

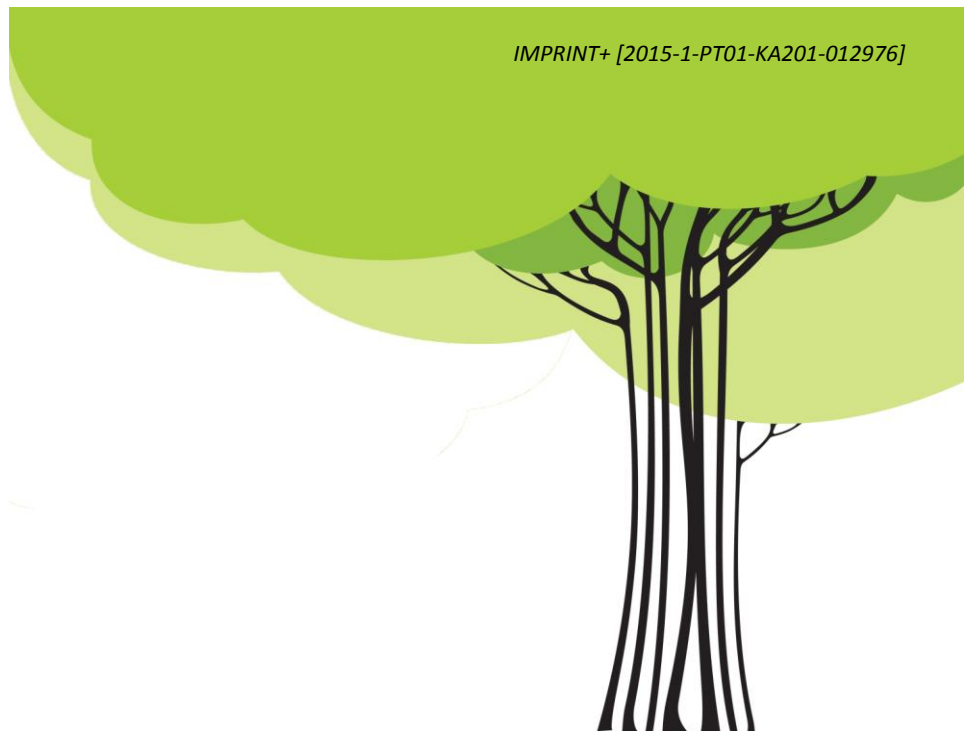


# IMPRINT

## Eco Assessment Tutorial

Habitat Doctor / Oct 2016

IMPRINT+ [2015-1-PT01-KA201-012976]



## Table of Contents

1. A Brief Guide to This Tutorial.....	3
2. Part 1. Pre-Fieldwork Research.....	4
I. Choosing a site.....	4
II. Know Your Site.....	5
III. Guide Research Questions.....	5
IV. Using Your Research.....	6
3. Part 2. Onsite Visual Assessment.....	7
I. Field work preparation.....	7
II. How to record your results.....	8
III. Ecological Investigation.....	8
IV. Human Impacts Assessment.....	14
V. Results Summary.....	18
4. Part 3. Back in Class.....	19



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## Habitat Doctor: Examine the Health of Your Ecosystem

### A Brief Guide to this Tutorial:

Welcome to the IMPRINT+ ecological site assessment tool. This simple fieldwork exercise will guide you in assessing an area for ecological health. A site is considered ecologically healthy when there is a high level of biodiversity and a variety of habitats for plants and animals to live in. A healthy site will also have low levels of pollution, few to no invasive species and little human disturbance.

The tutorial is made up of three parts. While we recommend using all three parts of the tutorial, it is not essential to complete Part 1 & 3 to partake in the IMPRINT+ project. You can use part two on its own to gain a greater understanding of your local landscapes.

#### **Part 1** – Pre-fieldwork Research.

Poses topics for an individual or a group to research before arrival at the site. With the knowledge acquired through this research you will be better able to assess the site accurately.

#### **Part 2** – Onsite visual assessment.

The assessments are made through simple visual and auditory observations. These observations are the first stage in ecological science. From these observations you can draw some simple conclusions about the site being studied. The more experience you gain with this kind of observational research, the greater the accuracy of your research will be.

#### **Part 3** – Back in Class or at Home.

This section provides some suggestions for school and youth groups of final activities that can be used after the site/habitat visit. This will help to consolidate learning and take the information and research to a deeper level of understanding.

## Part 1. Pre-Fieldwork Research

**Materials:** You will need access to online or hardcopy resources that have information about the area you are researching such as local blogs, conservation groups, environmental protection websites, plant, vertebrate and invertebrate identification guides, geological guides and detailed maps. You will need a notebook or electronic device to record your research.

**Optional:** Poster boards, paper, glue, markers, scissors, printers, computers

**Duration:** This can take as long or as little time as you have available. If your time is short then just focus on one or two of the suggested research questions. Or alternatively divide your group or class into teams that can each tackle different parts of the research.

