Thunder Bay National Marine Sanctuary

Lesson Specifications

Grade Level

6–8

Timeframe

Two, 45-minute sessions

Materials

Teacher Use: Computer, projector, and screen
Student computer access (1:1 or 1:2)
Student science journals or notebooks
Whiteboard and markers (1 per student)
Digital Materials (links provided):

- Explore the Blue: 360 Shipwreck Alley video
- Map of Thunder Bay National Marine Sanctuary
- Map of Thunder Bay National Marine Sanctuary Shipwrecks
- Lake Huron Food Web
- Zebra Mussels & Diporeia

Print Materials:

- Student Background Information & Discussion Questions
- Infographic Planning Sheet
- Infographic examples
- Activity Rubric

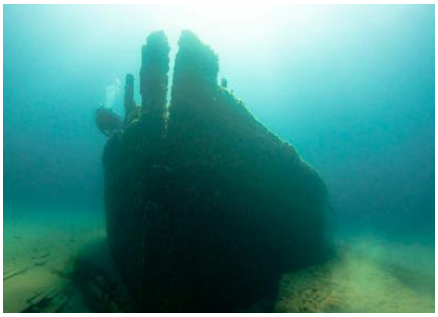

Photo: David J. Ruck/NOAA

Photo: NOAA

Activity Summary

In pairs, students will research the historical, ecological, and economic importance of Thunder Bay National Marine Sanctuary by focusing on the wreck of *D.M. Wilson*, a wooden coal freighter that sank in 1894.

Students will then create a digital infographic that communicates the importance of preserving the wreck.

Learning Objectives

Students will be able to:

- Explain and discuss the importance of the Great Lakes watershed
- Explain and discuss the historical significance of freshwater shipwrecks
- Explain and discuss the ecological impacts of freshwater shipwrecks
- Explain and discuss the economic value of freshwater shipwrecks
- Synthesize their knowledge in order to create a persuasive infographic that illustrates the historic, ecological, and economic importance of freshwater wrecks

Background Information

The Great Lakes

Photo: SeaWiFS Project, NASA/Goddard Space Flight Center and ORBIMAGE

The Great Lakes system includes lakes Superior, Michigan, Huron, Erie, and Ontario as well as a number of rivers and tributaries that connect the lakes to each other and, via the St. Lawrence Seaway, to the Atlantic Ocean. Together, they hold about 90% of the surface freshwater in the United States and approximately 20% of the world's surface freshwater supply. Forty million residents of the United States and Canada depend on this system for clean drinking water. Additionally, the Great Lakes watershed region supports 7% of the agricultural production of the United States and 25% of Canadian agriculture.

What is a watershed?

A watershed is the land area that channels rainfall and snowmelt to creeks, streams, and rivers, and eventually to outflow points such as reservoirs, bays, estuaries, and the ocean. A watershed can be small, consisting of a single pond. Others can encompass thousands of square miles across multiple states and may contain several streams, rivers, ponds, lakes, reservoirs, and underlying groundwater that are hundreds of miles from the ocean. Watersheds supply our drinking water, water for agriculture and manufacturing, offer opportunities for recreation such as fishing, and provide habitat to plants and animals. The Great Lakes contain about 23,000 km^3 of water, covering a total area of 244,000 km^2. The health of our freshwater supply depends directly on what enters local watersheds. Minimizing pollution and sedimentation is not only good for the local ecosystem, but for our consumption as well.

Spanning more than 1,200 kilometers (750 miles) from west to east, the Great Lakes provide water for drinking, transportation, power, recreation, and many other uses. Commercial and sport fishing, agriculture, recreation, tourism, manufacturing, and shipping are all important to the region. These activities create jobs and provide goods and services. In fact, if the Great Lakes region were its own country, it would have the third largest economy in the world with a gross domestic product of $6 trillion. Much of it is due to the trade between Canada and the U.S. for goods and services.

More than 3,500 species of plants and animals inhabit the Great Lakes ecosystem, including more than 170 species of fish. Many fishes such as northern pike, yellow perch, and bowfin spawn in coastal wetlands; others, such as walleye, rely on coastal wetlands to provide nursery habitats. More than 300 varieties of birds from water fowl such as ducks, herons, and loons, to birds of prey, including the bald eagle, inhabit the coastal regions surrounding the Great Lakes.

Lake Huron is the second-largest great lake, after Lake Superior, with a surface area slightly smaller than the state of West Virginia, which makes it the fifth-largest freshwater lake in the world. Lake Huron has the longest shoreline of all the Great Lakes due in part to the more than 30,000 islands found throughout.

Thunder Bay National Marine Sanctuary

Located in northwestern Lake Huron, Thunder Bay is adjacent to one of the most treacherous stretches of water within the Great Lakes system. Unpredictable weather, murky fog banks, sudden gales, and rocky shoals earned the area the name "Shipwreck Alley."

Established in 2000, the 4300-square-mile Thunder Bay National Marine Sanctuary protects one of America's best-preserved and nationally-significant collections of historic shipwrecks. Fire, ice, collisions, and storms have claimed over 200 vessels in and around Thunder Bay. To date, nearly 100 shipwrecks have been discovered within the sanctuary. Although the sheer number of shipwrecks is impressive, it is the range of vessel types located in the sanctuary that makes the collection nationally significant. From an 1844 sidewheel steamer to a modern 500-foot-long German freighter, the shipwrecks of Thunder Bay represent a microcosm of maritime commerce and travel on the Great Lakes.

