Best Practice Guidelines

for

Python Captive Breeding and Rearing Facilities

First Edition
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1. Introduction

The captive breeding and rearing of pythons (family Pythonidae) in commercial production facilities (python farms) is recognised as an important and legitimate source of python skins entering the reptile skin trade. Scientific studies have confirmed that python farming represents a biologically feasible, economically viable and ecologically sustainable agricultural enterprise, and it is now considered an established industry in China, Thailand and Viet Nam (Natusch and Lyons 2014).

Closed-cycle python farming (the production of pythons within a controlled environment independent from introduction of specimens from the wild) arose rapidly in Asia in the early part of this century, in response to diminishing supplies of wild sourced skins and increasing demands from international markets. The growth of the industry has been driven primarily by independent small-scale farmers relying on local knowledge and modified traditional livestock production systems, and as such attempts to characterise and control production standards have proved difficult.

Concerns were raised about the welfare implications of maintaining pythons in captivity, and there was a recognised need to develop minimum acceptable standards for commercial python farms.

These Guidelines are intended for incorporation into existing procedures at python farms and to provide support towards demonstrating regulatory requirements in the industry. They are also intended to align farming methods with welfare standards and to help protect captive pythons. The Guidelines provide information for proprietors, managers and staff responsible for the care and management of pythons. The Guidelines also contain information to assist in the implementation of the best practice.

The Guidelines were developed with the support of representatives from industry, science, policy, animal welfare, and others, such as supply chain persons. The Guidelines are based on current knowledge and technology and should be reviewed periodically to account for advances in the understanding of python physiology and behaviour, technology, husbandry, and welfare.

The Guidelines specifically cover principles for best practice for the skin trade. They do not necessarily include principles for maintaining pythons for other purposes, such as meat production, tourism, education or pets, although there may be considerable overlap. Humane-killing protocols are excluded, as these issues are dealt with in a separate document (see Related Documents below).

Purpose

The purpose of these Guidelines is to establish management practices for python farms producing python skins for the skin trade. The Guidelines aim to:

- To set an industry standard by defining minimum acceptable python management practices.
- Clearly define python welfare standards for incorporation into relevant industry quality assurance programs.
- Promote the humane and considerate treatment of pythons at python farms.
- Provide information to support good husbandry and management practices that deliver acceptable python welfare outcomes.
- Define duty of care and associated responsibilities for persons managing pythons at python farms.
- Provide assurance to the general community that effective python welfare standards for the python farming industry are in place.
- Demonstrate that these standards are being met.

Scope and aims

The Guidelines apply to python species produced on a commercial basis in closed-cycle production facilities specifically for their skins. At present this includes two species:

- **Reticulated python (*Python reticulatus*)**
- **Burmese python (*Python bivittatus*)**

These Guidelines recognize that facilities farming pythons vary considerably, from high-investment industrial-scale farms, to smaller "satellite farms" housing only a few specimens. The capacity to implement best practices will undoubtedly vary among facilities, as will the capacity to undertake research and development, and be aware of and implement new technologies.

Moreover, the Guidelines accept that best management practices will evolve and be updated over time, as the scientific community and industry learn more about the husbandry and management needs of pythons. Therefore, these Guidelines are not intended to be overly prescriptive. Instead, they offer guidance for the implementation of better management practices for the improvement of python welfare and husbandry for farms of all types.

Application

Python farms have a responsibility to ensure welfare outcomes are of a high standard. This is achieved via incorporation of these Guidelines within farm management systems and procedures, which should include:

- A demonstrated commitment by the proprietor to this objective;
- Welfare considerations for management of pythons; and
- Verification and review of all practices that impact python welfare

Specifically, these standards are designed to achieve the following fundamental aspects of python welfare:

1. Freedom from hunger and thirst,
2. Freedom from discomfort
3. Freedom from pain, injury and disease
4. Freedom to express normal behavior
5. Freedom from fear and distress

The Guidelines are presented in two sections:

Section 1 defines five Standards, each with specific outcomes and principles that detail how the intended outcomes can be achieved. These Standards and principles are the minimum requirement for best practice at python farms.

Section 2 contains best practice to assist the proprietor and manager(s) of python farms to implement the Standards. Good Management Practices (GMPs) provide specific details on the activities and procedures that assist in meeting the Standards. The GMPs are based on other standards, codes of practice and guidelines for the welfare of similar animals and current scientific literature.

Related documents

These Standards should be read in conjunction with:

- *Instructional Manual on the Humane Killing of Pythons;*
- *Instructional Poster on the Humane Killing of Pythons*;
- *Best Practice Guidelines for Python Processing Facilities*
- *Assessment of Python Breeding Farms Supplying the High-end Leather Industry*

For further information please contact the IUCN/SSC Boa & Python Specialist Group.

