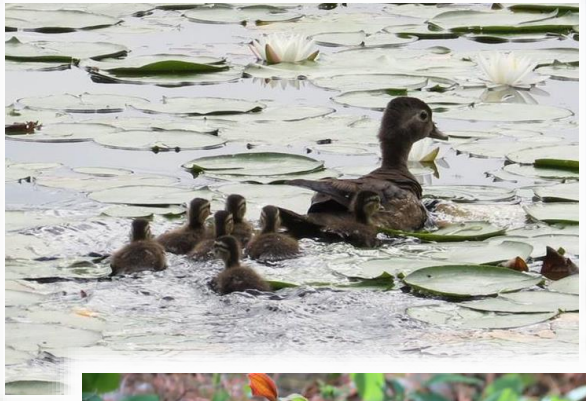

FAWN LAKE
Bedford’s largest and most aesthetic body of water.

FAWN LAKE'S VALUE TO BEDFORD

- MAJOR CONSERVATION ASSET
- UNIQUE AND DIVERSE ECOSYSTEM
- MULTI-GENERATIONAL AND MULTI-SEASONAL RECREATION USE
- HISTORICAL AUTHENTICITY
- EDUCATIONAL OPPORTUNITIES

CONSERVATION

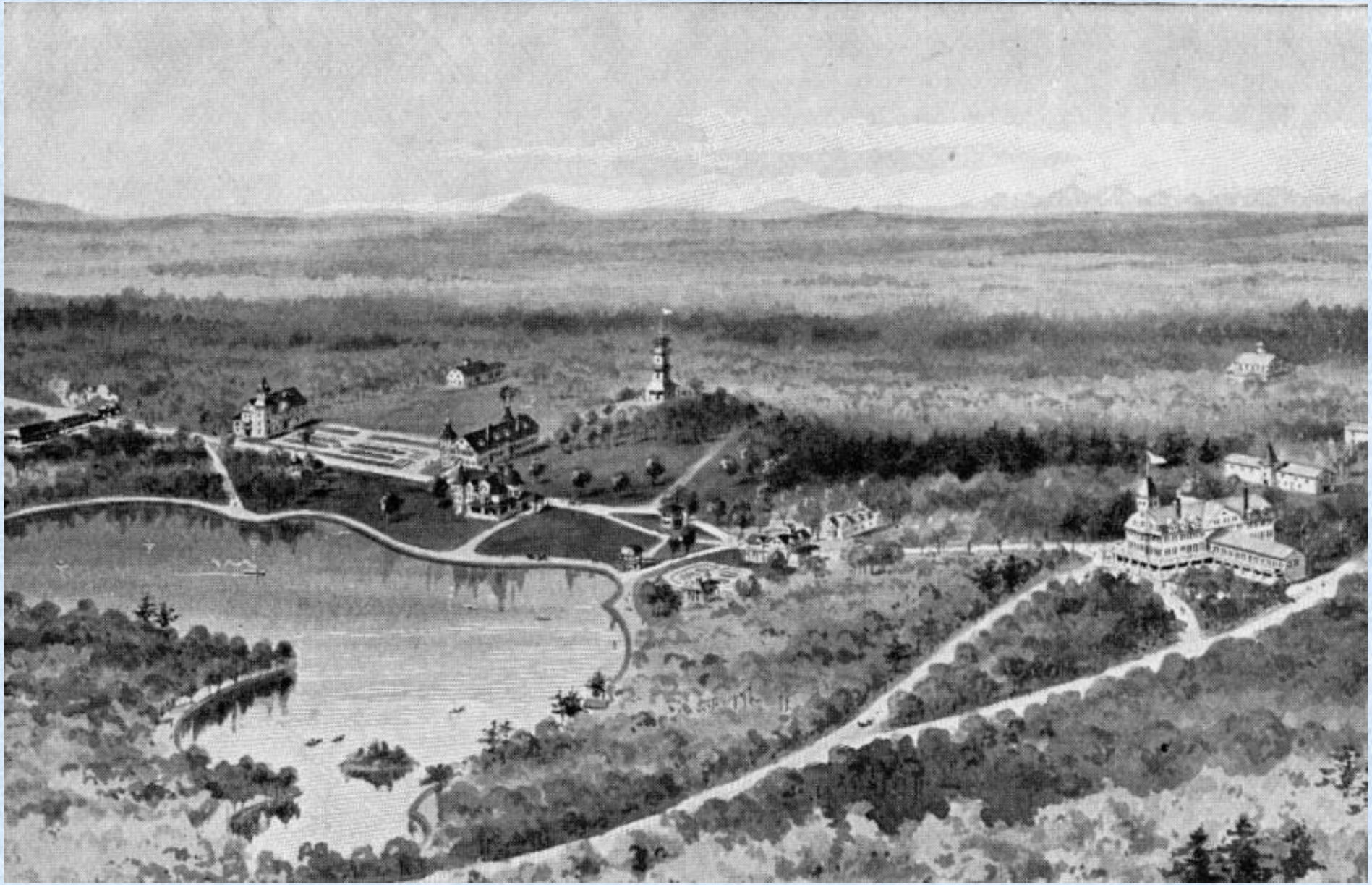


