

2.0 JOB 1, PART 2: SUMMARY OF CONOWINGO DAM WEST FISH LIFT OPERATIONS, 2008

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2.1 INTRODUCTION

The shore-based trapping device at Conowingo Dam known as the Conowingo West Fish Lift (West Lift) has operated every spring since 1972 for the purpose of collecting and counting American shad, river herring, other migratory species and resident fishes in the tailrace. Since 1985, most American shad collected here have been sorted from the daily catch, placed into circular transport tanks, and stocked into suitable spawning waters above the mainstem hydroelectric dams and/or used in spawning trials to collect eggs for hatchery rearing. During the spring runs of 1991 through 1996 the newer Conowingo East Fish Lift (East Lift) at Conowingo Dam was also used to trap and transport American shad.

With fish passage available at Holtwood and Safe Harbor dams since 1997, the East Lift was operated to pass all fish into the project head pond in spring 2008 (see Part 1). Upstream licensees are no longer obligated to pay for trap and transport activities from Conowingo Dam but Exelon Hydro (Exelon) has agreed to keep the West Lift operational and to administer an annual contract for West Lift trapping operations. West Lift project operation details are coordinated with the resource agencies through the Susquehanna River Technical Committee (SRTC). Funding to reimburse Exelon for contractor expenses for these operations, as well as shad tank spawning trials in 2008 was derived from several sources including upstream hydroelectric project owner/operator carryover monies from the 1984 settlement agreement, and annual contributions by the Pennsylvania Fish and Boat Commission (PFBC) and the Maryland Department of Natural Resources (MD DNR). These contributed funds have been administered by the U.S. Fish and Wildlife Service (USFWS), Susquehanna River Coordinator (Coordinator).

The objectives of West Lift operations in 2008 included: collection and enumeration of shad, river herring, and other migratory and resident fishes; and obtaining shad for an on-site tank spawning and shad egg collection program conducted at Conowingo Dam. Shad taken here are also monitored for MD DNR tags and sex ratios, and scale and head samples are taken for age and otolith analysis. No fish were trucked upstream in 2008.

2.2 METHODS

West Lift operational procedures adopted by the SRTC included limiting the period of operation to the peak six weeks of the run (late April through the first week in June) and limiting daily lift operations to 8 hours (1100-1900 hrs.). Within these parameters the West Lift was operated as in past years, maintaining appropriate entrance velocities and curbing use of adjacent Units 1 and 2 whenever river flow dropped below 60,000 cfs. Normandeau Associates, Inc. (NAI) was contracted by SECO to operate both Conowingo fish lifts and to conduct American shad tank

spawning trials with egg deliveries to PFBC Van Dyke hatchery.

American shad collected in the trap were counted and either placed into holding or spawning tanks. Shad in excess of those needed for on-site spawning, or for biological data collections were returned alive to the tailrace. Other species were identified, enumerated and returned to the tailrace. No live shad brood fish were provided to MD DNR for tank spawning in 2008. Every 50th shad in the West Lift collection was sacrificed for otoliths and a scale sample was taken. Lengths and weights were measured, and sex ratios of shad in daily catches were recorded.

2.3 RESULTS

Figure 1 shows daily West Lift shad catch, river flow and water temperatures for the 2008 season. Average daily river flow at Conowingo during the West Lift operating period fluctuated moderately from 35,100 to 66,400 and averaged 50,700 cubic feet per second (cfs) for the period 23 April through 28 May. It then steadily declined to a low of 24,400 cfs to 1 June the last day of West Lift operations. Water temperature during the period fairly cool fluctuating for 58 to 66° F (average 61° F) to 27 May, and then quickly rose to 71° F on 1 June when the fish lift was shut down for the season.

Total catch at the West Lift amounted to 733,553 fish of 37 taxa (Table 1). Gizzard shad catch was quite large comprising 98.7% of the total catch and, American shad, white perch, walleye, and channel catfish comprised 1.0% of the total. Alosine catch included 2,627 American shad (0.4% of the total catch), 9 river herring, and no hickory shad. Catch of American shad averaged 77 per operating day with peak day catches of 642, 175 and 168 shad on 18, 16, and 8 May respectively. Daily operating parameters and catch by major species are shown in Table 2. Lift operations began on 23 April and occurred on 34 of the next 40 days through 1 June. Total fishing effort over this period amounted to 481 lifts and a fishing time of 174.4 hours which is up from 2007.

