IFAW
International Fund for Animal Welfare

**Animal Action Education**

**Secondary Education (Ages 11–14)**

# Under One Sky

## Why Animals Matter

**"Under one sky, all animals matter. They are a critical part of the web of life."**

**Leonardo DiCaprio**
**Actor and Activist**

# Under One Sky

## How to Use This Programme

*Under One Sky* aims to educate students about the many reasons why animals matter and about the interdependence of humans and animals. The programme covers topics related to biodiversity and habitats, as well as some of the issues and challenges animals – and humans – face as our habitats increasingly intersect and complex human activities impact ecosystems. Here's one possible approach to teach this programme:

1. **Introduce Topic and Develop Content Knowledge** *Film* (**vimeo.com/7063703**); *Lesson 1: What's Your View?; Worksheet 1:What's Your Score?*
   - **Film** View the film with your class to build background and tap into students' prior knowledge about the relationships among people, animals and plants and how people impact animal habitats, and ecosystems. Following the viewing, students may take the short quiz on the **Worksheet 1:** *What's Your Score?* and discuss what they have learned.
   - **Student Magazine** Display the **Student Magazine** (pages 14-18) on an interactive whiteboard or bookmark them on individual computers. Ask students to read the magazine. You may want to do this in two-page sections over a period of days.
2. **Conduct Lesson Activities** *Teaching Guide, Student Magazine, Lesson Plans and Worksheets*
   - **Lesson 2** and **Worksheet 2:** *South India Gazette* focuses on understanding concepts of habitat loss and fragmentation of habitat and their impact on both animal and human populations.
   - **Lesson 3** and **Worksheet 3:** *Eco-investigators* introduce students to scientific fieldwork with a structured and easy-to-implement collection and tabulation activity.
3. **Extension Activity**
   At the end of a lesson, hand out the **Animal Action Pledge** (on page 13 of this book). Ask students to work with their families on small lifestyle changes that can have positive impact on animals and habitat and to report back on progress. They can use the 'Habitat Protection Pledge' on page 12 as a guide.

## Meeting Curriculum Aims

These materials may be adapted to meet curriculum aims in a number of subject areas including Science, English, Geography and Personal, Social and Health Education. See pages 3-4 for more details.

## Companion Film

The *Under One Sky* film is an excellent introduction to the content and concepts presented in this teaching guide. Narrated by actor and environmentalist Leonardo DiCaprio, the film runs about 10 minutes and is appropriate for general youth audiences.
View at **http://vimeo.com/7063703**

## Online Resources

IFAW's Animal Action education programmes offer a wealth of free teaching resources about animals and the environment: **www.ifaw.org/education**

## Animal Action Education

IFAW's Animal Action Education programme offers free resources focusing on animals and the environment. Curriculum-linked education materials are locally adapted for free distribution in eight languages and 20+ countries, reaching more than 5,000,000 young people worldwide each year. For more information about IFAW and the Animal Action Education programme, email **animalactionweek@ifaw.org**, or call 0207 587 6700.

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**Check out the Animal Action pages** in the front of this book for activities your students and community can participate in to help support the rescue of animals and preservation of their habitats.

# Links to the Key Stage 3 National Curriculum

Studies have shown that most children have an affinity for and interest in animals, meaning that lessons with animal content are more likely to capture pupils' attention, making learning more interesting for children. Teachers can use this interest to develop knowledge and skills relevant to both the national and whole school curriculum.

## National Curriculum for England

Specific links to a number of National Curriculum subjects are detailed below. Each lesson in the pack identifies broad subject learning outcomes which can be made more specific using the lists on this chart.

## The 'whole school curriculum'

Children's interest in animals as well as associated conservation, welfare and environmental issues will offer all schools an opportunity to demonstrate that they deliver that balanced and broadly based curriculum that 'prepares pupils at the school for the opportunities, responsibilities and experiences of life'.

**Teachers who have used IFAW's educational resources judge these lessons as excellent for delivering a range of core skills and competences essential for work based learning, social and emotional development and for community engagement and participation.**

# English

**Pupils should be taught to:**

## Spoken English

- use discussion in order to learn; they should be able to elaborate and explain clearly their understanding and ideas
- become competent in the arts of speaking and listening, making formal presentations, demonstrating to others and participating in debate.
- **speak confidently and effectively, including through:**
  - giving short speeches and presentations, expressing their own ideas and keeping to the point
  - participating in formal debates and structured discussions, summarising and/or building on what has been said

## Reading

- develop an appreciation and love of reading including a wide range of non-fiction in order to gain an understanding of increasingly challenging texts through making inferences and referring to evidence in the text.

## Writing

- **Write accurately, fluently, effectively and at length for pleasure and information through:**
  - notes and polished scripts for talks and presentations
  - a range of other narrative and non narrative texts, including arguments, and personal and formal letters
  - Summarising and organising material, and supporting ideas and arguments with any necessary factual detail

## Grammar and Vocabulary

- Pupils should be taught to consolidate and build on their vocabulary and use this in their writing and speech to achieve particular effects

# Links to the Key Stage 3 National Curriculum

## Science – Biology

**Pupils should be taught about:**

### Interactions and interdependencies; Relationships in an ecosystem

- the interdependence of organisms in an ecosystem, including food webs and insect pollinated crops
- the importance of plant reproduction through insect pollination in human food security
- how organisms affect, and are affected by, their environment, including the accumulation of toxic materials

### Genetics and evolution; Inheritance, chromosones, DNA and genes

- the variation between species and between individuals of the same species means some organisms compete more successfully, which can drive natural selection
- changes in the environment may leave individuals within a species, and some entire species, less well adapted to compete successfully and reproduce, which in turn may lead to extinction
- the importance of maintaining biodiversity and the use of gene banks to preserve hereditary material.

