

# An Open Educational Resource Learning Management System for Sustainability and Environment Studies

The screenshot displays the user interface of an Open Educational Resource Learning Management System. At the top, a navigation bar includes a logo and links for Home, About, Modules, Resources, and Contact Us. The main header features a background image of a wooden boardwalk on a beach, with the text "Sustainability and Environmental Studies" and "Open Educational Resources Learning Center". The main content area is titled "Biodiversity At Risk: A Global Perspective". On the left, a sidebar menu lists the course structure, with "3.6 Reflection Questions" highlighted. The main content area contains two reflection questions: "Reflection Question 1: How could climate change impact the invasive Burmese python in North America?" and "Reflection Question 2: Why are targeted removals of lionfish deemed necessary in order to protect coral reef ecosystems in the Caribbean?". On the right, there is a search bar, a login section with fields for Username and Password, and a "Log In" button. A "Forgot Password?" link is also present. The footer contains a copyright notice: "© 2020 Harvard Extension School. All Rights Reserved."

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## Sustainability and Environmental Studies

Open Educational Resources Learning Center

### Biodiversity At Risk: A Global Perspective

Introduction

- 1. Significance and Values
- 2. Climate Change Impacts
- 3. Invasive Species Impacts
  - 3.1 Lesson Unit 1
  - 3.2 Lesson Unit 2
  - 3.3 Lesson Unit 3
  - 3.4 Lesson Unit 4
  - 3.5 Assessment Quiz
  - 3.6 Reflection Questions**
  - 3.7 Instructional Activity
- 4. Conservation Measures

Instructor Notes

Instructor Reviews

Reflection Question 1: How could climate change impact the invasive Burmese python in North America?

Reflection Question 2: Why are targeted removals of lionfish deemed necessary in order to protect coral reef ecosystems in the Caribbean?

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**Final Presentation**  
**John Reilly**  
**May 11, 2020**

# 18 Month Journey

Time Period	Development Focus
Spring 2019	Performing the Competitive Analysis and the Needs Analysis and developing the Prototype in the Instructional Design Studio course.
Summer 2019	Writing the Pre-Capstone Proposal.
Fall 2019	Refining the project approach and submitting the Capstone Proposal in the Digital Media Design Capstone Tutorial course.
Spring 2020	Building the Learning Management System as the Capstone project.

# Bridging the Gap

## **eLearning Resources for Sustainability and Environmental Studies**

Existing eLearning resources are often too general and not focused on what environmental students need to learn.

Demand, though, continues to grow at a rapid pace as online education becomes more prevalent and mainstream.

Instructional content needs to complement instructor teachings rather than cover introductory concepts or replace textbooks and lectures.

Instructional content needs to be tailored to the course requirements by delving deeper into topics and issues in order to promote enduring understandings.

# Student and Instructor Interviews

## **Key Educational Outcomes for the Learning Management System**

Short, interactive lessons are more engaging than text.

Blended learning allows students to proceed at their own pace.

Offering multiple ways to teach the same skill is more engaging for students.

# Understanding by Design Approach

## **Methods to Capture Student Attention and Promote Enduring Understandings**

Designing instruction to achieve specific learning goals (Backward Design).

Having a Big Idea as the focus point for instruction and assessment.

Using hooks to capture student attention.

Chunking instructional content into smaller, more manageable pieces to improve retention.

Using repetition in instruction to reinforce learning concepts.

Crafting essential questions and statements of enduring understandings.

# Prototype Development

## **Proof of Concept Criteria**

The eLearning application helped to achieve the key educational outcomes.

The Understanding by Design approach helped to realize the key educational outcomes.

The system design was effective in supporting the eLearning application and learning approach.

# Technical Components

Technical Component	Application in the Learning Management System
WordPress Content Management System	Provided many of the required features of the LMS as well as a built-in database to house the instructional content.
Custom CSS	Needed to tailor the user experience of the WordPress platform into the custom LMS needed to meet the project requirements.
Custom JavaScript	Required to develop the more advanced features of the LMS such as a collapsible menu system and a responsive design.
WordPress Plugins	Extended the functionality of WordPress in order to meet the design requirements of the LMS.

