Aquatic plant management at Hominy Ridge Pond

Management Update 2017
Salamonie State Forest, Wabash County
N 40.8083, W-85.6847
Jed Pearson, fisheries biologist

Background

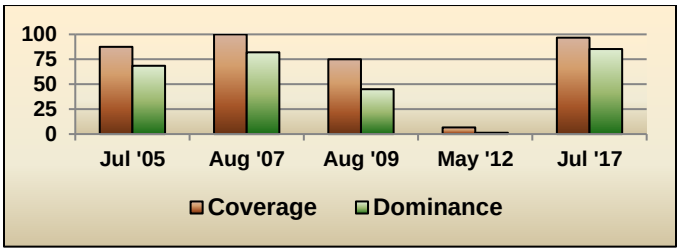
Before grass carp stockings were legalized in Indiana in 1992, the Division of Fish and Wildlife tested their effects on aquatic plants and fish in several ponds, including Hominy Ridge, an 11-acre pond dominated by small bluegills. To reduce naiad and chara, 120 grass carp were stocked in 1986. Opinions differ on whether plants declined when coontail later reached dense levels despite stocking 55 carp in 1993, 2002, 2004 and 2006. Forty more were stocked in 2008. After 2009, however, concerns surfaced that too many carp were present when few plants remained. Subsequent stockings were cancelled. At the request of the local manager, four grass carp (31-42½ in) were also removed during a fish survey in 2012.

In addition to curtailing grass carp stockings, a pick-up load of spatterdock tubers obtained from a dredging project were transplanted to the pond in 2013 to expand coverage of emergent plants. Other than small patches of cattails and water lilies, few emergents were present. The tubers were pinned to the bottom and screened to prevent grazing by grass carp. To monitor changes in the submersed plant community, standard rake-toss sampling and hydro-acoustic mapping were conducted on July 28. Emergent beds were photographed to compare with previous photos.

Results

Submersed plant coverage within the 15-foot littoral zone was high (97%). The dominance sum (i.e. "biomass") was also high. Coontail was present at all but one site. Coverage of each of five other species was 10% or less. Based on hydro-acoustic maps, mid-summer coverage increased from 33% of the pond in 2015 to 66% in 2016 and decreased to 43% in 2017. Average plant bio-volume (i.e. "height") was 39%, 70%, and 61%, respectively. Some additional increases in the size and density of the spatterdock beds were apparent in 2017.

Percent coverage (mostly coontail) and plant dominance, 2005-17.



Analysis and recommendations

Although grass carp were observed while sampling in 2017, they no longer limit plant abundance. Unfortunately no mid-summer data is available from 2009-2015 to document how sparse plants actually were. Even so, coverage and bio-volume have increased since 2015. While some shallow areas are now inaccessible to boating, there is little overall impairment of fishing. Whether the spatterdock beds continue to expand remains to be seen.

Two options for future actions are suggested: (1) stock additional grass carp to prevent further impairment, and/or (2) continue to monitor the plant/fish community. More large bluegills were present in 2012 when less vegetation was present ("farm-pond theory"), but coontail can provide an important substrate for invertebrates for large bluegills to eat ("natural-lake theory"). Despite decades of research, the role of aquatic plants and grass carp in fish management remain uncertain.

Prepared by: Jed Pearson, fisheries biologist, 8/22/17

References

Braun, E. 1990. Relative effectiveness of triploid grass carp in controlling aquatic vegetation in two impoundments. Indiana Division of Fish and Wildlife.

Delauder, T. 2012. Hominy Ridge Lake, Wabash County, fish management report. Indiana Division of Fish and Wildlife.

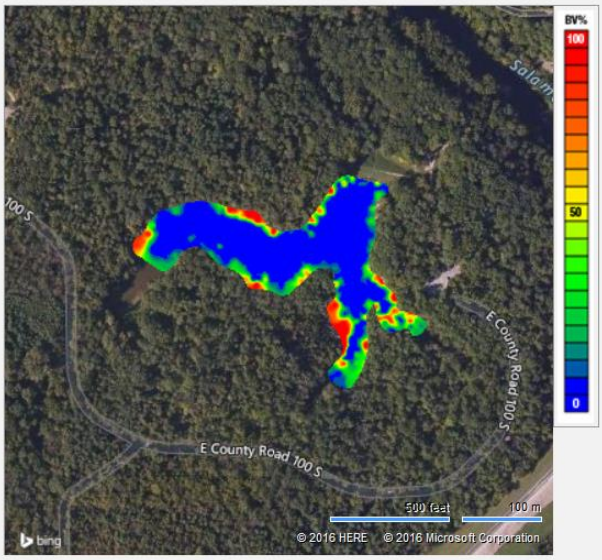
Pearson, J. 2016. Aquatic plant management at Hominy Ridge Pond. Indiana Division of Fish and Wildlife.