## Citizenship

**The national curriculum for citizenship aims to ensure that all pupils:**

- develop an interest in, and commitment to, participation in volunteering as well as other forms of responsible activity, that they will take with them into adulthood
- are equipped with the skills to think critically and debate political questions

**Pupils should be taught about:**

- human rights and international law (key stage 4)

## Geography

**Pupils should be taught to:**

### Human and physical geography

- understand how human and physical processes interact to influence, and change landscapes, environments and the climate; and how human activity relies on effective functioning of natural systems

### Geographical skills and fieldwork:

- use fieldwork in contrasting locations to collect, analyse and draw conclusions from geographical data, using multiple sources of increasingly complex information.

## Non-Statutory Personal, Social, Health and Economic Education

The non statutory nature of PSHE offers teachers and students the opportunity to creatively explore the three core themes of the subject through the lens of animal welfare and conservation as well as human interaction with animals.

**The PSHE Association identifies the following core themes for PSHE Education**

- Health and Wellbeing
- Relationships
- Living in the Wider World

These materials can also be useful for schools working towards the **Rights Respecting Schools Award**, encouraging children to participate in classroom activities and have their opinions heard and, through learning about the rights of others, learn about their own responsibilities to themselves and the wider global community.



# Lesson 1

## What's your View?

**Learning Outcomes:** Students will develop and demonstrate their speaking, listening and critical thinking skills, as well as acquire knowledge appropriate to biology, geography and citizenship.

## Activity 1: Lesson plan

1. Put up **Agree/Disagree** signs in each corner of the room.
2. Read each of the **Viewpoint statements** from the panel.
3. After each statement ask the students to go to the corner of the room marked with the sign that best represents their response and discuss their response with the other classmates there. You may wish to establish ground rules for discussion to encourage good listening, cooperation, and sensitivity to different viewpoints.
4. Explain that students can change their minds and move to a different corner as a result of discussions.
5. Record the number of students who agreed/disagreed with each statement.
6. After the exercise ask the class what they have learned from each other. Were there any surprises? How do they generally now feel about the importance of animals?

## Activity 2: Film/Text

1. For this activity, students will be watching the companion **film**, *Under One Sky*, and taking a quick quiz to test their listening and comprehension skills. Before you show the film, ask the students to bear in mind the statements they agreed/disagreed with from the first activity.
2. After viewing the film, have students complete the **What's Your Score?** quiz on the next page.
3. Go over the quiz answers and invite discussion on the open-ended questions 8–10.
4. Ask students to read the **Student Magazine** as a class from a whiteboard, or individually on personal computers.
5. Ask for ideas on what can be done, as individuals or as a group, to make the world a better place for animals. Finally, revisit the agree/disagree statements. Have their views changed as a result of the film, discussion, and new knowledge gained?

## Resources

- Four large signs: **Strongly Agree; Agree; Disagree; Strongly Disagree**
- Copies of the **Animal Action Pledge** on page 13 of this book for each student.

## Viewpoint statements

- Primates are our closest relatives so they deserve more protection than other animals.
- Animals should not be kept as pets.
- Respect for animals is as important as respect for humans.
- Humans should be allowed to kill animals that damage their crops or eat their livestock.
- Wild animals should stay in the wild.
- Animals are important to the natural environment.
- People don't need to spend time in nature.
- It is acceptable to use animals for human purposes.
- It is not important to consider animals when planning development projects that meet human needs, such as housing.

For homework, invite your students to creatively explore – through artwork, an essay, short story, or poem – the topic: *A day in a world without animals*.

# What's your Score?

• Reproducible

What have you learned from the film you have just seen?

Check the correct answers below.

**1** How many species of animal on earth have scientists named?

- ☐ a) approximately 10 million
- ☐ b) more than 1.8 million
- ☐ c) fewer than 800,000

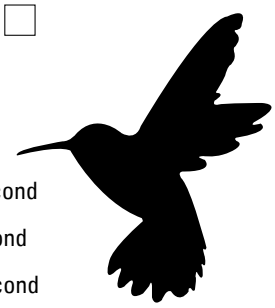
**2** The variety of species on earth can be described as:

- ☐ a) biodiversity
- ☐ b) true biology
- ☐ c) an ecosystem

**3** Elephants are the largest land animal on earth.

a) True ☐ b) False ☐

**4** Hummingbirds can flap their wings at:

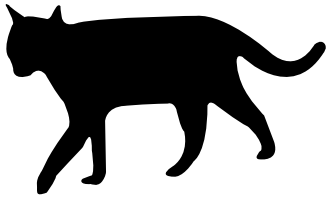


- ☐ a) 220 beats per second
- ☐ b) 20 beats per second
- ☐ c) 200 beats per second

**5** To navigate and find food, whales use:

- ☐ a) their excellent senses of smell
- ☐ b) echolocation
- ☐ c) translocation

**6** Cats are believed to first have been kept as pets by



- ☐ a) the Egyptians
- ☐ b) the Hebrews
- ☐ c) the Americans

**7** Why do you think some countries still hunt whales?

_____

_____

_____

**8** Why do you think that pets can make some people feel better?

_____

_____

_____

**9** If responsible whale watching protects whales and generates revenue, why do you think some countries still hunt whales?

