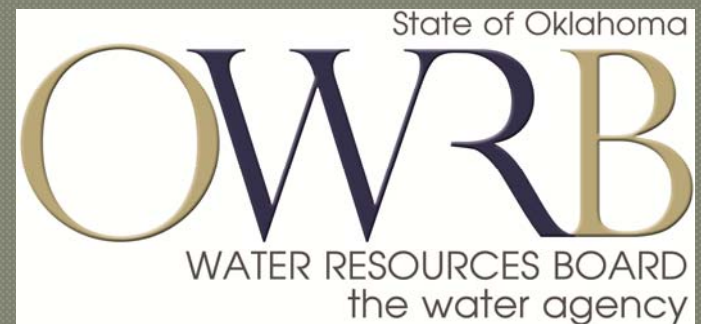


Reducing the Impact of Non-Point Source Pollution through the Establishment of Floating Wetlands in Eucha Lake

Oklahoma Water Resources
Board



Introduction

● Acknowledgements:

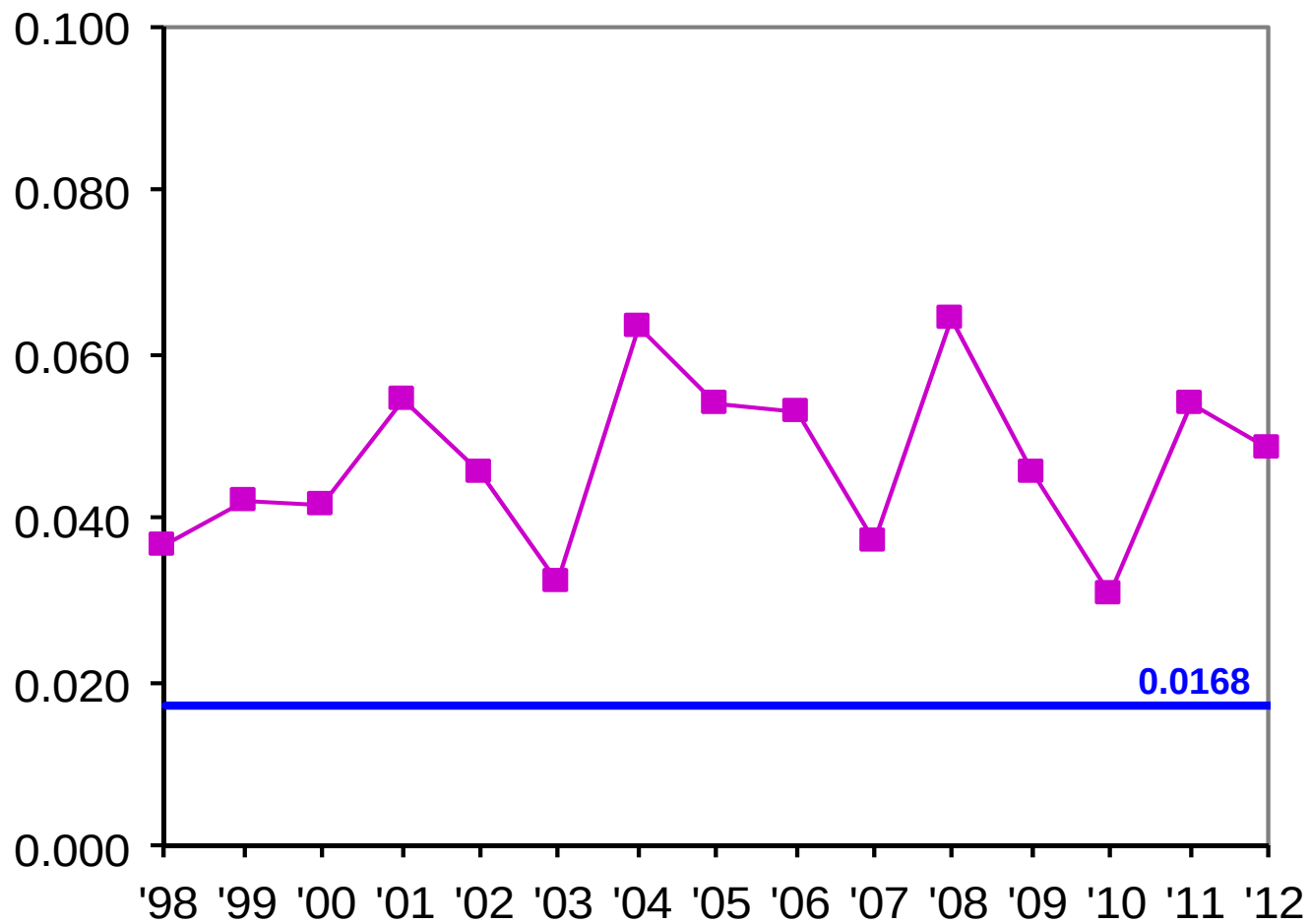
- Partnered with City of Tulsa
- EPA 319 funding used
- OSU SWFAL

