

NEW HOLLAND LAKE
Dubois County
2008 Fish Management Report

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2009

EXECUTIVE SUMMARY

- A general survey was conducted on April 28 (electrofishing) and June 18 to 19, 2008 (netting).
- Submersed vegetation was found at 71% of the littoral sites to a maximum depth of 6.0 ft. Four native species, southern naiad, brittle naiad, coontail, and leafy pondweed were collected. Southern naiad was the most frequently occurring (33%), followed by brittle naiad (17%), coontail (10%), and leafy pondweed (3%). Emergent plants observed include bulrush spp., buttonbush, creeping water primrose, and water willow.
- A total of 393 fish, representing six species, was collected that weighed an estimated 183 lbs. Largemouth bass ranked first by number (60%), followed by bluegill (25%), and redear sunfish (9%). Largemouth bass ranked first by weight (79%), followed by redear sunfish (11%), and bluegill (6%). Other species collected were warmouth, black crappie, and yellow bullhead. Species collected in past surveys include black bullhead, channel catfish, and green sunfish.
- Largemouth reached 14.0 in during their fifth year of growth. Largemouth bass growth was slow when compared to district averages with bass averaging 11.7 in at age 4 and 13.2 in at age 5. Bluegill growth was fast. Bluegill averaged 7.9 in at age 4 and 8.4 in at age 5.
- New Holland Lake provides excellent fishing for bluegill and redear sunfish. Nineteen percent of the bluegill and 83% of the redear collected were 7.0 in or longer. Largemouth bass are abundant, but most are under 14.0 in.
- The fishery is out of balance and is showing signs of a classic stockpiled bass population. Bass growth is slow, their catch rates are high, and their abundance is greater than bluegill. In contrast, the bluegill population is exhibiting low catch rates, fast growth, and low abundance. A supplemental survey targeting bass and panfish should be conducted in 2009 to monitor the fishery.

INTRODUCTION

New Holland Lake is a 16.6-acre impoundment constructed in 1956 to increase the town's water supply. The impoundment is located directly below the dam of Old Holland Lake. The shoreline consists of residential areas and city park grounds. Boat access is provided by a concrete boat ramp and most of the shoreline is available to bank fishing. A \$15.00 annual city boat launching permit is required to use the boat ramp. The launching permit is \$10.00 for residents of Holland. The launching permit also includes boat access to Old Holland Lake. No outboard motors are permitted.

The 2003 survey revealed excellent fishing for bluegill, largemouth bass, and redear sunfish. Twenty-six percent of the bluegill population was 6.0 in or longer and 33% of the redear were 8.0 in or longer. The largemouth population was balanced and 13% of bass collected were 14.0 in or longer.

METHODS

A general survey was conducted on April 28 (electrofishing) and June 18 to 19, 2008 (netting). Some of the lake's physical and chemical characteristics were measured. Submersed aquatic vegetation was sampled on August 8 using guidelines written by the Indiana Department of Natural Resources (2006).

Fish collection effort consisted of pulsed DC night electrofishing with two dippers for 0.50 h, one trap net lift, and two experimental-mesh gill net lifts. All fish collected were measured to the nearest 0.1 in TL. Average weights were estimated by using Fish Management District 7 averages. Scale samples from the electrofishing survey were taken from a subsample of sport fish for age and growth analysis. Proportional stock density (PSD) and relative stock density (RSD) indices were calculated for largemouth bass and bluegill (Anderson and Neumann 1996). The bluegill fishing potential index (BGFP) was used to classify the quality of the bluegill fishery (Ball and Tousignant 1996). All sampling was done in accordance with the Division of Fish and Wildlife sampling guidelines (Shipman et al. 2001).

RESULTS

New Holland Lake has a maximum depth of 16.0 ft. The Secchi disk depth was 2.3 ft and the conductivity was 174 μ S. Dissolved oxygen was not measured due to the meter being broken.

Submersed vegetation was found at 71% of the littoral sites to a maximum depth of 6.0 ft. Four native species, southern naiad, brittle naiad, coontail, and leafy pondweed were collected. Southern naiad was the most frequently occurring (33%), followed by brittle naiad (17%), coontail (10%), and leafy pondweed (3%). Emergent plants observed include bulrush spp., buttonbush, creeping water primrose, and water willow.

