

## STREAM ASSESSMENT



### MINNESOTA DEPARTMENT OF NATURAL RESOURCES DIVISION OF FISH AND WILDLIFE

Report Date: February 14, 2011

Region	Area	Stream Name	Tributary No.	Stream Length
3	Lake City	West Indian	M-34-17	7.2
County	Watershed Name, No.		Source (T, R, S)	Mouth (T, R, S)
Wabasha	Zumbro River, 41		T109N, R11W,S21	T110N,R11W,S31

**Date(s) of Assessment:** September 29, 2010.

**Assessment Purpose:** Long-term monitoring in Station 5.4 – brown trout, brook trout, and white sucker populations. Additional stations done in 2010 are reported in a separate document.

Station	Similar Reach	Stream Mile	Length (ft)	Mean Width (ft)	Acres	Water Temp (F)	Air Temp (F)	Downstream UTM's	
								utm <sub>x</sub> (↔)	utm <sub>y</sub> (↓)
5.4	2	5.40	780	17.3	.310	52		568328	4898689

#### Summary:

Station 5.4 on West Indian Creek is one of the stations in the Long-Term Monitoring program in Southeastern Minnesota. This station has been assessed 18 times in the fall and 17 times in the spring since 1981. Spring sampling was not done in 2010.

Estimates were obtained by using a two pass depletion method using a stream shocking barge.

Estimated brown trout numbers were 2195 adults/mile and 1,405 recruits/mile in this assessment. Number of brown trout ≥12 inches was estimated to be 152/mile, and the number ≥14 inches was estimated at 27/mile, but there were no brown trout ≥16 inches. Total brown trout biomass was estimated at 335.24 lbs/acre.

Estimated numbers of brook trout were 183 adults/mile and 0 recruits/mile. Brook trout >10 inches were estimated at 7/mile. Brook trout biomass was estimated at 18.9 lbs/acre.

There was one white sucker captured in this assessment.

## Fishery Characteristics – Population Estimates

### Population Metrics

Station	5.4 LTM		
Date	9/29/2010		
Gear	Barge		
Method	Two pass depletion		
Station length (ft)	780		

### Population Estimate in Station, Adults

Species	Number	Wt (lbs)		
Brown trout	324.29	98.33		
95% CI	57.61±			
Brook trout	27.00	5.85		
95% CI	46.48 ±			
Rainbow trout	0	0		
95% CI	±			
Total trout	351.29	104.18		

### Population Estimate in Station, Recruits (YOY or yearlings)

Species	Number	Wt (lbs)		
Brown trout	207.53	5.59		
95% CI	84.12±			
Brook trout	0	0		
95% CI	±			
Rainbow trout	0	0		
95% CI	±			
Total trout	207.53	5.59		

### Population Estimate in Station, Total

Species	Number	Wt (lbs)		
Brown trout	531.82	103.92		
Brook trout	27.00	5.85		
Rainbow trout	0	0.00		
Total trout	558.82	109.77		

### Population Estimate in Station, White Suckers (LTM stations only)

Species	Number	Wt (lbs)		
Adults	1			
95% CI	±			
Recruits	0			
95% CI	±			
Total white sucker	1			

**Fishery Characteristics – Population Estimates (continued)**

**Population Estimate Summary**

Station	September 29, 2010		
Date			
Species	No/Mile	No/Acre	Lbs/Acre
<b>Brown trout</b>	3600.01	1716.77	335.24
Adults	2195.20	1046.84	317.43
≥12 inches	152.31	72.63	
95% CI	45.41±	21.65±	
≥14 inches	27.08	12.91	
95% CI	46.90±	22.36±	
≥16 inches	0	0	
95% CI	±	±	
Recruits	1404.81	669.93	17.81
<b>Brook trout</b>	182.77	87.16	18.88
Adults	182.77	87.16	18.88
≥10 inches	6.77	3.23	
95% CI	±	±	
Recruits			
<b>Rainbow trout</b>	0	0	
Adults			
≥12 inches	0	0	
95% CI	±	±	
Recruits			
<b>All trout</b>	3782.78	1803.93	354.35
Adults	2377.97	1134.00	336.31
Recruits	1404.81	669.93	18.03

