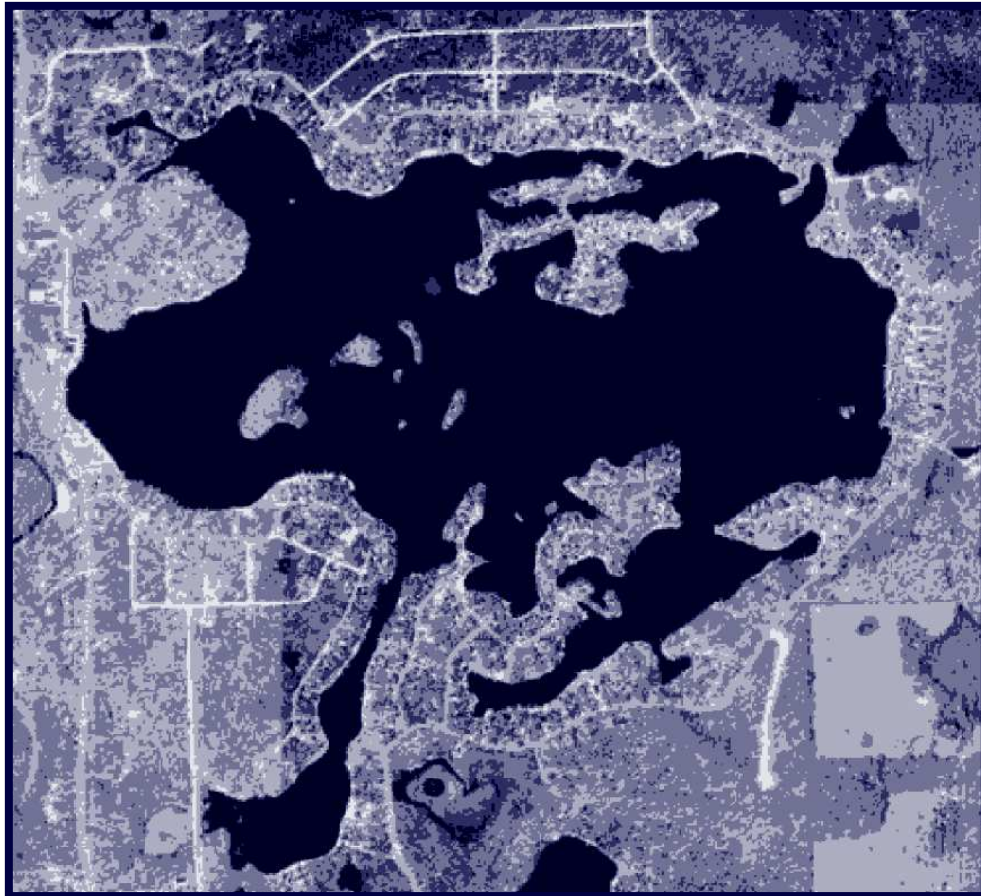


# *Lake Ogemaw*

## Critical Fishery Habitat Assessment Report 2008

CHURCHILL AND MILLS TOWNSHIPS

OGEMAW COUNTY, MICHIGAN



Prepared for:  
**Lake Ogemaw Summer Resort Association**

by:  
**Superior Environmental & Aquatic Services LLC**

**February 12, 2009**

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## INTRODUCTION

Lake Ogemaw is a predominately shallow lake approximately 555 acres in size located in Rifle River Watershed in Churchill and Mills Townships, Ogemaw County, Michigan (See Critical Fishery Habitat Map). The Lake Ogemaw Summer Resort Association has worked with Aquest Corporation and Superior Environmental & Aquatic Services LLC (SEAS) to conduct critical fishery habitat assessments in partial fulfillment of the regulatory requirements of the Inland Lakes and Streams Division of the Michigan Department of Environmental Quality Aquatic Nuisance Control Program.

## PURPOSE AND METHODS

The purpose of the fishery habitat assessment is to evaluate the effect of nuisance aquatic vegetation management activities on the fishery resources existing within the lake. To assemble the necessary information for fishery management recommendations, SEAS aquatic biologist conducted assessments of historical data, angler interviews and evaluation of critical fishery habitat. This report provides our assessment of critical habitat in Lake Ogemaw conducted during the summer of 2008.

## THE IMPORTANCE OF CRITICAL FISH HABITAT

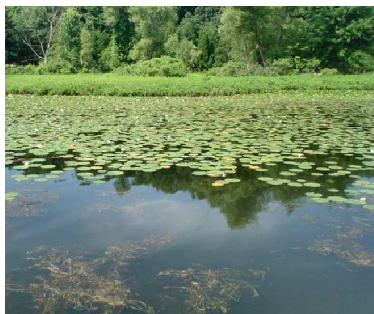
There are many factors that affect recreational fisheries including, angling pressure, other recreational uses, climate, competition, primary productivity, water quality, invasive plant species and resource management decisions. Quality and quantity of spawning, nursery and refuge habitat are three fundamental components of fish life history and can determine the survival of a species in a given environment. In simple terms, naturally sustaining fish populations cannot occur without a place to spawn. In addition, if spawning success is good but mortality of fry is high (due to lack of nursery habitat) then the number of adults added to the existing population by that year class will be reduced. In some fish species, mortality within the first 100 days of life can be as high as 99%. The high mortality of the early life stage is typically referred to as the bottleneck in population potential. In impoundments where water levels are manipulated it is important to know where these