2. The Standards

Summary of the Standards

Standard 1: Design and maintenance of facilities and equipment

Facilities and equipment are designed and maintained to ensure minimal interference and stress is incurred by pythons

Standard 2: Staff competency

Staff responsible for handling, restraint and care of pythons are competent[1] and have been inducted in procedures at the python farm

Standard 3: Safety and hygiene

High levels of safety and hygiene are maintained at the python farm

Standard 4: Husbandry protocols and planning to minimise stress and injury to pythons

Procedures for the management of pythons are developed and include prevention and mitigation of possible risks to python welfare

Standard 5: Identification and monitoring of trade compliance

Procedures are in place to gather information for the assessment of python farm production capabilities and ensure compliance with trade legislation.

[1] A person is deemed competent for a task when they can demonstrate current knowledge, skills, attitude, and behaviour to undertake the task.

Standard 1:
Design and maintenance of facilities and equipment

Outcome

Facilities and equipment are designed and maintained to ensure minimal interference and stress is incurred by pythons

Principles

P1.1. The area of the python farm should be sufficient to accommodate the maximum number of pythons held at any one time.

P1.2 The python farm is fenced or walled to prevent escape and access of unauthorised vehicles, persons and animals.

P1.3 Designated areas of the python farm are clearly marked and signposted for their specific task.

P1.4 Design and layout of the python farm takes into account protection of pythons from predators and the weather.

P1.5 Equipment for adequately maintaining, breeding and rearing pythons in captivity is available at the farm and maintained appropriately.

P1.6 Flooring in walkways and work areas is constructed to minimise slipping, falling and injury of staff.

Standard 2:
Staff competency

Outcome

Staff responsible for handling, restraint and care of pythons are competent[1] and have been inducted in procedures at the python farm

Principles

P2.1. Proprietor(s), manager(s) and staff are aware of, and keep, up-to-date information on current national legislation at the python farm.

P2.2 Proprietor(s) and manager(s) ensure there is effective communication with, and supervision of, staff throughout the risk management process.

P2.3 Staff are experienced in the relevant duties to be performed and assessed on a regular basis for competency.

P2.4 Records are kept at the python farm on staff concerning their training and assessment activities.

P2.5 Inexperienced (new) staff undergo induction in current procedures at the python farm, and are trained and monitored under supervision until deemed competent[2].

[2] A person is deemed competent for a task when they can demonstrate current knowledge, skills, attitude, and behaviour to undertake the task.

Standard 3:
Safety and hygiene

Outcome

High levels of safety and hygiene are maintained at the python farm

Principles

P3.1 The policy objective for the python farm includes safety and hygiene and a demonstrated commitment of the proprietor(s) and manager(s) to this objective.

P3.2 A system is in place to assure periodical or continuous cleaning of the python farm and equipment.

P3.3 Cleaning facilities, equipment and products are available at the python farm.

P3.4 Equipment for adequately maintaining pythons in captivity is available, maintained and stored appropriately at the farm.

P3.5 Liquid and solid waste are screened and disposed of in a safe and environmentally responsible manner.

P3.6 At least one first aid kit is provided at the python farm and a system is in place to ensure proper maintenance and effective operation.

P3.7 Staff have a high standard of personal hygiene when working at the python farm.

Standard 4:
Husbandry protocols and planning to minimise stress and injury to pythons

Outcome

Procedures for the management of pythons are developed and include prevention and mitigation of possible risks to python welfare

Principles

P4.1. The policy objective for the python farm includes python welfare and a demonstrated commitment of the proprietor(s) and manager(s) to this objective.

P4.2 Pythons are inspected by staff on a regular basis.

P4.3 An experienced veterinarian is consulted on a regular and needs basis regarding the health of pythons.

P4.4 Pythons are not unduly stressed by excessive noise, chemical pollution or human interaction.

P4.5 Sick or injured pythons are treated immediately and isolated from other pythons.

P4.6 Standard Operating Procedures (SOPs) are in place that ensure pythons are handled, restrained and moved in an appropriate manner with minimal stress.

P4.7 Adequate facilities and resources are available for the well-being of pythons, including:

a) Enclosures
b) Food
c) Water
d) Temperature
e) Breeding

P4.8 Procedures are in place to ensure effective communication between the proprietor, manager(s) and staff.

Standard 5:
Identification and monitoring of trade compliance

Outcome

Procedures are in place to gather information for the assessment of python farm production capabilities and ensure compliance with trade legislation.

Principles

P5.1 Records are kept on the numbers, sexes and origin of adult pythons.

P5.2 Records are kept on the number of eggs produced by pythons annually.

P5.3 Records are kept on the length of python skins.

P5.4 A system is in place to ensure pythons were bred and reared in captivity

3. Implementation of the Standards

Best practice is defined as commercial or professional procedures that are accepted or prescribed as being correct or most effective. In the table below, best practice describes how outcomes of the Standards can be achieved based upon its principles. Best practices also describe the actions and procedures needed to be undertaken to demonstrate that the outcomes of the Standards are being met.

