MINUTES OF A SPECIAL MEETING WORKSHOP OF BIG BEAR MUNICIPAL WATER DISTRICT HELD ON THURSDAY, NOVEMBER 22, 2013

The Open Session workshop began at 10:30 AM. Those in attendance included President Smith, Director Murphy, Director Lewis, Director Suhay, Director Eminger, General Manager Scott Heule, Lake Manager Mike Stephenson, and Board Secretary Vicki Sheppard.
Other staff members and members of the public were present (see attached sign-in sheet)

Aquatic Plant Management Program
Mr. Stephenson made a power point presentation (copy attached) discussing the history of the weed program, our current efforts and current lake conditions, TMDL targets, what could we have done differently in 2013, full harvesting program costs, Lake levels vs. littoral zone, and where do we go from here.

A member of the public (name not disclosed) stated that he sees a decrease of people coming up to Big Bear because they can't fish due to the weeds. He added that he thinks something is happening to the fish asking how we bring people to the lake with poor fishing conditions along with a lack of fish. Mr. Stephenson reported that our records of visitors to the lake are based on boat permit sales and they are not down. Mr. Heule stated that we have an obligation that we must meet in the TMDL as far as aquatic plants in the lake and that obligation is beyond our control. He added that we try and balance everything; weeds, aesthetics, and navigation. Mr. Mason Perry (member of the public) commented that it may appear like there are more weeds along the shore since the water level is down. Mr. Jim Dooley commented that the band of weeds along the shore is bad for paddling and it seems like there are more weeds than last year. Mr. Stephenson responded that the band of weeds along the shore actually used to be larger but due to the lower water level it may appear larger. Director Murphy asked if we decided to buy more harvesting equipment how long would it take to get it. Mr. Stephenson explained that he believes it may be fairly soon after the bid process. President Smith explained that we would need to determine where the money for the equipment would come from. A member of the public (name not disclosed) asked that as a resident, what he could do to help improve the bad fishing in the lake (suggesting more fishing events like the one sponsored by Western Outdoor News). Mr. Heule explained that this is an information only workshop and no decisions can be made at this time. Mr. Paul Beaty, valley resident and former owner of an aquatic management firm, reported that there is a grass carp that can eat milfoil. He asked if we had looked into this as a bio-control option for weed eradication explaining that they have saved multi-millions of dollars in harvesting costs in other lakes in California. He added that this is a unique fish, not a common carp. Mr. Stephenson reported that he is aware of the grass carp adding that Fish & Wildlife has issues for its use on Big Bear Lake. He explained that the weed problem in Big Bear Lake is multi-faceted and a scientific balancing act. Mr. Heule asked where the Board wants to go from here. Director Lewis stated that she would like direction from staff and asked what Mr. Stephenson suggests we do. Director Eminger commented that he understands the importance of the tourist population adding that we will do everything we can to address that. He asked how many fish the District raised this last year. Mr. Stephenson stated 3,000. It was the consensus of the Board to address the following:

- Identify popular fishing areas for harvesting efforts
- Look into purchase of harvesting equipment and associated staffing costs
- Staff recommendations and options

ADJOURNMENT
There being no further business, the workshop was adjourned at 12:06 PM.

Vicki Sheppard
Secretary to the Board
Big Bear Municipal Water District

(SEAL)

Workshop Sign-in Sheet November 22, 2013

NAME/AFFILIATION	ADDRESS	TELEPHONE NO EMAIL ADDRESS
Skip Sutton	P.O. Box 795 B.B.L.	Skipsutton@live.com 909 866-8203
Todd Murphy	P.O. Box 425 Fawnskin	toddkathymurphy@hotmail.com
Maryann Lewis	PO Box 6825 BBL	909-289-0353 maryannlewis1014@yahoo.com
Vince Smith		
John Emerson	P.O. Box 482 BBL	5858644
Judi Bowers	PO Box 1789 BBL	jbowers.grizzly@gmail.com
Catrina Rabago	P.O. Box 6766	
MASON PERRY	PO BOX 1892 BBC	909 725 7741
DAVE HENDERSON	PO Box 1749 BBL	762 233 7310
BOB AMEZQUITA	P.O. Box 6291 BBL	626 318-3235 bobamezquita@hotmail.com
PAUL BEATY	1112 Crater Mtn BBL	760-272-7444 pbeaty7@aol.com
JIM DOOLEY	PO Box 98 Fawn 92333	JDOOLEY@DOOLEY-COMPANY.COM 9098663414

WEEDS

Where are we and where do we want to be?

