# Piecing it Together: Photo Mosaic Activity

**Captain's Notes**

## Overview

*Students will piece together individual images of a shipwreck and create a photo mosaic like real maritime archaeologists.*

## Difficulty/Grade Level

*Easy-Moderate/Elementary*

## Suggested Group Size

*3-4 students per group*

## Time

*1 Hour*

## Objectives

*Students will learn how photo mosaics help archaeologists document and interpret shipwreck sites.*

## Skills and Strategies

- *Visual Identification*
- *Teamwork*
- *Problem Solving*

## Materials

- *2 Shipwreck Layout sheets (both bow and stern sections)*
- *Scissors*
- *Paper clips*
- *Labeled envelopes*
- *Vessel Histories (1 per student)*
- *Parts of a Ship diagram (1 per student)*
- *Site Plans vs. Photo Mosaics sheet (1 per student)*

## Preparation

1. *Make 2 copies of each of the ship layouts on 11"x 17" paper (the ships are cut into halves- bow and stern sections)*
2. *Cut out blocks on 1 sheet of each different ship layout- keep separate from one another*
3. *Scramble each ship's pieces and paper-clip these pieces together and put in separate envelopes labeled with the name and section of the ship.*
4. *Lay out the second copy of the ship layouts around the room. Make sure that the bow and stern sections of the same ship are not next to each other.*

## Helpful Hints

Use a different color paper for the Shipwreck Layout so the students will be able to see where they have already placed their blocks.

Remove all of the blocks that do not have any part of the shipwreck on them.

You will only need the vessel histories of the Pewabic, Nordmeer, and Windiate.

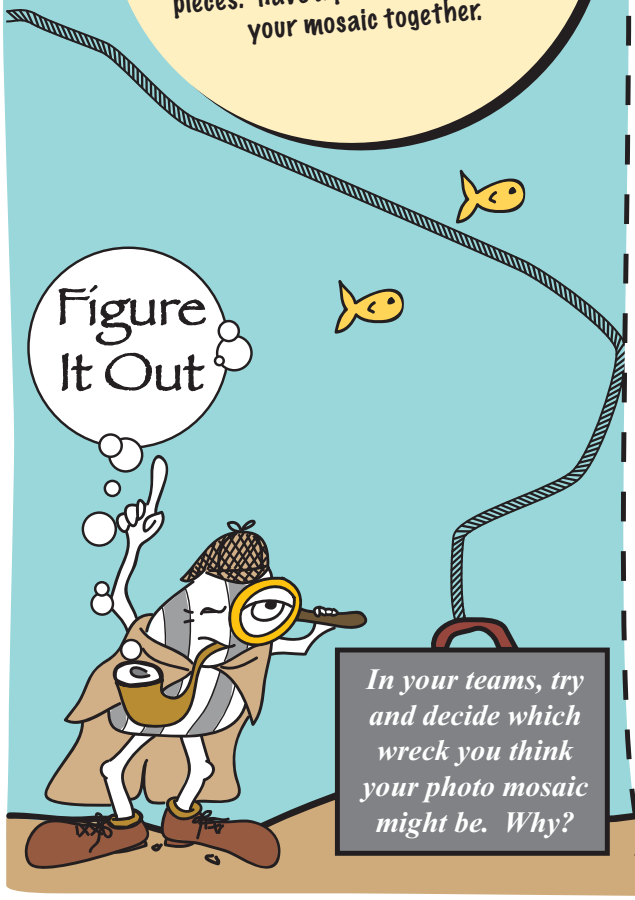
Share the story of the E.B Allen for comparison or to make the exercise more challenging.

## Procedures

1. *Read vessel histories to students before the activity begins.*
2. *Pass out Parts of a Ship Diagram and discuss the differences between types of vessels. Look for features like sails, propellers, smoke stacks, etc.*
3. *Discuss photo-mosaics and site plans (See Site Plans vs. Photo Mosaics)*
4. *Break the class into groups of 3-4 students.*
5. *Assign each team to a specific wreck but do not tell them which wreck it is. Teams will have to figure this out during the discussion.*
6. *Give each group 1 paper clipped bundle of blocks matching the section of the ship they have been assigned.*

## Shipwreck Challenge

Create your own mosaic by drawing a picture of a ship then cutting it into pieces. Have a partner try and put your mosaic together.




***In your teams, try and decide which wreck you think your photo mosaic might be. Why?***

## Discussion

- ***What type of ship did each team have and why do they think it is that type?***

  *The bulk freighter Nordmeer, because it does not have any masts, it doesn't have a life boat next to it, and it is not broken apart like the other ships. It also has many large hatches for lots of cargo.*
  *The steam propeller Pewabic, because it has two smoke stacks for the steam engine, no masts, no life boat, and it is made of wood. It also has a large hole in the deck where salvagers took out the copper cargo.*
  *The wooden schooner Windiate, because it has masts, the deck and hatch covers are still there, and the lifeboat is sitting next to the wreck.*

- ***How do archaeologists use photo mosaics to better understand shipwreck sites?***

  *Photo mosaics allow archaeologists to see a lot more detail than if they took just one picture. When archaeologists are diving, they can only see a little of the wreck at a time. By creating a photo mosaic, they can study the whole thing, but still see all the detail they did when they where up close. Archaeologists also use photo mosaics to document deep wrecks because divers have very limited time to measure and draw the sites.*

