

Chapter 5 Am I bovered?

Activity guidelines

Aims and learning intentions

- To explore the implications for the North West of doing nothing in response to peak oil and related climate change predictions.
- To provide pupils with a chance to consider their personal responses and reactions to these implications, as well as developing their knowledge and understanding about the region in which they live.
- To deliberately focus on the negative implications of doing nothing in order to consider the problems that will or may arise. (The following chapters discuss the positive opportunities that arise from addressing these implications and not “doing nothing”).

Before beginning.....

It may help to ensure that the pupils are clear about the following points:

1. The link between peak oil and climate change (see teacher notes and background notes for chapter 3 and 4).
2. The fact that this activity looks at the predicted consequences of doing nothing, allowing oil to become scarce or unavailable and emissions of greenhouse gases to continue unchecked. It assumes that no effort is made to develop alternative energy sources, redesign cars to use other fuel, reduce carbon dioxide or take any other mitigating action.

Activity 1 The “Do nothing” response – How might North West England be affected?

This activity develops awareness of the North West region as well as the impacts of climate change. It involves map work and is designed to be completed in pairs or small groups.

- The “Do nothing” response card sheet needs to be cut up, and one set of cards given to each pair or small group of pupils. Pupils then sort through the twelve cards which give information about a range of predicted impacts upon the North West.
- Questions can be asked to clarify understanding and to learn the relevance of any new concepts or vocabulary.
- The cards can then be placed on the A3 map of the North West (showing population density) in locations which will experience the stated problem. For example the Inland flooding card should be located somewhere on a floodplain, perhaps where flooding has already occurred, such as Carlisle in Cumbria. To locate the Threatened coastal habitats card the pupils will need to find a coastal nature reserve such as the salt marshes of Gayton Sands in Cheshire.
- Many of the cards have a wide variety of possible locations that hopefully makes the activity accessible and allows schools to make great use of local knowledge.
- Most of the cards can be located using the relevant pages of an atlas to identify upland areas, densely populated areas and so on. The additional North West map may help provide some more specific details, and offer opportunities to

develop map interpretation skills. The Environment Agency website can be used to establish the potential flood risk for areas across England and Wales.

Activity 2 Am I bovered?

This activity builds on activity 1 and asks pupils to consider their own values and attitudes concerning the impacts of climate change on their region.

- Pupils study the cards and consider which ones are likely to affect them. They place them on a copy of the worksheet How will climate change in the North West affect you? in the relevant part of the table. Deciding whether they will be affected directly, indirectly or not at all will be connected to the geography of the area in which they live, but also their lifestyles, interests, families employment and so on.
- Having begun to explore their own relationship to these impacts, they move on to consider which ones they personally are most concerned about. These personal feelings may be affected to a greater or lesser degree by how their own lives may be impacted.
- The cards are arranged in a pattern reflecting their decisions, such as a diamond, vertical line, horizontal line or any variation of these.
- Pupils are then encouraged to discuss their responses and explain their feelings and justify their decisions. This could be explored through a variety of activities such as group work, balloon debates, further research, creative writing or art work.
- Pupils will hopefully develop their understanding of how their home area could be affected, as well as examining their responses to other impacts. For example discussing whether or not it matters if we lose alpine plants from the region, and how some locations may be particularly affected by job losses.

Extension activity:

- Pupils imagine 20 years into the future, when some of the predicted impacts of climate change have begun to happen. They write a newspaper article with an eye-catching headline, describing an event that has taken place (such as a flood, severe storm, worries about heatstroke etc).

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Teacher notes and background information

- **Aims**
- **Background information**
- **Web links**

The aims behind this chapter

This chapter explores the predicted consequences of taking no action to mitigate climate change, or to prepare for a reduction in oil supplies. These two issues are discussed together because.....

1. They are intimately connected. Burning oil (as fuel and in the manufacturing process) has contributed to the rising global emissions of carbon dioxide, and thus to climate change. Clearly this accounts for only some of the greenhouse gas emissions, a topic which is expanded on in chapter 4. The other significant element of the connection is that use of oil has facilitated the current western consumer lifestyle (see chapter 3), which itself has been a tremendous cause of greenhouse gas emissions.
2. They are both imminent challenges to be faced. Our current way of life is dependent on the use of oil and on it being acceptable to produce greenhouse gas emissions as waste products. The loss of cheap, accessible oil and the consequences of climate change are the dual triggers which require us to change our current way of thinking.
3. The way forward can address both these issues simultaneously. Many of the solutions to these challenges can and are cutting the use of oil in all forms, whilst being carbon neutral (for example). Chapters 6 and 7 are encouraging forward thinking along these lines and beyond, so it seems appropriate to consider the implications of both issues together here.