Overall male to female sex ratio of shad in the West Lift in 2008 was 1.0 to 0.9 (Table 3). West Lift catch per effort of 15.1 American shad per fishing hour, 5 per lift, and 77 per day were lower than that reported for most all previous years (Table 4). Operations and fish catch at the West Lift during 1985-2008 are summarized in Table 5.

2.4 DISCUSSION

Spring 2008 water temperatures during West Lift operations were cooler than in 2007 and river flows fairly consistent hovering around 50,000 cfs until the last few days of West Lift operations. Peak day American shad catch occurred on 18 May and overall, daily shad abundance was smaller than in 2007 and overall annual catch was smaller for American shad despite an increase of 5 operating days. The catch of gizzard shad was one of the largest in last 11 years. Most shad collected in 2008 were released alive back to the tailrace.

2.5 TABLES AND FIGURES

Table 1: Catch of fishes at the Conowingo Dam West Fish Lift, 2008.

Number of Days	34
Number of Lifts	481
Fishing Time (hours : minutes)	174:22
Number of Taxa	37
AMERICAN SHAD	2,627
HICKORY SHAD	0
BLUEBACK HERRING	7
ALEWIFE	2
GIZZARD SHAD	724,737
STRIPED BASS	42
White Perch	2,036
American Eel	26
Brook Trout	2
Brown Trout	2
Rainbow Trout	1
Muskellunge	3
Carp	400
Goldfish	1
Comely Shiner	27
Spotfin Shiner	83
Spottail Shiner	76
Quillback	52
White Sucker	1
Shorthead Redhorse	325
White Catfish	5
Brown Bullhead	51
Channel Catfish	781
Flathead Catfish	22
Rock Bass	18
Redbreast Sunfish	21
Green Sunfish	1
Pumpkinseed	8
Bluegill	60
Smallmouth Bass	95
Largemouth Bass	4
Black Crappie	7
White Crappie	3
Yellow Perch	26
Walleye	1,971
Greenside Darter	1
Tessellated Darter	1
Sea Lamprey	28
Total	733,553

Job 1 – Part 2

Table 2: Daily summary of fishes collected at the Conowingo Dam West Fish Lift, 23 April - 1 June, 2008.

Date:	23-Apr	24-Apr	25-Apr	27-Apr	28-Apr	29-Apr	30-Apr	1-May
Day:	WEDNESDAY	THURSDAY	FRIDAY	SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY
Number of Lifts:	15	21	22	8	15	14	20	15
Time of First Lift:	12:00	10:40	10:35	10:20	11:55	12:00	10:20	9:50
Time of Last lift:	16:10	16:40	16:30	15:00	15:55	16:05	15:55	14:30
Operating time (hours):	4:10	6:00	5:55	4:40	4:00	4:05	5:35	4:40
Average Water Temperature (°F):	64.58	65.12	64.76	65.48	66.02	64.31	62.6	59.8
American shad	5	1	30	538	2	1	2	1
Blueback herring	0	0	0	0	0	0	0	1
Alewife	0	0	0	0	0	0	0	0
Gizzard shad	25,650	39,050	25,400	5,980	26,500	25,500	46,800	30,900
Hickory shad	0	0	0	0	0	0	0	0
Striped bass	1	0	6	0	0	0	0	0
Carp	1	27	22	1	20	3	8	4
Other species	78	118	265	73	238	221	341	147
Total	25,813	39,314	25,988	6,665	26,998	25,946	47,492	31,200

Date:	2-May	4-May	5-May	6-May	7-May	8-May	9-May	11-May
Day:	FRIDAY	SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SUNDAY
Number of Lifts:	16	20	20	21	16	15	10	8
Time of First Lift:	9:35	9:45	9:50	10:00	10:30	10:15	13:12	9:41
Time of Last lift:	15:45	15:50	15:50	16:20	15:45	15:25	16:02	15:15
Operating time (hours):	6:10	6:05	6:00	6:20	5:15	5:10	2:50	5:34
Average Water Temperature (°F):	59.7	60.7	61.7	62.7	64.0	65.6	64.9	64.3
American shad	4	63	6	84	148	168	73	141
Blueback herring	0	0	0	1	0	0	0	0
Alewife	1	0	0	0	1	0	0	0
Gizzard shad	31,400	26,700	48,600	41,200	30,800	17,070	4,905	5,800
Hickory shad	0	0	0	0	0	0	0	0
Striped bass	0	2	4	3	2	2	0	0
Carp	1	0	1	25	16	22	1	0
Other species	96	78	204	199	151	668	101	25
Total	31,598	26,921	49,019	41,711	31,269	18,598	5,181	5,991

Job 1 – Part 2

Table 2: Daily summary of fishes collected at the Conowingo Dam West Fish Lift, 23 April - 1 June, 2008 (continued).

