Comprehensive Survey Report of Lauderdale Lakes – Walworth County 2013

Middle Lake of the Lauderdale Lakes Chain (photo courtesy of Heidi Bunk, WDNR).

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SUMMARY

A comprehensive fisheries survey was conducted on the Lauderdale Lakes chain (Green, Middle and Mill Lakes) in Walworth County during the spring and fall of 2013. The primary goal of the survey was to assess gamefish and panfish population abundance, size structure and/or growth. The survey began April 10th, concluded October 8th and included various netting and electrofishing assessments. Species captured included northern pike, walleye, largemouth bass, smallmouth bass and bluegill.

Northern pike occurrence was relatively low during the survey, though size structure was quite strong. A low abundance population composed of large "remnant" fish is indicative of a relatively limited pike stocking program, as well as high harvest rates of adult pike. The DNR and the Lauderdale Lakes Improvement Association have been stocking large fingerling northern pike in recent years to increase the abundance of pike within the lakes. Northern pike provide important predatory pressure on small gamefish and panfish, helping to maintain balance among these species, while also providing a popular fishing option. The Lauderdale Lakes chain can certainly support a higher density of pike through plentiful wetland spawning habitat and a diverse forage base.

Walleye abundance, at 1.36/acre, was relatively low, but better than many other lakes in the area. Over 82% of the walleye captured were over the 15" minimum length limit. Low abundance and very strong size structure is fairly typical for other nearby lakes with a limited stocking history and high levels of walleye harvest. Walleye growth rates in the Lauderdale chain were similar to the accelerated growth shown in other southern Wisconsin waters, with many fish reaching the 15" minimum length limit prior to spawning for the first time. The chain has a history of supporting low levels of walleye natural reproduction, which is likely limited by low adult abundance and a very high density of largemouth bass. The chain was stocked with nearly 15,000 large fingerling walleye in 2015, which should create a strong surge of spawning fish in three to five years. Protecting walleye for at least one spawning season through restrictive harvest regulations would greatly improve the likelihood of maintaining a long term, fishable walleye population in the Lauderdale Lakes chain.

Largemouth bass abundance was estimated at 6.43/acre and relative abundance was relatively high (52.4/mile), though size structure was quite poor. Only 1% of the bass captured during the survey were greater than the 14" minimum length limit. The Lauderdale Lakes chain has a long history of an overabundant bass population with very poor size structure. Harvest pressure on largemouth bass is extremely low in comparison to other species, as is natural mortality without a higher density predator population. This produces a poor quality bass angling experience and can directly harm the success of other popular gamefish species, especially walleye. Exploitation of smaller bass should be maximized through relaxed harvest regulations and continued stocking of northern pike.

METHODS

A comprehensive fisheries survey was conducted on the Lauderdale Lakes Chain (Green, Middle and Mill Lakes) in Walworth County during the spring and fall of 2013. The primary goal of the survey was to assess gamefish and panfish population abundance, size structure and/or growth. Up to 12 fyke nets were fished to capture northern pike and walleye on Lauderdale Lakes from April 10th through April 22nd for a total of 109 net nights. Early spring electrofishing targeted walleye and was conducted from April 29th through May 1st for a total of 13.0 miles. Late spring electrofishing targeted largemouth bass, smallmouth bass and panfish and was conducted on May 6th and 7th for a total of 8.5 miles. Fall electrofishing targeted walleye and was conducted on October 7th and 8th for a total of 8.5 miles. Figure 1 displays the 2013 netting and electrofishing sampling locations and Table 1 summarizes the effort and target species for each survey type.

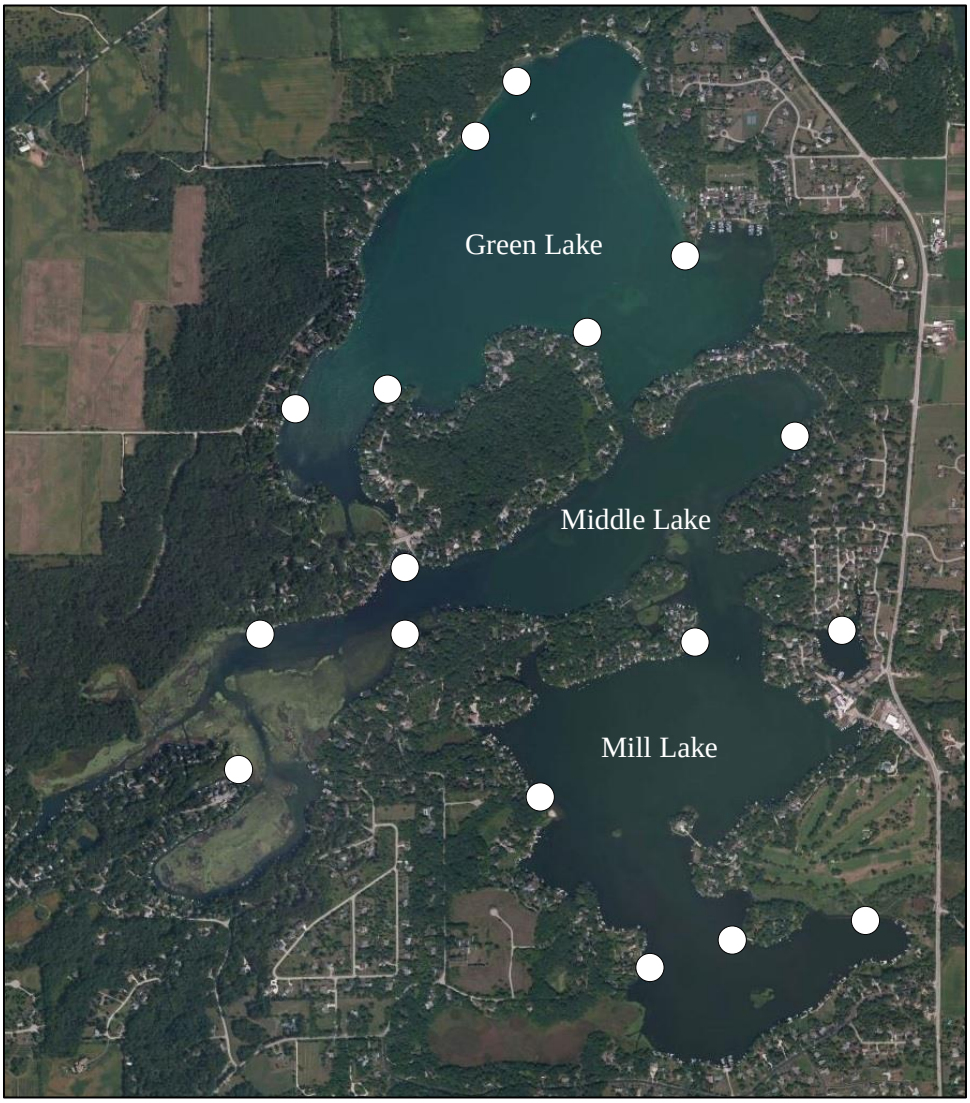

Figure 1. Map of fyke netting sites (○) during the 2013 Lauderdale Lakes survey. Electrofishing focused on the entire shore of Green Lake, the east shore of Middle Lake and the north shore of Mill Lake.