Implementation of Standard 1:
Design and maintenance of facilities and equipment

Principle reference	Principle	Best practice
P1.1	The area of the python farm should be sufficient to accommodate the maximum number of pythons held at any one time.	Pythons kept at the farm have sufficient area to be comfortable. This means there should be no overcrowding at any time during the course of standard management practices. Stocking densities shall be such as to minimise death, injury or disease.
P1.2	The python farm is fenced or walled to prevent access of unauthorised vehicles, persons and animals.	A barrier (greater than 1 m in height) must enclose the perimeter of the python farm. The barrier should contact the ground and be high enough to prevent access of unauthorized vehicles, persons and animals. The barrier may be constructed from materials such as brick, iron, or chain link fencing. It is recommended that a second barrier be constructed around enclosures to ensure contact between pythons and the general public is further minimized (e.g., enclosures situated within a secure building).
P1.3	Designated areas of the python farm are clearly marked and signposted.	Examples of designated areas include: • Proprietor and management office; • Areas for smoking, eating and drinking; • Toilets, showers and sinks; • Storeroom(s) for staff protective clothing; • Storeroom(s) for cleaning products and equipment; • Adult python enclosures; • Rearing enclosures; • Hatchling enclosures; • Isolation room (for sick and injured pythons); • Incubator room; • Designated killing area; and • Waste collection area.

P1.4	Design and layout of the python farm takes into account protection of pythons from predators and the weather.	Pythons are kept in a weather and predator proof area. Python enclosures should be free from direct rain, sun, draughts and excessively damp conditions (e.g. presence of mould).
P1.5	Equipment for adequately maintaining, breeding and rearing pythons in captivity is available at the farm and maintained appropriately.	Equipment used for storing, handling and transporting food should be cleaned and sterilized on a regular basis. Freezers for storing food should be in good working order. Feeding and handling equipment, such as tongs and holding containers/bags must be clean and in good working order. Python enclosures should be designed to prevent injury to the pythons. This includes the use of non-abrasive materials, the provision of adequate ventilation and the absence of materials and structures that may result in injury or entrapment. Python enclosures should be of a size that provides for the normal physiological function of the python. Note: Aggregations of pythons can promote diversity of microclimates within the confines of the enclosure. They can facilitate proper thermoregulation (e.g., pythons may group together to stay warm or humid) but they may also be a sign of stress – too cold or too much disturbance.
P1.6	Flooring in walkways and work areas is constructed to minimise slipping, falling and injury of staff.	Flooring is impervious and constructed of concrete slab, cement or tiles. Flooring constructed of concrete slab or cement may have groves in a 'diamond' pattern to minimise slipping, falling and injury of staff. If possible, the floor should slope sufficiently towards a drain to allow cleaning with water.

Implementation of Standard 2: *Staff competency*

Principle reference	Principle	Best practice
P2.1	Proprietor(s), manager(s) and staff are aware of and keep up-to-date information on current national legislation at the python farm.	Pythons should be kept and treated humanely in accordance with the current relevant national legislation. Python farmers should be authorised to keep pythons in captivity and comply with requirements in accordance with the current relevant national legislation.
P2.2	Proprietor(s) and manager(s) ensure there is effective communication with, and supervision of, staff throughout the	Procedures should be established to assure effective communication between the proprietor(s), manager(s) and staff. Pythons are potentially dangerous animals. The proprietor and manager(s) should ensure there is effective communication and supervision of staff throughout the induction and training process (e.g. when feeding large pythons).

	induction and training process.	Everyone should be sufficiently informed about the operation of the python farm. This may include a staff meeting with the proprietor and manager(s) once every few months or a notice board for important announcements, training, and introduction of new staff and operating procedures at the farm. Staff should complete an induction checklist and be aware of operating procedures at the python farm. For example, the attainment of a good hygiene and cleaning standards depends on the knowledge of hygiene and cleaning techniques, including personal hygiene.
P2.3	Staff are experienced in the relevant duties to be performed, and assessed on a regular basis for competency.	Competent staff is available to carry out tasks at the python farm, such as handling, feeding and egg collection and health care. At least one staff member should be competent in the appropriate skills for the task at hand. Staff is regularly assessed to ensure they are competent and on-going training needs of staff are regularly identified and addressed.
P2.4	Records are kept at the python farm on staff and their training and assessment activities.	Each staff has a record file that is kept up to date and includes information such as: • Contact details; • Emergency contact details; • License numbers (if applicable); • New staff induction checklist; and • Experience, training and assessment activities undertaken.
P2.5	Inexperienced (new) staff undergo induction in current procedures at the python farm, and are trained and monitored under supervision until deemed competent[3].	A system is in place that ensures staff receives adequate instruction and training. Inexperienced (new) staff are not permitted to handle or feed pythons without the direct supervision of competent staff. All staff must have completed an induction checklist before commencing employment. The induction checklist should be signed and dated and submitted to the proprietor(s) and/or manager(s) and be kept in staff records. Direct supervision of inexperienced (new) staff by competent staff occurs for tasks such as restraint, handling and feeding of pythons until competency is demonstrated. Where staff is observed to be undertaking these tasks incorrectly, corrective action is taken *immediately*.