### SPAWNING HABITAT



Spawning habitat consists of the physical structure selected by adult fish for egg deposition and fertilization. Fish utilize sand, gravel, snail shells, woody debris, hollow submerged timber, cobble, aquatic vegetation, submerged tree roots, and rock reefs as spawning substrate. Some fish species build nests and others simply broadcast eggs into the water column. The majority of fish species in temperate inland lakes orient to or select some form of physical substrate to spawn upon

### NURSERY HABITAT



Nursery habitat , consists of shallow littoral areas rich in aquatic plant life. Mouths of tributaries, lake fringe wetlands, coves, bays, marshes and even canals can serve as nursery areas. The highest quality nursery habitat provides the optimum temperature, shelter and food necessary inhibit predation and to sustain high rates of growth that occur during the first year of life.

### REFUGE HABITAT



Surveys in conducted by the Wisconsin Department of Natural Resources indicate that the presence of woody habitat is an important habitat variable providing forage and refuge for many fish species. Our observations also conclude that both largemouth and smallmouth bass preferentially orient spawning beds toward woody cover when the bottom substrate is also acceptable for construction of spawning beds.

critical habitats are and what the possible effects of water level manipulation may be upon them.

## HISTORY OF FISHERY MANAGEMENT

Management of fish populations involves determination of goals for protection, enhancement or restoration aspects of a given fish population. Fisheries management activities can include research, fish stocking, fishery population surveys and assessments, habitat protection, improvement and creation, and developing and issuing rules and regulations to achieve one or many of the aforementioned goals. These activities can be carried by state and federal agencies or private individuals and organizations. Prior fishery management activities can provide valuable information when assessing a fish population. Our approach consists of utilizing existing data including fish population surveys, fish planting and angler interviews to provide a general understanding of fishery management strategies.

### Fishery Surveys

There has been no detailed assessment of the fishery of Lake Ogemaw. Fish species observed during the survey include bullhead sp., rock bass, largemouth bass, bluegill sunfish, pumpkinseed sunfish, brook silverside, northern pike, yellow perch and minnow species.

### Fish Stocking

The Michigan Department of Natural Resources Fisheries Division and the members of the LOSRA Fish Committee have conducted fish stocking activities since 1980 to 2008. See the table in Appendix 1 for the number of species stocked by year. The fish stocking program has consisted of stocking panfish and piscivores. With the exception of fathead minnow (which was recorded in pounds stocked), more walleye were planted than any of the ten species included in the planting program (Figure 1). Fathead minnows were likely stocked to provide additional forage and minimize predation on other fish stocked. With the exception of the

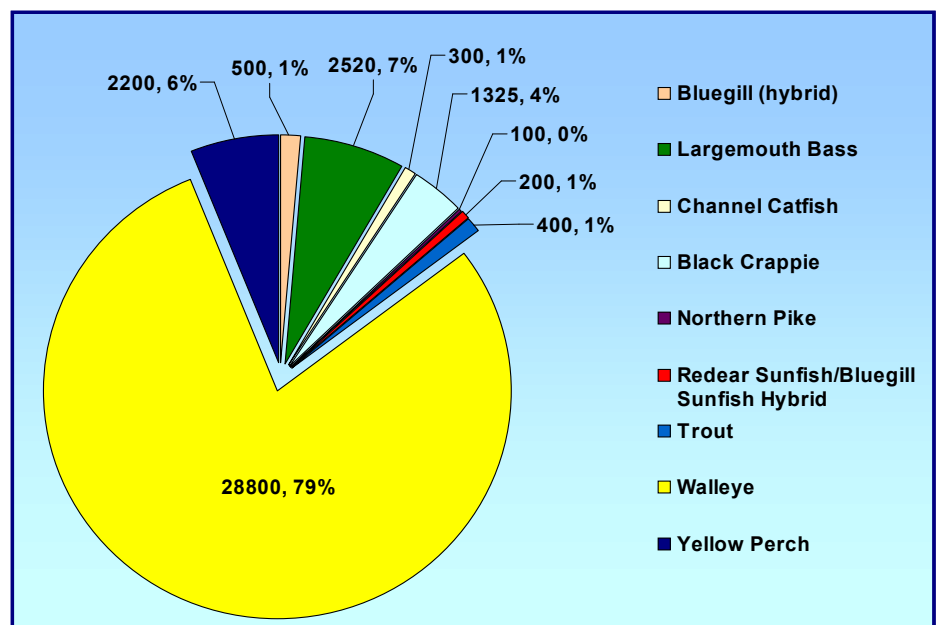


Figure 1. Number and percent composition of fish species planted in Lake Ogemaw by the LOSRA Fish Committee and MDNR Fisheries Division from 1980 - 2008.

plant of walleye fry in 1980, the majority of the individuals planted were greater than four inches. This is often done to minimize mortality from predation and increase the likelihood of successful spawning within one full year of planting. Hybrid sunfish in various crosses are planted to provide a fast growing population that is less resistant to stunting. Unfortunately, hybrids can cross with resident bluegill sunfish and produce progeny that is not hybrids but majority of one strain or the other. This means that the hybrid parent can add to the bluegill population through subsequent reproduction. Redear sunfish are unlikely to establish viable populations as it is primarily a southern fish species whose native northern range is northern Indiana. It was introduced to Michigan in the 1950's and has become naturalized in many lakes in the southern lower peninsula. It is unlikely that it would establish a successful population in Lake Ogemaw. See the section on Management Recommendations for additional suggestions regarding the future fish stocking activities.

