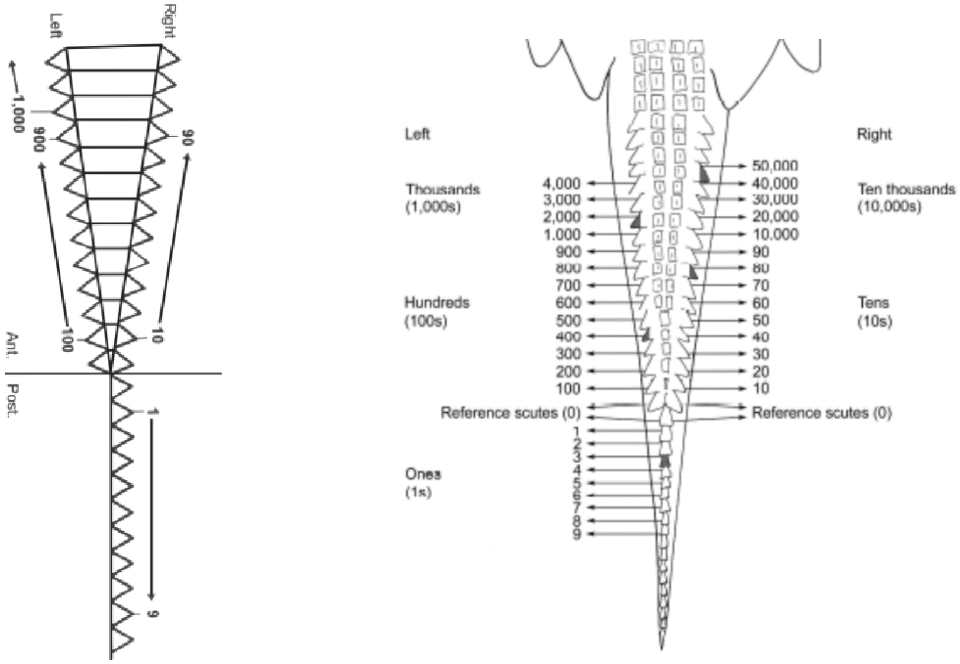


Figure 9. Crocodile numbering system

    - Use ropes, and rackets to restrain the crocodile;
    - Sterilize the knife and the marking positions, and cut the scutes at the specified location to create code for each crocodile individual. Sterilize the cuts and recheck the number;
    - Record the numbers and regulations of the numbering system on the crocodile animal information sheet;
    - If there are too many crocodiles in the same area, crocodiles can fight and the marking can be lost.
    - The cutting tail scutes method allows the examiner to recognize the animal from a distance without capturing animals.
- **Snake/python marking method: Scale clipping**
  - Subject: Snake, python weighing over 1kg, this method is frequently used on non-venomous snakes.
  - Equipment, and tools: Snake tongs, snake hook, transparent plastic tube, snake handling gloves, sharp scissors, alcohol, medical cotton.
  - Procedure:
    - Restrain the snake/python, and place the abdomen part near the tail facing up. Or use the clear plastic tube covered with a net at one end, choose the plastic tube that is fit for the snake's head, try to put the snake's head into the tube, and keep the hand at the other end of the tube (without the net) for making sure the snake can't crawl back;
    - Sterilize the marking area using an alcohol swab;

- Use a marker to mark the scales' positions following the numbering system. Use scissors to clip scales on the snake/python's abdomen in the marked area;
- Sterilize the cut area and recheck the number;
- Enter the numbering system and code on the animal information sheet.

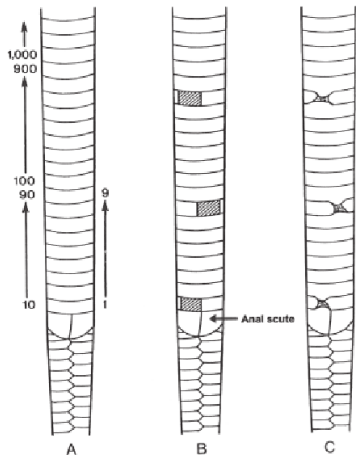


Figure 10. Snake/python marking system

The scale clipping method is only effective for a short time, the marking will fade when the snake/python sheds their skin.

- **Pangolin marking method**
  - Subject: All sizes of pangolin
  - Equipment, tools: Electric hand engraving tools, alcohol swabs, medical alcohol, gloves, scissors.
  - Procedure:
    - Capture and wait for the pangolin to roll into a ball;
    - Sterilize the marking area using an alcohol swab. Marking area is the cross row of scales at the position respectively with the hind legs;
    - Choose the large scales in the middle, on the spine, and use scissors to cut and mark the scales. Then use the electric hand engraving tools to mark the scales; Sterilize the marked area;
    - Enter the numbering system and code on the animal information sheet.

This method is comparatively durable, but will eventually fade over time.

- **Microchip implant method**

  Commonly used with **various species, including animals, birds, reptiles**
  - Subject: Large, medium, and small animals in different species. Animals need to be anesthetized, sedated, or restrained
  - Equipment, and tools: Appropriate capturing and restraining equipment depend on the species, microchip set, microchip installation device, gloves, medical alcohol, alcohol swab, suture kit, and microchip reader/scanner.
  - Procedure:
    - Use the microchip reader/scanner, record the microchip number, or adhere to the provided microchip number on the animal information sheet.

- Sterilize the implantation site with medical cotton and medical alcohol. Normally, the implantation site would be based on the procedure of the user agencies, for example, under the skin at the areas that are between the shoulder blades, in the left or right side of the neck, or in the left or right between the shoulder blades.

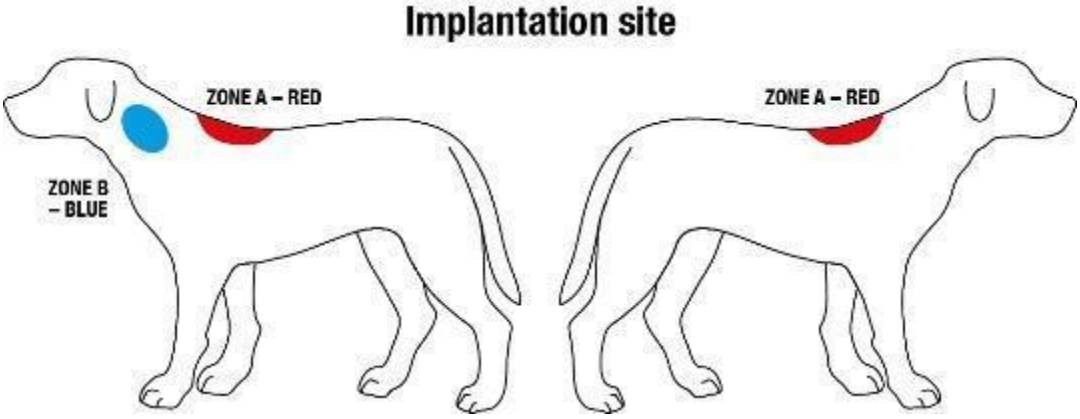


Figure 11. Implantation site

- Pinch some skin at the implantation site between the forefinger and thumb of the non-dominant hand, lift this fold of skin vertically away from the body, use the dominant hand to insert the needle swiftly into the fold of skin, with the needle angled downwards at a forty-five-degree angle. Lower the end of the implanter so that the direction of the needle is now approximately parallel to the skin surface. Press to push the microchip out of the needle and into the implantation position. Use the non-dominant hand to hold, apply pressure to the microchip placement, and pull out the implanter. Hold the hand in that place for about 10 seconds to make sure the microchip doesn't fall out.
- Use the microchip scanner to check the microchip is in place and working.

