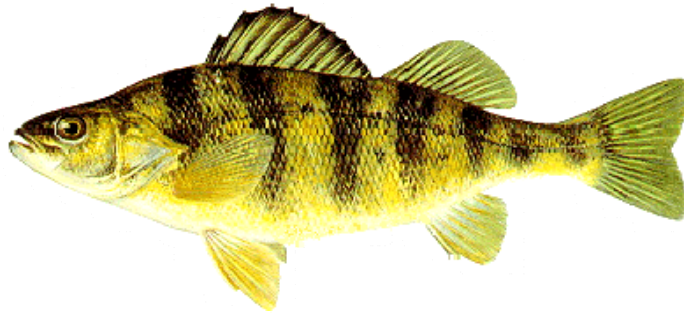


# Report of the Lake Erie Yellow Perch Task Group

March 27<sup>th</sup>, 2013



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## Presented to:

Standing Technical Committee  
Lake Erie Committee  
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**Note:** The data and management summaries contained in this report are provisional. Every effort has been made to ensure their accuracy. Contact individual agencies for complete state and provincial data. Data reported in pounds for years prior to 1996 have been converted from metric tonnes. Please contact the Yellow Perch Task Group or individual agencies before using or citing data published herein.

## Introduction

From April 2012 through March 2013, the Yellow Perch Task Group (YPTG) addressed the following charges:

1. Maintain and update centralized time series of datasets required for population models and assessment including:
  - a. Fishery harvest, effort, age composition, biological and stock parameters
  - b. Survey indices of young of year, juvenile and adult abundance, size at age and biological parameters
  - c. Fishing harvest and effort by grid.
2. Support a sustainable harvest policy by:
  - a. Examining exploitation strategies
  - b. Recommending an allowable harvest for 2013 for each management unit.
3. Assist the STC with the potential development of new exploitation strategies and completion of a Lake Erie Yellow Perch Management Plan.
4. Support QFC modeling efforts for catch-at-age models and harvest policies.

### Charge 1: 2012 Fisheries Review and Population Dynamics

The lakewide total allowable catch (TAC) in 2012 was 13.637 million pounds. This allocation represented a 7.8% increase from a TAC of 12.650 million pounds in 2011. For yellow perch assessment and allocation, Lake Erie is partitioned into four management units (Units, or MUs; Figure 1.1). The 2012 allocation by management unit was 1.800, 4.000, 7.000, and 0.837 million pounds for Units 1 through 4, respectively. In 2012, the LEC set the TAC for MU1, MU2, and MU3 higher than the mean RAH values suggested in the March 2012 YPTG report (1.364, 3.926, and 5.710 million pounds, respectively) and the MU4 TAC was set at the mean RAH (YPTG 2012). The lakewide harvest of yellow perch in 2012 was 10.786 million pounds, or 79.0% of the total 2012 TAC. This was a 12.1% increase from the 2011 harvest of 9.620 million pounds. Harvest by Lake Erie Management Units 1 through 4 was 1.729, 3.729, 4.677, and 0.651 million pounds, respectively (Table 1.1). The portion of TAC harvested was 96.1%, 93.2%, 66.8%, and 77.7%, in MUs 1 through 4, respectively. In 2012, Ontario harvested 6.901 million pounds, followed by Ohio (3.482 million lbs.), Pennsylvania (203 thousand lbs.), New York (106 thousand lbs.), and Michigan (93 thousand lbs.).

Ontario's fraction of allocation harvested was 103.0% in MU1, 102.9% in MU2, 102.9% in MU3, and 103.6% in MU4 (see comments below regarding Ontario's harvest reporting and commercial ice allowance policy). Ohio fishers attained 97.6% of their TAC in the western basin (MU1), 85.1% in the west central basin (MU2), and 32.9% in the east central basin (MU3). Michigan anglers in MU1 attained 56.9% of their TAC. Pennsylvania fisheries harvested 15.1% of their TAC in MU3 and 45.0% of their TAC in MU4. New York fisheries attained 41.0% of their TAC in MU4.

Ontario's portion of the lakewide yellow perch harvest decreased slightly to 64.0% in 2012 from 66.2% in 2011 (Table 1.1). Ohio's proportion of lakewide harvest increased to 32.3% in 2012, from 29.4% in 2011. Harvest in Michigan, Pennsylvania, and New York waters combined represented 3.7% of the lakewide harvest in 2012.

Ontario continued to employ a commercial ice allowance policy implemented in 2002, by which 3.3% is subtracted from commercial landed weight. This step was taken so that ice was not debited towards fishers' quotas. Ontario's landed weights in the YPTG report have not been adjusted to account for ice content. Ontario's reported yellow perch harvest in tables and figures is represented exclusively by the commercial gill net fishery. Reported sport harvests for Michigan, Ohio, Pennsylvania, and New York are based on creel survey estimates. Ohio, Pennsylvania, and New York trap net harvest and effort are based on commercial catch reports of landed fish. Additional fishery documentation is available in annual agency reports.

Harvest, fishing effort, and fishery harvest rates are summarized for the time period of 2000 to 2012 by management unit, year, agency, and gear type in Tables 1.2 to 1.5. Trends over a longer time series (1975 to 2012) are depicted graphically for harvest (Figure 1.2), fishing effort (Figure 1.3), and harvest rates (Figure 1.4) by management unit and gear type. The spatial distributions of harvest (all gears) and effort by gear type for 2012 in ten-minute interagency grids are presented in Figures 1.5 through 1.8.

Ontario's yellow perch harvest from large mesh (3 inches or greater) gill nets in 2012 was 4.5%, 16.7%, and 3.0% of the gill net harvest in MUs 1, 2 and 3, respectively, but was negligible in MU4 (0.2%). Harvest, effort, and catch per unit effort from (1) small mesh yellow perch effort (<3 inch stretched mesh) and (2) larger mesh sizes, are distinguished in Tables 1.2 to 1.5. Harvest from targeted small mesh gill nets in 2012 decreased 9.3% in MU1 and increased 18.1% in MU2, 25.5% in MU3, and 7.5% in MU4 from 2011 harvest. Ontario trap net harvest is minimal (115 pounds in 2012) and is included in the total harvest of yellow perch in MU1 (Tables 1.1 and 1.2). Ontario commercial smelt trawlers incidentally catch yellow perch in management units 2, 3

and 4, and this harvest is included in Tables 1.3 to 1.5. In 2012, 13,071 pounds of yellow perch were harvested in trawl nets in MU2, with an additional 247 pounds harvested in MU3 and 2,586 pounds in MU4.

Targeted gill net effort in 2012 increased from 2011 by 9.5% in MU2, 28.8% in MU3, and 13.2% in MU4, but decreased 12.7% in MU1. Gill net effort remained lower in 2012 compared to the 1990s and earlier decades (Figure 1.3). Targeted gill net harvest rates in 2012 decreased 2.6% in MU3, and 5.0% in MU4 from 2011, but increased 3.9% in MU1, and 7.8% in MU2 (Figure 1.4).

In 2012, sport harvest in U.S. waters increased 24.2% in MU1, 72.4% in MU2, and 26.6% in MU4 from 2011 harvest, but decreased 7.9% in MU3 (Figure 1.2). Angling effort in U.S. waters increased in 2012 from 2011 in MU1 (17.9%), MU2 (15.4%), and MU4 (9.3%), but decreased in MU3 (8.7%; Figure 1.3). Yellow perch sport harvest from Ontario waters is assessed periodically, but creel surveys were not performed in 2012.

Sport fishing harvest rates are commonly expressed as fish harvested per angler hour for those anglers seeking yellow perch. These harvest rates are presented in Tables 1.2 to 1.5. Compared to 2011 rates, harvest per angler hour in Ohio waters increased in MU1 (2.9%), MU2 (19.2%), and MU3 (9.8%), and also increased 8.0% in New York waters of MU4. Angler harvest rates decreased from 2011 in Michigan waters (29.4% in MU1) and in Pennsylvania waters (11.3% in MU3, 13.8% in MU4).

Angler harvest in kilograms per angler hour is presented graphically in Figure 1.4 for each management unit, by pooling jurisdictions' harvest weights and effort. In 2012, the sport harvest rate (in kg/hr) increased in all MUs; MU1 (5.4%), MU2 (49.3%), MU3 (0.8%), and MU4 (15.8%).

Harvest from Ohio, Pennsylvania, and New York commercial trap nets in 2012 increased 20.0% in MU2, 47.2% in MU3, and 17.7% in MU4. Compared to 2011, trap net effort (lifts) in 2012 increased in MU2 (21.2%), MU3 (88.7%), and MU4 (11.7%). There was no trap net harvest or effort in MU1 in 2012. In 2012, trap net harvest rates decreased from 2011 in MU2 (1.1%) and MU3 (22.2%), and increased in MU4 (5.6%).

### ***Age Composition and Growth***

Lakewide, the yellow perch harvest in 2012 consisted mostly of age-4 fish (2008 year class, 36.7%), with a fair contribution of age-5 fish (2007 year class, 30.6%), and the pooled older cohorts (ages 6+, 20.2%; Table 1.6). In MU1, age-4 (2008 year class, 38.2%), age-5 (2007 year class, 22.7%), and age-3 (20.4%) fish contributed the most to the fishery. In MU2,

the major age groups were age-4 (2008 year class, 42.1%) and age-5 (2007 year class, 35.6%). In MU3, age-5 (2007 year class, 32.1%), age-4 (2008 year class, 31.7%), and age-six-and-older (31.2%) fish contributed the most to the fishery. In MU4 the principal ages harvested were age-4 (2008 year class, 39.4%) and age-2 (2010 year class, 27.8%).

Yellow perch growth differs among life stages and between basins as illustrated by trends in total length-at-age (Figure 1.9). For simplicity, Figure 1.9 is comprised of young-of-the-year data from summer and fall interagency trawls, while data for age-1 and successive ages to age-4 are from Ontario Partnership gill net surveys (MUs 1 and 4) and Ohio fall trawls (MUs 2 and 3). As these data are taken from fall surveys, caution must be exercised when evaluating these figures. Seasonal exploitation patterns and density-dependent effects may alter the overall picture of growth trends. In addition, separate surveys in the same MU may show dissimilar trends in size-at-age due to north-south growth differences or fishery influences. However, size-at-age long-term time series results describe relatively stable length-at-age for ages 0 to 4 across the management units. Yellow perch condition in Figure 1.10 is comprised of data from Ontario Partnership gill net surveys (MUs 1 and 4) and Ohio fall trawls (MUs 2 and 3). Trends in condition may be influenced by seasonal differences in sampling. Additional data from Long Point Bay trawl surveys are used to determine condition of age-0 yellow perch in MU4.

The task group continues to update yellow perch growth data in: (1) weight-at-age values recorded annually in the harvest and (2) length- and weight-at-age values taken from interagency trawl and gill net surveys. These values are applied in the calculation of population biomass and the forecasting of harvest in the approaching year. Therefore, changes in weight-at-age factor into the changes in overall population biomass and determination of recommended allowable harvest (RAH). In 2007, the YPTG moved from using a two-year average of weight-at-age to using a three-year average, and this was format continued in 2012. This was done to minimize the impacts of weak year classes on determining the mean weight-at-age of yellow perch in the population and in the harvest.

### ***Statistical Catch-at-Age Analysis***

Population size for each management unit was estimated by statistical catch-at-age analysis (SCAA) using the Auto Differentiation Model Builder computer program (ADMB), with a standard version that incorporates commercial gill net catchability coefficients based on the seasonal distribution of harvest and relative catch rates. Estimates of population size from 1993 to 2012 and projections for 2013 are presented in Table 1.7. Abundance, biomass, survival, and

exploitation rates are presented by management unit graphically for 1975 to 2012 in Figures 1.11 to 1.14. Mean weights-at-age from assessment surveys were applied to abundance estimates to generate population biomass estimates (Table 1.8 and Figure 1.12). Population abundance and biomass estimates are critical to monitoring the status of stocks and determining allowable harvest.

Abundance estimates should be interpreted with several caveats. Inclusion of abundance estimates from 1975 to 2012 implies that the time series are continuous. Lack of data continuity for the entire time series weakens the validity of this assumption. Survey data from multiple agencies are represented only in the latter part of the time series (since the late 1980s); methods of fishery data collection have also varied. Some model parameters are constrained to constants, such as natural mortality, catchability, and selectivity blocks. This technique lessens our ability to directly compare abundance levels over three decades. In addition, commercial gill net selectivity is estimated independently in the latter part of the time series using gill net selectivity curves derived from index gillnet data by the method of Helser (1998), involving back calculation of length-at-age and weightings based on the monthly distribution of harvest-at-age. With catch-at-age analysis the most recent year's population estimates inherently have the widest error bounds; this is to be expected for cohorts that remain at-large under less than full selectivity in the population.

In the catch-at-age model, population estimates are derived by minimizing an objective function weighted by data sources including fishery effort, fishery catch, and survey catch rates. In 2011-2012, the YPTG group determined data weightings (referred to as lambdas in ADMB) using an expert opinion approach for evaluating potential sources of bias in data sets that could negatively influence model performance (YPTG 2012). These data weightings were also used in 2012-2013 and are presented in Appendix A Table 1.

### ***Recruitment Estimator for Incoming Age-2 Yellow Perch***

Age-2 yellow perch recruitment in 2013 was predicted by robust regression of juvenile yellow perch trawl and gill net indices against catch-at-age analysis estimates of two-year-old abundance in each management unit. All values were transformed by natural logarithm ( $\ln(x+0.01)$ ), and the regression equations included y-intercepts. Only survey data from within each individual management unit was used to project age-2 abundance in that management unit. Age-2 yellow perch recruitment in 2013 was calculated using the mean of age-2 values predicted

from the young-of-year and yearling indices that performed well in the regressions ( $r^2 > 0.50$ ) with age-2 abundance estimates (Appendix A Table 2). Data from trawl and gill net index series for the time period examined are presented in Appendix A Table 3, while a key that summarizes abbreviations used for the trawl and gill net series is presented as a legend in Appendix A Table 4.

Estimates of 2013 age-2 yellow perch recruitment (the 2011 year class) were 7.313, 13.178, 18.812, and 4.973 million fish in Management Units 1 through 4, respectively (Table 1.7, Appendix A Table 2). Due to year class strength and age-2 selectivity, the 2011 year class will have a small contribution to the fishery in all management units in 2013.

### ***2013 Population Size Projection***

Stock size estimates for 2013 yellow perch age-3-and-older were projected from statistical catch-at-age analysis (SCAA) estimates of 2012 population size and age-specific survival rates in 2012 (Table 1.8). Projected age-2 yellow perch recruitment from the 2011 year class (method described above) was added to the 2013 population estimate for older fish in each unit, producing the total standing stock in 2013 (Table 1.8). Standard errors and ranges for estimates are provided for each age in 2012 and following estimated survival from SCAA, for 2013. Descriptions of *min*, *mean*, and *max* population estimates refer to the age-specific mean estimates minus or plus one standard deviation (Table 1.8).

Stock size estimates for 2012 from SCAA in this report (Table 1.7) were higher than those projected previously in MU1, but were lower in MU2, and were similar to predicted values in MU's 3 and 4 (YPTG 2012). Differences in stock size estimates were due to additional data in the model. Current estimates of age-2 fish in 2012 are from the SCAA's first assessment of this cohort and as such have the widest error bounds.

Stock size estimates projected for 2013 were lower than 2012 in all management units (Table 1.8, Figure 1.11). Abundance projections for 2013 were 23.3, 45.3, 56.9, and 20.6 million age-2-and-older yellow perch in Management Units 1 through 4, respectively. Abundance estimates of age-2-and-older yellow perch in 2013 are projected to decrease by 20.6%, 23.3%, 17.4%, and 19.0% in MUs 1 through 4, respectively compared to the 2012 abundance estimates. Age-3-and-older yellow perch abundance in 2013 is projected to be 15.9, 32.1, 38.1, and 15.6 million fish in Units 1 through 4, respectively. Model estimates of abundance for age-3-and-older yellow perch for 2013 are projected to decrease from the 2012 estimates in MU2 (22.2%), and MU3 (21.2%), and increase in MU1 (0.6%) and MU4 (22.4%).



As a function of population estimates and mean weight-at-age from surveys, total biomass estimates of age-2-and-older yellow perch for 2013 are projected to decline in MU1 (9.8%), MU2 (17.9%), MU3 (14.7%), and MU4 (5.3%) compared to 2012 (Table 1.8 and Figure 1.12). In 2013, age-3 yellow perch (2010 year class) are expected to represent the largest fraction of biomass in MUs 1 and 4. In MUs 2 and 3, age-six-and-older yellow perch (pooled cohorts) are expected to represent the largest fraction of total biomass.

Estimates of yellow perch survival for age-3-and-older in 2011 were 49.7%, 57.1%, 63.6%, and 62.1% in MUs 1 to 4, respectively (Figure 1.13). In 2012, estimated survival rates of age-3-and-older fish were 47.7%, 51.0%, 52.0%, and 58.2% in Units 1 through 4 (Table 1.8 and Figure 1.13). Estimates of yellow perch survival in 2012 for age-2-and-older fish were: 54.3% in MU1, 54.4% in MU2, 55.3% in MU3, and 61.4% in MU4 (Table 1.8 and Figure 1.13). Survival estimates are a function of natural mortality and age-specific fishing mortality. Yellow perch SCAA models used in this report assume that natural mortality is 0.4, therefore mortality due to natural causes (33%) results in a survival of 67% before the effects of fishing are considered.

Estimated exploitation rates in 2011 were 21.6%, 12.3%, 4.3%, and 6.1% in Management Units 1 to 4, respectively, for age-3-and-older yellow perch. Exploitation rates for yellow perch age-3-and-older fish in 2012 were estimated at 24.0%, 19.9%, 18.7%, and 10.9%, for MUs 1 to 4, respectively (Figure 1.14). Estimates of yellow perch exploitation for age-2-and-older fish in 2012 were: 15.6% in MU1, 15.7% in MU2, 14.5% in MU3, and 6.9% in MU4 (Table 1.8 and Figure 1.14).

## **Charge 2: Harvest Strategy and RAH**

Fishing rates applied in 2013 are presented in Table 2.1, along with associated recommended allowable harvest (RAH) values for each management unit. These fishing rates are the same as those used in 2012. These interim harvest strategies were developed for a draft Yellow Perch Management Plan (YPMP; see Charge 3: Lake Erie Yellow Perch Management Plan) and tested using a yellow perch simulation (see YPTG 2010 report). The yellow perch simulation determined that fishing rates that were one-half of  $F_{msy}$  could support viable sport and commercial fisheries without inviting excessive biological risk. These target fishing rates applied to population estimates and their standard errors, were used to determine *min*, *mean*, and *max* RAH's for 2013 for each management unit (Tables 2.1 and 2.2).

Quota allocation by management unit and jurisdiction for 2013 was determined by the same methods applied in 2009-2012, using GIS applications of jurisdictional surface area of water within each MU (Figure 2.1). The allocation of shares by management unit and jurisdiction are:

Allocation of TAC within Management Unit and Jurisdiction, 2013:

<u>MU1:</u>	ONT	40.6%	OH	50.3%	MI	9.1%
<u>MU2:</u>	ONT	45.6%	OH	54.4%		
<u>MU3:</u>	ONT	52.3%	OH	32.4%	PA	15.3%
<u>MU4:</u>	ONT	58.0%	NY	31.0%	PA	11.0%

**Charge 3: Lake Erie Yellow Perch Management Plan**

With guidance from the STC, the YPTG was charged with supporting the development of a Lake Erie Yellow Perch Management Plan (YPMP). In February 2009, a draft YPMP was submitted to Michigan State University’s Quantitative Fisheries Center (QFC) for a technical review of the background material, exploitation strategies and associated yellow perch simulation. Despite changes in simulation methodology that followed, risk assessment, population and fishery objectives remain outstanding. Interim fishing rates, developed for the draft YPMP, currently applied for RAH in MUs 1, 2 and 3 are  $\frac{1}{2}F_{msy}$ . They are 0.67, 0.67, and 0.70 for Management Units 1–3, respectively. In MU4, a more conservative fishing rate of 0.30 was chosen.

