Inland Seas Angler

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Highlights of the Annual Lake Committee Meetings

Great Lakes Fishery Commission proceedings, Ypsilanti, MI

This forth of a series of annual special reports is a summary of Lake Michigan. This lake committee report is from the annual Lake Committee meetings hosted by the Great Lakes Fishery Commission in March 2011. We encourage reproduction with the appropriate credit to the GLSFC and the agencies involved. Our thanks to Brian Breidert, IN DNR; Jim Dexter, MI DNR; Dale Hanson, Lisa Walter and Charles Bronte, USFWS; and also thanks to the staffs of the GLFC and USGS for their contributions to these science documents.

Thanks also to the Great Lakes Fishery Commission, its staff, Chris Goddard & Marc Gaden, for their efforts in again convening and hosting all the Lake Committee meetings in Ypsilanti.

Lake Michigan

Index of Reports

Key
DFO = Department Fisheries, Oceans
FWS = U.S. Fish & Wildlife Service
LMC = Lake Michigan Committee
USGS = U.S. Geological Survey
CPE = Catch per effort
GB = (granular Bayluscide)
1 kiloton (kt) (1 kt = 1000 metric tons)

Harvest of Fishes from Lake Michigan during 2010

This report shows the harvest of fishes from Lake Michigan during 2010 for the four Lake Michigan agencies, including Illinois, Indiana, Michigan and Wisconsin. It also shows the long-term harvest of Salmonine, 1985-2010 **(Figs. 1 & 2**). The harvest of inshore fishes including bass, pike, panfish, yellow perch and walleye is shown in Fig.3.

	Rainbow Trout
	Brown Trout
	Lake Trout
	Coho Salmon
	Chinook Salmon

Harvest of Salmonine Fishes from Lake Michigan, including IL, IN, MI and MI, 1985-2010

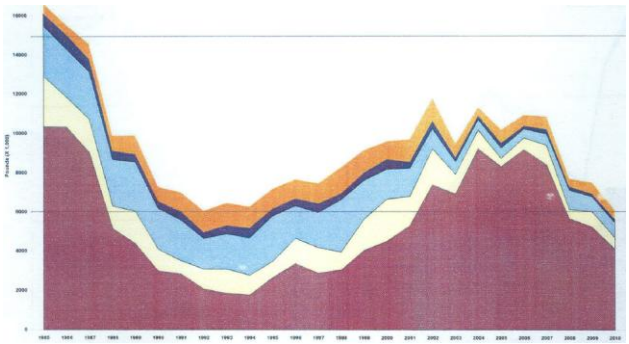


Fig. 1-Harvest of Salmonine Fishes from Lake Michigan

Sport Harvest for All State Agencies in 1000's of lbs, including IL, IN, MI, WI

1985-1997

SPECIES	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
chinook salmon	9539.863	9731.578	8003.968	4098.538	3378.054	2068.011	2314.737	1587.318	1414.179	1412.814	2148.767	2769.766	2404.061
coho salmon	2029.587	1200.923	1294.818	949.156	1284.431	850.744	445.745	759.773	844.33	771.257	501.043	913.751	959.226
pink salmon	2.4	0.1	6.5	0	2	0	0.1	0	0.2	0	0	0	0
lake trout	1362.438	1318.034	1432.163	1431.243	1640.494	1177.718	1673.36	999.45	1161.082	1061.26	1537.489	772.53	983.374
brook trout	7.9	8.881	2.744	6.929	3.861	9.051	5.401	15.78	3.006	8.214	2.385	0.732	0.669
brown trout	615.398	711.919	646.67	420.281	403.478	344.529	436.74	307.487	424.134	507.558	377.275	365.738	466.706
rainbow trout	537.695	499.1	772.687	795.228	965.326	754.081	984.262	1103.273	1152.325	1099.182	1024.154	981.283	1029.745
walleye	128.296	146.605	104.245	161.639	111.112	106.079	142.026	87.844	134.763	231.004	245.327	271.382	130.524
lveuow perch	1151.504	1538.677	2624.872	1967.633	1266.549	1315.172	1533.716	1426.183	1728.177	1033.422	1476.855	938.086	277.95
smb, musky, northern	0	0	0	0	0	0	0	0	0	0	0	0	0
pike, and panfish	107.8	106.4	174.8	14.543	60.122	49.464	101.788	92.445	64.891	74.827	61.747	87.069	90.795
burbot	0	0	0	0	0.3	0.2	0.7	0	0.05	0	0	0	0
lake whitefish	278.6	167	48	25.9	29	23	25.8	11.9	7.4	10.8	10.184	25.176	31.61
menominee	25	42.7	29.6	5.1	9	5	2	0	7.1	0	0	0	0
sturgeon	0	0.437	0.882	0.836	0.73	0.686	1.186	1.784	1.414	1.071	1.883	1.371	1.552
suckers	0	0	0	0	0.2	0.3	12.7	0	3.4	0	0	0	0.3
alewives	0	0	0	0	0	0	0	0	0	0	0	0	0
bloaters	0	0	0	0	0	0	0	0	0	0	0	0	0
lake herring	0	0	0	0	0	0	0	0	0.1	0	0	0	0
rainbow smelt	1	112.3	74.7	46.2	0	0	0	0	0	0	0	0	0
TOTAL	15787.48	15584.65	15216.65	9923.226	9154.657	6704.035	7680.261	6393.237	6946.551	6211.409	7387.109	7126.884	6376.512

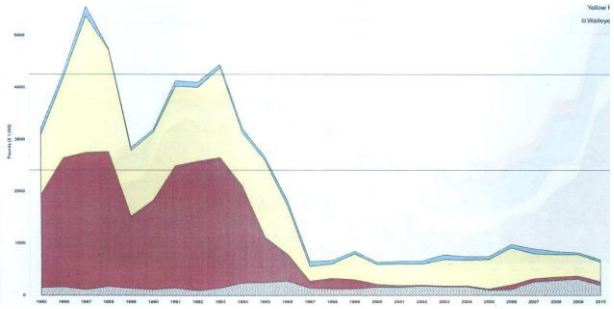
Fig. 2-Sport Harvest for All State Agencies in 1000's of lbs, including IL, IN, MI, WI (1985-1997)

1998-2010

SPECIES	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
chinook salmon	2738.134	3520.723	4055.161	4618.725	6591.548	6306.87	8503.02	7820.87	8567.94	8015.651	5227.47	4909.8	3909.05
coho salmon	615.953	1191.972	1397.491	1003.436	1353.335	875.344	858.2	350.15	559.21	818.272	409.61	680.2	514.71
pink salmon	0	0	0	0.05	0.041	0	0	0	0	0	0	0	0
lake trout	1614.825	796.891	667.415	752.582	600.404	328.28	239.71	233.82	195.29	295.847	322.59	362.77	340.41
brook trout	0.667	0.648	0.633	1.163	0.411	0.5	0	0	0.051	0.1	0	0	0
brown trout	313.331	407.158	511.898	329.143	391.308	221.78	183.35	253.87	157.42	231.486	176.1	145.86	176.05
rainbow trout	1347.189	1152.596	922.039	1157.826	1166.406	702.55	450.2	674.42	556.49	649.547	414.89	589.81	498.56
walleye	120.096	124.055	145.355	139.6	165.697	152.87	142.845	83.1	108.36	236.599	224.42	3OQ.4	178.5
vellowoerch	270.54	492.937	375.741	415.375	399.814	503.87	492.97	563.92	708.86	478.981	424.29	408.51	376.47
smb, musky, northern	0	0	0	0	0	0	0	0	0	0	0	0	0
pike, and panfish	65.145	48.045	41.128	44.768	56.215	92.71	65.56	55.95	67.58	92.58	61.08	35.7	42.05
burbot	0	0	1.362	0.5	0.3	0	0	0	17	0	0	0	0
lake whitefish	7.289	8.417	25.145	39.91	10.08	14	5.6	18.2	47.7	10	88.2	127.916	120.5
menominee	0	0	0	0	0	0	0	0	0	0	0	0	0
sturgeon	2.031	3.523	0	4.322	0	5.903	0	4.1	0	0	0	0	0
suckers	0	0	0	8.5	4.3	0	0	3.1	4.421	3.637	0	0	0
alewives	0	0	0	0	0	0	0	0	0	0	0	0	0
bloaters	0	0	0	0	0	0	0	0	0	0	0	0	0
lake herring	0	0	0	0	0	0	0	0	0	0	0	0	1.1
rainbow smelt	0	0	0	0	0.1	0	0	0	0	0	0	0	2
TOTAL	7095.2	7746.965	8143.368	8515.9	10739.96	9204.677	10941.46	10061.5	10990.32	10832.7	7348.65	7560.966	6159.4