SUMMARY

- History
- Current efforts
- Current lake condition
- TMDL targets
- What could we have done differently in 2013?
- Full harvesting program costs
- Lake level vs. littoral zone
- Where do we go from here?

HISTORY

- Harvesting began early 60's continued full scale until 2004
- Aquamog efforts 1984-2004
- By 2000 Lake was infested with 1,090 acres milfoil
- 2002 major Fluridone treatment approx. $750,000
- 2003-2004 Lake level dropped to –18.6'
- 2005-2006 minimal treatment efforts accrued

2008 ALGAE BLOOM

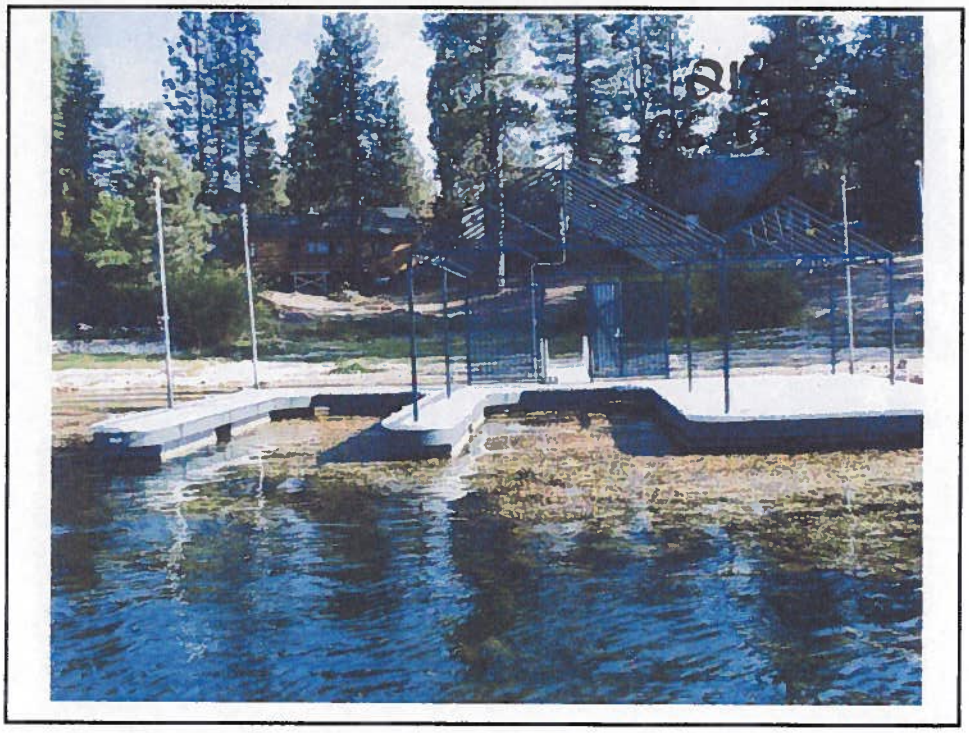
HISTORY cont.

