Lake Auburn Watershed Protection Commission

www.lakeauburnwater.org

Wednesday, September 14, 2022 at 3:30pm – 5:30pm AVCOG, 125 Manley Road, Auburn, Maine

AGENDA

1. Appointment of Tracy Roy as Treasurer

2. Minutes
    a. 06/08/2022 – Regular Meeting

3. Consent Agenda
    a. Financial Reports
    b. Water Quality & Watershed Report
    c. Education and Outreach Report

4. Public Comment

5. Staff Report
    a. Mike Broadbent – As deemed necessary by Mr. Broadbent
    b. Erica Kidd – As deemed necessary by Mrs. Kidd

6. Old Business
    a. Peer review update on Gracelawn property – Erica Kidd
    b. Lake Study recommendations- Erica Kidd

7. New Business
    a. CEI proposal to review FB Environmental studies – Erica Kidd
    b. Draft Resolution for consideration by LAWPC- Mary Ann Brenchick

8. Adjournment

FUTURE REGULAR MEETING SCHEDULE:

November 9, 2022

December 7, 2022 (if needed)

Minutes 6-8-22

Lake Auburn Watershed Protection Commission

Regular Meeting Minutes

Wednesday, June 8, 2022

Location: Androscoggin Valley Council of Governments (AVCOG), Auburn, Maine

Time: Meeting began at 3:30 PM

Recording: The meeting was recorded.

Commissioners Present: Mary Ann Brenchick, Amy Landry, Dan Bilodeau, Rick LaChapelle, Glen Holmes and Camille Parrish

Commissioners Absent: Dan Dube, Evan Cyr, Alan Holbrook

Others Present: Michael Broadbent Commission Secretary, Erica Kidd Watershed Manager, Carolyn Houtz Education and Outreach Coordinator

In the absence of the Commission Chair, Vice Chair LaChapelle ran the meeting.

Agenda Item 1: Recognition of service, Steve French

The Lake Auburn Watershed Protection Commission presented Steve French with a plaque and recognized him for his years of service to the Commission.

Agenda Item 2: Minutes

Vote 1 On a motion by Commissioner Holmes and seconded by Commissioner Parrish to receive the minutes as presented for the following meetings April 13, May 2 and May 24.

Passed 6-0

Agenda Item 3: Consent Agenda

Vote 2 On a motion by Commissioner Holmes and seconded by Commissioner Bilodeau to receive the consent agenda items as presented.

Passed 6-0

Agenda Item 4: Public Comment

Agenda Item 5: Staff Report

Mike Broadbent reported that the Commission did receive a stake holder request for comment on the By-Laws for the Protection of Lake Auburn from the Auburn Water District Trustees. This will come up in tonight's agenda for the Commissioners to compile their comments.

Agenda Item 6: Old Business

a. **Adoption of Robert's Rules of Order**

Vote 3 On a motion by Commissioner Brenchick and seconded by Commissioner Bilodeau to follow Robert's Rules of Order.

During the discussion the Commissioners discussed that they had already selected which portions of Robert's Rules that they would like to adopt.

Vote 4 On a motion by Commissioner Holmes and seconded by Commissioner Parrish to table this discussion until the next Commission meeting.

Passed 6-0

b. **Discussion of LAWPC By-Laws**

Commissioner LaChapelle recommended that three members of the Commission be chosen by the Chair and Vice Chair to work with Jim Pross to develop a set of By-Laws to be reviewed at the Commission's September meeting.

Vote 5 On a motion by Commissioner Parrish and seconded by Commissioner Holmes to form a sub-committee to be appointed by the Chair and Vice Chair to develop a draft set of By-Laws.

Passed 6-0

c. **Peer review update on the Gracelawn property**

Commissioner Parrish reported that there is no update at this time from CDM. They are expected to complete the report by June 17, 2022. The draft report will be sent to all Commissioners once it is complete.

Agenda Item 7: New Business

a. **Trail Project on LAWPC property.**

Erica provided the Commissioners with information on a trail that is being developed with the help of Will Libby, the City of Auburn and Carolyn Houtz to be located on the Tot Lot. Erica was informed that there is a $50,000 Grant that could help fund the creation of the trail. This Grant is made available through the Recreational Trails Program which is a State Grant that receives federal funds. Erica is seeking approval to apply for the Grant from the Commissioners.

Vote 6 On a motion by Commissioner Holmes and seconded by Commissioner Landry to apply for the Grant.

In discussion Dan asked that the Commissioners consider giving permanent recreational trail easements for all of LAWPC trails including this one on the Tot Lot.

Passed 6-0

b. Request by the Auburn Water District for LAWPC comment on proposed changes to the By-Laws for Protection of Lake Auburn.

The Commissioners took the time to read through the draft changes to the By-Laws during the meeting. They then went through page by page and came to a consensus on their comments about the draft changes to the By-Laws.

Commissioner Landry had to leave before the vote but shared her comments with the Commissioners before leaving.

Vote 7 On a motion by Commissioner Holmes and seconded by Commissioner Brenchick to have the Commission Secretary send the Auburn Water District the Commissioners' comments as discussed during the meeting.

Passed 4-0-1 Commissioner Bilodeau abstained from the vote.

c. Commissioner Items of Interest

Due to time constraints this discussion was skipped.

d. Executive Session pursuant to Maine 1 M.R.S.A. §405 6(c) regarding the possible acquisition of a specific parcel within the watershed.

Vote 8 On a motion by Commissioner Holmes and seconded by Commissioner Parrish to go into executive session pursuant to Maine 1 M.R.S.A. §405 6(c) regarding the possible acquisition of a specific parcel within the watershed.

Passed 5-0

Executive session ended at 5:50pm

Vote 9 On a motion by Commissioner Holmes and seconded by Commissioner LaChapelle to authorize the Watershed Manager to act on the discussions had during Executive Session.

Passed 5-0

Vote 9 On motion by Commissioner Holmes and seconded by Commissioner Parrish to adjourn the meeting.

Passed 5-0

A true record, attest;

Michael Broadbent
LAWPC Secretary

Financial Report

Lake Auburn Watershed Commission
Statement of Revenues & Expenditures
As of 9/6/22

	Original Operating Budget	Final Operating Budget	Operating Account	Balance	Sinking Fund	YTD Combined	12/31/21 Combined
Revenues:							
Contributions - AWD	58,250.00	58,250.00	38,833.36	19,416.64	13,333.36	52,166.72	75,000.00
Contributions - LWD	58,250.00	58,250.00	58,250.00	-	20,000.00	78,250.00	75,000.00
Timber Harvesting	14,000.00	14,000.00	28,562.96	(14,562.96)		28,562.96	93,763.92
Gain on Sale of Assets				-		-	25,830.46
Water Withdrawal Revenue			386.70	(386.70)		386.70	4,421.45
Intergovernmental	2,000.00	2,000.00	2,250.00	(250.00)		2,250.00	2,200.00
Interest	35.00	35.00	21.00	14.00	445.32	466.32	1,302.57
Total Revenues	**132,535.00**	**132,535.00**	**128,304.02**	**4,230.98**	**33,778.68**	**162,082.70**	**277,518.40**
Expenditures:							
Auburn Water Department	6,000.00	6,000.00	2,250.90	3,749.10		2,250.90	5,191.00
Lewiston Water Division	6,000.00	6,000.00	3,986.67	2,013.33		3,986.67	8,991.17
Executive Administration	750.00	750.00	511.54	238.46		511.54	
Forestry	4,500.00	4,500.00	7,050.19	(2,550.19)		7,050.19	10,064.59
Outside Services	3,325.00	3,325.00	350.00	2,975.00		350.00	3,435.00
Sanitary Facilities	3,760.00	3,760.00	1,665.00	2,095.00		1,665.00	2,680.00
Source Protection	63,250.00	63,250.00	14,409.75	48,840.25	11,434.00	25,843.75	41,198.99
Repairs to Property & Equipment	6,000.00	6,000.00	1,024.79	4,975.21		1,024.79	3,252.94
Public Education	1,775.00	1,775.00	-	1,775.00		-	2,371.28
Public Ed. - Labor	27,620.00	27,620.00	14,826.04	12,793.96		14,826.04	11,902.33
Public Ed. - Supplies	800.00	800.00	-	800.00		-	2,035.79
Public Ed. - Events	2,000.00	2,000.00	261.81	1,738.19		261.81	189.49
Public Ed. - Outside Services	500.00	500.00	-	500.00		-	-
Public Ed. - Public Relations	1,500.00	1,500.00	1,852.88	(352.88)		1,852.88	498.52
Public Ed. - Miscellaneous	1,500.00	1,500.00	392.68	1,107.32		392.68	1,183.83
Liability & D&O Insurance	11,650.00	11,650.00	9,845.40	1,804.60		9,845.40	12,075.47
Legal	4,000.00	4,000.00	9,427.50	(5,427.50)		9,427.50	6,454.50
Audit/Financial Services	6,695.00	6,695.00	5,845.63	849.37		5,845.63	6,595.26
Property Taxes	4,625.00	4,625.00	1,327.71	3,297.29		1,327.71	4,515.20
Operational Supplies	1,000.00	1,000.00	621.99	378.01		621.99	1,999.73
Depreciation/Amortization Expense			3,796.94	(3,796.94)		3,796.94	36,844.10
Miscellaneous	950.00	950.00	584.39	365.61		584.39	2,175.49
Total Expenditures	**158,200.00**	**158,200.00**	**80,031.81**	**78,168.19**	**11,434.00**	**91,465.81**	**163,654.68**
Excess Revenues Over Expenditures	(25,665.00)	(25,665.00)	48,272.21		22,344.68	70,616.89	113,863.72
Retained Earnings/Fund Balance, 1/1			2,218,418.12		3,443,929.61	5,662,347.73	5,548,484.01
Retained Earnings/Fund Balance, 12/31			**2,266,690.33**		**3,466,274.29**	**5,732,964.62**	**5,662,347.73**

Water Quality, Watershed, and Education & Outreach Reports

Water Quality Report

1. Average turbidity:
    a. June was 0.47 NTU in 2022, and 0.45 in 2021.
    b. July was 0.44 NTU in 2022, and 0.33 in 2021.
    c. August was 0.95 NTU in 2022, and 0.37 in 2021. 17 days over 1 NTU in 2022.
2. Water temperatures were very warm this summer, and we are in a drought.
3. Please see attached turbidity and temperature graphs for reference.
4. June-August fecal datasheets are attached.

Watershed Report

1. The MaineDOT is continuing a project on Route 4 in Auburn that involves removing the turnout near the boat launch, and reconfiguring the traffic pattern in that area.
2. MDOT also paved Lake Shore Drive, Johnson Road, Skillings Corner Road, and other roads in that area of the watershed.
3. Courtesy boat inspections ended on Labor Day weekend at the Route 4 boat launch.
4. Erica worked with Androscoggin Title Company to close the LAWPC purchase of the property located at 79 Point of Pine Road in Auburn on 8/29/22. Demolition of the structures on the property is scheduled for late September, including pumping and removal of the septic tank.
5. Culvert replacements, drainage improvements, and ditching are scheduled to continue on the Whitman Spring Road this fall. LWD will do the work.
6. The annual watershed inspection that is required per the Maine Drinking Water Program typically takes place in September, with the annual report provided by Erica to the DWP in October. This is a requirement of the waivers for filtration issued to AWD and LWD.
7. FB Environmental provided a Technical Memorandum to the City of Auburn on 8/1/22 that expanded on the modeling of proposed zoning and ordinance changes in the watershed, namely increasing minimum lot sizes to build and decreasing the depth to limiting factor for installing septic systems. Document is attached.
8. The Auburn Planning Board has tentatively scheduled a Public Hearing on the proposed zoning change in the watershed that includes the Rural Residential zone being changed to Low Density Country Residential. This would change the minimum lot size in this area from 1 acre-per-unit to 3 acres-per-unit. It would also change the septic requirements from 36” to limiting factor to 12” to limiting factor.

Watershed News

The following petition is on the Auburn City Council’s September 6th meeting agenda (pages attached):

On March 21, 2022, the Auburn City Council adopted Ordinance 08-03072022, amending the zoning map of 148 acres of Agriculture and Resource Protection (AG) to General Business of the Zoning Map and adjust the Article XII, Division 4, Sec. 60-951 Lake Auburn Overlay District map as proposed in the 2021 FB Environmental Report known as Lake Auburn-A Regulatory, Environmental, and Economic Analysis of Water Supply Protection.

On April 20, 2022, an affidavit to form a Petitioner's Committee was filed with the City Clerk. The deadline for the petition to be filed with the City Clerk was July 25, 2022. **The petition was filed with the City Clerk on July 21, 2022**. **At that point, the Ordinance was suspended from taking effect**.

The total number of valid signatures required was 1,647. The petition was reviewed, and signatures validated; **the petition was certified to be sufficient**, with 1,981 valid signatures and 135 invalid signatures, **on August 9, 2022**.

Once the petition is determined to be sufficient, the City Council shall promptly consider voting to repeal the ordinance. **If the Council fails to repeal the ordinance within 30 days after the date the petition was finally determined to be sufficient, it must submit the Ordinance to the voters of the City**.

If the repeal motion fails, it means that the Ordinance must be sent to the voters for a City-wide referendum vote. **The referendum election must be held "not less than one hundred twenty (120) days and not later than six (6) months from the date of the final city council vote thereon"**.

Education and Outreach Report

Past events

Wednesday Walk with Stanton Bird Club 6/1 – In June we partnered with Stanton Bird Club for one of their Wednesday Walk's. This walk started from the Southern end of the Whitman Spring Road Trail and went all the way up to the Hotel Loop and back.

Lewiston Farmers' Market 6/19 – We participated at the Lewiston Farmer's Market at their Community Table. Here we were able to pass out pamphlets and discuss with others in the community about Lake Auburn, the treatment process, land conservation, and more.

Living Soil Network 6/23 – Spero Latchis from The Living Soil Network presented The Ecology of Soil and Water: The Importance of Microbial Life in the Soil Sponge. This online presentation described how biologically healthy soil is the necessary foundation for our healthy waters. Soil that is working with fungi, microbes, and vegetation is able to capture and filter large quantities of water, withstand erosion, and does not need added fertilizers or nutrients to maintain plants.

Leavitt Plant Tour 6/29 – Students from Leavitt High School had a class trip touring the treatment plant and had a Q&A and discussion session afterwards.

Cover Cropping for Gardeners and Farmers 6/30 – University of Maine Cooperative Extension Specialist Jason Lilley presented Cover Cropping for Farmers and Gardeners. This event was part of our Soil and Water Talk Series with the Androscoggin Valley Soil and Water Conservation District. Jason first discussed what cover crops are, how we can benefit from them, and how it can increase soil and water quality.

Camp Smiles 7/15 – Camp Smiles, a Lewiston Recreational day camp visited us in July for a day field trip about the Lake Auburn Watershed. They took a tour of the treatment plant, looked at slides under a microscope of a water sample from the wet well, learned about water testing equipment, and participated in activities learning about wildlife, native trees, and testing pH. Stanton Bird Club kindly let LAWPC borrow their Wingspan Banner.

Where Does Your Water Come From 7/20 – This program was presented as part of Auburn Public Library's Adult Summer Reading Program, "Oceans of Possibilities" where adults spent time exploring Maine's waterways. Our event *Where Does Your Water Come From?* followed a drop of water through the Lake Auburn Watershed. The presentation went over what a watershed is, surface runoff, different types of surfaces and pollutants water might encounter, what it means to be an unfiltered water supply, how the water is treated, tested, and monitored, and how conserved areas naturally filter water. At the end there was a pollution and surface runoff demonstration.

Lake Auburn Walk and Talk 7/31 – On this beautiful July morning we had a walk starting at the North End of the Whitman Spring Road, to the Hotel Loop, and back. While enjoying the sun and views of the lake we also spotted some Cedar wax wings.

Lewiston Fun and Films Festival – Throughout the summer we participated in the Lewiston Summer Fun and Films series, hosted by Lewiston Police Department. We had activities like a pollution demonstration, hands-on water testing, painting, and coloring. Many people who stopped by told us what Lake Auburn means to them and were excited to learn more.

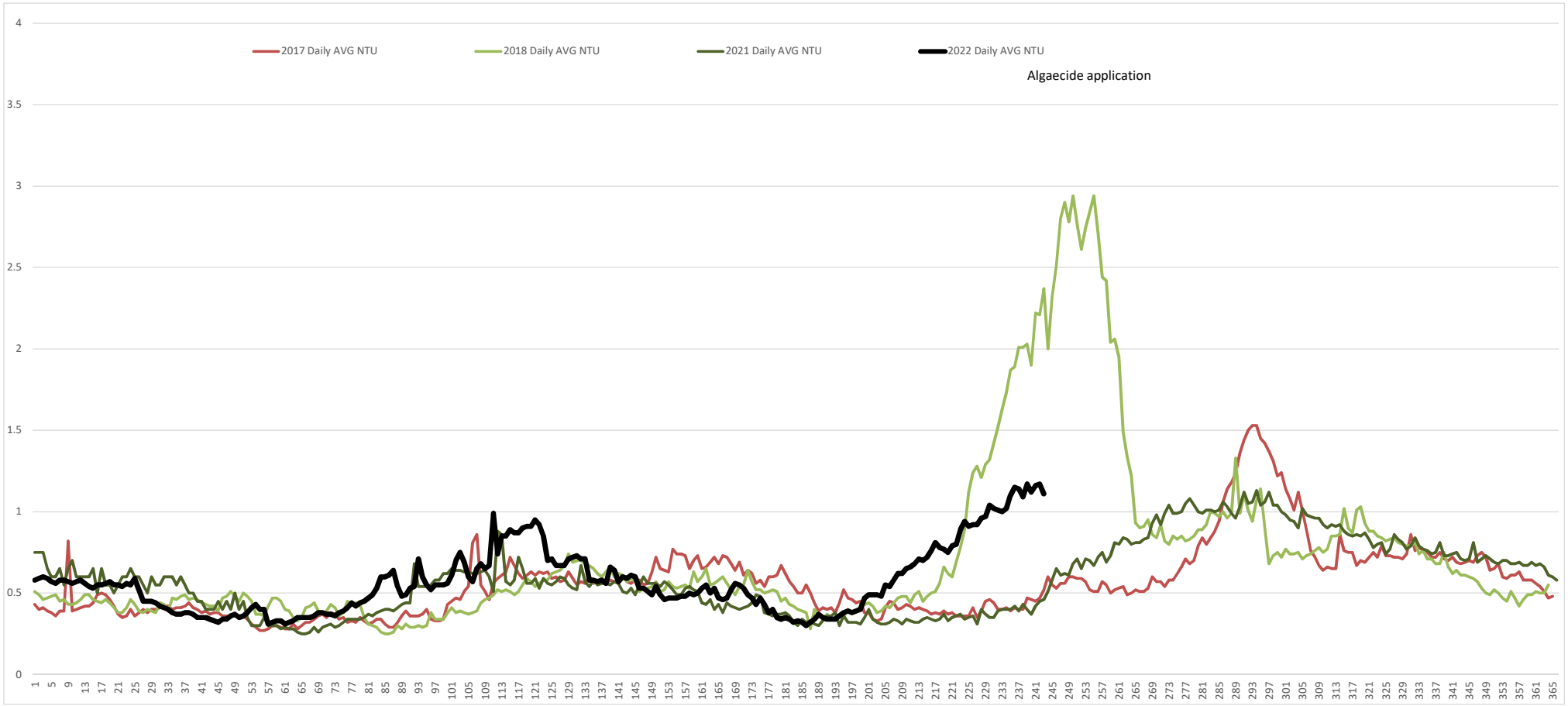
Lewiston Sprouts 8/4 – Lewiston Sprouts is a new community program by Maine Audubon, Maine Community Integration, and Healthy Home works. This 5-week summer program promoted environmental stewardship and outdoor confidence in Lewiston youth. This trip included a discussion about careers and pathways in environmental stewardship, women in STEM, a treatment plant tour, a pollution demonstration, testing out aquascopes on Lake Auburn.

