

Erosion – Is it a good or a bad thing for Lyme Regis?

This was the question a team of Geography and Photography students from Year 12 at The Woodroffe School asked a group of experts. The film produced can be found at:

<https://www.youtube.com/watch?v=jW1iD9GCDOc>

The following notes summarise the main points made in the film they produced. Comments are listed according to what the experts had to say with the approximate timing on the film given in brackets in minutes and seconds.

Richard Edmonds: Freelance Geologist who was involved in the setting up of The Charmouth Heritage Coast Centre and was also part of the World Heritage Jurassic Coast team.

(00m 30s) Lyme Regis - this is the town I grew up in and it was out there on those beaches where I got my love for fossils and geology, nature and wildlife. The reason the town is so famous for these things is because of landslides and the cliffs being eroded by the sea. That begs the question: Erosion – is it good or bad for the town?

(11.06) Guncliff – some of the oldest sea defences in the town where waves use to crash into the old seawalls. In the 1990s the engineers built a new sea wall and put rock armouring in front to protect it so there is now a really strong sea defence here to protect this part of the town.

(11.37) – Photographs and video from 2004 showing waves crashing onto the old sea defences.

(12.20) – Phases 2 & 3 of the coastal protection scheme involved the seafront. Here the engineers faced a double problem. The sea would hammer against the old sea wall and the properties along the front (Marine Parade) are built on ancient landslides. The challenge for the engineers was to both protect the seafront from the ravages of the sea and also stabilise the slope to protect the properties

(14.50) – East Cliff, Phase 4 of the coastal protection works. You will see a massive seawall to defend the base of the cliff. What you can't see is in the slopes behind where there are huge engineering works to stabilise the slope. On the other side however (to the East) it is a little different as you still have the seawall but the landslide is being allowed to move naturally and this is partly because it is still a very valuable wildlife site. It also reflects the difficulty of trying to hold the line with a scheme like this against the edge of the largest coastal landslide in Europe (Black Ven) and the junction is always going to be messy.

Professor Denys Brunsten: one of the most eminent geomorphologists of the past thirty years who has written many papers and text books on his subject. He was the 'founding father' who secured the nomination of our coastline as a world heritage site.

(01.20) If you want to understand a landslide you need to understand the geology, you need to know the rock mechanics, the soil mechanics, how soft rocks deform. Are they brittle? Are they ductile? Can you push them about like plasticine or do they break? You need to know what rainfall does, what water pressures are and so on.

(01.55) *Would you briefly outline how a landslide occurs?*

There are 3 things to understand. One is weight on back, the other is support at the toe and thirdly water pressure in the middle. And that all applies to the strength of the hill.

The way they work is whether you are applying a stress to the hillside that is greater than the strength the strength the hill can with stand.

(02.48) *How key have landslides been to shaping this coastline?*

Absolute here – this is landslide Mecca. This is why I spent my life down here working. These are some of the best landslides anywhere in Europe

(08.35) *Would you say the coast is difficult to manage? It's dynamic?*

Very difficult. There are one or two things you could say instantly. The dominant waves coming from the South West West. The big waves – the ones that are going to do the damage, are going to move the shingle. We haven't talked about what a beach is yet!

A beach – material deposited by waves and much originates from the cliffs and gets there by rockfalls and landslips and erosion. So a beach is not really land or sea, but a store of material that has been ripped off the land. Its function is to absorb the seas energy and protect the land behind – it is a shock absorber. All of the sun's energy which is brought through into the wave, which comes up onto the beach. What happens to all that energy? It drains into the beach, or it moves material up and down – energy absorbed on the shoreline and protects the land behind. All the energy of the planet dies on the shoreline – so it is a shock absorber. If it wasn't there we wouldn't be there, the land wouldn't be there.

(12.48) *How difficult is it to get the balance between manmade defences and natural processes on the coast?*

It's not at all difficult if you understand the strength of the land, the shock absorber, the energy you are applying and the things that muck it up from the atmosphere. If you get those right you find the solution. In Lyme Regis the solution is you have landslides coming down and you have to stop them, so you want to take the water out. You have a sea wall to stop any further cutting away of the toe. There are three things you don't do to a landslide – you don't put a weight on the back, you don't cut the toe away because in one case you are pushing it, in the other you are letting it go and you don't raise the water pressure inside. So you get the water out, you don't build anything on the top and you build a sea wall at the base to protect it and add a toe weight. Here in Lyme Regis we did all three. If you look at the front at Lyme Regis it's got a lovely toe weight – the beach, seawall stops erosion, the whole of the cliff is covered in drainage measures and it is also stabilised with 2000 piles – rods of concrete drilled into the slope to pin it down and give it support and you do not allow any building at the top. You don't shift material about either to change the balance. A cliff like a seesaw put a weight on the back it will move forwards– if you take the toe off the weight of the cliff will move it up – you need to get a balance – somewhere in the middle of the slope there is a neutral point.

