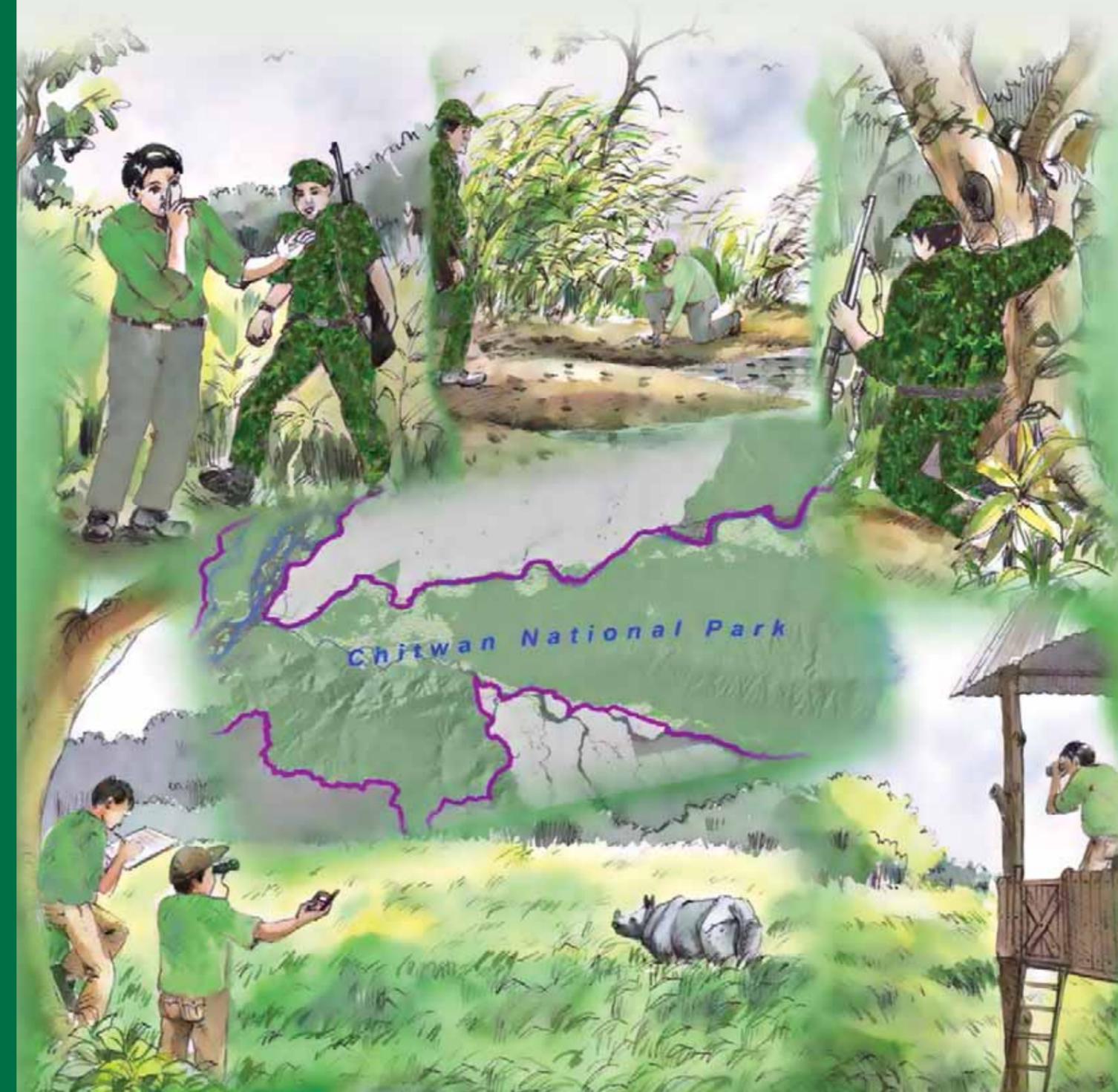


The Greater One-Horned Rhinoceros Monitoring Instructors' Training Manual



IUCN SSC Asian Rhino Specialist Group





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For course details, and to enquire about getting more copies or a pdf version of this manual, please contact IUCN AsRSG, or Department of National Parks and Wildlife Conservation (DNPWC) Babarmahal, or National Trust for Nature Conservation (NTNC), Khumaltar or World Wildlife Fund (WWF) Nepal Program, Baluwatar, Kathmandu, Nepal or Zoological Society of London (ZSL)

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MONITORING GREATER ONE-HORNED RHINO



Introduction to the IUCN SSC AsRSG Rhino Monitoring Course



The Greater One-Horned Rhino Monitoring Training Course

Who is it for? This course provides the necessary information, suggested training methods and material for training frontline staff (rangers and game scouts) in the monitoring and protection of rhino and their habitat.

What does it do? It focuses on training frontline staff to undertake effective patrol and tracking for anti-poaching and monitoring, and to accurately record information on rhino. Integrated anti-poaching patrol and monitoring is widely seen as vital to the proper conservation management of these endangered animals and their habitat.

The course is modular and provides training in the following:

Modules

1. Conservation background
2. Rhino biology and behaviour
3. Patrol, tracking and anti-poaching techniques
4. Map Work and GPS
5. Binoculars
6. Photography
7. Ageing rhino
8. Sexing rhino
9. Identification features and use of the rhino sighting booklet
10. Use of field patrol recording booklet
11. Staff health and hygiene



Introduction for Instructors

Security Goals ■ Protection of rhino and their habitat is crucial to success in their conservation. A key component of any successful park / wildlife conservation strategy has to maintain poaching at manageable low levels; whilst at the same time discouraging potential criminals by maintaining a high rate of success in investigating and prosecuting poaching and wildlife related crimes, and doing everything possible to maximise the chance of courts handing down stiff deterrent sentences. The increased involvement of local communities in conservation efforts can also assist protection effort.

Monitoring Goals

- The aim of rhino monitoring programmes is to obtain information to manage populations and their habitats wisely. Specifically, monitoring data collected on rhino provides estimates of population size, population age and sex structures, calving rates (female breeding performance) age / sex specific mortality rates, distributions and home ranges.
- A programme of ongoing rhino sightings, which includes a register of recognisable animals, and where needed a record of sightings of clean or unrecognisable rhino is therefore required to provide invaluable information for management.
- Rhino sighting and law enforcement data can guide patrol deployment and increase protection as well as provide measures to assess performance either through providing a complete record of the population on an ongoing basis, or by allowing accurate estimates of population size, performance and structure by incorporating mark-recapture procedures.
- The basis of any rhino monitoring approach should be that it provides the quality of information needed to meet the objectives of the monitoring programme. However, this will depend on the expertise, personnel, time and finances available for monitoring. A successful monitoring approach must form a match between required data quality and available resources.
- Rhino monitoring requires properly skilled and motivated staff, a system of control on data quality at observer and data recording level, and the support of the conservation management structures. The plight of the rhino has captured the concern and interest of many conservation personnel, from the decision-makers to the foot-slogging frontline staff; while this monitoring approach promotes the development of a keen knowledge of and feeling for rhino, which has helped to motivate further those involved.



Integrating Monitoring with Routine Security Patrolling



The security of a park or reserve is a function of the chain of command from the Officer-in-Charge through the Section or Area Ranger to the game scouts.

Integrating their routine security function with a biological monitoring technique has many advantages.

On the one hand, rhino (and other wildlife) monitoring provides a motivating and coordinating framework for the field patrol work, which strengthens lines of communication within the command structure and builds teamwork.

At the same time, the wide patrol coverage needed for security surveillance increases the encounter rate with rhino (and other wildlife), enabling valuable data to be collected.



Training objectives

Whatever the nature of the monitoring team, their success depends on them gaining high standards of observational and data collection skills. Formal training of personnel can greatly accelerate the process of acquiring such skills.

The training programme encompasses a minimum set of objectives.

Objectives: As a result of this training, each trainee should be able to:

- undertake effective patrols,
- locate and observe rhino in the field,
- observe and record basic information on population structures,
- discriminate and record recognition features of individual animals,
- maintain a high level of motivation and an understanding of the purpose of the security and monitoring programme.



The Design of this Training Course

This training course is designed for use directly in operational situations, that is, to be integrated within the normal management structure of the park or reserve. Training 'on site' has the advantage that trainees do not have to be removed from the field for any length of time, which may otherwise compromise daily duties and reserve security. Training can instead be combined with other routine functions, making both the training and the patrol and monitoring function as part of management.

The alternative is to bring in outside instructors or attend a training school. Besides disrupting daily duties and increasing costs, this results in the loss of personal contact and continuity provided by an in-line instructor.

Staff turnover and inexperience are likely to be the main weaknesses of any training approach, and this training programme seeks to overcome these problems by:

- Ensuring each component of the training course is a stand-alone module, so that a new trainee can join into the training course at any stage, without having to know things from other modules.
- Providing standardised training materials. Each instructor is given a self-contained package of training resource materials. This ensures that correct information is conveyed, and in a standardised format.
- Suggesting methods. Instruction is essentially a function of an individual's personality. The course suggests methods that are known to work, yet allows the flexibility to let instructors communicate a concept in their own way.
- Providing background material for the instructor. Training courses for instructors could also be conducted, but in the absence of specific training for instructors, the rationale for each component of the training course is clearly stated.



The Training Programme Package



The training programme has been designed as a self-contained package. Most of the materials necessary for training to be conducted in the field or at a central location are contained within the package. Some specific items are however required to be obtained by the instructors for some modules.

The basic package consists of the following:

- Instructor's Handbook comprising of an introduction, 10 course modules and an appendix.
- Set of laminated posters.
- Master copies of field recording forms for photocopying.
- A master copy of Ranger/Field Scout's booklet.
- Trainees evaluation tests for each module.



The Course Modules

There are **10 modules**, designed to achieve the objectives of the training programme:

Module 1: Conservation Background

[Problems currently faced in rhino conservation; the need for conservation and protection programmes; the role of the frontline staff]

Module 2: Rhino Biology and Behaviour

[Greater one-horned rhino physical and life-history features, daily activity and other behavioural characteristics]

Module 3: Patrol, Tracking and Anti-Poaching Techniques

[Patrol methods for rhino monitoring and law enforcement]

Module 4: Mapwork and GPS

[Map reading, location of a patrol/position or animal using a map; function of GPS; handling and care; how to use GPS to obtain location of a patrol/position or animal; how to analyse information]

Module 5: Binoculars

[Function of binoculars; handling and care; how to use binoculars for observation of wildlife]

Module 6: Photography

[Function of camera; handling and care; how to use cameras for monitoring rhino and other wildlife]

Module 7: Ageing Rhino

[Importance of accurate ageing: discrimination of age-classes]

Module 8: Sexing Rhino

[Importance of positive sexing; discrimination of sexes]

Module 9: Identification Features and Use of Rhino Sighting Booklet

[How to record rhino ID features, distinguish between ID and clean rhino and how to use the field rhino recording booklet]

Module 10: Use of Field Patrol Recording Booklet

[How to record patrol movements, illegal activities, animal sightings and mortalities in the field patrol recording notebook]

Module 11: Staff Health and Hygiene

[Changing the behaviour of frontline staff towards safe hygiene practices]



Structure of an Individual Course Module



Each module contains the following sections:

Rationale	This outlines to the instructor the background to each course module. It also draws the instructor's attention to the problems, which he/she may face during instruction.
Purpose	It is absolutely essential that training objectives are clear. This is what the training hopes to achieve. Put another way, each trainee should possess these skills when he has successfully completed the module.
Learning Assumptions	This describes the minimum standards which must have already been achieved by a person attempting the module.
Specific outcomes	This lists the individual parts of the module against which the learner will be assessed during the course.
Assessment criteria	Evidence which will be required in order for the learner to be assessed as competent in the module. The learner's competency in each specific outcome will be assessed. The learner will demonstrate his competency through written and practical tests.
Performance system	Formal tests for each module are included, as part of the training material and the trainee needs to obtain a high mark to pass the module. The real test, however, is in the field, where the trainee has to integrate the various components of his training. One method is to allow all trainees to conduct a patrol and record data individually, and then to conduct a general de-briefing session.
Equipment	A list of necessary equipment is provided. The posters with this training package provide pictures that re-enforce the content. They are also reproduced in the trainee workbooks and can be copied as posters to put up in field outposts or kitchens, and thus continually reinforce training. The posters are laminated for durability and so that they can be written on during the training session with non-permanent marker pens. The posters need to be kept out of direct sunlight as sunlight will make them fade. Paper and electronic copies of the field data recording forms are also provided which can be photocopied or printed for use during the practicals.



Course Flexibility and Further Development

- The training course is designed to provide basic training under conditions where instructors work with trainees in the field.
- To achieve this and to make it widely applicable, the training package has to be fairly unsophisticated.
- Instructors can introduce variation or include more specialised training aids e.g. video material.
- The success of training depends upon the motivation of the instructor, and his sensitivity both to the field situation and the people he is training.
- As the training proceeds instructors will be able to contribute their experience to the further development of training techniques.
- It will also be possible to include additional material, e.g. video material.



Instructor Skills

The field officer or experienced ranger or experienced staff play a key role as the instructor and co-ordinator of training. To perform this function, they require the following basic skills:

- **Personal experience in the field.** They must have the ability to conduct effective anti-poaching and monitoring patrols, locate animals and observe and record in the field.
- **Leadership qualities.** They must have the ability to motivate and inspire confidence in their staff.
- **Communication skills.** They must have the ability to convey information to their trainees and evaluate their response.



Training Method



- Each component of the course should be dealt with at a separate training session. It is essential not to tackle too much at once. This allows for time for discussion, for the elimination of confusion, and for time to reinforce what has been learnt. The course should proceed at the pace of the slowest.
- Training field staff will actually involve adult learning, or self-development and growth, rather than teaching. Keep this in mind and repeat it to the course participants from time to time. Adults have experience and can help each other learn, so that peer-group instruction can form a useful part of the training programme.
- All people learn best by active involvement and participation, and by knowing why they are learning something. Although some lecturing by the instructor will take place most of what people only hear is soon forgotten, and listening gets boring. Thus, keep lecture sessions short, and have activity sessions or feedback sessions often, to allow participants to actively learn.
- We recommend that when possible, the trainees should sit together round a table with the instructor, to form a learning team, rather than have the instructor standing in front of the class. The posters and other material supplied can be laid out on the table, passed around and discussed more interactively while the lecture is in progress. Each participant needs to feel necessary and involved.
- Training methods have been designed to be conducted with minimal facilities. The training materials are durable, portable and can be used without electrical equipment, if necessary.



Teaching a Course Module

The following key points will help in teaching the modules:

- **ORGANISE** carefully all the material you need to teach a module before you start presenting (posters, notes, pencils, writing pads, large sheets of paper, etc.).
- **PRACTICE** before presenting and make sure you fully understand all the material. Lots of practice makes it perfect.
- **SUMMARISE** what you are going to teach on small individual cards, which you can use again and again. This just needs to be bullet points or key words.
- **DO NOT** read from lots of text.
- **USE** the teaching posters as they are an excellent way to put your points across.
- **USE** dynamic body language (e.g. acting out examples, give practical demonstrations), make it fun/interesting.
- **DO NOT** go on and on about something and bore your trainees! Once they understand, move on.
- Talk to your **WHOLE** group of trainees **NOT** just one or two individuals. Try to look at them in the eye.
- Make the teaching **INTERACTIVE**. Ask questions and use local examples and experience. Let them talk/discuss things and tell you things they might know – do not “lecture” too much.
- Use a large piece of paper to write on and **EMPHASISE KEY POINTS**.
- **TEST** your trainees to assess whether they have understood you.
- If you do not know the answer to a question from one of the trainees, **DO NOT** make up an answer but explain that you will obtain the correct information and let them know as soon as possible.
- **RECAP** and **SUMMARIZE** main things covered in the course.



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Zoological Society of London

MONITORING GREATER ONE-HORNED RHINO



Module 1 Conservation Background

RATIONALE

- The field scouts and their officers involved in rhino monitoring have a major contribution to make to rhino conservation, and should be aware of the wider issues involved in rhino conservation.
- They should see they are part of an Asia-wide team, and develop a sense of working towards a common goal.
- Each participant should identify with the monitoring programme, know the importance of his/her contribution, and be aware of his responsibility to the wider community.
- Each participant should know that as the data being collected provides important information on which conservation decisions will be made - data quality and standardization is essential.
- Trainees should recognise the importance of the involvement of the local community in conservation.

PURPOSE

This module gives frontline protection staff and those involved in rhino monitoring the following background information:

- The problem with rhino — why rhinos are rare and endangered.
- The live values of rhino, and the need to increase numbers of rhino and protect them and their habitat.
- The role that those protecting and monitoring rhino play in their conservation.
- Why rhinos are monitored, and that the information once checked and analysed is used to make important management decisions.
- That data QUALITY is of paramount importance.



LEARNING ASSUMPTIONS

- No assumptions except that the learner can understand the language the module is presented in.

SPECIFIC OUTCOMES

A person assessed as competent in this module will know.

1. The threats rhinos face and why it is necessary to protect them.
2. Why it is necessary to increase their numbers.
3. The role the frontline staff play for effective conservation of the species.
4. Why rhino are monitored and what the data collected are used for.
5. Why data quality is so important.

ASSESSMENT CRITERIA

Trainees should demonstrate in a verbal or written (depending on trainees' standard of literacy) test e.g. multiple choice, that they know the following:

1

- Greater One-horned rhino were once very numerous but their populations crashed to low levels.
- Loss of habitat and poaching of rhino for their horn, (stimulated by illegal demand), has been the cause of the problem with rhino.
- Rhino horn is used mainly by people in other countries for traditional Chinese medicine and in the case of African rhino also for dagger handles.
- Conservationists worldwide are trying to protect and conserve all of the world's rhino species.

2

- Numbers of Greater One-horned rhino need to increase in numbers as rapidly as possible to minimize impacts of poaching out-break, and problems such as loss of genetic diversity and inbreeding depression, and disease which may reduce performance and may even lead to local extinctions.



- Living rhino have great value. Trainees should be able to list at least 3 of these values in (i) economic development (tourism, job creation, infrastructure development), (ii) their role as part of ecosystem functioning and their value as part of biodiversity as an umbrella species, and (iii) their socio-cultural/natural heritage/spiritual importance.

3. The front-line staff role in:

- Protecting the rhino from poaching,
- Looking out for illegal activities in their conservation area, and
- Collecting information on the rhinos themselves (monitoring) which can be used to further their conservation.

4. That rhinos are monitored to:

- Measure progress towards achieving rhino conservation goals,
- Assess the reproductive health and growth rate of populations,
- Provide the necessary data to make biological management decisions to keep rhino numbers growing at a rapid rate (5% plus and preferably higher) while the maintaining longer term genetic health of the population.

5. That monitoring data is only useful if it is of high quality and is standardised between areas as well as over time (allowing comparison and greater long-term understanding).

To be considered for Master rhino monitor status, a trainee should achieve a score of 80% correct.

PERFORMANCE SYSTEM

It is not essential to have passed this module to be able to become an accredited rhino ID monitor. However to provide the necessary background/context to monitoring this module should be completed by all trainees.

EQUIPMENT

ITEMS SUPPLIED

- Poster 1.1, 1.2, 1.3, 1.4, 1.5, 1.6.

ITEMS NOT SUPPLIED

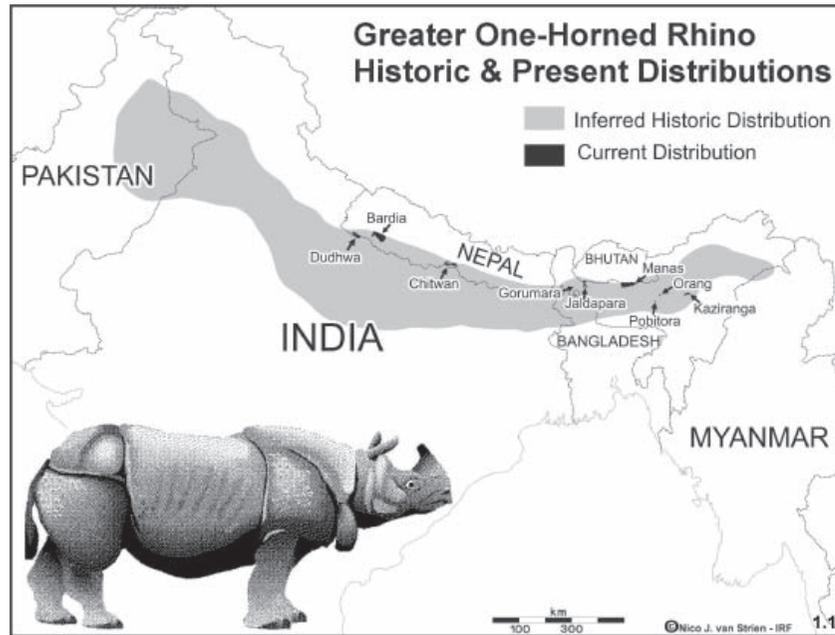
- Hooks on wall or prestick/bluetack for hanging up posters.
- Pencils, sharpeners, erasers, paper for trainees.
- Non-permanent marking pen for writing on posters.