RECREATION

ANIMAL DIVERSITY

PLANT DIVERSITY

HISTORY



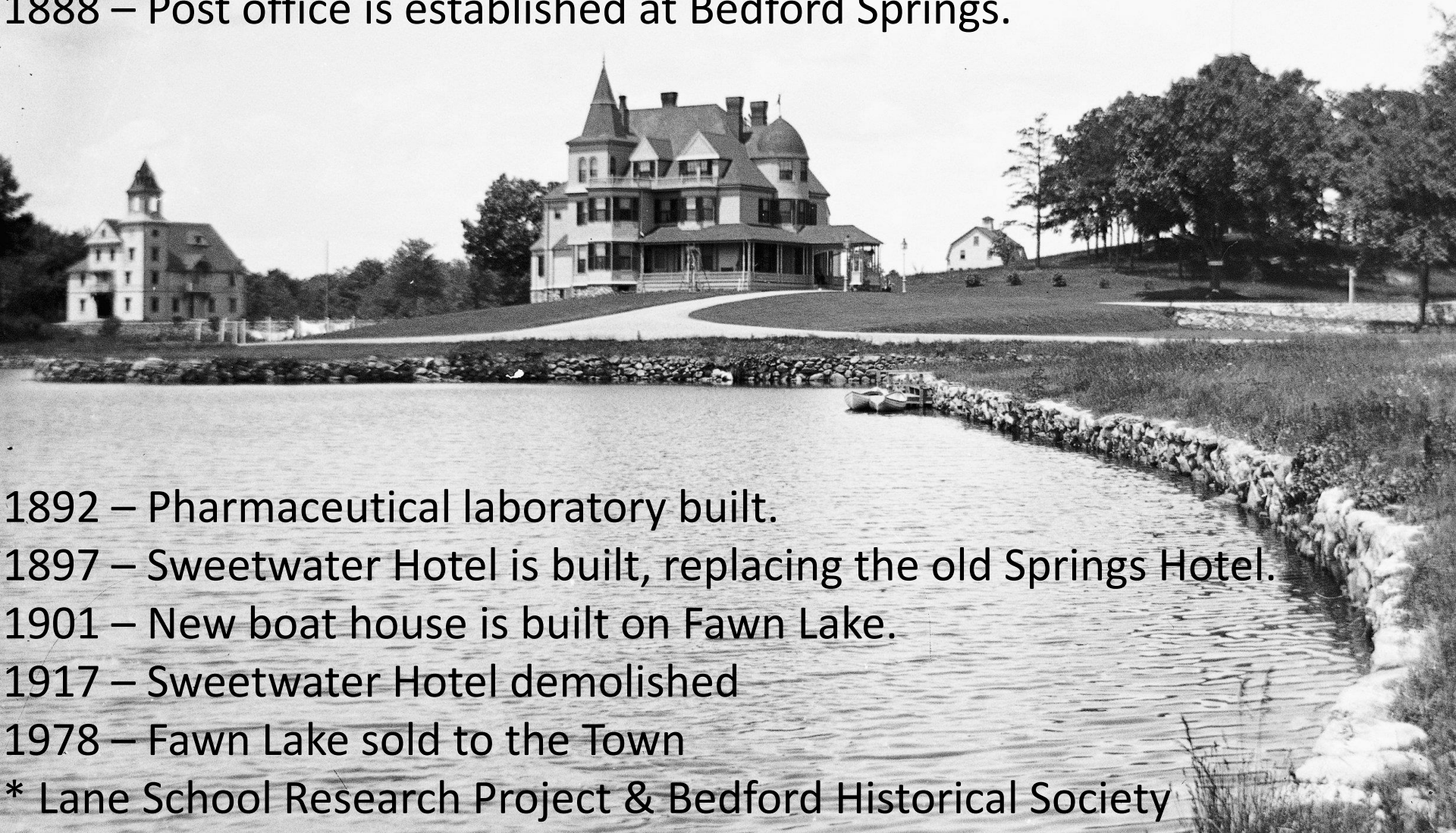
BRIEF HISTORY OF BEDFORD SPRINGS*

1843 – Springs Hotel built.

1866 – New York Pharmaceutical purchases the Bedford Springs property.

1877 – The narrow-gauge railroad between Bedford and Billerica opens.

1888 – Post office is established at Bedford Springs.