# WordPress Plugins

WordPress Plugin	LMS Application
BackWPup	Backup WordPress Instance
Code Embed	Embed JavaScript and HTML code in posts and pages
Contact Form 7	Create Custom Contact Forms
Duplicate Page	Duplicate Posts, Pages and Custom Posts
Embed Google Map	Create Google Maps
HD Quiz	Create Assessment Quizzes
Header and Footer Scripts	Embed JavaScript Coding into Header and Footer
PDF Embedder	Embed PDF into Posts and Pages
Sidebar Login Widget	Create Sidebar Used to Log into the LMS
User Access Manager	Manage Access to Posts, Pages, Categories and Files



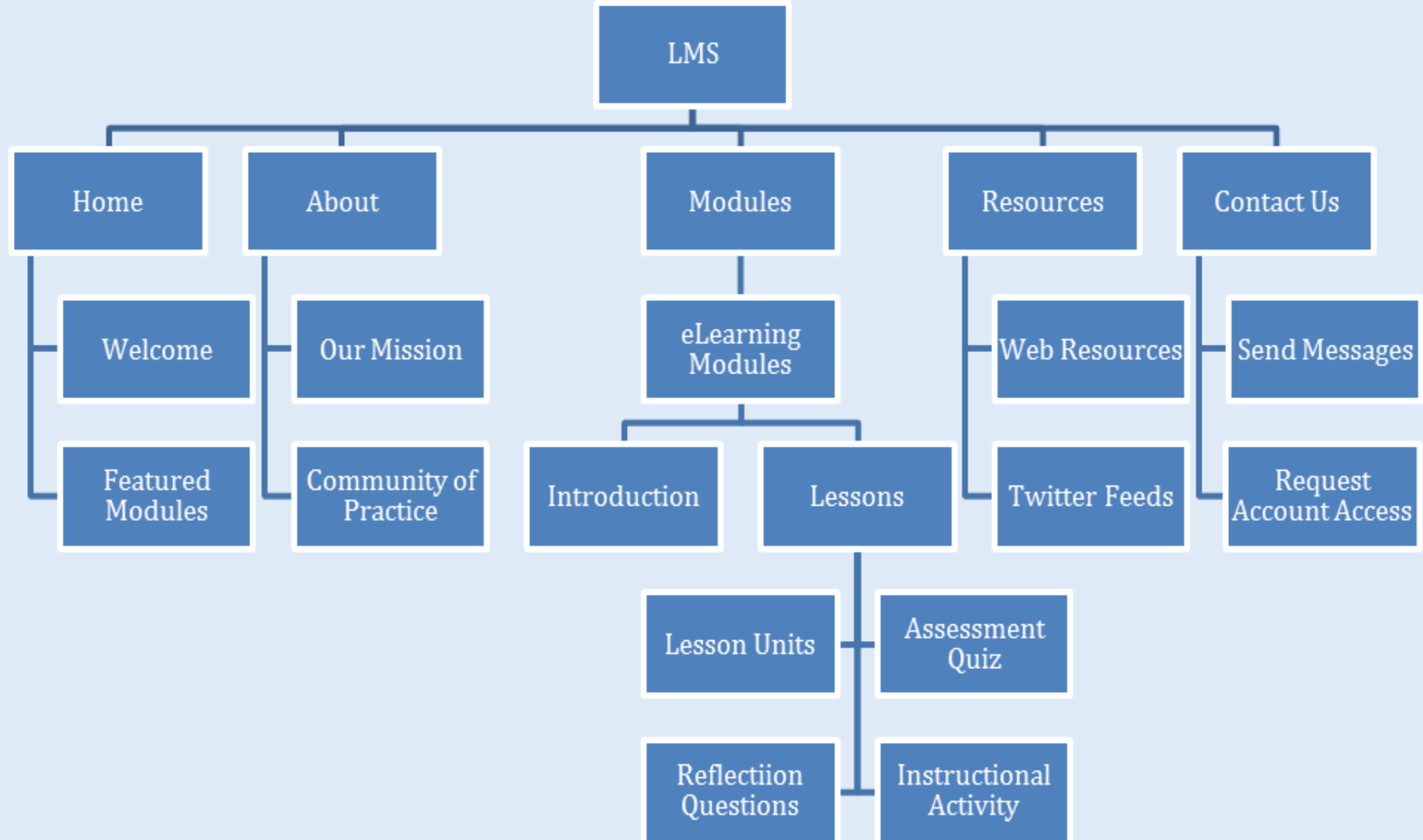
# Building the Learning Management System