Townsend Brook Trail Updates

We have been meeting with community partners like Bates and the AVEC program to expand the educational material and curriculum that will be included with the Townsend Brook Trail (formally known as the Tot Lot Trail). There will be a volunteer trail building day Saturday, September 17th from 9-11, meeting at the Auburn Tot Lot.

Other Updates

Carolyn has put in her notice and her last day with LAWPC will be September 30th.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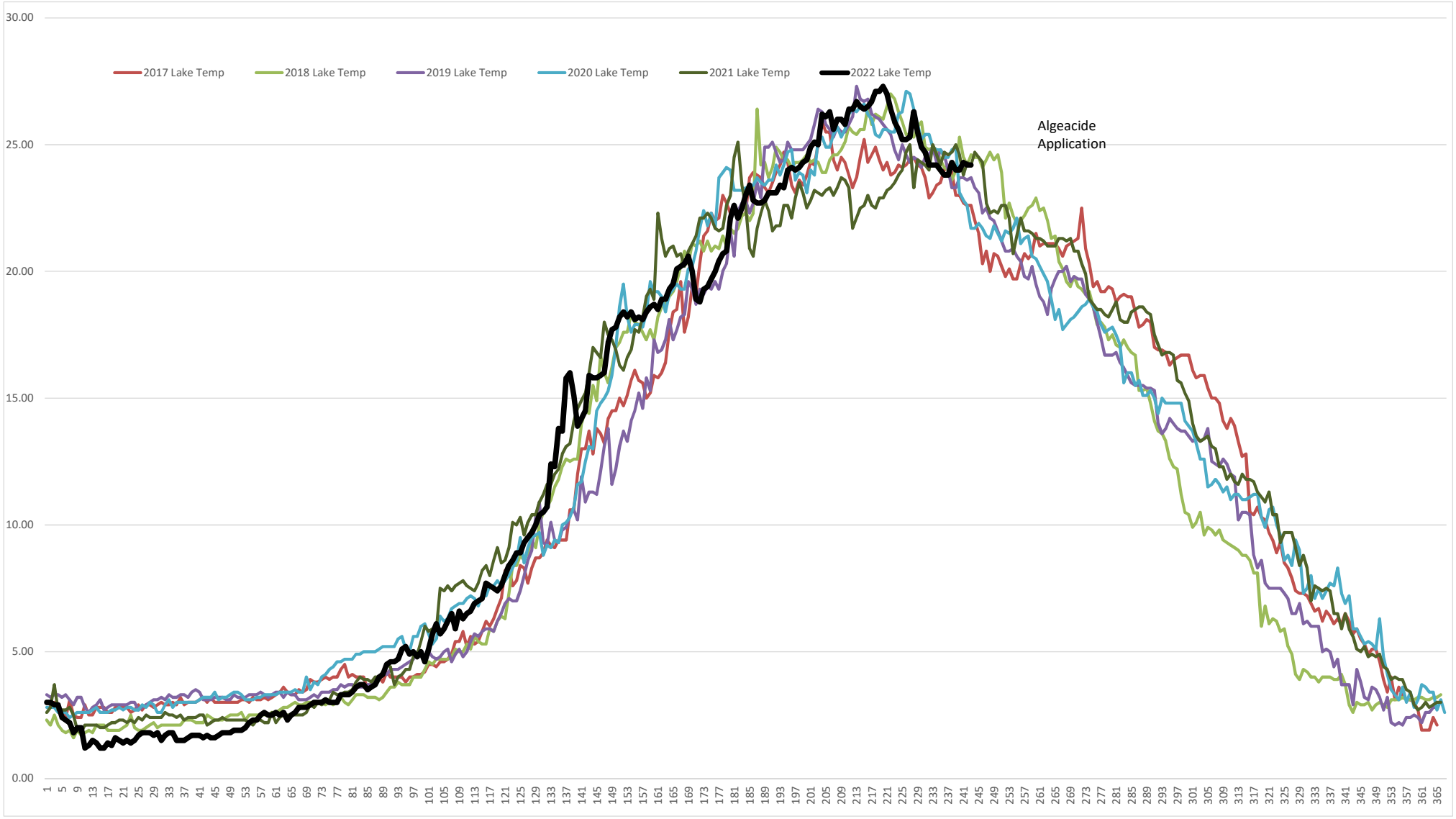
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2017 Lake Temp
2018 Lake Temp
2019 Lake Temp
2020 Lake Temp
2021 Lake Temp
2022 Lake Temp
Algeacide Application

Jun-22 INLINE

Collected			Temp	Turbidity		Ph	Amount	FECAL	QUANTITRAY		Fecal
DATE	TIME	BY	*C	1720E	TU5200	230 A	Sample	BACTERIA CFU	TOTAL	E.COLI	Confirmation
6/1	02:15	DAF	18.40	0.45	0.55	7.18	100	0			
6/2	02:30	DAF	18.20	0.45	0.55	7.14	100	0			
6/3	02:30	DAF	18.40	0.45	0.55	7.17	100	0			
6/4	05:40	DAF	18.10	0.45	0.55	7.11	100	0			
6/5	05:45	DAF	18.20	0.50	0.55	7.10	100	0			
6/6	02:45	DAF	18.10	0.45	0.50	7.09	100	0	46	1	
6/7	02:10	DAF	18.40	0.45	0.50	7.09	100	0			
6/8	03:15	DAF	18.60	0.45	0.50	7.14	100	0			
6/9	02:50	DAF	18.70	0.55	0.60	7.08	100	0			
6/10	02:35	DAF	18.50	0.45	0.55	7.17	100	0			
6/11	06:00	DAF	18.90	0.60	0.60	7.11	100	0			
6/12	06:10	DAF	18.90	0.45	0.45	7.08	100	0			
6/13	02:40	DAF	19.30	0.50	0.50	7.07	100	0	104.3	12.1	
6/14	02:40	DAF	19.50	0.50	0.55	7.15	100	0			
6/15	02:20	DAF	20.10	0.45	0.45	7.04	100	0			
6/16	03:25	DAF	20.20	0.45	0.50	7.12	100	0			
6/17	03:00	DAF	20.30	0.55	0.55	7.12	100	0			
6/18	03:00	DAF	20.60	0.50	0.50	7.11	100	0			
6/19	05:00	DAF	20.00	0.60	0.60	7.14	100	0			
6/20	07:10	LRB	18.90	0.55	0.45	7.23	100	0	517.2	14.2	
6/21	03:00	DAF	18.80	0.45	0.45	7.19	100	1			P,P
6/22	03:10	DAF	19.30	0.45	0.50	7.15	100	0			
6/23	02:50	DAF	19.40	0.45	0.50	7.19	100	0			
6/24	07:40	LRB	19.70	0.40	0.45	7.25	100	1			P,P
6/25	08:05	LRB	20.00	0.40	0.50	7.25	100	0			
6/26	08:20	LRB	20.40	0.35	0.40	7.19	100	0			
6/27	03:00	DAF	20.70	0.45	0.45	7.19	100	0	2419.6	2	
6/28	03:00	DAF	20.80	0.35	0.40	7.02	100	0			
6/29	03:00	DAF	22.10	0.35	0.50	7.16	100	0			
6/30	02:40	DAF	22.60	0.40	0.45	7.18	100	0			

Jul-22 INLINE

Collected			Temp	Turbidity		Ph	Amount	FECAL	QUANTITRAY		Fecal
DATE	TIME	BY	*C	1720E	TU5200	230 A	Sample	BACTERIA CFU	TOTAL	E.COLI	Confirmation
7/1	02:00	DAF	22.1	0.35	0.45	7.15	100	0			
7/2	06:10	DAF	22.5	0.40	0.50	7.23	100	0			
7/3	06:10	DAF	23.0	0.30	0.40	7.27	100	0			
7/4	06:00	DAF	23.4	0.30	0.45	7.25	100	0	248.8	2	
7/5	02:55	DAF	22.8	0.30	0.35	7.28	100	0			
7/6	03:00	DAF	22.7	0.30	0.40	7.27	100	0			
7/7	03:15	DAF	22.7	0.35	0.40	7.29	100	0			
7/8	03:15	DAF	22.8	0.30	0.45	7.30	100	0			
7/9	08:20	LRB	23.1	0.25	0.35	7.31	100	0			
7/10	08:10	LRB	23.1	0.30	0.40	7.34	100	0			
7/11	02:20	DAF	23.1	0.30	0.40	7.30	100	0	275.5	1	
7/12	02:15	DAF	23.4	0.35	0.45	7.29	100	0			
7/13	03:15	DAF	23.3	0.35	0.45	7.34	100	0			
7/14	03:25	DAF	24.0	0.40	0.45	7.30	100	0			
7/15	03:15	DAF	24.1	0.40	0.45	7.34	100	0			
7/16	05:45	DAF	24.0	0.40	0.45	7.22	100	0			
7/17	05:40	DAF	24.1	0.40	0.45	7.19	100	0			
7/18	02:50	DAF	24.3	0.40	0.45	7.24	100	0	410.6	4.1	
7/19	03:00	DAF	24.4	0.45	0.45	7.30	100	0			
7/20	03:15	DAF	24.9	0.50	0.50	7.31	100	0			
7/21	03:10	DAF	25.1	0.50	0.55	7.38	100	0			
7/22	03:20	DAF	25.0	0.50	0.50	7.45	100	0			
7/23	08:10	LRB	26.2	0.40	0.55	7.93	100	0			
7/24	08:10	LRB	26.1	0.50	0.60	8.24	100	0			
7/25	10:20	LRB	26.3	0.50	0.60	8.04	100	1	1413.6	1	P/P
7/26	07:35	LRB	25.6	0.50	0.60	7.96	100	1			P/P
7/27	05:55	LRB	26.0	0.55	0.65	8.20	100	0			
7/28	07:35	LRB	26.0	0.60	0.65	8.35	100	0			
7/29	05:55	LRB	25.8	0.60	0.70	8.37	100	0			
7/30	07:05	CAC	26.4	0.57	0.55	8.08	100	0			
7/31	07:30	CAC	26.4	0.56	0.75	8.23	100	0			
			24.28	0.42	0.50	7.54		0.1			

Aug-22 INLINE

Collected			Temp	Turbidity		Ph	Amount	FECAL	QUANTITRAY		Fecal
DATE	TIME	BY	*C	1720E	TU5200	230 A	Sample	BACTERIA CFU	TOTAL COLIFORM	E.COLI	Confirmation
8/1	04:40	DAF	26.7	0.65	0.65	7.91	100	0	>2419.6	3.1	
8/2	03:05	DAF	26.5	0.65	0.70	8.03	100	0			
8/3	02:35	DAF	26.4	0.75	0.80	8.05	100	0			
8/4	02:25	DAF	26.5	0.70	0.75	8.18	100	0			
8/5	02:55	DAF	26.7	0.80	0.80	8.19	100	1			P,P
8/6	07:40	LRB	27.1	0.70	0.75	8.58	100	1			P,P
8/7	08:00	LRB	27.1	0.75	0.80	8.68	100	0			
8/8	02:50	DAF	27.3	0.75	0.80	8.27	100	1	1986.3	2	P,P
8/9	03:10	DAF	27.0	0.75	0.80	8.49	100	2			P,P/P,P
8/10	02:50	DAF	26.4	0.80	0.85	8.21	100	2			P,P/P,P
8/11	02:45	DAF	25.9	0.85	0.95	8.21	100	0			
8/12	03:00	DAF	25.6	0.85	0.95	8.29	100	0			
8/13	06:30	DAF	25.2	0.90	0.95	8.25	100	1			P,P
8/14	06:30	DAF	25.2	0.90	0.95	8.34	100	0			
8/15	02:50	DAF	25.3	0.85	0.95	8.49	100	0	2419.6	1	
8/16	02:35	DAF	26.3	1.00	1.05	8.60	100	3			P,P/P,P/P,P
8/17	02:50	DAF	25.5	0.95	1.00	8.63	100	0			
8/18	03:00	DAF	24.9	1.05	1.10	8.29	100	0			
8/19	02:50	DAF	24.7	1.00	1.05	8.38	100	1			
8/20	07:35	LRB	24.2	0.95	1.05	8.39	100	3			
8/21	07:40	LRB	24.2	0.95	1.10	8.56	100	3			
8/22	03:10	DAF	24.2	1.00	1.10	8.67	100	0			
8/23	02:55	DAF	24.0	1.00	1.10	8.51	100	0			
8/24	02:55	DAF	23.8	1.10	1.10	8.31	100	0			
8/25	03:15	DAF	23.8	1.10	1.10	8.36	100	0			
8/26	03:00	DAF	24.3	1.10	1.10	8.67	100	0			
8/27	06:15	DAF	24.0	1.10	1.15	8.56	100	0			
8/28	06:10	DAF	24.0	1.10	1.15	8.49	100	0			
8/29	02:45	DAF	24.3	1.15	1.20	8.66	100	0	>2419.6	1.1	
8/30	02:40	DAF	24.2	1.15	1.20	8.50	100	0			
8/31	02:55	DAF	24.2	1.15	1.15	8.55	100	0			
			25.34	0.92	0.97	8.40		0.58			

TECHNICAL MEMORANDUM | LAKE AUBURN MODEL

TO: Eric Cousens, City of Auburn, Maine

FROM: Laura Diemer, FB Environmental Associates

SUBJECT: Memorandum on Modeling 2022 Proposed Ordinance Changes

DATE: August 1, 2022

CC: Forrest Bell & Maggie Kelly, FB Environmental Associates

The City of Auburn requested FB Environmental Associates (FBE) to evaluate proposed ordinance changes for their potential effects on land use and development in the Lake Auburn watershed and associated impacts to lake water quality. The purpose of this memorandum is to 1) summarize the proposed ordinance changes that the City of Auburn deliberated in May 2022 and 2) describe the modeling work that was completed which simulated the impact that the proposed ordinances changes will have on land use and development in the watershed and subsequent lake water quality.

BACKGROUND

This work follows up on a comprehensive analysis that FBE, along with Horsley Witten Group and Dr. Adam Daigneault of the University of Maine, conducted for the City of Auburn in 2021. For that analysis and subsequent report, FBE ran a buildout analysis and a coupled watershed-lake model that estimated phosphorus loading from the watershed to Lake Auburn and subsequent in-lake water quality conditions. The calibrated baseline watershed-lake model was run for several future scenarios that simulated in-lake water quality conditions under different watershed development conditions. With the calibrated baseline watershed-lake model, additional future scenarios can be run based on changes to the underlying model inputs and/or assumptions.

PROPOSED REGULATORY CHANGES & MODELING APPROACH

The proposed ordinance changes that FBE were given to consider are in Section 60-952 (the Lake Auburn Watershed District Overlay) and Section 60-1066 (the Phosphorus Control Ordinance). The ordinance changes with implications for the modeling effort are described in Table 1.

For carrying out the model run, the first step was to update the buildout analysis to account for the new ordinances. A buildout analysis uses existing or in this case proposed ordinances, existing natural features, and other development constraints to estimate the number and location of new buildings possible under the simulated zoning. Once the buildout analysis was complete, the results were input to the watershed-lake model. FBE started with the "Business As Usual + LID" model scenario and made adjustments to the new model run to account for the proposed ordinance changes, which included changing the number of projected new buildings (for Auburn only) and agricultural land area within the 100 ft buffer of surface waters[1] (refer to Table 1).

[1] Note for future model runs: with the anticipated decline in existing agricultural land area in the watershed, these agricultural lands were assumed to likely be replaced by new development; however, there were instances where the anticipated increase in development was less than the anticipated decline in agricultural lands which were then assumed to lay fallow and regenerate into forest. Overall, the new model run estimated up to 39 acres of regenerated forest by 2100. It may be more practical to convert these agricultural lands to open land rather than forest in the model unless the agricultural lands are managed and protected as forested land. Open land has a slightly higher phosphorus export compared to forested land, so this change in assumption would minorly increase the total phosphorus load estimate.

Table 1. Summary of existing ordinances and their proposed changes, along with a description of the modeling approach to account for these proposed ordinance changes.

Category	Existing Ordinance	Proposed Ordinance	*Model*: Modeling Approach
Agricultural Buffer Strips	In Section 60-952 (c), for tilled agricultural lands adjoining the lake or its perennial tributary streams, the width of untilled agricultural buffer strips is 50 feet.	The proposed ordinance changes the setback to 100 feet.	*Watershed-Lake Model:* FBE found the intersection of agricultural land use and a 100 ft buffer from Lake Auburn and its ponds and perennial tributaries (within the City of Auburn) and manually changed any agriculturally classified land use as open land, assuming that property owners will be required to reforest or lay fallow tilled fields within 100 ft of those surface waters. FBE identified 0.82 hectares (2.01 acres) and 2.26 hectares (5.58 acres) of agricultural land use within a 50 ft and 100 ft buffer, respectively, from Lake Auburn and its ponds and perennial tributaries (within the City of Auburn) (Table 2). Note that this desktop analysis was performed at a coarse scale, and some of these agricultural areas may be outside of the buffer zone if measured in the field. **Converting the 2.26 hectares (5.58 acres) of agricultural land use to open land for this new model run includes the 0.82 hectares (2.03 acres) of agricultural land within the existing 50 ft buffer restriction and posed as a minor limitation to directly comparing the results between the model runs since the "Business As Usual" model scenario considered some agricultural land within the 50 ft buffer despite existing regulations.**
Subsurface Disposal Systems (Septic Systems)	Section 60-952 (f) (1) currently prohibits the siting of systems where there is less than 36 inches of vertical separation from the bottom of the organic horizon and the nearest "limiting factor" (bedrock, seasonal water table, occluding layer of clay or other mineral that would prevent drainage). This vertical separation must be achieved by previously in-situ soils or sediments, disallowing the use of fill materials.	The proposed change allows for siting of septic systems where there is 12 inches of in-situ vertical separation between the bottom of the disposal field and the limiting factor, a standard that is consistent with the State of Maine Subsurface Wastewater Disposal Rules 10-144 Chapter 241 (a.k.a., Chapter 241). In addition, the revised section would allow the use of suitable fill materials to achieve a total of 36 inches of vertical separation, which is retained from the old rules.	*Buildout Analysis*: Using county-level NRCS soil series data, we updated the development constraints input to show areas with restrictive layers within 12" of the surface (compared to 36" originally).
	Section 60-952 (f) (2) currently prohibits the siting of septic systems within 300 feet of the high-water line where soils are described as deep, loose, and sandy containing 70 percent sand.	The proposed change prohibits the siting of septic systems within 400 feet of the high-water line where soils are profiled as gravel outwash or stratified drift as shown in Table 4D (profiles 5, 6, and some of 11) of Chapter 241.	*Buildout Analysis*: We expanded the target area from 300 to 400 ft around Lake Auburn and its ponds and tributaries. FBE roughly matched soil series (from county-level NRCS data) in the watershed to 5, 6, and 11 soil profiles in Table 4D of Chapter 241. However, the soil profiles in Table 4D are broadly applicable to several soil series under different environmental conditions and likely do not reflect true parcel-by-parcel variability in septic system siting restrictions. FBE's approach of excluding only those soil series that are definitively not 5, 6, and 11 soil profile types is conservative for development potential, showing nearly the entire 400 ft buffer as restricted from development. Practical field application of the Table 4D rules would likely be less restrictive, but there is no way of knowing the extent of the difference without field evaluations by a Licensed Site Evaluator. FBE confirmed this limitation with Daniel Locke, a Professional Geologist and Licensed Site Evaluator with the Maine Geological Survey. **Thus, the buildout analysis results for the new model run likely underestimated new building potential. There were 23 projected new buildings identified within the 300 ft buffer under the "Business As Usual" model scenario that the new scenario run using the Table 4D soil profiles excluded and therefore potentially underestimated development along the shoreline.**
Zoning Change	Approximately 1,038 acres are proposed to be rezoned from Rural Residential to Low-Density Country Residential. If carried out, this change will result in minimum three-acre lots where previously the minimum lot size was one acre.		*Buildout Analysis*: We rezoned Rural Residential to Low-Density Country Residential in the Auburn portion of the watershed so that the minimum lot size increased from 1 to 3 acres.