### Choosing a site

**The Purpose:** For this activity you can choose any natural site you wish to learn more about and investigate how healthy it is in ecological terms. It may be a site you wish to carry out some conservation work on, by increasing habitats through installing insect homes, bat boxes, bird boxes or even a pond. Or, you may wish to restore the site through removal of invasive species, by planting trees or suitable native species.

This tutorial will give you a sense of the ecological health of your site and what conservation actions could be necessary there. Sites can range from local parks, wildlife reserves, to back gardens, community gardens or patches of 'wasteland' in a village/town or even the area around a school or community centre.

The IMPRINT + App can assist you in finding what conservation action is suitable for your area and will provide links so you can learn how to do the various actions. You can use the App to record your action, allowing everyone to see the great conservation work happening all over Europe.

**Location:** Ideally the site will not be too far away from your home or school, so you can reduce costs and emissions on travel.

**Size:** The site can be any size, however, to make assessment manageable, we recommend no less than 10 students/volunteers to 0.3 hectare. You can have more students/volunteers on a smaller site, but with less than 10 on a large site, you may miss some important aspects of the assessment.

### Know Your Site

Please see below a list of questions to act as a guide in assisting you in learning as much as possible about your chosen site.

**The main focus of the research is:**

What can I expect to find at the site?

What information will I need to know when I get there, so I can carry out the field work assessment successfully?

#### Guide Research Questions

- What kind of habitat or landscape is your site?
- What plant and animal species are native to this habitat in your region?
- Does this habitat generally support a high level of biodiversity or low?
- Is this habitat rare or common in your region/country?
- Do trees belong in this habitat?
- Can you find a map of the area you intend to assess? Consider using google maps and satellite imagery or a similar online/ tool to view the site.
- What is the geology of your site? How might this influence what grows there?
- Is there water on your site? How might this impact what lives and grows at the site?
- What is the approximate area of the site in hectares?
- What is the distance to the nearest road?
- What is the distance to the nearest house?
- What infrastructure and industry is nearby?
- How might this affect your site?

**Please Note\*\***

- The larger the site is, the more likely it is to have a diverse range of species and greater population sizes. However, it is important to remember that certain habitats such as; sand dunes, karst limestone, desert, tundra may only have a few species of plants or animals, yet still be very healthy as they are unique environments, where only a small number of species are capable of living and surviving in. These species often have special biological adaptations to help them survive in these environments.
- The further away from industry and human activity, the site is less likely to suffer from human related impacts such as pollution and trampling.
- While trees and water sources are generally viewed as healthy in most ecosystems, there are occasions where they are not suitable – it is useful to know what is considered normal for the habitat you are studying

### Using Your Research

**For schools and youth groups carrying out this activity, we recommend that students use the information from their research for a purpose such as;**

- For a communications project. Students can create their own poster boards about their site to educate their local community or rest of the school.
- For a media project to raise awareness of the site (newspaper, blog, radio, video, website).
- For an exhibition to inform and raise awareness about the site.
- For a scientific report on the site which outlines what they anticipate finding when they go there. Students can divide into groups and research different aspects of the kind of habitat they will study during the fieldwork. Students are encouraged to work together in teams. Similar to scientists in an ecological consultancy which would be comprised of a number of specialists in a various scientific fields.

## Part 2. Onsite Visual Assessment

### Is your site Ecologically Healthy?

The aim of this assessment is to determine the health of a chosen site or habitat. This information should not be considered a guide for research or environmental assessment in a professional capacity in anyway. Ecosystems are complex environments with many varying factors that cannot be easily summed up in a single assessment.

**NOW THAT YOU HAVE CHOSEN YOUR SITE AND DONE SOME BACKGROUND RESEARCH YOU CAN PREPARE FOR YOUR FIELD WORK.**

### Field work preparation

#### Time Period

Decide how long you wish to spend on your fieldwork. Choose a set period of time to carry out the fieldwork, it can range from one hour in total or 30 min per day over a week or longer. It is up to your group to decide the schedule and timeframe that is right for you.

During the allocated time record the ecological factors in the survey below. The longer your study period the greater the accuracy of your results however, it is not always practical to study a site for a long period of time and it is important to remember your results will reflect a snapshot in time, which will vary from season to season, year to year.

**Materials:** Field notebook, camera, pens and pencils, ruler, measuring tape or meter stick and a length of twine or string.

**Optional:** A bin bag and gloves to collect rubbish found.

## How to record your results?

The assessment is divided into two parts. The first is an ecological investigation and the second is an assessment of human impacts on the site. Both sections are extremely important in understanding your site and choosing possible conservation actions to carry out there.

As a group decide who will be responsible for recording the different data sets. This will save time and avoid confusion when you are at your site.

Create a group notebook where all the final results and information will be stored. This can be digital or a hardcopy. You will need pencil and paper for taking notes when in the field as laptops and phones can be damaged by weather. Check the weather for the date you are due to carry out your fieldwork so you can be prepared with appropriate clothing and equipment.

