

Appendix P  
LimnoTech Boat Survey

## Memorandum

**From:** Ed Verhamme, LimnoTech

**Date:** September 26, 2016

**To:** Lorry Wagner, LEEDCo

**Project:** LEEDCo – Project Icebreaker

**CC:**

**SUBJECT:** Recreational Boat Slip Assessment for Cleveland Area Marinas

---

### Introduction

This memorandum was prepared at the request of LEEDCo to assess the extent of recreational boating in the Cleveland area and gather baseline data regarding area marinas and general boat characteristics. Information gathered included identifying the major marinas, counting the number of available boat slips, identifying the type of boat present in the slip, and estimating boat lengths. The study was conducted using high resolution aerial imagery in late summer of 2016. Data from this study will help to inform US Coast Guard Navigational Risk Assessments and other key permit documents.

### Overview

A recreational boat study was conducted in 2016 to count and classify power and sail boats in the recreational harbors, marinas, and yacht clubs in Lorain, Cuyahoga, and Lake Counties. Aerial imagery, with an on ground pixel resolution of approximately six inches, was obtained for 16 key harbor areas in the three county area surrounding Cleveland, Ohio on the morning of Wednesday, August 3, 2016. The imagery was captured by Aerial Associates under contract to LimnoTech using a Leica DMC III and post-processed to create a tiled image mosaic. For each of the 16 distinct harbor areas, LimnoTech staff delineated every visible boat slip and marked it as either empty or containing a power or sail boat. For slips containing a boat, a polyline was drawn from its stern to bow to allow for length measurements of each boat. Figure 1 shows an example of how boats were delineated in the marina.

### Results

A total of 6,057 boat slips were inventoried across the 16 marina areas. A summary of each of the 16 marina areas is shown in Table 1. A summary of boat lengths for all of marina areas is shown in Table 2. For sail boats, an estimate of the mast height above the water was generated by looking up sail boat specifications common of sailboats in each sailboat range on <http://sailboatdata.com>. Catalina brand sailboats were used for lengths up to 36 ft and Oceanis brand sailboats were used for sailboats longer than 36 ft. Mast height estimates are meant to be used as a rough guide of sailboat mast heights above the water. Additions to the top of the mast (from whip antennas and wind vanes) can increase the total height of the mast above the water by one or two feet.

Table 1. Summary of boat slips and type by marina area.

Cty.	Marina	Empty	Powerboat	Sailboat	Total
Cuyahoga	Bicentennial Park	46	1	0	47
	East 55 <sup>th</sup> ST	42	260	60	362
	Edgewater	133	235	254	622
	Euclid Creek	46	50	5	101
	Forest City YC	18	75	36	129
	Intercity YC	61	39	0	100
	Lakeside YC	67	127	42	236
	Northeast YC	50	85	17	152
	Olde River YC	82	170	3	255
	Rocky River	84	378	96	558
	Shoreby	50	59	6	115
	Whiskey Island	76	157	27	260
	<b>Sub-Total</b>	<b>755</b>	<b>1636</b>	<b>546</b>	<b>2937</b>
Lake	Fairport	270	449	92	811
	Mentor	277	448	52	777
	<b>Sub-Total</b>	<b>547</b>	<b>897</b>	<b>144</b>	<b>1588</b>
Lorain	Beaver Park	227	399	7	633
	Lorain	464	320	115	899
	<b>Sub-Total</b>	<b>691</b>	<b>719</b>	<b>122</b>	<b>1532</b>
<b>Total</b>		<b>1993</b>	<b>3252</b>	<b>812</b>	<b>6057</b>

Table 2. Summary of boat lengths and estimated mast heights above water.

