In 2009, the FQI value increased to 29.3. The values for all years are higher than the state and regional averages (Swanson 2009).

Aquatic Invasive Plants. Two aquatic invasive plants are found in Lake Wissota, curly-leaf pondweed (*Potamogeton crispus*) and Eurasian water milfoil (EWM, *Myriophyllum spicatum*). Both species have increased in frequency over the 20-year course of the three plant studies. *P. crispus* increased from 0.63% in 1989 to 3.45% in 2009. *M. spicatum* increased from 0% in 1989 to 0.98% in 2005 to 1.48% in 2009. These frequencies are low compared to other species in the lake (ie. *Elodea canadensis* had a 25% frequency in 2009). However, in areas like Moon Bay where there are several beds of EWM, the EWM may begin to crowd out native plants, if it hasn't begun to do so already. It is also disconcerting that the frequency of EWM is increasing at all, given that it has been treated each year since it was first documented in the lake. It would seem that the frequency of this plant should have decreased with the 2009 survey rather than increased, since it had been treated by herbicides for several seasons prior to the survey. It also is cause for concern that new areas of infestation appear each year. The increase in frequency of *P. crispus* should be monitored carefully to determine if it is displacing native plants.

Total Acreage Vegetated. Visual estimations of plant bed sizes totaled 495.5 (7.9%) acres over the entire water system, 162.9 (45.7%) acres in Moon Bay, 47.8 (11.9%) acres in Little Lake and 152.5 (13.2%) acres in the Chippewa River north of the main basin (Table 6). Shoreline vegetation occurred on 39.3 miles (70.1%) of the entire shoreline (Swanson 2009; Figure 12).

The Wisconsin Department of Natural Resources fisheries has recorded 47 species of fish from 11 families in Lake Wissota between 1976 and 2008.

Fisheries

The Wisconsin Department of Natural Resources has recorded 47 species of fish from 11 families in Lake Wissota between 1976 and 2008, (Appendix F). A state endangered species, the slender madtom (*Noturus exilis*) was reported in the lake, but there is dispute about its identification, and it may have been a misidentified stonecat. The greater redhorse (*Moxostoma valenciennesi*) is a state, threatened species that was found in the lake in 1994. The lake sturgeon (*Acipenser fulvescens*), common in the lake, is considered a species of special concern in Wisconsin. Species of special concern are species about which some problem of abundance or distribution is suspected but not proven. The main purpose of this category is to focus attention on these species before they become threatened or endangered. Common carp (*Cyprinus carpio*) was the only species in Lake Wissota not native to Wisconsin.

Twelve species were captured only one time in Lake Wissota: bigmouth buffalo (1975), greater redhorse (1994), warmouth (2006), blacknose shiner (*Notropis heterolepis*, 2005), bluntnose minnow (*Pimephales notatus*, 1994), hornyhead chub (*Nocomis biguttatus*, 1994), largescale stoneroller (*Campostoma oligolepis*, 1994), longnose dace (*Rhinichthys cataractae*, 1994), river shiner (*Notropis blennius*, 1976), blackside darter (*Percina maculata*, 2005), Iowa darter (*Etheostoma exile*, 1994), and central mudminnow (*Umbra lima*, 1994).

No efforts were made to document all fish species present in Lake Wissota prior to or after the elimination of the drawdowns on the lake. However, fish surveys conducted after the major late-winter drawdowns were eliminated have shown improvements in fish populations that are dependent on aquatic

vegetation for part of their life history, most notably, largemouth bass, northern pike, bluegill and yellow perch (Joseph Kurz, pers. comm. 2009).

