Cove Under Pressure

Trace how shoreline development affects aquatic biodiversity.

MAQ.4.4 "Research, analyze, and communicate the effects of urbanization and continued expansion by humans on the aquatic ecosystems' biodiversity (e.g., land use changes, erosion and sedimentation, over-fishing, invasive/exotic species..."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline three human activities in the passage and circle one effect on aquatic life for each. Give each activity and its matching effect the same number to show the cause-and-effect link.

Changes at Cedar Cove

(1) At Cedar Cove, a tidal creek once wound through a salt marsh before reaching a shallow bay. The marsh sheltered young fish, crabs, and wading birds, while nearby oyster reefs offered hard surfaces for many small animals. As houses and roads spread across the watershed, rainwater began rushing off roofs and pavement instead of soaking into soil. Fast runoff carved exposed streambanks and carried fine sediment into the creek. In cloudy water, less light reached underwater grasses, which need light to grow. When grass beds shrink, young fish lose cover, and fewer plant species can survive there.

(2) The same runoff carried fertilizer from lawns into the bay. Extra nutrients fueled algal blooms; when algae died, decomposers used dissolved oxygen as they broke the algae down. Fish and crabs could leave low-oxygen water, but animals fixed in place could die. Along the shore, property owners built bulkheads that replaced sections of marsh. Those walls removed shallow, sheltered habitat and reflected waves that stirred up more sediment. A wall can protect one yard from erosion while making it harder for marsh plants to hold soil and for juvenile animals to find food nearby.

(3) Meanwhile, heavy harvesting reduced the cove's oyster population. Oysters filter algae and other particles from water as they feed, so fewer oysters meant less filtering, although oysters alone could not stop fertilizer runoff. More boats visited a new dock, and some carried nonnative organisms attached to their hulls. If an introduced species survives and spreads, it may compete with native species for space or food; not every newcomer becomes invasive. These changes interact rather than arrive one at a time. To protect native biodiversity, residents would need to limit runoff and harvest, preserve marsh edges, and clean boat hulls.

2 ANSWER WITH EVIDENCE

Use the passage

1. How could new pavement reduce biodiversity in the bay even if no construction takes place in the water?

2. How could bulkheads and sediment stirred up by waves work together to harm juvenile animals?

3. Why might heavy oyster harvesting make the effects of fertilizer runoff worse?

4. How might visiting boats affect native biodiversity even if they release no pollution?

3 YOUR TURN

Your own words

A town plans a ferry terminal beside a creek that empties into a shallow bay with underwater grass. Write one paragraph proposing two different protections, one for runoff and one for visiting boats; explain how each could protect native biodiversity using cause-and-effect evidence from the passage.

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PART 1 · READ AND MARK

Underline three human activities in the passage and circle one effect on aquatic life for each. Give each activity and its matching effect the same number to show the cause-and-effect link. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	How could new pavement reduce biodiversity in the bay even if no construction takes place in the water?	**Pavement increases runoff that carries sediment into the creek. Cloudy water blocks light from underwater grasses, reducing plant survival and shelter for young fish.**
2	How could bulkheads and sediment stirred up by waves work together to harm juvenile animals?	**Bulkheads replace sheltered marsh habitat, while reflected waves stir up sediment. Juvenile animals lose places to find food, and cloudy water can further reduce underwater grass habitat.**
3	Why might heavy oyster harvesting make the effects of fertilizer runoff worse?	**Fertilizer fuels algal blooms, but fewer oysters remain to filter algae from the water. Dying algae can then contribute to low oxygen as decomposers break them down.**
4	How might visiting boats affect native biodiversity even if they release no pollution?	**Boats may carry nonnative organisms on their hulls. If those organisms survive and spread, they may compete with native species for space or food.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

The town should install rain gardens beside the parking area to slow runoff and trap sediment before it reaches the creek. Clearer water would let more light reach underwater grasses, preserving shelter for young fish. The terminal should also require boats to clean their hulls before entering the bay. That step could prevent nonnative organisms from reaching the grass beds and competing with native species for space or food. Together, these protections address two different threats instead of relying on one fix.

Accept other feasible runoff controls if the student explains a supported effect on aquatic life. Boat protections should address the risk of introducing nonnative organisms, not assume every introduced species becomes invasive.