

## Preliminary Model of Field Capture Kit for Emergency Use by Sumatran Rhinoceros RPU

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### *Proposed Concept for Field Capture Kit of Sumatran Rhino*

Today the Sumatran rhinoceros (*Dicerorhinus sumatrensis*) is considered one of the most endangered large mammals on earth with fewer than an estimated 300 animals remaining. Poaching for the animal's horn has resulted in their precipitous decline throughout Southeast Asia, with habitat loss a secondary factor contributing to population reduction and isolation. Sumatran rhinos continue to face increasing threats from human presence in the forest. The snare is one common form of poaching, and has caused significant impacts on the Sumatran rhino through injury and death. In most situations, members of the RPU will be the first lines of contact with a snared rhino or similar emergency. One or perhaps a few RPU's could be trained in the use of darting equipment and be provided a "FIELD KIT" complete with a pre-measured dose for a quick and safe anesthetic protocol for an adult Sumatran rhinoceros. In the event of a rhino emergency in the field (i.e. snared animal, etc.), the trained RPU could potentially act before other qualified help (often hours or even days away) could arrive at the scene.

### *Contents of FIELD KIT*

- 1) A short detailed instruction sheet in **English and Bahasa** with diagrams clearly outlining dart loading, delivery and pistol/pole syringe use.
- 2) RED labeled and pre-measured syringes with the two anesthetic drugs to be used for the sedation: Butorphanol and Azaperone.
- 3) A separate syringe containing the reversal agent (Naltrexone) labeled in GREEN that would be given following completion of snare removal or emergency care.
- 4) Several appropriate darts and needles with short easy to understand instructions and diagrams detailing dart loading and delivery.
- 5) Small pistol for delivery of dart to rhinoceros.
- 6) Gloves and dart/needle safety container.
- 7) Cable cutters or appropriate wire cutters for snare removal.
- 8) Topical disinfectant and triple antibiotic ointment to both clean and topically treat any snare-related injuries.
- 9) Pole syringe and appropriated syringes for hand-injection in situations where the dart pistol would be difficult to use.

### *Field darting protocol for rescue of snared or severely compromised Sumatran rhino*

**NOTE: The following drug dosages are preliminary as further investigations are needed to make appropriate recommendations for field use.**

#### **Sedation for snare removal**

<u>Drug</u>	<u>Dose</u>	<u>Total mg dose for ~ 600 kg</u>	<u>Dart volume</u>
Butorphanol	100 ug/kg IM	60 mg IM	6.0 ml
Azaperone	130 ug/kg IM	80 mg IM	0.8 ml

OR

#### **Recumbency for emergency treatment**

Butorphanol	150 ug/kg IM	90 mg IM	9.0 ml
Azaperone	170 ug/kg IM	100 mg IM	1.0 ml

Antagonism of butorphanol:

Naltrexone                    5 x butorphanol mg dose                    300 - 450 mg IM  
(partial dose IV if needed)

Dart volume:

If butorphanol concentration = 10 mg/ml then 60 mg is 6.0 ml

If azaperone concentration = 100 mg/ml then 80 mg is 0.8 ml

This would make a total dart volume of 6.8 ml (or 10.0 ml for recumbency)

This drug volume could be placed into a 10 ml Telinject or Daninject dart. The above dose is greater than that generally needed to sedate captive rhinos due to the increased stress and excitement of darting wild rhinoceros which can lead to overriding of drug effects. The above protocol should work well as a starting point for field rangers to have as part of a "field emergency kit" in case they need to make timely intervention as part of a conservation patrol (i.e. snare removal, etc.). Higher doses can be used to produce more marked sedation or produce recumbency as deemed necessary by the RPU team by following the guidelines outlined above.

*Narcotic Safety and Potential for Abuse*

While the combination of butorphanol and azaperone is considered very safe in rhinoceros compared to other narcotics, the butorphanol agent is an opiate derivative that could have significant effects if inadvertently injected into a human subject at these volumes. Based on this risk, the reversal drug (Naltrexone) should always be on hand and ready for administration to any victim should an accident occur. The Naltrexone dose that has already been pre-measured for use in the rhino should immediately be injected into the muscle of a human should an accidental exposure to butorphanol occur. Although abuse potential of these agents is low, these kits should be locked and placed under the supervision of the RPU leader only.