Assessment Category	Assessment Criteria
Learning Design	Well-structured, interesting and engaging instructional content which supports enduring understandings.
User Engagement	Instructors will recognize that the LMS can be used to supplement their teachings.
Application	Clearly demonstrates the capabilities of the Learning Management System.
Presentation	Clear and consistent professional-looking layout to garner interest in the Learning Management System.
Adaptability	Suitable for use in other educational and professional training applications.

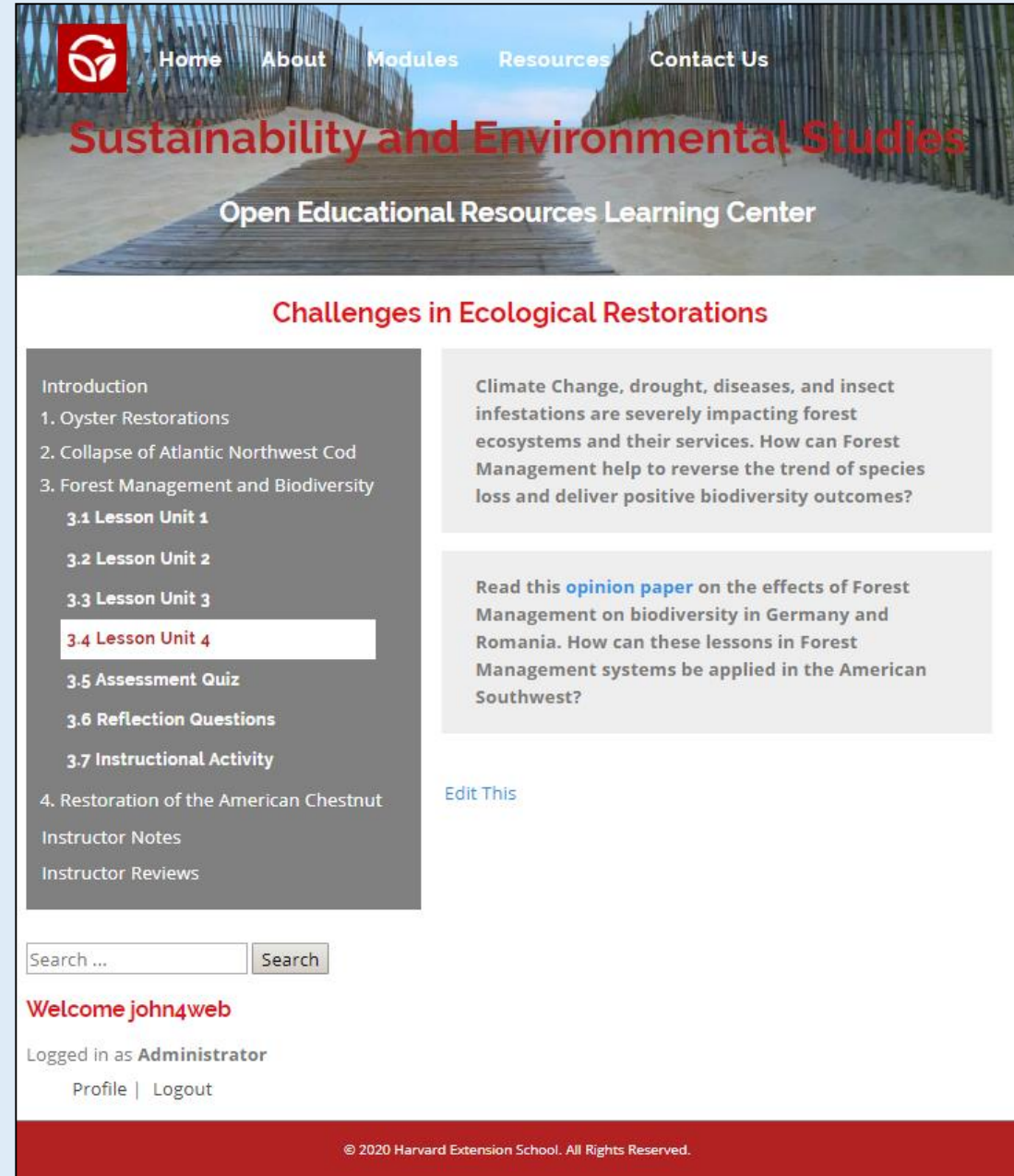
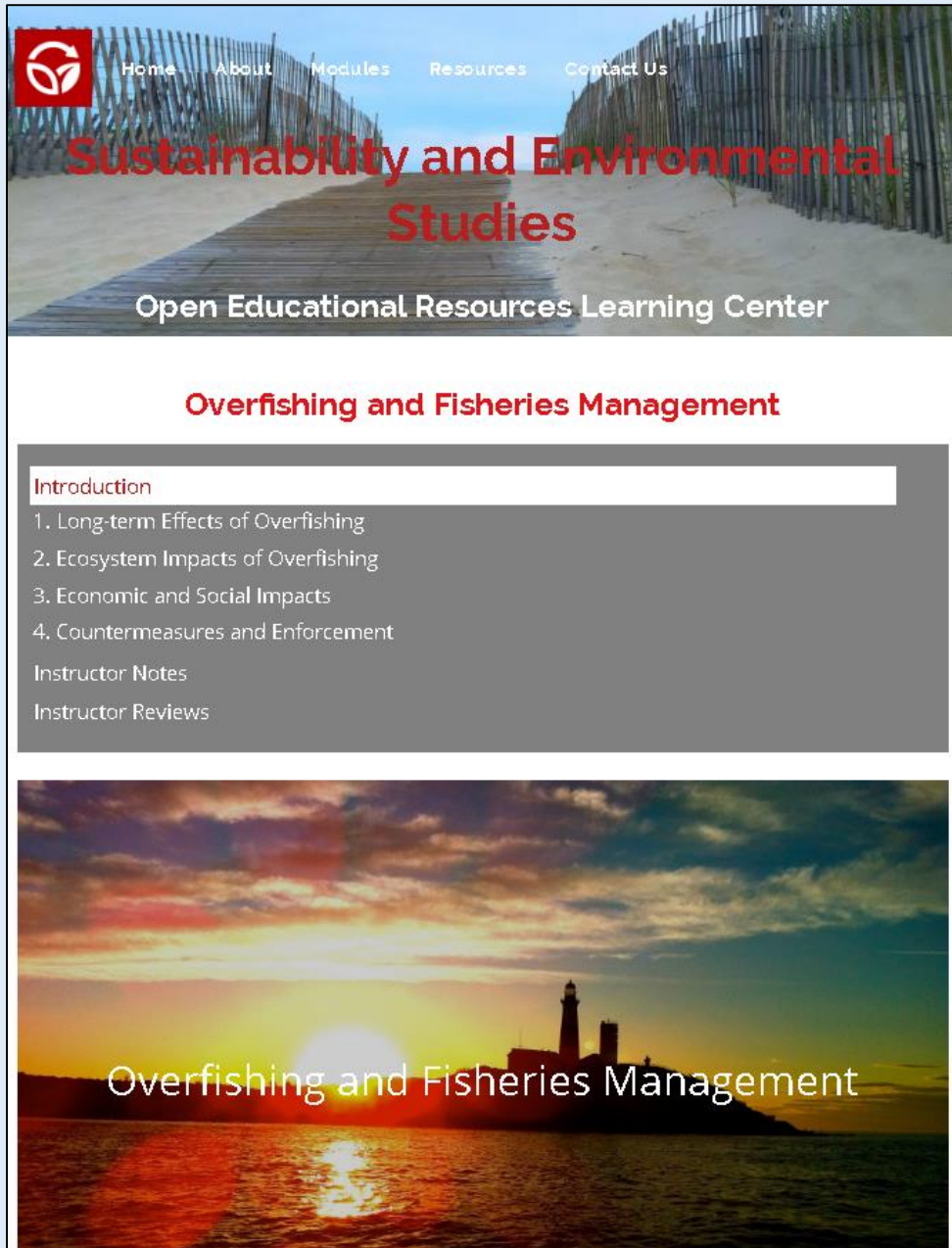
# Capstone Work Plan and Milestones

