



Climate Change at John Day Fossil Beds

The rocks at John Day Fossil Beds National Monument tell the story of how plants and animals responded to climate fluctuations over a span of more than 40 million years. As the local environment gradually became cooler and drier, species adapted to it, migrated elsewhere, or became extinct. The park's living flora and fauna today are those with strategies for survival in a place with 9 to 16 inches of precipitation a year and temperatures that range from above 100°F to below zero. Coyotes and beaver grow thick coats, some species hibernate, and others head south for the winter. Resource monitoring at the park can provide clues as to what future fossils may reveal about the unprecedented rate of climate change now underway.

Sagebrush Steppe

Contemporary vegetation in the park is dominated by bunchgrass steppe that supports diverse wildflowers and provides habitat for elk and other wildlife. Livestock grazing in the area began in the late 1800's and the John Day country was important to sheepherders in the early 20th century. However, this left an ecological legacy that challenges park managers and is likely to interact with climate change in complex ways. Invasive annual grasses such as cheatgrass and medusahead introduced during the historic era have infested many areas of the park. Drought and fire are expected to increase and may exacerbate these weed invasions. Furthermore, shifts in the boundaries of vegetation types, such as juniper encroachment into bunchgrass steppe, may also increase under expected changes in rainfall patterns.

Riparian Corridors

Chinook salmon and steelhead trout swim up the John Day River to spawn in the spring and the resulting smolts return to the Pacific Ocean. The upstream agricultural irrigation that reduces water flow in the park also reduces habitat for fish and other aquatic species, especially during late summer when lower flows can become too warm for the survival of trout and other cold water species. Climate change is likely to exacerbate these conditions and more frequent fire could reduce



NPS PHOTO

The John Day River in the Sheep Rock Unit.

riparian vegetation and wildlife habitat. By providing shade and preventing riverbank erosion, cottonwood, willows, sedges, and rushes help maintain water quality and provide leaf matter for the insects eaten by fish. The riparian vegetation is also used as nesting and roost sites for neotropical birds, swallows, and geese. Great blue heron, osprey and kingfishers feed on fish and frogs year-round, while bald eagles arrive in winter to hunt for fish.

Amphibians

Although predation by birds, fish, and the non-native bullfrogs limit the presence of native amphibians along the John Day River, the small seeps and springs scattered throughout the park provide secure habitat for western toads, spadefoot toads, Pacific tree frogs, and long-toed salamanders. Like other amphibians, these species require wetlands for part of their life cycle and tend to be highly sensitive to environmental change. Whether caused by warmer temperatures or reduced precipitation, shallower water exposes amphibian embryos to more extremes in water temperature and increases the likelihood of evaporation before metamorphosis occurs.

Bats

The bats that use the park's riparian areas to forage for insects may shift their ranges seasonally or year-round as a result of climate change. Some of the 14 species that have been documented in the park migrate to warmer areas where they can feed on insects all winter while others hibernate in cold, damp roosts. Warmer roosts could disrupt hibernation patterns and the associated timing of fetus development and gestation. Bats are also vulnerable to collision with wind turbines, and the rapid growth of this alternative form of energy production may pose additional risks to bat populations along the John Day River.

For More Information

Upper Columbia Basin Inventory and Monitoring Network
<http://science.nature.nps.gov/im/units/ucbn/>



S. ANDERSON



A spotted bat captured in 2003 and healthy bunchgrass steppe in the Clarno Unit of the park.