*Field darting protocol for rescue of free-ranging Sumatran rhino*

**NOTE: The following drug dosages are preliminary as further investigations are needed to make appropriate recommendations for field use.**

**Anesthesia for capture of free-ranging Sumatran rhinoceros**

<u>Drug</u>	<u>Dose</u>	<u>Total mg dose for ~ 600 kg</u>	<u>Dart volume</u>
Etorphine (M99)	3 - 5 ug/kg IM	2 to 3 mg IM	0.2 - 0.3 ml (using 10 mg/ml M99)
Azaperone	130 ug/kg IM	80 mg IM	2.0 ml (using 40 mg/ml Azap.)
Hyaluronidase		5000 IU	Reconstitute with above

The above protocol is provided as an alternative to use of the pit-trap for capture of the Sumatran rhinoceros when its use is not feasible. This protocol is NOT intended to be used in place of the pit-trap as the latter method is still considered the safest method for capture of free-ranging Sumatran rhinos. Since these drugs are dangerous to both the human handlers and the subject animal, this drug protocol should only be used by an experienced wildlife capture and veterinary team. However, these drugs provide the most consistent, reversible and rapid recumbency possible in order to expedite field capture of African and Asian rhinoceros species. A rapid recumbence will be critical to safe capture of a species such as the Sumatran rhino that may escape into the forest after darting and also be prone to both loss and other risks such as drowning. A capture system that employs a radio transmitter dart,

containing a transmitter that stays with the darted animal, may be important to insure that the animal can be located quickly in the thick rainforest environment.

*Full Antagonism of etorphine:*

Naltrexone	50 x etorphine mg dose	100 - 150 mg IM (partial dose IV if needed)
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**Options for sedation / tranquilization to facilitate safe translocation**

- 1) Partial reversal of narcotic effects with agonist-antagonist such as Nalorphine (without prior reversal with Naltrexone).  
Nalorphine 5 to 10 mg IV
- 2) Full reversal of narcotic with Naltrexone (see below) followed by sedation with Azaperone or Butorphanol (see doses above for sedation) for crating and translocation.  
Azaperone 100 to 150 mg IM (or to effect)

# SUMATRAN RHINO CAPTURE & TRANSLOCATION GUIDELINES

## Protocols for Sumatran rhino field capture, translocation or relocation

### *Overview of Capture Process*

The capture process for an "at risk" Sumatran rhinoceros found wandering within an Indonesian village or otherwise outside a protected area should be approached with the following guidelines in mind. Once the appropriate National Park, RPU and SRS staff have been contacted the following stepwise approach to capture and translocation is suggested.

### **Step 1 SECURE AREA**

The first priority in the event of a wild rhino found outside a protected area would be to secure the area from villagers to prevent the animal being shot or otherwise killed before capture or relocation of the rhino is possible.

### **Step 2 MAKE A PLAN FOR RHINO DISPOSITION**

If possible, a small core-group of decision makers should be formed (ie. head of National Parks, RPU and SRS) to make immediate decisions about rhino disposition. If the rhino is apparently unharmed and close to a protected area (<10 km) then it would be desirable to attempt to push the rhino back into the forest. If the animal is injured or otherwise in need of medical attention or is far (>10 km) from the forest a decision should be made to capture the animal.

### **Step 3 MAKE A PLAN FOR RHINO CAPTURE**

Considering the high risks associated with capture by the "chase to exhaustion" method (ie. rhino is captured following extensive chasing and stress without the use of routine capture methods such as veterinary drugs), this approach should be considered only as a last resort. The following suggested capture methods are listed in order of preference:

- **METHOD ONE: Field Capture Using a Dart Gun and Anesthetic Drugs**

If a trained capture team is available (ie. within 3 hours travel time) then it may be wise to have the RPU rangers carefully monitor and secure the rhino from a distance without pushing the animal to run as they await the capture team. The capture team **MUST** include one qualified veterinarian skilled in the use and handling of narcotic agents due to both human and animal safety risks. See the next page for suggested capture drug protocols.