- 2007 some milfoil treatments performed by Aquatechnex

2008	650 acres milfoil
2009	450 acres milfoil
2010	317 acres milfoil
2011	350 acres milfoil
2012	187 acres milfoil
2013	134 acres milfoil

CURRENT EFFORTS

- Treat all milfoil observed with systemic herbicide
- Harvest natives as needed for navigation
- Treat natives with contact herbicide for navigation when appropriate
- Treat all blue-green algae blooms



PESTICIDES USED

(herbicides and algaecides)

- Diquat (contact)
- Endothall (contact-ish)
- Fluridone (systemic)
- Triclopyr (systemic)
- Glyphosate (contact)
- Peroxyhydrate (oxidizer)
- Surfactants/adjuvants (penetrant)

2013 COST OF EFFORTS

HARVESTING	• $22,828.08
GRANULAR TREATMENT	• $87,705.00
LIQUID TREATMENT	• $19,027.78
TOTAL	• $129,560.86

AQUATIC VEGETATION

- Eurasian watermilfoil (non-native highly invasive)
- Coontail (native invasive)
- Curly-leaf pondweed (native can be invasive)
- Common elodea (native)
- Widgeon grass (native)
- Water smartweed (native)
- Sago pondweed (native)
- Chara (macroalgae)

NUTRIENT CALCULATION

WEED HARVESTING/ NUTRIENT REMOVAL 2013

Date	# Loads	% Milfoil	% Coontail	% Elodea	Total Wet Weight Lb's	Total Dry Weight Lb's	Milfoil Phosphorous Pounds	Coontail Phosphorous Pounds	Elodea Phosphorous Pounds	Total Phosphorous Pounds	Milfoil Nitrogen Pounds	Coontail Nitrogen Pounds	Elodea Nitrogen Pounds	Total Nitrogen Pounds	Emp. Unload Min.	Emp. Harvest Min.	Emp. Prep Cost
6/14/2013	2.75	90%	10%	0%	19,525	1,931.02	5.20	0.58	0.00	5.78	44.05	4.89	0.00	48.95	82.5	387.5	$67.65
6/17/2013	0.75	80%	20%	0%	5,325	526.64	1.26	0.32	0.00	1.58	10.68	2.67	0.00	13.35	22.5	457.5	$18.45
6/18/2013	1	90%	10%	0%	7,100	702.19	1.89	0.21	0.00	2.10	16.02	1.78	0.00	17.80	30	450	$24.60
6/19/2013	5.5	20%	78%	0%	39,050	3,862.05	2.31	8.87	0.00	11.56	19.56	73.42	0.00	97.89	165	315	$135.30
6/20/2013	7.25	40%	60%	0%	51,475	5,090.88	6.09	9.14	0.00	15.24	51.62	77.42	0.00	129.04	217.5	262.5	$179.36
6/21/2013	1	100%	0%	0%	7,100	702.19	2.10	0.00	0.00	2.10	17.80	0.00	0.00	17.80	30	450	$24.60
6/25/2013	1.5	100%	0%	0%	10,650	1,053.29	3.15	0.00	0.00	3.15	26.70	0.00	0.00	26.70	45	435	$36.90
6/26/2013	1.5	95%	5%	0%	10,650	1,053.29	2.99	0.16	0.00	3.15	25.36	1.35	0.00	26.70	45	435	$36.90
6/27/2013	2	95%	5%	0%	14,200	1,404.38	3.99	0.21	0.00	4.20	33.82	1.78	0.00	35.60	60	420	$49.20

NUTRIENT

# Loads	% Milfoil	% Coontail	% Elodea	Total Wet Weight Lb's	Total Dry Weight Lb's	Milfoil Phosphorous Pounds	Coontail Phosphorous Pounds	Elodea Phosphorous Pounds	Total Phosphorous Pounds	Milfoil Nitrogen Pounds	Coontail Nitrogen Pounds	Elodea Nitrogen Pounds	Total Nitrogen Pounds	Emp. Unload Min.	Emp Harvest Min.	Emp. Prep Cost	Employee Harvesting Cost
158.6				1,105,825	109,368.09				327.31				2,772.12	4,673	23,168	$3,831.45	$16,997.35
# Loads				Wet Weight	Dry Weight				Phosphorous				Nitrogen	TOTAL MIN.		Employee Cost	
														27,840		TOTAL	$22,828.80