Information on the different data sets you will collect is outlined below:

## Ecological Investigation

This section has several data sets, the information below explains how to collect and record this information. This information is essential to determining what environmental actions you will carry out later on. For example, if you choose to build habitat boxes, this investigation will guide you in figuring out what species you need to create habitat for.

### Data Set 1 – 3 – Species Count and Identification

For the species identification section, if working with a group of people, divide the group into three subgroups. Each sub-group will focus on either plants (data set 1), invertebrates, (data set 2) or vertebrates (data set 3). In doing so, each group will not have to compare results and avoid duplicate identifications. You do not need to be an ecologist to count how many species of plants and animals in an area. In fact, you do not need to even know the names of the plants and animals. You simply need to be good at observing detail. Through your observations you should be able to tell if one specimen (individual) is different enough from another so that it can be considered a different species.



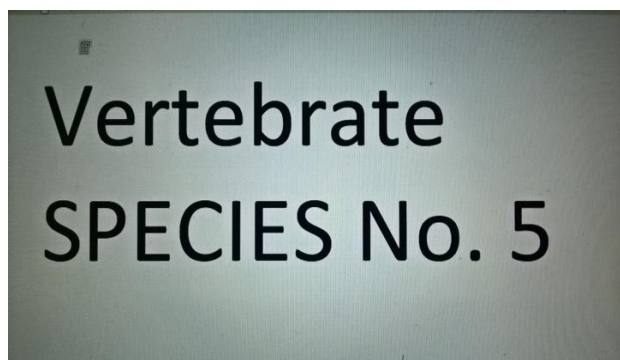
There are many ecology texts and websites that can assist you with how to identify different species and what to look out for during your observations.

We recommend using a camera (*place in a clear plastic bag if bad weather is due*) and taking photos of all the different species you see and then deleting the doubles. Then just count your photographs to give you the final number.

You can do this when recording invertebrates (bugs, insects, all animals without a backbone) and vertebrates (mammals, birds, amphibians and any animal with a back bone) and even plants (trees, grasses, lichens, mosses, mushrooms and flowers).

Remember to count just the number of species, not the number of individuals found. If you record a ground beetle but see ten ground beetles, this is still just a recording of one single species.

Using an A4 sheet write Vertebrate Species or Plant Species or Invertebrate Species. Then on a second sheet write a number. This way you can just change the no. next to your species type. Then take a picture of the “Vertebrate Species No. 1”, before you take photographs of the species you have found. Then on the next species you change the no. to the next in the sequence. This process gives you the opportunity to take a few pictures of an individual for accurate identification while still knowing it is the same species. It is useful to have a ruler next to the specimen if possible, as size can be difficult to determine in photographs when back at home or in school.



**HOW MANY DIFFERENT SPECIES OF PLANTS?**

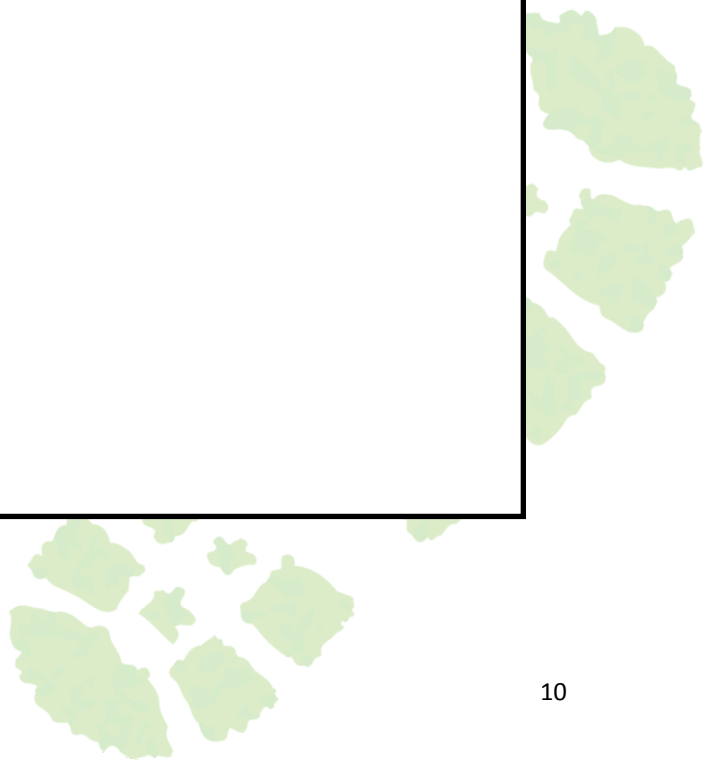
Final Number:

*LIST THE NAMES OF THE ONES YOU KNOW IN THE BOX BELOW...*

**HOW MANY DIFFERENT SPECIES OF INVERTEBRATES?**

Final Number:

