



Land Acquisition as a method of reducing nutrients to Lake Denham in the Harris Chain

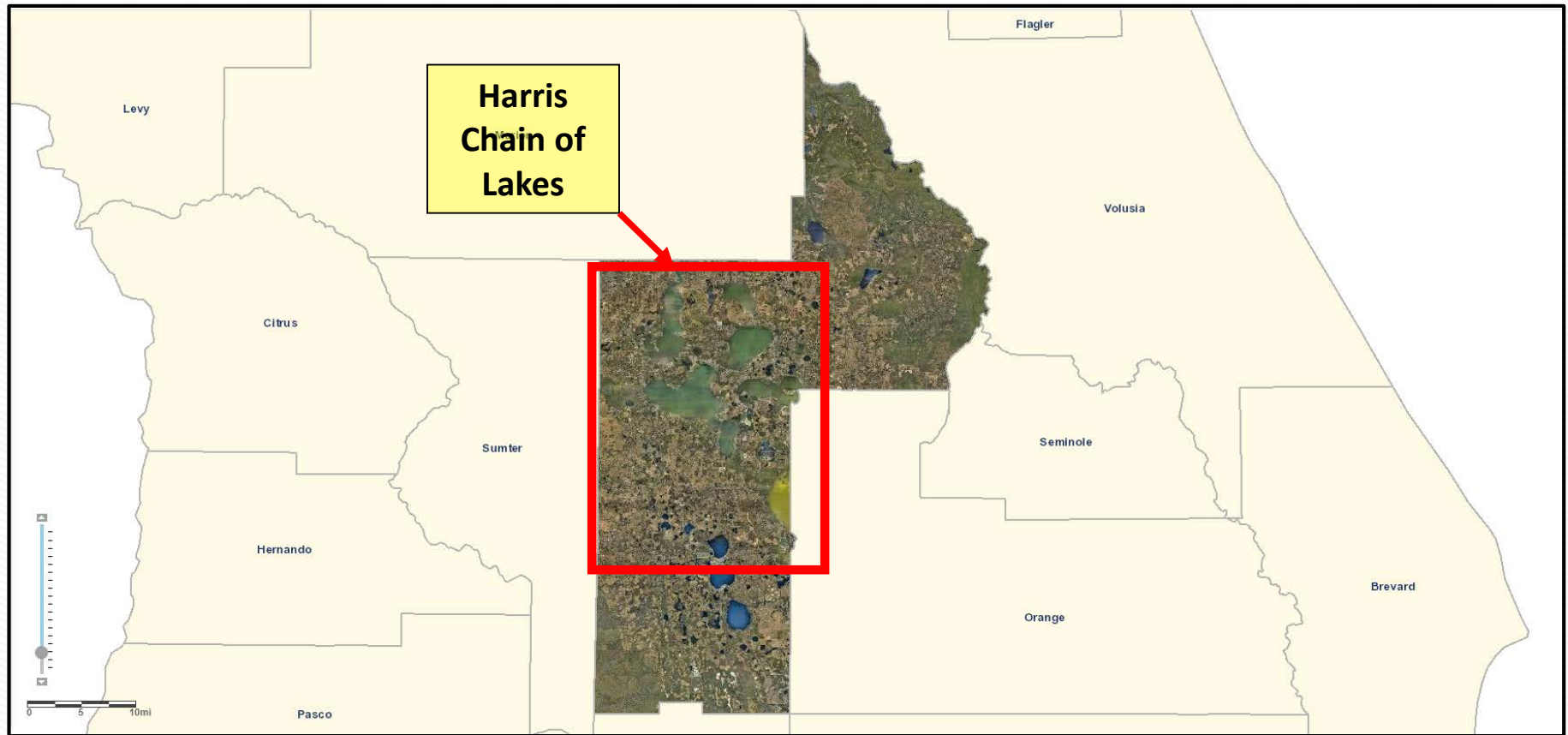
Ron Hart
Lake County Water Authority
Water Resources Director



