

State of New Jersey
Jon S. Corzine, Governor

FISH IBI REPORT 2004 SAMPLING

Volume 2- Site Data Summaries



New Jersey Department of Environmental Protection
Lisa P. Jackson, Commissioner

January 2006



NJ Department of Environmental Protection
P.O. Box 427, Trenton, NJ 08625-0427

WATER MONITORING AND STANDARDS
Leslie J. McGeorge, Administrator

Bureau of Freshwater & Biological Monitoring
Alfred L. Korndoerfer, Jr., Chief

January 2006

FISH IBI REPORT 2004 SAMPLING

Volume 2- Site Data Summaries

Report Design By:
WILLIAM HONACHEFSKY, SECTION CHIEF

FIELD SUPERVISOR
Christina Faust

DATA REDUCTION AND GRAPHICS
John Vile
John Abatemarco

FISH IDENTIFICATIONS
John Vile and John Abatemarco
Confirmation by: Philadelphia Academy of Natural Sciences

FIELD COLLECTION STAFF
Christina Faust
John Abatemarco
Johannus Franken

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James Kurtenbach, U.S. EPA Region 2

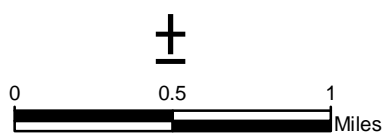
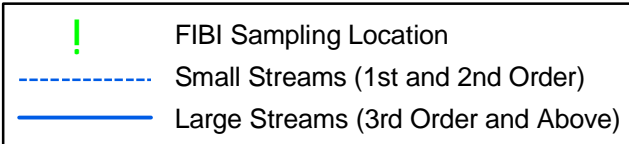
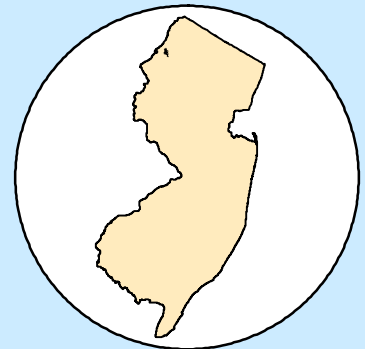
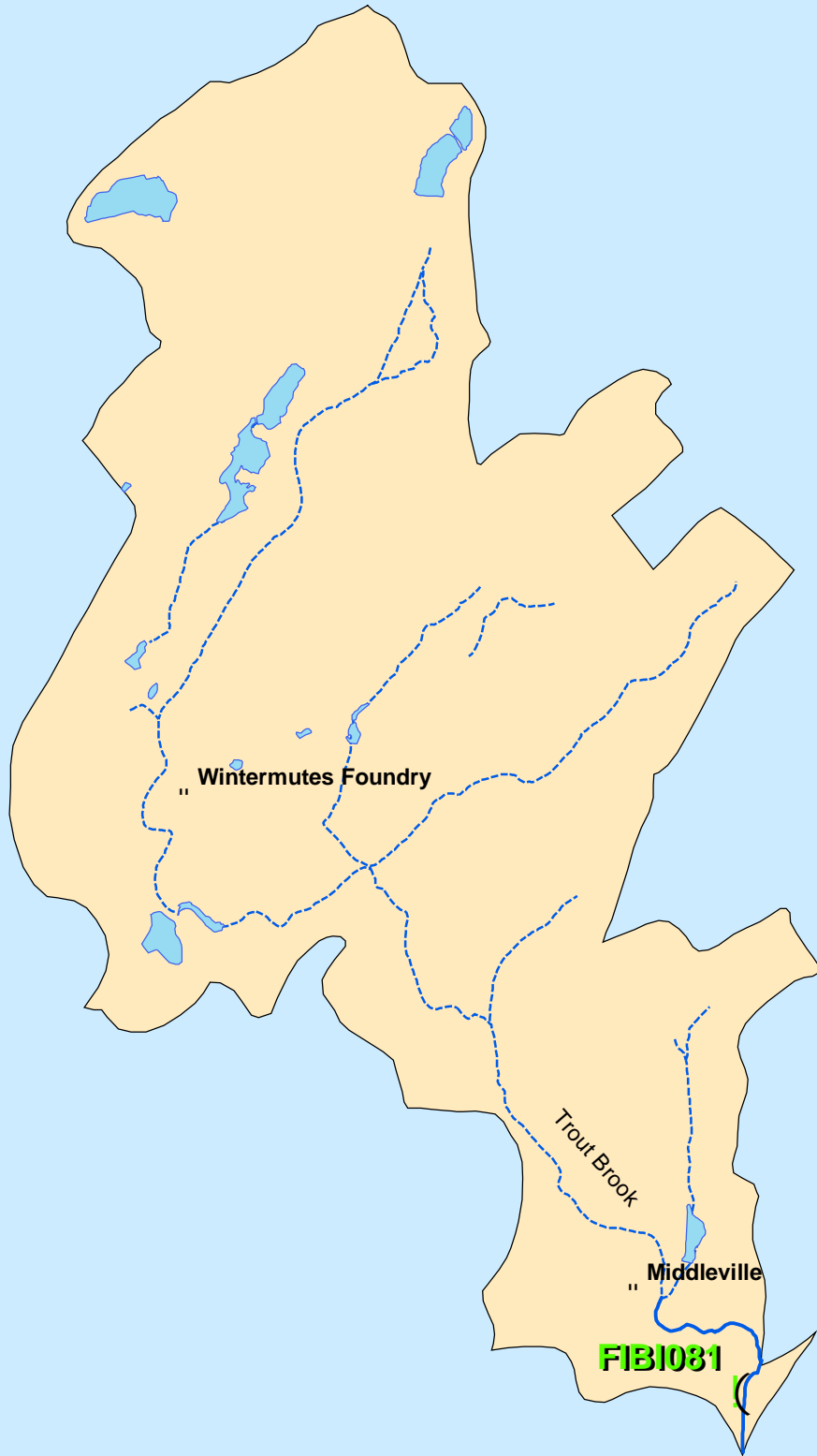
CONTENTS OF VOLUME 2

Volume 2 of the 2004 Fish IBI Report is the companion volume to Volume 1. Included in Volume 2 are individual site location maps, along with site specific aerial photography, habitat assessment sheets, site scoring sheets, and total number of fish species found, along with photographs of each.

Volume 2 is intended for those wanting more site specific details of each site than is provided in Volume 1.



Troy Brook - FIBI081



SUMMARY OF RESULTS

FIBI081 – Troy Brook

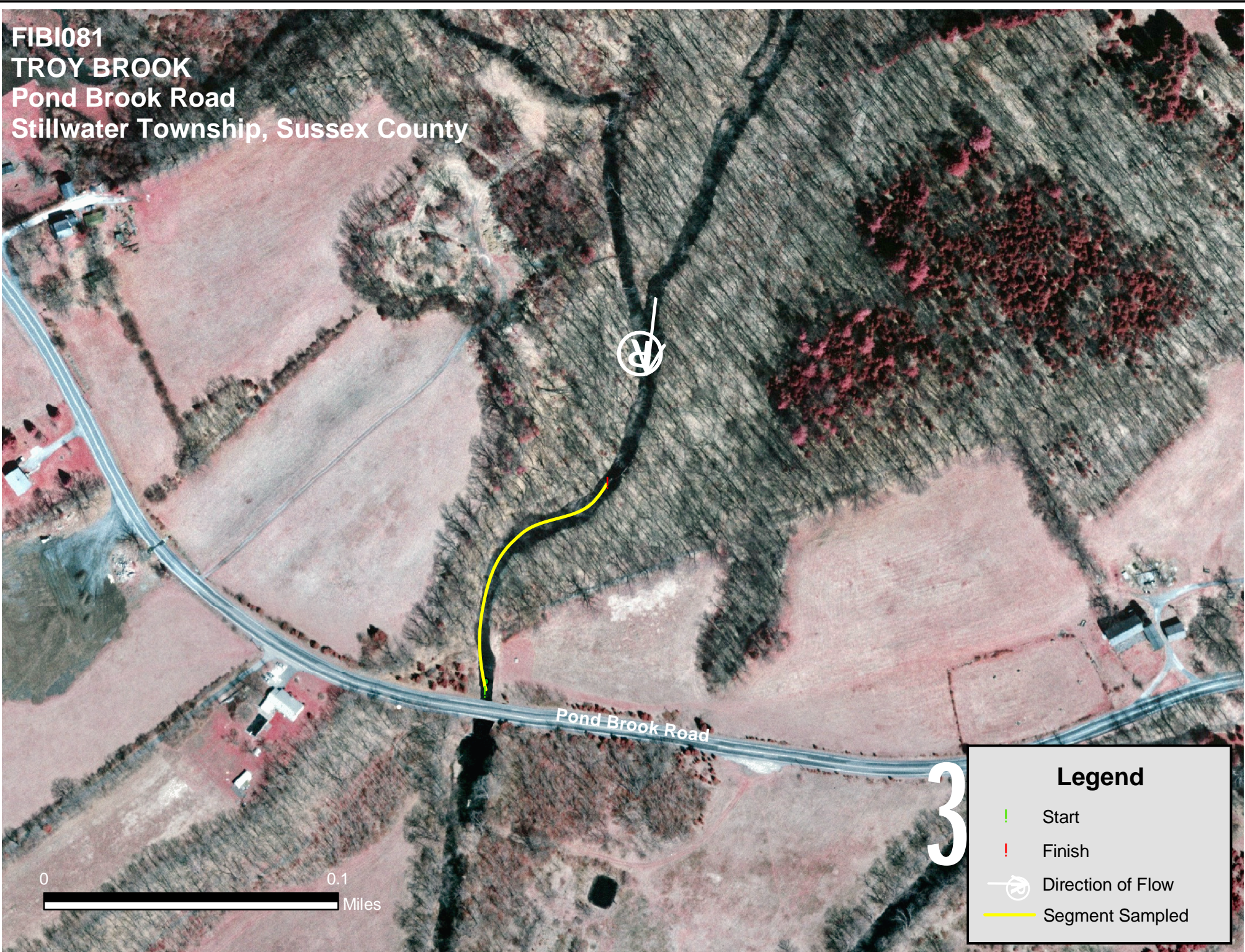


1. Stream Name:	Troy Brook
2. Sampling Date:	07-08-2004
3. Sampling Location:	Pond Brook Road
4. Municipality:	Stillwater
5. County:	Sussex
6. Watershed Management Area:	1
7. Contributing Drainage Area:	24.2 Square Miles
8. Electrofishing Gear:	2 Backpack
9. FIBI Score and Rating:	46 - Excellent
10. Habitat Score and Rating:	132- Sub-Optimal
11. Fishable Species Present:	Yes
12. Relevant AMNET ¹ Station Data:	
Proximity of FIBI station to AMNET station:	0.62 mi. downstream AN0023
AMNET Rating:	Round 1 - Moderate Round 2 – Non-impaired Round 3 - Moderate
13. Stream Chemistries:	
Dissolved Oxygen ²	N/A
Temperature.	22.6 °C
pH	7.82
Conductivity	276 µmhos/cm
14. Number of Fish With Anomalies:	0
15. Length of Stream Segment Sampled	150 Meters
16. Water Clarity:	Clear
17. Average Forest Open Canopy:	27.0%
18. Discharge:	10.2 ft. ³ /sec
19. Substrate:	10% Gravel and Sand, 70% Cobble, 10% Boulder, 5% Mud, 5% Silt
20. Habitat:	50% Riffle, 40% Run, 10% Pool
21. Snags	Yes
22. Periphyton	Slight
23. Submerged Aquatic Vegetation	Yes
24. Other observations:	
25. Number of Fish Species Identified:	16
26. Total Number of Fish Collected:	223

¹ AMNET is the acronym for the DEP's ambient benthic macroinvertebrate monitoring network – a series of 820 monitoring stations located throughout the state's waterways that collects data on the health of bottom dwelling stream fauna which in turn is used to assess general water quality.

² D.O. meter not working properly at the time of sampling.

FIBI081
TROY BROOK
Pond Brook Road
Stillwater Township, Sussex County



0 0.1 Miles

3

Legend

- ! Start
- ! Finish
- ↻ Direction of Flow
- Segment Sampled

FIBI081-Troy Brook @ Pond Brook Rd
Date Sampled - 7/08/2004

Excellent Good Fair Poor

	Score
# of Fish Species	5
# of Benthic Insectivorous Species (BI)	5
# of Trout and Centrarchid Species (trout, bass, sunfish, crappie)	5
# of Intolerant Species (IS)	5
Proportion of Individuals as White Suckers	5
Proportion of Individuals as Generalists (carp, creek chub, banded killifish, goldfish, fathead minnow, green sunfish)	5
Proportion of Individuals as Insectivorous Cyprinids (I and BI)	5
Proportion of Individuals as Trout OR Proportion of Individuals as Piscivores (Excluding American Eel)*	3
Number of Individuals in Sample	3
Proportion of Individuals w/disease/anomalies (excluding blackspot)	5
Total	46

<u>Stream Rating</u>	
45-50	Excellent
37-44	Good
29-36	Fair
10-28	Poor

	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
1. Epifaunal Substrate /Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
SCORE 16	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.					
SCORE 11	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
3. Velocity/Depth Regimes	All 4 velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (slow is <0.3 m/s, deep is >0.5 m)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity / depth regime (usually slow-deep).					
SCORE 13	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
SCORE 8	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
SCORE 10	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. In stream habitat greatly altered or removed entirely.					
SCORE 14	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.					
SCORE 17	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.					
SCORE <u>6</u> (LB)	Left	10	9			8	7	6			5	4	3			2	1	0			
SCORE <u>8</u> (RB)	Right	10	9			8	7	6			5	4	3			2	1	0			
9. Bank Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, under story shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
SCORE <u>7</u> (LB)	Left	10	9			8	7	6			5	4	3			2	1	0			
SCORE <u>9</u> (RB)	Right	10	9			8	7	6			5	4	3			2	1	0			
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.					
SCORE <u>9</u> (LB)	Left	10	9			8	7	6			5	4	3			2	1	0			
SCORE <u>4</u> (RB)	Right	10	9			8	7	6			5	4	3			2	1	0			