[3] A person is deemed competent for a task when they can demonstrate current knowledge, skills, attitude, and behaviour to undertake the task.

Implementation of Standard 3: *Safety and hygiene*

Principle reference	Principle	Best practice
3.1	The policy objective for the python farm includes safety and hygiene, and a demonstrated commitment of the proprietor(s) and manager(s) to this objective.	The python farm has a policy statement for safety and hygiene. A policy statement demonstrates that the proprietor(s) and manager(s) have made a commitment to providing an environment that promotes good standards for safety and hygiene and a system is in place to review operating procedures. An example policy objective for safety and hygiene may include: • Considers safety and hygiene an integral part of the success of the python farm and is committed to providing and maintaining a safe and healthy working environment for staff and pythons; • Will, as far as reasonably practicable, eliminate or, where this is not reasonably practicable, manage safety, hygiene and hazards to prevent all injuries, illnesses and dangerous incidents; • Is committed to creating a working environment that supports and encourages injury prevention and healthy lifestyle; and • Considers staff wellbeing, safety and injury prevention to be vital to the ultimate success of the python farms operations and productivity and is an integral part of management's responsibilities.
P3.2	A system is in place to assure periodical or continuous cleaning of the python farm	The python farm facilities and equipment are cleaned on a periodical or continuous basis to maintain a high standard of safety and hygiene. For example, python enclosures should be kept free from leftover food and solid faeces through daily inspections (spot cleaning) and cleaned thoroughly once a week. If substrates are used, these should be replaced on a regular basis. Facilities and equipment can be disinfected with household bleach (15% solution with water) before rinsing thoroughly. (NOTE: strong chemicals should not be used to clean python enclosures, or at least used in moderation and with extreme caution.) Chemicals and procedures for their use should comply with national agricultural and environmental legislation and guidelines.
P3.3	Cleaning facilities and products are available at the python farm for staff use.	Staff has access to cleaning facilities and products to wash their hands and arms before, during and after work at the python farm. Staff has access to cleaning equipment and products to periodically or continuously clean the python farm facilities and equipment. Cleaning products may include liquid hand soap/sanitizer and household bleach.
	Equipment for maintaining	Staff shall be provided with personal protective clothing and equipment (e.g., protective gloves for handling, tongs

P3.4	pythons in captivity is available, maintained and stored appropriately at the farm	for feeding). Equipment should only be used at the python farm, and not for other activities outside the premises.
P3.5	Liquid and solid waste are screened and disposed of in a safe and environmentally responsible manner.	Liquid and solid waste are not disposed of directly into water bodies, such as lakes, creeks, rivers and streams that may cause environmental and health contamination. Liquid and solid waste are disposed of to minimise pests (insects, rodents and other animals) that may carry disease. Liquid and solid waste may be screened and collected for further use (e.g. fertilizer). Solid waste may disposed of using simplified degradation systems, such as composting, digestion and wet rendering.
P3.6	At least one first aid kit is provided at the python farm and a system is in place to ensure proper maintenance and effective operation.	At least one first aid kit is provided at the python farm. All staff must be able to access a first aid kit. A first aid kit should be immediately identifiable and be kept in a prominent, accessible location to be retrieved promptly when required. A first aid kit should contain an inventory list of the contents so that items may be replaced when necessary. A first aid kit should provide basic equipment for administering first aid for injuries including: • Cuts, scratches, punctures, grazes and splinters • Muscular sprains and strains • Eye injuries Regular checks (after each use or, if the first aid kit is not used, at least once every 12 months) are conducted to ensure the first aid kit contains a complete set of the required items (an inventory list in the first aid kit should be signed and dated after each check). Contents of the first aid kit are checked to be in good working order (i.e., contents have not deteriorated, are within their expiry dates and sterile products are sealed and have not been tampered with).
P3.7	Staff have a high standard of personal hygiene when working at the python farm.	Salmonella and a host of other pathogens can be transmitted between reptiles, their prey and humans. Handling protocols should include hand washing between and immediately after handling pythons. Other ways for staff to improve personal hygiene may include, but are not limited to: • Keep fingernails short and clean; • Tie up long hair; • Wash hands and arms thoroughly and frequently with an anti-bacterial liquid soap and warm water; • Wash hands immediately after using the bathroom; • Wash hands immediately after handling python food; • Wash hands and arms immediately after contact with animals or contaminated (soiled) surfaces; • Report any case of illness or injury immediately; • Use showers daily, especially after work; • Don't litter – put rubbish in the bin; • Maintain your protective clothing as clean as you can; and • Cover minor cuts and abrasions with waterproof dressings and protective gloves or finger guards if only finger is cut.

