Local Conservation Support Group

Methods to monitor sites, species and habitats

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Methods to monitor sites species and habitats

CONTENTS

INTRODUCTION

Why count birds?

Counting birds and other animals can tell us a lot about our local environment. It helps us to understand how changes in the forests, farmlands and wetlands are affecting the abundance of wildlife. The information that we collect can be shown to other people in our local and national communities, so that they can better understand how their decisions are affecting wildlife and natural habitats.

If we count birds over a period of time we can measure whether their numbers are stable, or are increasing or decreasing. The numbers that we have counted provide evidence of what is happening.

If we study birds and their habitats we can detect any threats that might cause their numbers to decline. For example, cutting of forest may destroy some of the places which the birds use for nesting or feeding. This helps us to identify actions that could be taken to help reduce or prevent these threats.

If we are already taking action to protect the birds and their habitats, we can measure whether these are successful or not. We can tell whether the numbers of the birds increase or remain stable, or if they continue to decline.

Counting birds can help us to understand how land-use changes are affecting wildlife and the natural environment

What is a survey?

A survey involves a visit to a site to carefully and thoroughly record one or more of its features. Surveys of wildlife usually target a particular species or a group of species, or the habitats of the target species. Information about the target species or its habitats is collected in a systematic way. The results of the survey are written down and can be included in a survey report that we can send to other people to let them know what we have found.

A typical survey report may include the following sections:

- *Introduction*: to describe the survey site, the target species and/or habitats, and explain why the survey was carried out;
- *Methods*: to describe how the survey was done;
- *Results*: to give information about what was found during the survey; and
- *Discussion*: to consider what the results of the survey show us.

Wildlife surveys aim to record the numbers of a particular species or a group of species

What is monitoring?

Monitoring involves a series of repeated surveys, to keep wildlife under observation and record changes in species populations or in the condition of their habitats. The information gathered during monitoring helps us to understand how the world around us is changing. In the case of wildlife, it tells us whether species are declining in numbers or even in danger of becoming extinct.

This information helps to guide the actions that are needed for species and habitat conservation. Monitoring is therefore important to government agencies responsible for wildlife, conservation organisations such as RSPN and local community groups that are concerned about their local environment and wildlife. In particular, monitoring can detect threats and show how they are affecting local wildlife. This helps with the development of land management and conservation measures that are beneficial to wildlife.

A successful monitoring scheme should have the following characteristics:

- *Soundly designed*: the monitoring needs to be carefully planned;
- *Systematic*: standardised methods need to be used for the monitoring (this manual is designed to introduce the methods that can be used);
- *Regular*: the monitoring needs to be carried out regularly, to provide information that shows how the environment is changing;
- *Sustained over a long period*: monitoring will only give reliable results if it is carried out for a period of several years;
- *Well coordinated*: the organisers of need to provide clear guidance on when and how the monitoring needs to be carried out;
- *Provide regular feedback to participants*: the organisers need to provide information to the people doing the monitoring, so they understand how their work is producing useful results;
- *Produce data relevant to users*: the results of the monitoring need to be useful for the people and local communities who are doing the monitoring.

MONITORING SITES, SPECIES AND HABITATS

Monitoring important sites for wildlife

BirdLife International is a global partnership of bird conservation organisations, which is represented in more than 100 countries around the world. The BirdLife Partnership has a worldwide programme to identify and protect Important Bird Areas (or IBAs). These are the most important sites for bird conservation, and to date almost 10,000 IBAs have been identified in all regions of the world. A preliminary list of 23 IBAs has been identified in Bhutan.

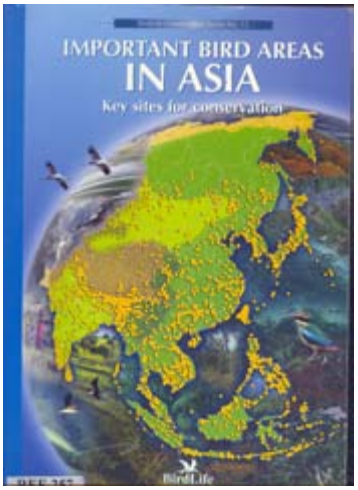
As part of the IBA Programme, BirdLife has developed an IBA monitoring framework. This is designed to allow BirdLife Partner organisations around the world to monitor the IBAs in their countries in a simple, low-cost way, with the help of local people and communities. This approach was designed for use at IBAs, but it can be applied to any site, and it can be used to monitor biodiversity other than birds, for example mammals. RSPN is planning to adapt the IBA monitoring framework for use at some of its project sites.