The LEC, STC, QFC, and stakeholder groups from all jurisdictions on Lake Erie have formed the Lake Erie Percid Management Advisory Group (LEPMAG), to address stakeholder objectives, modeling concerns, and exploitation policies for Lake Erie percids. During 2012, LEPMAG focused on walleye objectives and assessment models. LEPMAG also began a review of existing YPTG models and data sources, and began discussions on stakeholder objectives and catch-at-age modeling concerns for yellow perch. These discussions are expected to lead to updated statistical catch-at-age models and new exploitation strategies for yellow perch leading to the completion of a new Lake Erie Yellow Perch Management Plan.

**Charge 4: Support QFC Modeling Efforts for Catch-at-Age Models**

The LEPMAG, facilitated by the QFC, has begun a review of the yellow perch assessment models. This review will continue during the course of their discussion on yellow perch management, and the YPTG will support this endeavor. During December 2012, YPTG met with

the QFC to discuss existing yellow perch models and options for possible improvement. Model concerns discussed included catchability, selectivity, estimating recruitment, and migration between management units.

## **Acknowledgments**

The task group members wish to thank the following people for providing support to the task group during the past year:

- Tim Bader, Ann Marie Gorman, and Jeff Tyson of the Ohio Department of Natural Resources, Division of Wildlife;
- Karen Soper and Dr. Yingming Zhao of the Ontario Ministry of Natural Resources;
- Dr. Michael Jones, Lisa Petersen, and Matthew Catalano of Michigan State University's Quantitative Fishery Center;
- Dr. Carol Stepien and the Lake Erie Center of the University of Toledo;
- Richard Kraus and Patrick Kocovsky of the U.S. Geological Survey, Biological Resources Division, Sandusky.

The YPTG report could not be completed without the contributions of all Lake Erie staff from the Michigan Department of Natural Resources, Ohio Division of Wildlife, Pennsylvania Fish and Boat Commission, New York Department of Environmental Conservation, US Geological Survey – Biological Resources Division, and the Ontario Ministry of Natural Resources. In addition, the YPTG expresses thanks to the Great Lakes Fishery Commission for their continued support.

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Yellow Perch Task Group (YPTG). 2012. Report of the Yellow Perch Task Group, March 2012. Presented to the Standing Technical Committee, Lake Erie Committee of the Great Lakes Fishery Commission. Ann Arbor, Michigan, USA.

Table 1.1. Lake Erie yellow perch harvest in pounds by management unit (Unit) and agency, 2000-2012.

	Year	Ontario*		Ohio		Michigan		Pennsylvania		New York		Total Harvest
		Harvest	%	Harvest	%	Harvest	%	Harvest	%	Harvest	%	
<b>Unit 1</b>	2000	980,323	47	1,038,650	50	67,010	3	--	--	--	--	2,085,983
	2001	813,066	45	915,641	51	70,910	4	--	--	--	--	1,799,617
	2002	1,454,105	50	1,316,553	45	147,065	5	--	--	--	--	2,917,723
	2003	1,179,667	44	1,406,385	53	84,878	3	--	--	--	--	2,670,930
	2004	1,698,761	59	1,090,669	38	94,732	3	--	--	--	--	2,884,162
	2005	1,513,890	60	965,231	38	49,485	2	--	--	--	--	2,528,606
	2006	1,325,464	54	1,055,378	43	62,854	3	--	--	--	--	2,443,696
	2007	727,678	41	982,677	55	62,815	4	--	--	--	--	1,773,170
	2008	580,050	56	409,705	39	47,934	5	--	--	--	--	1,037,689
	2009	853,137	61	463,564	33	87,319	6	--	--	--	--	1,404,020
	2010	879,358	47	889,512	48	83,725	5	--	--	--	--	1,852,595
	2011	870,802	48	796,447	44	145,960	8	--	--	--	--	1,813,209
2012	752,872	44	883,245	51	93,291	5	--	--	--	--	1,729,408	
<b>Unit 2</b>	2000	1,484,125	56	1,169,234	44	--	--	--	--	--	--	2,653,359
	2001	1,794,275	51	1,747,069	49	--	--	--	--	--	--	3,541,344
	2002	2,190,621	52	1,986,730	48	--	--	--	--	--	--	4,177,351
	2003	2,107,639	50	2,113,285	50	--	--	--	--	--	--	4,220,924
	2004	2,051,473	48	2,246,264	52	--	--	--	--	--	--	4,297,737
	2005	2,666,231	59	1,843,190	41	--	--	--	--	--	--	4,509,421
	2006	3,102,269	69	1,393,732	31	--	--	--	--	--	--	4,496,001
	2007	1,847,139	45	2,244,656	55	--	--	--	--	--	--	4,091,795
	2008	1,990,237	50	2,005,000	50	--	--	--	--	--	--	3,995,237
	2009	2,495,611	58	1,801,978	42	--	--	--	--	--	--	4,297,589
	2010	1,888,876	56	1,457,823	44	--	--	--	--	--	--	3,346,699
	2011	1,665,258	54	1,399,503	46	--	--	--	--	--	--	3,064,761
2012	1,877,615	50	1,851,846	50	--	--	--	--	--	--	3,729,461	
<b>Unit 3</b>	2000	771,646	62	443,250	36	--	--	32,613	3	--	--	1,247,509
	2001	999,450	64	464,811	30	--	--	91,211	6	--	--	1,555,472
	2002	1,192,691	60	640,104	32	--	--	140,821	7	--	--	1,973,616
	2003	1,667,133	72	481,558	21	--	--	177,516	8	--	--	2,326,207
	2004	1,453,419	62	659,447	28	--	--	244,063	10	--	--	2,356,929
	2005	1,771,800	75	457,593	19	--	--	142,028	6	--	--	2,371,421
	2006	3,451,499	90	271,144	7	--	--	106,260	3	--	--	3,828,903
	2007	2,997,101	84	391,285	11	--	--	193,065	5	--	--	3,581,451
	2008	2,200,168	74	629,366	21	--	--	155,014	5	--	--	2,984,548
	2009	2,266,727	74	597,214	20	--	--	190,742	6	--	--	3,054,683
	2010	3,370,099	85	476,808	12	--	--	117,640	3	--	--	3,964,547
	2011	3,366,412	81	636,686	15	--	--	153,233	4	--	--	4,156,331
2012	3,768,183	81	746,999	16	--	--	161,751	3	--	--	4,676,933	
<b>Unit 4</b>	2000	35,686	73	--	--	--	--	10,950	22	2,458	5	49,094
	2001	35,893	60	--	--	--	--	8,337	14	15,319	26	59,549
	2002	87,541	54	--	--	--	--	46,903	29	26,903	17	161,347
	2003	84,772	60	--	--	--	--	39,821	28	16,511	12	141,104
	2004	98,733	49	--	--	--	--	46,344	23	54,862	27	199,939
	2005	195,347	67	--	--	--	--	42,226	15	53,468	18	291,041
	2006	230,226	69	--	--	--	--	57,005	17	48,107	14	335,338
	2007	185,954	78	--	--	--	--	25,859	11	25,935	11	237,748
	2008	240,270	77	--	--	--	--	31,325	10	40,809	13	312,404
	2009	272,579	72	--	--	--	--	37,991	10	70,030	18	380,600
	2010	467,612	89	--	--	--	--	19,989	4	37,730	7	525,331
	2011	468,001	80	--	--	--	--	37,040	6	80,848	14	585,889
2012	502,778	77	--	--	--	--	41,362	6	106,499	16	650,639	
<b>Lakewide Totals</b>	2000	3,271,780	54	2,651,134	44	67,010	1	43,563	<1	2,458	<1	6,035,945
	2001	3,642,684	52	3,127,521	45	70,910	1	99,548	1	15,319	<1	6,955,982
	2002	4,924,958	53	3,943,387	43	147,065	2	187,724	2	26,903	<1	9,230,037
	2003	5,039,211	54	4,001,228	43	84,878	1	217,337	2	16,511	<1	9,359,165
	2004	5,302,386	54	3,996,380	41	94,732	1	290,407	3	54,862	<1	9,738,767
	2005	6,147,268	63	3,266,014	34	49,485	<1	184,254	2	53,468	<1	9,700,489
	2006	8,109,458	73	2,720,254	24	62,854	<1	163,265	1	48,107	<1	11,103,938
	2007	5,757,872	59	3,618,618	37	62,815	<1	218,924	2	25,935	<1	9,684,164
	2008	5,010,725	60	3,044,071	37	47,934	<1	186,339	2	40,809	<1	8,329,878
	2009	5,888,054	64	2,862,756	31	87,319	1	228,733	3	70,030	1	9,136,892
	2010	6,605,945	68	2,824,143	29	83,725	1	137,629	1	37,730	<1	9,689,172
	2011	6,370,473	66	2,832,636	29	145,960	2	190,273	2	80,848	1	9,620,190
2012	6,901,448	64	3,482,090	32	93,291	1	203,113	2	106,499	1	10,786,441	

\*processor weight (quota debit weight) to 2001; fisher/observer weight from 2002 to 2012 (negating ice allowance).

**Table 1.2.** Harvest, effort and harvest per unit effort summaries for Lake Erie yellow perch fisheries in Management Unit 1 (Western Basin) by agency and gear type, 2000-2012.

	Year	Unit 1					
		Michigan	Ohio		Ontario Gill Nets		Ontario
		Sport	Trap Nets	Sport	Small Mesh	Large Mesh*	Trap Nets
<b>Harvest</b> (pounds)	2000	67,010	240,541	798,109	980,323	--	--
	2001	70,910	179,234	736,407	711,745	101,321	--
	2002	147,065	337,829	978,724	1,359,637	94,468	--
	2003	84,879	250,456	1,155,929	1,151,358	28,309	--
	2004	94,732	289,136	801,533	1,637,488	61,273	--
	2005	49,485	357,182	608,049	1,402,523	111,082	--
	2006	62,854	235,852	819,526	1,264,370	61,094	--
	2007	62,815	200,818	781,859	671,536	56,142	--
	2008	47,934	0	409,705	484,409	49,378	46,263
	2009	87,319	0	463,564	728,012	125,024	70
	2010	83,725	195,674	693,838	815,170	64,188	--
	2011	145,960	156,138	640,309	792,336	78,363	103
2012	93,291	0	883,245	718,585	34,172	115	
<b>Harvest</b> (Metric) (tonnes)	2000	30	109	362	445	--	--
	2001	32	81	334	323	46	--
	2002	67	153	444	617	43	--
	2003	38	114	524	522	13	--
	2004	43	131	364	743	28	--
	2005	22	162	276	636	50	--
	2006	29	107	372	573	28	--
	2007	28	91	355	305	25	--
	2008	22	0	186	220	22	20.98
	2009	40	0	210	330	57	0.03
	2010	38	89	315	370	29	--
	2011	66	71	290	359	36	0.05
2012	42	0	401	326	15	0.05	
<b>Effort</b> (a)	2000	122,447	4,026	965,628	6,741	--	--
	2001	97,761	1,518	720,923	2,167	2,142	--
	2002	190,573	2,715	900,289	4,546	739	--
	2003	121,638	2,213	1,182,694	3,725	395	--
	2004	206,902	4,351	833,690	6,052	901	--
	2005	98,429	3,903	816,959	5,170	1,182	--
	2006	118,628	3,517	683,994	5,194	787	--
	2007	181,698	2,951	823,624	2,230	1,125	--
	2008	95,925	0	519,050	1,653	899	--
	2009	130,556	0	578,303	3,058	1,680	--
	2010	132,852	2,607	798,240	3,152	845	--
	2011	139,344	3,219	729,369	2,571	682	--
2012	128,013	0	896,083	2,244	438	--	
<b>Harvest Rates</b> (b)	2000	2.2	27.1	3.0	66.0	--	--
	2001	2.9	53.5	3.4	149.0	21.5	--
	2002	2.5	56.4	3.4	135.6	58.0	--
	2003	2.4	51.3	3.5	140.2	32.5	--
	2004	1.6	30.1	3.0	122.7	30.8	--
	2005	1.7	41.5	3.1	123.0	42.6	--
	2006	1.7	30.4	4.2	110.4	35.2	--
	2007	1.0	30.9	3.4	136.6	22.6	--
	2008	1.5	--	2.7	132.9	24.9	--
	2009	2.7	--	3.1	108.0	33.8	--
	2010	2.3	34.0	3.4	117.3	34.4	--
	2011	3.4	22.0	3.5	139.8	52.1	--
2012	2.4	--	3.6	145.3	35.4	--	

(a) sport effort in angler-hours; gill net effort in km; trap net effort in lifts

(b) harvest rates for sport in fish/hr, gill net in kg/km, trap net in kg/lift

(\*) Large mesh catch rates are not targeted and therefore of limited value

**Table 1.3.** Harvest, effort and harvest per unit effort summaries for Lake Erie yellow perch fisheries in Management Unit 2 (western Central Basin) by agency and gear type, 2000-2012.

		Unit 2				
		Ohio		Ontario	Gill Nets	Ontario
Year		Trap Nets	Sport	Small Mesh	Large Mesh*	Trawls
<b>Harvest</b> (pounds)	2000	565,009	604,225	1,484,125	--	
	2001	905,088	841,891	1,593,704	200,571	
	2002	1,099,971	886,759	1,892,070	298,551	
	2003	1,255,205	858,080	2,019,617	88,022	
	2004	1,287,747	958,517	1,893,871	157,602	
	2005	1,162,746	680,444	2,446,007	219,723	
	2006	744,452	649,280	2,981,793	120,476	
	2007	1,701,552	543,104	1,561,287	173,699	112,153
	2008	1,376,588	628,412	1,669,682	253,984	66,203
	2009	1,338,616	463,362	1,994,208	482,402	15,439
	2010	935,616	522,207	1,410,051	470,926	7,899
	2011	1,070,817	328,686	1,312,168	339,404	13,686
	2012	1,285,336	566,510	1,550,104	314,440	13,071
<b>Harvest</b> (Metric) (tonnes)	2000	256	274	673	--	
	2001	410	382	723	91	
	2002	499	402	858	135	
	2003	569	389	916	40	
	2004	584	435	859	71	
	2005	527	309	1,109	100	
	2006	338	294	1,352	55	
	2007	772	246	708	79	51
	2008	624	285	757	115	30
	2009	607	210	904	219	7
	2010	424	237	639	214	4
	2011	486	149	595	154	6
	2012	583	257	703	143	6
<b>Effort</b> (a)	2000	5,272	601,712	6,266	--	
	2001	4,747	594,741	3,445	4,975	
	2002	7,675	658,799	4,786	3,209	
	2003	10,214	632,813	5,311	1,555	
	2004	12,023	659,454	4,929	2,787	
	2005	9,103	784,942	9,716	2,173	
	2006	7,544	499,412	11,692	1,925	
	2007	9,158	498,843	2,966	2,826	
	2008	3,983	450,060	3,124	2,629	
	2009	6,317	417,660	5,545	4,241	
	2010	6,701	502,507	3,783	3,905	
	2011	5,707	395,407	4,214	3,789	
	2012	6,919	456,404	4,616	2,942	
<b>Harvest Rates</b> (b)	2000	48.6	2.9	107.4	--	
	2001	86.5	3.2	209.9	18.3	
	2002	65.0	3.1	179.3	42.1	
	2003	55.7	3.3	172.5	25.7	
	2004	48.6	3.7	174.3	25.6	
	2005	57.9	2.8	114.2	45.9	
	2006	44.8	3.7	115.7	28.4	
	2007	84.3	2.8	238.7	27.9	
	2008	156.7	3.5	242.4	43.8	
	2009	96.1	3.0	163.1	51.6	
	2010	63.3	3.2	169.0	54.7	
	2011	85.1	2.6	141.2	40.6	
	2012	84.2	3.1	152.3	48.5	

(a) sport effort in angler-hours; gill net effort in km; trap net effort in lifts

(b) harvest rates for sport in fish/hr, gill net in kg/km, trap net in kg/lift

(\*) Large mesh catch rates are not targeted and therefore of limited value

**Table 1.4.** Harvest, effort and harvest per unit effort summaries for Lake Erie yellow perch fisheries in Management Unit 3 (eastern Central Basin) by agency and gear type, 2000-2012.

	Year	Unit 3						
		Ohio		Pennsylvania		Ontario Gill Nets		Ontario
		Trap Nets	Sport	Trap Nets	Sport	Small Mesh	Large Mesh*	Trawls
<b>Harvest</b> (pounds)	2000	156,510	286,740	5,930	26,683	771,646	--	
	2001	4,472	460,339	2,602	96,946	948,622	50,828	
	2002	0	640,104	2,009	138,812	1,094,894	97,797	
	2003	0	481,559	5,050	172,467	1,647,047	20,086	
	2004	0	659,447	7,753	236,310	1,443,314	10,105	
	2005	43,253	414,340	15,228	126,800	1,657,498	113,969	
	2006	70,310	200,834	20,467	85,793	3,332,037	119,461	
	2007	48,286	342,999	23,471	169,594	2,941,451	42,570	13,080
	2008	139,023	490,343	22,927	132,087	2,160,041	32,673	7,454
	2009	112,030	485,184	35,296	155,446	2,180,834	77,858	8,035
	2010	153,097	323,711	36,026	104,224	3,065,336	302,410	2,353
	2011	327,871	308,815	1,542	151,691	2,911,506	451,628	3,278
	2012	469,401	277,598	15,405	146,346	3,653,296	114,640	247
<b>Harvest</b> (Metric) (tonnes)	2000	71	130	2.7	12	350	--	
	2001	2.0	209	1.2	44	430	23	
	2002	0	290	0.9	63	497	44	
	2003	0	218	2.3	78	747	9.1	
	2004	0	299	3.5	107	655	4.6	
	2005	20	188	6.9	58	752	52	
	2006	32	91	9.3	39	1,511	54	
	2007	22	156	10.6	77	1,334	19	5.9
	2008	63	222	10.4	60	980	15	3.4
	2009	51	220	16.0	70	989	35	3.6
	2010	69	147	16.3	47	1,390	137	1.1
	2011	149	140	0.7	69	1,320	205	1.5
	2012	213	126	7.0	66	1,657	52	0.1
<b>Effort</b> (a)	2000	1,640	214,825	231	48,561	2,342	--	
	2001	32	269,062	175	90,214	2,451	1,047	
	2002	0	416,543	95	123,287	2,490	1,055	
	2003	0	256,890	87	138,720	4,617	316	
	2004	0	368,537	70	175,596	3,750	268	
	2005	947	305,885	129	127,462	5,098	743	
	2006	881	139,536	124	60,612	11,130	1,030	
	2007	713	218,683	88	135,611	6,115	614	
	2008	1,288	234,179	78	110,403	3,336	417	
	2009	482	289,602	121	139,438	4,050	728	
	2010	972	182,485	128	85,294	5,747	1,125	
	2011	1,108	182,630	37	94,025	6,093	1,481	
	2012	2,074	154,474	87	98,234	7,847	991	
<b>Harvest Rates</b> (b)	2000	43.3	3.0	11.6	1.9	149.4	--	
	2001	63.4	2.9	6.7	2.6	175.4	22.0	
	2002	--	2.7	9.6	3.6	199.6	41.7	
	2003	--	3.1	26.3	5.3	161.8	28.8	
	2004	--	4.3	50.2	3.9	174.6	17.1	
	2005	20.7	3.1	53.5	2.9	147.4	69.6	
	2006	36.2	3.3	74.9	3.7	135.8	52.6	
	2007	30.7	3.4	121.0	3.8	218.2	31.4	
	2008	49.0	4.6	133.3	4.5	293.6	35.5	
	2009	105.4	3.5	132.3	4.8	244.2	48.5	
	2010	71.4	4.0	127.6	4.0	241.9	121.9	
	2011	134.2	4.1	18.9	5.3	216.7	138.3	
	2012	102.6	4.5	80.3	4.7	211.1	52.5	

(a) sport effort in angler-hours; gill net effort in km; trap net effort in lifts

(b) harvest rates for sport in fish/hr, gill net in kg/km, trap net in kg/lift

(\*) Large mesh catch rates are not targeted and therefore of limited value

**Table 1.5.** Harvest, effort and harvest per unit effort summaries for Lake Erie yellow perch fisheries in Management Unit 4 (Eastern Basin) by agency and gear type, 2000-2012.