### Angler Interview

The fishing experience on this lake is perceived as fair to good by anglers especially for pike and Bass. Angler pressure is limited by the fact that there is no public boat launch. Recently residents have noticed a slight decline in the fishing experience, notably, a reduction in the catch rate of bass over 2 to 3 lbs. Bluegill

sunfish are very numerous and appear to be shorter than the 6 to 9 inch size range preferred by anglers for harvest. A detailed fish population assessment is necessary to determine age and growth characteristics of the fish population. Large walleye are caught on an inconsistent basis. Pike are numerous and large pike over 28 inches can be caught year-round. The LOSRA Fall 2008 newsletter reported a 22 inch largemouth bass, a 31 inch northern pike and 25 inch walleye were the largest of each species caught during the LOSRA fishing contest.

**Trophy Fishery**

Trophy sized fish from Lake Ogemaw have been reported and recorded in the MDNR Fisheries Division Master Angler Award (MAA) database (Table 1). Records indicate that Lake Ogemaw has the potential to support a trophy fishery for channel catfish. The both largemouth bass and reported in the current LOSRA newsletter meet the 22 inch minimum length necessary for MAA qualification.

**Table 1**

Species	County	Waterbody	Year	Length (in)
CHANNEL CATFISH	Ogemaw	Lake Ogemaw	1995	28.0
BLUEGILL	Ogemaw	Lake Ogemaw	2001	10.5
CHANNEL CATFISH	Ogemaw	Lake Ogemaw	1998	27.0
LARGEMOUTH BOSS	Ogemaw	Lake Ogemaw	1999	22.8
LARGEMOUTH BOSS	Ogemaw	Lake Ogemaw	2004	22.0
PUMPKINSEED SUNFISH	Ogemaw	Lake Ogemaw	2004	9.0

**CRITICAL FISH HABITAT ASSESSMENT**

**Methodology**

Assessment of critical spawning, nursery habitat and submerged woody habitat was conducted on site. Critical fish habitat parameters considered include 1) spawning substrate type; 2) depth; 3) relative abundance and use of spawning habitat and 4) shoreline development. Nursery habitat parameters included 1) observed use, 2) connections to lake; 3) vegetation type and 4) shoreline development. Presence of woody habitat was also recorded during the survey. In determining critical spawning and nursery habitat we assess both individual and combined value of the habitat parameters. If a threatened or endangered species is present, its habitat would automatically be deemed critical.

A map of the lake was prepared from aerial photos or MDNR Inland Lake Maps. Biological Observation Sections (BOS) were assigned to littoral and deep water areas and numbered. Habitat was visually assessed viewing through polarized sunglasses while slowly moving through littoral areas scanning from shore in water from a few inches to approximately 12 feet deep. Where visibility was difficult an Aqua-Vu™ underwater camera was used to provide visual confirmation of use of or changes to critical habitat. Documentation of habitat identification and utilization were scribed onto the map in the field and taken to the lab for analysis and transfer into digital format.

Because the assessment occurs over the span of one to two days during the spawning season, the survey can only be considered a snapshot of the actual utilization on the day of the observation. However, repeat observation across years can indicate real trends of habitat use and the potential for habitat to serve critical functions of fish can be inferred within the limits of methods used to assess habitat. Variation in location of critical fishery habitat areas from year to year may occur and may be the result of natural or anthropogenic induced fluctuations or may reflect an increase in investigator accuracy in detailing observations. Since the areas are visual estimates they are assumed to be accurate as to the degree that can be determined by visual observation.

**Data Analysis**

Analysis of data from maps included counts of habitat found within the BOS and calculation of relative percentage of habitat found in the total number of BOS units surveyed. BOS containing active spawning habitat were designated in its entirety as active spawning habitat even if non active spawning habitat was found within the BOS. Nursery and woody habitats were recorded in all BOS observed. Non active spawning