1892 – Pharmaceutical laboratory built.

1897 – Sweetwater Hotel is built, replacing the old Springs Hotel.

1901 – New boat house is built on Fawn Lake.

1917 – Sweetwater Hotel demolished

1978 – Fawn Lake sold to the Town

* Lane School Research Project & Bedford Historical Society

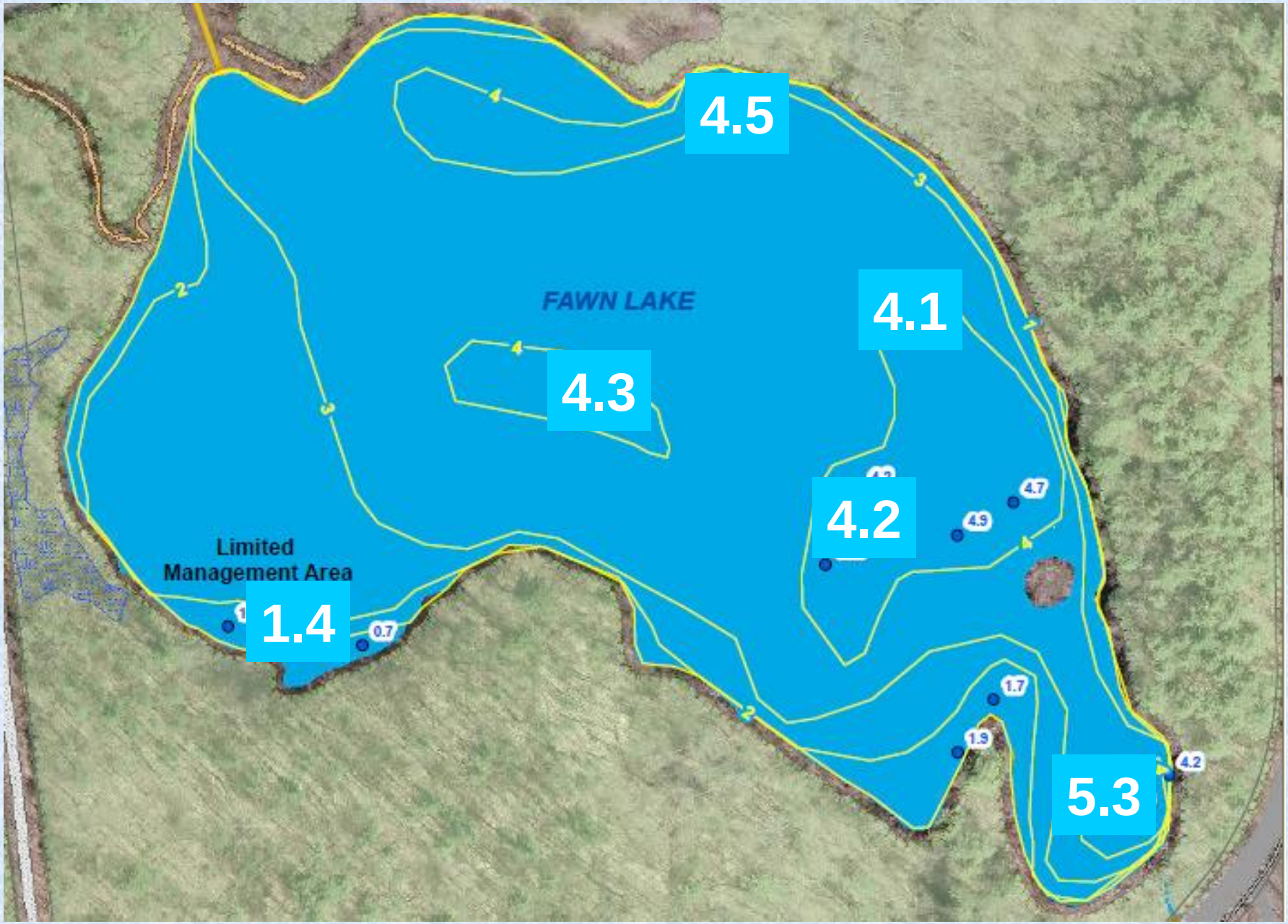
WHAT IS THE ISSUE?

