

ACCOUNTING YEAR 1982
(OCTOBER 1981 - SEPTEMBER 1982)

1982

FORTY-YEAR ACCOUNTING PERIOD

24. During the second year of the forty-year accounting period as stipulated by the modified Supreme Court decree, 1 October 1981 to 30 September 1982, the average diversion was 3087 cfs. This figure represents 96.5% of the normally allowed diversion rate as stipulated by the modified decree. A tabulation of average daily Lockport flows and diversion flows for accounting year 1982 is shown on Tables 6 and 7 respectively. The primary components of the Lake Michigan Diversion are summarized in Table 8. The primary components are illustrated in Figure 3 along with the approximate contribution of each component to the total 3087 cfs diversion (to nearest percent).

Table 6
 LOCKPORT FLOW
 (TABULAR SUMMARY FOR OCTOBER 1981 - SEPTEMBER 1982)
 PREPARED BY METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO
 (CFS)

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	3088	1581	3075	1847	2305	2618	3639	2008	3846	4028	4016	3849
2	1851	2045	2658	1785	2120	2708	5633	1946	2870	4548	3876	3145
3	2147	1789	2716	3263	2311	2824	4787	2145	2445	5561	4076	3224
4	3227	2160	2535	5766	2132	2669	2820	2288	1941	3629	8456	2676
5	4034	2360	2789	2094	2365	2748	4079	3185	2509	3954	4847	2910
6	2652	2006	2577	2514	2405	2653	2867	3293	2769	4777	4030	2843
7	2144	1739	2300	3083	2116	2749	3735	2073	2991	6565	10003	3438
8	1890	1581	2000	2732	2257	2345	3400	2064	2287	4072	12017	2485
9	2634	1796	2115	2398	2109	2010	2764	1846	2616	3095	4569	2943
10	1930	1651	2037	2590	2328	2531	2800	2041	1865	6542	3876	2675
11	2184	1639	2408	2437	2221	6829	2814	2236	2508	4377	4382	2683
12	2213	1707	1889	2516	2108	11380	4600	2187	2935	3807	5357	2728
13	2185	1746	1853	2638	2126	18378	3158	2008	2109	3931	5327	3466
14	3780	1574	1833	2534	1939	15437	4126	2328	2776	4494	5284	3400
15	2202	1574	2005	2619	2148	6218	2929	2751	6344	3810	5411	2661
16	2035	1713	1878	2325	2516	7133	9151	3049	2179	6292	5266	3202
17	3381	1520	1846	2400	2555	8213	5113	2437	2602	4323	5301	4010
18	2471	1738	2115	2606	3196	4744	5320	3131	3092	4594	5333	3732
19	2018	2866	1709	2372	2560	10768	3493	2375	3417	5735	5341	3301
20	1910	4490	1642	1981	2644	7693	2769	2441	3419	3608	3789	3181
21	2031	2773	2080	2406	4098	6559	2641	4003	3429	3811	4334	4307
22	2124	2221	1831	2481	6881	2909	2615	7628	3589	8181	3214	4673
23	1940	3125	2067	2268	2505	4372	2698	5000	3935	4357	3242	4375
24	1761	3203	1728	2034	4648	3363	2791	3102	3486	4486	3786	3972
25	1717	2637	1400	2644	3083	3813	2468	3567	5010	3161	3815	4283
26	1857	3125	1577	2374	3157	2740	2223	4881	3685	3667	2600	3787
27	1912	2296	2053	2430	2605	2627	1855	5065	4556	4201	2708	4820
28	1711	2355	1633	2223	2638	2616	2345	3166	5448	2726	3172	5287
29	1566	1934	1684	2203	2638	2677	2265	3290	4173	3641	4469	5371
30	2093	3194	1635	2604	2089	5862	2089	4568	3717	3706	3523	4927
31	1849	1702	1702	2509	2926	2926	2926	3498	3171	3299	3209	3209
MEAN	2275	2205	2044	2538	2717	5262	3466	3084	3285	4419	4795	3612

Table 7
TOTAL DIVERSION FROM LAKE MICHIGAN BY ILLINOIS
 (TABULAR SUMMARY FOR OCTOBER 1981 - SEPTEMBER 1982)
 PREPARED BY METROPOLITAN SANITARY DISTRICT OF GREATER CHICAGO
 (CFS)

