

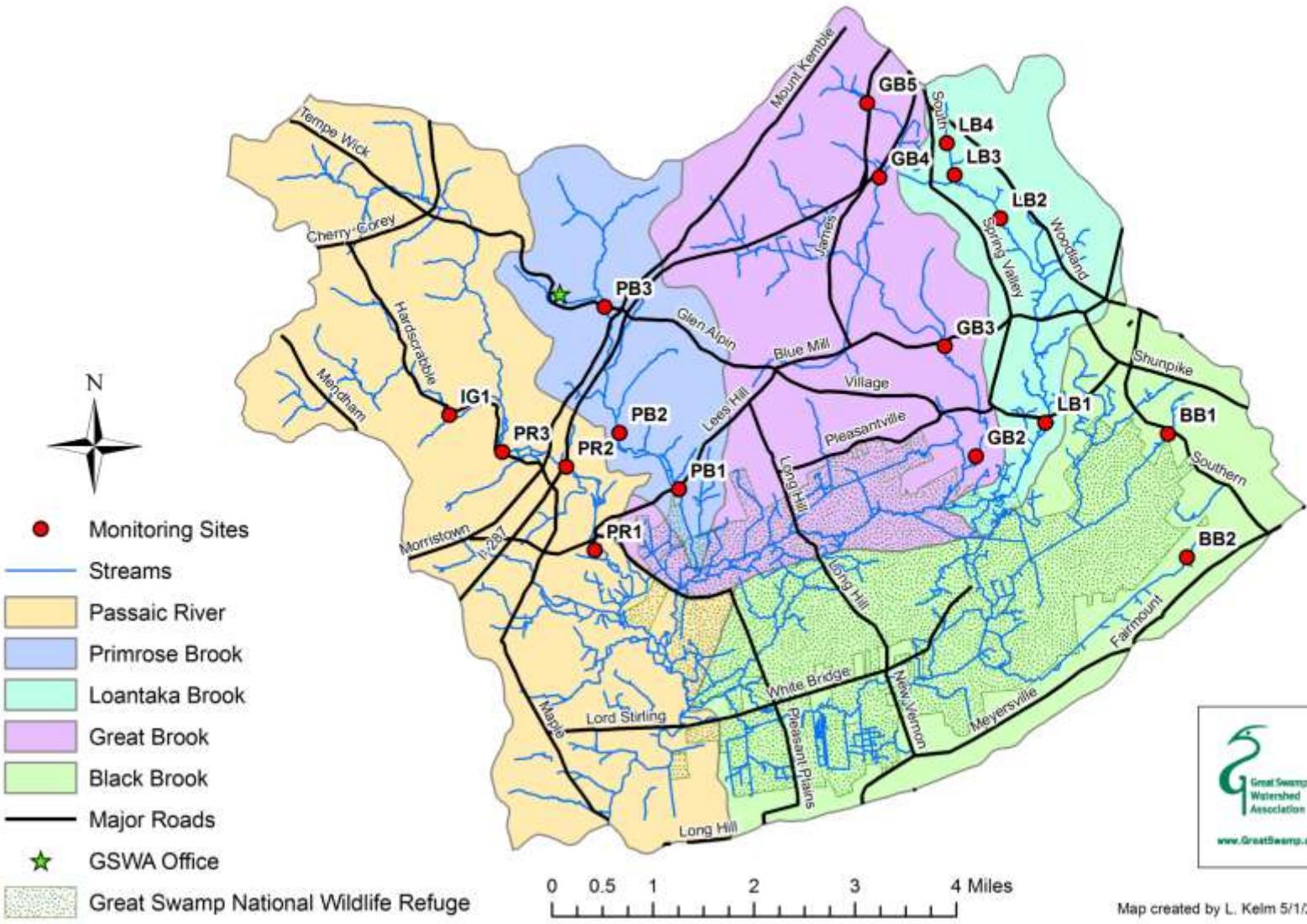
*Macroinvertebrate
Communities of the Great
Swamp Watershed

2012

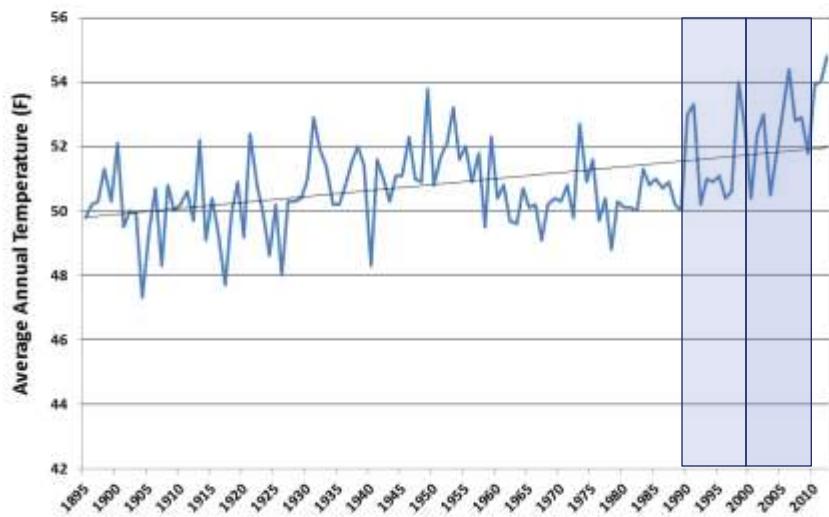
Lee Pollock

Professor Emeritus
Drew University

Macroinvertebrate Monitoring Sites in the Great Swamp Watershed

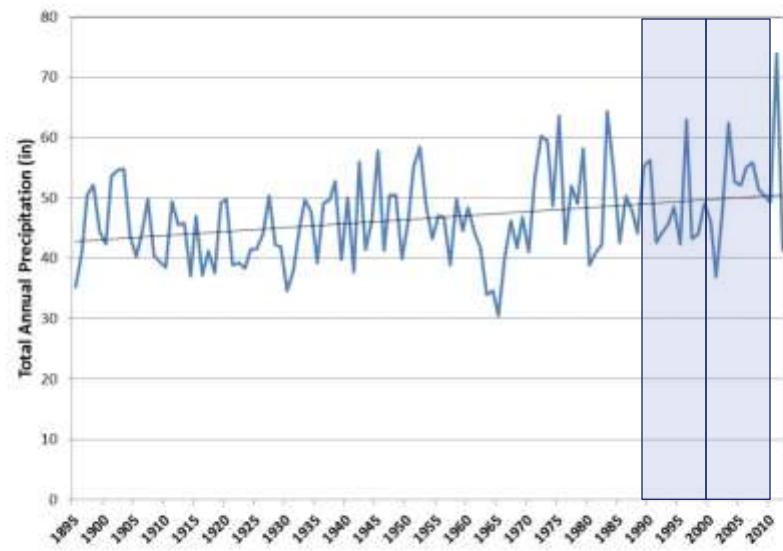


Northern New Jersey
Average Annual Temperature (°F)



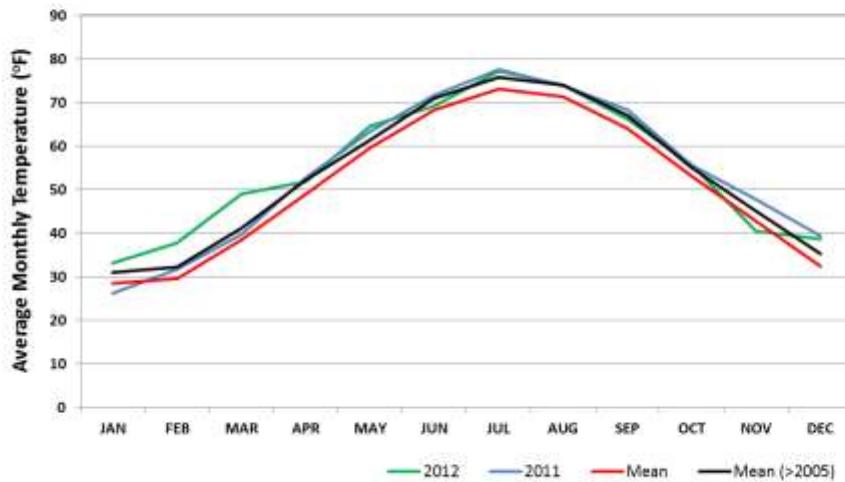
Source: http://climate.rutgers.edu/stateclim_v1/data/north_njhisttemp.html

Northern New Jersey
Annual Precipitation (in)



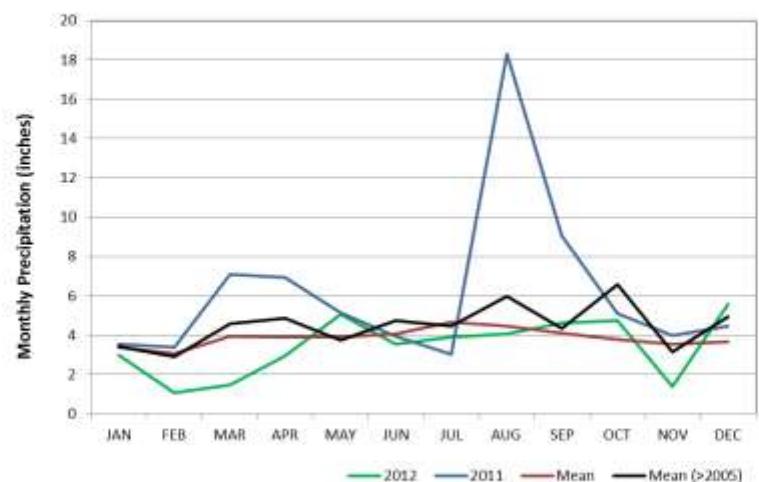
http://climate.rutgers.edu/stateclim_v1/data/north_njhistprecip.html

Northern New Jersey Average Monthly Temperature (°F)



Source: http://climate.rutgers.edu/stateclim_v1/data/north_njhisttemp.html

Northern New Jersey Monthly Precipitation (inches)



Source: http://climate.rutgers.edu/stateclim_v1/data/north_njhstprecip.html

Table 12-1. Great Swamp Watershed, May 25, 2012. Habitat Assessment

	B-IBI	temp	TDS	DO	pH	Turbidity	total	HabValue2
BB1	16	19.0	300.7	5.24	7.35	6.93	19.52	33
BB2	14	17.2	555	8.16	7.57	0.81	16.54	22
LB1	16	17.5	438.5	6.99	7.57	4.44	19	16
LB2	18	18.5	578	6.37	7.50	3.72	17.59	36
LB3	10	18.1	701	6.68	7.21	1.54	15.43	17
LB4	18	16.7	737	6.5	7.42	4.54	18.46	22
GB2	20	17.4	239.2	7.4	7.19	8.98	23.57	39
GB3	12	17.7	245.3	7.85	7.43	13.00	28.28	68
GB4	14	17.5	419.1	6.56	7.50	4.14	18.2	31
GB5	12	18.9	381	5.48	7.55	5.10	18.13	42
PB1	34	17.3	157.4	8.69	7.62	2.95	19.26	52
PB2	30	17.2	157.1	8.79	7.54	5.56	21.89	56
PB3	36	16.0	92.2	9.21	7.63	2.23	19.07	73
PR1	20	18.5	146	8.39	7.42	5.93	21.74	57
PR2	26	17.1	153.5	8.62	7.34	3.17	19.13	24
PR3	34	17.0	118.7	8.97	7.53	2.27	18.77	81
IG1	36	15.5	148.9	9.16	7.50	1.12	17.78	85

**Fig. 03-4 Great Swamp Streams
Bimonthly pH, 2003**

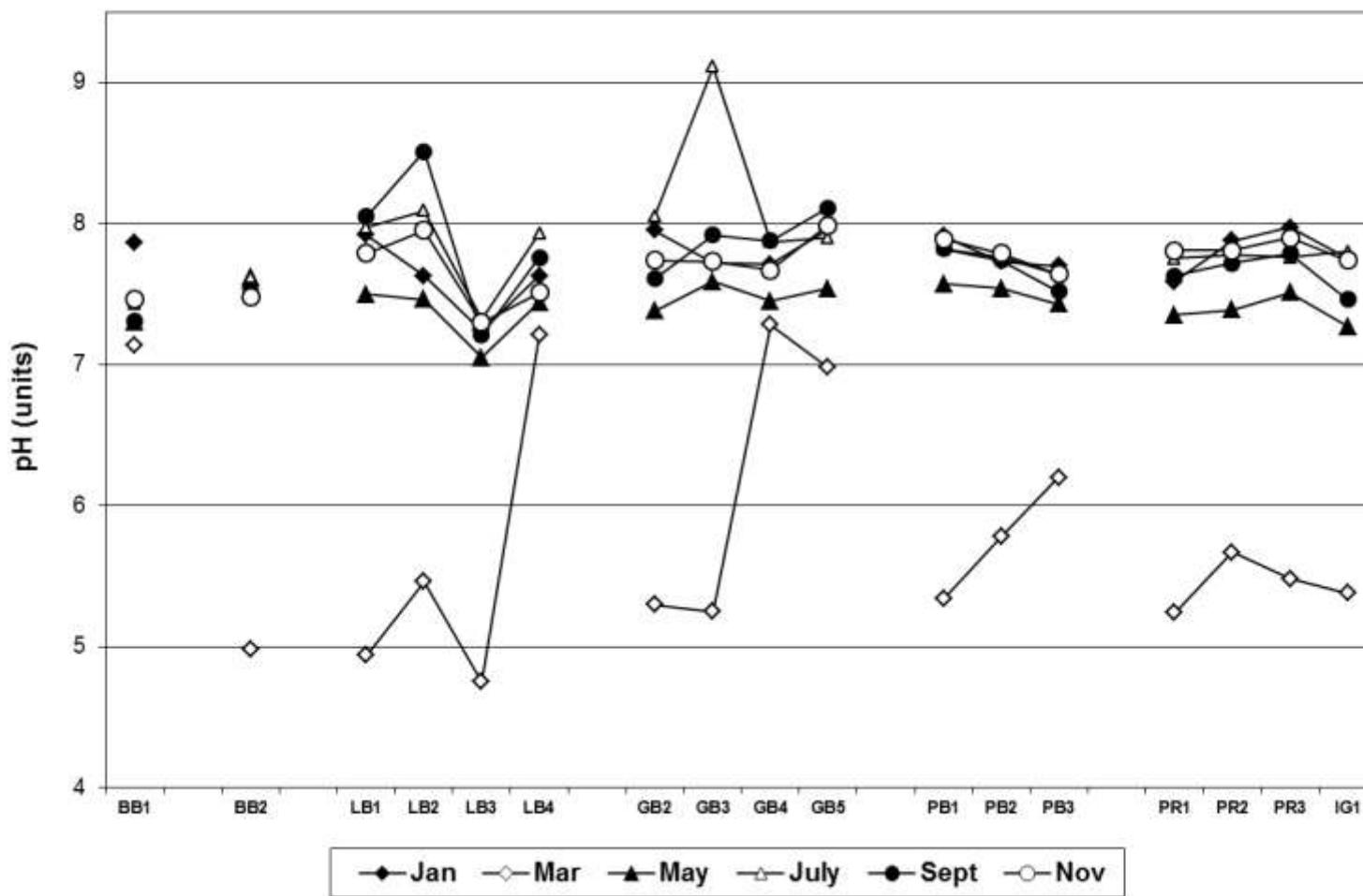
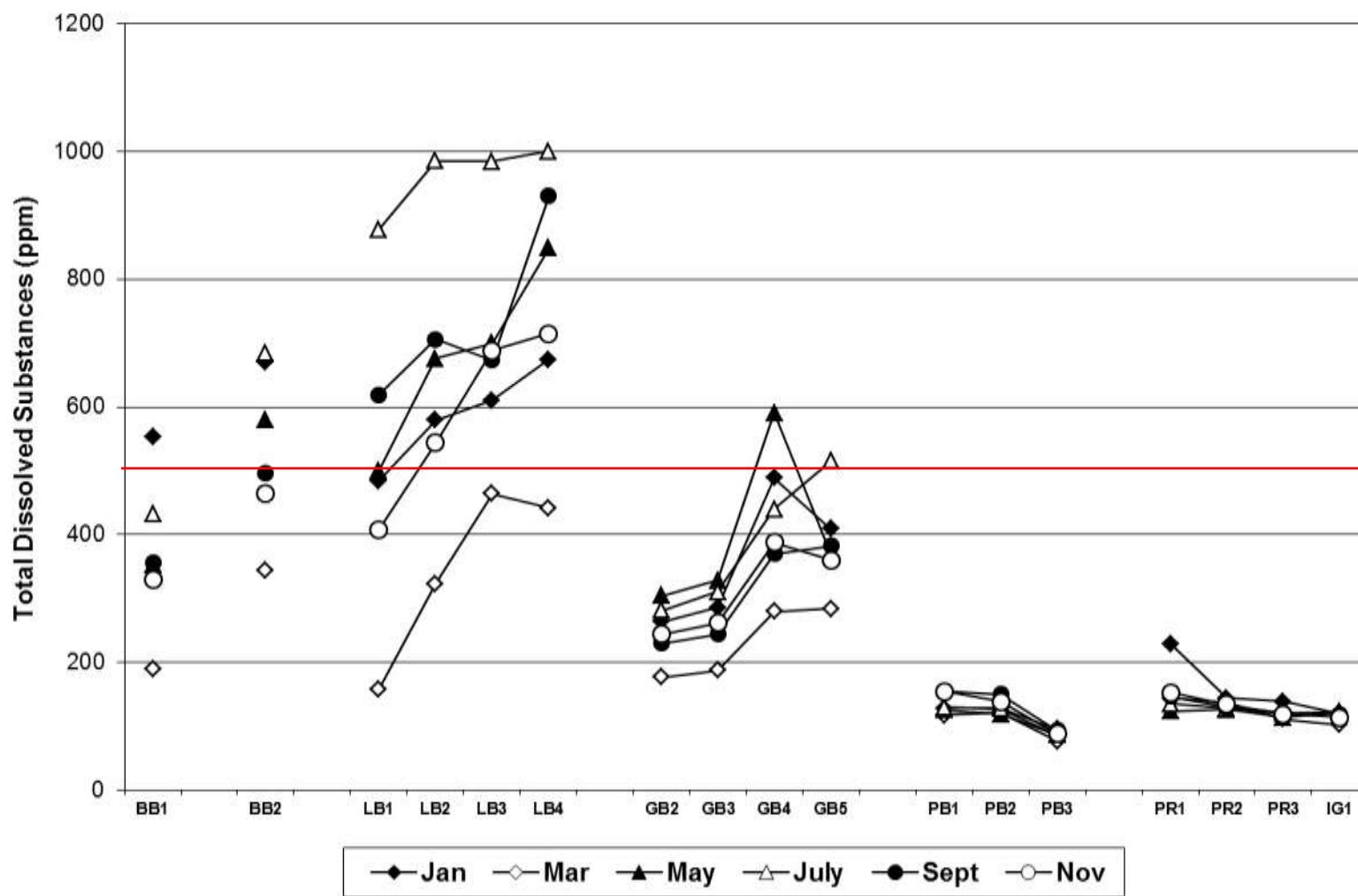


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IG1	36	15.5	148.9	9.16	7.50	1.12	17.78	85

**Fig. 03-2 Great Swamp Streams
Bimonthly TDS, 2003**



- Macroinvertebrates (MIVs)

- Direct, integrative measure of water quality
- Provide historical information
- Can be used to identify impairment sources
- Both broad dispersal as adults and limited mobility as nymphs/larvae
- Normally abundant
- Easy & inexpensive to sample and identify





