

MYTHBUSTERS #6

Public Power Council Fish and Wildlife Committee *Revealing Fish and Wildlife Myths*

MYTH: *Predation is not a significant factor on salmon and steelhead mortality as compared to the dams.*

THE FACTS:

- Predation is a significant factor on salmon and steelhead mortality and needs to be addressed as part of a comprehensive plan.
- Birds, fish and sea lions feed on salmon and steelhead in large quantities, significantly impacting the species mortality in the Columbia River Basin.
 - ⇒ Bird predators have consumed between 4% and 21% of the *juvenile* salmonids migrating down river each year.
 - ⇒ Predatory fish consume from 2% to 7% of the juvenile fall chinook passing some dams. No basinwide estimates are available.
 - ⇒ Sea lions consume an estimated 4% of the *adult* spring chinook population passing the Bonneville Dam each year. They also consume large numbers of sturgeon and lamprey. This figure does not include salmon and steelhead taken by sea lions from the estuary up to Bonneville Dam.
- Actions are being taken to address predation and more are planned. Some of these actions are paid for through the Columbia River Management Program of the US Army Corps with federal appropriations funding as well as funding from regional electricity customers.
 - ⇒ The Corps is currently relocating terns to areas away from the Columbia River. Exclusion wires are also being installed at dams to reduce predation. Additional action can be taken to control the populations of other predatory birds such as cormorants, gulls and pelicans.
 - ⇒ The only current program to control fish predators is the Northern Pikeminnow Management Program. For other predatory fish, states take action to enhance these species for recreational opportunities and to increase license sales. A balance between recreation and salmon and steelhead survival must be achieved.
 - ⇒ The Corps has initiated a program to monitor sea lion predation and to test methods for reducing predation rates, including “lethal take” of sea lions, a measure that is currently being litigated.

What arguments are used to support this myth?

- **Predators are natural and they do not eat that many fish.**
 - ⇒ **Counter:** Predatory populations, many of which are non-native species are increasing in number, resulting in significant reduction of both juvenile and adult salmon and steelhead migrants.
- **Some of these predatory fish species are important for recreation.**
 - ⇒ **Counter:** While some predatory species provide recreation opportunity, the impact they have on migrating salmon and steelhead is significant and should be addressed.

What this means:

Predation by birds, fish and sea lions is a serious problem that impacts the survival of salmon and steelhead in the Columbia River. Authorities must continue to increase the effectiveness of federal and state actions reducing predation to improve salmon and steelhead survival.

What are the supporting arguments for these facts?

1. **Predatory birds and fish consume tens of millions of salmon and steelhead each year in the Columbia River Basin. Sea Lions consume large numbers of adult salmon returning from the sea.**

The populations of many species that feed on salmon and steelhead in the Columbia River Basin are increasing each year due to changes in habitat and legal protections for some predators. BPA customers will fund about \$9 million in predation research and control programs in 2009. However, the current control programs are not adequate to mitigate the increased impact from these growing predator populations. The Corps and BPA are now in the process of developing a more holistic predator management program to address this growing problem. Following are some of the actions being taken and recommendations for improved predator management.

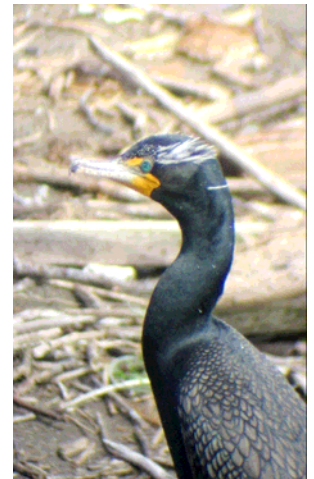
Bird Predators

Caspian terns and double-crested cormorants are the primary bird predators on juvenile salmon and steelhead in the Columbia River Basin. To a lesser extent other species such as gulls and pelicans feed on juvenile salmonids. Since 1998, avian predators have consumed between 4% and 21% of the juvenile salmonids migrating through the river each year (Muir, *et. al.*, 2009).



Caspian terns were first observed nesting in the Columbia River estuary in 1984. By 1998, about 17,000 terns were nesting on Rice Island in the estuary, making it the largest colony in the world. That year, terns ate an estimated 12.4 million salmon smolts, 13% of the year's entire seaward migration. The tern population is declining due to natural population fluctuations and relocation efforts by the Corps.