Category	Existing Ordinance	Proposed Ordinance	*Model*: Modeling Approach
	Auburn's Chapter 60 – Zoning, Article IV. – District Regulations, Division 2 – Agriculture and Resource Protection District use regulations provide restrictive standards for new development and are only approved on a case-by-case basis.	No change.	*Buildout Analysis*: We removed new development in the Agriculture and Resource Protection Zone. **The original "Business As Usual" model scenario showed 74 projected new buildings in the Agriculture and Resource Protection Zone, which posed as a limitation to directly comparing the results between the model runs.**
Phosphorus Control Plans	Section 60-1066 (1) concerns the applicability of the ordinance, with any new building or structure of 575 square feet of ground floor area requiring the creation of a Phosphorus Control Plan – essentially a detailed stormwater management plan that includes estimated phosphorus loading calculations.	The proposed change requires any new building of 200 square feet of ground floor area to develop a Phosphorus Control Plan, making the applicability much broader.	*Watershed-Lake Model:* For the broader application of Phosphorus Control Plan requirements on new development in the watershed, we will want to consider the fact that the change from 575 square feet to 200 square feet would largely only extend phosphorus controls to accessory buildings or additions since primary dwellings are already required to submit a Phosphorus Control Plan. In addition, the "Business As Usual" model scenario did not account for low impact development (LID) standards that would be implemented as a result of a Phosphorus Control Plan, so we recommend comparing the new model run results to the "Business As Usual + LID" model scenario. According to the Phosphorus Control Ordinance, the per-acre phosphorus allocation for new development in the Lake Auburn watershed is 0.047 lbs. per acre (0.060 lbs. per acre when including background levels) which would amount to 0.180 lbs. per year on a 3-acre lot. The phosphorus export for low density residential development assumed in the model is roughly 0.652 lbs. per acre. Applying LID adjustments (30% less impact area, 70% reduced phosphorus export) lowers the phosphorus export for low density residential development to roughly 0.121 lbs. per acre which would amount to 0.170 lbs. per year on a 3-acre lot with 1 acre of developed area and 2 acres of forest land. Despite the model appearing to meet the allowable phosphorus allocation per built lot, it is important to note that these are rough average estimates since the model adjusts the phosphorus export from any given parcel of land based on accumulation and runoff with dry and wet spells. There may be times when the phosphorus export is lower than the allowable phosphorus allocation and other times when it is higher. **Note**: The City of Auburn uses 450-ft-deep "residential strips" to effectively limit the construction of new roads in rural areas, most especially in the Lake Auburn watershed. Therefore, our assumption that each new building will slightly increase the amount of roadway in the area may not be applicable at least in the Auburn portion of the watershed. In addition, most new built lots in the watershed are less than one-half acre of developed area as opposed to the model assumption of one-acre (which was based on the average existing developed area per existing building in the watershed). Adjusting these model assumptions should be considered in a future model run but will likely have a negligible impact to the total phosphorus load and in-lake total phosphorus concentration.

Table 2. Agricultural land cover by sub-basin within a 50 ft and 100 ft buffer from Lake Auburn and its ponds and perennial tributaries (within the City of Auburn).

Basin Name	Land Cover	50 ft Buffer		100 ft Buffer	
		Area (hectares)	Area (Acres)	Area (hectares)	Area (Acres)
Townsend Brook	Cropland	0.01	0.02	0.01	0.02
Townsend Brook	Hay/Pasture	0.77	1.89	1.94	4.78
West Auburn Rd-Youngs Corner-Gracelawn-Summer St	Cropland	0.04	0.10	0.31	0.78
	Total	**0.82**	**2.01**	**2.26**	**5.58**

NEW MODEL RUN RESULTS

Results of the buildout analysis incorporating the 2022 ordinance changes compared to the original baseline buildout analysis are provided in Tables 3 and 4 and shown in Figures 1-3. The ordinance changes only impacted the Auburn portion of the watershed, reducing the total buildable area by 955 acres and the number of projected new buildings by 155. However, these results reflect adjustments made to the buildout assumptions that more accurately apply existing ordinances. For example, new development in the Agriculture and Resource Protection zone was removed which accounted for 928 acres of buildable area and 74 projected new buildings. In addition, there were 23 projected new buildings identified within the 300 ft buffer under the original baseline buildout that the ordinance changes conservatively excluded due to the limitations of using the Table 4D soil profiles. Accounting for these adjustments, the ordinance changes directly reduced the total buildable area by 27 acres and the number of projected new buildings by 58. This indicates that the expansion of buildable area with the lifting of the septic system siting restriction (changing from 36" to 12" to limiting factor) was effectively offset by the reduction of buildable area with the rezoning of Rural Residential to Low Density Country Residential (changing from 1-acre to 3-acre minimum lot size).

Results of the watershed-lake model are provided in Table 5. The new model run reflecting the 2022 ordinance changes and other adjustments resulted in a predicted total phosphorus load of 937 kg/yr and an in-lake total phosphorus concentration of 9.3 ppb. Compared to the "Business As Usual + LID" model scenario, the ordinance changes and other adjustments reduced the total phosphorus load by 6 kg/yr and the in-lake total phosphorus concentration by 0.1 ppb. Although a small change, the reduction entered a new tier or probability bracket for bloom risk, lowering it slightly from 40% to 30-40% with taste/odor complaints still possible but slightly less likely and filtration waiver violation remaining a low risk.

To meet the goal of 900 kg/yr total phosphorus load and 9.0 ppb in-lake total phosphorus concentration in the future at full buildout, additional changes to development strategies that limit total phosphorus export will be needed. While the City of Auburn has taken valuable action to put phosphorus controls in place on new development, the goal cannot be ultimately met without the cooperation of headwater towns to implement similar development strategies controlling phosphorus in the watershed.

Table 3. Amount of total and buildable land by town and zone in the Lake Auburn watershed. Results of the new model run incorporating the 2022 ordinance changes are compared to the original baseline buildout analysis. Note: the total area for the City of Auburn's zones, Low Density Country Residential and Rural Residential, are split between two values to show that Rural Residential was rezoned to Low Density Country Residential as part of the new model run incorporating the 2022 ordinance changes; the first value represents conditions under the original baseline buildout, and the second value represents conditions under the 2022 ordinance changes baseline buildout.

Zone	Total Area (acres)*	Original Baseline Buildout		2022 Ordinance Changes Baseline Buildout	
		Buildable Area (Acres)	Percent Buildable Area	Buildable Area (Acres)	Percent Buildable Area
Auburn					
Agriculture and Resource Protection	4,501	928	21%	0	0%
General Business	1	0	0%	0	0%
Low Density Country Residential	298 / 1,170	56	19%	322	28%
Neighborhood Business	2	0	0%	0	0%
Rural Residential	873 / 0	292	33%	0	0%
Suburban Residential	371	5	1%	5	1%
Buckfield					
General Development	155	154	100%	154	100%
Hebron					
General Development	175	83	47%	83	47%
Minot					
Rural District	843	414	49%	414	49%
Turner					
Commercial	19	11	58%	11	58%
General Residential I	94	59	63%	58	62%
General Residential II	219	99	45%	99	45%
Rural I	1,252	914	73%	914	73%
Rural II	634	527	83%	527	83%
Resource Protection	266	38	14%	38	14%
Shoreland Protection	110	30	27%	30	27%
Total	**9,811**	**3,610**	**37%**	**2,655**	**27%**

Table 4. Number of existing, projected, and total buildings by town and zone in the Lake Auburn watershed. Results of the new model run incorporating the 2022 ordinance changes are compared to the original baseline buildout analysis. Note: the number of existing buildings for the City of Auburn's zones, Low Density Country Residential and Rural Residential, are split between two values to show that Rural Residential was rezoned to Low Density Country Residential as part of the new model run incorporating the 2022 ordinance changes; the first value represents conditions under the original baseline buildout, and the second value represents conditions under the 2022 ordinance changes baseline buildout.

Zone	No. Existing Buildings	Original Baseline Buildout			2022 Ordinance Changes Baseline Buildout		
		No. Proj. Buildings	Total No. Buildings	Percent Increase	No. Proj. Buildings	Total No. Buildings	Percent Increase
Auburn							
Agriculture and Resource Protection	77	74	151	96	0	77	0
General Business	2	0	2	0	0	2	0
Low Density Country Residential	47 / 265	16	63	34	79	344	30
Rural Residential	218 / 0	143	361	66	0	0	0
Suburban Residential	75	6	81	8	6	81	8
Buckfield							
General Development	2	106	108	5,300	106	108	5,300
Hebron							
General Development	13	17	30	131	17	30	131
Minot							
Rural District	49	99	148	202	99	148	202
Turner							
Commercial	6	7	13	117	7	13	117
General Residential I	15	40	55	267	40	55	267
General Residential II	50	29	79	58	29	79	58
Rural I[2]	66	311	377	471	310	376	470
Rural II	14	61	75	436	61	75	436
Resource Protection	21	15	36	71	15	36	71
Shoreland Protection	23	14	37	61	14	37	61
Total	**678**	**938**	**1616**	**138**	**783**	**1,461**	**115**

[2] The original baseline buildout from May 2021 predicted 311 buildings. There were no changes to development constraints in Turner, so this difference is likely due to small differences in how the buildings were randomly placed by the model.

Table 5. Baseline and select scenario model results for total phosphorus (TP) load (kg/yr) and in-lake TP concentration (ppb), along with gross estimates for water quality risks related to drinking water and recreation in Lake Auburn. The new model run is highlighted in gray.

SCENARIO	YEAR	TP LOAD (KG/YR)	TP (PPB) - AVG	TP (PPB) - MIN	TP (PPB) - MAX	Bloom Risk	Taste/Odor	Filtration Waiver Violation Risk	Filtration Plant Needed?
Baseline or "Existing Conditions"	2018	1,114	10.9	9.2	14.4	40%	Complaints	None	No, borderline for taste/odor
Baseline + Alum Treatment	2020	842	8.3	6.6	11.8	10%	Likely Few Complaints	Likely None	No
Baseline + Alum Treatment + Climate Change (RCP 4.5) + Future "Business As Usual" Buildout (No Code Changes)	2100	957	9.5	7.8	13.0	40%	Complaints Likely	Low Risk	Likely no, but borderline for taste/odor
Baseline + Alum Treatment + Climate Change (RCP 4.5) + Future "Business As Usual" Buildout (No Code Changes) + Low Impact Development Standards	2100	943	9.4	7.7	12.9	40%	Complaints Likely	Low Risk	Likely no, but borderline for taste/odor
Baseline + Alum Treatment + Climate Change (RCP 4.5) + Future "Business As Usual + 2022 Ordinance Changes" Buildout (Code Changes) + Low Impact Development Standards	2100	937	9.3	7.6	12.8	30-40%	Complaints Possible	Low Risk	Likely no, but potentially for taste/odor
Lake Auburn Water Quality Goal Recommendation	2100	900	9.0			10-20%	Few Complaints	Low	No

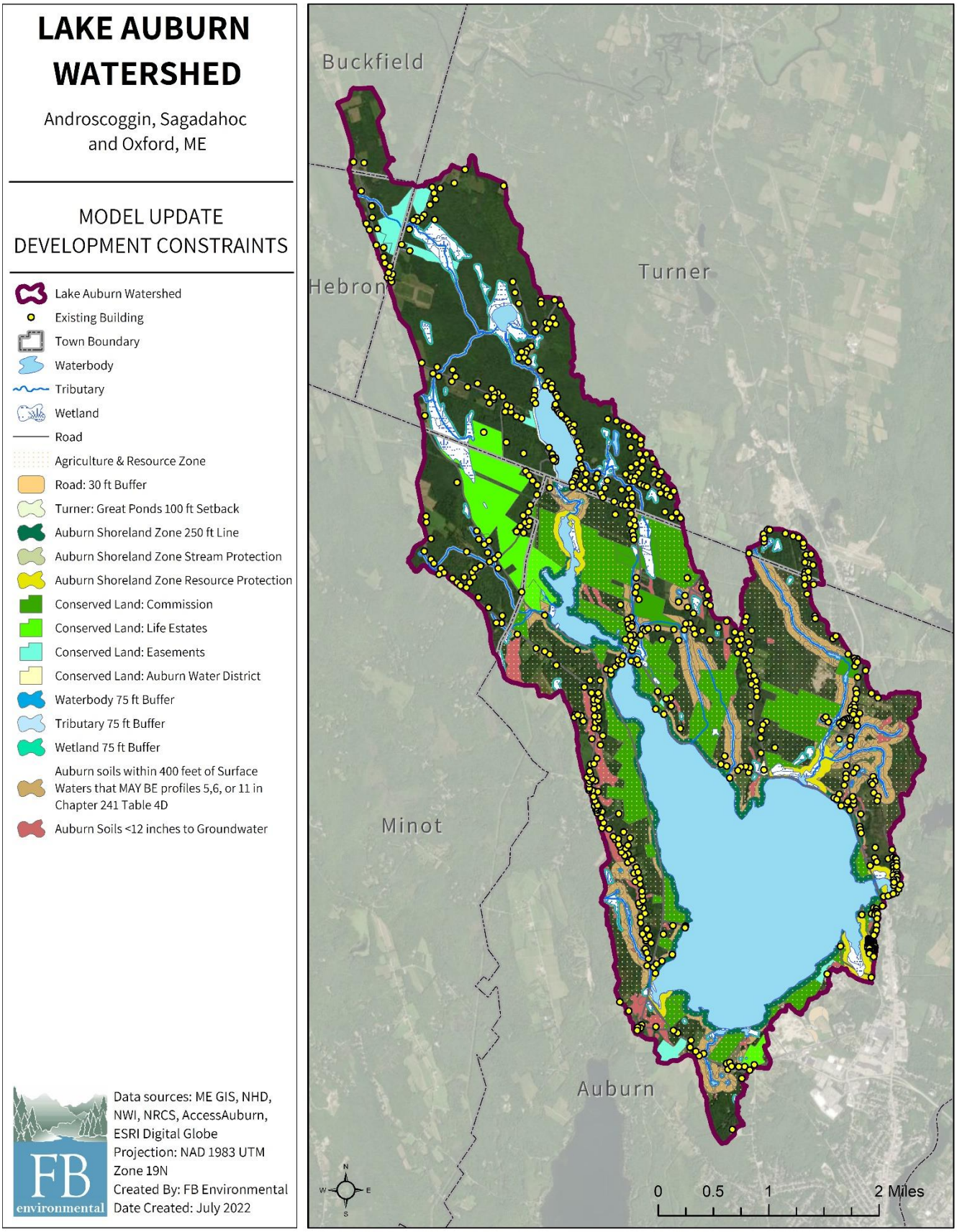


Figure 1. Development constraints in the Lake Auburn watershed for the 2022 ordinance changes baseline buildout analysis.

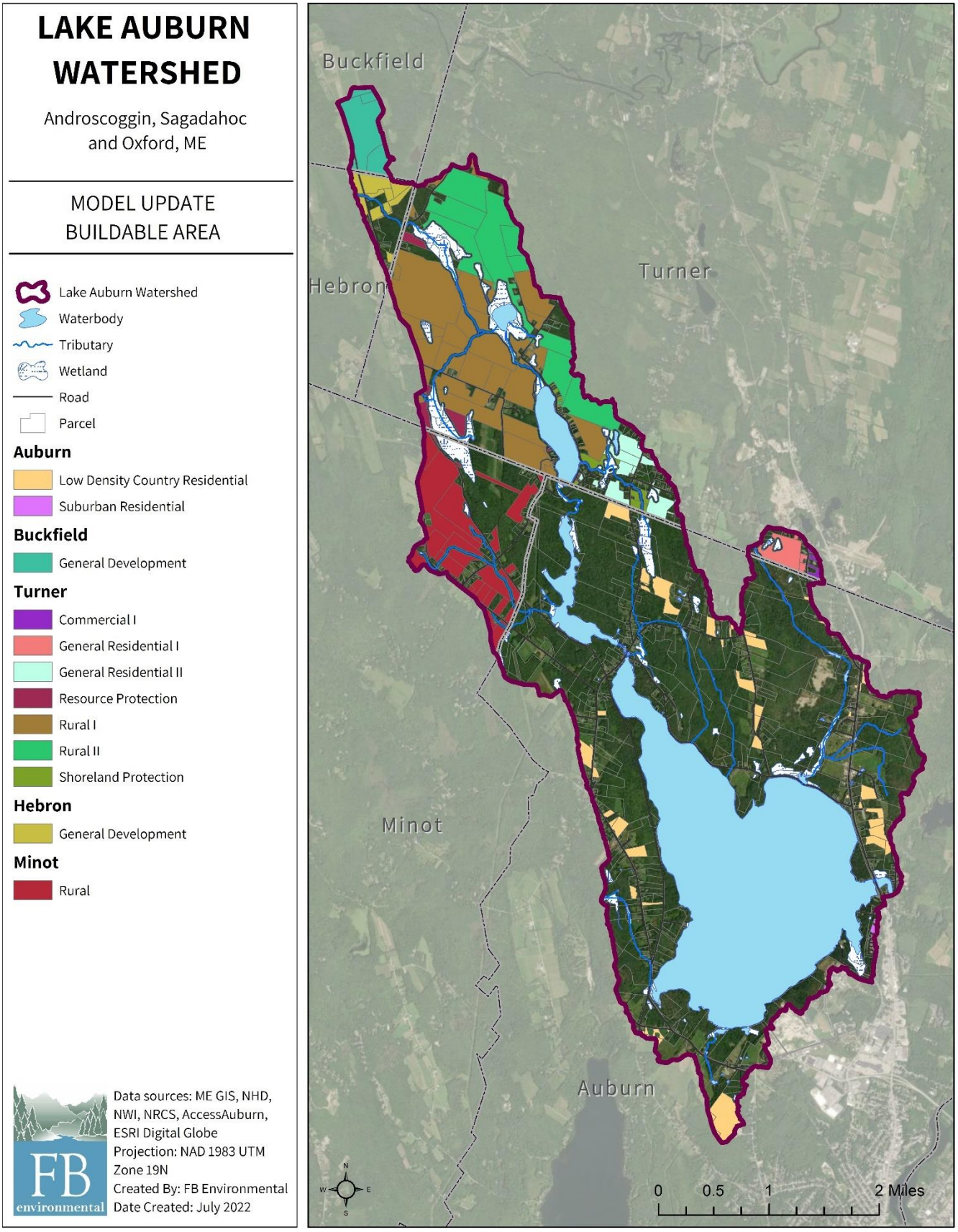


Figure 2. Buildable area in the Lake Auburn watershed for the 2022 ordinance changes baseline buildout analysis.