DAY	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP
1	2855	1478	2809	1737	2203	2416	3335	1858	3454	3881	3891	3619
2	1666	1937	2331	1653	2005	2500	5321	1807	2614	4313	3714	2968
3	2005	1677	2420	3021	2189	2606	4254	2005	2226	5221	3913	3078
4	3095	2003	2237	5224	2023	2465	2435	2121	1737	3456	8213	2540
5	3867	2115	2464	1698	2257	2588	3792	2936	2325	3802	4663	2796
6	2431	1863	2261	2216	2292	2487	2567	3083	2604	4619	3882	2730
7	1932	1617	2065	2873	2009	2583	3416	1900	2827	6230	9710	3295
8	1704	1462	1798	2516	2154	2182	3095	1923	2119	3875	11631	2339
9	2486	1650	1925	2227	2003	1840	2443	1711	2459	2930	4242	2799
10	1820	1511	1861	2404	2229	2312	2431	1888	1708	6203	3648	2521
11	2074	1514	2226	2293	2116	6358	2391	2075	2361	4086	4186	2555
12	2102	1588	1765	2351	2002	10605	4108	2036	2791	3640	5175	2611
13	2074	1631	1739	2486	2021	16812	2696	1857	1985	3747	5165	3322
14	3642	1462	1723	2382	1833	13968	3830	2180	2654	4312	5148	3253
15	2004	1463	1883	2452	1976	5285	2686	2577	6078	3638	5274	2529
16	1862	1600	1758	2158	2295	6270	8640	2941	2010	6064	5149	3073
17	3222	1395	1731	2244	2434	7456	4125	2327	2432	4089	5156	3773
18	2333	1605	2005	2479	2981	4095	4699	2974	2888	4423	5186	3459
19	1801	2670	1607	2243	2329	10128	3114	2215	3242	5523	5198	3157
20	1738	4034	1543	1859	2211	6906	2493	2287	3274	3424	3649	3009
21	1872	2489	1981	2286	3697	5921	2389	3772	3277	3615	4205	4151
22	1963	2017	1718	2362	6352	2421	2387	6787	3433	7784	3091	4510
23	1830	2896	1962	2138	1740	3923	2483	4753	3788	3989	3077	4234
24	1658	2827	1626	1916	4021	2933	2601	2891	3357	4108	3593	3840
25	1608	2363	1296	2519	2663	3441	2307	3380	4856	2809	3609	4152
26	1753	2831	1472	2248	2857	2436	2055	4675	3575	3396	2425	3681
27	1785	1817	1948	2305	2378	2369	1696	4718	4442	3925	2538	4715
28	1606	2037	1530	2111	2457	2374	2186	2907	5143	2491	3026	5161
29	1452	1705	1581	2084		2448	2120	3067	3983	3459	4327	5255
30	1992	2974	1531	2466		5540	1949	4361	3550	3541	3367	4809
31	1738		1602	2394		2527		3305		3153	3055	
MEAN	2128	2008	1884	2366	2490	4780	3135	2881	3106	4185	4616	3465

Table 8
 AVERAGE MONTHLY FLOWS (CFS)
 COMPONENTS OF LAKE MICHIGAN DIVERSION
 (ACCOUNTING YEAR 1982)

	Oct 81	Nov 81	Dec 81	Jan 82	Feb 82	Mar 82	Apr 82	May 82	Jun 82	Jul 82	Aug 82	Sep 82	Yearly Average
Total Lockages	129	59	31	38	15	15	43	134	147	169	154	126	88
Total Leakages	36	45	45	36	32	31	31	25	24	18	21	26	31
Total Navigational Makeup	214	38	23	0	0	99	47	312	279	172	90	70	112
Total Discretionary	41	0	0	0	0	0	0	5	478	799	1354	1137	318
1. Total Direct Diversion	420	142	99	74	47	145	121	476	928	1158	1619	1359	549
2. Total Storm Runoff & Direct Diversion	612	529	415	800	918	3227	1597	1214	1437	2374	2792	1811	1477
3. Total Storm Runoff	192	387	316	726	871	3082	1476	738	509	1216	1173	452	928
4. Total L.M. Diversion	2128	2008	1884	2366	2490	4780	3135	2881	3106	4185	4616	3465	3087
5. Total Domestic Pumpage	1516	1479	1469	1566	1572	1553	1538	1667	1669	1811	1824	1654	1610
6. Total Diversion													
Lockages.....													3%
Leakages.....													1%
Navigational Makeup.....													4%
Discretionary.....													10%
Storm Runoff.....													30%
Domestic Pumpage.....													52%
													Total 100%

