

Wisconsin's War on Nature

Fish Fervor Destroys Beavers—and Wetlands during Decade of Drought

It's not only unions that Wisconsin has declared war upon. Since 1985 the Wisconsin Dept. of Natural Resources (WDNR) has waged a successful campaign to wipe out 70% of the state's beavers (shrinking a population of 225,000 in 1985 to 67,000 in 2008) for the declared benefit of trout fishermen. Much of the battleground is in the northern Wisconsin, where beavers have been repeatedly "cleared" from about 1,500 miles of streams and adjacent uplands.

Hydrologist Donald Hey, co-founder of the Wetlands Initiative based in Illinois, said of the WDNR's current beaver plan, "They're making a huge mistake. If anything, they should go the other way. By eliminating the beaver, you are reducing the storage capacity of the watershed over time and reducing water quality."



WDNR efforts to increase native brook trout and non-native brown trout have reduced Wisconsin's beavers by 70%.

Because beaver dams slow the flow of streams and keep water on the land for days to weeks, instead of

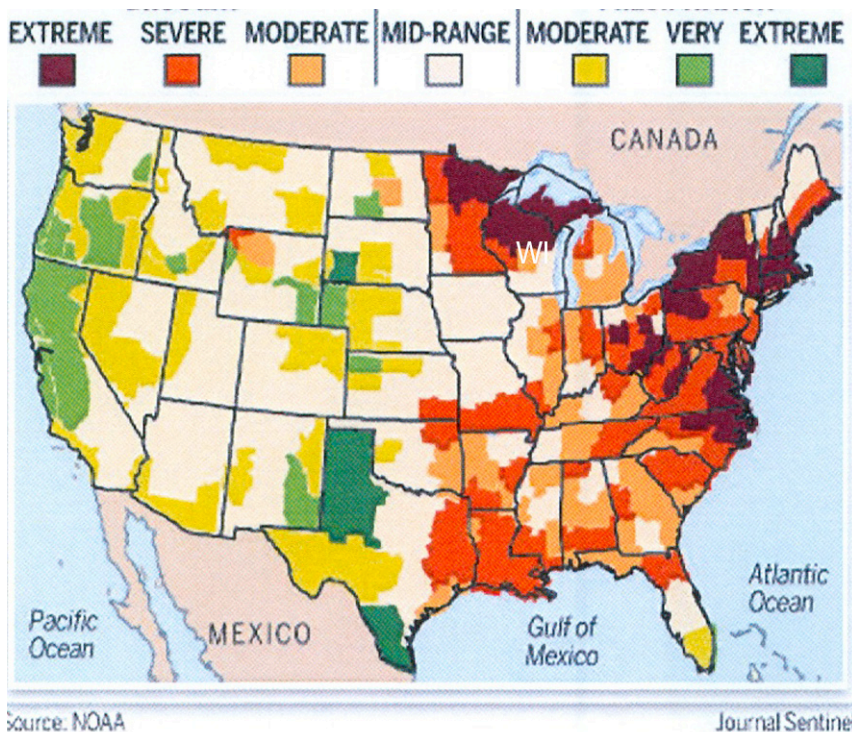
hours, silt settles out and waterways, are stabilized. This means less water treatment is needed downstream, and less damage occurs from floods and droughts. When the early fur traders took out tens of millions of North American beavers before 1900, hydrologists believe the water table in the Mississippi River drainage basin—including Wisconsin—dropped significantly. Now the state has created a Beaver Task Force to update the draconian management plan.

Deep drought in northern Wisconsin

In 2002 northern Wisconsin began experiencing dry conditions that had become a severe drought by 2010 (see the NOAA map to the left). According to a May 25, 2010 *Milwaukee Journal Sentinel*, article, most stream levels lost a third of their normal flow and "Wetlands are no longer wet. Trout stream tributaries are drying up."

This drought has eased a bit, according to NOAA's Weather Forecast Office at La Crosse, WI,

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This 2010 map shows northern Wisconsin, where many streams are kept "beaver free" in extreme drought. (See the white "WI".)

Wisconsin's War, Continued from p. 4 but during the first two weeks of March, 2012, “abnormally dry conditions continued across northern and western Wisconsin...”

1,500 miles of Wisconsin streams, mostly in the north, are kept “beaver free”

Could restoring beavers in Wisconsin help to alleviate the drought? A study by C. A. Johnston in a neighboring Midwest state showed that beaver activity over 48 years in a 115 square mile region of Minnesota increased the area of ponds and wetlands from 5,394 acres to 9,111 acres—an impressive 70% gain.

Beaver ponds and wetlands are known to raise groundwater levels, both upstream and downstream of dams, and may provide the last refuges for fish during times of drought. Droughts and other extreme weather events are expected to worsen as global climate change continues.