● Goal:

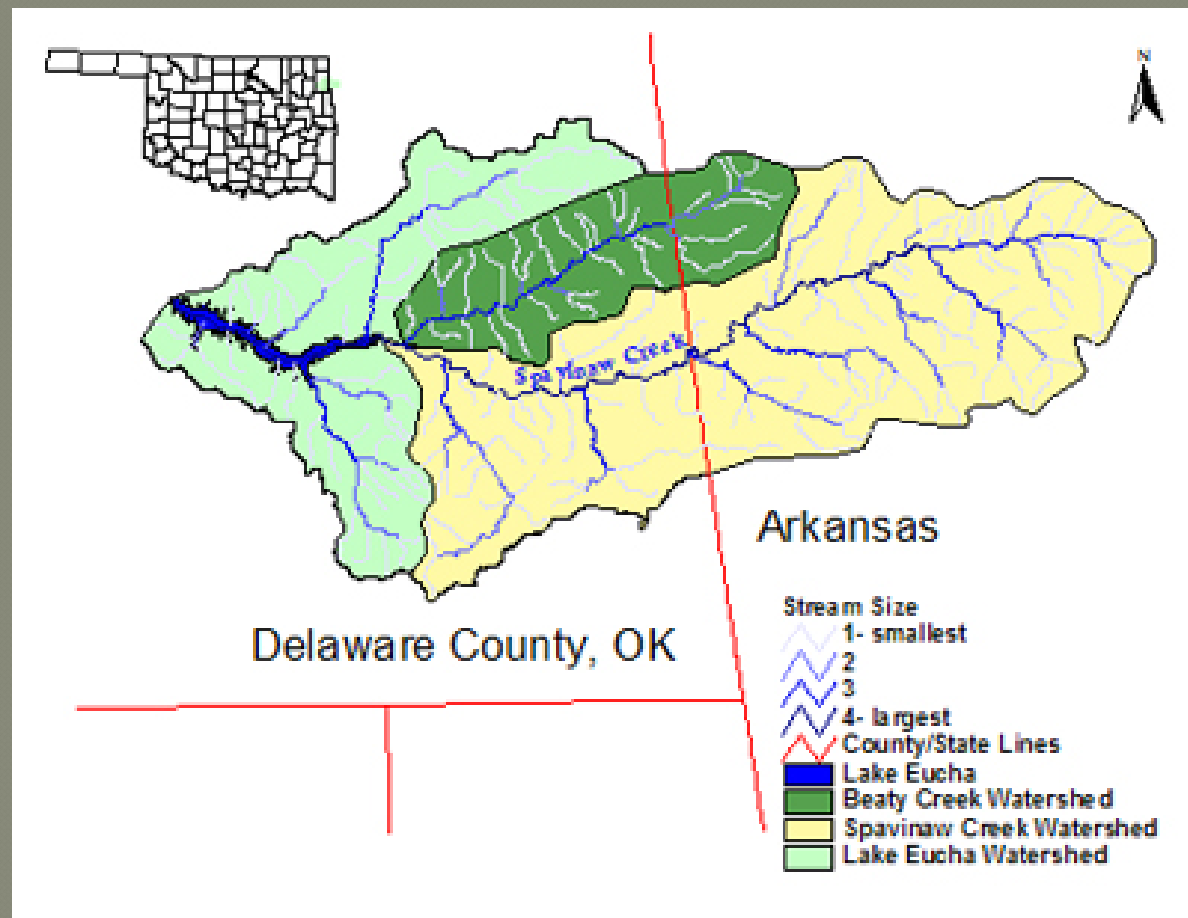
- Reduce effect of nutrient in lake
- OWQS site specific criteria – 0.0168 mg/L TP

