Exminster

Enquiry 4: How is flood management at Exminster Marshes helping lapwings out of the red?

Context and Learning Aims

Pupils will be supported in and outside of the classroom to:

• Identify and describe the key physical and human features of the Exe Estuary and in particular the location of Exminster Marshes;

• Understand that a marsh is a transition environment or ecosystem, found between the land and water in rivers and sea and performs a very important job of absorbing and regulating the flow of flood water;

• Recognise and describe the environment of Exminster Marshes and reflect upon how it makes them feel in terms of creating a sense of place;

• Appreciate why Exminster Marshes are a particularly rare and important kind of marsh (wet grazing marsh);

• Identify lapwings and know their living requirements particularly in terms of habitat; nesting and food needs and why this bird has experienced serious decline in the UK in recent years;

• Describe and explain what is happening at Exminster Marshes in the way of environmental and flood management to create habitat that the lapwing requires to breed successfully and why these measures support both birds and the control of flooding;

• Design an interpretation panel for the RSPB at Exminster which demonstrates their understanding of environmental management as well as a consideration of audience in terms of presentation.
Learning and teaching activities and curriculum progression

Key Question 4.1: Where are Exminster Marshes and what is the site like?

Provide each child with a copy of the aerial photograph of the Exe Estuary in Resource 4.1 and the O.S. map of the estuary in Resource 4.2. Encourage the children to orientate the map with the photograph which was taken looking southwards from Exeter to Exmouth. Next, print off an A4 copy of the aerial photograph for the children to stick in the centre of an A3 piece of plain paper. Using the map annotate the aerial photograph with the following labels:

- Exminster Marshes (not named on the map but its location is shown by the blue bird symbol just to the east of Exminster)
- Exeter Canal
- Topsham
- Turf Lock
- M5 motorway
- River Clyst
- River Exe
- Exmouth
- Dawlish Warren spit
- Starcross
- Lympstone

Resource 4.3 is a more detailed aerial photograph of Exminster Marshes. The marshes include fields between the railway line and the estuary, and to the west of the railway also. Ask the children to consider: What separates the marshes from the river estuary? Encourage them to identify the Exeter Canal. On either side of the Exeter canal is a tidal bank which keeps the salty water coming up the estuary at high tide out of Exminster which is a fresh water marsh (Resource 4.4). How are the tidal banks on either side of the canal shown on the map extract in Resource 4.5?

Now show the children the vertical aerial photograph in Resource 4.6 and the O.S. map of 1801 in Resource 4.7. On a copy of Resource 6 support the children to:

- Draw on the Exeter Canal and the tidal bank;
- Colour in green the area of Exminster Marshes which has since been reclaimed behind the tidal bank;
- Extend the area of Topsham and Exminster Village to show how they have grown since 1801

Take time to discuss with the children what they think a marsh is? What sort of place? What will it look, sound and smell like? Has anyone been to a marsh? A marsh is a wetland often found in lowland areas between higher and drier land and rivers and seas. A marsh is therefore a transition ecosystem and habitat between the terrestrial (land) and aquatic (rivers and seas). It is different from other wetlands such as swamps (which are normally associated with trees) and bogs which have built up very large deposits of acidic peat.
Now show the children the images of Exminster Marshes in **Resource 4.8**. The children need to do two things here:

*Ask them to note down all the features of the environment they see in the photographs so that they can use them later to describe Exminster Marshes* (describe = say what you see).

*What feelings do they get about Exminster Marshes? Write down as many adjectives as they can which give an idea of how this place makes them feel and the impressions they get from the photographs – a sense of place.*

The following passage is one of the most famous descriptions of a marsh. It was written by Charles Dickens in the opening passage of his book *Great Expectations*. This is how the main character in the book, Pip, describes how he feels about the marshland environment (of North Kent) in which he lives:

*Ours was the marsh country, down by the river, within, as the river wound, twenty miles of the sea. My first most vivid and broad impression of the identity of things seems to me to have been gained on a memorable raw afternoon towards evening. At such a time I found out for certain, that the bleak place overgrown with nettles was the churchyard and that the dark, flat wilderness beyond the churchyard, intersected with dykes and mounds and gates, with scattered cattle feeding on it, was the marshes; and that the low leaden line beyond, was the river, and that the distant savage lair from which the wind was rushing was the sea; and that the small bundle of shivers growing afraid of it all and beginning to cry, was Pip.*

Discuss with the children the adjectives that Dickens used to describe the marsh – raw; bleak; wilderness; leaden; savage etc. *How does his description compare with the children’s impressions of Exminster Marshes? How different would the children feel perhaps on a very wet windy gloomy afternoon out on Exminster Marshes when perhaps they might not be able to see much in front of them compared with a sunny summer’s day?*

Finally it is important for the children to know that Exminster Marshes are a rare kind of marsh called *grazing marsh*. Cows are kept on the fields in summer and early autumn to keep the grassland short and in winter and spring the fields are often flooded.