Beaver Task Force

Last year the Wisconsin Dept. of Natural Resources (WDNR) created a Beaver Management Task Force, composed of 10 WDNR staff along with 14 representatives of other agencies and “user groups” to update the state’s beaver plan—though WDNR will make the final decisions. WDNR briefly hosted an online survey aimed at trappers; some had complained about the statewide shortage of *Castor canadensis*, and held four public meetings with “moderate attendance” that ranged from 6 to 24 citizens. Many of these doubted that beaver dams harm trout, based on their own experiences.

Based upon the October 2011 WDNR Webinar, “Wisconsin Beaver Management: Past, Present and Future” (now online at fyi.uwex.edu/beaver), the badger state’s beavers may be still be in trouble. Four of the five presenters were from WDNR and the fifth was Jason Suckow of WI APHIS

Wildlife Services, who directs the federal contract killing in the north. Two staffers spoke from the WDNR’s Fisheries Bureau that has driven the anti-beaver plan.

Fish fervor trumps science

To justify the liberalized beaver trapping, along with much contract killing, during the Webinar a fisheries biologist cited only two studies: one by WDNR former employee Ed Avery and a more statistical study about the thermal effects of WI beaver ponds on brook trout by Gil McRae and Clayton Edwards. To WDNR’s Steve Avallemant, the “simple core issue” is (as given on WDNR’s new “Beaver and Trout Management...” poster), “Beaver and trout cannot coexist on coldwater streams in Wisconsin”. But the lead author of the WI thermal effects study, Gil McRae, recently said, “Certainly it did not show that beaver and trout could not coexist.”

“Removal of beaver dams did not generally reduce the difference between upstream and downstream temperatures...”

McRae, who is now Director of the Florida Fish and Wildlife Research Commission, explained, “The results depended upon where the ponds were located in relation to springs. Under certain conditions [beaver] ponds could raise the temperatures slightly.... Beaver can cut off trout from the upper reaches of a stream, but if all else is in balance, this is not a problem.” According to the abstract of McRae study, “Removal of beaver dams did not generally reduce the difference between upstream and downstream temperatures; in some cases dam removal increased the warming rate.”

“Beaver co-evolved with salmonids [salmon and trout] making improbable an essentially negative relationship between these organisms.”

according to a U.S. National Research Council report on *Riparian Areas* (USNRC 2002) that discussed beavers and “fish fervor.”

Ed Avery’s 1995 study of brook trout/ beaver relationships “had inconclusive findings that were statistically untested,” according to this NRC report. Avery’s 2002 study found increases in the size and number of brook trout 18 years after dams

“Beaver co-evolved with salmonids [salmon and trout] making improbable an essentially negative relationship improbable...”

were removed from the Pemonee River, which he said validated “the removal of beaver and beaver dams as one of Wisconsin’s most cost effective trout habitat management tools.” But many other changes occurred during those years, including WDNR’s switch to stocking hardier brook trout from wild spawn rather than farm-raised fish, new regulations limiting the number and size of trout fishermen can take, and the clean up of arsenic and other industrial wastes from the Pemonee River. These and a lack of control streams, make it impossible to determine a true cause and effect relationship.

Because high beaver dams raise groundwater levels, which causes subsurface flows of cool water to enter the waterways downstream of dams, “destroying high-head dams could be counterproductive by actually decreasing the interaction between groundwater and surface water and thereby warming downstream reaches” (Fuller 2011). When such cooling groundwater flows decrease, stream water temperatures rise, according to a U.S. Geological Survey study done in Wisconsin (Hunt 2006).

Steve MacFarland of the Bureau of Science Services suggested

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Wisconsin's War, Continued from p. 5 during the Webinar that more research be done on “the interactions between beaver and trout.” That’s a good idea, but no one mentioned that restoring lost beaver wetlands might alleviate the state’s decade-long drought, or focused upon the other essential services beavers provide for countless other species—including people.

When furbearer specialist Steve Olson listed “user concerns,” he included “Beaver decline”, “Wetland community concerns” (waterfowl, otters, amphibians) and “Forest and Wetland community stability” (due to the loss of beavers), but foremost on the list was “Damage control necessary” and “Priority trout streams free flowing.”

Free flowing stream mindset

Because today’s resource managers have never witnessed streams as a series of beaver dams such that early explorers encountered, they tend to assume that free flowing streams are normal. “Even our longest term baseline data are quite recent (within approximately the last fifty years),” according to *Riparian Areas* (USNRC 2002), “and come exclusively from a time after pre-settlement beaver populations were decimated...”