SOFT SEDIMENT ACCUMULATION

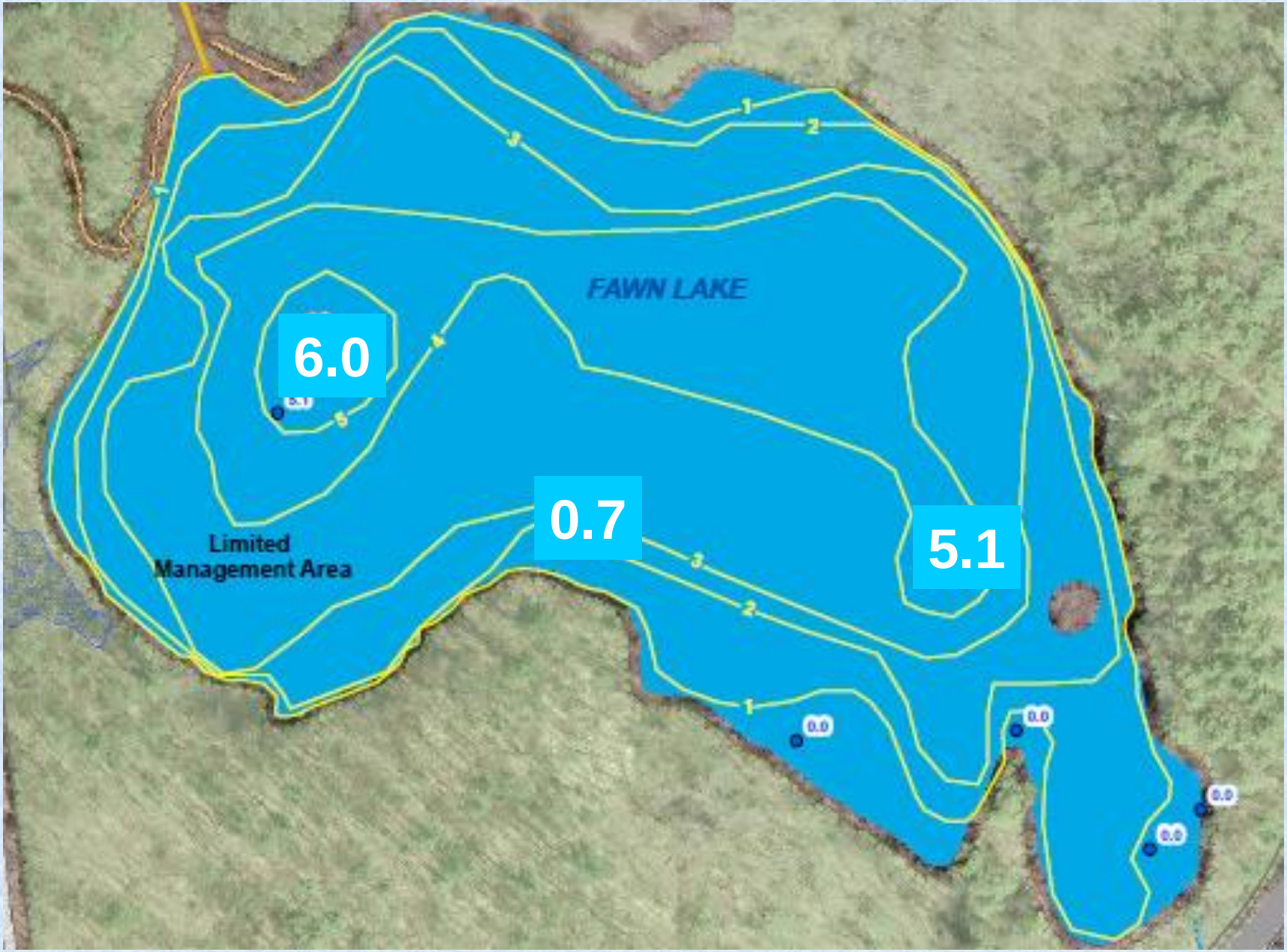
- REDUCES LAKE DEPTH
- CAUSES FISH KILLS
- INCREASES AMOUNT OF FLOATING AND SUBMERGED VEGETATION
- IMPEDES RECREATIONAL USE