HABITAT SCORE

132

HABITAT SCORES	VALUE
OPTIMAL	160 – 200
SUB-OPTIMAL	110 – 159
MARGINAL	60 – 109
POOR	< 60

FIBI081

07-08-2004

Troy Brook

LISTED IN ORDER OF ABUNDANCE

COMMON NAME	SCIENTIFIC NAME	# FOUND	SIZE RANGE (INCHES)
Longnose Dace	<i>Rhinichthys cataractae</i>	119	
American Eel	<i>Anguilla rostrata</i>	23	
Largemouth Bass	<i>Micropterus salmoides</i>	19	1.6 – 2.4
Margined Madtom	<i>Notropis insignis</i>	13	
Blacknose Dace	<i>Rhinichthys atratulus</i>	9	
Chain Pickerel	<i>Esox niger</i>	8	2.4 – 3.5
Yellow Perch	<i>Perca flavescens</i>	7	1.8 – 2.2
Cutlips Minnow	<i>Exoglossum maxillingua</i>	5	
White Sucker	<i>Catostomus commersoni</i>	4	
Redbreast Sunfish	<i>Lepomis auritus</i>	3	3.2
Tessellated Darter	<i>Etheostoma olmstedii</i>	3	
Yellow Bullhead	<i>Ameiurus natalis</i>	3	4.3 – 8.1
Bluegill	<i>Lepomis macrochirus</i>	2	3.5 – 4.1
Brown Bullhead	<i>Ictalurus nebulosus</i>	2	4.5 – 7.3
Pumpkinseed	<i>Lepomis gibbosus</i>	2	3.0 – 3.2
Brown Trout	<i>Salmo trutta</i>	1	7.9

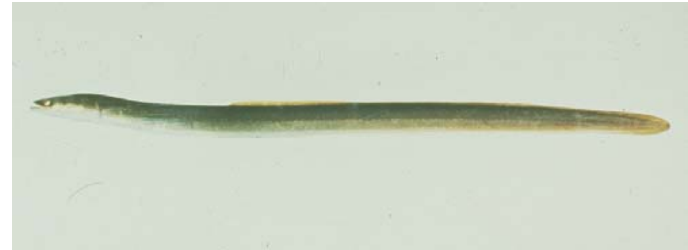
Species Identified at Troy Brook (FIBI081)
(Not to Scale)

Shute



Longnose Dace

John Scarola



American Eel

AFS



Largemouth Bass

Shute



Margined Madtom

John Scarola



Blacknose Dace

John Scarola



Chain Pickerel

Species Identified at Troy Brook (FIBI081)
(Not to Scale)

John Scarola



Yellow Perch

Jenkins, Berkhead



Cutlips Minnow

John Scarola



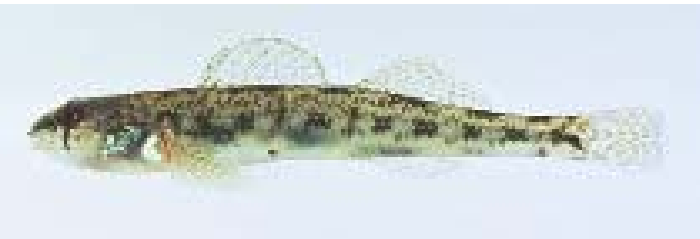
White Sucker

John Scarola



Redbreast Sunfish

John Scarola



Tessellated Darter

John Scarola



Yellow Bullhead

Species Identified at Troy Brook (FIBI081)
(Not to Scale)

John Scarola



Bluegill

John Scarola



Brown Bullhead

John Scarola



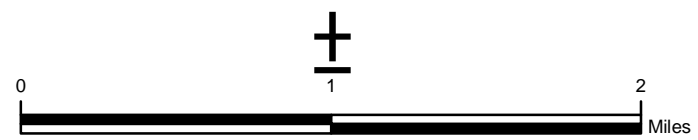
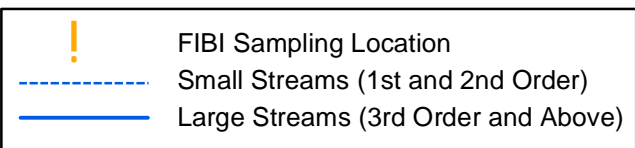
Pumpkinseed

John Scarola



Brown Trout

Paulins Kill - FIBI082



SUMMARY OF RESULTS

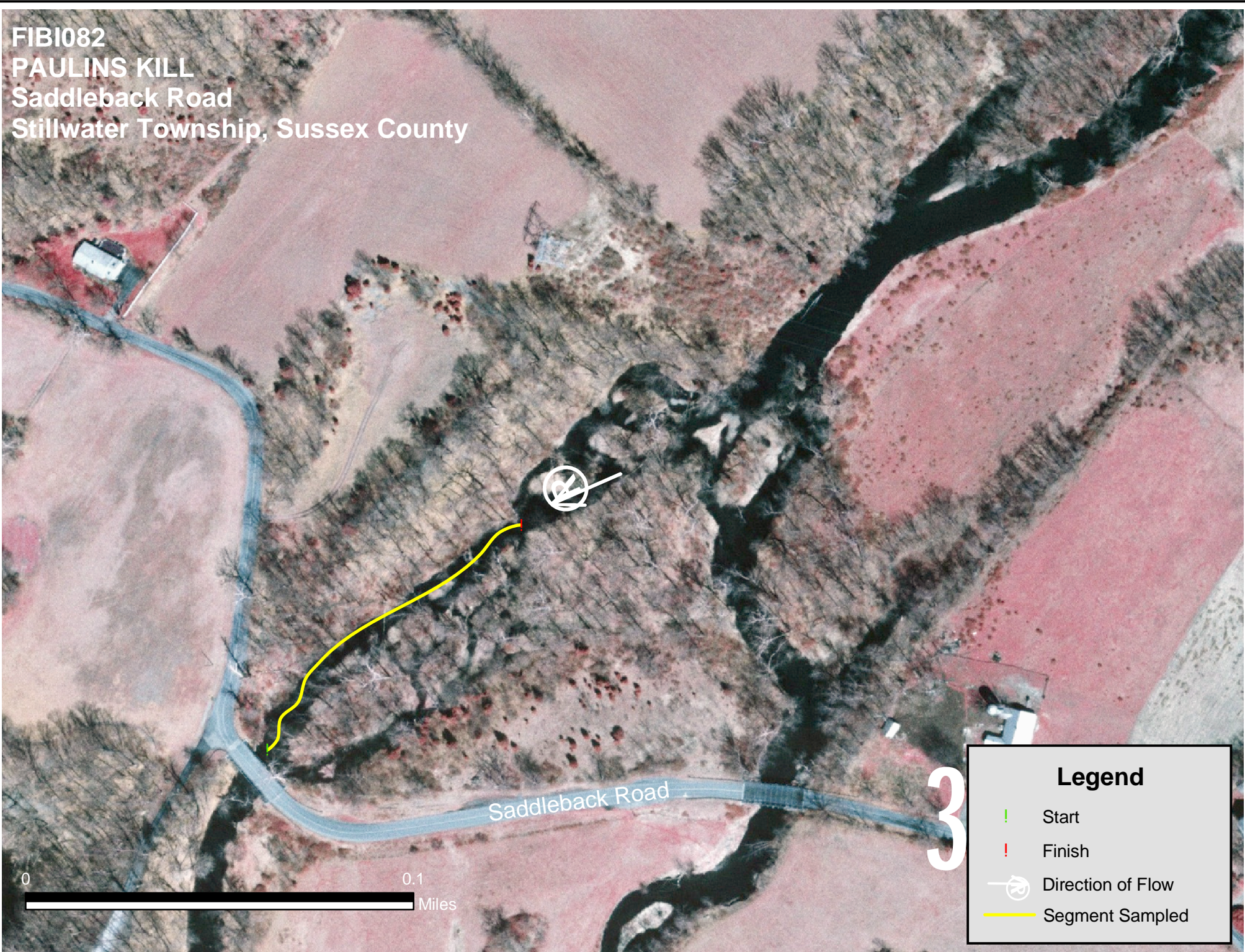
FIBI082 – Paulins Kill



1. Stream Name:	Paulins Kill
2. Sampling Date:	08-12-2004
3. Sampling Location:	Saddleback Road
4. Municipality	Stillwater
5. County:	Sussex
6. Watershed Management Area:	1
7. Contributing Drainage Area:	102.6 Square Miles
8. Electrofishing Gear:	2 Backpack
9. FIBI Score and Rating:	36 - Fair
10. Habitat Score and Rating:	128- Sub-Optimal
11. Fishable Species Present:	Yes
12. Relevant AMNET ¹ Station Data:	
Proximity of FIBI station to AMNET station:	2.84 mi. downstream AN0022
AMNET Rating:	Round 1 - Moderate Round 2 – Moderate Round 3 - Moderate
13. Stream Chemistries:	
Dissolved Oxygen	8.03 mg/L
Temperature.	22.8 °C
pH	8.11
Conductivity	437 µmhos/cm
14. Number of Fish With Anomalies:	0
15. Length of Stream Segment Sampled	150 Meters
16. Water Clarity:	Slightly Turbid
17. Average Forest Open Canopy:	41.6%
18. Discharge:	31.8 ft. ³ /sec
19. Substrate:	30% Gravel and Sand, 10% Cobble, 40% Mud, 20% Silt
20. Habitat:	10% Riffle, 45% Run, 45% Pool
21. Snags	Yes
22. Periphyton	Moderate
23. Submerged Aquatic Vegetation	Yes
24. Other observations:	
25. Number of Fish Species Identified:	19
26. Total Number of Fish Collected:	509

¹ AMNET is the acronym for the DEP's ambient benthic macroinvertebrate monitoring network – a series of 820 monitoring stations located throughout the state's waterways that collects data on the health of bottom dwelling stream fauna which in turn is used to assess general water quality.

FIBI082
PAULINS KILL
Saddleback Road
Stillwater Township, Sussex County



0 0.1 Miles

Legend

- ! Start
- ! Finish
- Direction of Flow
- Segment Sampled

3

FIBI082- @ Paulins Kill
Date Sampled - 8/12/2004

Excellent Good **Fair** Poor

	Score
# of Fish Species	5
# of Benthic Insectivorous Species (BI)	5
# of Trout and Centrarchid Species (trout, bass, sunfish, crappie)	5
# of Intolerant Species (IS)	3
Proportion of Individuals as White Suckers	1
Proportion of Individuals as Generalists (carp, creek chub, banded killifish, goldfish, fathead minnow, green sunfish)	5
Proportion of Individuals as Insectivorous Cyprinids (I and BI)	1
Proportion of Individuals as Trout *whichever gives better score OR	
Proportion of Individuals as Piscivores (Excluding American Eel)*	1
Number of Individuals in Sample	5
Proportion of Individuals w/disease/anomalies (excluding blackspot)	5
Total	36

<u>Stream Rating</u>	
45-50	Excellent
37-44	Good
29-36	Fair
10-28	Poor

	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
1. Epifaunal Substrate /Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
SCORE 16	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.					
SCORE 7	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
3. Velocity/Depth Regimes	All 4 velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (slow is <0.3 m/s, deep is >0.5 m)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity / depth regime (usually slow-deep).					
SCORE 14	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
SCORE 11	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
SCORE 8	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. In stream habitat greatly altered or removed entirely.					
SCORE 19	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.					
SCORE 17	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.					
SCORE 2 (LB)	Left	10	9			8	7	6			5	4	3			2	1	0			
SCORE 1 (RB)	Right	10	9			8	7	6			5	4	3			2	1	0			
9. Bank Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, under story shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
SCORE 9 (LB)	Left	10	9			8	7	6			5	4	3			2	1	0			
SCORE 9 (RB)	Right	10	9			8	7	6			5	4	3			2	1	0			
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.					
SCORE 7 (LB)	Left	10	9			8	7	6			5	4	3			2	1	0			
SCORE 8 (RB)	Right	10	9			8	7	6			5	4	3			2	1	0			

HABITAT SCORE

128

HABITAT SCORES	VALUE
OPTIMAL	160 – 200
SUB-OPTIMAL	110 – 159
MARGINAL	60 – 109
POOR	< 60

FIBI082

08-12-2004

Paulins Kill

LISTED IN ORDER OF ABUNDANCE

COMMON NAME	SCIENTIFIC NAME	# FOUND	SIZE RANGE (INCHES)
White Sucker	<i>Catostomus commersoni</i>	184	
Tessellated Darter	<i>Etheostoma olmstedii</i>	173	
Redbreast Sunfish	<i>Lepomis auritus</i>	50	1.4 – 5.7
Margined Madtom	<i>Notropis insignis</i>	22	
Bluegill	<i>Lepomis macrochirus</i>	21	1.8 – 3.8
Cutlips Minnow	<i>Exoglossum maxillingua</i>	18	
Yellow Bullhead	<i>Ameiurus natalis</i>	8	1.8 – 6.9
Yellow Perch	<i>Perca flavescens</i>	6	3.0 – 3.4
American Eel	<i>Anguilla rostrata</i>	5	
Rock Bass	<i>Ambloplites rupestris</i>	5	6.1
Creek Chub	<i>Semotilus atromaculatus</i>	4	
Banded Killifish	<i>Fundulus diaphanus</i>	3	
Blacknose Dace	<i>Rhinichthys atratulus</i>	2	
Longnose Dace	<i>Rhinichthys cataractae</i>	2	
Pumpkinseed	<i>Lepomis gibbosus</i>	2	4.1
Smallmouth Bass	<i>Micropterus dolomieu</i>	2	2.2 – 5.1
Chain Pickerel	<i>Esox niger</i>	1	8.1
Largemouth Bass	<i>Micropterus salmoides</i>	1	3.2
Mudminnow	<i>Umbra pygmaea</i>	1	

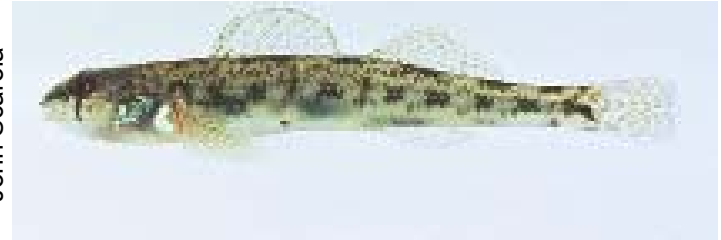
Species Identified at Paulins Kill (FIBI082)
(Not to Scale)

John Scarola



White Sucker

John Scarola



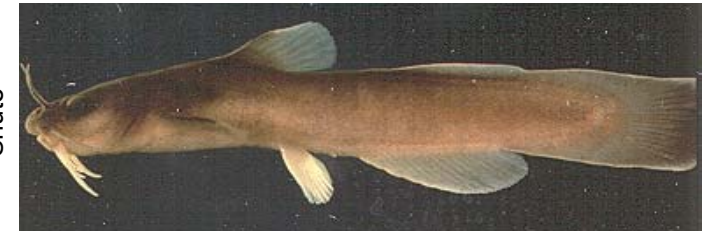
Tessellated Darter

John Scarola



Redbreast Sunfish

Shute



Margined Madtom

John Scarola



Bluegill

Jenkins, Burkhead



Cutlips Minnow

Species Identified at Paulins Kill (FIBI082)
(Not to Scale)

John Scarola



Yellow Bullhead

John Scarola



Yellow Perch

John Scarola



American Eel

John Scarola



Rockbass

Konrad Schmidt



Creek Chub

John Scarola



Banded Killifish

Species Identified at Paulins Kill (FIBI082)
(Not to Scale)