Fig. 2 continued-Sport Harvest…

Harvest of Inshore Fishes from Lake Michigan, including IL, IN, MI and MI, 1985-2010



	Bass, Pike, Panfish
	Sport Yellow Perch
	Commercial Yellow Perch
	Walleye

Fig 3-Harvest of Inshore Fishes, Lake Michigan

Summary of Lakewide harvest for all agencies, (sport, commercial, weir, assessment & incidental catch), 1985-2010

1985-1997

SPECIES	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997
chinook salmon	10335.76	10312.38	8994.268	5116.938	4351.454	2977.711	2822.937	2059.618	1842.279	1762.109	2627.977	3353.066	2859.061
coho salmon	2564.587	1515.623	1696.118	1167.456	1664.531	1101.644	676.445	1018.48	1229.13	1003.687	826.997	1269.251	1295.416
pink salmon	2.4	0.1	6.5	0	2	0	0.1	0	0.2	0	0	0	0
lake trout	2570.738	2461.434	2427.063	2382.343	2512.094	2084.818	2057.36	1542.95	1775.482	1875.4	2302.307	1667.49	1785.474
brook trout	8.9	9.681	2.944	7.029	4.061	9.551	5.601	16.08	5.306	9.62	2.385	0.732	0.669
brown trout	629.498	740.519	664.47	430.281	413.378	366.829	452.44	321.987	444.134	510.368	381.538	372.338	473.206
rainbow trout	548.295	512.3	788.187	801.528	971.126	757.881	991.562	1112.673	1168.025	1115.302	1037.888	996.283	1044.925
walleye	147.496	163.105	114.945	170.239	137.712	112.679	143.926	89.544	138.563	234.704	246.427	274.482	139.144
yellow perch	2952.504	4028.077	5265.372	4568.133	2650.749	3038.772	3886.516	3920.583	4244.877	2899.722	2354.485	1458.99	416.586
smb, musky, northern	0	0	0	0	0	0	0	0	0	0	0	0	0
pike, and panfish	119.1	112.7	181.9	20.343	61.422	49.864	102.788	93.145	64.891	74.827	61.747	87.069	90.805
burbot	49.4	96.5	69.3	141.6	109.7	71.7	103.4	120.2	52.25	84.22	54.4	31.52	38.8
lake whitefish	7802.4	7756.7	8732.1	8023.8	8189.5	7695.2	5822.3	7248.1	7199.1	7062.752	7609.864	8063.126	7447.29
menominee	284	366	329.4	260.5	200.8	254.8	147.4	223.6	253.9	196.1	118.4	184.4	183.303
sturgeon	0	0.437	0.882	0.836	0.73	0.686	1.186	1.784	1.414	1.071	1.883	1.371	1.552
suckers	905.8	859.1	1313.4	744.5	2773.1	416.8	983.3	1599.5	292.3	973.532	621.25	774.91	505.93
alewives	16802.4	8539.4	8743.9	7268.5	7579.9	3934.9	76.6	40.9	3.5	9.38	101.757	1.16	5.5
bloaters	6524.6	7919.4	5987.1	6138.7	8360.7	10342.3	3885.7	3630.2	4971.2	4631.98	3890.64	2567.71	3030.94
lake herring	2.9	10.9	25.4	11.8	12.8	14.8	0.1	1.6	0.2	0.1	0.1	0	0.01
rainbow smelt	4028.4	5421.1	3876.1	3847.6	4070.3	4017.6	3246.6	3845	2491.7	2049.661	1422.35	889.31	663.44
TOTAL	56545.1	50825.45	49219.35	41102.13	44066.06	37248.54	25406.26	26885.94	26178.45	24494.54	23662.4	21993.21	19982.05

Fig. 4- Summary of all Lake Michigan fishes caught, 1985-2010

1998-2010

SPECIES	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
chinook salmon	3038.005	4008.256	4473.565	5252.121	7359.653	6886.199	9186.923	8273.101	9142.229	8367.931	5622.706	5192.508	4079.517
coho salmon	895.077	1582.163	2155.828	1509.109	1835.275	1012.308	952.387	423.76	595.326	985.842	466.296	784.87	572.662
pink salmon	0	0	0	0.05	0.041	0	0.01	0	0	0	0	0	0
lake trout	2666.321	1987.835	1518.253	1436.249	1010.683	633.752	523.389	533.263	447.684	581.214	990.346	771.485	765.158
brook trout	0.667	0.648	0.633	1.163	0.411	0.5	0	0	0.051	0.1	0	0	0
brown trout	317.836	407.701	513.562	330.12	392.858	222.207	183.797	260.806	158.108	231.861	176.22	146.06	176.39
rainbow trout	1353.609	1161.788	928.576	1167.748	1173.176	711.085	456.905	679.921	561.825	656.847	420.75	596.31	501.75
walleye	121.649	125.465	158.091	152.546	181.167	162.272	164.94	101.064	111.14	257.115	286.646	311.946	187.361
yellow perch	484.249	680.803	437.909	460.711	421.802	526.103	513.301	591.831	802.854	546.654	495.391	472.712	454.029
smb, musky, northern	0	0	0	0	0	0	0	0	0	0	0	0	0
pike, and panfish	65.145	48.045	41.208	44.768	56.235	92.779	65.668	56.05	67.582	92.67	61.24	35.92	42.49
burbot	47.893	33.601	15.046	18.674	13.645	20.875	11.728	14.682	31.283	11.533	11.887	12.811	12.541
lake whitefish	7205.642	6793.035	4816.243	4745.976	3882.623	3909.841	4022.944	4215.897	5037.782	4660.22	6575.914	5945.74	5540.476
menominee	135.347	85.75	27.154	12.515	8.651	6.715	21.093	12.702	1.36	2.21	7.654	9.286	6.874
sturgeon	2.031	3.523	0	4.322	0	6.038	0.151	4.3	0.03	0.01	0.03	0	0.02
suckers	514.9876	47.899	8.962	17.711	7.111	125.931	3.481	29.414	6.769	4.574	4.209	2.681	5.616
alewives	92.903	16.857	48.904	109.097	200.129	97.6	63.81	44.262	28.774	20.321	62.489	6.487	17.356
bloaters	2817.428	1792.945	1335.534	1226.781	1701.834	1626.466	1385.654	1531.916	986.635	583.809	304.347	246.756	137.838
lake herring	0.05	0.92	0.22	0.11	0.394	0.152	0.033	0.1	0	0.445	15.418	1.025	8.208
rainbow smelt	701.48	1336.399	387.918	251.244	452.632	184.766	408.929	676.416	836.38	428.76	179.28	44.745	325.034
TOTAL	20460.32	20113.63	16867.61	16741.01	18698.32	16225.59	17965.14	17449.49	18815.81	17432.116	15680.823	14581.342	12833.32

Fig. 4- continued…✧

Salmonid Stocking Totals for Lake Michigan, 1976-2010, (USFWS)

The Great Lakes Fishery Commission's fish stocking database is designed to summarize federal, provincial, state, and tribal fish stocking events. This database contains agency records dating back to the 1950's and is available online at: http://www.glfc.org/fishstocking.