The content has been deliberately limited to negative consequences, to highlight the real problems we are hoping to avoid or mitigate. These could be viewed as the triggers for change in the North West region. It is not intended to imply that wider national and global consequences are not deeply important and of enormous educational significance, it is merely the focus point of this resource.

Background information

Introduction to the North West region

The North West region covers around 14,000 square km and is home to about 7 million people, most of whom live in the urban areas of Merseyside and Greater Manchester. It encompasses the five sub-regions of Cheshire, Merseyside, Greater Manchester, Lancashire and Cumbria. The variety of landscapes includes the mountains and lakes of the Lake District, the seaside at Blackpool and the industrial heritage of Manchester and Liverpool.

Agriculture covers 80 percent of the region, with grassland (permanent pasture) the dominant land use. There are over 400 Sites of Special Scientific Interest, with 29 percent of the landscape designated as nationally important, including many valuable habitats and wildlife areas. The region is also home to large industrial sites, such as Ellesmere Port on the Mersey estuary.

Climate Change and the implications of doing nothing

Much of the following has been sourced from the Environment Agency website. Please refer to them for any further clarification. <http://www.environment-agency.gov.uk/>

The carbon dioxide already released has determined climatic changes for the next thirty to forty years, but beyond that changes will depend on the level of reduction from now on. During the 21st century carbon dioxide levels are likely to double, resulting in a worldwide temperature increase of 1 degree Celsius. However, taking into account likely positive feedback loops the increase is predicted to be between 1.4 and 5.8 degrees Celsius. The Tyndall Centre suggest that if present emission levels of carbon dioxide and other greenhouse gases continue, the warming could be as much as 10 degrees Celsius. Some predicted implications for the North West are outlined below.

A Changing climate and weather patterns – general points:

6 of the 10 warmest years on UK records were between 1995 and 2004.

Predictions for 2080 for the North West:

Winter rainfall up 30%

Summer rainfall down 50%

Snowfall down 90%

Temperature up between 1 and 5 degrees Celsius

Increasing numbers of storms and intense downpours (all year)

B Sea level changes and coastal flooding:

Sea levels around the UK are now 10cm higher than in 1900, and the average number of winter storms has increased significantly. The sea level at Liverpool has risen 6cm in the last 50 years. By 2080 sea levels around the North West may rise by 67cm, and the risk of tidal surges during storms will be much greater. Consequently large areas of the North West coast are likely to experience flooding, or in some cases be lost completely.

Significant areas of the North West's industry (including petrochemicals, an oil refinery and a nuclear power plant) are vulnerable, being located on flat, low-lying land only just above existing high tide sea level. (The Bromborough sewage treatment works on Merseyside was flooded in 2001.) Many settlements may have to be abandoned, or protected with expensive flood defences.

The North West coastline is important for migratory birds, and for many well-known British species such as red squirrels and the arctic char. Some key nature reserves, such as the RSPB reserve at Gayton Sands in Cheshire, or the WWT reserve at Martin Mere in Lancashire may be lost completely, with consequences for the regions biodiversity.

C Inland flooding:

Wetter winters and more heavy downpours will significantly increase the flood risk inland. Lag times will be reduced due to soils being saturated for more of the winter season, and baked hard in the summer months (increasing the likelihood of localised but severe summer floods when it does rain). Peak river flows are estimated to be 20 percent higher by 2080. Across England and Wales an estimated £22-75 billion pounds will be needed to engineer sufficient flood defences this century, and protect the millions of people who will be living in flood risk areas. Currently 212,500

properties in the North West are at risk of flooding, and over £40 million is spent per year protecting people and property in this region.

In January 2005 Cumbria experienced severe flooding when the River Eden and its tributaries overtopped 8km of flood defences. Thousands of people were evacuated and over 2,000 properties flooded in Carlisle alone, with Cockermouth, Keswick, Appleby and Kendal also affected. Communications were severely disrupted across the region. This scenario could become far more common place in future years.