A total of 393 fish, representing six species, was collected that weighed an estimated 183 lbs. Largemouth bass ranked first by number (60%), followed by bluegill (25%), and redear sunfish (9%). Largemouth bass ranked first by weight (79%), followed by redear sunfish (11%), and bluegill (6%). Other species collected were warmouth, black crappie, and yellow bullhead. Species collected in past surveys include black bullhead, channel catfish, and green sunfish.

A total of 237 largemouth bass was sampled that weighed 144 lbs. They ranged in length from 2.0 to 21.0 in. The catch rates were 458.0/electrofishing h, 1.0/trap net lift, and 3.5/gill net lift. The electrofishing rate in 2003 was 225.6/h. Largemouth reached 14.0 in during their fifth year of growth. Largemouth bass grew slow when compared to district averages and 2003 results averaging 11.7 at age 4 and 13.2 in at age 5. In 2003, bass averaged 13.8 in at age 4 and 14.6 in at age 5.

The largemouth bass PSD decreased from 41 (2003) to 26. The suggested PSD range indicating a balanced largemouth bass fishery is 40 to 70 (Anderson and Neumann 1996). The RSD-14 and RSD-15 were 3 and 2 versus 32 and 12 in 2003.

A total of 100 bluegill was sampled that weighed 10 lbs. They ranged in length from 1.1 to 9.0 in. The catch rates were 132.0/electrofishing h, 32.0/trap net lift, and 1.0/gill net lift. The 2003 electrofishing catch rate was 274.3/h. Bluegill grew fast. Bluegill averaged 7.9 in at age 4 and 8.4 in at age 5 compared to the 2003 values of 7.7 for age 4 and 8.0 in for age 5. The bluegill district average growth was 6.4 in at age 4 and 7.2 in at age 5.

The bluegill PSD increased from 25 (2003) to 46. The suggested PSD range indicating a balanced bluegill fishery is 20 to 60 (Anderson and Neumann 1996). The RSD-7 was 44 and

RSD-8 was 32. The 2003 RSD-7 and RSD-8 values were 27 and 10. The BGFP index increased from 20 to 26, classifying the bluegill fishery as “excellent”.

Thirty-six redear sunfish were sampled that weighed 20 lbs. They ranged in length from 2.5 to 11.4 in. The catch rates were 70.0/electrofishing h, 1.0/trap net lift, and 0.0/gill net lift. The electrofishing catch rate in 2003 was 143.6/h. Redear sunfish grew fast. Redear averaged 9.8 in at age 4 and 10.9 in at age 5 compared to the district average of 7.9 and 8.8 in at age 4 and 5, respectively.

DISCUSSION

New Holland Lake provides excellent fishing for bluegill and redear sunfish. Nineteen percent of the bluegill and 83% of the redear collected were 7.0 in or longer. Largemouth bass are abundant, but most are under 14.0 in.

The fishery is out of balance and is showing signs of a classic stockpiled bass population. Bass growth is slow, their catch rates are high, and their abundance is greater than bluegill. In contrast, the bluegill population is exhibiting low catch rates, fast growth, and low abundance. A supplemental survey targeting bass and panfish should be conducted in 2009 to monitor the fishery.

RECOMMENDATIONS

- A supplemental largemouth bass and panfish survey should be conducted in 2009 on New Holland Lake.

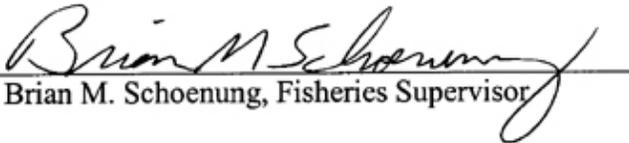
LITERATURE CITED

- Anderson, R. O. and R. M. Neumann. 1996. Length, weight, and associated structural indices. Pages 447-481 in B. R. Murphy and D. W. Willis, editors. Fisheries techniques, 2nd edition. American Fisheries Society, Bethesda, Maryland.
- Ball, R. L. and J. N. Tousignant. 1996. The development of an objective rating system to assess bluegill fishing in lakes and ponds. Research report. Indiana Department of Natural Resources. Indianapolis. 18 pp.
- Indiana Department of Natural Resources. 2006. Tier II aquatic vegetation survey protocol. 9 pp.