The IBA monitoring framework is designed to record changes to the:

- Condition of the site and the wildlife that it supports (the *state* of the site): based upon the populations and/or habitats of selected species;
- Threats facing the species and habitats (the *pressure* on the site): the human activities which affect the selected species and habitats;
- Conservation actions at the site (the *response*): the management status of the site and the amount of action taken for its conservation.

IBA monitoring is often carried out by local conservation groups and coordinated by the national BirdLife Partner organisation. In Bhutan, the LCSGs will conduct the monitoring activities and RSPN will provide support through the CEPF and other projects. Each LCSG will discuss with RSPN which species or habitats to monitor and when they will do the monitoring.

RSPN will provide standard monitoring forms to the LCSGs, who will record the results of each monitoring visit on these forms. The LCSGs will send the completed monitoring forms to RSPN, who will keep all of the completed forms and use the information from them to calculate monitoring scores for each site. If there are significant threats to any sites, RSPN will discuss with the LCSGs concerned what conservation actions can be taken. RSPN will use the information from the monitoring forms to help compile a report on the status of the species and habitats at all of the CEPF project sites.



BirdLife International has developed a framework to monitor Important Bird Areas in countries throughout the world

Which birds should we monitor?

Sites are identified as Important Bird Areas because they support populations of:

- *Globally threatened species*
- *Restricted-range species*
- *Biome-restricted species*
- *Congregatory species*

IBA monitoring is designed to focus on these IBA *trigger species* (see below for lists of these species in Bhutan) and their habitats, some of which are also targeted for conservation action in RSPN's Strategic Plan. However, at some sites it may also be appropriate to focus on common birds, to monitor how the populations of more familiar species are changing.

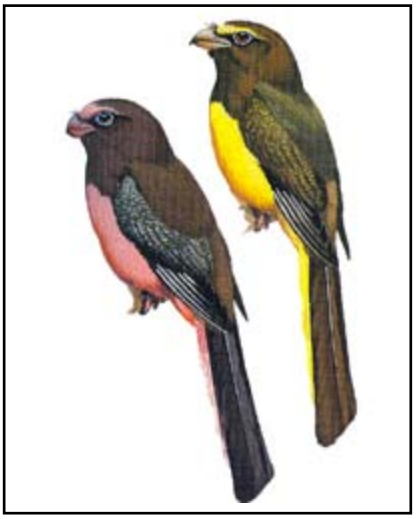
The following 12 *globally threatened species* occur regularly in Bhutan and have been used as *trigger species* to identify IBAs in the country:

- White-bellied Heron *Ardea insignis*
- Pallas's Fish-eagle *Haliaeetus leucoryphus*
- White-rumped Vulture *Gyps bengalensis*
- Red-headed Vulture *Sarcogyps calvus*
- Chestnut-breasted Partridge *Arborophila mandellii*
- Blyth's Tragopan *Tragopan blythii*
- Black-necked Crane *Grus nigricollis*
- Wood Snipe *Gallinago nemoricola*
- Dark-rumped Swift *Apus acuticauda*
- Rufous-necked Hornbill *Aceros nipalensis*
- Grey-crowned Prinia *Prinia cinereocapilla*
- Beautiful Nuthatch *Sitta formosa*

Beautiful Nuthatch is a globally threatened species which has an important population in Bhutan

The following 12 *restricted-range species* of the *Eastern Himalayas Endemic Bird Area* occur in Bhutan, and have been used as *trigger species* to identify IBAs in the country (note that three of these species are also globally threatened):

- Chestnut-breasted Partridge *Arborophila mandellii*
- Blyth's Tragopan *Tragopan blythii*
- Dark-rumped Swift *Apus acuticauda*
- Ward's Trogon *Harpactes wardi*
- Rusty-bellied Shortwing *Brachypteryx hyperythra*
- Rufous-throated Wren-babbler *Spelaeornis caudatus*
- Wedge-billed Wren-babbler *Sphenocichla humei*
- Hoary-throated Barwing *Actinodura nipalensis*
- Ludlow's Fulvetta *Alcippe ludlowi*
- White-naped Yuhina *Yuhina bakeri*
- Yellow-vented Warbler *Phylloscopus cantator*
- Broad-billed Warbler *Tickellia hodgsoni*