Table 1. Summary of survey types, effort and target species during the 2013 Lauderdale Lakes survey.

Survey Type	Dates	Total Effort	Target Species
Spring Netting I	April 10th – April 22nd	109 net nights	Northern Pike/Walleye
Spring Electrofishing I	April 29th – May 1st	13.0 miles	Walleye
Spring Electrofishing II	May 6th – May 7th	8.5 miles	Bass and Panfish
Fall Electrofishing	October 7th – October 8th	8.5 miles	Walleye

During the survey, all gamefish species and a subsample of panfish were measured to the nearest tenth-inch. A subsample of gamefish was also weighed to the nearest tenth-pound. Mean length, max length and catch per unit effort (e.g., catch per net night or catch per electrofishing mile) were calculated for all species sampled. Gamefish were also given differential finclips to identify recaptures and facilitate abundance estimates (female – right pectoral, male – left pectoral, unknown or immature – top caudal). Walleye and largemouth bass population estimates were calculated using the Chapman modification of the Petersen index:

$$N = \frac{(M+1)(C+1)}{(R+1)} - 1$$

where M is the number of marked fish at large, C is the number of fish examined for marks during the recapture run, and R is the number of marked fish captured during the recapture run. Aging structures collected from walleye allowed for estimation of growth rates.

RESULTS

Northern Pike

Northern pike were targeted and captured during the early spring fyke netting survey from April 10th through April 22nd. A total of 53 northern pike were captured, for a low catch rate of 0.5 per net night (Table 2). Males outnumbered females 32 to 20 (1.6:1), though female average length was greater by five inches. The biggest pike of the survey were a 39", 7.8lb post-spawn female and a 38", 11.1lb pre-spawn female (Figure 2). Northern pike proportional stock density (PSD; proportion of pike at least 14" that were also at least 21") was 73.6, indicating a population primarily composed of larger fish. Of the fish captured, 26.4% were of legal size (26" and greater), including half of the female pike.

Table 2. Northern pike fyke netting catch statistics during the 2013 Lauderdale Lakes survey (109 net nights).

	Number Captured	Number Measured	CPUE	Mean Length (Inches)	Max Length (Inches)	Mean Weight (Pounds)	PSD	% Legal
Total	53	53	0.5	24.2	39.0	3.19	73.6	26.4
Female	20	20	0.2	27.4	39.0	4.58	-	50.0
Male	32	32	0.3	22.3	31.2	2.45	-	12.5
Unknown	1	1	<0.1	20.5	20.5	1.38	-	0.0

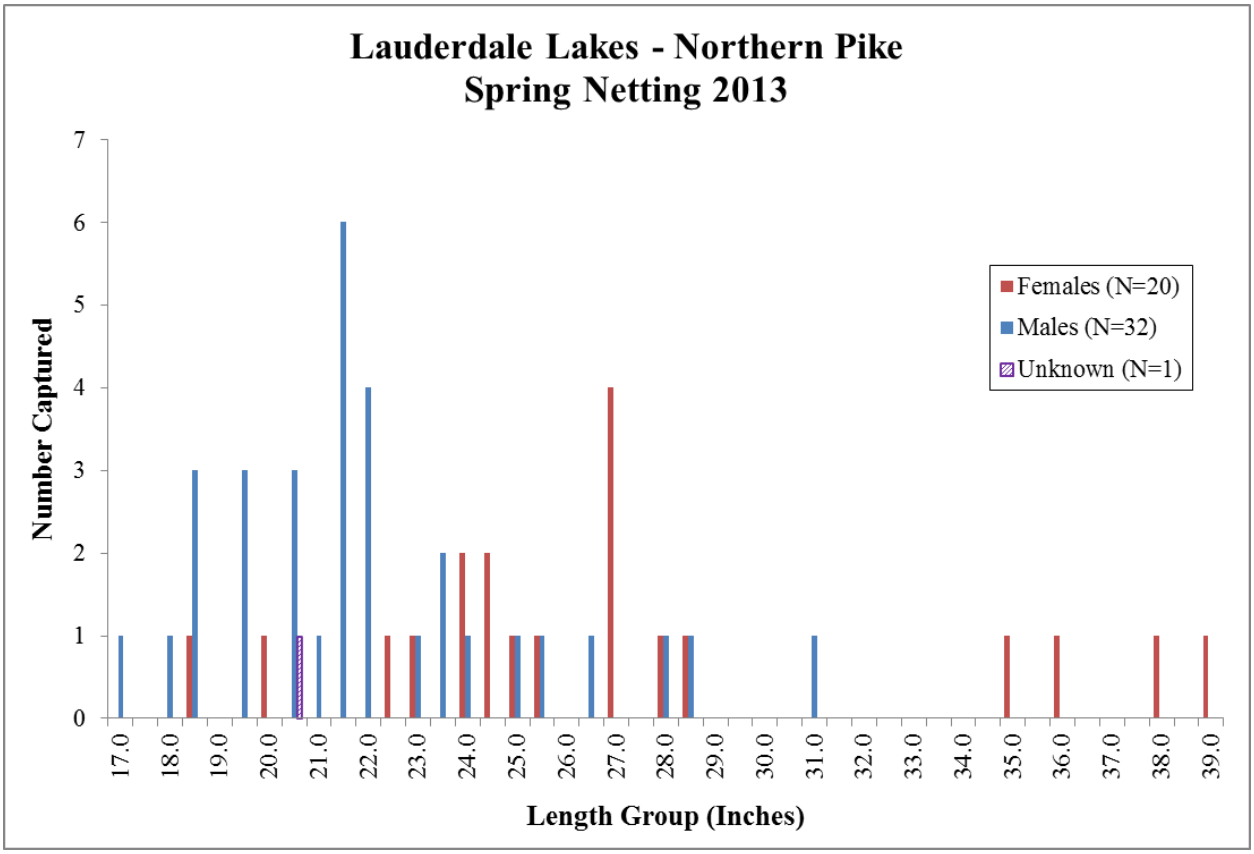

Figure 2. Gender-specific length frequency for northern pike captured during early spring fyke netting on Lauderdale Lakes in 2013.