1. Summation of lockages, leakages, navigational makeup, and discretionary flows (as obtained from MSDGC form LMO-6)
2. As obtained from column 17 of monthly hydraulic reports
3. As obtained by subtracting line 1 from line 2
4. As obtained from column 19 of monthly hydraulic reports
5. As obtained by subtracting line 2 from line 4
6. As obtained by dividing yearly averages of each component into average yearly diversion and rounding to nearest percent

LAKE MICHIGAN DIVERSION

ACCOUNTING YEAR 1982

AVERAGE ANNUAL DIVERSION = 3087 CFS

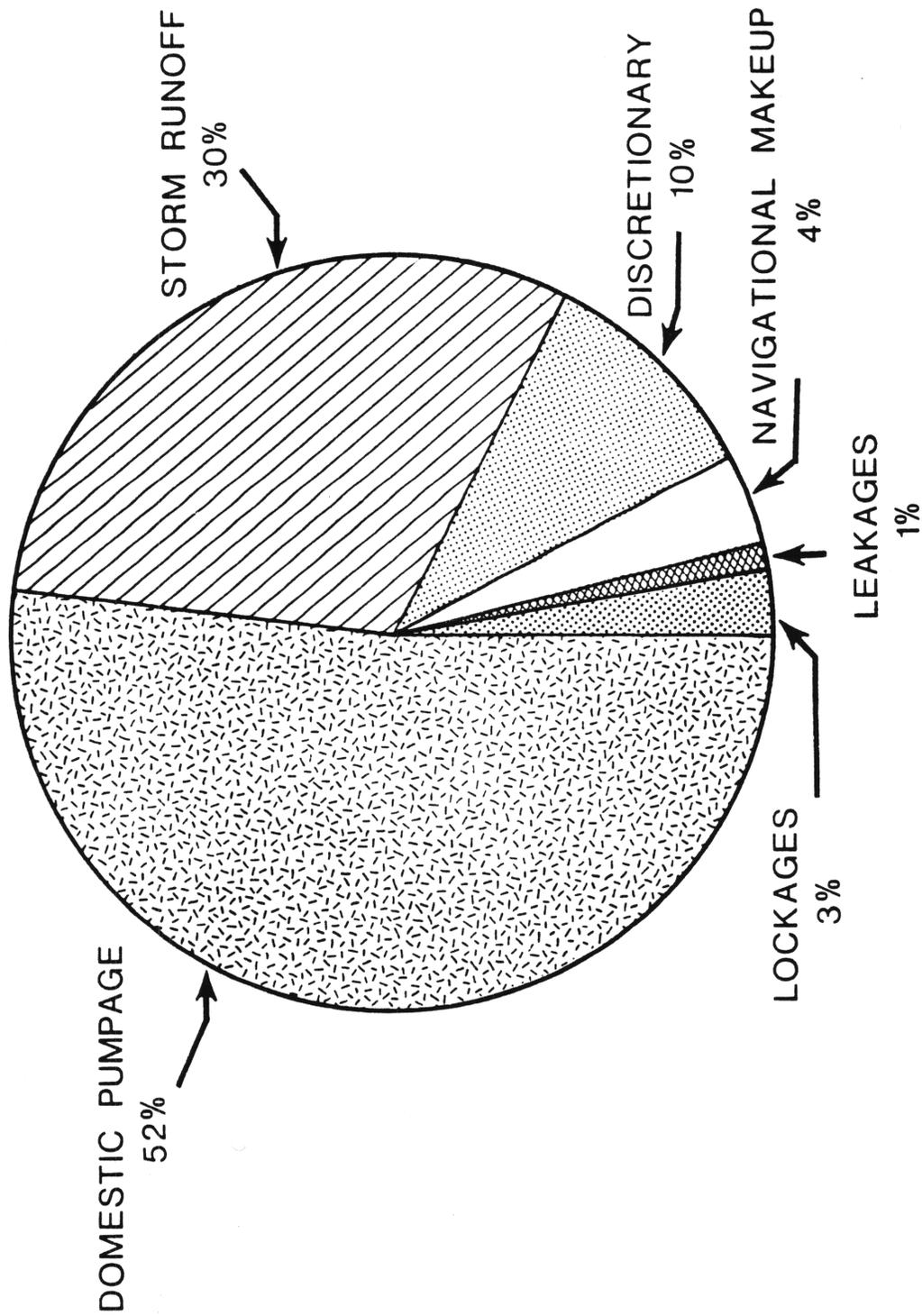


Figure 3

SIGNIFICANT HYDROLOGIC EVENTS

25. The following is a detailed itemization of events of strictly a hydrologic nature which occurred during accounting year 1982:

21-22 July 1982 - Severe rain and thunderstorms occurred causing extensive flooding to thousands of people in the Chicago District area. The July storm consisted of two distinct periods of rainfall; from 8:00 P.M. on 21 July to 1:00 A.M. on 22 July and from 6:00 A.M. to 10:00 A.M. on 22 July. Up to 7 inches of rain fell in the Chicago suburbs causing Lake Eleanor in Deerfield, Illinois to overflow resulting in extreme flooding. Glenview experienced 2.77 inches of precipitation in three hours which has a recurrence interval of slightly greater than 10 years. In Chicago, 2.45 inches of rain was measured at O'Hare Airport. The rainfall caused the water level in the North Shore Channel to rise 5 feet in two hours. On 22 July at the Wilmette Pumping Station, a backflow discharged 2.5 million gallons of sewage-tainted storm water from the North Shore Channel into Lake Michigan. The sluice gate was open from 10:30 A.M. to 10:44 A.M. and 10:51 A.M. to 11:06 A.M. for a total time of 29 minutes.

7 August 1982 - Up to 4 inches of rain fell within three hours in Chicago and the metropolitan area. Severe viaduct and basement flooding was reported in Chicago and the near west suburbs. The worst basement flooding occurred on Chicago's southwest side. The West Side Treatment Works reported precipitation of 3.67 inches in 4-1/2 hours which has a recurrence interval of slightly greater than 25 years. Above bankfull conditions on the Chicago River resulted in a backflow event. On 7 August at the Chicago River Controlling Works a backflow discharged 83.0 million gallons of water from the mouth of the Chicago River allowing raw sewage to pour into Lake Michigan. The sluice gate was open from 6:46 P.M. to 9:18 P.M. for a total time of 2 hours and 32 minutes.

