The issue of ineffective dams for cold water conservation

In 2015, California entered the fourth year of a severe drought – the kind that is increasingly likely as our climate warms. Although droughts are a regular feature of the state's climate, the current drought is unique in modern history. Taken together, the past four years have been exceptionally warm. Heat amplifies the effects of drought. It reduces snowpack, a major component of natural seasonal water storage. It decreases soil moisture, stressing natural vegetation and increasing irrigation demands. And it raises water temperatures, stressing fish and other species that live in rivers and lakes.

Dams poorly mimic the temperature patterns California streams require to support the state's native salmon and trout—more than three-quarters of which risk extinction. Bold actions are needed to reverse extinction trends and protect cold-water streams that are resilient to climate warming, according to a study published in the journal PLOS ONE by the University of California. The study helps identify where high-quality, cold-water habitat remains to help managers prioritize conservation efforts.

"It is no longer a good investment to put all our cold-water conservation eggs in a dam-regulated basket," said lead author Ann Willis, a senior staff researcher at the UC Davis Centre for Watershed Sciences and a fellow for the John Muir Institute of the Environment. "We need to consider places where the natural processes can occur again." Understanding where cold water is likely to stay cold is critical for conservation. But "cold" is more than just a number on a thermometer. The term represents the many factors that combine to create cold water capable of supporting aquatic ecosystems. Water managers deliver cold water from reservoirs to streams to support aquatic life. But Willis said this assumes that all cold water is the same -- akin to giving blood to another person without understanding their blood type and health status.

While previous studies have suggested that dams can be operated to achieve ideal temperatures, few tested that hypothesis against the temperature patterns aquatic ecosystems need. The UC Davis study assessed stream temperature data from 77 sites in California to model and classify their "thermal regimes," or annual temperature patterns. It found the state's reservoirs do not adequately replicate natural thermal patterns, making them incapable of supporting cold-water species effectively. The study does not suggest removing all dams. However, considering removing "deadbeat dams" where there are critical ecosystems could help restore natural processes and support fish, people and biodiversity amid climate warming.

Points to consider

- What do we need to achieve to adapt to effective country-driven climate change?
- How can we emphasise the importance of water management for reducing vulnerability and building climate resilience?
- How can we ensure that these activities are feasible?

Useful links

- https://www.counterpunch.org/2021/09/01/why-dams-are-ineffective-for-cold-water-conservation-for-salmon-and-trout/
- https://www.sciencedaily.com/releases/2021/08/210825143023.htm
- https://www.iucn.org/resources/issues-briefs/water-and-climate-change#why
- https://californiawaterblog.com/2020/06/14/whats-the-dam-problem-with-deadbeat-dams/