Implementation of Standard 4:
Husbandry protocols and planning to minimise stress and injury to pythons

Principle reference	Principle	Best practice
P4.1	The policy objective for the python farm includes python welfare and a demonstrated commitment of the proprietor(s) and manager(s) to this objective.	A policy statement demonstrates that the proprietor(s) and manager(s) have made a commitment to providing an environment that promotes good standards for python welfare and a system is in place to review operating procedures. The proprietor(s) and manager(s) have a responsibility to care for the welfare of pythons under their supervision and the python farm has a policy statement for python welfare.
P4.2	Pythons are inspected on a regular basis.	Pythons should be inspected at least once a day by trained staff. Inspections should include: • Spot cleaning and removal of faeces; • Water container refills; • Removal of regurgitated or uneaten food; • Identification and removal of sick, injured or dead pythons; and • Identification of behavioral or physical anomalies (excessive activity, signs of stress, deformations).
P4.3	An experienced veterinarian is consulted on a regular and needs basis regarding the healthcare of pythons.	It is recommended that for good husbandry practices, an experienced veterinarian is consulted regarding the healthcare of pythons. Routine inspections should pay particular attention to general health relating to nutrition and temperature management.
P4.4	Pythons are not unduly stressed by excessive ground vibrations, chemical pollution or human interaction.	Pythons are instinctive animals and therefore more susceptible to disturbances compared to domestic livestock. Staff must be cognizant of a wide range of environmental stimuli that may cause stress. In particular, excessive ground vibrations, chemical pollution and excessive human activity/interaction may result in pythons becoming stressed.
P4.5	Sick or injured pythons shall be treated timeously, and should be isolated from healthy pythons.	Sick or injured pythons are removed from their enclosure immediately and transferred to an isolation area to be treated. Pythons should remain in isolation for the duration of treatment (and occasionally for a period thereafter). If there is no possible chance of recovery, pythons should be euthanised. Staff should be aware of the risks posed by the spread of infection, and access to and from the isolation area should be accompanied by a sanitisation protocol. In the event of an infectious disease outbreak, entire enclosures and populations may need to be isolated, treated and/or disposed of (pythons humanely killed) accordingly (see accompanying *Instructional Manual on Humane Killing of Pythons*).
P4.6	Standard Operating Procedures (SOPs) are in place that ensure pythons are handled, restrained and moved in an appropriate manner with minimal stress.	The handling and transport of pythons shall be planned and executed efficiently, timeously and with minimum stress to pythons. At least one staff must be trained in appropriate techniques to handle pythons. Pythons > 3 m in length must be handled by a minimum of two people. During handling, a dry cotton sock may be placed over the python's head to reduce stress and risk of injury to the python and handlers.

		Pythons should not be given food at least three days prior to handling or moving. Food and water should be withheld during handling and transportation. When handling pythons, the body of the python must be supported at two or more points at all times and the python must not be dragged or dropped. The transportation of pythons by air shall be in accordance with International Air Transport Association (IATA) Live Animal Regulations. Pythons transported by road must be held in suitable sized bags, preferably cotton, such that they have sufficient space to loosely coil inside the bag. Bags should be knotted or tied at the end to ensure the python does not escape. Ensure that no part of the python's body is caught or tangled in the bag when the bag is closed and tied. Bags are free of loose thread or other imperfections that may enable a python to become entangled or injured. Bags are kept dry and out of direct sunlight and away from hot surfaces, as pythons can overheat quickly (i.e., if transported in a truck, they should be suitably covered to protect them from weather). Bags are not piled/stacked on top of each other. Ideally they should be placed individually in rigid containers. Large pythons should be bagged individually but smaller pythons (those < 2m) may be bagged communally. Care should be taken to prevent overcrowding to the point where individuals are unable to move freely around the bag. Hatchlings should not be transported if possible, as they are more susceptible to stress and disease compared to other life stages. Juvenile pythons (> 2 months old) generally present fewer transportation risks compared to hatchlings and are the preferred life stage for establishing foundation stock at new facilities/farms. The transportation of live pythons to established python farms should be accompanied by a quarantine protocol. All new arrivals should be isolated from the main population for at least one month to reduce the risk of transferring infectious parasites and diseases.
P4.7	Adequate facilities and resources are available for the well-being of all pythons, including: a) Enclosures b) Food c) Water d) Temperature e) Breeding f) Egg collection and incubation	**a) Enclosures** The type of enclosure used for pythons will be determined by the size of the individual: **Adult pythons (>2 m SVL):** Male and female pythons may be housed together at a ratio of 1 male to multiple females. Reproductively active males must not be housed together, especially in the case of reticulated pythons, which are prone to violent combat during courtship rituals. Enclosures should be: • Strong and secure, preferably fitted with locks; • Provide living space equivalent to $1m^2$ for every 30 kg of python, with a vertical height of at least 60cm; and • Have a length to width ratio of approximately 2 to 1. Very large pythons (> 30kg) should be housed individually to ensure a safe and controlled environment for