_____

_____

_____

**10** What two things you can do to make the world a better place for animals?

_____

_____

_____

Answers: 1. b; 2. a; 3. True ; 4. c; 5. b; 6.a; questions 7 – 10. It's your decision!



# Lesson 2

## Understanding Habitat

**Learning Outcomes:** Students will use text analysis of a newspaper article and comprehension skills to demonstrate an awareness of the many issues and concerns that impact implementing solutions to habitat loss and fragmentation.

## Lesson plan

- Discuss the term animal habitat and write the following definition on the board: Habitat is the combination of resources (e.g., food, water) and environmental conditions (e.g., temperature) present in an area that makes it possible for a species to survive and reproduce.
- Describe and explore the four main elements of habitat: cover, food, water, and space.
- Ask the class to imagine what would happen to various kinds of animals if just one of the four main habitat elements was taken away or changed in some way.
- Stress to the class the interdependency of the four elements. It is no good, for example, for elephants if there is lots of space, food, and cover in their territory, but they can't actually get to their water holes because a big road is being built that splits the territory in half.
- Use this example to introduce the term fragmentation and explain that it is caused when large areas of habitat are broken up by human activities (such as roads, development, agriculture, settlements, or logging).
- Invite the class to give some examples of things that might have caused fragmentation in their areas and to name some animals that they think might have been affected.
- Explain to the class that a key way of helping animals affected by fragmentation is to create and preserve wildlife corridors. A wildlife corridor is an area of habitat connecting wildlife populations separated by human activities.
- Invite the class to think about why corridors are important and encourage discussion in relation to the four main elements of habitat. For example, corridors provide the space that many species require. By increasing landscape connectivity, the corridors expand wildlife ranges and offer opportunities to breed with other populations of the same species.
- Provide students with the fictitious newspaper article hand out. As an additional resource, hand out the press releases/news article on real-life solutions to habitat fragmentation challenges.
- Divide the class into four groups, representing the various parties who will speak at a public meeting about the proposed project. Each group will be assigned a role:
  1. Government official who needs to get support for the road project from local inhabitants and conservation experts.
  2. Expert with international conservation organisation working to protect elephants and other wildlife in the area.
  3. Villager who has a farm at the edge of the wildlife reserves.
  4. Local small business owner who will be better connected to potential customers and whose transportation costs will be lower if the road is built.

  Give each group 15-20 minutes to draft a persuasive statement that reflects its point of view and nominate a spokesperson who will take on the assigned role.

  Bring the groups back together and have the designated spokespeople make their group's presentation to the rest of the class. The class represents the public audience attending the meeting. Remind your student audience to take notes of the key points raised and write down any questions that come to mind.

  At the end of the presentations, provide an opportunity for questions and suggested solutions from the 'audience.' Afterwards, have the class evaluate each of the presentations and summarise lessons learned.

### Resources

Fictitious newspaper article reproducible, "Road puts 1,000 elephants at risk," from next page

For homework, have students choose a wild animal and research its habitat needs, focusing on the four elements of habitat: space, cover, food, and water. How is this habitat being altered by human activities? What is being done, if anything, to protect the species and its natural habitat?

SOUTH INDIA
Gazette

# Road puts 1,000 elephants at risk

## New highway could cut through vital wildlife habitat in southern India

The lives of more than 1,000 wild elephants are at risk from a road that could cut through their habitat in Southern India. Conservation groups believe that the road will cut through a critical corridor of land linking two important wildlife reserves and will stop the elephants from moving safely along their natural migratory routes for foraging and breeding. Almost half of the wildlife corridors in India already have roads passing through them.

"It is crucial that something is done to help these elephants," said conservationist and elephant expert Anand Kumar. "Today, there are only 25,000 wild Asian elephants remaining in the whole of India. They are suffering greatly from poaching, habitat loss, and fragmentation. This piece of land is also key to the survival of several other species, such as tigers. We must work with the Indian government to protect it now."


© IFAW/ Aidong

The corridor between the two reserves is a narrow strip of land currently owned by local people. The land is not only used by the local elephant population, but by other animals such as leopards and tigers as it links two forested areas cut off from each other by deforestation and agricultural land.

> "It is crucial that something is done to help these elephants."
> – Anand Kumar, conservationist

Government officials in charge of the project say the new highway would better connect human settlements to the north and south of the reserves. However, a road cutting through the forest could also result in collisions between vehicles and animals straying onto or crossing the roadway.

Local villagers are also divided in their views of the proposed road. Some think it will help their area develop and allow them to commute more easily to towns nearby. Others are concerned that it will confine the elephants into small pockets of forest, forcing the herds to stray into local villages and fields looking for food, which could destroy crops and endanger their families.

"People have very little money here and depend on the crops they grow to feed their families. When elephants stray onto farm land they tear up crops with their trunks to eat and their huge feet can ruin a whole year's harvest. Sometimes people get injured and killed when they try to frighten them off their land," explains Karthik Gowda, who lives near the wildlife reserve.

If the road is given the go-ahead by the Indian government, work could begin within the next 18 months.

In the meantime, said Kumar, "We will be working with all parties to come up with solutions that not only protect the elephants' habitat and stop them being lost to India forever, but that will help local people and the government too."