John Scarola



Blacknose Dace

John Scarola



Longnose Dace

John Scarola



Pumpkinseed

John Scarola



Smallmouth Bass

John Scarola



Chain Pickerel

AFS



Largemouth Bass

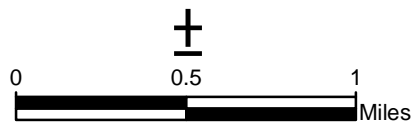
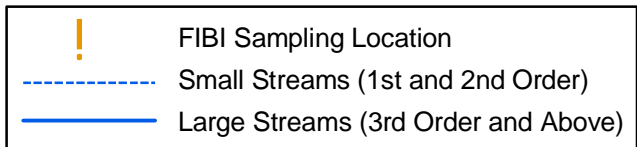
Species Identified at Paulins Kill (FIBI082)
(Not to Scale)

Jenkins, Burkhead



Eastern Mudminnow

Rockaway River - FIBI083



SUMMARY OF RESULTS

FIBI083 – Rockaway River



1. Stream Name:	Rockaway River
2. Sampling Date:	08-31-2004
3. Sampling Location:	Pocono Road
4. Municipality:	Denville
5. County:	Morris
6. Watershed Management Area:	6
7. Contributing Drainage Area:	99.0 Square Miles
8. Electrofishing Gear:	2 Backpack
9. FIBI Score and Rating:	36 - Fair
10. Habitat Score and Rating:	118- Sub-Optimal
11. Fishable Species Present:	Yes
12. Relevant AMNET ¹ Station Data:	
Proximity of FIBI station to AMNET station:	AN0248
AMNET Rating:	Round 1 – Non-impaired Round 2 – Non-impaired Round 3 - Moderate
13. Stream Chemistries:	
Dissolved Oxygen	8.8 mg/L
Temperature.	23.7 °C
pH	8.27
Conductivity	327 µmhos/cm
14. Number of Fish With Anomalies:	0
15. Length of Stream Segment Sampled	150 Meters
16. Water Clarity:	Clear
17. Average Forest Open Canopy:	37.7%
18. Discharge:	315.8 ft. ³ /sec
19. Substrate:	45% Gravel and Sand, 30% Cobble, 5% Boulder, 15% Mud, 5% Silt
20. Habitat:	5% Riffle, 90% Run, 5% Pool
21. Snags	No
22. Periphyton	Moderate
23. Submerged Aquatic Vegetation	Yes
24. Other observations:	
25. Number of Fish Species Identified:	10
26. Total Number of Fish Collected:	126

¹ AMNET is the acronym for the DEP's ambient benthic macroinvertebrate monitoring network – a series of 820 monitoring stations located throughout the state's waterways that collects data on the health of bottom dwelling stream fauna which in turn is used to assess general water quality.

FIBI083
ROCKAWAY RIVER
Pocono Road
Denville Township, Morris County



Pocono Road

3

Legend

- ! Start
- ! Finish
- ↻ Direction of Flow
- Segment Sampled

0 0.1 Miles

FIBI083- @ Rockaway River
Date Sampled - 8/31/2004

Excellent Good **Fair** Poor

	Score
# of Fish Species	5
# of Benthic Insectivorous Species (BI)	3
# of Trout and Centrarchid Species (trout, bass, sunfish, crappie)	3
# of Intolerant Species (IS)	3
Proportion of Individuals as White Suckers	5
Proportion of Individuals as Generalists (carp, creek chub, banded killifish, goldfish, fathead minnow, green sunfish)	5
Proportion of Individuals as Insectivorous Cyprinids (I and BI)	1
Proportion of Individuals as Trout *whichever gives better score OR	
Proportion of Individuals as Piscivores (Excluding American Eel)*	3
Number of Individuals in Sample	3
Proportion of Individuals w/disease/anomalies (excluding blackspot)	5
Total	36

<u>Stream Rating</u>	
45-50	Excellent
37-44	Good
29-36	Fair
10-28	Poor

HABITAT ASSESSMENT FOR *HIGH GRADIENT STREAMS* Rockaway River (FIB1083) – 8/31/04

	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
1. Epifaunal Substrate /Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
SCORE 11	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.					
SCORE 14	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
3. Velocity/Depth Regimes	All 4 velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (slow is <0.3 m/s, deep is >0.5 m)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity / depth regime (usually slow-deep).					
SCORE 12	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
SCORE 19	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
SCORE 15	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. In stream habitat greatly altered or removed entirely.					
SCORE 17	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.					
SCORE 1	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.					
SCORE <u>2</u> (LB)	Left	10	9			8	7	6			5	4	3			2	1	0			
SCORE <u>4</u> (RB)	Right	10	9			8	7	6			5	4	3			2	1	0			
9. Bank Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, under story shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
SCORE <u>6</u> (LB)	Left	10	9			8	7	6			5	4	3			2	1	0			
SCORE <u>7</u> (RB)	Right	10	9			8	7	6			5	4	3			2	1	0			
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.					
SCORE <u>1</u> (LB)	Left	10	9			8	7	6			5	4	3			2	1	0			
SCORE <u>9</u> (RB)	Right	10	9			8	7	6			5	4	3			2	1	0			

HABITAT SCORE

118

HABITAT SCORES	VALUE
OPTIMAL	160 – 200
SUB-OPTIMAL	110 – 159
MARGINAL	60 – 109
POOR	< 60

FIBI083

08-31-2004

Rockaway River

LISTED IN ORDER OF ABUNDANCE

COMMON NAME	SCIENTIFIC NAME	# FOUND	SIZE RANGE (INCHES)
Tessellated Darter	<i>Etheostoma olmstedii</i>	76	
Redbreast Sunfish	<i>Lepomis auritus</i>	26	1.6 – 6.3
Sea Lamprey	<i>Petromyzon marinus</i>	8	
Yellow Bullhead	<i>Ameiurus natalis</i>	4	6.7 – 8.3
Eastern Mudminnow	<i>Umbra pygmaea</i>	3	
Rock Bass	<i>Ambloplites rupestris</i>	3	5.1 – 8.3
Chain Pickerel	<i>Esox niger</i>	2	3.7 – 4.3
Smallmouth Bass	<i>Micropterus dolomieu</i>	2	1.8 – 3.2
Green Sunfish	<i>Lepomis cyanellus</i>	1	2.8
Margined Madtom	<i>Noturus insignis</i>	1	

Species Identified at Rockaway River (FIBI083)
(Not to Scale)

John Scarola



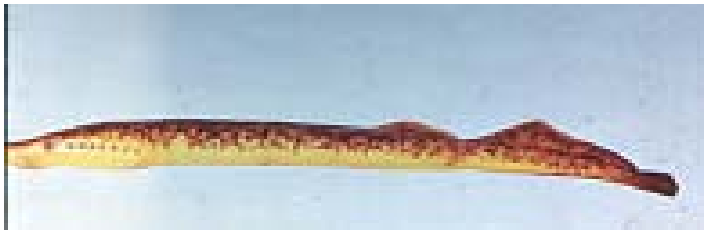
Tessellated Darter

John Scarola



Redbreast Sunfish

John Scarola



Sea Lamprey

John Scarola



Yellow Bullhead

Jenkins, Burkhead



Eastern Mudminnow

Jenkins, Burkhead



Rockbass

Species Identified at Rockaway River (FIBI083)
(Not to Scale)

John Scarola



Chain Pickerel

John Scarola



Smallmouth Bass

Konrad Schmidt



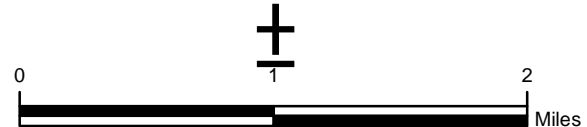
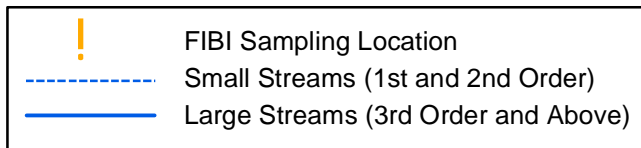
Green Sunfish

Shute



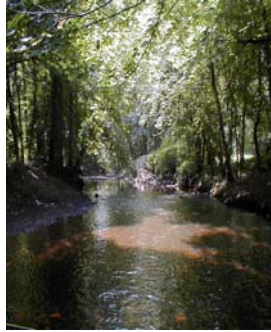
Margined Madtom

Robinsons Brook - FIBI084



SUMMARY OF RESULTS

FIBI084 – Robynsons Brook



1. Stream Name:	Robynsons Brook
2. Sampling Date:	07-20-2004
3. Sampling Location:	Central Avenue
4. Municipality	Rahway
5. County:	Union
6. Watershed Management Area:	7
7. Contributing Drainage Area:	20.0 Square Miles
8. Electrofishing Gear:	2 Backpack
9. FIBI Score and Rating:	34 - Fair
10. Habitat Score and Rating:	140- Sub-Optimal
11. Fishable Species Present:	Yes
12. Relevant AMNET ¹ Station Data:	
Proximity of FIBI station to AMNET station:	0.23 mi. downstream AN0199
AMNET Rating:	Round 1 - Moderate Round 2 – Moderate Round 3 - Moderate
13. Stream Chemistries:	
Dissolved Oxygen	6.60 mg/L
Temperature.	24.8 °C
pH	6.24
Conductivity	164 µmhos/cm
14. Number of Fish With Anomalies:	0
15. Length of Stream Segment Sampled	150 Meters
16. Water Clarity:	Clear
17. Average Forest Open Canopy:	7.8%
18. Discharge:	47.5 ft. ³ /sec
19. Substrate:	46% Gravel and Sand, 48% Cobble, 1% Boulder, 5% Silt
20. Habitat:	50% Riffle, 30% Run, 20% Pool
21. Snags	Yes
22. Periphyton	Slight
23. Submerged Aquatic Vegetation	Yes
24. Other observations:	
25. Number of Fish Species Identified:	11
26. Total Number of Fish Collected:	348

¹ AMNET is the acronym for the DEP's ambient benthic macroinvertebrate monitoring network – a series of 820 monitoring stations located throughout the state's waterways that collects data on the health of bottom dwelling stream fauna which in turn is used to assess general water quality.

FIBI084
ROBINSONS BROOK
Central Avenue
Rahway Boro, Union County

Central Avenue



0 0.1 Miles

3

Legend

-  Start
-  Finish
-  Direction of Flow
-  Segment Sampled

FIBI084- @ Robinson's Brook
Date Sampled - 7/20/2004

Excellent Good **Fair** Poor

	Score
# of Fish Species	5
# of Benthic Insectivorous Species (BI)	3
# of Trout and Centrarchid Species (trout, bass, sunfish, crappie)	5
# of Intolerant Species (IS)	1
Proportion of Individuals as White Suckers	3
Proportion of Individuals as Generalists (carp, creek chub, banded killifish, goldfish, fathead minnow, green sunfish)	5
Proportion of Individuals as Insectivorous Cyprinids (I and BI)	1
Proportion of Individuals as Trout *whichever gives better score OR	
Proportion of Individuals as Piscivores (Excluding American Eel)*	1
Number of Individuals in Sample	5
Proportion of Individuals w/disease/anomalies (excluding blackspot)	5
Total	34

<u>Stream Rating</u>	
45-50	Excellent
37-44	Good
29-36	Fair
10-28	Poor

HABITAT ASSESSMENT FOR *HIGH GRADIENT STREAMS* Robinson's Brook (FIB1084) – 7/20/04

	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
1. Epifaunal Substrate /Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
SCORE 19	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.					
SCORE 16	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
3. Velocity/Depth Regimes	All 4 velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (slow is <0.3 m/s, deep is >0.5 m)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity / depth regime (usually slow-deep).					
SCORE 15	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
SCORE 16	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
SCORE 12	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. In stream habitat greatly altered or removed entirely.					
SCORE 15	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.					
SCORE 17	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.					
SCORE <u>5</u> (LB)	Left	10	9			8	7	6			5	4	3			2	1	0			
SCORE <u>2</u> (RB)	Right	10	9			8	7	6			5	4	3			2	1	0			
9. Bank Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, under story shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
SCORE <u>6</u> (LB)	Left	10	9			8	7	6			5	4	3			2	1	0			
SCORE <u>7</u> (RB)	Right	10	9			8	7	6			5	4	3			2	1	0			
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.					
SCORE <u>4</u> (LB)	Left	10	9			8	7	6			5	4	3			2	1	0			
SCORE <u>6</u> (RB)	Right	10	9			8	7	6			5	4	3			2	1	0			

HABITAT SCORE

140

HABITAT SCORES	VALUE
OPTIMAL	160 – 200
SUB-OPTIMAL	110 – 159
MARGINAL	60 – 109
POOR	< 60

FIBI084

07-20-2004

Robinson's Brook

LISTED IN ORDER OF ABUNDANCE

COMMON NAME	SCIENTIFIC NAME	# FOUND	SIZE RANGE (INCHES)
American Eel	<i>Anguilla rostrata</i>	100	
Tessellated Darter	<i>Etheostoma olmstedii</i>	60	
Redbreast Sunfish	<i>Lepomis auritus</i>	59	3.0 – 6.5
Pumpkinseed	<i>Lepomis gibbosus</i>	36	2.6 – 4.3
White Sucker	<i>Catostomus commersoni</i>	35	
Common Shiner	<i>Notropis cornutus</i>	28	
Banded Killifish	<i>Fundulus diaphanus</i>	20	
Green Sunfish	<i>Lepomis cyanellus</i>	7	2.6 – 3.5
Goldfish	<i>Carassius auratus</i>	1	
Largemouth Bass	<i>Micropterus salmoides</i>	1	2.4
Redfin Pickerel	<i>Esox americanus americanus</i>	1	4.7

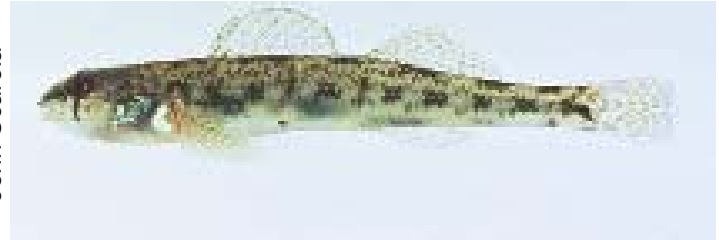
Species Identified at Robinson's Brook (FIBI084)
(Not to Scale)

John Scarola



American Eel

John Scarola



Tessellated Darter

John Scarola



Redbreast Sunfish

John Scarola



Pumpkinseed

Jenkins, Burkhead



White Sucker

Jenkins, Burkhead



Common Shiner

Species Identified at Robinson's Brook (FIBI084)
(Not to Scale)