D Increased air and water pollution:

High temperatures and low river flows (in summer months) provide ideal conditions for the accumulation and concentration of pollutants. Eutrophication is likely to increase, with consequences for fluvial habitats and biodiversity.

Flooding may result in sewage systems being overwhelmed more often, with resultant pollution problems in urban areas.

Higher summer temperatures are predicted to lead to higher levels of ill health and even death. With the hottest days reaching 40 degrees Celsius and above, more deaths are expected from heat stroke among vulnerable populations. Poorer air quality (linked to higher temperatures) is predicted to result in an increase in asthma and other conditions related to breathing difficulties.

E Changes within agriculture:

Agriculture within the region may have to change significantly to adapt to a longer growing season with reduced soil moisture. An increase in stormy weather is likely to threaten crop growth and harvesting more often. Pests may survive the warmer winter months in greater numbers, having a negative impact on crop growth and animal welfare and therefore on income. Soil erosion will become a bigger issue, due to the changing volumes and increased intensity of rainfall throughout the year.

F Impact on biodiversity:

Climate change is expected to push the natural climatic range of wildlife species north by about 50 to 80 km a decade. This means that northern species will be squeezed into ever smaller areas of the landscape, and habitats such as upland heaths and meadows will retreat up mountainsides. Species such as the snow bunting, and arctic alpine plants such as the purple saxifrage could disappear from the region entirely. Britain could also lose its place as an important wintering ground for wader birds which will migrate further north instead.

Tidal wetlands such as salt marshes are threatened by sea level rise, salinity changes and storm erosion. Inland flooding can also decimate populations of ground nesting birds if it occurs during nesting time. For example it is estimated that the summer floods of 2007 have contributed to a 45 percent fall in the number of blue tits across the UK this year.

Peak Oil

The implications for the rising cost of oil, and reduction (or loss) of supply are immense and wide reaching. To explore this more fully please refer to the teacher's notes in chapter 3, which explain the far reaching extent of our present reliance on oil. The implication of the changes ahead can easily be inferred!