Shipman, S., E. Braun, D. Carnahan, L. Koza, B. Schoenung, D. Keller, D. Kittaka, and T. Stefanavage. 2001. Manual of fishery survey methods. Indiana Department of Natural Resources. Indianapolis. 67 pp.

Submitted by: Michelle L. Cain, Assistant Fisheries Biologist
Date: December 2, 2008

Approved by: Daniel P. Carnahan, Fisheries Biologist

Approved by: 
Brian M. Schoenung, Fisheries Supervisor

Date: March 9, 2009

Appendix

Fisheries Survey Data.

LAKE SURVEY REPORT

Type of Survey	<input type="checkbox"/> Initial Survey	<input checked="" type="checkbox"/> Re-Survey
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Lake Name New Holland Lake	County Dubois	Date of survey (Month, day, year) April 28 and June 18 to 19, 2008
Biologist's name Michelle L. Cain		Date of approval (Month, day, year) March 9, 2009

LOCATION		
Quadrangle Name Velpen, Holland	Range 6W	Section 14
Township Name 3S	Nearest Town Holland	

ACCESSIBILITY						
State owned public access site			Privately owned public access site		Other access site City owned concrete boat ramp	
Surface acres 16.6	Maximum depth 16.0 ft	Average depth 7.8 ft	Acre feet 129.5	Water level 482 MSL	Extreme fluctuations None	
Location of benchmark SW¼, NW¼, Sect. 7, T3S, R5W						

INLETS		
Name 8" pipe from Old Holland City Lake	Location East end of lake	Origin SE¼, S14, T3S, R6W

OUTLETS														
Name Holland Water Works	Location West end of lake													
Water level control														
POOL	ELEVATION (Feet MSL)	ACRES												
TOP OF DAM														
TOP OF FLOOD CONTROL POOL														
TOP OF CONSERVATION POOL	482	16.6												
TOP OF MINIMUM POOL														
STREAMBED														
<table border="0"> <tr> <td>Bottom type</td> <td><input type="checkbox"/> Boulder</td> </tr> <tr> <td></td> <td><input type="checkbox"/> Gravel</td> </tr> <tr> <td></td> <td><input type="checkbox"/> Sand</td> </tr> <tr> <td></td> <td><input checked="" type="checkbox"/> Muck</td> </tr> <tr> <td></td> <td><input checked="" type="checkbox"/> Clay</td> </tr> <tr> <td></td> <td><input type="checkbox"/> Marl</td> </tr> </table>			Bottom type	<input type="checkbox"/> Boulder		<input type="checkbox"/> Gravel		<input type="checkbox"/> Sand		<input checked="" type="checkbox"/> Muck		<input checked="" type="checkbox"/> Clay		<input type="checkbox"/> Marl
Bottom type	<input type="checkbox"/> Boulder													
	<input type="checkbox"/> Gravel													
	<input type="checkbox"/> Sand													
	<input checked="" type="checkbox"/> Muck													
	<input checked="" type="checkbox"/> Clay													
	<input type="checkbox"/> Marl													

Watershed use Park, agriculture
Development of shoreline 15% Residential, 85% City Park

Previous surveys and investigations Fisheries surveys 1966, 1977, 1988, and 2003.