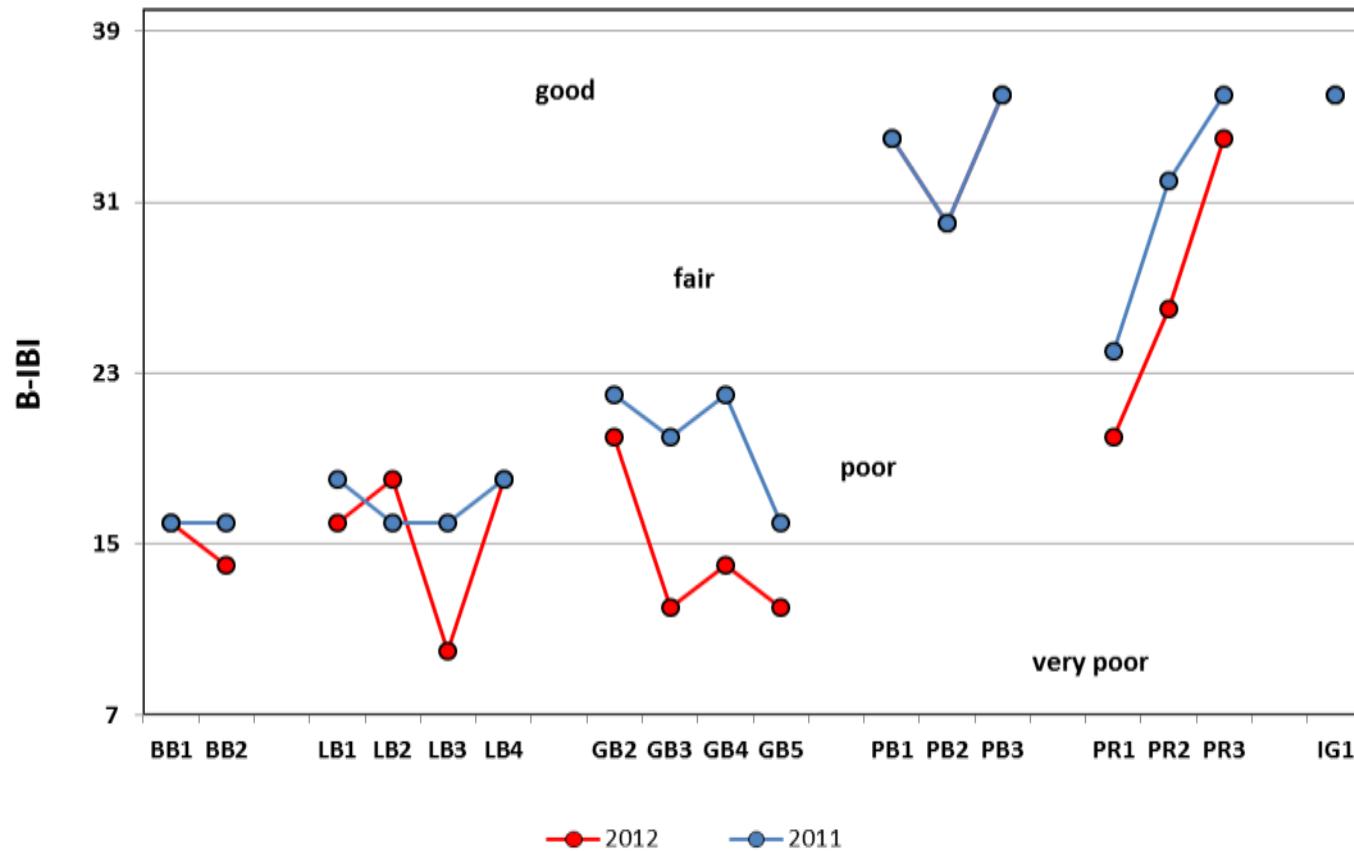


	BB1		RB1		Scoring Table		
	2008	2007	2008	2007	1	3	5
Dominance	0.485	0.724	0.310	0.590	>.75	.75-.5	<.5
Taxa	33	21	31	26	<12	12-20	>20
%Predators	0.051	0.008	0.138	0.067	<.025	.025-.1	>.1
Ind Intolerant	3	3	3	6	<2	2-4	>4
#Ephem	4	3	4	6	<2	2-5	>5
#Trich	6	4	9	5	<2	2-5	>5
#Plec	1	0	2	3	<2	2-4	>4
Ind Tolerant	3	3	2	2	>4	4-2	<2
B-IBI Scores					High	Low	
Dominance	5	3	5	3			
Taxa	5	5	5	5			
%Predators	3	1	5	3			
Ind Intolerant	3	3	3	5			
#Ephem	3	3	3	5			
#Trich	5	3	5	3			
#Plec	1	1	3	3			
Ind Tolerant	3	3	3	3			
B-IBI Total	28	22	32	30			
	BB1		RB1				

Calculating the Benthic Index of Biological Integrity B-IBI

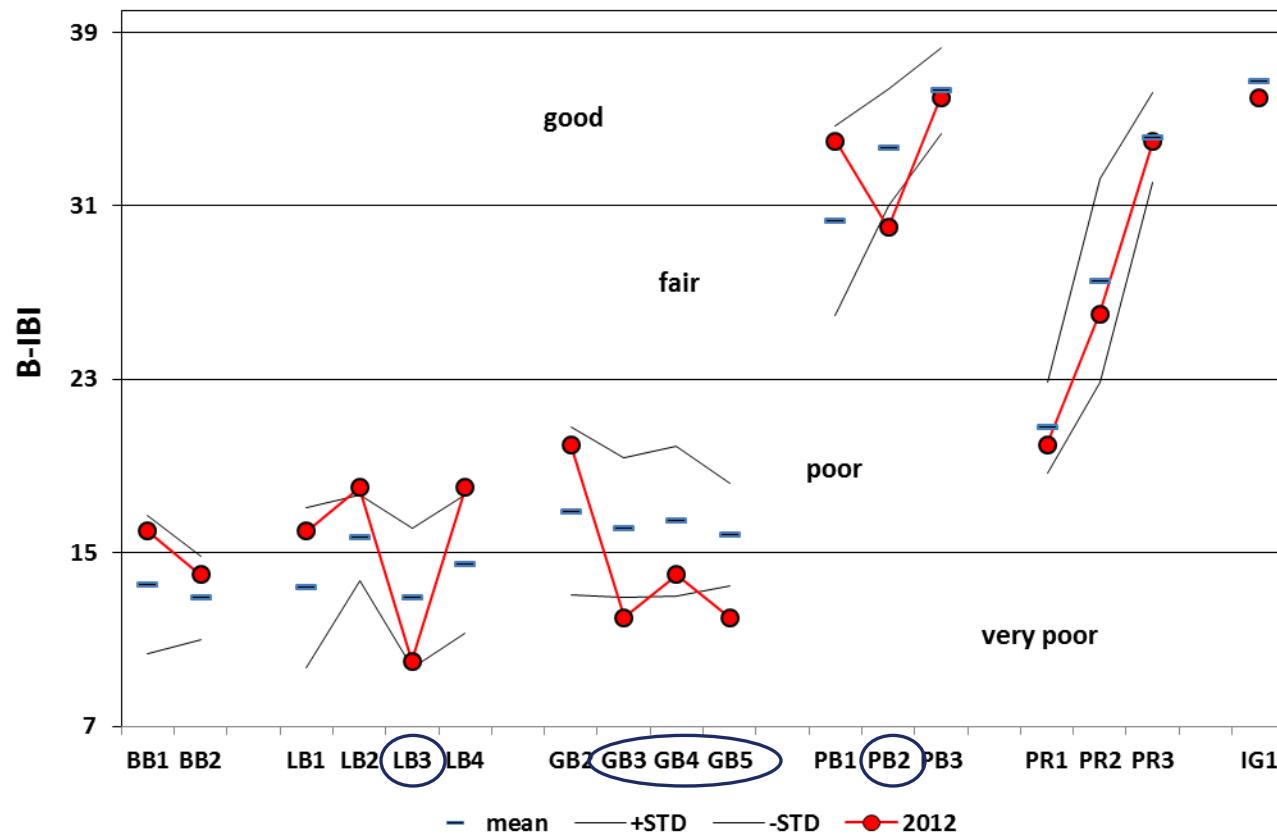
Great Swamp Streams

B-IBI Summer, 2012 vs Summer, 2011

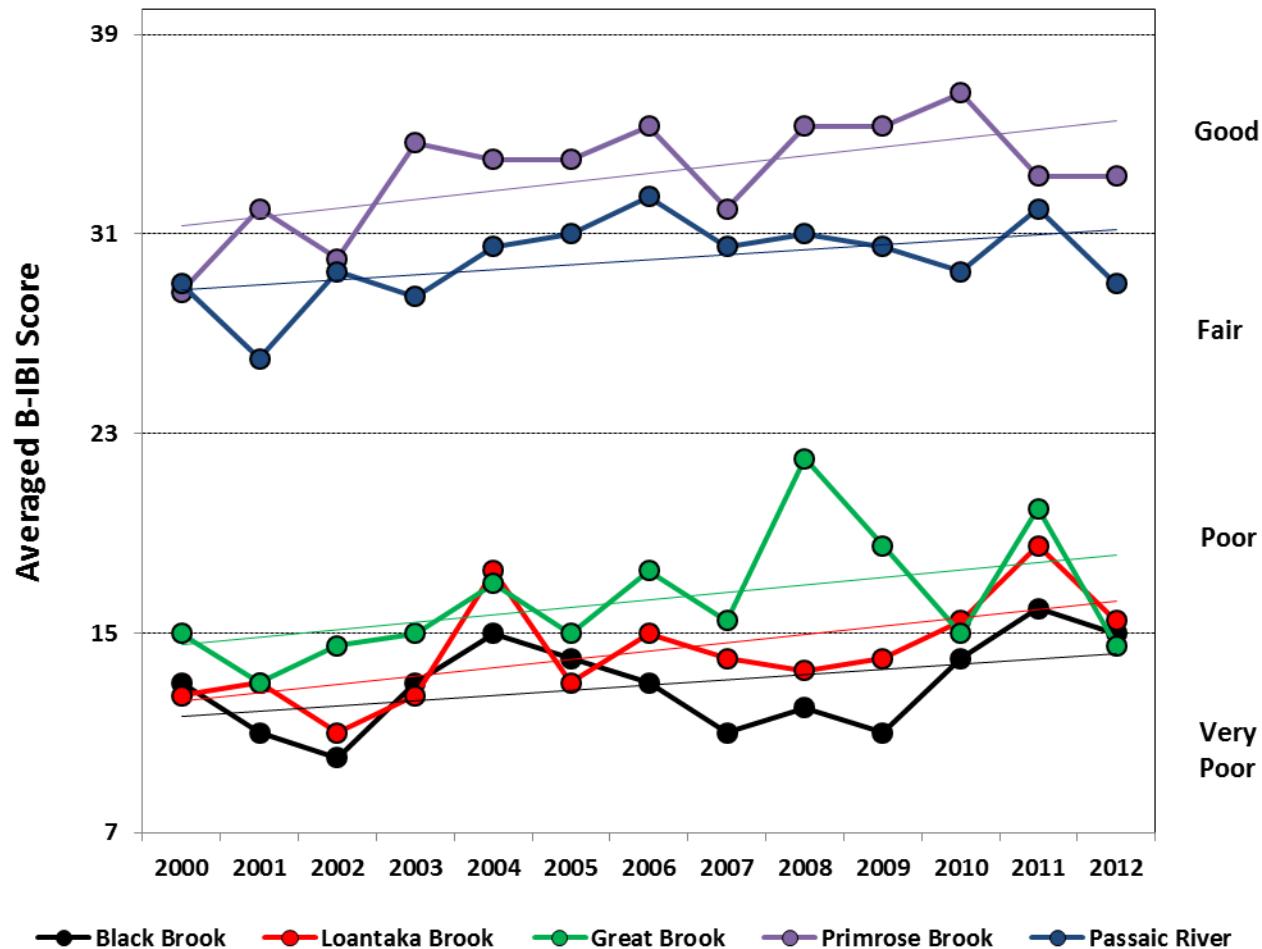


Great Swamp Streams

Summer 2012, Mean +/- STD (2000-2012)

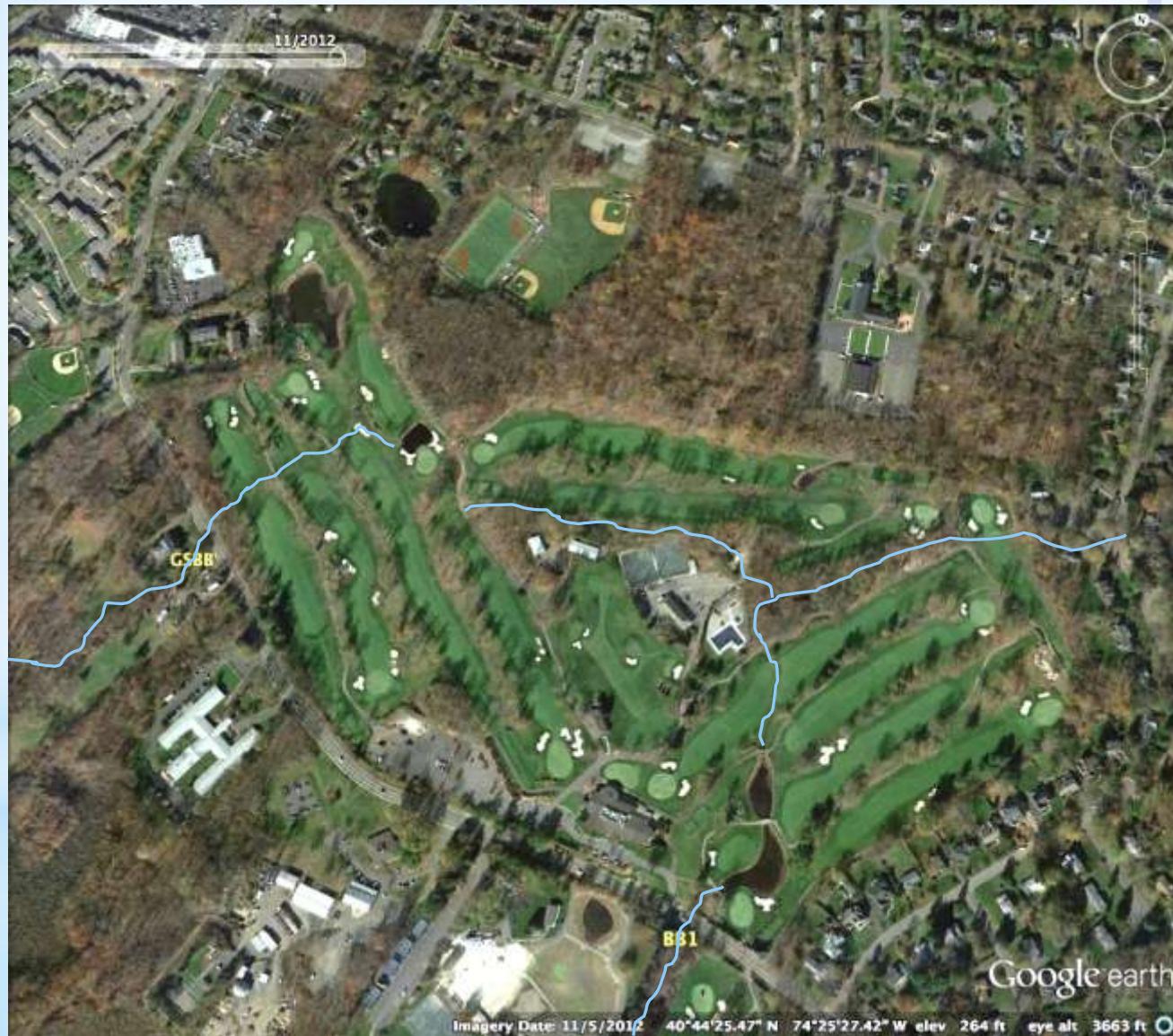


Great Swamp Watershed Streams Averaged Annual B-IBI Scores, 2000-2012



Southern Boulevard, Chatham Township
Golf course; heavily traveled roadway

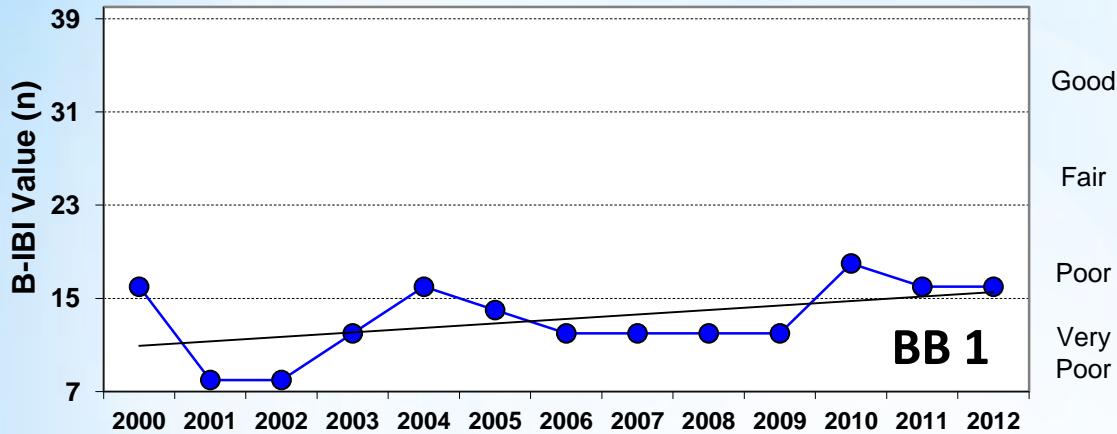
* BB 1



Southern Boulevard, Chatham Township
Golf course; heavily traveled roadway

* BB 1



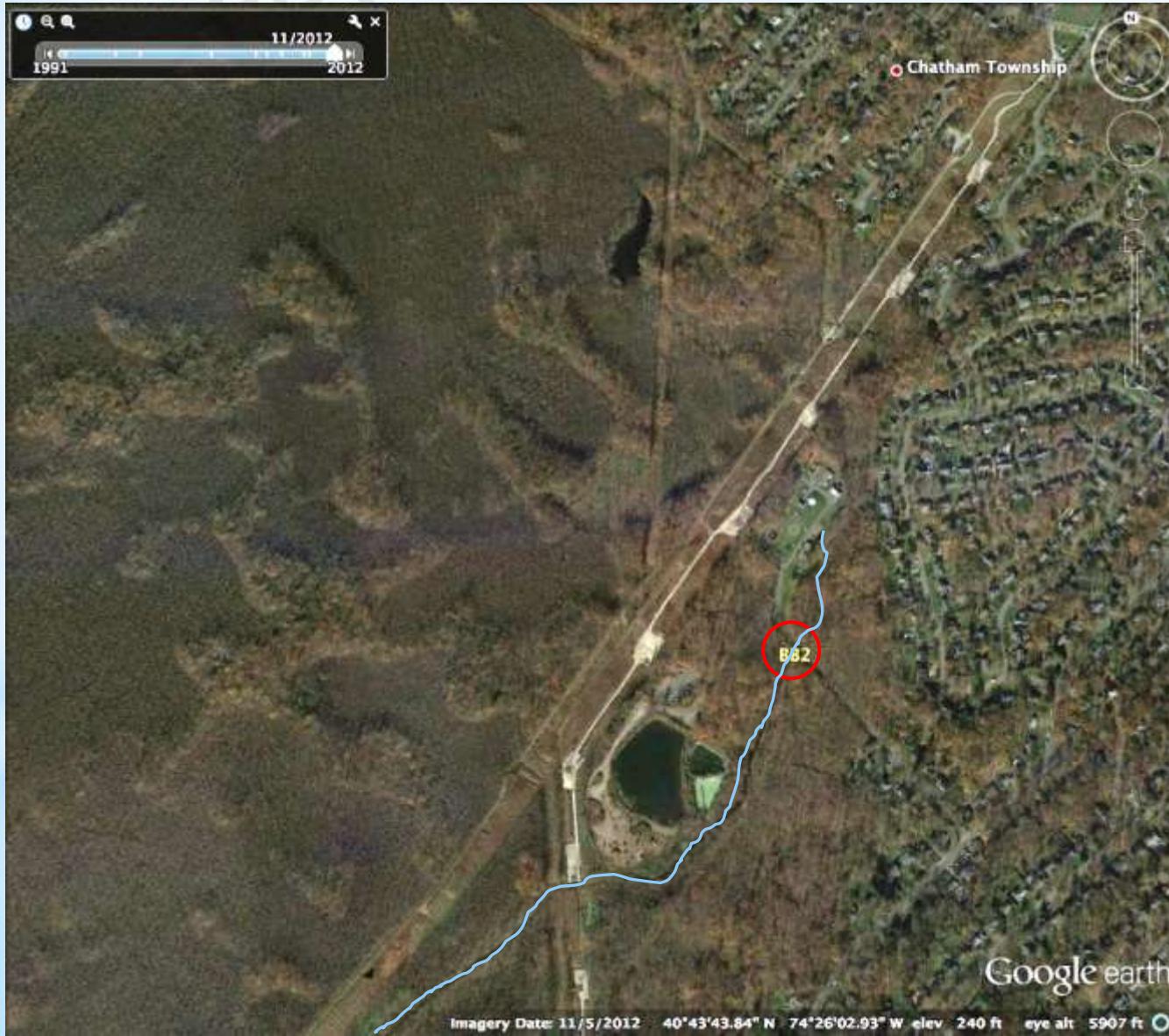


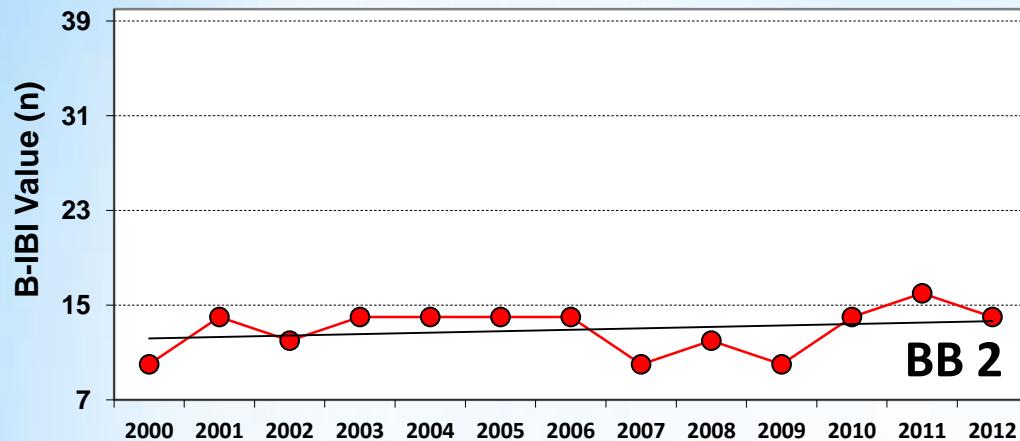
* BB 1
Small, slow flow
High temperature,
oil films