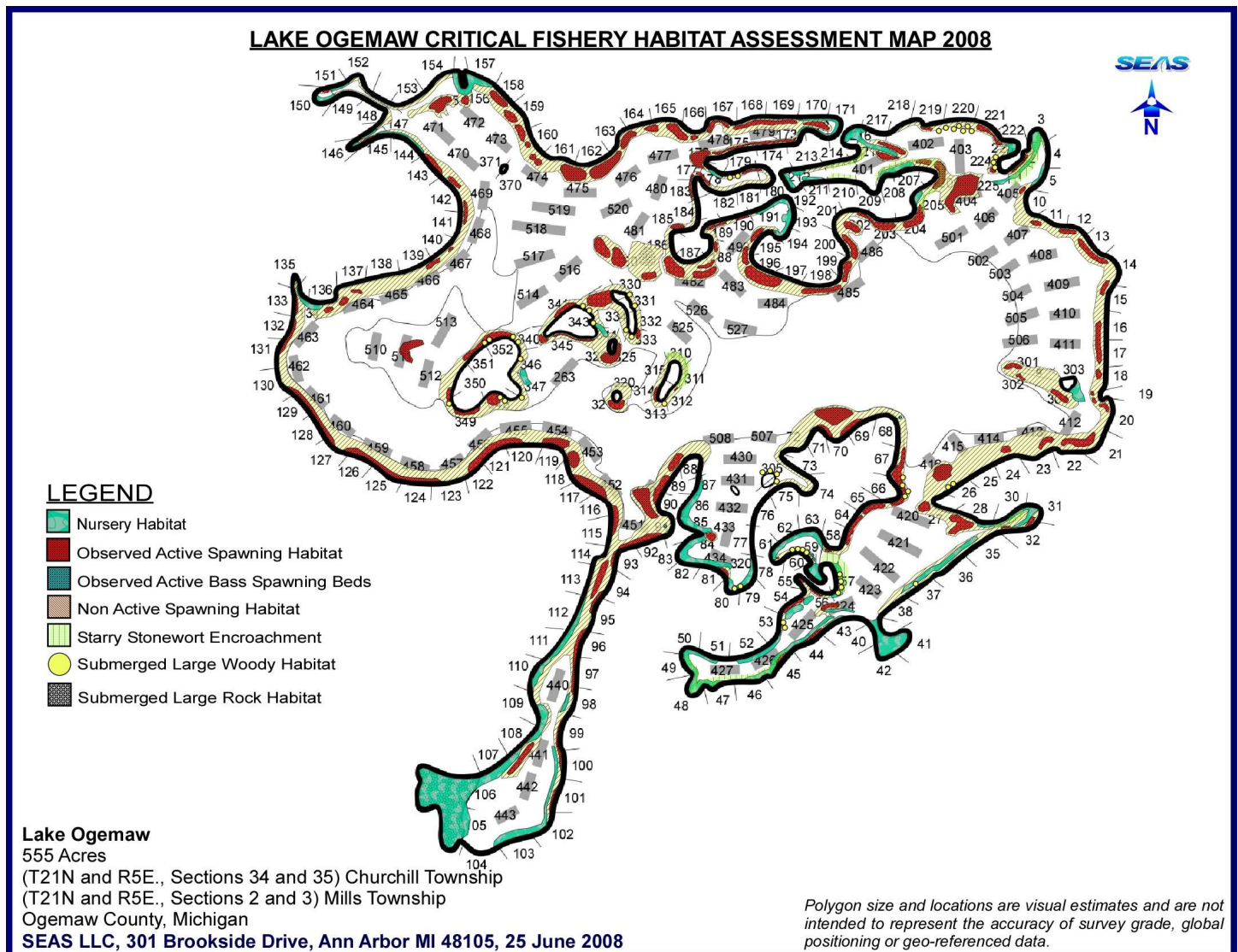
habitat was recorded in all BOS units surveyed. In areas where stary stonewort colonization prevented the use of habitat or changed the abundance of habitat from the previous year it was deemed to be Stary Stonewort Impacted.

## 2008 CRITICAL FISH HABITAT SURVEY RESULTS

Lake Ogemaw is a shallow, warmwater inland lake whose lake level is maintained via a water control structure. The majority of the lake is less than 10 feet deep. Bottom type consists of areas of pulpy peat in deeper areas and a patchwork of sand, sand/gravel and sand/silt and muck/pulpy peat in the littoral areas. The fishery habitat of Lake Ogemaw is suitable for a warm water fishery. Aquatic vegetation is abundant and diverse.

### Spawning Habitat

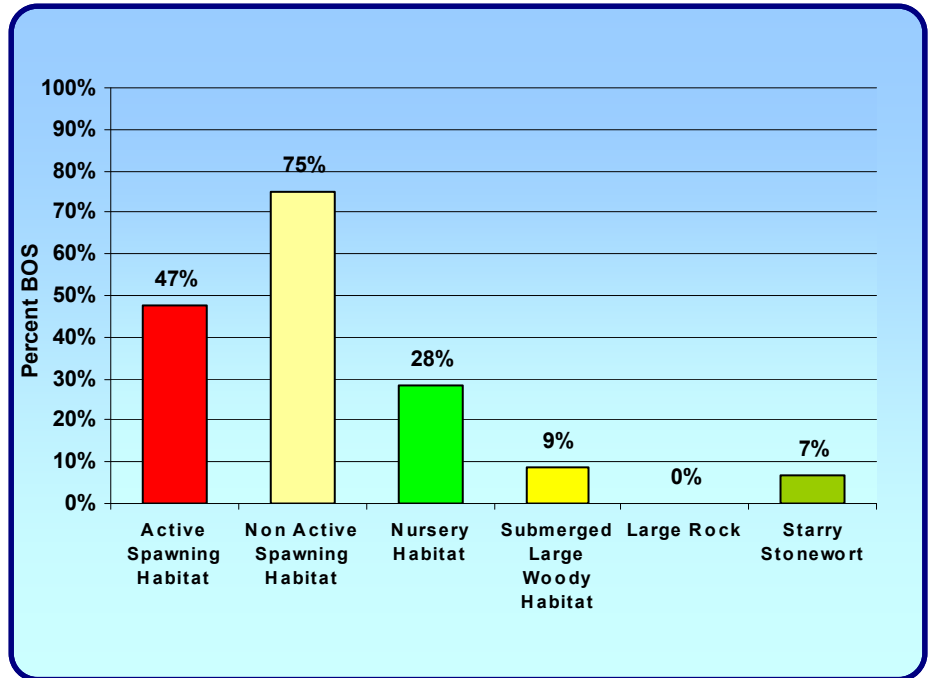
The majority of observed spawning activity took place in the littoral zone in water depth ranging from a few inches to approximately six feet deep (Figure 2). Spawning habitat for panfish and bass is very abundant in