John Scarola



Banded Killifish

John Scarola



Green Sunfish

Konrad Schmidt



Goldfish

Shute

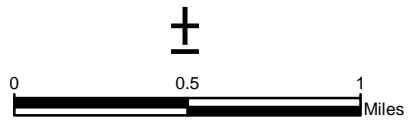
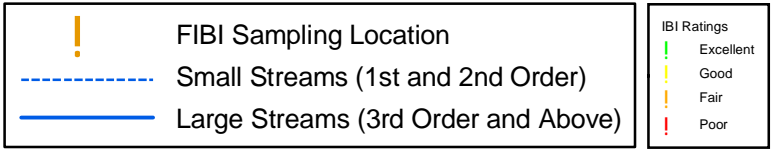
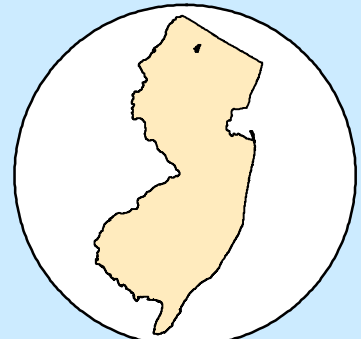


Largemouth Bass



Redfin Pickerel

Franklin Pond Creek - FIBI085



SUMMARY OF RESULTS

FIBI085 – Franklin Pond Creek¹



1. Stream Name:	Franklin Pond Creek
2. Sampling Date:	07-27-2004
3. Sampling Location:	Route 23
4. Municipality	Hardyston
5. County:	Sussex
6. Watershed Management Area:	2
7. Contributing Drainage Area:	4.5 Square Miles
8. Electrofishing Gear:	2 Backpack
9. FIBI Score and Rating:	34 - Fair
10. Habitat Score and Rating:	164- Optimal
11. Fishable Species Present:	Yes
12. Relevant AMNET ² Station Data:	
Proximity of FIBI station to AMNET station:	N/A
AMNET Rating:	N/A
13. Stream Chemistries:	
Dissolved Oxygen	8.72 mg/L
Temperature.	20.5 °C
pH	8.53
Conductivity	241 µmhos/cm
14. Number of Fish With Anomalies:	1 Eastern mudminnow with a deformed head
15. Length of Stream Segment Sampled	150 Meters
16. Water Clarity:	Clear
17. Average Forest Open Canopy:	10.1%
18. Discharge:	9.8 ft. ³ /sec
19. Substrate:	5% Gravel and Sand, 15% Cobble, 60% Boulder, 15% Bedrock
20. Habitat:	90% Riffle, 6% Run, 4% Pool
21. Snags	Yes
22. Periphyton	Moderate
23. Submerged Aquatic Vegetation	Yes
24. Other observations:	
25. Number of Fish Species Identified:	7
26. Total Number of Fish Collected:	29

¹ Site has been eliminated from the Fish IBI Monitoring Network due to a contributing drainage area of less than 5 square miles.

² AMNET is the acronym for the DEP's ambient benthic macroinvertebrate monitoring network – a series of 820 monitoring stations located throughout the state's waterways that collects data on the health of bottom dwelling stream fauna which in turn is used to assess general water quality.

FIBI085
FRANKLIN POND CREEK
Route 23
Hardyston Township, Sussex County



0 0.1 Miles

3

Legend

- ! Start
- ! Finish
- ↻ Direction of Flow
- Segment Sampled

FIBI085- @ Franklin Pond Creek
Date Sampled - 7/27/2004

Excellent Good **Fair** Poor

	Score
# of Fish Species	5
# of Benthic Insectivorous Species (BI)	1
# of Trout and Centrarchid Species (trout, bass, sunfish, crappie)	5
# of Intolerant Species (IS)	3
Proportion of Individuals as White Suckers	5
Proportion of Individuals as Generalists (carp, creek chub, banded killifish, goldfish, fathead minnow, green sunfish)	5
Proportion of Individuals as Insectivorous Cyprinids (I and BI)	1
Proportion of Individuals as Trout *whichever gives better score OR	
Proportion of Individuals as Piscivores (Excluding American Eel)*	5
Number of Individuals in Sample	1
Proportion of Individuals w/disease/anomalies (excluding blackspot)	3
Total	34

<u>Stream Rating</u>	
45-50	Excellent
37-44	Good
29-36	Fair
10-28	Poor

HABITAT ASSESSMENT FOR HIGH GRADIENT STREAMS Franklin Pond Ck (FIBI085) 7/27/04

	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
1. Epifaunal Substrate /Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
SCORE 16	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.					
SCORE 18	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
3. Velocity/Depth Regimes	All 4 velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (slow is <0.3 m/s, deep is >0.5 m)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity / depth regime (usually slow-deep).					
SCORE 15	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
SCORE 19	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
SCORE 17	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. In stream habitat greatly altered or removed entirely.					
SCORE 15	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.					
SCORE 19	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.					
SCORE 8 (LB)	Left	10	9	8	7	6	5	4	3	2	1	0									
SCORE 7 (RB)	Right	10	9	8	7	6	5	4	3	2	1	0									
9. Bank Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, under story shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
SCORE 8 (LB)	Left	10	9	8	7	6	5	4	3	2	1	0									
SCORE 9 (RB)	Right	10	9	8	7	6	5	4	3	2	1	0									
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.					
SCORE 8 (LB)	Left	10	9	8	7	6	5	4	3	2	1	0									
SCORE 5 (RB)	Right	10	9	8	7	6	5	4	3	2	1	0									

HABITAT SCORE

164

HABITAT SCORES	VALUE
OPTIMAL	160 – 200
SUB-OPTIMAL	110 – 159
MARGINAL	60 – 109
POOR	< 60

FIBI085

07-27-2004

Franklin Pond Creek

LISTED IN ORDER OF ABUNDANCE

COMMON NAME	SCIENTIFIC NAME	# FOUND	SIZE RANGE (INCHES)
Largemouth Bass	<i>Micropterus salmoides</i>	13	2.0 – 3.0
Redfin Pickerel	<i>Esox americanus americanus</i>	8	2.8 – 5.1
Mudminnow	<i>Umbra pygmaea</i>	2	
Rainbow Trout	<i>Oncorhynchus mykiss</i>	2	9.1 – 11.2
Yellow Perch	<i>Perca flavescens</i>	2	2.2 – 2.4
Bluegill	<i>Lepomis macrochirus</i>	1	3.5
Yellow Bullhead	<i>Ameiurus natalis</i>	1	3.5

Species Identified at Franklin Pond Creek (FIBI085)
(Not to Scale)

AFS



Largemouth Bass

Jenkins, Burkhead



Redfin Pickerel

Jenkins, Burkhead



Eastern Mudminnow

John Scarola



Rainbow Trout

John Scarola



Yellow Perch

John Scarola



Bluegill

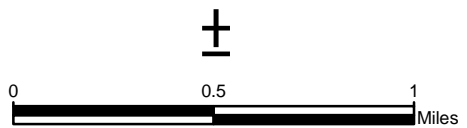
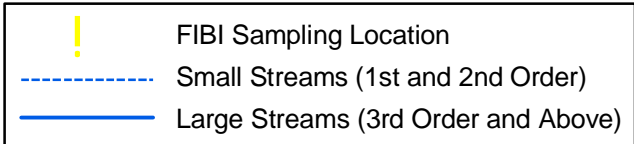
Species Identified at Franklin Pond Creek (FIBI085)
(Not to Scale)

John Scarola



Yellow Bullhead

Raritan River South Branch - FIBI086



SUMMARY OF RESULTS

FIBI086 – Raritan River South Branch



1. Stream Name:	Raritan River South Branch
2. Sampling Date:	09-14-2004
3. Sampling Location:	Grayrock Road
4. Municipality	Clinton
5. County:	Hunterdon
6. Watershed Management Area:	8
7. Contributing Drainage Area:	69.7 Square Miles
8. Electrofishing Gear:	2 Backpack
9. FIBI Score and Rating:	42 - Good
10. Habitat Score and Rating:	146- Sub-Optimal
11. Fishable Species Present:	Yes
12. Relevant AMNET ¹ Station Data:	
Proximity of FIBI station to AMNET station:	2.21 mi. upstream AN0322
AMNET Rating:	Round 1 – Non-impaired Round 2 – Non-impaired Round 3 – Non-impaired
13. Stream Chemistries:	
Dissolved Oxygen	8.55 mg/L
Temperature.	19.3 °C
pH	9.45
Conductivity	438 µmhos/cm
14. Number of Fish With Anomalies:	0
15. Length of Stream Segment Sampled	150 Meters
16. Water Clarity:	Clear
17. Average Forest Open Canopy:	72.3%
18. Discharge:	186.8 ft. ³ /sec
19. Substrate:	15% Gravel and Sand, 75% Cobble, 5% Boulder, 5% Silt
20. Habitat:	80% Riffle, 10% Run, 10% Pool
21. Snags	Yes
22. Periphyton	Slight
23. Submerged Aquatic Vegetation	Yes
24. Other observations:	
25. Number of Fish Species Identified:	16
26. Total Number of Fish Collected:	902

¹ AMNET is the acronym for the DEP's ambient benthic macroinvertebrate monitoring network – a series of 820 monitoring stations located throughout the state's waterways that collects data on the health of bottom dwelling stream fauna which in turn is used to assess general water quality.

FIBI086
RARITAN RIVER SOUTH BRANCH
Grayrock Road
Clinton Township, Hunterdon County



3

Legend

- ! Start
- ! Finish
- ↻ Direction of Flow
- Segment Sampled

FIBI086- @ Raritan River South Branch
Date Sampled - 9/14/2004

Excellent **Good** Fair Poor

	Score
# of Fish Species	5
# of Benthic Insectivorous Species (BI)	5
# of Trout and Centrarchid Species (trout, bass, sunfish, crappie)	3
# of Intolerant Species (IS)	5
Proportion of Individuals as White Suckers	3
Proportion of Individuals as Generalists (carp, creek chub, banded killifish, goldfish, fathead minnow, green sunfish)	5
Proportion of Individuals as Insectivorous Cyprinids (I and BI)	5
Proportion of Individuals as Trout	
OR	
Proportion of Individuals as Piscivores (Excluding American Eel)*	1
Number of Individuals in Sample	5
Proportion of Individuals w/disease/anomalies (excluding blackspot)	5
Total	42

Stream Rating

45-50 **Excellent**
37-44 **Good**
29-36 **Fair**
10-28 **Poor**

HABITAT ASSESSMENT FOR HIGH GRADIENT STREAMS Raritan River SB (FIBI086) – 9/14/04

	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
1. Epifaunal Substrate /Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
SCORE 14	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.					
SCORE 14	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
3. Velocity/Depth Regimes	All 4 velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (slow is <0.3 m/s, deep is >0.5 m)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity / depth regime (usually slow-deep).					
SCORE 10	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
SCORE 14	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
SCORE 19	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. In stream habitat greatly altered or removed entirely.					
SCORE 15	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.					
SCORE 19	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.					
SCORE <u>7</u> (LB)	Left	10	9			8	7	6			5	4	3			2	1	0			
SCORE 8 (RB)	Right	10	9			8	7	6			5	4	3			2	1	0			
9. Bank Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, under story shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
SCORE <u>9</u> (LB)	Left	10	9			8	7	6			5	4	3			2	1	0			
SCORE 6 (RB)	Right	10	9			8	7	6			5	4	3			2	1	0			
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.					
SCORE <u>10</u> (LB)	Left	10	9			8	7	6			5	4	3			2	1	0			
SCORE 1 (RB)	Right	10	9			8	7	6			5	4	3			2	1	0			

HABITAT SCORE

146

HABITAT SCORES	VALUE
OPTIMAL	160 – 200
SUB-OPTIMAL	110 – 159
MARGINAL	60 – 109
POOR	< 60

FIBI086

09-14-2004

Raritan River South Branch

LISTED IN ORDER OF ABUNDANCE

COMMON NAME	SCIENTIFIC NAME	# FOUND	SIZE RANGE (INCHES)
Tessellated Darter	<i>Etheostoma olmstedii</i>	309	
Longnose Dace	<i>Rhinichthys cataractae</i>	271	
Blacknose Dace	<i>Rhinichthys atratulus</i>	109	
White Sucker	<i>Catostomus commersoni</i>	98	
Margined Madtom	<i>Noturus insignis</i>	46	
Spottail Shiner	<i>Notropis hudsonius</i>	27	
American Eel	<i>Anguilla rostrata</i>	15	
Cutlips Minnow	<i>Exoglossum maxillingua</i>	8	
Banded Killifish	<i>Fundulus diaphanus</i>	5	
Brown Trout	<i>Salmo trutta</i>	5	3.5 – 9.8
Smallmouth Bass	<i>Micropterus dolomieu</i>	4	2.8 – 4.5
Creek Chub	<i>Semotilus atromaculatus</i>	1	
Eastern Mudminnow	<i>Umbra pygmaea</i>	1	
Redbreast Sunfish	<i>Lepomis auritus</i>	1	3.5
Redfin Pickerel	<i>Esox americanus americanus</i>	1	3.9
Yellow Bullhead	<i>Ameiurus natalis</i>	1	2.4

Species Identified at Raritan River S.B. (FIBI086)
(Not to Scale)

John Scarola



Tessellated Darter

John Scarola



Longnose Dace

John Scarola



Blacknose Dace

John Scarola



White Sucker

Shute



Margined Madtom

Konrad Schmidt



Spottail Shiner

Species Identified at Raritan River S.B. (FIBI086)
(Not to Scale)

John Scarola



American Eel

Jenkins, Burkhead



Cutlips Minnow

John Scarola



Banded Killifish

John Scarola



Brown Trout

John Scarola



Smallmouth Bass

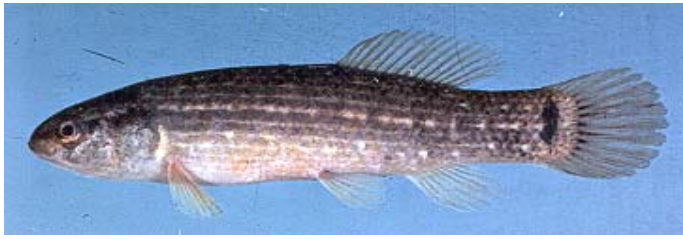
Konrad Schmidt



Creek Chub

Species Identified at Raritan River S.B. (FIBI086)
(Not to Scale)