Fuel Cost Per Day				No. of Days	TOTAL FUEL COST
$40.00				57	2280.00

TREATMENT SUMMARY

WEED TREATMENT 2013

Date	Zone	Dock %	Lake %	Prep Time in Min.	Total App. Min.	Dock Min.	Lake Min.	Employee Cost: Dock	Employee Cost: Lake	Employee Cost: Prep	Total lbs.	# lbs. Dock	# lbs. Lake	Cost of Treatment: Dock	Cost of Treatment: Lake
5/29	28,29	25%	75%	30	60	15	45	$12.30	$36.90	$24.60	1400	350	1050	$1,221.50	$3,664.50
5/29	29	100%	0%	30	30	30	0	$24.60	$0.00	$24.60	260	260	0	$907.40	$0.00
5/29	2	5%	95%	30	30	1.5	28.5	$1.23	$23.37	$24.60	540	27	513	$94.23	$1,790.37
5/29	20	100%	0%	30	60	60	0	$49.20	$0.00	$24.60	750	750	0	$2,617.50	$0.00
5/29	20	10%	90%	30	15	1.5	13.5	$1.23	$11.07	$24.60	270	27	243	$94.23	$848.07
5/29	20	20%	80%	30	15	3	12	$2.46	$9.84	$24.60	160	32	128	$111.68	$446.72
5/29	18	40%	60%	30	45	18	27	$14.76	$22.14	$24.60	1000	400	600	$1,396.00	$2,094.00
5/29	19	90%	10%	30	30	27	3	$22.14	$2.46	$24.60	700	630	70	$2,198.70	$244.30
5/30	55	35%	65%	30	30	10.5	19.5	$8.61	$15.99	$24.60	550	192.5	357.5	$671.83	$1,247.68
5/30	47	15%	85%	30	30	4.5	25.5	$3.69	$20.91	$24.60	1100	165	935	$575.85	$3,263.15
5/30	50	50%	50%	30	60	30	30	$24.60	$24.60	$24.60	1400	700	700	$2,443.00	$2,443.00

ON TARGET FLAKE (OTF)

WEED TREATMENT 2013

Date	Zone	Dock %	Lake %	Prep Time in Min.	Total App. Min.	Dock Min.	Lake Min.	Employee Cost: Dock	Employee Cost: Lake	Employee Cost: Prep	Total lbs.	# lbs. Dock	# lbs. Lake	Cost of Treatment: Dock	Cost of Treatment: Lake
		48.46%	51.54%	1170	1,740	674	1,066	$553	$874	$959	24,385	8,019	16,347	$27,984.57	$57,049.29
		Dock %	Lake %	TOTAL MIN.		Dock Time	Lake Time	Employee Cost			lbs	# lbs. Dock	# lbs. Lake	Treatment Cost	
				2910				TOTAL $2,386.20						TOTAL $85,033.85	

Fuel Cost Per Day	Days	TOTAL
$40.00	7	$280.00

GRAND TOTAL $87,700.05

LIQUID TREATMENT

WEED TREATMENT 2013

Date	Zone/ H	Dock %	Lake %	Prep Time in Min.	Total App. Min.	Dock Min.	Lake Min.	Employee Cost: Dock	Employee Cost: Lake	Employee Cost: Prep	Total gals	Gals Dock	Gals Lake	Cost of Treatment: Dock	Cost of Treatment: Lake
		75.14%	24.86%	1050	2,970	1,598	1,372	$1,310	$1,125	$861	155	47	108	$4,670.79	$10,740.58
		Dock %	Lake %	TOTAL MIN.		Dock Time	Lake Time	Employee Cost			lbs	# lbs. Dock	# lbs. Lake	Treatment Cost	
				4020				TOTAL $3,296.40						TOTAL $15,411.38	