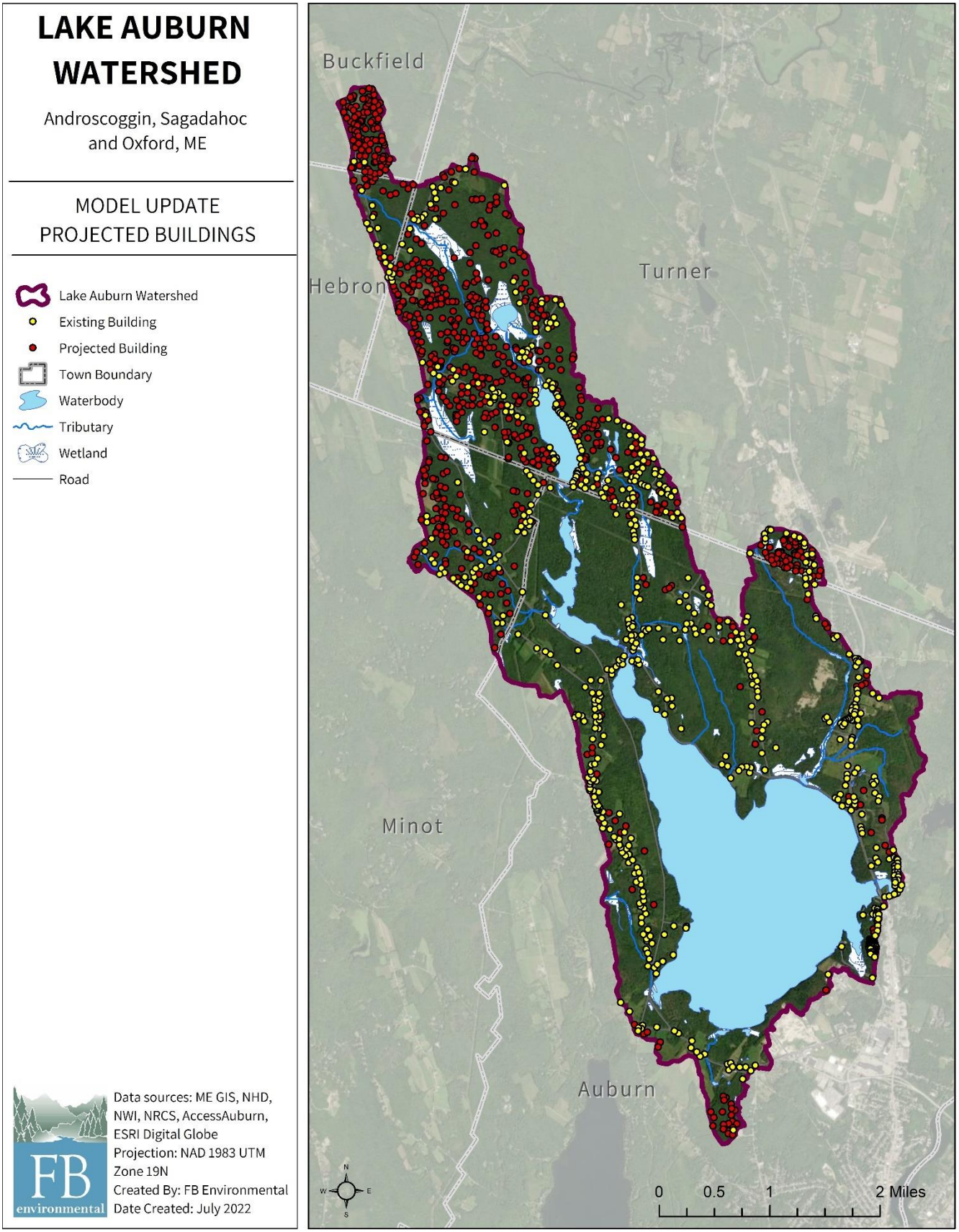


Figure 3. Existing and projected buildings in the Lake Auburn watershed for the 2022 ordinance changes baseline buildout analysis.

FUTURE SCENARIO CONSIDERATIONS

Considering additional nutrient attenuation by improved septic systems in the watershed. The City of Auburn will be requiring the use of diversion ditches and curtain drains for all septic system siting conditions. Diversion ditches and curtain drains divert surface and ground water away from leachfields to optimize the performance of septic systems, including their nutrient reduction potential (note: conventional septic systems are only designed for pathogen not nutrient removal; any nutrient removal is a byproduct of the design and is only optimized when an adequate biomat is established and maintained over time; the City of Auburn could consider requiring the installation of advanced treatment systems that directly target and reduce nutrients in sensitive environmental areas). The model already assumes that 90% of phosphorus in effluent is treated by an optimally functioning system and native soil. Additional research would be required to determine the validity of applying an adjustment factor to the phosphorus attenuation factor assumed for septic systems in the model. Even if an adjustment factor was justified in the literature, the change would likely be small and within the margin of uncertainty in the model. At the City's request, FBE could also make all existing and projected septic systems "new"[3] in the model to determine the possible improvement to in-lake water quality from upgrading all septic systems in the Auburn portion of the watershed (note: this would only be for shoreline septic systems; watershed septic systems are inherent to the land use export coefficients and would require additional research and consideration to tease out).

Including nitrogen modeling for Lake Auburn. The model can also predict nitrogen load and in-lake nitrogen concentrations, but additional work would be required to calibrate the model for nitrogen.

Strategizing how to achieve the target 900 kg/yr phosphorus load to Lake Auburn. The 2021 modeling effort set a target phosphorus load of 900 kg/yr for Lake Auburn to maintain good water quality and its filtration waiver. Model simulations for various circumstances would need to be played out to come up with one or more strategies for achieving the target load.

[3] Currently, the shoreline septic system load is a coarse estimate that splits the systems into "old" (>25 yrs) and "new" (<25 yrs) with a difference of 20% attenuation and 10% attenuation assumed for phosphorus, respectively. New systems are added to the model and split between the two age groups based on a similar ratio as existing old/new systems. This is because the model is projecting out to the end of the century - a system that is installed today will become "old" in 25 years and would likely be replaced a few times by the end of the century and alternate between those two age groups. A more nuanced analysis would take more research and discussion.

City of Auburn
City Council Information Sheet

Council Workshop or Meeting Date: September 6, 2022 **Referred Ordinance:** 08-03072022

Author: Sue Clements-Dallaire, City Clerk

Subject: Action on Citizen Petition and Potential Repeal of Ordinance 08-03072022

Information: On March 21, 2022, the City Council adopted Ordinance 08-03072022, amending the zoning map of 148 acres of Agriculture and Resource Protection (AG) to General Business (Parcel ID 289-001 and 289-002) of the Zoning Map and adjust the Article XII, Division 4, Sec. 60-951 Lake Auburn Overlay District map as proposed in the 2021 FB Environmental Report know as Lake Auburn-A Regulatory, Environmental, and Economic Analysis of Water Supply Protection.

On April 20, 2022, an affidavit to form a Petitioner's Committee was filed with the City Clerk. On April 25, 2022, petition blanks were issued. The deadline for the petition to be filed with the City Clerk was July 25, 2022. The petition was filed with the City Clerk on July 21, 2022. At that point, pursuant to Sec. 9.5 of the Charter, the Ordinance was suspended from taking effect.

The total number of valid signatures required was 1,647. *See* Charter Sec. 9.3(A). The petition was reviewed, and signatures validated; the petition was certified to be sufficient, with 1,981 valid signatures and 135 invalid signatures, on August 9, 2022. The City Clerk then issued a Certificate of Sufficiency of Petition and provided a copy to the Petitioners' Committee's contact person, Keri Myrick, on August 9, 2022.

Once the petition is determined to be sufficient, pursuant to Sec. 9.6 of the Charter, the City Council shall promptly consider voting to repeal the ordinance. If the Council fails to repeal the ordinance within 30 days after the date the petition was finally determined to be sufficient, it must submit the Ordinance to the voters of the City.

A proposed motion to act to repeal the ordinance is as follows: "I move that the ordinance specified in the referendum petition (Ordinance 08-03072022) be repealed."

If the repeal motion fails, it means that the Ordinance must be sent to the voters for a City-wide referendum vote. The timing of the referendum election is dictated by Sec. 9.6(B) of the Charter: the referendum election must be held "not less than one hundred twenty (120) days and not later than six (6) months from the date of the final city council vote thereon". If the City Council is ready on September 6, 2022, to set the date for the referendum election, a motion in substantially the same form as follows ought to be made: "I move that the ordinance specified in the referendum petition (Ordinance 08-03072022) be sent to a referendum vote to be held on _____, 202___." The timeframe to hold the special election would be no sooner than January 4, 2023, but no later than March 6, 2023.

City Budgetary Impacts: N/A

Staff Recommended Action: Consider the repeal of Ordinance 08-03072022.

Previous Meetings and History: On March 21, 2022, Council adopted Ordinance 08-03072022.

City Manager Comments:

I concur with the recommendation. Signature: Phillip Crowell Jr.

Attachments: Ordinance 08-03072022; copy of petition blanks; copy of affidavit to form a Petitioner's Committee; Certificate of Sufficiency of Petition; Article IX of the City Charter; Referred Ordinance 08-03072022.

ORDINANCE 08-03072022

City Council Ordinance

IN CITY COUNCIL

Amending the Zoning Map and Adjusting Article XII, Division 4, Sec. 60-951 Lake Auburn Watershed Overlay District Map

Be it ordained, that the City Council approve the amendment to the Zoning Map of 148 acres of Agriculture and Resource Protection (AG) to General Business (Parcel ID 289-001 and 289-002) of the Zoning Map and adjust the Article XII, Division 4, Sec. 60-951 Lake Auburn Watershed Overlay District map as proposed in the 2021 FB Environmental Report known as Lake Auburn- A Regulatory, Environmental, and Economic Analysis of Water Supply Protection.

A TRUE COPY

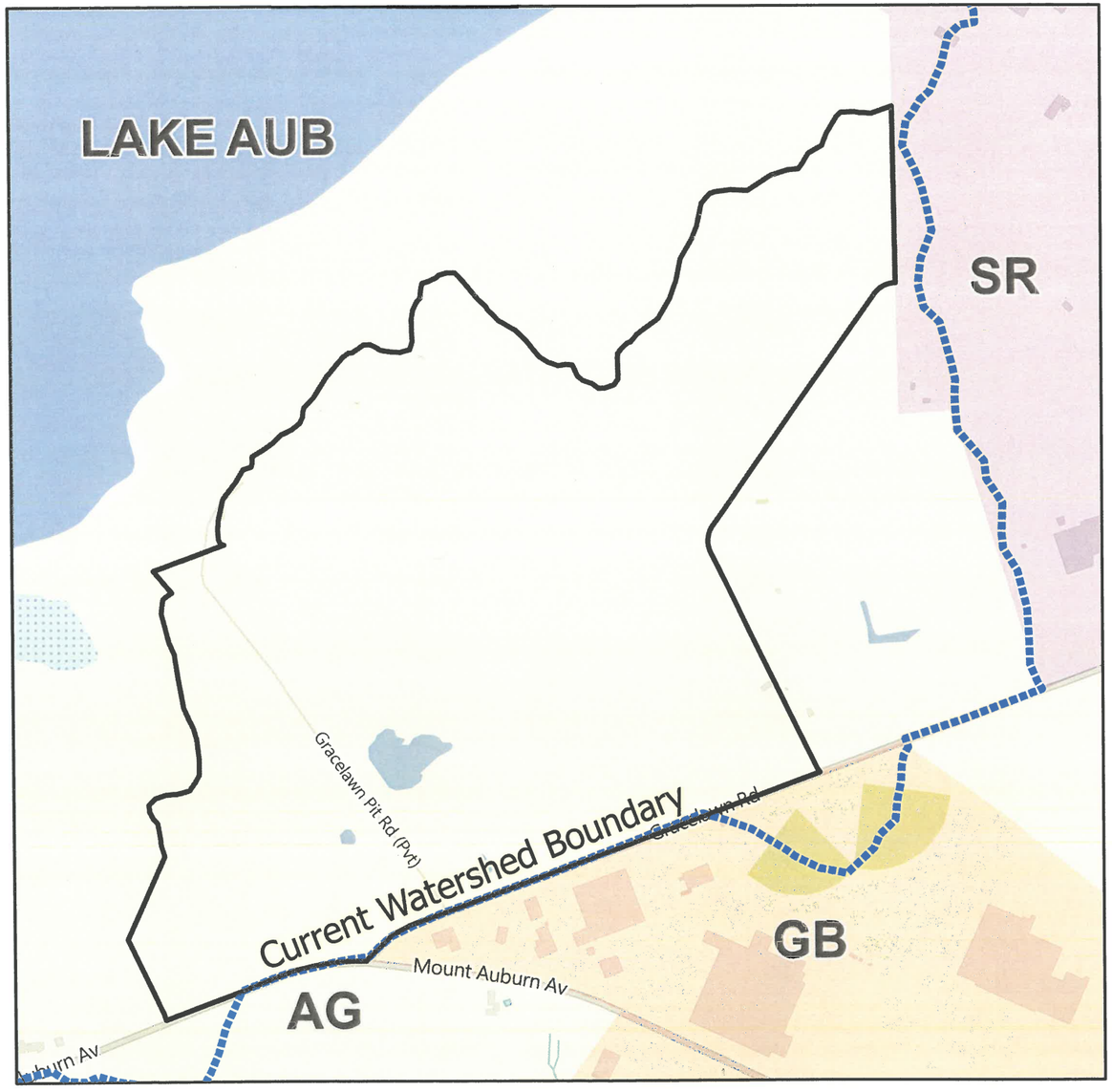
ATTEST Susan Clements-Dallaire 4/22/2022

Susan Clements-Dallaire, City Clerk Date

Passage of first reading on 3/7/2022, 4-3 (Councilors Staples, Gerry, and Whiting opposed).

Passage of second reading on 3/21/2022, as amended, 4-3 (Councilors Staples, Gerry, and Whiting opposed).

Gracelawn: Exhibit A



Current Zoning

Proposed Change

Current Watershed Boundary
Watershed Boundary from Report

Recommended Zoning Updates
Comp Plan to CDD
Extend to new watershed boundary

Current Zoning
AG - Agriculture and Resource Protection
GB - General Business
RR - Rural Residential
SR - Suburban Residential
Change Area

auburnmaine.gov

Referred Ordinance: 08-03072022

City Council Ordinance

IN CITY COUNCIL

Repealing Ordinance 08-03072022 adopted on 3/21/2022 amending the zoning map and adjusting Article XII, Division 4, Sec. 60-951 Lake Auburn Watershed Overlay District Map

Whereas, the City Council adopted Ordinance 08-03072022 on 3/21/2022 amending the zoning map of 148 acres of Agriculture and Resource Protection (AG) to General Business (Parcel ID 289-001 and 289-002) of the Zoning Map and adjust the Article XII, Division 4, Sec. 60-951 Lake Auburn Overlay District map as proposed in the 2021 FB Environmental Report know as Lake Auburn-A Regulatory, Environmental, and Economic Analysis of Water Supply Protection; and

Whereas, a Petitioners' Committee was formed to gather a minimum of 1,647 signatures of registered voters in the City of Auburn in an effort to repeal said Ordinance; and

Whereas, the petition was filed with the City Clerk on July 21, 2022 and determined to be sufficient on August 9, 2022; and

Whereas, Section 9.6 of the Charter provides that when a referendum petition has been determined to be sufficient, the City Council shall promptly consider voting to repeal the referred ordinance; and

Whereas, if the City Council fails to repeal the referred ordinance within 30 days after the date the petition was finally determined to be sufficient, the City Council shall submit the referred ordinance to the voters of the City;

NOW, THEREFORE, be it ordained that the City Council hereby repeals Ordinance 08-03072022 that was adopted on March 21, 2022.

Old Business- Peer Review of Gracelawn Studies

Draft Memorandum

To: *Erica Kidd, Watershed Manager*

From: *Robert H. Fitzgerald, PE, Water Resources Engineer*
Anne E. Malenfant, PE, PMP, Project Manager

Date: *June 24, 2022*

Subject: *Watershed Delineation Rezoning Review – Gravel Pit Parcel*
Lake Auburn Watershed Protection Commission

Study Area Introduction

Lake Auburn in Auburn, Maine provides public drinking water supply to Auburn and Lewiston, Maine. As part of the report "A Regulatory, Environmental, and Economic Analysis of Water Supply Protection in Auburn, Maine" (FB Environmental, 2021), a revision to the watershed delineation near the southeast shore of the lake was presented. This revision was based in part on previous hydrogeologic studies:

- E.C. Jordan Co., Hydrogeologic Investigation, Gracelawn Landfill/Lake Auburn, June 1990. (E.C. Jordan, 1990)
- Woodard and Curran Environmental Services, Supplemental Hydrogeological Study, Auburn Brush Dump, City of Auburn, ME, August 1995. (Woodard and Curran, 1995)
- Summit Environmental Consultants Inc., Ground Water Assessment, Gracelawn Road Gravel Pit, Auburn, ME, September 2007. (Summit, 2007)

The watershed delineation was moved northward, closer to the lake, removing approximately 148 acres from the estimated watershed. **Figure 1** shows the previous and revised delineations as presented by FB Environmental. **Figure 2** shows an approximation of these delineations sketched onto an aerial photo. The area between the old and proposed new delineations includes a number of sand and gravel borrow areas on the west side and former City of Auburn landfill and dump areas to the southeast

The recently proposed City of Auburn land use zoning change for this parcel is generally consistent with the revised watershed delineation, as shown in **Figure 3**. The area within the newly delineated watershed is generally shown to be in a "Resource Protection" zone, while much of the area just outside of the revised delineation is shown to be in a "General Business" zone.

This memo presents a review of the data presented in the hydrogeologic reports listed above that formed part of the basis for the new watershed delineation, plus a Maine DEP (MEDEP, 2019) memo related to the Gracelawn Landfill near the southern boundary of the study area.

- State of Maine Department of Environmental Protection, June 3 2019 Memorandum, Site: Gracelawn Landfill, Auburn, Subject Document: 2018 Annual Monitoring Report, Gracelawn Landfill, Auburn, ME prepared by CES Inc.

Study Area Topography

Topography and surface water drainage were not addressed in the reports reviewed for this memorandum. However, it is evident in **Figure 4** that topography was a significant factor in developing the revised watershed delineation. That is, the revised delineation in large part follows local topographic high points. Apparent exceptions are circled in **Figure 4**. The delineation does not follow the topographic high to the north near Summit well MW-1 and Jordan well MW-4, and does not extend south to the apparent topographic high between the bedrock outcrops labeled 325 and 320 (indicating surface elevation).