SAMPLING EFFORT					
ELECTROFISHING	Day hours		Night hours		Total hours
			0.5		0.5
TRAP NETS	Number of traps		Number of Lifts		Total effort
	1		1		1
GILL NETS	Number of nets		Number of Lifts		Total effort
	2		1		2
ROTENONE	Gallons	ppm	Acre Feet Treated	SHORELINE SEINING	Number of 100 Foot Seine Hauls

PHYSICAL AND CHEMICAL CHARACTERISTICS			
Color		Turbidity	
Light green		2 Feet 4 Inches (SECCHI DISK)	
Alkalinity (ppm)*		pH	
Surface: 68.4 Bottom: 119.7		Surface: 8.1 Bottom: 7.6	
Conductivity:		Air temperature:	
174 micromhos		69.1 °F	
Water chemistry GPS coordinates:			
N 38.25060767		W -87.04388732	

TEMPERATURE AND DISSOLVED OXYGEN (D.O.)								
DEPTH (FEET)	Degrees (°F)	D.O. (ppm)	DEPTH (FEET)	DEGREES (°F)	D.O. (ppm)	DEPTH (FEET)	DEGREES (°F)	D.O. (ppm)
SURFACE	79.0	N/A**	36			72		
2	79.5		38			74		
4	79.5		40			76		
6	77.9		42			78		
8	70.9		44			80		
10	64.9		46			82		
12	59.9		48			84		
14	55.8		50			86		
16 (Bottom)	54.1		52			88		
18			54			90		
20			56			92		
22			58			94		
24			60			96		
26			62			98		
28			64			100		
30			66					
32			68					
34			70					

COMMENTS
**DO meter was broken.

*ppm-parts per million

Occurrence and Abundance of Submersed Aquatic Plants

Lake: New Holland Lake	Secchi (ft): 3.3	SE Mean Species / Site: 0.25
Date: 8/8/2008	Littoral Sites w/Plants: 10	Mean Natives / Site: 0.63
Littoral Depth (ft): 6.0	Number of Species: 5	SE Mean Natives / Site: 0.19
Littoral Sites: 14	Max. Species / Site: 5	Species Diversity: 0.73
Total Sites: 30	Mean Species / Site: 0.87	Native Diversity: 0.63

<u>Species</u>	<u>Frequency of Occurrence</u>	<u>Score Frequency</u>				<u>Dominance</u>
		<u>0</u>	<u>1</u>	<u>3</u>	<u>5</u>	
Coontail	10.0	90.0	10.0	0.0	0.0	2.0
Brittle naiad	16.7	83.3	16.7	0.0	0.0	3.3
Southern naiad	33.3	66.7	33.3	0.0	0.0	6.7
Leafy pondweed	3.3	96.7	3.3	0.0	0.0	0.7

Other species noted:

Creeping water primrose, bulrush spp., water willow, and buttonbush.

NUMBER, PERCENTAGE, WEIGHT, AND AGE OF LARGEMOUTH BASS

TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH	TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH
1.0					19.0				
1.5					19.5				
2.0	1	0.4	0.01	Not aged	20.0				
2.5					20.5	1	0.4	4.72	7
3.0					21.0	1	0.4	4.76	9
3.5					21.5				
4.0					22.0				
4.5	2	0.8	0.04	1	22.5				
5.0	4	1.7	0.06	1, 2	23.0				
5.5	11	4.6	0.08	1, 2	23.5				
6.0	8	3.4	0.10	2	24.0				
6.5	7	3.0	0.13	2	24.5				
7.0	2	0.8	0.16	2	25.0				
7.5	3	1.3	0.20	Not aged	25.5				
8.0					26.0				
8.5					TOTAL	237			
9.0	11	4.6	0.33	3, 4					
9.5	21	8.9	0.39	3					
10.0	19	8.0	0.46	3, 4					
10.5	21	8.9	0.53	3, 4					
11.0	33	13.9	0.62	3, 4					
11.5	43	18.1	0.71	3, 4					
12.0	20	8.4	0.80	4					
12.5	17	7.2	0.91	4, 5					
13.0	7	3.0	1.02	4, 5					
13.5	1	0.4	1.15	5					
14.0	2	0.8	1.31	5					
14.5									
15.0									
15.5									
16.0									
16.5	1	0.4	2.40	6					
17.0									
17.5									
18.0	1	0.4	3.19	Not aged					
18.5									