D.M. Wilson Wreck

Built in 1873, *D.M. Wilson* was a 179 foot freighter headed for Milwaukee, Wisconsin with a load of coal when it sprang a leak and began sinking on October 27, 1894. The steamers *Hudson* and *Samuel Mitchell* took it in tow, but it foundered in 40 feet of water two miles north of Thunder Bay Island. The crew was rescued by a fourth ship. *Wilson* was broken up by a storm 10 days later, and debris was driven as far south as Tawas, more than 80 miles away. Much of the machinery was later salvaged. Most of *Wilson*'s hull remains intact today, including a large windlass that rests on the bow.

The cold, freshwater of the Great Lakes preserves the integrity of ships sunk hundreds of years ago, making it possible to observe fine details of the ship's structure and cargo, and in some cases, even the personal items brought on board by the crew.

Vocabulary	
Abiotic factors	The non-living factors in an ecosystem.
Biotic factors	The living factors in an ecosystem.
Ecosystem	A system of interactions between a community of organisms and their environment.
Food web	A picture that describes who eats whom in an ecological community.
Invasive species	An organism that causes ecological or economic harm in a new environment where it is not native.
Substrate	The surface or material on, or from which, an organism lives, grows, or obtains its nourishment.
Watershed	A land area that collects all rainfall and snowmelt and channels it into a specific outflow point.

Preparation

1. Download or open links to all digital materials.
2. Prepare teacher and student devices (e.g., laptop, computer/projector, handhelds, VR sets).
3. Preview digital and print materials.
4. Copy Student Background Information & Discussion Questions (one per student) and Infographic Planning Sheet (one per pair).

Photo: David J. Ruck/NOAA

Procedure

Part 1 – Introduction to Shipwreck Alley

Time: 20 minutes

1. Project *Explore the Blue: 360 Shipwreck Alley* video on screen. Demonstrate how to "look around": up, down, left, and right. Explain that shipwreck alley is part of Thunder Bay National Marine Sanctuary. "Shipwreck Alley" is the final resting place of almost 100 historically significant shipwrecks. In October 2000, Thunder Bay National Marine Sanctuary was established. The sanctuary is 4,300 square miles. Display a map of the sanctuary and significant shipwrecks.
2. Give students time to watch and explore *Explore the Blue: 360º Shipwreck Alley* video. Encourage them to pause the video and "look around." Have students record observations of the appearance of the shipwreck and any living things on or around it.
3. Have students find a partner and share their observations.
4. Introduce the difference between biotic and abiotic factors. Direct students to identify two to three biotic and abiotic factors observed in the 360º video. They may need to rewatch the video. Have students pair up and share their answers. Ask for a few volunteers to report out to the whole class.

Photo: David J. Ruck/NOAA

Emphasize the following important abiotic factors in freshwater ecosystems: temperature, current, dissolved gases and nutrients, and sunlight.

5. Explain that organisms depend on abiotic factors in their environments. For example, shipwrecks provide a substrate for invasive zebra mussels to grow. Zebra mussels consume vast quantities of phytoplankton and outcompete the native zooplankton, Diporeia. Native fish directly depend on Diporeia as a food source. Display pictures of zebra mussels and Diporeia (links provided). A Lake Huron Food Web link is also provided.
6. Ask students to infer a relationship between a biotic and an abiotic factor in Lake Huron. Have students pair up and share their answers. Ask for a few volunteers to report to the whole class.

Part 2 – Conservation Decisions in Action: Should the D.M. Wilson *Wreck be Conserved*

Time:

Research & Discussion – 25 minutes
Planning & Making Infographic – 45 minutes

Photo: David J. Ruck/NOAA

1. Distribute Student Background Information. Help students understand that they are assuming the role of an environmental consultant working for Thunder Bay National Marine Sanctuary (TBNMS). TBNMS has been approached by a private company that wants to run underwater fiber optic internet cable through Thunder Bay. The proposed route would require the removal of the *D.M. Wilson* wreck. The students' job is to research the historical, ecological, and economic significance of the wreck. Their research should also include the overall importance of TBNMS to conservation of freshwater cultural resources in the Great Lakes watershed that might be compromised by the proposed project.
2. Each student should review the Discussion Questions prior to reading the Student Background Information. After reading, each individual student should prepare to respond to the discussion questions using bullet pointed phrases. Once both partners have prepared their discussion points, pairs should discuss and revise their points. After pairs conclude their discussions, ask for a few volunteers to report to the whole class.
3. Distribute Infographic Planning Sheet. Show examples of infographics. Help students understand that their infographic needs to represent important information with images, data, and small amounts of text. They should focus on one main persuasive point per topic. Give students time to plan out their infographic.
4. Have students create their infographic using Google Docs or a free infographic generator. Once completed, have students submit their work electronically or print out infographics to display in the classroom.

If time permits, have students participate in a variation of a "gallery walk," to share work. Divide pairs in half and have one student stay with their computer to present their work. Give a time limit and

require students to view and discuss a required number of infographics in that time. Monitor and direct as needed so that each infographic presenter is visited. Then, switch roles and repeat. Once all students have participated, as a class, ask a few volunteers to share what they learned.

