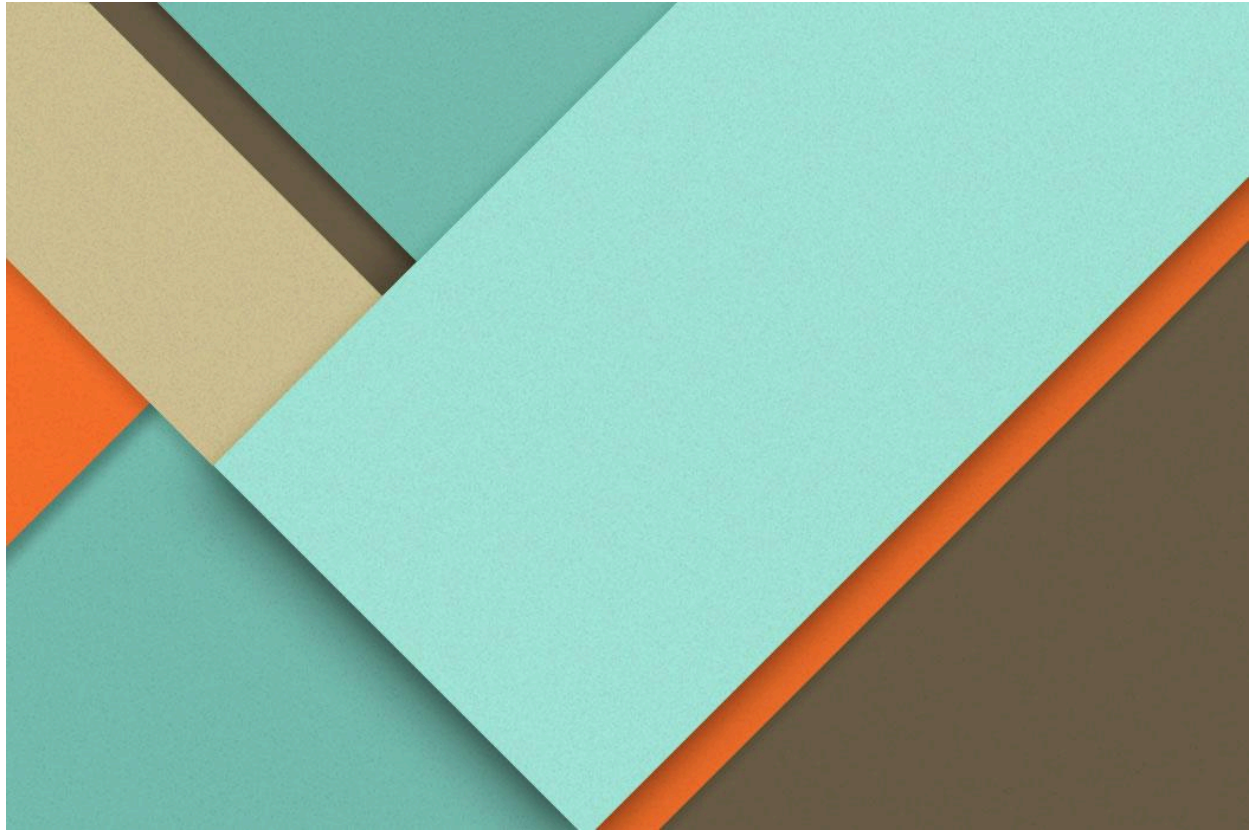




Coastal, Marine and Wildlife Conservation

19/04/2024

Exam Revision Guide (ACNA5001)

Overview

This is a summary and revision guide for content taught in Coastal, Marine and Wildlife Conservation (2023-2024). The exam format will comprise 4 longer answer questions and you will select 2 from this list to answer. The exam will last 2 hours and it is a closed-book exam. Example exam questions are provided for each lecture topic.

Course 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.

Part 1: Lecture Summary

I. Course introduction and large scale controls on coastal systems

The Coastal Zone

Large scale controls on coastal settings

- 1) Tectonic Setting (plate boundary position)
- 2) Sea Level (rising or falling)
- 3) Process Dominance (waves versus tides)
 - Wave Dominated Coasts
 - Mixed Energy
 - Tide Dominated Coasts
 - Wind and Waves

Example exam question: Explain the key large scale controls on coastal systems?

II. Coastal Ecosystems

Estuaries; Zones of an Estuary, Estuary Management

Mangroves and Salt Marshes

Coral Reefs; Distribution, Reef Types

Rocky Coasts

Example exam question: 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.

III. Why wildlife conservation

What is wildlife?

What is conservation?

The need for wildlife conservation: Govt Actions, Extinctions, Pop. Reductions

What to Save?