*LIST THE NAMES OF THE ONES YOU KNOW IN THE BOX BELOW...*

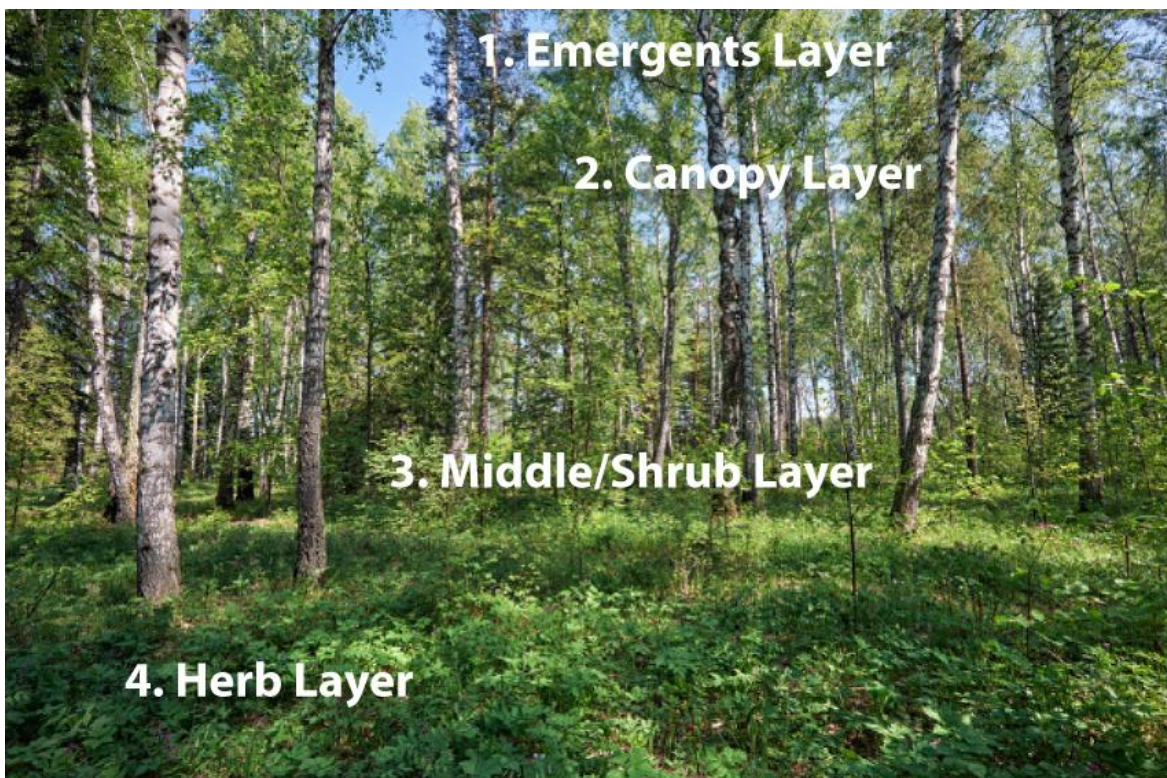


**HOW MANY DIFFERENT SPECIES OF VERTEBRATES?**

Final Number:

*LIST THE NAMES OF THE ONES YOU KNOW IN THE BOX BELOW...*

**Data Set 4 - Vegetation Layers**



**Layer 1 – Emergent Layer:** The tallest trees are the emergents, towering as much as 60 meters above the forest floor with trunks that measure up to 5 meters around. Most of these trees are broad-leaved hardwoods or evergreens. Sunlight is plentiful up here. Animals found are eagles, bats and butterflies.

**Layer 2 – Canopy Layer:** The tallest, most mature trees form the canopy of a woodland. The leaves of species such as Beech (*Fagus Sp.*) are so effectively patch worked and angled to catch the maximum amount of light, that they cast a very dense shade. This allows few plants to survive underneath. Ash (*Fraxinus Sp.*), by contrast, with its finely divided leaves, allows more light through to the woodland floor, so that layers are more likely to develop.

**Layer 3 – Middle/Shrub Layer:** This layer consists of younger individuals of the dominant trees, together with smaller trees and shrubs which are adapted to grow under lower light conditions. These characteristic understorey trees sometimes have a sprawling sideways growth form For example: Hazel (*Corylus Avellana*), Strawberry tree (*Arbutus unedo*), Common hawthorn (*Crataegus monogyna*), Elder (*Sambucus nigra*). This enables them to increase the surface area available to trap light filtering through the upper canopy. Invasive, non-native species such as Rhododendron, may dominate this layer in some woods.

