

11-1955

## Long Range Data (1955)

Walter A. Lawrance  
*Bates College*

Follow this and additional works at: <http://scarab.bates.edu/lawrance>



Part of the [Earth Sciences Commons](#), and the [Environmental Sciences Commons](#)

---

### Recommended Citation

Walter A. Lawrance Androscoggin River Studies Annual Report, November, 1955, Series I: Androscoggin River 1940-1983, Subseries I: Androscoggin River Studies, Box 2, Folder 3, Walter A. Lawrance Papers, Edmund S. Muskie Archives and Special Collections Library, Bates College, Lewiston, Maine.

This Article is brought to you for free and open access by the Muskie Archives and Special Collections Library at SCARAB. It has been accepted for inclusion in Walter Lawrance Papers by an authorized administrator of SCARAB. For more information, please contact [batesscarab@bates.edu](mailto:batesscarab@bates.edu).

ANDROSCOGGIN RIVER

and

POOL

LONG RANGE DATA

GENERALLY

1943 to 1954

## MEAN HOURLY AIR TEMPERATURES (F.)

<u>Year</u>	<u>May</u>	<u>June</u>	<u>July</u>	<u>August</u>	<u>September</u>	<u>October</u>
1954	51.71	62.34	66.39	64.88	57.25	51.83
1953	54.9	64.9	69.5	68.9	60.6	50.3
1952	52.0	65.5	73.9	68.7	61.0	47.6
1951	54.8	61.7	69.4	66.6	60.2	49.4
1950	54.6	64.1	68.9	66.0	55.1	49.8
1949	55.3	66.6	71.6	69.9	58.7	52.2
1948	50.3	60.0	70.5	69.9	61.2	48.6
1947	51.6	60.9	71.1	70.4	60.8	54.7
1946	53.4	63.6	67.9	64.7	61.4	50.8
1945	50.0	62.1	68.2	67.7	61.5	46.3
1944	58.0	63.5	69.8	72.6	60.7	48.2
1943	53.8	65.0	70.3	66.1	57.7	49.3
1942	56.8	64.7	68.8	68.2	60.7	50.8
1941	56.1	65.8	69.9	65.8	60.7	48.4
70 year average	53.57	63.18	68.94	66.70	59.21	48.59

WATER TEMPERATURES  
GULF ISLAND DAM

## Monthly Averages(x)

<u>Year</u>	<u>May(x)</u>	<u>June</u>	<u>July</u>	<u>August</u>	<u>September</u>
1954*	10.6	17.6	21.3	21.2	15.6
1953*	10.5	19.5	24.2	22.7	21.3
1952**	10.4	18.6	24.1	22.9	20.0
1951**	13.6	19.5	23.0	23.1	20.0
1950**	12.7	20.3	23.3	22.4	17.2
1949	16.0	20.3	24.0	24.5	20.0
1948	10.6	18.5	24.2	24.7	21.4
1947	10.6	16.6	25.2	25.6	22.3
1946	13.0	20.8	25.5	22.5	20.9
1945	11.4	18.2	23.5	23.8	20.4
1944	11.6	20.7	24.4	24.6	19.8
1943	10.8	19.5	23.6	22.4	18.0
(1942)	( - )	( - )	(23.6)	(24.0)	(20.0)
Twelve Year Average	11.8	19.2	23.9	23.4	19.7
1954 comp. with Aver.	-1.2	-1.6	-2.6	-2.2	-4.1

(x) Based on Thursday reports.

\* June through September average of daily reports

\*\* At twenty-foot depth except May; May and all others about five-foot depth.

## PRECIPITATION (INCHES) LEWISTON

<u>Year</u>	<u>May</u>	<u>June</u>	<u>July</u>	<u>August</u>	<u>September</u>	<u>October</u>
1954	6.42	5.83	3.94	4.96	6.58	2.93
1953	3.63	0.80	3.71	3.47	2.27	4.04
1952	5.58	4.10	1.14	1.92	3.39	2.40
1951	1.90	2.05	7.16	3.80	3.11	4.71
1950	0.84	3.14	0.93	2.71	1.44	2.85
1949	3.00	1.52	1.13	1.96	4.07	2.49
1948	6.53	3.89	1.50	2.04	0.91	3.35
1947	4.69	4.07	5.89	0.70	2.75	0.08
1946	3.05	1.59	4.59	7.30	4.65	1.64
1945	7.45	5.39	3.18	2.46	2.49	5.74
1944	0.57	5.25	3.99	1.43	6.29	4.35
1943	6.36	3.11	4.04	4.63	1.63	7.55
1942	1.42	6.54	2.92	1.09	2.83	2.21
1941	1.99	0.78	3.97	1.72	0.95	2.90
30 year average	3.43	3.41	3.56	3.07	3.62	3.52

TABLE ADF #1

AVERAGE DAILY FLOWS. G.I.D.  
c.f.s.

