



The Conservation Conundrum! Balancing Conservation with Other Needs...

Student Introduction

- ▶ This activity is a study into the issues arising out of the need for economic development, versus the need for conservation, along Southampton Water.
- ▶ The picture shows Fawley oil refinery and its associated facilities in the background, with saltmarshes and mudflats in the foreground. Why do you think that a

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Once upon a time...

Before any development occurred here, Southampton Water was fringed by mudflats and salt marshes along its length. Huge numbers of wildfowl and wetland birds were found, and rare species of plants thrived in the saltmarshes. The picture below shows what most of Southampton Water would once have looked like.

However, the rapid growth of the port in the 19th and 20th centuries led to a reduction in these ecosystems as areas were reclaimed to create the docks that we see today. Later, the container port upstream was built to handle the world's largest container ships. In the middle of the 20th century, Fawley oil refinery was constructed and further saltmarshes and mudflats were reclaimed to make way for the refinery, its pipelines, storage tanks, petrochemical plant cover, and the now-redundant power station.

Some saltmarsh has been reclaimed at Dibden Bay in preparation for port expansion; however it is highly controversial and has met with significant opposition. As such, plans are currently "on hold".

It's not just commercial and industrial land uses that have caused the demise of the ecosystems along Southampton Water. The development and growth of settlements such as Fawley, Hamble and Hythe and the development of recreational facilities such as marinas at Hythe and Hamble have also contributed.

As you make your way through the activities and tasks on this worksheet, you will learn what mudflats and saltmarshes are and how they form. You will see them first hand as you make your ferry crossings, and you will consider the threats to the ecosystems. Finally you will investigate how the area is being protected.



noun | co-nun-drum | /kə-'næn-drəm/

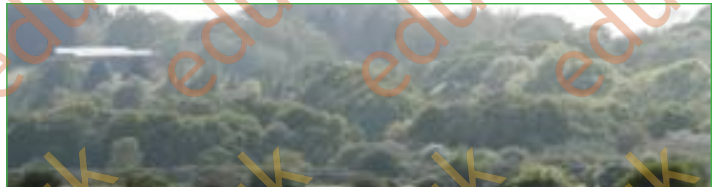
a confusing or difficult problem

Salt + Mud = Wildlife Heaven!

Saltmarshes and mudflats are really important ecosystems, supporting a wide variety of birds, plants and aquatic life. In this activity you are going to learn more about what they are, how they form, and what they are like.

Southampton Water is fringed, especially on its western shores, by intertidal (the area between the high and low tide marks) mudflats and salt marshes. These ecosystems thrive in sheltered, low energy coastal areas making Southampton Water, which is sheltered by Calshot Spit (especially the western shore), an ideal location for their development.

Mudflats are well named - they're muddy and pretty flat! They are often covered by the tide, only exposed at low tide. Therefore they do not have any vegetation cover, but they do have a covering of algae. The thick gloopy mud may not appeal



to us, but it is teeming with life and mudflats are a productive environment for many species including birds, geese and ducks.

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Depending on the tide, you may see mudflats for yourself on your ferry crossing.



Salt marshes are also an ecosystem of the intertidal zone. The low marsh is usually covered at high tide, but the high marsh is above all but the highest spring tides.



Salt marshes are vegetated, although they begin life as little more than an accumulation of mud and silt which is deposited in a sheltered location. As the mud and silt builds up, salt tolerant (halophytic) plants such as cordgrass (*spartina*) colonise the area.

These first plants are called pioneer plants and they are tough little things - able to tolerate the high salinity (salty conditions!) of the sea water and exposure. Cordgrass has long roots to stop it being swept away, and its tangled roots help to stabilise the mud and trap further sediment so that the level of mud builds up. This higher level is not covered by the sea so often, rainwater dilutes the salt content and

decomposing cordgrass fertilises it to enhance nutrient levels. This then allows other plant species to grow such as sea purslane, sea aster, sea lavender and even trees like oak and alder grow to create *Carr Woodland*.

The process described is known as **succession** and it describes the series of changes taking place in the plant community from the initial colonisation of a previously unvegetated surface, through to the development of a fully diverse ecosystem. More specifically, succession in a salt marsh is called a 'halosere'.

A saltmarsh contains networks of creeks which drain the marsh at low tide, and bring water in on the high tide. Salt pans, which are shallow pools of sea water, often develop between the creeks within the marsh and these are too salty for any plants to develop.