		management purposes and to prevent feeding conflict between pythons, which can result in severe injuries or death. **Juvenile pythons (<2 m SVL)**: Enclosures should be strong and secure to ensure safekeeping from predation (e.g., birds, rodents, small carnivores). This may be achieved by using wire mesh with holes small enough to exclude insects as small as a housefly. Juvenile pythons can be housed communally at a density that allows sufficient floor space for each individual to rest comfortably (i.e., no forced 'stacking'). A recommended stocking density for hatchlings is approximately 100 individuals per 1 m^2. **b) Food and feeding regimes** Pythons should be provided with a nutritionally balanced diet that contains appropriate levels of protein. Waste protein from the agri-food chain is an excellent source of food (e.g. still-born piglets, culled day-old chickens, catfish skins) Meat should be stored in a refrigerator and prepared under hygienic conditions. All surfaces, equipment and utensils used in the preparation of food should be washed with a detergent or detergent-disinfectant. Appropriate amounts of food shall be provided, taking into consideration the season (i.e., during winter pythons may not accept food) and the size of the pythons (i.e., larger pythons can be fed larger meals less often). *See information on python feeding regimes, below.* Food must be thawed prior to being offered to pythons. Cold/frozen food may not illicit a feeding response and can result in a shift in food preference. Ingestion of frozen food can result in death. Vitamins and minerals, such as calcium and phosphorous (for skeletal growth), must be provided if not present in the food. For example, diets comprising boneless pork off-cuts or catfish skins may benefit from bone meal supplements. Food is not contaminated by drugs, poison, other chemicals or pathogens that can affect a python's health. Pythons may be fed whole animals (or parts thereof) or reconstituted protein (e.g. sausages). Food is presented to pythons in such a way as to prevent injury during feeding. Pythons should be able to ingest food without competition from other pythons and without the risk of ingesting foreign articles. Pythons should be separated from each other and/or monitored closely during feeding. Live prey can inflict serious injuries on pythons and should only be fed as a last resort (e.g. unresponsive hatchlings). During feeding, the prey animals should be allowed to roam freely in the python's enclosure for a maximum period of 30 minutes. If uneaten, prey animals should be humanely dispatched and left in the python's

		enclosure overnight. Prey animals may be dispatched by means of blunt force trauma to the head. The killing action should be as vigorous as possible to ensure instant death. It is the responsibility of the proprietor and manager(s) to ensure the humane treatment of live prey animals. Live prey animals held on the facility are subject to similar welfare considerations as pythons. They should be provided with suitable enclosures, food and water prior to being fed to pythons. Rodents may attack pythons and should be monitored closely at all times. Uneaten food shall be removed within 12 hours and discarded. Temperature plays an important role in python digestion and should be considered before feeding pythons. For example, pythons should not be fed during or just prior to heatwaves or cold fronts. **Adult python feeding regime:** It is recommended that adult females be fed the equivalent of 5% of their body weight once every two weeks if expected to reproduce annually. It is recommended that males be fed the equivalent of 3% of their body weight once every two weeks. Overfeeding and underfeeding may result in reduced fecundity Dietary fat content is thought to be an important determinant of fecundity. It is recommended that on a dry matter basis, fat content averages no more than 25%. It is recommended that feed be withheld for at least 4 weeks during the winter breeding season (December in the northern hemisphere). Adult pythons may go without food for prolonged periods (up to two years), provided they are: • Otherwise healthy and in good condition; • Have regular access to drinking water; and • Have constant access to cool temperatures (~ 21°C). Some pythons have a tendency to fast during the extended breeding season, or when environmental conditions are suboptimal. This is natural behaviour and feeding regimes may need to be adjusted accordingly. Under commercial conditions, female reproductive output can be expected to decline after the fifth breeding season. **Hatchling, juvenile and sub adult python feeding regime:** It is recommended that hatchling, juvenile and sub adult pythons be fed the equivalent of up to 20% of their body weight once every five days. Hatchlings must have access to a suitable food source. Some individuals may need to be actively encouraged to start feeding. This is best achieved by manipulating the food item to simulate live prey (i.e. movement, scent and body temperature) or by offering freshly killed prey items. In exceptional circumstances, it may be necessary to

offer live prey animals. Assist feeding (placing the food item in the python's mouth until the natural swallowing response is initiated) and force feeding (pumping or pushing food directly into the python's stomach) are not recommended unless carried out by experienced staff.

Only the most robust hatchlings with aggressive feeding responses (e.g., willing to eat dead food) should be selected for future breeding stock. Future breeding stock should be raised on a diet regime similar to breeding adults to ensure optimal long-term condition.

c) Water

Pythons must have access to clean drinking water at all times and water shall be refreshed regularly. If the mean monthly relative humidity level falls below 50%, additional water should be provided (e.g. misting or larger water receptacles to allow animals to submerge).