Jenkins, Burkhead



Eastern Mudminnow

John Scarola



Redbreast Sunfish

Jenkins, Burkhead



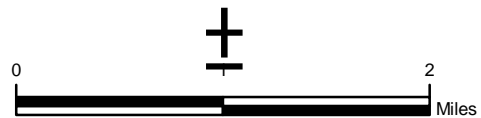
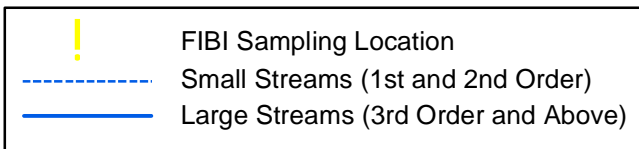
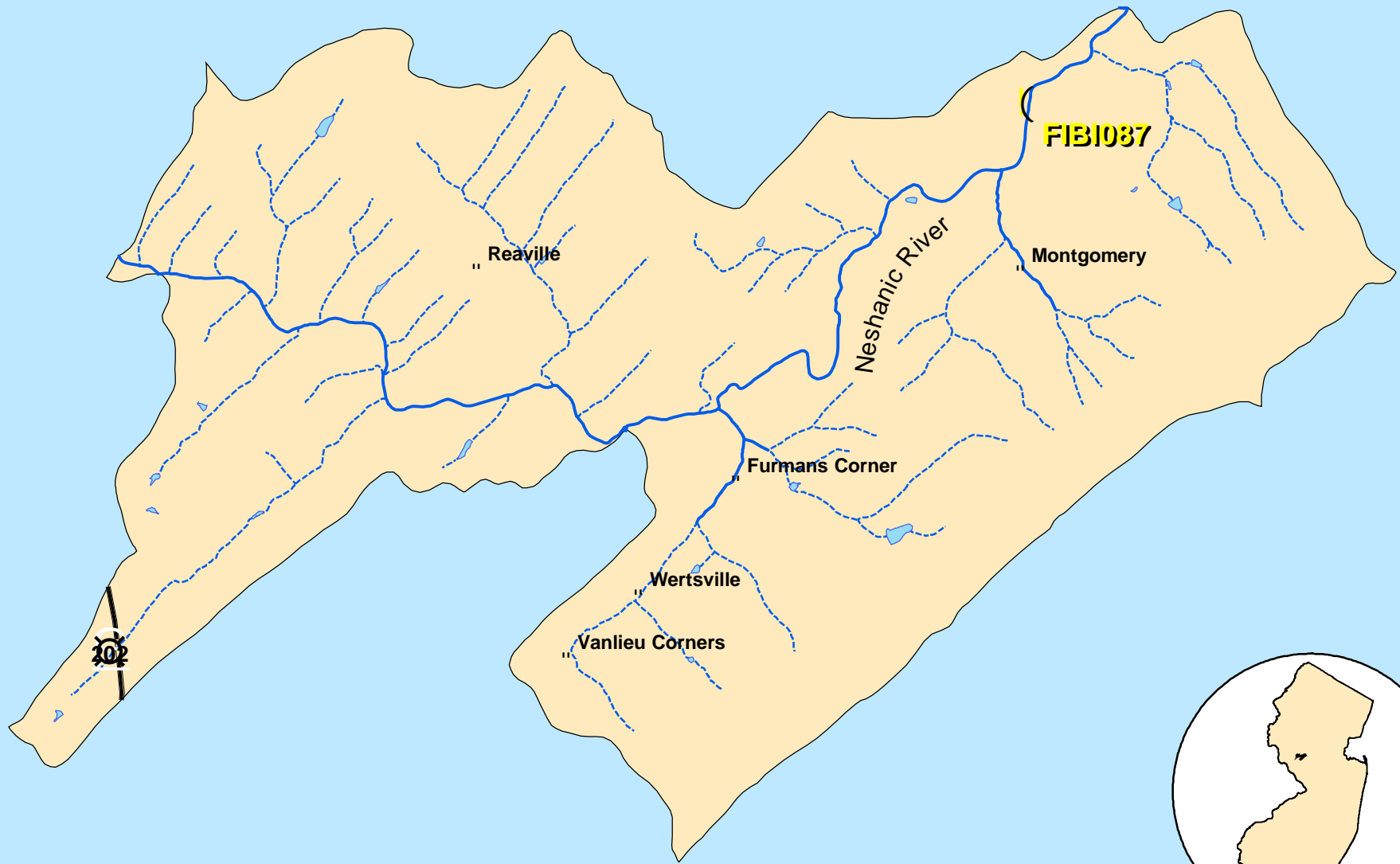
Redfin Pickerel

John Scarola



Yellow Bullhead

Neshanic River - FIBI087



SUMMARY OF RESULTS

FIBI087 – Neshanic River



1. Stream Name:	Neshanic River
2. Sampling Date:	07-16-2004
3. Sampling Location:	Black Point Road
4. Municipality:	Hillsborough
5. County:	Somerset
6. Watershed Management Area:	8
7. Contributing Drainage Area:	53.4 Square Miles
8. Electrofishing Gear:	2 Backpack
9. FIBI Score and Rating:	40 - Good
10. Habitat Score and Rating:	135- Sub-Optimal
11. Fishable Species Present:	Yes
12. Relevant AMNET ¹ Station Data:	
Proximity of FIBI station to AMNET station:	AN0337
AMNET Rating:	Round 1 - Moderate Round 2 – Moderate Round 3 - Moderate
13. Stream Chemistries:	
Dissolved Oxygen	7.93 mg/L
Temperature.	19.8 °C
pH	7.96
Conductivity	271 µmhos/cm
14. Number of Fish With Anomalies:	1 Green sunfish with a tumor
15. Length of Stream Segment Sampled	150 Meters
16. Water Clarity:	Slightly Turbid
17. Average Forest Open Canopy:	53.0%
18. Discharge:	181.8 ft. ³ /sec
19. Substrate:	40% Gravel and Sand, 35% Cobble, 9% Boulder, 5% Mud, 1% Silt, 10% Bedrock
20. Habitat:	5% Riffle, 85% Run, 10% Pool
21. Snags	Yes
22. Periphyton	Moderate
23. Submerged Aquatic Vegetation	Yes
24. Other observations:	
25. Number of Fish Species Identified:	19
26. Total Number of Fish Collected:	384

¹ AMNET is the acronym for the DEP's ambient benthic macroinvertebrate monitoring network – a series of 820 monitoring stations located throughout the state's waterways that collects data on the health of bottom dwelling stream fauna which in turn is used to assess general water quality.

FIBI087
NESHANIC RIVER
Amwell Road
Hillsborough Township, Somerset County



Legend

- ! Start
- ! Finish
- ↻ Direction of Flow
- Segment Sampled

3

0 0.1 Miles

FIBI087- @ Neshanic River
Date Sampled - 7/16/2004

Excellent **Good** Fair Poor

	Score
# of Fish Species	5
# of Benthic Insectivorous Species (BI)	5
# of Trout and Centrarchid Species (trout, bass, sunfish, crappie)	5
# of Intolerant Species (IS)	3
Proportion of Individuals as White Suckers	3
Proportion of Individuals as Generalists (carp, creek chub, banded killifish, goldfish, fathead minnow, green sunfish)	5
Proportion of Individuals as Insectivorous Cyprinids (I and BI)	1
Proportion of Individuals as Trout OR Proportion of Individuals as Piscivores (Excluding American Eel)*	3
Number of Individuals in Sample	5
Proportion of Individuals w/disease/anomalies (excluding blackspot)	5
Total	40

<u>Stream Rating</u>	
45-50	Excellent
37-44	Good
29-36	Fair
10-28	Poor

HABITAT ASSESSMENT FOR *HIGH GRADIENT STREAMS* Neshanic River (FIB1087) – 7/16/04

	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
1. Epifaunal Substrate /Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
SCORE 15	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.					
SCORE 13	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
3. Velocity/Depth Regimes	All 4 velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (slow is <0.3 m/s, deep is >0.5 m)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity / depth regime (usually slow-deep).					
SCORE 13	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
SCORE 18	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
SCORE 16	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. In stream habitat greatly altered or removed entirely.					
SCORE 15	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.					
SCORE 7	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.					
SCORE <u>5</u> (LB)	Left	10	9			8	7	6			5	4	3			2	1	0			
SCORE <u>4</u> (RB)	Right	10	9			8	7	6			5	4	3			2	1	0			
9. Bank Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, under story shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
SCORE <u>10</u> (LB)	Left	<u>10</u>	9			8	7	6			5	4	3			2	1	0			
SCORE <u>5</u> (RB)	Right	10	9			8	7	6			5	4	3			2	1	0			
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.					
SCORE <u>9</u> (LB)	Left	10	<u>9</u>			8	7	6			5	4	3			2	1	0			
SCORE <u>5</u> (RB)	Right	10	9			8	7	6			5	4	3			2	1	0			

HABITAT SCORE

135

HABITAT SCORES	VALUE
OPTIMAL	160 – 200
SUB-OPTIMAL	110 – 159
MARGINAL	60 – 109
POOR	< 60

FIBI087

07-16-2004

Neshanic River

LISTED IN ORDER OF ABUNDANCE

COMMON NAME	SCIENTIFIC NAME	# FOUND	SIZE RANGE (INCHES)
Tessellated Darter	<i>Etheostoma olmstedii</i>	135	
White Sucker	<i>Catostomus commersoni</i>	54	
Green Sunfish	<i>Lepomis cyanellus</i>	45	2.4 – 5.1
Redbreast Sunfish	<i>Lepomis auritus</i>	37	2.4 – 5.1
Spottail Shiner	<i>Notropis hudsonius</i>	26	
Smallmouth Bass	<i>Micropterus dolomieu</i>	22	1.2 – 5.9
Rockbass	<i>Ambloplites rupestris</i>	18	1.0 – 7.1
American Eel	<i>Anguilla rostrata</i>	11	
Longnose Dace	<i>Rhinichthys cataractae</i>	11	
Banded Killifish	<i>Fundulus diaphanus</i>	8	
Bluegill	<i>Lepomis macrochirus</i>	3	5.7
Margined Madtom	<i>Noturus insignis</i>	3	
Yellow Bullhead	<i>Ameiurus natalis</i>	3	1.6 – 8.1
Redfin Pickerel	<i>Esox americanus americanus</i>	2	4.7
Hybrid Green x Bluegill	<i>Lepomis cyanellus x macrochirus</i>	2	2.4 – 4.1
Brown Bullhead	<i>Ameiurus nebulosus</i>	1	8.7
Common Carp	<i>Cyprinus carpio</i>	1	
Golden Shiner	<i>Notemigonus crysoleucas</i>	1	
Swallowtail Shiner	<i>Notropis procne</i>	1	

Species Identified at Neshanic River (FIBI087)
(Not to Scale)

John Scarola



Tessellated Darter

John Scarola



White Sucker

Konrad Schmidt



Green Sunfish

John Scarola



Redbreast Sunfish

Konrad Schmidt



Spottail Shiner

John Scarola



Smallmouth Bass

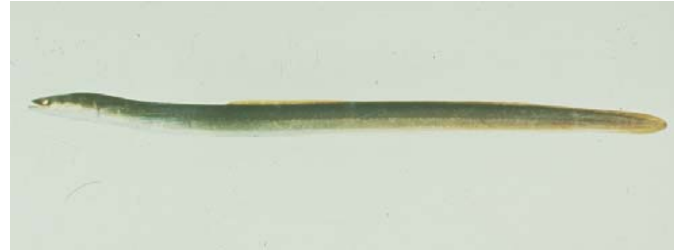
Species Identified at Neshanic River (FIBI087)
(Not to Scale)

John Scarola



Rockbass

John Scarola



American Eel

John Scarola



Longnose Dace

John Scarola



Banded Killifish

John Scarola



Bluegill

Shute



Margined Madtom

Species Identified at Neshanic River (FIBI087)
(Not to Scale)

John Scarola



Yellow Bullhead

Jenkins, Burkhead



Redfin Pickerel

No Picture Available

John Scarola



Brown Bullhead

Hybrid Green Sunfish X Bluegill

John Scarola



Common Carp

John Scarola



Golden Shiner

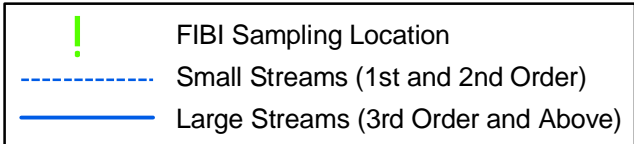
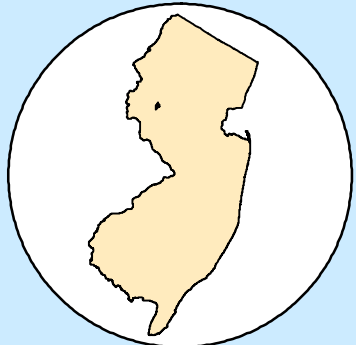
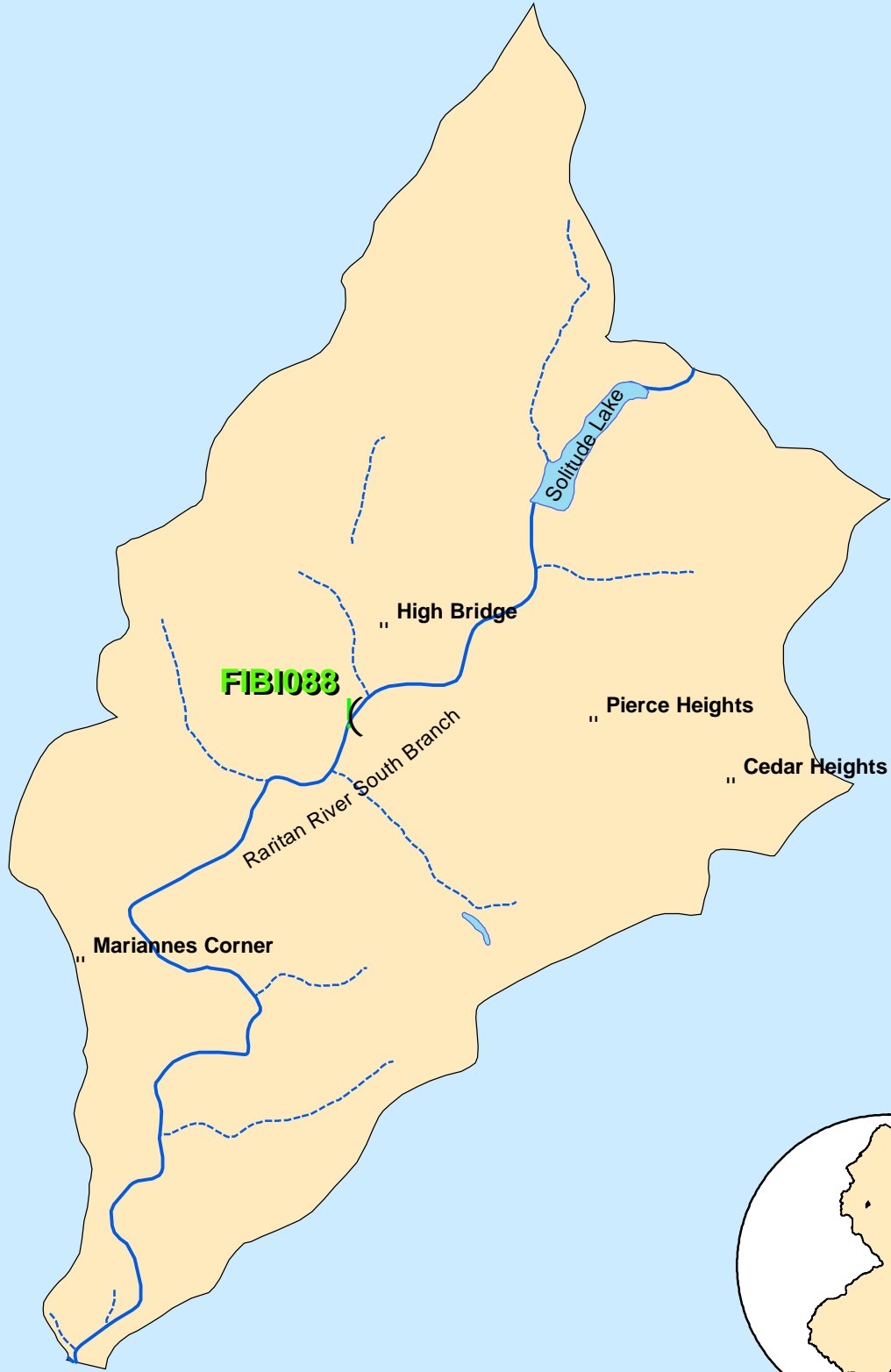
Species Identified at Neshanic River (FIBI087)
(Not to Scale)