Introduction

EUC03

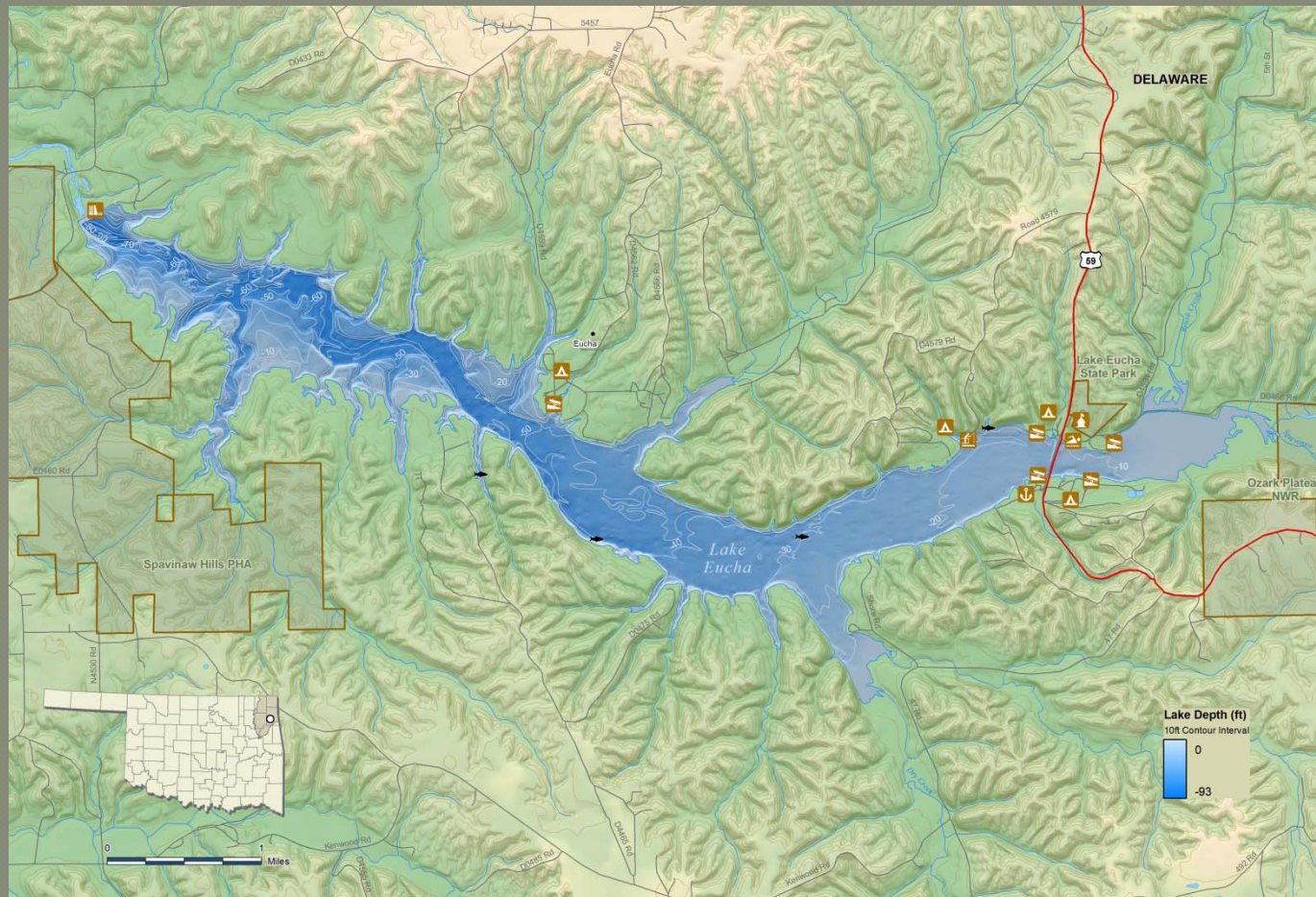


Lake Eucha Watershed



Courtesy of OCC

Lake Eucha



Floating Wetlands



Floating Wetlands



- 5' x 8' mats – 160 total

- 6,400 ft²



Target Plant Species

- Water Willow (*Justicia americana*)
- Lizard Tail (*Saururus cernuus*)
- Horse Tail (*Equisetum hyemale*)
- Softstem Bulrush (*Schoenoplectus tabernaemontani*)
- Squarestem Spikerush (*Eleocharis quadrangulata*)
- Creeping Burhead (*Echinodorus cordifolius*)
- Obedient Plant (*Physostegia virginiana*)
- Cardinal Flower (*Lobelia cardinalis*)
- Great Blue Lobelia (*Lobelia siphilitica*)
- Porcupine Sedge (*Carex hystericina*)
- Pennywort (*Hydrocotyle verticillata*)
- Flatstem Spikerush (*Eleocharis* spp.)
- Sweet Flag (*Acorus calamus*)
- Alligator Flag (*Thalia dealbata*)
- Arrowhead (*Sagittaria latifolia*)
- Bulltongue (*Sagittaria graminea*)
- Softstem Rush (*Juncus effusus*)
- Fowl Mannagrass (*Glyceria striata*)
- Lake Sedge (*Carex lurida*)
- Wild Celery (*Valisneria* spp.)
- Mudplantain (*Heteranthera dubia*)