Study Area Geology

Sand and Gravel Overburden

According to E.C. Jordan (1990), the overburden soils are primarily ice-contact deposits, which "consist largely of stratified water-laid, medium to fine sands. Widespread coarser deposits of sand, gravel, cobbles, and boulders are present at the surface (topset beds) across much of the site but only locally with depth." The sand and gravel deposits are noted to be 50 to 150 feet thick where borrow pits have been excavated.

Glacial Till

According to Jordan, a layer of till underlies the sand and gravel and overlies the bedrock. The till is described as "a very dense, heterogeneous, unstratified mixture of silt, clay, sand, gravel, cobbles, and boulders." As such, the till, where it exists, could act as a semi-confining layer inhibiting groundwater flow.

The presence of till is explicitly recorded in logs of borings that were continued into bedrock as rock cores. Till is not explicitly identified in boring logs of wells completed in the overburden. The till layer is noted by Jordan to be relatively thin, with a maximum observed thickness of 7.5 feet.

Bedrock

The overburden and till are underlain by bedrock. The bedrock is visually identified in rock cores as coarse-grained gneiss. A few areas where the bedrock is present at the ground surface (outcrops) have been observed near the center of the study area and at/near the lake shoreline.

The bedrock is considered to be water bearing; a few of the groundwater monitoring wells were completed in the bedrock. No estimate of the permeability or transmissivity (i.e. quantity of groundwater flow the bedrock can support) is provided.

Bedrock Surface Geometry

Groundwater flow in the sand and gravel overburden is influenced in part by the geometry of the bedrock (plus till layer) that underlie the sand and gravel overburden and define the limits of the overburden aquifer.

Figures 5 and **6** show bedrock surface contours as presented by E.C. Jordan (1990) and Woodard and Curran (1995), respectively. In **Figure 6**, bedrock surface contours are shown only for the northeast part of the study area (orange circle). Seismic survey lines in that area are also shown. The contours in both figures were developed based on seismic surveys, boring logs and surveyed elevations of outcrops. Though it is not stated how the thin till layer might affect the seismic data and refusal in borings, the delineated bedrock surface should be reasonably representative of the bottom of the sand and gravel overburden aquifer, except at the identified outcrops areas where the overburden aquifer does not exist.

Noteworthy features of the delineated bedrock surface geometry include the following:

Knob

- Near the center of the study area is an area of high bedrock, labeled "bedrock knob" in **Figure 5**. The area includes outcrops, indicated by triangles in the original figure, circled in red in **Figure 5**. Outcrop surface elevations of 350, 325 and 320 feet mean sea level (MSL) are shown. The reported bedrock surface at MW-201, just north of the outcrops, is also greater than 300 feet.

- The bedrock surface appears to decline most steeply from the "knob" area to the north and northwest towards the lake, and to the southwest.

West/Southwest

- A large area with bedrock elevation less than 250 feet MSL is indicated for the west/southwest portion of the study area by E.C. Jordan (1990).

- This is consistent with well data presented in the Summit (2007) report for this area. While top of bedrock/till, or refusal is not explicitly stated in the logs, the bottom elevations of all but two of the twelve Summit overburden monitoring wells are below 253 feet MSL.

- The eastern-most Summit wells, MW-2 and MW-5, have bottom elevations greater than 260 feet MSL, indicating where bedrock starts to rise towards the "knob". (The Summit report refers to a seismic survey performed, but no data from the survey are provided.)

- Bedrock outcrops at the shoreline with surface elevations 264-266 feet MSL shown in **Figure 3** indicate a rise of the bedrock surface near the shore. The relatively elevated bedrock here might significantly limit the hydraulic connection between the overburden aquifer and the lake, which has a water surface elevation of approximately 260 feet MSL.

South/Southeast

- The bedrock surface decline to the south and southeast of the knob is less steep. The bedrock surface at MW-203, approximately 900 feet to the south-southeast, is 283 feet MSL. At MW-6, approximately 1,500 feet southeast, the bedrock surface indicated by refusal is 277 feet MSL.

East/Northeast

- **Figure 6** shows bedrock surface elevation contours for this area presented by Woodard and Curran (1995). These are based on boring logs and the seismic survey. The contours indicate the bedrock surface is lower than 250 (and as low as 235) feet MSL at MW-202, MW-206 and MW-301, approximately 900 feet east of the knob, indicating a significant decline.

- The contours indicate a subsequent rise in the bedrock surface to elevations greater than 260 feet MSL farther to the northeast.

- Note that the contouring shown in **Figure 6** does not account for the higher bedrock surface estimated at MW-1, approximately 500 feet south of MW-301, to be 275 feet MSL.

- The green circle at the eastern edge of **Figure 6** highlights locations where the topographic contours indicate areas where the ground surface is less than 260 feet. The area is highlighted in **Figure 6** because subsequent figures in this report do not extend that far to the east.

Groundwater Flow

The following observations about likely groundwater flow features in the study area are made based on data presented in the reports reviewed for this memo. The observations are made in the context of estimating the Lake Auburn watershed area, noting that precise new delineations have not been made as part of this review task.

The discussion below is organized by subareas that share similar groundwater flow characteristics that are distinct from the other subareas. The subareas are defined and illustrated by the locations of representative monitoring wells or bedrock outcrops.

A. Lake Auburn

- The lake water level is controlled by a dam. Based on 1940-2012 data, the lake level averages approximately 259.9 feet MSL, with a range from approximately 257 to 262 feet MSL.

- Groundwater level probes installed 2 to 4 feet into the lake bottom sediments just offshore (**Figure 7**) indicated upward head gradients, i.e., groundwater flow into the lake, at 10 of the 12 working probes. (DP-10 was damaged.)

- A slight downward gradient was observed at DP-13 adjacent to the wetlands near the northwestern extent of the study area. DP-2, near the northeastern extent of the study area also indicated a downward gradient.
- The observation of bedrock outcrops near the shoreline suggests that the bedrock aquifer could be a source of groundwater discharging into the lake.
- While the measured gradients in the probes were substantial, up to 1 foot head difference, the rate of groundwater flow into the lake at the probe locations depends on the degree of flow resistance provided by the bottom sediments. No hydraulic conductivity estimates were included in the reports.

B. North Central (Knob Area)

- Three identified bedrock outcrops near the top of the bedrock "knob" are circled in **Figure 8**. Also circled is well MW-201, approximately 600 feet north of the outcrops. The water table is in the bedrock at MW-201. Hence, most or all groundwater flow in this subarea is within the bedrock.
- The measured water level in MW-201 is greater than 305 feet MSL, and is thus more than 40 feet above the lake water level.
- The groundwater level could be even higher near the outcrops, where the surface elevation is higher than at MW-201 and the bedrock aquifer is directly recharged.
- While there is insufficient data to reliably determine bedrock groundwater flow direction in this subarea, it is very possible that this flow is to the lake. This includes the outcrop area, some of which appears to be outside of the revised watershed delineation.

C. West-Southwest

- Measured groundwater levels are below lake level (250.0 to 255.2 feet on 5/24/1990) in E.C. Jordan overburden monitoring wells MW-2 – MW-5.
- Summit overburden monitoring wells in the same area, MW-1, MW-3, MW-4, MW-6 – MW-12, also had water levels below lake level (250.6 to 258.0 feet MSL on 5/15/2006 to 8/9/2007)
- Hence, overburden groundwater flow in the area represented by these 14 wells (indicated by solid green circles in **Figure 9**) does not discharge to the lake based on these data. A mild southerly gradient away from the lake is indicated for both sets of wells.
- These data consistent with the revised watershed delineation in this subarea, except that Jordan well MW-4 and Summit well MW-1, which are part of the group with water levels below lake level, are within the revised watershed.

- Data for the easternmost Summit wells, MW-2 and MW-5 (dashed green circles in **Figure 9**), indicate that both the bedrock surface and groundwater levels exceed the lake water level (maximum reported groundwater level 271 at MW-5).

- The ground surface and bedrock surface rise steeply to the knob east and northeast of MW-2 and MW-5. Hence, these wells are likely close to the northeastern limit of the area where groundwater flow is predominantly in the overburden and is reliably away from the lake. At both wells, the measured water level is near the bottom of the well, assumed to be at or near the bedrock or till surface.

- The lake sediment probe data suggests that lake water does not contribute significantly to overburden groundwater flow in this subarea. This is consistent with high bedrock observed near the lake shore that could limit the hydraulic connection between the lake and the overburden aquifer.

- No data are available to indicate whether bedrock flow in this subarea could discharge to the lake, thus causing the observed upward gradients in the lake sediments. However, even If the bedrock aquifer does discharge to the lake in this area, the bedrock aquifer could not in that case be recharged in this subarea where overburden heads are below lake level.

D. Southeast

- Southerly flow away from the Lake is indicated in the vicinity of the Gracelawn Landfill by groundwater levels measured at piezometers P-1, to the north, and P-2 and P-3 to the south of the landfill. The piezometer locations are circled in **Figure 10**.

- Southerly flow at the Gracelawn Landfill is also indicated by water quality sampling and analysis at wells MW-101 and MW-102, co-located with the piezometers south of the landfill. Elevated specific conductance (among other parameters) was reported for MW-101 and MW-10 by E.C. Jordan (1990) and for MW-101 by ME DEP (2019).

- To the north of the Graceland landfill approximately 600 feet, the water level at PZ-203 (289 to 293) is much higher than the water levels at the nearest wells to the south, southwest and southeast. It is likely, therefore, that groundwater flow from this location (dashed green circle in **Figure 10**) has a southerly component away from the lake, which is nearly one-half mile to the north.

- However, it is difficult to estimate the actual groundwater flow directions in this vicinity because it is significantly influenced by the high bedrock and till here. The measured water table at PZ/MW-203 is very near the top of till elevation, sometimes just above and sometimes just below.

E. Northeast

- Monitoring wells MW-1, MW-10, MW-202, MW-206 and MW-301 (indicated by orange circles in **Figure 11**) are located east of the area of highest bedrock associated with the "knob".
- A northward component to overburden groundwater flow is indicated by water levels measured by Woodard & Curran (1995) at MW-1 (278.7), MW-301 (275.5) and MW-206 (274.4). Synoptic data including these wells and MW-202 are not available.
- Approximately 600 feet farther east, the water level measured at MW-10 (272.7) indicates that there is also an eastern component to the groundwater flow.
- Woodard and Curran (1995) states, based on water quality data (not presented), that "it is possible that impacted groundwater from the north end of the brush dump and old burn area is flowing toward MW-10." This is consistent with both northward and eastward components to groundwater flow in this area.
- Lake Auburn (water level 260) and a stream channel east of MW-10, where ground surface is less than 260, are both possible points of discharge for groundwater in this area. The stream channel is tributary to the Androscoggin River.
- There is insufficient data to delineate a dividing line between flow to the lake and flow to the creek. One unknown is the influence (if any) on groundwater flow of the bedrock surface which rises to the east and north of MW-206 and MW-301.

Summary and Conclusions

As part of an environmental and regulatory analysis of Lake Auburn water supply protection (FB Environmental, 2021), a revised watershed delineation of the watershed near the southeast shore of the lake was presented which reduced the watershed area by 148 acres (**Figure 1**).

Lake Auburn is an unfiltered water supply source for the cities of Auburn and Lewiston, Maine. Hence, changes to the watershed delineation could be relevant to future land use and land use regulation and possible impacts on water quality.

The watershed revision was based in part on estimates of groundwater flow directions presented in previous hydrogeologic studies. CDM Smith reviewed the geologic, water level and water quality data and analyses presented in these reports. CDM Smith's observations and assessments pertinent to watershed delineation are presented in this memorandum.

The observations are organized in terms of subareas that share similar groundwater flow characteristics that are distinct from the other subareas.

Bedrock High (North Central)

Near the center of the area where the watershed delineation has been revised (study area), the bedrock surface rises, creating what is called a bedrock "knob". Groundwater flow here occurs

only in bedrock. The bedrock groundwater level well MW-201 in this subarea is more than 40 feet above the lake surface water level and the groundwater level could be higher still near the bedrock outcrops farther to the south. Well MW-201 and the outcrops are circled in red in **Figure 12**.

There are insufficient data to reliably determine bedrock aquifer flow directions, but it would be reasonable to extend the revised watershed farther south in this area, to at least include the observed outcrop areas where the bedrock aquifer would be directly recharged as well as the nearby topographic high.

West-Southwest

To the west and southwest of the bedrock knob is a subarea represented by 14 monitoring wells (solid green circles in **Figure 12**) where the overburden groundwater level measurements are consistently below the lake surface water level. Groundwater in the area represented by these wells does not discharge to the lake. This is consistent with the revised watershed delineation, except that two of the wells in this group are north of the revised watershed delineation as shown in **Figure 12**.

Summit Environmental well MW-2 and MW-5 (Dashed green circles in **Figure 12**) are likely near the limit of the west-southwest subarea where groundwater flow is predictably away from the lake. Just to the northeast of these wells the ground surface and bedrock surface rise steeply towards the knob area.

Gracelawn Landfill (Southeast)

The previous watershed delineation apparently included the Gracelawn Landfill near it's southeastern limit. Groundwater level and water quality data at wells circled in blue in **Figure 12** indicate that groundwater flow in this vicinity is southward, away from the lake. This is consistent with the revised watershed delineation.

Northeast

Groundwater in the area indicated by the orange circled wells east of the knob in **Figure 12** likely flows in part to Lake Auburn and in part to a small stream just east of the study area that is ultimately tributary to the Androscoggin River. Data in the review documents, are not sufficient to precisely locate the divide between groundwater flow to the lake and to the river, and thereby establish a precise watershed boundary.

Further Study

If a more precise delineation of the watershed is required in any area, the next step would be to create a 3-D geometric visualization model and associated geographic information system (GIS) incorporating and integrating all of the relevant geologic, well construction, water level and water quality data included in the reports that were reviewed. Additional data including topography, land parcels and other geographic features should also be included. Research to identify if there are other hydrogeologic data available not included in the reports reviewed for this memo that should be included in the visualization model. These might include additional seismic survey results and boring logs.

Subsequently, the need for and focus of additional field data collection and/or groundwater flow modeling can be assessed. Groundwater flow model development would be significantly expedited by previous completion the 3-D geologic visualization model.

Attachment

Technical Memorandum Figures

Figures

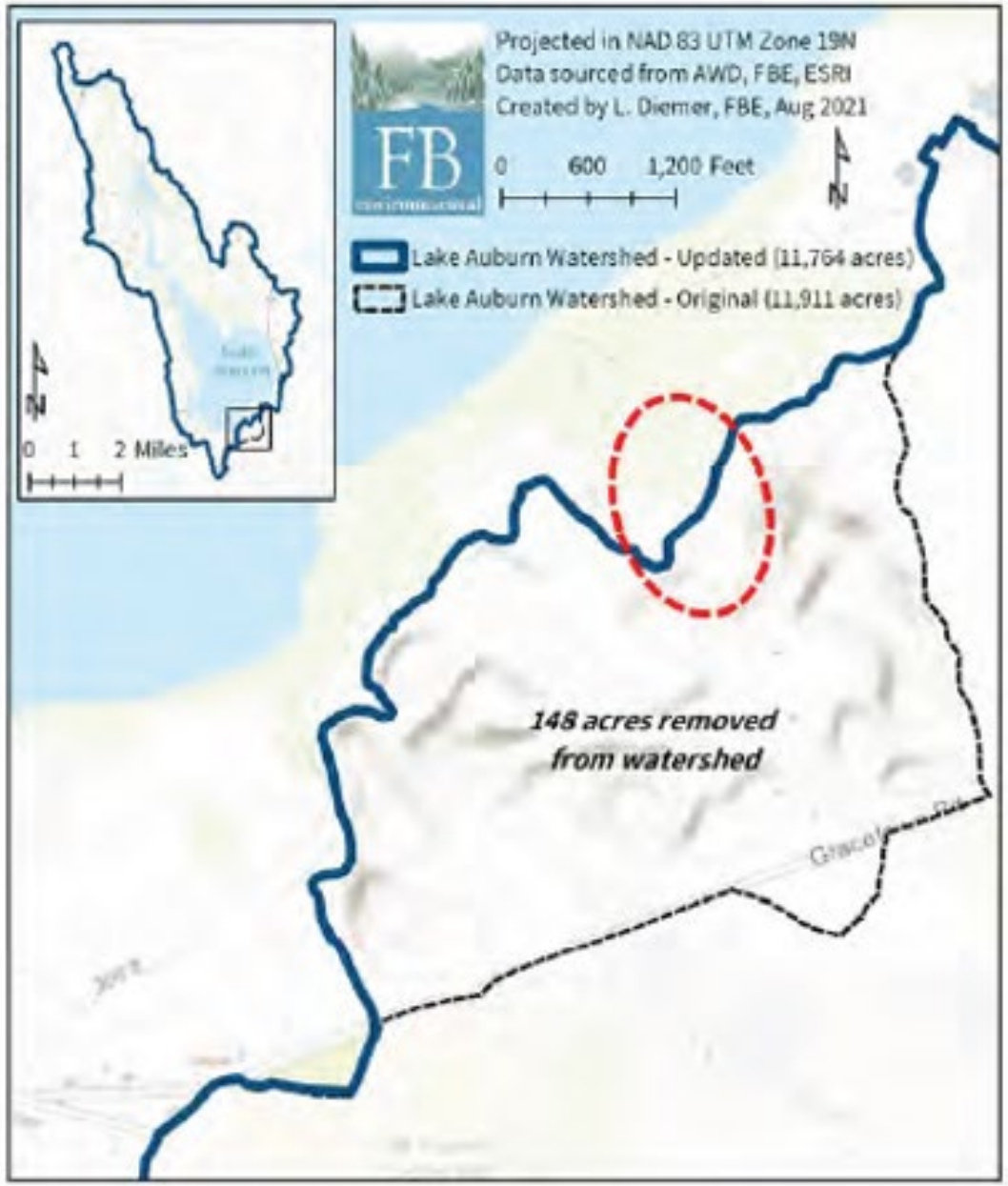


Figure 1 Previous (black dashed) and revised (blue) watershed delineation per FP Environmental (2021)