Jenkins, Burkhead



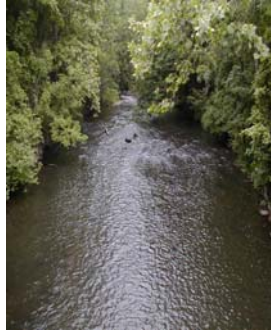
Swallowtail Shiner

Raritan River South Branch - FIBI088



SUMMARY OF RESULTS

FIBI088 – Raritan River South Branch



1. Stream Name:	Raritan River South Branch
2. Sampling Date:	09-15-2004
3. Sampling Location:	Arch Street
4. Municipality:	High Bridge
5. County:	Hunterdon
6. Watershed Management Area:	8
7. Contributing Drainage Area:	68.4 Square Miles
8. Electrofishing Gear:	2 Backpack
9. FIBI Score and Rating:	46 - Excellent
10. Habitat Score and Rating:	142- Sub-Optimal
11. Fishable Species Present:	Yes
12. Relevant AMNET ¹ Station Data:	
Proximity of FIBI station to AMNET station:	3.1 mi. upstream AN0322
AMNET Rating:	Round 1 – Non-impaired Round 2 – Non-impaired Round 3 – Non-impaired
13. Stream Chemistries:	
Dissolved Oxygen	9.26 mg/L
Temperature.	19.2 °C
pH	7.70
Conductivity	313 µmhos/cm
14. Number of Fish With Anomalies:	0
15. Length of Stream Segment Sampled	150 Meters
16. Water Clarity:	Slightly Turbid
17. Average Forest Open Canopy:	38.5%
18. Discharge:	184.8 ft. ³ /sec
19. Substrate:	5% Gravel and Sand, 70% Cobble, 25% Boulder
20. Habitat:	85% Riffle, 10% Run, 5% Pool
21. Snags	Yes
22. Periphyton	Moderate
23. Submerged Aquatic Vegetation	Yes
24. Other observations:	
25. Number of Fish Species Identified:	13
26. Total Number of Fish Collected:	289

¹ AMNET is the acronym for the DEP's ambient benthic macroinvertebrate monitoring network – a series of 820 monitoring stations located throughout the state's waterways that collects data on the health of bottom dwelling stream fauna which in turn is used to assess general water quality.

FIBI088
RARITAN RIVER SOUTH BRANCH
Arch Street
High Bridge Boro, Hunterdon County



Legend

- Start
- Finish
- Direction of Flow
- Segment Sampled

3

FIBI088- @ Raritan River South Branch
Date Sampled - 9/15/2004

Excellent Good Fair Poor

	Score
# of Fish Species	5
# of Benthic Insectivorous Species (BI)	5
# of Trout and Centrarchid Species (trout, bass, sunfish, crappie)	3
# of Intolerant Species (IS)	5
Proportion of Individuals as White Suckers	5
Proportion of Individuals as Generalists (carp, creek chub, banded killifish, goldfish, fathead minnow, green sunfish)	5
Proportion of Individuals as Insectivorous Cyprinids (I and BI)	5
Proportion of Individuals as Trout OR Proportion of Individuals as Piscivores (Excluding American Eel)*	3
Number of Individuals in Sample	5
Proportion of Individuals w/disease/anomalies (excluding blackspot)	5
Total	46

Stream Rating	
45-50	Excellent
37-44	Good
29-36	Fair
10-28	Poor

	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
1. Epifaunal Substrate /Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
SCORE 17	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.					
SCORE 19	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
3. Velocity/Depth Regimes	All 4 velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (slow is <0.3 m/s, deep is >0.5 m)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity / depth regime (usually slow-deep).					
SCORE 15	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
SCORE 9	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
SCORE 18	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. In stream habitat greatly altered or removed entirely.					
SCORE 11	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.					
SCORE 19	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.					
SCORE <u>9</u> (LB)	Left	10	9			8	7	6			5	4	3			2	1	0			
SCORE <u>6</u> (RB)	Right	10	9			8	7	6			5	4	3			2	1	0			
9. Bank Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, under story shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
SCORE <u>8</u> (LB)	Left	10	9			8	7	6			5	4	3			2	1	0			
SCORE <u>8</u> (RB)	Right	10	9			8	7	6			5	4	3			2	1	0			
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.					
SCORE <u>1</u> (LB)	Left	10	9			8	7	6			5	4	3			2	1	0			
SCORE <u>2</u> (RB)	Right	10	9			8	7	6			5	4	3			2	1	0			

HABITAT SCORE

142

HABITAT SCORES	VALUE
OPTIMAL	160 – 200
SUB-OPTIMAL	110 – 159
MARGINAL	60 – 109
POOR	< 60

FIBI088

09-15-2004

Raritan River South Branch

LISTED IN ORDER OF ABUNDANCE

COMMON NAME	SCIENTIFIC NAME	# FOUND	SIZE RANGE (INCHES)
Longnose Dace	<i>Rhinichthys cataractae</i>	118	
Tessellated Darter	<i>Etheostoma olmstedii</i>	73	
American Eel	<i>Anguilla rostrata</i>	46	
Blacknose Dace	<i>Rhinichthys atratulus</i>	22	
White Sucker	<i>Catostomus commersoni</i>	7	
Brown Trout	<i>Salmo trutta</i>	5	8.7 – 11.6
Redbreast Sunfish	<i>Lepomis auritus</i>	4	3.7 – 4.3
Smallmouth Bass	<i>Micropterus dolomieu</i>	4	3.2 – 5.7
Margined Madtom	<i>Noturus insignis</i>	3	
Spottail Shiner	<i>Notropis hudsonius</i>	3	
Cutlips Minnow	<i>Exoglossum maxillingua</i>	2	
Redfin Pickerel	<i>Esox americanus americanus</i>	1	8.7
Rock Bass	<i>Ambloplites rupestris</i>	1	7.9

Species Identified at Raritan River S.B. (FIBI088)
(Not to Scale)

John Scarola



Longnose Dace

John Scarola



Tessellated Darter

John Scarola



American Eel

John Scarola



Blacknose Dace

John Scarola



White Sucker

John Scarola



Brown Trout

Species Identified at Raritan River S.B. (FIBI088)
(Not to Scale)

John Scarola



Redbreast Sunfish

John Scarola



Smallmouth Bass

Shute



Margined Madtom

Konrad Schmidt



Spottail Shiner

Jenkins, Burkhead



Cutlips Minnow

Jenkins, Burkhead



Redfin Pickerel

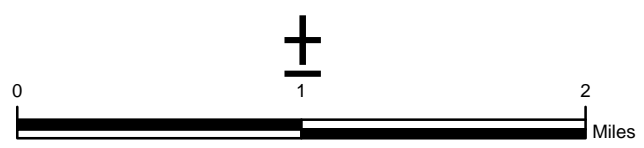
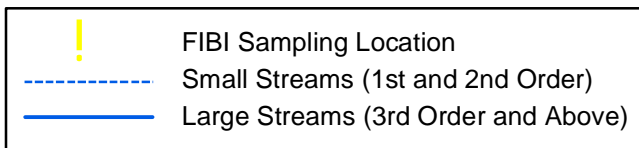
Species Identified at Raritan River S.B. (FIBI088)
(Not to Scale)

John Scarola



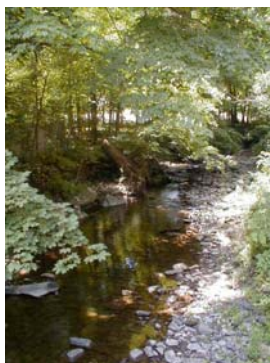
Rockbass

Bedens Brook - FIBI089



SUMMARY OF RESULTS

FIBI089 – Bedens Brook



1. Stream Name:	Bedens Brook
2. Sampling Date:	09-22-2004
3. Sampling Location:	Opossum Road
4. Municipality	Montgomery
5. County:	Somerset
6. Watershed Management Area:	10
7. Contributing Drainage Area:	26.5 Square Miles
8. Electrofishing Gear:	2 Backpack
9. FIBI Score and Rating:	40 - Good
10. Habitat Score and Rating:	120- Sub-Optimal
11. Fishable Species Present:	Yes
12. Relevant AMNET ¹ Station Data:	
Proximity of FIBI station to AMNET station:	1.2 mi. US AMNET site AN0401
AMNET Rating:	Round 1 - Moderate Round 2 – Moderate Round 3 – Non-impaired
13. Stream Chemistries:	
Dissolved Oxygen	10.15 mg/L
Temperature.	15.1 °C
pH	8.26
Conductivity	362 µmhos/cm
14. Number of Fish With Anomalies:	0
15. Length of Stream Segment Sampled	150 Meters
16. Water Clarity:	Clear
17. Average Forest Open Canopy:	17.2%
18. Discharge:	0.3 ft. ³ /sec
19. Substrate:	10% Gravel and Sand, 10% Cobble, 5% Mud, 5% Silt, 70% Bedrock
20. Habitat:	20% Riffle, 70% Run, 10% Pool
21. Snags	Yes
22. Periphyton	Moderate
23. Submerged Aquatic Vegetation	No
24. Other observations:	
25. Number of Fish Species Identified:	18
26. Total Number of Fish Collected:	553

¹ AMNET is the acronym for the DEP's ambient benthic macroinvertebrate monitoring network – a series of 820 monitoring stations located throughout the state's waterways that collects data on the health of bottom dwelling stream fauna which in turn is used to assess general water quality.

FIBI089
BEDENS BROOK
Opossum Road
Montgomery Township, Somerset County



0 0.1 Miles

Opossum Road

3

Legend

- ! Start
- ! Finish
- Direction of Flow
- Segment Sampled

FIBI089- @ Bedens Brook
Date Sampled - 9/22/2004

Excellent **Good** Fair Poor

	Score
# of Fish Species	5
# of Benthic Insectivorous Species (BI)	5
# of Trout and Centrarchid Species (trout, bass, sunfish, crappie)	5
# of Intolerant Species (IS)	1
Proportion of Individuals as White Suckers	5
Proportion of Individuals as Generalists (carp, creek chub, banded killifish, goldfish, fathead minnow, green sunfish)	5
Proportion of Individuals as Insectivorous Cyprinids (I and BI)	3
Proportion of Individuals as Trout	
OR	
Proportion of Individuals as Piscivores (Excluding American Eel)*	1
Number of Individuals in Sample	5
Proportion of Individuals w/disease/anomalies (excluding blackspot)	5
Total	40

Stream Rating

45-50 **Excellent**
37-44 **Good**
29-36 **Fair**
10-28 **Poor**

	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
1. Epifaunal Substrate /Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
SCORE 10	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.					
SCORE 18	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
3. Velocity/Depth Regimes	All 4 velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (slow is <0.3 m/s, deep is >0.5 m)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity / depth regime (usually slow-deep).					
SCORE 14	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
SCORE 3	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
SCORE 19	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. In stream habitat greatly altered or removed entirely.					
SCORE 19	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.					
SCORE 15	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.					
SCORE <u>1</u> (LB)	Left	10	9			8	7	6			5	4	3			2	1	0			
SCORE <u>0</u> (RB)	Right	10	9			8	7	6			5	4	3			2	1	0			
9. Bank Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, under story shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
SCORE <u>6</u> (LB)	Left	10	9			8	7	6			5	4	3			2	1	0			
SCORE <u>7</u> (RB)	Right	10	9			8	7	6			5	4	3			2	1	0			
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.					
SCORE <u>7</u> (LB)	Left	10	9			8	7	6			5	4	3			2	1	0			
SCORE <u>6</u> (RB)	Right	10	9			8	7	6			5	4	3			2	1	0			

HABITAT SCORE

120

HABITAT SCORES	VALUE
OPTIMAL	160 – 200
SUB-OPTIMAL	110 – 159
MARGINAL	60 – 109
POOR	< 60

FIBI089

09-22-2004

Beden's Brook

LISTED IN ORDER OF ABUNDANCE FOUND

COMMON NAME	SCIENTIFIC NAME	# FOUND	SIZE RANGE (INCHES)
American Eel	<i>Anguilla rostrata</i>	162	
Tessellated Darter	<i>Etheostoma olmstedii</i>	96	
Spottail Shiner	<i>Notropis hudsonius</i>	79	
Redbreast Sunfish	<i>Lepomis auritus</i>	35	2.2 – 6.1
Longnose Dace	<i>Rhinichthys cataractae</i>	30	
Common Shiner	<i>Notropis cornutus</i>	27	
White Sucker	<i>Catostomus commersoni</i>	21	
Banded Killifish	<i>Fundulus diaphanus</i>	19	
Blacknose Dace	<i>Rhinichthys atratulus</i>	19	
Green Sunfish	<i>Lepomis cyanellus</i>	16	1.8 – 5.7
Satinfin Shiner	<i>Notropis analostanus</i>	11	
Rockbass	<i>Ambloplites rupestris</i>	10	3.2 – 6.7
Bluegill	<i>Lepomis macrochirus</i>	9	2.6 – 3.4
Creek Chub	<i>Semotilus atromaculatus</i>	5	
Smallmouth Bass	<i>Micropterus dolomieu</i>	4	3.0 – 4.7
Golden Shiner	<i>Notemigonus crysoleucas</i>	3	
Yellow Bullhead	<i>Ameiurus natalis</i>	1	5.9

Species Identified at Bedens Brook (FIBI089)
(Not to Scale)