Walleye

Walleye were targeted and captured during the early spring fyke netting survey from April 10th through April 22nd. A total of 191 walleye were captured during netting, for a relatively low catch rate of 1.8 per net night (Table 3). Males outnumbered females 137 to 48 (2.9:1), though female average length was greater by four inches. The biggest walleye of the fyke netting survey were a 22.2", 4.0lb female and a 22.0", 4.3lb female (Figure 3). Walleye PSD (proportion of walleye at least 10" that were also at least 15") was 83.8, indicating a population primarily composed of larger fish. Of the fish captured, 82.4% were of legal size (15" and greater), including all of the female walleye. Walleye greater than 10" were given differential finclips (female – right pectoral, male – left pectoral, unknown or immature – top caudal) to identify recaptures and facilitate an abundance estimate following a recapture electrofishing run. Three likely one year old walleye ranging in size from 6.6 – 9.0 inches were also captured during the fyke netting survey and are presumed to be the product of one of two walleye stocking events in 2012, but could also have been the product of natural reproduction.

Table 3. Walleye fyke netting catch statistics during the 2013 Lauderdale Lakes survey (109 net nights).

	Number Captured	Number Measured	CPUE	Mean Length (Inches)	Max Length (Inches)	Mean Weight (Pounds)	PSD	% Legal
Total	191	188	1.8	16.9	22.2	1.91	83.8	82.4
Female	48	48	0.4	20.0	22.2	2.90	-	100.0
Male	137	135	1.3	15.9	20.0	1.43	-	78.5
Unknown	6	5	0.1	10.9	16.8	0.68	-	20.0

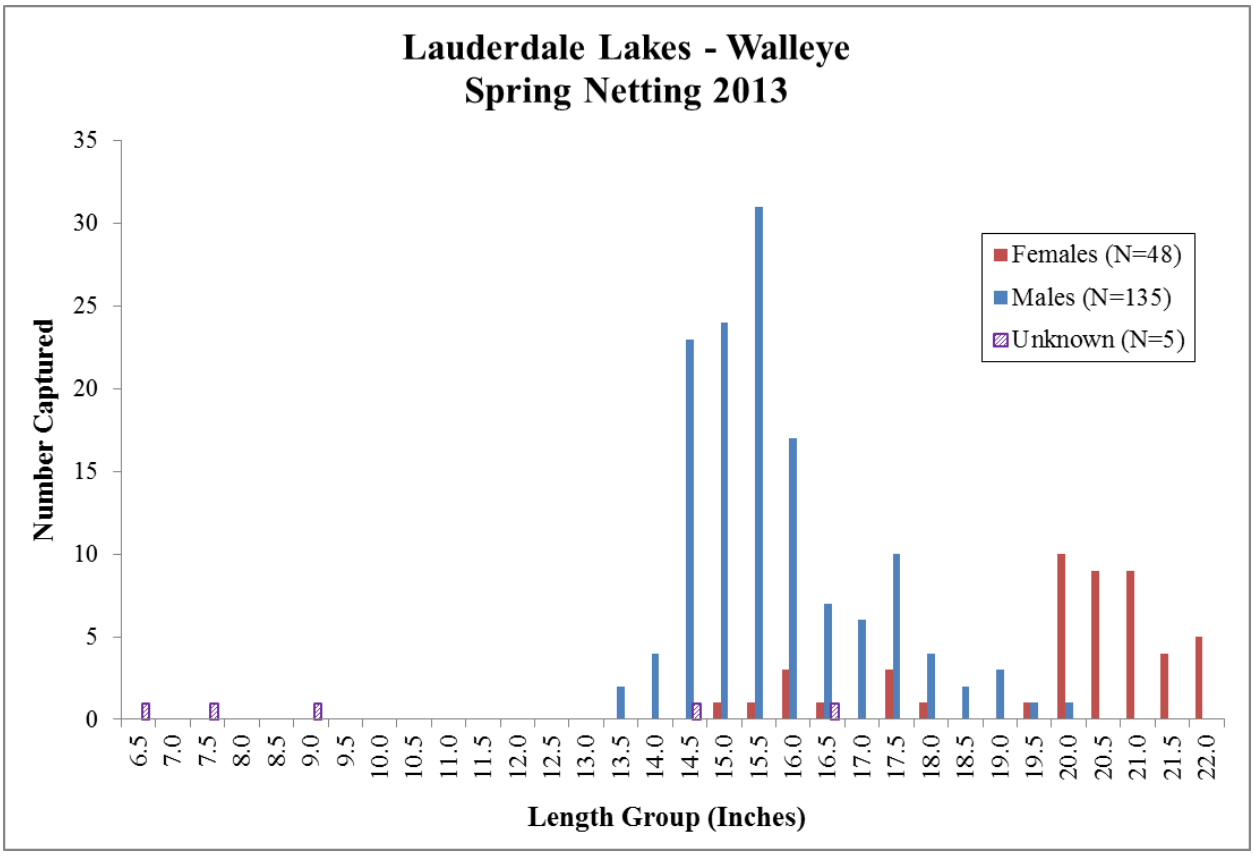

Figure 3. Gender-specific length frequency for walleye captured during early spring fyke netting on Lauderdale Lakes in 2013.

Walleye were also targeted and captured during the early spring electrofishing survey from April 29th through May 1st. A total of 76 walleye were captured during electrofishing, for a relatively low catch rate of 5.9 per mile. All walleye captured during the electrofishing runs were inspected for an existing finclip to facilitate an abundance estimate. A walleye population estimate was calculated using the Chapman modification of the Petersen index:

$$N = \frac{(M+1)(C+1)}{(R+1)} - 1$$

where M is the number of marked fish at large, C is the number of fish examined for marks during the recapture run, and R is the number of marked fish captured during the recapture run. The 2013 Lauderdale Lakes walleye population estimate was calculated as:

$$N = \frac{(185+1)(74+1)}{(13+1)} - 1$$

where N = 995 or 1.36 per lake acre, 95% CI [638, 1,705].

A subsample of the captured walleye was also weighed to the nearest tenth-pound and dorsal spines were collected to estimate growth rates. Age estimation allowed for comparison to average walleye growth rates in southern Wisconsin (Figure 4). The sample size of walleye captured was insufficient to produce a catch curve for estimation of survival, mortality and exploitation.

