Turtles in Trouble

Use field data to evaluate habitat and genetic change.

ENV.1.9 "Evaluate and communicate data that explains how human activity may impact biodiversity (e.g., introduction, removal, and reintroduction of an organism within an ecosystem; land usage) and genetic variations of organisms..."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline the two human actions at the restored wetland, then circle the numbers in the table that show changes in turtle counts and genetic variation. Number one reason the data cannot prove what caused those changes.

A Wetland for Bog Turtles

1 At two drained wetlands, a team tracks threatened bog turtles, small turtles that need sunny, shallow water. In 2016, workers filled the drainage ditch at one wetland, restoring wet ground. They also released eight captive-bred turtles from unrelated family lines there under conservation permits. The second wetland remained drained, providing a comparison site.

2 Researchers counted adults using the same search method at both wetlands in 2010 and 2025. They also tested DNA from 12 adults at each site in each year. Their variation measure is the average percentage of tested gene sites where a turtle has two different versions. Larger percentages indicate more genetic variation within sampled turtles, not necessarily more species.

BOG TURTLE SURVEY RESULTS

Wetland and year	Adults counted	DNA variation (%)
Restored, 2010	18	22
Restored, 2025	31	35
Unrestored, 2010	21	26
Unrestored, 2025	16	23

3 Wet ground provides bog turtles with feeding and nesting areas. Turtles from unrelated families may carry gene versions absent from a small local population. These are possible mechanisms, not proof of what happened here. Weather and predators may alter adult counts, while testing only 12 turtles per site limits confidence in DNA estimates. Careful comparisons can guide future conservation decisions.

2 ANSWER WITH EVIDENCE

Use the passage

1. How did the adult count and DNA variation change at the restored wetland from 2010 to 2025? Use numbers from the table.

2. Compare the changes at the restored and unrestored wetlands. What does the comparison suggest about the human actions?

3. Explain how each of the two human actions could affect the turtles. Connect one action to habitat and the other to genetic variation.

4. A student claims that releasing turtles alone caused the rise in DNA variation. Evaluate that claim using the study design.

3 YOUR TURN

Your own words

Propose a study that could help separate the effects of wetland restoration and turtle release. Describe one new comparison, two measures you would track over time, a result you would expect, and one reason the study still could not prove cause.

Turtles in Trouble

PART 1 · READ AND MARK

Underline the two human actions at the restored wetland, then circle the numbers in the table that show changes in turtle counts and genetic variation. Number one reason the data cannot prove what caused those changes. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	How did the adult count and DNA variation change at the restored wetland from 2010 to 2025? Use numbers from the table.	**The adult count rose from 18 to 31, and DNA variation rose from 22% to 35%.**
2	Compare the changes at the restored and unrestored wetlands. What does the comparison suggest about the human actions?	**Both measures increased at the restored wetland but decreased at the unrestored wetland. The comparison suggests that restoration and release may have helped, but it does not prove they caused the increases.**
3	Explain how each of the two human actions could affect the turtles. Connect one action to habitat and the other to genetic variation.	**Filling the ditch could improve feeding and nesting habitat. Releasing unrelated turtles could add gene versions to the population.**
4	A student claims that releasing turtles alone caused the rise in DNA variation. Evaluate that claim using the study design.	**The claim is not supported as a sole cause because workers restored the wetland and released turtles at the same site. The small DNA sample also limits confidence in the estimate.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

I would compare a wetland that is restored without turtle releases to a similar wetland that is restored and receives unrelated turtles. I would track adult counts and DNA variation at both sites for several years. If counts rose at both sites but DNA variation rose more at the release site, the releases might have added gene versions while restoration helped turtles survive. Differences between the wetlands before the study could still affect the results.

Accept comparisons that distinguish an association from proof of cause. For the open task, look for a comparison that isolates one action, two relevant measures, a plausible prediction, and a limitation.