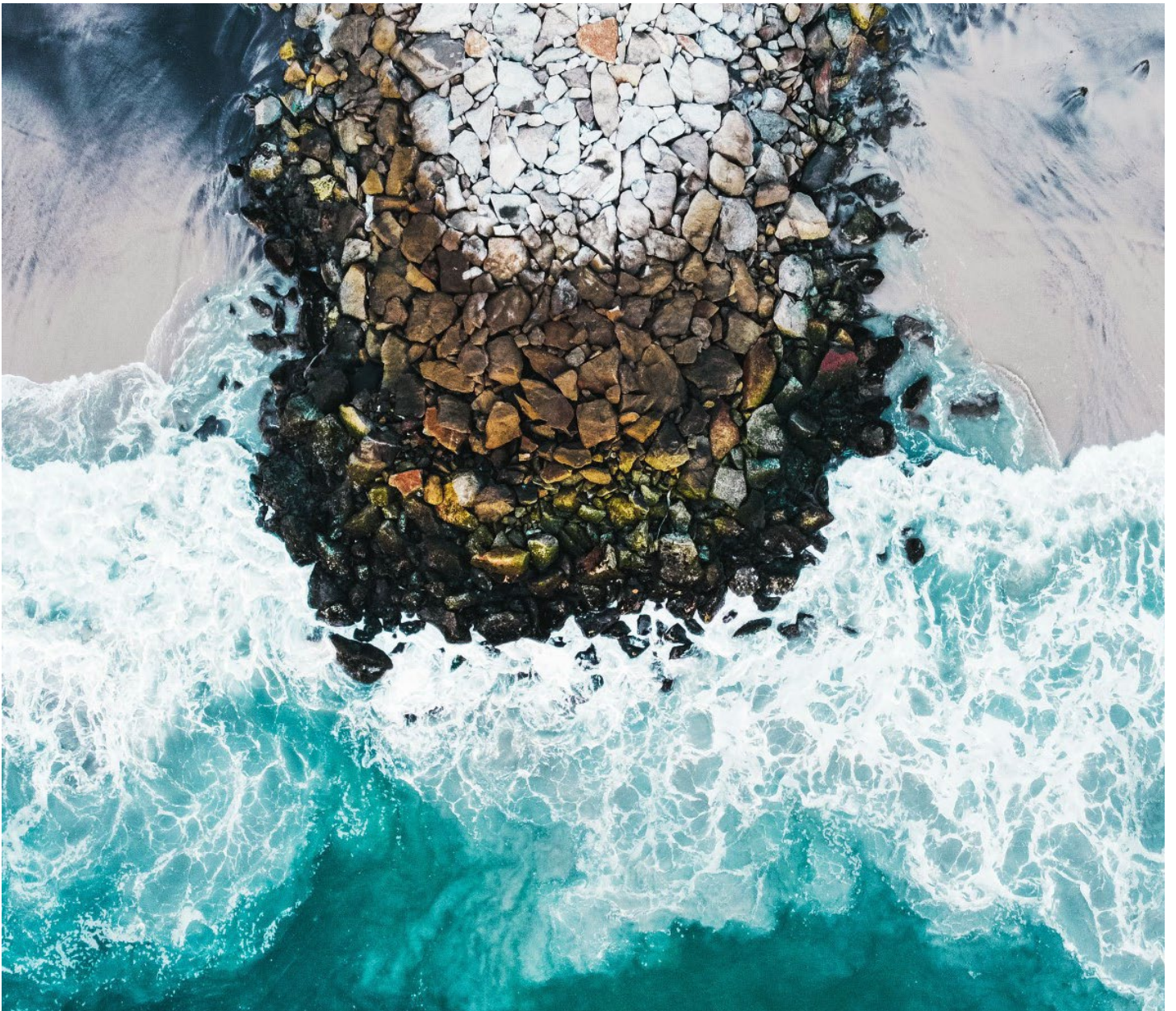




Coastal, Marine and Wildlife Conservation – Revision Guide

Revision Guide

Overview

This is a summary and revision guide for content taught in Coastal, Marine and Wildlife Conservation (2025-2026). The exam format will comprise 4 longer answer questions and you will select 2 from this list to answer; there is a past paper on Moodle for you to see an example of this. The exam will last 2 hours and it is a closed-book exam. Example exam questions are provided for each lecture topic.

