

Understanding Water Clarity

Introduction

Welcome to the Understanding Water Clarity learning module. This section provides information on the following topics:

- How water clarity is defined and measured in numbers
- Why water clarity is important
- Natural and human influences on water clarity

After completing this module you should be able to perform the following:

- Define the term water clarity
- Explain how water clarity is measured in numbers
- List four reasons why water clarity is important to aquatic life
- List some natural and human influences on water clarity

To begin the module, click the **Next** button at the bottom right of the screen.

Understanding Water Clarity

What is water clarity?

Water clarity is a measure of how clear water is.

To be more specific, water clarity is a measure of how far down light penetrates through water. The deeper light penetrates, the clearer the water.

How far down light penetrates through water depends on how many particles are suspended in the water. Suspended particles reduce water clarity by absorbing and scattering light.

Understanding Water Clarity

How is water clarity measured in numbers?

Scientists often estimate water clarity by measuring Secchi depth. Secchi depth is measured by using an instrument called a Secchi disk, which consists of a weighted plate attached to a rope that has been marked at measured intervals. To make the plate easier to view, it is divided into black and white quarters.

- Secchi depth is the distance at which a Secchi disk can no longer be seen as it is lowered into the water.
- Secchi depth is usually recorded in centimeters (cm).

The higher the Secchi depth, the clearer the water. For example, water with a Secchi depth of 200 cm is clearer than water with a Secchi depth of 150 cm.

Understanding Water Clarity

Understanding the numbers

Which of the following statements is false?

- A) Secchi depth provides an estimate of water clarity.
- B) Secchi depth is usually recorded in centimeters (cm).
- C) Water with a Secchi depth of 125 cm is clearer than water with a Secchi depth of 175 cm.
- D) None of the above.

The correct response is C!

Secchi depth provides an estimate of water clarity and is usually recorded in centimeters. The higher the Secchi depth, the clearer the water. Thus, water with a Secchi depth of 125 cm is less clear than water with a Secchi depth of 175 cm.

Understanding Water Clarity

The Importance of water clarity

Water clarity is reduced by suspended particles. Excessively high concentrations of suspended particles can have the following effects:

- Limit the amount of light available for photosynthesis
- Lead to lower dissolved oxygen concentrations
- Damage gills and suffocate fish and oysters
- Interfere with filter feeding by organisms (like oysters)

Understanding Water Clarity

Understanding the importance of water clarity

How can reduced water clarity negatively affect aquatic life?

- A) By limiting the amount of light available for photosynthesis
- B) By leading to lower dissolved oxygen concentrations
- C) By suffocating fish and oysters
- D) All the above

The correct response is D!

Reduced water clarity is caused by suspended particles, which can limit the amount of light available for photosynthesis, lead to lower dissolved oxygen concentrations, and suffocate fish and oysters.

Understanding Water Clarity

Influences on water clarity

Water clarity can be affected by both natural and human influences.

Natural influences:

- Rainfall
- High winds
- Extreme tides
- Algal blooms

Human influences:

- Boating
- Dredging
- Development
- Nutrient pollution

Understanding Water Clarity

Natural influences on water clarity (rainfall, wind, and tides)

Heavy rainfall, high winds, and extreme tides can reduce water clarity by increasing the amount of particles—particularly sand, silt, and clay sediments—suspended in water.

- Heavy rainfall increases stormwater runoff and carries soil and sediments from land into estuaries.
- High winds and extreme tides intensify water turbulence, stir up bottom sediments, and increase soil erosion along shorelines.

Understanding Water Clarity

Natural influences on water clarity (algal blooms)

Algal blooms are dense floating masses of tiny microscopic plants called phytoplankton. Algal blooms reduce water clarity by absorbing sunlight that otherwise would pass through water.

Important note: Some algal blooms produce toxins that accumulate in oysters and other aquatic life. Although high concentrations of these toxins generally do not kill oysters or other shellfish, the toxins can threaten human health, prompting closure of shellfish harvesting areas.

Understanding Water Clarity**Understanding natural influences on water clarity**

Water clarity can be reduced by which of the following?

- A) Heavy rainfall
- B) High winds
- C) Extreme tides
- D) All the above

The correct response is D!

Heavy rainfall, high winds, and extreme tides can reduce water clarity by increasing the amount of sand, silt, and clay particles suspended in water. Heavy rainfall increases stormwater runoff (which contains soil and sediments). High winds and extreme tides increase water turbulence (which stirs up bottom sediments and increases soil erosion along shorelines).

Understanding Water Clarity**Understanding natural influences on water clarity**

Algal blooms reduce water clarity by absorbing light at the water's surface.

- A) True
- B) False

The correct response is A!

Algal blooms are dense floating masses of tiny microscopic plants (called phytoplankton) that reduce water clarity by absorbing light at the water's surface.

Understanding Water Clarity**Human influences on water clarity (sediment pollution)**

Sediment pollution (excess sediments in water) reduces water clarity by increasing the concentration of suspended sediments in water.

Human activities that contribute to sediment pollution include the following:

- Boating – increases shoreline erosion
- Dredging – stirs up bottom sediments
- Development of land – impervious surfaces (such as roads and driveways) and removal of vegetation – increases stormwater runoff and soil erosion

Understanding Water Clarity**Human influences on water clarity (nutrient pollution)**

Nutrient pollution (excess nutrients in water) can reduce water clarity by increasing the growth of phytoplankton and the occurrence of algal blooms.

Sources of nutrient pollution include the following:

- Sewage treatment plants
- Industrial treatment plants
- Fertilized agricultural lands, residential lawns, and golf courses
- Livestock farms (animal wastes)

Understanding Water Clarity**Understanding human influences on water clarity**

Which of the following human activities contribute to sediment pollution?

- A) Boating
- B) Dredging
- C) Development
- D) All the above

The correct response is D!

Boating, dredging, and development all contribute to sediment pollution. Boating increases shoreline erosion, dredging stirs up bottom sediments, and development increases stormwater runoff and soil erosion.

Understanding Water Clarity**Understanding human influences on water clarity**

How can nutrient pollution reduce water clarity?

- A) By increasing suspended sediment concentrations
- B) By limiting the amount of light available for photosynthesis
- C) By increasing the growth of phytoplankton and the occurrence of algal blooms
- D) All the above

The correct response is C!

Nutrient pollution (excess nutrients in water) can reduce water clarity by increasing the growth of phytoplankton and the occurrence of algal blooms. Algal blooms are dense floating masses of tiny microscopic plants (called phytoplankton) that reduce water clarity by absorbing light at the water's surface.

Understanding Water Clarity Review

Congratulations! You have completed the Understanding Water Clarity learning module. In this section you learned about the following topics:

- How water clarity is defined and measured in numbers
- Why water clarity is important
- Natural and human influences on water clarity

You should now be able to perform the following:

- Define the term water clarity
- Explain how water clarity is measured in numbers
- List four reasons why water clarity is important to aquatic life
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