Fuel Cost Per Day	Days	TOTAL
$40.00	8	$320.00

GRAND TOTAL $19,027.78

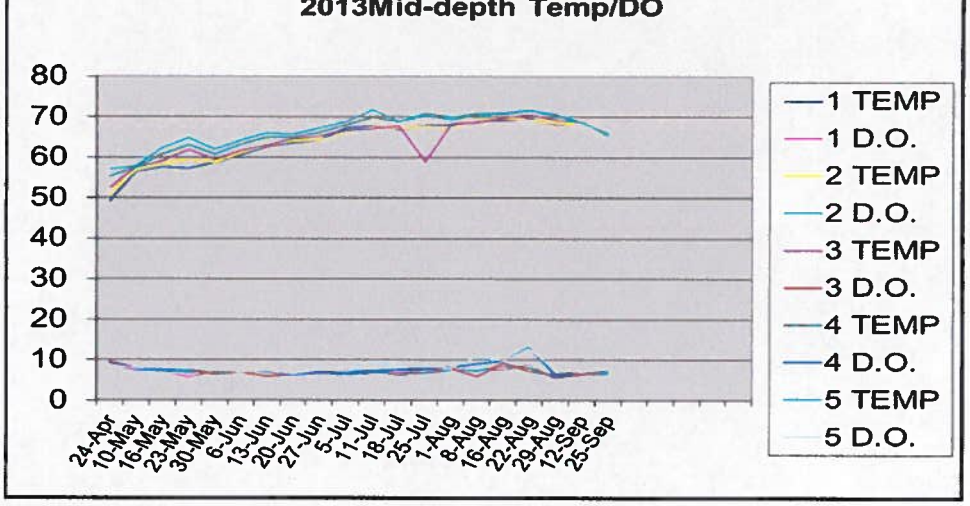
2013 AQUATIC PLANT COST

Granular total	$87,700.05
Liquid total	$19,070.28
Harvesting/dep	$34,828.00
Totals	$141,598.33

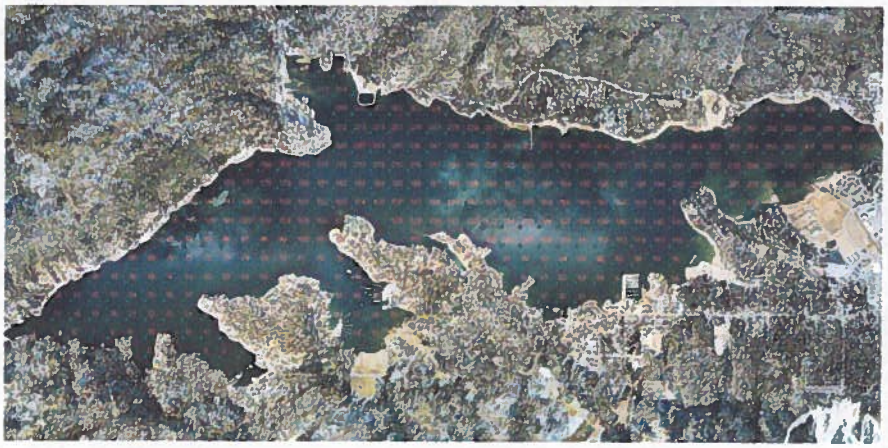
CURRENT LAKE CONDITIONS

- 134 acres Milfoil
- Approximately 300 acres coontail
- Approximately 100 acres macro algae
- Fair variety other natives
- Very high D.O.
- No planktonic algal blooms
- Very good water clarity