The purpose of this report is to briefly summarize the information in the GLFC database for Lake Michigan federal lake trout stocking and stocking rates of all salmonids within state waters of Lake Michigan **(Table 1)**.

A summary of lake trout stocking locations, described by priority area in *A Fisheries Management Implementation Strategy for the Rehabilitation of Lake Trout in Lake Michigan*, is also included (**Fig 1).** Total numbers of Service stocked lake trout are shown by statistical district for the time series 1976 – 2010 in **Table 2**).

2010 stocking overview

12.3 million Salmonids (combined species) were stocked in Lake Michigan in 2010, (**Table 1**). This number reflects slight increases in Chinook salmon and lake trout stocking numbers compared to 2009. Chinook stocking has been stable since the 25% stocking reduction for Chinook salmon was enacted in 2006. As of 2007, slightly greater numbers of lake trout have been stocked relative to Chinook salmon.

Millions of Lake Trout and Chinook stocked in Lake Michigan, fingerlings and yearlings, 1976-2010

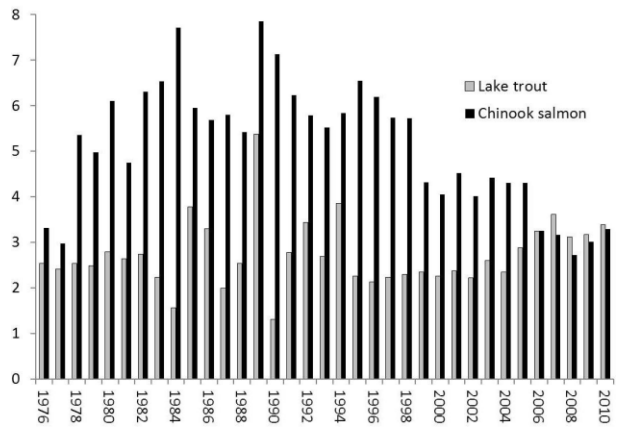


Fig 1-Lake trout and Chinook salmon stocked, 1976 – 2010

	Statistical District														Refuge area	
Year	MM123	MM4	MM5	MM6	MM7	MM8	WM1,2	WM3	WM4	WM5	WM6	ILL	IND	TOTAL	NR	SR
1980	0.319	0.200	0.117	0.202	0.200	0.148	0.000	0.400	0.193	0.340	0.080	0.087	0.174	2.461	0.319	0.199
1981	0.049	0.000	0.075	0.210	0.231	0.200	0.000	0.213	0.160	0.193	0.050	0.124	0.124	1.628	0.049	0.217
1982	0.075	0.000	0.075	0.226	0.423	0.182	0.000	0.218	0.150	0.229	0.050	0.152	0.153	1.932	0.075	0.433
1983	0.096	0.154	0.101	0.246	0.796	0.180	0.000	0.202	0.111	0.000	0.000	0.166	0.157	2.210	0.096	0.669
1984	0.000	0.062	0.000	0.080	0.332	0.200	0.000	0.217	0.000	0.000	0.000	0.100	0.108	1.099	0.000	0.382
1985	0.564	0.374	0.143	0.222	0.000	0.000	0.000	0.361	0.000	0.775	0.000	0.123	0.000	2.562	0.564	0.898
1986	0.924	0.180	0.150	0.070	0.000	0.000	0.000	0.367	0.000	0.684	0.000	0.100	0.000	2.474	0.924	0.784
1987	0.746	0.060	0.000	0.000	0.000	0.000	0.000	0.351	0.000	0.714	0.000	0.102	0.000	1.973	0.746	0.816
1988	0.767	0.152	0.130	0.000	0.270	0.000	0.000	0.192	0.000	0.274	0.000	0.100	0.000	1.885	0.767	0.644
1989	0.772	0.166	0.157	0.000	0.300	0.000	0.000	0.208	0.000	0.300	0.000	0.103	0.000	2.006	0.772	0.703
1990	0.618	0.000	0.000	0.000	0.254	0.000	0.000	0.000	0.000	0.445	0.000	0.000	0.000	1.317	0.618	0.700
1991	1.096	0.229	0.344	0.000	0.216	0.000	0.000	0.196	0.000	0.598	0.000	0.101	0.000	2.779	1.096	0.823
1992	0.987	0.330	0.309	0.000	0.257	0.000	0.000	0.200	0.000	0.578	0.000	0.100	0.000	2.761	0.987	0.865
1993	0.994	0.330	0.308	0.000	0.166	0.096	0.000	0.196	0.087	0.329	0.000	0.096	0.095	2.697	0.994	0.591
1994	0.944	0.333	0.308	0.199	0.107	0.102	0.000	0.197	0.000	0.210	0.000	0.097	0.000	2.496	0.944	0.414
1995	0.729	0.188	0.055	0.139	0.245	0.230	0.000	0.123	0.086	0.247	0.000	0.060	0.058	2.159	0.729	0.431
1996	0.578	0.198	0.185	0.119	0.161	0.169	0.000	0.122	0.064	0.255	0.000	0.061	0.060	1.971	0.578	0.363
1997	0.570	0.205	0.207	0.128	0.283	0.063	0.000	0.121	0.122	0.267	0.060	0.120	0.089	2.235	0.570	0.368
1998	0.621	0.219	0.205	0.126	0.166	0.194	0.000	0.115	0.136	0.330	0.065	0.060	0.066	2.302	0.621	0.359
1999	0.610	0.215	0.213	0.121	0.167	0.197	0.000	0.118	0.118	0.327	0.054	0.064	0.068	2.274	0.610	0.366
2000	0.610	0.285	0.200	0.120	0.161	0.181	0.000	0.116	0.116	0.296	0.114	0.000	0.061	2.260	0.610	0.290
2001	0.589	0.245	0.227	0.141	0.064	0.207	0.000	0.154	0.130	0.433	0.062	0.059	0.072	2.382	0.589	0.364
2002	0.576	0.258	0.168	0.060	0.063	0.120	0.000	0.120	0.000	0.435	0.065	0.061	0.060	1.987	0.576	0.263
2003	0.567	0.273	0.228	0.131	0.060	0.239	0.000	0.119	0.120	0.430	0.056	0.061	0.070	2.354	0.567	0.366
2004	0.677	0.241	0.197	0.120	0.060	0.256	0.000	0.108	0.057	0.515	0.063	0.060	0.000	2.354	0.677	0.367
2005	0.976	0.207	0.200	0.230	0.060	0.234	0.000	0.081	0.136	0.437	0.060	0.063	0.066	2.750	0.976	0.366
2006	1.177	0.183	0.192	0.120	0.057	0.183	0.000	0.095	0.162	0.412	0.061	0.068	0.060	2.770	1.177	0.370
2007	1.080	0.478	0.354	0.121	0.060	0.179	0.000	0.121	0.111	0.425	0.058	0.056	0.060	3.103	1.080	0.420
2008	1.178	0.344	0.192	0.133	0.038	0.057	0.000	0.056	0.057	0.613	0.050	0.127	0.038	2.882	1.178	0.739
2009	1.442	0.234	0.108	0.076	0.000	0.000	0.000	0.041	0.010	0.613	0.026	0.118	0.022	2.691	1.442	0.731
2010	1.483	0.316	0.142	0.072	0.000	0.000	0.000	0.059	0.019	0.614	0.047	0.120	0.038	2.910	1.483	0.734

Table 2- Millions of USFWS stocked yearling lake trout, by statistical district, between 1980 and 2010. Fish stocked in refuge areas (Northern Refuge (NR) and Southern Refuge (SR) are included in the statistical district totals and do not represent additional fish stocked.