Ward's Trogon is a restricted-range species which is found only in the Eastern Himalayas

There following six major biomes are found in Bhutan, and the characteristic bird species of these biomes have been used in the identification of IBAs. These bird species and their habitats can be used as targets for site monitoring:

- Eurasian high montane
- Sino-Himalayan temperate forest
- Sino-Himalayan subtropical forest
- Indochinese tropical moist forests
- Indo-Malayan tropical dry zone
- Indo-Gangetic plains

Many species of birds are characteristic of the various forest biomes that are found in Bhutan

There are rather few large wetlands in Bhutan, and only a few IBAs have been identified in the country because they support internationally important congregations of the following three waterbird species (note that two of these species are also globally threatened):

- White-bellied Heron *Ardea insignis*
- Ruddy Shelduck *Tadorna ferruginea*
- Black-necked Crane *Grus nigricollis*

Should we monitor species or habitats?

Some birds are relatively easy to monitor, but others are much more difficult. In general, birds are easier to survey and monitor if they are:

- Large, easy to see and to identify
- Noisy, easy to identify by sound
- Present in significant numbers

Large, noisy birds such as Nutcracker are easier to monitor than small, quiet forest birds

Other birds are more difficult to survey and monitor, including those that are:

- Small, difficult to see and to identify
- Quiet, difficult to identify by sound
- Occur at low densities

The birds that you want to monitor at your local site may all be difficult to monitor, for example because they are difficult to identify by sight or by sound. In this case, it is possible to monitor the habitats of one or more species instead of directly monitoring the bird populations. If there are changes in the extent and condition of habitats of these species, it is reasonable to assume that corresponding changes have taken place in the bird populations.

The following two sections outline methods that can be used to (1) directly monitor bird populations and (2) to monitor the extent and condition of the habitats of these birds. When you are planning how to do monitoring at your local site, first decide which species or habitats you will monitor, and then select the best methods to use.

METHODS TO SURVEY AND MONITOR SPECIES

The following section gives an overview of methods that can be used to survey and monitor species. Further information can be found in the books listed below in the *Selected references* section. Note that monitoring aims to record long-term changes in species populations, and it is very important to carry out the field monitoring in exactly the same way each time (i.e. use the same methods, visit the same parts of the site, for the same amount of time, and at the same time of day).

Total counts

Introduction

Total counts can be used when it is possible to count the entire population of the target species and to accurately assess its population size. This method is suitable for conspicuous species which are confined to a relatively small area. Examples are species that are large and conspicuous, species that breed in distinct colonies, and species that are confined to well-known fragments of habitat. If you are uncertain whether the whole population has been counted, the results of the count may be presented as a minimum population estimate.

Total counts are the most practical way to estimate populations of many waterbirds at wetlands, and species such as raptors at communal roost sites. If the species being counted is mobile or relatively widespread, several surveyors will be needed to make simultaneous counts at different sites. For example it is possible to carry out synchronised counts of waterbirds at wetlands (see example 3 below).

Guidelines

Once you have decided that a total count is realistic, consider the distribution of the target species at the survey site. Plan the route that you will take during the survey and where you will make the counts, and decide whether one person can make that count on their own or if more people are needed. If you think it would be helpful, mark the survey route and the count sites on a map.

During the count, observers should record whether they think the accuracy of the count was influenced by the weather or by the visibility (e.g. if there was fog or low cloud) and whether they believe the count was an underestimate of the true figure for other reasons. The results of total count can be used to calculate long-term population trends simply by comparing the results for each year.

Total counts can be used to accurately assess wintering populations of Black-necked Crane

Total counts example 1: Black-necked Crane
Black-necked Crane is a large and conspicuous bird that occurs in open habitats, and in Bhutan it is confined to a few relatively small areas of suitable habitat. It is therefore ideal for total counts. At a site such as Phobjikha it is possible for a small number of observers to count the total number of cranes very accurately.