- ***What is the difference between a site plan and a photo mosaic?***

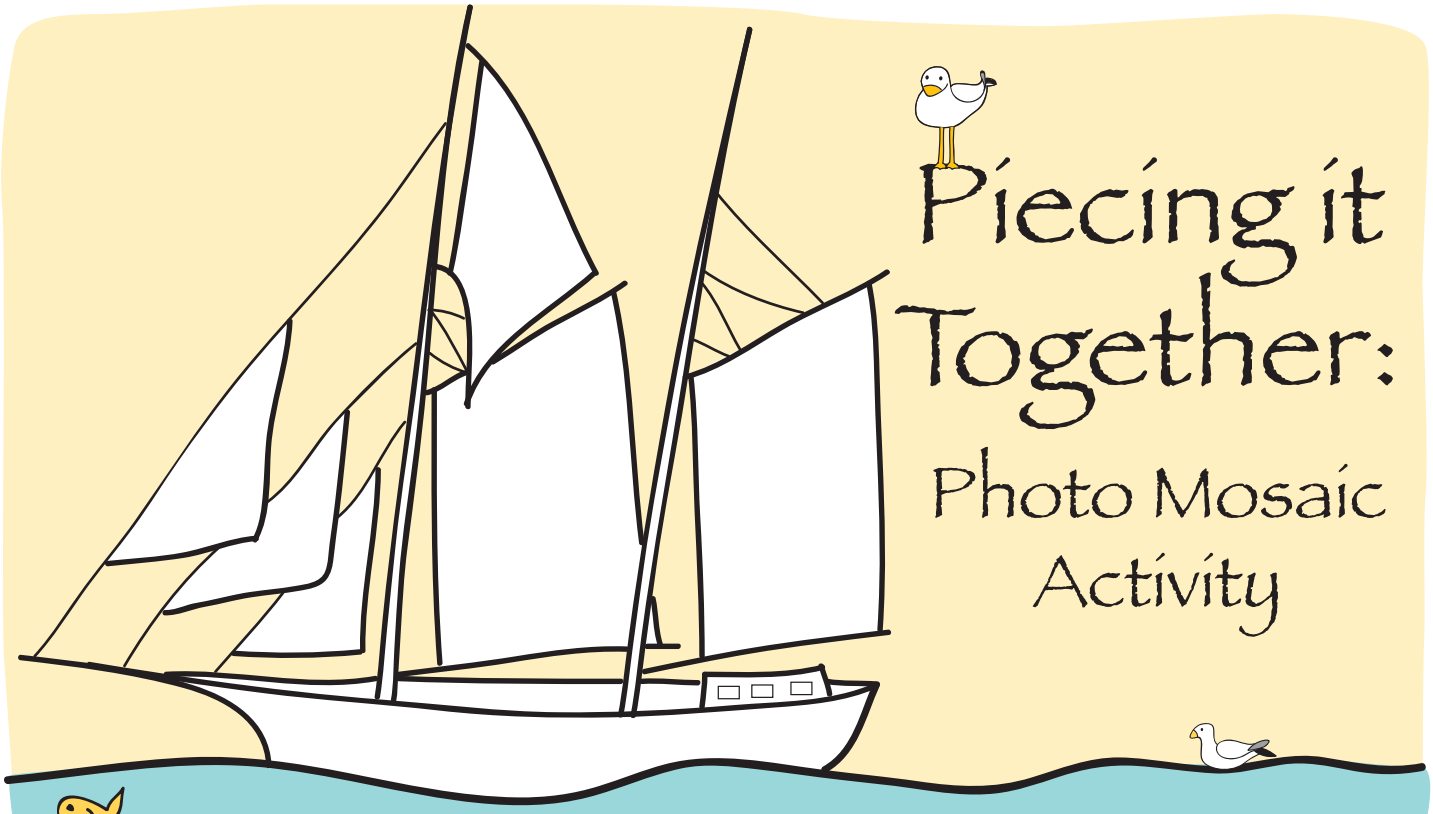
  *Site plans are carefully measured drawings made of shipwreck sites. Photo mosaics are made of many small pictures put together to make a large picture of shipwreck sites.*

## Reeling It In

*Review the differences between site plans and photo mosaics. Explain that archaeologists often use both to fully document and interpret a shipwreck site. Taking pictures of a site is a great way to document how shipwrecks look on the bottom. By taking only pictures and leaving only bubbles, we all can ensure the preservation of these amazing underwater treasures.*

## Further Information

- *Visit thunderbay.noaa.gov and the Alpena County Library for information about the shipwrecks of Thunder Bay and further education.*
- *Visit sanctuaries.noaa.gov for information about the Maritime Heritage Program and other National Marine Sanctuaries.*



# Piecing it Together:

## Photo Mosaic Activity

*Thunder Bay National Marine Sanctuary is an important location for maritime archaeologists. There are approximately 200 shipwrecks in and around Thunder Bay National Marine Sanctuary, representing every type of vessel that sailed on the Great Lakes during the "Shipwreck Century" from 1825-1925. With that many shipwrecks, Thunder Bay is a very historically significant place. Archaeologists from all over the world come to study the shipwrecks in the Great Lakes, especially the shipwreck sites in Thunder Bay.*

*How do **maritime archaeologists** study shipwreck sites? SCUBA divers dive down to the wreck to observe and record what they see. When archaeologists study a site they carefully document the shipwreck and its artifacts. That means they take many measurements, make drawings, and take pictures and video of the site. When archaeologists make a carefully measured drawing it is called a **site plan**. If archaeologists piece together the video or pictures from a shipwreck site, they create a photo mosaic. **Photo mosaics** are very useful in studying shipwreck sites because archaeologists can see exactly what the wreck looks like on the bottom of the lake.*

### Vessel Vocab

**ROV** – Remotely Operated Vehicle. ROV's are underwater robots that help archaeologists document shipwreck sites.

**Maritime Archaeology** – A discipline that studies human interaction with the sea, lakes and rivers through the study of vessels, shore side facilities, cargoes, and human remains.

**Photo Mosiac** – A composite image formed from many small pictures taken of a vessel, which are then stitched together using a computer to create one large picture.