Signs of stress, illness and injury in pythons

Physical signs of illness and injury	Physical signs of stress
• Gaping (sitting with open mouth) for long periods of time • Increased or thickened saliva • Paling of the tissues inside the mouth • Prolonged eversion of hemipenes or cloacal tissue after defecation • Swelling of body • Loss of muscle tone/strength • Tremors or shakiness • Difficult or failure to right itself • Scabs or blisters • Head raised upright for prolonged periods (stargazing) • Sneezing and signs of fluid around the nostrils • Excessive shedding • Poor appetite • Diarrhea, particularly if accompanied by atypical odor • Blood in feces	• Poor appetite • Regurgitation • Aggressive behavior (e.g., excessive hissing, striking) • Wounds around the nose and mouth from excessive striking • Excessive activity – constant moving around the enclosure • Consistent clustering in one part of the enclosure (e.g. warm/cool end) • Poor shedding cycles • Note: below 10°C pythons experience extreme cold stress and are no longer able to function normally (e.g., move to warmer part of the enclosure).

		d) Temperature It is recommended that ambient temperatures average 28°C. Pythons must not be exposed to ambient temperatures below 15°C for prolonged periods (more than 12 hours). Pythons shall not be exposed to direct sunlight or an ambient temperature above 35°C, unless they have the option of moving into a cooler microclimate. Pythons shall not be offered food when ambient temperatures fall below 21°C or rise above 35°C for prolonged periods. **NOTE:** Pythons regulate their metabolism and body temperature by moving between microclimates. In a natural setting they may actively seek out temperatures as low as 20°C or as high as 40°C, depending on physiological needs (e.g. feeding, resting, shedding, breeding). Pythons have an optimum digestive body temperature of between 30°C and 35°C but prefer to rest at cooler temperatures between 21°C and 25°C. **e) Breeding** Sexing adult pythons should be carried out by comparing relative size of the tails (males have proportionately longer tails than females) and cloacal spurs (males have prominent, recurved spurs whilst females have shorter, conical spurs). Other techniques may be used (e.g., inverting the hemipenes and cloacal probing) but these techniques can result in injury to the python and should only be carried out by experienced staff. Breeding animals should be relaxed, even when handled and disinclined to hiss or strike. They should display strong feeding responses to a wide range of food types, especially when young. They should be free from deformities and genetic or behavioural defects (e.g. nervous disorders). As a general rule, both male and female breeding animals should be selected from the largest animals in the cohort at the end of the first year (i.e. shortly before the majority are harvested) as size is a good surrogate for virtually all desirable traits. Breeding stock may be selected for skin pattern or colour, but these should be secondary selection criteria. Sexual maturity is a function of size rather than age. In general males mature before females (~12-24 months) and females are only ready to breed in their third season. Males and females should be in good condition with low body fat and good muscle tone. Lean and hungry pythons are more inclined to breed than overweight, recently fed pythons. Males and females should be placed together during the coldest months of the year (October to January) Sex ratios: one male to multiple females (maximum 1 to 4 if there is no rotation) Never put two reproductively active males in the same enclosure. Rotate males on a regular basis to ensure optimal fertility rates (approximately every 7 days) Gestation period is approximately 65 days.

		Females should be provided with a suitable environment to lay their eggs (i.e., warm, stable temperature, high humidity and feeling of security). Water receptacles should be removed from the enclosure shortly prior to the laying period as females may accidentally deposit eggs in the water, especially if relative humidity levels are low. **f) Egg collection and incubation** Pythons should not be unduly stressed during egg collection. It is recommended that a minimum of two staff be present when collecting eggs. Eggs should be collected within 12 hours of being laid. When removing the egg from the enclosure, its orientation must not be changed (i.e. the eggs shall not be turned upside down). The egg should be gently lifted and placed into an incubation receptacle (e.g., polystyrene box). A suitable incubation medium (e.g., vermiculite) should be used to secure the eggs in the incubation receptacle. Eggs may be separated (if freshly laid) or left in a cohesive clutch. Eggs may be marked with a pencil to ensure correct orientation. The incubation environment should be sufficiently ventilated and temperature controlled. The eggs shall not be exposed to dry conditions or direct sunlight, which can lead to dehydration. The eggs shall not be jolted or handled violently. The incubation environment shall be: • at a temperature of 31-32°C; • at a humidity of 90% to 95%, allowing for free gas exchange (oxygen); and • with no free water. Females may be allowed to carry out maternal (natural) incubation provided: • Relative humidity and ambient temperature parameters are slightly less than artificial incubation (i.e.,~85% and 28°C respectively); • Females are housed individually; and • Females are in good condition prior to and immediately after laying. Burmese and reticulated pythons are capable of thermogenesis during incubation and are highly capable of incubating their own eggs. Success rates for artificial and natural incubation are similar provided climatic conditions are stable (e.g., no unusual weather events) The incubation period for the eggs is approximately two months for Burmese pythons and two and a half months for reticulated pythons Hatchlings shall be transferred to an appropriate environment that is similar to the incubation environment (e.g. warm, high humidity). Hatchlings can be offered their first meal approximately 72 hours after hatching (once they

have completely ingested the yolk sac) and no later than shortly after their first shed (~2 weeks). Hatchlings are susceptible to stress and disease and therefore must be handled gently without sudden movements. Hatchlings shall be monitored for any disease (and if disease is noted, humanly killed - see accompanying report *Instructional Manual on Humane Killing of Pythons*).

