# After the Surge

Use marsh evidence to evaluate recovery after a storm

**BIO.10** "Engage in argument from evidence to support the claim that characteristics of an ecosystem contribute to its resilience and stability, including ecological succession and recovery from disturbance."

NAME _____ DATE _____

## 1 READ AND MARK

Read it twice

**YOUR JOB** Underline two observations that show recovery, circle one ecosystem feature that may affect recovery, and number one detail that makes a cause-and-effect claim uncertain.

### A Marsh After the Hurricane

1. After a hurricane crossed a coastal marsh, scientists followed two nearby plots that had faced similar winds. Before the storm, plants covered about 80 percent of each plot. Plot A had a thick mat of cordgrass roots and several salt-tolerant plant species. Plot B had a thinner root mat and was dominated by one plant species. Waves tore away stems and washed sediment from both plots. A month later, living plants covered 55 percent of Plot A but only 25 percent of Plot B. Both plots still had soil, buried seeds, and some living roots beneath the damaged surface.

2. Over the next spring, shoots grew from surviving roots, and seeds sprouted in patches of open mud. Cordgrass stems slowed water near the ground, allowing some suspended sediment to settle. Other marsh plants appeared in spaces between the new stems. This gradual shift in the plant community is secondary succession because soil survived the disturbance. After one year, plant cover reached 75 percent in Plot A and 35 percent in Plot B. By year three, cover reached 82 percent in A and 50 percent in B. Cover measures living plants, not every part of marsh health.

3. Plant cover is one sign of recovery, but marshes also provide habitat and hold shoreline sediment in place. In year three, observers found 12 crab burrows per square meter in Plot A and 4 in Plot B. Crabs can move sediment as they burrow, although burrow counts alone cannot show that all animal populations recovered. Plot A also sat slightly higher and flooded less often than Plot B. That difference makes it hard to tell how much of A's faster recovery came from its roots or mix of plants. Scientists would need more similar plots to test those explanations.

## 2 ANSWER WITH EVIDENCE

Use the passage

1. Which plot showed greater resilience after the hurricane? Support your claim with plant-cover data from a month after the storm and year three for both plots.

2. How do the surviving soil and roots support an argument that secondary succession helped the marsh recover?

3. A classmate says Plot A's plant cover proves its whole ecosystem had completely recovered by year three. Use two details from the passage to challenge that claim.

4. Which claim is better supported: 'Thick roots caused Plot A's faster recovery' or 'Plot A recovered faster, but the cause is uncertain'? Give evidence for both the recovery and the uncertainty.

## 3 YOUR TURN

Your own words

After a fire, most underground grass buds survive in a grassland, and two months later, shoots cover half the ground, compared with nearly all of it before the fire. In four or five sentences, argue how a grassland characteristic may support resilience, use the observations, describe a likely next step in succession, and propose one measurement to test your claim.

# After the Surge



## PART 1 · READ AND MARK

Underline two observations that show recovery, circle one ecosystem feature that may affect recovery, and number one detail that makes a cause-and-effect claim uncertain. Accept any marking that follows this job and points at the right text.

## PART 2 · ANSWERS

| # | QUESTION | ANSWER |
|---|---|---|
| 1 | Which plot showed greater resilience after the hurricane? Support your claim with plant-cover data from a month after the storm and year three for both plots. | **Plot A showed greater resilience. Its plant cover rose from 55 percent a month after the storm to 82 percent in year three, while Plot B rose from 25 percent to 50 percent.** |
| 2 | How do the surviving soil and roots support an argument that secondary succession helped the marsh recover? | **Soil and living roots remained after the storm, so shoots could regrow from roots. Plants also grew from buried seeds, allowing the plant community to recover through secondary succession.** |
| 3 | A classmate says Plot A's plant cover proves its whole ecosystem had completely recovered by year three. Use two details from the passage to challenge that claim. | **Plant cover measures only living plants, not every part of marsh health. The crab-burrow count cannot show whether all animal populations recovered.** |
| 4 | Which claim is better supported: 'Thick roots caused Plot A's faster recovery' or 'Plot A recovered faster, but the cause is uncertain'? Give evidence for both the recovery and the uncertainty. | **The second claim is better supported. By year three, plant cover was 82 percent in A and 50 percent in B, but A also sat higher and flooded less often, so roots cannot be identified as the sole cause.** |

## PART 3 · YOUR TURN (SAMPLE ANSWER)

Surviving underground buds may help this grassland recover because new shoots can grow without waiting for seeds to arrive. Shoots already cover half the ground two months after the fire, compared with nearly all of it before the fire. As secondary succession continues, grasses may spread into remaining open patches, but full recovery is not yet shown. Measuring plant cover each month would test whether the grassland is moving toward its earlier condition.

Accept evidence-based claims that distinguish observed recovery from proof of its cause or complete ecosystem recovery. For Your Turn, accept other measurable signs of recovery if the response connects the measurement to its claim.