**Site Plan** – A scaled drawing of a shipwreck and its artifacts as it lays on the bottom of the sea or lake.

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## Arti-FACTS

*Sometimes when a site is very deep and archaeologists can't spend as long on the site, they use* ***remotely operated vehicles (ROVs)*** *to take pictures and video for them. ROVs are a useful way to document a shipwreck site because they don't need air like SCUBA divers, so they can stay on the bottom a very long time.*

## Activity

*In this activity you and your team will work together like real maritime archaeologists to piece together a photo mosaic of a shipwreck. You will need to attach your pieces to the shipwreck layout in front of you. After you have finished, find the other half of your vessel and complete your photo mosaic. Remember to work together to solve the puzzle.*

## Materials

- *Shipwreck blocks*
- *Shipwreck layout*
- *Glue*

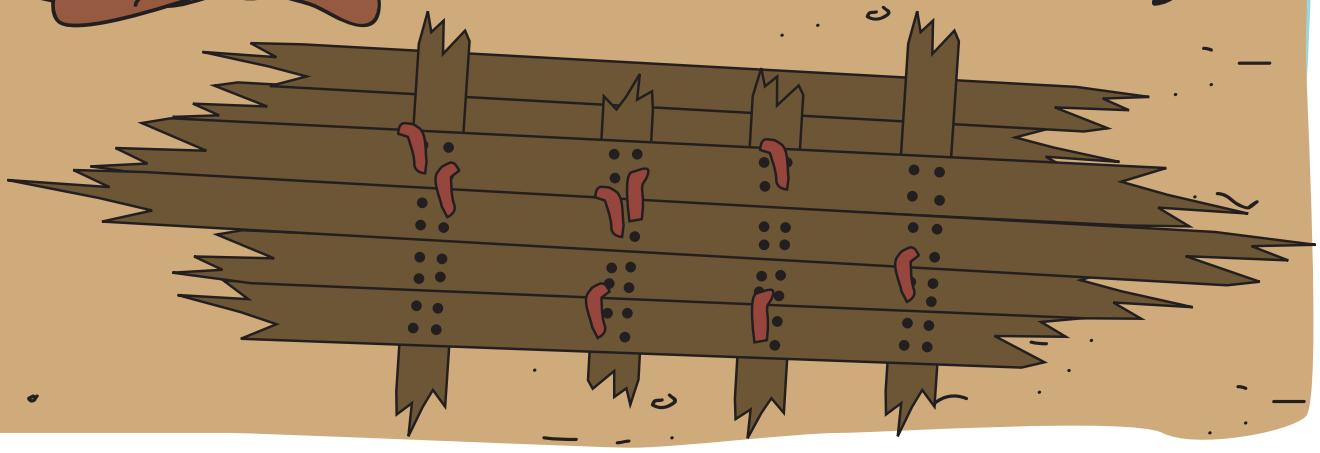
## Crew Commands

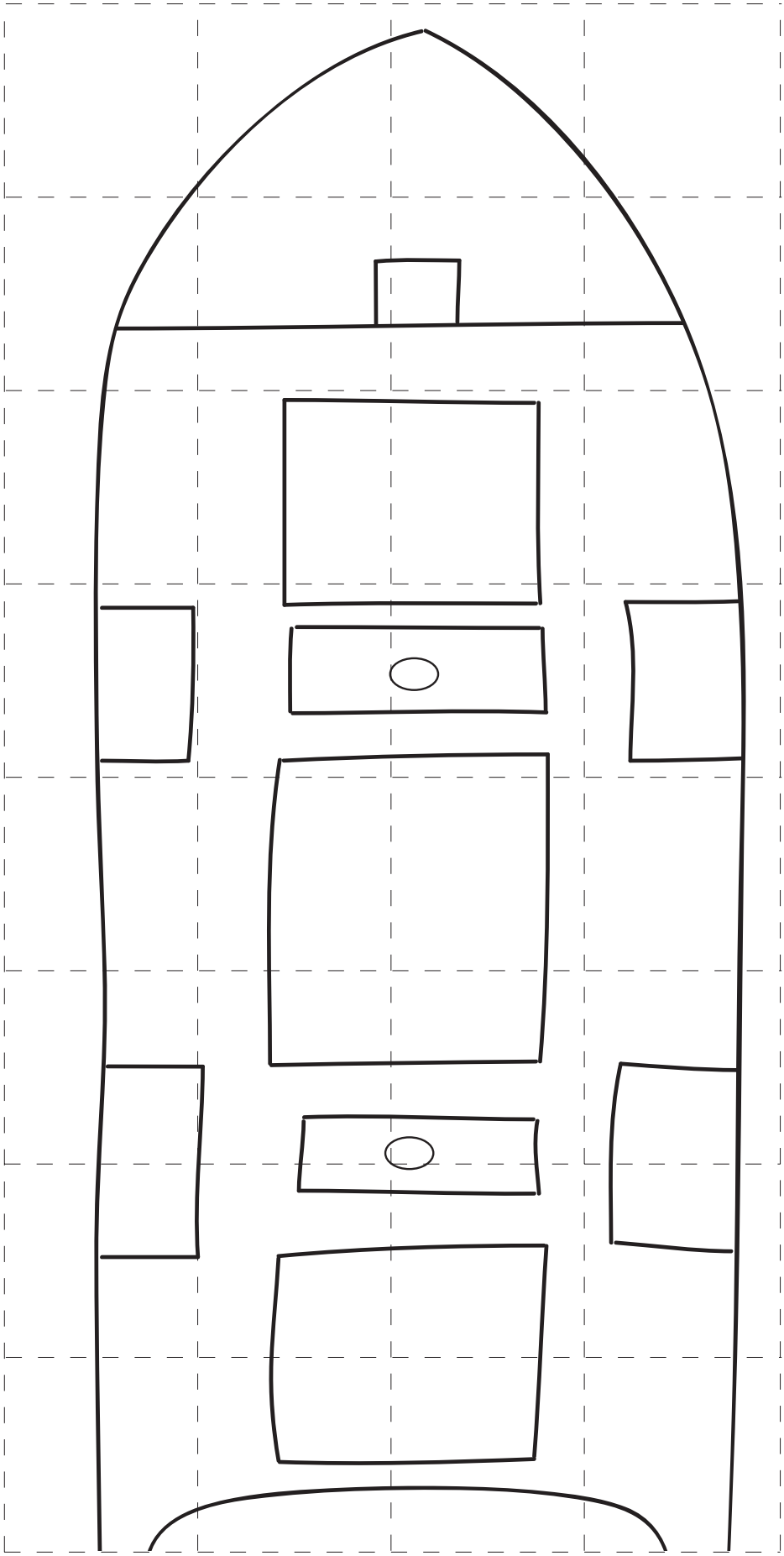
1. *Match up the cut pieces to your team's ship layout.*
2. *Glue the pieces of your photo mosaic onto larger ship layout.*
3. *Find the team with the other half of your vessel.*
4. *The first teams to complete their photo mosaic and find the other half of their vessel is the winner!*

