Duck Harbor Pond

Wayne County

2022 Walleye Maintenance Stocking Evaluation: Trap netting and Night Electrofishing Surveys

Duck Harbor Pond (230-acres), located in Wayne County, is open to the public for water-based recreation. The public access (GPS: 41.749145, -75.211382), maintained by Pennsylvania Fish and Boat Commission (Commission), consisting of a semi-improved boat launch, is located on the southwestern shore off Duck Harbor Road. Self-sustaining populations of panfish and black bass reside in the lake, managed by Commonwealth Inland Waters regulations.

The Commission annually maintenance stocks Walleye fingerlings (approximately 3-in to 4-in total length) for supporting a destination fishery under the guidelines described within the Commission's Walleye Plan (Table 1). Traditionally, stockings consisted of release of about 9,100 fingerlings annually (i.e., prior to 2015), but in more recent years (i.e., post 2015) annual maintenance stocking has consisted of 4,600 fingerlings. This rate is occasionally increased with unallocated (i.e., excess hatchery production) fingerings also stocked into Duck Harbor Pond. Efficacy of hatchery stockings for returning desirable adult sizes to anglers has not been assessed. Initiated in 2022, the recent base rate of Walleye fingerlings was doubled (returned to historic levels) to ensure our assessment of this program, that includes provision of improved angling opportunities for anglers to catch larger Walleye, was attainable. Annual sampling, that includes trap net and night-boat electrofishing was commenced in Spring 2022 to establish a baseline for this evaluation.

Table 1. Historical Pennsylvania Fish and Boat Commission Walleye maintenance stocking of fishes into Duck Harbor Pond. Base and unallocated stockings were not differentiated prior to 2006.

Year	Base	Unallocated	Total
1980			3,600
1981			3,600
1982			---
1983			---
1984			---
1985			7,150
1986			
1987			3,600
1988			---
1989			3,400
1990			3,600
1991			---
1992			3,450
1993			4,600
1994			58
1995			10,300
1996			3,600
1997			3,600
1998			2,400
1999			7,200
2000			3,600
2001			6,000

2002			4,800
2003			4,800
2004			4,800
2005			9,078
2006	9,097	8,000	17,097
2007	9,100		9,100
2008	9,100		9,100
2009	9,100		9,100
2010	9,100		9,100
2011	9,100		9,100
2012	8,613		8,613
2013	7,900	3,500	11,400
2014	9,100		9,100
2015	3,340		3,340
2016			---
2017			---
2018	4,600		4,600
2019	4,600	9,100	13,700
2020	4,600	1,150	5,750
2021	4,600	13,800	18,400
2022	11,400		11,400

For this general lake assessment and the Walleye baseline study, the two capture methods described above were utilized by Area 5 biologists to evaluate the status of the lake's fish populations in terms of their abundance and size distributions described in this report. Specifically, twelve overnight trap nets were deployed for 24-hour periods between April 18th and April 20th, 2022. Net leads were set directly onshore extending perpendicular to the shoreline into the lake, directing fish towards the lifting enclosure (lifting pot) situated at depths varying from 3.2-ft to 13.5-ft. Additionally, on June 5th, 12th, and 13th, 2022, ten single-pass night-boat electrofishing sites were sampled. Sampling was inclusive (i.e., all immobilized fish being captured), in 10-minute shoreline transects (each sampling duration accommodated sampling of approx. 1,150-ft), encompassing a total of 2.2-miles (62%) of shoreline. In both sampling methods, after capture, all fish were enumerated, measured for total length, and released with one exception. A subset of selected Walleye was euthanized for otolith extraction, for use to determine precise fish age and precise year of stocking. Once precise age determination is complete, contribution of annual stockings can be assigned to total trap net catch and electrofishing catch using an age-length key, presuming natural reproduction is not occurring. Preparation of otoliths for precise age determination and origin year of stocking are on-going.

2022 Trap Netting

A total of 393 fish were captured with trap nets representing 10 different species (Table 2). Bluegill (N = 124), Yellow Perch (N = 120), Brown Bullhead (N = 51), and Walleye (N = 49) were most abundant. Yellow Bullhead, Pumpkinseed, Chain Pickerel, Smallmouth Bass, American Eel, and Black Crappie were observed infrequently (N ≤ 30). Low catch of black bass was anticipated as trap nets are not effective in capturing these species.