Lake County



Harris Chain of Lakes



Harris Chain of Lakes

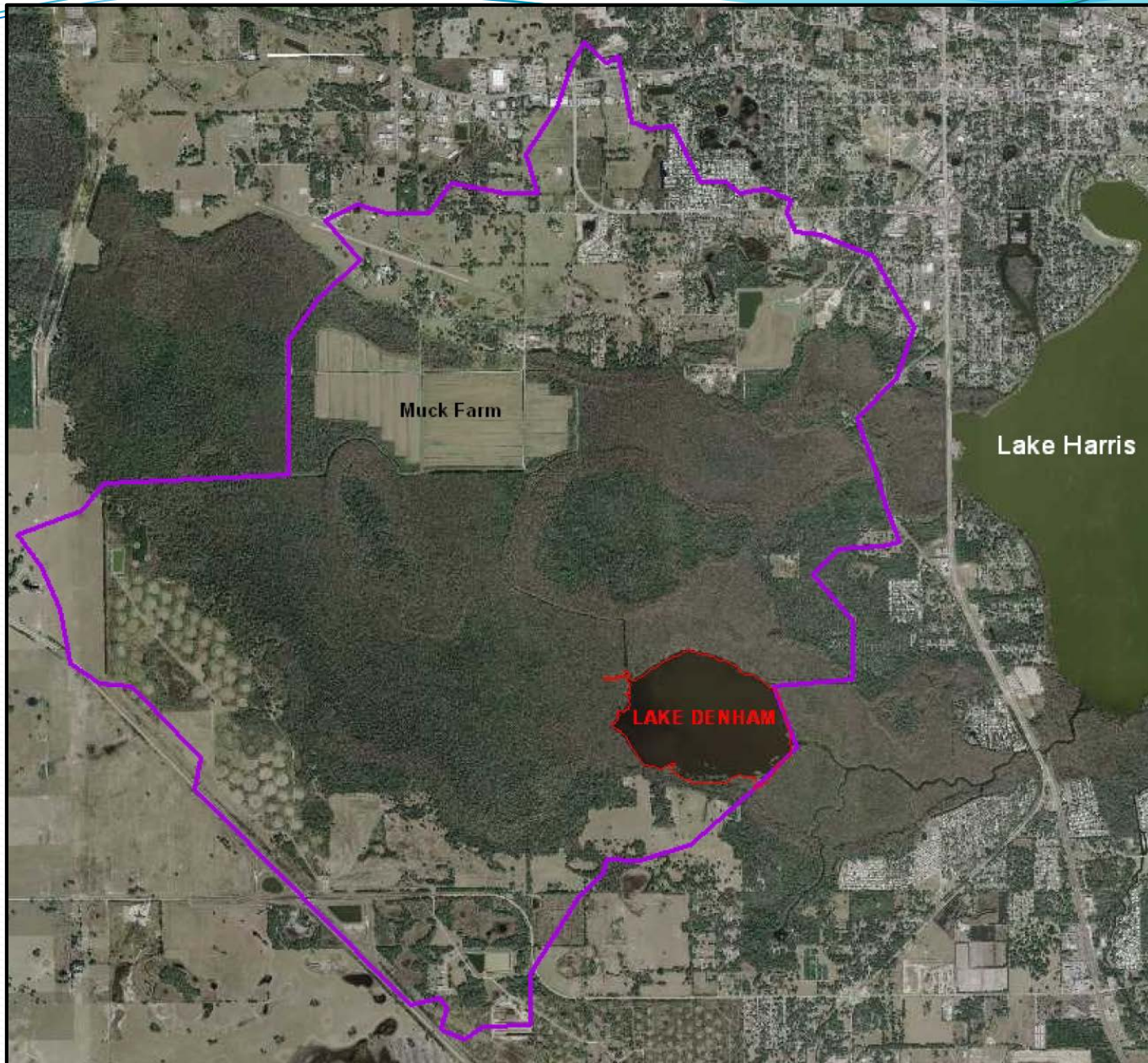


**Lake
Denham**

Orange

Apopka

Lake Denham Watershed

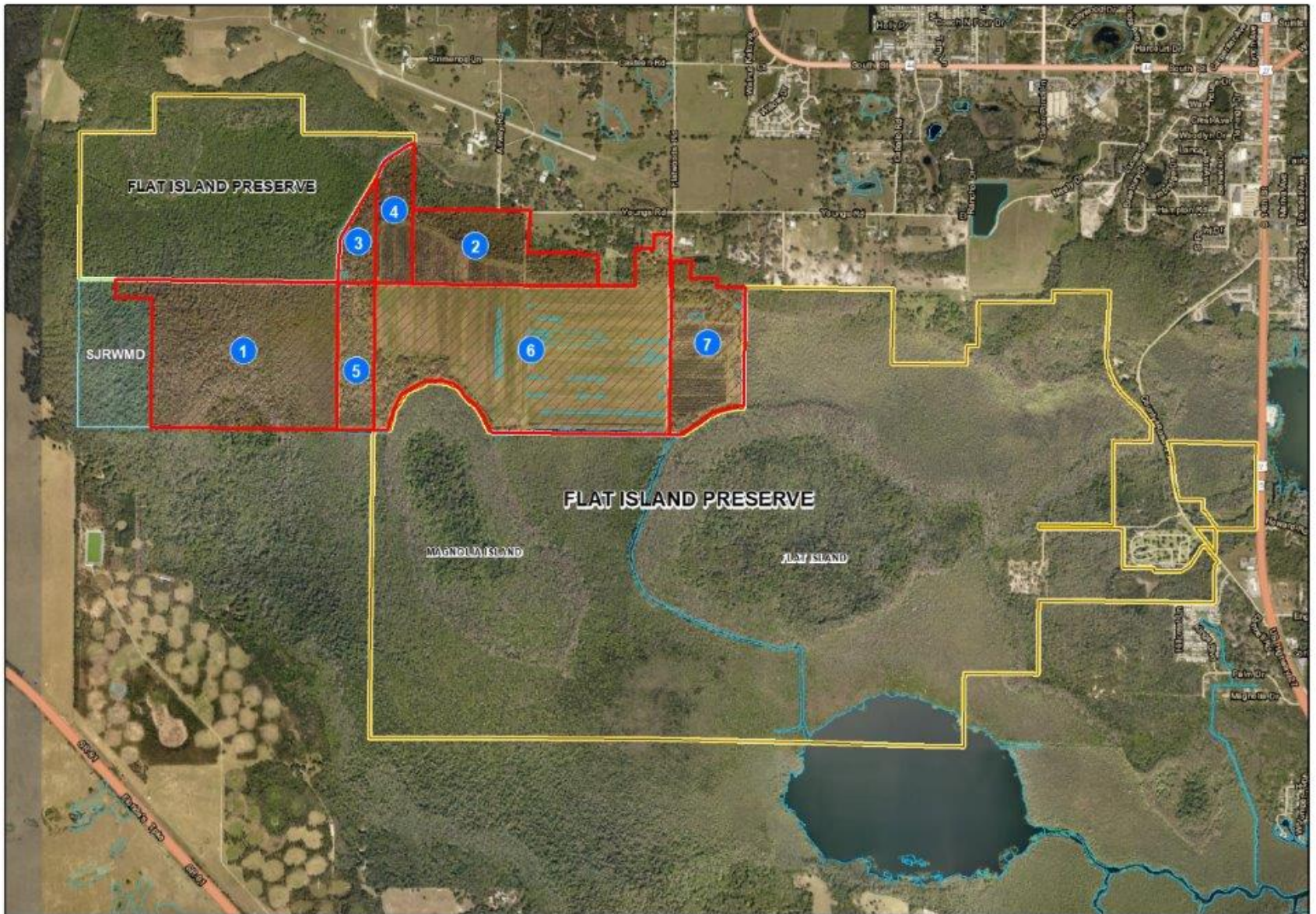


Lake Denham TP Loading

Sources of TP (lbs/yr)	TMDL loading	Controllable loading	Controllable % contribution	Reduction needed to meet TMDL
Atmospheric Deposition	77.2	0	0%	0
Seepage/groundwater includes septic	15.4	0	0%	0
Muck Farm	1101.6	1101.6	66.9%	672.4
Stormwater	1380.3			
Natural Areas	835.3	0	0%	0
Developed Areas	299.7	299.7	18.2%	182.9
Industrial	26.5	26.5	1.6%	16.2
Mining	0.8	0.8	0%	0.5
Internal Loading	727.5	0	0%	0
Agriculture	218.9	218.9	13.3%	133.6
Loading Information	Lbs per year			
Total P-loading (lbs/yr)	3302.8	1647.5	100%	1005.6
Total Maximum Daily Load (lbs/yr)	1569.7			
Total reduction needed in P-loading	1733.1			
TP Reduction needed in watershed without internal loading	1005.6			