This guide will provide a lecture summary, with links to the original slides, to help you get your notes in order.

Module Summary

To introduce coastal and marine ecosystems, and their conservation. From a scientific consideration of these pressures, students will evaluate strategies for the protection of the maritime environment and wider conservation of species, ecosystems and natural resources.

Disclaimer

This exam guide is provided as a suggested revision guide and does not replace the need to review additional content as provided in Moodle.

1 Module Introduction and Coastal Principles

The Coastal Zone

- Coastal zone anatomy, and energy distribution
- Large scale controls on coastal settings
 - Tectonic Setting (plate boundary position)
 - Sea Level (rising or falling)
- Local scale controls
 - Process Dominance (waves versus tides)
 - Wave Dominated Coasts
 - Mixed Energy
 - Tide Dominated Coasts
 - Wind and Waves

Coastal Ecosystems

- Estuaries
- Mangroves and Saltmarshes
- Coral Reefs
- Rocky Shores

Example exam questions:

1. Explain the key large scale controls on coastal systems?
2. Coral reefs are under threat across the globe. Discuss the main reasons for coral reef decline and highlight conservation measures being implemented to protect or restore reef ecosystems.

Lecture slides: https://prezi.com/view/HLIWIFSFDfLp0KI4XEa4/?referral_token=bgTj-UlnB3FN

2 Abiotic Factors

What are abiotic factors?

- Pressure, salinity, temperature, light, waves tides & currents, pH, oxygen.
- Application:
 - Ocean mixing and complexity
 - Deep Ocean
 - Hydrothermal Vents
 - Light and artificial light
 - pH and Ocean Acidification (also a separate lecture).

Example exam questions:

1. Using examples taken from previous El Nino events, identify and evaluate the main changes to our oceans as a result of higher sea surface temperatures (30)
2. What evidence is there that marine species around the UK are being affected by changes to ocean circulation and temperature increases? (15)
3. Discuss how climate change is affecting our oceans? You will be expected to consider the physical and biological impacts and provide detailed and credible statistics to emphasize your arguments. (100)

Lecture Slides: https://prezi.com/view/BDVuKtg76gphu5EZ4Tw6/?referral_token=bgTj-UlnB3FN

3 Wildlife Conservation and Biotic Factors

What is wildlife? What is conservation?

The need for wildlife conservation:

- Govt Actions
- Extinctions
- Population Reductions
- Choosing what to save

Biotic Factors

In both coastal and marine environments. How are organisms shaped by their environment?

How do they shape it in turn?

Threats

An overview of:

- Climate change
- INNS
- Pollution
- Habitat degradation
- Disease
- Unsustainable harvesting

(Many of these are covered in more detail in later lectures)

Example exam question:

1. Describe the main biotic factors in wildlife conservation.

Lecture Slides: <https://prezi.com/view/2bprwNUIw54fUFDXGR/>

4 Fieldwork Week

No lecture

5 Species Reintroductions

Reintroductions

- Captive breeding, captivity adaptation, genetics
- Translocation types;
 - introduction,
 - reintroduction,
 - reinforcement,
 - insurance populations

Rewilding

- Keystone species and similar concepts
- Engineer species; allogenic and autogenic, and also INNS
- Predators

Ethics and Criticism

- Economics, inc. ethics in stakeholder clashes. Cambrian Wildwood example
- Animal rights and welfare
- De-wilding

Example exam question:

1. Highlight the main ethical and economic concerns with animal reintroduction programs.

Lecture Slides: <https://prezi.com/view/gTWBH8OvrSOsQKX1Ooaq/>

6 Coastal and Marine Issues

Ecosystem Impacts

- Wildfire impacts on coastal and marine ecosystems
- Coastal Darkening
- Increased toxicity of metal pollution due to ocean acidification
- Equatorial marine communities are becoming depauperate due to climate migration
- Effects of altered nutritional content of fish due to climate change

Resource Exploitation

- The untapped potential of marine collagens and their impacts on marine ecosystems
- Impacts of expanding trade for fish swim bladders on target and non-target species.
- Impacts of fishing for mesopelagic species on the biological ocean pump
- Extraction of lithium from deep sea brine pools.