1. Why is there a problem with rhino?

Teaching suggestion

Use **poster 1.1** (below) to show where rhinos historically ranged and now are surviving in just a few pockets of the Terai

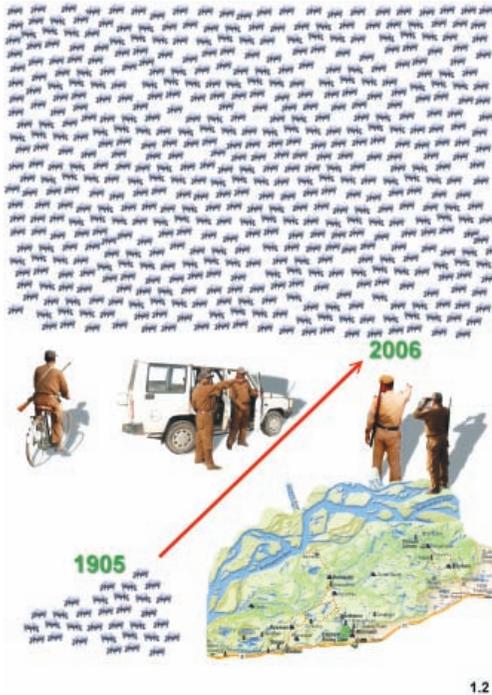


Changes in rhino numbers

The Endangered (as listed by IUCN) Greater One-horned rhinoceros (*Rhinoceros unicornis*) was once abundant throughout the floodplains of the Ganges, Brahmaputra and Sindh Rivers and their large tributaries between Indo–Burmese border in the east and Pakistan in the west. Currently, rhino are restricted to protected areas mainly in India and Nepal. In India, the majority are in Assam (Kaziranga National Park (NP), Pobitora Wildlife Sanctuary (WS) and Orang NP) but also in West Bengal (Jaldapara WS and Gorumara WS) and a few in Uttar Pradesh (Dudhwa NP). In Nepal rhinoceros occur mainly in Chitwan NP but have also been reintroduced to Bardia NP and Suklaphanta Wildlife Reserve (WR). Reintroduced rhino populations in Dudhwa NP in Uttar Pradesh, India and Suklaphanta WR, Nepal, are small with only Bardia NP so far receiving a founder number greater than the minimum 20 recommended.

Greater One-horned rhino numbers have recovered from less than 200 earlier in the 20th century and the total wild population has increased from 600–700 individuals in 1975 to c. 2500 in 2006. Periodic outbreaks of insurgency in parts of its range has often resulted in certain populations being eradicated or reduced significantly. The two major range states, India and Nepal, have invested significant commitment, effort, manpower and resources in protecting and conserving this species.

Teaching suggestion



Use the Kaziranga rhino expansion of numbers **poster 1.2** (below) to illustrate how rhino can be productive under conservation management.

After the wave of wildlife hunting and land colonization that accompanied colonial rule in India, the once widespread Greater One-horned rhino by 1905 may have been down to 10 individuals (as shown in the bottom right of the poster) around Kaziranga, but the population recovered to about 1,850 animals by 2006.

The recovery of numbers in this Park under protection in many ways mirrors the recovery of Southern white rhino numbers. However, in contrast to the Southern white rhino recovery, in the past little attention was paid to biological management or expanding the number of populations and range. As a result there have been few translocations and Kaziranga holds at least two-thirds of the remaining Greater One-horned rhino numbers in the wild. Apart from the strategic dangers of having so many 'eggs in one basket', there are clear signs of a density dependent reduction in population performance and possible habitat degradation following the increase in numbers. The Assam government has therefore recently launched a range expansion project called Rhino Vision 2020, which will use translocations from Kaziranga to re-establish rhino in other parks with the aim of conserving 3000 rhinoceros in Assam by 2020.

Chitwan NP holds the second largest population of the species. Again discuss how habitat loss and poaching reduced numbers from around 1000 to less than 100 in mid 1960s, but that conservationists' efforts to increase numbers had been successful for over 20 years with numbers increasing to 544 by 2000. Rhinos were also translocated during this period to create new populations in Bardia NP and Shuklaphanta WR. However, poaching escalated dramatically following the removal of many of the army anti-poaching units from the park because of the Maoist insurgency in the country. The 2005 census identified only 372 individuals, representing a 31% decrease since 2000. Poaching is still a big threat and more rhino have been poached.



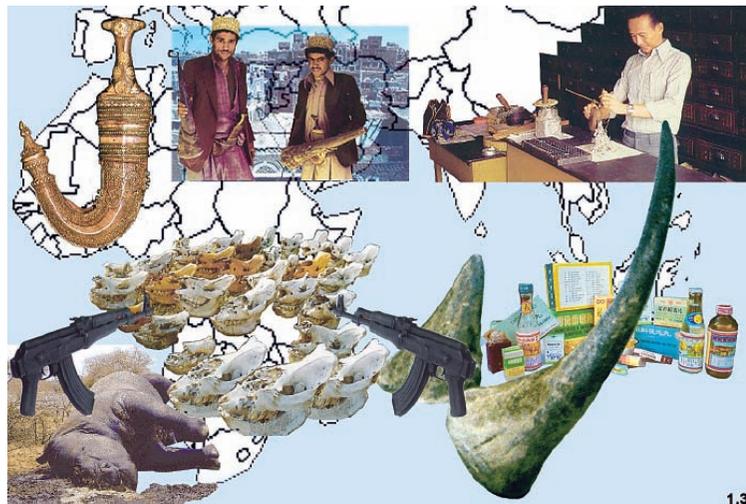
Mention that there are also two other species of rhino in Asia (Sumatran and Javan) that are even less numerous and two rhino species in Africa which are more numerous through conservation efforts.

Illegal demand for rhino horn and its main uses

While the demand for horn remains - the threat of poaching will remain. The demand for Great One-horned rhino horn has been primarily for use in traditional Chinese medicine (TCM). African rhino horn are also targeted for ceremonial dagger handles. This demand has stimulated and fuelled poaching. Contrary to what is written in the press, rhino horn use as an aphrodisiac is minimal: restricted to people from a small tribe in NW India. Dealers working in Asia entice local people (often very poor people) around parks and reserves to poach. They take horn from poachers for a small payment and smuggle it to user countries, selling it on at a much higher price to users. Thus Range countries lose out as they pay the cost of protection, while the bulk of any profits from illegal trading are made in another country. Poachers also face the greatest risk and are exploited.

Teaching suggestion

Use **poster 1.3** (below) when discussing the illegal demand for horn.



In many East Asian countries, rhino horn powder or shavings are used as an ingredient in traditional Chinese/S.E. Asian medicines, and have been so used for many thousands of years. Rhino horn is used for health-promoting tonics and many illnesses. It is particularly prescribed for the treatment of serious fevers.

Clinical trials however have indicated the horn has either no effect or has mild fever reducing properties (similar to taking a very mild Aspirin). Some TCM practitioners who prescribe horn in medicine for their patients believe that for some severe illnesses there is no substitute for rhino horn.



However cow and water buffalo horn are used as substitute medicines instead, and some believe they may be equally effective in reducing blood clotting. The high price of rhino horn, the difficulty in getting it, and the fact that it is now a criminal offence in most countries to use it, means that its use is limited.

In Yemen on the Arabian peninsula, horn is prized for use in dagger handles. The daggers are called *jambiya's*, and are a powerful cultural symbol of tribal status and social standing. They have been used by Yemeni men for over 6000 years. Yemen, at times has been the world's biggest user of horn. The government has tried to halt trade, and in 1997 joined CITES. Cheaper substitutes for rhino horn such as buffalo horn, camel hoof, plastic are used, in the handles, but are not as sought after. Very old rhino horn *jambiya's* are the most prized for their attractive sheen and fine hairline cracks which develop over many decades of handling. In an effort to offer a real high-quality alternative to rhino horn handles, very expensive handles are now being made from the rock agate.

The public in Yemen and South East Asian countries are mostly unaware of the plight of rhino and of the effect of their demand for horn. Better government controls and active education campaigns may reduce demand and thus rhino poaching.

The CITES ban of international trade in rhino horn of all species began in 1977: Countries who have signed the convention must prevent horn trade in and out of their country.

Use a film or video to give some background (e.g. like the National Geographic film *The Rhino War*, although this is now somewhat dated). Use a translator, or provide a translated soundtrack in the appropriate language.



2. Why is necessary to protect rhino and increase their numbers?

Preventing extinction

When rhino numbers are low, a poaching outbreak, catastrophic event (e.g. drought, disease), or genetic problems can eliminate a population or even the species or subspecies forever. Alternatively, when protected and well managed, rhino can easily increase from small numbers to large numbers, helping to ensure the long-term survival of the species into the future.



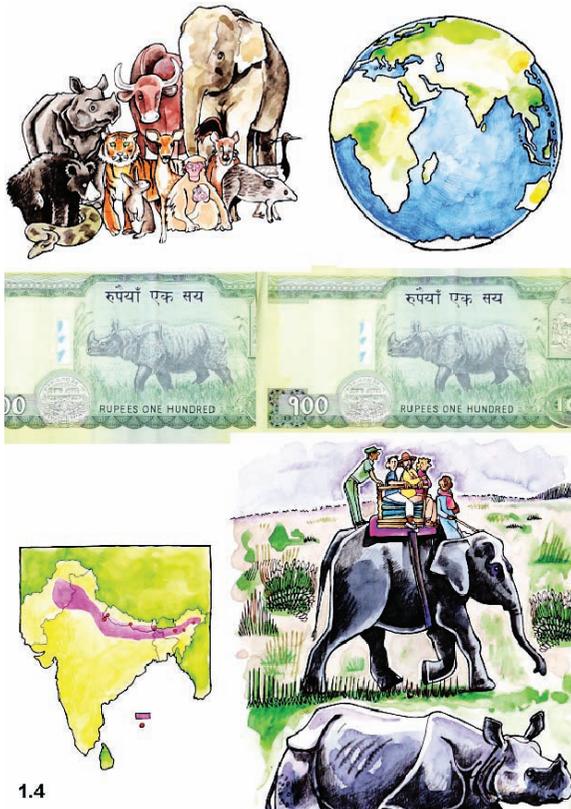
Rhinos are a umbrella species

Rhinoceros, like other charismatic megaherbivores, require large areas to support viable populations. They act as umbrella species for the ecosystems they inhabit because their conservation requirements, by default, encompass those of other smaller species. If rhinoceros can be successfully conserved and protected within an area, then the other species in the area will also benefit. The habitat in the whole area will also be protected.

Rhinos have a value

Rhinos should be conserved as they have value. The various uses and value of rhino are illustrated below.

Expand and develop the idea that rhinos have many values, based on the following values illustrated by **poster 1.4** (below).



1.4

- Cultural, spiritual and natural heritage value of rhino to humans.
- Education of current and future generations.
- Tourism - creating jobs both directly and indirectly. This also benefits the economy by generating foreign exchange (getting foreign money in). Charismatic animals such as rhino are a strong drawcard.
- Infrastructural and economic development, which help improve the lives of communities and generates business opportunities.
- Rhinos also play an ecological role as part of the ecosystem. You could discuss the role rhino dung piles play in creating food and habitat for many creatures, as well as creating nutrient hot-spot sites for the germination of some plant species such as *Trewia nudiflora*. Greater One-horned rhinos can also help create and maintain short grazing lawns which are favoured by other short grass grazers. Rhinos also can create water-holes through their wallowing. Rhinos are also part of planet earth's rich but threatened biodiversity.



3. What is the role of the frontline staff in rhino conservation?

Roles of frontline staff

The frontline staff's duties include:

- Protecting wildlife from poachers.
- Prevent loss, degradation and disturbance of habitat.
- Look out for information on illegal activities in and around their respective area of operation.
- Collecting information about the rhino themselves. Provided the information collected is accurate it can be very valuable in assisting management maintain high rhino population growth rates.

Successes to date in rhino conservation have come through the good security and monitoring efforts of people working in the field. Frontline staff therefore form the back-bone of rhino conservation.

Today's field staff continue to face the challenge of successfully protecting and monitoring rhino and contributing to building up rhino numbers to safer levels in their country. This requires courage, dedication and good team-work among all those committed to achieving this success.

Teaching suggestion

Use **poster 1.5** (below) to discuss the various roles of frontline staffs. Highlight how, with their colleagues in rhino areas throughout Asia, they are an essential part of a vital team effort to care for remaining rhino populations.





4. Why monitoring by frontline staff is so important?

To be successful in football you need both a good defence (rhino protection) and also a good attack that is capable of scoring a few goals a game (biological management of rhinos for rapid growth).

The importance of effective law enforcement

Effective law enforcement is essential to ensure the animals are well protected. Rhino poaching is likened to a fire. Once it has flared up and got out of hand, organised commercial poaching becomes extremely difficult to stop. This is why it is so important to “keep a lid on” poaching, maintaining it at low levels where it can be manageably contained. Successful protection will not only involve reacting after an event or incursion in the field, but importantly include pro-active measures such as regular patrols, use of intelligence networks and getting the support and cooperation of neighbouring communities for the conservation effort.

The importance of rapid growth

Rapid growth is also so important because small increases or declines in rhino performance can translate into many more or fewer rhinos in a short space of time and act as an insurance against poaching. For this reason, all current rhino conservation plans and strategies set a minimum acceptable target population growth. One of the main ways to achieve this is to maintain rhino numbers at productive densities by removing surplus animals and translocating them to set up new populations. The idea is to keep remaining females in good condition so that they can churn out calves at a rapid rate. Rhinos are no different to cows in that reproductive performance is related to condition. If quality food becomes limited then female condition and hence performance can decline.

In order to assess performance, it is necessary to obtain reliable population estimates as well as measures of female reproductive performance (such as age at first calving, inter-calving intervals, the ratio of calves to adult females etc.). By assessing body condition one can obtain another useful measure of rhino health. Recommended strategies for growth require accurate population estimates. Rhino sighting data obtained by frontline staff can ultimately be used to derive this necessary information.

Monitoring also provides a number of other equally useful information.

- Monitoring of law enforcement can be used to guide patrol deployment and increase protection as well as provide measures to assess performance.



- Monitoring of poaching and resource extraction activities helps in developing better protection strategies.
- Changes in habitat conditions need to be monitored for initiating necessary interventions for improving the habitat quality or for restoration of ecological balance.
- Monitoring is also very important following introductions into a new area. This is because the lessons learnt from such post-release monitoring can help guide future translocations. Post-removal monitoring in donor populations can also help increase understanding of rhino biology and should lead to improved guidelines aimed at maintaining the health and productivity of donor populations.

However to be of any use, monitoring data needs to be accurate. For example, unidentifiable (clean) rhino must also be carefully recorded, along with identifiable animals. If this is not done population estimates can be poor. Trainers need to emphasize that to be of any use monitoring data must be accurate. In addition, to facilitate comparisons between ranges and over time such information also needs to be collected in a standardized way (e.g. using standardized age classes and condition assessment ratings).

It is therefore essential that monitoring is not undertaken simply for the sake of monitoring— rather it should be done to provide the very data needed by management to both protect rhinos and assess rhino population performance, and thus make informed biological management decisions aimed at keeping populations healthy and achieving sustainable population growth.



5. Why is good quality data so important?

Rhino monitoring in the field is just the start of the process aimed at managing populations to keep them healthy and productive; whilst contributing to conservation goals.

Monitoring data is useful only if it is of high quality and is standardised between areas as well as over time (allowing comparison and greater long-term understanding).

Data quality is critical. The old adage “*Garbage In Garbage Out*” holds as poor and inaccurate monitoring data may result in poor law enforcement and biological management decisions.



Teaching suggestion

Rhino monitoring in the field is just the start of process aimed at managing rhino populations to keep them healthy and productive whilst contributing to metapopulation conservation goals

Protection staff must ensure that all sightings and signs, direct or indirect, of rhino are accurately recorded.

Use **poster 1.6** (below) to illustrate the value of quality field monitoring by explaining the sequence of actions shown.

The collected data has to undergo a sequence of actions:

- This course concentrates on only the first stage - monitoring rhinos in the field.
- As data quality is so important, it is necessary for staff controlling the monitoring programme (e.g. section rangers or wardens) to check rhino and patrol based sightings for accuracy. Ideally such sightings should have been collected by staff who have been accredited as competent in this course.
- Sighting and other information is then usually captured onto computer using a suitable database programme.
- The data can then be analysed to produce the required indices of patrol effort, illegal activities and population estimates, a number of indicators of population performance (e.g. average inter-calving intervals, ratio of calves/adult females, population growth rates etc.) and habitat suitability maps.
- This information in turn can be used for devising appropriate management actions.
- The end result is hopefully healthy and productive populations, and well managed habitat.



MONITORING GREATER ONE-HORNED RHINO



Module 2 Rhino Biology and Behaviour

RATIONALE

- The observers must have sufficient knowledge about the Greater One-horned rhino and its habitat to enable them to conduct their patrols or surveys effectively and get good monitoring data.
- The rhino can be dangerous, but can also be stressed by careless human approaches.
- The key aim of this module is to use knowledge to give trainees a sense of respect for rhino and encourage them to strive to get good quality data without disturbing the rhino if possible.
- Knowledge of their feeding habits and behaviour can be helpful in tracking down rhino for observation.
- There are also gaps in our knowledge of the rhino. The unique opportunity of being able to observe the animals at close quarters will enable us to fill in some of these gaps, if we know what to look out for.

PURPOSE

A person assessed as competent in this module will know:

- The main physical body features of the Greater One-horned rhino.
- The rhino's social behaviour, reproductive and daily activity patterns.
- The rhino's relationship to other animals in their habitat, and behaviour towards humans if detected.

LEARNING ASSUMPTIONS

- The learner can already use binoculars, which are an essential tool in the field.
- The learner is able to read and complete the forms in the rhino sighting booklet.
- The learner can understand the language in which the module is presented.



SPECIFIC OUTCOMES

1. Using observable body features, frontline staff should be able to quickly distinguish the Greater One-horned rhino from other species.
2. Frontline staff should be aware of the rhino's eyesight, smell and hearing capabilities.
3. They should be able to recognize the spoor and sign of the rhino.
4. They should have some knowledge of each the following aspects of rhino biology:
 - (a) Physical characteristics
 - (b) Daily activity patterns (eating, drinking, wallowing, sleeping)
 - (c) Behaviour (e.g. social, urination, defecation, fighting)
 - (d) Food types
 - (e) Length of pregnancy and inter-caving interval
 - (f) Relationships with other animals (e.g. natural enemies, mynahs)
 - (g) Behaviour when disturbed by humans.

ASSESSMENT CRITERIA

Trainees must get 80% in the theory (verbal or written) and in practice. Some of the areas the trainees need to get full marks are

- Trainees must correctly indicate whether the rhino can see well or poorly, or hear well or poorly.
- Trainees must identify 4 or more different kinds of signs made by a rhino. This must be tested in a field situation.
- Trainees must give the correct name of the activities shown in the pictures (poster 2.2).
- Trainees must correctly summarize the main food types of rhino.
- The correct multiple choice answer must be given to indicate the length of Greater One-horned rhino pregnancy and average range of interval between calves.



PERFORMANCE SYSTEM

It is not essential to have passed this module to be able to become an accredited rhino ID monitor. However to provide the necessary background/context to monitoring this module should be completed

EQUIPMENT

ITEMS SUPPLIED

- Poster 2.1, 2.2.

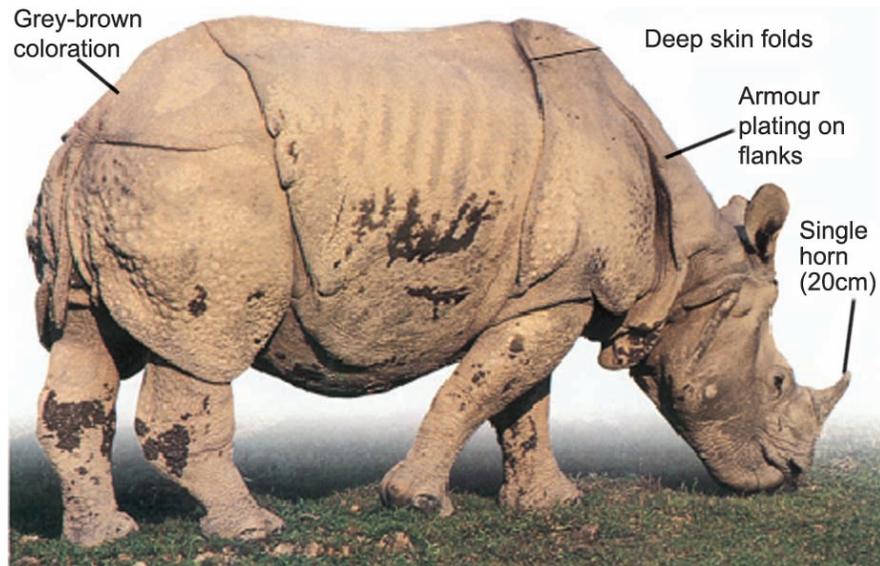
ITEMS NOT SUPPLIED

- Hooks on wall or prestick/bluetack for hanging up posters.
- Pencils, sharpeners, erasers, paper for trainees.
- Non-permanent marking pen for writing on posters.



1. Body features

Physical characteristics



Teaching suggestion

Use **poster 2.1** (above) to show the features of the Greater One-horned rhino.

