



Montana Outdoors Magazine Literacy Evaluation Program

“Notching Big Wins for Big Hole Grayling”

name: _____

1. When do Arctic grayling swim upstream to spawn?

2. Explain the process of “notching” a beaver dam, and tell why FWP does it on certain tributaries of the Big Hole River.

3. How did the recent string of low-runoff years impact beaver dams in the Big Hole watershed?

4. What is special about the population of Arctic grayling in the Upper Big Hole River?

5. Look at the maps atop page 14 and read the captions. The map shows dozens of smaller streams flowing into the Big Hole River, but Arctic grayling spawn in only _____ or _____ of the _____, _____ creeks.

6. What could happen if three of those spawning creeks were blocked?

7. What prompted landowners, state and federal agencies, and conservation groups to start working together to recover and sustain the Big Hole’s population of Arctic grayling?

8. Explain the following statement: “Everything we do relies on that collaboration.”



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9. The 2006 agreement (CCAA) offered by the USFWS provided guidance and funding for ranchers to adopt strategies that would improve their operations in ways that would help grayling benefit. One of those strategies has been preventing “entrainment.” Explain what entrainment is, and tell what is done to prevent it from happening.

10. What two strategies were implemented to keep cattle away from sensitive riparian areas?

11. Explain how the presence of willows along a stream provides colder water and cleaner gravel for grayling.

12. What did ranchers do in the extremely dry summer of 2025, demonstrating their commitment to preservation of the grayling population in the Big Hole?

13. Why do the grayling move into steeper tributaries during the heat of the summer?

14. Why hasn't notching the dams negatively impacted beaver in the Big Hole watershed?

15. How can disturbance of the dams caused by notching positively impact a stream? (2 ways)

16. According to Big Hole rancher Max Lapham, what two factors have been keys to the success of the Big Hole CCAA?



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Teachers:

1. For a possible bell-ringer ask students if they know what a “spawning run” is.
2. Discuss the map of the Upper Big Hole watershed atop of page 14. The Big Hole is a tributary of the Jefferson River, which flows into the Beaverhead. The Beaverhead flows into the Jefferson, which combines with the Madison and Gallatin to form the Missouri near Three Forks.
3. Consider watching the 3-minute FWP video about Arctic grayling. The QR code on page 19 can be used to access the video.
4. The article contains several words and acronyms that may be new to students. It may be helpful to go over them before students read the article. Here is a list: spawning, spring runoff, breach, tributary, headgate, low-gradient, riparian, FWP, USFWS
5. Give students a copy of the article. Have them read it silently, read it as a class, or read it to them.
6. If the assignment seems to be too much for the grade level you teach, consider assigning a certain number of questions (you decide how many, and each student gets to pick which ones they answer). Any questions they answer correctly beyond the required number can count as extra credit.

Answer Key

1. The last week of April and the first week of May.
2. Notching is the process of removing a section of a beaver dam. It allows grayling to swim upstream and spawn.
3. The low spring runoff left beaver dams intact, so the dams were a barrier to grayling who wanted to swim upstream to spawn.
4. The Big Hole grayling are the last river-dwelling population of grayling in the lower 48 states.
5. Arctic grayling spawn in only 6 or 7 of the cleanest , coldest creeks.
6. Half the spawning population could be lost.
7. An environmental group sued the USFWS to get Arctic grayling designated as an endangered species in the Lower 48.
8. Success depends on everyone working together, including ranchers, state and federal agencies, and conservation groups.
9. Entrainment is when grayling swim into irrigation canals, getting stranded there. This can be prevented by installing barriers (fish screens) that prevent the fish from going into the canals.
10. Building wildlife friendly fences to keep cows out of sensitive areas and installing watering tanks on higher areas away from streams.
11. The willows anchor (stabilize) the banks to make the channel narrower and deeper. They also provide shade, keeping the water colder - colder water contains more oxygen.
12. They closed their head gates (stopped irrigating) two weeks early to insure that enough water would be left in the stream for the grayling.
13. They are cooler and better oxygenated.
14. The beavers are accustomed to spring runoff breaching their dams, so they repair them soon after the water flow drops.
15. It allows sediment to be flushed downstream, creating good places for plants to take root. It also sweeps sediment from around the dam, leaving clean gravel and cobbles that grayling need for spawning.
16. The agencies (FWP, USFWS) listened to the ranchers. There was funding to pay for the projects.