	Atlantic Salmon	Brook Trout	Brown Trout	Chinook Salmon	Coho Salmon	Lake Trout	Rainbow Trout	Splake	Total
1976	0.020	0.075	1.129	3.317	3.196	2.548	1.863	0.000	12.148
1977	0.019	0.643	1.160	2.977	3.087	2.418	1.312	0.000	11.616
1978	0.046	0.248	1.503	5.365	2.685	2.539	1.933	0.000	14.319
1979	0.000	0.196	1.228	4.984	4.044	2.497	2.589	0.000	15.538
1980	0.000	0.204	1.292	6.106	2.943	2.791	2.630	0.000	15.967
1981	0.020	0.208	1.169	4.747	2.451	2.642	1.971	0.000	13.208
1982	0.045	0.259	2.139	6.312	2.181	2.746	2.525	0.000	16.207
1983	0.000	0.300	2.180	6.539	2.364	2.241	2.595	0.000	16.219
1984	0.000	0.233	1.803	7.710	2.954	1.565	3.111	0.034	17.410
1985	0.000	0.307	1.798	5.956	3.181	3.782	1.825	0.054	16.903
1986	0.000	0.197	1.434	5.693	2.291	3.297	2.222	0.115	15.249
1987	0.000	0.117	1.341	5.801	2.305	1.998	1.831	0.018	13.411
1988	0.017	0.466	1.516	5.417	3.210	2.546	1.429	0.104	14.706
1989	0.060	0.150	1.504	7.859	2.334	5.377	1.845	0.088	19.217
1990	0.000	0.400	1.772	7.129	2.380	1.317	1.600	0.050	14.648
1991	0.000	0.326	1.383	6.238	2.471	2.779	1.975	0.396	15.568
1992	0.000	0.272	1.615	5.795	2.712	3.435	1.689	0.099	15.618
1993	0.000	0.294	1.759	5.530	1.709	2.697	1.680	0.141	13.809
1994	0.000	0.269	2.172	5.837	1.497	3.854	2.220	0.166	16.015
1995	0.000	0.328	1.876	6.549	2.401	2.265	1.878	0.151	15.448
1996	0.000	0.180	1.787	6.193	3.112	2.141	1.849	0.201	15.463
1997	0.000	0.115	1.804	5.745	2.620	2.235	1.864	0.155	14.538
1998	0.000	0.408	1.742	5.721	2.059	2.302	1.618	0.097	13.948
1999	0.000	0.191	1.649	4.324	2.765	2.348	1.680	0.077	13.034
2000	0.000	0.045	1.666	4.049	2.499	2.260	1.244	0.079	11.842
2001	0.000	0.102	1.749	4.518	2.765	2.382	1.849	0.131	13.495
2002	0.000	0.050	1.754	4.015	2.690	2.224	1.861	0.126	12.721
2003	0.000	0.024	1.649	4.422	3.124	2.609	2.078	0.104	14.010
2004	0.000	0.001	1.601	4.303	1.687	2.354	1.583	0.122	11.651
2005	0.000	0.000	1.523	4.306	2.561	2.887	2.170	0.099	13.546
2006	0.000	0.001	1.611	3.253	2.430	3.255	1.788	0.166	12.504
2007	0.000	0.000	1.471	3.173	2.269	3.624	2.000	0.125	12.662
2008	0.000	0.005	1.469	2.725	2.029	3.122	1.618	0.087	11.056
2009	0.000	0.000	1.632	3.020	1.746	3.177	2.068	0.000	11.643
2010	0.000	0.041	1.426	3.295	2.516	3.385	1.677	0.000	12.339
10 year mean	0.000	0.022	1.588	3.703	2.382	2.902	1.869	0.096	12.563

Table 1-Millions of salmonids, fingerling and yearling stages combined, stocked between 1976 and 2010

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Status and Trends of Prey Fish Populations in Lake Michigan, 2010 (USGS)

The Lake Michigan Committee indicated that annual forage fish survey reports were not needed in 2011, given the effort spent towards the pending Lake Michigan State of the Lake Report. Nonetheless, the USGS offered to still develop short summaries of our surveys given the historical interest in this report.

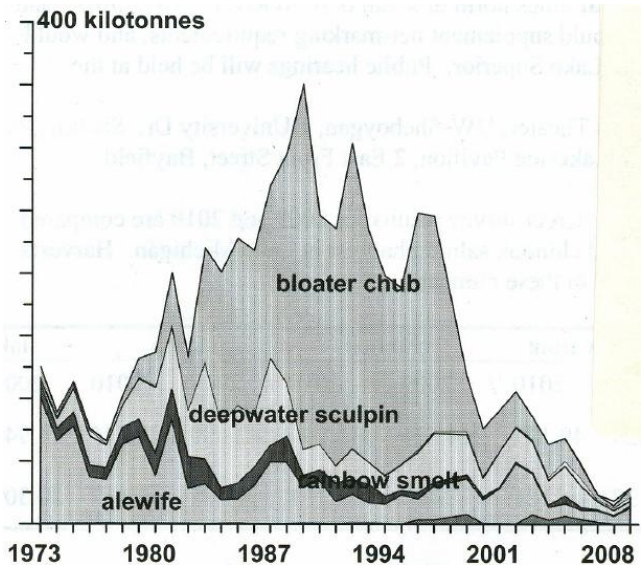
The Great Lakes Science Center has conducted lake-wide surveys of the fish community in Lake Michigan each fall since 1973 using standard 12-m bottom trawls towed along contour at depths of 9 to 110 m at each of seven index transects. All seven established index transects were completed in 2010. Below, we created Table 1 to summarize the 2010 lake-wide biomass results, and place them in context with the more recent (2005-2010) and long-term (1973-2004) averages.

Name	2010	2005-'10	1973-2004
Alewife	6.41	8.77	37.96
Bloater	7.79	8.39	92.35
Rainbow smelt	0.85	1.91	10.01
Deepwater sculpin	2.60	9.56	30.11
Slimy sculpin	2.74	3.44	1.37
Ninespine stickleback	0.17	2.20	1.43
Round goby	8.55	2.29	n/a

Table 1-key prey species in Lake Michigan, summary of biomass [kilotonnes (kt), 1 kt = 1000 metric tons], estimated by the bottom trawl between the 5-114-m depth contours. Columns indicate averages from 2010 only, 2005-2010, and 1973-2004.

Our changing lake

In 1989 the estimated combined lakewide biomass of four forage species in Lake Michigan hit a peak of around 350 kilotonnes, or 770,000,000 lbs. Most of that was bloater chubs. Today the total is less than 50 kilotonnes. In the 1970's the prime suspect in the decline of native species was alewives. Today, zebra and quagga mussels are usually blamed for changes in the ecosystem.



Overall summary

►Alewife biomass was the 2nd lowest biomass of the time series,

►Total prey fish biomass was the 3rd lowest biomass (29.1 kt) of the time series,

►Round goby biomass was the highest among the prey species, although it also had the highest variability,

►Slimy sculpin was the only species whose 2010 biomass exceeded that of its 1973-2004 average,

►Average bloater biomass has been increasing since 2008, although it remains <10% of its 1973-2004 average,

►Dreissenid biomass in 2010 (12.18 kt) was intermediate to 2008 and 2009 estimates, but only 7% of the peak biomass that occurred in 2006, 2007 (164.9 kt, 179.8 kt, respectively). ✧

2010 Lake Michigan Lake Trout Working Group Report, (LMC)

Klondike Reef strain from Lake Superior has been recommended for introduction to deep-water habitats; the LMC has decided that a limited number should be stocked experimentally in the near future. Lean lake trout from Seneca Lake (Finger Lakes, NY), Apostle Islands (Lake Superior), and Lewis Lake (Lake Michigan remnant) have been selected as the primary lean lake trout strains. Additionally, a remnant, nearshore form of lean lake trout from Parry Sound (Lake Huron) is being raised in FWS hatcheries and should be available for stocking in 2013.

Another LMC recommendation is (Increase overall abundance by 2014), increase densities of lake trout populations in targeted rehabilitation areas to levels observed in other Great Lakes locations where recruitment of wild fish to the adult population has occurred. To achieve this objective, CPUE in spring assessments should consistently exceed 25 lake trout/1000 feet of graded-mesh (2.0 – 6.0 inch) gill net fished.