Body inc. size

The Greater One-horned rhino rank among the largest of all land mammals, surpassed by only the two elephant species and the white rhino of Africa. Adult females weigh about 1,600 kilograms and adult males 1,800 to 2,200 kilograms and males measure between about 1.6 and 1.9 metres whilst females measure about 1.5-1.7 metres tall at the shoulder. Males and females are about 3 to 4 metres long. Point this height out on a man standing in front of the group.

Adult males are taller and slightly heavier than adult females. They also have more extensively developed neck and upper shoulder muscles than the females.

Head

Greater One-horned rhinos have a long boat shaped head which is generally carried close to the ground. They have a prehensile upper lip to gather long grasses. The tip of the lip can actually be folded away when they graze on shorter grasses. They also have long lower incisor teeth. In males, they can grow up to 8 centimeters long and are used in fighting and can inflict deep wounds. Hair is only found around the ears and as eyelashes; and also at the tip of the tail.

Horn

Each rhino has one horn, which grows continually from the skin at their base throughout the rhinos' life (like our fingernails). The horn has no connection to the skull although the nasal bones are extended to serve as a support. The horn is not used for fighting but for searching food (roots etc). This is the main reason why they have smaller horns in comparison with the two African species – black and white rhino.



The two African rhinos fight and display exclusively with the horns and lack lower outer incisor teeth. Horn shapes in Greater One-horned rhino differ between the sexes with males tending to have chunkier horns and the females often longer and slightly thinner ones. The horn is comprised of thousands of compressed hair-like strands, making it extremely hard and tough. Each rhino develops its own horn wear patterns.

Skin

The Greater One-horned rhino has a grey-brown, hairless skin, which develops thick folds, resembling armour plating. Several prominent folds protect the neck, shoulder and back. These become pinkish in colour. The skin has a maximum thickness of 4 centimeters, the subcutaneous fat is 2 – 5 centimeters thick and well supplied with blood, which helps in thermoregulation. Between the folds, around the stomach, the inner legs and the facial area, the skin is rather soft and thin. The tail lays well embedded between the hind leg folds. The skin on the flanks, shoulders and hindquarters is studded with masses of rounded epidermal tubercles or knobs. Knobs are distinct on upper parts of rear legs among fully grown individuals. Dimorphism is observed in the massive neck and upper shoulder muscles which are more extensively developed in adult males. The extensive primary and secondary neck and shoulder folds found in dominant males may serve for display in head to head confrontations between rival males.

Eyesight

Rhinos have poor eyesight, and being rather short sighted will not easily detect an observer standing more than 30 meters away. This is one of the reasons why they tend to attack 'in the last moment' out of the blue if at all. They can detect movement however, and their sense of hearing is excellent. If you find yourself close to a rhino, make sure that you move very slowly, try not to move across their line of sight, and take care not to stand on any small twigs or dry leaves or grass which could make a noise. Rhinos have an acute sense of smell, and will react if they pick up the scent of a human.

Hearing

Rhinos have an acute sense of smell, and will react if they pick up the scent of a human.

Smell

Spoor

Rhino have three toes, and thus three stout nails which leave impressions on the ground to the front and side of a softer wrinkled soul. Rhino front feet are bigger than the back feet.

Speed

Greater One-horned rhino are generally sedate in nature. However when charging or running away, they can move extremely fast. A rhino can gallop at about 40 kilometers/hour, the speed of Olympic 100 meters sprinters, so you are unlikely to outrun them. Rhino can change direction surprisingly quickly. The most effective way to elude a charging rhino is to move out of sight, either behind a tree or up one. Greater one-horned rhinoceros do not use their horn to gore intruders, but use their sharp teeth to bite off chunks of flesh instead. First prize is not to get yourself in such a situation in the first place if at all possible.



Diet

Rhinos are herbivores, feeding on wide variety of plants (up to 183 different species observed in Chitwan NP) with a strong seasonal variation: grass (about 80%, mainly *Saccharum spontaneum*, *S. bengalensis*, *Narenga porphorocoma*, *Arundo donex*, *Phragmites karka*, *Cynodon dactylon* etc.), fruits (*Trewia nudiflora* and *Ficus* spp.), leaves and branches of trees (*Litsea monopetala*, *Ficus glomerata*, *Ehretia laevis*, *Dalbergia*, *Acacia*) and shrubs (*Murraya paniculata*, *Colebrookia oppositifolia*, *Callicarpa macrophylla*, *Coffea bengalensis*, sedges and ferns, submerged and floating aquatic plants and agricultural crops (rice, wheat, maize, lentils). They eat on average 1% of their body weight daily. The Greater One-horned rhino is a hind gut fermenter and has a large caecum (90 centimeters) as well as a large colon (6 – 7,6 meters).

Teaching suggestion

Quiz trainees to highlight relevant body features of Greater One-horned rhino. Use **poster 2.1** to show the various features described above.



2. Rhino society and daily activity patterns



Social behaviour

Apart from cow-calf pairs, Greater One-horned rhinos rarely form groups (such groups normally include two or three sub-adults, especially sub-adults males that have recently left their mothers). Adults males are usually solitary, sometimes adult females associate with sub-adults. Adult males sometimes occur in temporary associations of up to nine rhinos of various sex and age classes. These groups form at wallows and grazing grounds where animals often feed or rest together but move independently of each other.



Communication & Vocalisation

Various types of vocalizations (10 distinct ones are known) are used by rhinos for communication. The main ones are the Snort, used as an initial contact call; the Honk, Bleat, and Roar, used during prolonged agonistic interactions; the Squeak-pant, uttered most frequently by males during prolonged chases after females or other males; and the Moo-grunt, used by calves as a contact call with their mothers.

Olfactory communication is important to rhinos. Scents are carried on the urine, the dung and pedal scent-glands. Tactile communication involves rubbing and licking, and is most frequent in play and peaceful interactions between cows and calves, sub-adults and courting pairs. It is often accompanied by low intensity vocalization.

Agonistic interactions are most frequent between adult males and cows with calves. Attacks on sub-adult males by adult males are also frequent. Agonistic behaviour also plays a large part in courtship.

Flehmen is performed by all age and sex classes, predominantly by adult males in response to the tracks or urine of female rhinos, but also by sub-adults.

Ranging behavior & territory

Rhinos can move over large areas and are not necessarily found again and again in the same spot. However, in areas where they are not harassed by poachers, rhino are creatures of habit and have favoured paths or "dandies" when foraging and resting places that they use repeatedly (Greater One-horned rhinos often wallow, hence the picture in the poster). **Even in such cases, never assume you know the rhino by the location alone.**

The area in which a rhino usually resides and moves in search of water, food and shelter is called its *home range*. Home range is different from territory – the latter being an area actively defended (usually by a dominant male). Breeding bulls have loosely defined territories, which are well defended but can overlap with those of both "weak" males, and with known, neighbouring "strong" males. The rapidly changing distribution of food sources and hence of females possibly precludes year round defense of a small territory as in the white rhino. Males only become fully sexually mature after 8-10 years old, and only become socially mature some years after this when they establish a territory. Females sexually mature at 5-7 years of age.

Male rhinos fight violently for favoured habitat places. A fight sometimes might end with the death of one male (in general the badly wounded animal dies days after the fight due to the inflicted wounds). However, it is not unusual to see several animals all grazing close together where there is abundant food.



Dung middens & spray urination

The rhinos have particular places for defecation, forming large “toilets” or mounds. This behaviour makes it vulnerable to poachers who wait for the animal at pre-determined locations. The dung heaps serves as ‘communication’ points. Several animals defecate at the same spot. Such a dung heap can become 5 meters wide and 1 meter, high. The animals commonly sniff them before defecating. After defecating the rhinos scratch their hind feet in the dung. By continuing to walk, they ‘transport’ their own smell around the paths. Adult males display by squirting urine in jets behind them and dragging their hind toes at the same time, creating long parallel furrows in the earth. Rhinos also mark their favoured path with the secretion from the gland on their feet.

Daily activities

The animals are most active in the early morning, in the late afternoon, and during the night. During the heat of the day, rhino rest in deep shade or in wallows. During the monsoon, this pattern changes slightly; there are cool wet days when rhinos feed at mid-day. Crop raiding takes place exclusively at night – much later during moonlit nights than moonless or cloudy nights. Less time is spent feeding during the monsoon than during the spring and winter.

Feeding

When feeding on tall grasses Greater One-horned rhinos use the prehensile upper lip to curl around the grass stems, then bend the stems over, bite the tops off and chew them, drawing the tips into the mouth from the side. In very tall grass, rhinos often walk forward with the stems, or canes, between their legs, pushing the stems down and grazing from the tips before walking on. The same method is used when browsing on saplings, and often brings foliage within the reach of an accompanying calf. Short grasses and herbs are grazed close to the ground using the lips; the tip of the prehensile upper lip is curled back into the mouth and opposed against the lower lip. Plants are often uprooted, the foliage bitten off, and the roots dropped. Aquatic plants are taken by ducking the head beneath the water, sometimes to the level of the feet; a meter or more below the water surface. They lick or eat soil or rock material for minerals such as sodium, potassium, calcium and magnesium.

Drinking

Greater One-horned rhinos drink daily from streams, rivers, lakes, puddles or wallows. Drinking normally lasts a minute or two; the lips are immersed but the animals pause at intervals with head lifted. Rhinos often drink very dirty water heavily contaminated with rhino urine.

Wallowing

Rhinos spend up to 60% per day wallowing in lakes, rivers and temporary pools (most frequently during the monsoon, less during the winter). Heat regulation is probably a major function of wallowing, but escape from *Tabanus* flies especially in tall grasslands during the monsoon may also be important.



3. Reproduction & calving



- Age to maturity** A female rhino is fully grown at about 6 years old in the wild. However, it takes up to 10 years for the male rhino to reach maturity.
- Mating** Mating takes place throughout the year and follows a characteristic pattern with several attempts at mountings. During this period the bulls can be extremely aggressive towards other bulls, and this is one of the causes of death of calves and sub-adults which remain with the mother. Severe tusk wounds are also often inflicted on the female.
- Pregnancy** A single calf is born after about 16 months. Birth is rapid, usually occurring about 30 minutes after the first signs of labour. At birth, the calf weighs 40-80 kilograms. The calf rises to its feet within about 30 minutes, and at once tries to suckle. Calves are suckled frequently up to the age of one year and only rarely after the age of 18 months. Under very good conditions, the calf can double its birth weight in one month; at one year of age it can reach ten times birth weight. While the calf is young, the cow may be more aggressive. Up to about a year old, the calves are susceptible to predation, although a mother will defend her calf fiercely.
- Calf behaviour** When running Greater One-horned rhino calves tend to run in front of their mother, possibly making them less vulnerable to predators. A calf usually stays with the mother up-to 2-4 years (mean age for male calves 39 months compared with 34 months for females), and will then be rejected from close association.
- Age at first calving** A female will become fertile (begin estrous cycles) as they approach their 4th year of age but do not usually conceive until at least a year later, and most commonly have their first calf at 6 to 8 years old, but sometimes earlier (5 to 6), sometimes later (8-10+ years).
- Interval between calves** In a healthy rapidly breeding population, inter-calving intervals may average 2½ - 3 years. Rhino can produce calves at around 2 year intervals, but can also take more than 4 years between calves, depending on the female's age and nutritional status.
- Calf predators** Rhinos have few predators (except human!), although tigers may kill young calves (tigers may take as many as 15% of all young born each year). Beyond the first year, rhinos are unaffected by predation.



Disease

Parasites include leeches, ticks and gut nematodes. Anthrax and hemorrhagic septicaemia both occur; the latter was responsible for the deaths of 15 rhinos in Kaziranga NP in 1974. There have been no epidemics so far but as populations increase with no alternative refuges available for the rhino, there are dangers in the future of facilitated epidemics.



4. Relationship with other animals

Mynahs and egrets are often seen in association with rhinos feeding on invertebrates on the rhino's skin or around its feet. Rhinos are bitten by bloodsucking *Tabanus* flies. The birds benefit the rhino by removing the insects and also raising the alarm if there is any danger approaching. This can be most frustrating when you are trying to approach a rhino closely to observe it.



5. Relationship towards humans

Behaviour varies from individual rhino to rhino. When disturbed, rhinos react very swiftly, usually standing up and facing the source of the disturbance. Because of their poor eyesight, they may not locate the disturbance in dense forest and tall grasslands easily. The animal stands with its ears erected towards the source of disturbance. The calves are mostly curious and usually lead their mother towards you. If you are sitting on an elephant back, rhinos would immediately run from the site. Rhinos frequently approached by elephants, mainly during elephant safari would not react aggressively. However, mother with small calf would always try to avoid domestic elephants. It is always very dangerous to approach rhino on foot. If approached closely, they may attack quickly; mothers with calf react more aggressively than males. They are very responsive to humans and so use of domestic elephants is strongly advised when planning how best to approach rhinos. A rhino usually only charges you if it can actually see where you are. Rhinos do not follow humans to attack or scare away. Rhino tracking on bare foot in forest or in grasslands should be avoided as much as possible. If you somehow encountered the rhino and you feel that you will be charged do the following: i) climb a tree that can support you, ii) jump down hill or into the river, iii) crawl through the thickets, iv) encircle big trees, such as Bombax.



Rhinos in most cases will turn and run away if an elephants approach them closely, but rhinos that are regularly approached by the safari elephants would not react aggressively and would not move away quickly.

As discussed earlier, rhinos have good hearing and smell. Therefore to have the best chance of not disturbing them you should approach quietly with the wind blowing towards you. Try to tread lightly, and be careful not to stand on twigs which may snap and alert a rhino. While rhino eyesight is not good, when you get closer rhinos can pick up your movement.



6. Ecology

Greater One-horned rhinos are found throughout their present range in alluvial plain habitats: tall floodplain grasslands with some grass species up to 8 meters tall and swampy areas with *Arundo*, *Phragmites*, *Themeda*, *Saccharum* and *Narenga* bordered by riverine woodlands (*Trewia*, *Bombax*, *Syzygium*, *Acacia* and *Dalbergia* communities) or, in parts of Nepal and Assam, by drier *Sal* or *Terminalia* forest. The great reduction in the range of the Greater One-horned rhino over the last 300 years was caused primarily by the disappearance of most of the alluvial plain grasslands of the northern Indian sub-continent and unprecedented poaching. By the middle of this century, rhinos were largely restricted to small isolated pockets of protected areas and their survival depended upon efficient legal protection. The small sizes of the present reserves mean that rhinos are within easy reach of and regularly feed in cultivated land and in woodland areas transformed by human activity and by domestic stock into short grassland with scattered trees and scrubby undergrowth. The alluvial plain habitats are characterised by rapid and very marked seasonal changes in weather and vegetation. Fires, annual monsoon floods and frequent changes in river courses maintain a high diversity of early successional vegetation stages on the valley floors, and human activity and stock-grazing have had a large impact on the protected areas bordering arable or grazing land.

MONITORING GREATER ONE-HORNED RHINO



Module 3

Patrol, Tracking and Anti-Poaching Techniques

RATIONALE

Poaching of Greater One-horned rhinoceros is a serious threat. It is therefore a key strategic objective to eliminate or contain poaching at very low levels in order to allow the remaining populations to build up in numbers. This module therefore contains basic guidelines on undertaking effective patrols and law enforcement.

Effective conservation of rhinos requires good quality population data in order to make effective management decisions. This module therefore also contains guidelines to improve a frontline staff's effectiveness in locating rhinos, approaching them safely, observing them while undetected, and leaving them safely and without unduly disturbing them. The techniques presented here can be adapted for many other key threatened wildlife species.

PURPOSE

This module contains guidelines to improve the effectiveness of monitoring and law enforcement staff. A person competent in this module:

- Understands the need for patrolling.
- Can identify the different signs of illegal activities.
- Is well-versed in the different methods for tracking poachers and techniques of anti-poaching activities.
- Be able to locate rhinos efficiently, approach and observe carefully, and wherever possible leave them undisturbed.

LEARNING ASSUMPTIONS

The learner can understand the language the module is presented in, and has received instruction in tracking and patrolling techniques as part of their basic training.



SPECIFIC OUTCOMES

The protection staff should demonstrate that they are able to:

- Identify the different signs of illegal activities and rhinos in their area.
- Track poachers using different patrol methods.
- Locate rhinos in the field, approach them safely, observe them undetected and leave them without disturbing.

ASSESSMENT CRITERIA

This assessment should be primarily based on field experiences where each of the above skills is clearly demonstrated. During the test the trainers should display/demonstrate:

1. Correct patrol, tracking and anti-poaching techniques
 - a. Paying attention to surrounding, staying alert and looking for any signs of illegal activities and rhino signs
 - b. Not making noises even when the team is using domestic elephants.
 - c. Wherever possible walk upwind when patrolling for rhinos
 - d. Spreading out the patrol line at times when trying to find signs of illegal activities or rhinos.
 - e. Scanning using binoculars.
2. Ability to detect the different signs of illegal activities and rhino.
3. Ability to follow poacher/rhino track including judging the age of tracks and signs.
4. How to approach rhinos undetected and make the necessary observations. Trainees must not rush in and get too close before looking. They must not move when a rhino looks up. Ideally they should approach the rhino from behind.



PERFORMANCE SYSTEM

This topic is one of the key skills needed for patrolling, tracking, law enforcement and routinely get good quality data on rhinos. Thus to be an accredited Master Observer, trainees obtain at least 80% in the written test and achieve competence in this module. Trainees who are deemed not yet competent should get more practice with experienced observers before re-sitting the test for this module.

EQUIPMENT

ITEMS SUPPLIED

- Poster 3.1, 3.2, 3.3, 3.4, 3.5.

ITEMS NOT SUPPLIED

- Hooks on wall or prestick/bluetack for hanging up posters.
- Pencils, sharpeners, erasers, paper for trainees.
- Non-permanent marking pen for writing on posters.



1. The purpose of patrols

Reasons for patrol

A large part of the duties of a protected area staff involves regular patrolling in the field.

Patrols are usually carried out for the following reasons:

- To detect the presence of any illegal activities (hunting, fishing, cattle grazing, burning, extraction of timber, grass and other non-timber forest products etc) and to arrest or deter poachers.
- To discover rhino (and other key wildlife species) mortalities.
- To report on the presence of special wildlife species including rhinos.
- To provide information on special projects e.g. rhino monitoring programmes.

Special patrols or surveys are also carried out to obtain population estimates of special wildlife species such as rhino and to assess changes in natural habitat including impact of alien plants such as *Mikania micrantha*, *Mimosa pigra* and *Lantana camera*.

Ask trainees why they undertake patrols. Use **poster 3.1** (below) to help illustrate the main purposes of patrolling.

Teaching suggestion

Anti-poaching



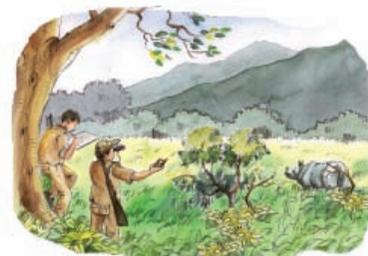
Law enforcement



Reasons for patrol



Wildlife monitoring



Research 3.1



2. The different types of patrols

Depending upon the reason for the patrol, different areas will be visited during patrols. For example,

- a boundary patrol will concentrate on the park perimeter,
- an anti-poaching patrol may concentrate on known poaching prone spots,
- an observation patrol will try to cover as wide an area as possible, and will try to visit areas which are not covered during the other kinds of patrol work, or as with the surveys may try to cover the areas where rhinos are suspected to occur.



3. The different types of patrolling

Patrols are carried out daily (day and night).

- Day patrols are normally carried out on foot as well as on elephant back. Foot patrols are not advised during monsoon and early part of winter, as it is nearly impossible to walk in the floodplain areas.
- For night patrols, barring patrolling on boundary roads, foot patrols are of little use and hazardous; however elephant back patrols are very effective inside the park.
- River patrols are undertaken, by both country boats and rubber boats. Outboard engine boats are useful during monsoon.
- Patrolling by jeep or similar vehicles can be effective to deter illegal activities because of its quick movement in reaching trouble spots.
- In a foot patrol unit there should be at least 1 game scout and 5 armed personnel to counter the possible attacks of miscreants and also for handling apprehended persons.
- For elephant back patrols, a minimum of two elephants with 3 persons (1 elephant driver, 1 game scout and 1 armed personnel) on each is normally effective.



- In river patrolling, two country boats or rubber boats with six protection staffs (rangers, game scouts and armed personnel) and two boatmen (per boat) are needed; during monsoon one outboard engine boat with 3-5 protection staff is sufficient.
- Patrol unit should be equipped with necessary arms and non-firearm staff with sticks and “khukuri” (dagger - should be kept in a shiny condition).
- Two / three torches, preferably 3-5 celled mega-lights are useful in case of emergency at night.
- Patrols normally should not be carried out at routine times and patrol areas should not be disclosed to un-authorized people.

Teaching suggestion

Ask trainees how they undertake patrols. Use **poster 3.2** (below) to help illustrate the different ways of conducting patrols.