EXISTING CONDITIONS - SUMMER

BATHYMETRY (depth, ft.)



SOFT SEDIMENT DEPTH (ft.)

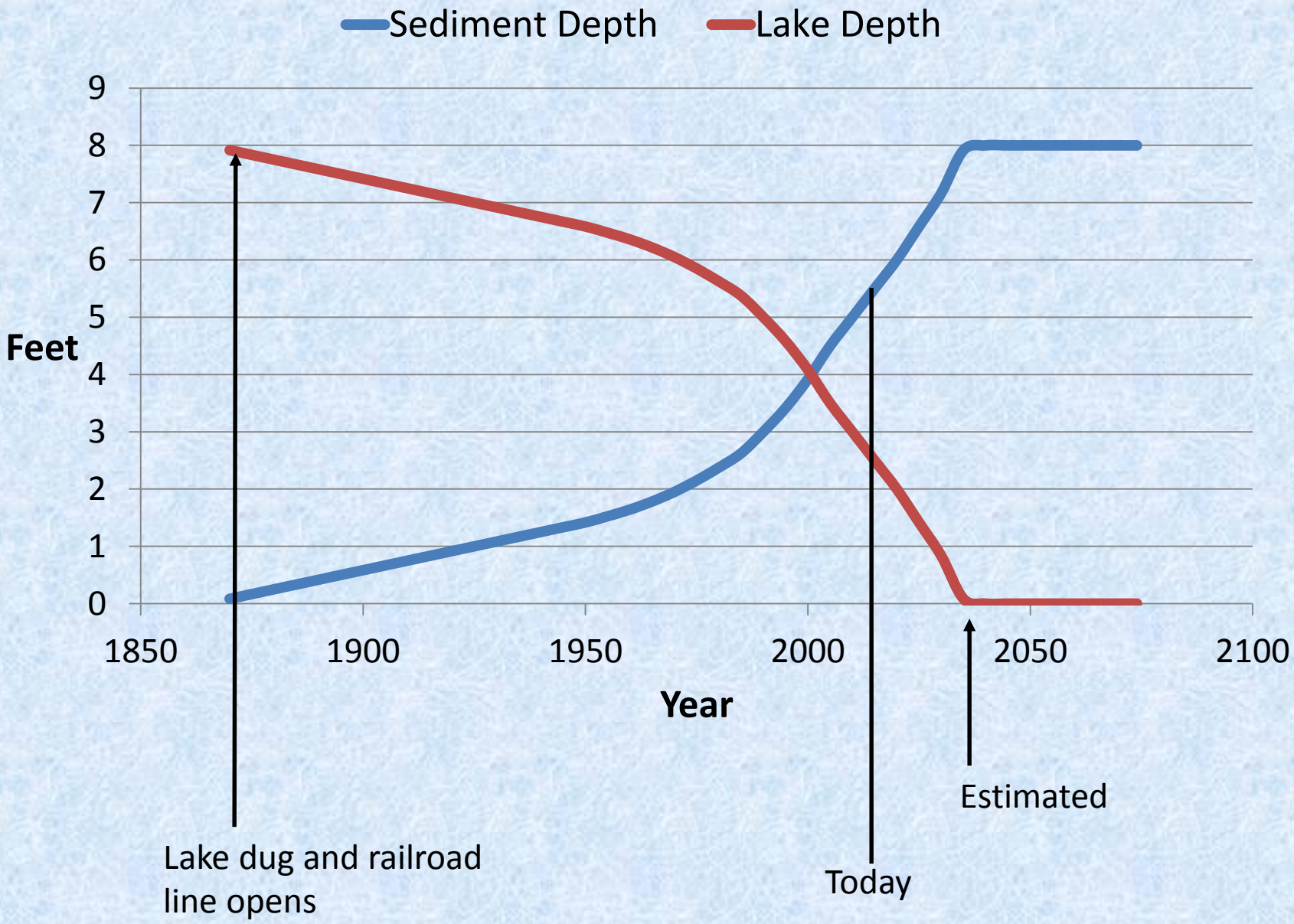


WHAT HAPPENDS IF THE TOWN DOES NOTHING?

SEDIMENT DEPTH INCREASES TO THE POINT WHERE THERE IS LITTLE OR NO OPEN WATER REMAINING

- LOSS OF ENVIRONMENTAL HABITATS
- LOSS OF MOST RECREATIONAL USES, VISUAL BEAUTY, AND OPEN WATER ECOSYSTEM
- EVENTUALLY BECOMES SWAMP
- HARBORS ODOR AND MOSQUITOS

ACCELERATING LOSS OF LAKE DEPTH



EUTROPHICATION

FAWN LAKE “AS IS”

FAWN LAKE RESTORED

RESTORATION METHODS

- MECHANICAL DRY DREDGING
- MECHANICAL WET DREDGING
- HYDRO-RAKING
- HYDRAULIC DREDGING
- HERBICIDES
- WATER LEVEL DRAWDOWN
- VEGETATION BARRIERS
- AERATION/CIRCULATION

As identified by Comprehensive Environmental Inc., and summarized in their report "Pond Management Strategies Matrix" prepared in March 2015.

EVALUATION CRITERIA

- Longevity of Treatment
- Environmental Impacts
- Effectiveness removing/reducing unwanted vegetation
- Recreational Use and Enjoyment
- Future Operations and Maintenance Requirements
- Overall Project Cost
- Neighborhood Impacts
- Logistics (dewatering, staging, sediment disposal)
- Time to Permit