**Figure 2. Map of critical fish habitat identified in Lake Ogemaw during the June 2008 Critical Fishery Habitat Survey.**

the littoral areas. Active bluegill and pumpkinseed sunfish and bass beds were observed during the fishery habitat survey. The majority of sunfish spawning areas were comprised of community nests consisting of 10 to more than 100 nests per aggregation. Largemouth bass spawning was far less abundant and may be a

reflection of the time of the survey was conducted, which was outside the peak spawning period for bass occurring from late May to early June. Non active spawning habitat was the most ubiquitous fish habitat component observed. Primarily consisting of sand and fine gravel, this habitat was observed in 75 percent of BOS (Figure 3). Active spawning habitat was also very prevalent being observed in 47% of the BOS units surveyed. Of the spawning habitat that was available only 28% was not in use, this is a very high rate of utilization. We have found that bass and sunfish utilize the exact same areas each year as spawning habitat. This indicates that the spawning areas are highly conserved and represent an optimum location to the extent that areas that appear to be exactly the same a few yards away are unused.



**Figure 3. Percentage of Biological Observation Units (BOS) containing critical fishery habitat types observed in Lake Ogemaw, Ogemaw County, Michigan during 2008 critical fishery habitat**

The LOSRA installed a walleye spawning shoal to promote natural reproduction of stocked walleye population presently maintained through limited stocking. An assessment of the shoal indicates that it is less than optimal in location and substrate quality to initiate spawning and support survival of sac fry. Walleye spawning shoals require wave action during the spawning season to provide oxygen and clean substrate for spawning. The shoal is too deep and embedded with sand and silt to provide suitable spawning habitat for walleye. A more likely location for walleye spawning would be downstream of the inlet culvert where water from the stream and increased oxygenation at the plunge pool would provide closer to optimum conditions for spawning walleye. Enhancement of this area should be considered. A very similar area was observed to be utilized by walleye where Sherman Creek enters into Cedar Lake in Iosco County.

Starry stonewort encroachment on spawning habitat was low as a result of management of water celery which also resulted in control of starry stonewort.

**Refuge Habitat (Submerged Large Woody Habitat)**

Lake Ogemaw contains a moderate amount of the submerged timber and woody habitat randomly distributed within the littoral areas of the lake. Configurations include submerged hardwoods and cedars and stump fields. This habitat is the preferred spawning substrate of channel catfish and prime refuge and forage areas for insectivorous and piscivorous fish species (Figures 1). Much of the lake shoreline has been development resulting in the removal of trees. The conversion of woody shoreline to lawn will likely preclude much additional recruitment of woody structure into the lake from these areas. Beaver activity will likely result in additional recruitment of woody structure near the islands. This is a critical habitat parameter that, if conserved and left in place will continue to provide benefits to the fishery.

**Nursery Habitat**

Numerous fry and juvenile fish species were observed in the nursery habitat areas associated with the coves, bays and near shore areas. This habitat was found in 28% of BOS with the largest contiguous parcel found in the area known as Grass Lake. Nursery habitat areas contain submergent and emergent vegetation that is crucial to the growth and survival of spawning young of the year and juveniles providing food, refuge and

warmth. These areas also contain vegetation that is the preferred spawning habitat of the gar, top minnows, yellow perch and northern pike. The structural complexity of nursery habitat is good in most areas and appears to favor floating leaved and rooted, submergent aquatic plants. The a large marsh forms the inlet

## **SUMMARY KEY CRITICAL FISHERY HABITAT OBSERVATIONS AND TRENDS**

SEAS has conducted observations to document presence and use of critical fishery habitat in Lake Ogemaw. A summary of our findings are as follows.

In 2008, spawning habitat for bass, northern pike, channel catfish and sunfish was more than adequate for sustaining successful spawning activity.

The large number of small bluegill were observed spawning throughout the lake. High rates of spawning success and survival by sunfish may cause an imbalance to occur in the fish population including a decrease in spawning success by largemouth bass. It can also result in less than desirable percentages of adults above the MDNR Preferred Stock Density of six inches in length,

Starry stonewort does not appear to represent a significant threat to spawning or nursery habitat, however, it should be monitored vigilantly as it can invade the majority of a lake within a two year time period.

The walleye spawning shoal is less than optimum for walleye reproduction and efforts to create a gravel bed immediately downstream of the inlet should be implemented as an alternative. The area should be at least twenty feet by thirty feet, containing gravel one to two inches in diameter spread roughly in a layer four to six inches deep. If necessary, gravel can be placed on geo fabric to prevent sinking into muck.

Dedicated spawning grounds are being documented and we continue to document which areas fish select for spawning activities. Three consecutive years of observation are required to designate a spawning area as critical, however, as we have observed in other lakes, certain fish spawning areas appear to be preferred and highly conserved by the second year of observation.

Adequate quantities and of quality nursery habitat was observed. Aquatic vegetation management activities are being conducted in a balanced manner: conserving this habitat for use by young-of-the-year and juvenile fish species. Use of lake fringe nursery areas and vegetated coves by young of the year and fingerlings of bass, sunfish and minnows was observed. It is likely that slightly deeper areas also provide nursery habitat since they are also well vegetated thus providing additional refuge.