Task 1: How much have you learnt? Complete the Diagram!



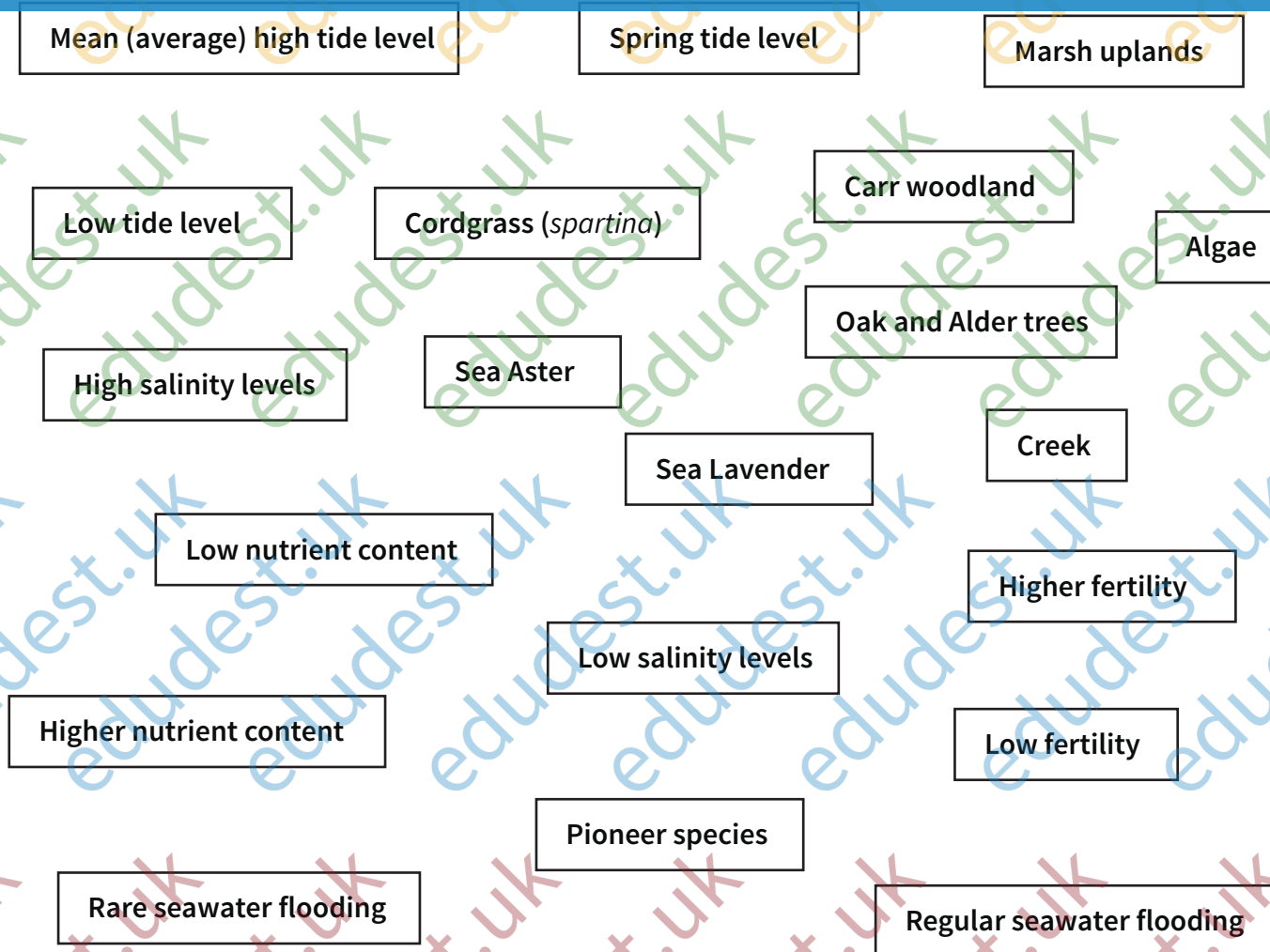
- » The diagram on page 4 is only partially completed.
- » It shows an outline of a cross-section from the sea and inland across mudflats and a saltmarsh.
- » Using what you have learned from reading the information above, you should be able to put the labels in the text boxes below into the correct place on the diagram.

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Task 2: Research Activity

You've now learned what mudflats and saltmarshes are, how they form and what they are like.