Milestone	Completion	Deliverable Description
Finalize the System Design	February 10	Finalize the design of the Learning Management System and curate the first 20% of the instructional content.
Complete the User Interface	March 2	Complete the user interface for the LMS and curate the next 20% of the instructional content.
Provide Community of Practice Access for Instructors	March 23	Provide instructors with secured access to post reviews on the learning modules, lessons, and activities and curate the next 20% of the instructional content.
Provide Community of Practice Access for Contributors	April 13	Provide contributors with secured access to update and create learning modules, lessons, and activities and curate the next 20% of the instructional content.
Complete the System	May 4	Complete the development of the LMS and curate the final 20% of the instructional content.

# The Learning Management System Website Map




# Clear and consistent professional-looking layout including a Responsive Design





Using the Understanding by Design approach, each lesson unit presents the Big Idea which serves as the focus point for instruction and assessment.

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# Sustainability and Environmental Studies

## Open Educational Resources Learning Center

### Overfishing and Fisheries Management

Introduction

1. Long-term Effects of Overfishing
2. Ecosystem Impacts of Overfishing
3. Economic and Social Impacts

3.1 Lesson Unit 1

3.2 Lesson Unit 2

3.3 Lesson Unit 3

3.4 Lesson Unit 4

3.5 Assessment Quiz

3.6 Reflection Questions


3.7 Instructional Activity

4. Countermeasures and Enforcement

Instructor Notes

Instructor Reviews

*Millions of people rely on fishing for their livelihood and over a billion depend heavily on fishing as their main source of protein. How could the threat posed by overfishing impact the people and fishing communities who depend on fisheries for their income, nutrition, and ways of life?*



Ocean Alert: Overfishing

Copy link

Living Oceans Foundation

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Each Lesson Unit opens with a hook to capture the student's attention.

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## Overfishing and Fisheries Management

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  - 3.7 Instructional Activity
- 4. Countermeasures and Enforcement

Instructor Notes

Instructor Reviews

*"Communities around the world depend on the fishing industry for food and income. And for many people fishing is a way of life and a necessity, not a luxury. With increasing population levels and challenges such as climate change, sustainable fishing is vital to safeguard food security and the livelihoods of millions of people around the world." — Marine Stewardship Council*

Review the **economic** as well as the **social** impacts of overfishing. Why do you think social impacts tend to follow economic impacts, especially in developing nations?

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Since attention significantly decreases after ten minutes, the lesson units are given in smaller, more manageable pieces to improve retention.

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*According to the Food and Agriculture Organization of the United Nations (FAO), one-third of the major commercial species are currently being fished at biologically unsustainable levels. With so many fisheries currently under strain from overfishing, aquaculture has become increasingly more important as an alternative source to help feed the world's growing population.*

So what is state of the world fisheries and aquaculture? Review this recent [summary](#) by the Food and Agriculture Organization of the United Nations to better understand the current conditions and implications for the future.

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A variety of media content (videos, articles, papers and websites) is used to make lesson units more interesting and engaging.

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### Overfishing and Fisheries Management

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Instructor Notes

Instructor Reviews


Many of the most productive tuna fisheries in the world reside within the vast exclusive economic zones of the small island nations of the Pacific. How can these developing countries be expected to effectively manage their fisheries when they cannot afford the necessary resources for proper management on their own?

Saving Our Fisheries, Protecting O... Watch later Share

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The Assessment Quiz is comprised of five essential questions as indicators of understanding as defined by the Six Facets of Understanding in the Understanding by Design approach.