Project Summary

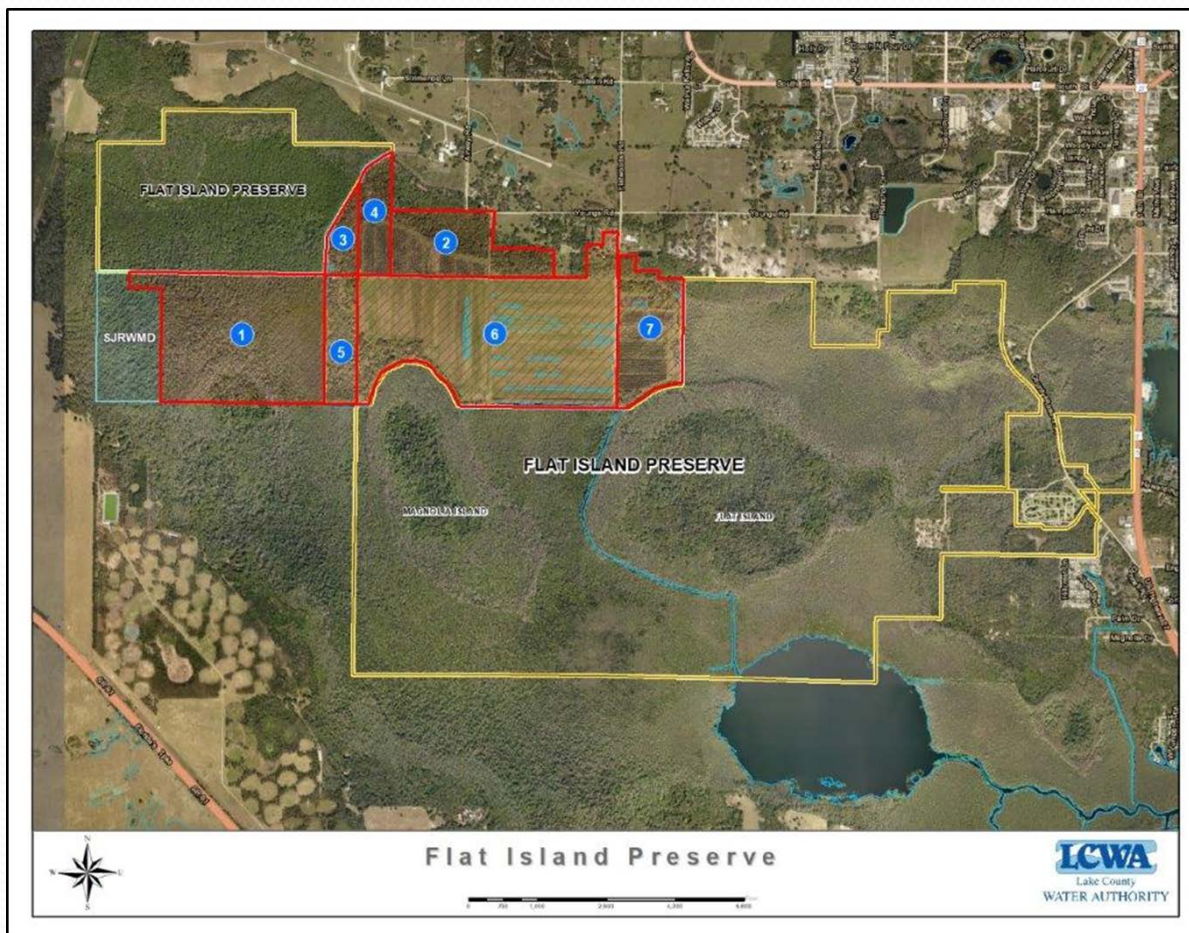
Project #	Project Name	Cost	Lbs TP Removed	Cost/lb over 20-yr life	Annual Maintenance	Comment
1	ABC Ag diversion to Mine Pit	\$757,000	1,809/yr	\$21	\$10,000	Cost includes 250k for mine purchase
2	Lake Yale Whole Lake Alum	\$3,944,000	14,326/yr	\$28	\$0	4 applications, enough to cover 10 yrs of groundwater
3	Trout Lake Whole Lake Alum	\$267,000	493/yr	\$54	0	4 applications, enough to cover 10 yrs of groundwater
4	Lake Denham Muck Farm Buyout	\$1,600,000	1,100/yr	\$73	\$30,000	Pollutant removal would occur for perpetuity
5	Lk Apopka Nutrient Reduction Facility (NuRF)	\$7,407,100	1,918/yr	\$592	\$457,402	Based on cost from 2009 to 2017
7	Combined LCWA Stormwater Grant Projects	\$25,571,523	1,326/yr	\$964	\$290,000	Includes 58 stormwater projects
8	Lake Yale Muck Dredging	\$523,000,000	14,063/yr	\$1,859	\$0	335M cy muck, assumed 20yr reduction in sediment release
9	Trout Lake Muck Dredging	\$6,800,000	303/yr	\$5,443	0	367,000 cy muck, assumed 20yr reduction in sediment release