Biotic Factors

Threats

Lecture Slides: [Wildlife Conservation - Intro by Elanor Alun on Prezi](#)

Example exam question: Describe the main biotic factors in wildlife conservation.

IV. Abiotic Factors

What are abiotic factors?

E.g. Temperature, Salinity, Light, Pressure, Currents, Tides, Nutrients, Oxygen.

Ocean mixing and complexity

Deep Ocean

Hydrothermal Vents

Light and artificial light

pH and Ocean Acidification (also a separate lecture).

In this session there were some examples of previous exam questions:

What major factors affect the ocean's productivity levels? (5)

b) 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)

c) What evidence is there that marine species around the UK are being affected by changes to ocean circulation and temperature increases? (15)

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://moodle.uwtsd.ac.uk/pluginfile.php/830674/mod_folder/content/0/Abiotic_Fin_al_Lecture2.pdf?forcedownload=1

V. Recovery of Threatened Species

Understanding the problem

- 1) IUCN Red List
- 2) IUCN Green Status
- 3) Case Study: Bonnethead Shark
- 4) 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

De-Extinction

Slides: [Recovery of Threatened Species by Elanor Alun on Prezi](#)

Example exam question: Describe the potential benefits and concerns of bringing back the Woolly Mammoth from extinction.

VI. Coastal and Marine Issues

Ecosystem Impacts

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

Resource Exploitation

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

New Technologies

- 10) Colocation of marine activities
- 11) Floating marine cities
- 12) Trace element contamination compounded by the global transition to green technologies
- 13) New underwater tracking systems to study non-surfacing marine animals
- 14) Soft robotics for marine research
- 15) 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.

Lecture Slides:

https://moodle.uwtsd.ac.uk/pluginfile.php/865450/mod_folder/content/0/Coastal%20and%20Marine%20issues%20%2810-11%29%20COMPLETE.pdf?forcedownload=1

Example exam question: How do we monitor non-surfacing marine animals? How do these monitoring approaches differ from methods used in surfacing marine wildlife?

VII. Rewilding

Rewilding

- 1) Keystone Species



- 2) Ecosystem Engineers; allogenic engineers, autogenic engineers
- 3) Predators; Rewilding Britain

Translocation and Reintroduction

- 1) Captive Breeding
- 2) Ex Situ
- 3) Genetic Considerations
- 4) Breeding Depressions
- 5) Ecological Similarity
- 6) Captive Adaptation
- 7) Genetic Trade-offs

Types of translocation: reintroduction, restocking, reinforcement, insurance populations, success and failure.

Ethics and Criticism

- 1) Economics
- 2) Animal rights and welfare
- 3) De-wilding

Lecture Slides: [Rewilding and Other Ethics by Elanor Alun on Prezi](#)

Example exam question: Highlight the main ethical and economic concerns with animal reintroduction programs.

VIII. Coastal and Marine Initiatives (Habitat Restoration)

Examples of habitat restoration

Key considerations: What were the main restoration activities happening? What are the benefits for habitat? Are there any potential issues? Are there benefits for the local community?

[For the love of the Sea](#)

[The Custodians](#)

[Coastal Wetland Response Program \(Victoria, Australia\)](#)

[Researching Habitat Restoration](#)

[Marine Protected Areas \(MPA\)](#)

Lecture Slides: [Course: Coastal, Marine and Wildlife Conservation \(ACNA5001\), Tile: Marine and Coastal Management \(uwtsd.ac.uk\)](#)

Example exam question: How do Marine Protected Areas (MPA) contribute to improved marine conservation?

IX. 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

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

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

Example exam question: What is the effect of increasing sea-ice melt on arctic communities and ecosystems?

X. Animal Physiology

1. Processes
2. Energy and Metabolism
3. Respiratory Systems
4. Muscle Systems
5. Thermoregulation
6. Osmo-regulation and Excretion
7. Cardiovascular Systems
8. Clocks and Hibernation

Physiological Plasticity

Lecture Slides: [Animal Physiology by Elanor Alun on Prezi](#)

Part 2: Lecture Summary

XI. Wildlife Ecology

Community Ecology

1. Predation and Herbivory
2. Niches and Competition
3. Symbiosis

Population Ecology

1. Life Tables
2. Survivorship
3. Age-Sex Structure
4. Life History Strategies

Behavioral Ecology

1. Resource Competition
2. Mating Systems
3. Social Behaviour

Lecture Slides: [Wildlife Ecology by Elanor Alun on Prezi](#)

Example exam question: What is an ecological niche? Describe why is it important in marine conservation?

XII. Overfishing

What is overfishing?

The Tragedy of the Commons (Hardin, 1968).