# Lesson 3

## Eco-investigation (Fieldwork)

**Learning Outcomes:** Students will demonstrate an understanding of science fieldwork and the impact of human activity on animals and habitat by participating in a fieldwork project. This activity meets science and biology curriculum aims

## Lesson plan

1. Explain technical terms such as biodiversity, ecosystem, biotic and abiotic, and use real-life examples to help connect students to these concepts.
2. Explain that they will be going outside to a study area you have identified (e.g. the school playground, nearby park, meadow, etc.) to explore local biodiversity through practical field work.
3. Describe the ecology and any human-built features of the study area. Ask your students the following questions (record their answers on the board for future reference): What plants and animals do you expect to find in the study area? What is this based on? (Remind your students that the season, time of day, weather, etc. will influence what is found).
4. Develop a code of conduct (how to behave outside the classroom) when working in and around nature. Remind students that we can affect the behaviour and comfort of animals just by being there. Recommend creating as little disturbance within the study area as possible and taking nothing away from the site.
5. Before entering the study area, hand out the **Eco-investigators data collection sheets** reproduced from the next page. Have students stand quietly as a group and observe the entire area. Ask them to record overall conditions, such as weather, plants, animals, species interactions, and human impacts or disruptions of the area.
6. Next, divide the class into pairs. Each will be responsible for randomly choosing a 2m by 2m square sample site within the study area. Students can use the rope to mark the perimeter of their sample site. Explain that it is important that sample site size and data collection techniques are standardised so that results can be compared.
7. Explain that each group will be using the sheet to collect as much information as they can on their sample site over a 30–minute period. The combined class results will give them an idea of the community of animals that the whole study area supports.
8. Remind students to look and listen for all types of animals, and signs of animals too, like footprints, scat, browse marks, and even bird songs. Note that they will also have room to record plant types and abiotic – non–living – factors like soil, rocks, rotting stumps, and even dew drops. [Note: you may wish to assign one partner the role of 'recorder' and the other as 'observer,' and then switch roles after 15 minutes].
9. Emphasise that they are welcome to use field guides – if available – but when filling out the data sheet they don't have to know the correct names of plants and animals. They can simply describe them. Encourage them to sketch or take photos of all the different components and to record location relative to other components within their sample site.
10. After data collection, give students time to identify the plants and animals they saw in their sample sites using field guides, internet resources, and discussion with others. Discuss the results as a class.
11. Referring back to the list of class expectations, ask the students if they found what they expected. Did they find anything they didn't expect? Did any groups find something unique from all the others? What were the factors of the study area or sample sites that influenced the overall class results and differences between the results of each group (e.g., animals were hiding from the noise of the class, area on a slope, etc.).
12. Choose a few species found by the class. What were these species doing in the study area? What resources were they using and how? (This is an indication of the habitat needs – food, water, cover, and space – of each species, and will be useful when discussing habitat in the next lesson.) What did they learn about their local ecosystem?
13. Discuss with the class the impacts of human activities on the ecosystems around them. What did they learn about these impacts on some of the species in the study area? What might they do differently now that they know?

### Resources

- Biodiversity and ecosystem definitions – see background information on the companion film online at **http://vimeo.com/7063703**
- Field guides/pictures of animals specific to local region
- Magnifying glasses/binoculars/cameras (optional)
- String or rope to mark study area; rulers and measuring tape
- Eco-investigators data collection sheets reproduced from next page
- Pencils, clipboards, extra sheets of paper for sketches, diagrams etc.

# Eco-investigators



Name _____ Sample site no. ___

Date _____ Time _____

Weather (Check all that apply)
Sunny ☐ Light rain or snow ☐ Light wind ☐
Cloudy ☐ Heavy rain or snow ☐ Strong wind ☐

Other _____

Sample site description

(Quickly sketch your site in reference to obvious landmarks – note unique features)

General observations (about the entire study area)

Record as much information as you can about the living and non-living components of your sample site. Include data such as name, description, number of individuals, and location within site.

**Attach separate sheets with your sketches, diagrams, and other notes or observations, including human impact or disturbances.**

## Plantae

Look for: colour, texture, patterns, shape, and size of leaves, bark, branches; life cycle signs (buds, new growth, flowers, seeds).

(trees, shrubs, vines, ferns, mosses, grasses, herbs...)

## Fungi

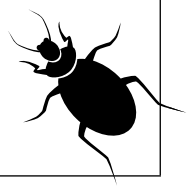
(mushrooms, molds, lichen...)

## Animalia

Look for: behaviours (flying, jumping, crawling, eating, hiding, nesting, hissing, curious…) and animal signs (tracks, scat, eggs, browsing, owl pellets, gnawing, bones, fur on a branch, nests, songs and calls…)

VERTEBRATES (mammals, birds, fish, reptiles & amphibians)

INVERTEBRATES (insects, spiders, worms, molluscs...)



## Abiotic

Non-living

SOIL (color, texture...)

ROCKS, etc. (size, number...)

SOURCES OF WATER

HUMAN FEATURES

OTHER (leaf litter, logs...)