5. Periods when rhinos and other wildlife are usually poached

Though there is no particular season for poaching,

- Rhino poaching used to normally take place in the months when tall grasses give the poachers hiding cover to shoot from close quarters (June – November). Patrolling in these months by protection staff is also difficult as the poachers use the most difficult and boggy paths where patrolling on elephant back becomes very difficult and poachers can get the warning of approaching patrol party because of noises of marching despite precautions. Foot patrol is nearly impossible in these conditions.
- Poaching of deer, wild boar and other small animals like porcupine take place in dry season (February-April) when the tall grasses get burnt and visibility of animals is greater.



6. Signs of illegal activities and poaching

Poaching / illegal activities are normally identified by:

- Actual sighting of a group of people normally not more than six near waterholes, dry riverbeds, creeks and in areas with wild animals.
- Foot trails of a number of people inside forest.
- Poacher's campsites.
- Machans (platform on trees close to rhino wallows and on rhino 'dandi' tracks). Machans are temporary platform made of branches and poles of trees tied on a tree branch at a height of about 10-12 ft.
- Traps and snares.
- Sound of gunshot.
- Torchlight at night.
- Cut branches of shrubs and trees (that stand in the way of intruders).



- Carcasses of wild animals that have been snared, shot or poisoned.
- Fires of dry grasses (at unusual times and in unusual places).
- Marked absence or unusual nervousness of deer normally occurring in grassland areas.

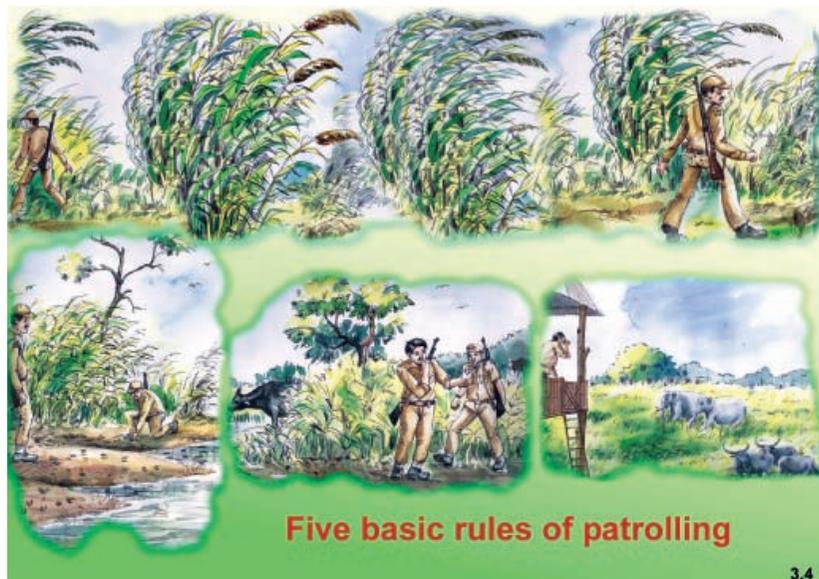


7. Patrol methods for monitoring & law enforcement

There are a number of basic rules which must be followed if you are going to be effective in your patrols.

Teaching suggestion

Use the **poster 3.4** (below) to illustrate five basic rules of patrolling (described below). Ask trainees to use their experience to contribute other guidelines for successful patrolling. Ask them if in their last patrol, there were times when they did, or did not follow any of these basic rules.



1. Pay attention to your surroundings as you patrol, using your sight, hearing and sense of smell. Stay alert and look to left and right. Try to detect any signs of illegal activities, poachers or rhino.
2. Patrol quietly. If you want to signal to another member of the group agree on a standard whistling or clicking call to attract their attention.



3. Where possible, when patrolling for rhino, walk into the wind (if the wind is behind you, your chances of finding the animal are small).
4. Patrol in an extended line. Keep within sighting distance of one another. Patrolling in single file looking at your feet is useless. When entering thick vegetation, arrange a meeting place and pan out so as to cover more of the area.
5. Stop every now and then. Use high ground or machan to scan over the area using binoculars. Be quiet, and listen. Sometimes smell can also be useful.



8. Where are rhinos likely to be found?

Teaching suggestion

Knowledge of the behaviour of rhino is very useful, and can increase your chances of finding a rhino quickly. Again use **poster 2.2** as the basis for a discussion of the most likely places where rhino can be found. This is a recap of the daily activity section covered in module 2.

- Rhinos are most active in the early morning, in the late afternoon, and during the night. It is early morning which gives you the greatest chance of observing the animal.
- Rhinos often rest in deep shade or in wallows during the heat of the day. They spend up to 60% per day wallowing in lakes, rivers and temporary pools (most frequently during the monsoon, less during the winter) and these are also excellent places to observe rhino.
- Rhinos in many areas use well-worn paths to move from place to place. These paths are a good place to check for spoor and dung toilets or scrapes.
- Rhinos raid crops only at night, much later during moonlit nights than moonless or cloudy nights. Machans are useful to sight these animals and these conflicts.

As the programme progresses, and frontline staff achieve more deliberate encounters with rhino, use patrol debriefing sessions to discuss the way in which field personnel located and approached rhino. This is to allow more experienced staff to pass on their knowledge to less-experienced scout, and to critically review what is actually taking place on the ground.



9. Picking up a trail of poachers and rhino



It is difficult to train a frontline staff to be a naturally good tracker, but there are certain points which a good field personnel will keep in mind. Tracking is a field skill which is best demonstrated on the ground in a practical session. First run through the points below. Then conduct a field training patrol to reinforce these basic guidelines.

Tracking of poachers on foot or on elephant back can be started from the paths originally created by elephant track (dandi) leading deep inside the forests.

The freshness of human footprints can give definite idea of poachers and they can be tracked down.

First, the track of a poacher or trail of a rhino must be detected. Many different signs made by poachers or animals can be used.

Find signs

At least some members of the poaching team will in barefoot which can be followed. There will also be signs of occasional cutting of twigs and branches. Other signs of poaching or illegal activities were discussed in the earlier section.

For rhinos:

- On the **ground**: dung, spoor (footmark), mud wallows, grazing signs.
- On **bushes and trees**: urine, mud, breaking of branches.
- In the **air**: dung may be smelt, and sometimes, sounds of munching on branches or grass may even be heard.

Track footprint / spoor

The approximate age (freshness) of the trail must first be established to decide if it is worth following. Take into account the weather (heat, rain, dew, air humidity, wind), the dampness of the ground, the amount of spring-back in trampled vegetation, and the day/night habits of animals making spoor under or over the track, the older the track the more other small leaves etc. may have fallen on top of the spoor.

The direction in which the poacher/rhino is moving can be determined from the footprint/spoor or the way in which grasses or twigs are bent, or how pebbles have been dislodged.



Use footprint/spoor and other sign to follow the poacher's/ rhino's trail:

- Walk next to footprint/spoor - not on it.
- Keep the trail between you and the sun so that the shadows created by the sun in the indented spoor can be more easily seen. Tracking is easier when the sun is low in the sky, for this reason.
- Work out whether the poacher/rhino was moving steadily, running, or for animals feeding along the trail, etc. as you go along.
- Scan ahead for signs, don't look only near your feet unless the sign is very difficult to detect.
- Anticipate which way the poacher/rhino would have moved - use your knowledge of poacher's/rhino's behaviour. Imagine you are the poacher/rhino: Where would you go next in this place...? Judge where the poacher/rhino went and move on to easier ground to pick up the train more easily and speed up the tracking process.
- If you lose the trail, and cannot anticipate the poacher's/ rhino's pace, direction or intentions, backtrack to the last sign, then start to search first in the likely-looking places for more sign. If this fails, move 50–100 meters from the last sign and work methodically in circle round that point, scanning very carefully till you cross the trail.
- Other animals may be disturbed by your movements and startle your "quarry". Also be careful not to walk straight into the poacher/rhino you are tracking!
- Track for short periods and then swap with another frontline staff: by taking turns, maximum attention can be given to tracking even as individuals tire.

One needs to be extra cautious when tracking injured animals as they can be very dangerous.



10. Field exercise - patrol techniques



Conduct a teaching patrol for trainees in the field using the following guidelines.

Check to ensure that the patrol team is fully prepared with the necessary monitoring equipment: binoculars, cameras (with a spare battery and lots of space on the memory card), fully charged GPS, rhino sighting booklet with sufficient blank sheets), patrol data recording booklet, communication equipment. Other checks include clothing and boots (colour needs to match with the terrain – e.g. jungle), water etc.

Also ensure that the patrol team is fully briefed on the area to be covered and their responsibilities, for example who will fill the data forms, who will operate the different equipment etc.

Select a suitable vantage point. Using a map of the area, and by picking out the main features, show the guards how to orient the map. Describe the main components of the area, taking major streams and vegetation types into account. Discuss the places where rhino are likely to be found or where fresh spoor could be picked up. Include:

- a. Time of the day and temperature.
- b. Time of the year.
- c. Machans and other viewing points.
- d. Known rhino paths, feeding areas, favoured wallows, or known dung toilet sites.
- e. Wind direction in relation to direction of patrol.

Discuss the factors which would prevent the patrol from encountering rhino e.g. noise factor/loud talking/radio left on/possible changes in wind down in a valley etc.

Plan the route.

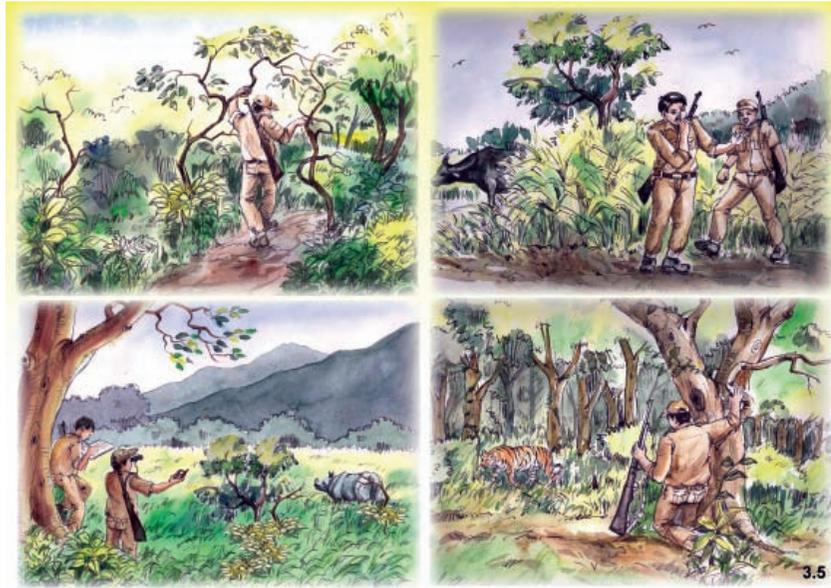
Conduct the patrol, stopping periodically to discuss the next section, or when a point of interest is encountered.



11. Approaching and observing rhino

Teaching suggestion

Use the **poster 3.5** (below) to illustrate the steps necessary to approach and observe rhinos sighted from a distance.



Every encounter with a rhino is different. Many patrol staff will have some previous experiences on which they can draw. Allow individuals to describe their encounters with rhinos. Use this opportunity to challenge the way in which they approached the situation and to suggest different approaches, if appropriate.

Approaching a rhino(s) undetected or without disturbing them is not easy. After you have actually spotted a rhino your actions from this point on will determine whether you will be successful or not. You are required to coolly and calmly tackle the situation as follows:

Stop and assess the situation

How can you get nearer the animal quietly and safely? Look at the terrain between you and the animal. Check the wind direction and move downwind so that the animal will not detect you. Then plan your next move, so as not to disturb the animal. If on foot look for natural cover, climbable trees, and escape routes in case the animal is dangerous and detects you.

Be patient

The animal may already have been disturbed and will take time to settle down.

Slowly and silently move closer

To avoid detection, use natural cover to approach the animal. If on foot, avoid sideways movements. Don't stand on dry twigs and noisy leaves etc. Learn to step lightly rather than pounding your feet into the ground.

Use your binoculars to look at your animal(s) and record details and do not disturb animals

Even from a distance, with binoculars the animal can be seen well without the need to approach it too closely (risking disturbing it). Your patience will be rewarded and quietly record on the animal in the sighting form. Take the opportunity to watch the animal whenever possible, and to learn about the animal's behavior. If you have completed all records possible, then move away quietly, in the same cautious way in which you approached the animal. In this way, you will place neither yourself nor the animal in any unnecessary danger.



Teaching suggestion

Practice in the field is the key to success here. It is a good idea to let different trainees take charge of an animal approach, and then to have a debriefing session where the good and bad points of the specific approach are discussed.



12. Other effective protection / anti-poaching approaches

The following are some other effective anti-poaching approaches:

- Effective monitoring of law enforcement and using this information to effectively deploy patrols.
- Effective investigation, timely prosecution and heavy sentencing of wildlife crimes.
- Relevant training of staff (e.g. Scene of Crime Investigation) and use of appropriate technologies for detecting/preventing poaching.
- Effective intelligence network with timely analysis or intelligence information and motivating incentives for informers.
- Raising awareness among the people of the buffer zone or neighbouring communities about the importance of wildlife protection and the law.
- Implementing effective methods for minimising wildlife damage to agricultural crops, properties and lives of local communities.
- Providing sustainable sources of livelihoods to the poor communities who are prone to engage in poaching activities.

MONITORING GREATER ONE-HORNED RHINO



Module 4 Map Work and GPS

RATIONALE

- Effective patrolling for any purpose requires a thorough understanding of the terrain. In the context of rhino monitoring and law enforcement, accurate location of patrol routes, rhino sightings and illegal activities is required for analysis, reporting and decision making.
- This can either be done using map work or a GPS or a combination of both.

PURPOSE

- This module will show trainees the purpose of maps, what a map is, common map symbols, how to read the terrain from a map, and how to locate and record positions on a map.
- The GPS component of this module aims to teach trainees what a GPS is and does, how to look after one and how to get and record a GPS location.

LEARNING ASSUMPTIONS

- No assumptions except that the learner can read and understand the language in which the module is presented.

SPECIFIC OUTCOMES

Map Component (optional)

- Trainees should know how a map represents a piece of land.
- Trainees should know how to locate positions and patrol routes using a map.
- Trainees should be able to interpret some of the symbols found on maps, e.g. north pointer, rivers, roads, boundaries, scale and contours.
- Trainees should be able to record the location of individual rhino sightings using a grid on a map of their patrol area.
- Trainees should be able to record the location of illegal activities using a grid on a map of their patrol area.
- Trainees should be able to record their patrol movements using a grid on a map of their patrol area.



SPECIFIC OUTCOMES

GPS Component

- Trainees should know that a GPS can be used to record position.
- Trainees must know how to care and look after a GPS.
- Trainees should be able to use a GPS to obtain and record a position.

ASSESSMENT CRITERIA

Map Component (optional)

This assessment should be based on field tests with a grid map of the area.

- From a vantage point, the trainee must be able to correctly orientate a map containing the area over which he is looking.
- The trainee should be able to correctly locate places on the map, for example where they patrolled yesterday, where a rhino sighting, illegal activities or rhino mortality occurred.
- Trainees should demonstrate they know the meaning of map symbols - e.g. the north pointer, rivers, roads, boundaries, scale and contours.
- Trainees must correctly read off and record the grid reference of patrol movements and sightings of rhino and illegal activities they have made.

GPS Component

This assessment should be based on verbal or written tests, and a field test using a GPS unit to record position.

- Trainees should be able to explain what a GPS unit does.
- Trainees must be able to explain how a GPS unit should be looked after.
- Trainees must be able to use a GPS unit to obtain and record a position.

PERFORMANCE SYSTEM

To become an accredited rhino (and other wildlife) monitor, trainees must be accredited in at least the GPS component of this module.



EQUIPMENT

ITEMS SUPPLIED

- Poster 4.1, 4.2.

ITEMS NOT SUPPLIED

- Hooks on wall or prestick/bluetack for hanging up posters.
- Pencils, sharpeners, erasers, paper for trainees.
- Non-permanent marking pen for writing on posters.
- GPS unit with charged batteries.
- Maps of local area or reserve.
- Blackboard and easel.
- Compass (optional).
- GPS unit with charged batteries.
- Rocks, basin for water, several pieces of different coloured chalk, pieces of soft white cloth (e.g. handkerchiefs), marker-pen for drawing on cloth.



1. What is a map and what is its purpose?

What is a map A map is a picture of a piece of the earth.

Teaching suggestion

Obtain a map of the reserve and point out some of the key features: hills, rivers, roads, camps etc and how they are spatially related.

Uses of maps

- Determining rhino locations and distributions in an area;
- Analysing rhino movement and home range;
- Determining which areas are favoured by rhino;
- Pinpointing areas of concern or interest;
- Determining locations of illegal activities and patrol movements;
- Learning how thoroughly a national park or reserve is being covered by routine patrols, and whether specific attention needs to be directed towards any particular area;
- Effectively planning patrols, which requires a knowledge of an area's topography;
- Gathering and transferring knowledge about an area for security, management and research purposes.

Purpose of maps

A map is a very useful tool in conservation. A map contains information about an area e.g. where all the hills, rivers and roads are located. If you have not yet visited every part of your park or reserve, you can look at a map and find out what the area is made up of. A map can be used for:

- Planning and carrying out a law enforcement patrol;
- Recording information about an area e.g. the distribution of alien plants, or the distribution of rhino.

Teaching suggestion

Ask the trainees to draw the ground plan of the park office, showing the buildings, fences, car parking areas and tracks.

Look carefully at where the buildings are in relation to the boundaries and to the main road.

Teaching suggestion

Get trainees to draw other features that are relevant such as the main entrance to the compound and the position of doors and windows. Get them to draw (or use stones to represent) these features.



In the same way that the drawing of the park office puts information about a big area on a small area, so there are ways of representing large pieces of ground like the park/reserve in which they work in and key features in the environment such as rivers, hills and forest patches. In the same way one can show how staff move around the office area, one can show where frontline staff patrolled, where rhinos and poachers etc were found.

Teaching suggestion

Get trainees to make their own reserve map on a bare piece of ground/ paving.

Ask them to decide what things they want on their map: mountains, hills, rivers and drainage lines, forest patches, roads, fence/boundary, buildings, special places they know, e.g. waterholes, big trees. They must think of a way to represent such items.

- Stones, sand or mud, tin cans, strings, sticks etc can be collected to use in representing features, or else they can just be drawn on the ground with chalk / a stick.
- On a side bit of ground they can draw a key: a list of each item and how they will represent it. This can be updated as they think of things to add.
- Have the trainees start to draw their reserve map. Perhaps first mark out roughly where three or four of the main features are, paying attention to their relative directions and distances.
- Trainees must then complete their map, filling in as much detail as they want, moving things if needed, until they are happy that they have a useful, if rough, map of their area.
- Taking one map at a time, get an outsider or two (or members of the other group) to play the “new recruits”. Ask the mapmakers to explain the map to them. Ask them to show on the map how to patrol from one important place to another, and explain things he will pass on the way.
- Get the new recruits to ask questions (e.g. Where is North? Where to find a certain rhino, what does that mean? How do you go from the camp to the gate?).
- Get the team to discuss the benefits and problems with their map in its purpose of conveying information on an area from one person to another.

Afterwards, get a proper map of your park/reserve (best to have a copy for each frontline staff). Find well-known sites on the map. These can be discussed and compared to those devised by the ground mapping teams.



2. Map symbols

North pointer Use a map as an example, and discuss what the symbols on it represent (e.g. the north pointer, rivers, roads, buildings, boundaries, the scale and contours). There are some very important symbols that are found on maps that help us to understand the map.

If a pointer is not used, then usually, by convention, the top of the map is **North**. A compass can also be used to measure where North lies. Demonstrate using a compass where North lies.

It is important to turn the map so that it is orientated in the correct direction.

The sun rises in the **East** and sets in the **West**. If you stand with the sunrise on your right hand side and the sunset on your left, you will be facing North. **South** is opposite to North.

Always orientate the map correctly, i.e. so that the North pointer or North side of the map is pointing to real North.

Obvious features

These are rivers, roads, buildings, etc.

Contours

One of the problems, which we face when we try to represent a piece of the earth on paper, is that the paper is flat and cannot show the hills and valleys. To solve this problem, we use **contour** lines.

Teaching suggestion

With the trainees, compare an aerial photograph and the map of your reserve side by side.

Find a hill on the aerial photograph and see how it is drawn on the map.

Look for steep areas and flat areas on each: how are they represented?

Teaching suggestion

Have some (dry) rocks of various domed/ flat-bottomed shapes, a basin or two of water, and pieces of chalk handy. Get a few volunteers to do this with each rock: Dip the rock 1/4 way into the water so the bottom bit of each rock is wet, then lift it up, keeping hold of it. Get other volunteers to trace along the watermark ring made around each rock by the water. Holding the rock in exactly the same way, slowly dip the rock in water again to just deeper than 1/4 way. Lift the rock and mark the new waterline. Repeat 4-5 times, dipping the rock deeper each time by the same amount until the top of the rock is reached. Each rock now has contour lines around the top half. Turn the rock 90 degrees and look at it from the top to see how contours would look if put on a map.



Explain that if contour lines are far apart, then the hill or rock is reasonably flat in that place but if contour lines are close together, then the hill or rock is steep.

Now look at a contour map of your area:

In the same way, map contour lines represent the shape of hills and mountains, with the smallest circle the top of the hill and the largest circle the base. Examine some well-known hills and valleys on the map, noting the appearance (closeness) of the contours in each known spot. Discuss these.