ELECTROFISHING CATCH	458.0/h	GILL NET CATCH	3.5/lift	TRAP NET CATCH	1.0/lift
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NUMBER, PERCENTAGE, WEIGHT, AND AGE OF BLUEGILL									
TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH	TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH
1.0	7	7.0	0.01	Not aged	19.0				
1.5	11	11.0	0.01	1	19.5				
2.0	19	19.0	0.01	1	20.0				
2.5	13	13.0	0.01	1	20.5				
3.0	7	7.0	0.02	1	21.0				
3.5	9	9.0	0.03	1	21.5				
4.0	7	7.0	0.05	2	22.0				
4.5	1	1.0	0.07	2	22.5				
5.0	4	4.0	0.09	2	23.0				
5.5	1	1.0	0.13	3	23.5				
6.0	1	1.0	0.17	Not aged	24.0				
6.5	1	1.0	0.22	3	24.5				
7.0					25.0				
7.5	5	5.0	0.34	4, 5	25.5				
8.0	8	8.0	0.41	4, 5	26.0				
8.5	5	5.0	0.49	5, 6	TOTAL	100			
9.0	1	1.0	0.58	Not aged					
9.5									
10.0									
10.5									
11.0									
11.5									
12.0									
12.5									
13.0									
13.5									
14.0									
14.5									
15.0									
15.5									
16.0									
16.5									
17.0									
17.5									
18.0									
18.5									

ELECTROFISHING CATCH	132.0/h	GILL NET CATCH	1.0/lift	TRAP NET CATCH	32.0/lift
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NUMBER, PERCENTAGE, WEIGHT, AND AGE OF REDEAR SUNFISH

TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH	TOTAL LENGTH (inches)	NUMBER COLLECTED	PERCENT OF FISH COLLECTED	AVERAGE WEIGHT (pounds)	AGE OF FISH
1.0					19.0				
1.5					19.5				
2.0					20.0				
2.5	4	11.1	0.02	1	20.5				
3.0					21.0				
3.5					21.5				
4.0					22.0				
4.5	1	2.8	0.07	1	22.5				
5.0					23.0				
5.5					23.5				
6.0	1	2.8	0.17	2	24.0				
6.5					24.5				
7.0					25.0				
7.5	4	11.1	0.33	2, 3	25.5				
8.0					26.0				
8.5	1	2.8	0.48	4	TOTAL	36			
9.0	7	19.4	0.57	4					
9.5	6	16.7	0.66	4					
10.0	5	13.9	0.76	4					
10.5	6	16.7	0.87	4, 5					
11.0	1	2.8	0.98	5					
11.5									
12.0									
12.5									
13.0									
13.5									
14.0									
14.5									
15.0									
15.5									
16.0									
16.5									
17.0									
17.5									
18.0									
18.5									

ELECTROFISHING CATCH	70.0/h	GILL NET CATCH	0.0/lift	TRAP NET CATCH	1.0/lift
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LARGEMOUTH BASS AGE-LENGTH KEY

Length group (in)	Total number	Sub-sample	AGE									
			1	2	3	4	5	6	7	8	9	
2.0	1	0										
2.5												
3.0												
3.5												
4.0												
4.5	2	2	2									
5.0	4	3	3	1								
5.5	11	5	2	9								
6.0	8	5		8								
6.5	7	5		7								
7.0	2	2		2								
7.5	3											
8.0												
8.5												
9.0	11	4			8	3						
9.5	21	6			21							
10.0	19	5			15	4						
10.5	21	5			13	8						
11.0	33	5			13	20						
11.5	43	4			11	32						
12.0	20	4				20						
12.5	17	5				10	7					
13.0	7	4				2	5					
13.5	1	1					1					
14.0	2	2					2					
14.5												
15.0												
15.5												
16.0												
16.5	1	1						1				
17.0												
17.5												
18.0	1											
18.5												
19.0												
19.5												
20.0												
20.5	1	1								1		
21.0	1	1										1
Totals	237	70	7	27	81	99	15	1	1			1

AGE-LENGTH KEY SUMMARY						
Age	Number	Mean			Lower	Upper
		TL	Var	SE	95%CI	95%CI
1	7	5.3	0.18	0.16	4.9	5.6
2	27	6.2	0.28	0.10	6.0	6.4
3	81	10.5	0.63	0.09	10.3	10.6
4	99	11.7	0.59	0.08	11.5	11.8
5	15	13.2	0.28	0.14	12.9	13.5
6	1	16.8				
7	1	20.8				
8						
9	1	21.3				