Date:	12-May	13-May	14-May	15-May	16-May	18-May	19-May	20-May
Day:	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SUNDAY	MONDAY	TUESDAY
Number of Lifts:	18	15	15	11	19	12	6	18
Time of First Lift:	10:15	9:35	10:10	9:55	9:27	9:45	12:45	10:00
Time of Last lift:	15:50	15:25	15:00	15:40	16:00	15:30	15:50	14:50
Operating time (hours):	5:35	5:50	4:50	5:45	6:33	5:45	3:05	4:50
Average Water Temperature (°F):	63.7	62.0	61.9	61.8	62.2	62.2	61.3	59.6
American shad	6	3	1	1	175	642	3	100
Blueback herring	0	0	0	0	0	2	0	1
Alewife	0	0	0	0	0	0	0	0
Gizzard shad	39,150	31,000	25,750	20,300	21,300	6,030	8,850	17,150
Hickory shad	0	0	0	0	0	0	0	0
Striped bass	1	1	1	0	0	1	0	0
Carp	9	4	1	17	25	8	0	6
Other species	151	116	68	69	127	122	116	103
Total	39,468	31,240	25,889	20,456	21,754	6,927	9,085	17,463

Date:	21-May	22-May	23-May	25-May	26-May	27-May	28-May	29-May
Day:	WEDNESDAY	THURSDAY	FRIDAY	SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY
Number of Lifts:	15	7	9	8	11	18	16	11
Time of First Lift:	11:25	13:25	9:45	9:55	9:25	9:30	11:15	9:30
Time of Last lift:	15:45	15:50	14:45	15:50	15:50	15:50	15:40	15:40
Operating time (hours):	4:20	2:25	5:00	5:55	6:25	6:20	4:25	6:10
Average Water Temperature (°F):	59.3	58.2	58.0	59.5	60.4	63.7	64.9	66.6
American shad	31	5	6	107	5	107	31	49
Blueback herring	1	0	0	0	0	0	0	1
Alewife	0	0	0	0	0	0	0	0
Gizzard shad	26,100	5,700	11,595	1,720	13,900	21,450	28,450	5,850
Hickory shad	0	0	0	0	0	0	0	0
Striped bass	1	0	1	4	0	4	1	2
Carp	1	2	5	2	2	41	43	12
Other species	181	124	97	172	55	199	121	209
Total	26,496	5,955	11,801	2,177	14,017	22,000	28,767	6,332

Job 1 – Part 2

Table 2: Daily summary of fishes collected at the Conowingo Dam West Fish Lift, 23 April - 1 June, 2008 (continued).

Date:	30-May	1-Jun	
Day:	FRIDAY	SUNDAY	Total for the Year
Number of Lifts:	10	6	481
Time of First Lift:	10:30	10:45	
Time of Last lift:	15:40	14:15	
Operating time (hours):	5:10	3:30	174.37
Average Water Temperature (°F):	67.9	70.0	
American shad	47	41	2,627
Blueback herring	0	0	7
Alewife	0	0	2
Gizzard shad	6,757	1,430	724,737
Hickory shad	0	0	-
Striped bass	5	0	42
Carp	49	21	400
Other species	591	114	5,738
Total	8,040	1,720	733,553

Table 3: American shad sex ratio information, Conowingo West Fish Lift, 2008. No operation on 26 April, 3, 10, 17, 24, and 31 May.