1. Compile and graph the results of your study using a bar or line graph. Describe any 'trends' that you notice from the graphs
2. Describe the major ecosystems your study area is located in (e.g., temperate forest, taiga, desert, lake, river, etc.) and list three indicator species you found or might expect to find (e.g., song sparrow, caribou moss, black spruce tree).
3. Describe the climatic conditions in your area (e.g., temperature, precipitation). List three ways that climate, habitat and biodiversity are connected.
4. Make a list of the different groups of animals (such as mammal, bird, and insect classes) that your group found in your study area. What was the most abundant group of species in your study area and why?
5. Choose one species. What was this species doing in your study area? What resources were they using and how?
6. Draw a food web showing the connections between at least five species (plants and animals) you saw in your study area.
7. List any threatened or endangered species that you found in your study area. If you didn't find any, choose a threatened or endangered species in your region. What conservation measure(s) could you put into practice to help this species thrive?
8. Describe any animal 'homes' you found in your area. How did you know they were animal homes?
9. What measures could be put in place to protect or create animal homes in the area?
10. Were there any human-made barriers in the study area restricting wildlife access to food and shelter? What could be done to reduce the disruption?

# Habitat

## Protection Pledge

**We all know how important our home is to us – and it's just the same for animals. But the impact of human activities is altering ecosystems and animal habitats around the world. It negatively affects the environment that we all call home.**

**Animal homes come in many sizes – from an anthill to a desert, from a pond to an ocean, from a blade of grass to a forest. You can protect these homes for animals in many different ways right where you live, and make a positive impact on our collective home, planet Earth!**

### As an individual, family, school or community, pledge

#### 1. Be aware and take care

Animals and their homes are everywhere! Whether playing in your garden, riding your bike to a friend's house, travelling with your family, or on a nature walk, you will come in contact with animals, large and small, and the homes they depend upon for survival.

It might be an insect marching across a walkway, a small reptile or mammal foraging for food in the grass, or a lost dog or cat searching for its family.

We can all do our part to make sure our encounters with animals and their homes – large and small – are responsible, positive and do not end in tragedy.

- **Keep your eyes and ears open.**
- **Slow down, go around, step over, don't disturb and tread lightly.**
- **Stay on designated paths.**
- **If you see an animal in need, ask an adult to call the people who can help, like the RSPCA or a Wildlife Rescue Centre.**

#### 2. Change course

**Refuse, reduce, reuse, recycle**

Refuse what you don't need (instead of accepting gifts at your next birthday party, ask for donations to your favourite charity). Reduce the number of things you throw away (pack a litterless school lunch). Reuse items (start a toy or sports equipment swap programme; switch to reusable shopping bags). Recycle (bottles, paper, plastic, tin).

**Save energy**

At home, school and work, switch off lights and electrical items. Walk, cycle and use public transportion where possible. Buy foods grown locally and goods produced in your region. Holiday closer to home. It all adds up to help combat global warming, pollution and depletion of natural resources.

#### 3. Keep it clean

Dispose of your own rubbish and hazardous waste properly. Compost table scraps. Pick up litter wherever you come across it. Organise a local beach, park or neighbourhood clean-up with a group of friends or your class at school.

Pledging to use less paper – and use recycled paper – really does save trees for forest dwellers. Turning off your bedroom lights and riding your bike means fewer greenhouse gases warming our planet. Cleaning up litter in your school grounds or a local park protects pets and wildlife from coming in contact with dangerous rubbish. Slowing down for wildlife crossing the road in search of food or a new home saves lives.



Research indicates that global warming caused by human activities, including energy consumption, could impact animals worldwide, from the poles to the tropics. For example, the United Nations' Intergovernmental Panel on Climate Change suggests that arid habitats may become even drier, which means that water and food could become more scarce for elephants in southern and eastern Africa.

# Animal Action Pledge

I,_____

and my family pledge to take action for animals. This is the action we are going to take: _____

_____

_____

Here is a picture of how we will **Take Action for Animals!**

# Under One Sky

For hundreds of millions of years, animals have inhabited the land, the seas and the skies of our planet. From the smallest insects to the largest mammals, animals are vital threads in the web of life that sustains us all.

## Animals Matter

Animals have been our close companions and workmates for thousands of years. They are woven into the fabric of cultures around the world. There are myriad animal wonders to be found, even in your own backyard, such as a spider's web, which is stronger than its equivalent weight in steel or an ant that can carry ten times its body weight.

Earth supports an incredible diversity of animal life. According to the 2005 Millennium Ecosystem Assessment, which was funded by the United Nations and conducted by 1,300 experts from 95 countries, there are between three and 30 million animal species inhabiting our planet. Fewer than two million have been scientifically accounted for.

This rich animal and plant biodiversity combines to form a giant web that is interconnected in ways even scientists don't fully understand. What we do know is that approximately one fifth of all known mammals and 12 percent of all known birds are threatened with extinction. According to the latest figures from the International Union for Conservation of Nature (IUCN), which maintains a globally recognised list of endangered species (called the Red List), an alarming 16,928 species of animals – from insects and shellfish to gorillas and elephants – are threatened with extinction. There are more than 600 in the United States alone, according to the U.S. Fish and Wildlife Service.

The incredible variety of life on Earth is called 'biological diversity,' commonly referred to as **biodiversity**. In part a measure of the richness of life, biodiversity exists on three levels: genetic diversity – the variety in DNA molecules; taxonomic diversity – the number and variety of species and other taxa such as families, orders, and ecosystem diversity – variety among communities of living organisms and their abiotic (non-living) habitats.

The full consequences of biodiversity loss are largely unknown, but we do know that biodiversity plays a critical role in ecosystem function. For example, recent studies suggest that declines in marine biodiversity are impairing the ocean's capacity to provide food and maintain water quality.