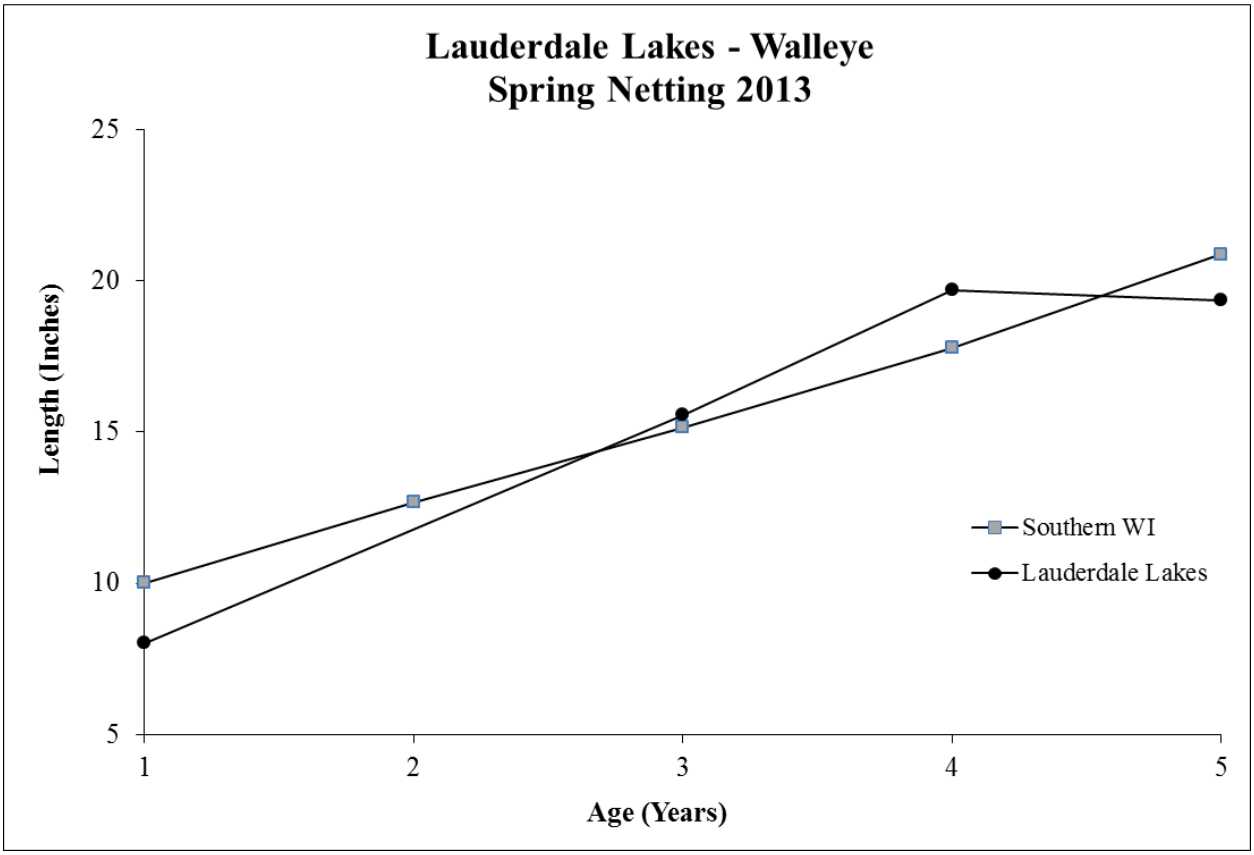

Figure 4. Length at age estimate for walleye captured during the spring survey on Lauderdale Lakes in 2013.

Walleye were also captured during a fall electrofishing survey primarily targeting young-of-year (YOY) walleye on October 7th and 8th. A total of 52 walleye were captured during electrofishing, for a relatively low catch rate of 6.1 per mile (Table 4). Of the walleye captured, as many as five were likely YOY based on estimated growth rates on the Lauderdale Lake chain (Figures 4 and 5), resulting in a low YOY catch rate of 0.6 per mile. These YOY are assumed to be naturally reproduced since no walleye stocking events occurred in the Lauderdale chain in 2013. Unfortunately, no aging structures were collected from walleye in the fall, so the age of these five fish cannot be conclusively estimated.

Table 4. Walleye fall electrofishing catch statistics during the 2013 Lauderdale Lakes survey (8.5 miles).

Number Captured	Number Measured	CPUE	Mean Length (Inches)	Max Length (Inches)	Mean Weight (Pounds)	PSD	% Legal
52	46	6.1	14.4	24.0	1.09	57.5	50.0