Figure 12. Microchip implantation procedure

Microchip implantation has multiple advantages: good durability (depends on the manufacturer), limited cause the irritation, discomfort to animals, rarely broken … nonduplicating identification number.

However, microchip implantation has some disadvantages:

- A microchip scanner is compulsory;
- While scanning, the microchip scanner has to be close to the microchip (10-20cm);

For some wildlife, especially aggressive species, it is hard for the personnel to approach and use the scanner, personnel would have to stand outside the fence, and then lure animals near the fence to do microchip scanning;

2.8.3. Marking method comparison

Table 5. Marking method comparison

Method comparison	Microchip	Colored band on legs	Scale clipping	Ear tagging
Subject	Various species	Bird	Reptile	Herbivorous Hoofed animal
Operation	Fast, easy	Moderately slow	Considerably slow	Moderately slow
Number reading	Appropriate device	Depends on the reader	Depends on the reader	Depends on the reader
Number of identifications	Nonduplicate	Duplication is possible	Duplication is possible	Nonduplicate
Durability	Depends on manufacturer	Depends on manufacturer	Depends on external factors	Depends on manufacturer and external factors
Health Risks	Low impact	Yes	Yes	Yes

Caution:

- Animal marking should only be attempted by specialized agencies/individuals. Law enforcement officers without specialization can injure the animal, especially in cases when the scene needs to be kept intact.

- If anesthesia is required: anesthesia is a technique that avoids harming both people and animals during direct contact. However, anesthesia techniques require the operator to be skilled (e.g. using anesthesia, post-anesthesia recovery, anesthetic shock, handling a gun, etc.) and have the practical experience and with each species, there will be different steps. Therefore, for the safety of humans and animals, support from experienced and technical people is needed.

3. During operations

3.1. Minimum PPE list for live animal or fresh dead seizures

On ALL operations, before entering the scene and assessing risks, basic PPE should be brought to the site:

- (1) Masks (both surgical masks and Respirator masks, e.g. N95 facemask)
- (2) Nitrile gloves
- (3) Washable closed toe shoes
- (4) Sterile alcohol solution

For a live or fresh dead animal seizure/confiscation, additional equipment should be brought to the site:

- PPE: See Table 6 for the level of PPE needed by wildlife taxa. Make sure extra PPE is taken incase items become torn or damaged.
- Wildlife handling equipment and transport crates. See Table 6 for equipment by wildlife taxa.
- Container of water for handwashing, and antibacterial soap
- Hand alcohol gel that contains at least 80% alcohol
- Disinfectant for cleaning equipment after use: bleach and Virkon.
- Scrubbing brush
- Large waste bags; one for infectious waste disposal (such as disposable PPE) and one for equipment that will be disinfected for re-use (such as plastic goggles, face shields and rubber boots)
- Disinfectant wipes or bottle of disinfectant spray for disinfecting outside of waste bags before they go in the vehicle
- First aid kit including povidone-iodine for washing any scratches or bites, eyewash, dressing to cover any scratches or bites

If performing confiscations of primates, due to the risk of B virus, the handler should also carry:

- 1 liter of saline eye wash
- Freshly prepared 1:20 dilution of household bleach for initial wash of skin if it becomes exposed (NOT to be used on mucous membranes)

Table 6. Summary of PPE and wildlife handling equipment to be used by wildlife taxa

Form of wildlife	Class	Sub-group	Sub-group	Example species	PPE to use	Wildlife handling equipment and tools are needed if live animals
Live or fresh dead	**Mammals**	Primates	Large >15kg	Large macaques, orangutan	Full PPE	Seek expert help
			Medium 3-15kg	Some macaque species, gibbons, langurs	Full PPE	If handling is necessary, seek expert help
			Small 0-3kg	Lorises, Tarsiers	Full PPE	Soft nets, gauntlet gloves, transport crate
		Carnivores	Large >15kg	Bears, large felids	Full PPE	Seek expert help
			Medium 3-15kg	Leopard cats, civets, otters	Full PPE	If handling is necessary, seek expert help
			Small 0-3kg	Martens, weasels, mongoose	Full PPE	Nets, gauntlet gloves, shield, cage door barrier, transport crate
		Rodents		Squirrels, rats	Full PPE	Soft nets, gauntlet gloves, shield, cloth bags, transport crate
		Bats			Full PPE	Gauntlet gloves, towel, fine net, torch, cardboard transport box
		Pangolins			Full PPE	Smooth-sided transport box, towel to cover box, gauntlet gloves
	Birds	Poultry/ waterfowl			Full PPE	Soft non-knotted mesh net, towel, transport crate
		Raptors		Owls	Full PPE	Gauntlet gloves, towel, transport crate
		Psittaciformes		Parrots	Full PPE	Soft non-knotted mesh net, towel, transport crate (light metal crate is recommended)
	Reptiles	Snakes	Venomous	Cobra, viper	Basic PPE	Use snake specialist – seek expert help

Form of wildlife	Class	Sub-group	Sub-group	Example species	PPE to use	Wildlife handling equipment and tools are needed if live animals
			Non-venomous	Python, boa	Basic PPE	Snake hook, clear plastic tubes, plastic shield, snake tongs, hessian bags/pillow cases, transport box
		Turtles/ tortoises			Basic PPE	Gauntlet gloves, transport crate, or cloth bag
		Lizards		Monitor lizards, water dragons	Basic PPE	Net, gauntlet gloves, transport crate
Dry dead	**All wildlife**	All species		Ivory, rhino horn, tiger bones, pangolin scales	Basic PPE	No handling equipment needed

3.2. Putting on Personal Protection Equipment (PPE)

Designate the area for putting on and taking off PPE: Once the species that are going to be seized/confiscated have been identified and the correct PPE and wildlife handling equipment brought to the site, staff need to designate an area for putting on and taking off PPE.

- Well-ventilated area;
- This should be at least 10m away from the animals;
- Before going anywhere near animals, this area should be set up with a first-aid kit, hand alcohol gel, a bucket of disinfectant for washing boots and disinfecting equipment, and waste bags open and ready to receive used PPE.

Spend as little time in PPE as possible as it can get very hot and heat stress can occur. Pre-plan activities before putting on the PPE and drink water beforehand. Minimize the number of personnel who will come into close contact (within 2m) of the wildlife and maintain the same team for the duration of the operation to minimize the number of people contacting the animal.

Remember there is the possibility for disease transmission both ways – from the staff to the animal and from the animal to the staff. So before going near the animal, the following hand hygiene protocol must occur and clean PPE must be worn.