**Population Estimate Summary (LTM stations only)**

Species	No/Mile	No/Acre	Lbs/Acre
<b>White sucker</b>	6.77	3.23	
Adults	6.77	3.23	
Recruits	0	0	

0

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**Fishery Characteristics – Length Frequency in Station (Actual Catch)**

Species	Brown Trout	Brook Trout	
Station	LTM	LTM	
Date	September 29, 2010	September 29, 2010	
Length Class			
0 – 2.9	2		
3.0 – 3.4	21		
3.5 – 3.9	57		
4.0 – 4.4	45		
4.5 – 4.9	9		
5.0 – 5.4	2		
5.5 – 5.9	6		
6.0 – 6.4	21	2	
6.5 – 6.9	24	2	
7.0 – 7.4	31	2	
7.5 – 7.9	34	2	
8.0 – 8.4	27	4	
8.5 – 8.9	30		
9.0 – 9.4	18	2	
9.5 – 9.9	9		
10.0 – 10.4	6		
10.5 – 10.9	7		
11.0 – 11.4	5		
11.5 – 11.9	8	1	
12.0 – 12.4	3		
12.5 – 12.9	7		
13.0 – 13.4	6		
13.5 – 13.9	1		
14.0 – 14.9	2		
15.0 – 15.9	1		
16.0 – 16.9			
17.0 – 17.9			
18.0 – 18.9			
19.0 – 19.9			
20.0 – 20.9			
21.0 – 21.9			
22.0 – 22.9			
23.0 – 23.9			
24.0 – 24.9			
25.0 – 25.9			
26.0 – 26.9			
27.0 – 27.9			
28.0 – 28.9			
29.0 – 29.9			
30.0+			
<b>Sample Size</b>	<b>382</b>	<b>15</b>	

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**Fishery Characteristics – Non-game species**

**Species Sampled**

Station	5.4		
Date	September 29, 2010		
Length (ft)	780		
Mean Width (ft)	17.3		
<b>Species</b>	<b>Number</b>	<b>Number</b>	<b>Number</b>
Sculpin, Mottled	237		
Sucker, White	1		

**Coldwater Index of Biotic Integrity (Mundahl and Simon 1998) for Station.**

Value	Score	Metric	IBI Rating Guidelines	
498		Total Captured		
4	10	Number of Species	105-120	Excellent
3	5	Number of Coldwater Species	70-100	Good
0	10	Number of Minnow Species	35-65	Fair
2	5	Number of Benthic Species	10-30	Poor
1	10	Number of Tolerant Species	0-5	Very Poor
3.46	0	Percent Salmonids as Brook Trout		
49.39	10	Percent Intolerant Individuals		
99.79	10	Percent Coldwater Individuals		
.20	5	Percent White Suckers		
52.2	5	Percent Top Carnivores		
313.57	10	Number of Coldwater Individuals per 150m		
.63	10	Number of Warmwater Individuals per 150m		
	<u>90</u>	<b>TOTAL IBI SCORE (120 maximum)</b>		
	75.00	<b>Percent of maximum score</b>		

**Stream Characteristics – Minnesota Stream Habitat Assessment (MSHA)  
(Fisheries Stream Survey Manual)**

MSHA Metric	Component score maximum	Component score of station
Surrounding Land Use	5	2.5
Riparian Zone	15	8
Instream Zone – Substrate	27	17.6
Instream Zone – Cover	17	14
Channel Morphology	36	30
	100	<b>Final score</b> 72.1

## Discussion of Fishery:

Station 5.4 on West Indian Creek is one of the stations in the Long-Term Monitoring program of southeast Minnesota. This station has been assessed 18 times in the fall and 17 times in the spring since 1981 (Table 1). Spring sampling was not done on this station in 2010.

Estimated numbers of adult brown trout in this assessment were 2,195/mile which is higher than the 17 year assessment mean of 747/mile (Figure 1, Table 1). Estimated number of brown trout recruits was 1,405/mile which is higher than the 17 year mean of 940/mile. Brown trout  $\geq 12$  inches were estimated at 152/mile, which is above the 17-year mean of 97/mile (Figure 2, Table 1). Estimated number of brown trout  $\geq 14$  inches was 27/mile (Figure 2, Table 1), but there were no brown trout collected  $\geq 16$  inches in this assessment and one has not been collected since 2002 (Table 1). Total brown trout biomass was estimated at 335.2 lbs/acre which is well above the 17 year mean of 136.7 lbs/acre (Table 1).