- Pickerelweed (*Pontederia cordata* L.)



Floating Wetlands



Modified Daubenmire Method

	Water Willow	Lizard Tail	Softstem	Squarestem	Creeping Burhead	Obedient	Pink Butterfly Weed
% Canopy Cover	16.44	1.88	1.70	1.75	0.81	0.00	0.44
Frequency	100.00	40.00	40.00	27.50	22.50	0.00	3.75
	Porcupine Sedge	Thalia	Pennywort	Flatstem	Sweet Flag	Arrowhead	Bulltongue
% Canopy Cover	2.99	1.26	7.49	3.64	0.83	0.72	0.73
Frequency	31.25	47.50	53.75	30.00	13.75	3.75	20.00
	Rush	Pickerel weed	Smartweed	Mud plantain	Rosemallow	Other weed	Lobelia
% Canopy Cover	8.04	2.13	0.51	0.58	0.17	4.90	1.33
Frequency	41.25	36.25	38.75	2.50	3.75	68.75	32.50
	Unidentified grasses	Three Square	Water Primrose	Dodder	Bacopa	Other Sedge	Cottonwood
% Canopy Cover	11.57	4.59	0.17	16.44	0.17	5.42	0.17
Frequency	96.25	13.75	1.25	45.00	1.25	83.75	5.00

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Sediment Traps



Methods

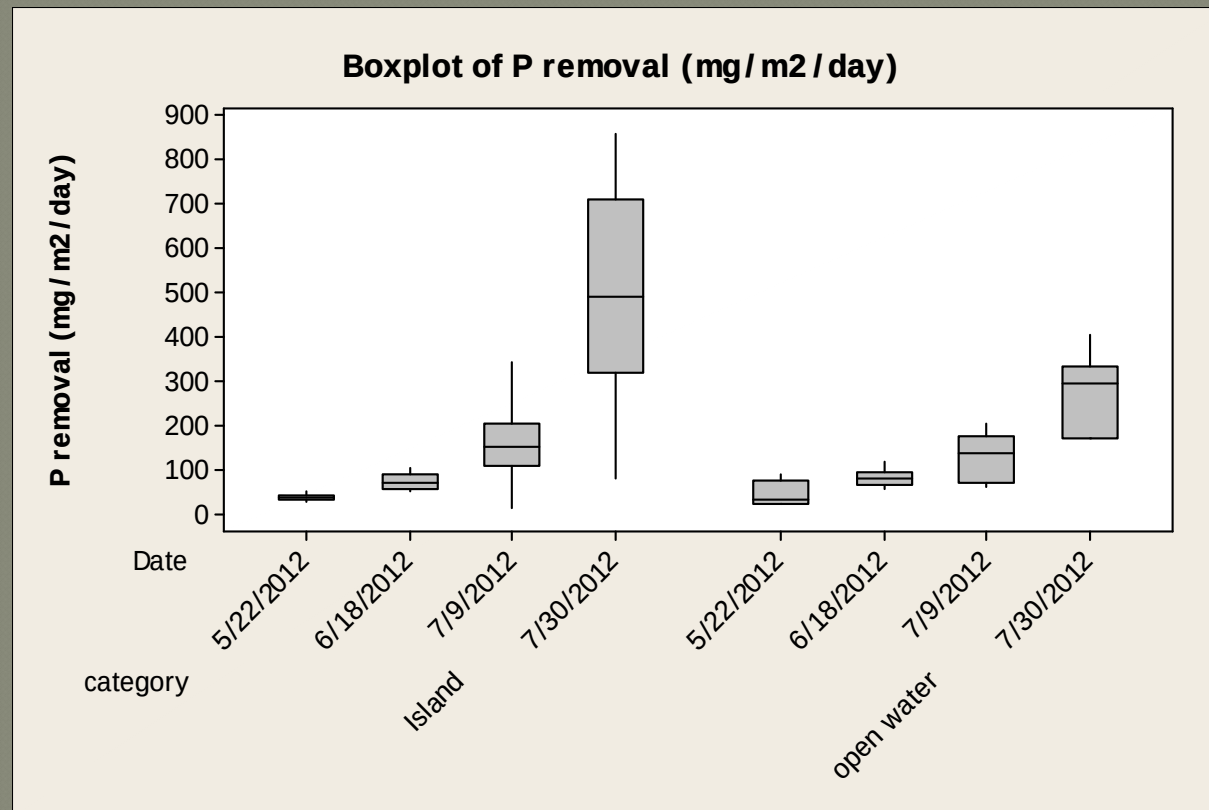
- 6 traps installed with 4 tubes each
 - 4 under wetlands
 - 2 open water
- Samples collected every 3 weeks