**Layer 4 – Field Layer:** The field layer is usually best developed where substantial amounts of light reach the woodland floor, for example in clearings, or newly coppiced areas of woodland. *(This layer is not pictured on the example above, it looks similar to a garden lawn or grassy field)*

**Layer 5 – Herb Layer:** The ground layer will largely consist of a great variety of different mosses. It may also include ivy growing along the ground rather than climbing up in the trees. Mosses require constant high moisture levels, so this layer will be less well developed in drier woods

**HOW MANY LAYERS OF VEGETATION ARE THERE?**

**Final Number:**

*DESCRIBE THE LAYERS AS BEST YOU CAN IN THE BOX BELOW...*

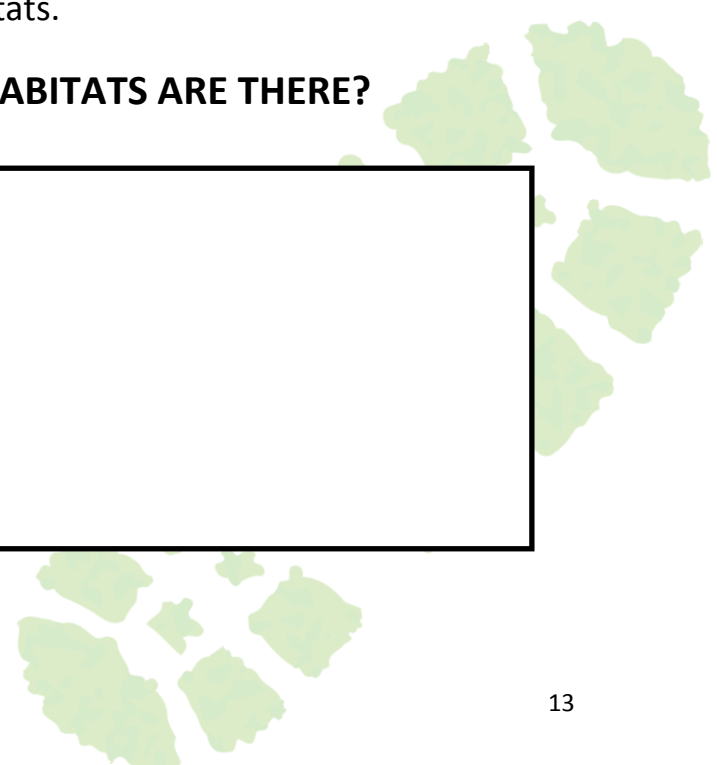
**Data Set 6 – Habitat Count**

A habitat is the area where a plant or animal spends the majority of its daily life. This is different to its home. For example, a squirrel’s home is its dray (a kind of nest) in a tree, however the squirrel’s habitat is the entire forest. The forest is considered a macro habitat as it covers a large area.

You may also find micro habitats (smaller areas can also be a habitat to smaller species), a single oak tree can support up to 300 different species of invertebrates that may spend their entire life on the tree. This data set includes both macro and micro habitats. However, if you have a particularly large site, you may wish to just focus on macro habitats.

**HOW MANY DIFFERENT KINDS OF HABITATS ARE THERE?**

*List them in the box below...*



## Human Impact Assessment

For this section, refer to the guide images in the appendix that give examples of a severe, moderate and no impact for each data set. As a group estimate where the site falls between these guides, and circle the relevant number on the scale for the chosen site. In the box for observation notes, describe the impact verbally, noting any usual or significant aspects to it.

Allocate points to your site based on the severity of the human impacts on a scale from 10 (the impact being very severe) to 100 (having no impact at all)

When you have completed all the sections add up the points to see what the total is for your site and then go to the results section.

*The images in Appendix I are a guide to assist you in identifying where on the scale your site is. For example; if the habitat looks like it has more litter & Waste than the image for 'moderate' then you would mark 40 points, as the amount of pollution increases, the points decrease.*

### LITTER & WASTE

0-----10 -----20 ----- 30 ----- 40 ----- **50** ----- 60 ----- 70----- 80 ----- 90 ---- **100**  
**Severe** **Moderate** **None**

Observation Notes:

**TRAMPLING**

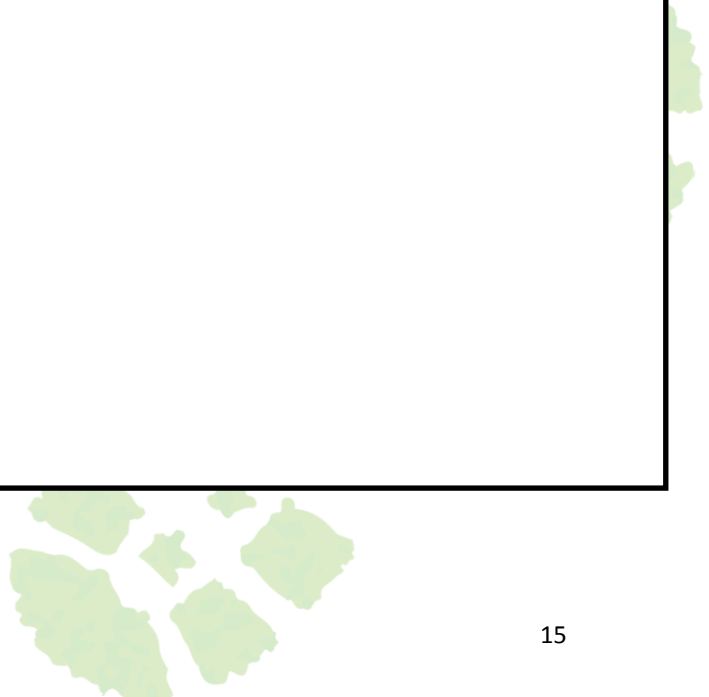
0-----10-----20-----30-----40-----50-----60-----70-----80-----90----100  
Severe Moderate None