* BB2

Drainage channel, STP





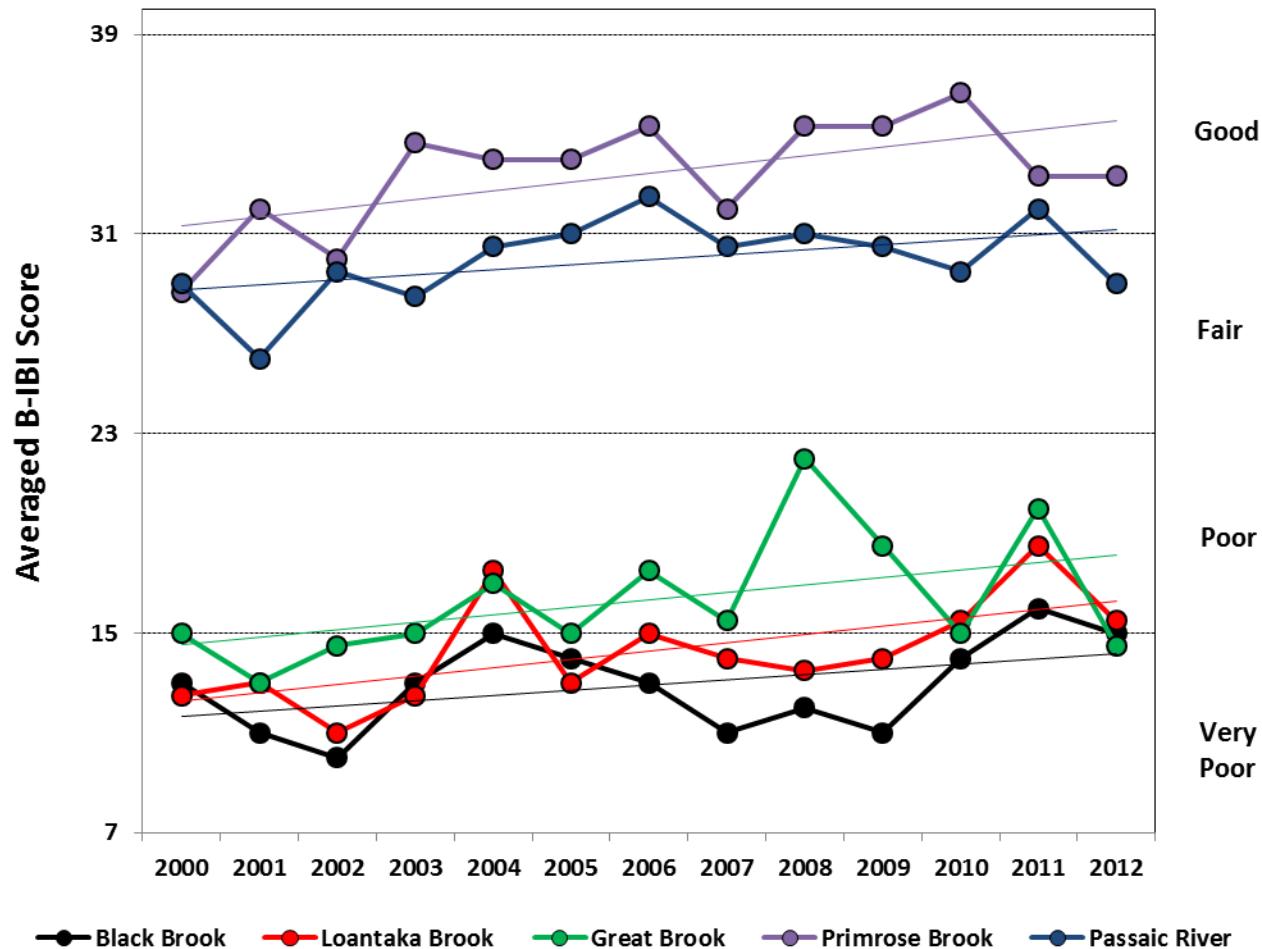
Good
Fair
Poor
Very Poor



Sandy, poor substrate
High TDS (> NJS)