Education Standards	
Next Generation Science Standards	**Supports NGSS Performance Expectation** MS- ESS3-4: Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems. **Science and Engineering Practices:** • Engaging in Argument from Evidence • Analyzing and Interpreting Data **Crosscutting Concepts:** • Cause and Effect • Patterns • Energy and Matter **Disciplinary Core Ideas:** • ESS3.C: Human Impacts on Earth Systems • LS2.A: Interdependent Relationships in Ecosystems • LS2.C: Ecosystem Dynamics, Functioning, and Resilience

Common Core State Standards	**Language Arts:**
	• Integration of Knowledge and Ideas:
	  ○ CCSS.ELA-Literacy.RST.6-8.7
	  ○ CCSS.ELA-Literacy.RST.6-8.9
	  ○ CCSS.ELA-Literacy.RI.6.7
	• Production and Distribution of Writing:
	  ○ CCSS.ELA-Literacy.WHST.6-8.4
	  ○ CCSS.ELA-Literacy.WHST.6-8.6
	• Text Types and Purposes:
	  ○ CCSS.ELA-Literacy.WHST.6-8.1
	  ○ CCSS.ELA-Literacy.WHSY.6-8.2
	  ○ CCSS. ELA-Literacy.W.6-8.1
	  ○ CCSS.ELA-Literacy.W.6-8.2

Ocean Literacy Principles	1. The Great Lakes, bodies of fresh water with many features, are connected to each other and to the world ocean. 5. The Great Lakes support a broad diversity of life and ecosystems. 6. The Great Lakes and humans in their watersheds are inextricably interconnected. 8.The Great Lakes are socially, economically, and environmentally significant to the region, the nation and the planet.

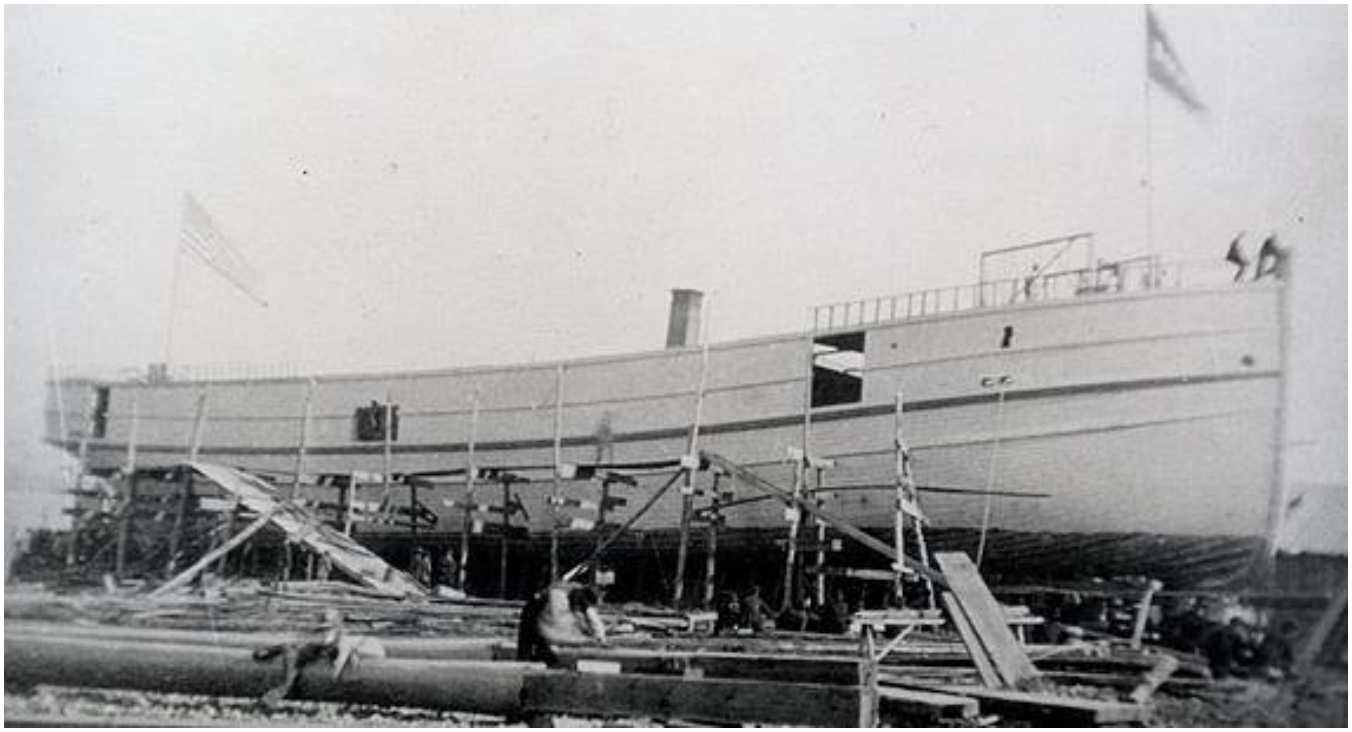

Photo: NOAA

Links to Lesson Content

- Exploring the Blue: 360° Shipwreck Alley: https://sanctuaries.noaa.gov/vr/thunder-bay/shipwreck-alley/
- Map of Thunder Bay National Marine Sanctuary: https://nmssanctuaries.blob.core.windows.net/sanctuaries-prod/media/archive/science/sentinel-site-program/thunder-bay/TBNMS-SS.jpg
- Map of Thunder Bay National Marine Sanctuary Shipwrecks: https://thunderbay.noaa.gov/google/embeddedmap.html
- Lake Huron Food Web: https://www.glerl.noaa.gov/pubs/brochures/foodweb/LHfoodweb.pdf
- Zebra Mussels: https://www.flickr.com/photos/noaa_glerl/4076024710
- Diporeia: https://www.flickr.com/photos/noaa_glerl/4077328491