Observation Notes:

**WATER POLLUTION**

10-----20-----30-----40-----50-----60-----70-----80-----90----100  
Severe Moderate None

Observation Notes:



**AIR POLLUTION**

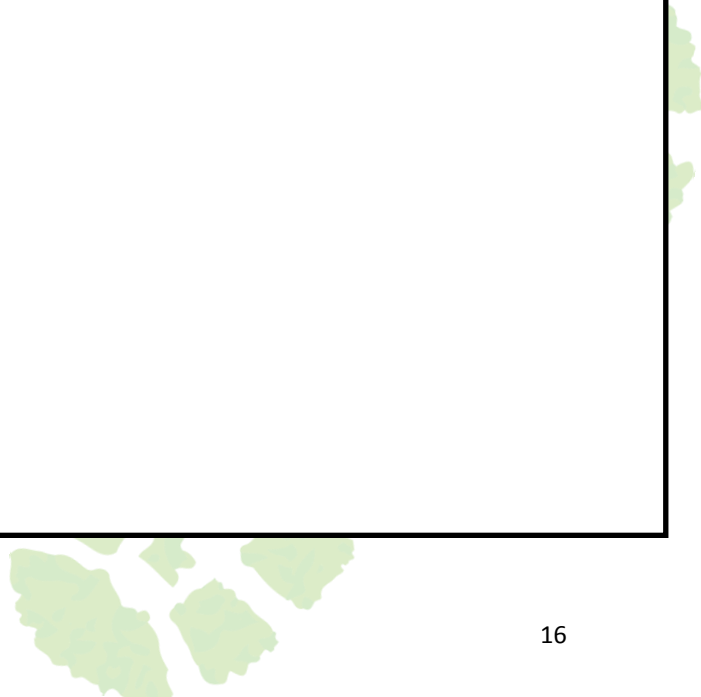
10 -----20 ----- 30 ----- 40 ----- **50** ----- 60 ----- 70----- 80 ----- 90 ---- **100**  
Severe Moderate None

Observation Notes:

**NOISE POLLUTION**

10 -----20 ----- 30 ----- 40 ----- **50** ----- 60 ----- 70----- 80 ----- 90 ---- **100**  
Severe Moderate None

Observation Notes:





## INVASIVE SPECIES

10 -----20 ----- 30 ----- 40 ----- 50 ----- 60 ----- 70----- 80 ----- 90 ---- 100  
Severe Moderate None

Observation Notes:



## Results Summary

Now that you have all of your recordings and observations, out of the human impact assessment you can add up all of the points you have allocated to your site. The total will fall under one of the following categories which will give you an indication of where your site falls in terms of ecological health.

### Out of a possible 600 points - what did your habitat score?

#### High score [400-600) – Healthy

Your ecosystem appears to be healthy, scoring such a high mark indicates low levels of pollution and a potentially high degree of biodiversity. A healthy ecosystem is considered to be one that is self-sustaining. It can cope with a certain degree of stress in the form of weather damage, animal grazing or mild human impacts such as walking. It does not require replanting each year or the provision of food for the organisms that live there. All resources for the survival of its organisms are found within the ecosystem.

#### Moderate score [200-399] – Moderately healthy

A moderately healthy ecosystem is one that is experiencing some stresses that are too much for the ecosystem to bounce back from. As a result, visible impacts can be seen, such as bare soil from trampling or litter that is not biodegradable or water pollution that is too much for the water cycle to clean. It generally will not take a lot of work to restore a site such as this to full health. For suggestions on how to help habitats and biodiversity use the IMPRINT+ App and see what you can do to help.

#### Low Score [ 0-199] - Unhealthy

If your site scored below 200, it will not be a very healthy area, ecologically speaking. Some species may live there but there will be a lower diversity as not many species are able to cope with the environmental stresses an unhealthy area. Stresses include human activity such as trampling and waste or they could be environment caused such as a lack of water due to drought or no food source due to low biodiversity. In sites like this, we can be incredibly beneficial as we can make a huge difference to the plants and animals that live in an area like this, through very simple and easy actions. For suggestions on what actions you could take to improve the health of this site, check out the IMPRINT+ App.

## Part 3. Back in Class or at Home

You now have a lot of data from your fieldwork. The data gives you information on your site's ecological health as well as the opportunity to create visual communications that illustrate the key findings.