It should be noted that the volumes in the backflow events discussed above are not included in the diversion flows which were computed for this accounting year.

OTHER SIGNIFICANT EVENTS RELATING TO THE DIVERSION

26. The following is a detailed itemization of events of a more general nature affecting the diversion accounting system during accounting year 1982:

8 October 1981 - Third diversion negotiation meeting held between the Corps, MSDGC and IDOT.

20 November 1981 - Fourth diversion negotiation meeting held between the Corps and IDOT - Memorandum of Understanding (MOU) between Corps and IDOT concerning diversion accounting submitted to the State of Illinois for review and consideration.

12 February 1982 - Letter sent from Chicago District to North Central Division, COE requesting technical assistance on developing turbine rating curves at Lockport Powerhouse.

18 February 1982 - Letter sent from IDOT to Chicago District proposing the formation of a technical committee composed of members from IDOT, COE, USGS and MSD whose purpose it would be to analyze the existing information on acoustic velocity flowmeters and ultimately reach a decision as to whether AVM should be installed to measure total flow at Lockport.

8 March 1982 - Letter sent from North Central Division, COE, to North Pacific Division, COE with request for technical assistance as described in 12 February 1982 letter above.

2 April 1982 - Letter sent from North Pacific Division, COE, to North Central Division, COE, stating that technical assistance as requested in 8 March 1982 letter above would be provided; letter sent from Chicago District to IDOT acknowledging above 18 February 1982 letter and confirming Corps' participation on AVM committee.

7 April 1982 - First AVM committee meeting with discussion of committee role and study approach.

4-5 May 1982 - Visit to Chicago by Mr. Brian Moentenich of North Pacific Division, COE, to provide technical assistance in developing turbine rating relationships for the Lockport Powerhouse facilities; Field trip conducted on 4 May 1982 by Mr. Moentenich and Chicago District personnel to inspect Lockport Powerhouse and Controlling Works.