Indiana Division of Fish and Wildlife

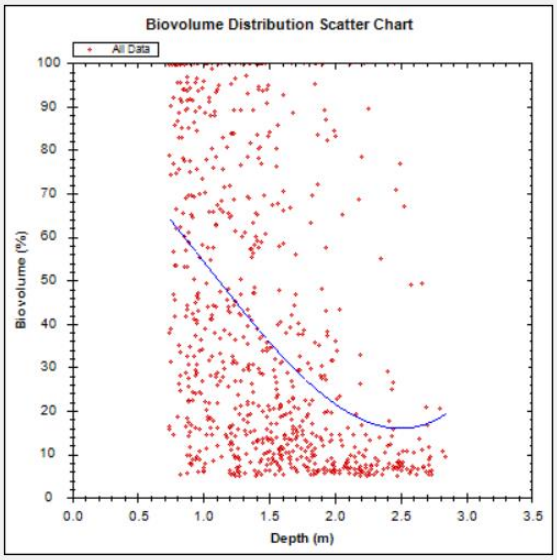
BioBase sampling results on July 28, 2015.

AOI	Type	PAC	Avg BVp	SD BVp	Avg BVw	SD BVw	Depth Range	Avg Depth	Distance	No. Points
1	Point	33%	39.1%	±32.8%	12.9%	±26.3%	0.32-4.89 m	2 m	3.86 km	2,415
	Grid	35.3%	34.1%	±27.8%	12.1%	±23.2%	0.07-4.97 m	2.1 m	-	1,098

Vegetation Biovolume Heat Map



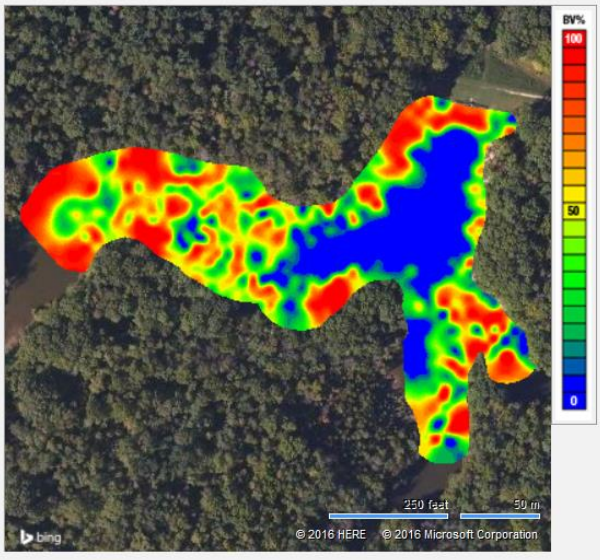
Biovolume Distribution Scatter Chart



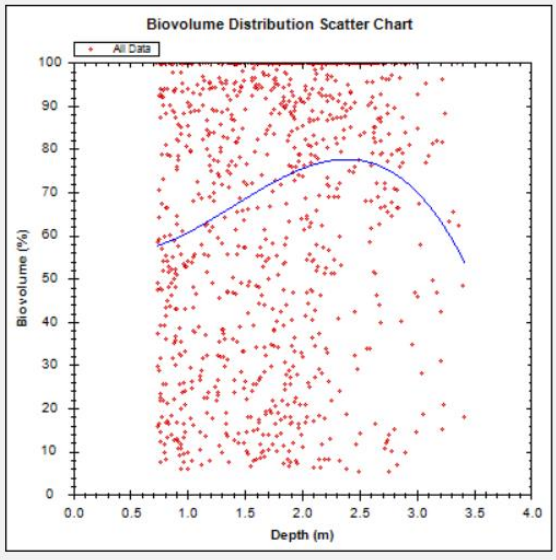
BioBase sampling results on July 18, 2016.

