

Summary of Predation Issue Conversations at Reclamation Facilities and Operations

Predation on fish at Reclamation dams and diversion structures is widespread in the western United States, and is one of many stresses contributing to the decline of native freshwater fish. River systems and flow regimes have been dramatically altered from historic conditions due to impoundments and associated water storage and diversion operations. In addition, many nonnative fishes and aquatic invertebrates have been introduced (some intentionally, some accidentally) both for sport and as a source of prey. These two factors together have created conditions in which native freshwater fish (including smaller species and juvenile of larger species) are disappearing. This pattern is widespread in part because western native fishes evolved in river systems with relatively few predators. Predators include invertebrates to mammals, many introduced, and some native but in unusual abundance due to habitat alteration. Introduced fish and other aquatic predators (e.g. crayfish, birds, and mammals) are a type of invasive problem that is serious and significant. Oftentimes, regulated rivers enable these pest species to have higher reproduction and compete more efficiently than the native fish. By regulating river flows, we've created opportunistic feeding and nesting sites along river corridors.

Predation on native fish may occur when fish are delayed, injured, and/ or disoriented in upstream and downstream migrations, passage through turbine and spillway releases, or stranded in poor habitat due to alteration of natural flow/temperatures, etc. Reclamation is involved in a variety of projects to evaluate and improve performance of fish screens and fish passage to reduce the size of fish losses (although sometimes, these same screens create habitat that's conducive to introduced predatory species).

Predation on threatened and endangered native (T&E) fish species appears to significantly impact the success of recovery efforts in the western United States. Efforts are underway in some facilities/river systems, but a more coordinated comprehensive undertaking may be needed. Efforts to reduce predators in the vicinity of dams and water diversion structures by the Army Corp of Engineers in the Columbia River seem successful. Improved fish passage structures would reduce delay in upstream and downstream migrations which would then reduce predation on native fish that are delayed and/or blocked from completing their migration. Modified flows in key river corridors would reduce island formation which would reduce bird predation on outmigrating juvenile fish. In addition, more natural flows would improve nursery habitat for larval and juvenile fish.

Other efforts could include more analysis of feeding habits of predatory species, modification of fish screen and water diversion systems to move predators away from passing native fish (or provide refuge for sensitive species), wider development of programs to balance recreation with T&E conservation/recovery goals .

Some well-known predation problem areas include channel catfish and common carp in the San Juan River, flathead catfish, striped bass, common carp and centrarchids in the lower Colorado River, striped bass in the Sacramento-San Joaquin system, smallmouth bass, northern pikeminnow, sea lions, and several bird species in the Columbia River system, and northern pike, walleye, channel catfish, and smallmouth bass in the Yampa River, etc. Three efforts used by several agencies to reduce the number

of predators with some success include active and continuous predator removal trips in the San Juan and Yampa rivers, offering a bounty to anglers who catch and remove northern pikeminnow in the Columbia drainage, and reservoir eradication (both by target species removal efforts and whole lake poisoning). In-river efforts to remove predators are costly in many ways, but may allow the native species an opportunity to recover. The northern pikeminnow issue in the Columbia basin is interesting because on the one hand this fish is a native species, but its population has exploded due to dam construction and the easy availability of disoriented prey sized juvenile salmonids up and downstream.

Early efforts to manage riverine fisheries focused on supplying sport fish for anglers. Although this continues today, we are also widely involved in identifying and ameliorating conditions that contribute to impacts like predation on the T&E species. We are in a period of trying to cope with the many changes due to settlement of the west, and fish predation, due to a suite of past and ongoing habitat changes is significant and needs to be directly addressed.