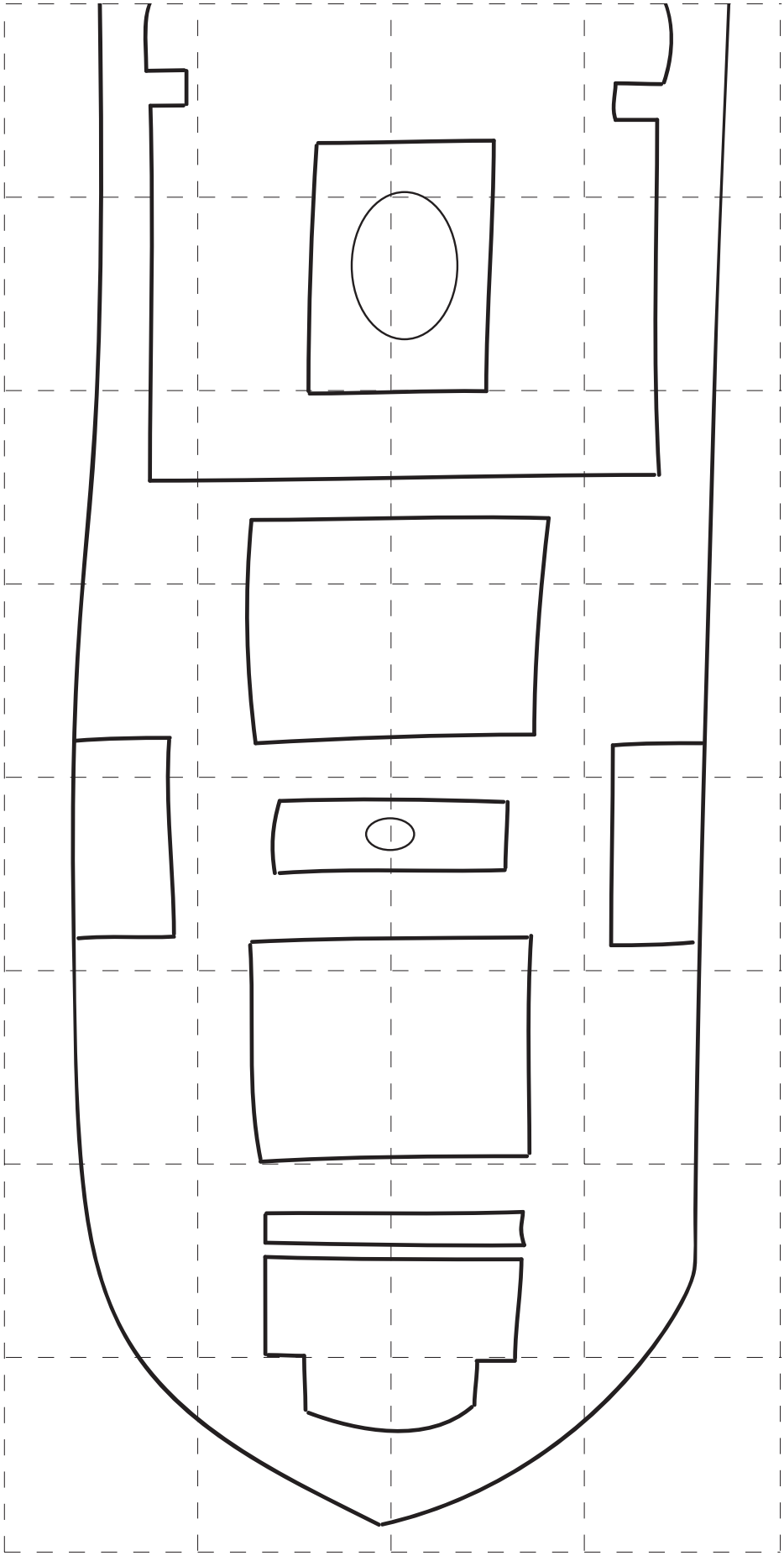
## Shipwreck Challenge

**Create your own mosaic by drawing a picture of a ship then cutting it into pieces. Have a partner try and put your mosaic together.**

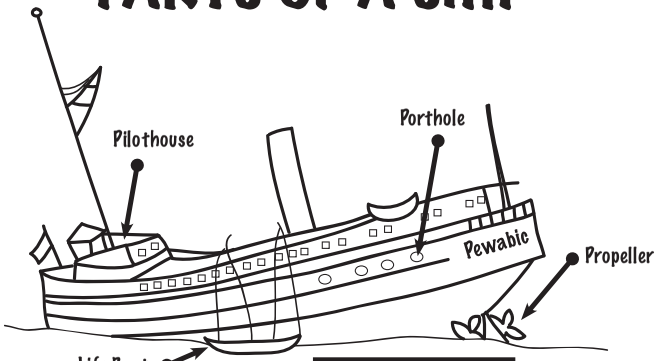
***In your teams, try and decide which wreck you think your photo mosaic might be. Why?***