Good hand hygiene techniques are vital. Hand hygiene can be done using either antibacterial soap/water or alcohol gel (minimum 80%) and should last around 20 seconds. It is important that whether you are using soap or alcohol gel, all surfaces of your hands and wrists are cleaned (see Figure 2). Once cleaning if complete, if using soap/water, rinse hands and wrists well under running water or have someone pour the water. Air dry your hands. If using alcohol gel, wait until the gel has evaporated and your hands are dry.

Figure 13. Hand washing technique

How to put on basic PPE

1. Hand hygiene with soap and water or alcohol gel
2. Apron or dedicated clothing goes on first
3. The surgical mask goes on
4. Put on nitrile gloves

How to put on full PPE (see Figure 14 below)

1. Hand hygiene with soap and water or alcohol gel
2. Shoe covers on
3. Put on inner pairs of nitrile gloves
4. Coveralls go on
5. The respirator mask (e.g., N95 mask) goes on. Form the section of mask over your nose to fit the bridge of your nose and make sure there are no gaps around the edge. Any time you put on a respirator, perform a seal check by inhaling sharply. If there is air leakage around the edges of the mask, readjust to ensure a proper seal.
6. Pull the hood of the coveralls up or put on separate hood
7. Put on apron
8. Put on the outer pair of gloves over the first pair and extend the gloves over the coverall cuffs
9. Face shield or goggles on

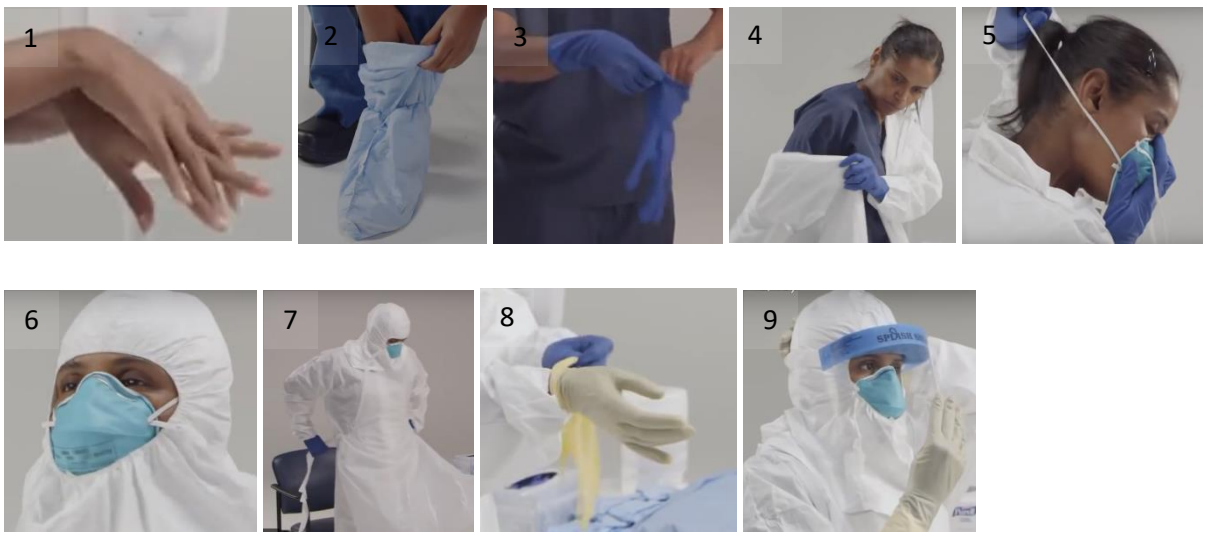


Figure 14. Putting on Full PPE

Once you are wearing PPE and handling the animal, remember your gloves are contaminated.

- DO NOT touch your face or any other unprotected area of the body with your gloves.
- DO NOT eat, drink or smoke whilst wearing PPE or in the area near the animal.

If the mask gets wet during sampling, it will no longer be effective and should be changed (using the PPE removal procedures described below).

3.3. Taking off PPE, cleaning and disinfection

When taking off PPE it is very important to remember that everything you are wearing could be contaminated on the outside with pathogens. Always think about what you are touching and make sure you perform hand hygiene between removing each piece of PPE. Only take PPE off in the designated area. As soon as you take off a contaminated item, it should be put in the biohazard bag.

How to remove basic PPE

1. Hand hygiene with alcohol gel
2. Remove and dispose of the apron. Put in a disposable biohazard bag. Or take off dedicated clothing and put it in a bag for washing
3. Hand hygiene with alcohol gel
4. Remove gloves. Place in a disposable bag
5. Hand hygiene with alcohol gel
6. Remove surgical mask
7. Make sure everything is inside a disposable bag
8. Close the disposable biohazard bag
9. Hand hygiene with alcohol gel

How to remove full PPE (see Figure 15 below)

1. Use a disinfectant wipe to wipe off any visible contamination of PPE. Place in a disposable biohazard bag
2. Remove apron. Place in a disposable bag
3. Hand hygiene with alcohol gel
4. Remove outer gloves. Place in a disposable bag
5. Hand hygiene with alcohol gel
6. Remove face shields or goggles. Place in a bag for disinfecting
7. Hand hygiene with alcohol gel
8. Pull down (if attached) or pull off the hood of coverall
9. Remove the coverall by rolling it down until inside out. Place in a disposable bag
10. Hand hygiene with alcohol gel
11. Remove shoe covers. Place in disposable bag or boots in a bag to disinfect
12. Remove inner gloves. Place in a disposable bag. Hand hygiene
13. Put on a new pair of gloves
14. Remove the respirator (e.g., N95 mask) - first the top, then the bottom strap
15. Hand hygiene with alcohol gel
16. Use a disinfectant wipe to clean off shoes
17. Hand hygiene with alcohol gel
18. Remove gloves. Place in a disposable bag. Close disposable bag.
19. Hand hygiene with alcohol gel
20. Wash hands with soap and running water

Figure 15. Taking off Full PPE

Once you have completed taking off the PPE, wipe or spray the outside of the disposable bag with disinfectant. DO NOT burn or bury the waste in the field, take it back to the protected area headquarters for burning or burial (the district or provincial vet officer or health officer can advise you on how to handle biohazard waste i.e. where and how to burn or whether to burn or bury).

Cleaning and disinfection of equipment and boots

Cleaning is critical to remove all organic material from footwear and equipment before disinfection, to ensure the effectiveness of disinfectants. This should be done in the designated area for removing PPE. A brush should be available for scrubbing surfaces of equipment and footwear. For disinfecting boots and equipment, use Chlorine bleach diluted 1:10 with water or Virkon disinfectant solution. For metal equipment, use Virkon as bleach corrodes metal. Freshly made disinfectant solution can be put in a spray bottle to allow spraying of equipment. Because they are porous, leather gloves cannot easily be disinfected. Spray, wipe, or soak gloves in 10% bleach and allow to sit or dry for >10 minutes. Once cleaning and disinfection of equipment and boots have been completed, wash hands, lower arms, and wrists.

3.4. Wildlife capture/handling techniques

Keep silence, maximize the number of persons participating in capturing and handling the animals, clarify roles and tasks for each member, and have one leader coordinate the whole group. Tasks need to be handled quickly, firmly, and quietly.