Date	Sample size	Males	Females	Male:Female Ratio
23-Apr	5	2	3	1: 1.5
24-Apr	1	1	0	1: 0.0
25-Apr	30	13	17	1: 1.3
27-Apr	118	63	55	1: 0.9
28-Apr	2	2	0	1: 0.0
29-Apr	1	1	0	1: 0.0
30-Apr	2	0	2	1: 0.0
1-May	1	0	1	
2-May	4	1	3	1: 3.0
4-May	63	38	25	1: 0.7
5-May	6	2	4	1: 2.0
6-May	84	47	37	1: 0.8
7-May	130	82	48	1: 0.6
8-May	107	63	44	1: 0.7
9-May	73	49	24	1: 0.5
11-May	140	55	85	1: 1.5
12-May	6	2	4	1: 2.0
13-May	3	2	1	1: 0.5
14-May	1	0	1	
15-May	1	0	1	
16-May	174	106	68	1: 0.6
18-May	148	70	78	1: 1.1
19-May	3	2	1	1: 0.5
20-May	100	52	48	1: 0.9
21-May	31	15	16	1: 1.1
22-May	5	3	2	1: 0.7
23-May	6	5	1	1: 0.2
25-May	107	60	47	1: 0.8
26-May	5	0	5	
27-May	107	54	53	1: 1.0
28-May	31	14	17	1: 1.2
29-May	49	21	28	1: 1.3
30-May	47	19	28	1: 1.5
1-Jun	41	13	28	1: 2.2
Totals	1,632	857	775	1: 0.9

Table 4: Catch and effort of American shad taken at the Conowingo Dam west Fish Lift during primary collection periods,* 1985-2008.

Year	Number Days	Number Lifts	Fishing Hours	Total Catch	Catch Per Day	Catch Per Lift	Catch Per Hour
1985	37	839	328.6	1,518	41	2	4.6
1986	53	737	431.5	5,136	97	7	11.9
1987	49	1,295	506.5	7,659	156	6	15.1
1988	54	1,166	471.7	5,137	95	4	10.9
1989	46	1,034	447.2	8,216	179	8	18.4
1990	62	1,247	541.0	15,958	257	13	29.5
1991	59	1,123	478.5	13,273	225	12	27.7
1992	61	1,517	566.0	10,323	169	7	18.2
1993	41	971	398.0	5,328	130	5	13.4
1994	44	918	414.0	5,595	127	6	13.5
1995	64	1,216	632.2	15,588	244	13	24.7
1996	27	441	245.2	11,458	424	26	46.7
1997	44	611	295.1	12,974	295	21	44.0
1998	26	476	238.6	6,577	253	14	27.6
1999	43	709	312.6	9,658	225	14	30.9
2000	34	424	206.5	9,785	288	23	47.4
2001	41	425	195.1	10,940	267	26	56.1
2002	31	417	147.1	9,347	302	22	63.5
2003	31	637	171.8	9,802	316	27	57.0
2004	14	151	74.3	3,426	245	23	46.1
2005	30	295	165.9	3,896	130	13	23.5
2006	37	394	214.9	3,970	107	10	18.5
2007	29	288	135.3	4,272	147	15	31.6
2008	34	481	174.4	2,627	77	5	15.1

*Only applies to 1985-1995 data. Excludes early and late season catch and effort when less than 10 shad/day were taken.

Table 5: Operations and fish catch at Conowingo West Fish Lift, 1985 - 2008.

Year	Number of Days	Total Fish (Millions)	Number of Taxa	American Shad	Hickory Shad	Alewife	Blueback Herring
1985	55	2.318	41	1,546	9	377	6,763
1986	59	1.831	43	5,195	45	2,822	6,327
1987	60	2.593	43	7,667	35	357	5,861
1988	60	1.602	49	5,169	64	712	14,570
1989	53	1.066	45	8,311	28	1,902	3,611
1990	72	1.188	44	15,964	77	425	9,658
1991	63	0.533	45	13,330	120	2,649	15,616
1992	64	1.560	46	10,335	376	3,344	27,533
1993	45	0.713	37	5,343	0	572	4,052
1994	47	0.564	46	5,615	1	70	2,603
1995	68	0.995	44	15,588	36	5,405	93,859
1996	28	1.233	39	11,473	0	1	871
1997	44	0.346	39	12,974	118	11	133,257
1998	41	0.575	38	6,577	6	31	5,511
1999	43	0.722	34	9,658	32	1,795	8,546
2000	34	0.458	37	9,785	1	9,189	14,326
2001	41	0.310	38	10,940	36	7,824	16,320
2002	31	0.419	35	9,347	0	141	428
2003	31	0.147	30	9,802	1	16	183
2004	14	0.039	30	3,426	0	0	1
2005	30	0.094	36	3,896	0	0	0
2006	37	0.163	38	3,970	0	2	6
2007	29	0.159	36	4,272	0	7	153
2008	34	0.733	37	2,627	0	2	7