AOI	Type	PAC	Avg BVp	SD BVp	Avg BVw	SD BVw	Depth Range	Avg Depth	Distance	No. Points
1	Point	66.4%	70%	±31.6%	46.4%	±41.9%	0.3-4.77 m	1.94 m	3.63 km	1,715
	Grid	77.4%	53.8%	±28.2%	41.6%	±33.5%	0.01-4.68 m	1.98 m	-	972

Vegetation Biovolume Heat Map



Biovolume Distribution Scatter Chart



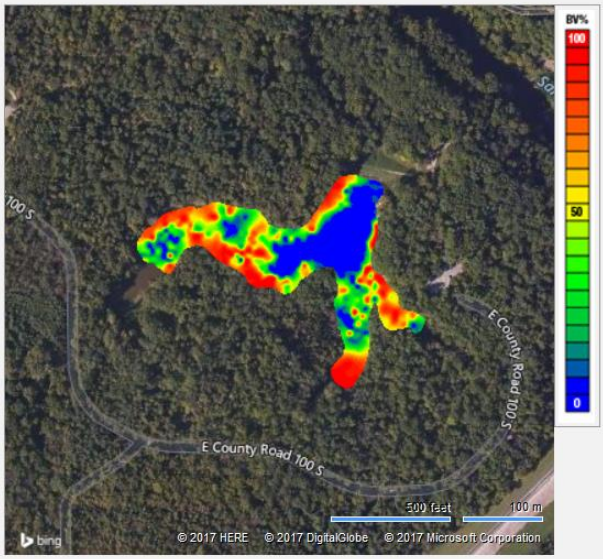
Your purchase of fishing equipment and motor boat fuel supports boating access and Sport Fish Restoration.

Indiana Fishing Regulation Guide:
http://www.in.gov/dnr/fishwild/2347.htm

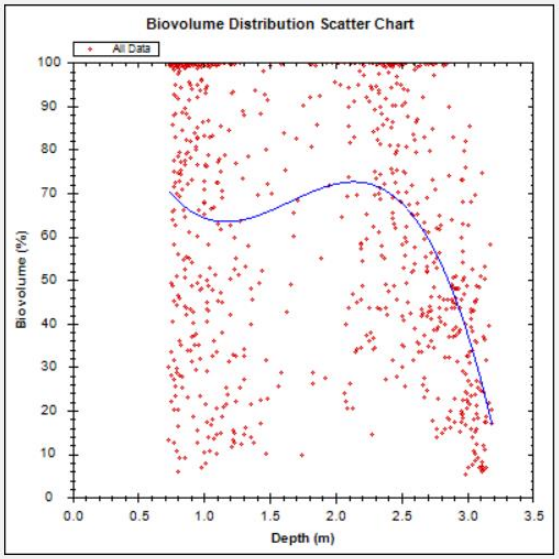
BioBase sampling results on July 28, 2017.

AOI	Type	PAC	Avg BVp	SD BVp	Avg BVw	SD BVw	Depth Range	Avg Depth	Distance	No. Points
1	Point	43%	61%	±30%	26.2%	±36%	0.37-5.02 m	2.39 m	4.42 km	1,837
	Grid	72.9%	53.7%	±28.8%	39.1%	±34.3%	0-4.81 m	1.69 m	-	1,044

Vegetation Biovolume Heat Map



Biovolume Distribution Scatter Chart



Your purchase of fishing equipment and motor boat fuel supports boating access and Sport Fish Restoration.

Indiana Fishing Regulation Guide:
http://www.in.gov/dnr/fishwild/2347.htm

SPORT FISH RESTORATION

Photos below: *Images **displayed vertically** depicting the expansion of specific spatterdock beds from 2015-2017.*

Bed 1 – 2015

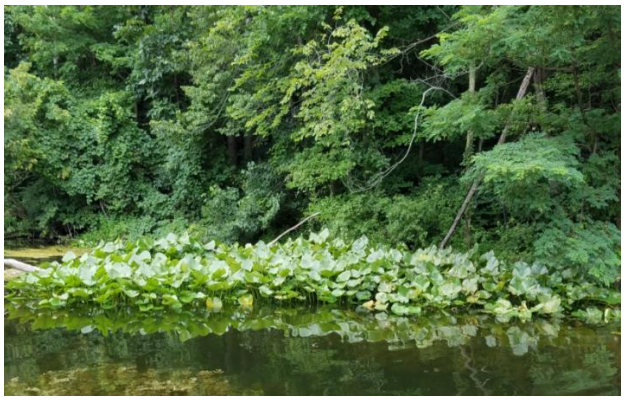
Bed 2 - 2015

Bed 1 – 2016

Bed 2 – 2016

Bed 1 – 2017

Bed 2 - 2017



Your purchase of fishing equipment and motor boat fuel supports boating access and Sport Fish Restoration.