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## Sustainability and Environmental Studies

### Open Educational Resources Learning Center

### Overfishing and Fisheries Management

Assess your knowledge and understanding about the economic and social effects of overfishing by taking this short quiz.

**#1 Which statement about fish stocks in a no-take reserve compared to those in an adjacent fishery is not correct?**

- ☒ Smaller fish have a better chance to grow to maturity in the no-take reserve.
- ☒ Fish can spill out of the reserve and be legally caught in the adjacent fishery.
- ☒ Fish can spill out of the reserve and thereby ensure increased populations in adjacent fishery.
- ☐ Adult fish can reproduce in greater numbers in the no-take reserve.

**#2 The loss of livelihoods for fishermen can be best described as**

- ☒ an environmental impact.
- ☒ an economic impact.
- ☒ a social impact.
- ☒ a cultural impact.

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Introduction

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Reflection questions can be given as individual or group assignments to assess understanding or can be discussed in class.

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**Overfishing and Fisheries Management**

**Introduction**

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Instructor Notes  
Instructor Reviews

**Reflection Question 1:** Why do you think overfishing poses such a significant threat to the economic and social welfare of developing nations which rely heavily on fishing?

**Reflection Question 2:** What are the global trends in aquaculture and capture fisheries production and how are they impacting total fish production?

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Students complete the instructional activities which are meant to reinforce the enduring understandings of the lesson.

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Part 1: Discuss the steps individuals can take to help prevent overfishing and explain why these steps would be beneficial to fisheries if enough people participated.

Part 2: Discuss how and why the nations of the Pacific Islands collaborate in managing their fisheries. Elaborate on the role played by the United Nations Development Program (UNDP).

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Instructors can supplement the lesson with their own curated content by posting to the Instructor Notes section.

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# Sustainability and Environmental Studies

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Instructor Notes

Instructor Reviews

1. Long-term Effects of Overfishing – In the documentary film *An Ocean Mystery: The Missing Catch*, marine biologist Dr. Daniel Pauly, argues that the number of fish caught worldwide is drastically underestimated and that without significant change we face disaster. Watch an excerpt from this film to appreciate how this looming environmental catastrophe could permanently alter communities and ways of life worldwide.

 The Ocean Is Running Out of Fish...  Watch later  Share



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Finally, instructors can refine the lesson and understandings by posting to the Instructor Reviews section.

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# Sustainability and Environmental Studies

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### Overfishing and Fisheries Management

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*2. Ecosystem Impacts of Overfishing* – The oceans are under assault by both overfishing and climate change. However, these two issues do not need to be addressed mutually exclusively. Climate change is already causing shifts in the distributions of some fish stocks. Fisheries Management can help alleviate the pressure on stocks from overfishing, making them more resilient to the stressors of climate change.

*4. Countermeasures and Enforcement* – While aquaculture can help alleviate the effects of overfishing, it must be done sustainably or risk contributing to the reduction of wild fish stocks worldwide. Many large, carnivorous farmed fish like salmon and tuna can actually consume more fish biomass from wild stocks than they produce. Poorly managed aquaculture can also result in habitat degradation and loss, applying further pressure on wild fish populations.

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# Concluding Remarks

## Summary and Conclusions

Existing eLearning resources are generally limited and not very effective.

Demand for online educational resources will continue to grow rapidly.


Instructional content in eLearning resources needs to complement instructor teachings.

Instructional content in eLearning resources needs to be tailored to the course requirements.

eLearning resources need to deploy methods to capture and maintain student attention.

eLearning resources need to deploy methods to promote enduring understandings.

Your suggestions will be greatly appreciated at <http://johnr1.sgedu.site/wp/survey/>.

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## Sustainability and Environmental Studies

Open Educational Resources Learning Center

### Please Submit Your Responses

[Final Presentation](#)

Your Name (Optional)

How interesting and engaging did you find the instructional content?

☒ Low  
☐ Fair  
☐ Good  
☐ Very Good

How would you rate the ability of the System to supplement instructor teachings?

☒ Low  
☐ Fair  
☐ Good  
☐ Very Good

How would you rate the capabilities of System as an eLearning application?

☒ Low  
☐ Fair  
☐ Good  
☐ Very Good

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