Egg deposition rates have remained low at the sites where egg deposition has been measured in northern Lake Michigan. Nearly all of the measured densities of lake trout eggs have been less than 60 eggs/m2 **(Fig 1).**

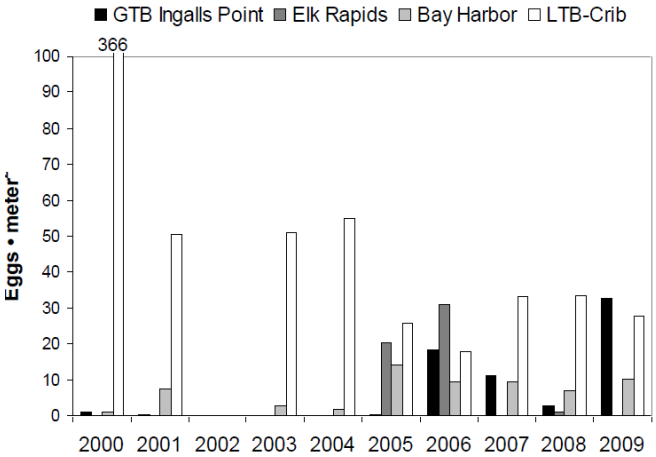


Fig 1-Numbers of lake trout eggs observed per square meter in northern Lake Michigan fall egg deposition surveys

Less than 4% of lake trout of all ages captured during the spring LWAP survey of 2010 were fish that had no fin clip, which indicates very little natural reproduction (Figure 6). Three unclipped lake trout were caught in bottom trawls off Frankfort during the USGS Great Lakes Science Center fall survey in September 2010. Two of these fish were less than 70 mm in total length, and they may represent the first wild age-0 lake trout ever caught during the lakewide Lake Michigan bottom trawl survey, which began in 1973. In addition, about 20% of the juvenile lake trout incidentally caught in gill nets set for bloaters near the Midlake Refuge during February 2011 were unclipped fish.

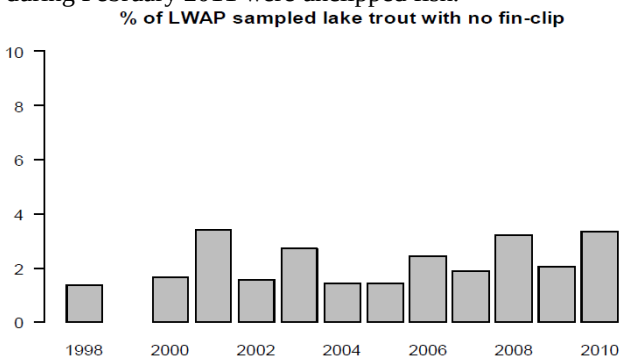


Fig 2-Percentage of lake trout captured in spring surveys without fin clips; lack of a fin clip suggest fish was produced in the lake

Lake trout stocking

The U. S. Fish and Wildlife Service stocked a total of 2.91 million yearling (14-16 months old) lake trout into Lake Michigan in 2010. Stocking totals for each state jurisdiction were 120,166 in IL, 38,385 in IN 2,012,755 in MI, and 738,549 in WI (**Fig 3).** All non-ADCWT yearling fish received a LPRV fin clip. A small number of lake trout (118,310) received an adipose clip paired with a coded wire tag. These fish were used to test the autotrailer tagging process and were stocked in northern Lake Michigan. The stocked yearling lake trout consisted of three strains: Apostle Islands, Lewis Lake, and Seneca Lake. Additionally, 427,767 fall fingerlings of two strains (Apostle Islands and Seneca Lake) were stocked into Indiana (50,000), Michigan (171,337), and Wisconsin (206,430) waters (**Fig 3).** The fall fingerlings were all adipose clipped and coded wire tagged.

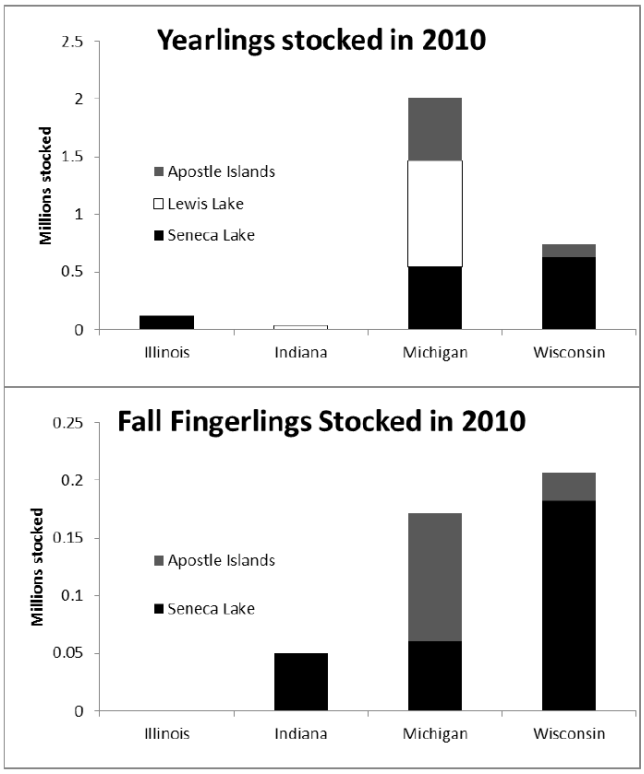


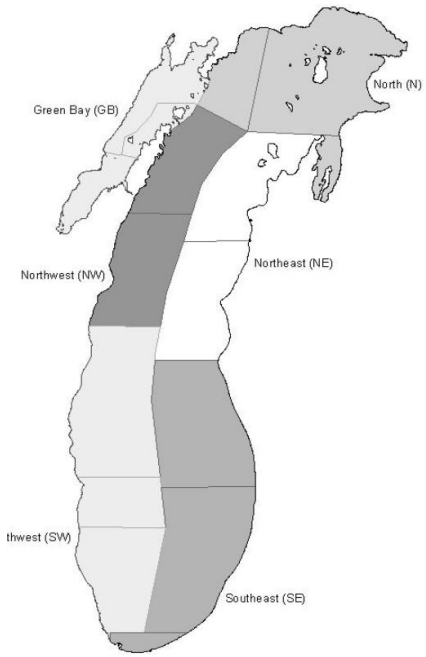
Fig 3-Spring yearling and fall fingerling lake trout stocking, 2010

✧

2010 Lake Michigan Recreational Fishery Trends by Region, (USFWS)

This report summarizes total fishing effort, targeted effort for trout and salmon species and yellow perch, and harvest rates for select species. Harvest rates are also shown in the context of fish stocking numbers to portray trends across regions of Lake Michigan. Abbreviations used throughout this report are as follows: BKT (brook trout), BNT (brown trout), CHS (Chinook), COH (Coho), LAT (lake trout),

RBT (rainbow trout), SMB (smallmouth bass), SPE (splake), WAE (walleye) and YEP (yellow perch).



Fishing Effort

Recreational fishing effort totaled 5.1 million angler-hours in 2010. This is higher than the recent low of 4.6 million hours in 2008 but effort is down from last year and has declined roughly 25% compared to the 1995 – 2002 time period. Total fishing effort was highest on the western side of Lake Michigan, including Green Bay. In Green Bay, fishing effort was most directed at yellow perch (YEP) and other non-SAT species, presumably walleye. Salmon and trout are primarily targeted in all other areas of Lake Michigan.

Recreational harvest

Anglers harvested over 1.88 million fish from Lake Michigan in 2010. Yellow perch and Chinook salmon were most important numerically, but harvest in terms of weight is currently unavailable due to inter-state reporting differences; these reporting differences will be addressed in 2011 to standardize harvest biomass across states dating back to 1995. Numbers of fish harvested during the 2010 Lake Michigan recreational fishery are shown in **Table 1**.