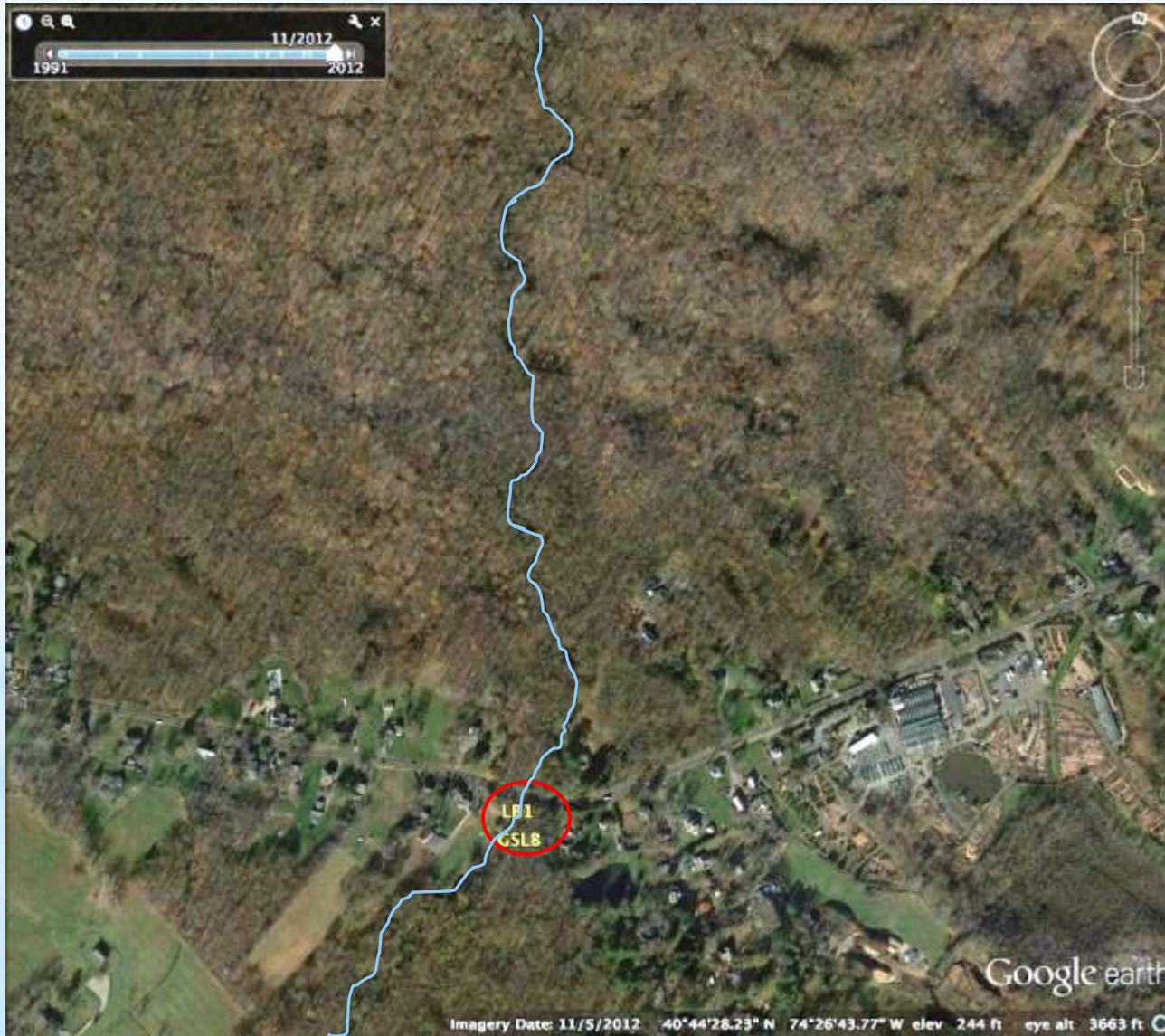


Great Swamp Watershed Streams Averaged Annual B-IBI Scores, 2000-2012



GSWA monitoring site
High turbidity, sediments
Diluted but high TDS

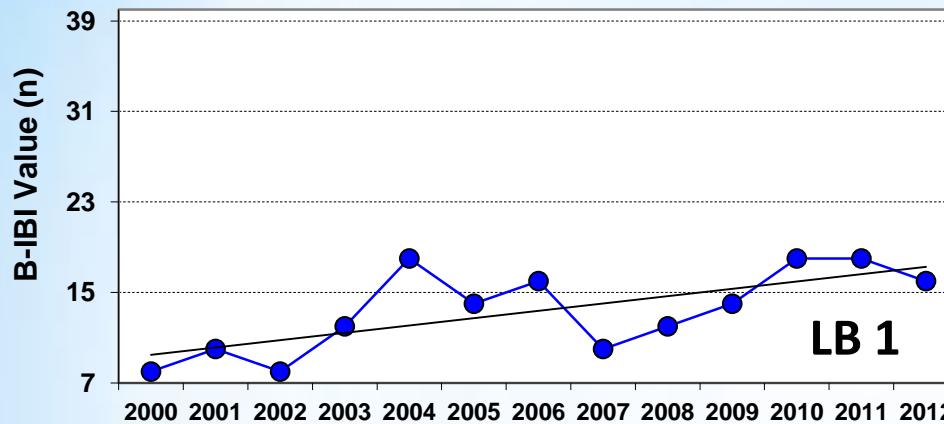
* LB1



GSWA monitoring site
High turbidity, sediments
Diluted but high TDS

* LB1





Good
Fair
Poor
Very Poor

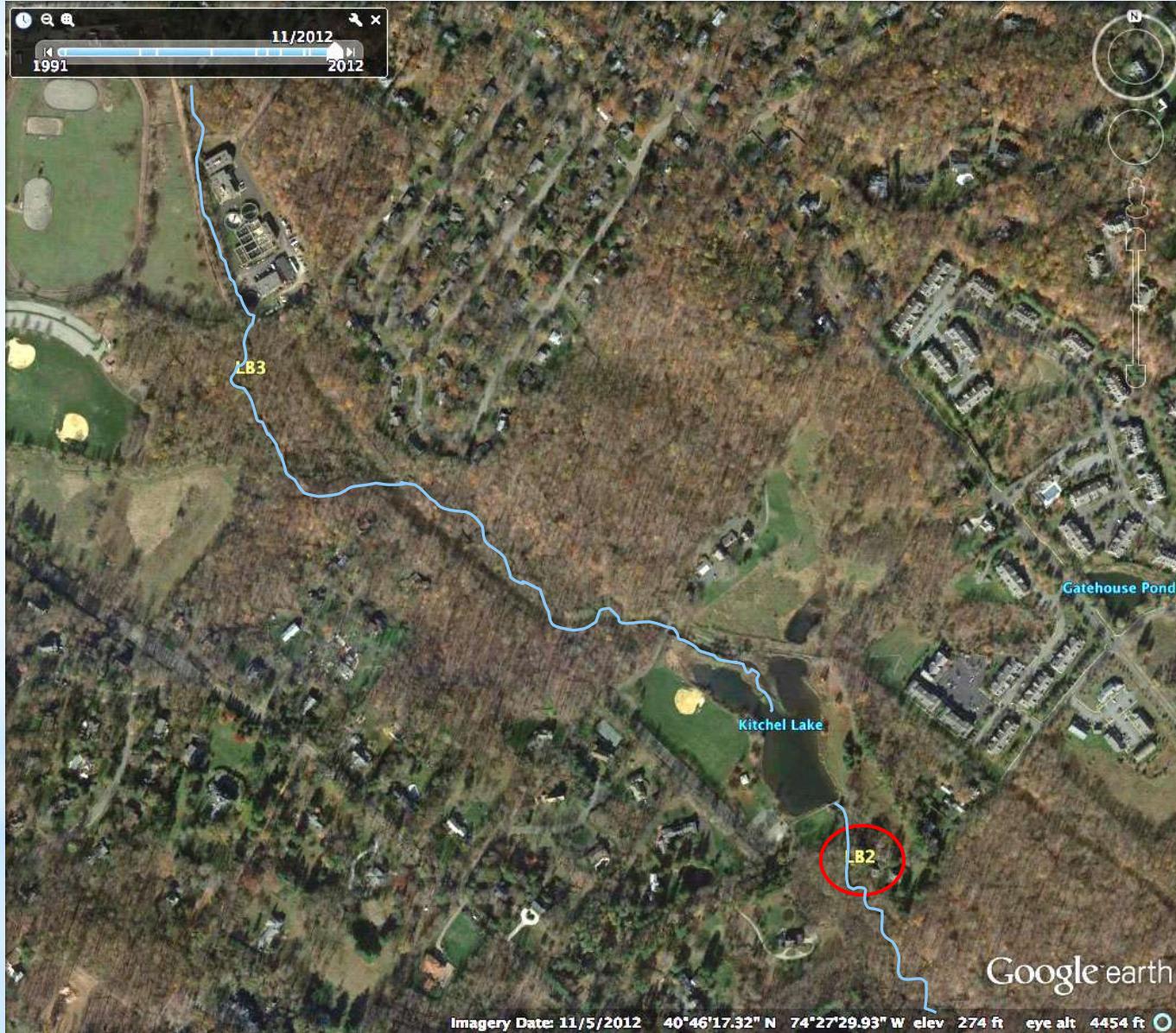


Limited substrate

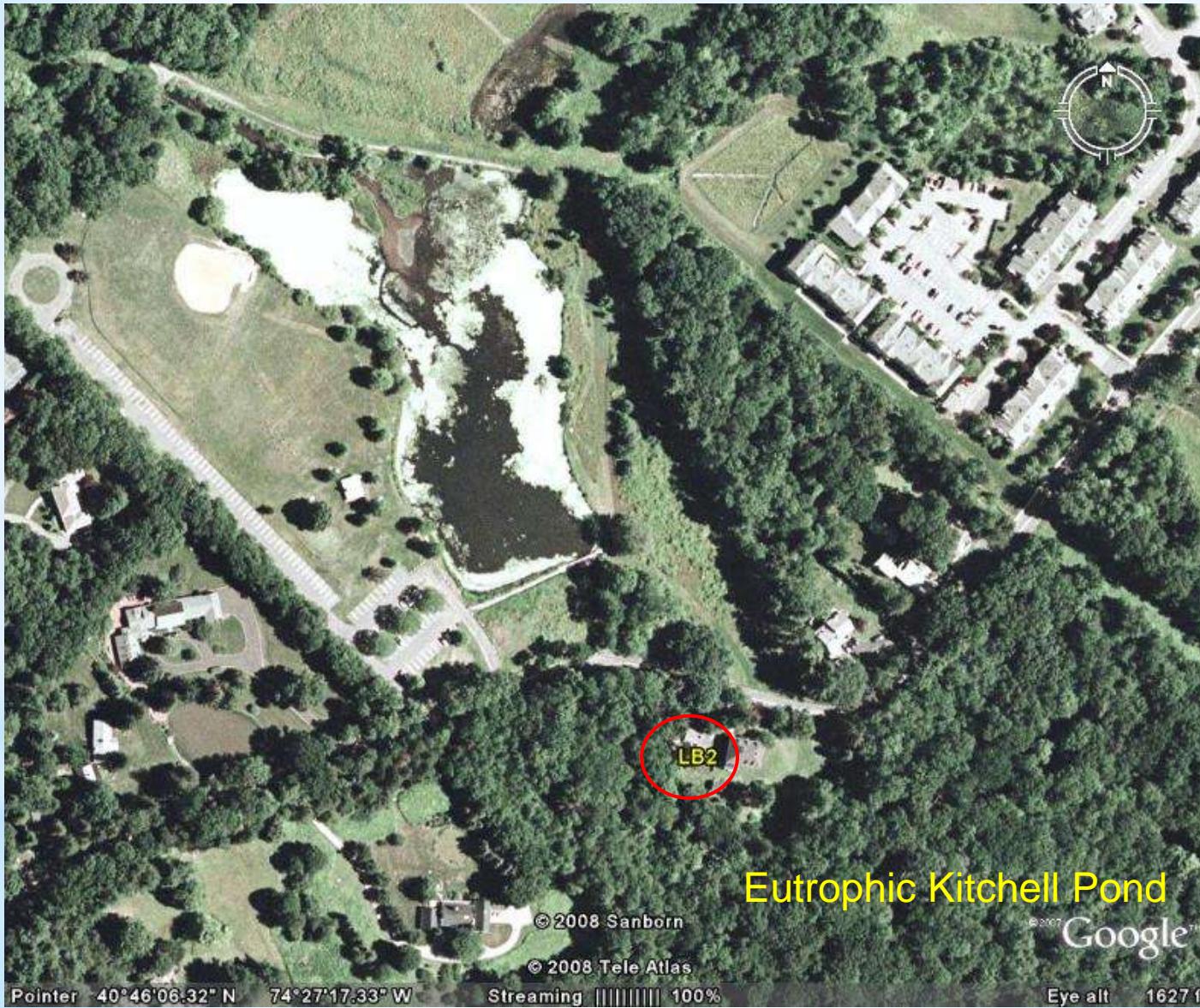


Bank erosion

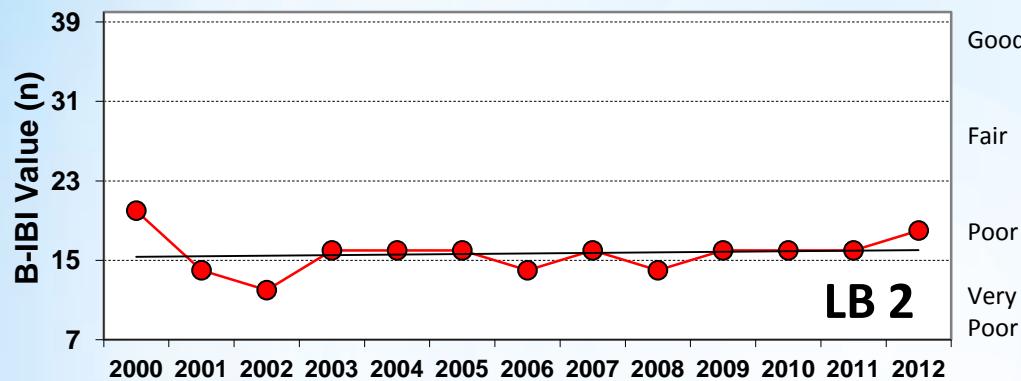
* LB2



*LB2



*LB2



High temperature,
low DO, detritus
High TDS >NJS, chemical smell



Morris Township STP
Strong chemical smell
High TDS

* LB3

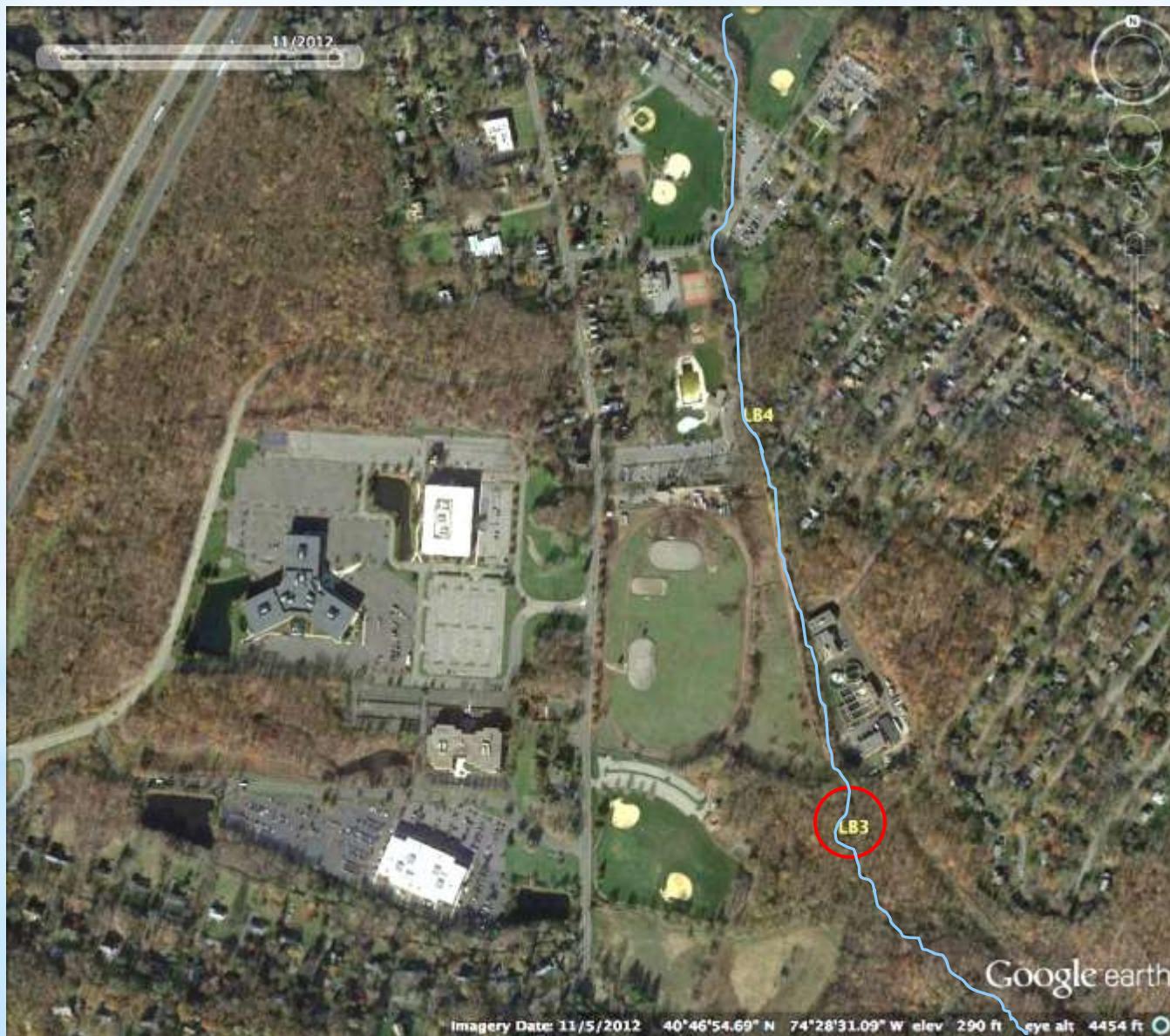




Image © 2007 State of New Jersey

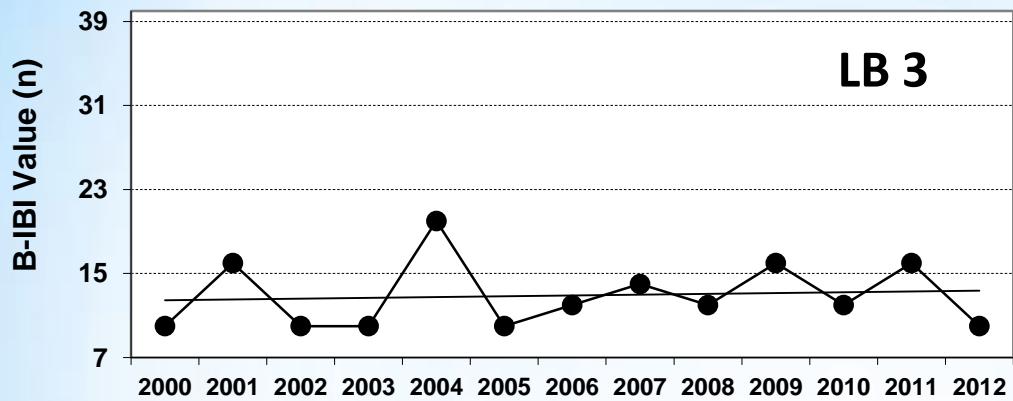
© 2006 Google

Pointer 40°46'25.40" N 74°27'48.97" W elev 289 ft Streaming ||||| 100%

Eye alt 1860 ft

* LB3

Very limited substrate -
shifting sands,
 $TDS = 701 \text{ mg/L}$; >>NJS

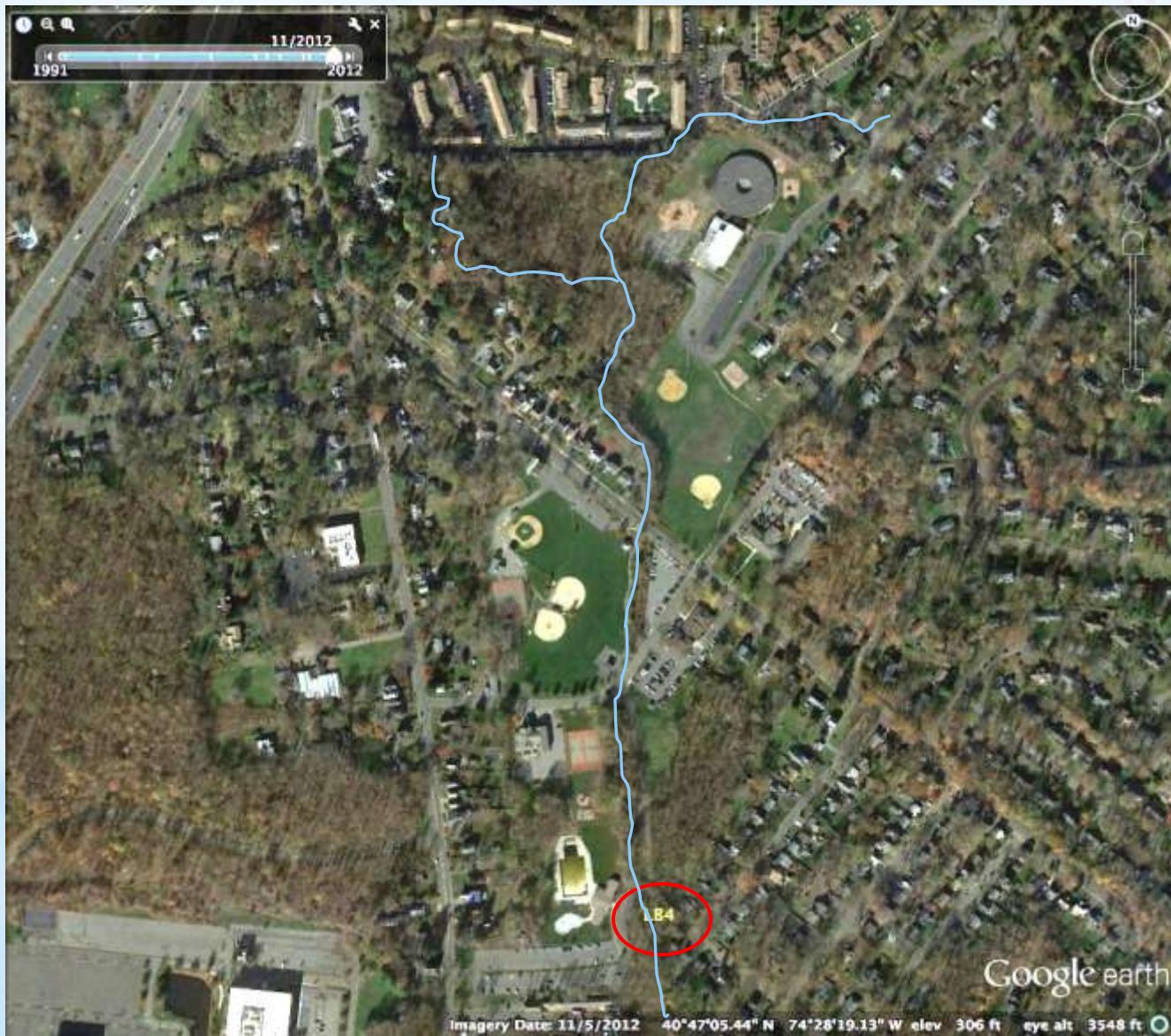


Good
Fair
Poor
Very
Poor



* LB4

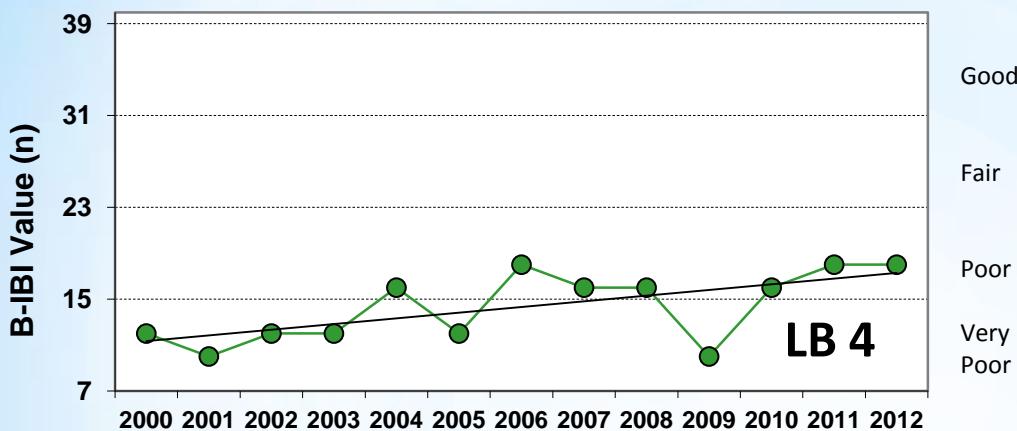
Fanok Road municipal pool Channelized ditch