Physical handling of animals can often be avoided by encouraging an animal to enter a transport crate using patience or food as enticement. This is always the preferred option if possible, as it minimizes risk to both handler and animal.

Animals are likely to become stressed and possibly struggle when captured or handled. This raises the risk of the animal overheating, especially for mammals in a hot climate. Conducting confiscations at cooler times of day is advisable, as is having cold water ready to cool the animals if they start to overheat.

If mammals cannot be caught quickly, the confiscation may need to be postponed to avoid hyperthermia.

The team leader needs to be flexible observe the animal before and during the process of capturing and transferring the cage, and try to utilize available items while transferring the cage. When there are signs of abnormal things, promptly halt the action.

3.4.1. Mammals:

- **Small mammals (<3kg):** e.g., loris, mustelids, squirrels, rats, bats.
  - Gauntlet gloves and a secure neck grip are often sufficient for this group of mammals.
  - If a net is used, fine mesh is needed to ensure claws don't get entangled.
  - Once in the net, grasp the animal securely through the net around the head and neck and carefully remove the net.
  - Small mammals have sharp teeth – handling must be done quickly to prevent the animal from turning its head and biting.
  - Take care, if wearing thick gloves, not to exert too much pressure which can restrict the animal's breathing.
  - Loris: Loris has a wide range of motion for head rotation, therefore must be cautious when handling, use a thick cotton towel to cover the loris' body for easier handling.
  - Squirrels and mice: A cotton towel can be used to cover when gripping the animal by the head and neck. Or lift the animal by the tail.
  - Bats:
    - If in a small enclosure throw a towel over the bat to restrict flight then grasp with gauntlet-gloved hands;
    - If in a big enclosure where flight is possible, shine a bright light on a perched bat to daze it then grasp it with gauntlet-gloved hands;
    - If nets are used the hoop must be big enough to allow open wings to pass through easily and the mesh should be fine;
    - Must be cautious when capturing bats for the bat's wings are their vulnerable part. Carefully align the bat's wings in its natural upside-down position;
    - Bats can be transported in cardboard boxes.
- **Medium mammals (3-15kg):**

- Medium sized **primates,** e.g. gibbons, langurs, some macaques:
  - Primates should be enticed into a transport cage or self-closing cage using food;
  - Handling with nets and gloves should only be a last resort and must only be attempted by very experienced handlers as the risk of injury to both handler and animal is high. Contact experts for assistance if handling is necessary;
  - Chemical immobilization using a blow pipe or jab stick is preferable to using nets and gloves but should only be attempted by experienced personnel from a rescue center or zoo;
  - When receiving animals from the local people, law enforcement officers can coordinate with local people to approach, capture, and transport the animals.

- Medium sized **carnivores,** e.g. leopard cats, civets, otters:
  - Carnivores should be enticed into a transport cage or self-closing cage using food.
  - In cases when direct contact with the animal is needed, the handler must have basic equipment, including nets, gloves, and cloth bags. Handling carnivores must only be attempted by very experienced handlers as the risk of injury to both handler and animal is high. Contact experts for assistance if handling is necessary.
- **Pangolins**
  - Pangolins are shy and likely to curl into a defensive ball when handled – don't let the animal curl around your arm as it can be painful.
  - Pangolins can be easily moved when curled up. If they uncurl, hold by the tail with one hand, the other hand supporting under the body.
  - They have sharp claws that can cause cuts and scratches so leather gloves should be used.
  - Pangolins get stressed very easily and stress can lead to fatalities. It is very important to keep stress to a minimum by keeping people away from the animals, keeping quiet, and covering the box with a towel to reduce visualization of handlers.

- **Large mammals (>15kg)**: e.g., bears, large primates, large carnivores. Expert help should always be brought in. No human contact during confiscation and chemical immobilization is often needed. To avoid harming the animal or even causing fatalities, handlers should not feed animals within 12 hours before anesthesia, if the animal is already fed, it is compulsory to wait at least 12 hours. Some species react negatively to anesthesia at a certain ratio. Emergency medications should be prepared just in case. Do not transport animals when anesthesia is still effective, do not leave animals in direct sunlight.

3.4.2. Birds:

- If in a large cage or aviary, use a soft, non-knotted net to catch the bird;
- Caution: Trapping birds in large cages can cause them to panic and head-on to the cage sides, causing serious head injury or fatalities (especially pheasant species). The net should be used to surround and narrow down the space, then catch birds with a small cage or bird-catching nets;
- If a bird is in a small cage, use gloves and a towel;
- Birds are very fragile and a bird catching nets can easily fracture a bird's leg or wing if not used gently;

- Once in the net, hold the bird's head or beak while carefully removing the net, and fold the wings in a natural position when the bird perches, legs stretched back in the direction of the tail. The left hand holds the legs, tail, and wing tips, the right hand holds the head and shoulder;
- If raptors are being confiscated, wear gauntlets and make sure the legs and talons are controlled. Grasp legs stretched back in the direction of the tail. The left-hand holds the legs, tail and wing tips, and then the head. A towel can be used to cover the bird's head and wrap the wings;
- If handling larger species with long beaks such as egrets, wear eye protection;
- If handling a bird with a long and big beak, use a hand to restrain their beak and then wings; Stress in birds can be severe so keep handling time to a minimum. Birds do not have diaphragms and so if squeezed too tightly they cannot breathe. Take care when using gloves and towels not to restrict breathing. Avoid damage to feathers at all costs as birds use feathers for maintaining body heat as well as flying;
- When transporting birds, line the crate with a towel or newspaper to allow the bird to grip during transport. If possible, put a metal bar in the bottom of the cage for them to perch on. Line the cage with foam rubber or similar material to minimize negative impacts on the bird when it is stressed;
- When it is necessary to keep many individuals/species of bird together, the activity should be implemented at night or in a dark room so that the animals can better adapt and mitigate the situation of animals fighting.

3.4.3. Reptiles

- **Non-venomous snakes**:
  - Remember, if a species of snake cannot be identified, treat it as venomous and call an expert. Even through a camera, non-venomous and venomous snakes are easily identified by experts. So, can seek professional help by sharing images.
  - A snake hook can be used to pick up a non-venomous snake and place it in front of a clear plastic tube (hold the plastic tube with snake tongs) so the snake chooses to slide into the tube. The tube should be just wider than the head of the snake. As the snake slides into the tube, both the tube and the snake are grabbed quickly with the head and upper part of the body within the tube. In addition, one can use a stick to guide the snake into the sack or cloth bag, after 1/5 of the snake's body and head are in the bag, seal the bag with the dominant hand while the other hand continues pushing the snake's body into the bag. Tie the bag at least twice to ensure the snake doesn't escape;
  - If the snake will not enter the tube or sack, use the snake hook to gently pin the head of the snake to the ground to allow the handler to grasp the head. Lift the tail with the left hand and put it in a box or bag;
  - Grab the y-shaped end of a snake tong to press the snake's head down, then gently hold the snake head, do not use too much force as it may damage the bones of the snake's head and neck;
  - The head is held behind the occiput using the thumb and middle finger, while the index finger is placed on top of the head. Care must be taken not to put too much pressure on the joint at the back of the head (atlantooccipital joint) as it may snap;
  - Before putting a snake in a bag, or transport box, check whether the snake has its mouth sewn with thread or zinc, if it does, mark and record, and notify the receiving agency (zoo, rescue center);