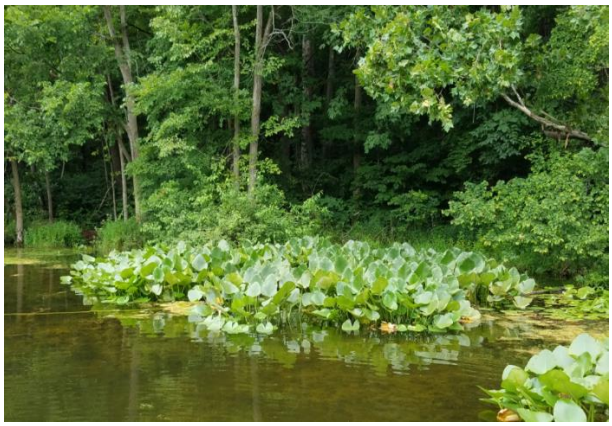
Indiana Fishing Regulation Guide:
http://www.in.gov/dnr/fishwild/2347.htm

SPORT FISH RESTORATION

Photos below: *Images **displayed horizontally** depicting the expansion of specific spatterdock beds from 2016-2017.*

Bed 3 – 2016

Bed 3 - 2017



Bed 4- 2016`

Bed 4 - 2017

Bed 5 – 2016

Bed 5 - 2017

Submersed plant summaries: 2005-2017

Occurrence and abundance of submersed aquatic plants in Hominy Ridge

County:	Wabash	Total sites:	40	Number of species:	6
Date:	7/27/05	Sites with plants:	35	Number of native species:	4
Biologist:	Benson	Sites with native plants:	35	Maximum species/site:	3
Trophic status:	Eutro	Vegetated sites (%):	87.5	Mean species/site:	1.18
Secchi (ft):	7.0	Native vegetated sites (%):	87.5	Standard error (ms/s):	0.12
Minimum contour (ft):	0.0	Leafy coverage (%):	87.5	Mean native species/site:	1.05
Maximum contour (ft):	0.0	Native leafy coverage (%):	87.5	Standard error (mns/s):	0.10
Max plant depth (ft):	12.0	Vegetated depth (%):	80.0	Species diversity:	0.43
Max sample depth (ft):	15.5	Dominance sum:	68.5	Native species diversity:	0.29

	Occurrence		Rake score observations (N,%) per species								Plant
Common Name	Frequency (%)		0	%	1	%	3	%	5	%	Dominance
Coontail	35	87.5	5	12.5	9	22.5	7	17.5	19	47.5	62.5
Curly-leaf pondweed	4	10.0	36	90.0	4	10.0	0	0.0	0	0.0	2.0
Chara	4	10.0	36	90.0	4	10.0	0	0.0	0	0.0	2.0
Other native 1	2	5.0	38	95.0	2	5.0	0	0.0	0	0.0	1.0
Thin-leaf pondweeds	1	2.5	39	97.5	1	2.5	0	0.0	0	0.0	0.5
Brittle naiad	1	2.5	39	97.5	1	2.5	0	0.0	0	0.0	0.5
Filamentous algae	3	7.5									

Occurrence and abundance of submersed aquatic plants in Hominy Ridge

County:	Wabash	Total sites:	20	Number of species:	2
Date:	8/29/07	Sites with plants:	20	Number of native species:	2
Biologist:	Braun	Sites with native plants:	20	Maximum species/site:	2
Trophic status:	Eutro	Vegetated sites (%):	100.0	Mean species/site:	2.00
Secchi (ft):	9.0	Native vegetated sites (%):	100.0	Standard error (ms/s):	0.00
Minimum contour (ft):	0.0	Leafy coverage (%):	100.0	Mean native species/site:	2.00
Maximum contour (ft):	0.0	Native leafy coverage (%):	100.0	Standard error (mns/s):	0.00
Max plant depth (ft):	12.0	Vegetated depth (%):	80.0	Species diversity:	0.50
Max sample depth (ft):	14.0	Dominance sum:	82.0	Native species diversity:	0.50

	Occurrence		Rake score observations (N,%) per species								Plant
Common Name	Frequency (%)		0	%	1	%	3	%	5	%	Dominance
Coontail	19	95.0	1	5.0	3	15.0	1	5.0	15	75.0	81.0
Sago pondweed	1	5.0	19	95.0	1	5.0	0	0.0	0	0.0	1.0
Filamentous algae	9	45.0									