3. Scale

The scale of a map tells us how the map displays and measures the distance between places. If we take a ruler and measure 10 cm on the map, say away from the base camp, the scale will tell how far that distance is if we were to go now and walk it in reality.

Many maps are 1 in 50 000 or 1 in 10 000 scales. This means that one unit measured on the map, is really 50 000 (or 10 000) of those same units in real distance.

- 1 cm on the 1:50 000 map is 50 000cm, which is 0.5 kilometres or 500m, in reality.
- (For 1:10 000 scale, 1cm on map = 10 000cm which is 100m in reality).
- For 1:50 000 scale maps, 2 cm is 2 x 50 000cm in reality, which is 1000 meters or 1 km.
- For 1:10 000 scale maps, 2cm = 2 x 10 000cm = 200m in reality. 10 cm = 10 x 10 000cm = 1 km or 1000m on such a map.



4. Locating your position using a map

Teaching suggestion

Take frontline staff to vantage points in your reserve. Using a map of the area, allow trainees to pick out recognisable points in the reserve that can be related to points on the map. Stop frequently to determine position.

Carefully follow the procedure below to determine your position on a map of your reserve.

- Find north and turning the map so that the north pointer (or top of map) is pointing north.
- Identify large-scale features on the ground and find their position on the map. How far away from these features are you? Where are you in relation to hills, rivers, etc?
- Trace the path that you took to reach your present position. Where did you climb a hill? Where did you cross a river or stream?



5. Using Grid References to locate sightings on a map

If you wish to tell somebody where you walked, or where you saw an individual rhino, you could make a mark on the map and give it to the other person.

To make this easier, reserves may have divided their area up into blocks. They are not real blocks that you can see on the ground, but they help to indicate a particular position. They are called grid squares.

Most grid references are read along the horizontal (across the top or bottom) axis first, then along the vertical (left/right side) axis next.



How does it work?

- Each satellite constantly transmits its positional information with time stamp.
- GPS receiver receives the signal and calculates the difference in time from when it was sent and received. From this it works out the distance the signal travelled (at the speed of light).
- Distances to minimum of 3 satellites enables positional calculation.
- Addition of 4th satellite provides height measurement.
- However, requires line of sight from the satellite to function.

What can GPS receivers do?

- Displays and updates position (and height) on the screen which can be transcribed directly to a standard map (poster 4.1 for example).
- It also displays distance and bearing to way-point (although this is only accurate whilst on the move).
- Allows position to be stored (way-points) and way-points to be entered.
- Displays speed and course over ground and many more functions.

GPS setup

All GPS receivers must be set-up for correct use. In general, this means the setting of the following parameters:

- Coordinate display format.
- Latitude and Longitude or grid coordinates.
- The mapping datum.
- Distance, speed and height units.
- Time format.

Coordinate Reference System

- Majority of mapping allows the identification of a position by either Latitude and Longitude (degrees °, minutes ' & seconds ") or grid reference (UTM).
- Great care must be taken in selecting the correct coordinate system and interpreting the reading.
- Datum must also be carefully selected.



The dangers

- GPS requires line of sight to satellites... it will not work in all terrain.
- The position displayed can often be misread so please be careful.
- Errors can easily be made when computing waypoints.
- Batteries can fail.

Conclusions

- GPS is an extremely useful mapping and navigation aid.
- It can be used as a hand-held device or in a vehicle (GPS can be fitted with external antenna).
- GPS units are small, economically designed and robust.
- GPS can be used in all weathers.
- GPS will significantly aid in rhino monitoring and law enforcement.

Use **poster 4.2** (below) to show some of the above points.

Teaching suggestion



Further information & instructions

Specific instructions for the basic functions of the Garmin Etrex GPS unit are given in a separate document. Also, each GPS unit is issued with a detailed user manual and quick reference guide.

MONITORING GREATER ONE-HORNED RHINO



Module 5 Binoculars

RATIONALE

- Binoculars are an essential piece of equipment for observing rhino (and other wildlife). Many of the identification characteristics of rhino cannot be seen without binoculars. It is often difficult to get really close to the animals to observe them, and binoculars are therefore a valuable aid.
- They have a number of drawbacks when used in the field. They are fragile, susceptible to shock, and are not water resistant. As they are expensive to buy and repair it may be practically difficult to replace/repair them if damaged.
- They are also quite difficult to use, and are useless to an untrained person.

PURPOSE

A person assessed as competent in this module will know:

- How to look after binoculars.
- How to use them.

LEARNING ASSUMPTIONS

- No assumptions except that the learner can understand the language the module is presented in.

SPECIFIC OUTCOMES

- Game scouts should know the purpose of binoculars.
- They should know how to use and care for binoculars.
- They should routinely make use of binoculars to observe rhino and other wildlife during monitoring.



ASSESSMENT CRITERIA

This assessment should be by verbal or written testing and practical testing (field test and simulation).

- By verbal or written test - the trainees must get a minimum of 80% to pass this module – important points - each trainee should describe the functions (what they do or what one does with them) of the various parts of a pair of binoculars labelled A to E in poster 5.2. Each trainee should describe how to focus a pair of binoculars for their eyes, while using a real pair and demonstrating this.
- By practical testing - Place a rhino ear poster (or a pair of simply notched rhino ears) at a distance where the details are not visible to the naked eye. Ask the trainee to set up the binoculars for his eyes and then ask him look at the picture through his binoculars and mark the places on the ear diagram in a field recording booklet where the rhino ears are marked. (5 points for correct drawing).
- Finally - field test: the trainee should be seen to routinely use their binoculars to observe details during rhino (and wildlife) observation.
 - >= 80% = accredited
 - 70% - <80% = nearly competent (re-testing needed)
 - less than 70% = not yet competent

PERFORMANCE SYSTEM

- To become an accredited rhino (and other wildlife) monitor trainees must be accredited in this module.

EQUIPMENT

ITEMS SUPPLIED

- Poster 5.1, 5.2, 5.3.

ITEMS NOT SUPPLIED

- Binoculars.
- Prestick/bluetack for hanging up posters.
- Pencils, sharpeners, erasers for trainees.
- Non-permanent marking pen for writing on posters.



1. What is the purpose of the binoculars?

Value of binoculars

Binoculars are special instruments which enlarge the object you are looking at, so that you can see it more clearly. They are extremely valuable when looking at rhino and for law enforcement because:

- it is difficult to get close to a rhino;
- it is not always safe to get close enough to identify and make notes on the animal;
- it is difficult to detect signs of illegal activities and poachers from a distance.

Teaching suggestion

Use **poster 5.1** (below) to illustrate what a binocular does.





2. Care of binoculars

Binoculars are expensive to both buy and repair if damaged. There are two things that can cause binoculars to become useless:

- Dropping or hitting binoculars against something displaces the prisms and lenses, which have to be perfectly aligned for the binoculars to work properly.
- Leaving binoculars in the rain, or dropping them into water allows moisture to get into the lenses, misting them up totally, and causing fungus to grow on the lenses, which damages them severely.

How to treat binoculars

To maintain clear vision through binoculars, field scouts must be careful not to scratch the lenses. If these are scratched it will make it difficult to see through them. Scratching can be caused by dust, sand or branches etc. coming into contact with the lens; or by trying to clean the lenses with a dirty soiled cloth.

Therefore :

- Take care not to drop or bash binoculars against rocks.
- Always keep the strap around your neck. Keep the strap short so that they don't bounce around, and tuck them into your shirt (or in a belt case or your pocket if the binoculars are small) when not in use or when climbing trees.
- Prevent them from getting wet. Keep a plastic bag handy to wrap them in if it starts raining or if you have to cross a river.
- Do not wash binoculars.
- Do not place them anywhere where they will get dirty or covered in dust or sand.
- Blow sand or dust off the lenses. Wiping lenses without doing this first will only scratch them. Also, only use a clean soft cloth to clean lenses. A dirty cloth may have grit in it which may scratch the lenses if used to clean them.

Teaching suggestion

Demonstrate the effect of scratching a piece of plastic ruler or glass.



3. The different parts of a pair of binoculars

Teaching suggestion

Use **poster 5.2** (below) to point out the different parts of a pair of binoculars.

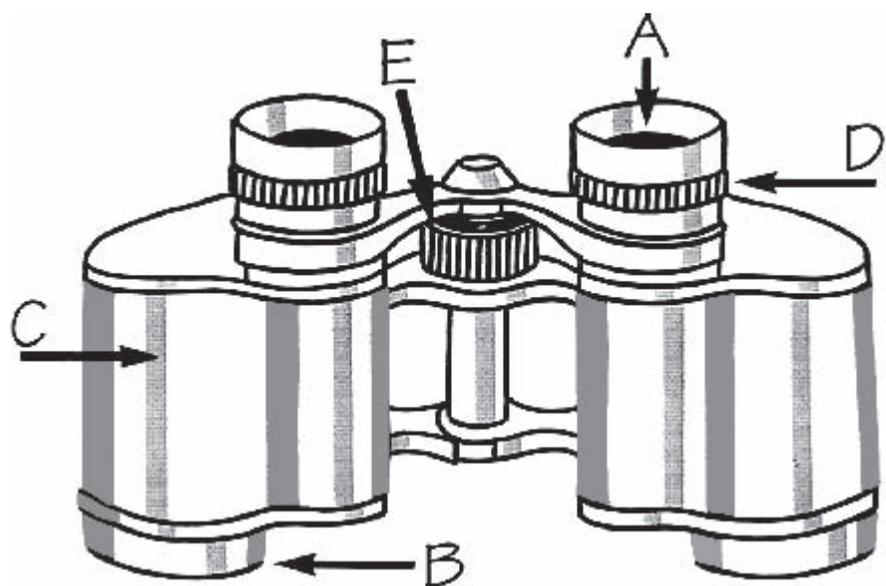
At the same time it is advisable to allow trainees to find and look at these parts on their binoculars.

Reinforce by questioning.

Parts of a pair of binoculars

From the outside, you can see two sets of lenses.

- **A** shows an eye-piece.
- **B** is a front lens.
- **C** shows the barrels of the binoculars. There are other lenses and prisms inside the binoculars here which cause the image to be enlarged.
- **D** shows the right lens adjusting ring. This focuses the right eye piece to adjust for any difference in vision between your right and left eye.
- **E** shows the centre (main) focusing wheel. Use **E** to adjust for your left eye, then turn **D** to focus your right eye. After that, all you need to do to focus both eyepieces together viewing a new distance / scene, is to adjust **E**.





4. How to focus an object?

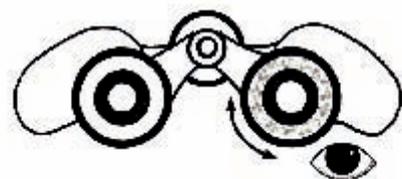
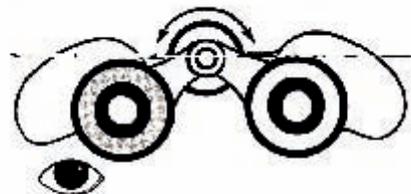
Teaching suggestion

Use **poster 5.3** (below) to explain the stages in focusing a pair of binoculars.

Reinforce this procedure by repeating and demonstrating the instructions, and by allowing individual trainees to go through the procedure, saying out loud what they are doing. (It is advisable to stand with your back to the trainees while you demonstrate, so that your right hand / eye is on the same side as theirs, else you and they are liable to get confused).

How to focus binoculars and how to adjust them to suit your eyes

1. Hold the binoculars with the eye-pieces towards you, and the centre-focusing ring at the top. Use both hands.
2. Place the eye-pieces against your eyes and adjust the space between the eyepieces so that you see a single sharp-edged circle.
3. Lower the binoculars. With your eyes, look at an object e.g. a tree about 50m away.
4. Without moving your head (i.e. continue looking at the object) bring the eyepieces to your eyes. You should see the object even if it is not clear.
5. Practice lifting the binoculars to your eyes without moving your head.
6. Now, looking at the object through the binoculars, close your right eye. You can also place a lens cap, or your hand over the right lens.
7. Turn the centre focusing wheel until the object becomes clear in your left eye.
8. Now open your right eye and close your left eye. Turn the right eye-piece adjusting ring until the object comes into clear focus.
9. Open both eyes. You should now be able to look at any object and focus by turning the centre-focusing wheel only.



MONITORING GREATER ONE-HORNED RHINO



Module 6 Photography

RATIONALE

Photography is essential for successful monitoring when observing the Greater One-horned rhino (and other wildlife) in the field. Important information on identification features in close detail can be recorded for master ID files/database to aid in individual identification of rhino. It can be difficult to get close to wildlife to take photographs of them, but modern digital cameras make this easier and are a useful aid providing there are not any problems with deep bush or tall grass.

There are a number of problems using cameras for photography in the field. They are not water resistant, susceptible to shock, relatively fragile and must be protected against dust, sunlight and carefully carried. Training is required in good preparation, maintenance and care to ensure that the provided equipment is used effectively in the field.

Modern cameras have made taking photographs much easier, however good training of front line staff will be required in the field to successfully take pictures for rhino monitoring and protection.

PURPOSE

A person assessed as competent in this module will know:

- How to look after the camera and prepare all the equipment needed to take a picture in the field.
- How to use the camera to take suitable pictures required for monitoring/protection.

LEARNING ASSUMPTIONS

- No assumptions except that the learner can understand the language the module is presented in.



SPECIFIC OUTCOMES

- The value of photography to wildlife monitoring/protection should be clearly known
- To know how to prepare and care for all the camera equipment provided
- To make the best use of photographic equipment to supply important picture information to aid rhino and other wildlife monitoring in the field.

ASSESSMENT CRITERIA

The assessment should be made by practical testing in the care and use of equipment, with a field test to examine the standard of photography.

By practical testing – the first practical test will require the trainee to show the examiner they can operate the camera effectively by locating and demonstrating the functions needed for use when taking pictures in the field. The trainee must also demonstrate the ability to hold the camera securely. A second practical test will be used to assess the photographic skills of the trainee by the examiner. The trainee will supply pictures ideally taken in the field which will need to show some use of the zoom, the ability to hold the camera steady and to be able to accurately focus the camera.

There will be no pass mark accredited to this module. To become an accredited photographer the trainee must show to the satisfaction of the examiner that they understand the care and preparation of equipment required and are capable of successfully operating the camera to take pictures in the field.

PERFORMANCE SYSTEM

- It is not essential to have passed this module to be able to become an accredited rhino monitor. However, to become a field photographer, trainees should complete this module including the assessments.

EQUIPMENT

ITEMS SUPPLIED

- Poster 6.1, 6.2, 6.3.

ITEMS NOT SUPPLIED

- Digital or film camera with batteries.
- Prestick/bluetack for hanging up posters.
- Pencils, sharpeners, erasers for trainees.
- Non-permanent marker pen for writing on posters.



1. What is the purpose of the photography?

Value of Photography

Photography is a very important aid to record information whilst monitoring wildlife. It can help supply important information on identification features of individual rhino to be stored in a master ID file/database. It can be useful for law enforcement (e.g. when collecting evidence for prosecution) and for habitat management.

In addition,

- It can be difficult to get close to a rhino.
- It is often not safe to be close enough to a rhino for individual identification for database/research purposes.
- Evidence for law enforcement may be difficult to present and may be damaged in time.

Teaching suggestion

Use **poster 6.1** (below) to show how photography can supply useful information.

Describe with the help of this poster how pictures can provide useful information such as identifying individual rhinos by their ears, tears, horn shapes and body marks. Explain how the use of pictures can help determine the age and sex of a rhino and give important information about the health of them and the habitat in the area the picture was taken in.





2. Preparation and care of camera equipment

Teaching suggestion

Demonstrate how to prepare/care cameras for the field using the steps below.

Equipment required for a filed Trip

- A digital/film camera with the correct battery/batteries.
- A memory card or film to take pictures.
- A spare battery or set of batteries.
- A suitable cloth to clean the lens.
- A rucksack, camera case or a pocket to protect the camera in.

Equipment checks required

- 1) The camera is working properly with the batteries fully charged and working on full power.
- 2) There is enough space on the memory card or you have enough film to take pictures in the field.
- 3) You must have a spare battery or set of batteries should they run out.
- 4) A clean non-abrasive cloth to clean the camera lens of moisture or dust.
- 5) A rucksack, camera case or a pocket to protect the camera in deep bush.

Saving battery power

Listed below are the common reasons why the batteries power is used up faster:

- 1) The power is left on without using the camera to take pictures.
- 2) Using the flash takes more battery power for the camera to operate.
- 3) Leaving a pop up flash ready for use when pictures are not being taken.
- 4) Frequent review of images or use of the rear screen to access the menu.
- 5) Continual use of autofocus when it is not necessary or may be difficult for it to focus completely.

Care of the camera/ equipment

Modern cameras require great care and they must be stored correctly.

Taking care of your camera must include:

- 1) To protect the camera from shock and damage at all times.
- 2) To protect the camera from dust, sunlight, rain and when travelling in deep bush or tall grass.
- 3) When camera is no longer in use after a field trip the batteries should be removed as they may lose power/charge and may corrode over a long time.
- 4) The camera should be stored in a cool, dry place and away from direct sunlight.
- 5) Avoid touching the rear screen or the glass elements of the lens with your fingers/hands.
- 6) When operating the camera handle it carefully as certain parts are fragile and difficult to repair.
- 7) Be aware the lens has many coatings on its front element which can easily be damaged by wiping it too abrasively and often.
- 8) Report any faults or damage such as the dropping of the camera in water as soon as possible.





3. The important parts of a camera

Teaching suggestion

Use **poster 6.2** (below) to explain the different parts of a camera. It is advisable to allow trainees to find and look at these parts on their own camera and reinforce by questioning.

1. Lens
2. Flash
3. Grip



4. Viewfinder
5. Screen
6. Camera/Review Button
7. Menu Button
8. Display Button
9. Function Set Button



10. On/Off Button
11. Shutter Release
12. Zoom
13. Main Exposure Dial



14. Battery Compartment
15. Memory Card Compartment
16. Tripod Socket
17. Batteries. Please note direction of batteries male and female +/-





4. Operation of a camera

Why is it important to train people?

Cameras for wildlife monitoring are limited in number and therefore the trainee must display the ability to make the best use of the equipment provided.

What personal requirements are needed?

A successful field photographer requires a number of attributes and skills. Field photographers must have a good wildlife/field knowledge, the ability to deeply concentrate and observe wildlife without distraction, to be decisive in choosing where and when to take a photograph, to be patient if it is not possible to take a photograph quickly, be disciplined enough to remember the types of pictures required and remain calm around wildlife when taking pictures of it at all times.

The basics

Before going out into the field any trainee must know how to effectively use the camera.

Teaching suggestion

Use a camera to demonstrate to each trainee individually.

If enough cameras are available give each trainee one to use and demonstrate to them how to operate the camera and then watch them do this under your supervision.

Important parts of the camera to be demonstrated

- 1) The on/off power button.
- 2) The battery compartment: for the removal /replacement of batteries.
- 3) The memory card compartment: for the removal/replacement of a card.
- 4) The main operation switch: For the control of how the camera will operate.
- 5) The shutter release button: Used to focus the camera and take pictures.
- 6) The zoom control: To magnify the lens when required.
- 7) The menu button: To adjust certain camera settings if required.
- 8) The image replay button: To check an image has been taken successfully.
- 9) The flash: To use it only when necessary and not if it disturbs wildlife.



Operation of the camera to take pictures

Ask each trainee to operate the camera and ensure they are capable of holding it securely.

Teaching suggestion

Organise field trips to take pictures of wildlife if you can. Set up exercises to encourage the use of the zoom and good focusing of the lens.

Important information for trainees:

- 1) Use the zoom as the rhino is likely to be a long distance away.
- 2) Always make sure the camera is being held securely.
- 3) Do not use the flash whenever possible.
- 4) Be patient and wait to take a picture as not to disturb the rhino.
- 5) Try to find a better view if it's difficult to take a picture.
- 6) Have the camera ready to take pictures upon approaching the rhino as there may be only one chance to get a picture.

Understanding light

Use the sun to demonstrate the direction of light.

Teaching suggestion

The safest direction of sunlight to take a picture is when it comes from behind you. When the sun is low in the sky either early in the morning or late in the afternoon more detail can be seen which is very helpful for individual identification of rhino. Sunlight coming directly at you normally results in a poor quality picture. As the amount of light available falls it becomes harder to take pictures especially if the zoom is used. Try to find something to support the camera with to help avoid shaking the camera and spoiling the picture.



Focusing of the lens

Sharp pictures are achieved by using a focus point which can be seen through the viewfinder or on the view screen and are most commonly placed in the centre of the image. If this is not used the camera may not focus in the right place.

Automatic focussing of the lens becomes difficult in deep grass or bush as it is not easy to decide where the focus should be. The photographer should wait until a clearer view of the rhino is available to take a successful picture.

Light metering

A camera can automatically work out settings to take a picture however bright the light is. However it makes mistakes so trainees should avoid pointing the camera at very bright objects such as the sky and very dark ones such as deep shadows or black coloured objects.

The use of flash

Using flash automatically is really a substitute to increase the amount of light in a picture and should be used only when it is absolutely necessary as it may disturb wildlife.