BLUEGILL AGE-LENGTH KEY

Length group (in)	Total number	Sub-sample	AGE					
			1	2	3	4	5	6
1.0	7	0						
1.5	11	5	11					
2.0	19	4	19					
2.5	13	4	13					
3.0	7	1	7					
3.5	9	5	9					
4.0	7	5		7				
4.5	1	1		1				
5.0	4	4		4				
5.5	1	1			1			
6.0	1	0						
6.5	1	1			1			
7.0								
7.5	5	5				4	1	
8.0	8	6				1	7	
8.5	5	5					4	1
9.0	1	0						
Totals	100	47	59	12	2	5	12	1

AGE-LENGTH KEY SUMMARY						
Age	Number	Mean			Lower 95%CI	Upper 95%CI
		TL	Var	SE		
1	59	2.6	0.44	0.09	2.4	2.8
2	12	4.6	0.23	0.14	4.3	4.9
3	2	6.3	0.50	0.50	5.3	7.3
4	5	7.9	0.06	0.10	7.7	8.1
5	12	8.4	0.10	0.09	8.2	8.6
6	1	8.8				

REDEAR SUNFISH AGE-LENGTH KEY

Length group (in)	Total number	Sub-sample	AGE					
			1	2	3	4	5	
2.5	4	4	4					
3.0								
3.5								
4.0								
4.5	1	1	1					
5.0								
5.5								
6.0	1	1		1				
6.5								
7.0								
7.5	4	4		1	3			
8.0								
8.5	1	1					1	
9.0	7	5					7	
9.5	6	6					6	
10.0	5	4					5	
10.5	6	6					2	4
11.0	1	1						1
Totals	36	33	5	2	3	21		5

AGE-LENGTH KEY SUMMARY						
Age	Number	Mean			Lower 95%CI	Upper 95%CI
		TL	Var	SE		
1	5	3.2	0.80	0.40	2.4	4.0
2	2	7.0	1.13	0.75	5.5	8.5
3	3	7.8	0.00	0.00	7.8	7.8
4	21	9.8	0.30	0.12	9.5	10.0
5	5	10.9	0.05	0.10	10.7	11.1

GPS LOCATION OF SAMPLING EQUIPMENT

GILL NETS			TRAP NETS			ELECTROFISHING		
1	N 38.2501434	W -87.0439273	1	N 38.2533795	W -87.0429770	1	N 38.2533108	W -87.0428461
	N 38.2515154	W -87.0419452	2	N	W	1	N 38.2517833	W -87.0418842
2	N	W	3	N	W	2	N 38.2515352	W -87.0446527
	N	W	4	N	W	2	N 38.2510284	W -87.0426518
3	N	W	5	N	W	3	N	W
	N	W	6	N	W	3	N	W
4	N	W	7	N	W	4	N	W
	N	W	8	N	W	4	N	W
5	N	W	9	N	W	5	N	W
	N	W	10	N	W	5	N	W
6	N	W	11	N	W	6	N	W
	N	W	12	N	W	6	N	W
7	N	W	13	N	W	7	N	W
	N	W	14	N	W	7	N	W
8	N	W	15	N	W	8	N	W
	N	W	16	N	W	8	N	W
9	N	W	17	N	W	9	N	W
	N	W	18	N	W	9	N	W
10	N	W	19	N	W	10	N	W
	N	W	20	N	W	10	N	W
11	N	W				11	N	W
	N	W				11	N	W
12	N	W				12	N	W
	N	W				12	N	W
13	N	W				13	N	W
	N	W				13	N	W
14	N	W				14	N	W
	N	W				14	N	W
15	N	W				15	N	W
	N	W				15	N	W
16	N	W				16	N	W
	N	W				16	N	W
17	N	W				17	N	W
	N	W				17	N	W
18	N	W				18	N	W
	N	W				18	N	W
19	N	W				19	N	W
	N	W				19	N	W
20	N	W				20	N	W
	N	W				20	N	W