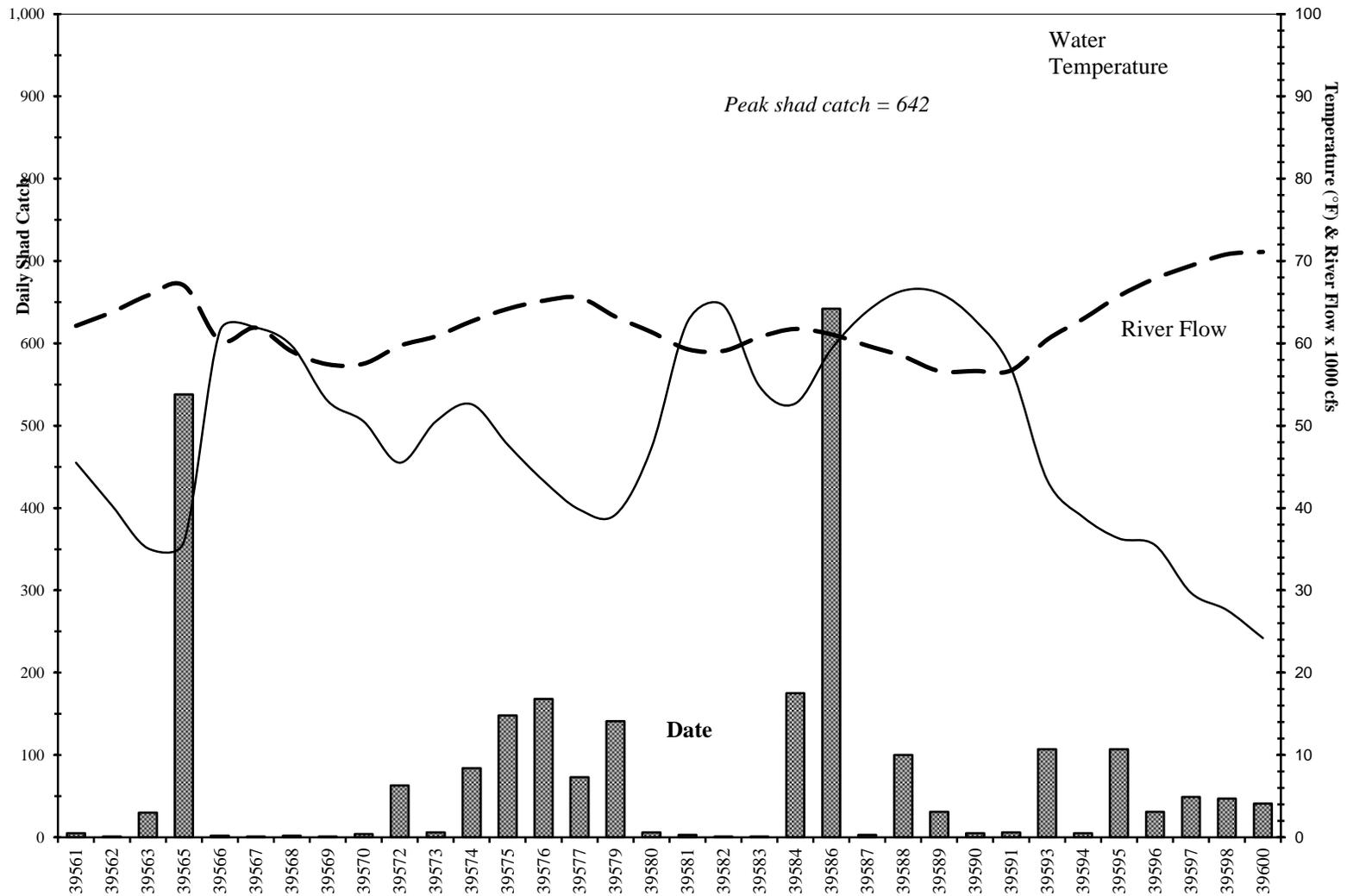


Figure 1: A plot of river flow (x 1000 cfs) and water temperature (°F) in relation to the daily American shad catch at the Conowingo West Fish Lift, spring 2008. The West Lift was not operated on 26 April, 3, 10, 17, 24 and 31 May.