GPS and a camera

When operating a camera in the field, a separate hand held GPS unit can be used to record the exact location of pictures after they have been taken. This may be very useful for research as it would allow detailed information about an individual ID rhino's movement to be assessed.

Protection of a camera

Using a camera in the field exposes it to dust, temperature, moisture and accidental damage. To operate a camera successfully trainees must understand to protect the camera correctly when not in use. A rucksack or camera bag must be used in the field. The trainee must also report any faults with the camera to the appropriate personnel.



Good field pictures for rhino conservation

Use **poster 6.3** (below) to demonstrate to trainees the type of images required for conservation purposes.

Teaching suggestion

Trainees must be given a clear description of the images required for rhino monitoring and management.



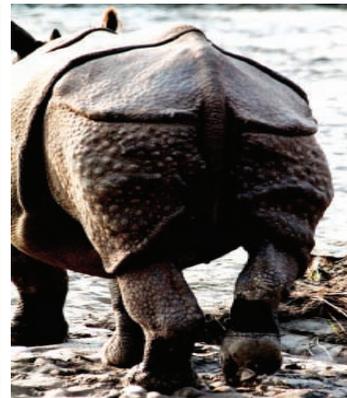
1) A clear picture of the rhino without too much bush around it.



3) Identification from the ears, horn and skin folds



2) Pictures to determine the possible age and sex of a rhino.



4) Identification from the skin knobs, tail etc.

Testing suggestion

Conduct a field practical and ask each trainee to take and supply at least five rhino/wildlife pictures for assessment.

The trainees must show they have the ability to operate the camera successfully in the field. Their pictures should be in focus, show they are able to securely hold the camera, take at least five images that are useful for rhino conservation purposes, take pictures in dull and bright light and have a clear understanding of the images required as accredited rhino monitors.

MONITORING GREATER ONE-HORNED RHINO



Module 7 Ageing Rhino

RATIONALE

Accurately classifying the ages of rhinos seen is a key component of monitoring because ...

- Age is one of the things used to help distinguish between different animals;
- It provides valuable information (along with sex information) on the growth of the population, and how often calves are being born;
- Knowing rhinos' ages helps us understand factors such as territorial behaviour, ranging patterns, calving success and risks of dying in rhino;
- By learning and using the standardised age class system data can be compared throughout the region and over time;
- If ageing is not assessed and recorded correctly, it is useless.

PURPOSE

- This module teaches field rangers the importance of correctly ageing rhinos and the need to use a standardised system. It describes a basic standardised 3 age class system (calves, sub-adults and adults) recommended and used by the AsRSG. In the future a advanced 6 age class system will be added to age calves more accurately.

LEARNING ASSUMPTIONS

- The learner must be able to find, safely approach and observe rhino in the field and he must be able to use binoculars. The learner must know why they are monitoring rhino and the importance of data quality. The learner must also understand the language the module is presented in.



SPECIFIC OUTCOMES

1. Frontline staff must know that it is important age rhino correctly and to use the standardized system.
2. The learner will demonstrate an understanding and knowledge of the standardized age class system.
3. A competent trainee will be able to place rhino seen during monitoring into the correct age category.
4. Alternatively if the quality of sighting was not good enough, the trainee should always indicate that the age could not be reliably determined. A competent observer will never guess.

ASSESSMENT CRITERIA

- By verbal or written tests:
 - demonstrate that they know the importance of correctly ageing rhino using the standardised age classes;
 - age class the various pictures of rhinos;
 - the trainees must get a minimum of 80% to pass this module.
- By field testing - the trainee must correctly determine the age of a minimum of 6 rhino calves, sub-adults, adults in a field situation and must correctly record these on the rhino sighting forms. The instructor must independently determine the age classes.

Marking system:

>= 80% = accredited

70% - <80% = nearly competent (re-testing needed)

less than 70% = not yet competent

PERFORMANCE SYSTEM

- This is a key module. Trainees cannot become accredited unless they can demonstrate an ability to correctly age rhino using the standardized system. Non-accredited observers' field data should not be used for detailed population age structure and related analyses. Advanced age classes when developed and implemented for more exact ageing of calves should only be used if provided by experienced master observers.



EQUIPMENT

ITEMS SUPPLIED

- Poster 7.1, 7.2.

ITEMS NOT SUPPLIED

- Binoculars.
- Prestick/bluetack for hanging up posters.
- Pencils, sharpeners, erasers for trainees.
- Non-permanent marking pen for writing on posters.
- Field recording booklet.



1. Why is accurate standardised ageing important?

Why knowing the age of rhino is important

There are a number of features which make one rhino different from any other. [sex, size, age, horn and ear shapes, skin folds, epidermal knobs, damaged tails, scars, deformities, group composition]. All of these features are important, but **age** and **sex** are very important because:

- Cow-calf combinations may in some cases be distinguished by their different aged calves.
- The survival of a calf can be tracked through time. Nutritional stress or predation could claim calves.
- The number of cows of definite calf-bearing age tells us how fast the population can potentially grow.
- The average actual age at which females first calve tell us how healthy the population is. If there are too many rhinos for the available food in an area, young females' first calves can be delayed.
- Age/Sex data also indicates whether you are likely to have enough or too many adult breeding bulls, now and in the future.
- Such data can give better insights into age-related behaviour. Male aggression and dominance changes with age. The chances of death through poor nutrition, predation and fighting also changes with rhino age.
- If different age class categories are used in different reserves or at different times, it becomes impossible to properly compare information. For this reason it is essential that the AsRSG recommended standardised age category system is used in all areas, to gain a long-term understanding of rhino population dynamics in our areas and allow comparison between areas during rhino status reporting.



2. The standardized age class system

The use of standardized age classes is essential

If a rhino is identifiable and its birth date is known accurately, it is possible to age it accurately. However, in many situations rhino are not frequently seen and it is not possible to establish the birth date of each rhino accurately. In such cases rhino may be seen for the first time at any age, and judging their approximate age, or age-class, becomes important.

For observers with limited experience (general staff, local community) a basic 3 age class system has been described and adopted by the AsRSG. For the more experienced observers (rhino scouts) extra three classes will be added in the near future to age calves more accurately following extensive field studies. These will be based on the body size of rhino relative to that of an adult female, and the length of horns and will represent the *average* appearance of GOH rhino in different age classes. Sometimes, rhino grow faster or slower for their age. However, the standardized system should still be used where birthdates are unknown, as on average it will produce correct age estimates in most situations.

The standardized basic 3 age class system

- **Calves: A new born maximum up to about 4 years (dependent rhino with mother)**
- **Sub-adult: independent rhino up to about 6 years**
- **Adult: Greater than 6 years**



3. Differences between sub-adult and adult rhino

Teaching suggestion

Use **poster 7.1** (below) to explain the difference between sub-adult rhino and adult rhino.



Characteristic features of adult rhino: Body of an adult rhino is massive and well built. Neck folds (3) are thick and fully developed. Upper rump folds are thick and clearly visible. Shoulder and lower rump folds reach down to the elbow and knee, respectively. Both sides of the rump and shoulders contain distinct knobs. Ribs are distinct and back is slightly lowered. Horns are fully grown and mostly eroded due to rubbing in tree trunks and searching for food. Cuts on ears and body are common. Adult males are obstinate and defensive while approached by an elephant. Adult females with small calf are spooky and some times act aggressive to protect the calf.

Sub-adult: Body size is generally small and clean. Neck folds are not well developed. Third neck fold near the shoulder is not distinct. Horns are not totally grown and mostly look like a small mound. Rump and shoulder folds are not well developed. Knobs on rump and shoulder are at the early stage of development. Ribs are buried underneath the skin and not distinctly visible. Both male and female sub-adults are very spooky and some time seen in a small group of 2 to 3 animals.

Teaching suggestion

Test trainees using **poster 7.2.** (below)



MONITORING GREATER ONE-HORNED RHINO



Module 8 Sexing Rhino

RATIONALE

- It is important to know the number of male and female rhino in a population (along with their age classes). This information can be used to interpret the rate at which the population is growing, and its future potential rate of growth.
- However, if the sex information that is collected is incorrect, it is useless.

PURPOSE

- This module provides the information necessary for competent trainees to distinguish the sex of a rhino, and to correctly record this information.

LEARNING ASSUMPTIONS

- No assumptions except that the learner can understand the language the module is presented in.

SPECIFIC OUTCOMES

A competent trainee must ...

1. understand the importance of accurately sexing rhino,
2. know how to positively sex greater one-horned rhino in the field,
3. be able to record this information correctly, and
4. know they must **never** guess the sex of a rhino (if unsure use "unknown" or "?").



ASSESSMENT CRITERIA

This assessment should be by verbal or written and practical testing (field test).

- By means of verbal questioning, trainees should show that they know the importance of correctly determining and recording rhino sex.
- Trainees should be tested on at least 10 rhino using poster 8.2; the trainee must correctly determine the sex of these pictures and record these on a test sheet.
- By field testing - the trainee must correctly determine the sex of 5 rhino found in the field, and must correctly record these on the rhino sighting forms.

It is important that trainees record the rhino sexes as unknown if they cannot properly identify the sex of the rhino in these tests.

Marking system: one point is given for each rhino correctly sexed, as well as for recording that the sex of a rhino was unknown and could not be determined when this was really the case (i.e. the sex was really not visible).

>= 9 out of 10 = accredited

7 or 8 out of 10 = nearly competent (re-testing needed)

6 or less = not yet competent

PERFORMANCE SYSTEM

- This is a key module. Trainees cannot become accredited unless they can demonstrate an ability to correctly sex rhino. If they cannot do this, their rhino sighting data should not be used for detailed population age structure and related analyses.

EQUIPMENT

ITEMS SUPPLIED

- Poster 8.1, 8.2.

ITEMS NOT SUPPLIED

- Binoculars.
- Prestick/bluetack for hanging up posters.
- Pencils, sharpeners, erasers for trainees.
- Non-permanent marking pen for writing on posters.
- Field recording booklet.



1. Why sex a rhino?

Knowing the sex of a rhino is valuable

- Sex is one of features which make one rhino different from any other [also size, age, horn shapes, ears, tail, skin folds, group composition].
- The breeding potential and growth rate of the population is determined mainly by the relative numbers of males and females of different ages that are present. Male and female rhinos behave differently in terms of ranging patterns and aggression to each other.



2. Sexing rhino in the field

A rhino will be either a male or a female,

The sex must be determined by *actually seeing the sex organs (external genitalia)*.

There is no other completely accurate method. Binoculars should be used when sexing in the field.

But

When looking at a rhino in the field, it is not always possible to be sure of its sex.

Check the sex of each animal in a group

Record sex of the animal as:



For a male

For a female OR

If you cannot actually see the sex organs (experienced observers see below).

Don't make assumptions and don't guess

If you are not sure put '?' - do not guess or make assumptions—you could be wrong.

- A large animal with a small animal is **not** automatically a cow and calf. It could be a big bull with a young female!
- A single animal is **not** automatically a male. It could be a female without a calf.
- Adult males and females may differ in the thickness of their necks and horn bases, but these differences can be subtle and unreliable.



Emphasise that monitoring data is only useful if it is accurate.

Experienced observers

Experienced observers can also determine sex through careful observation of

- Size of neck folds and girth of neck (which are more pronounced in adult males and these extensive primary and secondary neck and shoulder folds may serve for display in head-to-head confrontations between rival males).
- Urination (dominant males engage in squirt urination).

Teaching suggestion

Use poster 8.1 to show the above.



3. What is the difference between male and female rhino sex organs?

Teaching suggestion

Use **poster 8.1** (below) to explain the differences between male and female rhino.



It is quite difficult to decide what sex an animal is. The tail normally obstructs clear sighting of the sex organ. Unlike in African rhino species, the Greater One-Horned rhino does not normally curl up its tail whilst running away from an observer.



When looking at the rear of a rhino carefully look to see if you can see ...

- **a vulva (female)**
- **penis and scrotum (male).**

These are the diagnostic features.

When the rhino is slightly side-on to you, sometimes you can see the male penis as the rhino walks or stands. Take care not to confuse the udders of a lactating female with the penis of a male.

A female's vulva can sometimes be seen in a side-on view if she lifts her tail slightly. The anus is directly below the tail and should not be confused with the vulva which is a bit lower down.

Also...

- Males spray urine from the penis which hangs low between the legs.
- Females spay or "dump" urine from higher up, a bit below the anus.

Remember:

although flehmen is most common in males, females may also sometimes flehmen. These are therefore not definitive and reliable indicators of sex.

Emphasize the dangers of guessing a rhino's sex, and of sexing a distant rhino without the use of binoculars.

Teaching suggestion

Use every opportunity during training patrols to sex rhinos in the field. Test the trainees using **poster 8.2** (below)



Different features to differentiate sex of rhino

MONITORING GREATER ONE-HORNED RHINO



Module 9 Identification Features and Use of Rhino Sighting Booklet

RATIONALE

- A rhino can contain distinct body features which can be used to identify it. Rhino monitoring in many rhino areas is based on actually identifying and knowing individual rhino where possible in the population.
- The Rhino Sighting Notebook is a very useful aid for recording the identification features of rhino in a field situation. Without it, details which would have been useful are invariably forgotten by the observer.
- Recording identifying features allows knowledge to be transferred between people, and acts as a check that everyone is talking about the same named rhino over time, as identifying features may change over the years.

PURPOSE

- Trainees are trained to look for and draw/note any features such as horn shape, ear tears, skin folds, deformities, body scars or tail shape that could identify a rhino.
- They are trained to correctly fill in all the information needed in rhino monitoring into their rhino sighting booklet.

LEARNING ASSUMPTIONS

- The learner must be able to find, safely approach and observe rhino in the field and he must be able to use binoculars.
- The learner must know why they are monitoring rhino and the importance of data quality.
- The learner must also understand the language the module is presented in.



SPECIFIC OUTCOMES

- Trainees should know how to systematically search for the various characteristic body features, markings or deformities on sighted rhino, and know how to record these in the rhino sighting notebook.
- They must be able to sex and age all of the members of a group of rhinos and to record the group composition in the rhino sighting notebook.
- They must also be able to use the rhino sighting notebook to record information on sighting conditions, habitat type, rhino behavior/activity and for master observers the body condition of the observed rhino.
- They must know how to fill in date, time and location information for sightings.

ASSESSMENT CRITERIA

- By written test – the trainees must get a minimum of 80% to pass this module. Trainees have to fill in a set of rhino sighting images (provided with this training material) into their rhino sighting booklet. Display one “sighting” at a time to the trainees. Trainees must then fill in pages from their rhino sighting booklet for each sighting.
- By field testing - the trainees have to fill into their rhino sighting booklet 4 sightings of real rhino in the field. A single sighting can be one rhino alone or two or more rhino together (i.e. a group). The trainees must complete the sighting forms using whatever information they gathered during the sighting. You the instructor must also record the information to use to compare against the trainees’ records.

Marking system: Each form starts with 30 points assigned. Points are subtracted for each piece of information not filled in - the number of points subtracted is shown below (e.g. 2 points are subtracted if the observer’s name is not filled in, and one is subtracted if a rhino side view box is not filled in (tick or cross).

Form points:

- ≥ 26 point = accredited
- 21-26 points = nearly competent -retest
- ≤ 20 points = not yet competent.

Take all of a single trainee’s forms for all his “sightings”. If 4 or more forms get “not yet competent”, overall trainee score is “not yet competent”. If more than half the forms are “accredited” and none are “not yet competent”, the overall trainee score is “accredited”.

In all other cases the trainee is nearly competent and must be re-tested.

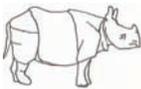


GREATER ONE-HORNED RHINO SIGHTING FORM

Seen?



Seen?



Protected Area _____ Date _____
 Observers _____ Time (24 hrs) _____
 Location (Area/Block No.) _____
 GPS Location UTM Eastings:

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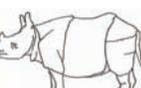
 UTM Northings:

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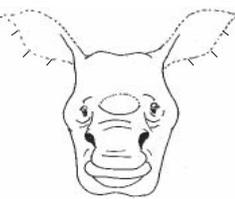
Seen?



Seen?



Seen?



Total:	ADULT	SUBADULT	CALF
Male	♂		
Female	♀		
Unknown	?		

Sex: (if seen) ♂ ♀ ? UNKNOWN

Age: ADULT SUBADULT CALF

Period Observed: ____ (min.) Distance ____ (m)
 Binocs? Y / N Disturbed? Y / N
 Body Condition Score: 1_2_3_4_5 (1 to 5 incl. ½ scores)
 Habitat: Tall grassland / Short grassland / Sal forest /
 Riverine forest / Wetland / Other
 Activity: Mating / Feeding / Resting / Wallowing / Other





PERFORMANCE SYSTEM

This is a key module. It is essential to have passed this module to be able to become accredited in rhino monitoring.

EQUIPMENT

ITEMS SUPPLIED

- Poster 9.1, 9.2, 9.3, 9.4, 9.5, 9.6, 9.7, 9.8.

ITEMS NOT SUPPLIED

- Hooks on wall or prestick/bluetack for hanging up posters.
- Pencils, sharpeners, erasers, paper for trainees.
- Non-permanent marking pen for writing on posters.
- Binoculars.
- Rhino sighting booklets.



1. Rhino body features in identification

There are a number of features which make one rhino different from any other; [sex, size, age, horn and ear shapes, skin folds, epidermal knobs, damaged tails, scars, deformities, group composition].

In this module trainees will be shown how to record these details and all of the others they have learnt, in the Rhino Sighting Booklet.

It is very important that trainees record everything fully and accurately. If they are unsure of the details of any feature, they should write that they are unsure (e.g.?).



2. The rhino sighting booklet

Emphasise to them that they *should not guess*.

The booklet has been put together to form a convenient way of recording all of the details about a greater one-horned rhino. It is also small enough to fit into a shirt pocket so it can be carried by field scouts at all times.

Each rhino area can re-design and adapt the booklet to meet their specific need (e.g. to include local languages - spaces for additional data etc).

Start using pages from the middle of the booklet.

Please note - for sightings involving more than one rhino, one page is filled out for each rhino in the group.

This includes calves, *however for young calves (< 1 year) it is also acceptable to only record a calf (and with sex and approximate age in months) in the group composition box of the mother's card*. Also write in the notes that this female has a small calf of the approximate age. For older calves (> 1 year) and for sub-adult rhino, each should have its own page completed.

Use the **Rhino Sighting Booklet** to demonstrate how a record form is on the centre pages and how these can then be pulled out and handed to the field coordinator.

Use a new page for each rhino in a group ...

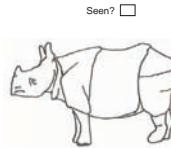
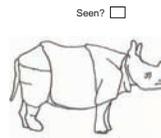
Teaching suggestion



3. Information section & front view of ears and horn features

Teaching suggestion

Fill in the following information (make up an example) on the **poster 9.1** (below) and get trainees to fill in their rhino sighting form in their booklet.



GREATER ONE-HORNED RHINO SIGHTING FORM

Protected Area _____ Date _____

Observers _____ Time (24 hrs) _____

Location (Area/Block No.) _____

GPS Location UTM Eastings:

--	--	--	--	--	--	--	--

UTM Northings:

--	--	--	--	--	--	--	--

General information

- **Rhino area:** Record the name of your reserve.
- **Date:** Record the date you observed the rhino as date-month-year, e.g. 1st March 2007 should be "01.03.07" or "01 March 07".
- **Observers:** Record the names of the observers of the rhino.
- **Time:** Record the time at which you saw the rhino e.g. "17.05 p.m."
- **Location (Area/Block No):** Record the area or block no where you saw the rhino. If you don't have a GPS then you should enter a place name of the location if known.
- **GPS Location:** Using your GPS unit, record the location, e.g. UTM Northing: "3045990", UTM Easting: "5420601".

Ears

- Indicate using a tick in each seen box if the ear was seen properly or with a cross if an ear was not properly seen.
- Observe ears carefully and accurately draw in the size, shape, angle and position of any ear-markings. If there are no ear markings, it is very important to note this. Also make sure to record the markings in the correct ear.



Teaching suggestion

Use **poster 9.2** (below) to go through some of the ear-mark variations which can occur in the Greater One-horned rhino.



Greater One-Horned Rhino Ear Patterns

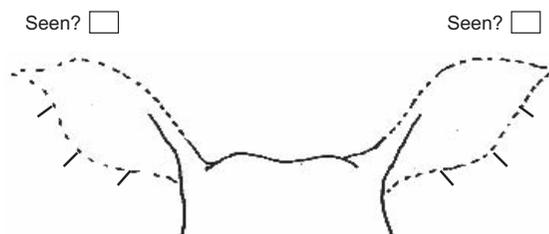
Left or right ear?

Use **poster 9.3** (below) draw a mark on one ear of the rhino facing you. Ask trainees which ear to draw it on when the rhino is facing away from you - check by holding your own ear, turning to face away, than drawing it on the rhino facing away. Get trainees used to *always* calling right and left by refereeing to the *rhino's* right and left side or ear, never to their own right or left, when talking about a rhino and its ear marks. This will prevent confusion.