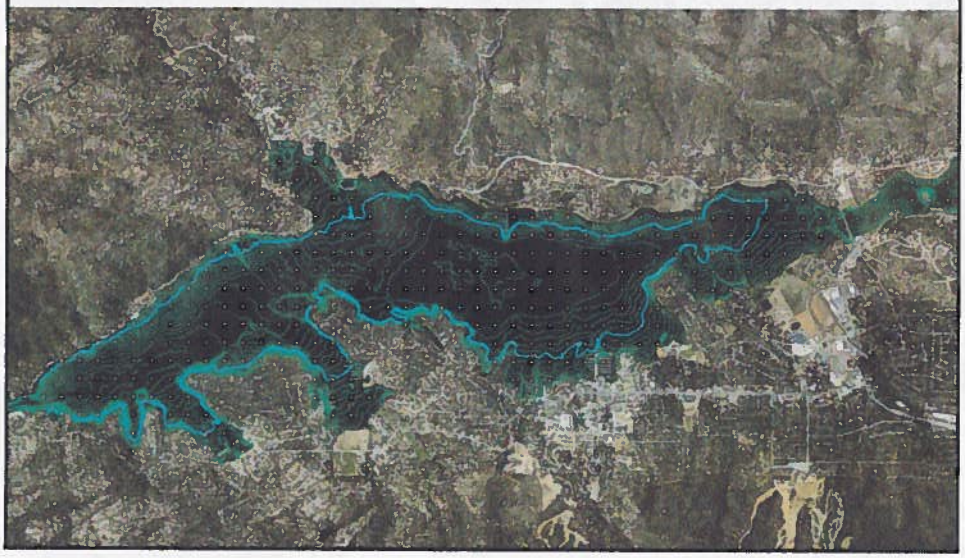
D.O. graph



SURVEY POINTS



2013 LITTORAL ZONE



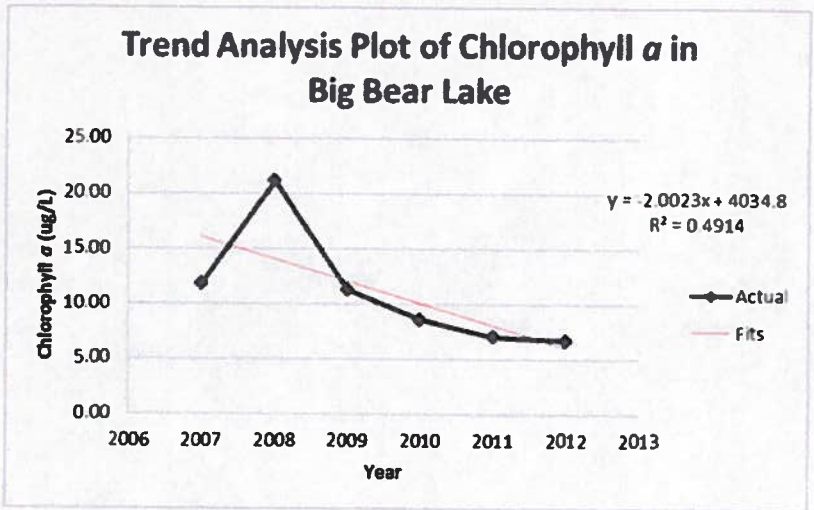
2011 MILFOIL MAP

2012 MILFOIL MAP

TMDL TARGETS

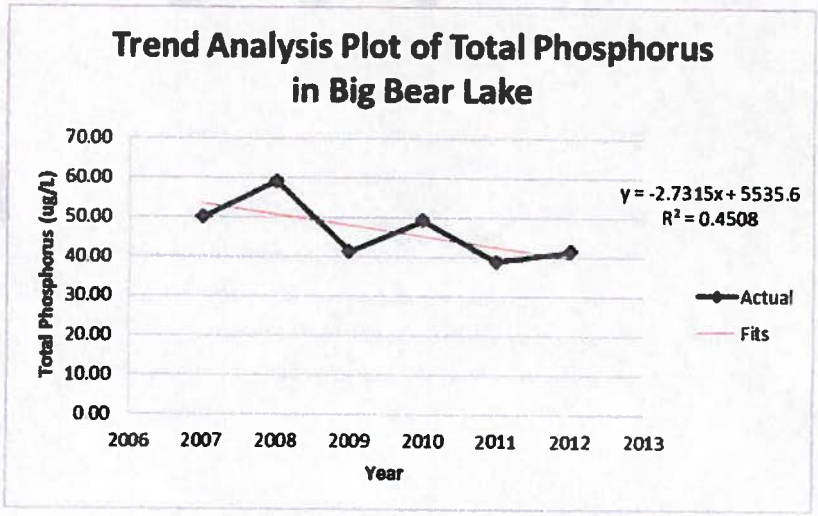
- Chlorophyll a 14 ug/L
- Phosphorous 35 ug/L average during growing season
- Milfoil reduction 95% on total lake area basis
- 30-40% aquatic plant coverage on total lake area basis