* LB4

Fanok Road municipal pool
Channelized ditch



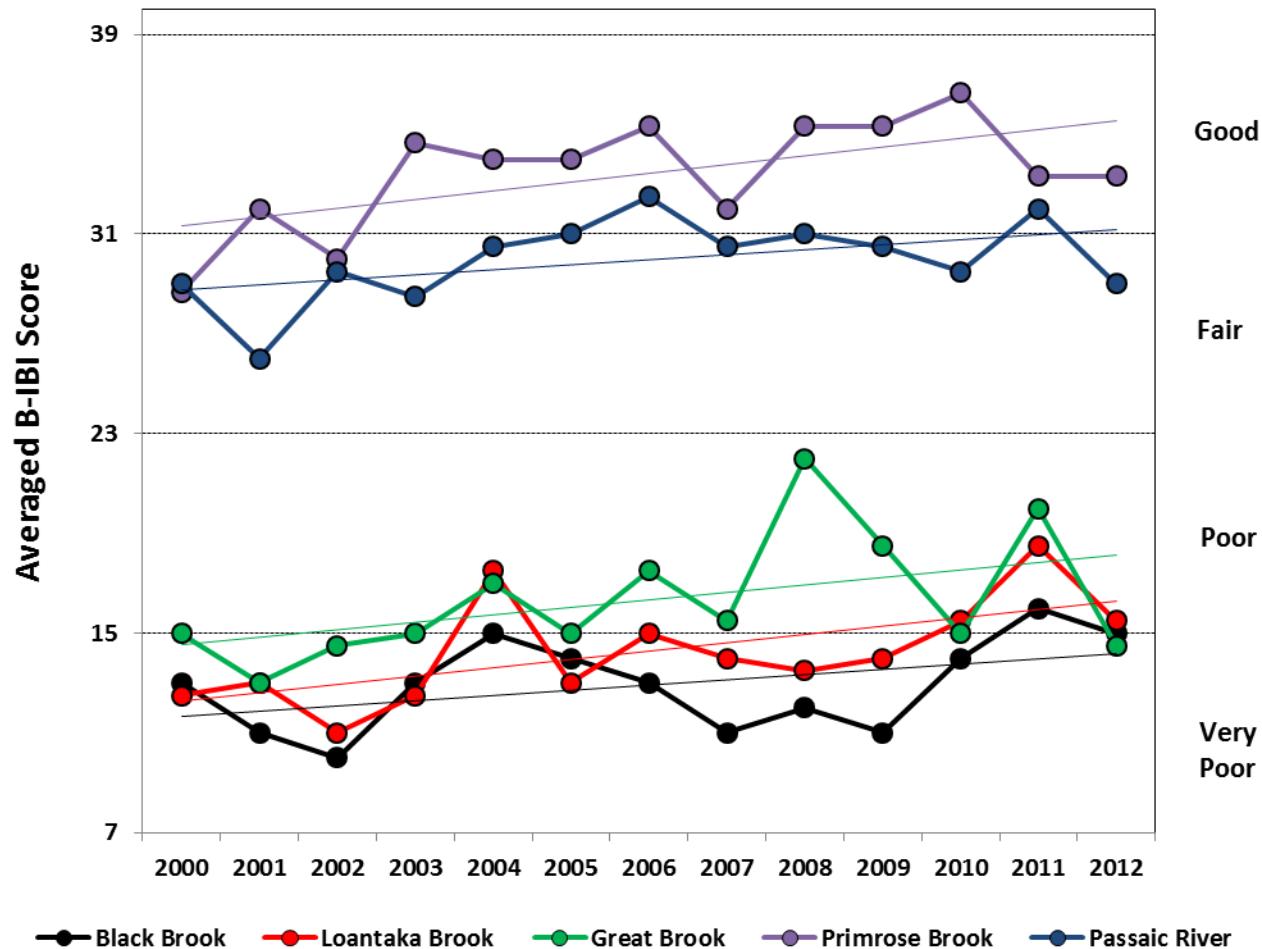


* LB4

Little MIV substrate,
TDS = 737 mg/L
>>NJS

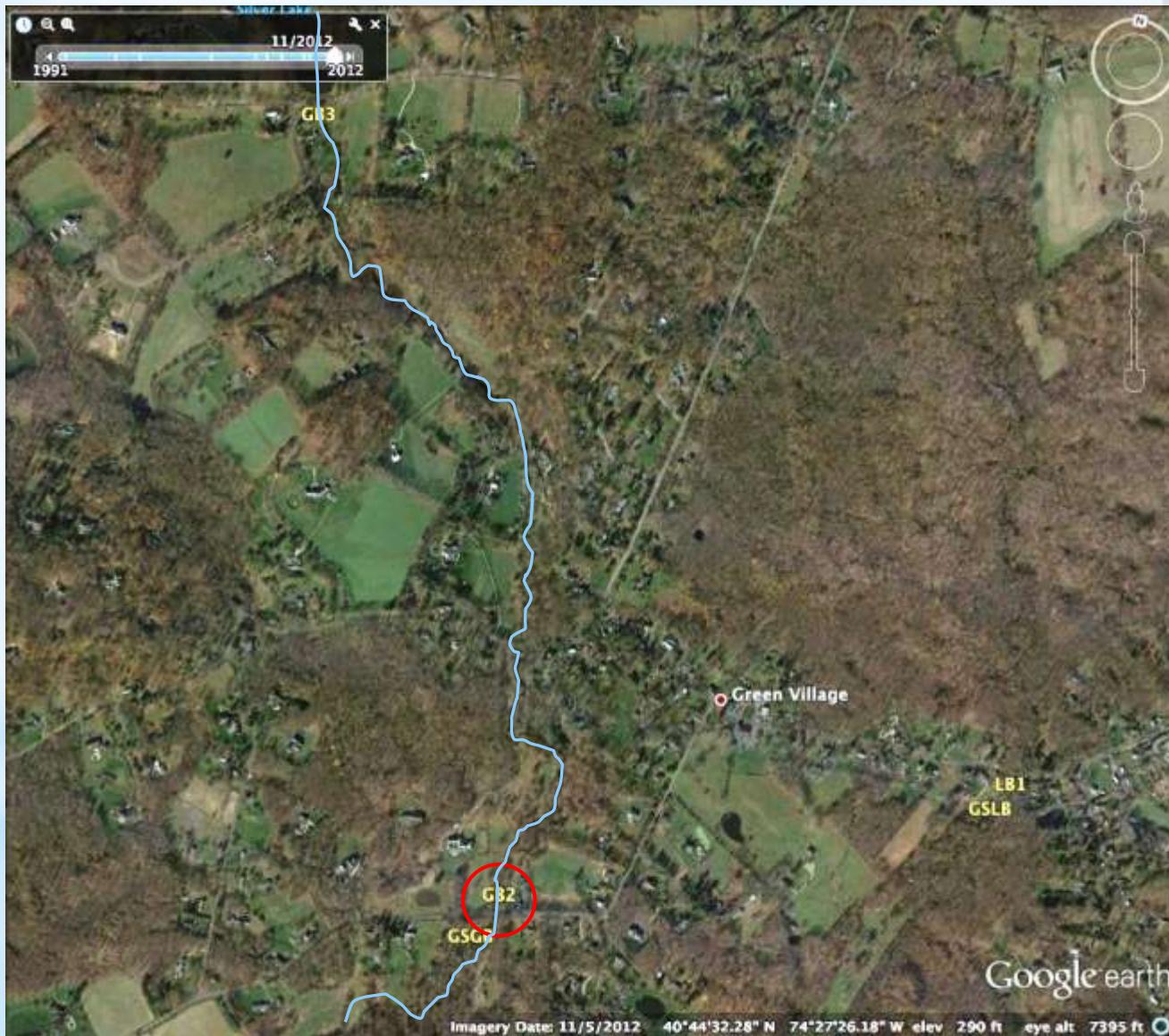


Great Swamp Watershed Streams Averaged Annual B-IBI Scores, 2000-2012



*GB2

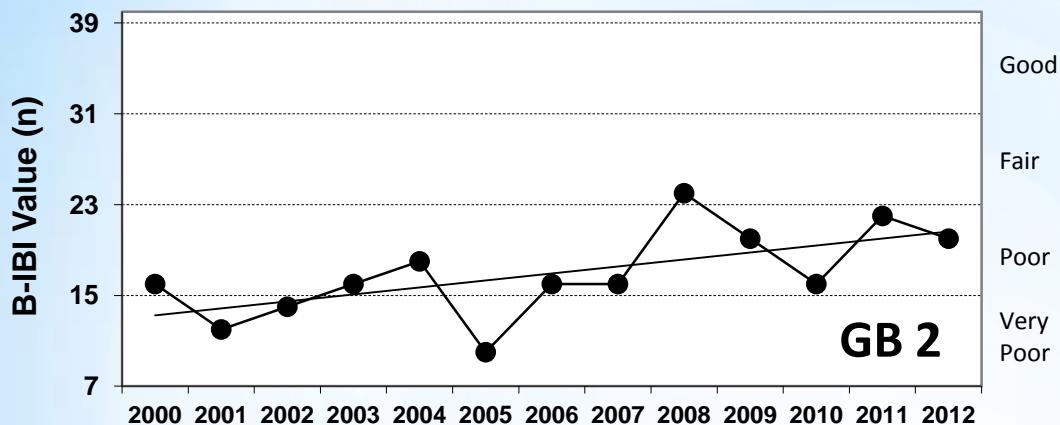
GSWA monitoring site



*GB2

GSWA monitoring site
Sedimentation – but mussels





* GB2

Poor substrate diversity,
High turbidity –
silt bar expanding



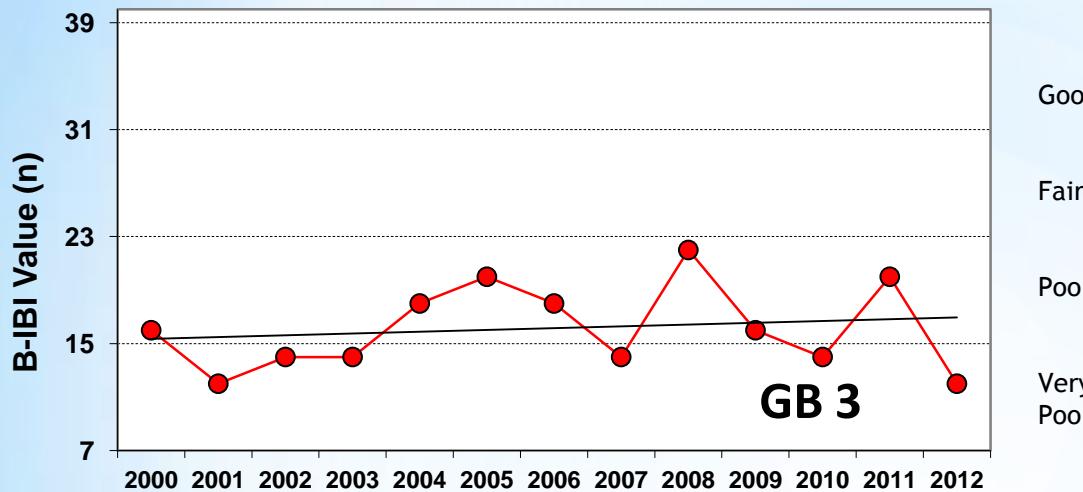
Below Silver Lake

* GB3



Below Silver Lake





Good
Fair
Poor
Very Poor

* GB3

Good substrate
High temperature,
Very high turbidity –
silt & debris



Office complex
Parking lots, retention ponds, I-287

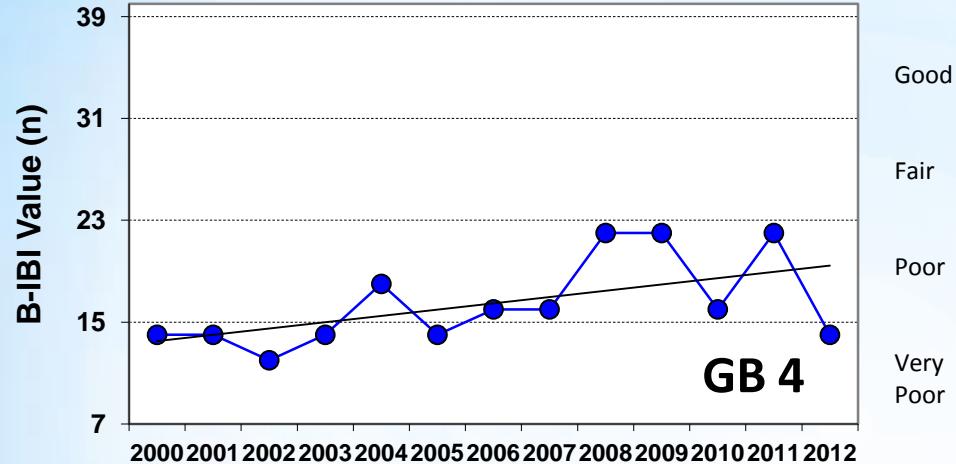
* GB4



* GB4

Office complex
Parking lots, retention ponds, I-287





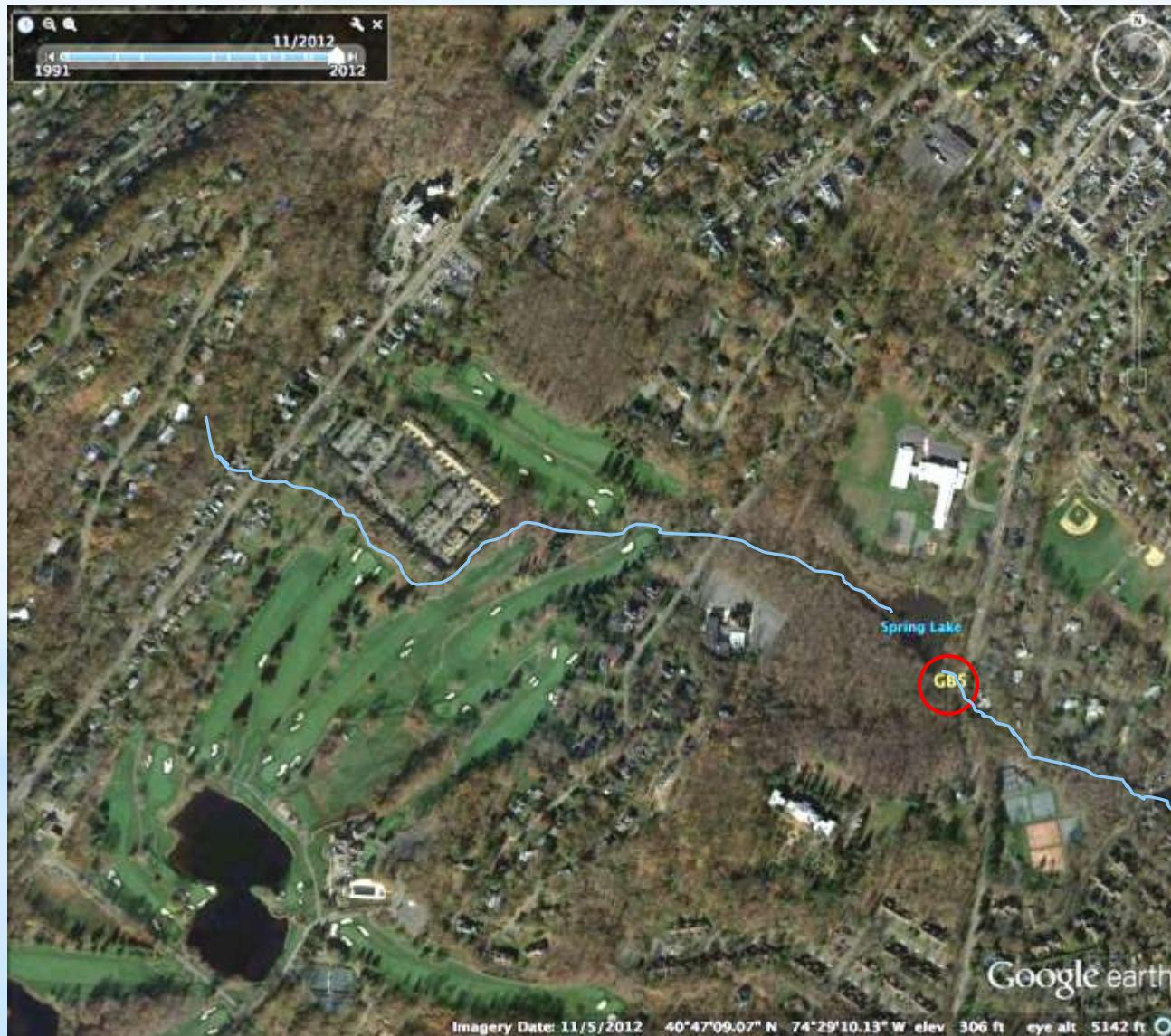
* GB4

Poor substrate,
High TDS & silt,
2012: 8 fewer Spp



*GB5

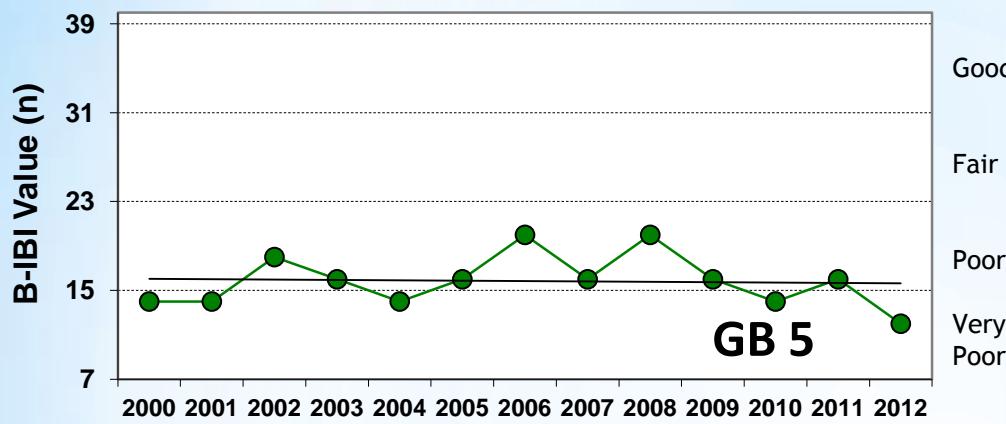
James Street, Foote's Pond
Eutrophic, silty
Golf course upstream



*GB5

James Street, Foote's Pond
Eutrophic, silty
Golf course upstream





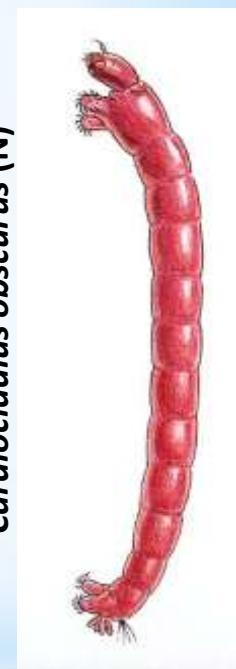
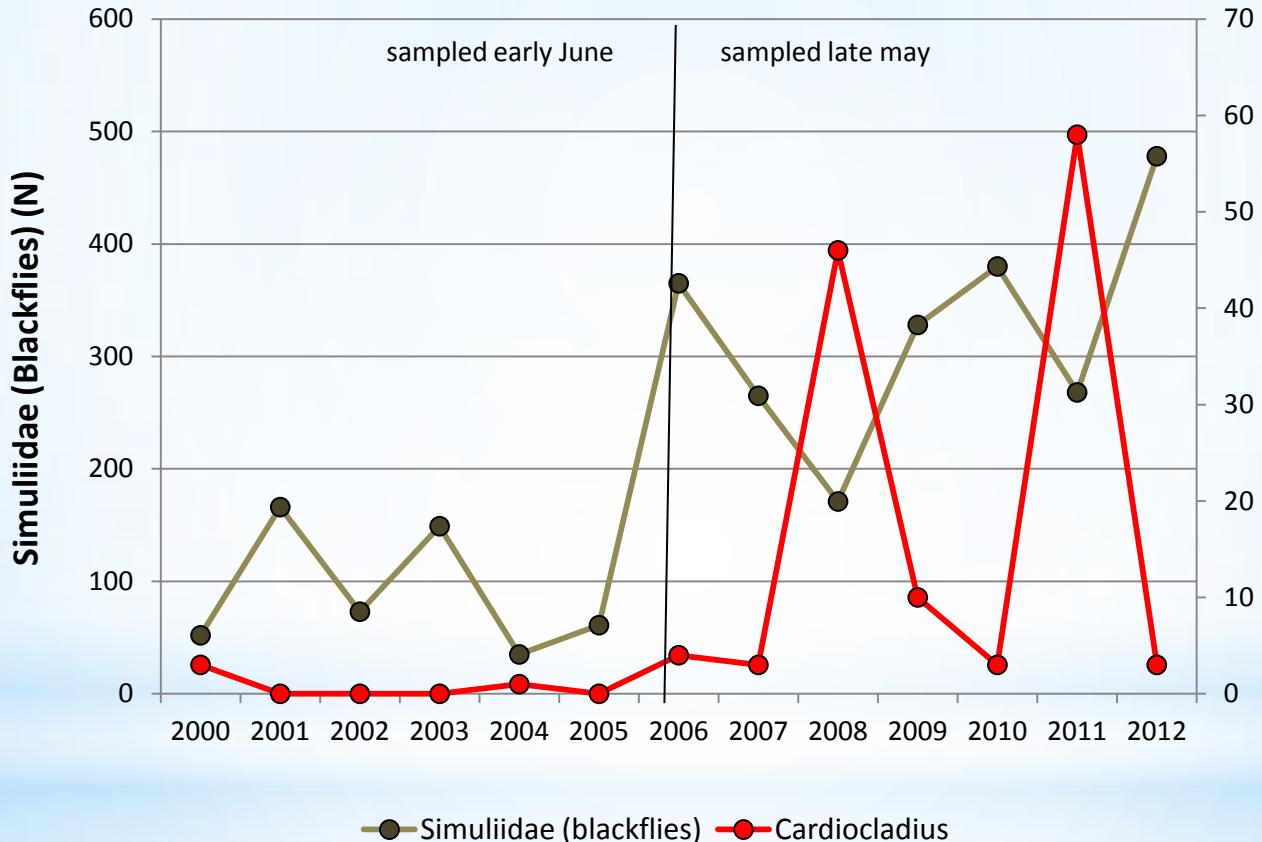
* GB5