The brook trout population was estimated at 183 adults/mile and 0 recruits/mile (Table 2). The number of adults is much higher than 2009 but the recruit population is the same as 2009 (Table 2). Total brook trout biomass was estimated at 18.88 lbs/acre which is well above the 11 year mean of 1.8 lbs/acre (Table 2). The estimated number of brook trout  $>10$  inches was 7/mile which is higher than the 11 year mean of 1 (Table 2).

There was 1 white sucker collected during this assessment giving an estimate of 6.77/mile.

A section of West Indian Creek is currently being managed using a 12-16" protected slot with bait allowed. This area begins at the County 4 bridge and continues upstream to the stream source, and this LTM station is included in this stretch. The long range management plan for West Indian Creek finalized in the year 2000 wanted to achieve a brown trout fishery consisting of 1000 adults/mile with 15% of the population  $\geq 12$  inches within the special regulations area. There was only 7% of the population of adult brown trout  $\geq 12$  in this assessment (Table 1). Since the special regulations inception the average brown trout population  $\geq 12$  inches/mile is 11%. Before the implementation of the special regulation, the percentage of adult brown trout  $\geq 12$  inches was 52% from 1981-1986 but total population was much lower (Table 1). No fall data is available for 1987 to 1998 on station 5.4 (Table 1).

The Coldwater IBI (Mundahl and Simon 1998) score of 90 is lower than last year (Table 3). This score reflects the presence of a white sucker, the high percentage of top carnivores, and a lower percentage of brook trout. From 2003 to 2010 the IBI score has ranged from 85 to 105.

The Minnesota Stream Habitat Assessment score was 72.1 slightly lower than the 2009 value of 74.1 (Table 3). The surrounding land use is row crop agriculture. The stream has moderate bank erosion and moderate shade. The pools were made up mostly of sand and other substrates were moderately embedded. The riffle/run complex was made up of gravel and cobble. Extensive amounts of cover were available in all categories. Channel stability and sinuosity were moderate and the channel development was good. From 2007 to 2010 the score has ranged from 66.2 to 74.1 (Table 3).

This stream is currently designated as a high priority stream for the Long-Term Monitoring Program of southeast Minnesota. This requires annual measurements of discharge, geomorphology, fish habitat, and aquatic plants. In 2010 there is no discharge info available. Width to depth ratio was 11.1, entrenchment ratio was 1.8, and the stream was typed as a F4 (Table 4). The brown trout habitat quality index (HQI) score was 24 (Table 5). The highest percentage of cover for larger fishes was instream vegetation at 21%, with water depth  $>2$  feet at 19.38% and overhanging vegetation at 7.47% (Table 6). Spotted Touch-me-not was abundant. American brooklime was common. Reed canary, small duckweed, water cress, and algae were occasional. Common waterweed and Water buttercup were rare (Table 7).

The 12"-16" protected slot was implemented in 1999. Due to the lack of any brown trout  $\geq 16$  inches since 2002, the goal of 15% of brown trout  $\geq 12$  inches not being reached, and evidence that there were more brown trout  $\geq 12$  inches before implementation of the special regulation, suggests evaluation of the slot should be considered.

Stream	West Indian
Tributary number	M-34-17
Report Date	February 14, 2011

**Credits and Signatures:**

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**Field Crew:**  
Randy Binder, Bill Wayne, Isaac Kruze, Dan Spence

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**Report completed by:**

<b>Name:</b> Dan Spence	<b>Title:</b> Fisheries Specialist	<b>Date:</b> February 14, 2011
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**Approved by:**