Environmental Impact of Fishing

Status of Stocks

Fishing down the food web

Economic and Social Costs

The rise of aquaculture

Activities: Fingerprint Game

Interpreting global fishing watch

Lecture Slides: [Course: Coastal, Marine and Wildlife Conservation \(ACNA5001\), Title: Marine Notes \(uwtsd.ac.uk\)](#)

Example exam question: What are the leading causes of overfishing? How can monitoring fish stocks help combat overfishing?

XIII. Censuses and Surveys

Introduction

1. Censuses, Samples and population indices
2. Survey Plans
3. Generalist Techniques

Quadrats and Transects

Abundance Measures

DAFOR Scale

Indices

Long Vegetation

Mark-Recapture

4. Species Specific

Birds

Group Based Counts; colonies, cliffs, burrows and ground nesters.

Tree Colonies, Roosts, Flocks

Mammals; Sea Otter, Polar Bear, Cetaceans, Sirenians, Pinnipeds

Cetacean Surveys, Marking and Tagging

Fish Stocks; Electronic Monitoring

Invertebrates

Mud Bugs

Areal Surveys

Example exam question: Critically appraise the methodologies used for monitoring Pinnipeds detailing the pros and cons of each method.

Lecture Slides: [Wildlife Censuses and Surveys by Elanor Alun on Prezi](#)

XIV. Mapping and Monitoring

Mapping: How do we map oceans?

- 1) Echosounder
- 2) Reflection Seismic
- 3) Sidescan Sonar
- 4) Multibeam Sonar
- 5) Satellite Altimetry
- 6) (Remotely Operated Vehicles (ROVs) and Autonomous Underwater Vehicles (AUVs))

Mapping of Coastline

Mapping and Classifications; Coastal Classification Systems; e.g. Shepherd (1973)
Primary and Secondary Coasts

Finkl (2004) Coastal Classification: Systematic Approaches to coastal classification

Readings: [Course: Coastal, Marine and Wildlife Conservation \(ACNA5001\), Tile: Mapping and Monitoring \(uwtsd.ac.uk\)](#)

GIS approaches to coastal monitoring (Activity)

Lecture Slides: [Course: Coastal, Marine and Wildlife Conservation \(ACNA5001\), Tile: Mapping and Monitoring \(uwtsd.ac.uk\)](#)

Example exam question: How do we map the oceans? Describe two methods of gathering information on the physical properties of the ocean or seafloor.

XV. Species and Ecosystem Responses to Climate Change

Climate Change

Impacts

Distribution Shifts

1. Range Shifts
2. Niche Reshuffling
3. Ecosystem Example
4. Microclimate Impacts
5. Oceans

Acidification

Protected Areas

1. The Key Issues
2. Case Studies

Solutions

1. Indigenous Knowledge and Values
2. Adaptation and Resilience Options

Lecture Slides: [Species and Ecosystem Responses to Climate Change by Elanor Alun on Prezi](#)

Example exam question: Outline a response to climate change for a particular species.

XVI. Ocean warming and Acidification

Waters high thermal inertia

Marine Chemistry

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

How does acidification affect wildlife? Shells and carbon.

Lab Experiment (Activity).

Lecture Slides: [Ocean Warming and Acidification by Elanor Alun on Prezi](#)

Example exam question: Highlight the impacts of ocean warming and acidification on the marine environment.

XVII. 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

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

Shoreline Management Plans

- 1) Hold the line
- 2) No active intervention
- 3) Managed Retreat
- 4) Advance the line

Lecture Slides: [Course: Coastal, Marine and Wildlife Conservation \(ACNA5001\), Tile: Sea level Rise \(uwtsd.ac.uk\)](#)

Example exam question: Describe the four strategies in a Shoreline Management Plan (SMP) and provide examples of how these approaches can be implemented.

XVIII. Hard and Soft Engineering

Hard Engineering (Dr. Hannah Williams)

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

Soft Engineering

- 1) Beach Nourishment
- 2) Oyster Reefs
- 3) Salt Marshes
- 4) Seagrass Extent
- 5) Mangroves and Conservation
- 6) Dunes
- 7) Coral
- 8) Beach drainage

Working with Nature and Hybrid Interventions

Lecture Slides: [Course: Coastal, Marine and Wildlife Conservation \(ACNA5001\), Tile: Coastal Notes \(uwtsd.ac.uk\)](#)

Example exam question: Soft Engineering, Nature Based Solutions or Building with Nature are not effective strategies at dealing with long-term sea-level rise. Discuss to what extent you agree or disagree with this statement, providing evidence to support your argument.

XIX. Coastal Management: Essential for Conservation

Case Study Examples of Marine, Coastal and Wildlife Management (no slides).

XX. Dune Surveys

Dune visit to undertake vegetation transects.