- When holding a snake, the body must be supported. If unsupported, the snake may feel insecure and thrash about;
- Large snakes should never be handled by one person alone; for every 3 feet of snake, there should be an extra person to assist with handling;
- If a snake appears to be dead, never pick it up with bare hands as snakes can play dead and then bite; Snakes often poop while being captured, be careful not to be contaminated with snake's poo, especially on the mucous membranes. Wash and sanitize immediately if come in contact with the snake's poo, in case the poo contact with the eye and mouth, wash with a saltwater solution (saline) and an appropriate sterilization solution. Snake faeces may contain salmonella, which can cause acute bacterial infection;

- **Lizards**:
  - Catch monitor lizards with a net and gauntlet gloves;
  - They should then be grasped through the net over the shoulders, the net removed then hold one hand on the shoulders, one hand over the tail at the point between 1/3 and ½ of the tail length from the root of the tail;
  - If the nets are not available, use your hand to hold the tail and lift the animal off the ground, then quickly move the animal to a transport crate or cloth bag;
  - Monitor lizards have very strong jaws and care should be taken to avoid bites;
  - With other lizard species, DO NOT use your hand to hold the tail. Use the dominant hand to hold on to the shoulders and neck, the other hand presses down the pelvis, clamps the waist between the index and middle fingers, and the root of the tail is in between the thumb and the ring finger.
- **Turtles/tortoises**:
  - Tortoises tend to be shy and easy to handle.
  - Some turtles, such as snapping turtles and soft-shell turtles, may deliver a serious bite and should be handled using gauntlet gloves.
  - When capturing turtles and soft-shell turtles, use a hand to grab the hollow part of the hind legs and lift the turtle, keeping the turtle's body in a balanced crawling-like posture.
  - Avoid turning turtles/tortoises on their backs.

Note:

• Always check for the safety of the cage/crate before moving the animal in.

• After the animal has been placed in a cage/crate/transport box, it is necessary to carefully check the lock/safety belt to ensure that it is tightly locked in case the animal escapes, and causes danger (due to the instinct that many animals will find any way to escape in a strange environment).

3.5. Bite/scratch protocol

If a member of staff gets bitten or scratched, the following should be done:

- An injured person notifies other staff and work stops
- The bite or scratch should be washed for 5 minutes with soap and running water. In the event of a macaque bite or scratch, wash for 15 minutes with povidone-iodine.
- Apply an antiseptic with anti-viral properties to the wound e.g., an iodine-based disinfectant such as povidone-iodine If mucous membranes become contaminated with a splash of animal

urine/faeces/saliva then use eyewash/saline to do a 5-minute continuous flush. If the splash is from a macaque, then do a 15-minute continuous flush of any exposed mucous membranes

- If the injury/bite is from a bat or carnivore then get post-exposure rabies vaccination as soon as possible (within 24 hours)
- Consult a doctor if a bite or scratch has penetrated the skin barrier as antibiotics will likely be prescribed
- 24 hours after the bite/scratch occurs, ensure the staff member is examined by a doctor to assess for swelling, pain, heat, fever
- If the bite or scratch is from a macaque or from a primate that has been housed with macaques then B Virus emergency protocol must be triggered immediately. See Appendix D for B Virus protocol.

After an enforcement operation involving wildlife, if any enforcement officer or those involved in the confiscation event feel sick they should seek medical attention immediately and inform the doctor that there has been contact with wildlife. If a breach of PPE occurred during the operation and known exposure to wildlife occurred, staff should seek medical advice immediately.

4. Overnight/24 hr. holding of animals

Once confiscated, animals should be taken directly to rescue centers. If this is not possible and they have to be held overnight, animals need to be provided for while minimizing handling and continuing biosecurity precautions. These guidelines do not cover longer term housing of animals and if an animal is being held for more than 24 hours then enforcement officials should contact rescue centers or zoos for advice on feeding and husbandry.

General principles:

- Keep good records for confiscated animals. The minimum information should include the date and location of where the animal was confiscated and if they were mixed with other species. Ideally, each animal should be given a unique ID for record keeping so the animal can be tracked.
- Specific staff should be designated to care for the confiscated animals to minimize exposure risk to other members of the team.
- Keep the animal in a quiet and dark place with minimum disturbance.
- Keep the animal in a ventilated, shaded environment, away from the wind, and ensure that the temperature is between 30 and 35 degrees Celsius.
- For some amphibians, the transport cage needs to be replenished with damp towels or water trays deep enough to keep the animal moist.
- If the transport crate is of sufficient size (large enough for an animal to stand up and turn around) and the animal is only going to be kept for 24 hours before transfer to a rescue center or release site, then keep the animal in the transport crate overnight. This minimizes risk from further handling of the animal.
- Provide water– enough so the animal can drink but not submerge itself as it may be weak and at risk of drowning. If an inbuilt water container is present in the transport crate, water can be provided without having to open the crate. Otherwise, a low, wide, heavy and damage-resistant water dish can be used and a cage divider (see Table 4) can be used to keep the animal at the back of the crate while the door is opened and water or food put in, without risk of escape.
- Provide food and water. The only animals that should not have food provided in the first 24 hrs after confiscation are snakes. Ensure the food provided is appropriate for the species of animal (seek advice

from rescue centers if unsure). Food should only be provided in a small amount on the first few days (20% of food demand on the first day and gradually increase the amount for the next days), excessive feeding can negatively impact the animal on the first few days. Animals should not have water provided excessively right after confiscation, only a small amount should be given every hour for a minimum of 8 hours (most animals seized during law enforcement are dehydrated, and drinking too much in a short time can cause water shock or fatalities).

- Ideally, keep animals in a well-ventilated area to reduce the risk of airborne pathogens.
- Ideally, keep animals in an isolated area where staff are not walking through.
- Don't mix wildlife species. Aim to keep a minimum of 1m between different species.
- Practice good biosecurity when going near the animals. Remember disease can travel both ways, from humans to animals and from animals to humans. If there is a possibility that the animal will be reintroduced to the wild, it's important to make sure they don't pick up a disease while being held in captivity. Staff need to wash their hands and put on basic PPE before going in to feed/check animals and follow the PPE removal protocol described in section 3.3 when leaving the room where the animal is being kept. To make following these protocols easier, it helps to have alcohol gel, boots and respirator masks (e.g., N95 masks) on a table and a trash can set up at the entry to the room.
- Place a tray or plastic sheeting under the cage to catch urine or faeces for easy disposal.
- If large confiscations of multiple animals occur, sick and healthy animals need to be separated if possible.
- Once the animals have been transferred to a rescue center or released, disinfect/mop with 1:10 diluted bleach and ventilate the area for 30 minutes before personnel enter without masks. Toilet cleaners can be used as an alternative.