On a smaller but no less important scale, loss of genetic diversity can greatly impact the survival of a species. Northern right whales were hunted to the brink of extinction in the 19th century. By the early 20th century, only about 100 individuals remained. Today, some researchers think that the entire northern right whale population may be descendants of only two or three females. As a result, low genetic variation may be one of the factors hindering the recovery of this critically-endangered species.

In partnership with the Kenya Wildlife Service, IFAW has helped to protect the incredible diversity of wildlife in Tsavo National Park, home to 400 bird species and 60 mammal species, including the largest single populations of elephant and rhino in Kenya.

The good news is that species can, and do, recover. In 2008, the status of 37 mammal species around the world improved and in the past 15 years scientists believe that 16 bird species avoided extinction because of conservation programmes. All are a critical part of the web of life, so when we protect animals we are ultimately protecting ourselves and our future.

## Complex Connections

Animals matter as essential components of **ecosystems** – a scientific term that describes the complex interactions between animals, plants and the non-living factors of their habitats.

Ecosystems come in a variety of sizes. They can be as small as an anthill or as large as the Earth's biosphere. From a rotting log to the rainforest, a forest stream to the ocean floor, a farm field to a school yard, ecosystems provide habitat that is just as important to animals as homes and neighborhoods are to people. They provide essential food, cover, migratory corridors, and breeding and nursery areas for animals of all kinds.

Each species has its own habitat requirements that are essential to survival. A whale that is adapted to the saltwater ocean could not live in a freshwater lake; a polar bear could not survive in the desert. But all habitats share four essential elements: water, food, cover and space.

Some animals migrate between habitats on a seasonal or even daily basis. Harp seals, for example, journey over 5,000 km (3,000 miles) on a round-trip following the formation of ice floes from northern feeding grounds to more southerly waters, where they give birth and nurse their young.

The amount of suitable habitat for a wildlife species determines, in part, the number of individuals that can survive in any given area. When this habitat is reduced or fragmented into disconnected patches, some species may find it more difficult to disperse or migrate. Some populations may decline or go locally extinct while others may increase, and the overall composition of the animal and plant community changes.

Some animals not only rely on an ecosystem for habitat, but are also themselves essential in supporting that ecosystem. Without them, a cascade of local extinctions could occur. These animals are known as **keystone species** because many other species in the ecosystem depend on them in the same way that the keystone keeps a stone arch from falling.

For example, elephants are considered a keystone species in maintaining the African savannah. They preserve the grasslands by knocking down and weeding out trees and shrubs. Without elephants, much of the savannah would turn into woodland. And in some forest habitats, certain tree species rely on elephants to digest their seeds for germination to occur.

Many other animals play a similar role in maintaining functioning ecosystems, from grizzly bears and wolves to sea otters, oysters and starfish.

© IFAW/K. Gruys

**Above**

Grizzly bears, like elephants, are vital in sustaining the ecosystems in which they live. IFAW has been supporting the rehabilitation and release of orphaned grizzly bears and as of 2011 had released eight bears into the wild.

**Below**

Asian elephants are as important in their forest ecosystems as African elephants are to the savannah. In the Wild Elephant Valley of southwest China, IFAW's unique Asian elephant conservation initiative promotes successful solutions to human/wildlife conflict that has plagued this remote, forested region.

© IFAW/C. Cullen

Humpback and right whales, among others, travel thousands of miles in a seasonal migration between multiple habitats. IFAW works to protect migrating whales from being hit by ships, entangled in fishing gear and other threats.

© IFAW

**Above**

Many species of falcons, hawks, owls and other birds of prey have sharply declined due to habitat loss, hunting and other human impacts. In China, IFAW's Beijing Raptor Rescue Centre saves breathtaking birds, like this owl, from illegal wildlife trade, habitat loss and other threats. The goal is to send them back to the sky.

**Below**

Pollution in all forms is one of the biggest threats to wildlife and habitats. IFAW is a world leader in successfully rescuing and cleaning penguins and other seabirds caught in oil spills so they can return to a healthy life in the wild.

© IFAW/J.M. Barredo

## One Home For Us All

Healthy, functioning ecosystems provide vital homes for both animals and people. Unfortunately, research conducted by 1,000 scientists involved in the Millennium Ecosystem Assessment concluded that humans have altered the Earth's ecosystems more in the past 50 years than any other period in our history. As a result, biologists believe that we are now seeing species extinctions at 1,000 times the natural rate. Many believe that planet earth is currently experiencing its sixth mass extinction.

Causes include pollution; overhunting and overfishing; habitat encroachment (from housing developments, agriculture, ranching, mining operations or logging); invasion of non-native species (sometimes introduced inadvertently via shipping or as a result of illegal trade in exotic species); and unnatural temperature changes in the environment.

**Habitat fragmentation** due to human activities such as urbanisation, transportation, agriculture, and resource extraction is an ever-increasing threat to many animals. Maintaining or creating **wildlife corridors** – linear patches of habitat that connect two or more adjacent areas – can help animals move between patches of suitable habitat. Hedgerows, for example, are used by small mammals, insects, and birds to avoid predators while moving through farmland. Corridors are increasingly important for species such as elephants and tigers that migrate or roam across landscapes that have become fragmented.

Most scientists now agree that climate change is taking place in the world due to global warming caused by human activities. According to the results of a comprehensive scientific study conducted on four continents, this climate change could cause the destruction of ecosystems, ranging from coral reefs to mountain meadows. Consequently it could drive more than a million animals and plant species to extinction by 2050. This may be one of the greatest threats animals will face during our lifetime.

