

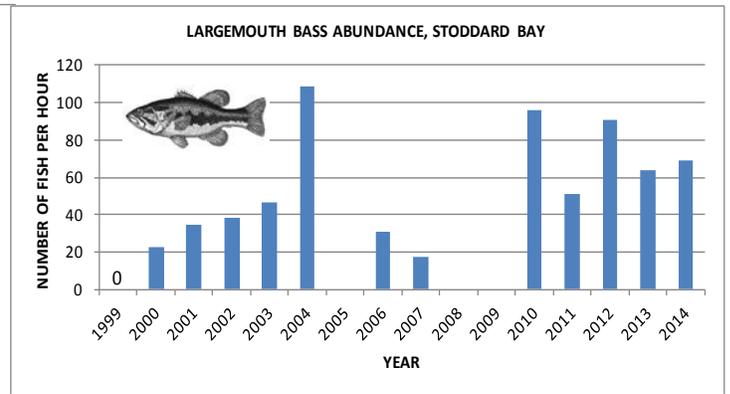
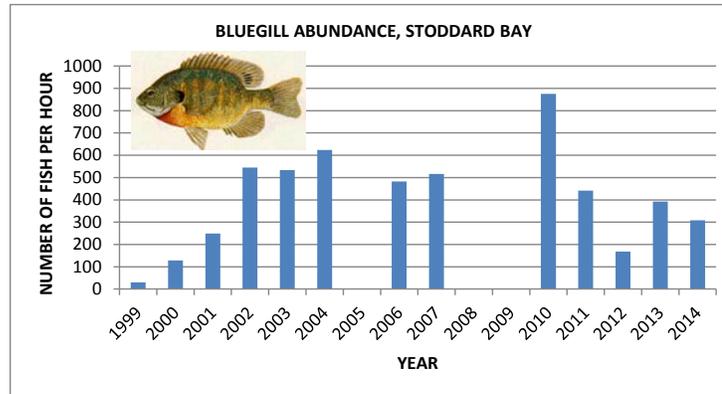
An Evaluation of Fishery Trends at the Stoddard Bay Habitat Project



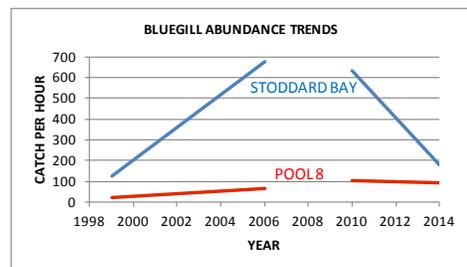
Stoddard Bay (Phase II Habitat Project) is a very popular fishery for bluegill, yellow perch, crappie and largemouth bass, particularly in winter. It is located near Stoddard in Pool 8 of the Mississippi River. The federal Upper Mississippi River Restoration Program (UMRRP) completed the project in September of 1999 for 3.5 million dollars. Features included 26 acres of islands, 15 acres of dredging, and the construction of six “seed” islands. The project area encompassed 600 acres of an impounded reach. A rock sill was designed with a notch to deliver 50 cubic feet per second of water into the project for over-wintering fish. The purpose of the project was to reduce wave action and associated erosion to promote water quality conditions and vegetation favorable to this formerly degraded fishery. This habitat project, located on the Upper Mississippi River National Wildlife and Fish Refuge, was spearheaded by the U.S. Army Corps of Engineers. Partners included the Wisconsin Department of Natural Resources (WDNR), Minnesota Department of Natural Resources, the U.S. Fish and Wildlife Service, and local interests.

During 1990 and 1999-2014, the WDNR sampled fish using nighttime electro-fishing at five locations within the project area. No samples were taken in 2005, 2008 or 2009. Samples were taken during the mid-October through mid-November time period. Electro-fishing runs were typically 595 meters long; a total of sixty-six runs were conducted, and all non young-of-the-year game fishes were captured, counted, measured and released.

