Macroinvertebrate Monitoring Sites in the Great Swamp Watershed
Northern New Jersey
Average Monthly Temperature (°F)

Northern New Jersey
Monthly Precipitation (inches)

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

Source: http://climate.rutgers.edu/stateclim_v1/data/north_njhistprecip.html
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Fig. 03-4 Great Swamp Streams
Bimonthly pH, 2003

- pH (units)

- BB1, BB2, LB1, LB2, LB3, LB4, GB2, GB3, GB4, GB5, PB1, PB2, PB3, PR1, PR2, PR3, IG1

- Jan, Mar, May, July, Sept, Nov
Table 12-1. Great Swamp Watershed, May 25, 2012. Habitat Assessment

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

Total Dissolved Substances (ppm)

- Jan
- Mar
- May
- July
- Sept
- Nov
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
Calculating the Benthic Index of Biological Integrity  B-IBI

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<th>RB1</th>
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High Stress Level  Low Stress Level

- Dominance: 5 (5) 3 (5) 3 (5)
- Taxa: 5 (5) 5 (5) 5 (5)
- %Predators: 3 (1) 5 (5) 3 (5)
- Ind Intolerant: 3 (3) 3 (3) 5 (5)
- #Ephem: 3 (3) 3 (3) 5 (5)
- #Trich: 5 (3) 5 (5) 3 (5)
- #Plec: 1 (1) 3 (3) 3 (3)
- Ind Tolerant: 3 (3) 3 (3) 3 (3)
Great Swamp Streams
B-IBI Summer, 2012 vs Summer, 2011

good

fair

poor

very poor

BB1 BB2 LB1 LB2 LB3 LB4 GB2 GB3 GB4 GB5 PB1 PB2 PB3 PR1 PR2 PR3 IG1

- 2012
- 2011
Great Swamp Streams
Summer 2012, Mean +/- STD (2000-2012)
Great Swamp Watershed Streams
Averaged Annual B-IBI Scores, 2000-2012

Averaged B-IBI Score


Black Brook  Loantaka Brook  Great Brook  Primrose Brook  Passaic River
Southern Boulevard, Chatham Township
Golf course; heavily traveled roadway
Southern Boulevard, Chatham Township
Golf course; heavily traveled roadway
**BB 1**

Small, slow flow
High temperature, oil films
Drainage channel, STP
**BB2**

Sandy, poor substrate
High TDS (> NJS)
Great Swamp Watershed Streams
Averaged Annual B-IBI Scores, 2000-2012

- Good
- Fair
- Poor
- Very Poor

Averaged B-IBI Score


- Black Brook
- Loantaka Brook
- Great Brook
- Primrose Brook
- Passaic River
GSWA monitoring site
High turbidity, sediments
Diluted but high TDS
GSWA monitoring site
High turbidity, sediments
Diluted but high TDS
*LB1*

Limited substrate

B-I BI Value (n)

- Good
- Fair
- Poor
- Very Poor

Graph showing B-I BI Value (n) from 2000 to 2012 with LB1 highlighted.
Bank erosion
Eutrophic Kitchell Pond
**LB2**

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

- Good
- Fair
- Poor
- Very Poor
Morris Township STP
Strong chemical smell
High TDS
*LB3

Very limited substrate - shifting sands, TDS = 701 mg/L; >>NJS
Fanok Road municipal pool
Channelized ditch
Fanok Road municipal pool
Channelized ditch
Little MIV substrate,
TDS = 737 mg/L
>>NJS
Great Swamp Watershed Streams
Averaged Annual B-IBI Scores, 2000-2012

- Black Brook
- Loantaka Brook
- Great Brook
- Primrose Brook
- Passaic River
GSWA monitoring site
GSWA monitoring site
Sedimentation – but mussels
GB 2

Poor substrate diversity,
High turbidity –
silt bar expanding
Below Silver Lake
Below Silver Lake
**GB 3**

Good substrate

High temperature,

Very high turbidity –

silt & debris

---

B-IBI Value (n)

Good

Fair

Poor

Very Poor

*
Office complex
Parking lots, retention ponds, I-287
Office complex
Parking lots, retention ponds, I-287
GB4

Poor substrate, High TDS & silt, 2012: 8 fewer Spp
James Street, Footes Pond
Eutrophic, silty
Golf course upstream
James Street, Footes Pond
Eutrophic, silty
Golf course upstream
GB5

Temperature high, Low DO, Thick silt & algae cover substrate
Great Brook, 2000-2012
Simuliidae vs *Cardiocladius obscurus*

Simuliidae (Blackflies) (N)

Cardiocladius obscurus (N)

Simuliidae (blackflies) vs *Cardiocladius obscurus*
sampled early June vs sampled late may
Great Brook, 2000-2012
Great Brook B-IBI vs Cardiocladius obscurus

Cardiocladius (N)
sampled early June

B-IBI Value
sampled late may
Great Swamp Watershed Streams
Averaged Annual B-IBI Scores, 2000-2012

Averaged B-IBI Score

Good
Fair
Poor
Very Poor


- Black Brook
- Loantaka Brook
- Great Brook
- Primrose Brook
- Passaic River
Lee’s Hill Road
PB 1

- Good substrate
- Some sedimentation
Opposite Youngs Road
Good canopy cover
Mt Kemble influences?
Opposite Youngs Road
Good canopy cover
Mt Kemble influences?
PB2

Big 2011 drop in B-IBI sustained in 2012
Tempe Wick Road
Small impoundment upstream
Tempe Wick Road
Small impoundment upstream
PB 3

Ideal MIV habitat - Despite heavily traveled roadway
Great Swamp Watershed Streams
Averaged Annual B-IBI Scores, 2000-2012

Averaged B-IBI Score

- Good
- Fair
- Poor
- Very Poor

- Black Brook
- Loantaka Brook
- Great Brook
- Primrose Brook
- Passaic River

Graph showing averaged annual B-IBI scores from 2000 to 2012 for different streams in the Great Swamp Watershed.
Below Osborn Pond
High temperature, eutrophication products from pond
Below Osborn Pond
High temperature, eutrophication products from pond
Limited substrate
Hydropsychids up
Cardiocladius down

*PR1*
Below I-287
Flooding, sediments, highway debris
Below I-287
Flooding, sediments, highway debris
Entire rocky substrate blown out (by Irene?). New, less well endowed site downstream. Fewer Mayflies, Caddisflies.
Hardscrabble Road
Ideal habitat – close to roadway
**PR 3**

High MIV diversity; low density

B-IBI Value (n)

- Good
- Fair
- Poor
- Very Poor

*PR 3*
Upper Passaic tributary
“Reference” site
IG 1

Great habitat

*IG 1

B-IBI Value (n)

Good
Fair
Poor
Very Poor

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

- Good
- Fair
- Poor
- Very Poor

Averaged B-IBI Score

Black Brook, Loantaka Brook, Great Brook, Primrose Brook, Passaic River
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