### A Species Guide

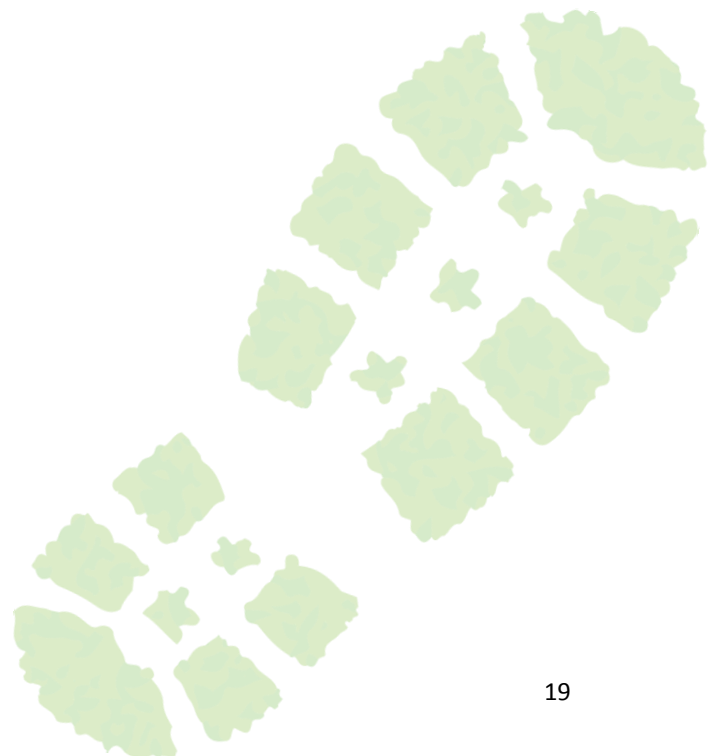
Or create a species guide to the site. Use the photos that you took and the earlier research to create a guide for other users of the area.

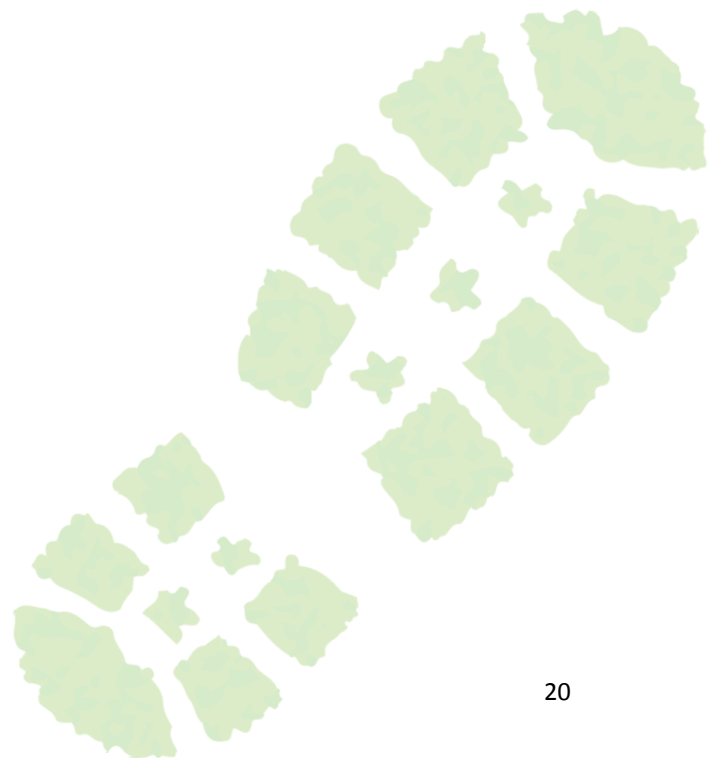
Here is a link to a key created for a science fair by students in the U.S.

<http://www.education.com/science-fair/article/dichotomous-key/>

### Translate Your Data

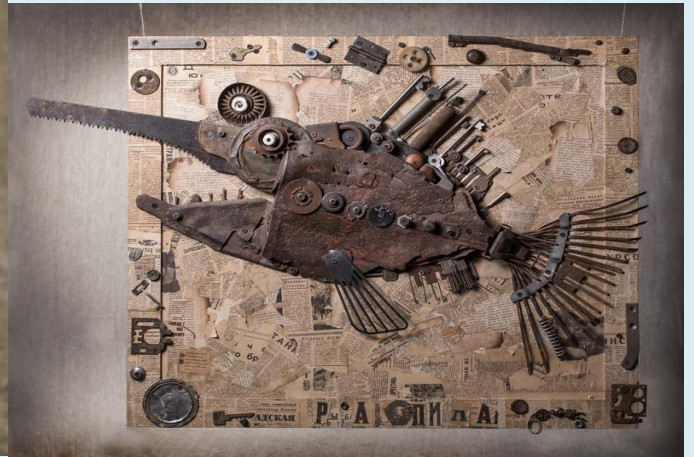
**Consider creating using infographs or pie charts to show the percentages of species that you found.**





## Artistic Interpretations

Create an art project inspired by the site. Here are some examples of environmental art projects which aim to raise awareness of local issues.