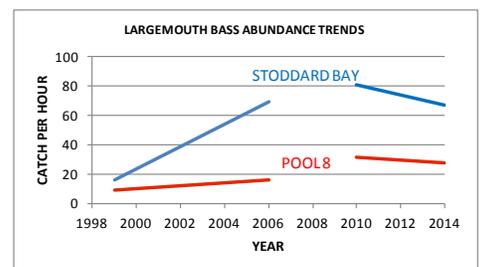
Bluegill abundance within Stoddard Bay increased from 1999 through 2006. Later, from 2010 through 2014, bluegill abundance declined. Largemouth bass also increased abundance from 1999 through 2006 and neither increased nor decreased abundance thereafter. Throughout all years, there was a general upward trend in bass numbers. Yellow perch abundance gradually increased from 1999-2014.



Several factors may influence abundance estimates when sampling fish on the Mississippi River. Annual variations in current velocity, water surface elevation, water quality, weather, sampling crew performance, angler harvest, and aquatic vegetation may affect abundance estimates. One important variable that can be examined is fluctuations in the surrounding population. Initial increases in game fish abundance could reflect trends occurring



throughout the pool and not population changes resulting from project construction. To compare Stoddard Bay changes to those found in the rest of Pool 8, we used fish data collected by the UMRRP*. Stoddard Bay bluegill and largemouth bass abundance increases from 1999-2006 were significantly greater than increases found with other areas of Pool 8; increases were 12 and 8 times more in Stoddard Bay. These results suggest bluegill and



largemouth bass populations increased the first eight years within Stoddard Bay due to project construction. An initial and later increase in yellow perch abundance was not different than increasing trends in Pool 8.

Fish populations within Stoddard Bay increased greatly compared to those populations found pre-construction. During a 1990 electro-fishing sample, bluegill and yellow perch were not found within the area, while largemouth bass were netted at 3 fish per hour. Post-construction samples found bluegill, largemouth bass and yellow perch catches increased to 370, 40 and 3.9 fish per hour, respectively.

In separate samples conducted since 2000, 730 fall electro-fishing samples were taken throughout Pool 8. Stoddard Bay ranked fourth highest of eighteen water bodies for bluegill abundance. Within the impounded reach of Pool 8, Stoddard Bay had the highest bluegill abundance among ten water bodies.

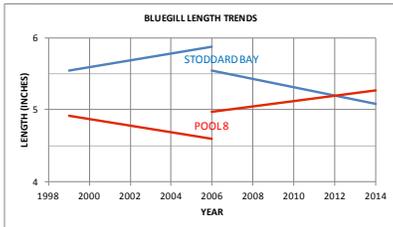
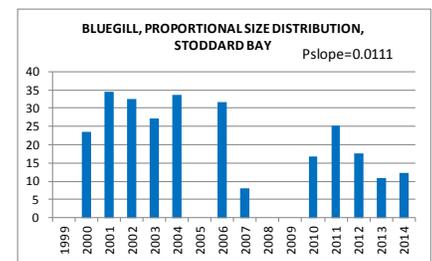
During more recent years, bluegill abundance within Stoddard Bay declined significantly; from 2010 to 2014, bluegill numbers declined 70 percent. At the same time, bluegill abundance within all of Pool 8 remained unchanged. Our measured abundance decrease is supported by recent angler complaints about decreased catches. In spite of recent declines, fish abundance is substantially higher than before project construction.



On winter weekends, hundreds of anglers flock to the project to ice fish. People come from distant locations including Illinois, Iowa, and southern Wisconsin because of increased fish numbers. Because of the large number of anglers, vehicle parking can be difficult. In response, local residents have allowed parking on private property as well as access by foot. A nearby motel caters to anglers and hunters. Because of the project, they have expanded their offerings to include parking for ice anglers, sale of live bait and fishing and hunting licenses. They've affirmed that "The Stoddard Islands...have created an area of the river that has resulted in excellent fishing" and that "the area is known for some of the best fishing and hunting in Southwest Wisconsin." Based on early 2000's winter aerial ice angler surveys, 30% of all ice fishing shacks and anglers in Pool 8 were located in Stoddard Bay.