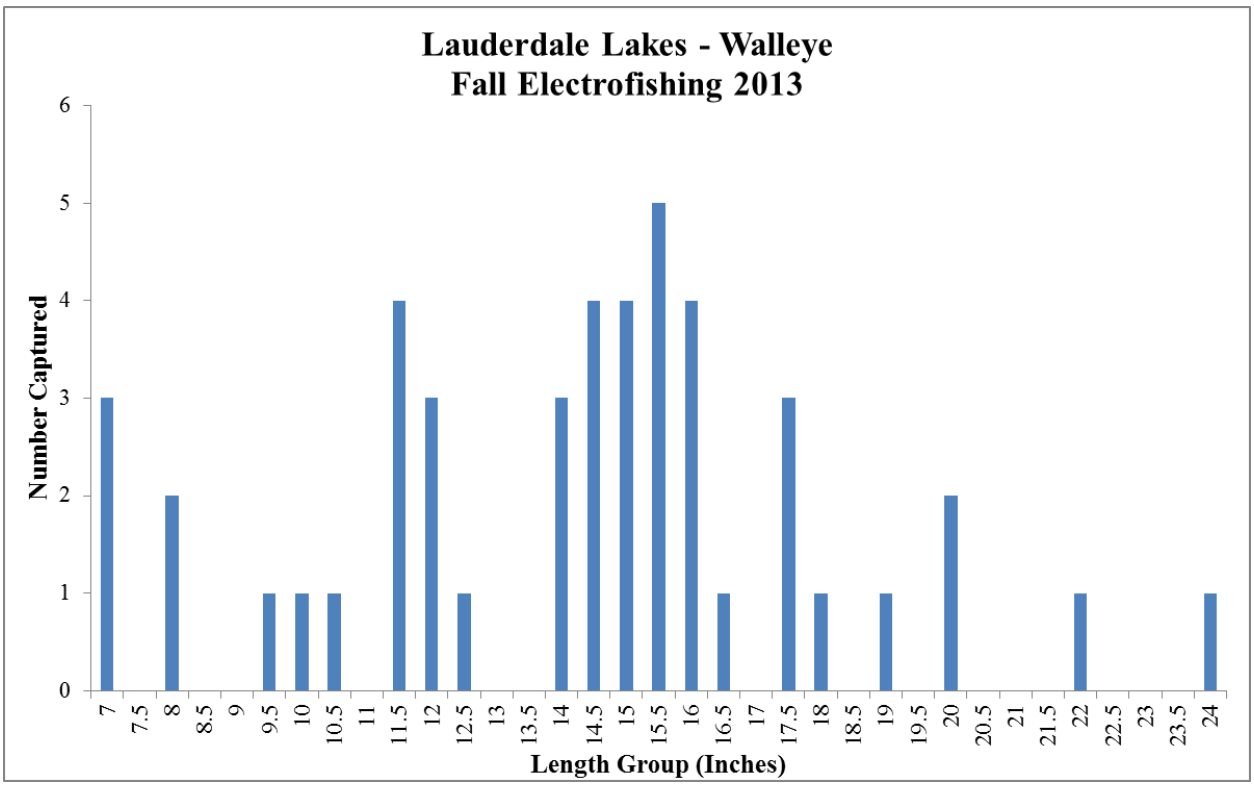

Figure 5. Length frequency for walleye captured during fall electrofishing on Lauderdale Lakes in 2013 (N=46).

Largemouth Bass

Largemouth bass were targeted and captured during the late spring electrofishing survey on May 6th and 7th. A total of 445 largemouth bass were captured during electrofishing, for a relatively high catch rate of 52.4 per mile (Table 5). The biggest bass of the survey was 17.2" and 2.9lb (Figure 6). Largemouth bass PSD (proportion of bass at least 8" that were also at least 12") was 22.8, indicating a population primarily composed of smaller fish. This result is consistent with other recent surveys on Lauderdale Lakes, which have repeatedly found a relatively small largemouth bass PSD (Figure 7). Of the fish captured, only one was of legal size (14" and greater).

Table 5. Largemouth bass late spring electrofishing catch statistics during the 2013 Lauderdale Lakes survey (8.5 miles).

Number Captured	Number Measured	CPUE	Mean Length (Inches)	Max Length (Inches)	Mean Weight (Pounds)	PSD	% Legal
445	104	52.4	10.6	17.2	0.68	22.8	1.0

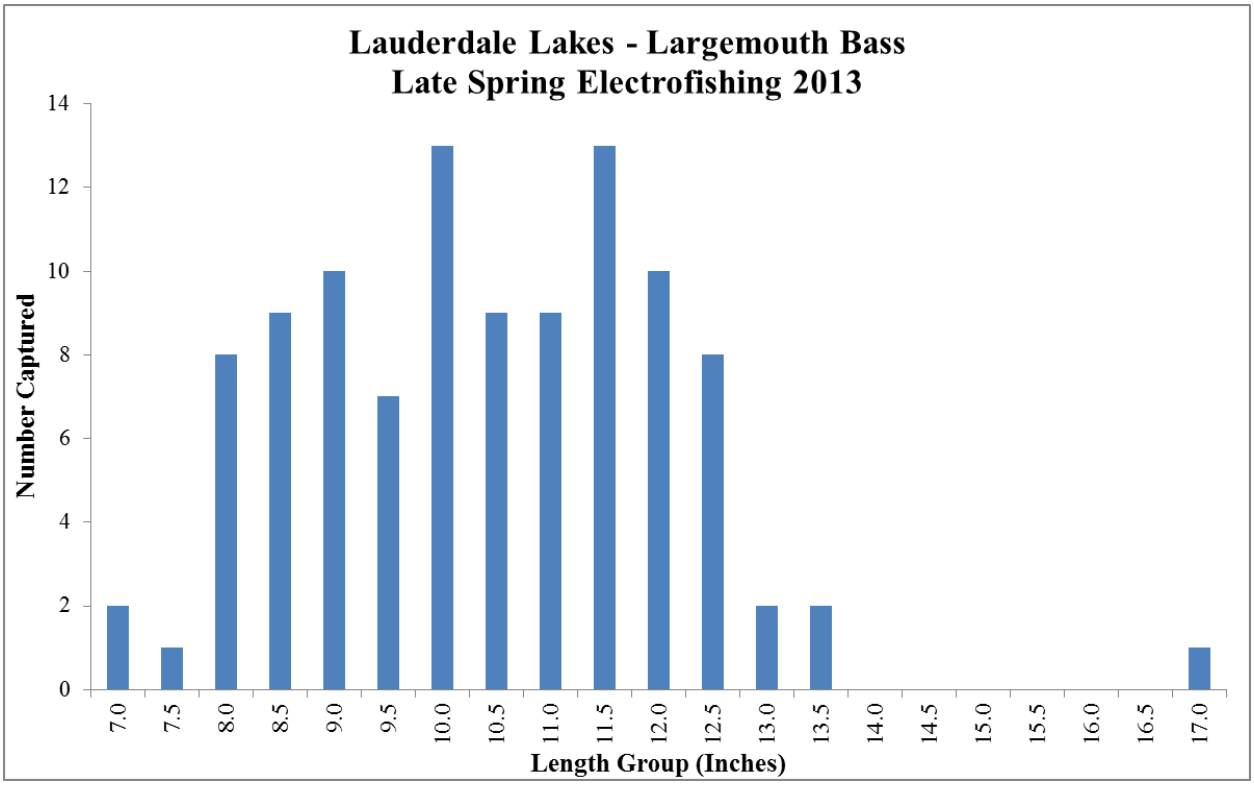

Figure 6. Length frequency for largemouth bass captured during late spring electrofishing on Lauderdale Lakes in 2013 (N=104).

Many of the largemouth bass captured during the 2013 spring survey were marked with a top caudal finclip. All bass captured during the final night of spring electrofishing were inspected for an existing finclip to facilitate an abundance estimate. A bass population estimate was calculated using the Chapman modification of the Petersen index:

$$N = \frac{(M+1)(C+1)}{(R+1)} - 1$$

where M is the number of marked fish at large, C is the number of fish examined for marks during the recapture run, and R is the number of marked fish captured during the recapture run. The 2013 Lauderdale Lakes largemouth bass population estimate was calculated as:

$$N = \frac{(489+1)(392+1)}{(40+1)} - 1$$

where N = 4,696 or 6.43 per lake acre, 95% CI [3,536, 6,424].