Spawning activity by bass and sunfish does not appear to be negatively effected by vegetation management activities and may be aided by control of the invasive starry stonewort.

Recruitment of additional woody habitat in the form of submerged timber should not be discouraged as it has a very positive effect on fish communities. Care should be taken not to remove submerged woody structure so that it can continue to provide viable habitat for the fishery.

Eurasian watermilfoil, water celery, starry stonewort and curly-leaf pondweed (*Potamogeton crispus*) should be controlled and improvement in the overall diversity of the plant population should be encouraged. This will allow for increased niche habitat and vertical diversity not evident among uniform stands of such species. In addition moderate densities of aquatic vegetation provides for more balanced predator-prey interactions which leads to a more balanced and diverse fish population.

The LOSRA has been made aware that a very invasive plant species is present in Michigan waters including Lake Ogemaw that represents a real and growing threat to critical fishery habitat. The invasive plant species is *Nitella Obtusa*, commonly known as starry stonewort. SEAS biologists have documented its encroachment and eradication of spawning and nursery habitat in other inland lakes in many Michigan lake and now in Lake

Ogemaw. This plant aggressively colonizes the lake bottom forming a dense mat up to six feet thick that prevents penetration of aquatic vegetation and access to bottom substrates by nest building fishes. We have documented the rapid spread and encroachment on spawning and nursery habitat throughout the lake by starry stonewort. This is a highly aggressive bottom growing algae (charophyte) that has the ability to greatly decrease nursery habitat structural complexity, compress and eliminate critical spawning areas. In this report we have documented the extent of the infestation and have added it to the maps for reference.

Viral Hemorrhagic Septicemia or VHS is a disease affecting warmwater fishes and can be transmitted to via stocking of infected fish or incidental transfer of bait or fish from infected waters. This disease has the ability to cause high morality in fish populations during spring months. If stocking is considered, it is highly recommended that fish come from a vendor whose operation has been certified by the Michigan DNR as VHS free. In addition, anglers should be prohibited from dumping bait buckets in Lake Ogemaw.

## FISHERY MANAGEMENT RECOMMENDATIONS

The fishery of Lake Ogemaw has experienced fishery management activities primarily in the form of planting fish and limited habitat enhancement for walleye. LOSRA has taken an active role in the management of the fishery however fishery management is best conducted when defined goals and strategies for success are implemented and measurable. It appears that the recreational fishery is important to the LOSRA but consensus as to what the goals of fishery management should be and the implementation of strategies and will the cost justify the benefit. In light of these findings the SEAS provides the following suggestions with regard to goal clarification, objectives and strategies for fish populations and fish habitat. The numbered objectives do not have to be conducted in order of occurrence they can be completed as money or time permits. These suggestions are for a five year management program in an ideal situation where cost would not be a limitation and are submitted for modification by the LOSRA as needed.

## FISH POPULATIONS

**Present Status:** Good recreational fishery for pike but fewer large bass being caught and bluegill sunfish appear to be stunting. Large channel catfish and walleye are caught on occasion. A detailed fish population assessment has not been conducted therefore growth and age of fish and overall species composition is unknown.

**Suggested Goal:** **A recreational fishery providing trophy fishing for bass, pike, channel catfish and walleye with fewer and larger bluegill as a percentage of overall fish population.**

**Objective 1:** **Conduct fish population assessment (In Year 5).**

**Strategy:** Conduct fish population assessment using gill nets, trap nets, seines and electro fishing units to characterize fish population.

Conduct analysis of fish scales and spines to assess age and growth.

**Success:** Fish population survey and report of findings completed.

**Cost** **\$9700.00**

**Objective 2** **Provide habitat enhancement for stocked predators and document use.**

**Strategy:** Create walleye spawning bed near the inlet to lake Ogemaw as described in this report  
Provide fallen logs and woody debris for channel catfish spawning habitat.

**Success:** Verified by documentation of use or capture of young of year and juveniles.

**Cost:** **LORSA Volunteers estimate \$200.00**

<b>Objective 3</b>	<b>Increase size and number of adult bass</b>
<b>Strategy:</b>	Implement a creel limit of 3 fish over 14 inches and release of all bass over 18 inches
<b>Success:</b>	Increase in angler perception of adult bass population and increased catch rate of Master Angler Award sized bass.
<b>Cost</b>	<b>LOSRA derived (Meetings, Communications, Posted Signage) \$500.00 to \$850.00</b>
<b>Objective 4:</b>	<b>Stock predators at appropriate amounts of predators to reduce bluegill populations</b>
<b>Strategy:</b>	Stock walleye fingerlings at 20 to 50 spring fingerlings per acre bi-annually. Stock channel catfish 10 to 20 spring fingerlings per acre bi-annually
<b>Success:</b>	Increase in PSD of bluegill and evidence of increased walleye and channel catfish catch rates
<b>Cost</b>	Walleye \$2.35 (3-5 inch fish) x 20 per acre @ 555 acres = \$26,085 MDNR Permit to stock \$250 ( <b>Total 26,335</b> ) Channel Catfish \$0.69 (3 - 5 inch fish) x 20 per acre @ 555 acres = \$7659.00 MDNR permit to stock \$250.00 ( <b>Total 7909.00</b> )
<b>Objective 5</b>	<b>Assess recreational angling benefits of fishery management (In Year 5)</b>
<b>Strategy:</b>	Conduct Creel Census either via roving angler interviews or voluntary mail to determine catch rates, fishing pressure and angler use.
<b>Success:</b>	Census information analyzed and delivered in a report of findings
<b>Cost</b>	Roving Survey and Report \$8,400.00 Mail In Survey and Report \$3500.00
<b>Objective 6</b>	<b>Verify and Monitor Critical Fishery Habitat</b>
<b>Strategy:</b>	Continue to monitor critical fishery habitat and protect and augment habitat where necessary. Continue critical fish habitat assessments to detect changes in habitat use and availability that may affect the fishery. Confirm location of critical spawning habitat areas.
<b>Success:</b>	Delivery of an annual summary report verifying location and use of critical fishery habitat.
<b>Cost</b>	<b>1,700.00 per year (for two more years then as needed).</b>