Temperature high,
Low DO,
Thick silt & algae
cover substrate



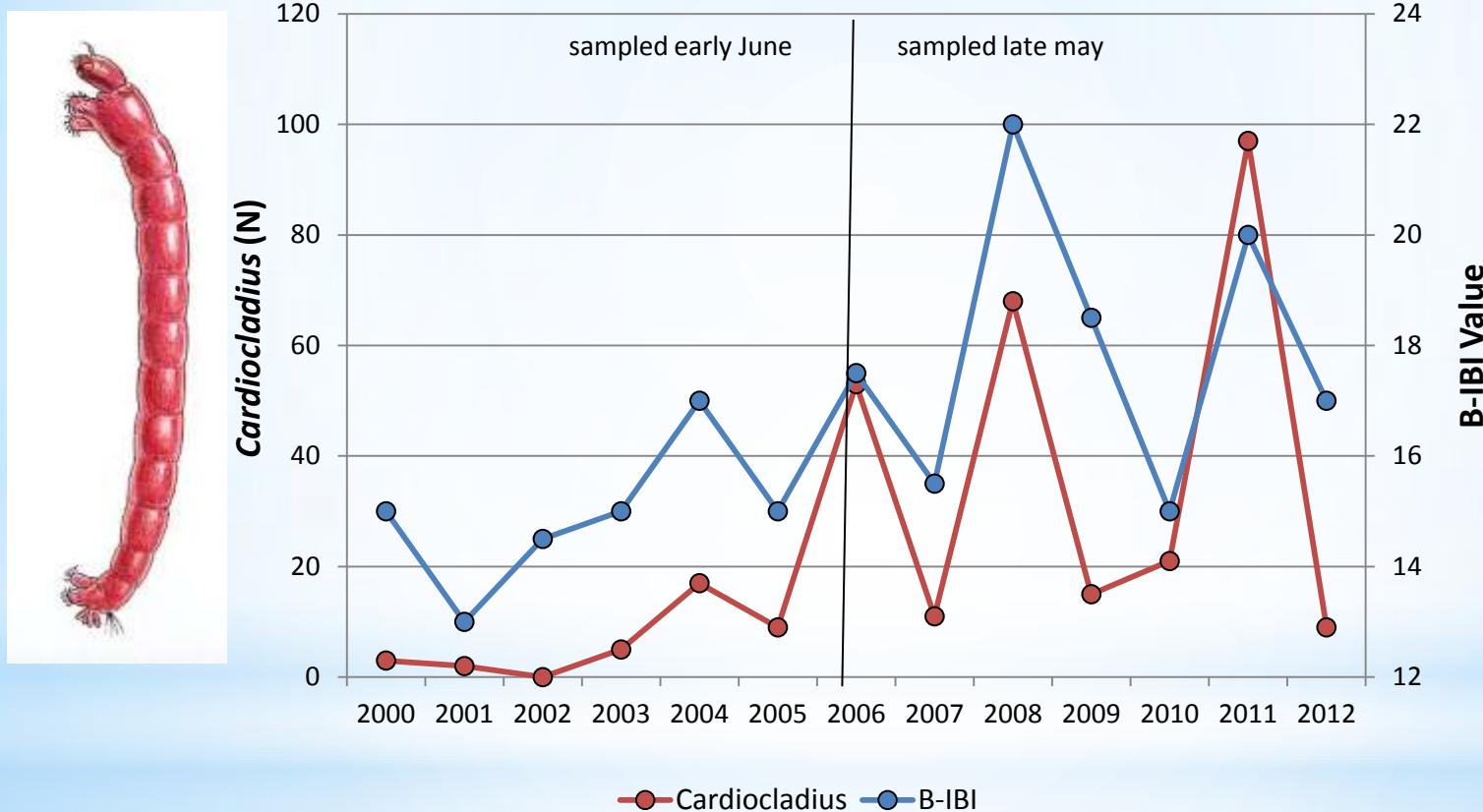
Great Brook, 2000-2012

Simuliidae vs *Cardiocladus obscurus*

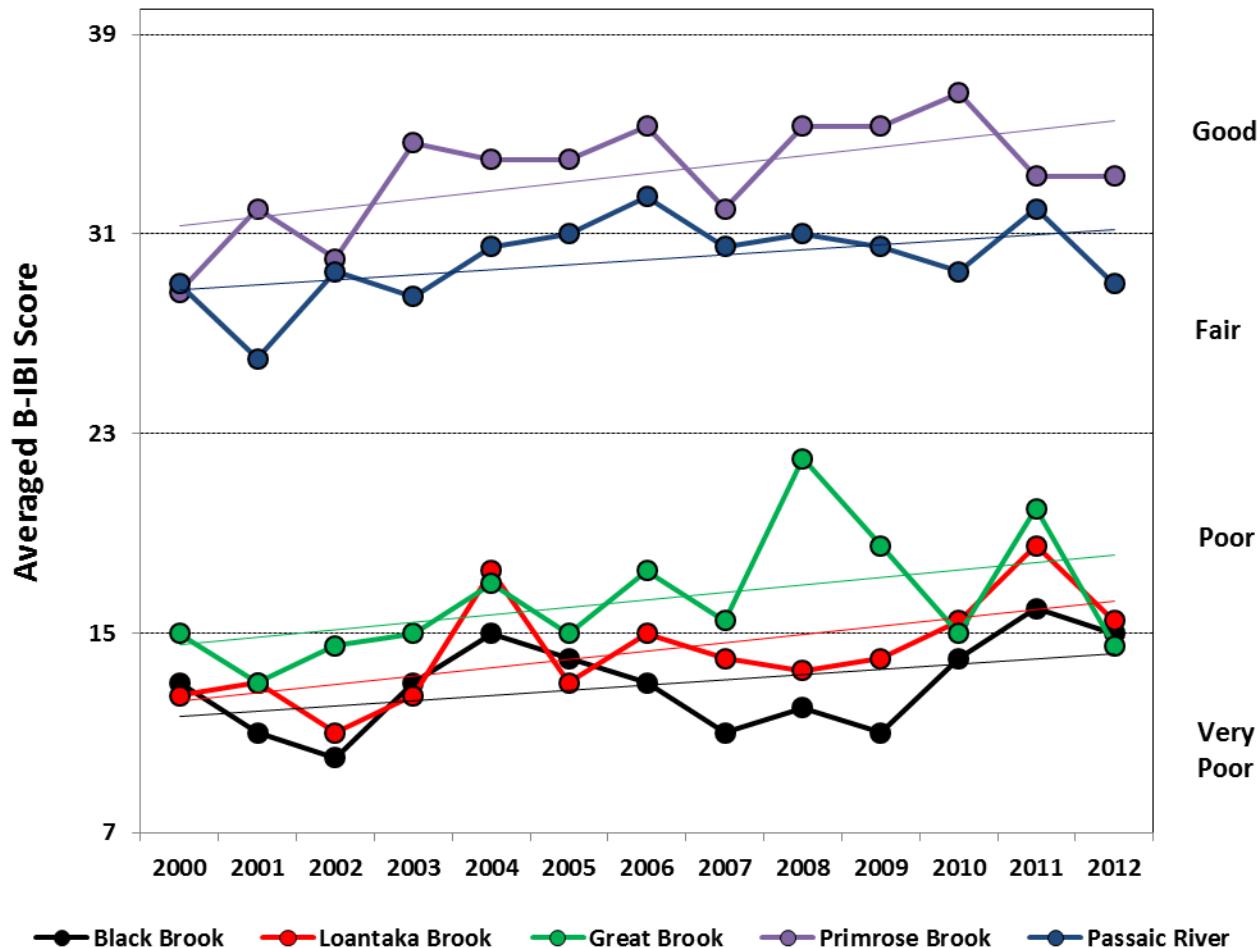


Great Brook , 2000-2012

Great Brook B-IBI vs *Cardiocladus obscurus*

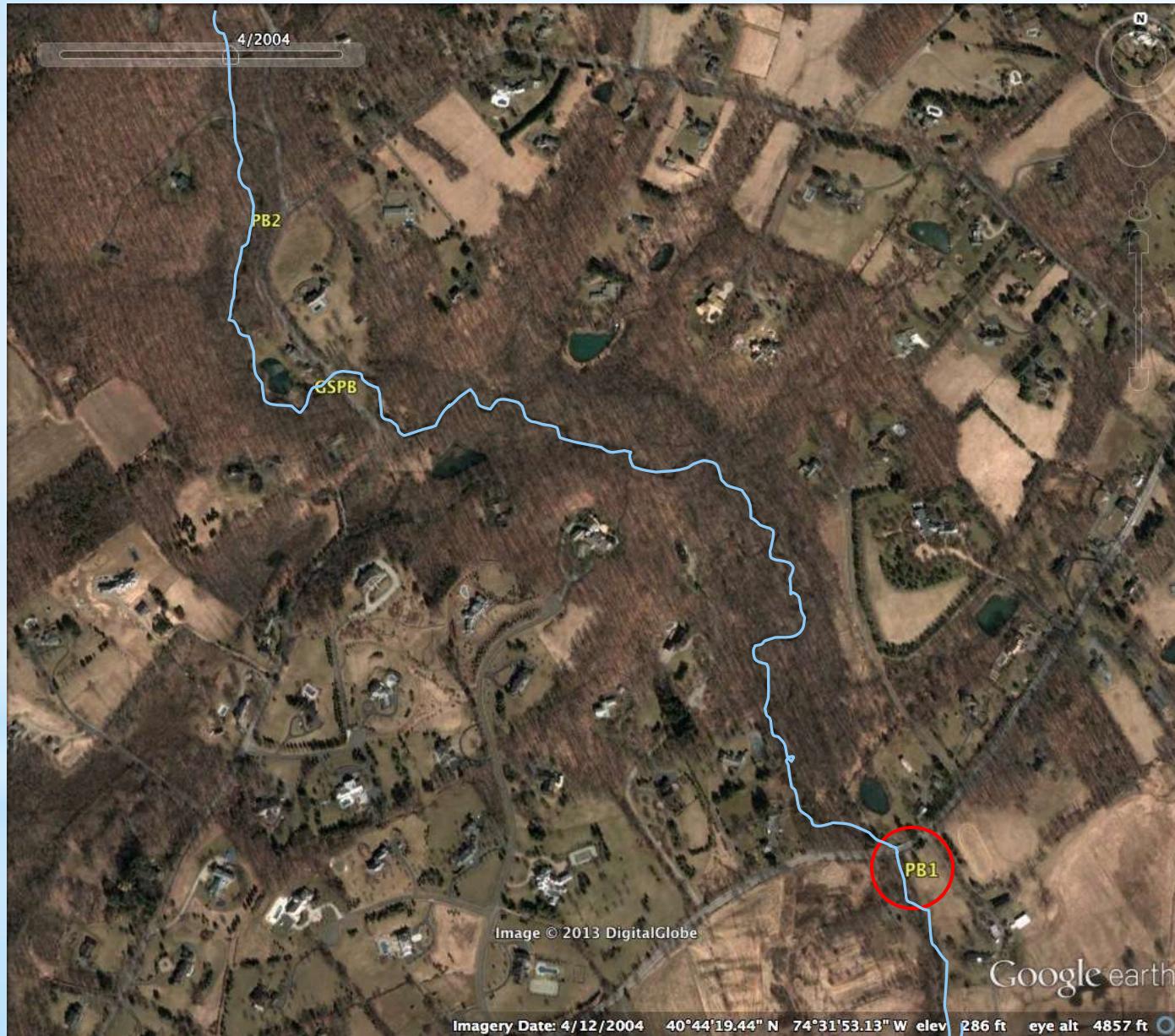


Great Swamp Watershed Streams Averaged Annual B-IBI Scores, 2000-2012



Lee's Hill Road

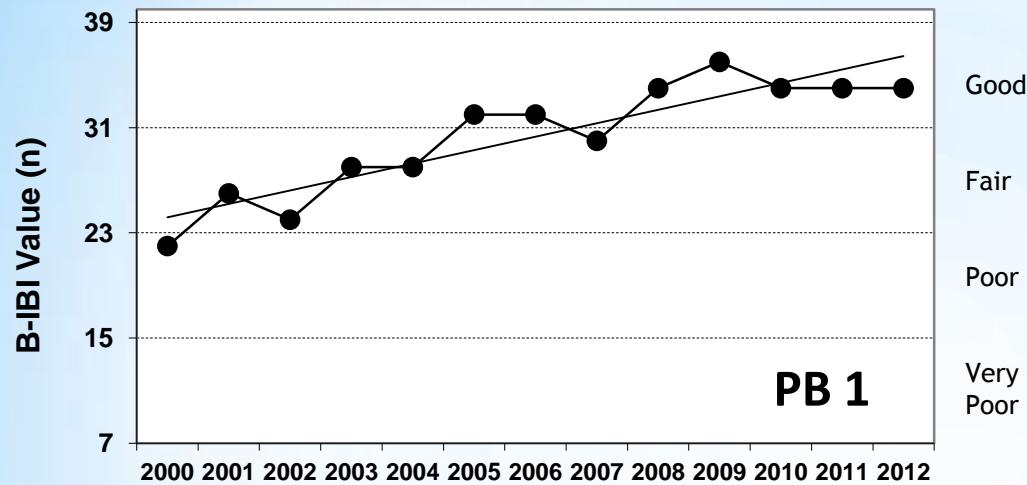
* PB1



*PB1

Lee's Hill Road





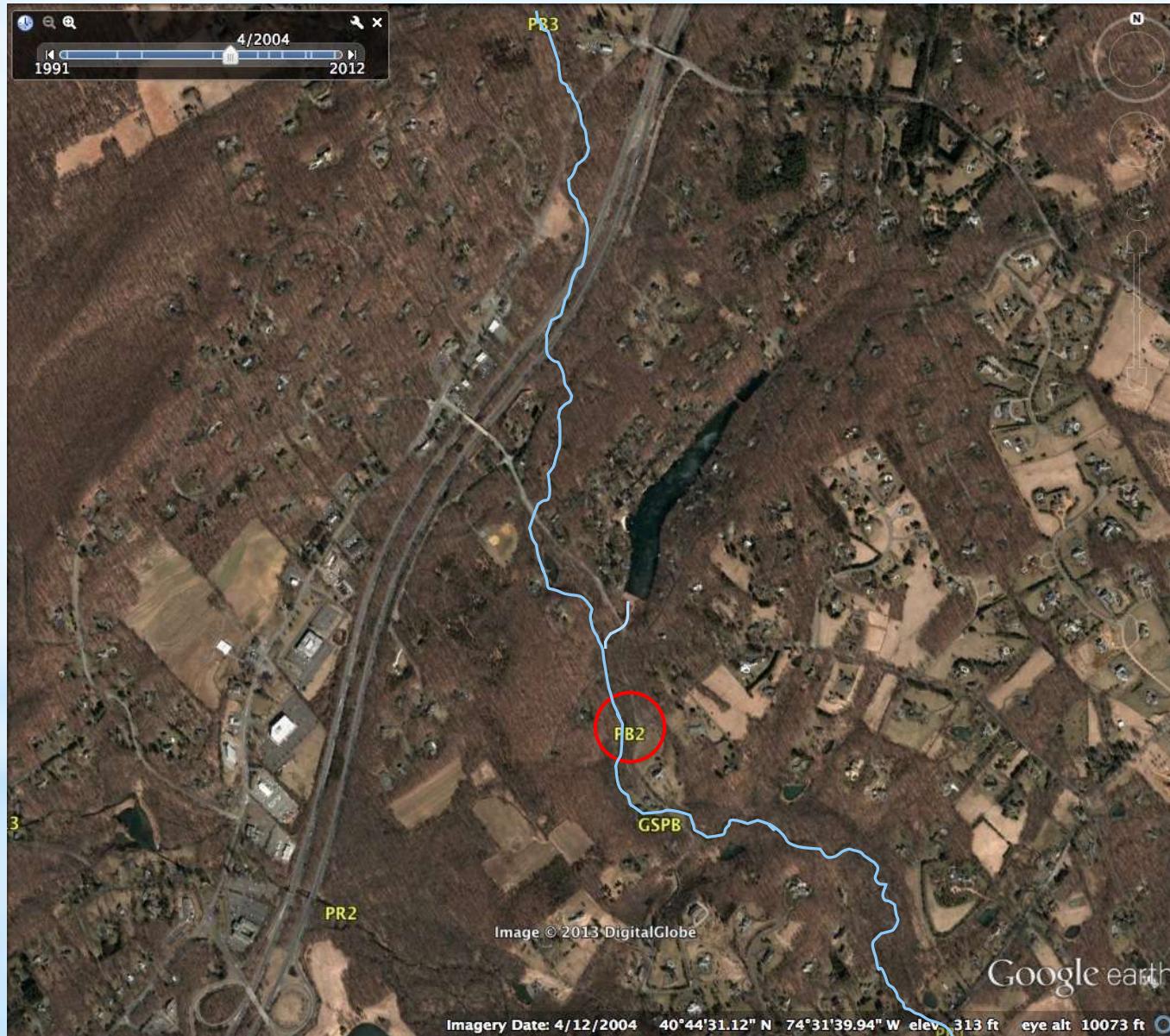
* **PB 1**

Good substrate
Some sedimentation



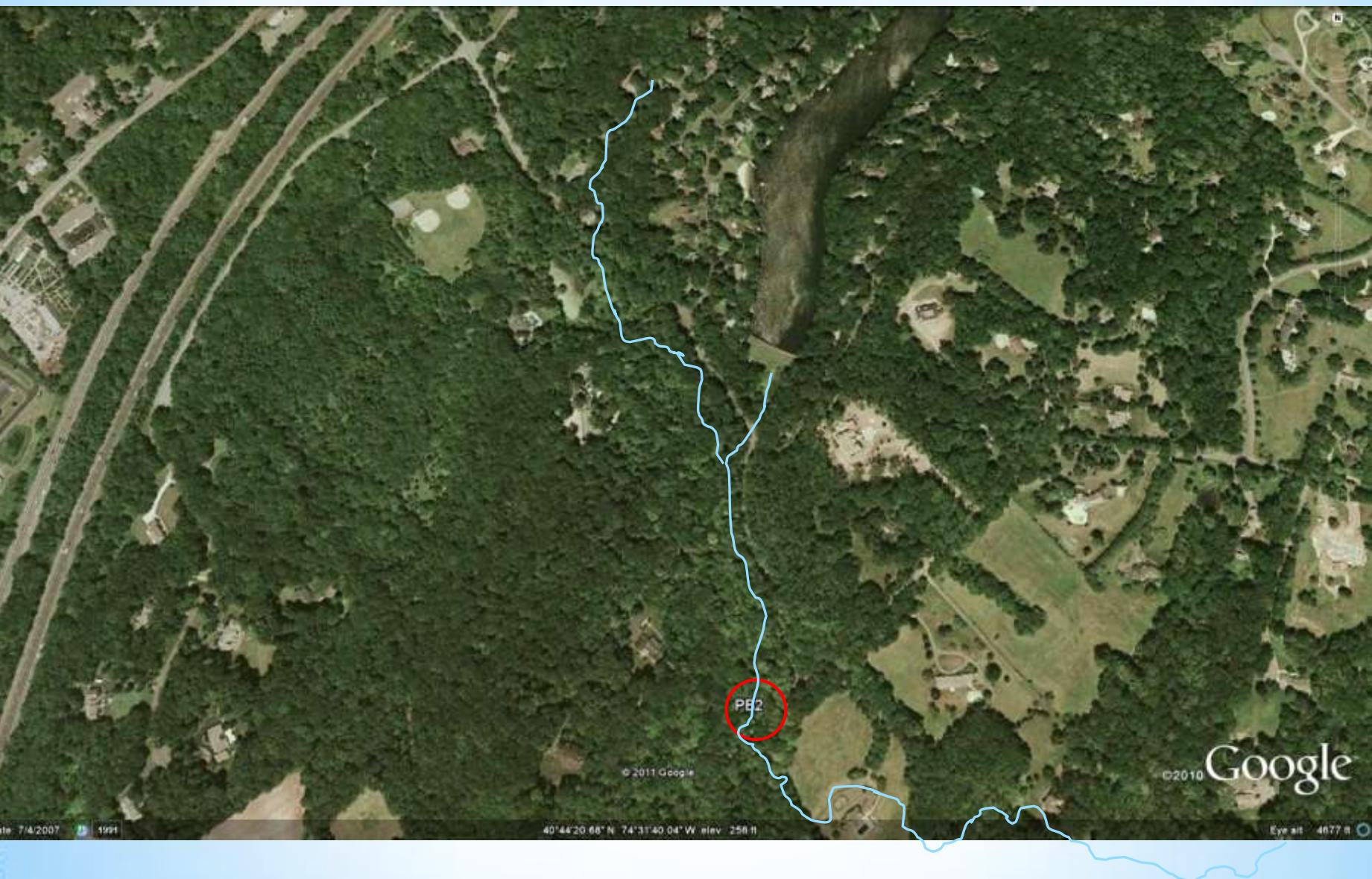
Opposite Youngs Road
Good canopy cover
Mt Kemble influences?

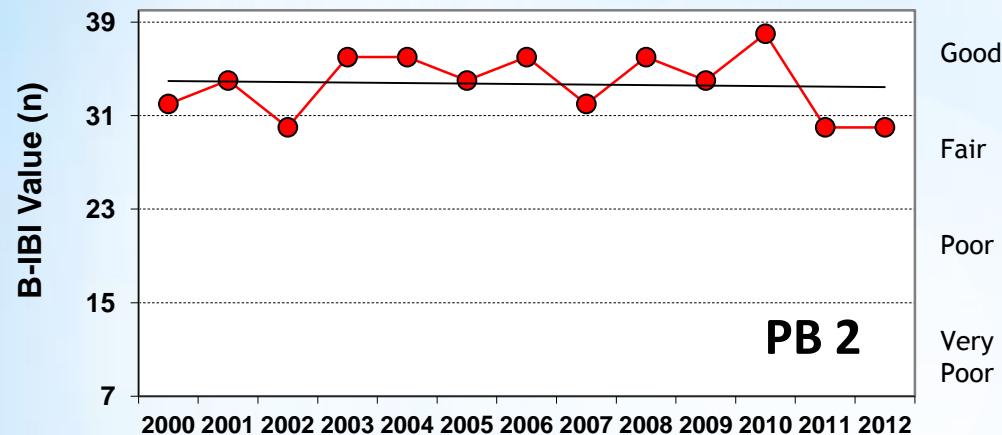
* PB2



Opposite Youngs Road
Good canopy cover
Mt Kemble influences?

* PB2





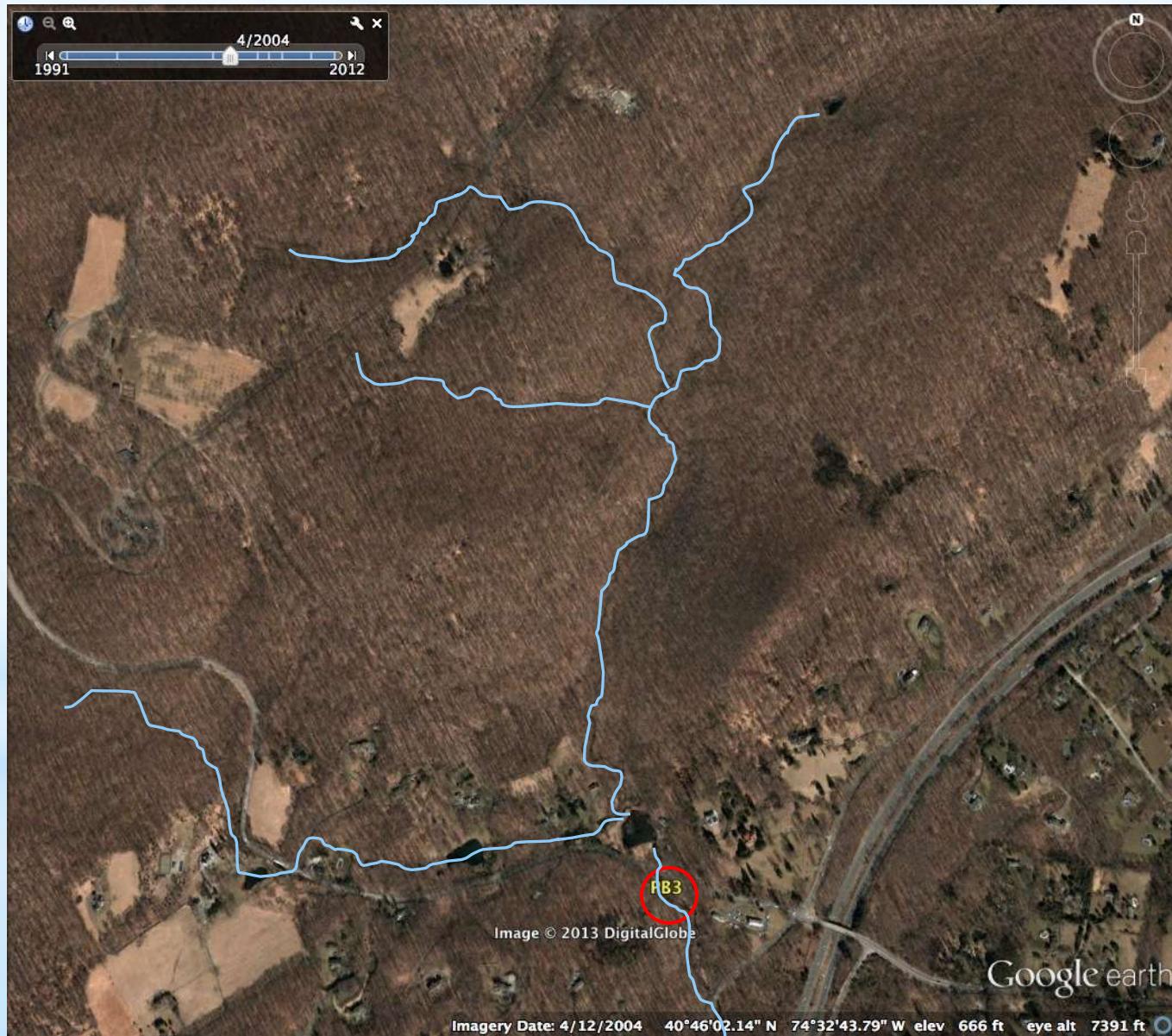
*PB2

Big 2011 drop in B-IBI
sustained in 2012



*PB3

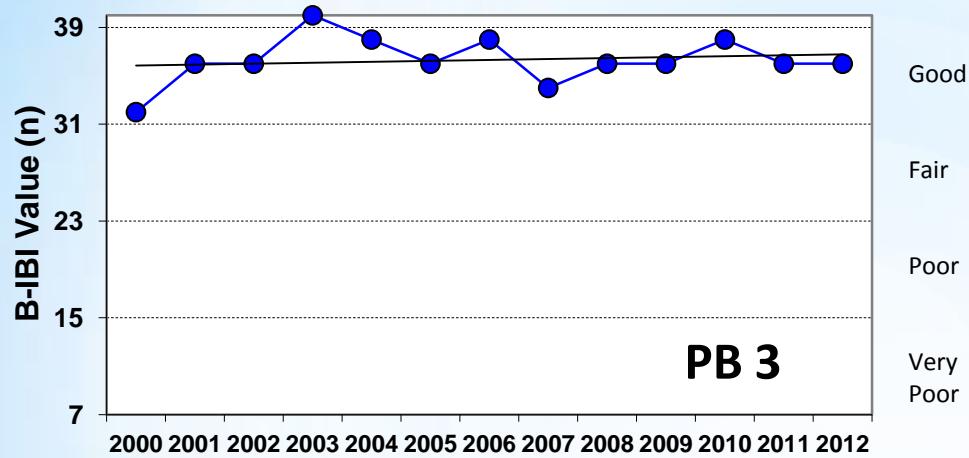
Tempe Wick Road Small impoundment upstream