Root Growth



Sediment Accretion



Phosphorus Removal

- Plant Uptake

- 1.376 kg/yr

- Sediment Accretion

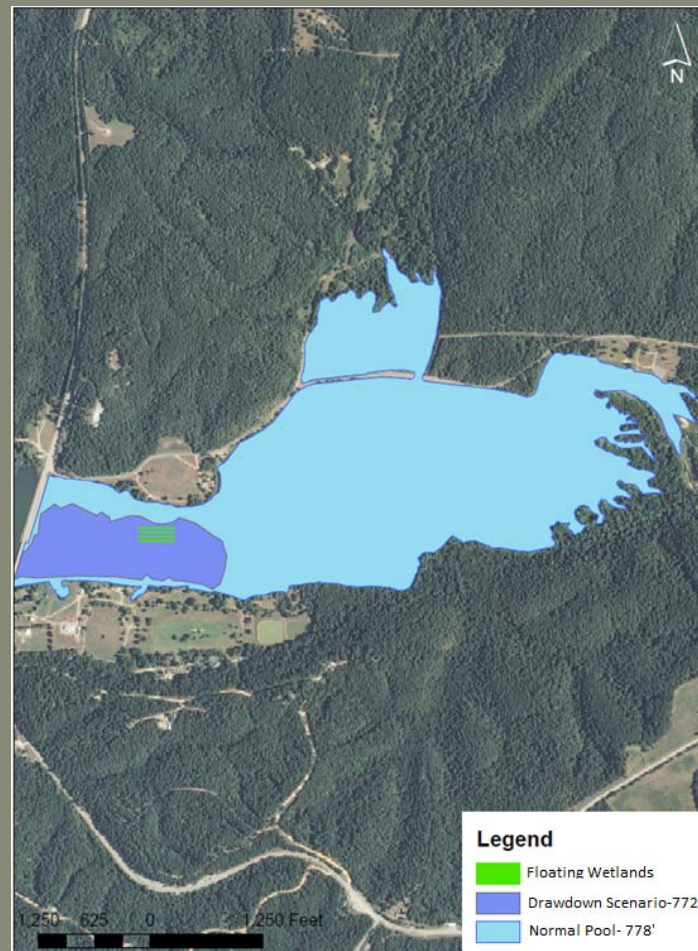
- 53.76 kg/yr



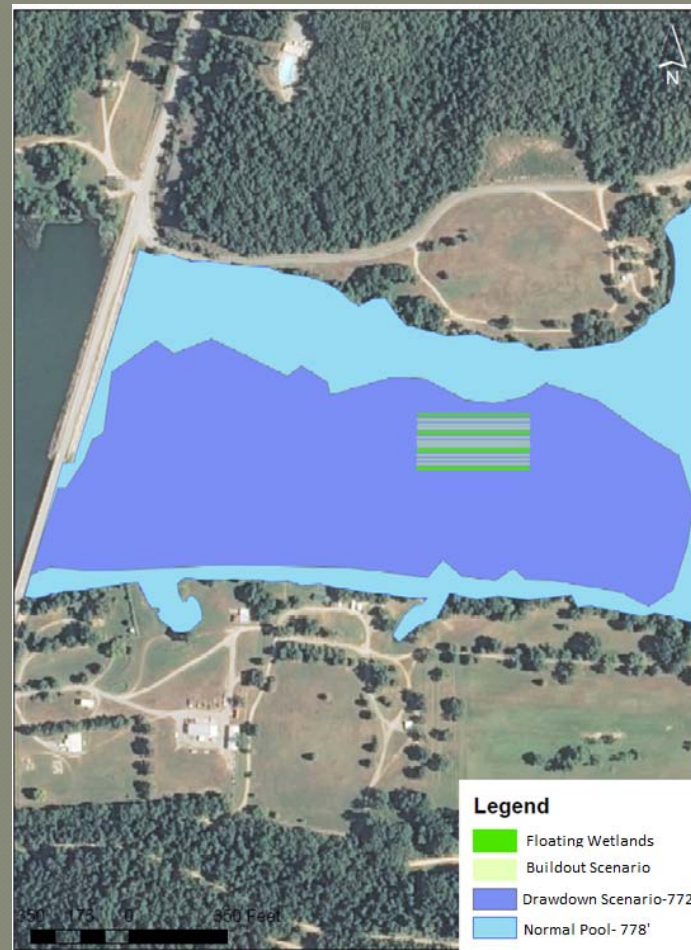
Islands as Habitat



ExHEP



ExHEP



ExHEP

H.S.I						
Common Name	Control	Control Drawdown	FW Current	FW Current Drawdown	Buildout	Buildout Drawdown
Black Crappie	0.9058	0.8900	0.9062	0.8943	0.9075	0.9060
BlueGill	0.7443	0.7125	0.7448	0.7188	0.7464	0.7352
Large Mouth Bass	0.8843	0.8758	0.8845	0.8780	0.8852	0.8844
Red Ear Sunfish	0.4547	0.4294	0.4558	0.4386	0.4591	0.4662
White Crappie	0.7452	0.7365	0.7454	0.7389	0.7461	0.7453
Gizzard Shad	0.7442	0.6667	0.7457	0.6797	0.7504	0.7188
Channel Catfish	0.6669	0.6515	0.6673	0.6556	0.6686	0.6671
Green Sunfish	0.7086	0.6943	0.7090	0.6981	0.7102	0.7088
Spotted Bass	0.4547	0.4294	0.4558	0.4386	0.4591	0.4662
Habitat Units (acres)						
Black Crappie	260.871	30.261	260.994	30.407	261.361	30.805
BlueGill	214.367	24.225	214.506	24.439	214.951	24.997
Large Mouth Bass	254.677	29.776	254.746	29.853	254.950	30.070
Red Ear Sunfish	130.960	14.600	131.273	14.912	132.212	15.851
White Crappie	214.613	25.041	214.681	25.122	214.882	25.340
Gizzard Shad	214.328	22.667	214.772	23.110	216.102	24.440
Channel Catfish	192.063	22.153	192.188	22.290	192.562	22.681