Flat Island Preserve



Lake Denham Muck Farm Buyout

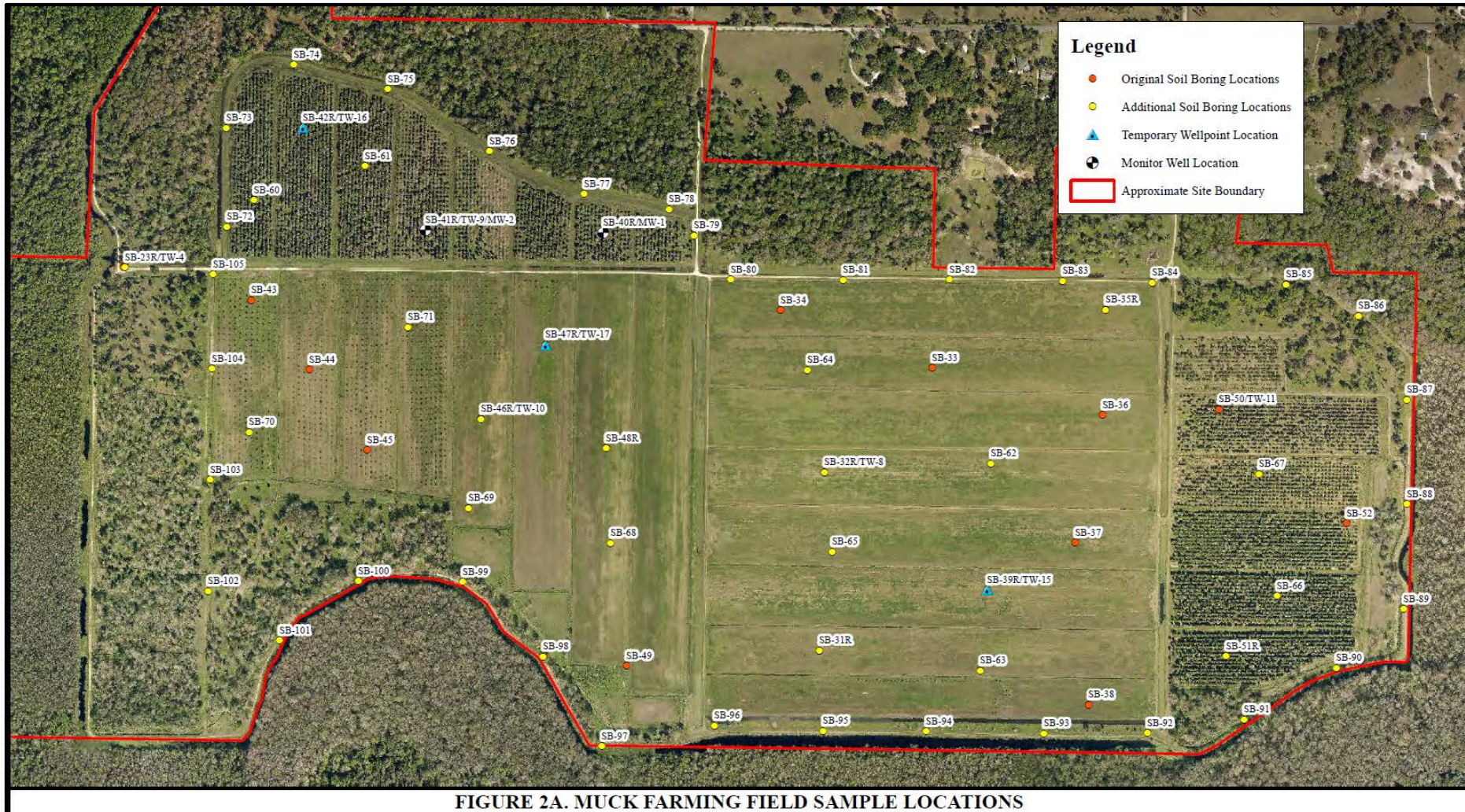


- Cost \$1,600,000
- 1,100 lbs. TP removed per yr.
- 20-yr life cost per lb (\$73)
- Annual Maintenance \$30,000
- Pollutant removal would occur for perpetuity