Additional Information

- What is a Watershed?: https://oceanservice.noaa.gov/facts/watershed.html
- Zebra Mussels in Lake Huron: https://www.lakehuron.ca/zebramussels
- Invasive Species: https://oceanservice.noaa.gov/facts/invasive.html
- Thunder Bay National Marine Sanctuary: https://thunderbay.noaa.gov/
- The Great Lakes Economy: https://www.visualcapitalist.com/great-lakes-economy/
- Marine Heritagehttps://sanctuaries.noaa.gov/maritime/
- Project Shiphunt: https://thunderbay.noaa.gov/shiphunt.html
- Thunder Bay National Marine Sanctuaries Infographics: https://sanctuaries.noaa.gov/science/conservation/2020-tbnms-analysis-of-visitors-and-residents.html

- Shipwreck Tour: https://www.youtube.com/watch?v=CHLV8QYHeJI
- Shipwrecks as Habitats: https://sanctuaries.noaa.gov/earthisblue/wk208-shipwrecks-habitat-feature.html
- Threats to the Great Lakes Watershed:
    - https://www.regions.noaa.gov/great-lakes/index.php/regional-snapshots/
    - https://www.epa.gov/greatlakes

Alternative/Extension Ideas

- Students complete the infographic in their journal/notebook.
- Students draft their infographic in Google Docs.
- Students use a free resource to create their infographic.
- In small groups, or individually, students create a fictional story (or movie) based on *D.M. Wilson*, told from the perspective of the ship itself, a crew member, or the captain.
- In small groups, pairs, or individually, students write a newspaper or magazine-style article about the *D.M. Wilson* wreck or the role of Thunder Bay National Marine Sanctuary from the perspective of economic, ecological, or historical importance.

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If you have any further questions or need additional information, email sanctuary.education@noaa.gov.

Funding provided by the National Marine Sanctuary Foundation.

Student Background Information & Discussion Questions

Directions

- Preview the discussion questions below before reading the Student Background Information.
- As you read, prepare to discuss these questions with your partner and the whole class by recording bullet pointed phrases that address each question. Be as specific and detailed as possible.
- If you finish before your partner is ready to discuss, make a list of two to three questions you have about the Great Lakes watershed, or the historical, ecological, and economic importance of wrecks like *D.M. Wilson*.

Discussion Questions

1. How does Thunder Bay National Marine Sanctuary (TBNMS) contribute to the conservation of freshwater cultural resources in the Great Lakes watershed?
2. What is the historical significance of wrecks like *D.M. Wilson*?
3. How do wrecks like *D.M. Wilson* also contribute to the Lake Huron ecosystem?
4. What is the economic value of wrecks like *D.M. Wilson*?

The Great Lakes

The Great Lakes system includes lakes Superior, Michigan, Huron, Erie, and Ontario as well as a number of rivers and tributaries that connect the lakes to each other and, via the St. Lawrence Seaway, to the Atlantic Ocean. Together, they hold about 90% of the surface freshwater in the United States and approximately 20% of the world's surface freshwater supply. Forty million residents of the United States and Canada depend on this system for clean drinking water. Additionally, the Great Lakes watershed region supports 7% of the agricultural production of the United States and 25% of Canadian agriculture.

The Great Lakes. Photo: SeaWiFS Project, NASA/Goddard Space Flight Center and ORBIMAGE

What is a watershed?

A watershed is the land area that channels rainfall and snowmelt to creeks, streams, and rivers, and eventually to outflow points such as reservoirs, bays, estuaries, and the ocean. A watershed can be small, consisting of a single pond. Others can encompass thousands of square miles across multiple states and may contain several streams, rivers, ponds, lakes, reservoirs, and underlying groundwater that are hundreds of miles from the ocean. Watersheds supply our drinking water, water for agriculture and manufacturing, offer opportunities for recreation such as fishing, and provide habitat to plants and

animals. The Great Lakes contain about 23,000 km^3 of water, covering a total area of 244,000 km^2. That's more than six quadrillion (even bigger than a trillion) gallons of water making the region one of the larger watersheds in the United States. To put it another way, an Olympic-size swimming pool contains 660,253.09 gallons of water; water from the Great Lakes could easily fill 9 billion Olympic-size pools with a bit left over! The health of our freshwater supply depends directly on what enters local watersheds. Minimizing pollution and sedimentation is not only good for the local ecosystem, but for our consumption as well!

Spanning more than 1,200 kilometers (750 miles) from west to east, the Great Lakes provide water for drinking, transportation, power, recreation, and many other uses. Commercial and sport fishing, agriculture, recreation, tourism, manufacturing, and shipping are all important to the region. These activities create jobs and provide goods and services. In fact, if the Great Lakes region were its own country, it would have the third largest economy in the world with a gross domestic product of $6 trillion. Much of it is due to the trade between Canada and the U.S. for goods and services.