New Technologies

- Colocation of marine activities
- Floating marine cities
- Trace element contamination compounded by the global transition to green technologies
- New underwater tracking systems to study non-surfacing marine animals
- Soft robotics for marine research
- The effects of new biodegradable materials in the marine environment.

Horizon Scanning Activity - We conducted a horizon scan to discuss marine and coastal impacts in the Swansea and South Wales region.

Example exam question:

1. How do we monitor non-surfacing marine animals? How do these monitoring approaches differ from methods used in surfacing marine wildlife?

Lecture Slides: <https://prezi.com/view/VGdKAfflbDjcyCfWJHu/>

7 Coastal and Marine Habitat Restoration

Restoration Case Studies.

- Câr y Môr Ocean Farm, Wales
- Converting trawled habitat into sustainable fisheries, West Scotland
- Coastal Wetland Restoration, Victoria, Australia

For each, we asked what the restoration activities were, the benefits for wildlife, potential issues, and community benefits.

After this, we researched some other examples ourselves

Marine Protected Areas (MPAs)

- What are they; stages of establishment, levels of protection offered
- Choose a UK example. Why is it needed? What stage is it at? What level of protection does it offer?

Example exam question:

1. Using case studies or examples, assess the potential benefits of coastal restoration projects

Lecture slides: <https://prezi.com/p/2axfxnqjeaw/?present=1>

8 Hard and Soft Engineering (Dr. Hannah Williams)

Hard Engineering

Groynes, sea walls, rip rap, revetments, offshore breakwaters

Soft Engineering

- Beach Nourishment
- Oyster Reefs
- Salt Marshes
- Seagrass Extent
- Mangroves and Conservation
- Dunes
- Coral
- Beach drainage

Working with Nature and Hybrid Interventions

Example exam question:

1. Using examples, assess the effectiveness of soft engineering options when dealing with climate-induced sea level rise in island or low-lying nations

Lecture Slides: <https://moodle.uwtsd.ac.uk/course/view.php?id=10916#> (Moodle Tile: Hard and Soft Engineering)

9 Fieldtrip

No lecture

10 Overfishing

What is Overfishing?

- The Tragedy of the Commons (Hardin, 1968).
- Environmental Impact of Fishing (inc. Fishing down the food web)
- Status of Stocks, and the Economic and Social Costs
- Unsustainable vs sustainable methods
- The rise of aquaculture

Activities:

Finprint Game, and self study of Interpreting global fishing watch

Example exam questions:

1. What are the leading causes of overfishing?
2. How can monitoring fish stocks help combat overfishing?

Lecture Slides: https://prezi.com/view/pnK4l1U8mlDotKdmDU33/?referral_token=bgTj-UlnB3FN

11 High Latitude Coastlines

Physical and Human dimensions of high latitude coastlines

- Arctic Climate Change
- Impact of sea-ice melt
- Permafrost thaw
- The role of designated protected areas (MPA)
- Indigenous voice and creation of conservation policies

Activity: Arctic Change and Global Risks: [Strategic Intelligence \(weforum.org\)](https://www.weforum.org/)

Example exam question:

1. What is the effect of increasing sea-ice melt on Arctic communities and ecosystems?

Lecture Content: [High Latitudes Coastlines and Communities \(uwtsd.ac.uk\)](http://uwtsd.ac.uk)

Christmas Break!

12 Recovery of Threatened Species

How do species recover from threats?

Understanding the Problem

- IUCN Red List
- IUCN Green Status
- Case Study: Bonnethead Shark
- UKBAP

Extinction Risk

What are the risks for a reduced population? What are the minimum number necessary for a viable population?

- Risks and vulnerability
- Refugee Species
- Gap Species
- Paradox Species
- Viability Modelling, PVA

Example exam question:

1. Describe the potential benefits and concerns of bringing back the Woolly Mammoth from extinction.

Slides: <https://prezi.com/view/PObmmY5gugpRH5LJwmJH/>

13 Seminar – De-Extinction

Class discussion of de-extinction

14 Fieldtrip

No lecture

1.5 Animal Physiology

Processes:

- Energy and Metabolism
- Respiratory Systems
- Muscle Systems
- Osmo-regulation and Excretion
- Cardiovascular Systems

How are these similar between species? How do they differ?