		Unit 4						
		New York		Pennsylvania		Ontario Gill Nets		Ontario
	Year	Trap Nets	Sport	Trap Nets	Sport	Small Mesh	Large Mesh*	Trawls
<b>Harvest</b> (pounds)	2000	625	1,833	0	10,950	35,686	--	
	2001	27	15,292	0	8,337	34,284	1,608	
	2002	1,951	24,952	29	46,874	85,935	1,606	
	2003	1,048	15,464	0	39,822	84,648	124	
	2004	3,907	50,955	0	90,514	98,716	17	
	2005	7,726	45,742	0	42,226	195,258	52	
	2006	9,423	38,684	0	57,005	229,063	1,163	
	2007	9,511	16,424	0	25,859	179,595	3,076	3,283
	2008	11,136	29,673	0	31,325	234,366	2,689	3,215
	2009	13,476	56,554	0	37,991	266,425	4,738	1,416
	2010	11,772	25,958	0	26,263	465,775	1,517	320
	2011	15,045	65,803	0	37,040	464,331	2,761	909
	2012	17,709	88,790	0	41,362	499,359	833	2,586
<b>Harvest</b> (Metric) (tonnes)	2000	0.3	0.8	0	5.0	16.2	--	
	2001	0.01	6.9	0	3.8	15.5	0.73	
	2002	0.9	11.3	0.01	21.3	39.0	0.70	
	2003	0.5	7.0	0	18.1	38.4	0.06	
	2004	1.8	23.1	0	41.0	44.8	0.01	
	2005	3.5	20.7	0	19.2	88.6	0.02	
	2006	4.3	17.5	0	25.9	103.9	0.53	
	2007	4.3	7.4	0	11.7	81.4	1.40	
	2008	5.1	13.5	0	14.2	106.3	1.22	1.46
	2009	6.1	25.6	0	17.2	120.8	2.15	0.64
	2010	5.3	11.8	0	11.9	211.2	0.69	0.15
	2011	6.8	29.8	0	16.8	210.6	1.25	0.41
	2012	8.0	40.3	0	18.8	226.5	0.38	1.17
<b>Effort</b> (a)	2000	44	2,606	0	21,146	314	--	
	2001	39	22,950	0	12,451	128	28.0	
	2002	89	44,270	9	61,734	224	28.0	
	2003	91	33,162	0	32,525	373	21.0	
	2004	44	73,056	0	62,639	355	3.2	
	2005	179	58,667	0	70,921	782	7.8	
	2006	208	46,174	0	47,274	1,007	31.8	
	2007	144	29,999	0	31,545	550	62.1	
	2008	137	34,511	0	27,041	569	69.2	
	2009	215	58,829	0	58,475	718	50.9	
	2010	287	35,526	0	26,544	1,227	21.7	
	2011	383	50,479	0	48,537	1,564	28.6	
	2012	428	58,621	0	49,577	1,770	12.9	
<b>Harvest Rates</b> (b)	2000	6.4	0.20	--	1.7	51.5	--	
	2001	0.3	1.65	--	1.5	121.5	26.0	
	2002	9.9	1.13	1.5	2.4	174.0	25.0	
	2003	5.2	0.76	--	1.9	102.9	2.9	
	2004	40.3	1.14	--	1.7	126.1	2.4	
	2005	19.6	1.23	--	1.8	113.2	3.0	
	2006	20.5	1.36	--	2.9	103.2	16.6	
	2007	30.0	0.97	--	1.5	148.1	22.5	
	2008	36.9	1.68	--	6.4	186.8	17.6	
	2009	28.4	1.77	--	3.2	168.3	42.2	
	2010	18.6	1.31	--	2.2	172.1	31.7	
	2011	17.8	2.01	--	2.9	134.6	43.8	
	2012	18.8	2.17	--	2.5	127.9	29.3	

(a) sport effort in angler-hours; gill net effort in km; trap net effort in lifts

(b) harvest rates for sport in fish/hr, gill net in kg/km, trap net in kg/lift

(\*) Large mesh catch rates are not targeted and therefore of limited value



**Table 1.6.** Estimated 2012 Lake Erie yellow perch harvest by age and numbers of fish by gear and management unit (Unit).

Gear	Age	Unit 1		Unit 2		Unit 3		Unit 4		Lakewide	
		Number	%	Number	%	Number	%	Number	%	Number	%
<b>Gill Nets</b>	1	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
	2	101,485	4.3	114,458	2.2	99,452	0.9	433,188	31.9	748,583	3.7
	3	182,941	7.8	180,192	3.5	246,279	2.2	57,959	4.3	667,371	3.3
	4	1,179,815	50.0	2,085,526	40.2	3,382,548	30.6	524,881	38.6	7,172,770	35.9
	5	643,360	27.3	1,660,757	32.0	3,458,591	31.3	193,180	14.2	5,955,888	29.8
	6+	250,698	10.6	1,142,324	22.0	3,877,171	35.0	149,069	11.0	5,419,262	27.1
	<b>Total</b>	2,358,299	<b>39.2</b>	5,183,257	<b>49.9</b>	11,064,040	<b>82.4</b>	1,358,277	<b>82.3</b>	19,963,874	<b>63.4</b>
<b>Trap Nets</b>	1	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
	2	0	0.0	18,823	0.5	32,348	2.5	0	0.0	51,171	1.0
	3	0	0.0	127,463	3.4	46,904	3.7	856	2.0	175,223	3.4
	4	0	0.0	1,710,098	45.5	499,769	39.0	17,696	41.3	2,227,563	43.8
	5	0	0.0	1,628,930	43.3	546,673	42.6	11,131	26.0	2,186,734	43.0
	6+	0	0.0	277,095	7.4	156,886	12.2	13,129	30.7	447,110	8.8
	<b>Total</b>	0	<b>0.0</b>	3,762,409	<b>36.3</b>	1,282,580	<b>9.5</b>	42,812	<b>2.6</b>	5,087,801	<b>16.2</b>
<b>Sport</b>	1	9,176	0.3	359	0.0	946	0.1	0	0.0	10,481	0.2
	2	650,474	17.8	70,542	4.9	64,973	6.0	26,428	10.6	812,417	12.6
	3	1,048,093	28.6	220,036	15.4	185,518	17.1	17,629	7.1	1,471,277	22.9
	4	1,117,685	30.5	572,435	39.9	370,061	34.0	107,888	43.2	2,168,069	33.7
	5	726,230	19.8	404,738	28.2	304,368	28.0	43,022	17.2	1,478,358	23.0
	6+	111,125	3.0	165,148	11.5	161,462	14.8	54,499	21.8	492,234	7.7
	<b>Total</b>	3,662,783	<b>60.8</b>	1,433,258	<b>13.8</b>	1,087,329	<b>8.1</b>	249,467	<b>15.1</b>	6,432,836	<b>20.4</b>
<b>All Gear</b>	1	9,176	0.2	359	0.0	946	0.0	0	0.0	10,481	0.0
	2	751,959	12.5	203,823	2.0	196,772	1.5	459,617	27.8	1,612,171	5.1
	3	1,231,034	20.4	527,691	5.1	478,701	3.6	76,444	4.6	2,313,871	7.3
	4	2,297,500	38.2	4,368,059	42.1	4,252,378	31.7	650,465	39.4	11,568,402	36.7
	5	1,369,590	22.7	3,694,425	35.6	4,309,632	32.1	247,334	15.0	9,620,980	30.6
	6+	361,823	6.0	1,584,567	15.3	4,195,520	31.2	216,697	13.1	6,358,606	20.2
	<b>Total</b>	6,021,082	<b>19.1</b>	10,378,924	<b>33.0</b>	13,433,949	<b>42.7</b>	1,650,556	<b>5.2</b>	31,484,511	<b>100.0</b>

Note: Values in italics delineate harvest percentage by gear in each Unit, while the values in the 'All Gear' boxes are for lakewide harvest percentage by Unit.

**Table 1.7.** Yellow perch stock size (millions of fish) in each Lake Erie management unit. Abundance in the years 1993 to 2012 are estimated by statistical catch-age analysis. The 2013 abundance estimates use age-2 estimates derived from regressions of SCAA age-2 abundance values against YOY and yearling trawl index values.

Age	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	
<b>Unit 1</b>																						
2	3.830	9.354	23.326	29.214	22.658	44.048	10.477	34.234	33.670	7.806	40.903	3.240	53.414	1.589	9.261	10.159	24.482	14.201	9.193	13.420	7.313	
3	8.649	1.530	5.637	14.230	17.366	14.026	27.061	6.682	21.774	21.706	4.996	25.716	2.061	33.122	1.021	5.574	6.268	15.466	9.063	5.883	8.379	
4	1.921	2.197	0.645	2.505	6.108	8.008	6.970	14.741	3.657	12.843	11.193	2.736	11.909	1.017	13.188	0.551	2.912	3.225	8.113	4.873	3.016	
5	0.149	0.314	0.508	0.181	0.685	1.932	3.003	3.195	7.412	1.996	5.300	5.024	1.021	4.340	0.415	5.319	0.299	1.422	1.530	3.813	2.272	
6+	0.077	0.028	0.076	0.175	0.094	0.169	0.493	1.325	2.032	4.930	2.463	3.195	2.400	1.014	1.646	0.795	3.037	1.581	1.370	1.282	2.272	
2 and Older	14.627	13.423	30.191	46.305	46.910	68.183	48.004	60.177	68.544	49.280	64.855	39.911	70.805	41.081	25.532	22.398	36.997	35.895	29.268	29.270	23.253	
3 and Older	10.797	4.069	6.865	17.090	24.252	24.135	37.527	25.943	34.874	41.475	23.952	36.671	17.391	39.492	16.270	12.239	12.516	21.694	20.075	15.851	15.940	
<b>Unit 2</b>																						
2	5.479	11.925	13.104	26.712	11.950	61.247	14.911	57.756	54.318	11.606	95.121	4.014	193.555	4.662	23.968	26.130	54.832	46.395	7.848	17.786	13.178	
3	10.371	2.673	6.842	7.347	13.124	6.171	32.542	9.197	34.494	32.092	7.296	57.507	2.613	124.047	3.062	15.554	17.207	35.417	30.089	5.154	11.072	
4	2.405	4.106	0.948	2.547	2.953	4.163	2.617	17.875	4.969	19.378	17.043	4.093	30.372	1.497	68.472	1.798	9.338	10.056	20.874	18.329	3.018	
5	0.235	0.723	0.884	0.200	0.603	0.523	0.879	1.261	8.397	2.406	8.773	7.355	1.965	13.456	0.872	32.056	0.940	4.521	5.258	11.292	9.129	
6+	0.229	0.127	0.182	0.228	0.102	0.080	0.091	0.392	0.747	4.429	3.081	5.163	5.735	3.445	7.535	3.884	18.903	9.338	6.976	6.459	8.872	
2 and Older	18.719	19.554	21.961	37.035	28.733	72.183	51.041	86.481	102.925	69.911	131.315	78.132	234.240	147.108	103.909	79.421	101.219	105.726	71.045	59.020	45.269	
3 and Older	13.240	7.628	8.856	10.322	16.783	10.937	36.129	28.725	48.607	58.305	36.194	74.118	40.685	142.445	79.941	53.291	46.387	59.331	63.197	41.234	32.091	
<b>Unit 3</b>																						
2	2.958	6.320	7.154	13.497	10.600	43.438	12.232	46.407	26.977	6.761	38.007	4.521	152.594	6.090	31.036	45.492	41.198	45.759	3.136	20.592	18.812	
3	2.297	1.479	3.644	4.431	8.593	6.707	28.188	7.949	30.041	17.299	4.346	24.659	2.966	101.360	4.037	19.525	30.258	27.528	30.306	2.095	12.986	
4	1.301	0.982	0.778	2.142	2.608	4.763	4.060	18.076	5.039	19.080	10.804	2.694	15.223	1.834	56.776	2.478	12.330	19.786	17.549	19.840	1.211	
5	0.246	0.437	0.320	0.395	1.090	1.332	2.676	2.548	10.979	3.123	11.404	6.321	1.581	8.767	1.008	32.420	1.493	7.707	11.803	11.017	10.234	
6+	0.315	0.192	0.226	0.281	0.339	0.675	1.042	2.277	2.896	8.529	6.992	10.768	9.974	6.705	6.949	4.484	22.240	14.786	13.076	15.387	13.671	
2 and Older	7.117	9.410	12.122	20.746	23.229	56.914	48.197	77.256	75.931	54.792	71.553	48.964	182.337	124.757	99.804	104.399	107.518	115.564	75.870	68.931	56.914	
3 and Older	4.159	3.090	4.967	7.249	12.630	13.476	35.964	30.850	48.954	48.031	33.546	44.444	29.743	118.667	68.769	58.907	66.321	69.806	72.734	48.339	38.102	
<b>Unit 4</b>																						
2	0.257	0.156	1.394	0.847	0.386	4.512	1.788	14.452	3.473	2.362	8.003	1.482	11.302	0.973	9.017	9.742	8.997	14.607	1.402	12.631	4.973	
3	0.057	0.165	0.101	0.920	0.559	0.255	3.022	1.187	9.650	2.328	1.582	5.350	0.984	7.495	0.649	5.982	6.485	6.027	9.721	0.933	8.168	
4	0.160	0.026	0.082	0.059	0.543	0.330	0.168	1.935	0.784	6.446	1.542	1.038	3.470	0.622	4.519	0.423	3.895	4.276	3.864	6.130	0.588	
5	0.098	0.049	0.010	0.041	0.031	0.285	0.210	0.105	1.260	0.522	4.189	0.987	0.657	2.141	0.364	2.901	0.272	2.515	2.652	2.397	3.630	
6+	0.203	0.092	0.050	0.029	0.036	0.034	0.194	0.248	0.229	0.987	0.959	3.242	2.622	1.982	2.315	1.720	2.929	2.032	2.779	3.273	3.199	
2 and Older	0.775	0.487	1.636	1.896	1.554	5.416	5.383	17.927	15.396	12.645	16.275	12.098	19.034	13.213	16.864	20.767	22.577	29.458	20.419	25.365	20.557	
3 and Older	0.518	0.332	0.242	1.050	1.168	0.903	3.594	3.475	11.923	10.283	8.272	10.617	7.732	12.240	7.847	11.026	13.580	14.850	19.016	12.733	15.584	

**Table 1.8.** Projection of the 2013 Lake Erie yellow perch population. Stock size estimates are derived from survival from 2012 abundance, and age-2 estimates for 2013 are derived from regressions of SCAA age-2 abundance against YOY and yearling survey indices (see Appendix A). Standard errors are produced from SCAA and regression analyses.

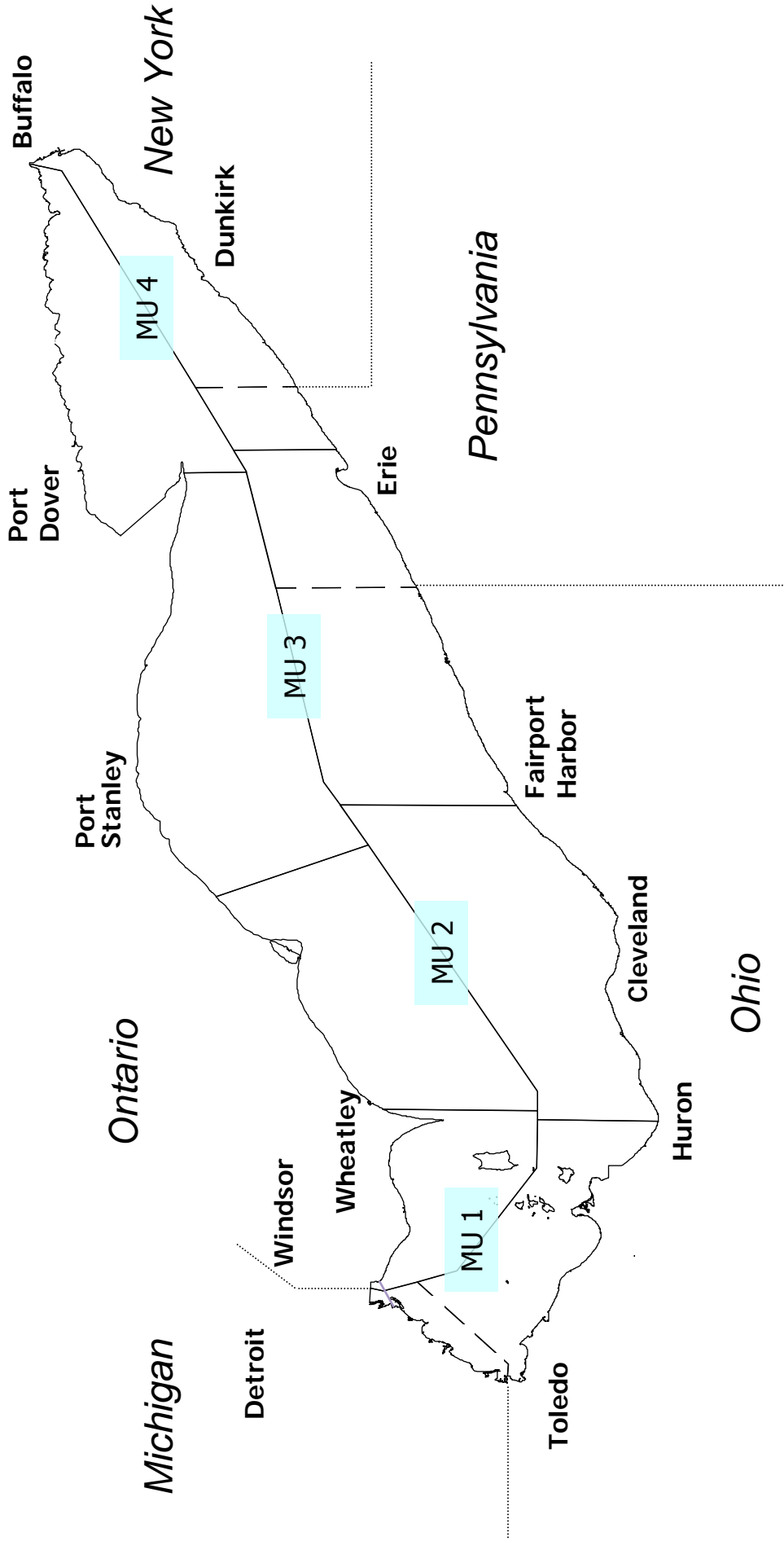
Age	2012 Parameters						Rate Functions						2013 Parameters						3-yr Mean	
	Stock Size (numbers)			Mortality Rates			Survival Rate			Stock Size (numbers)			Survival Rate			Weight in				
	Mean	Std. Dev.	Max.	(F)	(Z)	(A)	(u)	(S)	(S)	Mean	Min.	Max.	Age	Age	Mean	Min.	Max.	Pop'n. (kg)	millions kg	
<b>Unit 1</b>																				
2	13.420	8.197	5.223	21.617	0.071	0.471	0.376	0.057	0.624	2	7.313	3.842	15.309	0.065	0.899	0.475	1.048			
3	5.883	2.521	3.362	8.404	0.268	0.668	0.487	0.195	0.513	3	8.379	3.261	13.497	0.100	0.553	0.838	1.848			
4	4.873	1.807	3.066	6.679	0.363	0.763	0.534	0.254	0.466	4	3.016	1.724	4.309	0.141	0.624	0.425	0.938			
5	3.813	1.439	2.374	5.252	0.407	0.807	0.554	0.279	0.446	5	2.272	1.430	3.114	0.168	0.618	0.382	0.842			
6+	1.282	0.480	0.802	1.761	0.409	0.809	0.555	0.280	0.445	6+	2.272	1.416	3.128	0.251	0.291	0.570	1.257			
Total (3+)	29.270		14.827	43.714	0.208	0.608	0.455	0.156	0.545	Total (3+)	23.253	11.673	39.358	0.116	2.985	2.691	5.933			
	15.851		9.604	22.097	0.340	0.740	0.523	0.240	0.477		15.940	7.831	24.048	0.139	2.085	2.215	4.885			
<b>Unit 2</b>																				
2	17.786	9.789	7.997	27.575	0.074	0.474	0.377	0.059	0.623	2	13.178	6.933	26.134	0.074	1.476	0.975	2.150			
3	5.154	2.075	3.079	7.229	0.135	0.535	0.414	0.105	0.586	3	11.072	4.978	17.165	0.121	0.618	1.340	2.954			
4	18.329	6.261	12.068	24.590	0.297	0.697	0.502	0.214	0.498	4	3.018	1.803	4.234	0.153	2.768	0.462	1.018			
5	11.292	3.656	7.636	14.948	0.295	0.695	0.501	0.213	0.499	5	9.129	6.011	12.248	0.197	2.033	1.798	3.966			
6+	6.459	2.015	4.445	8.474	0.291	0.691	0.499	0.210	0.501	6+	8.872	6.038	11.706	0.269	1.582	2.387	5.262			
Total (3+)	59.020		35.224	82.815	0.209	0.609	0.456	0.157	0.544	Total (3+)	45.269	25.763	71.487	0.154	8.477	6.962	15.351			
	41.234		27.228	55.240	0.274	0.674	0.490	0.199	0.510		32.091	18.830	45.353	0.187	7.001	5.987	13.200			
<b>Unit 3</b>																				
2	20.592	12.911	7.681	33.503	0.061	0.461	0.369	0.049	0.631	2	18.812	8.689	41.955	0.054	1.297	1.016	2.240			
3	2.095	0.971	1.125	3.066	0.148	0.548	0.422	0.114	0.578	3	12.986	4.844	21.128	0.108	0.247	1.402	3.093			
4	19.840	7.839	12.001	27.678	0.262	0.662	0.484	0.192	0.516	4	1.211	0.650	1.772	0.139	2.718	0.168	0.371			
5	11.017	4.025	6.993	15.042	0.267	0.667	0.487	0.195	0.513	5	10.234	6.190	14.277	0.182	1.796	1.863	4.107			
6+	15.387	4.869	10.518	20.256	0.252	0.652	0.479	0.185	0.521	6+	13.671	9.069	18.274	0.260	3.324	3.554	7.838			
Total (3+)	68.931		38.317	99.545	0.193	0.593	0.447	0.145	0.553	Total (3+)	56.914	29.442	97.407	0.141	9.382	8.004	17.648			
	48.339		30.636	66.042	0.255	0.655	0.480	0.187	0.520		38.102	20.753	55.451	0.183	8.085	6.988	15.408			
<b>Unit 4</b>																				
2	12.631	8.839	3.792	21.470	0.036	0.436	0.353	0.029	0.647	2	4.973	2.236	11.392	0.096	1.099	0.477	1.053			
3	0.933	0.529	0.404	1.462	0.062	0.462	0.370	0.050	0.630	3	8.168	2.452	13.883	0.156	0.127	1.274	2.810			
4	6.130	3.211	2.919	9.341	0.124	0.524	0.408	0.097	0.592	4	0.588	0.254	0.921	0.232	1.294	0.136	0.301			
5	2.397	1.216	1.181	3.613	0.158	0.558	0.428	0.121	0.572	5	3.630	1.729	5.531	0.272	0.546	0.987	2.177			
6+	3.273	1.649	1.624	4.922	0.183	0.583	0.442	0.139	0.558	6+	3.199	1.582	4.815	0.333	1.097	1.065	2.349			
Total (3+)	25.365		9.921	40.809	0.087	0.487	0.386	0.069	0.614	Total (3+)	20.557	8.254	36.543	0.192	4.162	3.941	8.689			
	12.733		6.128	19.338	0.140	0.540	0.418	0.109	0.582		15.584	6.018	25.151	0.222	3.063	3.463	7.636			