Appendix A

Examples of serious zoonotic diseases that can be transmitted by wildlife in Asia

The following are a few examples of zoonotic diseases that can be found in wildlife species that may be encountered in enforcement operations. This is not an exhaustive list. Included here are some diseases that can have serious health implications for humans and can be transmitted through either bites, scratches, facial splashes or inhalation of aerosols:

Rabies. Rabies is a potential risk when handling any mammal but in particular **bats and carnivores**. *Transmission is through bites, scratches or facial splash with saliva or urine.* Rabies can cause a life-threatening infection of the brain and nerves in humans. Clinical signs of rabies in animals are quite variable and may not be obvious, so when handling bats and carnivores, the potential for rabies should be assumed. Anyone expecting to handle mammals during confiscations should be vaccinated for rabies. If a bite or scratch or contamination of mucous membrane with saliva or urine occurs then work should stop immediately and the bite washing protocol in Section 3.5 followed and post-exposure vaccination obtained as soon as possible (within 24 hours). When handling bats or carnivores, the correct PPE and careful handling technique can reduce the risk of infection.

Hantaan virus. The Hantaan virus is carried by **rodents.** *Transmission to humans is through inhalation of aerosols of rodent faeces or urine or, less commonly through rodent bites.* It can cause severe hemorrhagic fever with renal syndrome (HFRS) in humans. Symptoms of HFRS initially are fever, progressing to abdominal pain, vomiting, bleeding and kidney failure. In 6-15% of cases, it can cause death. If symptoms of infection occur within 45 days of exposure, a doctor should be notified as early treatment can be life-saving. Aerosolization of rodent faeces or urine is of particular risk in confined spaces, for example in rodent-infested buildings or in places where rodents have been confined to cages for long periods. When conducting an operation in a space where rodents are present or if rodents are handled, the correct PPE, in particular, a well-fitted respirator (eg N95) mask and careful handling technique can reduce the risk of infection.

Highly Pathogenic Avian Influenza (H5N1) 'Bird Flu'. Wild birds are the natural reservoir of H5N1, in particular waterfowl such as ducks, geese and swans. It can also be found in other birds. *The disease is transmitted to humans through contact with infected saliva, nasal secretions, faeces and blood.* Symptoms in humans include fever, cough, sore throat, muscle aches and in severe cases breathing problems and pneumonia that can be fatal. When handling waterfowl, the correct PPE can reduce the risk of infection.

Coronaviruses. Bats are known to be the reservoir host of at least one serious coronavirus (Severe Acute Respiratory Syndrome coronavirus, SARS-CoV-1). The origins of SARS-CoV-2, or Covid 19, remain unknown but its genome indicates a strong likelihood that the reservoir species is bats (McIver et al., 2020). Mustelids with naturally acquired SARS-CoV-2 infection have also been identified (Opriessnig and Huang 2020). *Although research is ongoing, it should be presumed that transmission could occur through bites, scratches or contamination of mucous membranes with saliva, urine or faeces. W*hen handling bats and mustelids, the correct PPE and careful handling technique can reduce the risk of infection.

Appendix B

Fit testing a respirator mask

Each staff member using a respirator mask must undergo a fit test to identify a model of mask that fits the face well and ensure the mask fits the face without any gaps. This should be done before using the respirator mask in the field. Performing a fit test takes 15-20 minutes. Qualitative fit test kits are available for purchase through 3M. Staff should receive training on how to perform a fit test.

Once a fit test has been completed, the staff member should always use the same model of respirator mask for future work.

Facial hair can make it difficult for the mask to form a proper seal around the face. If staff with facial hair fail the fit test, a loose-fitting (i.e., helmeted or hooded) powered air purifying respirator equipped with high-efficiency filters may need to be used or facial hair removed.

Workers with respiratory problems may experience respiratory distress when wearing a respirator mask. If this is the case, these staff members cannot wear respirator masks and therefore cannot participate in confiscations of mammals and birds.

The following video gives an overview of respirator mask fit testing requirements for any worker who is required to wear one:

https://www.osha.gov/laws-regs/standardinterpretations/2020-03-14

The transcript for this video can be viewed at

https://www.youtube.com/watch?v=Tzpz5fko-fg (English)

The following video guides the manufacturer of 3M respirator masks on how to perform a fit test:

https://www.youtube.com/watch?v=PthSES4O9d8

Appendix C

Wildlife handling equipment specifications

- **Gloves:** Gauntlet gloves protect from smaller animal bites and scratches. They will not necessarily protect from medium sized carnivores or primate bites. Hexarmor Hercules 400R6E gloves are good, or leather welders gloves can suffice if custom gloves are not available. Ideally, gauntlets should be slightly loose on the hand so if an animal bites, the finger can slip sideways and be missed by the bite. Care is needed not to harm the animal when wearing thick gloves as the ability to feel how tightly the animal is being held is reduced.

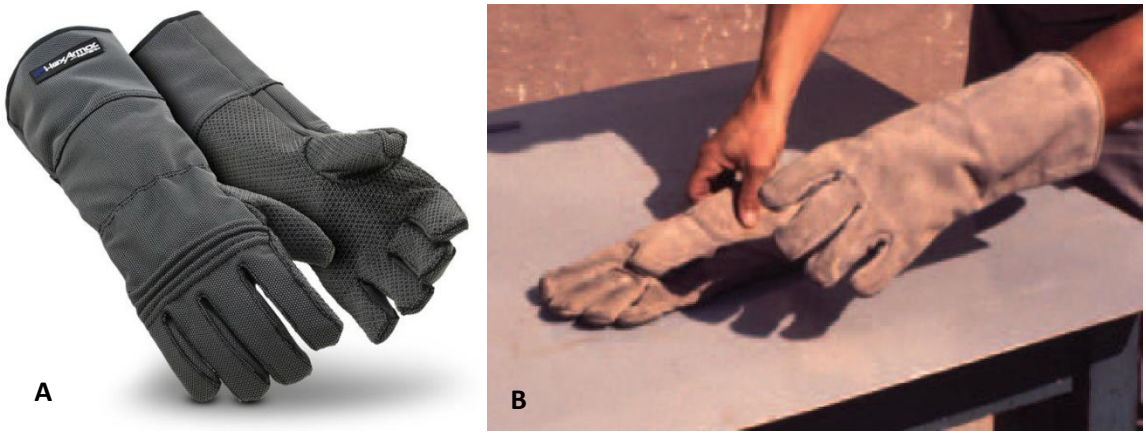


Figure 16. Gauntlet gloves for animal handling. A - Hexarmor Hercules 400R6E gloves, B - leather welders gloves

- **Nets**: Hoop nets are essential pieces of equipment. They have a long, strong pole fixed to a metal or fiberglass hoop supporting the net, allowing the handler to keep a distance from the animal. The hoop of the net should be large enough that it can be placed over the animal with enough room to avoid the hoop edge injuring the animal. The holes in the net should be small enough so the animal cannot put its head through the holes and risk strangulation and cannot stick arms or legs through the holes. The net should be deep enough to allow the net to be folded over or twisted to trap the animal inside (see Figure 7B). The thickness and type of mesh used will depend on the species. Soft mesh should be used for small animals, non-knotted mesh for birds and strong/thick mesh for larger animals. A variety of sizes and mesh strengths should be purchased to allow the capture of a wide range of species.