In recent years, *double-crested cormorant* populations in the Columbia River estuary have increased from 100 pairs in 1989 to around 12,480 pairs in 2004, making it the largest colony of its kind on the Pacific Coast. These birds ate an estimated 6.4 million salmon and steelhead in 2004. The cormorant population continues to increase.



Predation by *gulls* and *pelicans* is localized but can be significant. The populations of these two species are increasing and subsequently, so are predation rates.



Fish Predators

Some predatory fish species such as the northern pikeminnow are native to the Pacific Northwest. Additionally, there are large populations of non-native predatory fish species throughout the Columbia River Basin. Non-native predatory species such as smallmouth bass, northern walleye and channel catfish were often planted in streams and lakes in the Pacific Northwest during the last two centuries to enhance recreational fishing opportunities. Currently, states have enhancement programs for these fish to provide more recreational opportunities and increase license sales.

The primary native fish predator of juvenile salmonids in the Columbia River Basin is the ***northern pikeminnow*** (NPM). While there has been no basinwide evaluation of NPM predation, the ODFW estimated that in the early-1990s, NPM consumed an estimated 1.4 million juvenile salmonids in the John Day reservoir alone (Ward 1997).

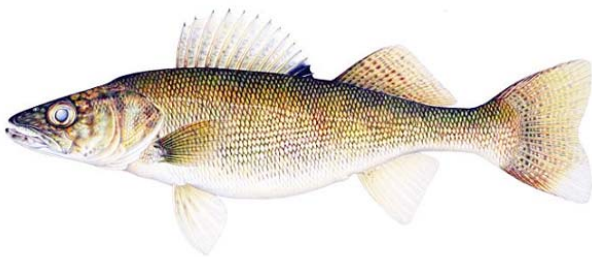
Northern Pikeminnow



Smallmouth Bass



Northern Walleye



There has been little work done to quantify the predation by non-native predatory fish species such as bass, walleye and catfish. However, minimal findings are not positive.

- The USGS-Biological Survey found that smallmouth bass consumed about 2% of the juvenile spring chinook and 7% of the juvenile fall chinook passing The Dalles Dam in 2002 (Duran, *et. al.* 2003).
- The WDFW reported it has recently observed large populations of channel catfish below the dams in the Snake River and in the Yakima River.

Channel Catfish



Sea Lions

Large numbers of sea lions began preying on adult salmon and steelhead at Bonneville Dam in 2002. Sea lions have also been observed to prey on sturgeon and lamprey. The numbers of both California and Steller sea lions have increased each year and they are staying for a longer period of time resulting in higher predation rates on adult salmon and steelhead. They feed at the dam primarily in the spring then migrate to breeding areas in California and Alaska by June each year.

Sea lions consumed about 4,500 adult salmonids at Bonneville Dam in 2008; a large majority of these fish were spring chinook. Sea lions consumed almost 4.7% of the spring chinook and steelhead run in 2007. Sea lions captured an estimated 800 sturgeon near Bonneville Dam in 2008.

California sea lions feed primarily on salmonids, particularly spring chinook. Males may reach 1,000 lbs. and 7 feet in length. Females grow to 220 lbs. and up to 6 feet in length. A California sea lion captured at Bonneville Dam in 2008 weighed 1,454 lbs., the largest for any animal observed to date. The population of this species is large and growing along the Pacific Coast of the United States.



Steller sea lions are much larger than the California sea lions. They can weigh over one ton and reach lengths over 9 feet. These large animals have been observed to feed primarily on large sturgeon in the vicinity of Bonneville Dam. This species is listed as **threatened** under the Endangered Species Act, significantly limiting options for controlling this species in the Columbia River.

2. Predatory bird, mammal and fish species should remain a key focus of salmon recovery efforts.

Suggested additional actions:

- Assess population of predatory species in the federal hydrosystem
- Assess and quantify feeding habits and consumption rates of predatory species
- Develop programs to balance native predatory species populations with salmon conservation goals
- Develop programs to control populations of non-native predatory and invasive species populations that are impacting juvenile fish passage survival or salmon recovery efforts
- Management actions should be primarily focused in the vicinity of the dams to address their localized effects

Current actions:

Bird Predators

There are a few primary strategies used to control predatory bird populations. Most predatory bird species are protected species under the Migratory Bird Treaty Act and cannot be harmed. Control actions must undergo rigorous evaluation and environmental review.