**Table 2.1.** Estimated harvest of Lake Erie yellow perch for 2013 using the proposed fishing policy and selectivity-at-age from combined fishing gears.

Age	2013										2013 Harvest Range							
	Stock Size (numbers)					Exploitation Rate					3-yr Mean		Catch (millions of kg)		Catch (millions of lbs)			
	Mean	Min.	Max.	F	F (age)	F (age)	(u)	Mean	Min.	Max.	Harvest (kg)	Weight in	Mean	Max.	Mean	Min.	Max.	
<b>Unit 1</b>																		
2	7.313	3.842	15.309	0.670	0.137	0.092	0.073	0.530	0.279	1.110	0.097	0.051	0.027	0.108	0.113	0.060	0.237	
3	8.379	3.261	13.497	0.670	0.576	0.386	0.267	2.239	0.872	3.607	0.116	0.260	0.101	0.418	0.573	0.223	0.923	
4	3.016	1.724	4.309	0.670	0.757	0.507	0.333	1.006	0.575	1.437	0.134	0.135	0.077	0.193	0.297	0.170	0.424	
5	2.272	1.430	3.114	0.670	0.790	0.529	0.345	0.783	0.493	1.073	0.149	0.117	0.073	0.160	0.257	0.162	0.353	
6+	2.272	1.416	3.128	0.670	0.846	0.567	0.363	0.825	0.515	1.136	0.181	0.149	0.093	0.206	0.329	0.205	0.454	
<b>Total</b>	23.253	11.673	39.358				0.232	5.384	2.732	8.364	0.132	0.712	0.372	1.084	1.570	0.820	2.391	
<b>(3+)</b>	15.940	7.831	24.048				0.305	4.854	2.454	7.254	0.136	0.661	0.345	0.977	1.457	0.760	2.153	
<b>Unit 2</b>																		
2	13.178	6.933	26.134	0.670	0.142	0.095	0.075	0.989	0.520	1.961	0.120	0.119	0.062	0.235	0.262	0.138	0.519	
3	11.072	4.978	17.165	0.670	0.415	0.278	0.202	2.236	1.005	3.466	0.139	0.311	0.140	0.482	0.685	0.308	1.062	
4	3.018	1.803	4.234	0.670	0.737	0.494	0.326	0.985	0.589	1.382	0.148	0.146	0.087	0.205	0.322	0.192	0.451	
5	9.129	6.011	12.248	0.670	0.760	0.509	0.334	3.053	2.010	4.096	0.164	0.501	0.330	0.672	1.104	0.727	1.481	
6+	8.872	6.038	11.706	0.670	0.808	0.541	0.351	3.112	2.118	4.106	0.195	0.607	0.413	0.801	1.338	0.911	1.765	
<b>Total</b>	45.269	25.763	71.487				0.229	10.375	6.242	15.011	0.162	1.683	1.032	2.394	3.711	2.275	5.279	
<b>(3+)</b>	32.091	18.830	45.353				0.292	9.386	5.722	13.050	0.167	1.564	0.969	2.159	3.449	2.138	4.760	
<b>Unit 3</b>																		
2	18.812	8.689	41.955	0.700	0.063	0.044	0.036	0.670	0.309	1.494	0.107	0.072	0.033	0.160	0.158	0.073	0.352	
3	12.986	4.844	21.128	0.700	0.275	0.193	0.145	1.886	0.704	3.069	0.137	0.258	0.096	0.420	0.570	0.213	0.927	
4	1.211	0.650	1.772	0.700	0.676	0.473	0.316	0.382	0.205	0.559	0.149	0.057	0.031	0.083	0.126	0.067	0.184	
5	10.234	6.190	14.277	0.700	0.721	0.505	0.332	3.399	2.056	4.742	0.166	0.564	0.341	0.787	1.244	0.753	1.736	
6+	13.671	9.069	18.274	0.700	0.747	0.523	0.341	4.668	3.096	6.239	0.190	0.887	0.588	1.185	1.956	1.297	2.614	
<b>Total</b>	56.914	29.442	97.407				0.193	11.005	6.371	16.103	0.167	1.838	1.090	2.636	4.053	2.403	5.813	
<b>(3+)</b>	38.102	20.753	55.451				0.271	10.335	6.061	14.609	0.171	1.766	1.057	2.476	3.895	2.330	5.460	
<b>Unit 4</b>																		
2	4.973	2.236	11.392	0.300	0.061	0.018	0.015	0.074	0.033	0.170	0.128	0.010	0.004	0.022	0.021	0.009	0.048	
3	8.168	2.452	13.883	0.300	0.291	0.087	0.069	0.564	0.169	0.959	0.156	0.088	0.026	0.150	0.194	0.058	0.330	
4	0.588	0.254	0.921	0.300	0.494	0.148	0.114	0.067	0.029	0.105	0.187	0.013	0.005	0.020	0.028	0.012	0.043	
5	3.630	1.729	5.531	0.300	0.721	0.216	0.161	0.586	0.279	0.893	0.213	0.125	0.059	0.190	0.275	0.131	0.419	
6+	3.199	1.582	4.815	0.300	0.758	0.227	0.169	0.540	0.267	0.813	0.227	0.123	0.061	0.185	0.270	0.134	0.407	
<b>Total</b>	20.557	8.254	36.543				0.089	1.832	0.778	2.941	0.195	0.358	0.156	0.566	0.789	0.345	1.248	
<b>(3+)</b>	15.584	6.018	25.151				0.113	1.758	0.745	2.771	0.198	0.348	0.152	0.544	0.768	0.335	1.200	

Table 2.2. Lake Erie yellow perch fishing rates and the Recommended Allowable Harvest (RAH; in millions of lbs) for 2013 by Management Unit (Unit).

Unit	Fishing Rate	Recommended Allowable Harvest (millions lbs.)		
		Min	Mean	Max
1	0.670	0.820	1.570	2.391
2	0.670	2.275	3.711	5.279
3	0.700	2.403	4.053	5.813
4	0.300	0.345	0.789	1.248
<b>Total</b>		5.842	10.122	14.731



**Figure 1.1.** Yellow Perch Management Units (MUs) of Lake Erie, for illustrative purposes only; this map should not be used for quota determination or border delineation.

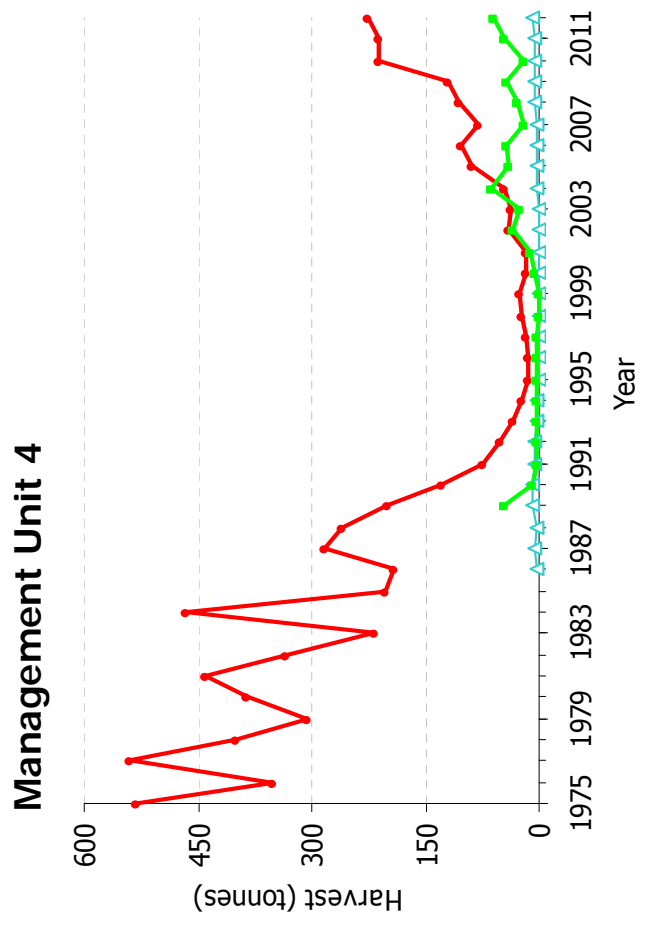
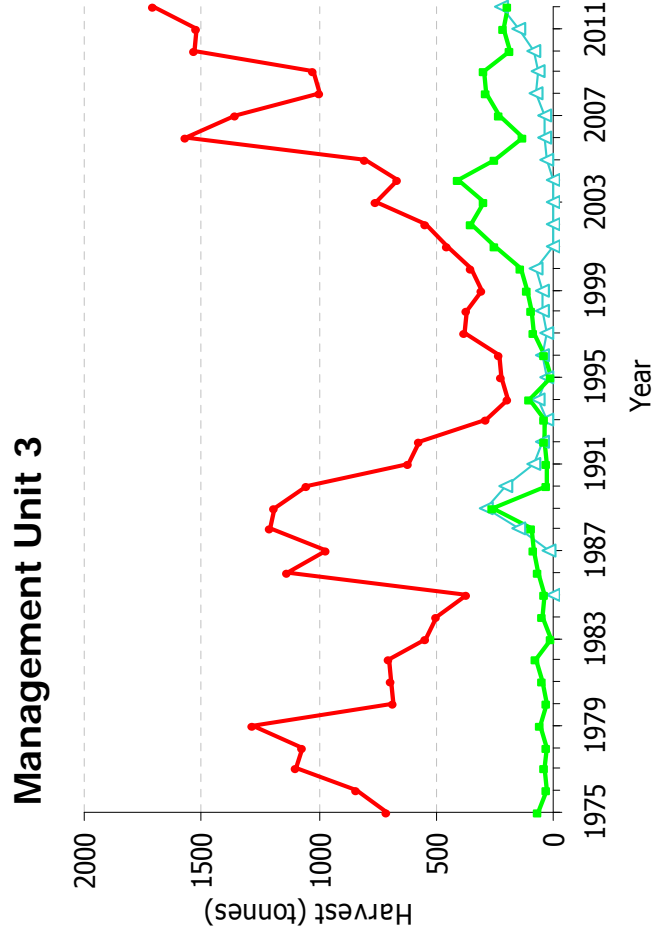
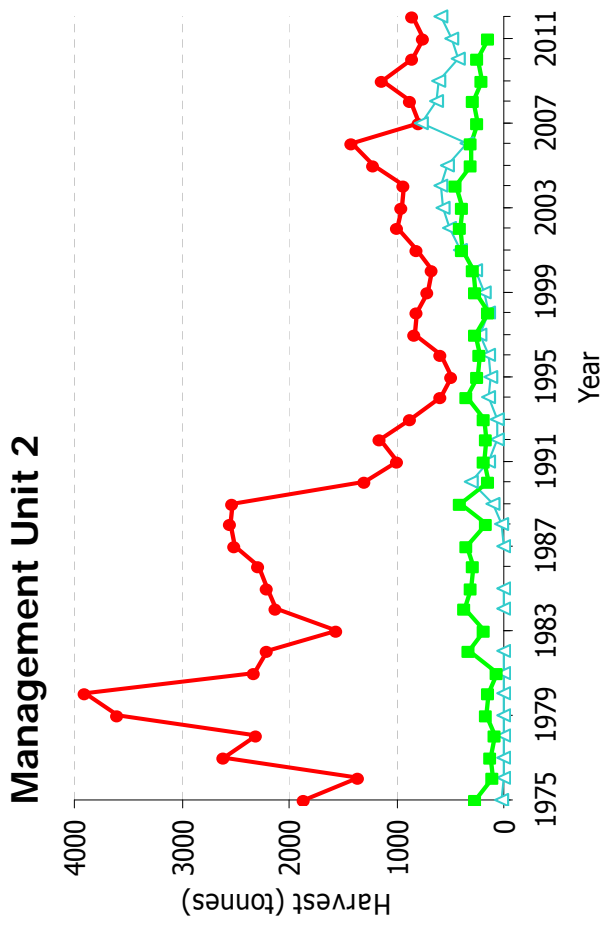
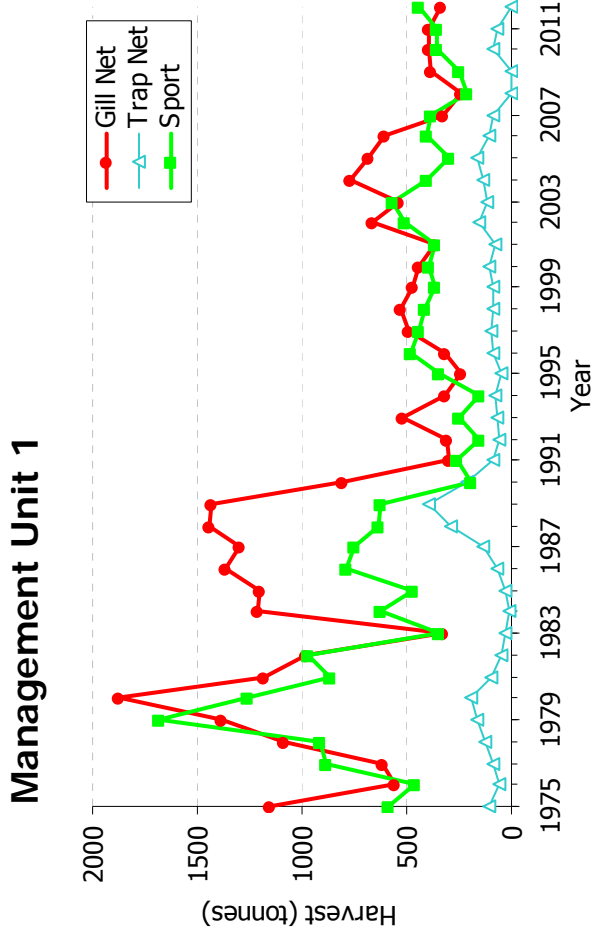
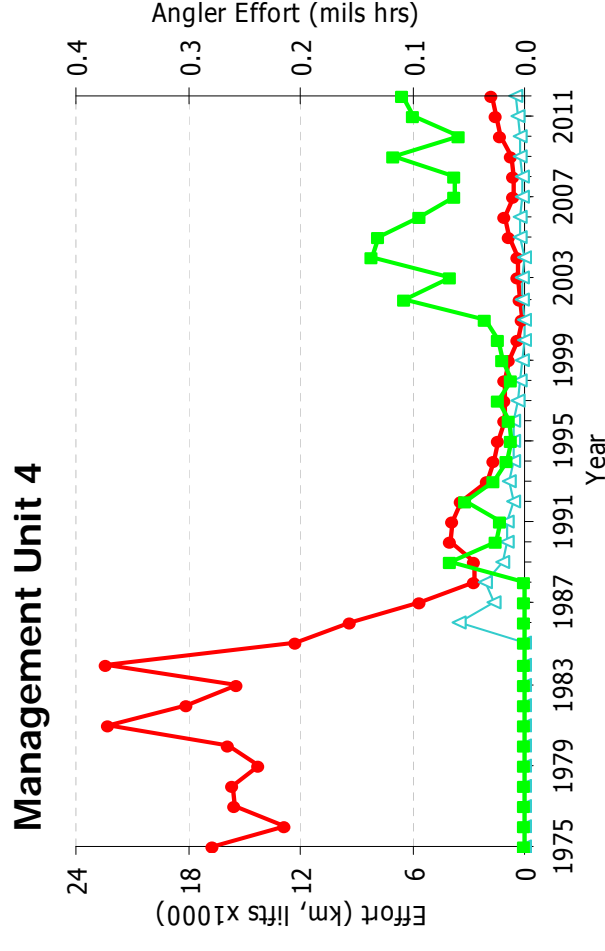
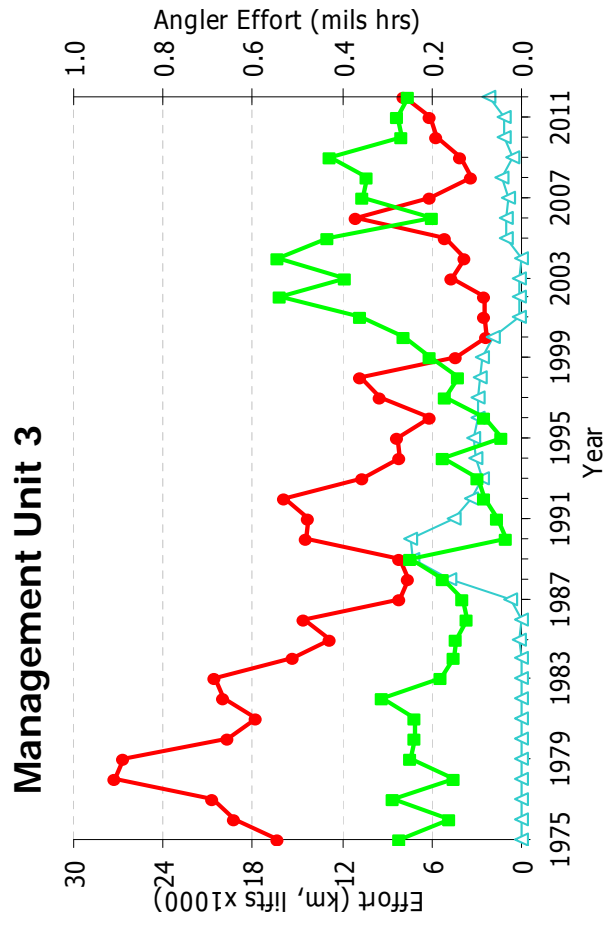
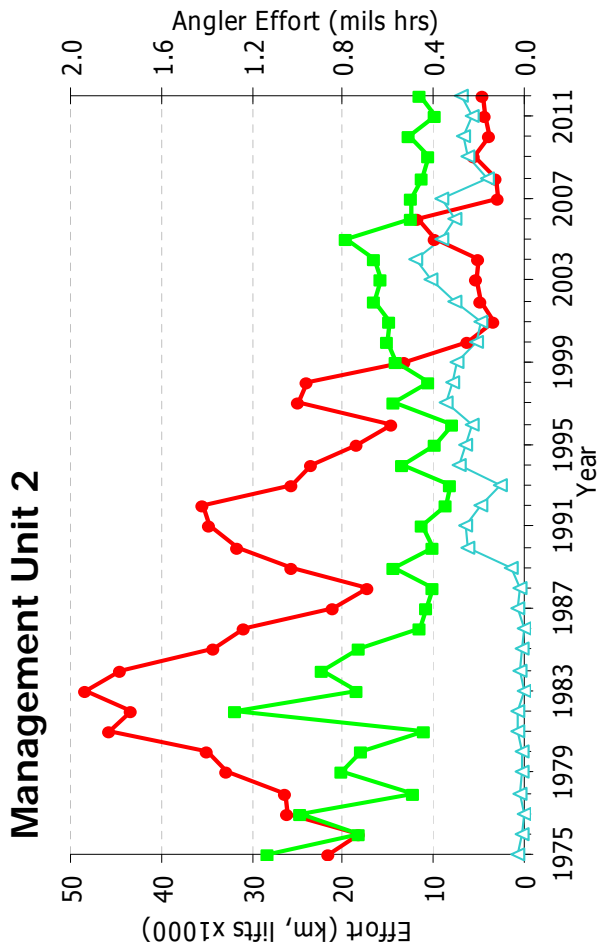
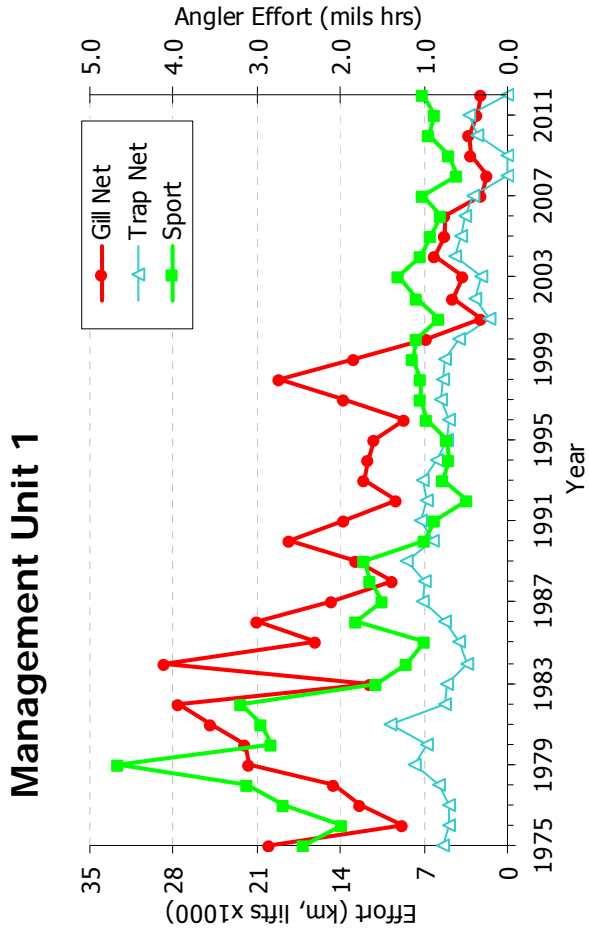
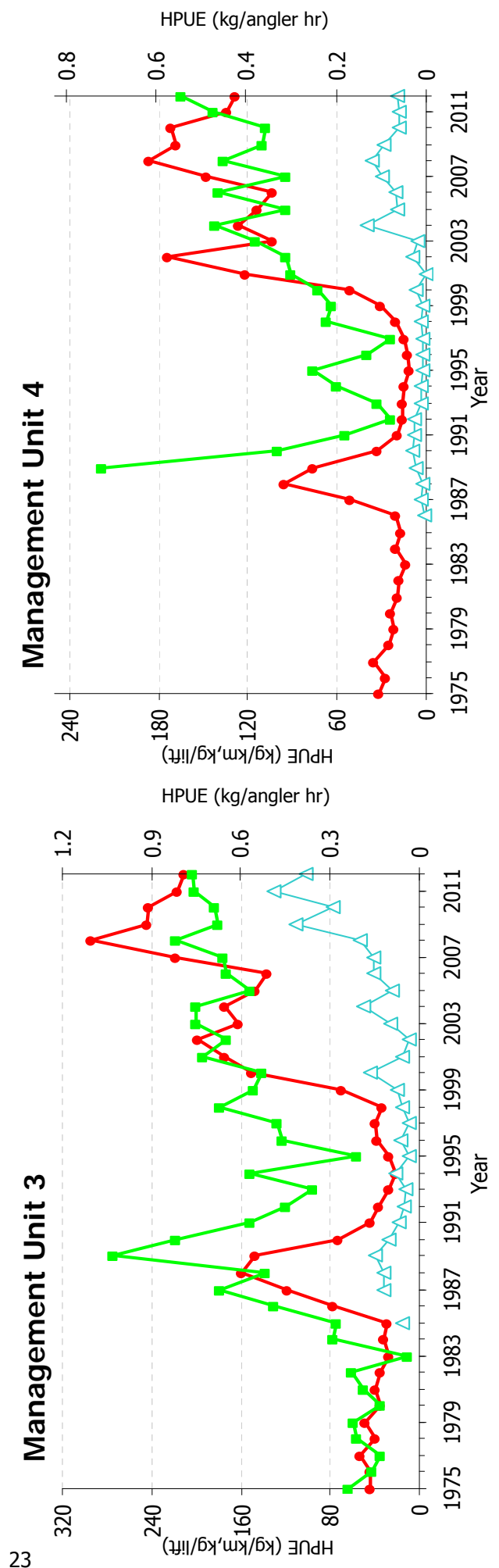
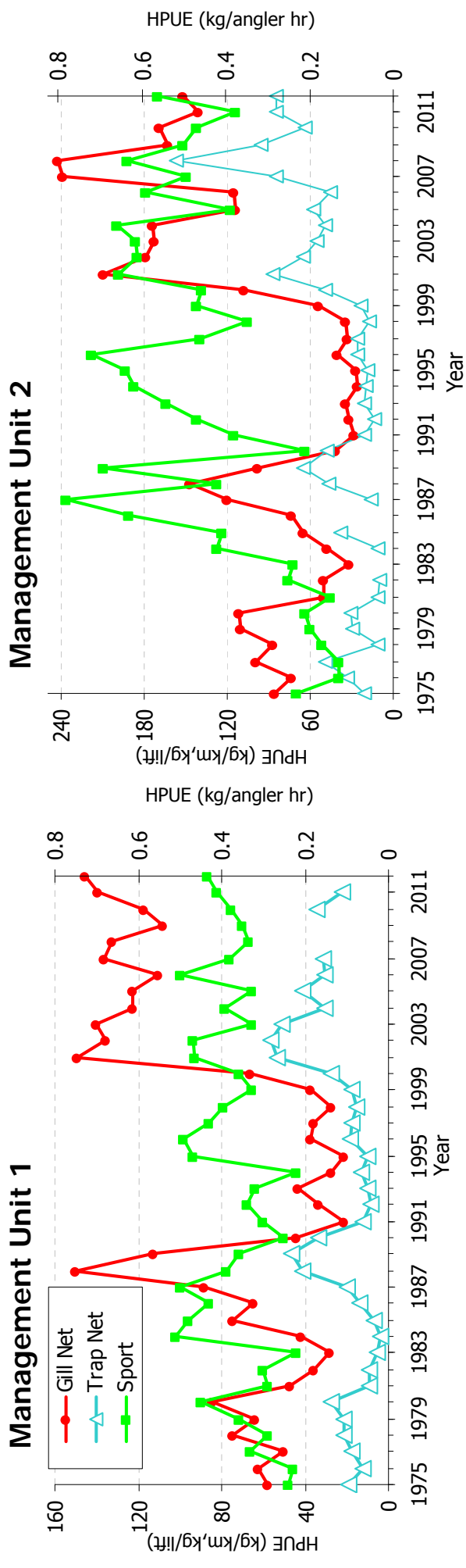