Year	BKT	BNT	CHS	COH	LAT	RBT	SMB	SPL	WAE	YEP
1995	2,006	92,529	240,257	190,096	189,550	172,728	42,393	8,423	100,169	3,254,560
1996	592	82,508	330,707	254,159	122,752	156,488	60,560	26,504	86,459	2,133,809
1997	355	113,004	277,041	433,027	151,964	163,573	61,650	11,492	58,820	818,069
1998	159	56,136	310,904	256,377	236,150	218,653	32,825	8,568	50,720	709,223
1999	618	67,399	312,113	184,684	106,140	153,463	32,702	4,622	50,122	1,384,318
2000	254	99,657	348,579	350,290	100,748	135,100	23,790	5,271	48,845	882,820
2001	263	49,620	376,038	261,780	102,205	154,762	22,980	2,308	80,646	995,248
2002	178	62,779	534,836	304,773	81,853	153,889	24,722	2,249	65,913	778,297
2003	126	35,905	580,676	154,855	46,883	96,784	25,484	865	47,442	935,838
2004	3	29,368	720,705	142,444	34,068	55,679	24,032	232	49,432	810,790
2005	18	39,953	826,940	113,160	35,340	95,009	13,021	59	31,827	1,239,088
2006	9	23,942	826,149	105,753	35,991	83,822	12,572	12	52,128	1,579,890
2007	62	44,228	773,470	149,652	48,233	94,847	17,757	-	88,341	1,183,060
2008	13	29,481	508,269	78,036	50,604	70,246	12,953	205	68,228	754,707
2009	27	25,157	458,214	164,119	58,055	94,119	14,194	39	99,965	1,471,443
2010	-	25,802	531,170	136,559	60,009	87,247	53,551	-	79,405	908,399

Table 1-Number of fish, by species, harvested by recreational anglers in Lake Michigan, 1995 to 2010

Chinook salmon

Chinook salmon stocking levels were reduced by roughly 25% in 1999, and again in 2006, to address concerns of a dwindling forage base. Hence the number of Chinook stocked declined from 6.5 million in 1995 to 3.3 million in 2010. Chinook salmon harvest has declined since the 2006 stocking reduction and appears to have stabilized at roughly one-half million fish over the last three years. Although harvest numbers are down from recent years, the harvest rate (per angler-hour fished) spiked upwards in 2010 across all regions of Lake Michigan **(Fig 1).** Chinook harvest rates were highest in northwestern Lake Michigan at nearly 0.4 Chinook per angler-hour in 2010 and approached the record harvest rate observed in 2007. There is no clear correlation between Chinook harvest rates and levels of fish stocking, such relationships are likely masked by natural reproduction, migrations beyond stocking regions, and the response of fishing effort to altered stocking numbers.

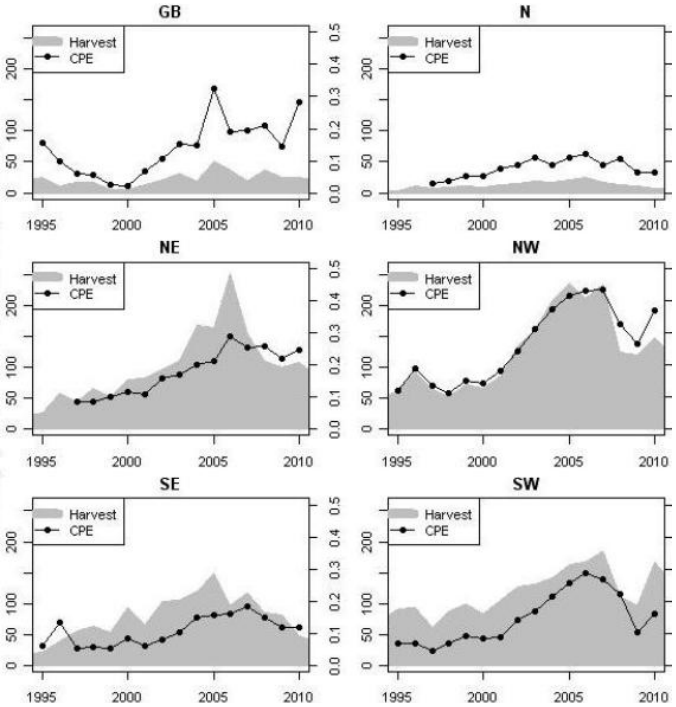


Fig 1, Thousands of Chinook salmon harvested by region (left) with corresponding harvest per angler-hour of SAT targeted effort

Yellow perch

Yellow perch harvest in 2010 declined nearly 40% from 2009 levels. The biggest decrease in harvest was in the southeast region, yet harvest rates remained near 2 fish per angler-hour. Yellow perch are also an important sportfish in Green Bay and southwest regions of the lake and both harvest and harvest rates remained stable from 2009 levels.

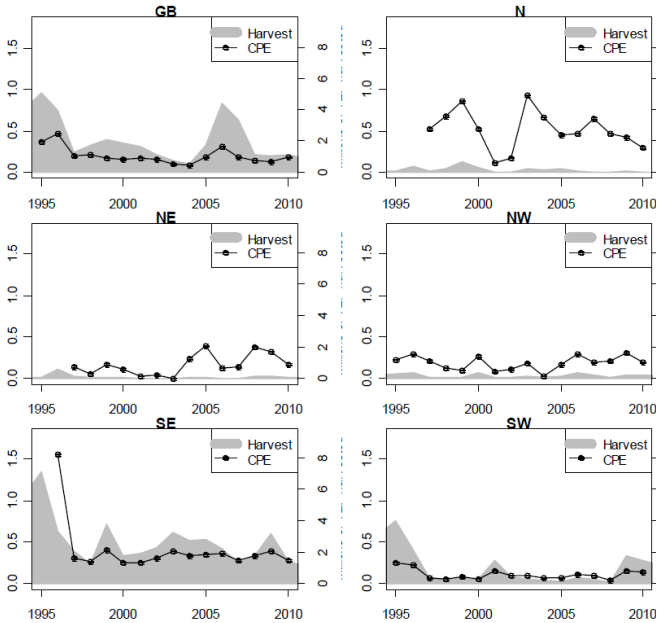


Fig 2-Millions of yellow perch harvested by region (left) with corresponding harvest per angler-hour of YEP targeted effort

Lake trout

Lake trout harvest has remained stable since 2007 with fifty to sixty thousand lakers harvested annually. This level of harvest is well below that sustained in the mid 1990's when harvest was well over 100,000 fish annually. Harvest and harvest rates are highest in the north region, near 0.1 lake trout per angler-hour, but generally harvest rates remain low lake-wide. Since 2003 stocking has gradually increased in the northern region; recreational harvest has been relatively stable but harvest rates have been increasing. This suggests that angler preference in this region may be shifting and more anglers are targeting lake trout as opposed to other species of Pacific salmon. Harvest and harvest rates in the southeast region have also increased recently despite relatively low levels of stocking in this region. ✧

Management Strategy for the Rehabilitation of Lake Trout in Lake Michigan

Lake trout rehabilitation efforts have been occurring on Lake Michigan since the early 1960s. However there has not been any significant survival of wild lake trout past age-1. The Lake Michigan Lake Trout Task Group provided a critical review of possible impediments, broadly described as: poor survival of early-life stages, a lake-wide population of lake trout that is too low, and spawning aggregations that are too diffuse and in inappropriate locations. While much has been learned about this extirpated species in the past 5 decades, the goal of a self-sustaining population in Lake Michigan has remained elusive.

This Strategy is a fusion of recommendations in *A Guide for the Rehabilitation of LakeTtrout in Lake Michigan (Guide).*

As a historically important native species, great emphasis has been placed on rehabilitation of lake trout by all management agencies on Lake Michigan and the federal government. Management agencies are responsible for providing recreational and commercial harvest opportunities while attempting to maintain, protect, and restore the sustainability of the fish community and ecology of Lake Michigan. Within the Fish Community Objectives (FCOs), the Salmon and Trout Objective for Lake Michigan is to:
Establish a diverse Salmonine community capable of sustaining an annual harvest of 2.7 to 6.8 million Kg (6 to 15 million pounds), of which 20-25% is lake trout. Establish a self-sustaining lake trout population.