The destruction of rainforests, home to two-thirds of all known species and the greatest terrestrial source of the air that we breathe, is another threat to our planet.

At present more than an acre of rainforest is lost every second, endangering the survival of the myriad of species that rely on this vital ecosystem.

© IFAW/S.Cook

Since 1979, sea ice off the East coast of Canada has been going down by 6 per cent a decade, with dire consequences for harp seals, who need the ice floes to give birth and nurse their pups. IFAW has been working for more than 45 years to protect these fascinating animals, which face the largest marine mammal hunt in the world.

Koalas are marsupials that are native to Australia and the only surviving members of the family Phascolarctidae. When wildfires surged through Australia in early 2009, IFAW helped to rescue and rehabilitate koalas, kangaroos, wombats and other animals injured and displaced by the smoke and flames.

## Animals and Us

Look back in time or around you today and you will see the powerful bond that exists between animals and people. Animals are featured in childhood fables and great works of literature; in 3,000–year–old cave drawings and modern art; in the 12 symbols of the ancient Chinese zodiac and as the mascots of modern sports teams.

Millions of people in every country in the world share their home with animals, from cats, dogs, and horses to rabbits and pigs.

Among the first domesticated animals were wolves. These were used for hunting by prehistoric humans more than 10,000 years ago. Now, dogs are the only animal found in virtually every human society on this planet.

The ancient Egyptians domesticated wild cats 6,000 years ago, probably to protect their grain stores from rodents. Cats became important to early agricultural societies, just as dogs had become important to earlier hunting cultures.

For many people, companion animals truly are their best friends and part of the family. Working animals, such as guide dogs and donkeys, are vital to their owners' daily lives. Some animals, including dogs, cats, and horses, have also been recognised by health professions for their therapeutic effect. This ranges from relieving stress and lowering blood pressure to helping children overcome physical, mental, and emotional disorders.

One of the oldest of all occupations was hunting for food for survival. But the 21st century looks very different from the early days of human civilization.

Our soaring population is now using the planet's resources – including animals – at rates well beyond sustainable levels. According to a report of the United Nations Environment Program, hunting and trade are among the key factors pushing many wildlife species to the brink of extinction.

Today we need to find different and creative ways of living with animals. For example, responsible whale watching can be a viable economic alternative to whaling. It can promote appreciation and protection of whales while generating more than a billion dollars of annual income for coastal communities worldwide.

In India, for example, some coastal towns have adopted the whale shark as their mascot because of growing appreciation for this largest living fish species, which is vulnerable to extinction. Whale sharks were once hunted by fishermen in many of the communities that now protect them.



**Above**

From the townships of South Africa to the Navajo Nation in the United States, IFAW provides crucial veterinary care for dogs and cats in impoverished communities around the globe, caring for some 50,000 companion animals worldwide each year.

**Below**

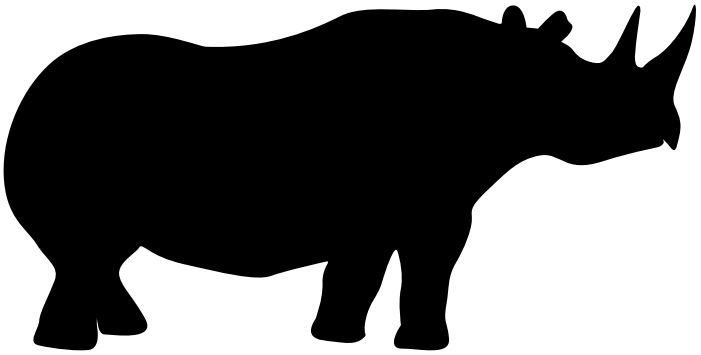
Hundreds of whales, dolphins, seals, and other marine animals receive hands–on help from the IFAW Marine Mammal Rescue Team each year, from the shores of Cape Cod in the United States to the African island of Madagascar.



Animals are not only victims when disasters strike but are also among the bravest heroes. When a devastating earthquake shook China in 2008, IFAW emergency relief teams were among the first organisations on the ground, working alongside search and rescue dogs to find survivors – both animals and people. Exhausted from searching the wreckage, this rescue dog fell asleep with his special protective boots lined up before him.



## Glossary



**abiotic:** non–living

**biodiversity:** biological diversity; a measurement of variation in species, genes, and living communities in an area

**biotic:** living

**domesticated animals:** animals that have been adapted over time to be dependent on humans for food and shelter. Domesticated animals were adapted by humans to be useful to them for food, companionship, or work.

**ecosystems:** interacting communities of plants, animals, and the non–living components of the environments in which these plants and animals live

**habitat:** the area where a type of plant or animal lives

**extinct:** no longer living (as in a species that no longer lives on Earth)

**genetic diversity:** variety in the code for inherited traits of an entire species

**habitat fragmentation:** the process of breaking up a habitat into smaller and more disconnected patches

**hedgerow:** a row of shrubs or trees separating fields

**keystone species:** species that strongly affect the structure and function of an ecosystem, as a keystone in an arch affects its strength

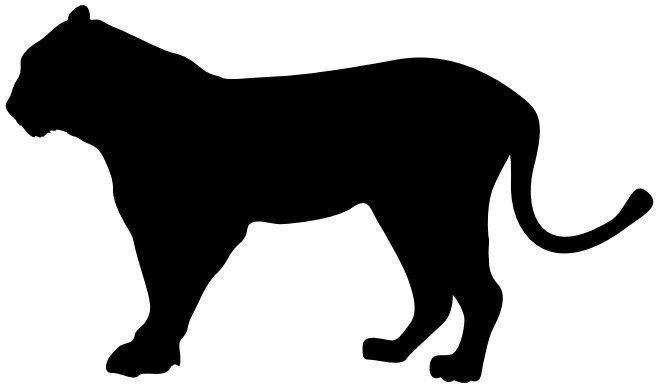
**marsupials:** mammals whose females have a pouch. Their babies are born before they are completely developed. So the babies live in their mother's pouches while they finish their development. Kangaroos and koalas are marsupials.