Figure 1.2. Historic Lake Erie yellow perch harvest (metric tonnes) by management unit and gear type.

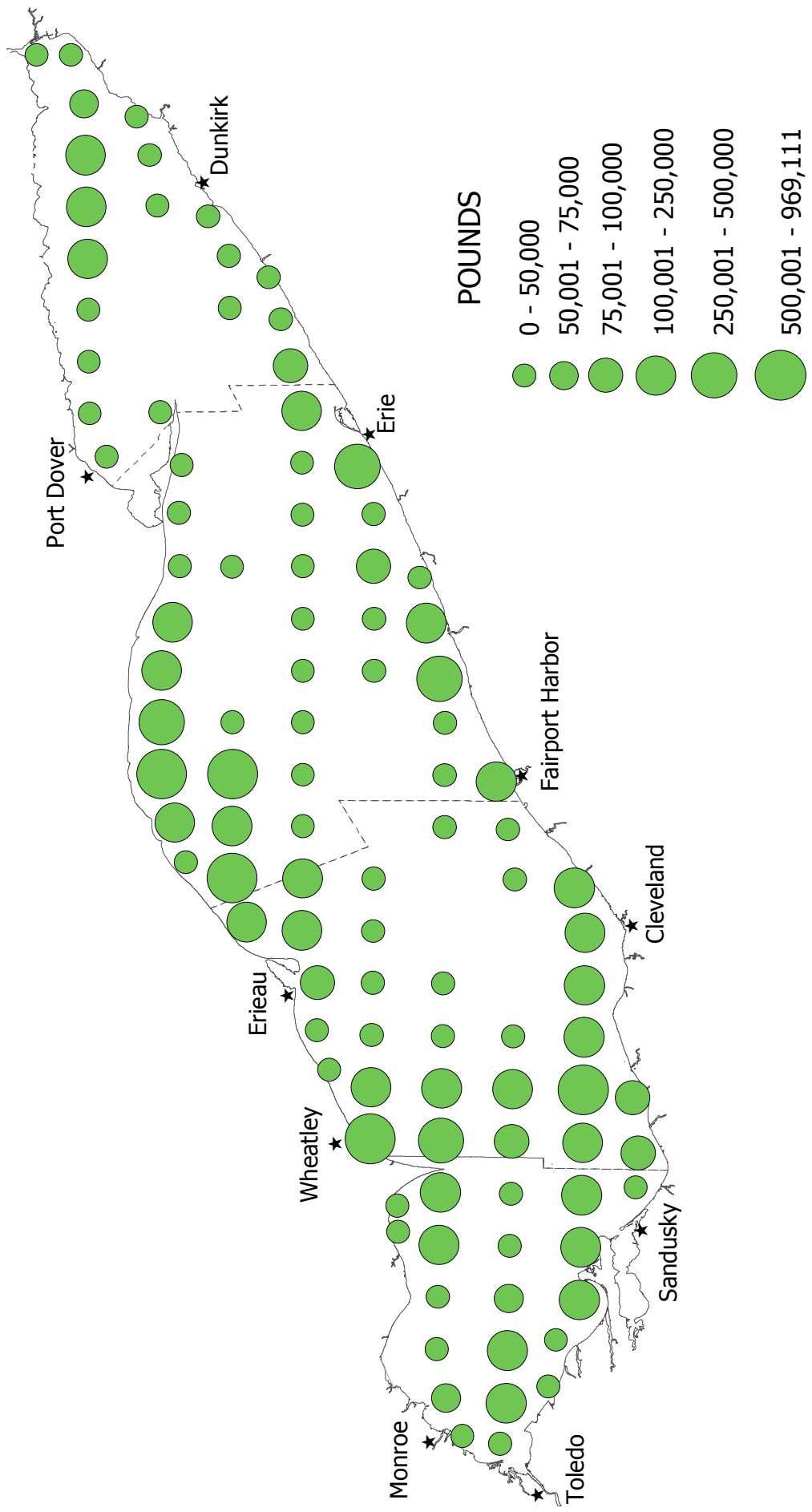


**Figure 1.3.** Historic Lake Erie yellow perch effort by management unit and gear type. Note: gill net effort presented is targeted effort with small mesh (< 3”).





**Figure 1.4.** Historic Lake Erie yellow perch harvest per unit effort (HPUE) by management unit and gear type. Note: 2001 to 2012 gill net CPUE is for small mesh (< 3") only.



**Figure 1.5.** Spatial distribution of yellow perch total harvest (lbs.) in 2012 by 10-minute grid.

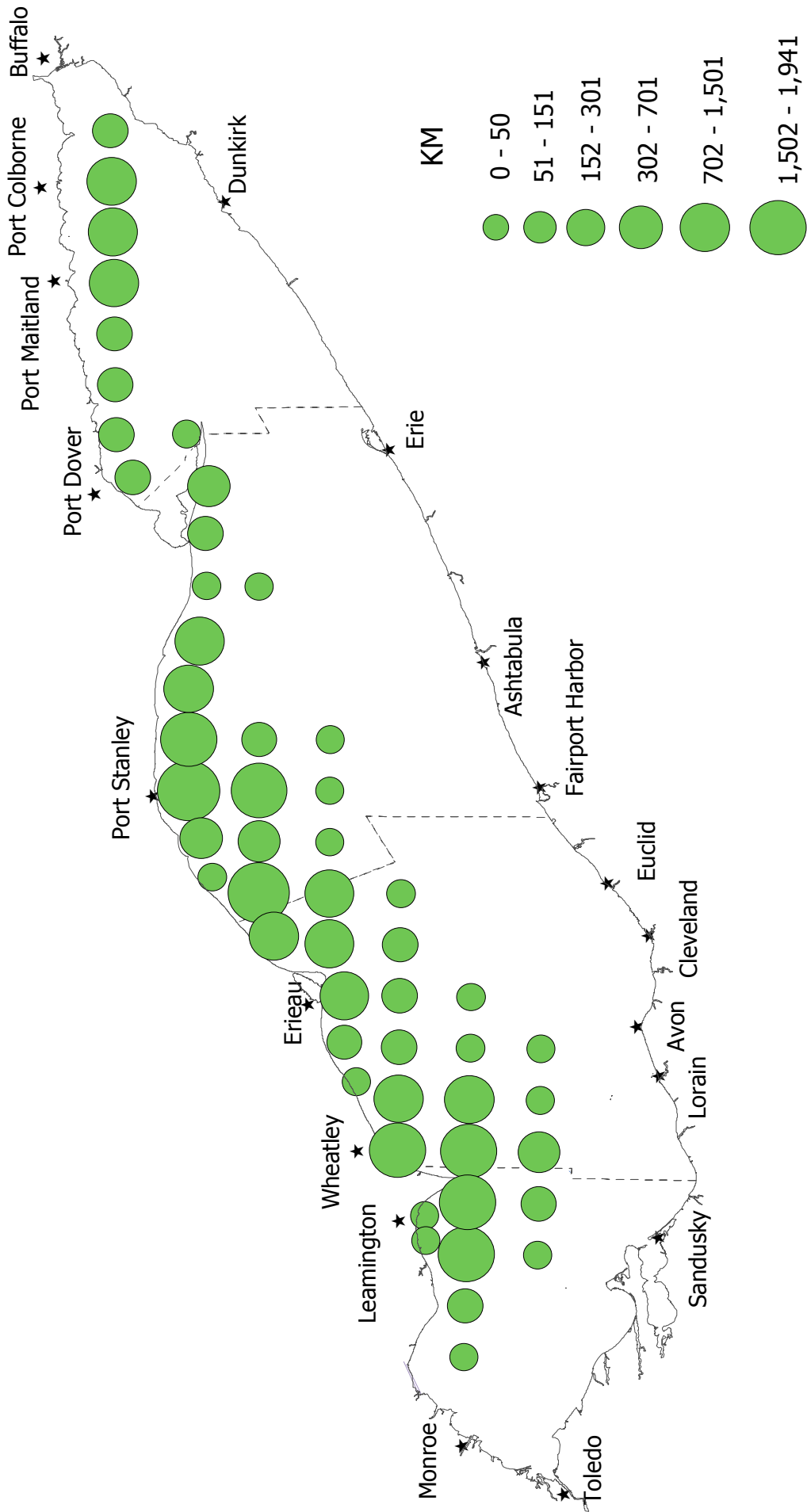
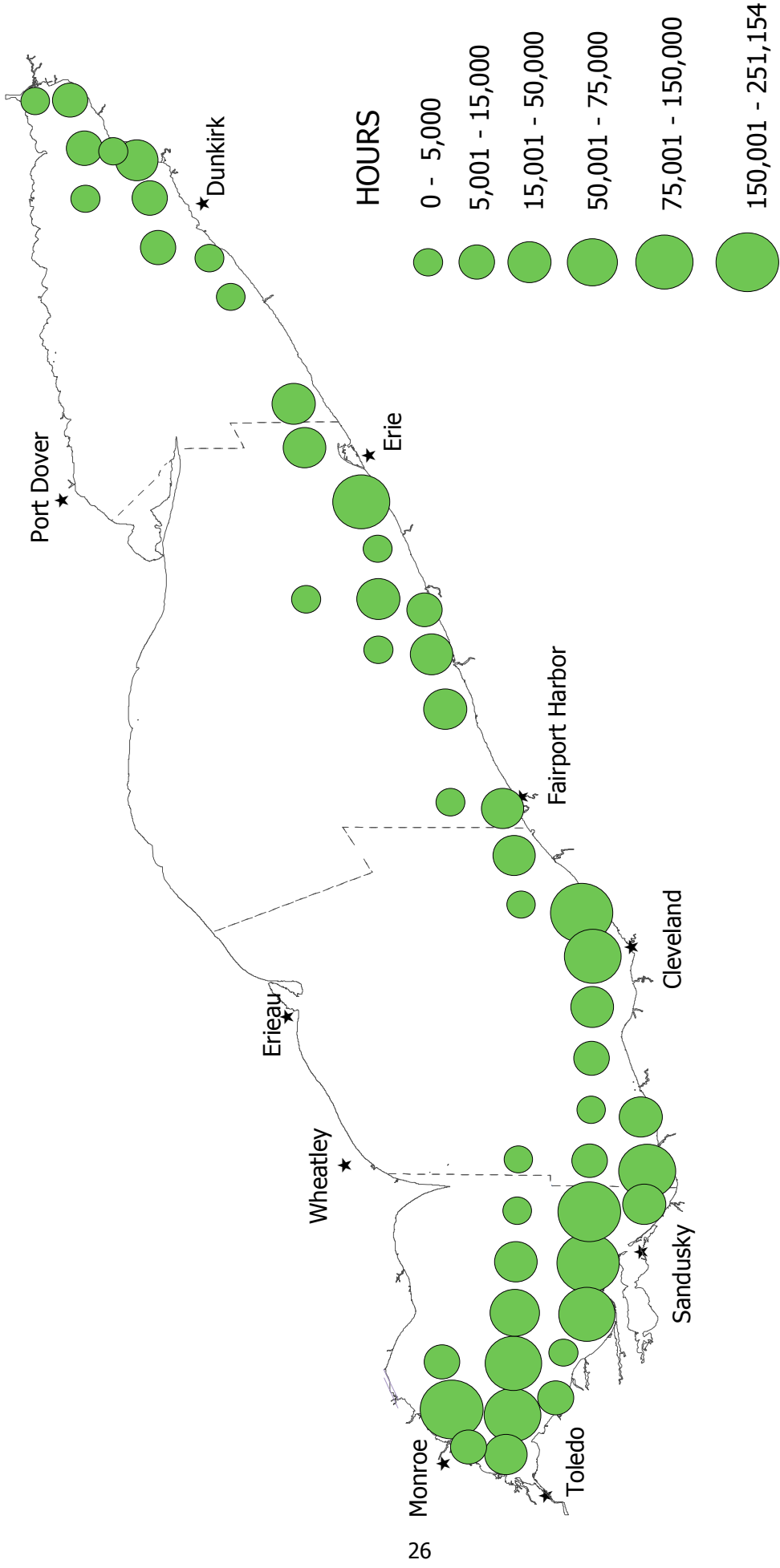
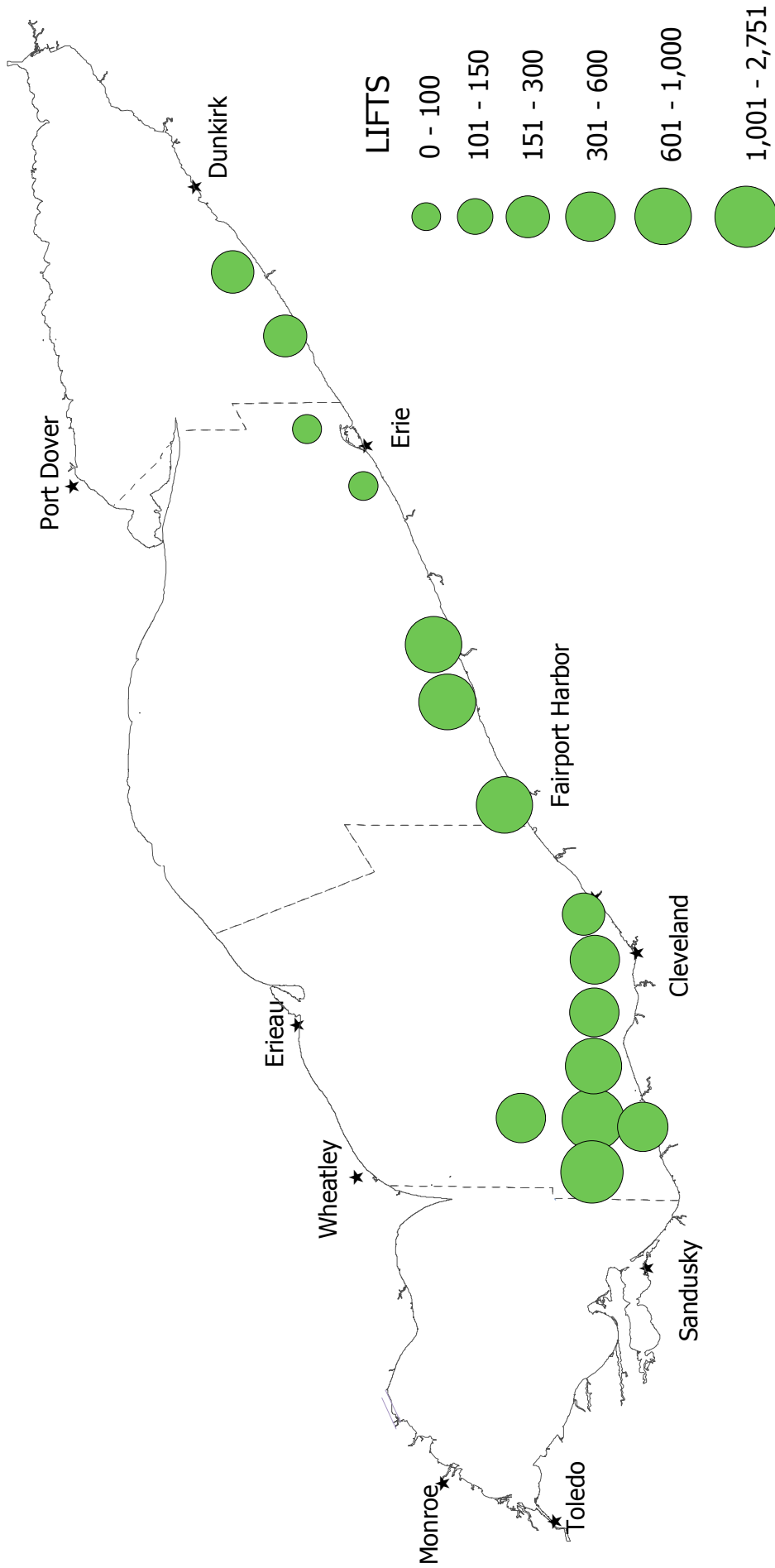