The commercial fishing industry within the Great Lakes extracts millions of pounds of fish per year and is valued at more than $7 billion annually, supporting more than 75,000 jobs. Farmers within the Great Lakes watershed produce corn, soybeans, hay, milk, and other food products accounting for more than $15 billion earned annually. The area is also known for its industry that produces steel, chemicals, and other products. The shipping opportunities in the Great Lakes played a critical role in settlement of the region, historically, and development of industry. Today more than 200 million tons of cargo pass through its waters each year.

More than 3,500 species of plants and animals inhabit the Great Lakes ecosystem, including more than 170 species of fish. Many fishes such as northern pike, yellow perch, and bowfin spawn in coastal wetlands; others, such as walleye, rely on coastal wetlands to provide nursery habitats. More than 300 varieties of birds from water fowl such as ducks, herons, and loons, to birds of prey, including the bald eagle, inhabit the coastal regions surrounding the Great Lakes. Recreational sport-fishing, hunting, bird-watching, and photography account for more than $50 billion dollars annually in economic activity within the Great Lakes region.

Yellow perch. Photo: USDA

Lake Huron is the second-largest great lake, after Lake Superior, with a surface area slightly smaller than the state of West Virginia, which makes it the fifth-largest freshwater lake in the world. The French, the first European colonists to the region, referred to the lake as *Keregnondi*, a Wayandot word which they translated to "Freshwater Sea" or "Lake of the Hurons" (the Wayandot people were also called the Huron people). Lake Huron has the longest shoreline of all the Great Lakes due in part to the more than 30,000 islands found throughout.

Thunder Bay National Marine Sanctuary

Thunder Bay Lighthouse. Photo: Brian Taggart/NOAA

Located in northwestern Lake Huron, Thunder Bay is adjacent to one of the most treacherous stretches of water within the Great Lakes system. Unpredictable weather, murky fog banks, sudden gales, and rocky shoals earned the area the name "Shipwreck Alley." Established in 2000, the 4300-square-mile Thunder Bay National Marine Sanctuary protects one of America's best-preserved and nationally-significant collections of shipwrecks. Fire, ice, collisions, and storms have claimed over 200 vessels in and around Thunder Bay. To date, nearly 100 shipwrecks have been discovered within the sanctuary. Although the sheer number of shipwrecks is impressive, it is the range of vessel types located in the sanctuary that makes the collection nationally significant. From an 1844 sidewheel steamer to a modern 500-foot-long German freighter, the shipwrecks of Thunder Bay represent a microcosm of maritime commerce and travel on the Great Lakes.

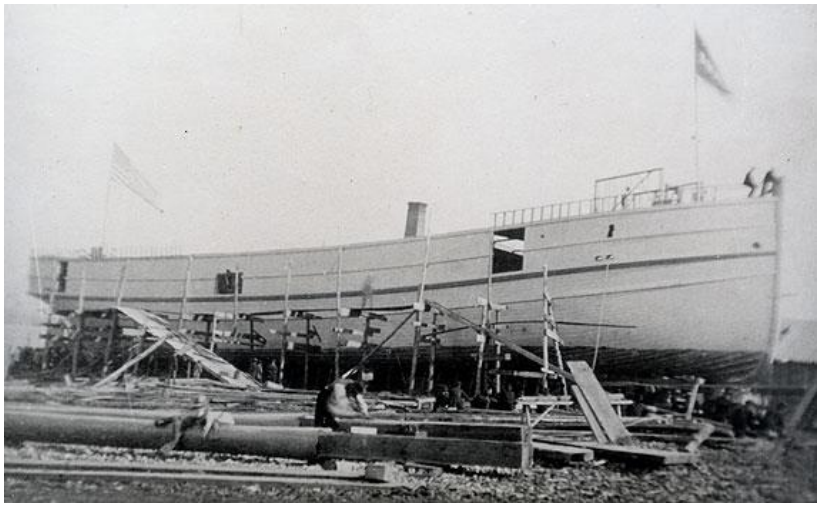
Northeastern Michigan's maritime landscape includes the hundreds of shipwrecks located on Lake Huron bottomlands. It also encompasses all of the cultural and natural features related to maritime heritage. Lifesaving stations, lighthouses, historic boats and ships, commercial fishing camps, docks, and working ports are among the more obvious historic and archaeological features. Many features are less visible and some remain unrecognized or unknown. Humans have used the waters of Thunder Bay and its shores for thousands of years. Geological and archaeological evidence suggests a high probability of prehistoric archaeological sites awaiting discovery.

D.M. Wilson. Photo: NOAA

The Thunder Bay National Marine Sanctuary regulations protect these maritime heritage resources. To enforce these regulations, the sanctuary partners with local, state, and federal authorities. It also relies on observations from recreational divers and other members of the community. The sanctuary strongly encourages recreational divers, snorkelers, and paddlers to responsibly visit sanctuary shipwrecks. To facilitate recreational access, the sanctuary invests in mooring buoys. A mooring buoy is a type of floatation device secured to the bottom of the lake (or ocean) where boats can safely tie up instead of anchoring. Mooring buoys help boaters not damage the lake or seabed. They are designed to improve safety and access to resources, while reducing visitor impacts.