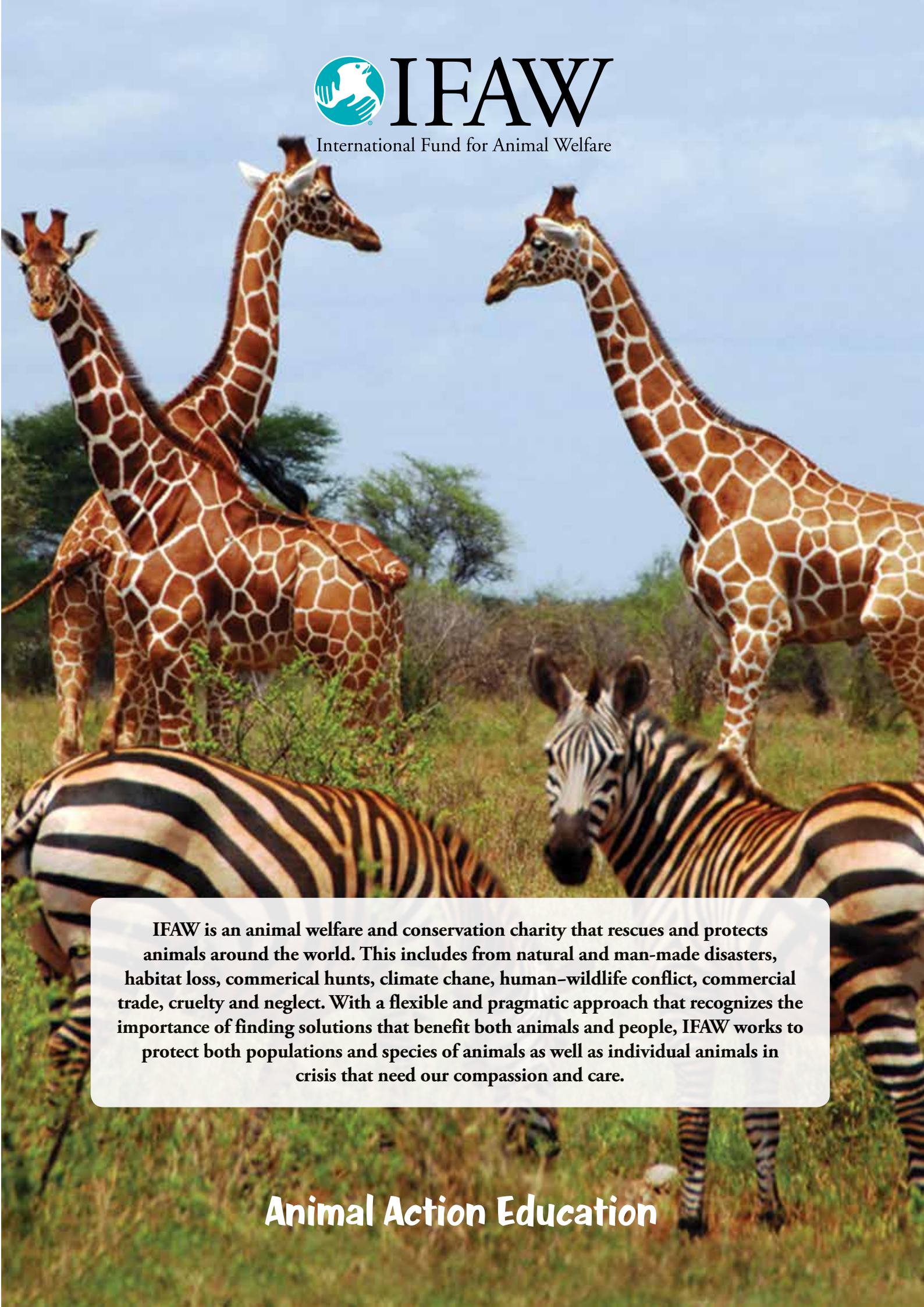
**Red List:** a list of endangered species issued by the International Union for Conservation of Nature

**savannah:** a flat grassland without many trees

**species:** a group of living things that are similar and can have babies

**wildlife corridors:** connecting areas of land or water, across which animals travel from one habitat to another, for food, safety or seasonal migration. Also known as migratory corridors.





IFAW

International Fund for Animal Welfare

**IFAW is an animal welfare and conservation charity that rescues and protects animals around the world. This includes from natural and man-made disasters, habitat loss, commerical hunts, climate chane, human–wildlife conflict, commercial trade, cruelty and neglect. With a flexible and pragmatic approach that recognizes the importance of finding solutions that benefit both animals and people, IFAW works to protect both populations and species of animals as well as individual animals in crisis that need our compassion and care.**

# Animal Action Education