Lake Denham Muck Farm



Phase II Environmental Assessments



Comparison of the Lake Apopka North Shore and the Lake Denham Muck Farm Phase II Environmental Assessment

	Apopka Muck Farms		Denham Muck Farm		Amount Apopka is higher than Denham	
Pesticide	Average	Maximum	Average	Maximum	Average	Maximum
DDD	0.816	8.8	0.0014	0.0054	583x	1630x
DDE	1.842	16	0.0094	0.029	196x	552x
DDT	1.398	62	0.0013	0.0045	1075x	13778x
Dieldrin	0.423	3.3	0.00041	0.003	1032x	1100x
Toxaphene	14.268	150	0.053	0.110*	269x	1364x
				* Below detection limits		

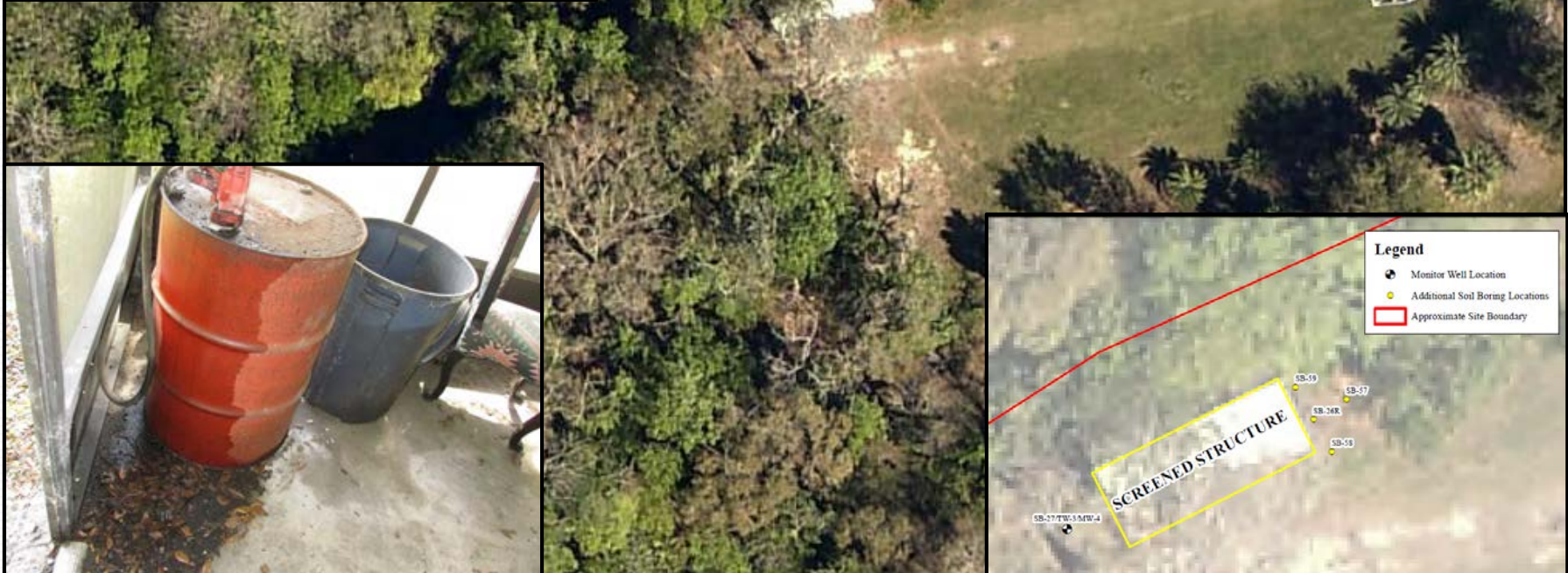
Lake Denham Muck Farm