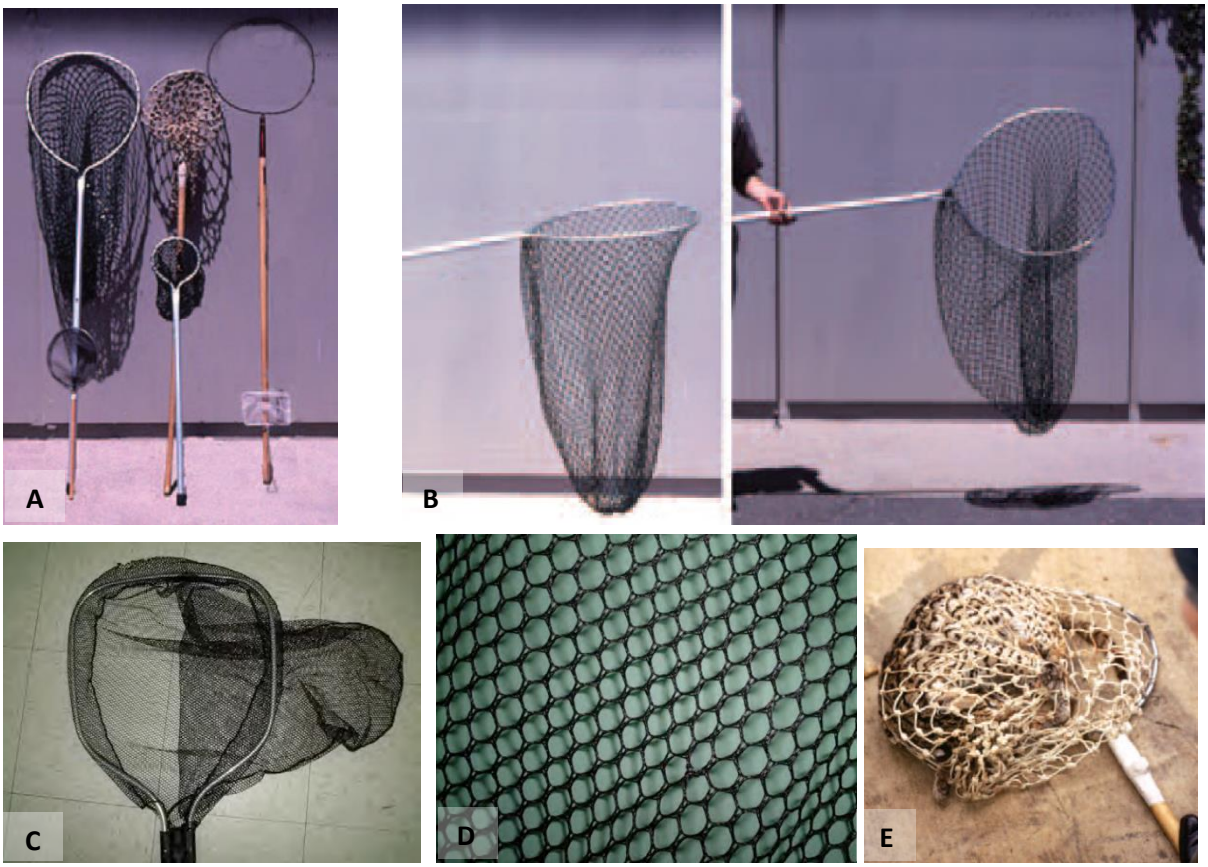


Figure 17. Hoop nets.

A - Having a range of hoop nets allows the capture of different species. B - Hoop nets must be deep enough to allow folding or twisting to trap animals in the bottom of the net. C - Nets for birds must be soft and not knotted. D - Close-up of non-knotted mesh for birds. E - Strong rope nets are used for larger animals but the holes are still small enough to stop the animal poking a leg or head through a hole. Photos: Fowler 2008 and KFBG 2009.

- **Transport crates**: Having a selection of strong wooden, plastic or metal transport crates of varying sizes is advisable. It is essential to have a sliding door on crates to allow more controlled access to animals while minimizing the risk of escape. This also allows the crate to be put directly up against a cage for the transfer of animals. Having one end covered in mesh or bars with a sliding metal or wooden panel over the top (Figure 18) allows visualization of the animal and access to inbuilt water containers without having to open doors. Crates should be large enough for an animal to stand up and turn around. 25% of the vertical surfaces of crates should be ventilated with holes. The crate floor should be lined with suitable material, perforated or flattened, in the case of perforation, the hole should not be larger than ¼ the foot size. Crate sides should be lined with suitable materials to prevent collision risks (VD: for hoofed animals, rubber foam should be lined to prevent panic animals from heading onto the side causing head damage; for carnivores and primates, crate side should be lined with splinter free plywood). The crate should be easy to disinfect. It is often necessary to hold animals overnight before they are taken to a rescue center or released so having an in-built water container with outside access avoids having to open doors to provide water, do not provide too much water on the first day, provide a small amount every hour and for at least 8 hours. The crate should be slightly raised off the floor to allow drainage of urine. If the animal is being held overnight, a tray or plastic sheet can be slid underneath the crate to collect urine and allow safe disposal and minimize urine

splashes during onward transport of the animal. Advice on specific requirements of crates for various wildlife taxa can be gained from speaking to in-country rescue centers dealing with specific taxa.

Transport crate for specific wildlife taxa:

- Hoofed animals transport crate: The crate should have a sliding door 1.5 times the animal body length, 2 times the shoulder width, 1.2 to 1.5 times the height (counting from the foot to the top of the head when standing straight and the height of the horns), the bottom of the barrel should be lined with a perforated rubber mat maximum size of ¼ the width of the foot, the crate sides should have foam rubber lining (or other material with dampening feature)
- Carnivores transport crate: The sliding door should be 1.1 -> 1.5 times the animal's body length, 2 - 2.5 times the shoulder width, and 1.2 -> 1.5 times the height. The sides and floors should be lined with cleaned pressed wood (small wood splinters can hurt animals).
- Primates transport crate: a container with a suitable sliding door is at least 2.5 times the width of the shoulder, 1.2->1.5 times the height is recommended. The sides and floors should be lined with cleaned pressed wood (note that small wood splinters may injure the animal), 2 bars can be attached along the container side so that the animals can hold the handles while transporting.
- Pangolins are very susceptible to self-injury – they can tear off claws on metal cages. They are also very easily stressed so wooden transport crates with solid smooth sides that minimize visual contact and potential for self-injury are best for transport (Figure 19A).
- For birds, the crate should be a minimum size of roughly double the height of the bird in all three dimensions but not be too large or the bird will flap and damage itself. Wire mesh crates should be avoided for birds as they can easily damage feathers, the crate side should be lined with foam rubber to reduce the injury risks when birds are stressed.
- For non-venomous snakes, a clear plastic box (to allow visualization of the inside of the box) with a lid and ventilation holes is adequate (Figure 9B). If a box with a sliding lid (ideally made of clear plastic) can be made, this is even better, allowing gradual opening of the box and so better control of the snake. Ideally, the snake should be inside a sack inside the box.