Occurrence and abundance of submersed aquatic plants in													Hominy Ridge		
County:	Wabash					Total sites:	20			Number of species:	1				
Date:	8/4/09					Sites with plants:	15			Number of native species:	1				
Biologist:	Edgell					Sites with native plants:	15			Maximum species/site:	1				
Trophic status:	Eutro					Vegetated sites (%):	75.0			Mean species/site:	0.75				
Secchi (ft):	6.5					Native vegetated sites (%):	75.0			Standard error (ms/s):	0.10				
Minimum contour (ft):	0.0					Leafy coverage (%):	75.0			Mean native species/site:	0.75				
Maximum contour (ft):	0.0					Native leafy coverage (%):	75.0			Standard error (mns/s):	0.10				
Max plant depth (ft):	9.0					Vegetated depth (%):	60.0			Species diversity:	0.00				
Max sample depth (ft):	14.5					Dominance sum:	45.0			Native species diversity:	0.00				
	Occurrence			Rake score observations (N,%) per species										Plant	
Common Name	Frequency (%)			0	%	1	%	3	%	5	%			Dominance	
Coontail	15	75.0		5	25.0	5	25.0	5	25.0	5	25.0			45.0	
Filamentous algae	3	15.0													

Occurrence and abundance of submersed aquatic plants in													Hominy Ridge		
County:	Wabash					Total sites:	30			Number of species:	1				
Date:	5/21/12					Sites with plants:	2			Number of native species:	1				
Biologist:	Pearson					Sites with native plants:	2			Maximum species/site:	1				
Trophic status:	Eutro					Vegetated sites (%):	6.7			Mean species/site:	0.07				
Secchi (ft):	11.5					Native vegetated sites (%):	6.7			Standard error (ms/s):	0.05				
Minimum contour (ft):	0.0					Leafy coverage (%):	0.0			Mean native species/site:	0.07				
Maximum contour (ft):	0.0					Native leafy coverage (%):	0.0			Standard error (mns/s):	0.05				
Max plant depth (ft):	5.0					Vegetated depth (%):	33.3			Species diversity:	0.00				
Max sample depth (ft):	15.0					Dominance sum:	1.3			Native species diversity:	0.00				
	Occurrence			Rake score observations (N,%) per species										Plant	
Common Name	Frequency (%)			0	%	1	%	3	%	5	%			Dominance	
Common naiad	2	6.7		28	93.3	2	6.7	0	0.0	0	0.0			1.3	
Filamentous algae	13	43.3													

Occurrence and abundance of submersed aquatic plants in Hominy Ridge

County:	Wabash			Total sites:	30		Number of species:	6		
Date:	7/28/17			Sites with plants:	29		Number of native species:	3		
Biologist:	Pearson			Sites with native plants:	29		Maximum species/site:	6		
Trophic status:	Eutro			Vegetated sites (%):	96.7		Mean species/site:	1.27		
Secchi (ft):	8.8			Native vegetated sites (%):	96.7		Standard error (ms/s):	0.19		
Minimum contour (ft):	0.0			Leafy coverage (%):	96.7		Mean native species/site:	1.10		
Maximum contour (ft):	0.0			Native leafy coverage (%):	96.7		Standard error (mns/s):	0.09		
Max plant depth (ft):	13.5			Vegetated depth (%):	90.0		Species diversity:	0.40		
Max sample depth (ft):	15.0			Dominance sum:	85.3		Native species diversity:	0.22		

	Occurrence		Rake score observations (N,%) per species									Plant
Common Name	Frequency (%)		0	%	1	%	3	%	5	%		Dominance
Coontail	29	96.7	1	3.3	3	10.0	8	26.7	18	60.0		78.0
Eurasian water milfoil	2	6.7	28	93.3	1	3.3	1	3.3	0	0.0		2.7
Common naiad	3	10.0	27	90.0	3	10.0	0	0.0	0	0.0		2.0
Brittle naiad	2	6.7	28	93.3	2	6.7	0	0.0	0	0.0		1.3
Curly-leaf pondweed	1	3.3	29	96.7	1	3.3	0	0.0	0	0.0		0.7
Long-leaf pondweed	1	3.3	29	96.7	1	3.3	0	0.0	0	0.0		0.7
Filamentous algae	4	13.3										