Total lengths were utilized to gain insight to species-specific size distributions (Table 3). Sizes of captured Walleye varied from 15-in to 29-in, with the majority (76%) being 20-in to 22-inches. All captured Walleye were representative of quality-sized (≥ 15-in) fishes. Bluegills varied from 2-in to 8-in with most being quality-sized (≥ 6-in) at 7-in (60%) and 8-in (27%). Multiple size classes were readily evident of captured Yellow Perch at 4-

in (32%), 7-in and 8-in, combined (45%, combined), and 10-in (8%), with 42% representing quality-sized (≥ 8-in) fishes. The few (N = 19) Pumpkinseed captured were principally (79%) 5-in to 7-in fishes.

Table 2. Total catch (N) of fish captured derived from individual trap net (TN) sets on Duck Harbor Pond during April 2022.

Species	TN 1	TN 2	TN 3	TN 4	TN 5	TN 6	TN 7	TN 8	TN 9	TN 10	TN 11	TN 12	Total
American Eel			1	1									2
Black Crappie			1										1
Bluegill	1	10	26	16	1	39	4		25	2			124
Brown Bullhead	1	3	1	2	1	9	11	1	1	4	17		51
Chain Pickerel			3	1					1				5
Pumpkinseed	2	7	3	2		1	4						19
Smallmouth Bass	1		1										2
Walleye	3	3	2			31			9		1		49
Yellow Bullhead	2	4	7	1					2	4			20
Yellow Perch	6	39	17			10	16		4	10	13	5	120
Effort (h)	23.5	27.0	23.2	26.9	21.4	21.3	21.4	23.3	21.7	21.8	22.4	21.8	

2022 Night-boat Electrofishing

Night-boat electrofishing captured 1,462 fish representing 14 different species (Table 4). Pumpkinseed (N = 486), Alewife (N = 392), Bluegill (N = 332), Yellow Perch (N = 66), Smallmouth Bass (N = 56), and Walleye (N = 37) were the most prevalent. Largemouth Bass, Brown Bullhead, Yellow Bullhead, Chain Pickerel, American Eel, Golden Shiner, Lepomis Hybrids and Black Crappie were also present (N ≤ 30).

Observed size classes for various gamefishes captured were encouraging (Table 5). The majority (95%) of Walleye were quality-sized (≥ 15-in) or larger; however, the presence (3%) of yearling Walleye may be suggestive of survival of the previous year's maintenance stockings. While it is unknown if Walleye are naturally reproducing within Duck Harbor Pond, it is presumed to be non-self-sustaining. Sizes of Largemouth Bass varied from 3-in to 22-in, with 67% of the catch representing quality-sized fish. Yearling-sized (3-in) Largemouth Bass were also evident. Similarly, Smallmouth Bass sizes were well-represented by multiple size groups including yearlings (3-in, 20% and 4-in, 20%) and quality-sized (≥ 11-in, 50%) fishes. Forty-six and 50% of the Bluegill and Pumpkinseed catch were quality-sized (≥ 6-in), whereas 38% of the Yellow Perch catch were quality-sized (≥ 8-in) or larger.

Comparison to Historical Time-series

No relevant historical data is appropriate for comparative purposes to the 2022 trap net and night-boat electrofishing surveys. Previous surveys employing either trap net (i.e., April 1979 and April 1983) or night-boat electrofishing (i.e., June 1979, September 1993, April 2018, and October 2021) were infrequent. Moreover, since historical sampling took place considerable time had elapsed relative to the present-day surveys, precluding conclusive statements about trends in gamefish abundance. The recent night-boat electrofishing surveys (i.e., 2018 and 2021) were targeting specific life-stages of Walleye: spawning adults (2018), or young-of-the-year (2021), and hence accomplished during a different calendar season. Thus, observed catches were anticipated to be skewed towards those objectives.

Table 3. Size (total length in inches) frequency distribution of fish captured using trap nets on Duck Harbor Pond Lake during April 2022.