John Scarola



American Eel

John Scarola



Tessellated Darter

Konrad Schmidt



Spottail Shiner

John Scarola



Redbreast Sunfish

John Scarola



Longnose Dace

Konrad Schmidt



Common Shiner

Species Identified at Bedens Brook (FIBI089)
(Not to Scale)

John Scarola



White Sucker

John Scarola



Banded Killifish

John Scarola



Blacknose Dace

Konrad Schmidt



Green Sunfish

Jenkins, Burkhead



Satinfin Shiner

John Scarola



Rockbass

Species Identified at Bedens Brook (FIBI089)
(Not to Scale)

John Scarola



Bluegill

Konrad Schmidt



Creek Chub

John Scarola



Smallmouth Bass

John Scarola



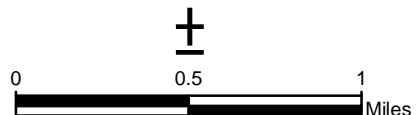
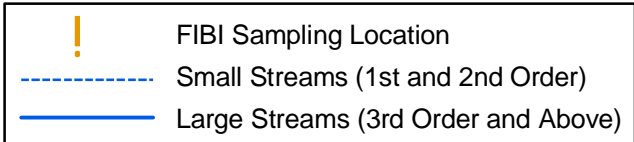
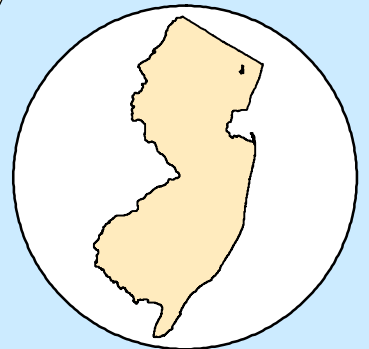
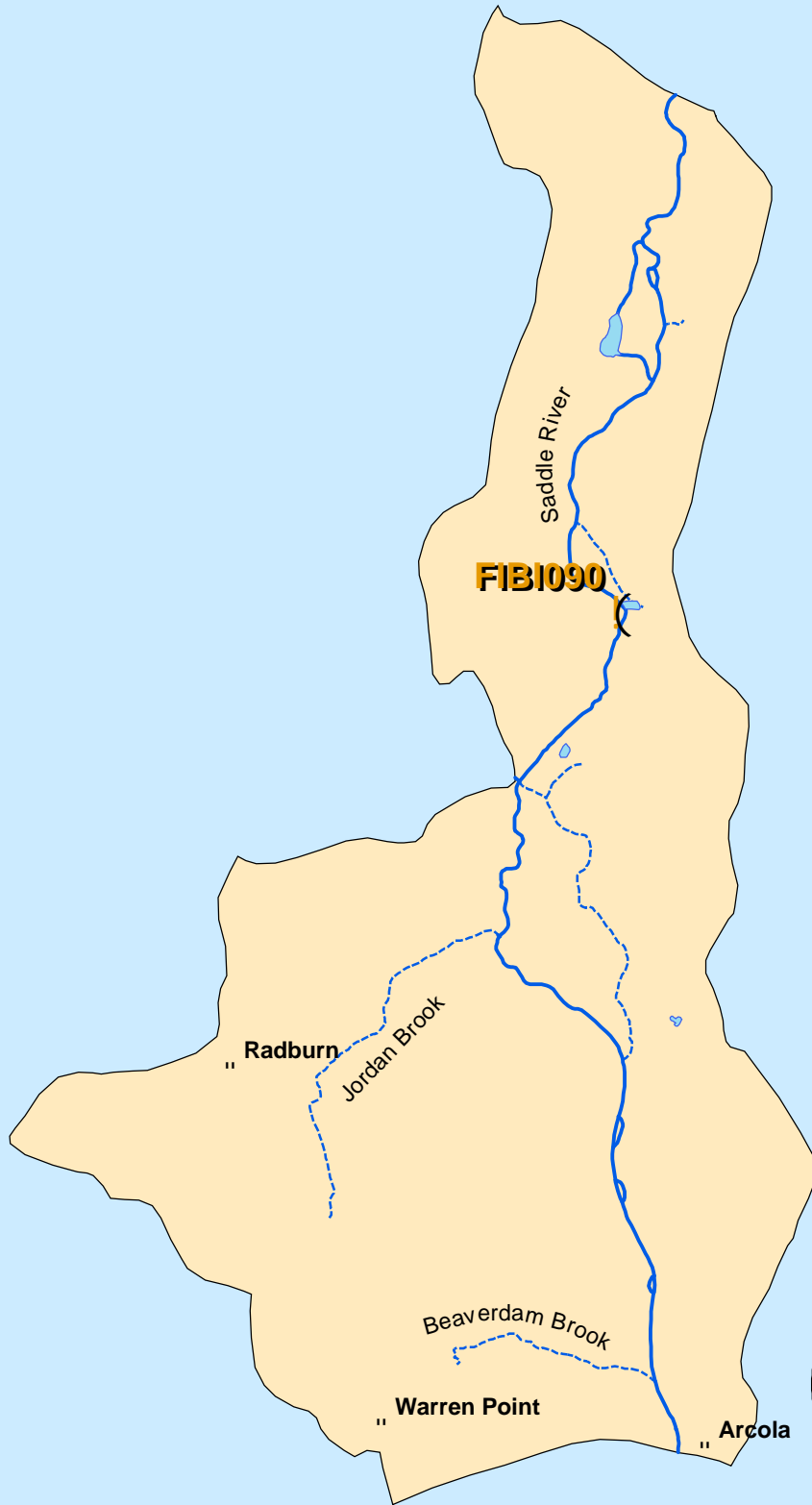
Golden Shiner

John Scarola



Yellow Bullhead

Saddle River - FIBI090



SUMMARY OF RESULTS

FIBI090 – Saddle River



1. Stream Name:	Saddle River
2. Sampling Date:	07-21-2004
3. Sampling Location:	Grove Street
4. Municipality:	Ridgewood Village
5. County:	Bergen
6. Watershed Management Area:	4
7. Contributing Drainage Area:	4414.1 Square Miles
8. Electrofishing Gear:	2 Backpack
9. FIBI Score and Rating:	30 - Fair
10. Habitat Score and Rating:	127- Sub-Optimal
11. Fishable Species Present:	Yes
12. Relevant AMNET ¹ Station Data:	
Proximity of FIBI station to AMNET station:	0.91 mi. downstream AN0282
AMNET Rating:	Round 1 – Non-impaired Round 2 – Non-impaired Round 3 – Non-impaired
13. Stream Chemistries:	
Dissolved Oxygen	11.0 mg/L
Temperature.	22.5 °C
pH	7.80
Conductivity	442 µmhos/cm
14. Number of Fish With Anomalies:	0
15. Length of Stream Segment Sampled	150 Meters
16. Water Clarity:	Clear
17. Average Forest Open Canopy:	72.8%
18. Discharge:	33.1 ft. ³ /sec
19. Substrate:	95% Gravel and Sand, 3% Silt, 2% Rip-rap
20. Habitat:	5% Riffle, 75% Run, 20% Pool
21. Snags	Yes
22. Periphyton	Heavy
23. Submerged Aquatic Vegetation	No
24. Other observations:	
25. Number of Fish Species Identified:	15
26. Total Number of Fish Collected:	508

¹ AMNET is the acronym for the DEP's ambient benthic macroinvertebrate monitoring network – a series of 820 monitoring stations located throughout the state's waterways that collects data on the health of bottom dwelling stream fauna which in turn is used to assess general water quality.

FIBI090
SADDLE RIVER
Grove Street
Ridgewood Village, Bergen County



0 0.1 Miles

Legend

- ! Start
- ! Finish
- ↻ Direction of Flow
- Segment Sampled

3

FIBI090- @ Saddle River
Date Sampled - 7/21/2004

Excellent Good **Fair** Poor

	Score
# of Fish Species	5
# of Benthic Insectivorous Species (BI)	3
# of Trout and Centrarchid Species (trout, bass, sunfish, crappie)	3
# of Intolerant Species (IS)	1
Proportion of Individuals as White Suckers	1
Proportion of Individuals as Generalists (carp, creek chub, banded killifish, goldfish, fathead minnow, green sunfish)	5
Proportion of Individuals as Insectivorous Cyprinids (I and BI)	1
Proportion of Individuals as Trout *whichever gives better score OR	
Proportion of Individuals as Piscivores (Excluding American Eel)*	1
Number of Individuals in Sample	5
Proportion of Individuals w/disease/anomalies (excluding blackspot)	5
Total	30

<u>Stream Rating</u>	
45-50	Excellent
37-44	Good
29-36	Fair
10-28	Poor

	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
1. Epifaunal Substrate /Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
SCORE 14	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.					
SCORE 17	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
3. Velocity/Depth Regimes	All 4 velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (slow is <0.3 m/s, deep is >0.5 m)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity / depth regime (usually slow-deep).					
SCORE 15	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
SCORE 10	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
SCORE 11	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. In stream habitat greatly altered or removed entirely.					
SCORE 15	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.					
SCORE 5	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.					
SCORE <u>6</u> (LB)	Left	10	9			8	7	6			5	4	3			2	1	0			
SCORE <u>7</u> (RB)	Right	10	9			8	7	6			5	4	3			2	1	0			
9. Bank Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, under story shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
SCORE <u>7</u> (LB)	Left	10	9			8	7	6			5	4	3			2	1	0			
SCORE <u>9</u> (RB)	Right	10	9			8	7	6			5	4	3			2	1	0			
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.					
SCORE <u>4</u> (LB)	Left	10	9			8	7	6			5	4	3			2	1	0			
SCORE <u>7</u> (RB)	Right	10	9			8	7	6			5	4	3			2	1	0			

HABITAT SCORE

127

HABITAT SCORES	VALUE
OPTIMAL	160 – 200
SUB-OPTIMAL	110 – 159
MARGINAL	60 – 109
POOR	< 60

FIBI090

07-21-2004

Saddle River

LISTED IN ORDER OF ABUNDANCE FOUND

COMMON NAME	SCIENTIFIC NAME	# FOUND	SIZE RANGE (INCHES)
White Sucker	<i>Catostomus commersoni</i>	230	
Tessellated Darter	<i>Etheostoma olmstedii</i>	118	
Blacknose Dace	<i>Rhinichthys atratulus</i>	83	
Redbreast Sunfish	<i>Lepomis auritus</i>	18	1.4 – 3.7
Green Sunfish	<i>Lepomis cyanellus</i>	16	2.0 – 5.1
American Eel	<i>Anguilla rostrata</i>	12	
Largemouth Bass	<i>Micropterus salmoides</i>	9	1.6 – 7.7
Brown Trout	<i>Salmo trutta</i>	6	2.8 – 3.9
Banded Killifish	<i>Fundulus diaphanus</i>	5	
Longnose Dace	<i>Rhinichthys cataractae</i>	4	
Bluegill	<i>Lepomis macrochirus</i>	3	2.4 – 3.5
Common Carp	<i>Cyprinus carpio</i>	1	
Pumpkinseed	<i>Lepomis gibbosus</i>	1	3.2
Bluegill x Green Sunfish Hybrid	<i>Lepomis macrochirus x cyanellus</i>	1	4.1
Oriental Weatherfish	<i>Misgurnus anguillicaudatus</i>	1	

Species Identified at Saddle River (FIBI090)
(Not to Scale)

John Scarola



White Sucker

John Scarola



Tessellated Darter

John Scarola



Blacknose Dace

John Scarola



Redbreast Sunfish

Konrad Schmidt



Green Sunfish

John Scarola



American Eel

Species Identified at Saddle River (FIBI090)
(Not to Scale)

AFS



Largemouth Bass

John Scarola



Brown Trout

John Scarola



Banded Killifish

Konrad Schmidt



Longnose Dace

John Scarola



Bluegill

Konrad Schmidt



Common Carp

Species Identified at Saddle River (FIBI090)
(Not to Scale)

John Scarola



Pumpkinseed

No Picture Available

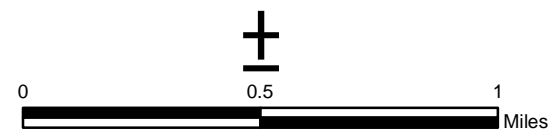
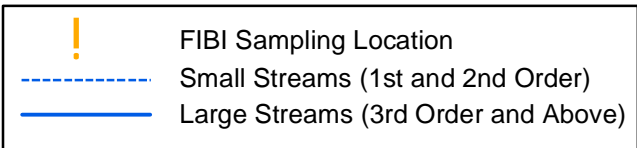
Hybrid Green Sunfish X Bluegill

Noel Burkhead



Oriental Weatherfish

Green Brook - FIBI091



SUMMARY OF RESULTS

FIBI091 – Green Brook



1. Stream Name:	Green Brook
2. Sampling Date:	08-26-2004
3. Sampling Location:	Union Avenue
4. Municipality:	South Bound Brook
5. County:	Middlesex/Somerset
6. Watershed Management Area:	9
7. Contributing Drainage Area:	51.1 Square Miles
8. Electrofishing Gear:	2 Backpack
9. FIBI Score and Rating:	36 - Fair
10. Habitat Score and Rating:	152- Sub-Optimal
11. Fishable Species Present:	Yes
12. Relevant AMNET ¹ Station Data:	
Proximity of FIBI station to AMNET station:	0.34 mi. upstream AN0426
AMNET Rating:	Round 1 - Moderate Round 2 – Moderate Round 3 - Severe
13. Stream Chemistries:	
Dissolved Oxygen	7.92 mg/L
Temperature.	19.3 °C
pH	6.46
Conductivity	480 µmhos/cm
14. Number of Fish With Anomalies:	0
15. Length of Stream Segment Sampled	150 Meters
16. Water Clarity:	Turbid
17. Average Forest Open Canopy:	44.7%
18. Discharge:	104.9 ft. ³ /sec
19. Substrate:	40% Gravel and Sand, 45% Mud, 15% Silt
20. Habitat:	25% Riffle, 15% Run, 60% Pool
21. Snags	Yes
22. Periphyton	Heavy
23. Submerged Aquatic Vegetation	Yes
24. Other observations:	
25. Number of Fish Species Identified:	16
26. Total Number of Fish Collected:	604

¹ AMNET is the acronym for the DEP's ambient benthic macroinvertebrate monitoring network – a series of 820 monitoring stations located throughout the state's waterways that collects data on the health of bottom dwelling stream fauna which in turn is used to assess general water quality.