Figure 2 Google Earth aerial photo of study area

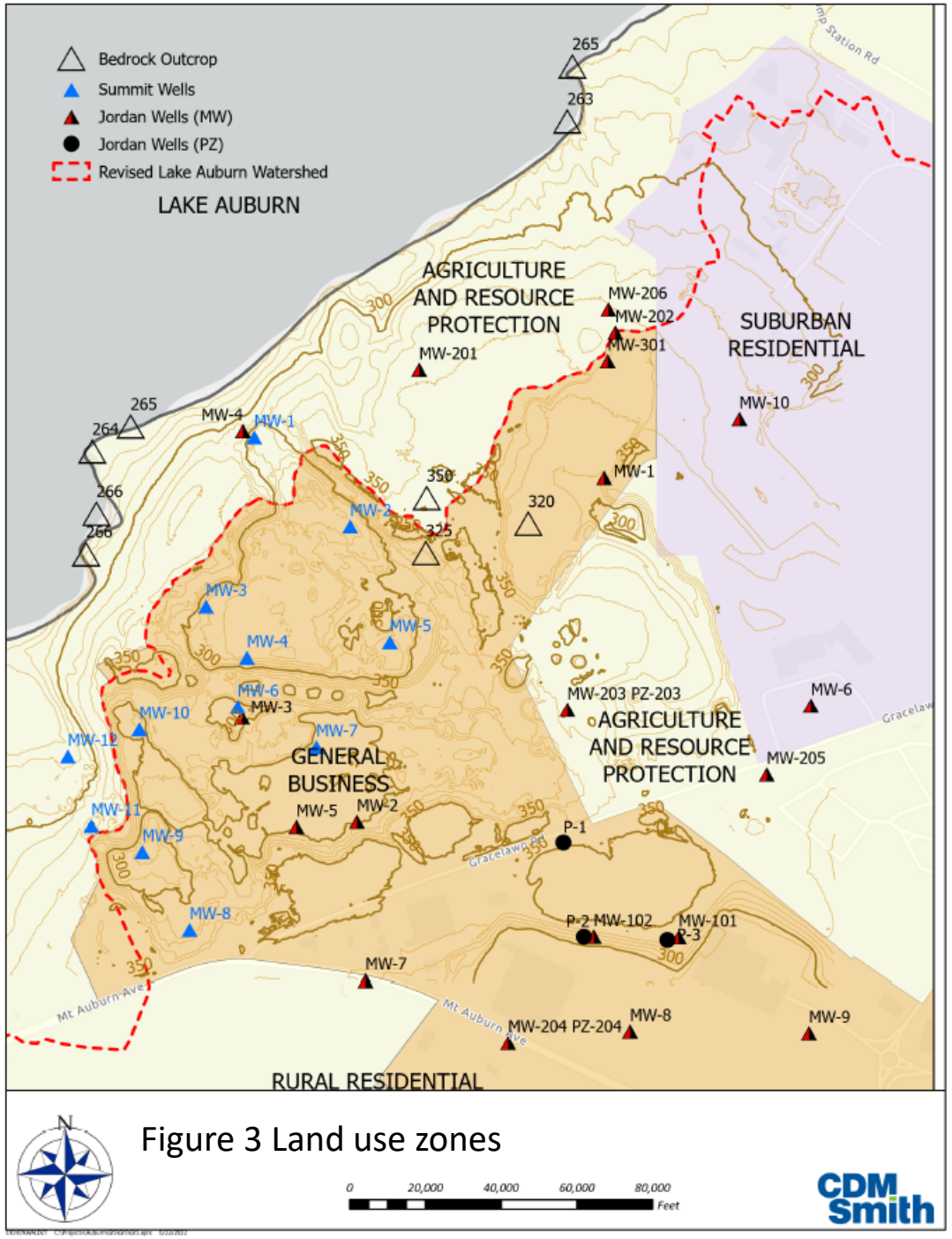


Figure 3 Land use zones

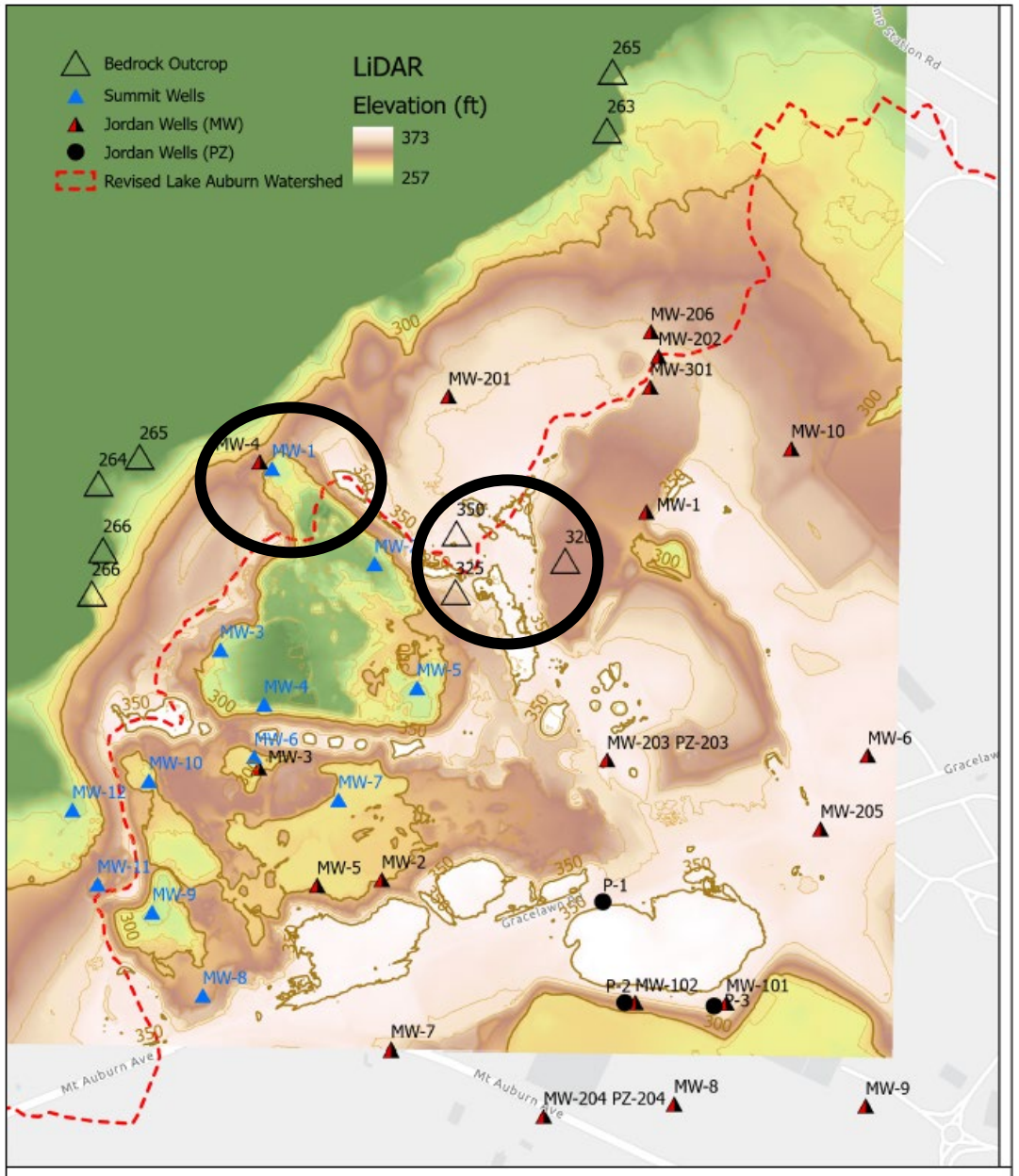


Figure 4 Topography

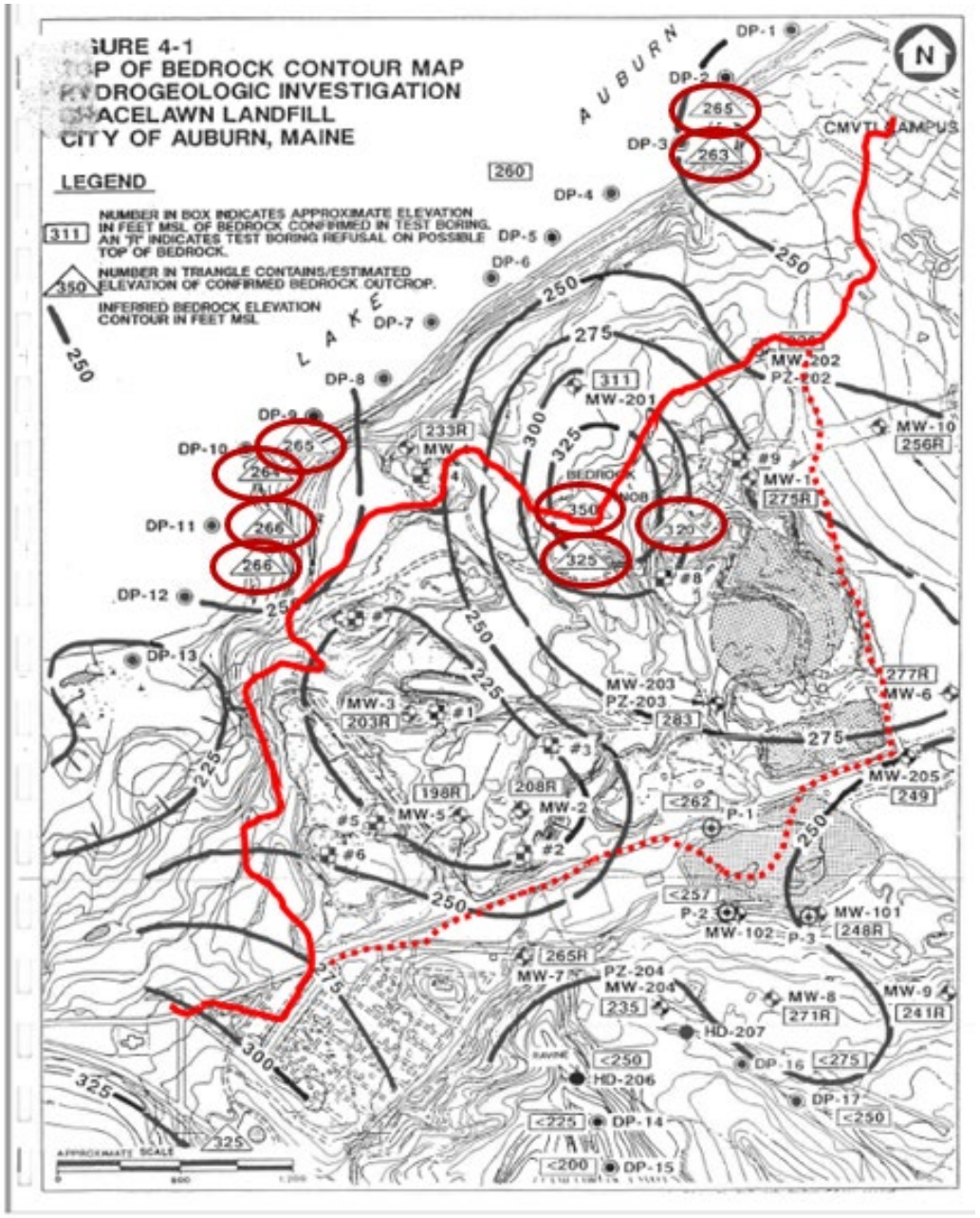


Figure 5 Bedrock surface contour map from E.C. Jordan (1990)

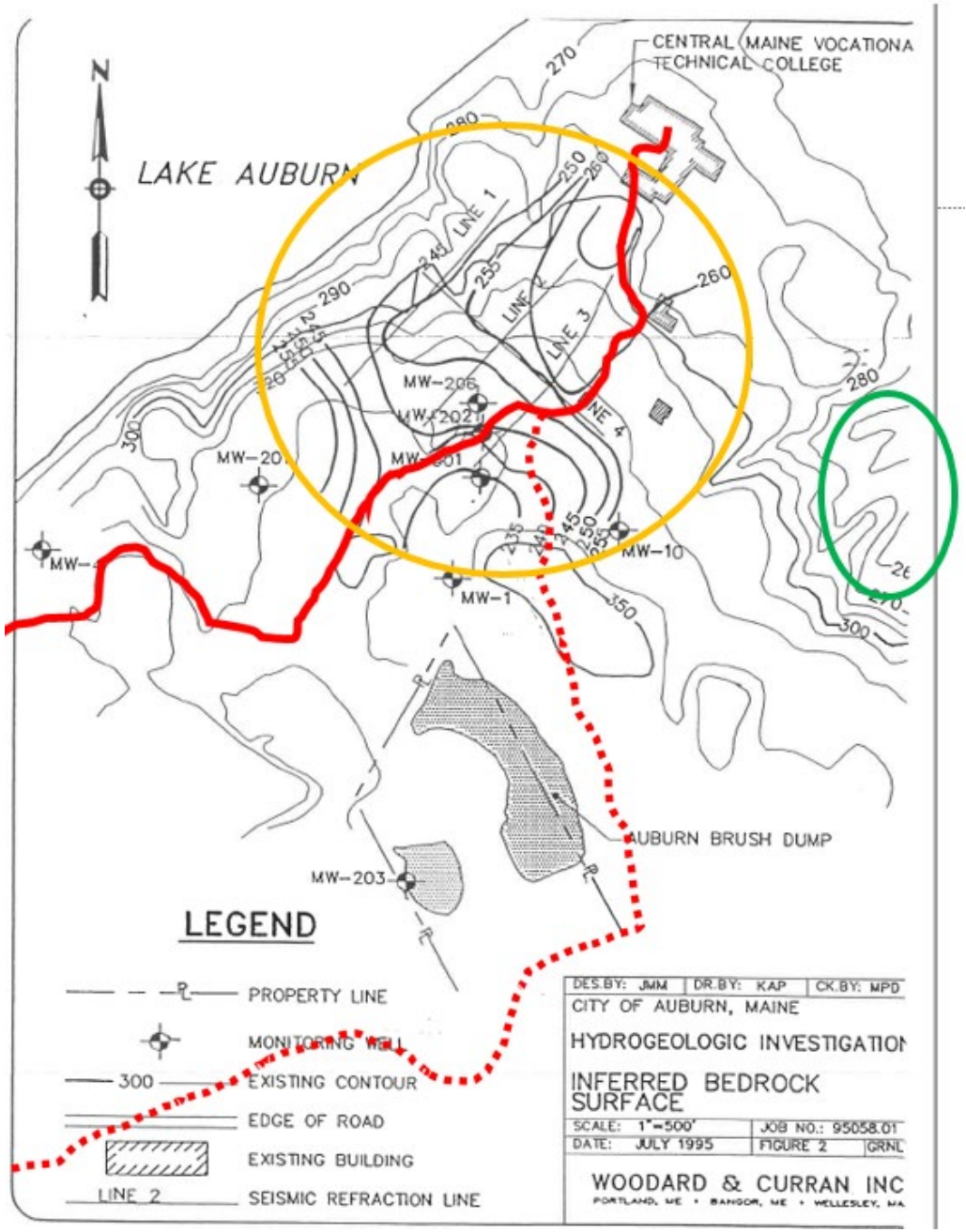


Figure 6 Bedrock surface contours from Woodward & Curran (1995)