Rehabilitation of lake trout in Lake Michigan while maintaining populations of other species throughout the Great Lakes will continue to be a challenging undertaking due to direct (e.g., predation) and indirect (e.g., changes in forage) impacts of exotic species and the inherent ecological instability they bring. The process of fishery management includes not only concerns about the biology of fish and their habitats, but also economics, user attitudes and desires, and the interest of the general public

In the development of this Strategy, the LMC drew from technical recommendations provided in the Guide to advance lake trout rehabilitation within a realistic time frame. Some options presented in the Guide were deemed not possible or unsuitable to implement in the immediate future due to budgetary and socio-political constraints. Rehabilitation efforts in this Strategy are focused in prioritized areas to maximize the potential for targeted rehabilitation, and to advance our understanding of major biological impediments. "Lake-wide" rehabilitation may be pursued in the future based on the results of efforts in these prioritized areas, and when agencies might be better positioned to address other non-biological constraints.

Key Aspects of the Implementation Strategy

The following aspects represent groupings of technical recommendations found in the Guide. In some instances it was agreed that Guide recommendations should be fully implemented. For others, the LMC adopted specific recommendations, chose not to implement others, or altered some recommendations to balance fisheries management considerations with the biological basis of the Guide's recommendations.

►*Stocking - locations and numbers*
►*Stocking – Strains*
►*Stocking - Life stages*
►*Hatchery criteria*
►*Numbers of lake trout*
►*Timing and method of distribution*
►*Diversification of lake trout diet*
►*Mortality controls*

Strategy Actions

Stocking

Lakewide salmonine predator stockings should be held to 2006 "baseline" levels, plus/minus 10% (6.1 million Chinook salmon equivalents), unless the LMC achieves consensus to go above this level. The LMC agrees that any increased predator stockings above the targeted 2006 baseline stocking targets (by species) will be allocated to lake trout until the lake trout maximum target is reached (3.31 million yearling and 550,000 fall fingerling lake trout annually for a total of 3.53 million yearling equivalents).

Annual lake trout stocking will be initially limited to 2.74 million yearling equivalents plus or minus 10% unless consensus is achieved by the LMC to increase this number. The decision to increase above 2.74 million yearling equivalents will be based upon the Federal hatchery production and the consensus of the LMC utilizing decision support tools and information. The USFWS expects full production capabilities by 2014 (3.53 million yearling equivalents.

Regulations

- Promote angler retention of smaller, younger lake trout and release of larger, older lake trout
- Adjust local harvest regulations if appropriate when mortality rates exceed target levels

Studies

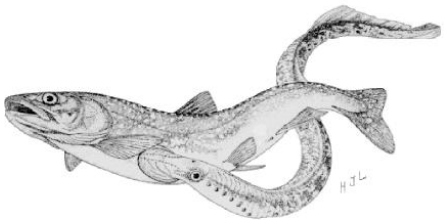
- Compare survival and movement of stocked fall fingerlings and yearlings at nearshore locations, using coded wire tags
- Continue long-term strain and reef evaluation at the West and East Beaver reef groups, the Charlevoix group, Sheboygan, Northeast, East, and Milwaukee Reefs.
- Compare enhanced stocking rates at the West and East Beaver reef groups, and the Charlevoix group.
- Experiment with stocking spring fry at densities >500 per m^2 at specified reef locations upon LMC agreement of an appropriate marking protocol and evaluation
- Investigate lake trout diets to provide data for predator-prey models, and potential vectors for thiamine deficiency syndrome.

Strategy Revision

The LMC will conduct a comprehensive review of the Strategy evaluation. By October 1, 2020 the LMC shall adopt a new or revised strategy. Interim (prior to 2020) modifications to the Strategy may be implemented, by consensus of the LMC, if circumstances warrant such modifications. Any modifications to the Strategy will be documented by the LMC. ✧

Management of Sea Lampreys in Lake Michigan, 2010

Sea Lamprey abundance declined markedly in 2008 and again in 2009, but increased slightly during 2010. During 2010 sea lamprey abundance was estimated to be 89,278 (82,928, which is greater than the target range of 57,000 sea lamprey. Marking rates may be affected by the declining abundance of large lake trout as well as the abundance of sea lampreys. These marking rates have trended upward, but have been greater than target levels since 1995.



The increasing trend in sea lamprey abundance between 2000 and 2007 led the Commission to increase assessment and treatment effort in Lake Michigan. The causes of the increase may be due to reduced lampricide control effort, increased production upstream of deteriorated barriers, and increased survival of juvenile lampreys due to changes in the fish community. However, all known and likely sources of sea lampreys have been surveyed and control efforts have been targeted at all potential sources of sea lampreys in Lake Michigan.

Beginning in 2005, the states and tribes agreed to relax previous restrictions on TFM concentrations in select sturgeon streams to maximize treatment effectiveness. Treatments of streams with sturgeon reproduction were scheduled later during the year, when larval lake sturgeon exceed 100mm in length and may be less vulnerable.

Tributary Information

Lake Michigan has 511 tributaries. One hundred twenty-three tributaries have historical records of larval sea lamprey production, and of these, 79 tributaries have been treated with lampricides at least once during 2001-2010. Thirty-nine tributaries are treated on a regular cycle.

Lampricide Control

Lampricide treatments were completed in 26 tributaries and 2 lentic areas. Lentic applications on the Boyne and Cedar rivers were conducted in conjunction with the TFM treatment of the streams.

● The upper Boardman River had not been treated since 1987, but was added to the schedule and treated after several year classes of sea lamprey larvae were discovered.

● The White River was treated from White Cloud, including 28 miles of river upstream of Hesperia Dam. Repairs were also made to the dam.

● Treatment of Trail Creek was compromised when Willow Creek, a major tributary, unexpectedly tripled in flow during the application. The increase was likely due to a landowner cleaning a 3ft diameter standpipe that controls the level of a small lake.

● Stony Creek was treated for the first time since 1987. Arthur Bay Creek and Johnson Creek were treated for the first time since 1970 and 1963, respectively. Numerous large larval sea lampreys were collected in Arthur Bay Creek, however, only a few larval sea lampreys were observed in Johnson and Stony creeks.

● The Cedar River was selected as one of two locations for the final phase of an ongoing study examining distribution of TFM in a stream undergoing lampricide treatment.

● A significant rain event dramatically increased stream discharge during treatment of the Cedar River. Despite the challenge of achieving minimum lethal concentrations with rising water levels, the increased discharge improved treatment conditions by alleviating the radical pH shifts that often occur during low water treatments on this river.

● The Ford River was treated in two simultaneous segments and required additional lampricide application sites due to extremely low discharge. The combination of low water and high temperatures resulted in water chemistries that increased minimum lethal concentrations throughout the stream compared to the 2008 treatment.

● Studies evaluating lampricide toxicity to lake sturgeon were conducted by the Service and the USGS Upper Midwest Environmental Science Center during the lampricide treatments of the Millecoquins and Sturgeon rivers.

● The first treatment of Mattix Creek was successfully completed.

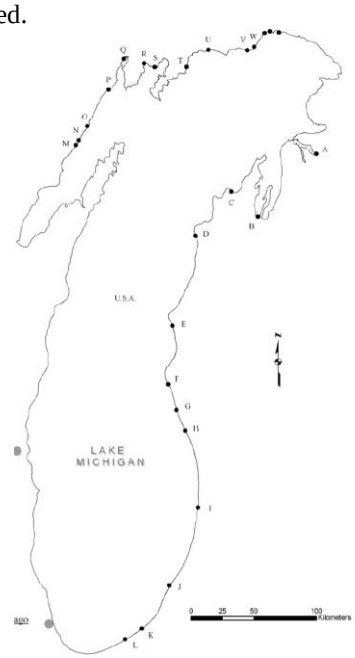


Fig 1-Locations of tributaries treated with lampricides during 2010

Alternative Control

There are nine sea lamprey barriers on Lake Michigan. Four of these were purposebuilt by the Commission to block sea lamprey spawning migrations and five were modifications to existing structures or barriers constructed by others that ensure sea lampreys remain blocked at those sites.