Green Sunfish	204.080	23.605	204.195	23.736	204.538	24.099
Spotted Bass	130.960	14.600	131.273	14.912	132.212	15.851
Habitat Units Created (acres)						
Black Crappie	0.000	0.000	0.124	0.146	0.491	0.544
BlueGill	0.000	0.000	0.139	0.214	0.584	0.772
Large Mouth Bass	0.000	0.000	0.068	0.078	0.272	0.294
Red Ear Sunfish	0.000	0.000	0.313	0.313	1.252	1.251
White Crappie	0.000	0.000	0.068	0.081	0.269	0.299
Gizzard Shad	0.000	0.000	0.443	0.444	1.774	1.774
Channel Catfish	0.000	0.000	0.125	0.138	0.499	0.529
Green Sunfish	0.000	0.000	0.115	0.130	0.458	0.494
Spotted Bass	0.000	0.000	0.313	0.313	1.252	1.251

Fish Survey



Fish Survey

Common Name	Scientific Name	Floating Wetlands				Total
		South	South +1	North -1	North	
Largemouth Bass	<i>Micropterus salmoides</i>	17	17	42	37	113
Bluegill	<i>Lepomis macrochirus</i>	10	89	200	98	397
Gizzard Shad	<i>Dorosoma cepedianum</i>	5	4	1	10	20
Green Sunfish	<i>Lepomis cyanellus</i>	2	1		4	7
Spotted Sucker	<i>Minytrema melanops</i>	1	4	2		7
Golden Shiner	<i>Notemigonus crysoleucas</i>	1	2	3	12	18
White Bass	<i>Morone chrysops</i>	1				1
Redear Sunfish	<i>Lepomis microlophus</i>		1		1	2
Threadfin Shad	<i>Dorosoma petenense</i>		75		2	77
Brook Silverside	<i>Labidesthes sicculus</i>		1			1
Warmouth	<i>Lepomis gulosus</i>			3	4	7
Blackstrip Topminnow	<i>Fundulus notatus</i>				1	1
		37	194	251	169	651