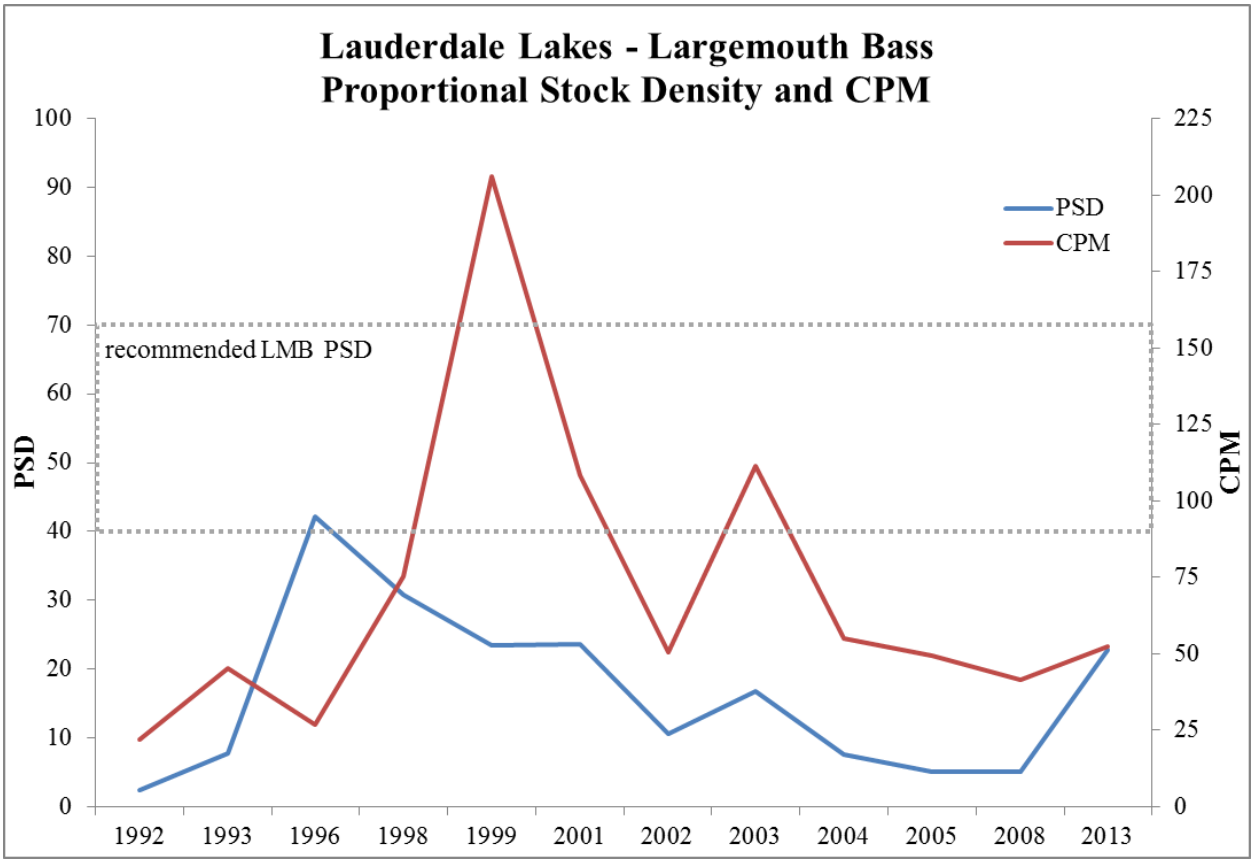

Figure 7. Largemouth bass proportional stock density (PSD; proportion of bass at least 8" that were also at least 12") and CPM (catch per electrofishing mile) from recent surveys on the Lauderdale Lakes chain, as well as the recommended PSD range for largemouth bass (Gabelhouse 1984).

Bluegill

Bluegill were targeted and captured in a single half-mile "catch all" run during the late spring electrofishing survey on May 6th. A total of 58 bluegill were captured during electrofishing, for a moderate catch rate of 116.0 per mile (Table 6). The biggest bluegill of the survey was 7.8" (Figure 8) and bluegill PSD (proportion of bluegill at least 3" that were also at least 6") was 58.6, indicating a population with healthy size structure. Of the fish captured, approximately 59% were 6" and greater.

Table 6. Bluegill late spring electrofishing catch statistics during the 2013 Lauderdale Lakes survey (0.5 miles).

Number Captured	Number Measured	CPUE	Mean Length (Inches)	Max Length (Inches)	PSD	% 6"+
58	58	116.0	6.1	7.8	58.6	58.6

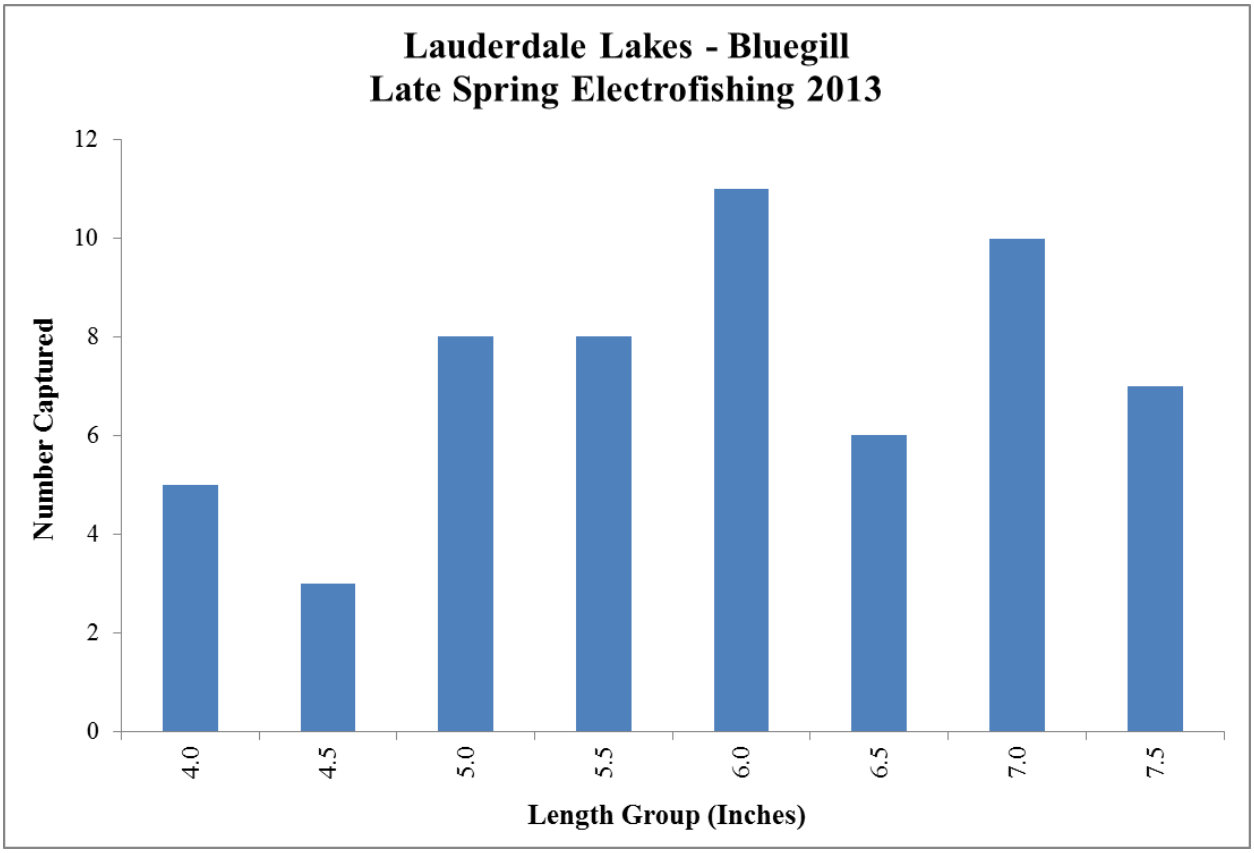

Figure 8. Length frequency for bluegill captured during late spring electrofishing on Lauderdale Lakes in 2013 (N=58).