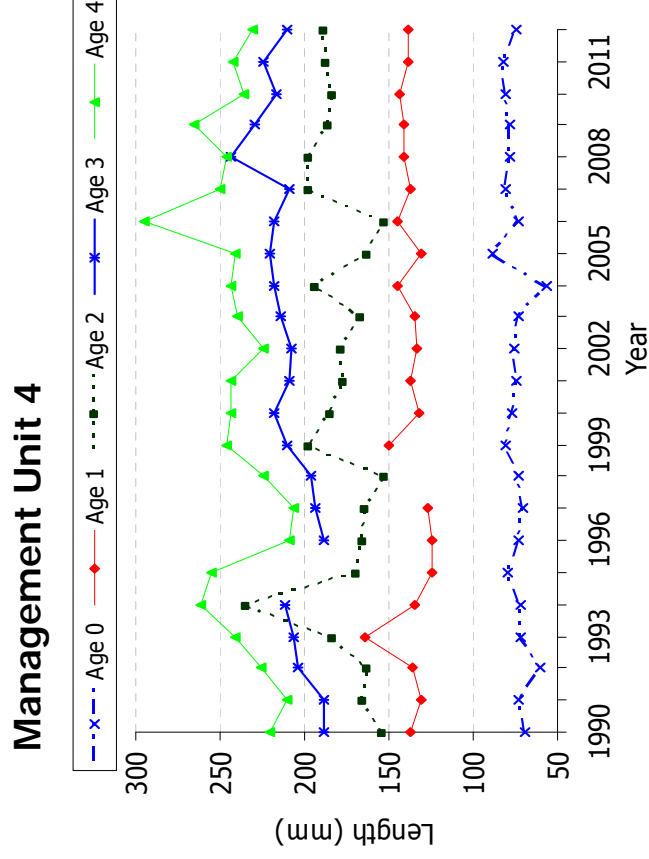
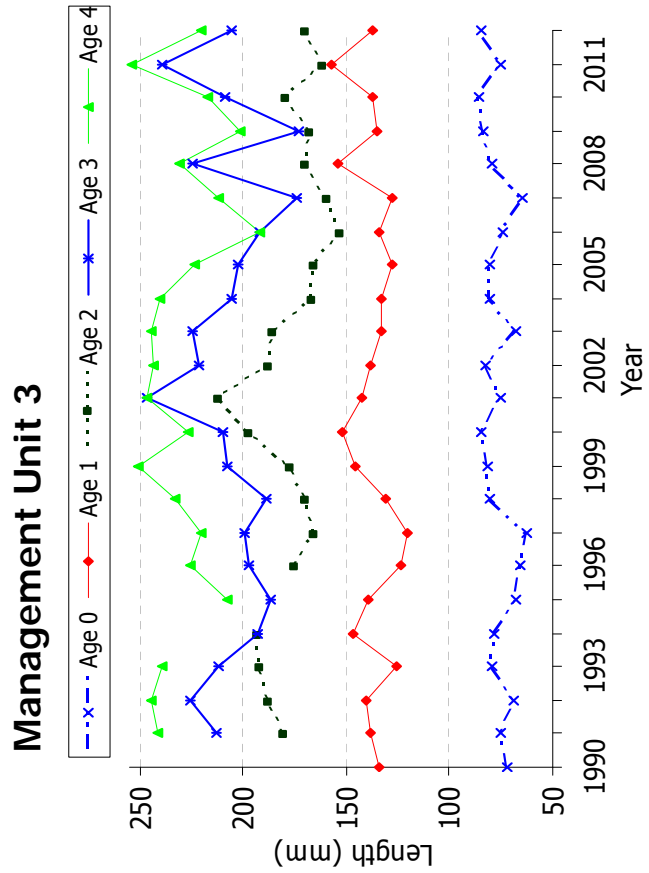
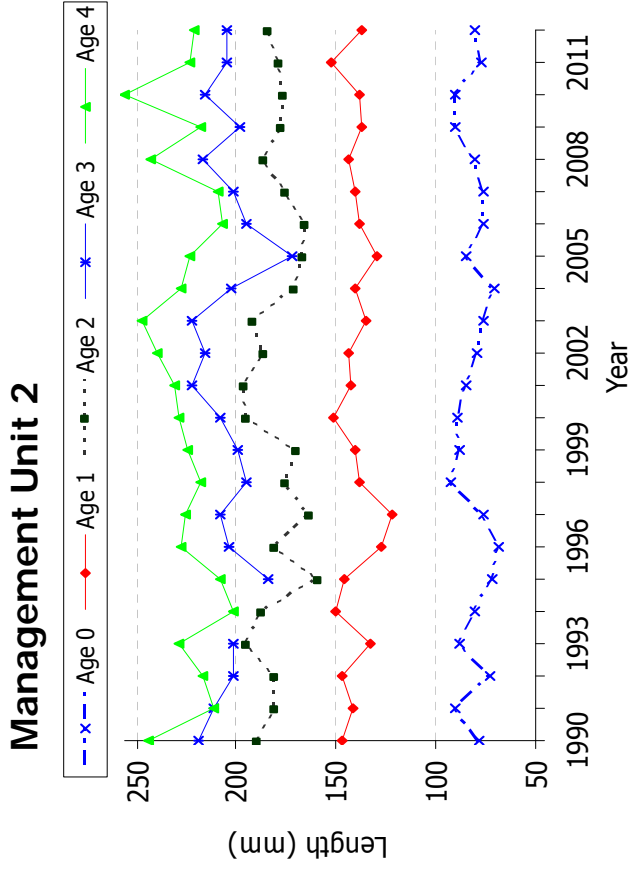
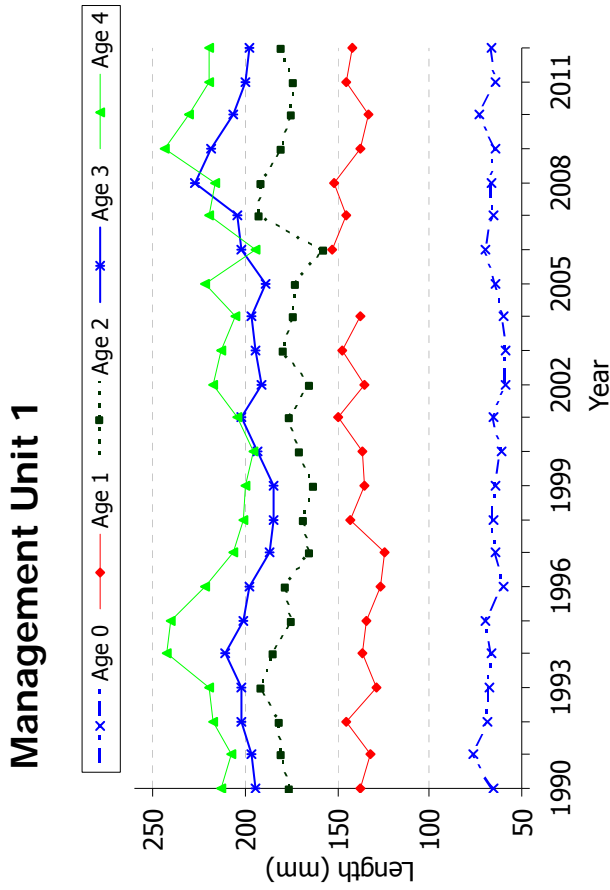
Figure 1.6. Spatial distribution of yellow perch gill net effort (km) in 2012 by 10-minute grid.



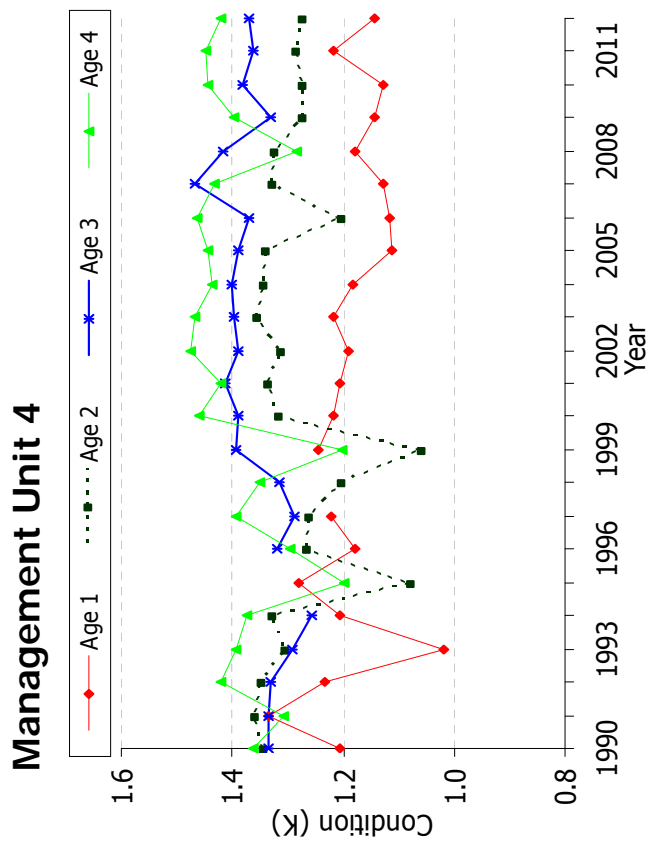
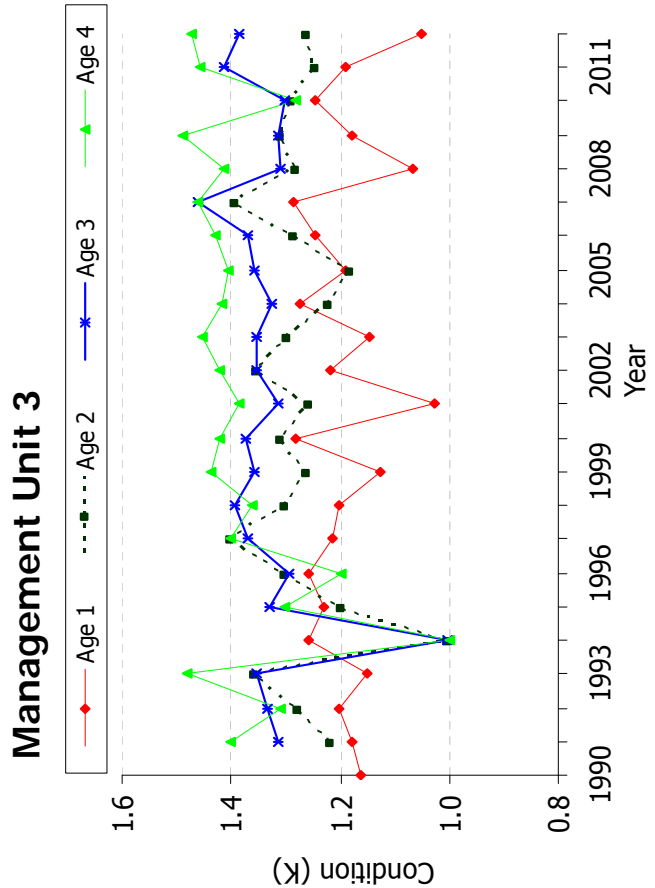
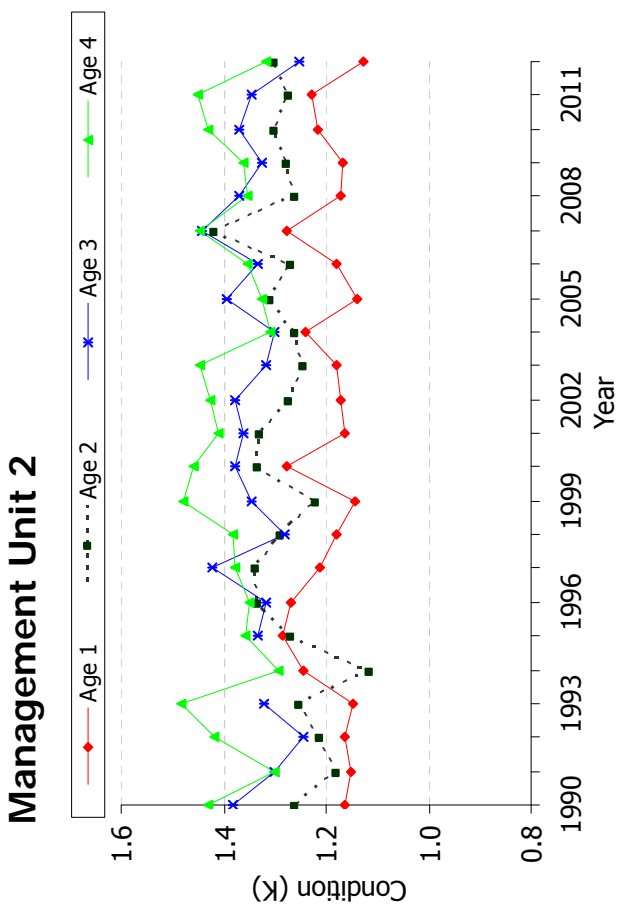
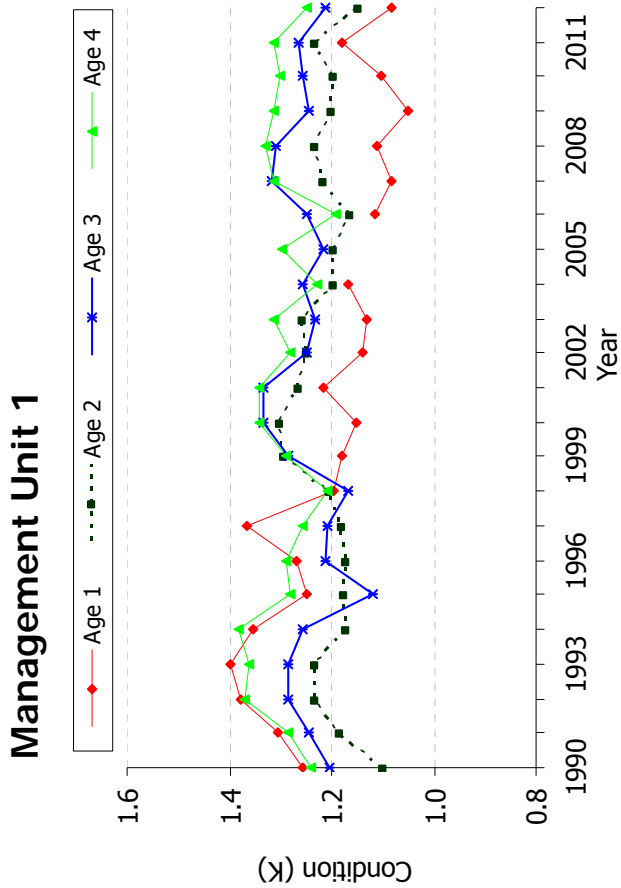
**Figure 1.7.** Spatial distribution of yellow perch sport angling effort (angler hours) in 2012 by 10-minute grid.