Before your ferry journey, you are going to research why they are important (and therefore why it's important that they are conserved!).

Using the internet, visit www.edudest.uk/followup and type in this document's number, **10724**. This will provide access to a number of suggested links which will help you answer the questions in the table below. Feel free to 'surf' for other sites too.



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Examples of bird species found on mudflats and saltmarshes
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Examples of plant species found on mudflats and saltmarshes

The importance of saltmarshes and mudflats to fish, molluscs and crustaceans

The importance of mudflats and saltmarshes as a natural sea defence against erosion

The importance of mudflats and saltmarshes as a recreation / public resource

ON THE FERRY

During your crossing to/from the Isle of Wight you will be able to see saltmarshes, particularly along the western shores of Southampton Water.

This is on your right as you look towards the front of the boat if you are travelling TO the Isle of Wight, and on your left if you are travelling back towards Southampton.

Depending on the tide, you may also see mudflats exposed below the saltmarsh, but if the tide is high when you travel these will be covered.

There are five simple activities for you to complete during your journey. They do not have to be done in any particular order, in fact, it is a good idea to read through all of them and do them all as you go.

Task One: Photographer!

Take photos of the salt marshes and/or mudflats as you go.

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Task Two Curriculum relevant materials supporting school trips to the Isle of Wight

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In the frame below draw a simple field sketch of the salt marshes. Try to add some labels / detail - remember what you did in the previous activity at school!

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Task Three: Spotter!

What threats to the saltmarshes can you spot as you travel along Southampton Water?

In the table below, make a list of the threats and then, for each one, try to explain how and why you think it will threaten the saltmarshes.



Threat	How / why this is a threat

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Task Four: Spit-Spotter!

Behind Calshot Spit, shown in the picture, extensive saltmarsh has developed.

As you travel along and past the spit, see if you can label the picture below to explain why you think the saltmarsh has developed here, and to describe what it is like.



Task Five: Time for an EQA!

EQA stands for **Environmental Quality Assessment**, and it is a type of survey commonly used in geography fieldwork to make judgements about the quality of the environment (both natural and man-made) of an area. You may get many different variations on the theme but, essentially, the principle is the same; different 'aspects' of the area are assessed and scored.

You are going to complete an EQA at each site marked on the map below as you travel along Southampton Water. At the end (where it opens out into the Solent) you will calculate and average EQA for each column, and then an overall average. This will give you some idea of the overall quality of the environment of Southampton Water.

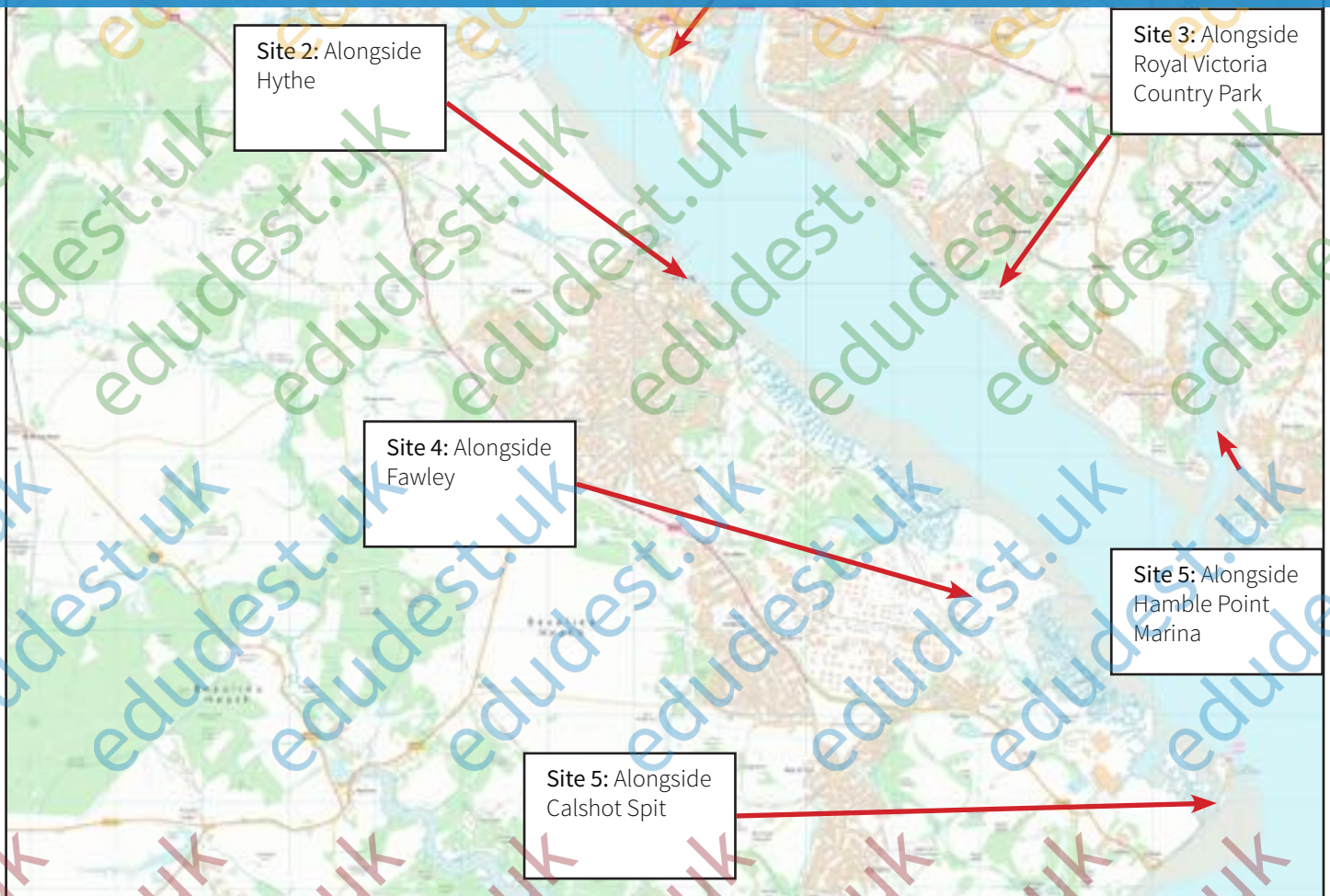
Use the tables on page 9 to help you.