**Area Fisheries Supervisor's  
Signature**

**Date:**  
April 25, 2011

**Regional Fisheries Manager's  
Signature**

*Bradford Parsons* 5-18-11

**Table 1. Trends in brown trout population metrics for West Indian Creek 1981-2010**

Station	River Mile	Similar Reach	Date	No./mile (Adult)	No./mile (Recruits)	No./mile (≥12 in.)	No./mile (≥14 in.)	No./mile (≥16 in.)	lbs/acre (all sizes)
5.4	5.4	2	9/29/2010	2195	1405	152	27	0	335.24
5.4	5.4	2	9/17/2009	731	2,955	121	7	0	141.68
5.4	5.4	2	9/22/2008	879	622	68	14	0	149.66
5.4	5.4	2	9/26/2007	1,579	144	163	27	0	267
5.4	5.4	2	10/3/2006	545	884	92	11	0	108.14
5.4	5.4	2	9/27/2005	766	92	32	0	0	94.6
5.4	5.4	2	10/12/2004	1,111	975	114	0	0	175.37
5.4	5.4	2	10/17/2003	973	1,168	252	16	0	193.4
5.4	5.4	2	9/16/2002	2,063	1,144	193	54	16	286
5.4	5.4	2	9/24/2001	2,115	2,966	199	40	13	312.81
5.4	5.4	2	9/20/2000	755	2,437	98	32	5	168.32
5.4	5.4	2	9/16/1999	725	669	79	20	7	115.2
5.4	5.4	2	9/26/1986	64	694	44	-	-	74
5.4	5.4	2	9/23/1985	109	58	53	-	-	44
5.4	5.4	2	9/24/1984	144	646	52	-	-	91
5.4	5.4	2	10/3/1983	51	144	33	-	-	29
5.4	5.4	2	10/5/1982	54	288	23	-	-	48
5.4	5.4	2	10/13/1981	32	94	32	-	-	25
			<b>Fall Mean</b>	<b>747</b>	<b>940</b>	<b>97</b>	<b>20</b>	<b>4</b>	<b>136.7</b>

**Table 2. Trends in brook trout population metrics for West Indian Creek, 1999-2010**

Station	River Mile	Similar Reach	Date	No./mile (Adult)	No./mile (Recruits)	No./mile (≥10 in.)	lbs/acre (all sizes)
5.4	5.4	2	9/29/2010	183	0	7	18.88
5.4	5.4	2	9/17/2009	7	0	0	1.26
5.4	5.4	2	9/22/2008	7	14	0	0.92
5.4	5.4	2	9/26/2007	108	0	7	12
5.4	5.4	2	10/3/2006	11	11	0	1.21
5.4	5.4	2	9/27/2005	0	0	0	0
5.4	5.4	2	10/12/2004	5	5	0	0.7
5.4	5.4	2	10/17/2003	0	22	0	1
5.4	5.4	2	9/16/2002	32	0	0	3
5.4	5.4	2	9/24/2001	0	0	0	0
5.4	5.4	2	9/20/2000	0	0	0	0
5.4	5.4	2	9/16/1999	0	0	0	0
			<b>Fall Mean</b>	<b>16</b>	<b>5</b>	<b>1</b>	<b>1.8</b>



**Table 3. Trends in Index of Biotic Integrity (Mundahl and Simon 1998) and Minnesota Stream Habitat**

Assessment (Fisheries Stream Survey Manual 2007) scores for West Indian Creek, 2003-2010

Station	River Mile	Similar Reach	Date	IBI	Land Use	Riparian Zone	Instream Substrate	Instream Cover	Channel Morphology	Final Score
5.4	5.42		9/29/2010	90	2.5	8	17.6	14	30	72.1
5.4	5.4	2	9/17/2009	100	2.5	10	17.6	16	28	74.1
5.4	5.4	2	9/22/2008	100	2.5	9.5	17	13	28	70
5.4	5.4	2	9/26/2007	85	2.5	8.5	17.2	13	25	66.2
5.4	5.4	2	10/3/2006	90	-	-	-	-	-	-
5.4	5.4	2	10/12/2004	105	-	-	-	-	-	-
5.4	5.4	2	3/29/2004	95	-	-	-	-	-	-
5.4	5.4	2	10/17/2003	105	-	-	-	-	-	-
5.4	5.4	2	4/7/2003	85	-	-	-	-	-	-

**Table 4. Geomorphologic measurement summary for West Indian Creek, years 2008-2010**

Station	Date	Bankfull Width	Mean Depth	W/D	Bankfull XS Area	Flood Prone Width	Entrench. Ratio	Slope (water)	Sinuosity	Stream Type
5.4	7/29/2010	10.8	0.97	11.1	10.4	19.0	1.8	0.0030	1.2	F4
5.4	7/23/2009	10.1	0.71	14.4	7.2	13.4	1.3	0.0033	1.2	F4
5.4	7/30/2008	10.5	0.68	15.5	7.1	13.9	1.3	0.0023	1.3	F4