(21.00) This has been one of the most difficult engineering project and problem I have known. Because of the team that Keith Cole put together, because of the cooperation of the town, because of the funding from at first the Ministry of Agriculture, later on from the Department of the Environment and now the Environment Agency because we were all able to talk about it and I was able to teach we all came together as a team and it has worked. The fact is after 10 years later the beach is still here – that has never been achieved before at Lyme Regis. Good scheme!

Geoff Davis: geotechnical engineer responsible for the engineering works in stabilising both the shore line and the sea defences in Lyme Regis.

(03.07) Landsliding is only a problem where it is interacting with housing and buildings where for example houses may be falling off the edge of a cliff.

(11.50) *What has been done around the coast to protect it, to stop landslides occurring?*

Since the late 1980s there has been a whole range of different schemes put into effect by West Dorset District Council who are the local authority responsible for coastal protection in the area.

We did a series of phased schemes.

Harry May: local resident and fishing trip boatman, whose family's house was wrecked in a landslide in 1962

(03.16) – pictures of the 1962 landslide

I came back from school that day and the house was creaking and groaning – the whole place moved about 5 inches but this was enough to bring the ceilings down and the floors up. The house was wrecked completely.

It must have been quite emotional and a big deal to see your house collapse?

My mother's hair went white over the next few years. You couldn't insure against landslides in those days, you can now – it was called an act of God, so they were left completely finished by it. The house had to be brought down manually because it was still completely standing but wrecked.

Toby Guiducci, Albany Guest House proprietor, Lyme Regis

(04.31) I think at the end of the day even a project of this size – it slows things down as best it can but at the end of the day it's Mother Nature who is going to win?

(05.00) *Do you think fossil hunting is one of the main attractions for Lyme?*

Yes definitely, when people come to Lyme Regis they are coming for fossil hunting, a lot of them are walking the SW coastal path. That is something that coastal erosion has affected quite a lot, the path from here to Seaton was closed for quite a long time because of slippage and was diverted last year. The path from here to Charmouth goes across the golf course and down the main road rather than its original pathway. But yes fossil hunting is always going to be a classic interest and we get quite a lot of international visitors who come here looking for fossils.

(19.16) The question of the longevity of the defences is a good one. Will they last 60 years or 80 years or 40 years? Only time will tell. There already seem to be problems with the mesh where the material is slipping through – was it planned like that?. For myself personally even a 30 year roadmap works as I hope to be retired by then. However from a business perspective we must consider resalability. Would I have considered buying the business without the planned 60 years of sea defences? Would a prospective buyer want it with the challenges involved and only a 30 year life span of the defences? So yes that is a concern for me.

Martin Diplock: Lyme Regis estate agent

(04.42) It's not good for the future of the town. If there was a major slip, as has happened in the past that would make a big difference to people's confidence in investing in local businesses and buying properties here.

(20.30) People now feel if they bought a property on the cliff edge the chances are that it is not likely to disappear over the side in the next 50 years. This has helped with people now able to insure their properties against slippage or coastal erosion which was an issue before with some insurance companies. So there has been a lot of positives.

Alison Ferris: Centre Warden, Charmouth Heritage Coast Centre

(05.50) *Do you think there are any benefits of landslides to us in the local area?*

Yes there are lots of benefits – obviously one of the great benefits to me because all of these wonderful landslides produce fossils for us to find and without the landslides we wouldn't discover them. That's not to suggest that people go climbing the cliffs – that is a very silly thing to do and is really dangerous. There lots of sticky mud where you can get stuck and there's lots of rocks falling. But without the landslides coming down and the sea washing out the fossils out of the rocks we wouldn't discover some of things we have. Yes some of the most amazing fossils in the world have been found here.

(07.20) *Given that tourism is one of the biggest earners for Lyme Regis do you feel it has an overall positive effect?*

I think we have positive and negative effects. We had some very big landslides back in December, around Christmas which brought in between 500 and 1000 people in a couple of hours. There were very high tides and stormy conditions and we had people swimming, fully clothed with back packs on around the landslips trying to find fossils because they saw landslide on the news - you can find fossils. They thought I am going to go there, I am going to find treasure and maybe make millions out of it. Who knows what they were thinking? They quite clearly didn't have a clue. So fossil hunting in some ways can have a negative effect but if people are educated, if people come and visit the Heritage Centre, Lyme Regis Museum and places along the coastline where you can get good information about how to go about things correctly on our beaches then it can have a very positive effect. Fossil hunting here is one of our biggest sources of income.

Donald Campbell: Voluntary Warden for Natural England

(06.30) *What are the positive and negative effects of landslides on wildlife in the surrounding area?*

One of the most obvious effects of the landslips is that the whole of the coast between Sidmouth and West Bay is highly unstable and which creates wonderful habitats for small minibeasts. The charity Buglife gets very excited about some of the obscure animals that are to be found here. There is a little tiger beetle, which is limited to this area and there are about 100 species that are nationally scarce that make use of the landslip and soft muds where they can burrow and sunbathe.