**Key Question 4.2: How does Exminster marsh help to control flooding along the Exe Estuary?**

Explain to the children that because marsh is found between the land and rivers and seas, it can help to reduce the risk of flooding. *Can the children think how Exminster Marshes might help to do this? Where do they think the water on the marshes comes from? Some of it will collect there when it rains but how else will it arrive?* Talk with the children about the water cycle (**Resource 4.9**) and where rainwater goes when it falls on the land. Some is absorbed by the soil and plants; some condenses and the remainder runs off into streams and rivers. *Where do rivers and streams flow to?* Almost all rivers eventually flow into other rivers and finally the sea. As part of the Alphin Brook Flood Defence Scheme three rivers to the east of Exeter: *Alphin Brook; Berry Brook and Matford Brook* flow into Exminster Marshes. When the rain is heavy then the rivers fill up and flow quickly into the marsh so protecting properties in parts of Exeter from flooding. Once in the marsh the water flows into drainage ditches, some of which the *Environment Agency* dredges. A system of sluices and pumps can control the level of the water in the ditches and how quickly it is allowed to flow into the River Exe. In this way the marsh acts to absorb flood water from the three rivers and to release it gradually into the estuary. This is known as *flood management.*
The Matford Brook joins the Alpin Brook and originally this would have flowed into the Exe Estuary to create an area of salt marsh. The brook now goes underneath the canal and when the tide stops it from draining into the estuary waters flow into the marshes, which are managed as a flood storage area to reduce flooding in the Matford and Alphington areas of Exeter. The marshes we see today are man-made. It was the building of the canal which excluded the tide from the area and created the freshwater marshes. Ditches were dig in the marshes and structures installed to manage water levels here. Show the children a Lidar map (Resource 4.10) which indicates the old network of tidal creeks as well as the relatively new drainage ditches. You can also see banks within the marshes (old sea walls) which show how land has been progressively reclaimed from the sea.

**Key Question 4.3: What is a lapwing and why is it in the red?**

Show the children all of the images in Resource 4.11. The bird is a *lapwing* which is commonly known as a *peewit* also. From the photographs what kind of habitat do the children feel the lapwing prefers? Now support the children to access the RSPB website bird guide pages on the lapwings at: [www.rspb.org.uk/wildlife/birdguide/name/l/lapwing/](http://www.rspb.org.uk/wildlife/birdguide/name/l/lapwing/)

The children can:

- Listen to the audio of the lapwing’s call – why is the lapwing also called a peewit?
- Watch the video of the lapwings nesting – what kind of environment do they prefer to nest in?
- What do they eat?
- What are their nests like and how many clutches of eggs do they lay?
- What is the red list and why are lapwings on it?

Lapwings used to be found on farmland throughout the UK but their numbers have fallen drastically during the past 30 years. An important reason for this is that places that they prefer to nest in are disappearing. Encourage the children to look at the photographs of the two lapwing chicks in Resource 4.12. What are the surroundings like in both of these photographs? Lapwings prefer to nest, during March to early June, in scrapes in the ground in places with short vegetation so that they can get a good all round view of possible predators such as crows or foxes – they can see them coming from a long way off. They also like to be close to areas of shallow water with muddy edges where insects and worms are available for their chicks to eat independently within 2-3 hours of hatching. They are not fed by their parents! The problem for the lapwing is that the places they prefer to nest in during the breeding season such as bare (fallow) ploughed fields; crops of wheat and barley that have been planted in the spring (so only short plants at the time of nesting) and areas of wet grassland (meadows) are to be found less and less in the UK.
Key Question 4.4: How is the RSPB managing flood water at Exminster to help the lapwing?

Explain to the children that you are going to show them a series of images of people (and animals!) working for the RSPB (Royal Society for the Protection of Birds) managing the environment at Exminster. The RSPB is the country's largest nature conservation charity which works with many partners to protect threatened birds and wildlife in nature reserves such as Exminster.

In each case the children need to describe what they think is happening and why it could be helping the lapwing:

**Resource 4.13:** Using a JCB to create a scrape of shallow water with gently sloping sides with a muddy margin;

**Resource 4.14:** Cutting back tall and tough plants in the fields such as rush and tufted hairgrass;

**Resource 4.15:** Creating new ditches so the level of flood water on the grassland can be controlled;

**Resource 4.16:** Bringing in herds of cattle to graze the meadows.

All of these management activities are helping the lapwing. The RSPB is creating shallow hollows or ‘scrapes’ in the fields which collect water. As the water rises and falls, muddy edges form which is ideal feeding ground for young lapwing chicks. A lot of effort is also put into cutting down the taller and tougher plants in the fields (which even the cattle won’t eat) to maintain an open aspect with good visibility for the nesting lapwings. Cattle are brought into the reserve in late summer and autumn to achieve the same thing. New ditches have been dug to distribute water and manage and flows in the marshes.

Today, the Exminster Marshes are one of only two places in Devon where lapwings still nest!

Explain to the children that the RSPB has asked them to design an interpretation panel such as the one in Resource 4.17 which will go in the car park of the RSPB reserve at Exminster Marshes. An interpretation panel helps visitors to understand things that are going on in the reserve and what to look out for during their stay. Tell the children that the new interpretation panel for Exminster will be all about what the RSPB is doing there to help out the lapwings. On an A3 plain paper sheet the children will design their interpretation panel following this design brief:

**Title:** Helping the Lapwing at Exminster to get out of the red

**Key requirements to include in the panel:**

- How to identify a lapwing; its song; food and habitat requirements particularly for nesting;
- An explanation of why the lapwing is in decline and flagged as ‘red’;
- Clear and simple diagrams/photographs to demonstrate what the RSPB is doing at Exminster to help the lapwing – how it is managing the environment;
Sample Resources from Enquiry 4. The complete set of resources supporting learning in this enquiry are available on the accompanying DVD and online at www.licco.eu

Resource 4.3