Thunder Bay National Marine Sanctuary conducts scientific research and monitoring of its maritime heritage resources to ensure their long-term protection. Archaeological and historical research conducted by the sanctuary and its partners is fundamental to better understanding the region's historic shipwrecks.

D.M. Wilson Wreck



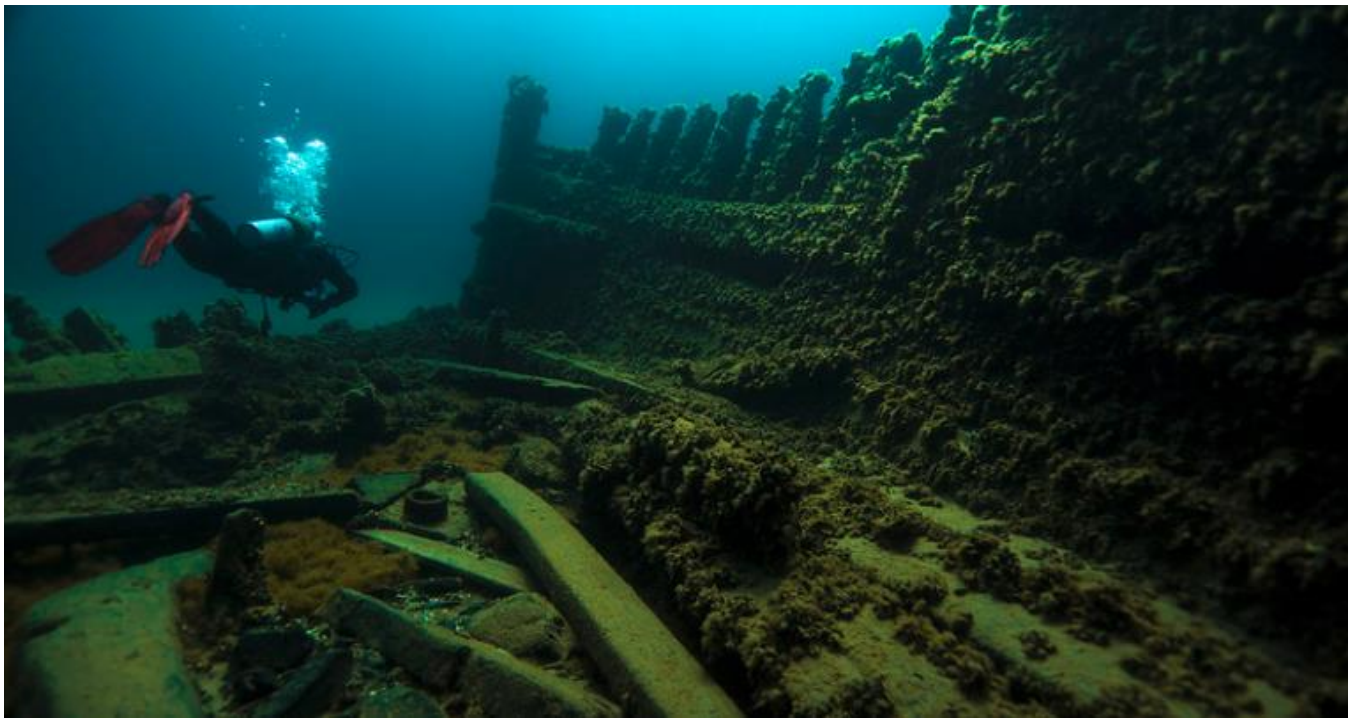
D.M. Wilson. Photo: NOAA

Built in 1873, *D.M. Wilson* was a 179-foot freighter steaming in Lake Huron and headed for Milwaukee, Wisconsin with its cargo load of coal when it sprang a leak and began sinking on October 27, 1894. The steamships *Hudson* and *Samuel Mitchell* that were nearby tried to help by taking it in tow, but it filled with so much water that it began to sink in about 40 feet of water two miles north of Thunder Bay Island. The crew was rescued by another ship as they abandoned *Wilson* to Lake Huron. *Wilson* was broken up by a storm 10 days later, and debris from the ship was driven as far south as Tawas, more than 80 miles away. Much of the machinery was later salvaged. Most of the *Wilson's* hull remains intact today, including a large windlass (a type of winch used on ships to lift anchors) that rests on the bow (front of the ship).

The cold, freshwater of the Great Lakes preserves the integrity of ships sunk hundreds of years ago, making it possible to observe fine details of the ship's structure and cargo, and in some cases, even the personal items brought on board by the crew. Unlike their marine (saltwater) counterparts, freshwater shipwrecks will not be deteriorated by marine worms burrowing through their wooden hulls. Also, salt water is highly corrosive to metal, which means iron and steel ships maintain their integrity much longer in freshwater. The quality of the shipwrecks found throughout Thunder Bay make it a top destination for many wreck divers interested in exploring the history of each ship.

Much like ocean artificial reefs, freshwater wrecks are homes for various fish species. However, invasive mussels have now infiltrated most of the Great Lakes, growing on hard surfaces, including shipwrecks. These invasive mollusks are filter feeders, feeding on large volumes of plankton. Their voracious feeding habits have increased the visibility underwater. This increased visibility may have benefitted scuba divers, but it has also altered the native food web, causing algae growth directly on the shipwrecks. As sunlight is now able to penetrate deeper, algae can often be found growing seasonally on the surface of many wrecks, blurring their once clear structure.

