

3. The Rocky Mountains, the headwaters for the Colorado River, have experienced a severe drought for many of the past twenty years. States and cities downstream that depend on the river water have had to find solutions to the reduced water flow.

One city located downstream from the Rocky Mountains is Las Vegas, Nevada. In Las Vegas, one solution to reduce the amount of water used for irrigation is to remove landscaping and lawns that use grasses not native to the local area and replace them with desert-tolerant landscaping.

- (a) **Identify** a typical type of plant that would be used in desert-tolerant landscaping.
- (b) **Justify** the removal of landscaping and lawns that use grasses not native to the local area by describing an additional advantage, other than reducing the amount of water needed for irrigation.

Warmer seasonal temperatures in the Rocky Mountains have led to earlier mountain snowmelt and an increased risk of forest fires as soil and vegetation dry out.

- (c) **Describe** how a prescribed burn would reduce the severity and spread of forest fires.
- (d) **Describe** a disadvantage of a prescribed burn in a forested ecosystem.

Lake Powell is a large reservoir on the Colorado River. Lake Powell is formed by a dam with a hydroelectric power plant. At full capacity or full pool, Lake Powell contains 25.16 million acre-feet (maf) of water. Currently, Lake Powell is at 36% full capacity.

- (e) **Calculate** the number of million acre-feet (maf) of water currently in Lake Powell. **Show** your work.

In 2021, after years of drought, Lake Powell held 7.9 million acre-feet (maf) of water. One million acre-feet is equivalent to 3.26×10^{11} gallons.

- (f) The watershed of the Upper Colorado River contributes an average of 9.60 maf of water to Lake Powell annually. The melted mountain snow found in the watershed contributes 50% of the average river flow into Lake Powell. In 2021, the river flow was 36% of the annual average. Assuming that all resources to that flow contributed the same proportions as in prior years, **calculate** the amount of water (in million acre-feet) that was contributed by the melted mountain snow in 2021. **Show** your work.
- (g) The average household in the United States consumes 5.0×10^4 gallons of water in a year. **Calculate** the number of households that could be supported for one year by the average flow of 9.60 maf of water into Lake Powell. **Show** your work.

Begin your response to this question at the top of a new page in the separate Free Response booklet and fill in the appropriate circle at the top of each page to indicate the question number.

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