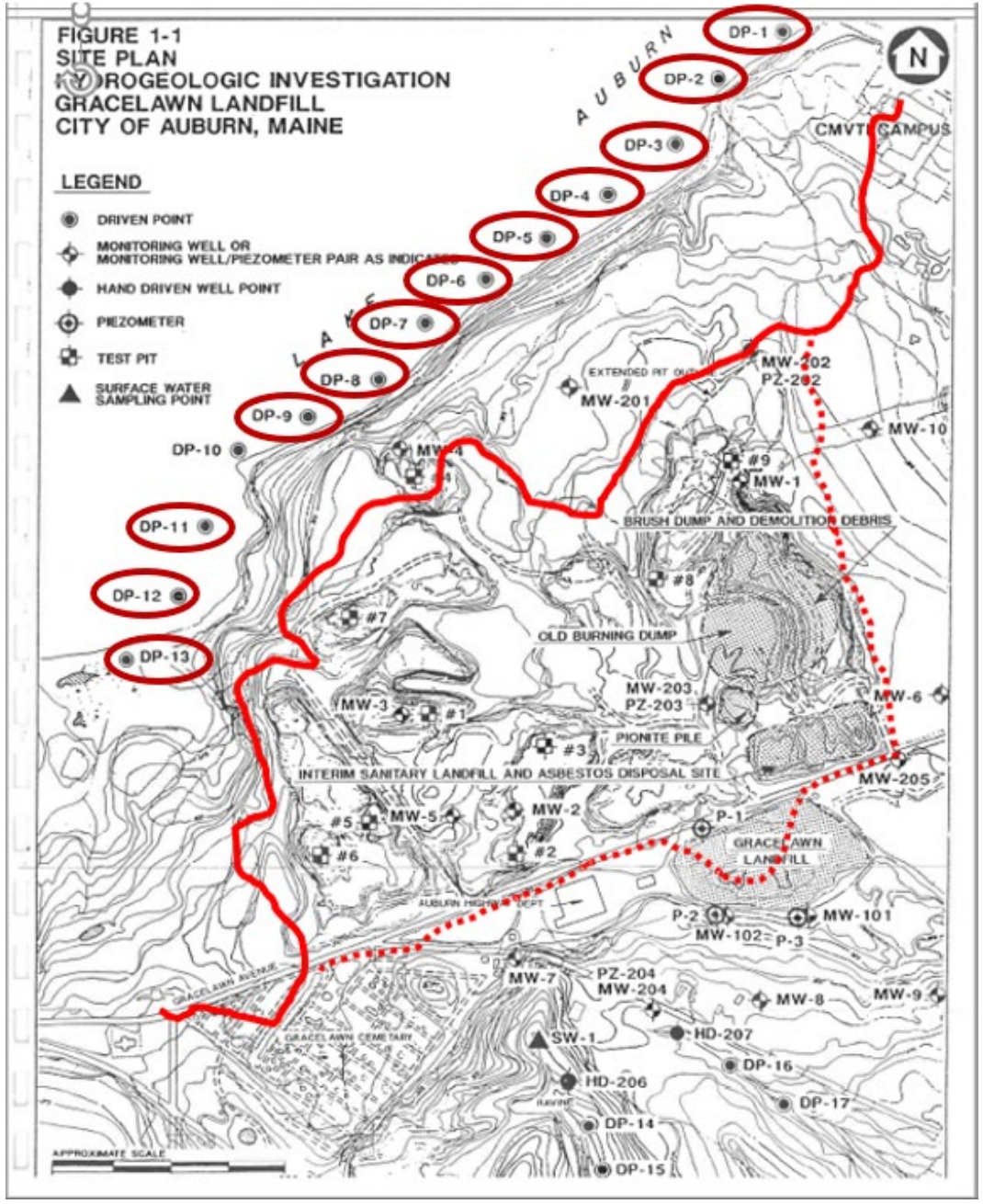


Figure 7 Subarea A: Lake Agawam sediment probes

Figure 8 Subarea B: Monitoring well MW-201 and bedrock "knob" outcrops

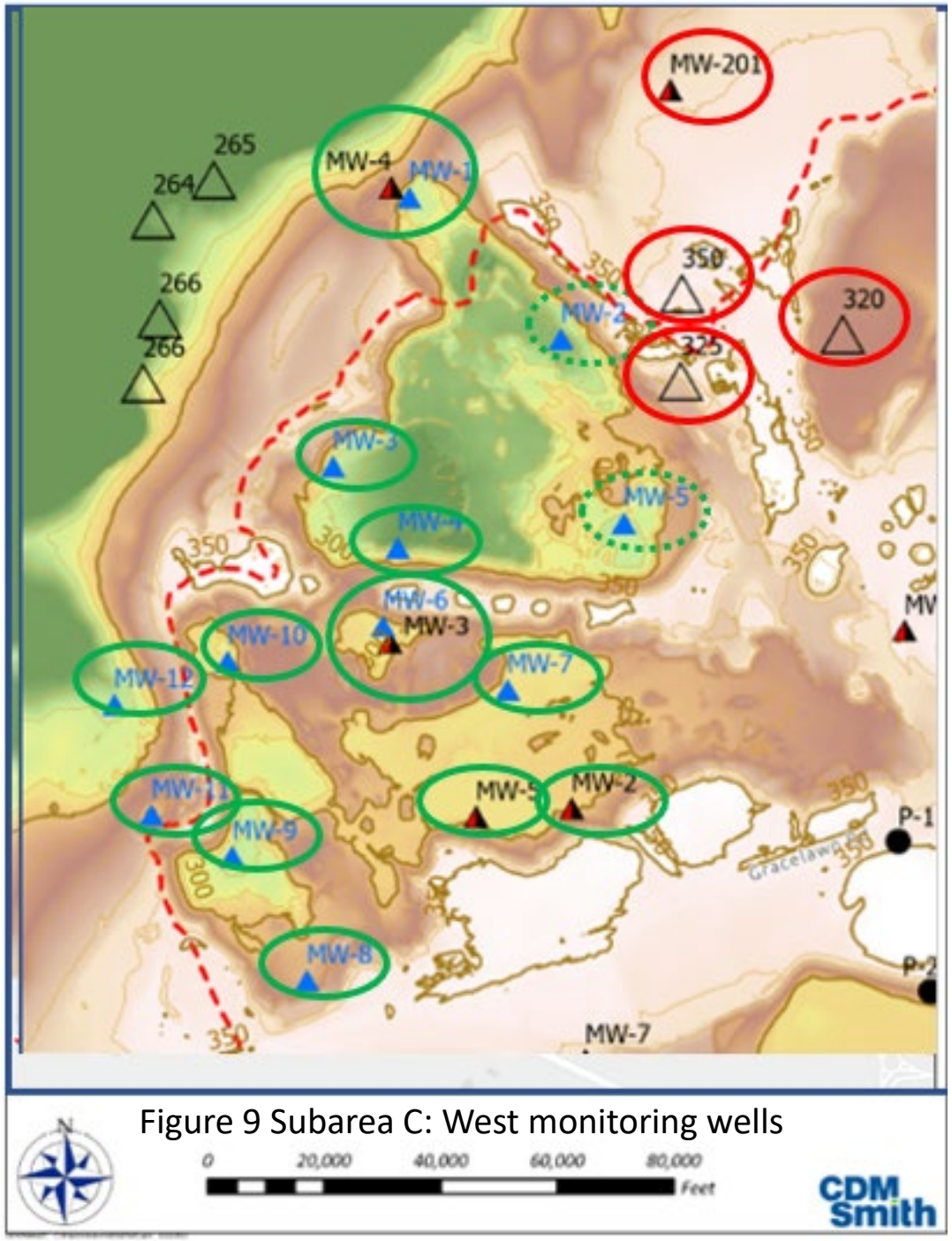


Figure 9 Subarea C: West monitoring wells

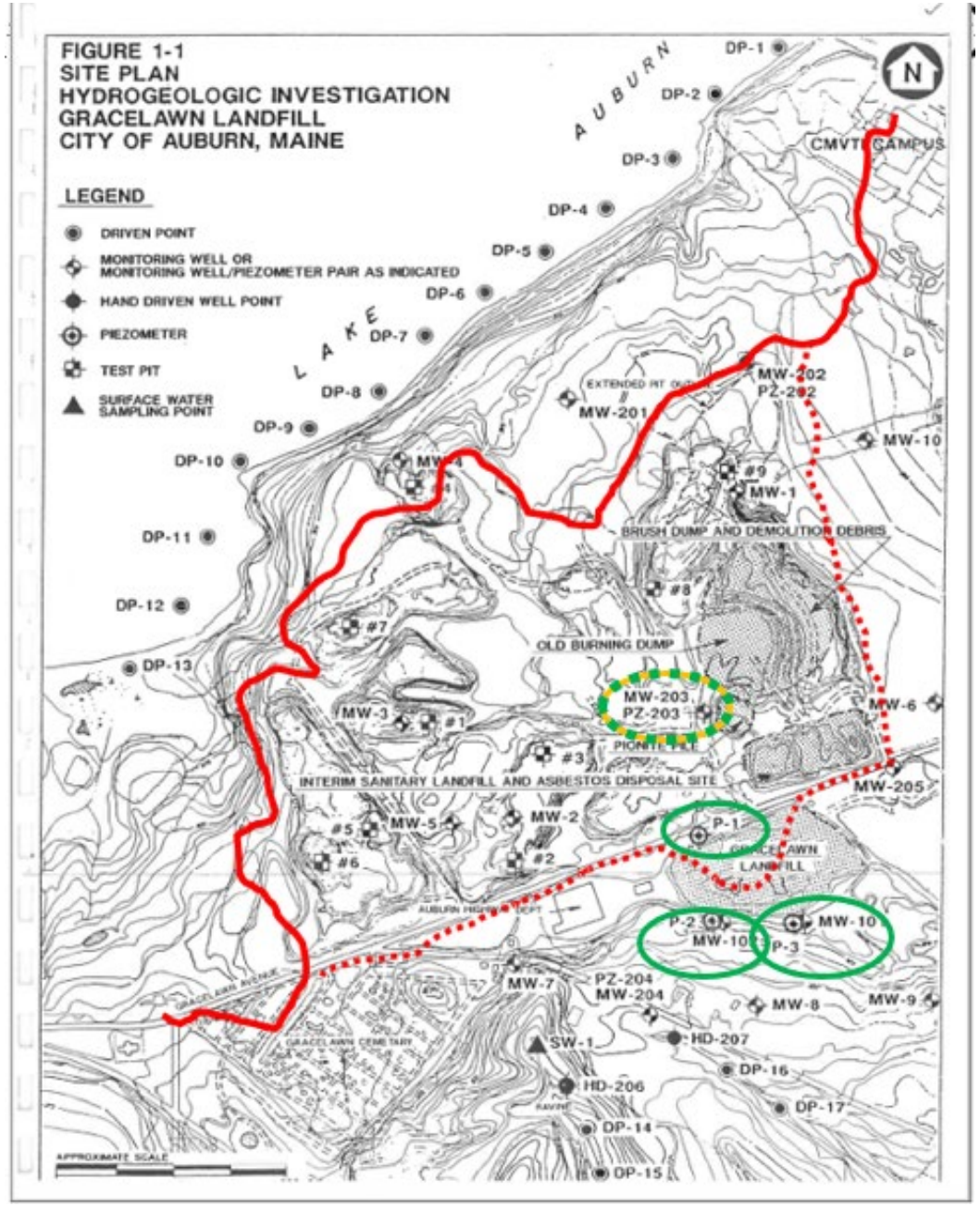


Figure 10 Subarea D: Gracelawn Landfill monitoring wells and MW/PZ-203

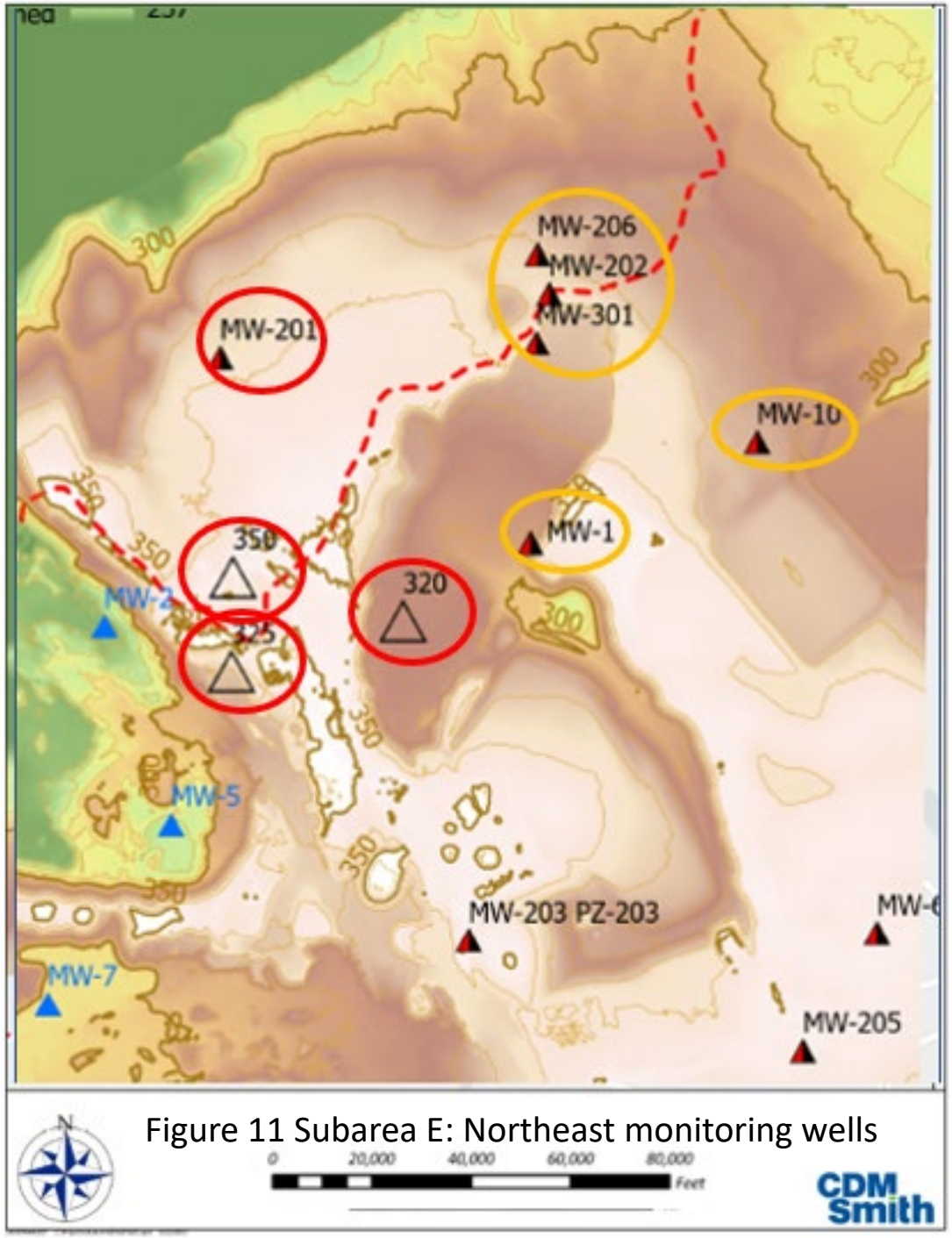


Figure 11 Subarea E: Northeast monitoring wells

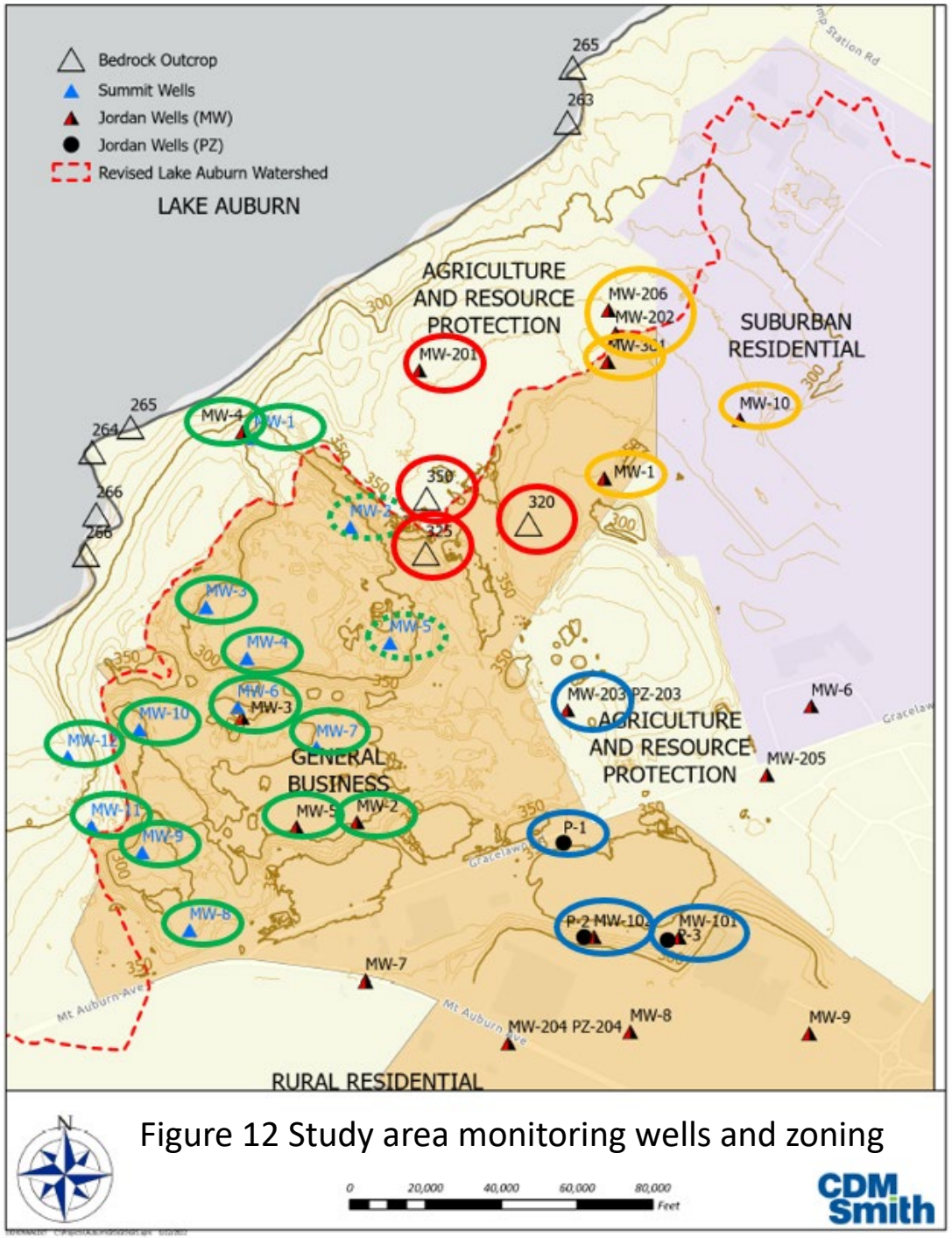


Figure 12 Study area monitoring wells and zoning

Old Business- Excerpts of Recommendations from 2021 Lake Study

A Regulatory, Environmental, and Economic Analysis of Water Supply Protection in Auburn, Maine

FOR THE CITY OF AUBURN, ME

FB Environmental Associates
Horsley Witten Group
The University of Maine

October 2021

Photo Credit: Sun Journal

Section 4, Analysis of Economic Impacts, examines the costs and benefits of the same development and water quality scenarios for the Lake Auburn watershed that are covered by the environmental analysis in Section 3. The analysis combines well-established economic methods with data on land use and water quality to systematically evaluate how these scenarios change or reallocate costs and benefits. We find that the source of the largest increases in benefits in all future scenarios is the increase in property taxes collected by Auburn, which climb from $3.6 million to $9 million annually in the highest development scenario. Meanwhile, the source of the largest extra costs is in dealing with declining water quality in Lake Auburn, especially treating water in a filtration plant which is estimated at over $3 million annually. Table 4-7 provides a detailed summary of our estimated aggregate costs and benefits across all scenarios. We find that the added benefits to Auburn are mostly or entirely offset by increased costs to Lewiston, resulting in negligible net economic benefit to the communities served by Lake Auburn.

Section 5 provides a summary of key findings, a discussion on several topics that overlap the regulatory, environmental, and economic analyses, and a set of holistic recommendations for the City of Auburn and other stakeholders to consider:

1. The City of Auburn should not seek to ease the current resource protection zoning or consider rezoning portions of the watershed for increased density. Increased density and new opportunities for residential development are better suited to other areas of Auburn outside of the Lake Auburn watershed.

2. The Auburn Planning Board and City Council should take up our recommended ordinance revisions and, if acceptable in their current form, adopt them. These recommended revisions are fully elaborated in Section 2 and in a separate document to the City.

3. The City of Auburn should share the findings on aggregate economic impacts with all partners and stakeholders for use in an open, transparent, and thoughtful public discussion of the fairness, equity, and sustainability of the current cost sharing and benefit allocations, as well as practical ways forward.

4. The City of Auburn, the Auburn Water District, the City of Lewiston, and the Lake Auburn Watershed Protection Commission should fully support collaborative work with local governments, land trusts, private landowners, and other potential partners in the upper Lake Auburn watershed to control development and limit phosphorus loading.

5. The key Lake Auburn stakeholders should cooperatively conduct a comprehensive review and gap analysis of current water quality monitoring efforts carried out by both the Auburn Water District and Bates College in the Lake Auburn watershed. This initiative should produce a monitoring plan, create a position for a full-time, dedicated data manager, continue collaboration with Bates College on student-assisted monitoring, and consider creating a technical science advisory board to the Lake Auburn Watershed Protection Commission to establish or maintain key local, State, and regional partnerships for review and guidance on water quality issues.

6. Given its high probability of causing a filtration waiver violation, a swimming area will likely not be feasible for Lake Auburn at any time unless State and federal authorities sign off. If a swimming area were to be re-instituted at Lake Auburn, we provide many actions that would need to take place to ensure that the area does not contribute to water quality degradation. Refer to Swimming in Section 3.

7. Allowance of only small watercraft restricted to areas away from the water supply intake should continue, and improved stabilization techniques at vehicle and pedestrian access points along the lake shoreline should be implemented, along with clear and effective barriers to foot and vehicle access.

8. The Lake Auburn Watershed Protection Commission should coordinate with local youth conservation groups or AmeriCorps to perform annual maintenance of trails and install best practices that limit erosion of trails, especially those sections nearest the lake. In addition, surveying how much horse manure may be found on the trails to inform a reconsideration of horseback riding near the lake is recommended, as manure can be a significant nutrient source in sufficient quantities. Finally, it is recommended that the City acquire permanent recreational trail easements to LAWPC properties with trails for guaranteed public access in the future.

9. The Lake Auburn Watershed Protection Commission should develop a comprehensive natural resource management plan for their lands that focuses firstly on drinking water protection and secondly on wildlife habitat protection, with multiple management options offered. The plan should incorporate new mapping of critical resources such as streams, wetlands, vernal pools, cover types, and rare, threatened, and endangered species present.

10. The Lake Auburn Watershed Protection Commission should work with local conservation groups and land trusts to purchase land in the watershed outside of Auburn. We also recommend that the Commission consider putting all their properties into permanent conservation.