Diving *D.M. Wilson.* Photo: David J. Ruck/NOAA



Diving *Van Valkenburg*. Photo: David J. Ruck/NOAA

Additional Information

- The Great Lakes Economy: https://www.visualcapitalist.com/great-lakes-economy/
- Shipwreck Tour: https://www.youtube.com/watch?v=CHLV8QYHeJI
- Shipwrecks as Habitats: https://sanctuaries.noaa.gov/earthisblue/wk208-shipwrecks-habitat-feature.html
- Marine Heritage: https://sanctuaries.noaa.gov/maritime/
- Threats to the Great Lakes Watershed: https://www.epa.gov/greatlakes
- https://www.regions.noaa.gov/great-lakes/index.php/regional-snapshots/
- TEDEd "What's So Great About The Great Lakes?": https://www.youtube.com/watch?v=gBRcOLcEwF0

Infographic Planning Sheet

Part 1 – Four Simple Steps for Making Infographics

Please read the four steps below.

Step 1 – Outline the goal of your infographic.

In this assignment, the goal is to communicate the importance of the *D.M. Wilson* wreck in terms of its historical, economic, and ecological value. Your infographic should also include the overall importance of Thunder Bay National Marine Sanctuary to conserving the freshwater cultural resources in the Great Lakes watershed.

Step 2 – Collect Data for Your Infographic

Supplement the information you learned in the Student Background Information with research from Thunder Bay National Marine Sanctuary website: https://thunderbay.noaa.gov/

Step 3 – Visualize Your Information

Determine a way to represent your information visually. Use pictures, graphs, and/or charts. Include important data that represents the value of the wreck and few supporting ideas to include as text.

Organize your infographic with descriptive headers for each topic you wish to inform the reader. Your headers should be similar to the following: Importance of Thunder Bay National Marine Sanctuary to Conservation; Historical Importance of Wrecks; Ecological Importance of Wrecks; and Economic Importance of Wrecks.

Step 4 – Make Your Infographic

Use Google Docs to make a simple informational infographic or use an online template from a free website.