This “free flowing stream paradigm” might explain Steve Olson’s response to a Webinar attendee’s question, “What was the pre-European settlement beaver population in Wisconsin? He replied, “Obviously the beaver population was much lower than what it is today...” WDNr has produced a new poster with “Historic Wisconsin Beaver Trends”, including “1600 – 1850–Beaver statewide -Low density,” even though one of WDNr’s own publications on The Beaver states, “Beavers were abundant in Wisconsin before settlement.”

“For two hundred years, Wisconsin life as dominated by the beaver,” according to the Wisconsin Historical Society’s website. “From 1650 to 1850 the economy revolved around beavers in the way that today’s revolves around oil.”

Historical record show that fur traders exported many tens of thousands of beaver pelts annually from Wisconsin until limitless killing depleted the animals about 1850. Most beaver experts have estimated the species population in the U.S. during recent decades to be only about 10% of the pre-settlement population.

What about Other Species—& People?

What about the impact of destroying wetlands upon rare species and essential services for people? Before WDNr began the campaign to shrink the state’s beaver population (this included liberalized trapping regulations, plus contract killings via APHIS Wildlife Services and other hired trappers), there were about 225,000 beavers existed in the state in 1985. By 2008 (the latest year with a statewide estimate), only 68,000 beavers survived.

Each year about 40,000 beavers are being trapped. How might this loss—beaver damming restores and maintains wetlands—impact Wisconsin’s other wildlife and essential environmental services for people?

Lost wetlands services from 157,000 beavers may be worth over \$2.3 billion per year.

What might losing 157,000 beavers since 1985 mean in terms of vital wetland services? A 1997 study by over a dozen ecologists and economists rated the ecological services provided by freshwater wetlands such as water cleansing, critical habitat, and water regulation, including drought prevention, as worth about \$8,000 per acre per year (Costanza 1997). Since it’s been estimated that an average WI beaver colony has 5.5 members, 157,000 beavers represents 28,545 colonies.

In another Great Lakes state, New York, it was estimated that a beaver colony impounds 15 acres on average. If each WI colony impounded a more conservative estimate of only 10 acres, then since 1985 about 285,450 wetland acres have been lost. Multiplying this figure by the 1997 study’s estimate of the value of wetlands ecological services at \$8,000/acre/year gives an estimate of the lost Wisconsin wetland services as being worth more than \$2.3 billion per year.

Cutting the losses

Some of this loss could easily be prevented by using modern beaver flow devices at bridges and culverts, where APHIS WS now traps. Currently it appears that the modern highly effective devices, such as the Beaver Deceiver and Flex Leveler have not yet reached Wisconsin.

As a WDNr Wetland Communities webpage states, “Wetlands perform a number of natural functions that benefit

natural ecosystems and society. Water quality is often dependent upon wetlands because they serve to trap sediment, remove nutrients, protect shorelines, and slow the effects of floodwater. They also serve as both discharge and recharge areas for groundwater and provide habitat for many species of plants and animals.... 43% of all federally-listed threatened and endangered species use wetlands at some point in their life cycles.... Further loss or degradation of wetlands would affect a disproportionate share of Wisconsin’s rare species.”

Although a 2011 summary of the WDNr’s Beaver Management Plan describes beavers as “creating superb wetland habitat for our enjoyment and the benefit of numerous other wildlife” between such rhetoric and agency policy there’s a huge disconnect, driven by the fisheries bureau and trout lobby.

How are Wisconsin’s wetlands doing?

Wisconsin had lost about 50% of its original wetlands by the mid 1980s, according to U.S. EPA “Facts about Wetlands” with data from a 1989 US Fish and Wildlife Service study by Dahl and Johnson. Since then, losses have continued in most states even as efforts began to build a digital wetland database nationwide. A colored map of “wetlands inventory status” in *National Wetlands Inventory: A Strategy for the 21st Century* (2002 FWS) is startling. It shows Wisconsin as almost entirely white—at the very beginning “Photointerpretation in Progress” stage of wetlands mapping, bounded by three red states already having “Large Scale Digital Maps.” The badger state also lagged behind all the others nationwide.

Wisconsin is in the midst of a multi-state region with “the highest rate of freshwater wetlands loss to upland between 2004 and 2009,” according to a map in the latest FWS report to Congress, *Status and Trends of Wetlands in the Conterminous United States 2004 to 2009* (Dahl 2011). The same report features a Wisconsin wetlands restoration project as an example of “over-reporting.” Researchers from universities and agencies used geospatial data to determine the accuracy of a WI project reported to have restored 121 wetland acres. They found, instead, the project area had only 35 acres of reestablished wetland—less than a third of the claimed acreage.

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At the National Wetlands Inventory website (USFWS 2012) the following appears under "Wisconsin State Data": "The statewide dataset for Wisconsin is not available due to policy issues between the USFWS National Wetlands Inventory and the State of Wisconsin." Wisconsin's program to digitize wetland maps "is underfunded and understaffed," according to a WDNR web page on WI Wetlands: Acreage Facts (<http://dnr.wi.gov/wetlands/acreagefacts.html>) "As a result there is no reliable qualitative and quantitative data about current rates of wetland loss."