<u>Year</u>	<u>May</u>	<u>June</u>	<u>July</u>	<u>Aug.</u>	<u>Sept.</u>	<u>Oct.</u>	<u>aver. J.A.S.</u>
1955	8497	5061	2410	2832	2206	2178	2483
1954	14423	7449	4824	3598	14137	8823	7520
1953	10265	2685	2146	2216	1939	2039	2100
<u>1953-1955</u>	<u>11062</u>	<u>5065</u>	<u>3127</u>	<u>2882</u>	<u>6094</u>	<u>4347</u>	<u>4034</u>
1952	10265	8335	2225	1908	1837	1782	1990
1951	8691	3244	2883	2500	2617	2837	2666
1950	6693	3896	3187	2314	2404	2366	2635
1949	5262	2917	1951	1850	1839	1757	1880
1948	11260	3932	2159	2014	1776	1718	1983
<u>1948-1952</u>	<u>8434</u>	<u>4465</u>	<u>2481</u>	<u>2117</u>	<u>2094</u>	<u>2092</u>	<u>2231</u>
<u>1948-1955</u>	<u>9419</u>	<u>4690</u>	<u>2723</u>	<u>2404</u>	<u>3594</u>	<u>2937</u>	<u>2907</u>
1947	16344	8737	4046	2751	2241	1780	3012
1946	8454	4026	2586	3535	2464	4946	2861
1945	15384	5701	3824	2327	2471	5117	2874
1944	13225	4362	2727	1984	2354	2761	2355
1943	14985	8912	2976	3759	3548	5490	3427
<u>1943-1947</u>	<u>13678</u>	<u>6348</u>	<u>3232</u>	<u>2871</u>	<u>2615</u>	<u>4019</u>	<u>2906</u>
<u>1943-1955</u>	<u>11057</u>	<u>5327</u>	<u>2919</u>	<u>2584</u>	<u>3218</u>	<u>3353</u>	<u>2907</u>
1942	7053	9544	2770	1966	1929	2112	2221
1941	3197	2170	2136	1727	1481	1584	1781
1940	17589	5806	2920	2073	2625	1932	2539
1939	14458	4301	2461	2250	1894	2100	2201
1938	8097	3068	3334	2711	5107	3187	3717
<u>1938-1942</u>	<u>10079</u>	<u>4978</u>	<u>2724</u>	<u>2145</u>	<u>2607</u>	<u>2183</u>	<u>2491</u>
<u>1938-1955</u>	<u>10786</u>	<u>5230</u>	<u>2865</u>	<u>2462</u>	<u>3048</u>	<u>3028</u>	<u>2791</u>