Other Species

Several other fish species were captured during the comprehensive survey on Lauderdale Lakes in 2013. Bycatch summary results are shown in the tables below. Panfish and gamefish are only reported during sampling season in which they were specifically targeted.

Table 7. "Other species" netting bycatch summary during the 2013 Lauderdale Lakes survey (109 net nights).

Species	Number Captured	CPUE	Mean Length (Inches)	Max Length (Inches)
Black Bullhead	2	<0.1	9.2	12.5
Bowfin	4	<0.1	22.3	24.5
Channel Catfish	1	<0.1	15.5	15.5
Lake Chubsucker	1	<0.1	8.8	8.8
Rock Bass	19	0.2	6.8	9.7
Yellow Bullhead	36	0.3	11.1	13.8

Table 8. “Other species” early spring electrofishing bycatch summary during the 2013 Lauderdale Lakes survey (13.0 miles).

Species	Number Captured	CPUE	Mean Length (Inches)	Max Length (Inches)
Bowfin	1	0.1	-	-
White Sucker	3	0.2	22.8	24.6

Table 9. “Other species” late spring electrofishing bycatch summary during the 2013 Lauderdale Lakes survey (0.5 miles, 8.5 miles for others).

Species	Number Captured	CPUE	Mean Length (Inches)	Max Length (Inches)
Black Crappie	1	2.0	7.2	7.2
Bowfin	2	0.2	24.7	25.2
Brown Bullhead	3	0.4	8.8	13.7
Common Carp	14	28.0	-	-
Common Shiner	2	0.2	-	-

Table 10. “Other species” fall electrofishing bycatch summary during the 2013 Lauderdale Lakes survey (8.5 miles).

Species	Number Captured	CPUE	Mean Length (Inches)	Max Length (Inches)
Longnose Gar	7	0.8	27.7	38.1
Rock Bass	12	1.4	8.1	9.1
White Sucker	1	0.1	21.0	21.0
Yellow Bullhead	1	0.1	11.5	11.5

DISCUSSION

The 842 acre Lauderdale Lakes chain provides anglers with a diverse and popular mix of gamefish, including walleye, northern pike, largemouth bass, smallmouth bass and several species of panfish. The chain contains a variety of habitat, including shallow wetlands, sand and gravel flats, abundant aquatic vegetation, rocky points, steep drop-offs and holes up to 57' deep. The size, depth, habitat variety, and diverse forage base allows the chain to sustain several popular fishing opportunities for local and visiting anglers.

The Lauderdale Lakes Improvement Association (LLIA) has a long history of being a valuable collaborative partner in the effective management of fisheries resources within the chain. LLIA has completed annual fish crib projects since 2010, installing a total of 16 6'x6'x6' fish cribs and a large Christmas tree reef. LLIA also works cooperatively with DNR Fisheries Management to develop a fish stocking protocol, investing over $56,000 toward fish stocking since 2003 and coordinating a large group of volunteers to stock fish by boat throughout the chain. The collaborative relationship between DNR Fisheries Management and LLIA is extremely valuable and should be fostered into the future.

Northern pike occurrence in the 2013 survey was relatively low (0.5/net night). Size structure was quite strong (PSD of 73.6). Anderson and Weithman (1978) recommended a PSD range of 30-60 for a balanced northern pike population. A low abundance population primarily composed of large "remnant" fish is indicative of the relatively low pike stocking rates for the Lauderdale chain, as well as the high harvest pressure on northern pike compared to some other fish species. Size structure and abundance improvements can be made by increasing stocking rates and/or raising the minimum length limit, keeping larger individuals in the population while increasing the likelihood of sustainable natural reproduction. The Lauderdale chain offers access to plentiful wetland spawning habitat for northern pike, particularly in the western portions of Middle and Mill Lakes. The 2013 survey results also indicate the chain can produce memorable pike approaching 40".

Recent stocking of northern pike by the DNR and LLIA has utilized large fingerling fish stocked in the fall (average size 8.9-13.0"). Large fingerling northern pike are significantly more costly to raise than small fingerling fish stocked in the spring (average size 3.5-5.5"), but also show significantly higher expected survival rates, particularly in systems with an overabundant largemouth bass population such as the Lauderdale Lakes chain. Given proper size structure and abundance (achieved through natural reproduction, stocking or both), pike can provide an important top predator presence in a fish community, improving size structure of other popular species that may otherwise become overabundant (largemouth bass, panfish, etc.) and controlling rough fish species. Maximizing northern pike stocking rates in the near future is expected to produce notable benefits to the fish community and the overall fishing experience, based on the ability of the Lauderdale Lakes chain to support sizable pike and the need to greatly improve the size structure of the largemouth bass population.

Total walleye abundance was estimated at only 1.36/acre, with males greatly outnumbering females. Size structure was very strong (PSD of 83.8) and over 82% of the walleye captured were over the 15" minimum length limit. Anderson and Weithman (1978) recommended a PSD range of 30-60 for balanced walleye populations. As with the Lauderdale pike, a low abundance population primarily composed of large "remnant" fish is indicative of relatively low stocking rates and high harvest pressure. Walleye growth rates in the Lauderdale chain were similar to average growth rates for southern Wisconsin, with many fish reaching the statewide standard 15" minimum length limit in their third year. Such accelerated growth rates in the southern part of the state often leave walleye vulnerable to harvest prior to reaching sexual maturity, which typically occurs from age 3 to 5 (Becker 1983). Some low level of walleye natural

reproduction does occur in the Lauderdale chain, as indicated by the 2013 fall electrofishing results and those in recent years (2008 and 2004). The most likely limiting factors for walleye natural reproduction in many area lakes are poor adult walleye abundance (due to relatively low stocking rates and the increased harvest vulnerability of sub-adult and adult walleye caused by accelerated growth rates), a lack of optimal walleye spawning habitat, and predation/competition from overly abundant largemouth bass populations. The most significant of these factors for the Lauderdale chain are walleye stocking rates, walleye growth rates and largemouth bass abundance, whereas walleye spawning habitat is more plentiful in the chain than in many other nearby lakes.