Potential Petroleum Spill Sites



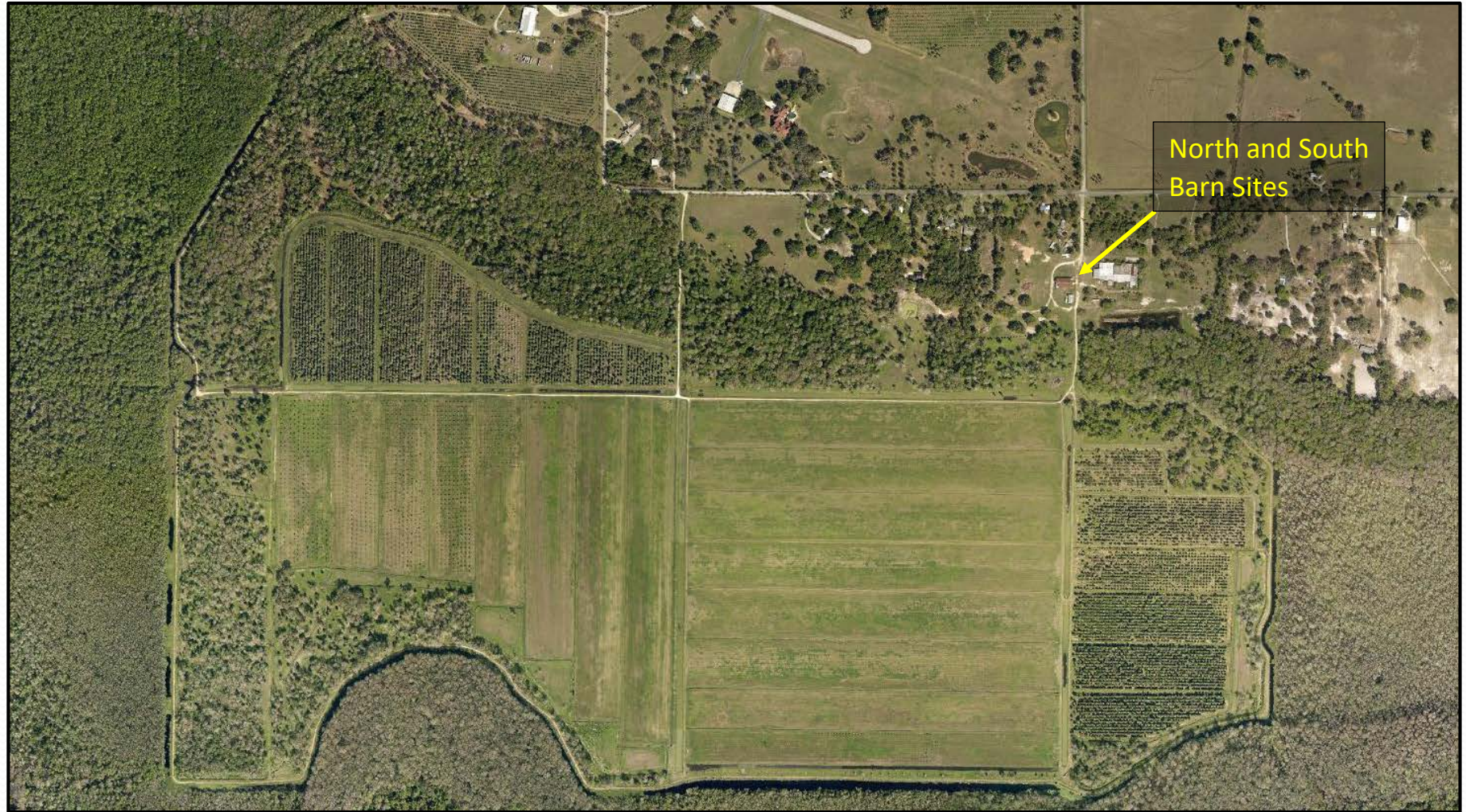
Lake Denham Muck Farm

Screened Room Potential Petroleum Spill Site



Lake Denham Muck Farm

North and South Barn Sites



Lake Denham Muck Farm

North and South Barn Sites



Lake Denham Muck Farm

North Barn Contents



Lake Denham Muck Farm North and South Barns



Special Thanks to:

- City of Leesburg
- St. Johns River Water Management District



Future of the Lake Denham Muck Farm

- Cooperative Project with the Florida Fish and Wildlife



New Lake County Water Authority Water Resource Director's Office