**Table 5. Brown trout Habitat Quality Index (Thorn and Anderson 2001) for West Indian Creek, years 2008-2010**

Station	Date	Shade	Pool Area	Pool Type	Fines	Cover	Erosion	Width	W/D	HQI Total
5.4	8/12/2010	4	3	3	1	3	4	3	3	24
5.4	8/27/2009	4	3	3	1	3	4	4	3	25
5.4	8/20/2008	4	3	3	1	3	4	4	3	25

**Table 6. Cover for larger fishes summary for West Indian Creek, years 2008-2010**

Station	Date	UCB (%)	OHV (%)	WD (%)	OD (%)	BO (%)	ISV (%)	>2' (%)	>3' (%)
5.4	8/12/2010	1.09	7.47	3.60	0.06	1.78	21.0	19.38	6.72
5.4	8/27/2009	0.66	8.11	3.04	0.14	2.33	42.0	20.62	9.48
5.4	8/20/2008	1.02	8.08	2.72	0	0.24	27.0	26.25	11.06

UCB = undercut bank, OHV = overhanging vegetation, WD = woody debris, OD = other debris, BO = boulders, ISV = instream vegetation

**Table 7. Abundance of aquatic plants in West Indian Creek, years 2008-2010**

Aquatic plant	2008	2009	2010
Water cress ( <i>Rorippa nasturtium-aquaticum</i> )	R	R	O
Common waterweed ( <i>Elodea canadensis</i> )	-	-	R
Water Buttercup ( <i>Ranunculus</i> sp.)	C	C	R
American Brooklime ( <i>Veronica americana</i> )	A	A	C
Algae	R	R	O
Small Duckweed	O	O	O
Spotted Touch-me-not ( <i>Impatiens capensis</i> )	R	C	A
Reed Canary ( <i>Phalaris arundinacea</i> )	C	C	O

A = abundant, C = common, O = occasional, R = rare

### References

Fisheries Stream Survey Manual. 2007. Special Publication No. 165. Minnesota Department of Natural Resources.

Mundahl, N.D., and T.P. Simon. 1998. Development and application of an index of biotic integrity for coldwater streams of the upper Midwestern United States. Pages 383-415 In Thomas P. Simon (ed.). Assessing the Sustainability and Biological Integrity of Water Resources Using Fish Communities. CRC Press, Boca Raton, Florida.