20 May 1982 - Boat trip (USGS, IDOT, Northeastern Illinois Planning Commission (NIPC), MSDGC, COE) with the purpose of selecting potential sites for installation of AVM flowmeter to measure total flow at Lockport.

26 May 1982 - Report summarizing findings of Mr. Moentenich (NPD) during visit to Chicago forwarded to Chicago District; report detailed a method of measuring flow through the turbines at Lockport Powerhouse with recommendations.

16 June 1982 - Letter sent from Chicago District to IDOT summarizing the diversion negotiations and stating that negotiations should be terminated as a result of the impasse which had been reached. IDOT was allowed fourteen days to respond to the letter after which time negotiations would be considered formally terminated.

22 June 1982 - Letter sent from Chicago District to MSDGC with copy furnished to IDOT forwarding a copy of NPD turbine report for review and consideration.

7 July 1982 - No response from IDOT received on above 16 June 1982 letter from Chicago District and diversion negotiations are considered formally terminated.

12-13 July 1982 - Representative from Corps' Waterways Experiment Station (WES), Mr. Dale Hart, visited Chicago for meeting and field trip to Lockport with the purpose of inspecting the sluice gates at the Controlling

Works and Powerhouse needed for future work in the development of new rating curves for these structures.

3 August 1982 - Scope of Work from WES sent to Chicago District with list of activities and schedule of completion dates.

6 August 1982 - Letter sent from MSDGC to Chicago District with copy furnished to IDOT in response to above 22 June 1982 Chicago District letter with favorable reaction to turbine report but stating that responsibility for diversion accounting remained with the State of Illinois and, therefore, no financial commitments could be made on the part of MSDGC in this matter.

11 August 1982 - Second AVM committee meeting held with discussion of background report, committee recommendations and presentation by manufacturer.

18 August 1982 - Letter sent from Chicago District to MSDGC with copy furnished to IDOT forwarding above WES scope of work for review and comments.

13 September 1982 - Letter sent from IDOT to Chicago District forwarding copy of proposal (draft) submitted by NIPC to IDOT concerning the development of a new Lake Michigan diversion accounting system and the preparation of an annual hydraulic report. In specific, letter requested Corps' comments on above proposal.

21 September 1982 - Letter sent from IDOT to Chicago District forwarding copy of draft report summarizing the findings and recommendations of the AVM study committee. In specific, letter requested Corps' comments on above draft report (copy of letter and report provided to all members of study committee).

CORPS' ACTIVITIES - SUPERVISION, DIRECTION AND AUDIT

27. During accounting year 1982, the Corps was again extremely active in fulfilling the requirements of the modified Supreme Court decree. Corps' personnel were present to observe and assist in leakage tests conducted by the MSDGC at Lockport Lock. As a member of the AVM study committee, the Corps conducted a boat trip to the Sanitary and Ship Canal in May, 1982 with the purpose of selecting potential sites for an AVM installation. After selection of the final site was made, the Corps completed detailed field surveys in order to determine channel configuration.

28. Corps' personnel were also extensively involved in the review and verification process associated with the monthly hydraulic reports of Lake Michigan diversion. Specifically, fifteen monthly hydraulic reports covering the period from October 1980 to December 1981 inclusive were checked during this accounting year. All fifteen reports were checked separately for mathematical accuracy on a routine basis in accordance with the schedule agreed upon by the Corps, MSDGC and IDOT. The checking process included the review of supportive data, verification of general consistency and a random detailed numerical analysis of one day for each month. After each individual review, preliminary approval of the report was provided subject to final review at the end of the accounting year in the preparation of this annual report. It should be noted that the nine monthly hydraulic reports covering the period from January 1982 to September 1982 inclusive were checked during accounting year 1983.

29. Additionally, during accounting year 1982, the Corps conducted an on-going extensive review and comparison of the recommendations made by the first three-member technical committee and those of IDOT's consultant (Harza Engineering). During accounting year 1982, the Corps was active in the process of performing various supporting studies and investigations pertaining to the measurement of diversion flows. Specifically, the Corps began the process of developing a standard operation procedure for the measurement of leakage at Lockport Lock. This project was continued into accounting year 1983. It is anticipated that this report will be completed and available for distribution by the end of March, 1984.