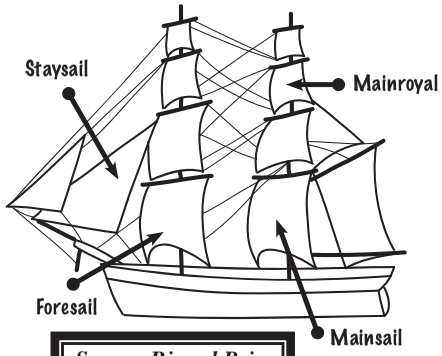




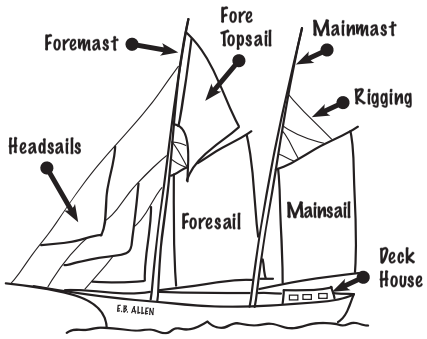
# PARTS OF A SHIP



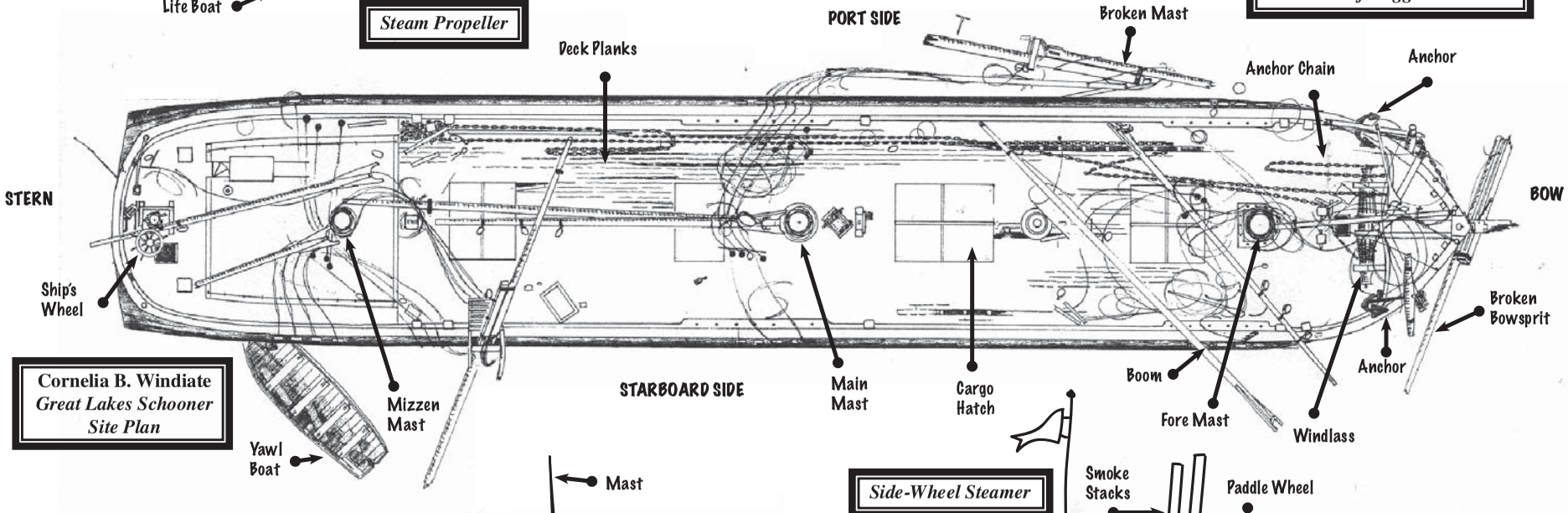

*Steam Propeller*



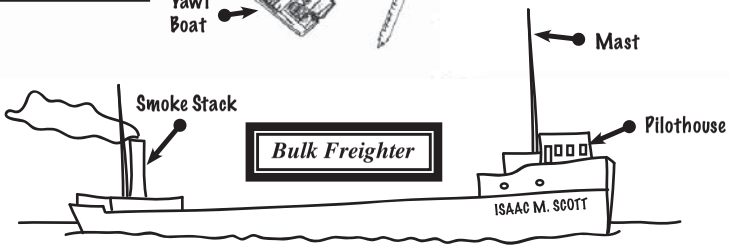

*Square-Rigged Brig*



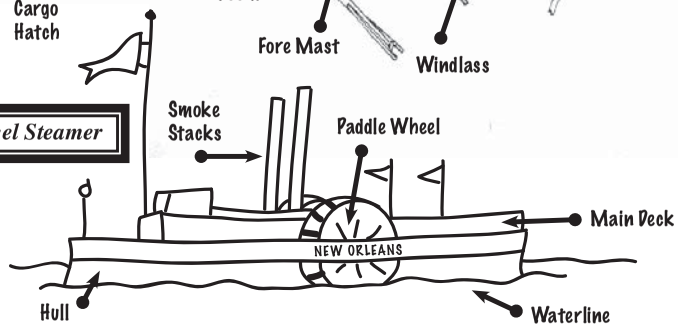

*Fore and Aft Rigged Schooner*



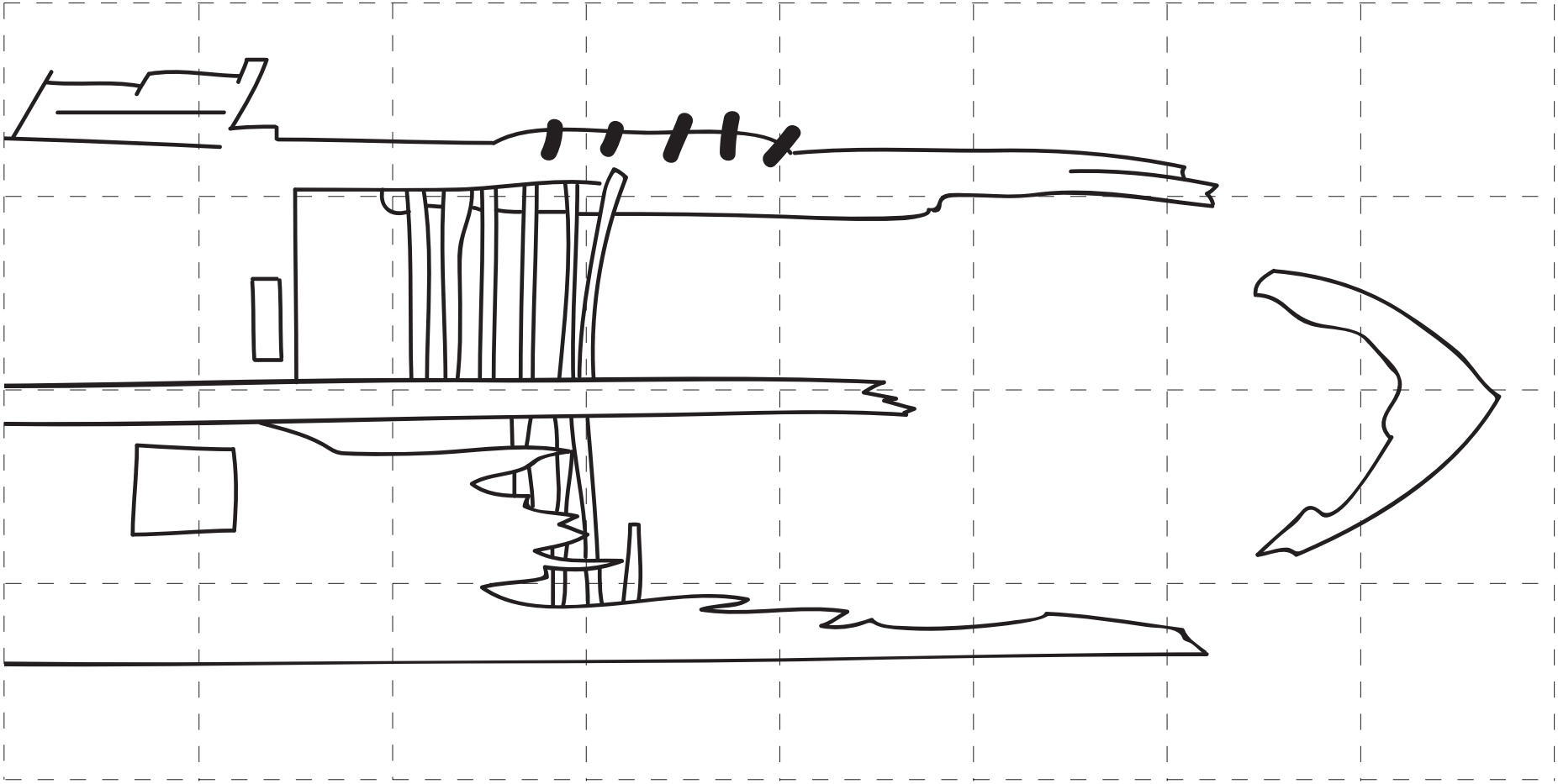

**Cornelia B. Windiate**
*Great Lakes Schooner*
*Site Plan*



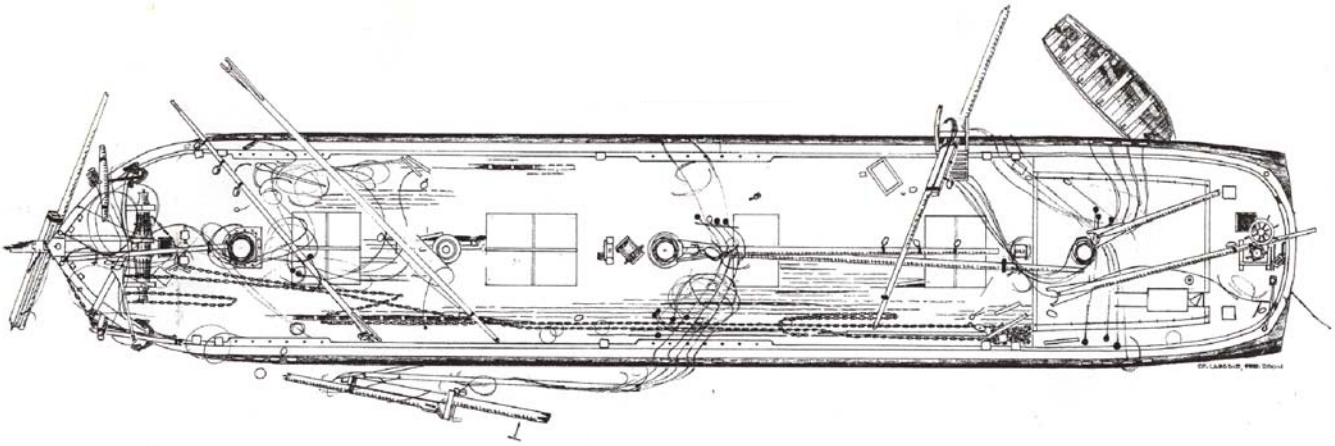

*Bulk Freighter*

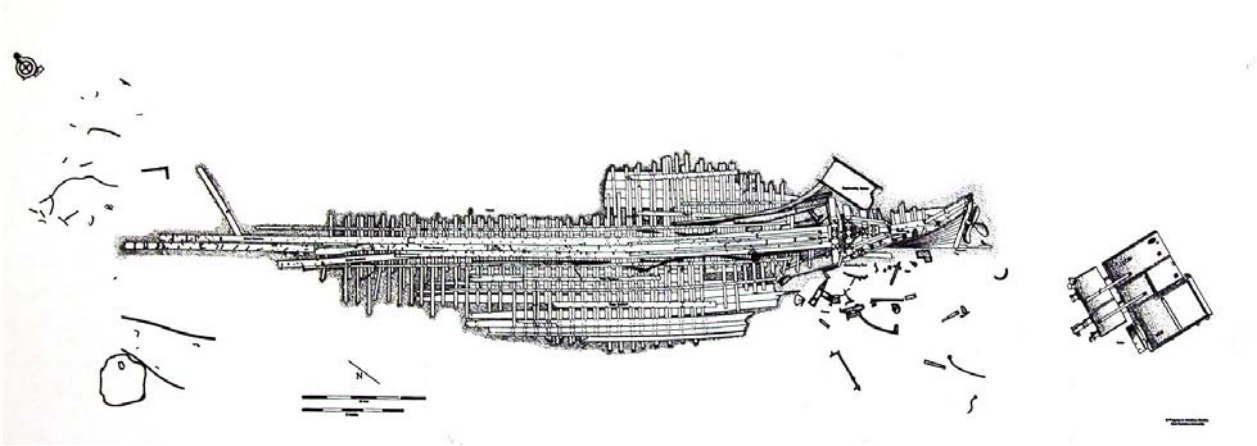



*Side-Wheel Steamer*