Tony Flux : Coast and Marine Adviser (SW) National Trust

(15.30) *In the National Trust's opinion which would you say is the more important for the area of Lyme Regis – checking the local's land and livelihood or that nature takes its course as intended?*

The bottom line is protecting this bit of coastline for the local people. Protecting nature is very important for open coasts but where you have this level of infrastructure there is no choice we must be protecting people's livelihoods, their properties and the services to the town

(18.10) What you have to remember with any is the idea of service life. How long will this last? Because we know that generally the service life of coastal defences is about 60 years. So you then have to say - Have you made a rod for your own back? Does it mean that in 60 years' time the engineers have to come back and do it again? And the likelihood is, they will.

Daryl Turner: Councillor, West Dorset District Council

(04.20) Over the last twenty years around £60m has been spent on Lyme Regis, which considering the size of the community is an awful lot of money.

(16.10) Over the last twenty years around £60m has been spent on Lyme Regis, which considering the size of the community is an awful lot of money. A lot of it comes from DEFRA and the European Union, which could be interesting in the next phase of the project.

Would you the money spent on Lyme Regis has been spent efficiently and well?

I probably have different views than the council on this. I am surprised we have spent this much money on such a small community. I know it's important and historical but the fact you are protecting a part of the coast which will probably disappear in time, I have my doubts it is money well spent. As far as the economy and tourism of Dorset it probably is worth it but I doubt we will fully protect it and it has a finite lifespan. It is whether the money is well spent balanced against that lifespan.

It's difficult, I've been born and bred in Lyme, I love the place but I have other concerns about how the money could have been spent. Lots of areas we struggle with, especially on the County Council - money could possibly have been spent on other things like adult social, children's services

(17.40) Do you think coastal defences are a big thing for a council and being prioritised too much?

When the money was available in the past I don't think there was any great issue. But the financial situation the country and especially the council finds itself in now means we have to question if it is worth spending money of these projects in the future.

(18.40) If the coastal defences have a 60 year lifecycle what do you think will happen after this?

I don't see how we can get more money in to do any more work in the future. Shoreline management plan talks about managed retreat and at the end of the life of these defences it will be a very different Lyme Regis we will be looking at.

(21.30) Student summaries

After this week I think coastal erosion is a very good thing for Lyme Regis. Without the erosion Lyme wouldn't be the same it wouldn't have the Jurassic Coast, it wouldn't have the fossils, it wouldn't have the shops, the businesses, the beach. It would be just another bit of coast with nothing really there.

I always thought coastal erosion was bad for Lyme Regis because of all the buildings and properties at risk behind the sea defences. As the week has gone on I've seen there are benefits like the fossils.

Originally I thought coastal erosion was a really bad thing because the infrastructure was at threat from erosion but now I'm thinking that it is actually a good thing for the town.

I didn't think people's opinions were so varied – there are people who thought erosion was good, there are people who thought erosion was bad, there were some who didn't care about it at all and thought more money could be put into other things.

I think one of the most interesting parts of the project were listening to people's opinions about the project because it really is a local thing

I think it's good for Lyme as it allows the town to be there and the tourism it brings it allows the fossils to be there and allows education of the young people

I've got a lot more appreciation of how documentaries are made and how difficult and a lot about engineering and geography, how the coast works, how planning needs to work with nature – working with what you have got rather than against it all the time.

Possible questions associated with the film:

1. Identify the main mass movement processes experienced along the coastline and show how they are influenced by rock type and structure.
2. Explain the physical processes which affect the Lyme Regis coastline.
3. Make a list of the different land uses at risk from coastal erosion in the local area.
4. Describe both the hard and soft engineering methods used to protect the local coastline.
5. Identify areas along the local coast where the management strategies used could be classified as **a) hold the line; b) advance the line; c) do nothing; d) managed retreat.**
6. Along much of Lyme Regis' seafront the main strategy has been to *advance the line*. Describe how this was achieved and suggest why this strategy was chosen, including its benefits and drawbacks.
7. Create a table to summarise the advantages and disadvantages of erosion to Lyme Regis. Within your table identify economic, environmental and social aspects.
8. Evaluate the views of the different stakeholders represented in the film.
9. How do you think tourist views may differ from those of local inhabitants?
10. In two columns summarise the main COSTS and BENEFITS of Lyme Regis' coastal defences.

Possible fieldwork and research tasks which could be undertaken in the Lyme Regis area linked to the film.

1. Description, photographing and measurement, evaluation of the different types of coastal defences.
2. Bi-polar analysis of the different coastal defences.
3. Questionnaires related to landslips, coastal defences, tourism.
4. Annotated field sketches.
5. Beach profile measurement and pebble analysis.
6. Activity surveys.
7. Oral histories
8. Structured interviews with different stakeholders.
9. Comparison of photographs/post cards over time.
10. Historic maps to compare.
11. Local newspaper articles / blogs / forums.
12. Land use surveys to identify how it differs where different management strategies are used.
13. Use of GIS - <https://explorer.geowessex.com/>

Other useful links:

<https://www.dorsetforyou.gov.uk/lyme>

http://thebritishgeographer.weebly.com/uploads/1/1/8/1/11812015/hard_engineering.pdf

<http://jurassiccoast.org/about/conserving-the-coast/>