- **METHOD TWO: Field Capture Using a Temporary Boma +/- Sedation**

If a trained capture team is not available, then it may be possible to follow the animal closely (without excessive chasing) until it is located in an area where it is resting and approachable (ie. laying in water or other suitable location). Large sheets of shade cloth or tarp could be used to create a temporary boma surrounding the rhino which would facilitate sedation and crating.

- **METHOD THREE: Chase Rhino Until Exhaustion Followed by Crating**

This approach should be avoided if at all possible because of the high risks of inducing capture myopathy and death in the animal.

## **FIELD DARTING PROTOCOLS**

### ***Darting protocols for snare-removal or rescue of compromised Sumatran rhino***

The recommended protocol for field anesthesia is the butorphanol/azaperone combination due to its inherent safety for both rhino and people unless trained staff is present for use of more potent opioids such as Etorphine (skip to PROTOCOL 2 if trained staff are available). Protocol 1 may require confinement within a temporary boma or some additional restraint via a body or head rope to facilitate crating.

#### **PROTOCOL 1**

##### **Sedation for snare removal or capture of compromised Sumatran rhinoceros**

<u>Drug</u>	<u>Dose</u>	<u>Total mg dose for ~ 600 kg</u>	<u>Dart volume</u>
Butorphanol	140 ug/kg IM	80 mg IM	8.0 ml
Azaperone	140 ug/kg IM	80 mg IM	2.0 ml

*Antagonism of butorphanol (after crating or at unloading):*

*Naltrexone*                      *5 x butorphanol mg dose*    *450 mg IM*

Dart volume:

If butorphanol concentration = 10 mg/ml then 80 mg is 8.0 ml

If azaperone concentration = 40 mg/ml then 80 mg is 2.0 ml

This would make a total dart volume of 10.0 ml

This drug volume could be placed into a 10 ml Daninject dart. The above dose is greater than that generally needed to sedate captive rhinos due to the increased stress and excitement of darting wild rhinoceros which can lead to overriding of drug effects. The above protocol should work well as a starting point for field rangers as part of a "field emergency kit" in case timely interventions are needed as part of a conservation patrol (i.e. snare removal, etc.).

#### **PROTOCOL 2**

##### **Anesthesia for field capture of free-ranging Sumatran rhinoceros**

<u>Drug</u>	<u>Dose</u>	<u>Total mg dose for ~ 600 kg</u>	<u>Dart volume</u>
Etorphine (M99)	5 ug/kg IM	3 mg IM	0.3 ml (using 10 mg/ml M99)
Azaperone	140 ug/kg IM	80 mg IM	2.0 ml (using 40 mg/ml Azap.)
Hyaluronidase (optional)		5000 IU	Reconstitute with above

*Antagonism of etorphine (after crating):*

*Naltrexone*                      *50 x etorphine mg dose*    *100 - 150 mg IM*

NOTE: Since these drugs are dangerous to both the human handlers and the subject animal, an experienced wildlife veterinary capture team should only use this drug protocol. However, these drugs provide the most consistent, reversible and rapid recumbency possible in order to expedite field capture of African and Asian rhinoceros species. A rapid recumbency will be critical for safe capture of a species such as the Sumatran rhino that may escape into the wet rainforest environment and risk drowning or suffer from capture myopathy.

## **REPORT ON THE RESCUE AND EVACUATION OF A FEMALE SUMATRAN RHINO THAT STRAYED OUT OF WAY KAMBAS NATIONAL PARK, SUMATRA, INDONESIA**

On 20 September 2005 a rescue and evacuation operation of a young female Sumatran Rhino was carried out by the staff of the NP, with assistance of teams from SRS, RPU, WCS-IP and PKHS (Sumatran Tiger Program).

The Rescue and Translocation Operation was successful and the rhino, named 'Ratu' is now in the Sumatran Rhino Sanctuary (SRS) in Way Kambas NP, to supplement the captive breeding program for this very rare and highly endangered species. The rhino will need some more time to recover from the stress and exhaustion of her wanderings and subsequent translocation, but a full recovery is expected.

The name 'Ratu' was taken from the name of the village 'Labuhan Ratu' from where she was taken to the SRS. 'Labuhan' means 'city', 'ratu' means 'queen'.

A detailed report of the events and the actions taken, prepared by staff of the SRS, is presented.

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