Operation and Maintenance

● Routine maintenance, spring start-up, and safety inspections were performed on seven barriers.
● The Pere Marquette River electrical barrier was discontinued in 2010 and the site has been decommissioned

During 2010, field crews visited 461 potential barrier sites on tributaries to Lake Michigan. Sites were inspected that were either previously inaccessible or where additional information was needed. Field crews re-visited streams where, historically, no sea lamprey larvae were found and inspected at least one more barrier upstream from the first sea lamprey barrier encountered in the system. This will allow the program to respond effectively to future barrier removal proposals on those systems. The initial inventory is nearly complete and in the future, barrier sites will be monitored on a rotating schedule.

● White River – Repairs were made to the Hesperia Dam through a cooperative agreement with the Village of Hesperia Department of Public Works. The dam was partially dewatered and inspected for possible paths of escapement. Repairs to the dam included a resurface of the spillway, stop log channel repair, installation of new stop logs, and sealing of large cracks and voids.
● Boardman River - Union Street Dam in downtown Traverse City has historically served as a lamprey barrier, but several year classes of larval sea lampreys were discovered upstream of the barrier during 2010. Investigation is ongoing to identify the escapement route. A current plan to remove three upstream dams from the Boardman River hinges on retaining Union Street Dam as a sea lamprey barrier.
● Consultations to ensure blockage at barriers were conducted with partner agencies on nine tributaries.

New Construction

● Manistique River – The U.S. Army Corps of Engineers is the lead agency administering a project to construct a sea lamprey barrier to replace a deteriorated structure in the Manistique River. The existing Manistique Paper, Inc. dam was identified as the most feasible site for a new barrier. Hydrology and hydraulic analysis indicated that additional real estate easements will be necessary. Construction is scheduled for early 2012.
● Days River – Stanley Consultants completed topographic surveys and was provided tailwater stage height data collected below the existing sea lamprey barrier. This information will be used to complete a hydrology and hydraulic analysis of the barrier site. The analysis will determine the crest height necessary to block spawning-phase migrations of sea lampreys.
● Trail Creek – Construction was planned for 2010. Due to delays in real estate negotiations construction is now scheduled for 2011.

Assessment

Larval assessment surveys were conducted on a total of 129 tributaries and offshore of 10 tributaries.
● Surveys to estimate the abundance of larval sea lampreys were conducted in 36 tributaries and offshore of two tributaries.
● Surveys to detect the presence of new larval sea lamprey populations were conducted in 48 tributaries. A new population was discovered in French Farm Creek.
● Post-treatment assessments were conducted in 28 tributaries and 2 lentic areas to determine the effectiveness of lampricide treatments during 2009 and 2010.
● Surveys to evaluate barrier effectiveness were conducted in five tributaries. Several year classes of larval sea lampreys were present upstream of Union Street Dam on the Boardman River, between Sabin Dam and Boardman Lake and this area was subsequently treated with lampricide.
● Surveys to collect larval lampreys for pheromone extraction were conducted in three tributaries.

Spawning-phase

A total of 19,427 sea lampreys were trapped at 17 sites in 16 tributaries during 2010 **(Fig 3).**
● The estimated population of spawning-phase sea lampreys during 2010 was 89,278, which was greater than the target of 57,000 (**Fig 2**).
● Spawning-phase sea lamprey migrations were monitored in the Boardman and Betsie rivers
● A total of 6,395 spawning-phase male sea lampreys were delivered to the sterilization facility from trapping operations on the Manistique (3,350), Peshtigo (572), Carp Lake Outlet (114), Boardman (111), Betsie (317), Manistee (154), Muskegon (82), and St. Joseph (116) rivers. The total includes 1,579 lampreys that were grouped for transport from a combination of Lake Michigan tributaries.
● A three-year field-scale management experiment using the mating pheromone to enhance trap captures was conducted in 20 Great Lakes tributaries, including the Carp Lake Outlet and Betsie and Manistee rivers on Lake Michigan.

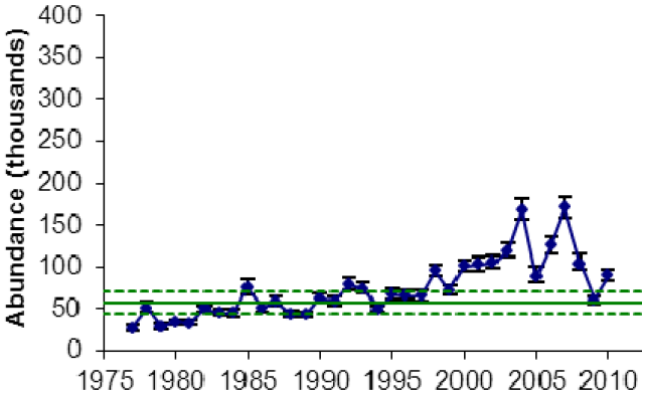


Fig 4-Estimates of spawning-phase sea lampreys, 1977-2010; target level is solid horizontal line

Parasitic-phase

The target rate for sea lamprey marking on lake trout in Lake Michigan is five fresh (A1-A3) wounds per 100 fish >533mm **(Fig 3)**. Lake trout wounding data for Lake Michigan are provided by the state DNRs and tribal agencies. Past wounding data are currently being reviewed and reanalyzed which could result in changes to the information presented here. Fall 2008-2010 wounding data (2009-2011 spawning years) have not been reported, but will be included in the 2010 Annual Report to the Commission.

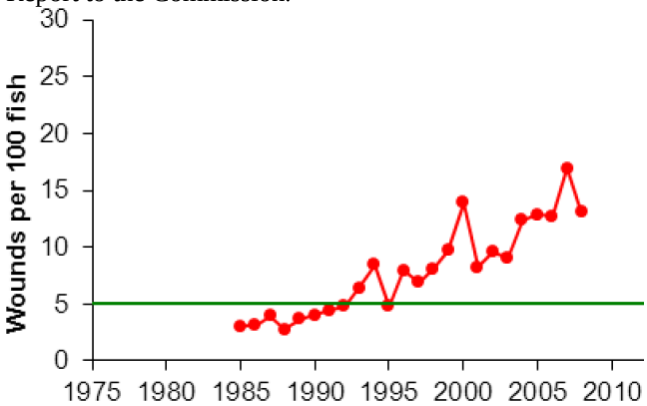


Fig 5-Number of A1-3 wounds per 100 lake trout; horizontal line represents target of five wounds per 100 fish.

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Other Breaking News Items:

(Click on title or URL to read full article)

Asian Carp issues aired in Muskegon town hall meeting
There may be bigger fish to fry than Asian carp when it comes to invasive species — but that doesn't mean the carp risk can be ignored. That was the view of many at a Muskegon town-hall meeting Friday on fighting the spread of Asian carp, a catchall term for several non-native species.

Lake Erie walleye kill was probably weather-related
The dead walleye that began appearing on Lake Erie several weeks ago are the result of natural forces, and likely not the result of commercial fishermen from Canada or a deadly virus, the Ohio Department of Natural Resources reports.

Carp-stopping dam plan killed in Minnesota House committee
A move by the Minnesota House Ways and Means Committee to eliminated funding for a carp-stopping dam at Coon Rapids on the Mississippi River has drawn sharp criticism from the Minnesota Department of Natural Resources.

Thousands of Lake Erie Walleye turn up dead
Thousands of walleye are washing up on the western shore of Lake Erie.Wildlife researchers are trying to find out what's causing the massive kill and to determine if it could spread to the other Great Lakes. One expert says the die-off can likely be blamed on natural causes based on the stress of spawning, and the cold, stormy spring.

End