5 YEARS CHLOROPHYLL TRENDS



2008 ALGAE BLOOM

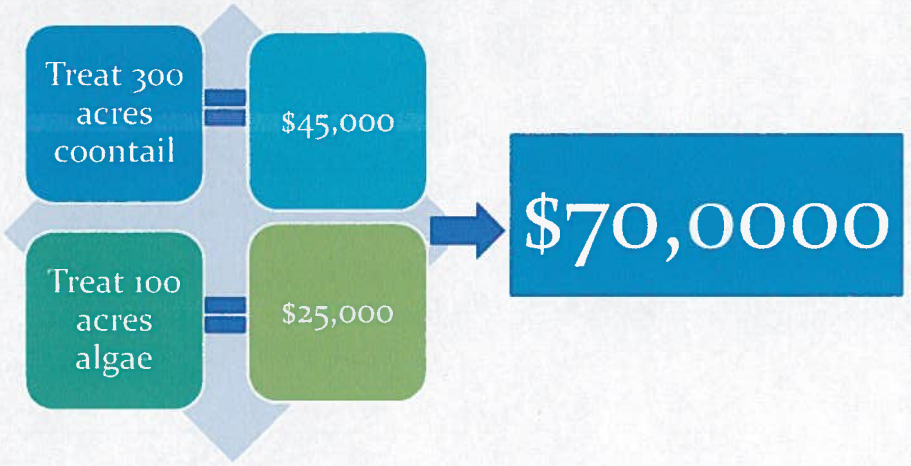
5 YEARS PHOSPHORUS TRENDS



AESTHETICS?

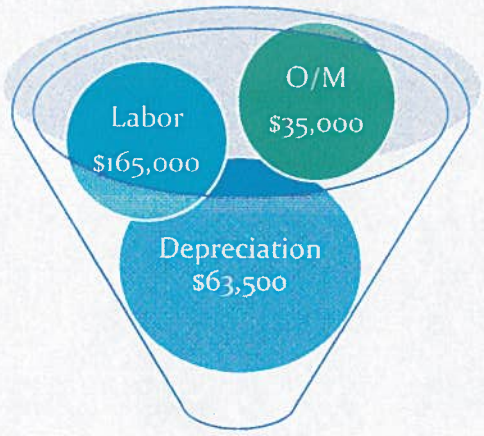
- Harvest milfoil (bad idea)
- Treat all visible native plants
- Treat all macroalgae
- Ignore pay cuts

COST FOR AESTHETIC TREATMENT



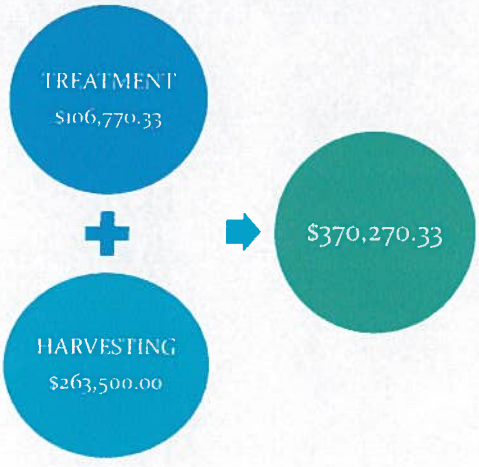
INITIAL PURCHASES FOR FULL SCALE HARVESTING

ANNUAL COST OF FULL SCALE HARVESTING



$263,500

TOTAL ANNUAL COST OF FULL SCALE EFFORTS PROPOSED



So what do you want the Lake to look like

??????????