Length (in)	American Eel	Black Crappie	Bluegill	Brown Bullhead	Chain Pickerel	Pumpkinseed	Smallmouth Bass	Walleye	Yellow Bullhead	Yellow Perch
2			1							
3						1				
4			3			2	1			38
5			5			5			1	4
6			7	1		6				1
7			74	5		4			2	27
8			34	4					1	27
9				9		1			5	8
10				7					8	9
11				2					3	3
12				3						1
13		1		3						1
14				13						1
15	1			4			1	1		
16								1		
17					1			3		
18								1		
19					1					
20					1			10		
21					1			13		
22	1							14		
23								3		
24					1			1		
25								1		
26										
27										
28										
29								1		
Total	2	1	124	51	5	19	2	49	20	120

Table 4. Total catch of fishes and effort (hours) from Duck Harbor Pond from individual night-boat electrofishing (NBE) survey transects in June 2022.

Species	NBE 1	NBE 2	NBE 2B	NBE 3	NBE 4	NBE 5	NBE 6	NBE 7	NBE 8	NBE 10B	Total
Alewife	64	58	19	24	43	20	29	25	87	23	392
American Eel						1		3	2		6
Black Crappie	1										1
Bluegill	24	34	25	49	11	37	50	44	26	32	332
Brown Bullhead		1	5	4		1	3	3	1	1	19
Chain Pickerel		1	3	1		3	4	1	1		14
Golden Shiner		1	1				1		1		4
Largemouth Bass	1	7	2	3	2	2	2			5	24
Lepomis Hybrids	1	2		1		3					7
Pumpkinseed	23	54	60	46	45	53	46	40	42	77	486
Smallmouth Bass	4		4	8	6	10	5	4	7	8	56
Walleye	4	3		9	5	9	2	3	2		37
Yellow Bullhead		1	3	3		1	2	6	1	1	18
Yellow Perch	4		8	6	2	6	10	16	6	8	66
Effort (h)	0.17	0.18	0.12	0.16	0.19	0.17	0.16	0.17	0.17	0.17	

Yet, the observed catches from the 2018 night-boat electrofishing may offer some insight to the general status of adult Walleyes relative to the 2022 surveys. Calculation of catch-per-unit-of-effort (CPUE; fish/h) as the annual mean allows comparability between the 2018 and 2022 night-boat electrofishing surveys. As anticipated, mean catch rates observed in 2018 (CPUE = 36.4 fish/h) was higher than observed in 2022 (CPUE = 21.9 fish/h; Figure 1) but a greater portion of the catch were larger sized from the 2022 survey than observed in 2018 (Figure 2). The most frequently caught size class Walleye were 19-in fish in 2018 and 23-in fish from the 2022 surveys. It is unknown if these fish represent the same year-class. Age class will be knowable following precise age determinations.

Conclusions

Findings from the 2022 trap net and night-boat electrofishing surveys are intended to form a baseline for evaluation of the Commission's annual maintenance Walleye stockings. Certainly, the capture of multiple quality-sized Walleye suggests these stocked fish grow to sizes to support the fishery, presuming natural reproduction is not occurring. However, by increasing the stocking rate, the Commission is hopeful of improved Walleye abundance and size distribution. Available forage is not anticipated to be a limiting factor on Walleye growth or density, given the abundance of an introduced forage fish (Alewife). Based on our 2022 assessment catches, anglers should continue to expect frequent catches of quality-sized fishes.

Table 5. Size (total length) frequency distribution of fishes from Duck Harbor Pond captured during the night-boat electrofishing survey in June 2022.

Length (in)	Alewife	Black Crappie	Bluegill	Brown Bullhead	Chain Pickerel	Golden Shiner	Largemouth Bass	Lepomis Hybrids	Pumpkinseed	Smallmouth Bass	Walleye	Yellow Bullhead	Yellow Perch
0									1				
1			3										
2			20						15				
3	121		10				3		27	11			
4	80		31			2	2	1	91	11	1	1	13
5	10		109					1	82	1			25
6			82			1		4	212				2
7			64					1	29	1		1	1
8			7						2	1		6	7
9				2		1	1			1		7	13
10		1		5			2			2		1	3
11					1					1		1	
12				1						3			1
13				3						2	1		1
14				7	1		2			7		1	
15				1						9	1		
16					1		2			4			
17					2		6			1	1		
18					5		1			1	2		
19					3		3				1		
20					1		1				5		
21											4		
22							1				6		
23											7		
24											5		
25											3		
Unmeasured	181			6					27				
Total	392	1	332	19	14	4	24	7	486	56	37	18	66

Figure 1. Annual mean catch-per-unit-of-effort (fish/h) for Walleye captured in 2018 and 2022 night-boat electrofishing surveys.