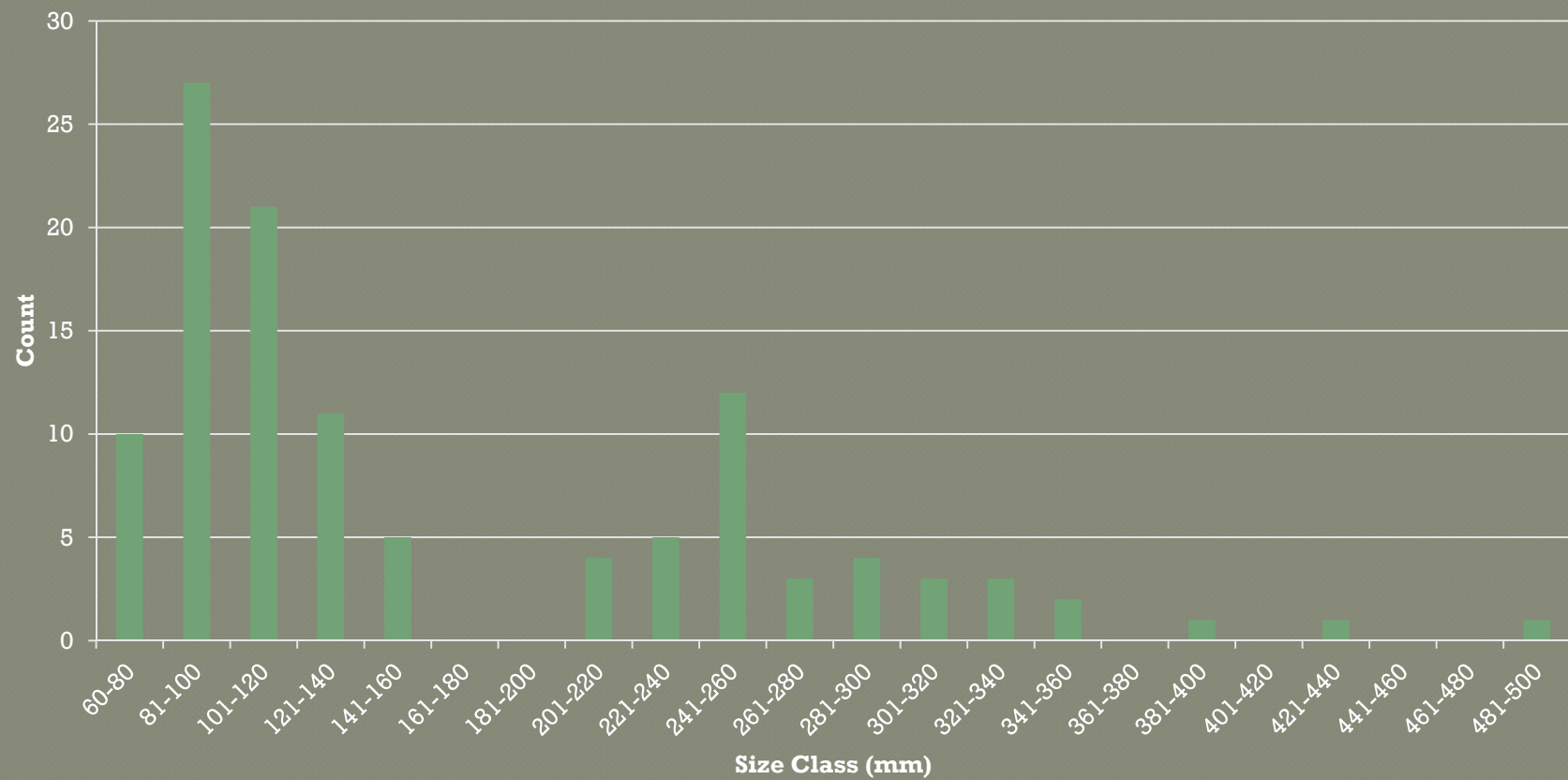
Fish Survey

	ODWC	OWRB		ODWC	OWRB
Carp	X		Brook silverside	X	X
Green sunfish	X	X	Channel catfish	X	
Golden shiner	X	X	Spotted bass	X	
Largemouth bass	X	X	White sucker	X	
Black crappie	X		Spotted sucker	X	X
Bluegill sunfish	X	X	Black redhorse	X	
Longear sunfish	X		Golden redhorse	X	
Redear sunfish	X	X	White Bass		X
Warmouth sunfish	X	X	Threadfin Shad		X
Gizzard shad	X	X	Blackstrip Topminnow		X
Flathead Catfish		*			