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Aspect	Description	Score					Description
		1 Very Poor	2 Poor	3 Average	4 Good	5 Excellent	
A. Noise	<i>Very noisy</i>						<i>Very quiet</i>
B. Aesthetics	<i>Unattractive, visual pollution</i>						<i>Attractive</i>
C. Safety	<i>Unsafe, lots of hazards</i>						<i>Very safe</i>
D. Open space	<i>Very crowded, limited open space</i>						<i>Lots of open space</i>
E. Air quality	<i>Very smelly / polluted</i>						<i>Very clean / no smell</i>
F. Environment	<i>Natural environments absent</i>						<i>Natural environments evident</i>
G. Design / Maintenance	<i>Poorly designed / maintained. Evidence of decay.</i>						<i>Well designed / maintained. No evidence of decay.</i>

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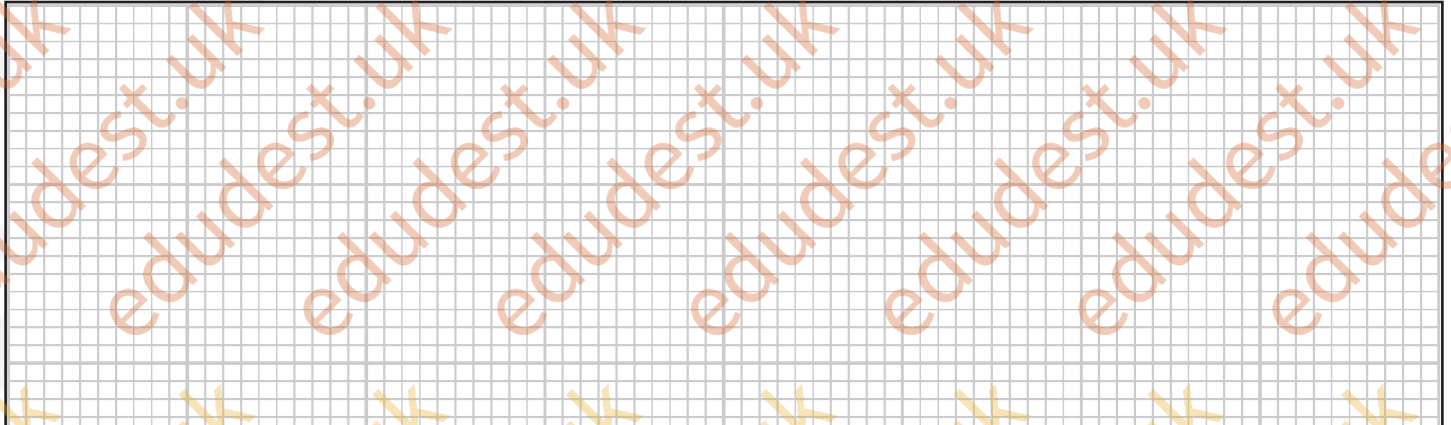
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Aspect	Site 1	Site 2	Site 3	Site 4	Site 5	Site 6
A						
B						
C						
D						
E						
F						
G						
Average						
Overall Average						