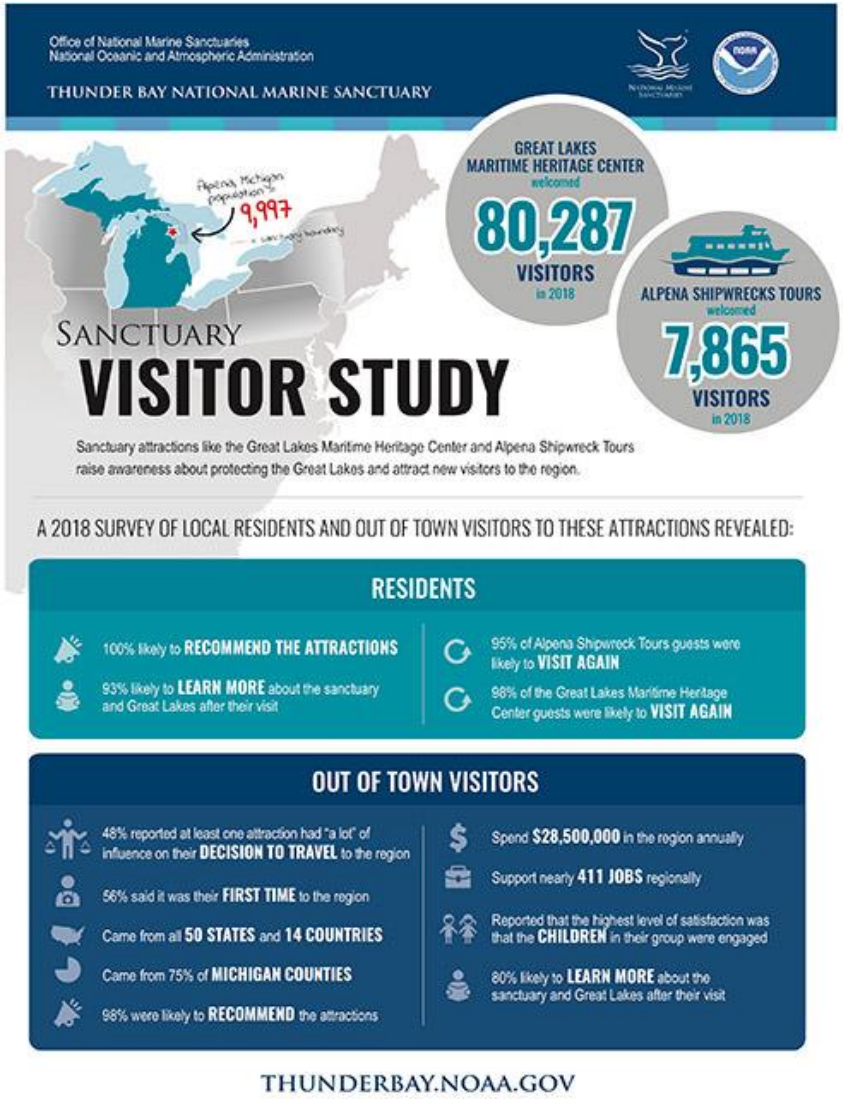
Part 2 – Infographic Draft

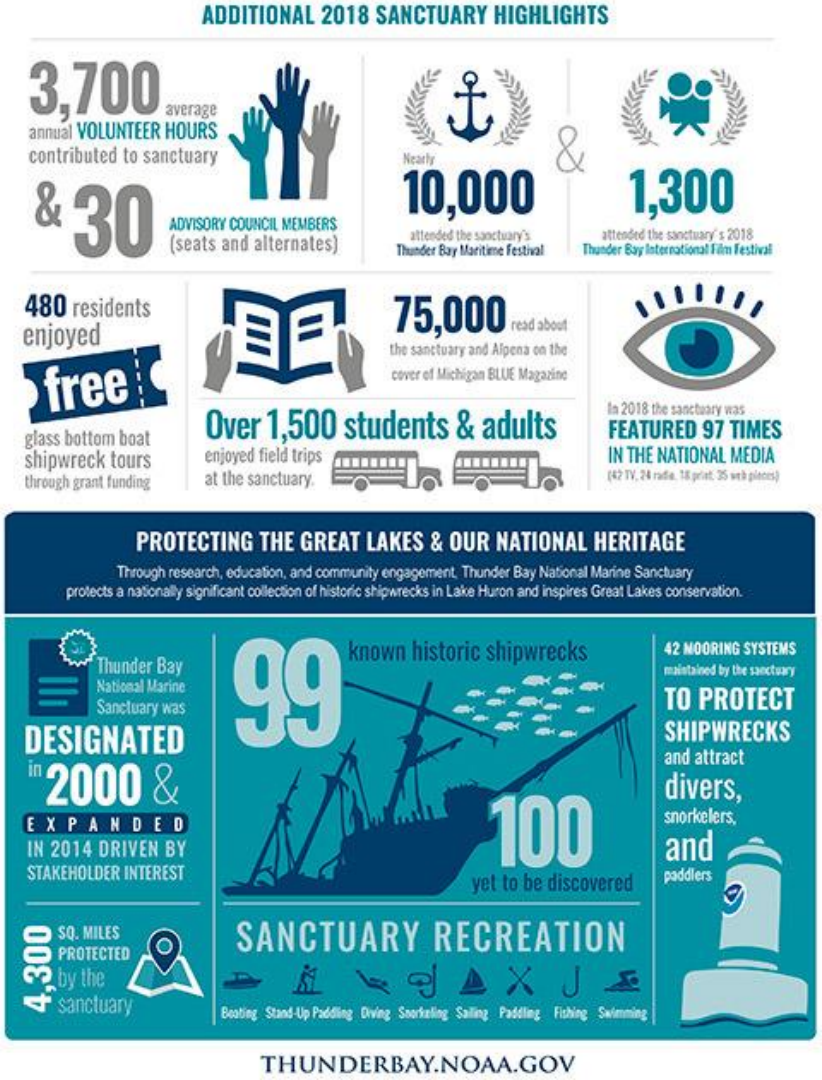
Complete the infographic planner provided. Each section should include a title or header, an idea for at least one visual, supporting data, and a small amount of text.

Note, this is only to help outline your thoughts, it is not the final product.

Infographic Title:
Topic 1:
Topic 2:
Topic 3:
Topic 4:

Infographic Examples





Activity Rubric

Activity Component	4 – Student exceeds assignment expectations	3 – Student meets assignment expectations	2 – Student approaches assignment expectations	1 – Student's work is below assignment expectations
Background Reading & Discussion Questions	Reading was completed thoughtfully. Student's bullet points were detailed and specific. Student's discussion was detailed and specific. Student included additional questions and/or contributed to the whole group discussion.	Reading was completed thoughtfully. Student's bullet points were detailed and specific. Student's discussion was detailed and specific.	Reading was completed. Student's bullet points need some details. Student's discussion needs some details.	Reading was completed hastily. Student's bullet points need many details. Student's discussion needs many details.
Infographic Planning Sheet	Planning sheet includes extra information, pictures, and details.	Planning sheet completed according to directions.	Planning sheet is missing a few required elements.	Planning sheet is missing many required elements.
Infographic: TBNMS & Conservation	Importance of TBNMS to freshwater cultural resource conservation is communicated using all required elements. Extra elements are added.	Importance of TBNMS to freshwater cultural resource conservation is communicated using all required elements.	Importance of TBNMS to freshwater cultural resource conservation is communicated using most required elements.	Importance of TBNMS to freshwater cultural resource conservation is communicated using few required elements.
Infographic: Historical Importance of *D.M. Wilson* Wreck	Historical importance is communicated using all required elements. Extra elements are added.	Historical importance is communicated using all required elements.	Historical importance is communicated using most required elements.	Historical importance is communicated using few required elements.
Infographic: Ecological Importance of *D.M. Wilson* Wreck	Ecological importance is communicated using all required elements. Extra elements are added.	Ecological importance is communicated using all required elements.	Ecological importance is communicated using most required elements.	Ecological importance is communicated using few required elements.
Infographic: Economic Importance of *D.M. Wilson* Wreck	Economic importance is communicated using all required elements. Extra elements are added.	Economic importance is communicated using all required elements.	Economic importance is communicated using most required elements.	Economic importance is communicated using few required elements.