# Site Plans vs. Photo Mosaics





A site plan is a carefully measured drawing that archaeologists make of a shipwreck and the artifacts on or around the shipwreck. Divers measure the wreck underwater and then transfer their measurements onto graph paper to create a site plan. Site plans help archaeologists see how the whole site looks. They can tell exactly where parts of the ship are in relation to other things onboard and around the site. Archaeologists can also see from site plans how the ship was built. This is sometimes hard while underwater because ships can be very large, in scattered pieces, or covered with marine life like zebra mussels.

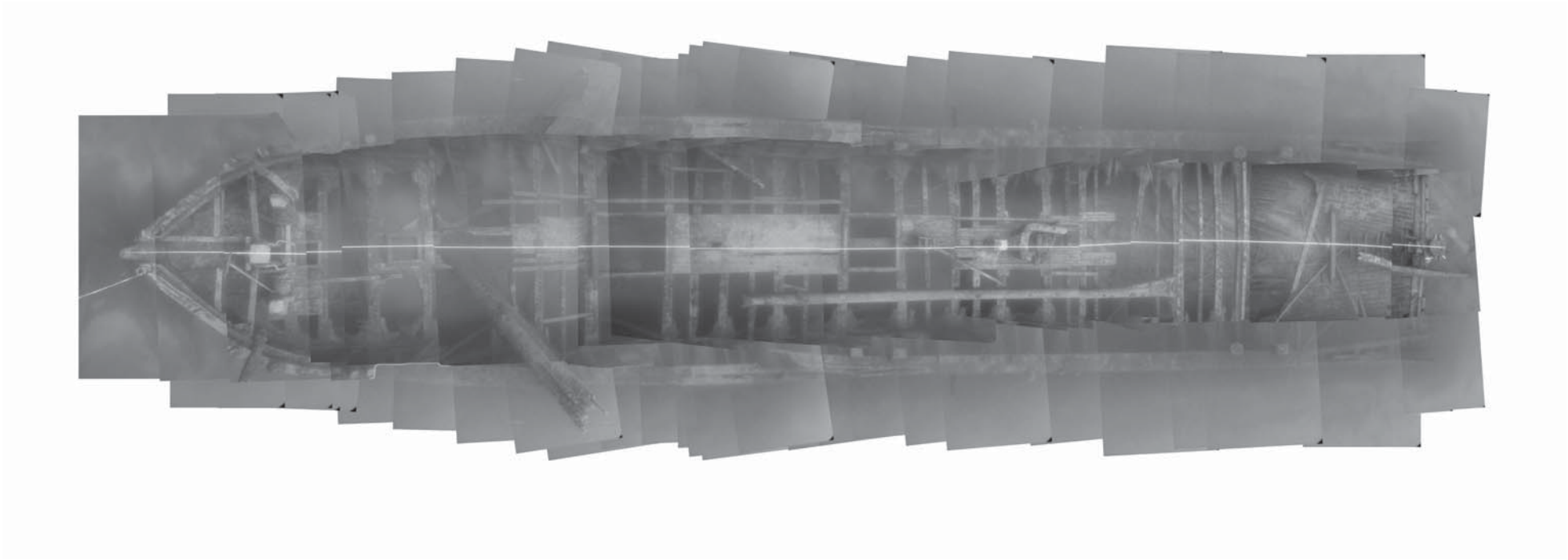


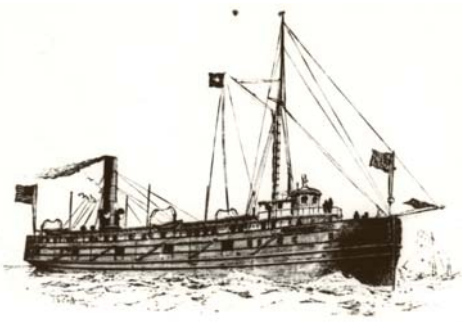
Photo mosaics are another great way to look at shipwrecks. A photo mosaic is a picture that is made up of many smaller pictures of a wreck site. These smaller pictures are all pieced together to create a larger image of the whole shipwreck. This image is not measured, but gives archaeologists a look at the shipwreck just as it is underwater. Because visibility (how far you can see in water) can be very poor and wrecks are big, taking many small images of a shipwreck and piecing them together is a great way to see all the detail of the whole wreck all at once.