*PB3

Tempe Wick Road
Small impoundment upstream





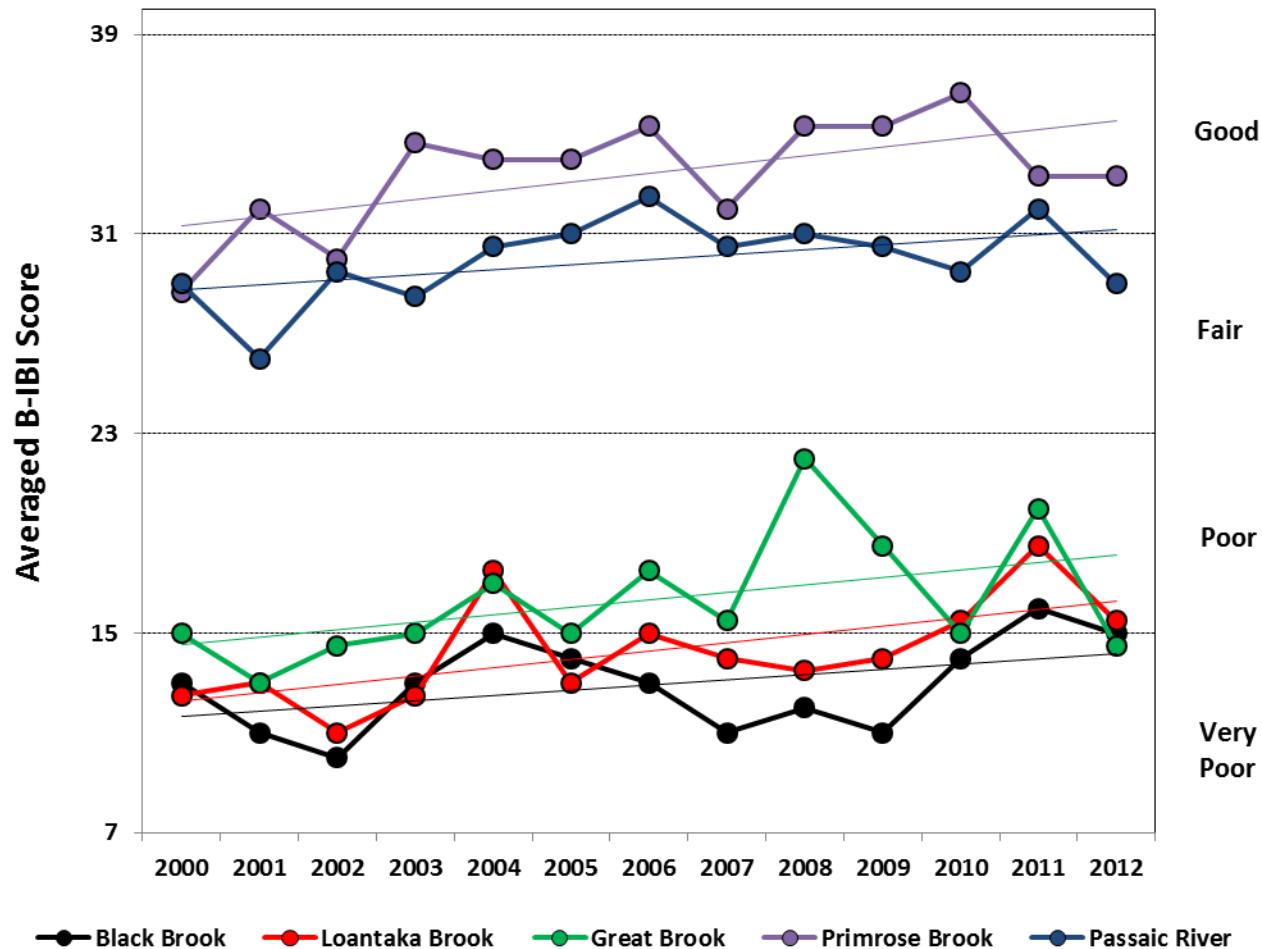
Good
Fair
Poor
Very Poor

*PB3

Ideal MIV habitat - Despite heavily traveled roadway

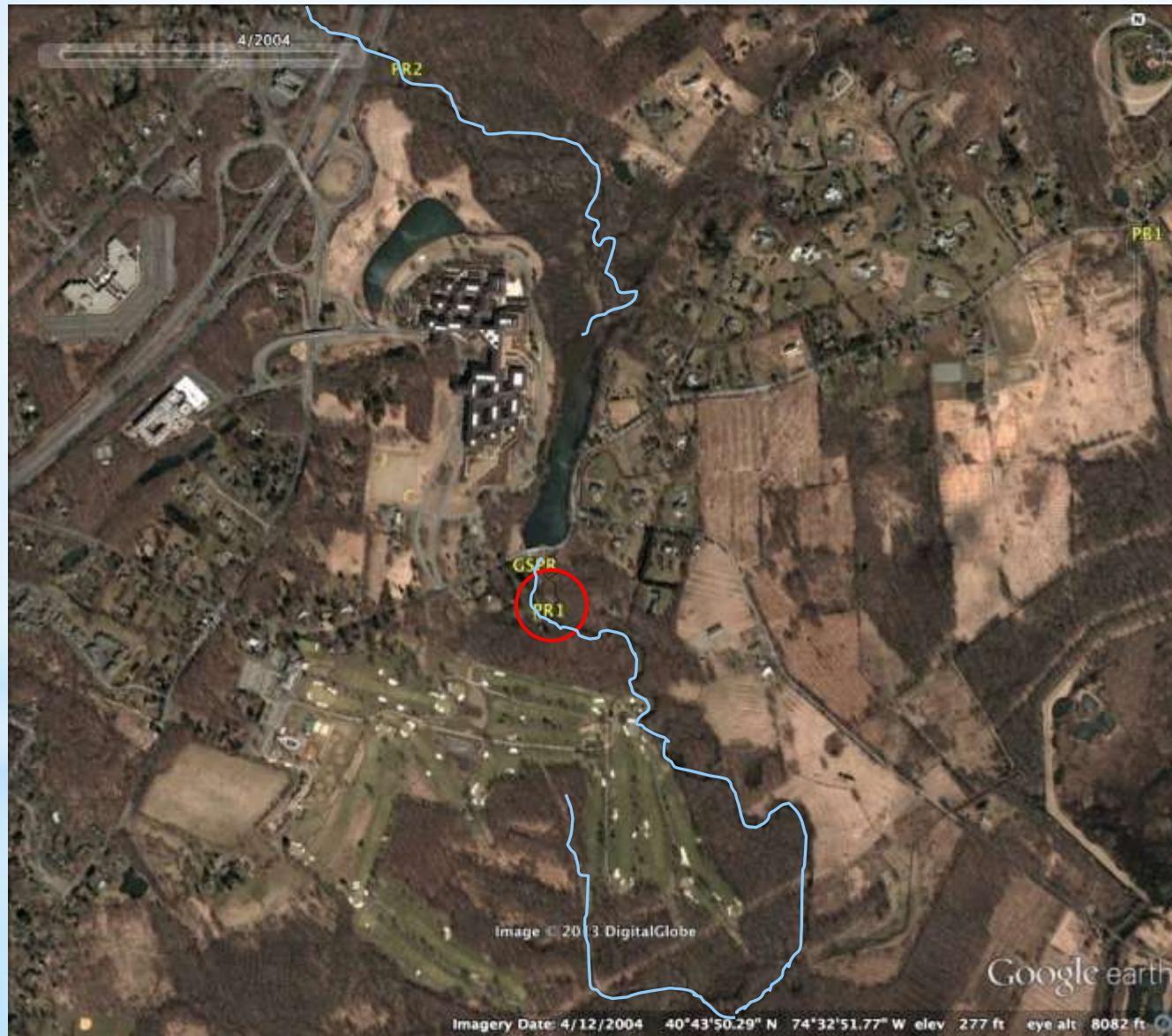


Great Swamp Watershed Streams Averaged Annual B-IBI Scores, 2000-2012



* PR1

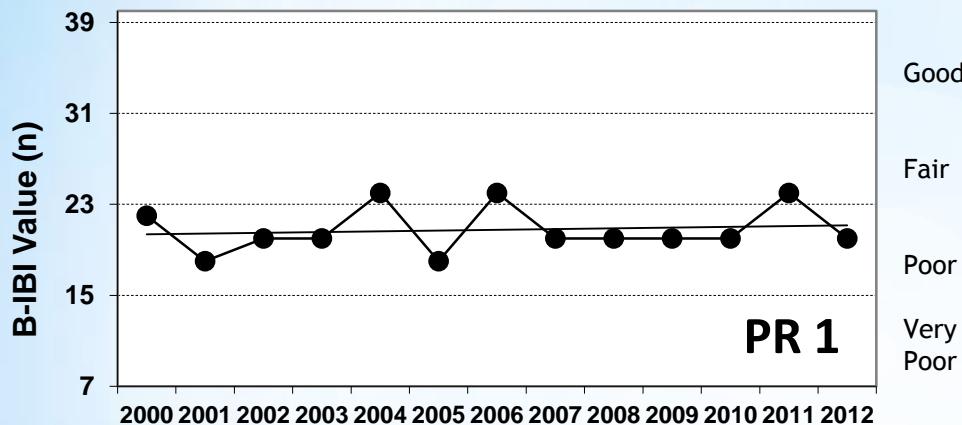
Below Osborn Pond
High temperature, eutrophication products from pond



* PR1

Below Osborn Pond
High temperature, eutrophication products from pond





* PR1

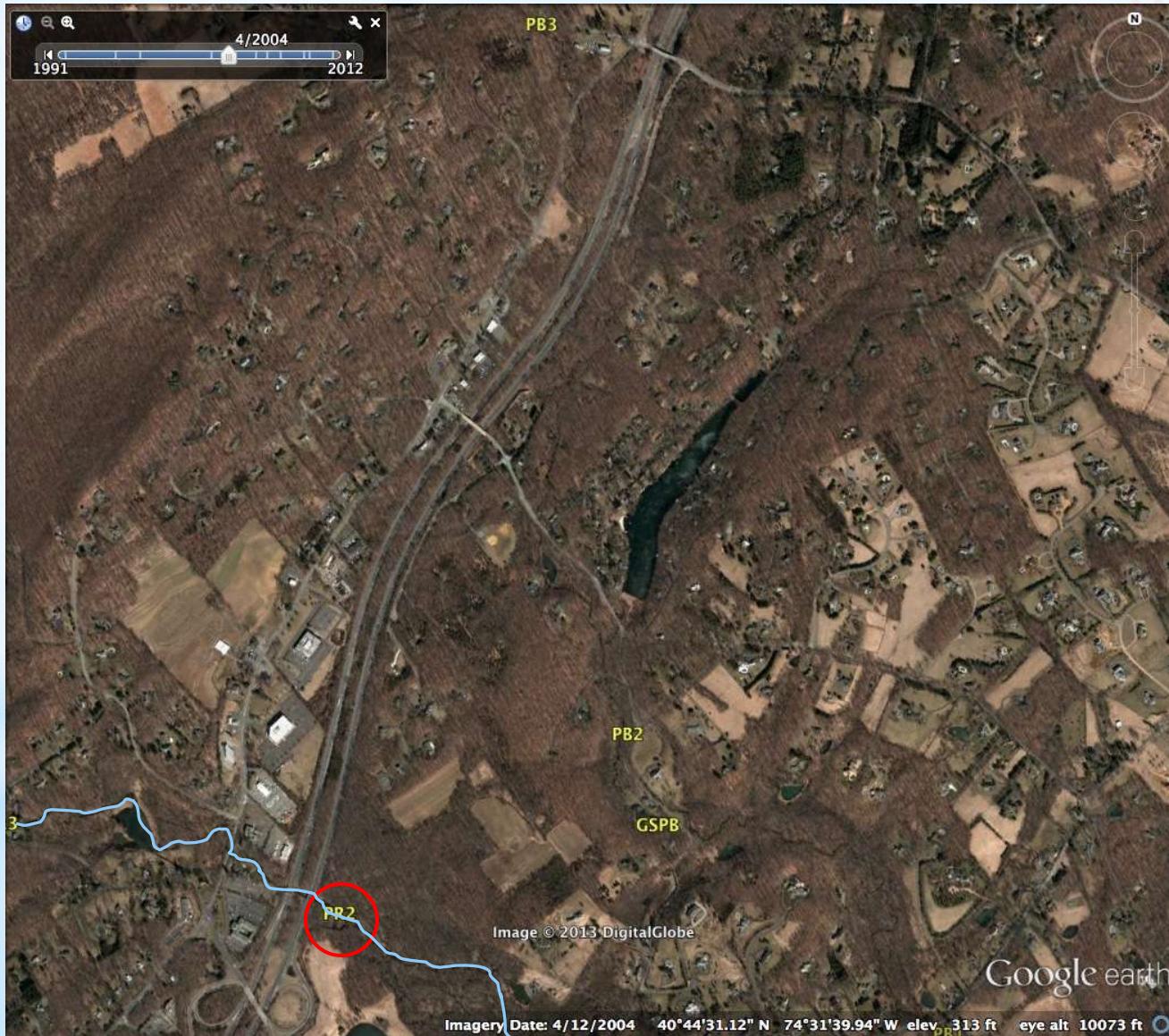


Limited substrate
Hydropsychids up
Cardiocladius down

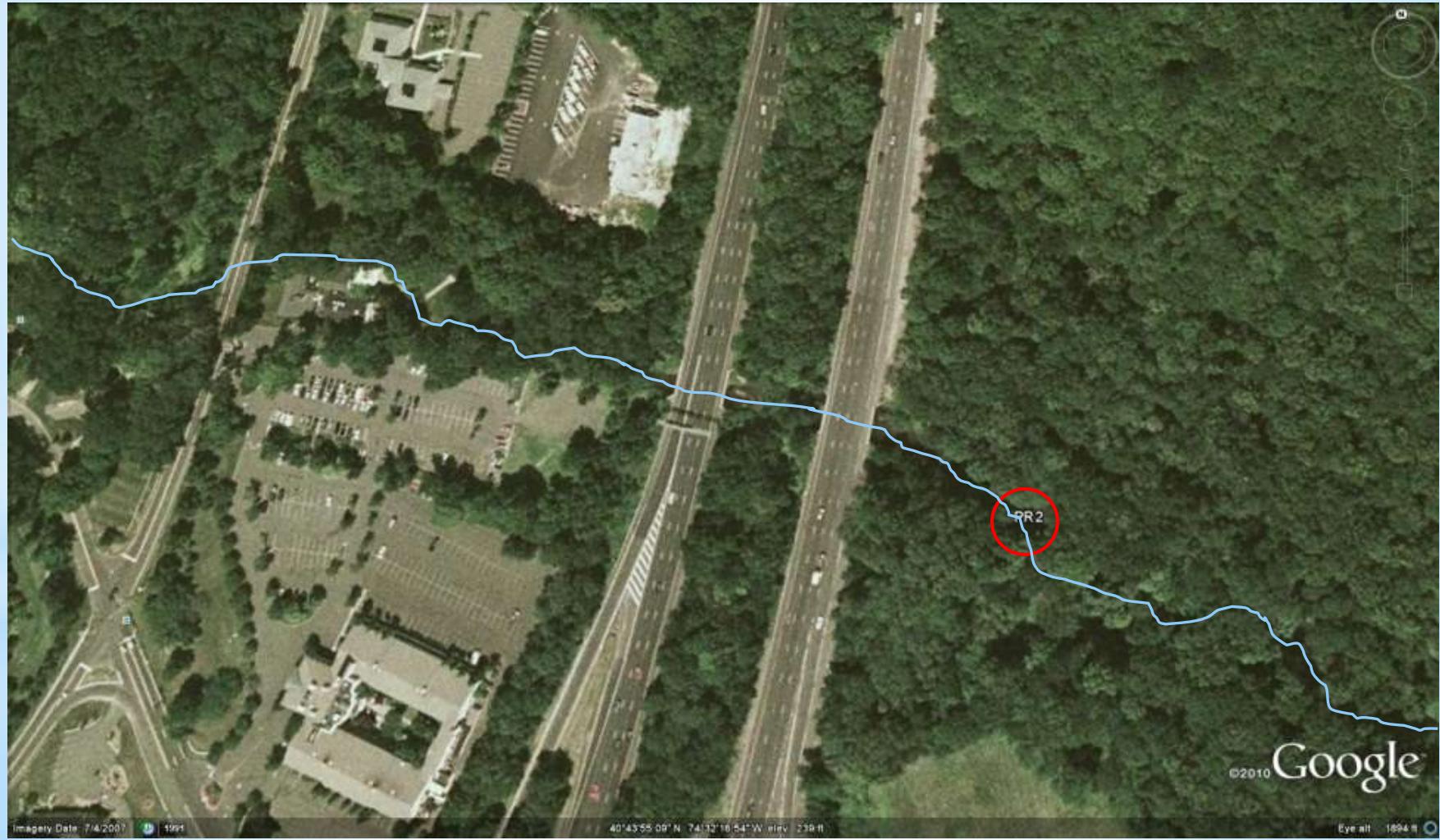


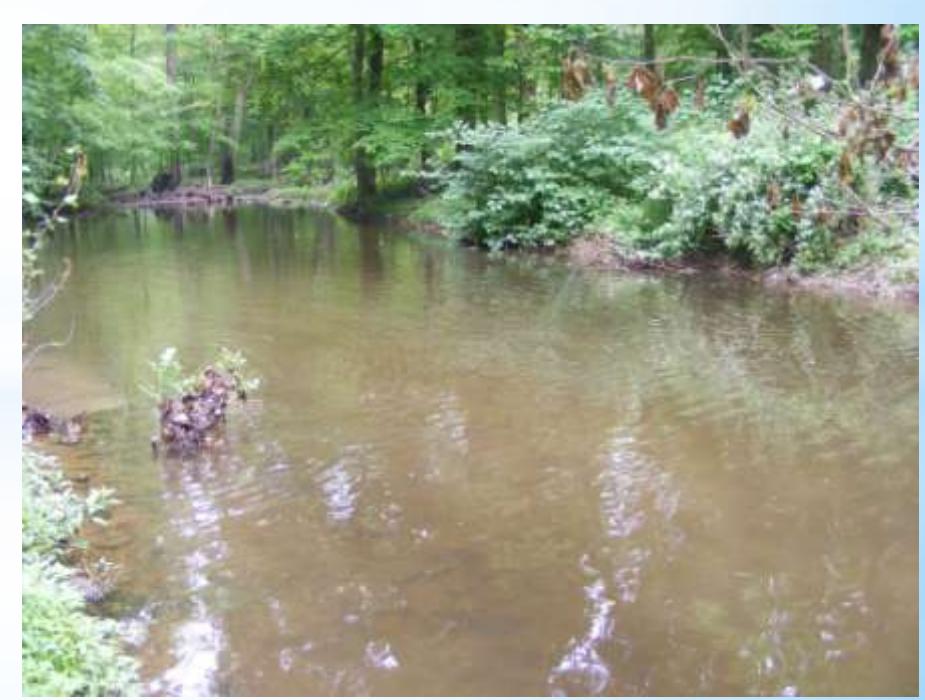
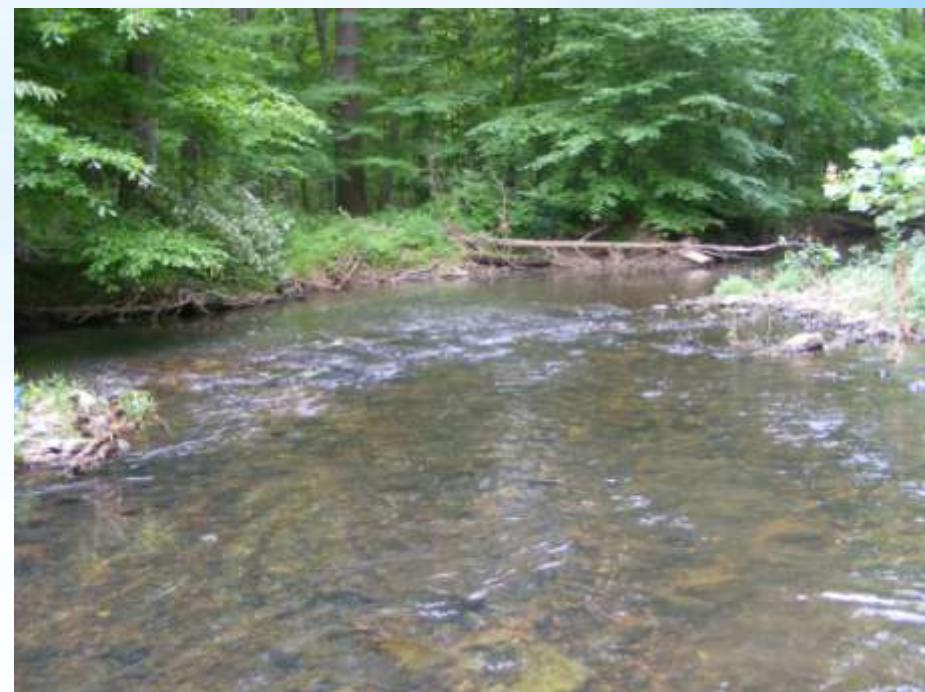
Below I-287
Flooding, sediments, highway debris