EVALUATION OF METHODS

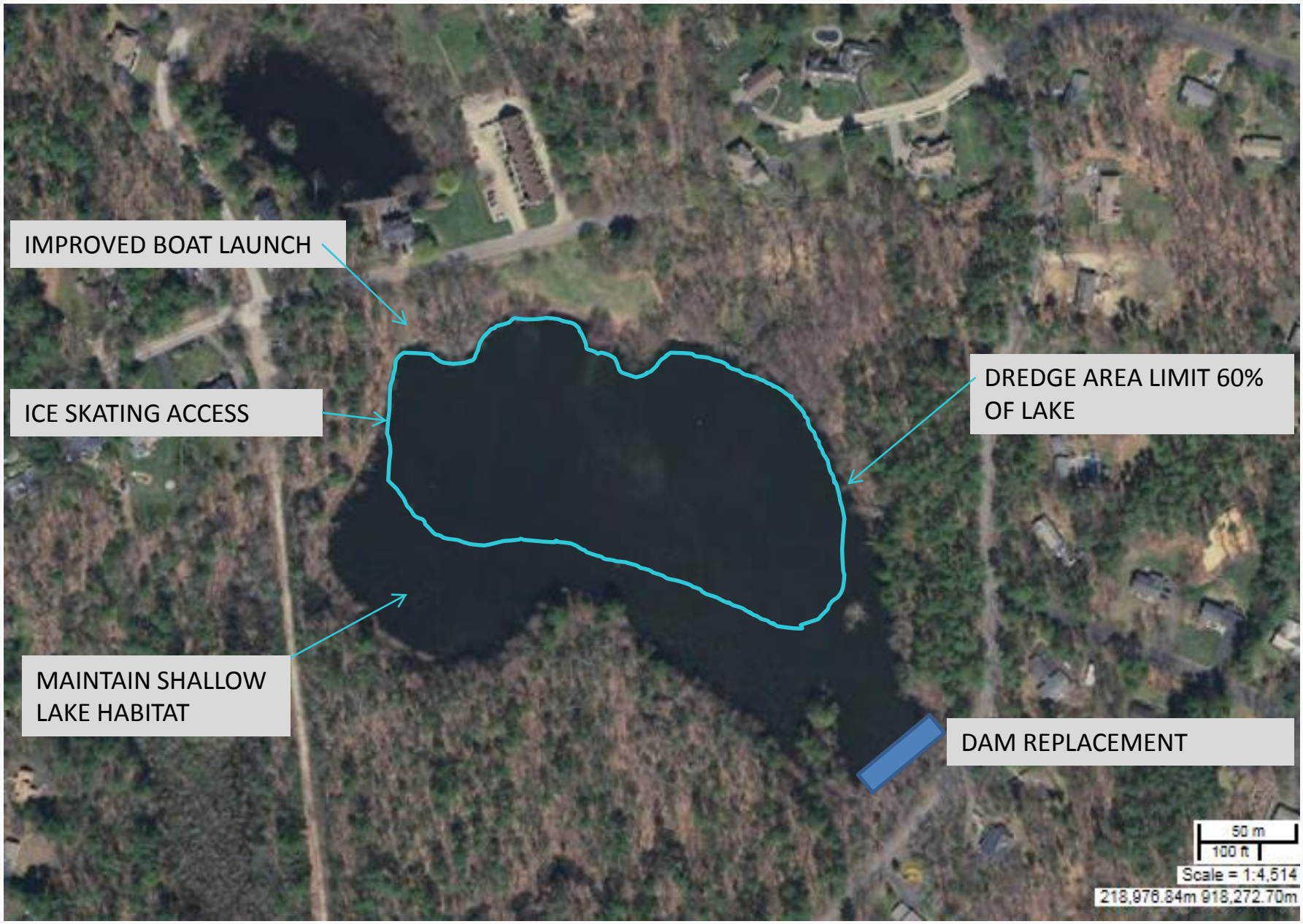
- The evaluation criteria were prioritized by the Committee by performing a Pair-Wise Analysis to arrive at a priority ranking. Highest priority = Longevity of Treatment

- The criteria were evaluated against each improvement method as identified by Comprehensive Environmental Inc., and summarized in their “Pond Management Strategies Matrix” prepared in March 2015.

RECOMMENDED RESTORATION PLAN

- DREDGE 60% OF THE LAKE TO THE ORIGINAL 8 FOOT DEPTH
- PRESERVE 40% OF LAKE FOR ECOLOGICAL DIVERISTY
- IMPLEMENT RESTORATION WITHOUT DRAINING THE LAKE
- INCORPORATE DAM REPLACEMENT INTO PERMITTING

RESTORATION PLAN DESIGN



WHY DREDGE?

- EFFECTIVELY REMOVES ACCUMULATED SEDIMENT AND UNWANTED VEGETATION
- RETURNS THE LAKE TO ITS ORIGINAL STATE OF 150 YEARS AGO AND RESETS THE "EUTROPHICATION CLOCK"
- RESTORES / SUPPORTS RECREATIONAL USES
- PRESERVES HISTORICAL LANDSCAPE AND NATURAL BEAUTY

DREDGING OPTIONS

HYDRO-RAKING

MECHANICAL WET DREDGING

MECHANICAL DRY DREDGING

HYDRAULIC DREDGING

WHY HYDRAULIC DREDGING?