TABLE #3

COMPARISON OF ODOR  
INTENSITY NUMBERS

1943-1954 inclusive

	<u>Date</u>						<u>Intensity</u>					
	43	44	45	46	47	48	43	44	45	46	47	48
June	17	15	14	13	12	17	50	39	29	--	--	--
	24	22	21	20	19	24	44	45	35	30	23	18
	1	29	28	27	26	1	41	43	34	40	24	29
July	8	6	5	4	3	8	58	27	27	49	29	33
	15	13	12	11	10	15	56	33	30	57	19	41
	22	20	19	18	17	22	49	51	36	51	28	42
	29	27	26	25	24	29	47	55	37	41	35	35
Aug.	5	3	2	1	31	5	50	79	42	56	48	37
	12	10	9	8	7	12	40	69	49	52	41	41
	19	17	16	15	14	19	40	62	50	46	53	34
	26	24	23	22	21	26	42	68	49	39	65	25
	2	31	30	29	28	2	49	52	46	45	69	27
Sept.	9	7	6	5	4	9	52	55	37	38	65	30
	16	14	13	12	11	16	43	56	45	22	49	38
	23	21	20	19	18	23	40	42	32	40	42	30
	30	28	27	26	25	30	31	37	24	45	48	23
Oct.					2						42	
	<u>Date</u>						<u>Intensity</u>					
	49	50	51	52	53	54	49	50	51	52	53	54
June	16	15	14	12	11	10	--	--	--	--	--	--
	23	22	21	19	18	17	28	15	13	13	21	25
	30	29	28	26	25	24	30	25	15	18	28	25
July	7	6	5	3	2	1	31	34	24	21	34	25
	14	13	12	10	9	8	25	23	23	26	30	17
	21	20	19	17	16	15	26	23	20	23	25	20
	28	27	26	24	23	22	28	30	22	30	23	16
Aug.	4	3	2	31	30	29	24	25	26	40	22	18
	11	10	9	7	6	5	27	25	32	38	17	21
	18	17	16	14	13	12	30	23	27	41	15	16
	25	24	23	21	20	19	29	24	29	35	18	19
	1	31	30	28	27	26	29	27	34	37	17	16
Sept.	8	7	6	4	3	2	14	23	27	24	15	13
	15	14	13	11	10	9	12	12	19	25	13	14
	22	21	20	18	17	16	21	15	13	24	10	22*
	29	28	27	25	24	23	12	9	21	27	9	18
	Oct.				2	1	30				26	15

\* Partial estimate.

TABLE #

COMPARISON OF ODOR  
INTENSITY NUMBERS

1943-1954 inclusive

<u>1943</u>	<u>1944</u>	<u>1945</u>	<u>1946</u>	<u>1947</u>	<u>1948</u>	
732	813	602	651	680	483	Total of Intensity Numbers
16	16	16	15	16	15	Number of weeks
46	51	38	43	43	32	Average weekly Intensity Number
58	79	59	57 56	69	43 41 41	Maximum weekly Intensity Number
7/8	8/3	8/16	7/11 8/1	8/28	7/22 7/15 8/12	Maximum odor downtown during week ending
<u>1949</u>	<u>1950</u>	<u>1951</u>	<u>1952</u>	<u>1953</u>	<u>1954</u>	
366	333	345	448	312	297	Total of Intensity Numbers
15	15	15	16	16	16	Number of weeks
24	22	23	28	19	18	Average weekly Intensity Number
31	34	34	41	34	25	Maximum weekly Intensity Number
*	7/6**	8/30	8/14	7/2	6/17 6/24 7/1	Maximum odor downtown during week ending

\*Statistically, July 7, but not materially different from some other weeks.

\*\*Not significant

ODOR INTENSITY DURATION

Weeks in each Range

	<u>54</u>	<u>53</u>	<u>52</u>	<u>51</u>	<u>50</u>	<u>49</u>	<u>48</u>	<u>47</u>	<u>46</u>	<u>45</u>	<u>44</u>	<u>43</u>
Range I ) Under 42 }	16	16	16	15	15	15	14	7	7	10	4	5
Range II ) 42 to 48 }	0	0	0	0	0	0	1	4	3	3	3	4
Range III ) 49 to 58 }	0	0	0	0	0	0	0	2	5	3	5	7
Range IV ) Above 58 }	0	0	0	0	0	0	0	3	0	0	4	0
TOTAL WEEKS	16	16	16	15	15	15	15	16	15	16	16	16

AVERAGE MONTHLY

ODOR INTENSITY NUMBERS

	<u>54</u>	<u>53</u>	<u>52</u>	<u>51</u>	<u>50</u>	<u>49</u>	<u>48</u>	<u>47</u>	<u>46</u>	<u>45</u>	<u>44</u>	<u>43</u>
June	25	30*	16*	14*	20*	29*	24*	24	35*	33	42	45
July	18	27	28	22	28	28	38	32	30	33	42	55
August	18	17	38	30	25	28	32	56	47	47	66	44
September	16**	12**	25**	20	15	18	30	49	36	35	48	42

\* Two weeks; other Junes three weeks  
 \*\* Five weeks.