Teaching suggestion

Use **poster 9.4** (below) to show the different parts of the ear. Then using **poster 9.2** select an ear marked rhino and demonstrate the steps to draw a mark. Follow the steps:





- Step 1** Use **poster 9.3**, draw a mark on one ear of the rhino facing you.
- Step 2** Does one or both ears have a feature? If neither do, the ears are “clean” - note this down, but you must check this carefully to be sure.
Do one ear at a time
- Step 3** If there is a mark/tear, is it on the outside edge or the inside edge? Is it on the upper half or the lower half? In which quarter (1/4) of this half is it - upper or lower?
Where on the ear is the mark/tear?
- Step 4** Make a small mark on the *edge* of the ear where you see the start of the mark/tear is positioned. Do the same (small mark) to show where the tear ends.
Mark the location of the start and end of the mark/tear
- Step 5** In which direction does the mark/tear point? Try to get the angle right....
Make a mark to give the direction
- Is the top line of the mark/tear horizontal (level with the ground)?
 - Is it pointing upwards?
 - Is it pointing downwards?
 - Is the bottom line of the mark/tear horizontal (level with the ground)? (etc.)
- Step 6** How deep into the ear does it go?
Make a mark to give mark/tear depth
- ½ way into the ear?
 - More than ½ way?
 - Less than ½ way?
- Step 7** Draw the mark/tear using your small marks as guides, taking care to make it look the same shape as the real ear mark/tear (e.g. is it wide or narrow?)

Check your drawing with the example, and change it if necessary.

Repeat steps 3-7 for other ear marks/tears.

NOTE: by means of practice, aim to make the use of these steps automatic in trainees, so that the observing, judging and drawing aspects come together as a single, swift process.



Horn from the front view

Draw in any horn features as seen from the front, e.g. skewness, dents, very thick base.

Horn shape and size are one of the features which can distinguish individual rhino. For ID purposes, it is the shape and the relative angle and size of the horn which can sometime be distinctive. They are also helpful in determining the age of sub-adult or younger rhino.

Always take good photographs of the rhino features as they will be very useful for ID

A problem with the use of horns is that they change in appearance, by growth, wear, and by severe damage.

Drawing horn features well is also rather difficult. Where possible take good photographs of the horn (and the other body features) as they will be very useful in identification.

Use **poster 9.5**, to illustrate the following differences between horns:

- Length (horns may be long or short).
- Thickness (some horns are thick and others are thin; some horns are much thicker at the base than others).
- Curvature (some horns are relatively straight, whereas others have a sharp backward curve; some horns may lean).
- Fine shape and indentations/cracks/bumps.
- Angle (horns may rise up from the "top" of the nose, or they may appear to lean forward a bit).
- Alignment (seen from the front, the horn may be exactly in line or may be skewed towards the left or right).





A brief comment on "observing"

The key to accurately observing and drawing both ear-marks and rhino horn, is to achieve a state of calm but intense concentration on the rhino's features. Don't be overcome by the urgency of having to instantly record every detail, but try to deliberately focus your mind and attention on each feature one at a time, and on the whole animal. For horns, you will be monitoring "spatial" things - heights, slopes, curves, angles, irregularities.

The ability to draw good rhino horn features mainly comes with lots of practice

Choose the rhino photographed from the front from **poster 9.5** to draw its horn on the centre figure of **poster 9.1**. Get the trainee to get lots of practice by drawing the different rhino horns from the **rhino horn poster 9.5**, going through each step with them at first.

They can draw the rhino horn into pages from their rhino sighting booklet. Watch how each person proceeds and suggest where a trainee needs to look more carefully at the horn and adjust their drawing—gently provide assistance if needed.

Collect all drawings of some of the more unusual rhino horns and tape them to the wall for all to see. Allow the trainees to comment on their drawing progress and discuss what ideas they had that helped them draw the horns well, or where they were having difficulties.

4. Sex, age and sighting conditions



Use poster 9.6

Total:		ADULT	SUBADULT	CALF
Male	♂			
Female	♀			
Unknown	?			

Notes: _____

Sex: (if seen) ♂ ♀ ? UNKNOWN

Age: ADULT SUBADULT CALF

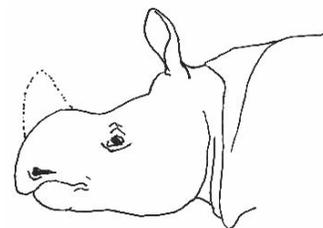
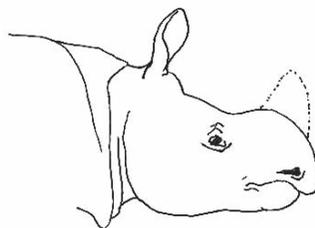
Period Observed: ____ (min.) Distance ____ (m)

Binos? Y / N Disturbed? Y / N

Body Condition Score: 1__2__3__4__5 (1 to 5 incl. ½ scores)

Habitat: Tall grassland / Short grassland / Sal forest / Riverine forest / Wetland / Other

Activity: Mating / Feeding / Resting / Wallowing / Other





Rhino sex

- **Sex:** Draw a circle around the sex of the animal which you observed (who's ID features you are recording). Remember to put this down only if you actually saw the sex organs or mammary glands or urination (adult males squirt urinate). *Only in the case of a small infant rhino (< 1 year) closely associated with an adult rhino with no other rhino around can you safely assume that the adult is a female- its mother.* In all other cases, **never guess the sex of a rhino.**

Draw a circle around “? Unknown” if you cannot be sure about the sex.

Note that master observers with significant experience can sometimes tell adult males apart based on several characteristics. Adult males are larger in stature and bulk than adult females. The horn is usually wider at the base in males than in the females, and is more often broken off or worn down by rubbing on trees and bushes. Adult male also differ from adult females in having short, thick neck and more deeply folded skin around it and a bigger bib beneath the chin. **It is important that master observers use care when identifying sex based on these features.**

Rhino age

- **Age:** Draw a circle around the age (calf, subadult, adult) of the animal which you observed. Draw a circle around “? Unknown” if you cannot be sure about the age. Never guess the age of a rhino.

Sighting conditions

- **Period observed:** Enter the time period the rhino was observed (in minutes).
- **Distance:** Record the distance you were from the rhino during the main observation period (in meters).
- **Binos?:** Indicate by drawing a circle around Y (yes) or N (no) whether or not you used binoculars to observe the animal.
- **Disturbed?:** Indicate by drawing a circle around Y (yes) or N (no) whether or not the rhino was disturbed by your presence.

These optional additional information can be used to determine whether certain factors affected the quality of a sighting or not. However the key question remains—were the actual rhino features seen properly to get a good ID?

Rhino body condition, activity and habitat



- **Body condition:** Draw a circle around the numbers 1, 2, 3, 4, 5 to record the estimated body condition score of the rhino. You can also draw a circle around two numbers to indicate a score in between these values. For example, a circle drawn around the numbers 1 and 2 indicates a score of 1.5. **You must only record this information if the lighting condition is good and you have been well trained to do this.**
- **Activity:** Draw a circle around the activity (Mating, Feeding, Resting, Wallowing, Other) of the rhino you are observing. Record "Other" if the animal is not doing any one of the following: Mating, Feeding, Resting or Wallowing.
- **Habitat type:** Draw a circle around the habitat (Tall grassland, Short grassland, Sal forest, Riverine forest, Wetland, Other) in which the rhino was seen. If you have indicated "Other" then provide further information in the Notes field.



5. Group composition

Teaching suggestion

Use **poster 9.7** (below) to show how the Group Composition box is filled in - fill in the group box for the group of rhino above the box.



Total:		ADULT	SUBADULT	CALF
Male	♂			
Female	♀			
Unknown	?			



If the rhino is the member of a group, fill in the *total number of animals, including this rhino*, and the ages and sexes of this and all the other rhino.

For example the above group was 1 adult female, 1 calf (<1 year) of unknown sex. Fill in 1, 2 or whatever the correct number of rhino in the given age/sex category) in the relevant square for each of the rhino in the group.

Link calves to mothers

Important—If there was one or more calves and more than one adult female, indicate with a line linking the two relevant records which mother belongs to which calf.

Master observers—record the age in months of <1 year calves

For rhino calves (<1 year), if possible fill in your estimate of the actual age in months of the rhino calf. Only do this if you saw the calf well and can make a good estimate of its age.

It should be emphasized that the truthfulness of recording is the critical factor. Inaccurate or incorrect recording defeats the object of the exercise.



6. Horn details (side view)

Horn from the side view

The length and shape of the rhino's horn is drawn in on the rhino head side views. Any distinctive markings should also be drawn. (Draw in an example for trainees - explain that they need only fill in one of the head side views unless the horn had a different feature from the other side).

Teaching suggestion

Use **poster 9.6** to draw examples of rhino horn taken from **poster 9.5**. Go through all the following steps to show how to draw a rhino's horn accurately:

Step 1: Look at the horn height relative to the height (length) of an erect ear, and its angle to the front face of the rhino's nose. Try to "imprint" the appearance of the horns onto your mind first by observing, them. Then draw them.

Step 2: Look at the angle between the rhino's relatively flat nose and the base of the horn. Is the horn leaning forward, more straight up or backward compared to the front face of the nose? Make a faint line at the horn base to show this angle of leaning.

Step 3: Make a small, faint vertical line mark for how far forward in front or over the nose the horn tip reaches.



Step 4: Judge the length of the horn relative to the ear length and make a horizontal horn tip level mark with your pencil, crossing the vertical line. *You should now have a faint + mark indicating where the tip of the front horn reaches.*

Step 5: Draw in the general shape of the horn:

- o Look at the curve of the front face of the horn—is it fairly straight or fairly curved? Lightly draw the general curve of the front face of the horn, from the base angle mark to the tip marks.
- o Look at the back face of the horn, noting how it curves up to the horn tip. Draw this in lightly.

Step 6: Draw in the finer details of the horn shape, showing any bulges at the horn base, flat areas, or dents, splits or cracks.



7. Rhino body and tail features

When observing an animal, it is necessary to look carefully (if possible) at both sides, back and front to see whether there are distinguishing marks on the rhino or not, and to check the health of the rhino (condition, injuries etc). It is just as important to note that there are *no* markings, so that it is clear that all parts of the body have been seen.

Tail

- Examine the tail. Draw any unusual features of the tail.
 - o The tail may be intact.
 - o The end tuft may be missing.
 - o A large piece of the tail may be missing.
 - o The tail may be abnormally bent to one side or the other. (This should not be confused with the way in which the rhino sometimes lifts or curls its tail).
- Indicate with a tick in the box whether you have seen the tail or not.

Body markings

- Look for any unusual “permanent” markings, unusual epidermal knobs or patterns of body folds on the left or right side or front / rear of the body, and draw them in on the appropriate rhino picture. You can also additionally write a brief description of the feature(s) and point this to the drawn feature.
- Indicate with ticks in the correct boxes if you have seen the left side, right side, back and front of the rhino. Place a cross if not.



Examples:

Old scars are permanent markings on the skin (back or sides of the body, chest or buttocks or head).

Scars

They are caused by an old injury or damage and may be visible as a groove or a discoloured or raised area of skin e.g. where a rhino has been injured by another, or caught in a snare. Look

Wounds

Fresh wounds that are red or weeping (oozing fluid) should be noted. In wounded rhino, the wound's condition and especially the rhino's body condition may need to be specially monitored: if these deteriorate, veterinary intervention may be required (do not leave it until too late).

Skin folds

Skin folds can be used to help identify individuals, but they are difficult to remember and record accurately, and may change in appearance as the rhino gets older or gets fatter or thinner.

Epidermal knobs

Size and location of epidermal knobs can also help to identify but like skin folds are difficult to remember and record accurately, and may change in appearance as the rhino gets fatter or thinner.

Deformities

Some rhinos may have anatomical deformities not mentioned so far, e.g. caused at birth or through an injury. These may include leg or head deformities, jaw deformities, muscular deformities e.g. a sagging shoulder or upper lip. These are helpful identification features and should be noted.

Importance of accuracy

It is very important that any features are recorded in the correct place, and on the correct side of the body. Old scars are sometimes white or pink in colour. Note this. If there are no markings it is important to note this too.

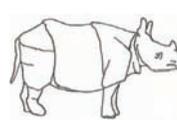
Use **poster 9.8** (below) to show these features.



Seen?



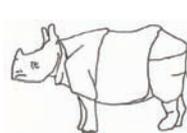
Seen?



Seen?



Seen?



MONITORING GREATER ONE-HORNED RHINO



Module 10

Use of Field Patrol Recording Booklet

RATIONALE

- The Field Patrol Recording Booklet is a very useful aid for recording information on sightings of animals, illegal activities, animal mortalities and patrol movements in the field. Without it, details which are useful are invariably forgotten by the observer.
- Monitoring data collected on rare, threatened and indicator species, provides at least a measure of population abundance, distribution and movements and with more detailed data estimates of population size, population age and sex structures, calving rates (female breeding performance), and age / sex specific mortality rates.
- Monitoring of law enforcement can be used to guide patrol deployment and increase protection as well as provide measures to assess performance.

PURPOSE

- A person assessed as competent in this module will be able to complete the patrol recording forms accurately.

LEARNING ASSUMPTIONS

- The learner can already use binoculars, which are an essential tool in the field.
- The learner can accurately identify the species that they record both direct sightings and indirect signs.
- The learner can accurately identify signs of illegal activities.
- The learner is able to read and complete the forms in the patrol-based field data recording booklet.

SPECIFIC OUTCOMES

- Patrol frontline staff should be able to record the observations that they make as part of their patrols, using the field recording forms provided.



ASSESSMENT CRITERIA

- By written test – the trainees should get a minimum of 80% to pass this module.
- By field testing – the trainee should be seen to routinely record details during surveillance and monitoring patrols, using their data recording booklet.

>= 80% = accredited

70% - <80% = nearly competent (re-testing needed)

less than 70% = not yet competent

PERFORMANCE SYSTEM

To become an accredited wildlife monitor trainees must be accredited in this module.

EQUIPMENT

ITEMS SUPPLIED

- Posters 10.1, 10.2, 10.3, 10.4, 10.5, 10.6.

ITEMS NOT SUPPLIED

- Hooks on wall or prestick/bluetack for hanging up posters.
- Pencils, sharpeners, erasers, paper for trainees.
- Non-permanent marking pen for writing on posters.
- Binoculars.
- Patrol data recording booklets.



1. Patrol log page

Teaching suggestion

This page should be used to enter general information about your patrol. It should then be used to record your locations at regular intervals during your patrols. By relating your locations to a map, you will be able to see the route you have travelled or the area in which you have patrolled. Use a new sheet for each day. Use **poster 10.1** (below) to illustrate how to complete the form as detailed below.



Patrol Log Form			
Date:		Area:	Checked by:
Start time:		End time:	
Number of persons on patrol:		Armed:	Unarmed:
Patrol method: Bicycle, Boat, Elephant, Foot, Vehicle, Other			
Patrol type: General duties, Investigation, Monitoring, Research, Surveillance, Other			
Date/Time	Latitude	Longitude	Place Name

General information

How to complete the patrol log page?

Patrol general information

- **Date:** Today's date as date-month-year, e.g. 1st March 2010 should be '01.03.10" or "01 March 10".
- **Area:** The name of the range or park area you operate in.
- **Checked by:** This should be initialised by the person who is in charge and has checked and corrected the information on the completed forms.
- **Start and end times:** Record the start and end times of the patrol e.g. "06.15 a.m." and "13.30 p.m.".
- **Number of persons on patrol:** The number of staff in patrol team. Enter both the number of armed and unarmed personnel on patrol.
- **Patrol method:** Mark your patrol method from the list in the form. Note this may be different from that illustrated in **poster 9.1**.
- **Patrol type:** Mark your patrol type from the list in the form. Note this may be different from that illustrated in poster 9.1.



This page should be completed as follows:

- **Time:** Record the time you saw the animal(s), e.g. "6.55 a.m."
- **Species:** Record the symbol of the animal species you saw from the "Wild Animal Codes" table e.g. "TI" for "Tiger".
- **GPS location:** Using your GPS unit, record the location, e.g. "N3045990", "E542060". If you don't have a GPS then you should enter a place name of the location of the sighting.
- **Notes:** Enter relevant information about your sighting; for example anything unusual about the animal(s) such as injury/body condition (good, fair, poor) or behaviour.

Direct sightings

For direct sightings

- **Adult:** Record the number of adult "males"; "females"; and "those you can't determine their sex" next to the symbols "M", "F" and "U" respectively. Don't guess - if you are unsure put down the number in the unknown sex category.
- **Young:** Record the number of young "males", "females"; and "those you can't determine their sex" next to the symbols "M", "F" and "U" respectively. Don't guess - if you are unsure put down the number in the unknown sex category.

Indirect sightings

For indirect sightings

- **Tracks/Signs:** Record the symbol of the animal sign from the "Wild Animal Codes" table in your field data recording booklet e.g. "FP" for "Footprint".



3. Illegal activities page

Teaching suggestion

This form should be used to record sightings/signs of illegal activity or poaching that are found during your patrols. Enter a separate record for each type of illegal sighting.



10.17 AM



Illegal Activity Form					
Activity	Location (GPS/Place name)	Time	Time elapsed	Details	Action

Use **poster 10.3** to show how the page should be completed as follows:

- **Activity:** Record here the symbol of the illegal activity you saw from the "Illegal Activity Codes" table (see Section 6) e.g. "PS" for "Illegal Persons Seen".
- **GPS location:** Using your GPS unit, record the location, e.g. "N3045990", "E542060". If you don't have a GPS then you should enter a place name of the location where you found the illegal activity or its sign.
- **Time:** The time you saw the illegal activity or its sign, e.g. "6.55 a.m.".
- **Time Elapsed:** Enter the symbol of approximately how long it has been since the illegal activity took place or how old the sign is from the "Illegal Activity Codes" table e.g. "A" for "< 1 day". You can also enter for example "B-C" for "between 1 day and fortnight (15 days)".
- **Details:** Add specific details here. See the "Illegal Activity Codes" table for the information required for each type of illegal activity. For example, if you saw 3 illegal people, one with a rifle, one with a spear and one unarmed then you should enter "2 armed (1 rifle and 1 spear); 1 unarmed. Also a separate record in the mortality form must be filled in for animals illegally killed.
- **Action:** Record here what action you took on sighting the illegal activity, for e.g. traps seized.



4. Animal mortalities page



Teaching suggestion

This page should be used to record any animal species, listed in the animal symbols table of your field data recording booklet, that are found dead either due to natural (including predation) or human-induced causes. A separate record must be filled in the page for each animal species seen.



14.21 PM



Animal Mortality Form												
Species	Sex			Age			Time	Location (GPS/Place name)	Carcass state	Apparent cause of death	Reason for stating cause of death	Parts recovered
	M	F	U	A	Y	U						

Note: Species – write U if Unknown
Apparent cause of death – Disease, Old age, Predation, Poaching, Unknown, Injury, Other
Carcass state – Fresh, Partially decayed, Bones
Reasons for stating cause of death – Shot, Poison, Speared, Pit trap, Horns/Tusks cut etc

Use **poster 10.4** (above) to show how the page should be completed by following the steps below.

- **Species:** Record the symbol of the animal species from the “Wild Animal Codes” table here e.g. “TI” for “Tiger”. If you cannot precisely identify the animal(s), due to decomposition, for example, then use a general description (e.g. “deer”), rather than try to guess.
- **Sex:** Record the number of “males”; “females”; and “those you can’t determine their sex” next to the symbols “M”, “F” and “U” respectively. Don’t guess - if you are unsure put down the number in the unknown sex category.
- **Age:** Record the number of “adults”, “young” and those you can’t determine their age class” next to the symbols “A”, “Y” and “U” respectively.
- **Time:** The time you saw the dead animal(s), e.g. “6.55 a.m.”.



- **GPS location:** Using your GPS unit, record the location, e.g. "N3045990", "E542060". If you don't have a GPS then you should enter a place name of the location of the sighting.
- **Carcass State:** Do not try to guess. Write down the carcass state (as you have observed) from the list provided at the bottom of the mortality form.
- **Apparent cause of death:** Do not try to guess. Only record the cause of death if it appears obvious. Write down the cause from the list provided at the bottom of the mortality form.
- **Reason for stating cause:** Enter the evidence for the stated cause of death if known, e.g. broken leg or if illegally killed then shot, poisoned, speared, pit trap, horn/tusks cut etc.
- **Parts recovered:** Write down the parts of the animal you have recovered. For example, tusks (single or both) or horn.



5. Wild animal codes

Teaching suggestion

The following table provides an example of animal codes and tracks and signs categories that need to be used while recording data on animal sightings and mortalities. This information is also given in the inside front cover of the patrol data recording booklet and will be specific for your area.

Wild Animal Codes		
Elephant = EL	Wild boar = WB	Otter = OT
Rhino = RH	Hyaena = HY	Gharial = GH
Barking deer = BD	Leopard = LP	Monitor lizard = ML
Chital = CH	Rattal = RA	Mugger crocodile = MC
Gaurigai = GA	Sloth bear = SB	Python = PY
Hispid hare = HH	Tiger = TI	Bengal florican = BF
Hog deer = HD	Wild dog = WD	Great hornbill = GH
Nilgai = NG	Common langur = CL	Lesser Florican = LF
Sambar = SA	Resus monkey = RM	Sarus crane = SC
Swamp deer = SD	Dolphin = DP	Swamp francolin = SF
Male = M, Female = F, Adult = A, Young = Y		
Tracks/Signs Categories		
Foot print = FP	Feeding sign = FS	Dung = DU
Calls = CA	Nest = NE	Other = OT

Use **poster 10.5** (below) to show how the codes should be used.