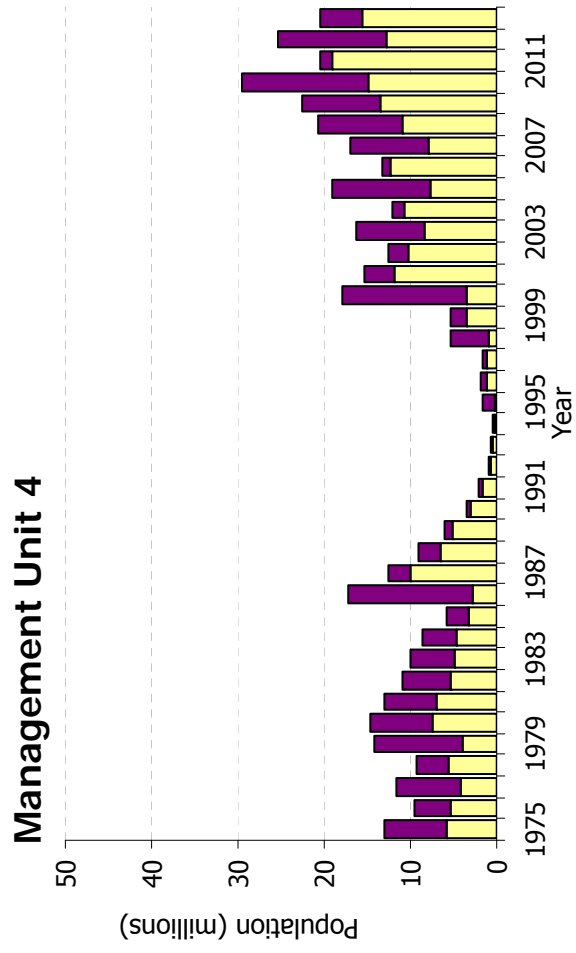
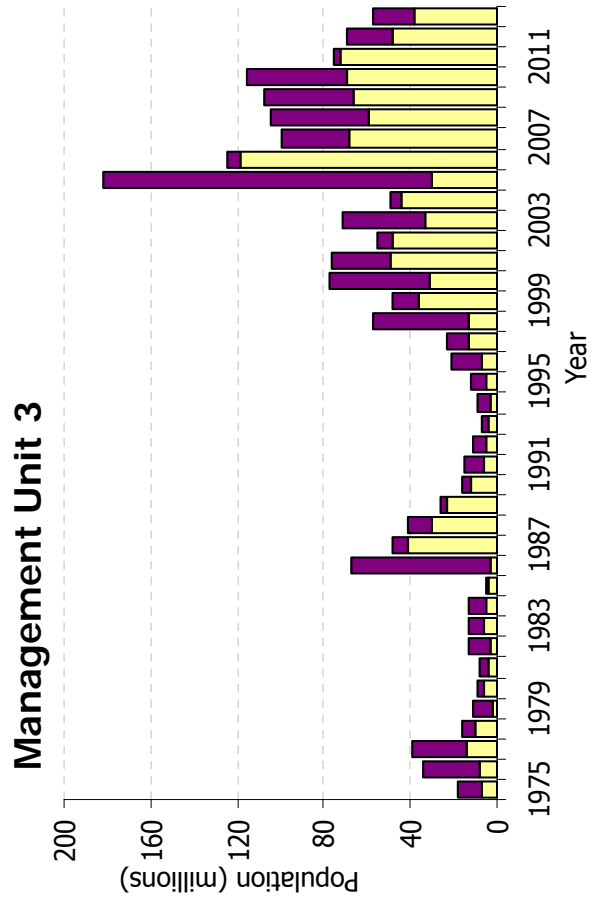
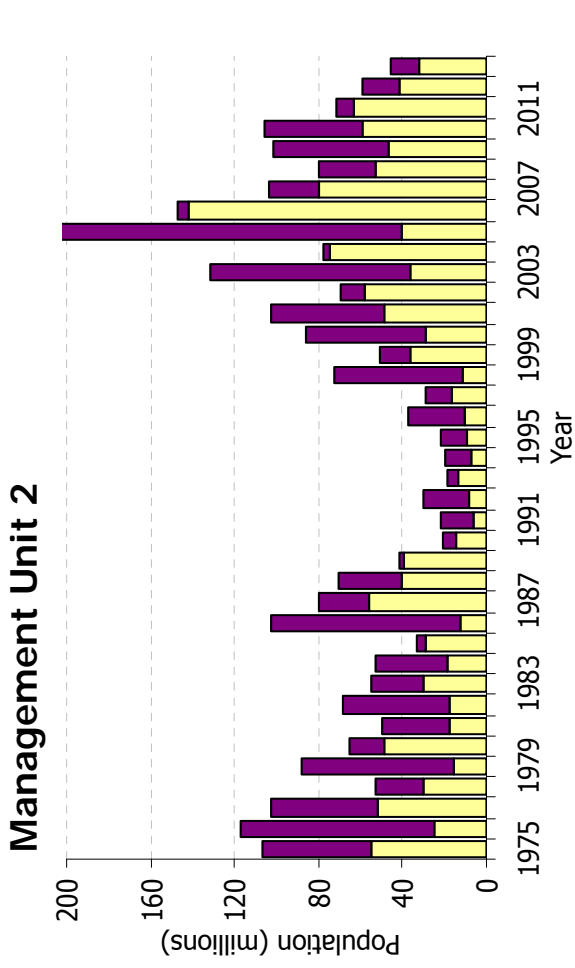
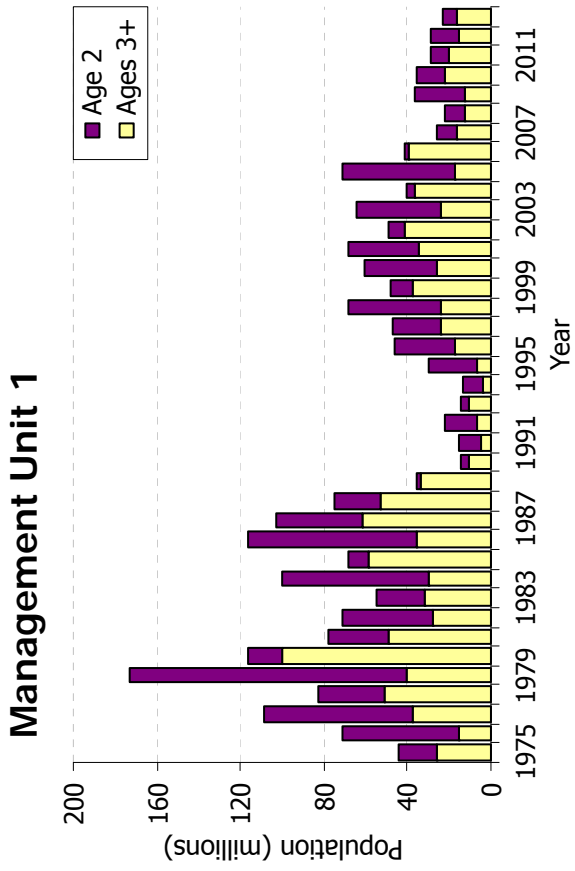
**Figure 1.8.** Spatial distribution of yellow perch trap net effort (lifts) in 2012 by 10-minute grid.



**Figure 1.9.** Yellow perch total length-at-age from 1990-2012 fall interagency experimental samples for ages 0-4 by management unit (MU).

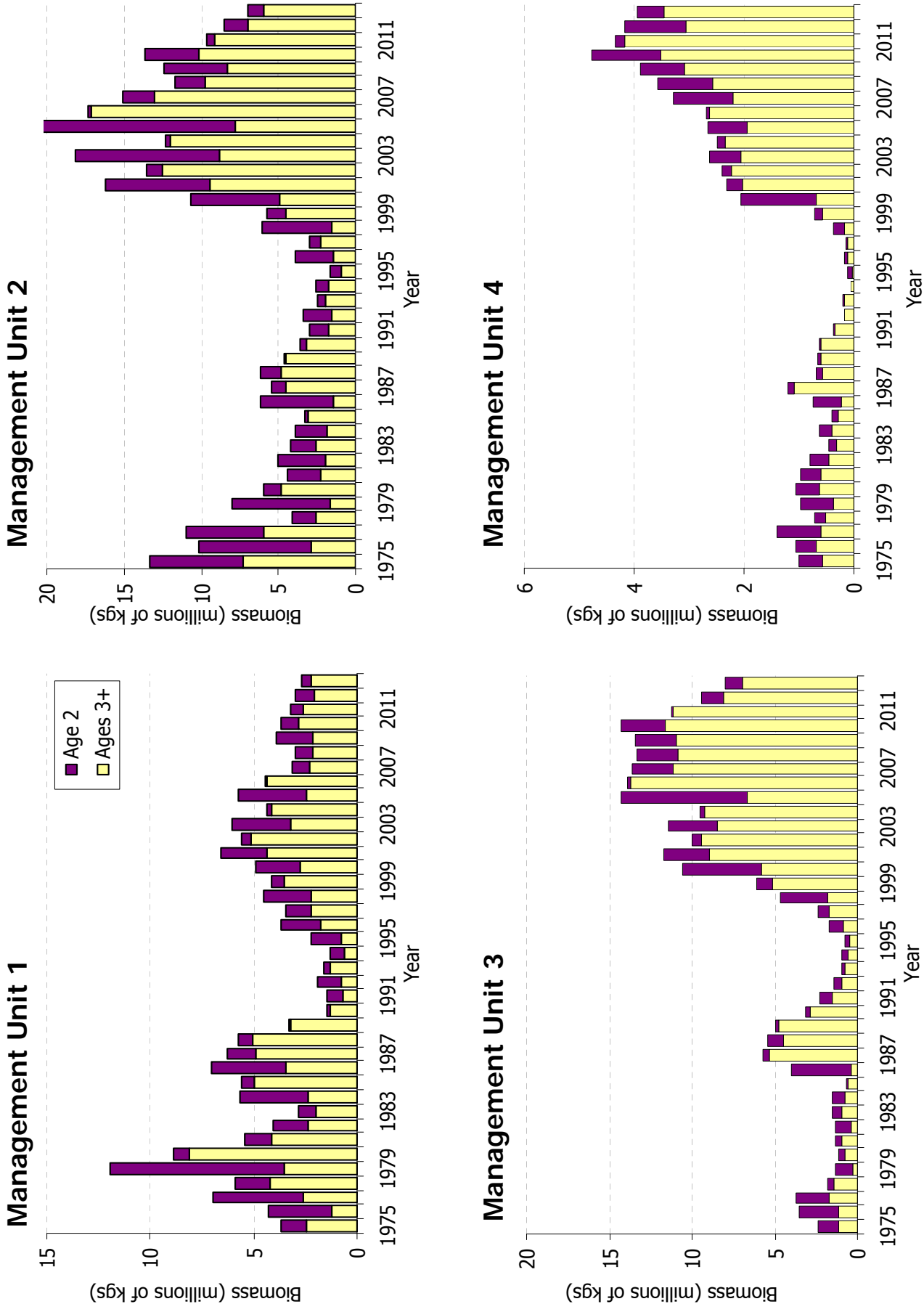


**Figure 1.10.** Yellow perch condition (K) at age from 1990-2012 fall interagency experimental samples for ages 1-4 by management unit (MU).

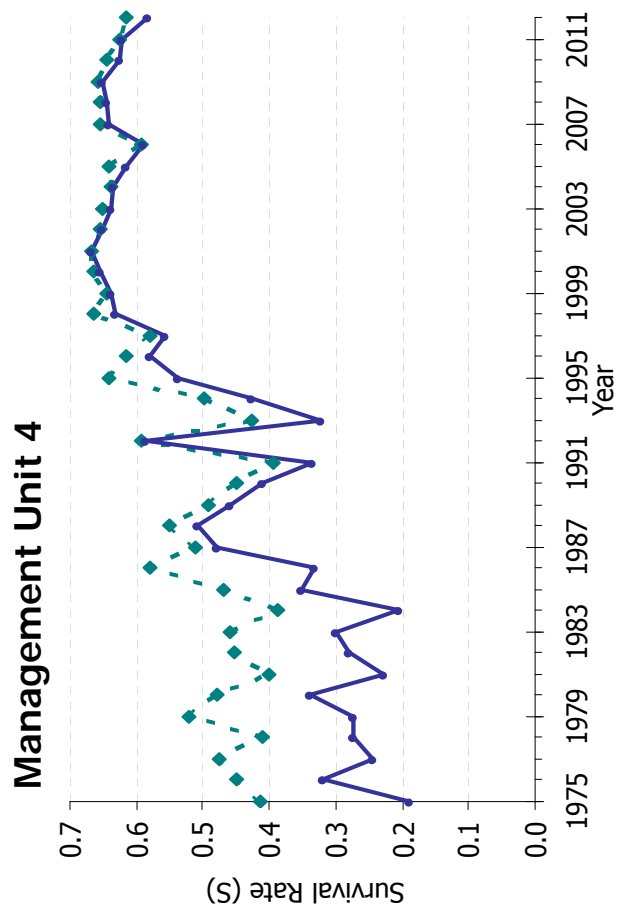
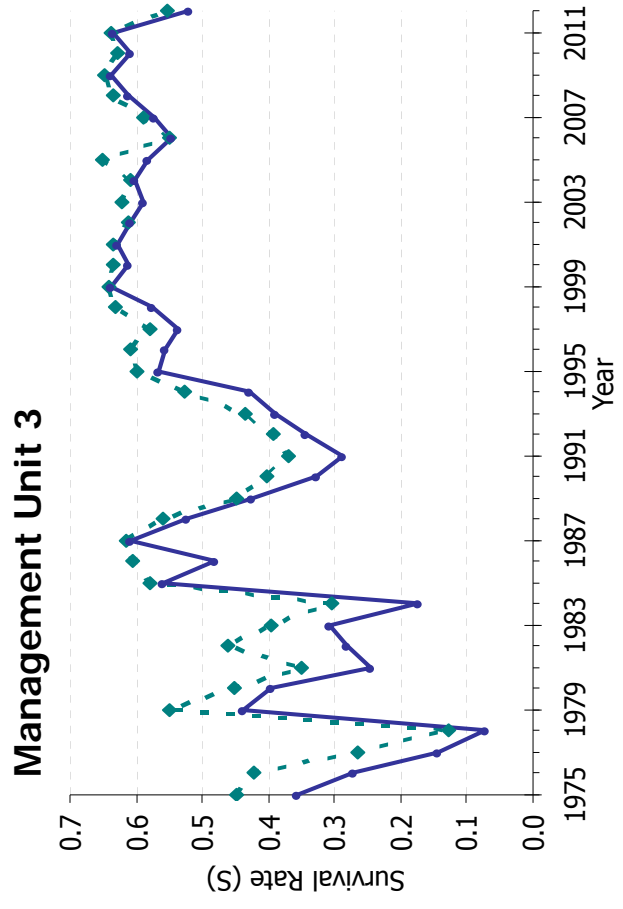
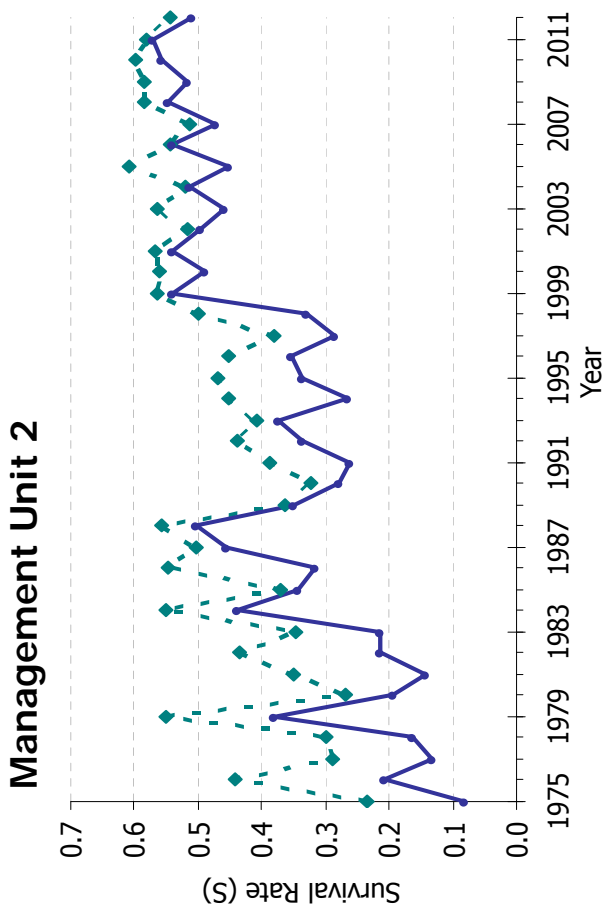
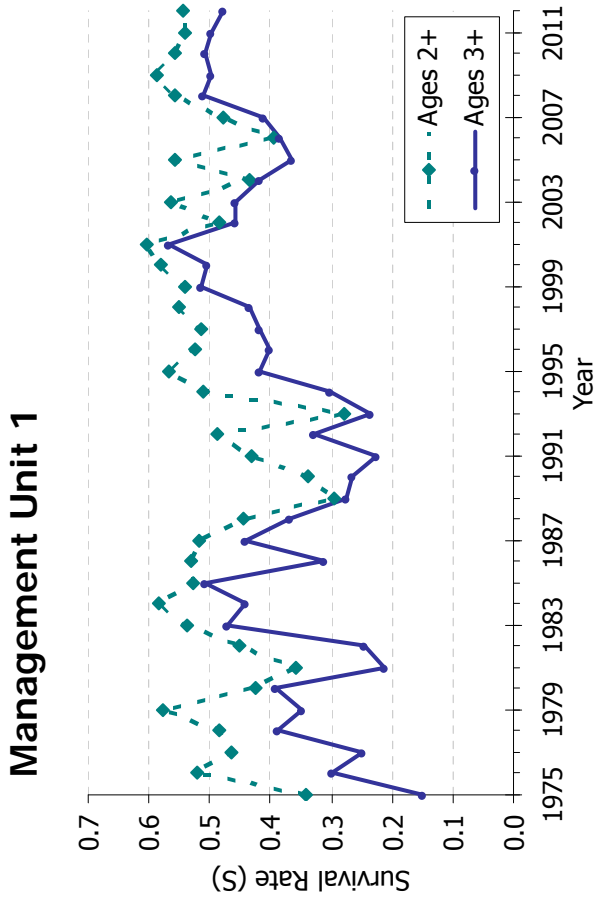


**Figure 1.11.** Lake Erie yellow perch population estimates by management unit for age 2 (dark bars) and ages 3+ (light bars). Estimates for 2013 are from SCAA and regressions for age 2 from survey gears.