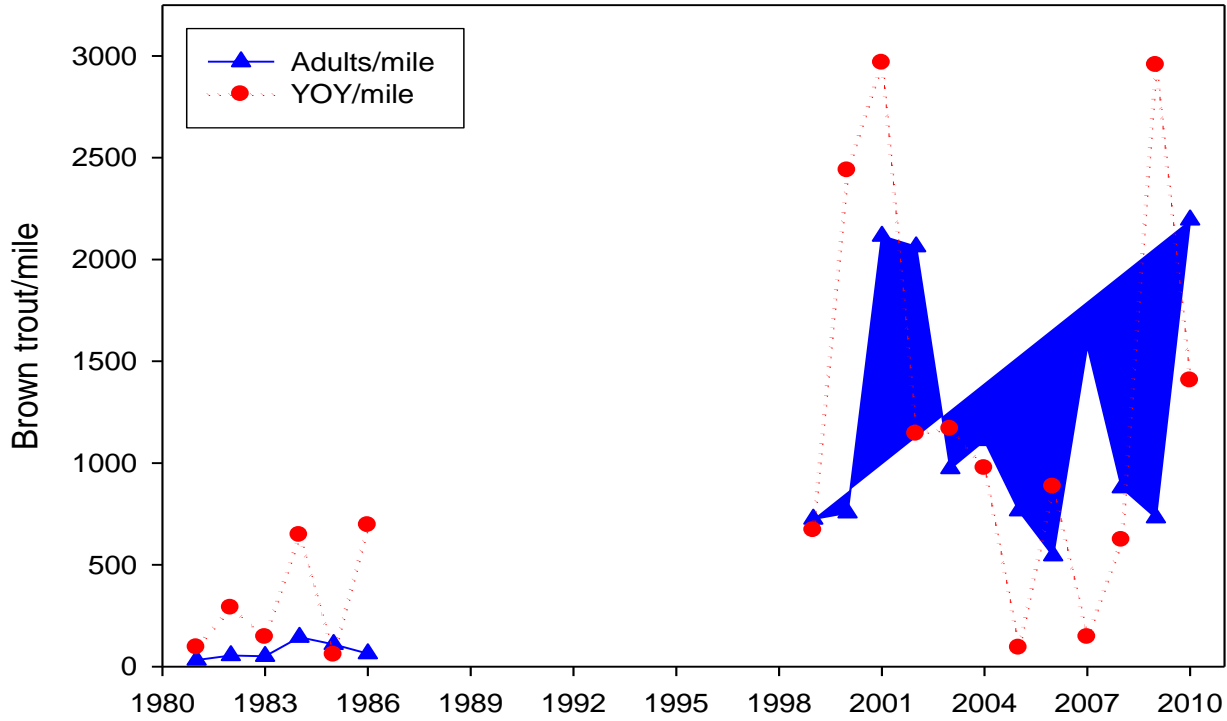


Figure 1. Abundance of brown trout adults and recruits (YOY) in West Indian Creek, fall 1981-2010

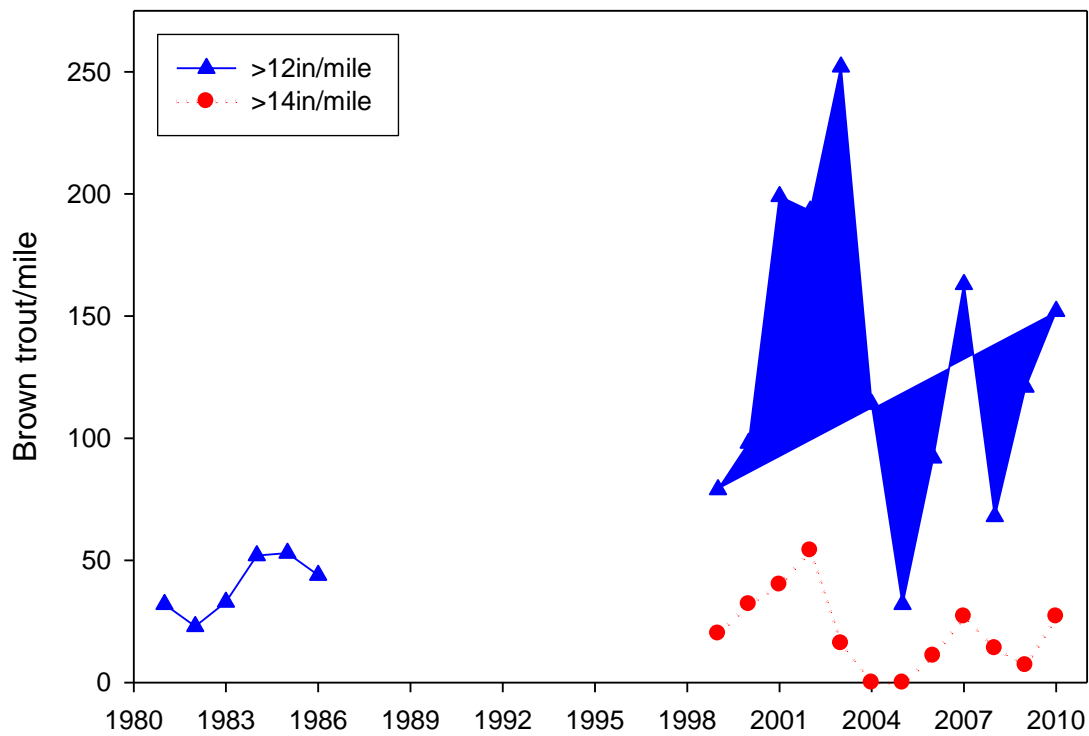


Figure 2. Abundance of brown trout  $\geq 12$  inches and  $\geq 14$  inches in West Indian Creek, fall 1981-2010