Physiological Plasticity

How some species can be particularly adaptive to their environment, either physically or behaviourally

Example exam questions:

1. Describe the different systems used by marine organisms to osmoregulate, and how this affects their distribution.
2. As climate change affects our coastal ecosystems, explain, with examples, how physiological plasticity may give some species an advantage.

Lecture Slides: <https://prezi.com/view/oVNE2wJ3xT12D8ZP87he/>

16 Ocean Warming and Acidification

Lecture and virtual lab focusing on urchins

Marine Chemistry

(chemical composition and processes, inc interactions with atmosphere):

- Atmospheric Carbon; The Keeling Curve; where does Carbon come from? Anthropogenic and Natural Sources (Natural: Respiration and decomposition, Carbonate rock weathering, volcanic eruption. Anthropogenic sources: Fossil fuels, fires, deforestation.)
- What is alkalinity? Ocean pH. Carbon and water, under normal and acidified conditions

Wildlife Impacts

How does acidification affect wildlife? Shells and carbon.

Lab Experiment (Activity):

<https://depts.washington.edu/urchin/index.php?view=acidocean&part=part1>

Example exam question:

1. Highlight the impacts of ocean warming and acidification on the marine environment.

Lecture Slides: <https://prezi.com/view/t9yyzIGsV7Z1Ywf8ewsD/>

17 Species and Ecosystem Responses to Climate Change

How climate change is affecting species distributions and biological communities

Impacts: Distribution Shifts

- Range Shifts
- Niche Reshuffling
- Ecosystem Example
- Microclimate Impacts
- Oceans (including heat)

Protected Areas

- The Key Issue (connectivity failures)
- Case Studies (Everglades)

Solutions

- Indigenous Knowledge and Values; links between biodiversity and culture; indigenous management systems; case studies of integrated management
- Adaptation and Resilience Options (connectivity, translocations, mechanical adaptive strategies, anticipatory policy planning)

Example exam question:

1. Outline a response to climate change for a particular species.

Lecture Slides: <https://prezi.com/view/ArvIKb2eXeGEZNGEsK6p/>

18 Sea Level Rise and Adaptation

The scale of the challenge

- Storm surges
- Rainfall patterns
- Risks to people and property

Large Scale Management and Frameworks for Coastal Management

- DPSIR (Driving Forces, Pressures, State, Impacts, Responses)
- Examples of DPSIR in coastal and marine applications

Shoreline Management Plans

- Hold the line
- No active intervention
- Managed Retreat
- Advance the line

Example exam question:

1. Apply the DPSIR framework to Swansea Bay and outline management recommendations from it

Lecture Slides: https://prezi.com/view/m6czXbXgASsfDT00Yg0e/?referral_token=bgTj-UlnB3FN

19 Censuses and Surveys

Generalist Techniques.

- The main techniques for mobile and immobile species
- Quadrats and Transects
 - Abundance Measures
 - DAFOR Scale
 - Indices
 - Long Vegetation
- Mark-Recapture

Species Specific survey techniques.

- Birds: Group Based Counts; colonies, cliffs, burrows and ground nesters. Tree Colonies, Roosts, Flocks
- Mammals; Sea Otter, Polar Bear, Cetaceans, Sirenians, Pinnipeds. How to survey them? How to mark them?
- Fish Stocks; Electronic Monitoring
- Invertebrates: Mud; Bugs; Areal Surveys

Example exam question:

1. Critically appraise the methodologies used for monitoring Pinnipeds, detailing the pros and cons of each method.

Lecture Slides: <https://prezi.com/view/zAVo2DWWyJAuRhHgkZu/>

20 Wildlife Ecology

Community Ecology

- Predation and Herbivory
- Niches and Competition
- Symbiosis

Population Ecology

- Life Tables, Survivorship and Age-Sex Structure
- Life History Strategies

Behavioural Ecology

- Resource Competition
- Mating Systems
- Social Behaviour

Example exam question:

1. What is an ecological niche? Describe why is it important in marine conservation?

Lecture Slides: <https://prezi.com/view/7VKQzV3gC3eXndWOjSBV/>

21 Mapping and Monitoring

GIS lab – thematic mapping with porpoises

22 Revision Sessions

- I. Saltmarsh investigation sessions (file on Moodle)
- II. Coastal management game
- III. Revision