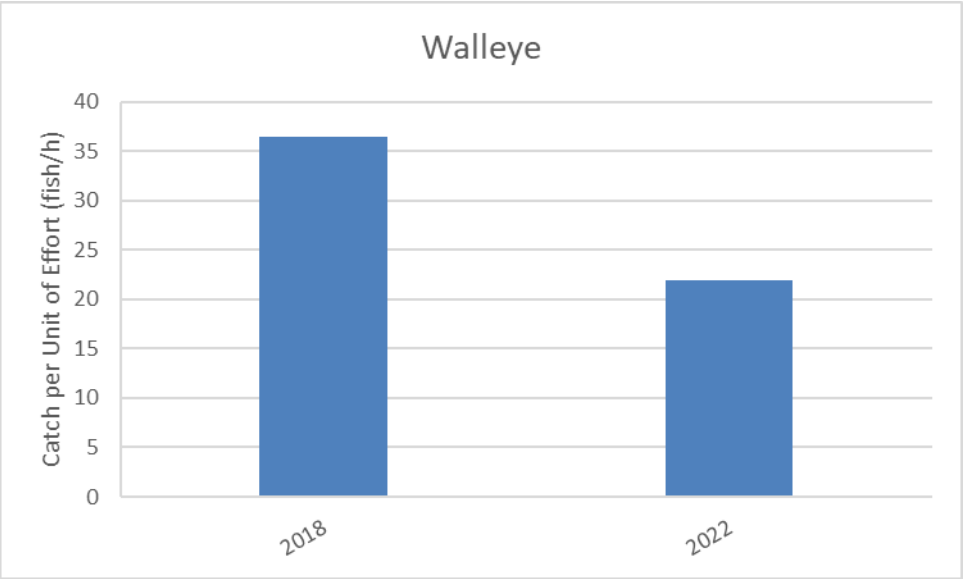
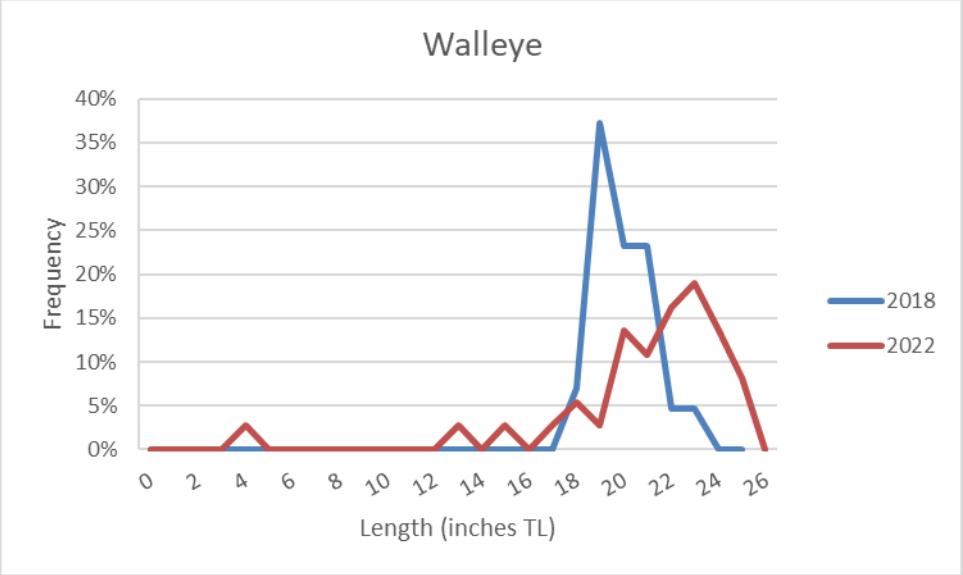


Figure 2. Size (total length) frequency distribution of Walleye captured in 2018 and 2021 night-boat electrofishing surveys.



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