## Discussion & Reflection

**Use these questions to stimulate debate and reflect on the experience with your students.**

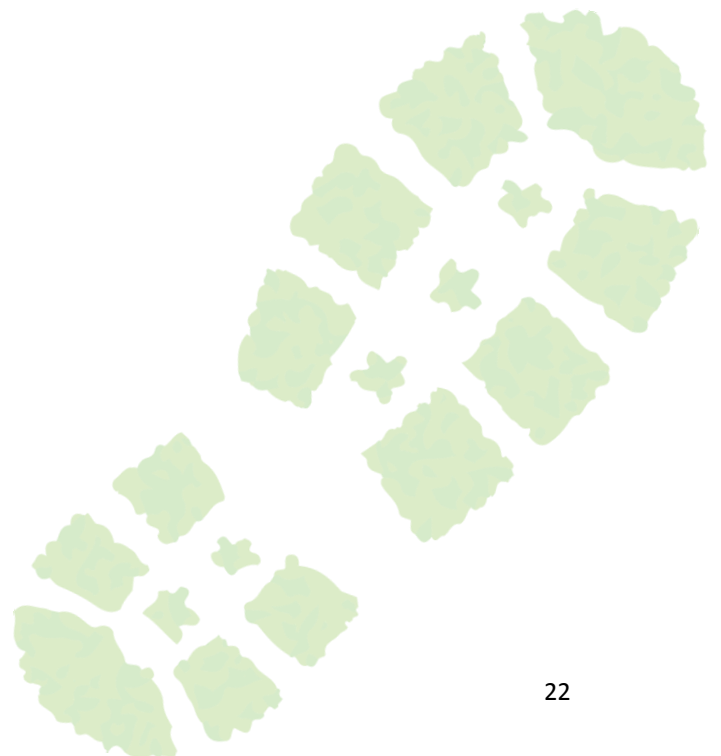
Group reflection questions:

- Were you surprised by how many species you found?
- What result did you find the most interesting?
- Do you think the site has value to you personally?
- How could we improve the site?
- Why might it be important to help restore the site?
- What benefits might restoration bring?
- What benefit might this site have to the wider community?

**Finally, now that you have carried out your assessment, is there a way you can help leave a positive footprint on your site? Can you help improve its health in anyway?**

**For suggestions on ways to improve the health of your ecosystem, check out the IMPRINT+ App.**

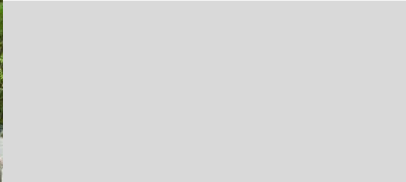
**Share your findings with us on our Facebook page and CONGRATULATIONS and thank you for your hard work on behalf of our biodiversity and natural resources!**



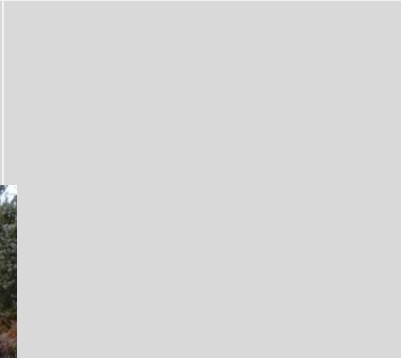
## Human impact scale - Visual Guide

Severe	Moderate	None
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### Litter & Waste



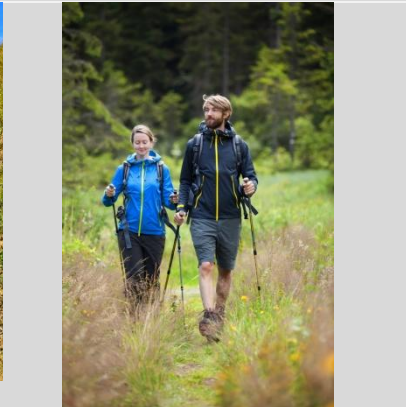
(c) Multiplier Event 1



(c) Lisa Lopes



### Trampling



### Water Pollution



## Air Pollution



Air pollution can be hard to see when it is moderate. Indicators such as roads, factories and industry nearby

It can be hard to know if a site has good quality air or if it is polluted. We use indicators such as the presence of shrubby, hairy and leafy lichens to give a sense of how clean the air is.

**Noise Pollution** – This category is not visual, but auditory. Take a minute of silence at your site and see which of the following descriptions fit your experience best.

During your minute silence, you can only hear human made sounds. No natural sounds exist or if they do they cannot be heard over the human sound.

During your minute silence, you can hear natural sounds as well as some human made sounds such as traffic, machinery, music or industry.

During your minute silence, you only hear natural sounds such as leaves rustling, birds singing, or natural water moving.

**Invasive Species** – Invasive species are different for different areas, however some species are more vigorous than others. For this category you will need to research what is invasive and problematic for your locality. For the scale we have used the example of Japanese Knotweed.



Japanese Knotweed covering an entire area



Just a few individual plants of Japanese Knotweed.



An area with no Japanese Knotweed