Predation is usually localized and can be addressed with management actions. BPA Customers fund a variety of research and control programs. Over \$5 million will be spent in 2009 on the following types of management actions:

Relocation: By creating an island made of dredge spoils in the Columbia River estuary, the Corps provided stable, safe, high quality breeding habitat for terns. The Corps relocated terns to this island in 1999, moving them from habitat farther upriver. The hypothesis was that if the terns were closer to the ocean they would eat more marine fish species such as herring. By 2003, all terns nesting in the Columbia River estuary used this island. By 2005, the colony's salmon consumption declined from that of previous years, to about 3.6 million (BPA 2006). In the last few years, the Corps has constructed artificial nesting islands in southern Oregon and in the Bay Area of California. Last year, several terns relocated from the Columbia River to these new breeding grounds. These actions have been effective steps toward reducing the population of terns in the Columbia River Basin.

Exclusion: the Corps has installed avian wires at most dams. This is a series of wires strung between the dams and shore to effectively block birds from feeding near the dams. This strategy has proven effective for reducing predation in the vicinity of the dams.

Removal: The Corps formerly used lethal measures to remove a portion of birds feeding near the dams. They were recently sued to stop this practice. The Corps is now in the process of obtaining a biological opinion from the USFWS to allow removal of some birds in areas adjacent to dams.

Fish Predators

The only program to control fish predators is the Northern Pikeminnow Management Program (NPMP). Funded by BPA customers at about \$3M annually, this program pays anglers to remove northern pikeminnow from the Columbia and Snake rivers. Since 1990, anglers have removed about 3 million large northern pikeminnow from the Columbia and Snake rivers. BPA estimates that pikeminnow predation on young salmonids has been cut by 30%, saving 2 million to 4 million juvenile salmon a year (BPA 2006).

Little is being done to control populations of other fish predators such as bass, walleye and catfish. Contrary to controlling these populations, states have enhancement programs to increase recreational value of these fish and boost license sales. The Corps should initiate a program to quantify predation rates by these non-native fish species. The Corps should also initiate a program to reduce the number of fish predators in the vicinity of the dams to improve juvenile fish passage survival.

Sea Lions

The Corps initiated an extensive monitoring program at Bonneville Dam to estimate the numbers of fish consumed by sea lions each year. The Corps is also working with the states and tribes to develop methods to harass sea lions in the vicinity of Bonneville Dam in an attempt to reduce predation. Sea lion predation further downstream of the dam is natural and there are currently no plans to address this source of fish mortality. BPA Customers will fund about \$500,000 in sea lion research and control measures in 2009.

Currently, harassment techniques involve a combination of non-lethal deterrents, including chasing sea lions with boats, above-water pyrotechnics (i.e., cracker shells, screamer shells or rockets), rubber bullets, rubber buckshot, and beanbags. Boat-based crews also used underwater percussive devices known as seal bombs. These measures appear to have had little effect on reducing predation. Some study results indicate that sea lions began shifting their feeding activities to night and other times when harassment was not occurring.

The Corps is developing a program to remove California sea lions and is currently allowed to relocate or lethally remove up to 85 animals. Because the lethal removal element of the program is currently being litigated, the Corps is only relocating animals. Although Steller sea lions also appear to be feeding on large numbers of adult salmon and steelhead, the Corps is not planning to remove them because these sea lions are ESA listed species.

Literature Cited

- Bonneville Power Administration (BPA) 2006. Backgrounder: Predator control helps salmon. December 2006. Bonneville Power Administration. Portland, Oregon
- Duran, I. N., Liedtke, T. L. and J. H. Petersen 2003. Predator-Prey Interactions in The Dalles Dam Tailrace, 2002 Annual Report of Research for 2002. U. S. Geological Survey Western Fisheries Research Center Columbia River Research Laboratory 5501A Cook-Underwood Road. Cook, Washington
- Independent Science Advisory Board 2008. Non-Native Species Impacts on Native Salmonids in the Columbia River Basin Including Recommendations for Evaluating the Use of Non-Native Fish Species in Resident Fish Substitution Projects. ISAB 2008-4. Prepared for the Northwest Power and Conservation Council. Portland, Oregon
- Muir, B., Smith, S. Marsh, D, Williams, J. and J. Faulkner 2009. Reach Survival Estimates, 2008. Presentation to the NW Power and Conservation Council, March 10, 2009. NOAA-F Northwest Fisheries Science Center. Seattle Washington.
- Ward, D. L., 1997. Evaluation of the Northern Squawfish Management Program. Final Report of Research, 1990-96. Edited by David L. Ward. Oregon Department of Fish and Wildlife. Clackamas, OR 97015