6. Illegal activity codes

The following **poster 10.6** provides an example of illegal activity codes for use while recording data. This information is also given in the inside back cover of the patrol data recording booklet and will be specific for your area.

Illegal Activity Codes		
Symbol	Activity	Detail
PS	Illegal persons seen	Number armed, Number unarmed, Weapons
PE	Illegal persons encountered	Number armed, Number unarmed, Weapons
GS	Gunshots heard	Number, Direction, Distance
FP	Footprints of poachers	Number, General direction
CF	Camps and fireplaces	-
ST	Snares and traps	Number, Type
OS	Other signs	-
AP	Animals poached (carcasses)	Species, Number (fill in mortality form)
CG	Cattle grazing	Number
BG	Buffalo grazing	Number
MA	Machan	-
CT	Cart, tractor tracks	-
LG	Logging	Number, Species
BL	Branch lopping	Species, % branch lopped
GC	Grass cutting	Number of people,
FS	Illegal fishing	Number of people, Number of boats, Number of nets
Time elapsed categories: A = <1 day, B = <1 week, C = <1 fortnight, D = <1 month, E = <6 months, F = <1 year, G = <2 years, H = 2 years and above		
<i>Note: If not sure, say approximate, eg., E – G (between 6 months and 2 years)</i>		
Weapons: Rifle, Gun, Spear, Knife, Bows and Arrow, Other (specify)		

Teaching suggestion

Use **poster 10.6** (above) to show how the codes should be used.

MONITORING GREATER ONE-HORNED RHINO



Module 11 Staff Health & Hygiene

RATIONALE

- Monitoring wildlife by frontline protection staff involves physical vigour and long hours of work.
- Staff members need to maintain their personal health as well as hygiene to undertake field duties regularly.
- The trainees should recognise the benefits of sound hygiene and sanitation in maintaining their health.
- Basic training can help to increase hygiene awareness and to promote improved hygiene behaviour among trainees.

PURPOSE

This module aims at changing the behaviour of frontline protection staff towards safe hygiene practices through education. The following background information will be provided to the trainees.

- Importance of following a safe personal and public (surrounding environment) hygiene regime.
- Good practices in personal, water, food, and forest camp hygiene.
- Valuing the presence of healthy frontline protection staff living in clean environment who are physically fit to carry out field duties.

LEARNING ASSUMPTIONS

- Trainees have some knowledge of personal and public hygiene practices.
- Trainees understand the language the module is presented in.



SPECIFIC OUTCOMES

A person assessed as competent in this module will know:

- Why is it vital to maintain personal hygiene and health.
- Why sanitary conditions in living (forest camp) quarters need to be maintained.
- The various safe practices for personal hygiene (food, water).
- The different good practices for public hygiene (toilet, disposal of waste).

ASSESSMENT CRITERIA

It is not essential to have passed this module to be able to become an accredited rhino ID monitor. However, in verbal/written tests depending upon their standard of literacy, and inspection of forest camps, the trainees should demonstrate that they know the following:

- The importance of maintaining personal hygiene and health.
- Need for keeping the living (forest camp) quarters in sanitary conditions.
- The safe practices for personal hygiene (food, water, sanitation).
- The good practices for public hygiene (sanitation, disposal of waste).

PERFORMANCE SYSTEM

It is not essential to have passed this module as this is a supplementary exercise. However to provide the necessary background/context to monitoring, this module should be completed by all trainees.

EQUIPMENT

ITEMS SUPPLIED

- None

ITEMS NOT SUPPLIED

- Pencils, sharpeners, erasers, paper for trainees.



1. Importance of maintaining personal health & public hygiene

Incidence of illness

The most frequent cause of illness and even death in the country and state is the incidence of different types of water and sanitation related diseases such as diarrhoea, worm infestation, skin and eye ailments, and malaria.

These diseases are spread through agents; bacteria, viruses, parasites and mosquitoes, which cannot be seen, except mosquitoes. Through the mouth or skin or passing of excreta, these agents enter the human body. They are further passed to another person through food, fingers, water or flies because of poor hygienic practices.

One (1) gram of excreta can contain:

10 million viruses, 1 million bacteria, 1000 parasite cysts, 100 parasite eggs.

Protection staff live in camps that have basic infrastructures and facilities. There is a tendency to ignore safe hygiene practices among the camp members because these are considered unimportant or there is a lack of awareness about proper hygiene behaviour. As a result many suffer regularly and are unable to link disease with poor hygiene practices.

Very often there is not enough scope or resources to maintain a high standard of hygiene in these camps. Notwithstanding, by following simple and preventive hygiene practices, staff members can cut off the transmission routes of water and sanitation related diseases. Improved personal and public hygiene behaviour will ensure a healthy life that will help to undertake field duties regularly and efficiently.



2. Personal hygiene

Personal cleanliness

The best way to prevent disease is to keep body and camp surroundings clean. Even though forest camps are temporary settlements these constitute a home for many who have to spend considerable time in the forest.

Personal cleanliness includes using hand washing and bathing, safe water, keeping cooking area and utensils clean, safe storage of cooking food, using and cleaning toilets/latrines.

Forest camps need to be kept clean to prevent spread of diseases and shared facilities such as water use, latrines, garbage disposal have to be maintained properly and collectively.



Part of body	What to do	Likely problems if not done
Hands	<ul style="list-style-type: none"> Wash hands with soap or ash with plenty of water after using toilet, before and after cooking and eating. 	Dysentery, diarrhoea, worm infections, cholera, some respiratory infections (cold)
Head	<ul style="list-style-type: none"> Wash eyes Wash face Wash hair Clean ears. Do not use sharp and pointed objects to clean the ears; it may injure your eardrum. Cotton or the corner of your gamosa is good to use for cleaning ears. 	Eye disease (trachoma, conjunctivitis) Lice infestation Accumulation of wax may cause early deafness.
Body	<ul style="list-style-type: none"> Regular bathing Washing clothes Sun the bedding Use toilets and urinals 	Skin infections (scabies, fungal), lice, and ringworm. Bed bugs Dysentery, diarrhoea, worm infections, cholera
Feet	<ul style="list-style-type: none"> Trimming nails Wear chappals or shoes 	Fungus and worm infections
Mouth	<ul style="list-style-type: none"> Drink safe water Cleaning teeth after meals Clean utensils Cover mouth with handkerchief when sneezing / coughing 	Dysentery, diarrhoea, worm infections, cholera Bad breath, tooth decay Dysentery, diarrhoea Spread of respiratory infection

Sanitation

Recommended toilet practice:

- Wear slippers/chappals to the toilet to prevent germs sticking to your feet.
- Use clean mug and safe water in the toilet.
- For pour-flush latrines, pour water into the toilet pan before and after use.
- For pit latrines, add a little ash or soil to the pit after each use.
- Wash hands and feet thoroughly with lots of water and soap/ash. Do not use mud as it contains germs and bacteria.

The number of germs on fingertips doubles after using the toilet.



3. Food hygiene



Food handling and preparation

There are microbes in our food that can cause food poisoning. These can usually be controlled by heating (cooking) and/or chilling (refrigerating) the food. But given the chance they can easily spread around the kitchen - via our hands, chopping boards, cloths, knives and other utensils. If they are allowed to cross-contaminate other foods – especially cooked foods – they can make us ill. Good kitchen hygiene and good personal hygiene are important to help control the spread of harmful germs.

- Raw meat, poultry, fish and other raw foods can easily cross-contaminate other foods. Always wash hands and utensils thoroughly after handling such foods and before any contact with other food, especially cooked foods.
- Wash thoroughly vegetables and fruits with clean water before consumption.
- Boil drinking water continuously for 20 minutes to kill germs.
- Store boiled water in a clean pot with lid.
- Boil milk for at least 20 minutes to kill germs.
- Meat, poultry and fish should be cooked well to ensure the centre parts are well done.
- Avoid eating stale/leftover food as heat and humidity tend to promote the growth of bacteria and germs.
- Wash your hands with clean water and soap before handling any food, especially when you are cooking for other people.
- Do not smoke while preparing food as you may contaminate the food with ash.

Food storage practices

Proper storage of food is an important part of reducing the risk of food poisoning. Some foods must be eaten within a short space of time; other foods, such as flour, pulses, canned foods and many others last much longer and can be stored at room temperature. But even dried foods have limits on their storage time. So watch out for storage instructions and make sure you always store foods: in the right place, at the right temperature, for the right time.



Washing and drying of utensils

- Clean kitchen surfaces after preparing foods. Try to 'clean as you go'. After use, wash all crockery and utensils with hot water and washing up liquid.
- Change the water regularly then rinse in clean, hot water. Where possible leave to drain until dry.
- Containers and cooking pots should be clean and clean water must be used for cooking.
- Keep all food cupboards clean, cool, tidy and dry. When you take cans from the storage area, before opening wipe over the tops to remove any dust. And don't forget to clean the can opener/ knife.
- Give your kitchen area a thorough "spring clean" periodically.



4. Water supply

Safe water

In a temporary camp, it may be appropriate to use a nearby river if the water appears to be clean.

Look for the following signs that may indicate clean water:

- Presence of plant life in the river and on the riverbanks.
- Presence of fish in the river.

Contaminated water

The following signs indicate contaminated water, by natural or man-made means:

- Stagnant water.
- Water smells foul.
- Water is murky or cloudy.
- Absence of fish.
- Absence of plant life.
- Presence of scum, foam, oily residue or other contaminants in or on water.
- Presence of rubbish in or near water.
- Dead animals in water.

Bathing and washing must never be done near the source of water. Always wash yourself and your clothes at least 10m from the source of the water so that wastewater containing soapsuds can filter through the soil before it reaches the water supply. If the water supply is a free-flowing river, it is fine to bathe or swim in it - just don't bring any soap with you!

Storage of water

Ensure that the water butt or tank is clean and has not previously been used to store motor oil or other chemicals. Cover the tank with a lid to prevent contamination from anything that might fall in.

Methods of water treatment

There are several different ways of treating water once it has been taken from the river or the well. If the water contains stones, plant material or other small objects, these should be filtered out by using a sieve. If the water is muddy, it should be left for the mud to settle, then the clearer water could be poured through several layers of a fine cloth such as muslin. Water should be brought to the boil, and then kept on a "rolling boil" for 20 minutes. This is the most effective way of killing all bacteria in water. Latrines should be placed at least 50m from any water source to avoid contaminating the water supply.



5. Camp sanitation

Clean campsite

Regular cleaning (sweeping and mopping the living areas to remove dust and dirt from all corners) of the camp is essential to keep insects, bacteria and diseases away. Spitting around the camp should be discouraged because the sputum can carry bacteria, which will be spread by flies and other insects.

Waste water

Different types of waste should be treated differently, depending on what it is.

All waste should be kept away from the main living areas of the camp, as the smell will attract many animals from small insects to large mammals.

Waste water from cooking, washing dishes, people or clothes should be poured into a pit called a "soak-away" so that the water is filtered through the ground until it reaches the water table. Water should not remain stagnant in these pits to avoid health hazards, so it may be necessary to dig drainage channels to spread the water over a larger area to allow it to soak away or evaporate. The soak-away should be filled in with soil when the campsite is vacated.

In the wet season, it may be worth digging drainage channels around the living areas so that excess rainwater can also be drained away to prevent flooding of the camp.

Solid waste

Solid waste will contaminate the environment if left lying around the campsite. It will look unsightly, may present health hazards to the staff and may injure wildlife if animals try to eat it. Different types of waste should be treated in different ways.

**Re-use or recycle**

Re-usable or recyclable waste such as tins, cans, plastic bottles or similar can be re-used on camp or can be taken to a nearby town or village where they can be re-used or even recycled. Make sure they have been washed out, so they do not create a bad smell and keep them in a sack or box.

Waste that cannot be directly re-used or recycled can still be used in other ways.

Compost

Food waste, except meat, can be kept in a pile, away from the main living area, to rot down to form compost, which is rich in nutrients and can be used if any crops are being grown on camp or in a local village.

Other food waste

Food waste such as meat should be thrown into a pit, well away from the immediate living area because it may encourage carnivores or carrion feeders into the area. If it smells too much, it can be covered with soil from time to time. When the campsite is vacated, it should be covered completely with soil.

Burnable waste for fire

Other organic waste that will not quickly rot, such as paper, card and wood can be kept as kindling and fire-wood. Plastic waste should not be put on the fire in the cooking area because some waste, including many plastics, can produce cyanide fumes as well as other toxic chemicals, which can be lethal.

Other waste

Any waste that cannot be composted, rotted in a food pit, burnt on the kitchen fire, re-used or recycled, should be buried in a pit so that it can eventually decay. If it is not possible to bury it, then it should be burnt but as a last resort. The fire should be well away from the living area to keep toxic fumes away. Also, grass and other dry plant materials should be cleared in a 2m-3m radius of the fire to avoid setting fire to the surrounding area.

Malaria

Malaria is carried by certain types of mosquito and is the biggest killer of people in the world (even bigger than AIDS, wars, car accidents etc). Prevention is always better than cure.

- Avoid water accumulation near camp to interrupt mosquito breeding.
- Use proper mosquito netting to avoid mosquito bites while sleeping.
- Smoke is not good for health but it can be useful in the camp in the evening to repel mosquitoes.
- Avoid mosquito bites by keeping arms and legs covered in the evening.

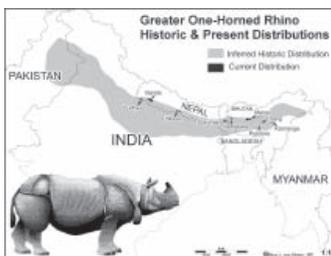
MONITORING GREATER ONE-HORNED RHINO



Appendix: Training Posters

Posters are arranged according to the modules.

Module 1: Conservation Background



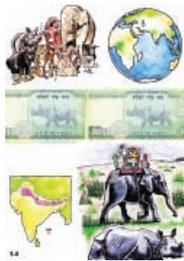
1.1: Rhino distributions



1.2: Rhino productivity



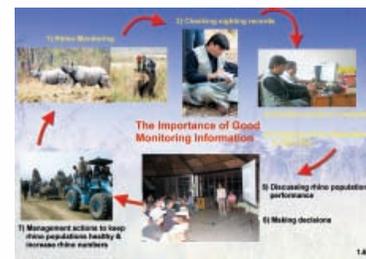
1.3: Illegal demand of rhino horn



1.4: Rhino values



1.5: Role of frontline staff



1.6: Importance of monitoring information

Module 2: Rhino Biology and Behaviour



2.1: Rhino body features



2.2: Rhino Behaviour



Module 3: Patrol and Tracking Techniques



3.1: Reasons for patrol



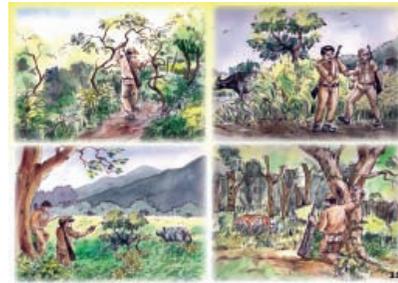
3.2: Types of patrol



3.3: Types of poaching

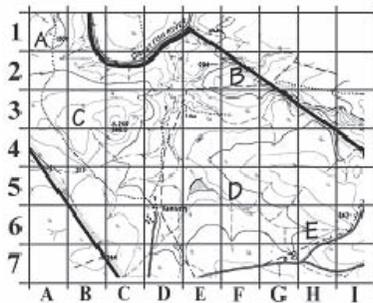


3.4: Rules of patrolling



3.5: Approaching and observing rhino

Module 4: Map Work and GPS



4.1: A simple map grid

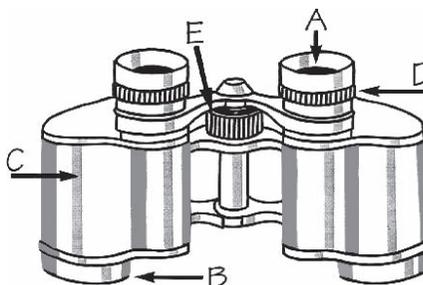


4.2: Use of GPS

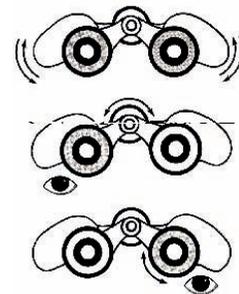
Module 5: Binoculars



5.1: Use of a binocular



5.2: Parts of a binocular



5.3: Adjusting focus



Module 6: Photography



6.1: Use of photography for rhino identification



1) A clear picture of the rhino without too much bush around it.



3) Identification from the ears, horn and skin folds



2) Pictures to determine the possible age and sex of a rhino.



4) Identification from the spot patterns, tail and sexual organs.



6.2: Important parts of camera

6.3: Good field picture for rhino conservation

Module 7: Ageing Rhino



7.1: Rhino age classes



7.2: Rhino ageing



Module 8: Sexing Rhino

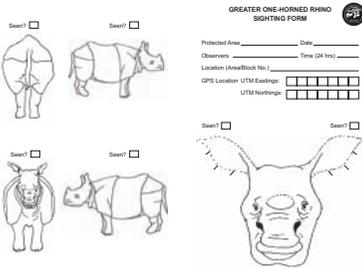


8.1: Difference between male and female rhino



8.2: Different features to differentiate sex of rhino

Module 9: ID Features and Use of Rhino Sighting Booklet



9.1: Filling in ears, horns, position, date/time

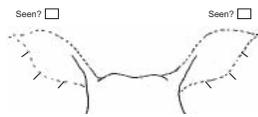


Greater One-Horned Rhino Ear Patterns

9.2: Ear patterns



9.3: Left and right ear



9.4: Ear parts



Greater One-Horned Rhino Horn Patterns

9.2: Horn patterns

Total	ADULT	SUBADULT	CALF
Male	0	0	0
Female	0	0	0
Unknown	0	0	0

Sex: Male Female UNKNOWN

Age: ADULT SUBADULT CALF

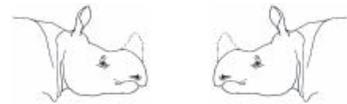
Partial Observed: _____ (min) Distance: _____ (m)

Group: F / M Count: F / M

Body Condition Score: 1 2 3 4 5 (1 to 5 incl. 15 scores)

Habitat: Tall grassland / Short grassland / Dry forest / Wetland / Other

Activity: Mating / Feeding / Resting / Walking / Other

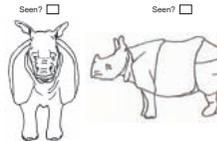
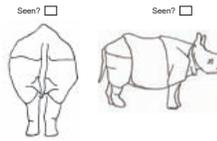


9.6: Filling in sex, age class, body condition, group composition, horn shape



Total:		ADULT	SUBADULT	CALF
Male	♂			
Female	♀			
Unknown	?			

9.7: Filling in group composition



9.8: Filling in body markings and other features

Module 10: Use of Field Patrol Recording Booklet



Patrol Log Form			
Date:	Area:	Checked by:	
Start time:	End time:	Armed: Unarmed:	
Patrol method: Bicycle, Boat, Elephant, Foot, Vehicle, Other			
Patrol type: General duties, Investigation, Monitoring, Research, Surveillance, Other			
Date/Time	Latitude	Longitude	Place Name

10.1: Patrol log form



Time	Species	Observer					Distance	Remarks	Armed/Unarmed	Notes
		1	2	3	4	5				

10.2: Wildlife sighting form



Illegal Activity Form					
Activity	Location (GPS/Photo)	Time	Time elapsed	Details	Action

10.3: Illegal activity form



Animal Mortality Form								
Species	Sex	Age	Time	Location (GPS/Photo)	Carcass state	Apparent cause of death	Reason for stating cause of death	Parts recovered

Note: Species = write U if Unknown
 Apparent cause of death - Disease, Old age, Predation, Poaching, Unknown, Injury, Other
 Carcass state - Fresh, Partially decayed, Bones
 Reasons for stating cause of death - Shot, Poison, Spear, Pit trap, Horns/Tusks cut etc.

10.4: Animal mortality form

Wild Animal Codes		
Elephant = EL	Wild boar = WB	Otter = OT
Rhino = RH	Hyena = HY	Gharial = GH
Barking deer = BD	Leopard = LP	Monitor lizard = ML
Chital = CH	Ratel = RA	Mugger crocodile = MC
Gaur/gai = GA	Sluth bear = SB	Python = PY
Humped hare = HH	Tiger = TI	Bengal florican = BF
Hog deer = HD	Wild dog = WD	Great hornbill = GH
Nilgai = NG	Common langur = CL	Lesser Florican = LF
Sambar = SA	Resus monkey = RM	Sarus crane = SC
Swamp deer = SD	Dolphin = DP	Swamp francolin = SF
Male = M, Female = F, Adult = A, Young = Y		
Tracks/Signs Categories		
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10.5: Wild animal codes

Illegal Activity Codes		
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AP	Animals poached (carcasses)	Species, Number (fill in mortality form)
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Note: If not sure, say approximate, eg. E = G (between 6 months and 2 years)		
Weapons: Rifle, Gun, Spear, Knife, Bows and Arrow, Other (specify)		

10.6: Illegal activity codes