TABLE #5

GENERAL ODOR COVERAGE  
 1943 THROUGH 1954  
 NUMBER OF DAYS AND HIGHEST INTENSITIES  
 AT STATION #6

Month	1954 Highest days	Highest Intens.	1953 Highest days	Highest Intens.	1952 Highest days	Highest Intens.
June	0	-	0	-	0	-
July	0	-	0	-	5	2 #2 1 #3
August	0	-	0	-	7	3 #2 4 #3
Sept.	0	-	0	-	5	2 #2 3 #3
Total Days	0		0		15	

Month	1948 Highest days	Highest Intens.	1947 Highest days	Highest Intens.	1946 Highest days	Highest Intens.
June	0	-	0	-	0	-
July	4	1 #1 1 #2 2 #3	0	-	8	1 #2 7 #3
August	12	1 #1 8 #2 3 #3	13	7 #3 6 #4	6	1 #2 2 #3 3 #4
Sept.	4	2 #2 2 #3	10	1 #2 7 #3 2 #4	7	1 #2 4 #3 2 #4
Total Days	20		23		21	

TABLE #5  
 GENERAL ODOR COVERAGE  
 1943 THROUGH 1954  
 NUMBER OF DAYS AND HIGHEST INTENSITIES  
 AT STATION #6

1951 Highest days Intens.			1950 Highest days Intens.			1949 Highest days Intens.			Month
0	-		0	-		2	1 #2 1 #3		June
1	1 #2		2	1 #1 1 #2		0	-		July
4	1 #1 2 #2 1 #3		3	2 #1 1 #2		3	2 #2 1 #3		August
1	1 #2		0	-		0	-		Sept.
6			5			5			Total Days
1945 Highest days Intens.			1944 Highest days Intens.			1943 Highest days Intens.			Month
0	-		0	-		0	-		June
0	-		5	1 #2 2 #3 2 #4		6	4 #3 2 #4		July
7	3 #3 4 #4		15	1 #2 1 #3 1 #4 1 #5 1 #6		6	2 #2 3 #3 1 #4		August
4	1 #2 3 #3		8	2 #2 6 #3		0	-		Sept.
11			28			12			Total Days

TABLE #6

## FREQUENCY OF RECORDED ODOR TYPES

1943 THROUGH 1954  
DAYS PER MONTH\*

Type of Odor	<u>June</u>											
	<u>54</u>	<u>53</u>	<u>52</u>	<u>51</u>	<u>50</u>	<u>49</u>	<u>48</u>	<u>47</u>	<u>46</u>	<u>45</u>	<u>44</u>	<u>43</u>
Pig-pen	0	0	0	0	0	2	1	10	17	18	17	0
Hydrogen Sulfide	0	0	0	0	0	0	0	0	0	0	2	0
Mouldy	0	3	0	0	3	9	5	5	5	11	4	5
Musty	19	15	12	11	9	3	2	8	4	0	11	8
Earthy	0	4	1	0	1	1	0	0	0	6	0	17
Sulfite	0	0	0	0	0	0	0	0	0	0	0	0
Fishy	0	0	0	0	1	0	0	0	0	0	0	0
Sour	0	0	0	0	0	0	0	2	3	1	0	0
Woody	0	0	0	0	0	0	0	0	0	0	0	0

Type of Odor	<u>August</u>											
	<u>54</u>	<u>53</u>	<u>52</u>	<u>51</u>	<u>50</u>	<u>49</u>	<u>48</u>	<u>47</u>	<u>46</u>	<u>45</u>	<u>44</u>	<u>43</u>
Pig-pen	2	7	28	23	21	17	24	13	20	21	30	13
Hydrogen Sulfide	0	0	14	0	0	1	16	19	17	20	30	16
Mouldy	0	0	6	5	1	5	2	3	7	12	9	1
Musty	29	24	8	6	18	17	2	0	5	0	3	28
Earthy	0	6	7	6	4	2	0	0	0	3	0	0
Sulfite	0	0	0	0	0	0	0	0	0	0	3	5
Fishy	0	0	0	0	0	0	0	0	2	1	0	1
Sour	0	1	0	0	0	1	0	1	1	5	0	0
Woody	1	0	0	0	0	0	0	0	0	0	0	0

