



## **Can a River be Restored after a Century of Disturbance? Lessons from Fossil Creek, Arizona (USA).**

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Fossil Creek, Arizona was dammed and water was diverted for hydropower production for almost a century. Historically Fossil Creek was a large stream high in calcium carbonate that formed large travertine dams. Travertine formation was dramatically reduced because of the water diversion. Non-native bass and sunfish dominated the fish assemblage. Managers removed non-native fish, returned full flows, and dismantled the diversion dam. Here we demonstrate that multiple attributes of the river rebounded when the primary threats were reversed. Travertine dam formation increased immediately changing the geomorphology of the river. Native fish increased quickly and remained high. Both removal of non-natives and return of flow was essential to fish recovery. Food web structure, measured using stable isotopes, showed that natives replaced non-natives at the top of the food chain. The contribution of algae in fish diets increased concurrent with increases in primary productivity. Primary productivity and nitrogen uptake increased in response to flow and travertine deposition. Non-native crayfish increased immediately following restoration but subsequently declined in most sites. Non-native crayfish appear to be controlled by fish predation and travertine deposition. The primary remaining threat is unsustainable recreation. Because Fossil Creek is designated as a Wild and Scenic River, managers will be required to develop and enforce an adequate management plan.