**APPENDIX 1**

**LAKE OGEMAW FISH STOCKING RECORDS**

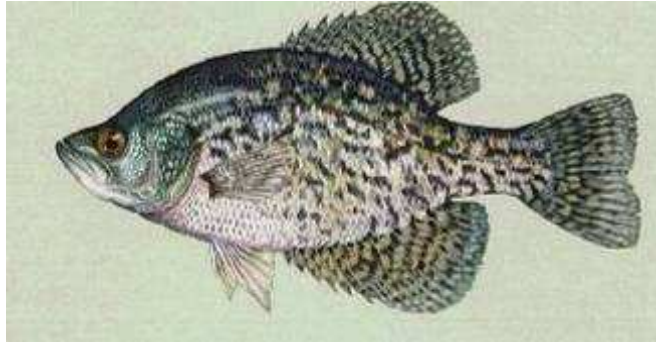
**LAKE OGEMAW FISH STOCKING**

County	Site	Date	Species	Number	Avg. Length (in.)
Ogemaw	Lake Ogemaw	1980	Walleye	20,000	0
Ogemaw	Lake Ogemaw	1996	Bluegill (hybrid)	500	5-7
			Fathead minnow	161 lbs	N.A.
			Largemouth Bass	335	6-8
			Walleye	1000	5-7
			Yellow Perch	1000	5-7
Ogemaw	Lake Ogemaw	1997	Fathead minnow	300 lbs	N.A.
			Channel Catfish	300	10-12
			Walleye	1500	5-7
Ogemaw	Lake Ogemaw	1998	Fathead minnow	300 lbs	N.A.
			Redear Sunfish/Bluegill	200	4-6
			Sunfish Hybrid	1000	5-7
			Walleye	1000	5-7
			Yellow Perch	200	4-7
Ogemaw	Lake Ogemaw	1999	Black Crappie	50	5-7
			Fathead minnow	400 lbs	N.A.
			Largemouth Bass	125	6-8
			Trout	250	12
Ogemaw	Lake Ogemaw	2000	Black Crappie	200	5-6
			Fathead minnow	400 lbs	N.A.
			Trout	200	12
			Walleye	1000	5-7
			Yellow Perch	300	6-8
Ogemaw	Lake Ogemaw	2001	Fathead minnow	400 lbs	N.A.
			Trout	200	12
			Walleye	1000	5-6
			Yellow Perch	300	5-6
Ogemaw	Lake Ogemaw	2002	Fathead minnow	400 lbs	N.A.
			Yellow Perch	400	6-8
Ogemaw	Lake Ogemaw	2003	Walleye	550	6-8
Ogemaw	Lake Ogemaw	2004	Black Crappie	275	6-8
			Walleye	1500	7-9
Ogemaw	Lake Ogemaw	2005	Largemouth Bass	630	6-8
			Walleye	1000	7-9
Ogemaw	Lake Ogemaw	2006	Largemouth Bass	630	6-8
			Walleye	1000	7-9
Ogemaw	Lake Ogemaw	2007	Black Crappie	500	4-6
			Walleye	750	7-9
Ogemaw	Lake Ogemaw	2008	Largemouth Bass	800	6-8
			Black Crappie	300	5-6