Type of Odor	<u>TOTALS</u>											
	<u>54</u>	<u>53</u>	<u>52</u>	<u>51</u>	<u>40</u>	<u>49</u>	<u>48</u>	<u>47</u>	<u>46</u>	<u>45</u>	<u>44</u>	<u>43</u>
Pig-pen	2	24	57	32	36	34	76	75	83	74	95	37
Hydrogen Sulfide	0	0	17	0	0	1	36	43	45	24	61	42
Mouldy	0	5	22	20	9	19	18	12	18	53	23	6
Musty	106	81	44	54	64	59	9	12	14	5	20	84
Earthy	1	23	17	19	11	3	0	0	1	15	0	27
Sulfite	0	0	0	0	0	0	0	2	1	1	3	6
Fishy	0	0	0	0	1	0	0	0	4	3	7	1
Sour	0	1	2	0	1	1	0	6	9	18	1	1
Woody	7	0	0	0	0	0	0	0	0	0	0	0

\*Not including Table #5 data





PRODUCTION, RIVER FLOWS and POLLUTION FACTORS

1941 through 1954

Year	<u>Tons of Production</u> <u>June 15 to Sept. 30 inclusive</u>				<u>River Flows</u> <u>G.I.D.</u>		MCF/D	P.F.
	Brown	Oxford	Int.P.	Total	Daily Aver.	Daily Aver. c.f.s.		
1941	61060	19673	6277	87010	806	1819	157	5.15
1942	59954	20383	4911	85248	789	4202	363	2.18
1943	35614	20588	5628	61830	573	4622	399	1.58
1944	37484	17348	4907	59739	553	2878	248	2.23
1945	34862	18055	5566	58483	542	3319	287	1.90
1946	34718	19815	6032	60565	561	2901	251	2.24
1947	27900	19946	6102	53948	500	3353	290	1.72
1948	17818	19936	1091	38845	362	2150	186	1.93
1949	13893	21029	1687	36609	359	2082	180	1.88
1950	23394	22580	2209	48183	446	2696	233	2.00
1951	22612	17074	2437	42123	392	2685	232	1.69
1952	16858	16709	2393	35960	333	2261	195	1.72
1953	14794	13508	1516	29818	276	2133	184	1.50
1954	23020	15192	3655	41867	398	7283	628	0.62

\* Tons equivalent sulphite waste liquor discharged to the river.

## NATIONAL COUNCIL for STREAM IMPROVEMENT

## ANDROSCOGGIN RIVER PROJECTS

1946 through 1954

- 1946 (1) Survey of Benthic Deposits.  
 (2) Benthic decomposition studies. Gases produced etc at varying pH.
- 1947 (3) Time of passage of pollution (Sulphite Waste Liquor) (published)  
 (4) Rate of decomposition of Benthic materials.  
 (5) Mechanism of Hydrogen Sulphide production.  
 (6) Suspended solids.
- 1948 (7) Oxygen demands created by anaerobic digestion of the Benthic Deposits under controlled Laboratory condition.  
 (8)\*Survey of Benthic Deposits.  
 (9) Velocity of the water in the Androscoggin Pool at different depths.  
 (10)\*Suspended solids into and out of Pool.
- 1949 (11) Hydrogen sulphide studies. Production in the Pool water and Benthic. Additives to stimulate and suppress formation.  
 (12)\*Liming of Benthic.  
 (13) Microbial oxidation of carbohydrate and carbohydrate-lignin solution with Androscoggin flora.
- 1950 (14) Aerobic and anaerobic microbial utilization of nutrient in Androscoggin River Water.  
 (15) Hydrogen Sulphide Production in Androscoggin River Water.  
 (16) Oxygen demand of the Benthic Deposits.
- 1951 (17)\*Liming of Benthic.  
 (18) Oxygen demands of Sulphite Waste Liquor produced by Brown Company, Oxford Paper Company and International Paper Company.  
 (19) Comparison of B.O.D. with stabilized and fortified waters.
- 1952 (20) Action of Sodium Nitrate on Benthic Deposits.  
 (21) Role of Phosphate in Androscoggin water and Benthic Deposits.  
 (22) Polarographic determination of Nitrate. (published)
- 1953 (23) Microbial studies in the Androscoggin River, Berlin, New Hampshire to Lisbon Falls, Maine.  
 (24)\*Liming of Benthic.  
 (25) Survey of analytical data 1949 to 1953 to determine trends, if any, in pollution carrying capacity, B.O.D., D.O. etc. (not completed)
- 1954 (26) The Rate of Biological Oxidation at Various Locations in the Androscoggin River and Pool and the Effect of Added Nutrients.  
 (27) Addition of Oxygen to the Androscoggin River and Pool.

\* Continuation of previous project.