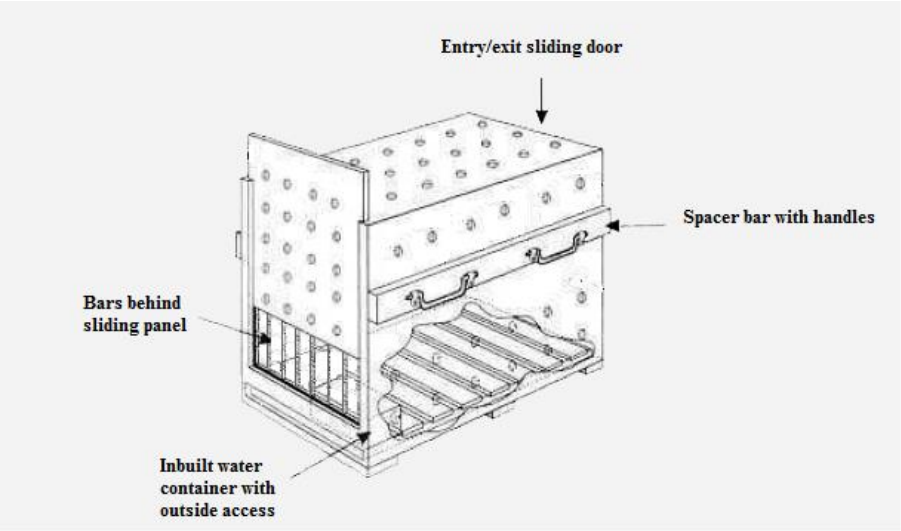


Figure 18. An example transport crate. Advice on specific requirements of crates for various wildlife taxa can be gained from speaking to in-country rescue centers dealing with specific taxa.


A


B

Figure 19. Transport crates for particular wildlife taxa.
A - Crate for Pangolin: a smooth-sided wooden box minimizes the risk of self-trauma. Photo: WCS Vietnam;
B - Plastic box for non-venomous snakes with holes for ventilation

- **Shields and cage door barriers**: A shield (Figure 20A) can be used to encourage small animals to move into a transport crate. A cage door barrier, such as a strong piece of plywood (Figure 20B) can be used if an animal needs to be transferred from a cage with a swing door to a transport crate. The barrier can be used to cover the opening of the swing door until the transport box can be put flush against the cage. This technique only works for animals that are not strong enough to push the barrier away.


A


B

Figure 20. A - Shield for encouraging animals to move into transport cage; B - a cage door barrier to stop the escape of an animal while opening a swing door and putting the transport crate against the cage. Photos: Fowler 2008

- **A cage divider:** A cage divider has metal rods that can be inserted down through a cage to allow the animal to be kept at the back of the cage. They are useful if an animal needs to be held overnight, to allow the cage to be opened to put in food or water while preventing the escape of the animal. Cage dividers can be made easily and can be designed to fit specific transport crates.

Figure 21. Cage dividers are used to stop an animal from escaping when the cage door is opened

- **Self-closing cages**

  Self-closing cages, such as Tomahawk traps, can be used if an animal is in a large enclosure and handling is deemed too dangerous. The trap is baited with food and the animal enters the cage to get the food, triggering the door to close. The disadvantage of these traps is that it can be time-consuming to wait for the animal to go into the cage of their own accord.

Figure 22. A tomahawk trap can be used for small to medium sized animals. Photo: PREDICT Tanzania Team

- **Equipment for snakes:** Snake hooks (Figure 23A) are very useful for lifting snakes from containers, directing their movement and gently pinning heads to the floor. Clear plastic tubes (Figure 23B) are useful to allow snakes to slide into and allow containment of the head. The tubes can be easily made from any clear plastic pipes (e.g. used for building/manufacturing) that are then cut down to size and a cap fitted. Plastic shields (Figure 23C) can be used to capture slightly aggressive non-poisonous snakes by trapping the head against the floor with gentle pressure to allow the handler to move in and grasp behind the head. Grasping snake tongs (Figure 23D) are not suitable for direct handling of snakes as they can easily cause injury if not used correctly. However, they are useful for removing dishes, feeding or holding plastic tubes. Hessian bags or pillow cases with enough room to tie a knot in the top can be used to transport snakes inside a transport box.

Figure 23. Snake handling equipment. A - snake hook, B - clear plastic tubes, C - plastic shield, D - grasping snake tongs. Photos Fowler 2008.

Appendix D

B Virus Exposure Emergency Protocol in the event of a macaque bite, scratch or mucous membrane/eye splash

(PREDICT One Health Consortium 2016)

FIRST AID SHOULD BE CARRIED OUT IMMEDIATELY AFTER MACAQUE BITE/SCRATCH/MUCOUS MEMBRANE/EYE SPLASH

Bite or scratch: wash skin for 15 minutes with a solution containing detergent soap (e.g. povidine iodine or chlorhexidine). If available, wash the skin first with freshly prepared 1:20 diluted household bleach followed by the detergent soap. DON'T USE bleach on mucous membranes.

Mucous membrane exposure: flush eye or mucous membranes with sterile saline solution or water for 15 min (or 1 liter).

After initial first aid, a health care professional should be consulted as soon as possible, preferably within hours, to decide whether prophylactic treatment with acyclovir should be started. There have not been any controlled studies to show that acyclovir can prevent infection of B virus in humans so it should always be the goal not to be injured by a macaque. The doctor may also take a blood sample to perform paired serum samples and take a swab of the wound for culture.

Prophylactic acyclovir treatment is recommended if:

- The bite/scratch went through the skin or a mucosal splash occurred and the macaque was ill or had oral or genital lesions seen with B virus
- The bite/scratch went through the skin or a mucosal splash occurred and the area was not cleaned properly at the time
- A laceration of the head, neck or torso occurred
- A deep puncture bite occurred
- A needle stick injury is associated with tissue or fluid from the nervous system or lesions suspicious of B virus, eyelids, or mucosa.
- Puncture or laceration by an object that was (a) contaminated either with fluid from monkey oral or genital lesions or with nervous system tissues, or (b) known to contain B virus.
- The doctor takes a post-cleaning swab and the culture is positive for B virus.

Prophylactic acyclovir treatment is considered if:

- The bite/scratch or mucosal splash was adequately cleaned
- A needle stick injury involving blood from an ill or immunocompromised macaque
- Puncture or laceration from an object that was contaminated with body fluid (other than that from a lesion)

Prophylactic acyclovir treatment is not recommended if:

- The bite/scratch did not puncture the skin
- Exposure was from a different species of primate/not a macaque

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Wildlife Conservation Society (WCS) has worked in Viet Nam since 2006 with a focus on supporting to reform of national laws and policies and building the capacity of law enforcement for Vietnamese authorities to combat wildlife crime. We prioritize several key activities to influence wildlife trafficking networks, with the ultimate goal of supporting Vietnamese law enforcement agencies to effectively prevent and combat wildlife trafficking.

Contact us

Wildlife Conservation Society, Viet Nam Office

Suite 106, D Building, Thanh Cong villa,
No. 3, Thanh Cong Street, Ba Dinh District, Ha Noi
Tel: +84 24 3514 9750
Email: wcsvietnam@wcs.org
Website: https://vietnam.wcs.org/