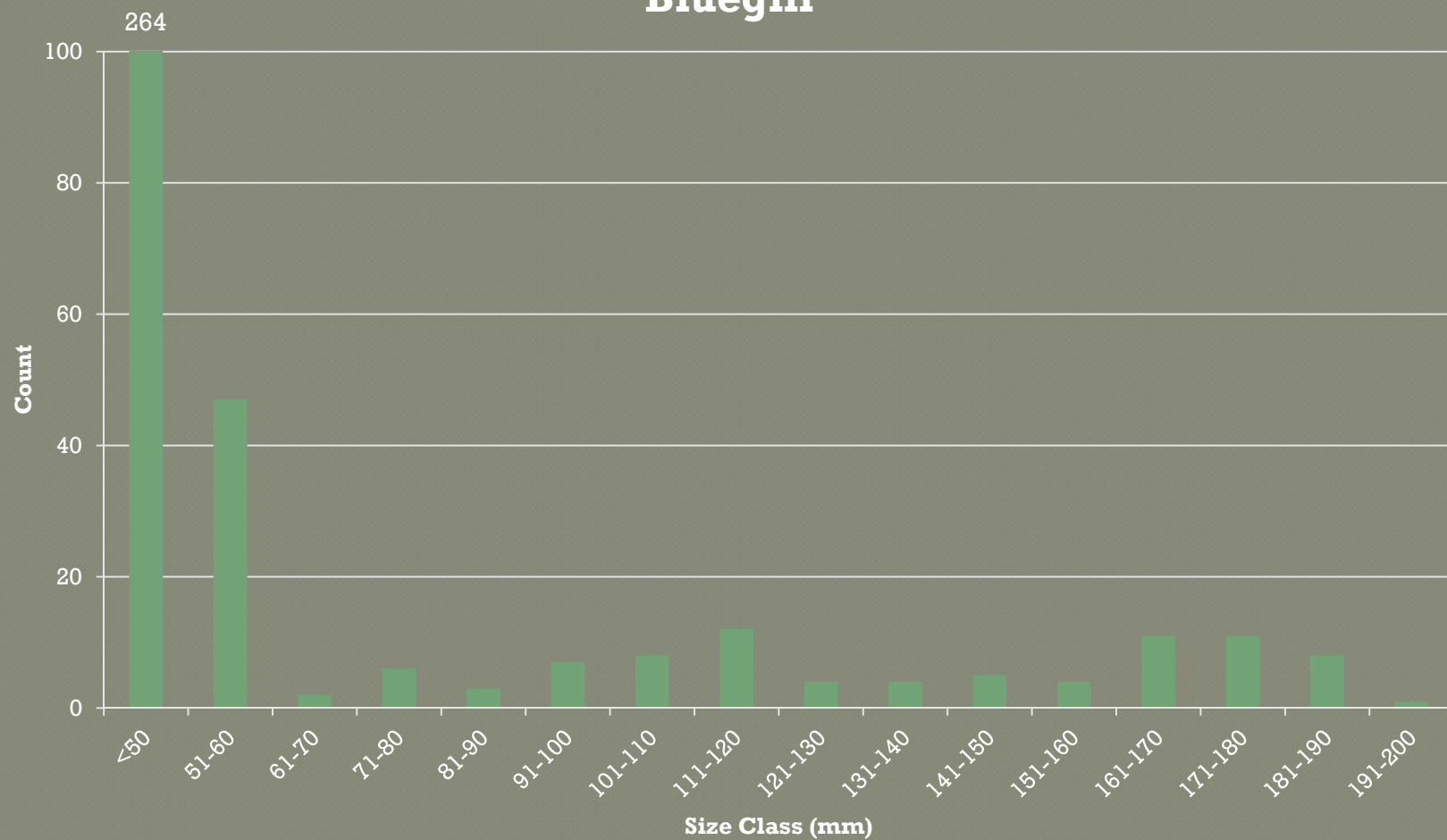
Fish Survey

Largemouth Bass



Fish Survey

Bluegill



Conclusions

- Floating Islands reduce nutrients and add habitat
 - Increasing reductions as plants grow
- Establish plant harvest regime
 - Remove Dodder
- Continue nutrient reduction measurements
- Increase Island footprint to increase removals

Questions