**APPENDIX 2**

**FISH OF LAKE OGEMAW**

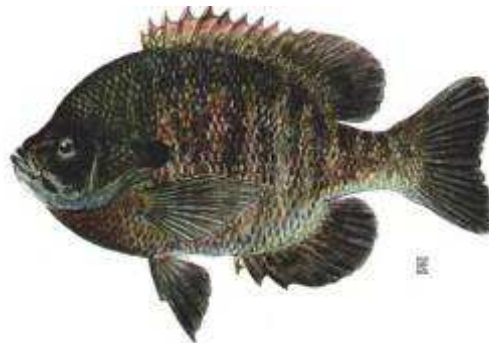
**BLACK CRAPPIE**



**BROOK SILVERSIDE**



**BLUEGILL**



**CHANNEL CATFISH**



**LARGEMOUTH BASS**



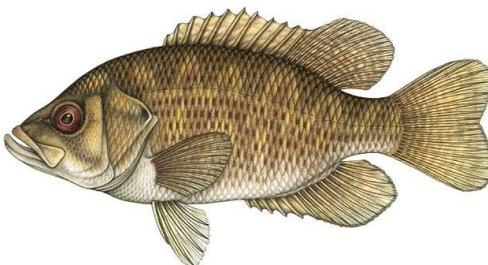
**NORTHERN PIKE**



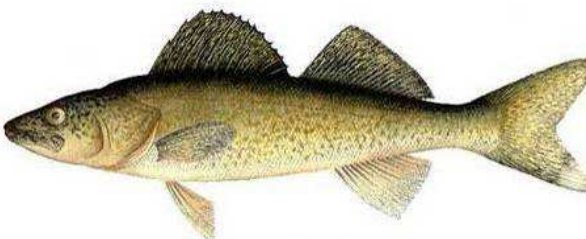
**PUMPKINSEED**



**ROCK BASS**



**WALLEYE**



**YELLOW BULLHEAD**



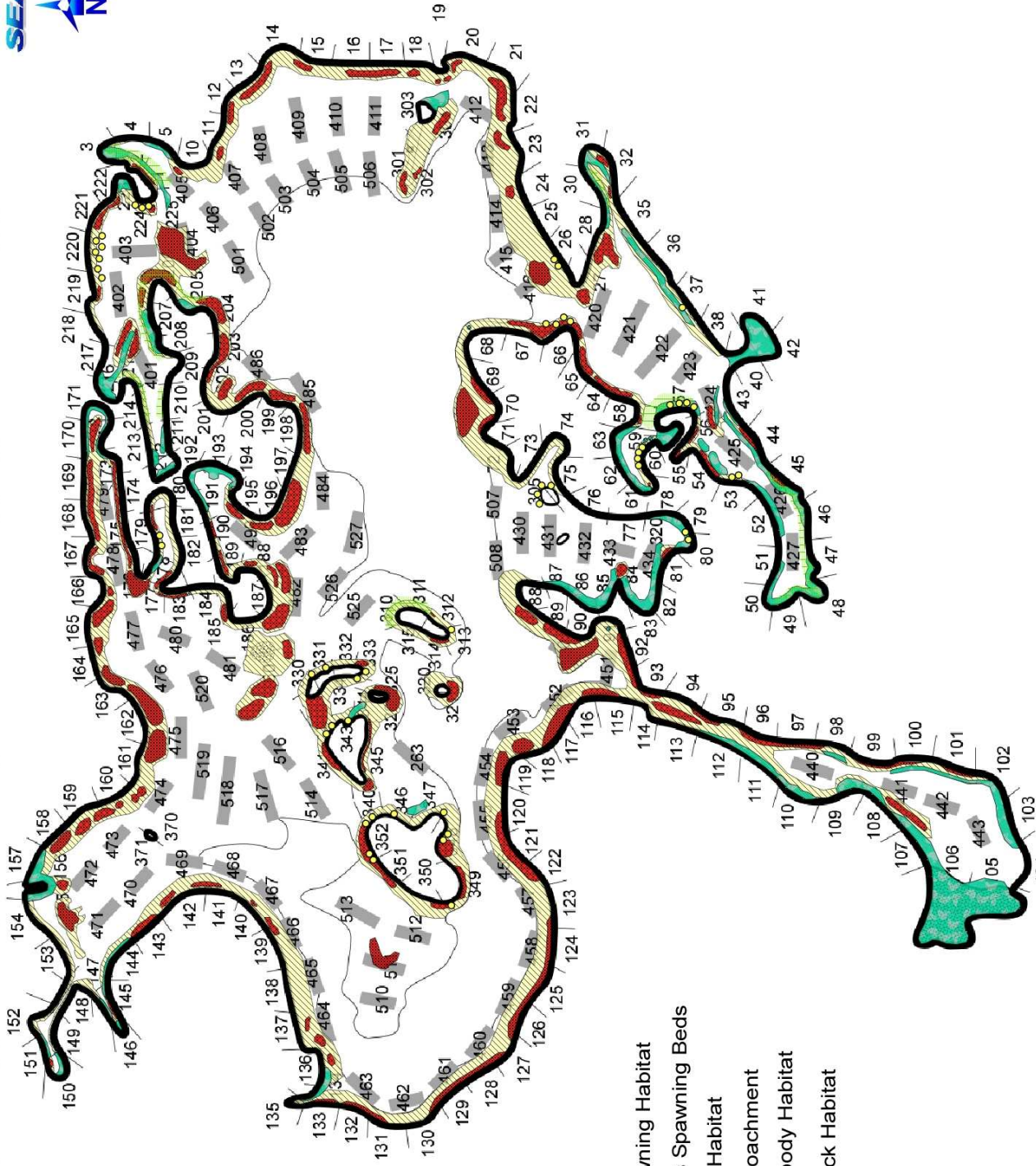
**YELLOW PERCH**










**APPENDIX 3**

**CRITICAL FISHERY HABITAT MAPS**

**LAKE OGEMAW CRITICAL FISHERY HABITAT ASSESSMENT MAP 2008**



**LEGEND**

-  Nursery Habitat
-  Observed Active Spawning Habitat
-  Observed Active Bass Spawning Beds
-  Non Active Spawning Habitat
-  Starry Stonewort Encroachment
-  Submerged Large Woody Habitat
-  Submerged Large Rock Habitat

**Lake Ogemaw**

555 Acres

(T21N and R5E., Sections 34 and 35) Churchill Township

(T21N and R5E., Sections 2 and 3) Mills Township

Ogemaw County, Michigan

**SEAS LLC, 301 Brookside Drive, Ann Arbor MI 48105, 25 June 2008**

*Polygon size and locations are visual estimates and are not intended to represent the accuracy of survey grade, global positioning or geo-referenced data.*