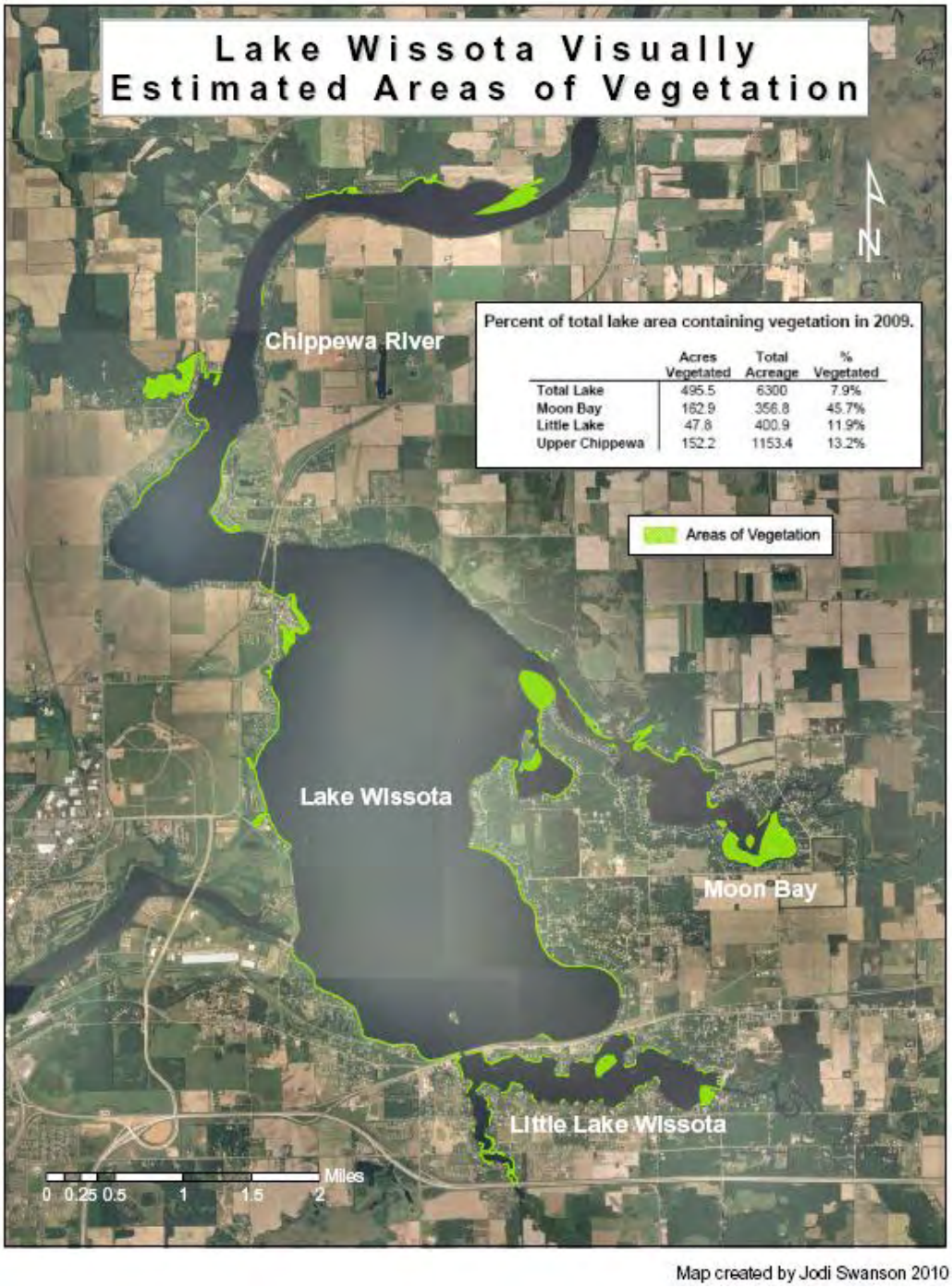

Figure 12. Map of visually estimated areas of vegetation on Lake Wissota from 2009.

Six fish species are considered abundant in Lake Wissota: walleye (*Sander vitreus*), black crappie (*Pomoxis nigromaculatus*), bluegill (*Lepomis macrochirus*), yellow perch (*Perca flavescens*), silver redhorse (*Moxostoma anisurum*), and emerald shiner (*Notropis atherinoides*). An additional nine species are considered common: channel catfish (*Ictalurus punctatus*), flathead catfish (*Pylodictis olivaris*), muskellunge (*Esox masquinongy*), northern pike (*Esox lucius*), smallmouth bass (*Micropterus dolomieu*), golden redhorse (*Moxostoma erythrurum*), shorthead redhorse (*Moxostoma macrolepidotum*), golden shiner (*Notomigonus crysoleucas*), and troutperch (*Percopsis omiscomaycus*).

Three species are considered rare on Lake Wissota: bigmouth buffalo (*Ictiobus cyprinellus*), warmouth (*Lupomis gulosus*), and creek chub (*Semotilus atromaculatus*).

Figure 13. Green Heron on Lake Wissota, 2009.
Photo courtesy of Jessica Soine.

Wildlife Habitat

The wildlife habitat available on Lake Wissota was assessed during a critical habitat area study conducted on 25 September 2006. Critical Habitat Areas are identified areas that provide food, shelter, or spawning/nesting habitat for wildlife (Figure 14) and invertebrates or areas that provide important navigational or scenic beauty locations for the public. **Critical Habitat Areas may also be identified because of their importance in maintaining water quality**. Critical habitat areas are NOT docks, rafts, or boathouses, etc. Twelve Critical Habitat Areas have been designated on Lake Wissota (Figure 14) (Konkel, 2007).

Critical Habitat Areas on Lake Wissota provide more than 180 acres of critical wildlife habitat along more than 6.4 miles of shoreline (11% of the 56 total miles of shoreline around the lake) (Konkel 2007). Some of the fisheries and wildlife that benefit from these areas include: walleye, northern pike, musky, largemouth and smallmouth bass, crappie, bluegill, yellow perch, lake sturgeon, catfish, suckers, waterfowl, eagles, kingfishers, geese, coots, double crested cormorants, great blue herons, other shorebirds, songbirds and upland birds, muskrat, beaver, otter, deer, mink, turtles frogs, toads, snakes and salamanders.

Critical Habitat Areas also provide an important buffer for the shoreline, which reduces erosion and absorbs nutrient runoff. Wave action is absorbed by submergent and emergent vegetation that reduce the force of the waves as they reach the shore. Vegetation also traps nutrients that run off the shoreline and into the lake during rain events. A copy of the Critical Habitat study can be obtained from the LWIPA website (www.lwipa.net) or from the WDNR website (http://dnr.wi.gov/lakes/critical habitat/)

The wildlife in Lake Wissota ultimately depend on organisms a little further down the food chain, the macroinvertebrates (insects, crustaceans, etc.), which are an important food source for many organisms. The macroinvertebrate community in Lake Wissota was inventoried during 1993-94 (Delong and Mundahl 1995) and demonstrated that the late-winter drawdowns of the lake had negative consequences for the macroinvertebrates