In the winter and spring of 2020-2021, 8,775 acres of agricultural land in Yolo County, California was intentionally flooded. These “dry-side” rice fields, although on the former floodplain of the Sacramento River, are separated from the fish-bearing Sacramento River (the “wet-side”) by high flood levees. Today, levees cut off 95% of the Central Valley’s floodplains from river channels so that Central Valley aquatic ecosystems no longer recruit floodplain the food web resources needed to support robust aquatic food webs, create fish biomass and sustain abundant fish populations.

In this experiment we asked whether floodplain food web resources “grown” in intentionally inundated “dry-side” agricultural fields could be exported back to the river via flood drainage infrastructure. If so, we were interested to know whether those resources could improve juvenile salmon foraging success and increase growth rates. In order to test these questions, we caged fish in the floodplain drainage canal, at the location where the floodplain drainage water entered the river and at locations both up- and downstream. We hypothesized that zooplankton abundance and fish growth rates would be elevated at the managed floodplain outfall location, relative to the upstream location. We measured water quality parameters, zooplankton species assemblage and abundance, and juvenile Chinook salmon growth rates with PIT tagged, hatchery-origin fish confined to enclosures at the study locations. The 8,775 acres of managed floodplain was drained over the coarse of 5 weeks in February and March, 2021 at a maximum rate of 1,000 cfs. The Sacramento River flow during the experiment ranged from 3,000-12,000 cfs. Fish growth rates at the floodplain outfall location were up to twelve times greater than growth rates upstream of the outfall and enclosure fish experienced growth rate benefits at least up to six miles downstream from the managed floodplain outfall.

This study demonstrated a management practice that transfers floodplain food web benefits from managed floodplains without anadromous fish access, to the food-scarce Sacramento River ecosystem. Multiple districts across the Sacramento Valley maintain similar water infrastructure to what was used in this pilot action. If incorporated at large scale into water management practices, fish food production on “dry-side” agricultural fields and wildlife refuges could contribute substantial food resources to rearing and out-migrating juvenile salmon populations in the Sacramento River system.