In recent years, the Lauderdale Lakes chain was typically stocked with approximately 29,000 small fingerling walleye (average size 1.7"). Survival rates of small fingerling walleye are generally quite poor, particularly in systems with an overabundant population of largemouth bass. Walleye stocking rates greatly increased for the Lauderdale chain and several other lakes throughout the state with the implementation of the Wisconsin Walleye Initiative in 2013. The Lauderdale Lakes chain was stocked with a total of 14,597 large fingerling walleye (average size 8.0") in 2015. Such a significant increase in stocking rates and average size of stocked fish is expected to greatly improve survival rates and the likelihood of establishing a fishable adult walleye population in the short term. The Lauderdale Lakes chain has a proven history of supporting walleye natural reproduction at low levels and a notable increase in adult walleye abundance brought about by elevated stocking rates is expected to improve the likelihood of high levels of natural reproduction. Given accelerated walleye growth rates in southern Wisconsin, long term sustainability of the walleye population will require increasing the minimum length limit to protect adult walleye from harvest for at least one spawning season.

Largemouth bass abundance was estimated at 6.43/acre and bass occurrence in the 2013 survey was relatively frequent (52.4/mile), though size structure was quite poor (PSD of 22.8). Gabelhouse (1984) recommended a bass PSD range of 40-70 for a moderate density population in a balanced fish community made up of several popular species. Largemouth bass PSD in the Lauderdale chain has been consistently low, only reaching the recommended range once since 1992. Only 1% of the bass captured in the 2013 survey were of legal size (14" and greater), further indicating an overabundant and likely stunted population. The chain has, however, repeatedly shown the ability to produce an occasional memorable fish, including multiple 20" bass captured during the 2013 survey.

As with many other lakes in the area, largemouth bass harvest pressure is extremely low in the Lauderdale chain, especially in comparison to other gamefish species. An overabundant and stunted bass population not only fails to provide a quality fishing experience for bass anglers, but can also directly harm the success of other popular gamefish species. Given the high abundance and poor size structure of the bass population, as well as the multitude of popular gamefish species in the Lauderdale Lakes chain, exploitation of smaller bass should be maximized while also maintaining the opportunity for anglers to catch memorable to trophy size fish.

Relatively few bluegill were captured during late spring electrofishing in 2013, though effort was admittedly low (0.5 "catch all" miles). The survey produced a moderate bluegill catch rate of 116.0/mile and an average length just over 6". The size structure of the population appeared to be well balanced, as the 58.6 PSD fell within the recommended range of 20-60 (Anderson 1985). A high density largemouth bass population such as that found in the Lauderdale Lakes chain is generally thought to produce preferred length panfish through predation on smaller fish (Gabelhouse 1984). Reductions in largemouth bass abundance may lessen this effect, though increases in pike and walleye abundance will likely maintain predator pressure on the bluegill population, thereby producing similar size structure benefits.

MANAGEMENT RECOMMENDATIONS

- Maintain and enhance the valuable cooperative relationship between DNR Fisheries Management and the Lauderdale Lakes Improvement Association and other stakeholders to achieve common goals (stocking, habitat enhancement, etc.).
- Maximize stocking rates of large fingerling northern pike to increase pike abundance and levels of top predator pressure on small bass and panfish. Current stocking guidance for the South District is two large fingerling northern pike per lake acre.
- Consider a protective harvest regulation for northern pike if increased stocking rates do not achieve a sufficient increase in abundance.
- Maximize stocking rates of walleye (preferably large fingerling) to improve abundance and promote increased levels of natural reproduction. The Lauderdale Lakes chain is currently stocked with 20 large fingerling walleye per lake acre through the Wisconsin Walleye Initiative.
- Protect adult walleye for at least one spawning season with an 18" minimum length limit and daily bag of three to promote increased levels of natural reproduction and improve the likelihood of sustaining a long term, fishable walleye population. The management objectives of this regulation change include increasing walleye abundance to 2.0/acre, increasing relative abundance to 10.0 per fall electrofishing mile, and/or maintaining PSD at 30.0 or greater.
- Maximize harvest pressure on small largemouth bass with a 14" to 18" protected slot to improve bass size structure, increase the likelihood of success for other gamefish species and provide a better overall fishing experience. The management objectives of this regulation change include increasing largemouth bass PSD to 40.0 or greater and reducing relative abundance to 40.0 or less per late spring electrofishing mile.
- Continue to monitor bluegill relative abundance and size structure as changes occur among gamefish species abundance.

STOCKING HISTORY

Year	Species	Size	Number	Funding
2015	Walleye	Large fingerling (8.0")	14,597	DNR
	Northern Pike	Large fingerling (15.0")	800	Association
	Northern Pike	Large fingerling (8.9")	881	DNR
	Yellow Perch	Large fingerling (6.0")	6,800	Association
2014	Northern Pike	Large fingerling (13.0")	900	Association
2013	Northern Pike	Large fingerling (8.9")	1,332	DNR
2012	Walleye	Small fingerling (1.7")	29,435	DNR
2010	Walleye	Small fingerling (1.7")	29,435	DNR
2004	Smallmouth Bass	Large fingerling (4.0")	1,500	Association
2004	Smallmouth Bass	Large fingerling (4.0")	13,940	DNR
2003	Smallmouth Bass	Large fingerling (3.3")	4,950	DNR
2002	Smallmouth Bass	Large fingerling 2.6")	8,120	DNR
2002	Smallmouth Bass	Large fingerling (3.9")	1,554	DNR
2001	Smallmouth Bass	Small fingerling (1.1")	21,000	DNR
1998	Walleye	Delavan adults (13.0")	602	DNR

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The author would like to comment on the original report publication. The corrected detail is offered here to clarify the fishery data published in the report within the context of temporal limitations encountered during the survey's sampling effort.

The proposed corrections include the following additions to the original report:

- Page 2, paragraph two, second sentence: Add, "Pike sampling efforts were complicated by an extremely late start to the netting season, likely well after peak pike spawning activity."
- Page 4, paragraph two, second sentence: Add, "The netting survey was initiated much later than usual, likely well after peak pike spawning activity."
- Page 13, paragraph three, first sentence: Add, "though netting was initiated much later than usual and well after peak pike spawning activity."