Fish populations within Stoddard Bay exhibited changes in average length through time. Average bluegill length increased 0.3 inches from 1999-2006. This increase is an indication of a maturing population that may not have experienced excessive angling mortality. From 2006-2014, bluegill average length decreased 0.5 inches. Interestingly, Pool 8 had opposite trends. When bluegill size was increasing in Stoddard Bay, it was decreasing within Pool 8; when bluegill average length was decreasing within Stoddard Bay, it was increasing within Pool 8. Largemouth bass average size from 1999-2006 decreased by 1.1 inches. Later, during 2006-2014, largemouth bass average size increased 4.4 inches. Largemouth bass average lengths followed the same trend within Pool 8 throughout the time periods. From 1999 through 2014, the average size of yellow perch decreased 2.7 inches; most of this decrease occurred during the latter part of the time period. Over the same time period, there was an increase in size of yellow perch within Pool 8.

To summarize the size structure of bluegill populations within Stoddard Bay, we examined trends in proportional size distribution (PSD) through time; PSD is a length-frequency index that measures the proportion of quality sized fish within a population. A PSD can range from 0-100; a low PSD indicates a fishery dominated by smaller fish, whereas a high PSD indicates a fishery dominated by larger fish. From 1999-2014, bluegill PSDs within Stoddard Bay significantly declined. This decline suggests angler harvest, weak reproduction or juvenile survival affected bluegill size structure. As anglers harvest larger fish, PSDs will decline if similar numbers of smaller fish do not recruit into a harvestable size.



Our sampling data for Stoddard Bay, especially for bluegill abundance and average length, suggests that 2006 and 2007 is a transition period. In most cases, earlier upward trends are reversed. For example, bluegill length increased from 1999-2006 but then showed a downward trend from 2006-2014. Similarly, the early increasing trend in bluegill abundance declined during the later years of the time period. It appears 2006 was a "tipping point" when trends reversed direction.

SUMMARY

- From 1999 through 2006, the abundance of largemouth bass and bluegill significantly increased in the Stoddard Bay habitat project. This increase is substantially greater than increases seen within all of Pool 8. Yellow perch abundance increased throughout the 1999-2014 sample period; increased yellow perch abundance was similar to increases measured within Pool 8.
- Bluegill, largemouth bass and yellow perch increased in abundance compared to pre-construction samples. After project construction, Stoddard Bay had the highest bluegill abundance rank in lower Pool 8.
- Since 2010, bluegill abundance within Stoddard Bay decreased 70 percent. Bluegill abundance within Pool 8 remained stable.
- Bluegill size initially increased within the project suggesting a maturing population. In later years, average bluegill size has decreased. Average size of yellow perch decreased from 1999-2014. Pool 8 had an opposite average length trend for both these species.
- Opposite size trends in Stoddard Bay and Pool 8 observed for bluegill and yellow perch may be related to high exploitation within the project area, particularly in winter. Identical size trends for Stoddard Bay and Pool 8 largemouth bass could be due to lower exploitation rates. Bass are harvested at a much lower rate than panfishes.
- Although recent declines in bluegill abundance have been measured, the construction of Stoddard Bay clearly increased game fish numbers and provided a quality fishery.

The U.S. Army Corps of Engineers' Upper Mississippi River Restoration (UMRR) Program Long Term Resource Monitoring (LTRM) element is implemented by the U.S. Geological Survey, Upper Midwest Environment Sciences Center (UMESC), in cooperation with the five Upper Mississippi River System (UMRS) states of Illinois, Iowa, Minnesota, Missouri, and Wisconsin. The U.S. Army Corps of Engineers (Corps) provides guidance and has overall Program responsibility.

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