Total counts example 2: White-bellied Heron
White-bellied Heron is a large and conspicuous bird, but it is secretive and many of the forested rivers that it inhabits are several hours walk from the nearest road. It is confined to a few suitable stretches of habitat and it is territorial, and it is possible over the course of a breeding season to visit all of the potential sites to look for the species and produce a minimum population estimate.

Total counts example 3: Waterbirds at wetlands
Many species of waterbirds tend to congregate at wetlands to nest or to feed, for example Ruddy Shelduck and other waterfowl occur in flocks along some of the rivers in Bhutan. These birds are large and occur in open habitats, and they are therefore easy to locate and count. To conduct a total count, it is necessary to plan a survey route and select places with a good view of the wetland where counts can be made without disturbing the birds. If the survey site is large and several people participate in the counts, it is necessary to avoid double-counting of birds by coordinating the counts (i.e. all observers make the counts during a set time period) and agreeing exactly which parts of the wetland will be counted by each observer. In this case, it is helpful to mark the areas to be covered by each observer on a map.


Waterbirds such as Ruddy Shelduck tend to congregate at wetlands to nest or to feed

Timed searches

Introduction
Timed searches can be used to standardise the surveying of cryptic species, or species spread over a wide area which cannot easily be sampled using transects or point counts, for example birds flying over the forest canopy. The results of timed searches can be expressed as the number of birds found per hour or day. It is usual to further standardise timed search surveys by searching only within a defined area (which needs to be recorded, for example by marking it on a map). The results from timed searches in a defined area can be used to estimate a minimum density, which can be extrapolated across areas of similar habitat to obtain a total population index.

Guidelines

Once you have decided that timed searches are a good technique, consider where it is best to look for the target species at the survey site. Mark on a map the places where the counts will be carried out, for example points where you can sit and count birds seen in flight. Another way to carry out timed searches is to subdivide large sites into sample areas on a map, and select a random sample of these sample areas for searching.

Timed searches are suitable for large species such as Rufous-necked Hornbill that regularly fly over the forest canopy

Timed searches example 1: Hornbills flying over forest canopy

Timed searches are suitable for large species that regularly fly over the forest canopy, such as hornbills. It is necessary to locate and mark on a map places with a good view over the forest canopy where the time counts can be carried out. Decide how long to spend at each place (for example one hour) and what time of day to make the counts (ideally when the hornbills are most active). If you are confident that you can accurately identify the different species of hornbills that you see, the timed searches can focus on individual species (e.g. the globally threatened Rufous-necked Hornbill). If identification to species is not possible, hornbills of all species may be counted.

Timed searches example 2: Wood Snipe in valley wetlands

The globally threatened Wood Snipe winters in wetlands in agricultural areas in several valleys in Bhutan. It is a cryptic species that is difficult to find. A possible technique to survey the species would be to divide the potential suitable habitat into sample areas on a map (using a grid), and conduct timed searches in a randomly selected sample of these sample areas.

Timed searches example 3: Forest birds

For many forest species, timed searches within sample areas may be used as a simple alternative to transects and point counts. It is necessary to select target species that you are confident that you can identify accurately by sight or by their calls, and to decide on the area to be searched (which should be marked on a map). Forest birds are often most active in the early morning, and it is therefore ideal to conduct the timed searches at this time of day. This technique can also be used to count night birds such as owls and nightjars that call regularly during the night.

Line transects

Introduction

Transect methods involve moving along a line between two points and counting the number of individuals on either side of the line. They are used to estimate populations of species that are either too common or widespread to estimate using direct counts, or too elusive for the whole population at a site to be reliably detected. Transects are a good technique to use in some habitats, e.g. agricultural land, grassland, wetlands; however, in general point counts are

more suitable in forested habitats such as those found at many sites in Bhutan. Transects are efficient because they enable an observer to cover large areas in a relatively short time. They can be used to collect encounter rates, calculated as individuals seen per unit time or per unit of transect length.

Line transects work well in open habitats such as agricultural land or grassland

Guidelines

At the sites where transects can be used, they should ideally be selected randomly; however, difficulties of access often mean that in practice they have to follow a trail or a river. Once the transects have been defined and marked onto a map, they should be walked at a steady speed and all encounters of the target species should be recorded. Birds seen in flight are normally recorded separately from those on the ground or perched.