- LIMITS ENVIRONMENTAL IMPACT, MINIMIZING HARM TO FISH AND OTHER WILDLIFE
- ALLOWS MORE INCREMENTAL STAGING IF REQUIRED TO LOWER PROJECT COST VS MECHANICAL WET DREDGING

WHY DREDGE 60% ?

- BALANCES COST AND BENEFITS
- PRESERVES A PORTION OF THE EXISTING ECOSYSTEM
- PROVIDES PARTIAL HISTORICAL RESTORATION
- RETAINS ALL RECREATIONAL ACCESS

WHY 8 FEET?

- RESTORES LAKE TO ORIGINAL 1800'S DEPTH
- PROVIDES LONG TERM SOLUTION
- INCREMENTAL COST OF GOING DEEPER IS NOT JUSTIFIED

FAWN LAKE RESTORATION COST ANALYSIS

Method	Average Cost	Permitting	Total	20 Year Cost	50 Year Cost
Dredging					
Mechanical Dry Dredging	$ 912,000	$ 100,000	$ 1,012,000	$ 1,012,000	$ 1,012,000
Mechanical Wet Dredging	$ 960,000	$ 100,000	$ 1,060,000	$ 1,060,000	$ 1,060,000
Hydraulic Dredging	$ 888,000	$ 100,000	$ 988,000	$ 988,000	$ 988,000
Chemical Treatments					
Diquat (Reward)	$ 6,500	$ 5,000	$ 11,500	$ 115,000	$ 287,500
Glyphosate (Rodeo)	$ 8,625	$ 5,000	$ 13,625	$ 136,250	$ 340,625
Fluridone (Sonar)	$ 14,625	$ 5,000	$ 19,625	$ 196,250	$ 490,625
Hydroraking	$ 140,000	$ 7,500	$ 147,500	$ 737,500	$ 1,843,750
Combination of Hydroraking and Diquat				$ 873,750	$ 2,184,375
Weed/Mechnical harvesting	$ 10,638	$ 7,500	$ 18,138	$ 362,750	$ 531,875
Aeration/Artificial Circulation – Set Up	$ 18,400	$ 50,000	$ 68,400		
Maintenance	$ 4,888		$ 4,888	$ 166,150	$ 312,775

FAWN LAKE COMMITTEE RECOMMENDATION

- RESTORE OPEN WATER
- RETURN TO ORIGINAL LAKE DEPTH IN THE NORTHERN AREA
- IMPROVE RECREATIONAL ACCESS
- PRESERVE ECOLOGIC DIVERSITY
- RESPECT HISTORICAL AUTHENTICITY
- PROVIDE COST EFFECTIVE LONG-TERM SOLUTION


QUESTIONS
& DISCUSSION

REJECTED OPTIONS

- HERBICIDES – environmental impacts, unknown health effects, changing science
- WATER LEVEL DRAWDOWN – destroys all existing aquatic habitats
- VEGETATION BARRIERS – not durable, require seasonal maintenance
- AERATION/CIRCULATION – not effective as stand alone, possible add-on
- HYDRORAKING – expensive and not effective
- DAM REMOVAL – inconsistent with preservation goals

PAIR WISE RANKING

RANK	SCORE		Environmental Impacts (positive or negative)	Effectiveness removing/reducing unwanted vegetation	Logistics (including de-watering, staging, sediment disposal)	Recreational Use and Enjoyment	Neighborhood Impacts	Future Operations and Maintenace Requirements	Time to permit and complete project	Longevity of Treatment	Overall Project Cost
2	6	Environmental Impacts (positive or negative)				50-50				50-50	
2	6	Effectiveness removing/reducing unwanted vegetation									
6	1	Logistics (including de-watering, staging, sediment disposal)									
3	5.5	Recreational Use and Enjoyment									
5	2	Neighborhood Impacts									
4	4	Future Operations and Maintenace Requirements									
7	0	Time to Permit and Complete Project									
1	7.5	Longevity of Treatment									
4	4	Overall Project Cost									