Acknowledgements

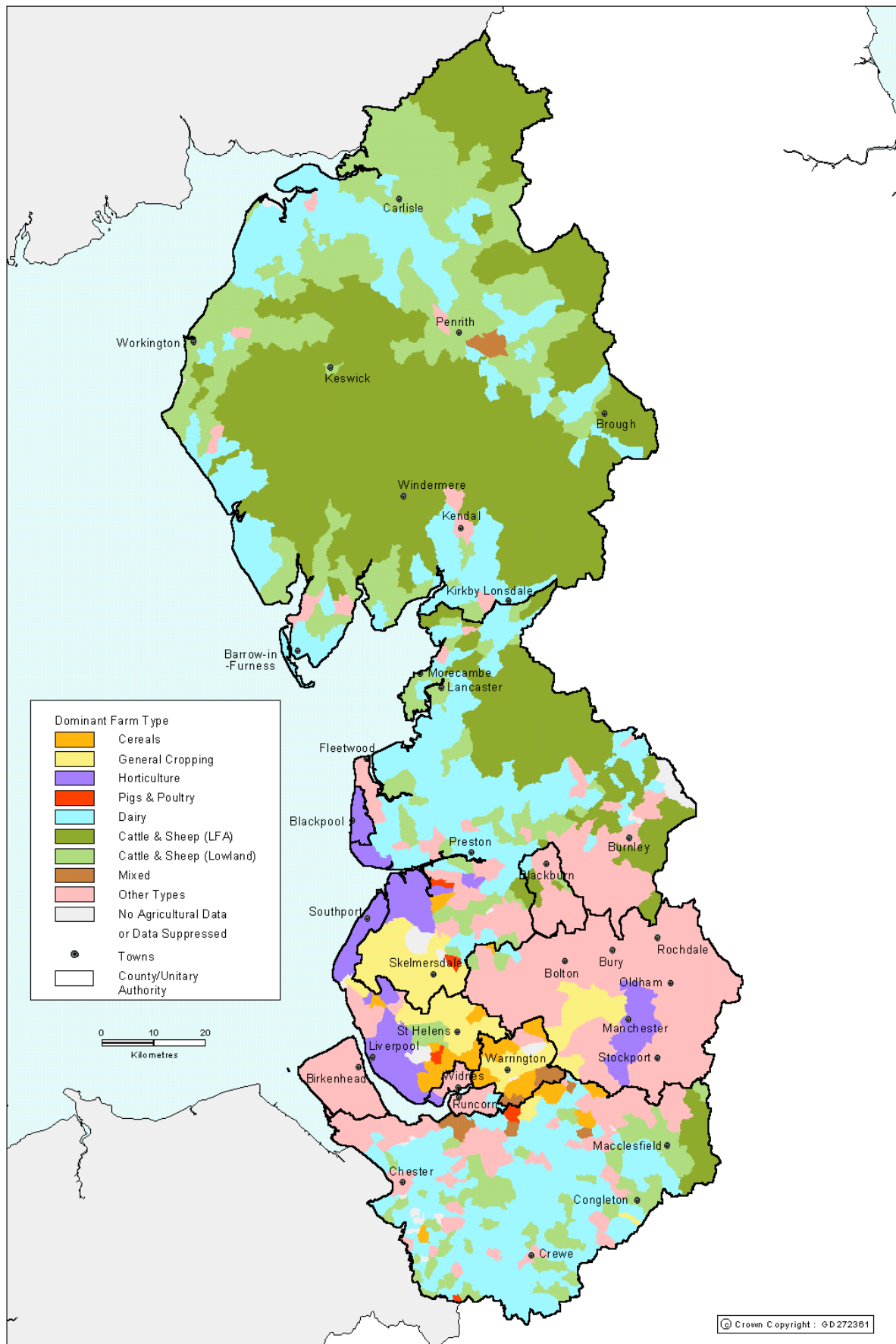
Images sourced from www.flickr.com

Chapter 5

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|---------------------|---------------------------|
| Storm at sea | by Bogdan Morar |
| Eden floods | by eleda |
| Esso petrol station | by mjb84 |
| Alpine plant | by Calypso Orchid |
| Mountain hare | by Simpologist |
| Car and tree | by Janet59 |
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| Pasture | by Donnie Ray |
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Chapter 5 Am I bovered?
Activity 1 The “Do nothing” response

Map2. Distribution of farming type in the North West region.



The “Do Nothing” response – How might North West England be affected?

Coastal Flooding

By 2080 sea levels around the North West may rise by 67cm. Settlements and industry along the coast will have to be moved or protected with very expensive sea defences. More frequent storms will make this problem worse.

Inland flooding

Wetter winters and more intense rainfall will mean many homes and other properties are at risk, as rivers overflow more often and more severely. This may cause major disruption and misery.

Job losses

When oil prices reach very high levels, any jobs connected with oil may be at risk. This will include petrochemical plants, manufacturing involving plastics and jobs that rely on cheap petrol costs.

Cost of living rises

As oil prices rise so may the price of everything connected to oil. This includes; petrol, all products involving oil as an ingredient (such as plastics), goods transported using oil, and oil fired central heating.

Storm damage

The number of storms and how severe they are will increase. This may mean more hurricane force winds causing; widespread damage to property and infrastructure, major disruption and loss of lives.

Threatened coastal habitats

Rising sea levels and more frequent storm surges will destroy some habitats such as salt marshes. Some of these habitats in the North West are nationally important, and home to rare species of birds and animals which will be lost.

Health problems

Warmer and drier summers may lead to poorer air quality. This may mean more people have breathing problems such as asthma. More people may also die from heat stroke in summer and the spread of viruses in the winter.

Reduced snowfall

Snowfall may fall by 90 percent by 2080. It will be replaced by more rain and wind in the winter months.

Threatened upland habitats

A rise in temperature will affect all species which live in the mountains and uplands of the North West. Some of them will not survive because they need the present colder temperatures to live.

Traffic issues

There is predicted to be 40 percent more traffic by 2059 which will mean more congestion. Unless rising costs of petrol mean that only the richer people will be able to drive cars often.

Problems for agriculture

Drier summers will mean more money spent on irrigation. Wetter winters will cause more problems with soil erosion. Warmer winters will mean more pests affecting crops and animals. Costs of fuel and fertiliser will rise.

Lifestyle changes

Extreme weather will affect our lives more often. We may also have to do without many of the products we buy today. Transport will become very expensive and food supplies will change.

How might the North West be affected if we “Do Nothing”?

Map1. Population density of the North West region.