The lack of money to map Wisconsin wetlands contrasts sharply with the ample funding for trout projects—revenues for trout management from license sales and trout stamps in 2009 was \$1,618,053.

"In fiscal year 2008 APHIS kept 750 miles of trout stream beaver free. About 90% of the work was in the Northern region," according to Expenditures of Inland Water Trout Stamp Revenues, Fiscal Years 2008-2010. "APHIS beaver control activities" doubled in 2009 when "1,517 miles of trout stream were kept free of beaver dams." Has the impact of degrading streams and destroying wetlands upon rare species and essential services for people gone unnoticed?

As Wisconsin heats up

"Wisconsin is at the southern edge of the natural distribution of brook trout," and "an increase in the average summer air temperature of just over 5° F could eliminate up to 95 percent of the brook trout habitat across the state", according to the Wisconsin Initiative on Climate Change Impacts (WICCI) (Pomlun 2011). "UW-Madison climate scientists, using data from the world's most powerful computer models, estimate that average annual temperatures in Wisconsin will continue to rise approximately six to seven degrees Fahrenheit by midcentury." Brook trout are sensitive to warm water and may be doomed, if the above forecast comes true.

Brown trout, a non-native species that was imported from Europe—where they evolved with European beavers—are more tolerant of warm water. Many wildlife species, and people, would benefit greatly if the WICCI recommendation to "Restore wetlands in upland areas to provide water storage, filtration and mitigate storm flows and nutrient loading

downstream" is carried out. The simplest way to do this and increase ecosystem resilience to climate change, would be to restore beavers.

Fish fervor and the CC rule

Ironically, pioneering ecologist Aldo Leopold had promoted the WI Conservation Act of 1927 that created the state's powerful Conservation Congress (CC) that's allowed the opinions of trout fishermen to outweigh both the public's environmental concerns and science-based policies. Leopold had "the good idea of bringing grassroots citizen input from a variety of interests... county by county," explains wildlife activist and columnist Patricia Randolph. But he had also warned: "1. That the money to manage nature and wildlife in Wisconsin come from general public funds (not special interest killing funds) and 2. That the landowner and environmentalist be as valued a part of the process as the hunter."

Funding to manage WI wildlife comes from licenses, instead of general public funds, despite Aldo Leopold's warning.

"Both were subverted," Randolph says. Funding to manage WI wildlife comes from licenses, instead of general public funds, and the general public is not involved in county CC elections. Because the Conservation Congress (CC) is supposedly just an advisory board, delegate elections are called "Hearings" and advertised in the outdoors pages. Although the elections may last four hours and involve many dozens of proposals, it is not an "issue-driven process" as candidates need not debate the issues publically. Randolph said, "I was elected into this mess in 1999-2002 under death threats as the first ever to break into their good ole boys club—and they resented it." Both she and a Green Party representative were treated like unwelcome outsiders and subjected to comments like, "We really should have a season on antis."

Randolph wrote a Nov. 27, 2011 column in *The Cap Times* about the WDNR's beaver policies that obliterate wetlands. She recently said Wisconsin wildlife activists are setting up a website to alert the public about their state's more egregious wildlife practices, such as hunting of wolves with dogs, and the new

site will have a beaver page. Wisconsin environmental groups must become more active in promoting and lobbying for science-based beaver/wetland policies that benefit both wildlife and citizens.

It's likely that some members of the Beaver Task Force are now questioning the shaky foundations of WDNR's beaver plan—including the claims that pre-settlement beaver populations were low and that beaver and trout cannot coexist on Wisconsin streams. Will anyone speak up publicly about this, or will they be worn down by peer pressure during sometimes day-long meetings?

The New York state environmental agency set up a similar stakeholder's committee in the late 1990s as part of a public relations effort to liberalize beaver trapping. But one committee member bravely acted against his own interests as a professional consultant to reveal the holes in the agency's argument. As a result, a bill to indiscriminately slaughter the state's beavers failed and many vital New York beaver wetlands survived.

As climate change inevitably brings more droughts and floods to Wisconsin, making use of nature's engineers to naturally restore wetlands and regulate flowages would be a cost-effective way to decrease the damage and improve the environment for everyone.

Sharon T. Brown

The last word in ignorance is the man who says of an animal or plant: "What good is it?" If the land mechanism as a whole is good, then every part is good, whether we understand it or not. If the biota, in the course of eons has built something we do not understand, who but a fool would discard seemingly useless parts? To keep every cog and wheel is the first precaution of intelligent tinkering.

Aldo Leopold (1953) Round River

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