Artificial Incubation	Natural Incubation
Eggs collected within 12 hours of being laid Do not change orientation of egg when removing from nest (mark egg with a pencil to show top) Eggs may be separated or left in a cohesive clutch depending on how soon after laying they are collected. Do not try to separate eggs once they are stuck together. Gently place egg or clutch in incubation receptacle (polystyrene box) on top of sterile incubation medium (e.g., vermiculite) Egg fertility and viability may be determined through candling, whereby a bright light is shone through the egg to reveal a network of blood vessels. Eggs must not be exposed to dry conditions or direct sunlight After egg collection, females can be washed with water and placed in a fresh enclosure to discourage residual incubation behaviour and encourage feeding. The incubation environment should be: • at a temperature of 31-32°C; • at a humidity of 90% to 95%, allowing for free gas exchange (oxygen); and • with no free water. Eggs can tolerate brief fluctuations in temperature and humidity. However, temperatures should not be allowed to rise above 33°C or	The female should appear healthy and reasonably robust post laying. Emaciated animals (those displaying loose skin folks, pronounced skeletal definition) and sick or injured animals should not be allowed to attempt maternal incubation. Incubating females must be housed individually in a sheltered and secluded part of the farm. Incubating pythons should be provided with a suitable incubation medium as a substrate (e.g., coconut fibres, sand). This helps to protect the eggs, control humidity and provide a comfortable place for the female to incubate. Incubating females should have access to fresh drinking water Food should be withheld for the entire duration of incubation Relative humidity levels should be maintained at approximately 80-90% Ambient temperatures should be maintained at approximately 28°C. Hatchlings and eggs that have started to hatch should be removed and

		drop below 26°C. Unless stuck to other eggs, infertile eggs should be removed from the incubator. (Note: Decaying eggs don't necessarily impact healthy eggs). Suboptimal incubation conditions may result in embryo mortality or weak hatchlings (e.g., deformed, small). Neonates may be assisted during the hatching process by creating a small slit in the top of the egg once it has reached full term. The incubation medium shall be used once only for the incubation of the eggs and shall be discarded after the eggs have hatched.	placed in the hatchling enclosure as soon as possible.

Implementation of Standard 5:
Identification and monitoring of trade compliance

Principle reference	Principle	Best practice
P5.1	Records are kept on the numbers, sexes and origin of adult pythons held on the farm.	Records should be kept on the number and sexes of breeding stock held on the farm. This may be loosely defined as animals over 10kg (Note: pythons may reach sexual maturity below this size, but the majority of breeding females will be over 10kg). Information on where these pythons originated should also be maintained (e.g. name and contact details of farm where they were bred/sourced).
P5.2	Records are kept on the number of eggs produced by pythons	Records should be kept on the number of eggs laid at the farm and number of hatchings produced each year. Eggs shells should be retained and stored safely for a minimum of one year.
P5.3	Records are kept on the length of python skins.	Once air-dried, the length of python skins produced by the python farm is recorded (snout to vent length in cm). This information provides a means of auditing farm outputs (skins) against legitimate inputs (captive bred stock)
P5.4	A system is in place to ensure pythons were bred and raised in captivity	The proprietor(s) and managers of the python farm should take steps to verify the legality and source (i.e., captive-bred) of pythons held at their facilities. This can be achieved through detailed record keeping or tagging procedures, breeding non-wild type pythons (e.g., rare skin colour or pattern mutations), or through more sophisticated methods such as genotyping or stable isotope technologies.

4. Appendices

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Definitions and acronyms

Competency A person is deemed competent for a task when they can demonstrate current knowledge, skills, attitude and behaviour to undertake the task. Note: Evidence of competency is considered to include (1) on-the-job training (including induction training) for the tasks required, (2) demonstration of relevant/previous experience, (3) formal or recognised training, (4) records of training/supervision and/or sign off by supervisor.

Euthanasia Derived from the Greek terms *eu* meaning good and *thanatos* meaning death. The term is usually used to describe ending the life of an individual animal in a way that minimizes or eliminates pain and distress. A good death is tantamount to the humane termination of an animal's life.

Humane killing Actions undertaken to euthanase an animal that results in rapid loss of consciousness and death of the animal that avoids or minimises pain and distress.

Injury Any wound or damage to the body resulting from an event in the work environment.

Processing Facility Premises used for the slaughter of snakes and production of meat or meat products for human and/or animal consumption.

Standard Operating Procedures (SOPs) Detailed instructions for carrying out specific, repetitive tasks. For example, SOPs may describe how equipment will be used, how measurements will be taken or how operating procedures are undertaken.

Stress A response that activates behavioural, physiological and/or psychological coping mechanisms.

Unconsciousness Loss of individual awareness. Occurs when the brain's ability to integrate information is blocked or disrupted.

Verification The application of methods, procedures and other evaluations, in addition to monitoring, to determine compliance.