Percentile of boats counted	Power Boat Length (ft)	Sailboats		
		Length (ft)	# of boats > or =	Min. Mast Height (ft)
25%	23	26	586	41
50%	27	29	396	45
75%	31	33	191	48
90%	36	36	74	50
95%	39	38	47	54
97%	42	40	20	58
99%	48	45	8	65



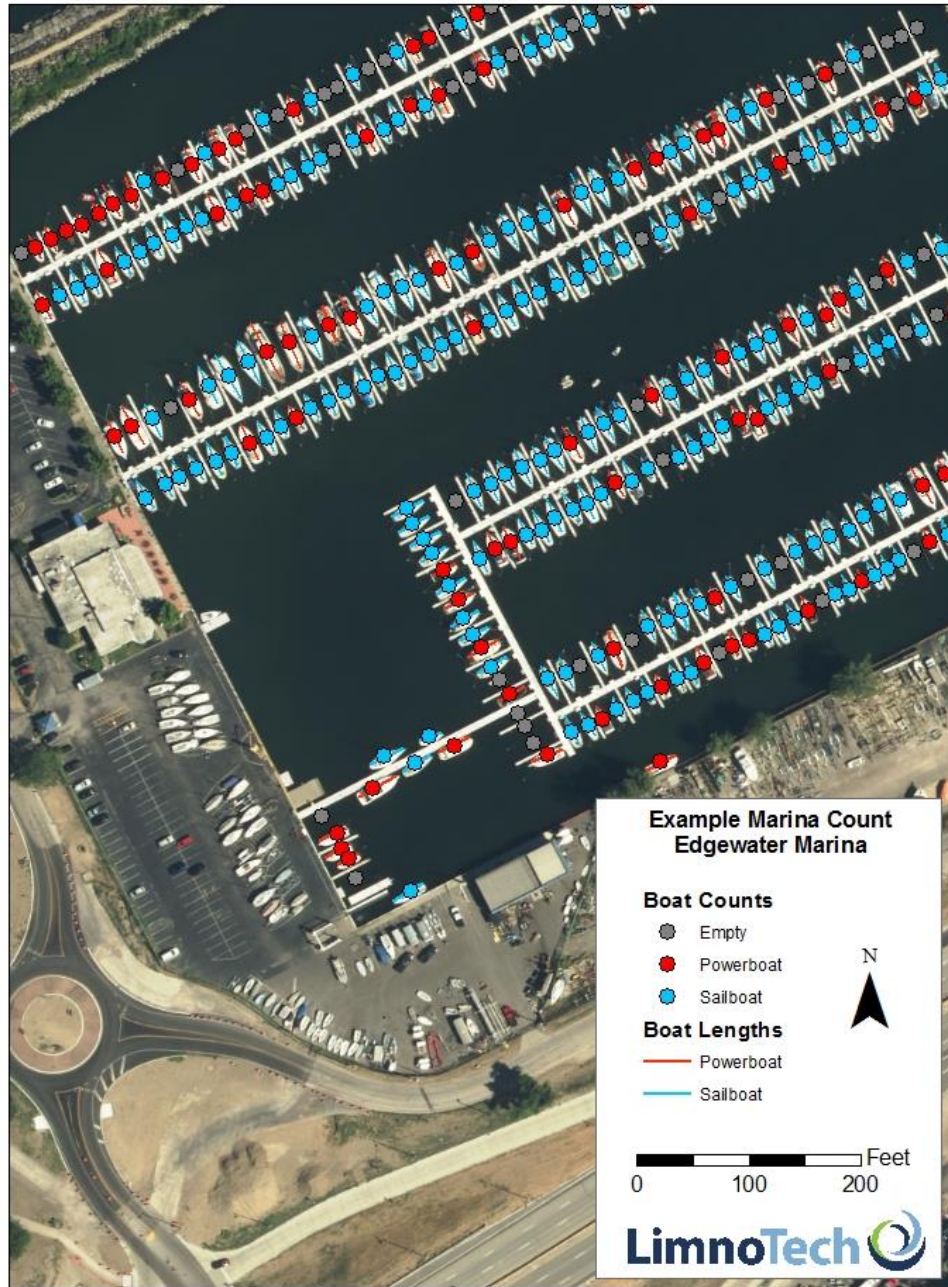


Figure 1. Example marina count from Edgewater Marina.