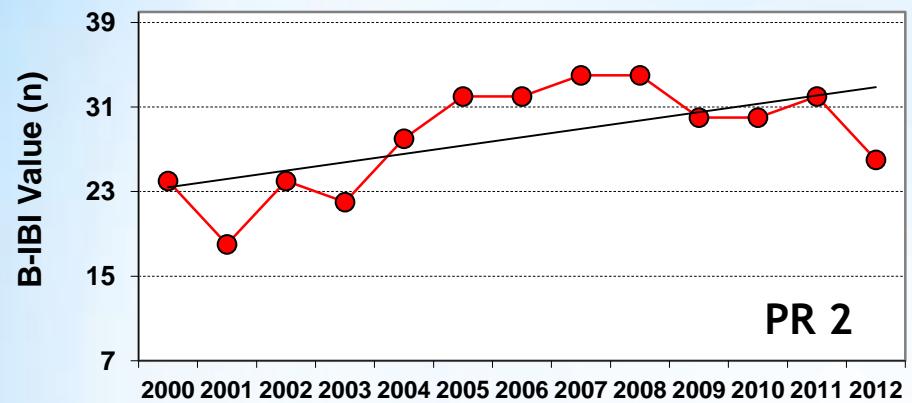
* PR2



Below I-287
Flooding, sediments, highway debris







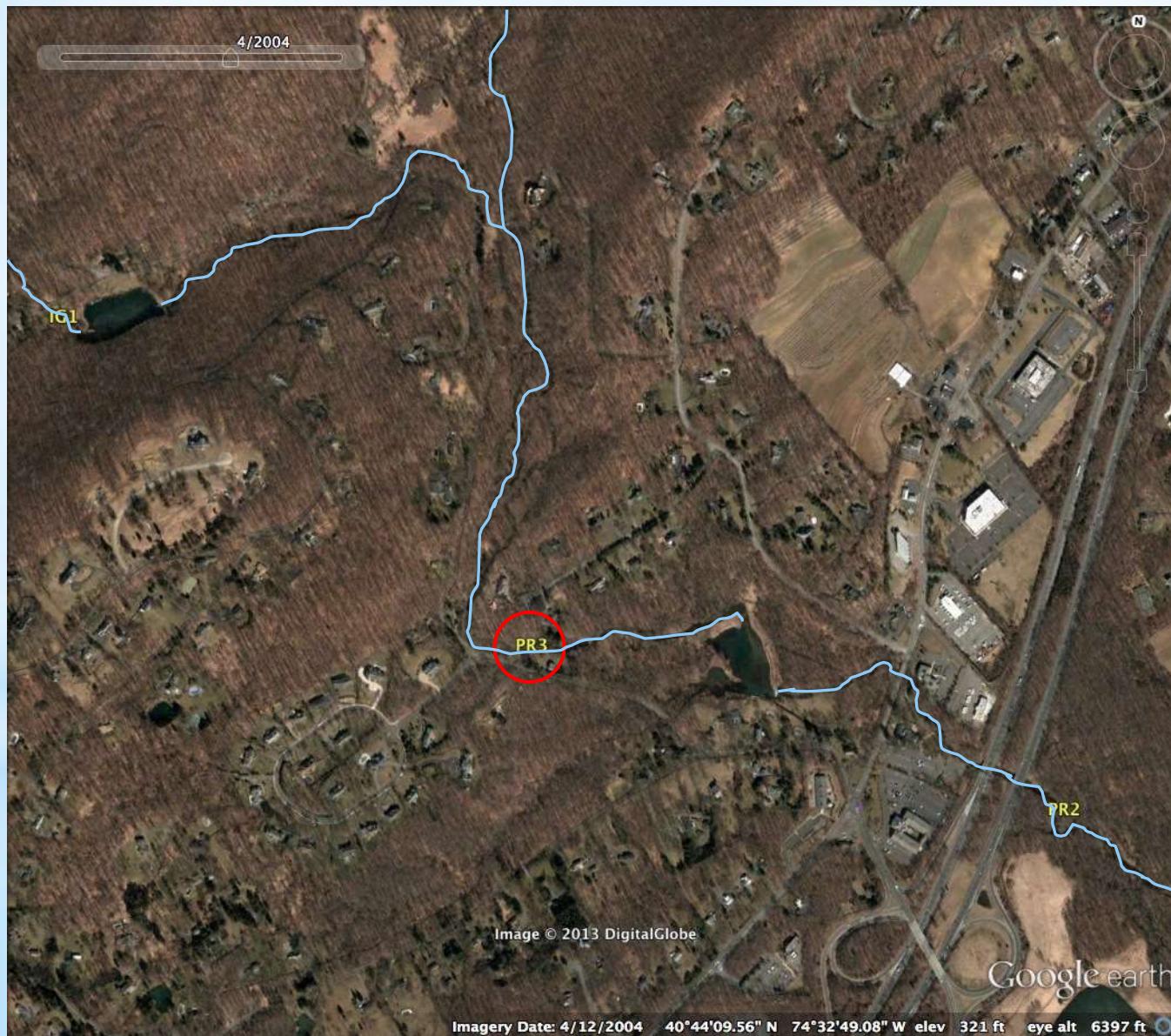
*PR2

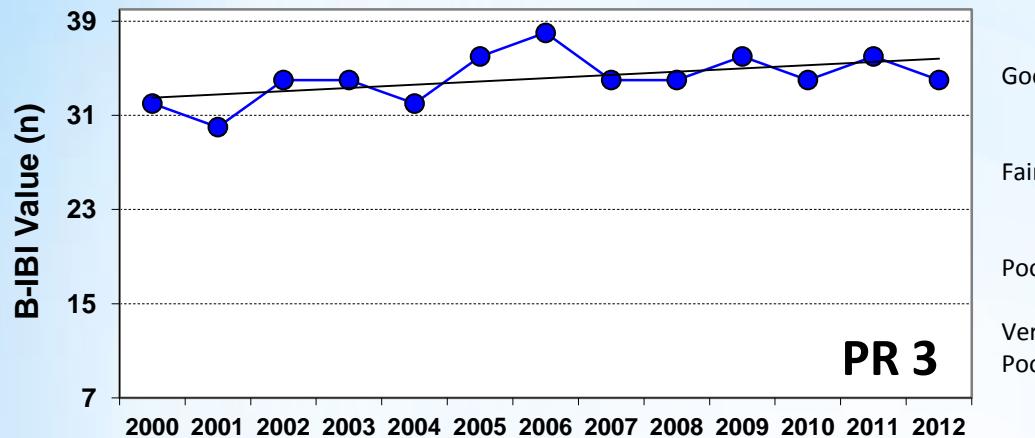
Entire rocky substrate blown out (by Irene?). New, less well endowed site downstream. Fewer Mayflies, Caddisflies.



*PR3

Hardscrabble Road Ideal habitat – close to roadway





Good
Fair
Poor
Very Poor

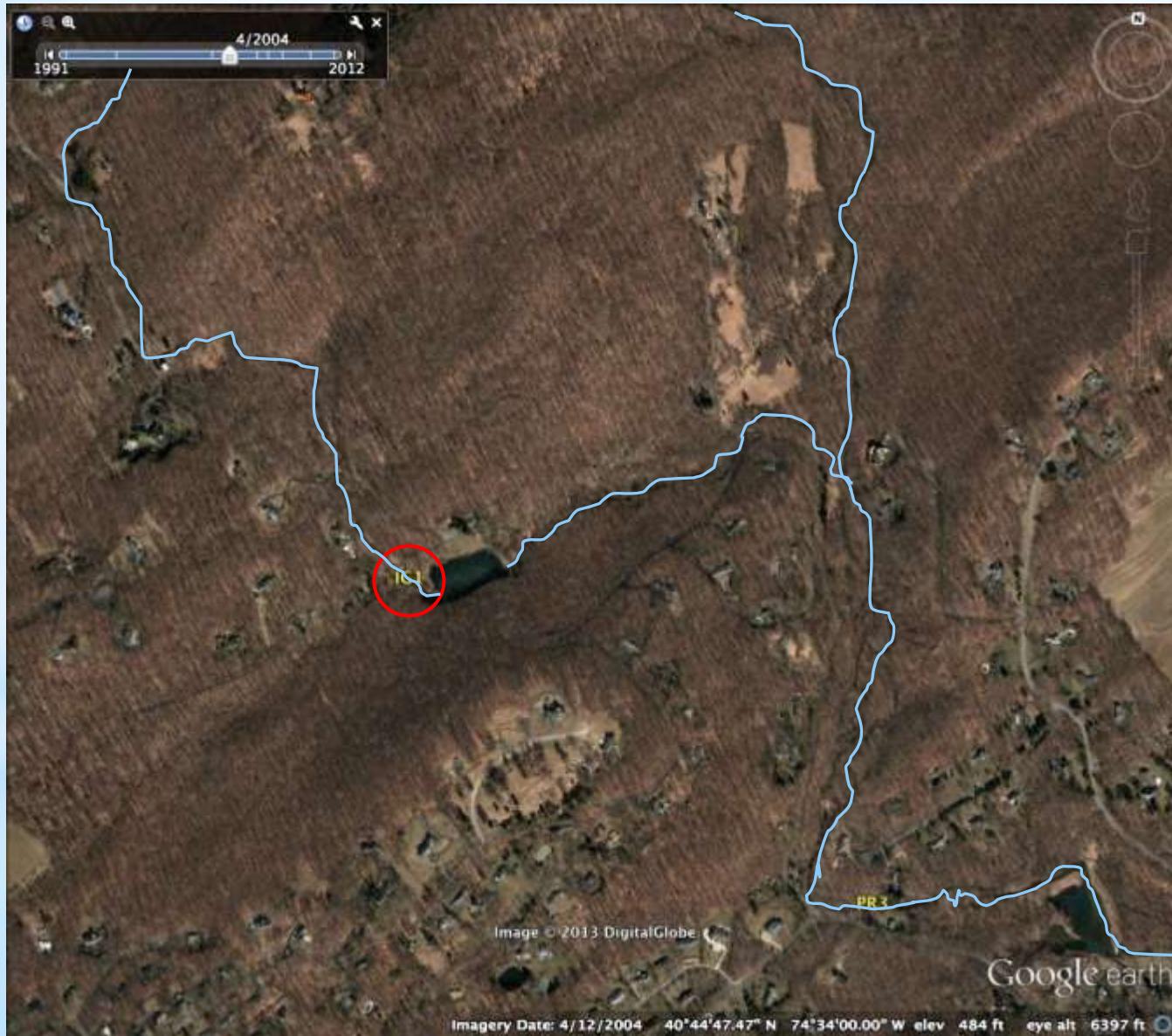
*PR3

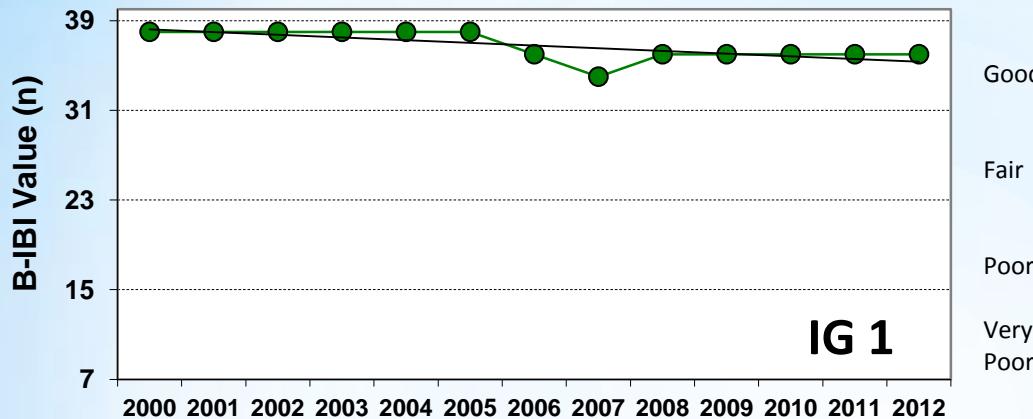
High MIV diversity;
low density



Upper Passaic tributary
“Reference” site

*IG1





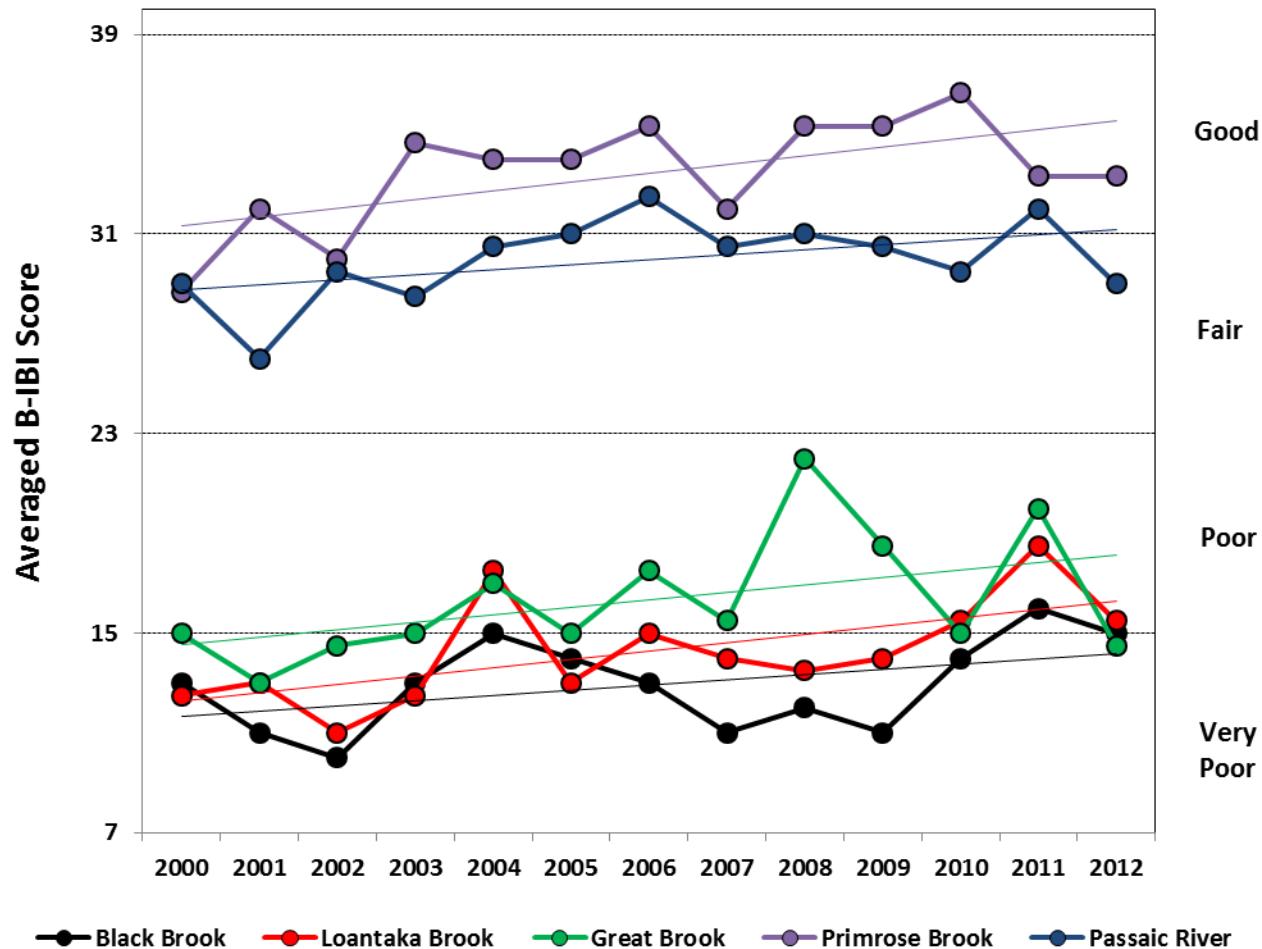
Good
Fair
Poor
Very
Poor

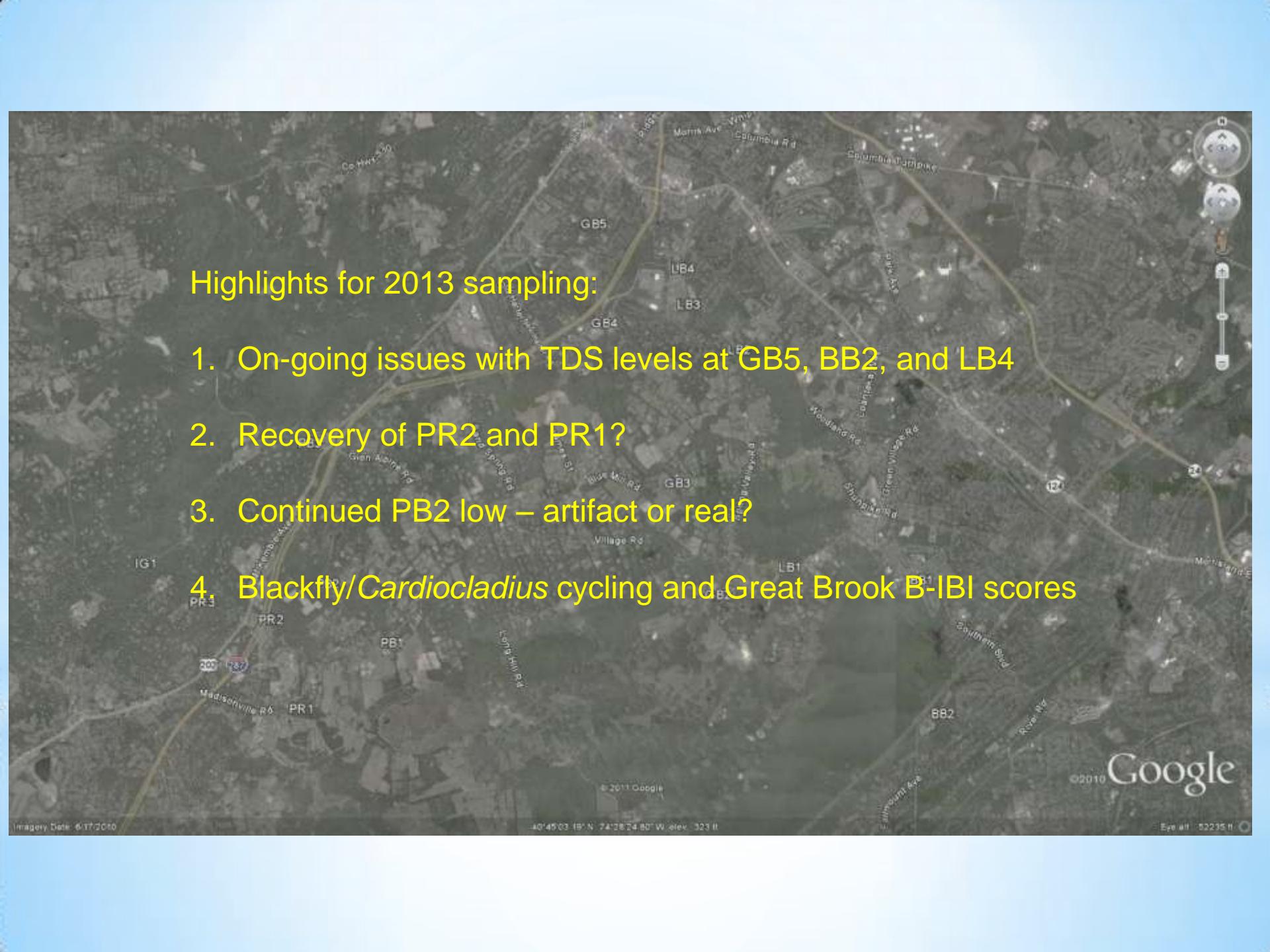
* IG1

Great habitat



Great Swamp Watershed Streams Averaged Annual B-IBI Scores, 2000-2012





Highlights for 2013 sampling:

1. On-going issues with TDS levels at GB5, BB2, and LB4
2. Recovery of PR2 and PR1?
3. Continued PB2 low – artifact or real?
4. Blackfly/*Cardiocladius* cycling and Great Brook B-IBI scores