Key Findings

Section 2, Analysis of Regulatory Impacts

We found that the regulatory framework for the protection of Lake Auburn as a water supply can be revised to be more clearly defined, better aligned with the best available science and State and regional norms, and more fairly applied across different land uses and activities. Specific recommendations are described in depth in Section 2, and direct ordinance language revisions are provided in a separate document to the City. A summary of our recommended revisions is outlined below:

- Revise the septic system requirements of the Lake Auburn Watershed Overlay District Ordinance to incorporate the Maine Subsurface Wastewater Disposal Rules, including provisions that allow for mounded leach fields and other State-approved alternative designs where there is not a native, in-situ, 36-inch vertical separation between the bottom of the organic horizon and the bedrock, water table, or other restrictive layer. Refer to Appendix 1.
- Revise the Phosphorus Control Ordinance to clarify that the limit of a project area does not apply to a given land use but to a demarcated limit of disturbance, such that all disturbance within that area is required to meet the erosion and sedimentation controls and other phosphorus controls under a plan required by the Phosphorus Control Ordinance.
- Require timber harvest and agricultural activities to meet the same requirements as other land uses under the Phosphorus Control Ordinance. Currently, timber management and harvesting must be conducted in accordance with a forest management plan prepared and supervised by a registered forester, while agriculture must be conducted in accordance with a soil and water conservation plan approved by the ACSWCD, making these uses effectively exempt from City oversight. Removing the exemption and requiring timber and agriculture to meet the same erosion control standards under the Phosphorus Control Ordinance would ensure that water quality protection is a central feature of any timber harvesting or agricultural activities in the Lake Auburn watershed.
- Develop a clear set of standards for farm management that will be consistently applied to farms in the watershed for the purpose of controlling erosion and limiting the delivery of excess phosphorus from the farm practices to Lake Auburn. One approach is to set a concrete limit on the amount of agricultural activities that are phosphorus-intensive (e.g., commercial raising of livestock, fertilized row crops, manure spreading). It is important to note that water quality is predicted to be much worse across all future scenarios if agricultural land use does not decline as predicted.
- Adjust the agricultural buffer strip requirement in the Lake Auburn Watershed Overlay District Ordinance to improve its effectiveness. Recommended adjustments include widening the buffer to 75 or 100 feet, requiring the buffer to be vegetated, and requiring the buffer to be located downgradient of all agricultural activities, perpendicular to the direction of overland flow, in all areas of the watershed (as opposed to requiring buffers only for agricultural activities that are adjacent to surface water).
- Update the Lake Auburn Watershed Overlay District Ordinance to reflect the revised watershed boundary, reducing the existing watershed boundary by 148 acres in the Gracelawn Road area.
- Incorporate low impact development requirements for single family residential development on the 1- and 3-acre lots allowed in the Lake Auburn watershed by way of referencing the Maine Stormwater Management Design Manual, Volume 2. The use of low impact development can help to limit the impacts of stormwater runoff and associated erosion and pollutants from sites. The standards as they apply to a water supply watershed are presented below:
  - » Disturbance on an individual lot must be less than 15,000 square feet (including building, driveway, walkways, lawn area, construction access, and grading).
  - » A minimum natural vegetated buffer must be maintained downgradient of all developed areas on the lot. This buffer shall be 50 feet wide if naturally forested or 75 feet wide if maintained as a natural meadow.
  - » No more than 7,500 square feet of impervious cover is located on the property.
  - » A minimum of 40 percent of the lot area must be maintained as an undisturbed natural area. If the existing land has been disturbed by prior activities, a natural vegetated buffer and/or undisturbed natural area may be proposed through restoration and revegetation.

Section 3, Analysis of Environmental Impacts

We found that Lake Auburn water quality in the last decade had reached a tipping point, whereby nuisance algae blooms were becoming more frequent and were threatening the filtration waiver. The partial alum treatment conducted in 2019 significantly reduced the

managed by land trusts. The water supply in-take is at the far southern extent of the lake in the Lower Bay. A 3,000-foot 'No Trespassing' zone surrounds the in-take, and no bodily contact is allowed within two miles of the in-take. Boating, fishing, snowmobiling, and ice fishing are allowed within the 2-mile limit but not within the 3,000-foot limit. Overall, the restricted area is very similar in size and structure to that of Lake Auburn (with the exception that the on-ice activities are not allowed on Lake Auburn). Taking Sebago Lake as a whole, however, the major difference with Lake Auburn is that Sebago's Lower Bay comprises a small fraction of the overall lake, the rest of which has no special swimming or boating restrictions for water supply.

Sebago Lake and its watershed are located many miles away from the service areas of the PWD. This geographical separation means that the communities served by PWD have no ability to enact land use controls on the lakeshore or in the watershed, unlike the situation in Lake Auburn where the City of Auburn can use its zoning ordinances to enact protections for the shorefront and watershed. It is likely that this lack of control over Sebago Lake's upper watershed has spurred the PWD to focus on cooperation with land trusts and private forestland owners to conserve tracts of land. As an example, PWD Environmental Services Manager Paul Hunt told the project team that the PWD is part of a partnership, Sebago Clean Waters, that seeks to raise the total amount of land conserved (and managed at least partly for water supply protection) from the current 12% of the watershed to 25% in the next 15 years (P. Hunt, pers. comm).

In all the examples considered, the authorities in charge of water supply protection emphasize the need to maintain shoreline control as much as possible, to conserve key water supply lands, and to tightly regulate recreation, regardless of current water quality.

Floods Pond in Otis, Maine has been the public water supply source for Bangor Water, the independent water district that serves Bangor and surrounding communities since 1959. At 635 acres of surface area, surrounded by a 4,600-acre watershed in Otis and neighboring Clifton, Floods Pond is less than half the size of Lake Auburn. Maximum depth is similar at 133 feet. Like Lake Auburn, Floods Pond also qualifies for a filtration waiver owing to its historically excellent water quality.

Land use in the Floods Pond watershed is largely controlled by Bangor Water, which owns or holds landowner agreements to manage 4,500 acres or more than 99% of the watershed land area. There is no public access to Floods Pond, which is home to a native population of Arctic char (Salvelinus alpinus), a coldwater fish species closely related to both salmon and lake trout that has been used by the Maine Department of Inland Fisheries and Wildlife to establish coldwater fish populations in other Maine lakes. Fishing, boating, and swimming are prohibited, as are hiking, wildlife viewing, and hunting in posted areas that include the entire shoreline.

The geography of Floods Pond as a water supply resembles China Lake more than Lake Auburn. The vast majority of Bangor Water customers are in downstream communities (Bangor, Eddington, Hampden, Hermon, and Orrington), while the protected shoreline and watershed areas are in upstream communities that do not use the water. (A small portion of Clifton is served by Bangor Water.) Bangor Water controls nearly all the Floods Pond watershed in Otis and Clifton, 4,500 acres total and more than LAWPC controls in the Lake Auburn watershed. Recreational activities are also much more restricted at Floods Pond than at Lake Auburn. Floods Pond provides a useful comparison point at the more restrictive end of the spectrum that puts the lost tax revenues and recreational opportunities at Lake Auburn in perspective.

To summarize, these comparisons with other water supply lakes demonstrate that the protections surrounding Lake Auburn do not exceed those of China Lake, Sebago Lake, or Floods Pond. The restrictions on recreational opportunities at Lake Auburn are similar to those at other drinking water supplies, including filtered and unfiltered water sources. Similarly, land use restrictions within the Lake Auburn watershed are far from the most prohibitive among the examples discussed, with only 20% of the watershed held or managed as water supply land compared to 99% of the Floods Pond watershed. In all the examples considered, the authorities in charge of water supply protection emphasize the need to maintain shoreline control as much as possible, to conserve key water supply lands, and to tightly regulate recreation, regardless of current water quality.

Holistic Recommendations

1. We recommend that the City of Auburn not seek to ease the current resource protection zoning or

consider rezoning portions of the watershed for increased density (e.g., village node-style development). Increased density and new opportunities for residential development are better suited to other areas of Auburn outside of the Lake Auburn watershed, preferably areas already served by sanitary sewer (for the benefit of nearby water resources such as the Androscoggin River). This recommendation is based on two key findings of this study that are fully elaborated in Section 3:

- Lake Auburn and its watershed are already at or near the key environmental thresholds of 10 parts per billion annual average total phosphorus and 75% forested watershed land cover; and
- The future scenario models showed that easing restrictions on further development in the Lake Auburn watershed would set the lake on a path toward deteriorating water quality, regardless of the beneficial effects of requiring low impact development techniques and without obvious management strategies to combat further declines in water quality.

2. We recommend that the Planning Board and City Council take up our recommended ordinance revisions and, if acceptable in their current form, adopt them. If not acceptable in their current form, the recommended revisions should be reworked and made more practicable but not watered down or fundamentally changed in their intent or effect. These recommended changes represent a move toward simpler, more transparent, more evenly applied regulations that are based on the best available science. These recommended revisions are fully elaborated in Section 2 and in a separate document to the City.

3. We recommend that the City of Auburn share the findings of Section 4, Analysis of Economic Impacts, with all partners and stakeholders so that the accounting of aggregate economic impacts of the existing conditions and various future scenarios are used as the basis for an open, transparent, and thoughtful public discussion of the fairness, equity, and sustainability of the current cost sharing and benefit allocations, as well as practical ways forward. This recommendation is based on the key finding that any net benefits to the City or Auburn residents and taxpayers from expanded residential development in the Lake Auburn watershed would be counterbalanced by additional costs to Lewiston and its residents and taxpayers, in the form of increased costs associated with mitigating declining water quality and decreased benefits from recreation. These findings are fully elaborated by Section 4 of this report. As a next step in this planning process, we recommend that a scenario be modeled and run through a benefit cost analysis that meets the target water quality goal for Lake Auburn, which was not possible in the future scenarios modeled in this study when considering Auburn-only changes to regulations and management approaches. Developing a scenario that meets the water quality goal may require several iterations. The scenario should likely expand the existing Lake Auburn Watershed Overlay District to the upper watershed towns, require implementation of low impact development techniques on new development watershed-wide, and account for septic design standard changes.

4. We recommend that the City of Auburn, City of Lewiston LWD, AWD, and LAWPC fully support collaborative work with local governments, land trusts, private landowners, and other potential partners in the upper Lake Auburn watershed (Turner, Minot, Hebron, and Buckfield) to control development and limit phosphorus loading. Historically, LAWPC has been an active player in fostering collaborative action between the local governments, with representation from the upper watershed towns. This recommendation is based on the key finding from this study that Auburn alone cannot accomplish sufficient phosphorus load reductions to prevent deteriorating water quality in Lake Auburn, but will require active participation from the upper watershed towns. This finding is fully elaborated in Section 3.

5. We recommend completing a comprehensive review and gap analysis of current water quality monitoring efforts carried out by both AWD and Bates College in the Lake Auburn watershed. Identify gaps based on weaknesses and assumptions for the model. From the review and gap analysis, devise a robust long-term water quality monitoring plan and annual cost estimate for Lake Auburn. We also recommend that 1) the AWD hire a full-time, dedicated data management technician for improved management, access, and analysis of collected water quality data; 2) the AWD and LWD continue collaboration with Bates College on student-assisted monitoring; and 3) LAWPC consider creating a technical science advisory board to establish or maintain key local, State, and regional partnerships that can help to provide regular review and guidance on water quality issues.

6. Given its high probability of causing a filtration waiver violation, a swimming area will likely not be feasible for Lake Auburn at any time unless State and federal authorities sign off. If a swimming area were to be re-instituted at Lake Auburn, we provide many actions that would need to take place to ensure that the area does not contribute to water quality degradation. Refer to Swimming in Section 3.

7. Allowance of only small watercraft restricted to areas away from the in-take should continue, and improved stabilization techniques at vehicle and pedestrian access points along the lake shoreline should be implemented, along with clear and effective barriers to foot and vehicle access.

8. We recommend that the LAWPC coordinate with local youth conservation groups or AmeriCorps to perform annual maintenance of trails and install best practices that limit erosion of trails, especially those sections nearest the lake. In addition, surveying how much horse manure may be found on the trails to inform a reconsideration of horseback riding near the lake is recommended, as manure can be a significant nutrient source in sufficient quantities. Finally, it is recommended that the City acquire permanent recreational trail easements to LAWPC properties with trails for guaranteed public access in the future.

9. We recommend developing a comprehensive natural resource management plan for LAWPC lands that focuses firstly on drinking water protection and secondly on wildlife habitat protection if in the interest of public water supply protection, with multiple management options offered. We also recommend developing natural resource inventories for all LAWPC lands to map critical streams (perennial and intermittent), wetlands, vernal pools, cover types, rare, threatened, and endangered species present, etc. to include in individual natural resource management plans that set management objectives and methods to achieve water resource and wildlife habitat protection for each LAWPC parcel. If timber harvesting continues in the Lake Auburn watershed on LAWPC or private lands, then we recommend a series of actions to minimize forestry impacts to water quality. Refer to Forest Management in Section 3.

10. We recommend that LAWPC work with local conservation groups and land trusts to purchase land in the watershed outside of Auburn. We also recommend that LAWPC consider putting all their properties into permanent conservation. These properties are currently protected under the LAWPC by-laws but provide no higher-level legal protection from future development if said by-laws were to be revoked.

Photo Credit: Sun Journal

New Business- Proposal for Review of FBE Reports

COMPREHENSIVE
ENVIRONMENTAL
INCORPORATED

21 Depot Street
Merrimack, NH 03054
603.424.8441

August 16, 2022

Sid Hazelton, P.E., Superintendent
Auburn Water District
268 Court Street
Auburn, Maine 04212-0414

RE: D R A F T Scope of Services for Peer Review

Dear Mr. Hazelton:

Comprehensive Environmental Inc. (CEI) is pleased to submit this scope of services to perform a peer review of *A Regulatory, Environmental, and Economic Analysis of Water Supply Protection in Auburn, Maine* prepared by FB Environmental Associates dated October 2021 and the supplemental Lake Auburn Model Technical Memorandum dated August 1, 2022. The purpose of the review is to evaluate the conclusions drawn as they pertain to development and water quality impacts on Lake Auburn. Services will include the following:

SCOPE OF SERVICES

CEI will review the recent FB Environmental Associates study documents to evaluate the assumptions used to estimate phosphorus loads to the lake under various buildout scenarios that consider proposed zoning changes and the conclusions drawn from these assumptions as they pertain to the water quality of Lake Auburn. These will be compared with past studies where septic system requirements were evaluated and recommended and phosphorus loads were calculated.

CEI will review the following documents under this task:

- A Regulatory, Environmental, and Economic Analysis of Water Supply Protection in Auburn, Maine prepared by FB Environmental Associates, Horsely Witten Group and The University of Maine, dated October 2021.
- Lake Auburn Model Technical Memorandum addressed to Eric Cousens, City of Auburn, prepared by Laura Diemer, FB Environmental Associates, dated August 1, 2022.
- Memo addressed to Eric Cousens, John Blaise prepared by Sid Haselton, P.E., Superintendent of AWD, dated August 8, 2022.
- Lake Auburn Watershed Management Plan prepared by CEI, dated April 19, 2010.
- Lake Auburn Diagnostic Watershed Study prepared by CEI, dated March 13, 2013.

Any responses to the August 8, 2022 memo will also be reviewed if available.

CEI will then prepare a memorandum report summarizing its review and opinion on the

conclusions that were drawn under the FB Environmental Associates Study as they pertain to the predicted water quality of Lake Auburn under the various scenarios evaluated. This will be a qualitative analysis and will not include any pollutant load modeling to evaluate other assumptions.

CEI has assumed one remote meeting (Zoom or conference call) with Auburn Water District (AWD) and one round of response to comments.

COST AND SCHEDULE
The above work can be completed in accordance with the attached Standard Contract Form for a not to exceed upper limit of $6,000. The work will be completed within one month of notice to proceed.

ADDITIONAL SERVICES
Should AWD request additional services (e.g., pollutant load calculations, in person meetings), these can be performed by CEI on a time and materials basis.

If you have any questions about the above scope of services, please feel free to call me at 800-725-2550 ext. 301 or Rebecca Balke of my staff at ext. 308. If this meets with your approval, please indicate so by signing below and returning a copy to me.

Sincerely,

COMPREHENSIVE ENVIRONMENTAL INC.	APPROVED:
Eileen Pannetier	BY:
President	
Attachment: Standard Contract	DATE:

New Business- Resolution for LAWPC

Lake Auburn Watershed Protection Commission

September 14, 2022

Resolution of the Lake Auburn Watershed Protection Commission Regarding:

City of Auburn Proposed Revisions to the Lake Auburn Watershed Zoning Ordinance

The following resolution was adopted on the 14nd day of September, 2022 by the Commissioners of the Lake Auburn Watershed Protection Commission (the "Commission") by a vote of _to _ at the Commission's regularly scheduled meeting on September 14, 2022:

WHEREAS, in 1993, the Lake Auburn Watershed Protection Commission ("Commission") was formed with the principal purpose to maintain safe and healthful environmental conditions within the Lake Auburn Watershed, to prevent and control water pollution and to protect and maintain the present quality and volume of potable water supplied from the Lake Auburn Watershed, and

WHEREAS, the Commission has the authority to take legal action to enforce the laws and ordinances relative to the watershed and drinking water pollution, to such extent as is required to protect the watershed or waters of Lake Auburn in order to maintain its purity and the exemption from filtration requirements under the surface water treatment rules adopted under the Safe Drinking Water Act; and

WHEREAS, Lake Auburn is the public drinking water supply for water consumers in the City of Auburn and also (pursuant to Chapter 153 of the Laws of 1899) is the public drinking water supply for the City of Lewiston; and

WHEREAS, the United States Environmental Protection Agency, pursuant to the Safe Drinking Water Act, promulgated rules in June of 1989 calling for the filtration of all surface water supplies that cannot meet stringent criteria with respect to purity; and

WHEREAS, the 2010 City of Auburn Comprehensive Plan; Chapter 1(A), provides Goals, Objectives and Strategies with regard to natural resources, with Goal A.1 expressing the public's desire to: "Maintain the exceptional water quality of Lake Auburn and existing waiver from filtration to avoid the need for costly treatment;" and

WHEREAS, the Auburn Water District has adopted a by-law regarding the land located within the Lake Auburn Watershed Overlay District, which provides that, "These zoning and land use policies, and the enforcement of them, are deemed to provide sufficient protection for the water supply from the adverse effects of human activities in the watershed," which conclusion is premised on the existing development standards, restrictions, and definitions presently applicable to the underlying zoning districts within the Lake Auburn Watershed Overlay District, which existing standards are a critical component of the Commission's efforts to protect and preserve the water quality of Lake Auburn; and

WHEREAS, the existing terms, definitions, restrictions, and conditions provided for in the Lake Auburn Watershed Overlay District are a necessary component of ongoing efforts to protect Lake Auburn and must be maintained as they presently exist within the Lake Auburn Watershed Overlay District to preserve the purity of the public water supply, and to prevent irreparable harm to the same; and

WHEREAS, the City of Auburn is currently in the process of considering adopting revisions to the septic Ordinance as currently outlined in the Lake Auburn Watershed Zoning Ordinance that was adopted in July 1974; as a result of recommendations made from *A Regulatory, Environmental, and Economic analysis of Water Supply Protection in Auburn, Maine*, prepared by FB Environmental Associates dated October 2021, and the supplemental *Lake Auburn Model Technical Memorandum* dated August 1, 2022; and

WHEREAS, the Commission has approved a Scope of Services for Comprehensive Environmental Incorporated (CEI) to evaluate the conclusions drawn from FB Environmental Report and Technical Memorandum as they pertain to development and water quality impacts on Lake Auburn; and

WHEREAS, the CEI report will be completed within a month of notice to proceed; and

WHEREAS, the evaluation of results of CEI conclusions may have an impact on the City of Auburns decision to approve the revised Septic Ordinance

WHEREAS, the City of Auburn may be planning to approve the revised Septic Ordinance in late September/early October, and

WHEREAS, the CEI evaluation and vetting their conclusions may not be completed by late September/early October, and

NOW THEREFORE, the Lake Auburn Watershed Protection Commission hereby RESOLVES that the City of Auburn's proposed revisions to the existing Lake Auburn Watershed Zoning Ordinances should not be amended until such time as Comprehensive Environmental Incorporated (CEI) has completed a peer review of

***A Regulatory, Environmental, and Economic analysis of Water Supply Protection in Auburn, Maine*, prepared by FB Environmental Associates dated October 2021, and the supplemental *Lake Auburn Model Technical Memorandum* dated August 1, 2022. The Commission also resolves that time be allowed for proper vetting of the information supplied. The Commission further Resolves that this Resolution shall be forwarded to the Auburn City Council, the Auburn Water District, and the City of Auburn Planning Board.**

_____ _____

Evan Cyr Date
LAWPC Commission Chair