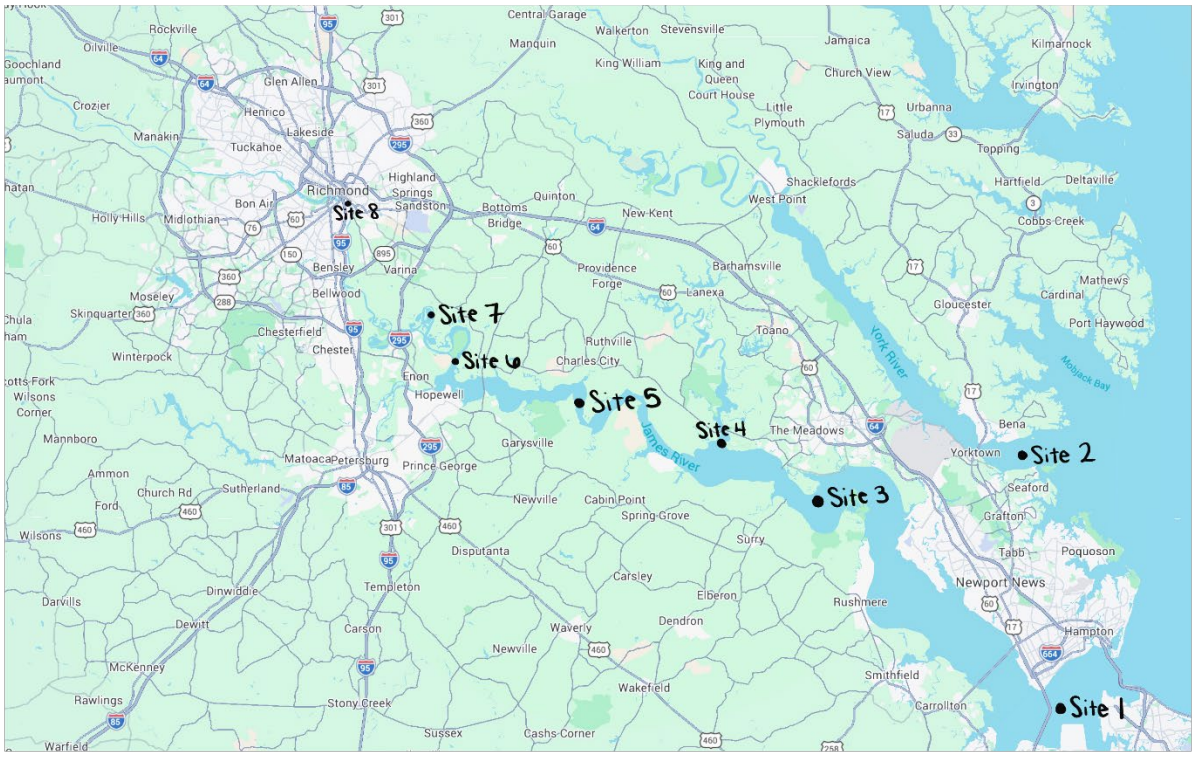
Where in the Water is the Atlantic Sturgeon?

Introduction:

The Atlantic sturgeon or the *Acipenser oxyrinchus*, is an ancient fish that was at one time abundant in the upper rivers of the Chesapeake Bay, but due to overfishing, their population has declined and is still struggling. Researchers want to know what is holding them back. Is it climate change? Is it insufficient habitat? We want to be able to characterize their whereabouts and where they like to hangout, but the migratory species can be difficult to find. We need help finding where sturgeons prefer to live and what could be preventing the population from growing.

Below is a map of the James River and some neighboring rivers with labeled locations of where our researchers have gathered water samples. Each water sample is labeled with site number and some environmental information that was recorded on the day the water was sampled.



Base image from Google Earth

Field Data: Collected on October 10th, 2025

Site #	Temperature (°C)	Dissolved Oxygen (%)	Substrate	Depth
Site 1	25°C	70%	Rocky	3 meters
Site 2	26°C	30%	Soft, silty	5 meters
Site 3	25°C	80%	Soft, silty	7 meters
Site 4	22°C	60%	Soft, silty	9 meters
Site 5	20°C	100%	Rocky	8 meters
Site 6	25°C	98%	Rocky	2 meters
Site 7	20°C	98%	Soft, silty	5 meters
Site 8	19°C	60%	Rocky	3 meters

Name: _____

Instructions:

You have received eight water samples taken by our researchers from sites mainly in the James River, but also the York and Chickahominy rivers. These water samples contain lots of DNA, but we're looking for the Atlantic sturgeon DNA! Pour each water sample through a filter (careful not to cross-contaminate your samples) and extract the Atlantic sturgeon DNA (the clear beads). After each extraction, count how many clear white beads there are to know what the sturgeons' relative abundance is!

While analyzing each site, take good lab and field notes by filling in the information on your worksheet. Based on the provided handout, indicate whether you think the recorded temperatures are high or normal, and if the dissolved oxygen levels are low or normal.

Data Collection:

Site #	Temperature (°C) High or Normal?	Dissolved Oxygen (%) Low or Normal?	Substrate Soft or Rocky?	DNA #
Site 1				
Site 2				
Site 3				
Site 4				
Site 5				
Site 6				
Site 7				
Site 8				

Graph it:

Graph your results below as a bar graph:

Analysis:

1. Circle which site had the highest relative abundance of Atlantic sturgeon DNA?

   Site 1 Site 2 Site 3 Site 4 Site 5 Site 6 Site 7 Site 8

2. What environmental factors supported a higher abundance at this site?

3. Circle which site had the least relative abundance of Atlantic sturgeon DNA?

   Site 1 Site 2 Site 3 Site 4 Site 5 Site 6 Site 7 Site 8

4. What environmental factors supported a lower abundance at this site?

Conclusion:

1. Based on your data, what is the optimal temperature range for sturgeon success?

2. What is the suboptimal temperature range?

3. Based on your data, what is the optimal dissolved oxygen range for sturgeon success?

4. What is the suboptimal dissolved oxygen range?

5. Think about the relative abundance and abiotic factors you observed at each site. What predictions can you make about the greatest limitation to Atlantic sturgeon presence?

6. The state government wants to know what the best location is for a habitat restoration project. Based on your findings, which site would be the best option? Explain why you would choose this location.

7. Protecting the environment needs everyone's help! List some action items the community (farmers, industry, and individuals) could do to help their environment and sturgeon.

WANTED

Acipenser oxyrinchus oxyrinchus

aka: the Atlantic sturgeon

$$$ REWARD $$$

SCIENTIFIC ADVANCEMENT

HABITAT PREFERENCES:

- **19°C - 22°C**
- **80-100% dissolved oxygen**
- **Hard bottom substrates**

Image sourced from Animalia