# THE VESSEL HISTORY TRIBUNE

Thunder Bay National Marine Sanctuary - Alpena, Michigan

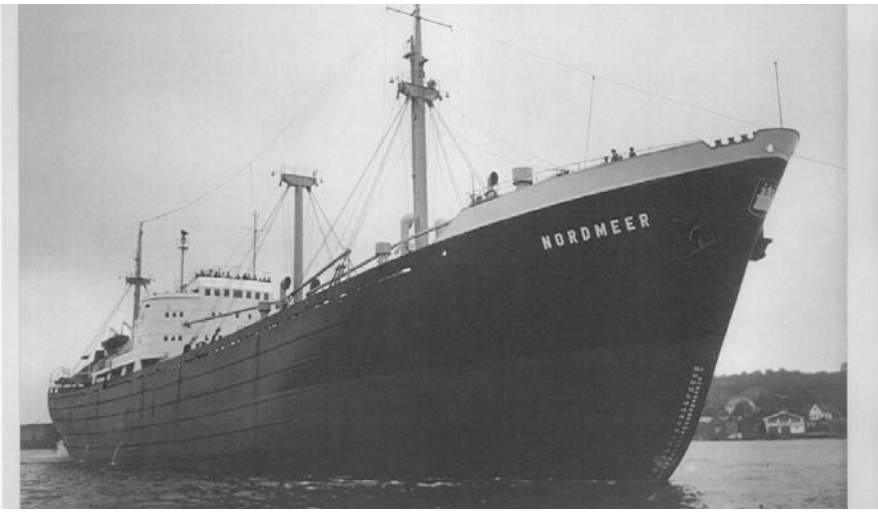
## PEWABIC

The wooden steam propeller Pewabic was built in 1863 and was only two years old when it went down in 1865. The 200 foot long steamer was carrying two of the most valuable cargoes of the time, people and copper. On the evening of August 9th, 1865, the Pewabic sailed to meet its sister ship Meteor to exchange news or mail. Right before the two ships met, the Pewabic turned in front of the Meteor. The two ships collided, creating a large hole in the port bow of the Pewabic sinking it in about five minutes. Air pressure blew off the upper deck and the ship went down bow first, smashing into the bottom 165 feet below the surface. The large support arch that runs down the center of the ship can still be seen as well as a hole in the bow section where salvagers removed the precious copper cargo.



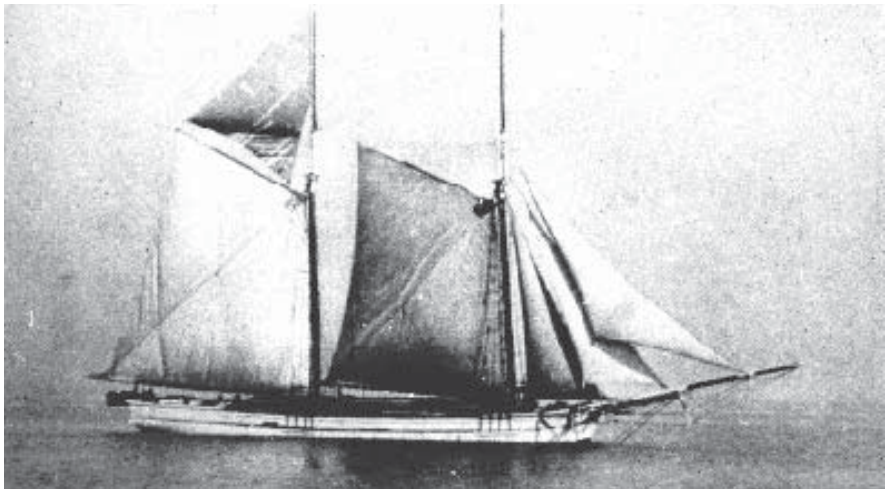
## NORDMEER

The most recent shipwreck in Thunder Bay National Marine Sanctuary is the German freighter Nordmeer. Coming all the way from Hamburg, Germany, the Nordmeer ended its run on the Great Lakes when it wrecked on November 19, 1966. Because of an error in navigation, the Nordmeer ran aground seven miles northeast of Thunder Bay Island. About 25 feet of the metal superstructure was sticking out of the water when it ran aground showing no damage at all. The large square hatches show archaeologists that this vessel carried bulk cargoes. In fact, the Nordmeer was carrying almost 1000 giant steel coils as it passed through Lake Huron. These coils as well as many other artifacts, including paper, were later salvaged off of the Nordmeer. The artifacts were donated to Thunder Bay National Marine Sanctuary and are now on display at the Great Lakes Maritime Heritage Center.



## CORNELIA B. WINDIATE

The Cornelia B. Windiate left port from Milwaukee, Wisconsin carrying a cargo of wheat. Not long into the journey, the Windiate got caught in a storm and vanished. No one knew what happened to the ship or its crew. It was not until the 1990s that local SCUBA divers found the wooden schooner in 185 feet of water just north of the Thunder Bay National Marine Sanctuary boundary. The Windiate is sitting upright on the bottom virtually intact. All three masts are still standing and the yawl boat lies beside it. The rigging is still in place, the hatch covers are still there, and the anchor chain rests on the deck. The ships's wheel lies close to the fully intact deck house.
Scientists believe that the Windiate was caught in an ice storm and that ice covered everything on deck. With all the ice onboard, the Windiate was too heavy to float, but because ice is buoyant (it floats in water), the ship sank very slowly to the bottom.



## E.B. ALLEN

The E.B. Allen was built in 1864 and was only seven years old when it left Chicago with a cargo of wheat. As the two-masted, 134 foot long wooden schooner approached Thunder Bay, a thick fog rolled in. Out of nowhere appeared another vessel, the Newsboy. There was no time for the E.B. Allen to move out of the way and the Newsboy rammed into the port side making a very large hole. The E.B. Allen sank quickly as water filled the cargo hold. The pressure of the air trapped beneath the deck as the Allen sank caused the deck to blow off.

Today, the E.B. Allen is sitting upright on the bottom of Thunder Bay with a missing upper deck and a visible hole in the port side. The windlass can be seen at the bow and one of the masts has fallen over, but is still in place.