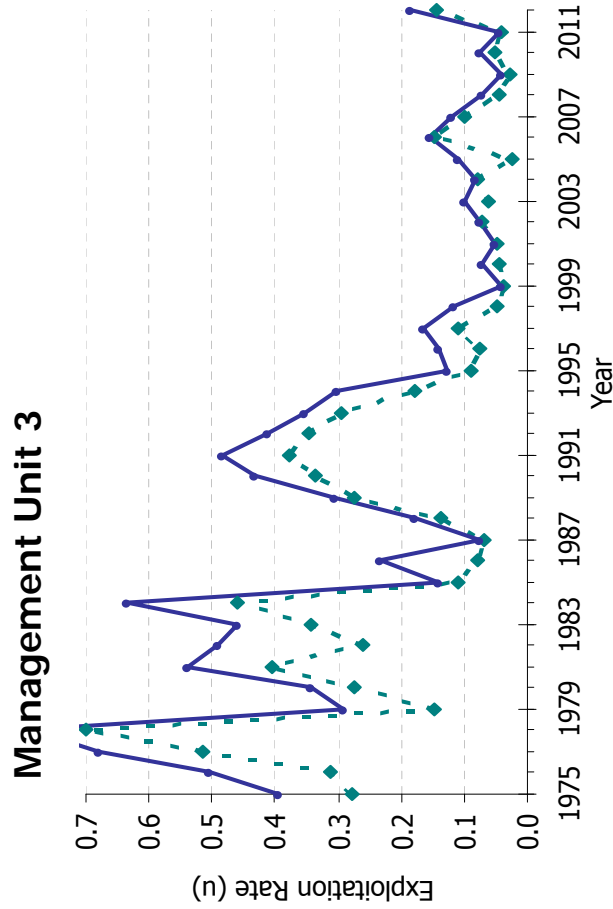
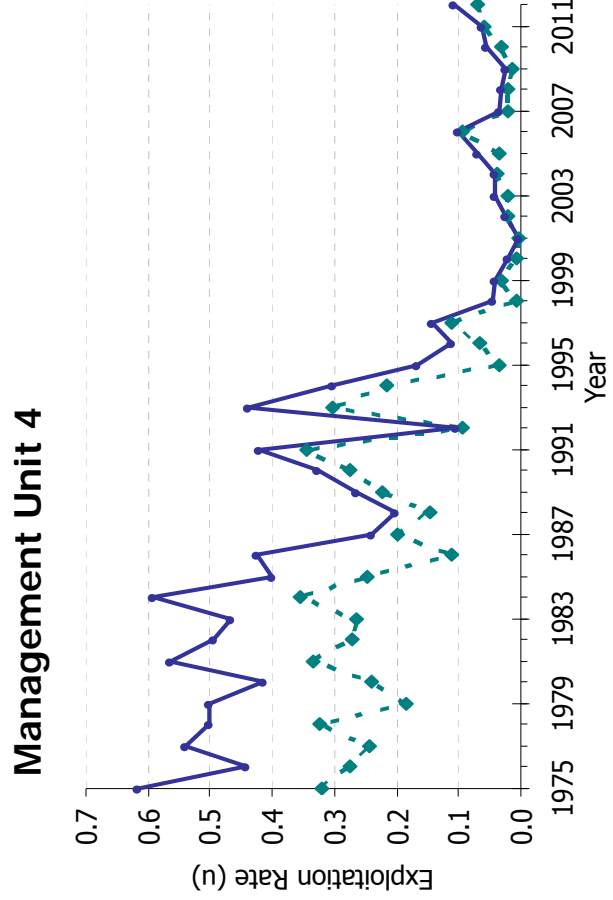
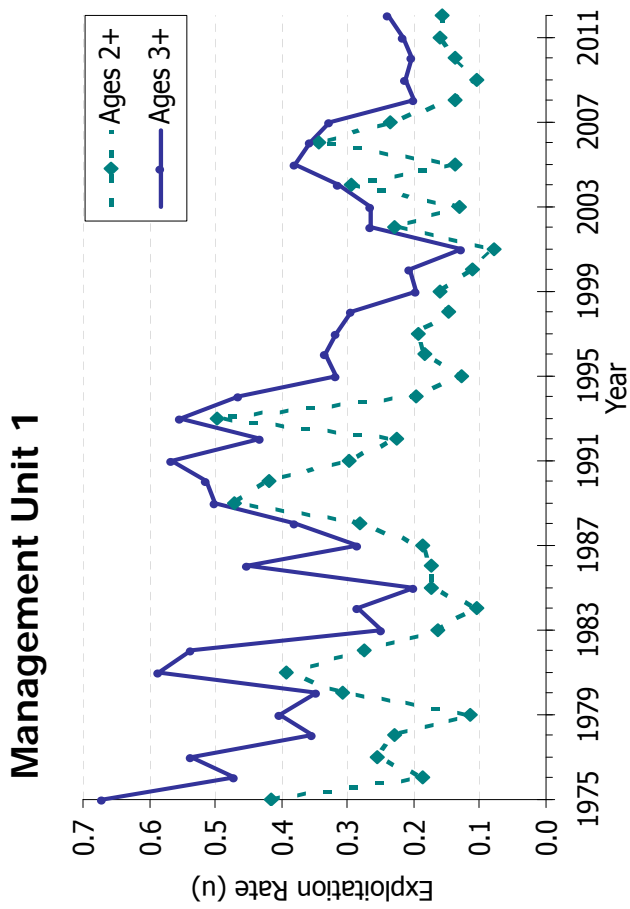
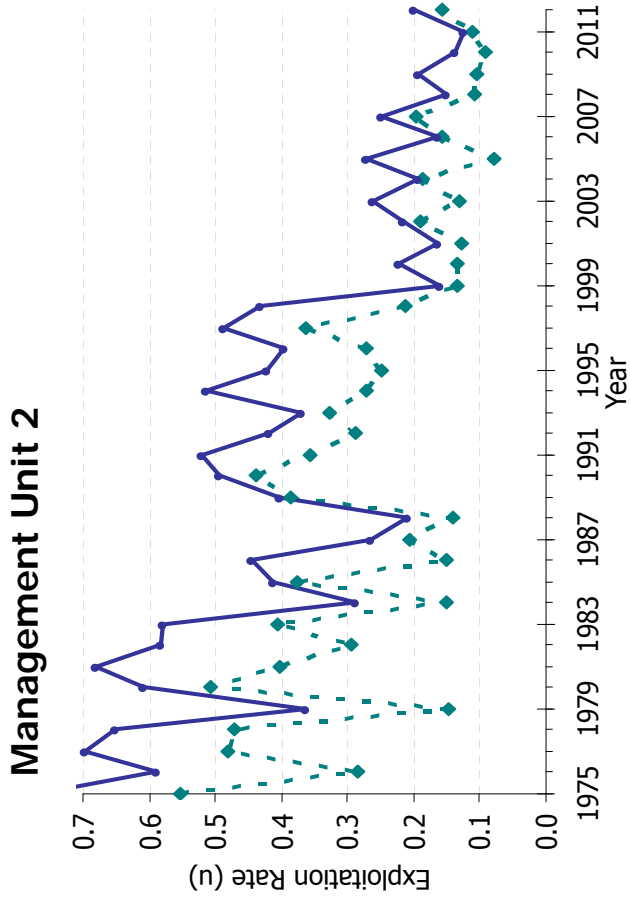




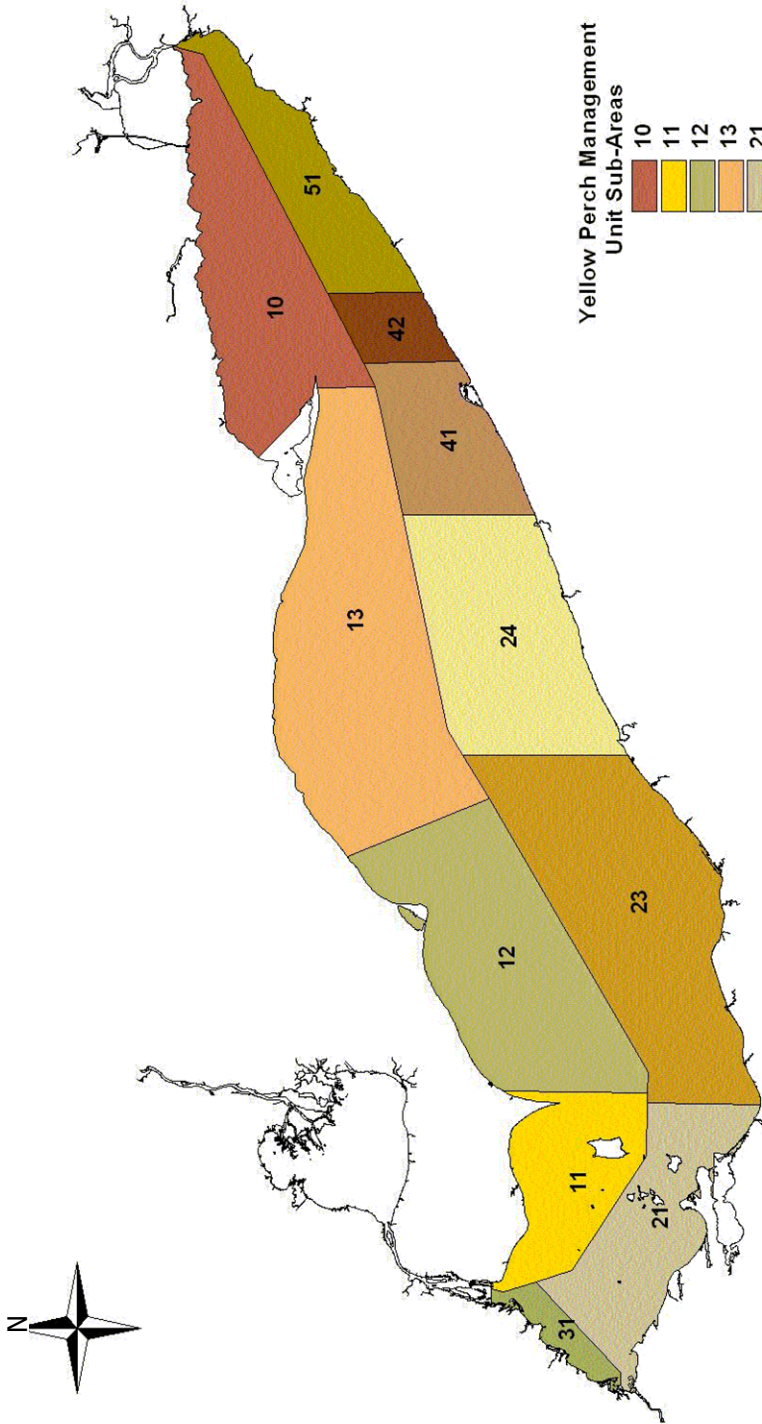
**Figure 1.12.** Lake Erie yellow perch biomass estimates by management unit for age 2 (dark bars) and ages 3+ (light bars). Estimates for 2013 are from SCAA and regressions for age 2 from survey gears.



**Figure 1.13.** Lake Erie yellow perch survival rates by management unit for ages 2+ (dashed line) and ages 3+ (solid line). Estimates are derived from SCAA.



**Figure 1.14.** Lake Erie yellow perch exploitation rates by management unit for ages 2+ (dashed line) and ages 3+ (solid line). Estimates are derived from SCAA.



Management Unit	Sub-Area	Jurisdiction	Area Estimate (km <sup>2</sup> )	New Relative Surface Area
MU1	11	Ontario	1537.1	40.6%
	31	Michigan	344.8	9.1%
	21	Ohio	1905.6	50.3%
		<b>MU1 Total</b>	<b>3787.5</b>	
MU2	12	Ontario	3497.4	45.6%
	23	Ohio	4175.3	54.4%
		<b>MU2 Total</b>	<b>7672.7</b>	
MU3	13	Ontario	4749.9	52.3%
	24	Ohio	2943.7	32.4%
	41	Pennsylvania	1385.8	15.3%
		<b>MU3 Total</b>	<b>9079.4</b>	
MU4	10	Ontario	2818.7	58.0%
	42	Pennsylvania	535.6	11.0%
	51	New York	1507.2	31.0%
		<b>MU4 Total</b>	<b>4861.4</b>	

Figure 2.1 Calculations for subunit areas in the Yellow Perch Task Group Management Units.

**Appendix A Table 1.** Expert Opinion (EO) Lambda ( $\lambda$ ) values and relative number of terms associated with catch-at-age analysis data sources by management unit (Unit).

Unit	Data Source	$\lambda$	Relative Number of Terms
1	Commercial Gill Net Effort	0.8	1
	Sport Effort	0.7	1
	Commercial Trap Net Effort	0.5	1
	Commercial Gill Net Harvest	1.0	5
	Sport Harvest	0.9	5
	Commercial Trap Net Harvest	0.7	5
	Trawl Survey Catch Rates	1.0	3
	Partnership Gill Net Index Catch Rates	1.0	5
2	Commercial Gill Net Effort	0.8	1
	Sport Effort	0.8	1
	Commercial Trap Net Effort	0.6	1
	Commercial Gill Net Harvest	1.0	5
	Sport Harvest	0.9	5
	Commercial Trap Net Harvest	0.7	5
	Trawl Survey Catch Rates	0.9	4
	Partnership Gill Net Index Catch Rates	1.0	5
3	Commercial Gill Net Effort	0.8	1
	Sport Effort	0.8	1
	Commercial Trap Net Effort	0.6	1
	Commercial Gill Net Harvest	1.0	5
	Sport Harvest	0.8	5
	Commercial Trap Net Harvest	0.6	5
	Trawl Survey Catch Rates	1.0	4
	Partnership Gill Net Index Catch Rates	1.0	5
4	Commercial Gill Net Effort	0.8	1
	Sport Effort	0.7	1
	Commercial Trap Net Effort	0.6	1
	Commercial Gill Net Harvest	1.0	5
	Sport Harvest	0.7	5
	Commercial Trap Net Harvest	0.6	5
	NY Gill Net Survey Catch Rates	1.0	5
	Partnership Gill Net Index Catch Rates	0.9	5

**Appendix A Table 2.** Robust regression results from survey indices used for projecting estimates of age-2 yellow perch recruiting in 2013 by Management Unit; SE=standard error.

<b>Management Unit 1</b>										
Index	R-Square	Intercept	Intercept SE	Slope	Slope SE	Value	Lower Age-2 Est	Age-2 estimate	Upper Age-2 Est	Upper Age-2 Est
OHF10	0.6997	-0.6899	0.4494	0.6961	0.0909	12.0	1.431	2.820	5.551	5.551
OHF11	0.6741	0.4835	0.3350	0.6869	0.0980	6.0	3.326	5.549	9.254	9.254
OOS10	0.8161	-1.0099	0.5820	0.6736	0.1046	178.0	3.873	11.938	36.757	36.757
OHS11	0.8358	0.4946	0.3063	0.6477	0.0860	2.2	1.875	2.731	3.976	3.976
OPSF11	0.6920	1.3839	0.2410	0.3075	0.0501	53.1	8.708	13.527	21.009	21.009
<b>mean</b>							<b>3.842</b>	<b>7.313</b>	<b>15.309</b>	<b>15.309</b>
<b>Management Unit 2</b>										
Index	R-Square	Intercept	Intercept SE	Slope	Slope SE	Value	Lower Age-2 Est	Age-2 estimate	Upper Age-2 Est	Upper Age-2 Est
OHF20B	0.6978	1.1422	0.3748	0.6062	0.1070	8.7	6.337	11.628	21.333	21.333
OHF21B	0.5948	0.9859	0.4973	0.6684	0.1482	8.5	4.955	11.203	25.314	25.314
OHJ21B	0.5834	0.7204	0.5677	0.5475	0.1248	35.4	5.252	14.478	39.883	39.883
OHS20	0.6206	1.9505	0.2790	0.3421	0.0687	7.1	9.085	13.747	20.797	20.797
OHS21	0.5174	1.5924	0.4032	0.4734	0.1104	9.3	7.372	14.124	27.051	27.051
OPSF21	0.8577	0.9407	0.2783	0.5478	0.0650	21.9	8.599	13.888	22.426	22.426
<b>mean</b>							<b>6.933</b>	<b>13.178</b>	<b>26.134</b>	<b>26.134</b>
<b>Management Unit 3</b>										
Index	R-Square	Intercept	Intercept SE	Slope	Slope SE	Value	Lower Age-2 Est	Age-2 estimate	Upper Age-2 Est	Upper Age-2 Est
OHF30	0.7305	1.4404	0.3134	0.5020	0.1025	15.1	9.122	16.492	29.812	29.812
OHF31	0.6729	1.6001	0.4346	0.4251	0.1424	23.3	7.802	18.881	45.671	45.671
OHJ31	0.7355	1.2606	0.3849	0.5178	0.1178	76.5	13.598	33.322	81.634	81.634
OHS30	0.8406	1.3851	0.2310	0.3736	0.0500	14.1	7.458	10.730	15.436	15.436
OHS31B	0.5475	1.5750	0.4883	0.3663	0.1342	23.5	6.159	15.347	38.219	38.219
OPSF31	0.7893	0.8377	0.4127	0.5298	0.1039	48.7	7.994	18.100	40.962	40.962
<b>mean</b>							<b>8.689</b>	<b>18.812</b>	<b>41.955</b>	<b>41.955</b>
<b>Management Unit 4</b>										
Index	R-Square	Intercept	Intercept SE	Slope	Slope SE	Value	Lower Age-2 Est	Age-2 estimate	Upper Age-2 Est	Upper Age-2 Est
LPC40	0.7810	0.1713	0.3083	0.3777	0.0878	176.7	3.898	8.369	17.953	17.953
LPC41	0.6427	0.5475	0.2757	0.4456	0.1219	2.0	1.635	2.350	3.375	3.375
NYF40	0.6043	-0.4480	0.4661	0.3913	0.1118	87.2	1.388	3.661	9.632	9.632
NYF41	0.7592	-0.3318	0.3738	0.6177	0.1457	16.3	1.834	4.016	8.777	8.777
OPSF41	0.5213	0.1084	0.3854	0.3691	0.1243	117.8	2.426	6.470	17.224	17.224
<b>mean</b>							<b>2.236</b>	<b>4.973</b>	<b>11.392</b>	<b>11.392</b>

Appendix A Table 3. Interagency trawl surveys indices. All series are reported in arithmetic mean catch per hectare.

Year	OHS10	OHF10	OHS11	OHF11	OOS10	OOS11	OHS20	OHF20	OHS21	OHF21	OHS30	OHF30	OHF20B	OHF21B	OHF30B	OHF31B	OHS20B	OHS21B	OHS30B	OHS31B	OHJ21B	OHJ31B	OHJ21	OHJ31		
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Year	OHS31	OHF31	OLPN40	OLPN41	ILP40	ILP41	NYF40	NYF41	LPS41	LPC40	LPC41	OLPO40	OLPO41	OPSF11	OPSF21	OPSF31	OPSF41	
1984																		
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Appendix A Table 4. Legend. Lakewide trawl index codes and series names used in Appendix A Tables 2 and 3. All series are reported in arithmetic mean catch per hectare, except LPS41 and OPSF11-41, gill net indices which are reported in mean catch per lift. Abbreviations in Appendix T3 ending with a 'B' represent survey indices blocked by depth strata.

Abbreviation	Series
OHS10	Ohio Management Unit 1 summer age 0
OHS11	Ohio Management Unit 1 summer age 1
OHF10	Ohio Management Unit 1 fall age 0
OHF11	Ohio Management Unit 1 fall age 1
OOS10	Ontario/Ohio Management Unit 1 summer age 0
OOS11	Ontario/Ohio Management Unit 1 summer age 1
OHS20	Ohio Management Unit 2 summer age 0
OHF20	Ohio Management Unit 2 fall age 0
OHS21	Ohio Management Unit 2 summer age 1
OHF21	Ohio Management Unit 2 fall age 1
OHS30	Ohio Management Unit 3 summer age 0
OHF30	Ohio Management Unit 3 fall age 0
OHS31	Ohio Management Unit 3 summer age 1
OHF31	Ohio Management Unit 3 fall age 1
OHJ21	Ohio Management Unit 2 June age 1
OHJ31	Ohio Management Unit 3 June age 1
OLPN40	Outer Long Point Bay Nearshore Management Unit 4 age 0
OLPN41	Outer Long Point Bay Nearshore Management Unit 4 age 1
OLPO40	Outer Long Point Bay Offshore Management Unit 4 age 0
OLPO41	Outer Long Point Bay Offshore Management Unit 4 age 1
ILPF40	Inner Long Point Bay Management Unit 4 age 0
ILPF41	Inner Long Point Bay Management Unit 4 age 1
LPC40	Long Point Composite Management Unit 4 age 0
LPC41	Long Point Composite Unit 4 age 1
LPS41	Long Point Bay Management Unit 4 summer Gill Net age 1
NYF40	New York Management Unit 4 fall age 0
NYF41	New York Management Unit 4 fall age 1
OPSF11	Ontario Partnership Gill Net Management Unit 1 fall age 1
OPSF21	Ontario Partnership Gill Net Management Unit 2 fall age 1
OPSF31	Ontario Partnership Gill Net Management Unit 3 fall age 1
OPSF41	Ontario Partnership Gill Net Management Unit 4 fall age 1