Extension Activities

- Using the frame below, draw a graph to show how the environmental quality varies as you go along Southampton Water. Use your average scores for each site to complete it.



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- Describe what your graph shows.
- Using the map, and your own observations from the ferry, what has influenced your results, e.g. why was EQ higher in some places than others?
- Do you think that an EQA is a fair and reliable method of assessing environmental quality? What are the strengths and limitations of using this method? Can you suggest any possible improvements?

BACK AT SCHOOL

Diamond Decision Making!

So, you have learned all about saltmarshes and mudflats, and you have been able to make observations on your ferry crossing. Now it is time to think more about the conservation conundrum - why is it so hard to balance conservation with other needs?

Task 1: All Scrambled Up!

There are many different human activities taking place along Southampton Water. Can you unscramble the following words to make a list of them?

▶ **RTOP** = _____

▶ **TDYRIUNS** = _____

▶ **CALTOENR** = _____

▶ **LORSIENNA** = _____

▶ **VTOCNSIRANOE** = _____

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Task 2: Decisions Diamond

Each of these different user groups will have a different view on what should and shouldn't happen along Southampton Water and, because of this, conflict can arise when a particular activity or development 'upsets' one of more of the user groups.

You are going to complete the following activity to help you understand how different groups have different opinions and priorities.

Instructions

1. Look at the diamond on the following page. It is divided into 9 smaller diamonds, each containing a different statement.
2. Cut out along the dotted lines so that you have your 9 diamonds in front of you.
3. Your teacher will give you a 'role'.
4. In character, you must arrange the diamonds with the statement which you consider would be the most important to you at the top, the next two below and so on until the statement you are least concerned with is at the bottom.
5. Think carefully about your order, and make sure you can justify why you have chosen this order later on!

Access is really important

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Use of Southampton Water

Low levels of pollution; visual, noise and air

Plenty of open space to build on

Profitability- I like making money!

Nice quiet, peaceful surroundings

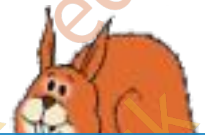
Preserving the habitats of plants and animals

Key Question: Based on what you have learned, why do you think it is difficult to balance the needs of everyone?

Task 3: Conservation in Action

You are going to be finding out what is being done to conserve the ecosystems and wildlife along Southampton Water.

In order to do this, you will be using an on-line GIS (Geographical Information Systems) map which can be found here:



<http://www.magic.gov.uk/>

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zoom in to this area. Change the scale to 1:50,000 and you should be able to view the whole of Southampton Water.

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GIS maps allow you to view a great deal of information by adding and subtracting 'layers'. The 'table of contents' on the left hand side gives you the 'menu' of all of the different layers which are available to view. There are a great many – experiment for a few minutes by clicking into some of them, e.g. the different types of map and aerial photography. See how the display changes as you click in and out of the layers.

The headings in the table of contents with a + sign have more sub-categories for you to explore and then, when you click into these, there are even more sub-sub-categories! Take a few minutes to explore some of these, e.g. click on 'habitats and species' and then choose 'habitats' and then select the first in the list; 'coastal saltmarsh, England' – you will see the saltmarshes along Southampton Water displayed. Notice how they are along the western shore; can you remember why this is?

You are going to use the 'designations' menu in the table of contents. Go into it and choose the 'land-based designations' sub-category. You will be presented with a very long list of different designations. You should un-tick them all so that the map is blank (only the background map showing). You will then go through each designation and make a note of which designations cover Southampton Water in the table on the next page.

After you have gone through them all, and have your list of designations, you will use the internet to find out what each one stands for, and exactly what it means in terms of conservations and how this is helping to protect the environment of Southampton Water.

Designation	Explanation: What it is, what it does and how it protects the environment

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Extension: Who do you think the above designations help the most? Who might still be unhappy about things, and why?