Point counts

Introduction

Point counts involve carrying out standardised, timed counts from a point. Like transects, the points are preferably located randomly within the site and away from trails, but this may not be possible at many sites in Bhutan because of the mountainous terrain. Point counts are better suited than line transects to dense habitats, such as forest, and safer to use in steep or difficult terrain. However, they are less efficient than line transects in terms of data collected per unit time. Point counts can be used to collect encounter rates, calculated as individuals recorded per unit time, to provide an index of abundance for one (or indices for many) species.

Guidelines

The points where counts will be carried out need to be marked onto a map of the survey site. It is ideal to select them randomly but difficulties of access often mean that in practice it is often only possible to visit points which are on or near to trails or rivers. If used for monitoring, the points have to be marked in the field (e.g. by marking a tree or with a GPS reading) so that they can be relocated in the future. The time spent at a point should be long enough to record

Point counts are an excellent method to survey forest birds

everything near the point but not so long that there is significant movement of birds into the area. It is often useful to arrive at a point early and spend a few minutes in silence so that your presence does not affect the behaviour of the target species.

Point counts example 1: Forest birds

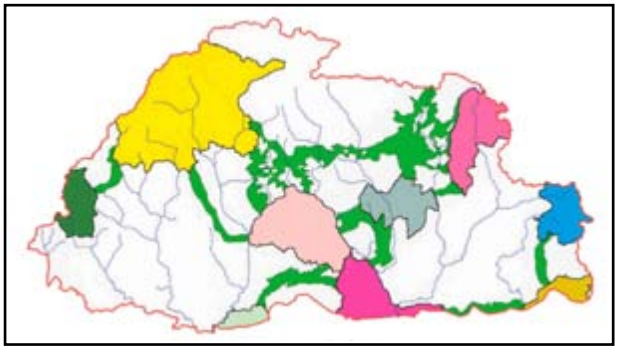
Point counts are an excellent method to survey many forest species. The points should be selected and marked on a map as described above, either randomly or along a trail or river (depending on the ease of access to the forest habitat). It is necessary to select target species that you are confident that you can identify accurately by sight or by their calls. Forest birds are often most active in the early morning, and it is therefore best to conduct the point counts at this time of day. After arriving at each point, wait for five minutes before starting to count birds, and then spend the next 10 minutes carrying out the survey. Write down the total number of individual birds of each species that you see or hear during the 10 minute survey period. Then move on to the next point.

METHODS TO SURVEY AND MONITOR HABITATS

Habitat mapping

Introduction

A national series of habitat maps is available for use at sites throughout Bhutan, which show the boundaries of forest areas as well as other habitat-related features (e.g. lakes). These maps can be used as a baseline for monitoring of changes in the extent of forest and other broad habitat types at the survey sites. However, the maps were produced over 20 years ago and need to be ground-truthed to check whether they are still accurate.



A national series of habitat maps is available for use at sites throughout Bhutan

Guidelines

Simple habitat mapping could be very informative are many sites in Bhutan, for example to monitor changes in the forest boundaries. Initially it is necessary to obtain the forest map for the survey site, and check it carefully in the field to confirm whether the forest boundaries and other habitat features are still accurate or whether there have been any significant changes. These changes should be marked onto the hardcopy maps. Monitoring visits should be made to check for further changes, ideally at least once every year and at the same times of year (to minimise the effects of seasonal changes on the results of the long-term monitoring). It would be ideal to differentiate on the maps between undisturbed natural forest (with an intact canopy), forest that has been significantly disturbed (where the forest canopy will be relatively less complete) and forest that has been planted by man.

Fixed-point photography

Introduction

Repeated photographs provide a quick visual record of broad changes in vegetation and habitat, and digital cameras are now widely available and are relatively cheap to purchase and to use. Fixed-point photography provides illustrations for reports and can convince people that changes have actually taken place. In most habitats and situations vegetation changes detectable from fixed-point photography are unlikely to be noticeable at intervals of less than 5-10 years However, when sudden changes happen, e.g. as a result of management or natural events (e.g. floods or landslides), photographs can be taken to record these changes. It is important that

Fixed-point photography is a valuable technique to record changes in the extent of natural habitats

the time of year at which photographs are taken within any particular sequence is consistent. Analysis is by subjective comparison by eye of a series of photographs taken over a period of time, recording any obvious changes.

Guidelines

Fixed-point photography is potentially a valuable technique, and can be used in combination with habitat mapping. It is necessary to decide on the number and location of positions from which photographs are taken, with the aim of including representative views of all the habitats of the site and all major forms of management. Points chosen should have a good view that is unlikely to become obscured by vegetation growth. It is vital to enable the precise relocation of the camera position and there must therefore be a permanent marker, either already existing or installed especially for the purpose (e.g. a metal post in the ground). The simplest method of taking repeat photographs is to relocate the fixed points and use previous photographs as guidance for lining up the shot.

COLLECTING INFORMATION ON THREATS AND CONSERVATION MEASURES

Introduction

It is important to understand whether there are threats that might be affecting wildlife and habitats, because this helps with the development of effective conservation measures to maintain the populations of animals and plants. It is also important to know about any conservation measures that are already being taken. Some simple guidelines are given below on how to detect and monitor threats, and how to find information about existing conservation measures.

Guidelines

Many socio-economic research and monitoring techniques are available, but it is beyond the scope of this manual to talk about them in detail. A simple approach that can be used during the CEPF project is to hold meetings of local people at the project sites, and discuss with them the following questions:

- What are the important species of birds and other biodiversity at the survey site?
- What are the important habitat types for these species?
- What are the threats that might be affecting these species and habitats?
- What factors are causing these threats and what is the impact on the species and habitats?
- How can the threats and their impacts be monitored, and are there indicators that can be used for this (e.g. cutting of trees can be monitored by counting tree-stumps along a line transect)?

BirdLife IBA monitoring framework assesses threats in the following way (note that the framework document provides more information and includes a list of threat types):

- *Timing* of threat – is it:
  (a) Happening now;
  (b) Likely in short term (within 4 years);
  (c) Likely in long term (beyond 4 years);
  (d) Past (and unlikely to return) and no longer limiting.
- *Scope* of threat – does it affect:
  (a) Whole population/area (>90%);
  (b) Most of population/area (50-90%);
  (c) Some of population/area (10-50%);
  (d) Few individuals/small area (<10%).
- *Severity* of threat – is it causing:
  (a) Rapid deterioration (>30% over 10 years or 3 generations, whichever is the longer);
  (b) Moderate deterioration (10–30% over 10 years or 3 generations);
  (c) Slow deterioration (1–10% over 10 years or 3 generations);
  (d) No or imperceptible deterioration (<1% over 10 years).

This assessment of threats can provide the basis of management plans, which include measures to mitigate the impacts of the different threats on species and habitats. It is important to develop these measures through discussions with local decision-makers and communities, as these local stakeholders will play a crucial role in implementing many of the solutions to the problems.

In order to assess the conservation actions at a site, the following questions need to be addressed (note that the IBA monitoring framework document provides more information and includes a list of types of conservation action):

<Threat type> is affecting wildlife and habitats at some sites in Bhutan.

- *Conservation designation* – does the site have a formal designation that covers:
  (a) Whole area of the site (>90%);
  (b) Most of the site (50-90%);
  (c) Some of the site (10-50%);
  (d) Little/none of the site (<10%).
- *Management planning* – does the site have:
  (a) A comprehensive and appropriate management plan exists that aims to maintain or improve the populations of qualifying species;
  (b) A management plan exists but it is out of date or not comprehensive;
  (c) No management plan exists but the management planning process has begun;
  (d) No management planning has taken place.
- *Conservation action* – which of the following applies:
  (a) The conservation measures needed for the site are being comprehensively and effectively implemented;
  (b) Substantive conservation measures are being implemented but these are not comprehensive and are limited by resources and capacity;
  (c) Some limited conservation initiatives are in place (e.g. action by LCSGs);
  (d) Very little or no conservation action is taking place.

The results of the assessments of threats and conservation actions described above can be entered onto the form from the IBA monitoring framework. The data entered into these forms can be used by RSPN to complete the assessments of the threats (or *pressures*) and conservation action (or *response*) at each of the CEPF project sites.

Actions are being taken for the conservation of threatened species at some sites in Bhutan, for example to project Black-necked Crane and its habitat at Phobjikha.

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