FIBI091
GREEN BROOK
Union Avenue
Ridgewood Township, Bergen County



FIBI091- @ Green Brook
Date Sampled - 8/26/2004

Excellent Good **Fair** Poor

	Score
# of Fish Species	5
# of Benthic Insectivorous Species (BI)	5
# of Trout and Centrarchid Species (trout, bass, sunfish, crappie)	3
# of Intolerant Species (IS)	1
Proportion of Individuals as White Suckers	3
Proportion of Individuals as Generalists (carp, creek chub, banded killifish, goldfish, fathead minnow, green sunfish)	5
Proportion of Individuals as Insectivorous Cyprinids (I and BI)	3
Proportion of Individuals as Trout *whichever gives better score OR	
Proportion of Individuals as Piscivores (Excluding American Eel)*	1
Number of Individuals in Sample	5
Proportion of Individuals w/disease/anomalies (excluding blackspot)	5
Total	36

<u>Stream Rating</u>	
45-50	Excellent
37-44	Good
29-36	Fair
10-28	Poor

	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
1. Epifaunal Substrate /Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
SCORE 19	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.					
SCORE 11	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
3. Velocity/Depth Regimes	All 4 velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (slow is <0.3 m/s, deep is >0.5 m)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity / depth regime (usually slow-deep).					
SCORE 19	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
SCORE 9	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
SCORE 16	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. In stream habitat greatly altered or removed entirely.					
SCORE 19	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.					
SCORE 17	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.					
SCORE <u>5</u> (LB)	Left	10	9			8	7	6			5	4	3			2	1	0			
SCORE <u>2</u> (RB)	Right	10	9			8	7	6			5	4	3			2	1	0			
9. Bank Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, under story shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
SCORE <u>9</u> (LB)	Left	10	9			8	7	6			5	4	3			2	1	0			
SCORE <u>9</u> (RB)	Right	10	9			8	7	6			5	4	3			2	1	0			
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.					
SCORE <u>8</u> (LB)	Left	10	9			8	7	6			5	4	3			2	1	0			
SCORE <u>9</u> (RB)	Right	10	9			8	7	6			5	4	3			2	1	0			

HABITAT SCORE

152

HABITAT SCORES	VALUE
OPTIMAL	160 – 200
SUB-OPTIMAL	110 – 159
MARGINAL	60 – 109
POOR	< 60

FIBI091

08-26-2004

Green Brook

LISTED IN ORDER OF ABUNDANCE FOUND

COMMON NAME	SCIENTIFIC NAME	# FOUND	SIZE RANGE (INCHES)
Spottail Shiner	<i>Notropis hudsonius</i>	223	
American Eel	<i>Anguilla rostrata</i>	155	
Tessellated Darter	<i>Etheostoma olmstedii</i>	82	
White Sucker	<i>Catostomus commersoni</i>	62	
Longnose Dace	<i>Rhinichthys cataractae</i>	21	
Redbreast Sunfish	<i>Lepomis auritus</i>	20	3.4 – 6.1
Fallfish	<i>Semotilus corporalis</i>	16	
Banded Killifish	<i>Fundulus diaphanus</i>	8	
Creek Chub	<i>Semotilus atromaculatus</i>	4	
Common Shiner	<i>Notropis cornutus</i>	3	
Satinfin Shiner	<i>Notropis analostanus</i>	3	
Golden Shiner	<i>Notemigonus crysoleucas</i>	2	
Green Sunfish	<i>Lepomis cyanellus</i>	2	5.1
Blacknose Dace	<i>Rhinichthys atratulus</i>	1	
Brown Bullhead	<i>Ameiurus nebulosus</i>	1	4.7
Yellow Bullhead	<i>Ameiurus natalis</i>	1	8.3

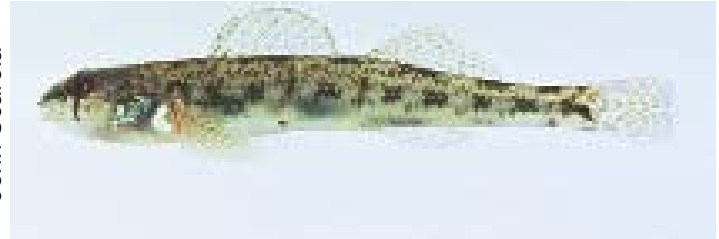
Species Identified at Green Brook (FIBI091)
(Not to Scale)

John Scarola



White Sucker

John Scarola



Tessellated Darter

John Scarola



Redbreast Sunfish

Shute



Margined Madtom

John Scarola



Bluegill

Jenkins, Burkhead



Cutlips Minnow

Species Identified at Green Brook (FIBI091)
(Not to Scale)

John Scarola



Yellow Bullhead

John Scarola



Yellow Perch

John Scarola



American Eel

John Scarola



Rockbass

Konrad Schmidt



Creek Chub

John Scarola



Banded Killifish

Species Identified at Green Brook (FIBI091)
(Not to Scale)

John Scarola



Blacknose Dace

John Scarola



Longnose Dace

John Scarola



Pumpkinseed

John Scarola



Smallmouth Bass

John Scarola



Chain Pickerel

AFS



Largemouth Bass

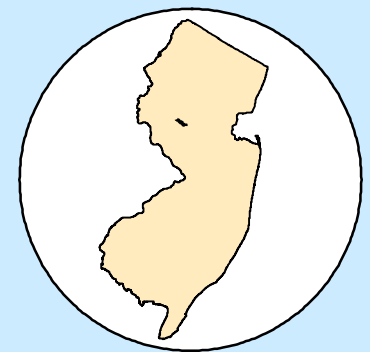
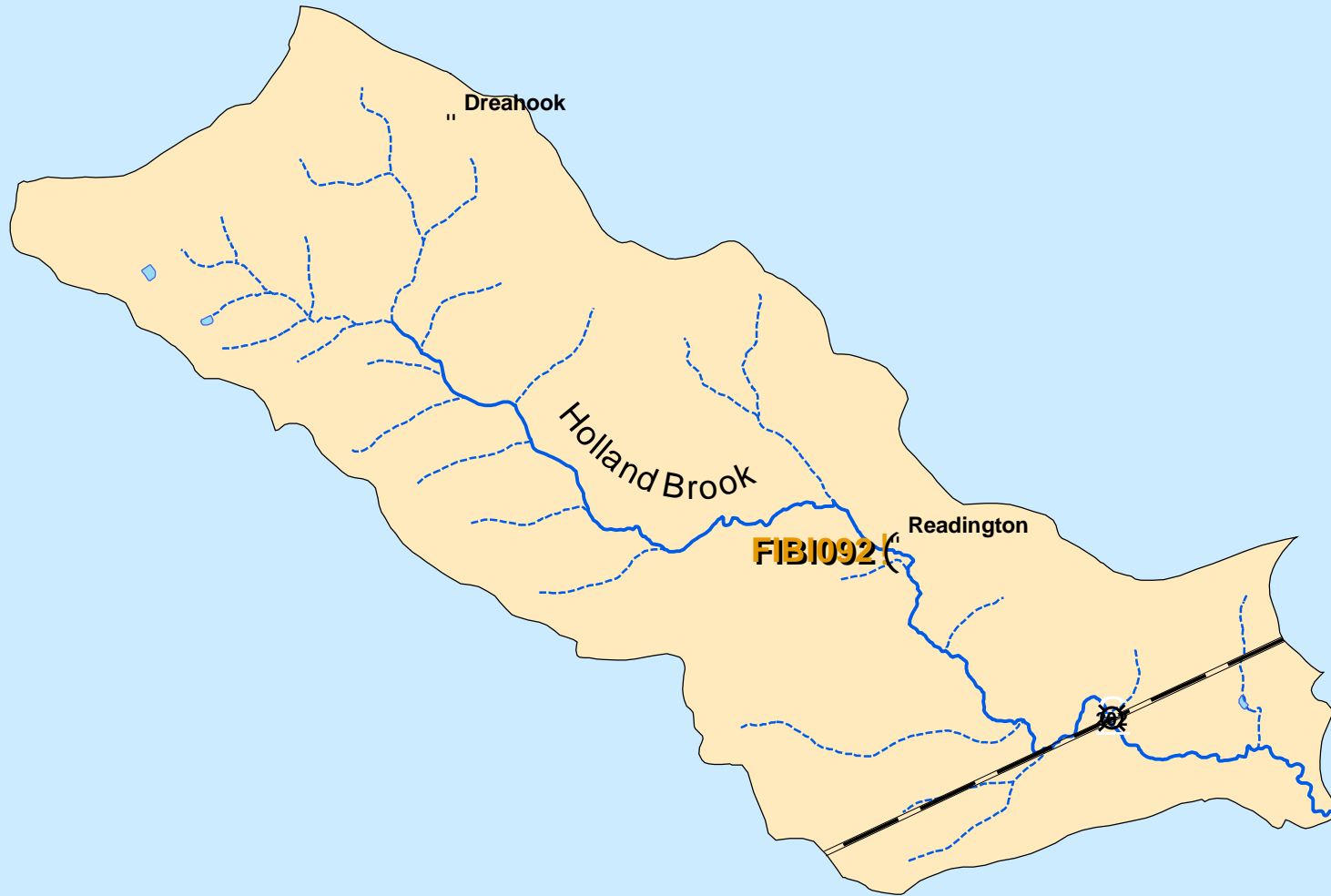
Species Identified at Green Brook (FIBI091)
(Not to Scale)




Jenkins, Burkhead




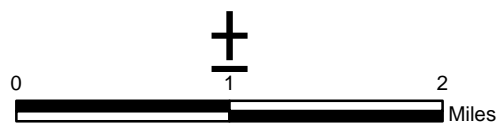
Eastern Mudminnow

Holland Brook - FIBI092



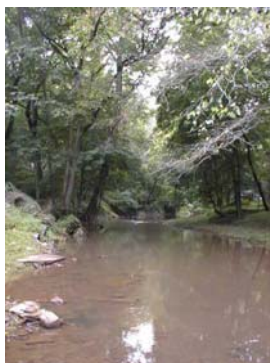
	FIBI Sampling Location
	Small Streams (1st and 2nd Order)
	Large Streams (3rd Order and Above)

IBI Ratings	
	Excellent
	Good
	Fair
	Poor



SUMMARY OF RESULTS

FIBI092 – Holland Brook



1. Stream Name:	Holland Brook
2. Sampling Date:	07-14-2004
3. Sampling Location:	Hillcrest Road
4. Municipality:	Readington
5. County:	Hunterdon
6. Watershed Management Area:	8
7. Contributing Drainage Area:	7.9 Square Miles
8. Electrofishing Gear:	2 Backpack
9. FIBI Score and Rating:	34 - Fair
10. Habitat Score and Rating:	126- Sub-Optimal
11. Fishable Species Present:	Yes
12. Relevant AMNET ¹ Station Data:	
Proximity of FIBI station to AMNET station:	2.75 mi. downstream AN0342
AMNET Rating:	Round 1 - Non-impaired Round 2 – Non-impaired Round 3 – Non-impaired
13. Stream Chemistries:	
Dissolved Oxygen	8.4 mg/L
Temperature.	18.2 °C
pH	7.24
Conductivity	208 µmhos/cm
14. Number of Fish With Anomalies:	0
15. Length of Stream Segment Sampled	150 Meters
16. Water Clarity:	Slightly Turbid
17. Average Forest Open Canopy:	18.7%
18. Discharge:	31.1 ft. ³ /sec
19. Substrate:	40% Gravel and Sand, 5% Cobble, 10% Boulder, 10% Mud, 35% Silt
20. Habitat:	3% Riffle, 95% Run, 2% Pool
21. Snags	Yes
22. Periphyton	Slight
23. Submerged Aquatic Vegetation	Yes
24. Other observations:	
25. Number of Fish Species Identified:	15
26. Total Number of Fish Collected:	196

¹ AMNET is the acronym for the DEP's ambient benthic macroinvertebrate monitoring network – a series of 820 monitoring stations located throughout the state's waterways that collects data on the health of bottom dwelling stream fauna which in turn is used to assess general water quality.

FIBI092
HOLLAND BROOK
Hillcrest Road
Readington Township, Hunterdon County



Legend

- Start
- Finish
- Direction of Flow
- Segment Sampled

0 0.1 Miles

FIBI092- @ Holland Brook
Date Sampled - 7/14/2004

Excellent Good **Fair** Poor

	Score
# of Fish Species	5
# of Benthic Insectivorous Species (BI)	3
# of Trout and Centrarchid Species (trout, bass, sunfish, crappie)	5
# of Intolerant Species (IS)	3
Proportion of Individuals as White Suckers	1
Proportion of Individuals as Generalists (carp, creek chub, banded killifish, goldfish, fathead minnow, green sunfish)	5
Proportion of Individuals as Insectivorous Cyprinids (I and BI)	1
Proportion of Individuals as Trout *whichever gives better score OR	
Proportion of Individuals as Piscivores (Excluding American Eel)*	3
Number of Individuals in Sample	3
Proportion of Individuals w/disease/anomalies (excluding blackspot)	5
Total	34

<u>Stream Rating</u>	
45-50	Excellent
37-44	Good
29-36	Fair
10-28	Poor

	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
1. Epifaunal Substrate /Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
SCORE 8	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.					
SCORE 11	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
3. Velocity/Depth Regimes	All 4 velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (slow is <0.3 m/s, deep is >0.5 m)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity / depth regime (usually slow-deep).					
SCORE 12	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
SCORE 13	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
SCORE 16	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. In stream habitat greatly altered or removed entirely.					
SCORE 17	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.					
SCORE 8	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.					
SCORE <u>7</u> (LB)	Left	10	9			8	7	6			5	4	3			2	1	0			
SCORE <u>5</u> (RB)	Right	10	9			8	7	6			5	4	3			2	1	0			
9. Bank Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, under story shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
SCORE <u>6</u> (LB)	Left	10	9			8	7	6			5	4	3			2	1	0			
SCORE <u>9</u> (RB)	Right	10	9			8	7	6			5	4	3			2	1	0			
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.					
SCORE <u>6</u> (LB)	Left	10	9			8	7	6			5	4	3			2	1	0			
SCORE <u>8</u> (RB)	Right	10	9			8	7	6			5	4	3			2	1	0			

HABITAT SCORE

126

HABITAT SCORES	VALUE
OPTIMAL	160 – 200
SUB-OPTIMAL	110 – 159
MARGINAL	60 – 109
POOR	< 60

FIBI092

07-14-2004

Holland Brook

LISTED IN ORDER OF ABUNDANCE FOUND

COMMON NAME	SCIENTIFIC NAME	# FOUND	SIZE RANGE (INCHES)
White Sucker	<i>Catostomus commersoni</i>	71	
Spottail Shiner	<i>Notropis hudsonius</i>	29	
Tessellated Darter	<i>Etheostoma olmstedii</i>	19	
Green Sunfish	<i>Lepomis cyanellus</i>	17	2.0 – 5.1
Redbreast Sunfish	<i>Lepomis auritus</i>	14	3.2 – 4.7
American Eel	<i>Anguilla rostrata</i>	12	
Rockbass	<i>Ambloplites rupestris</i>	12	3.5 – 6.5
Common Shiner	<i>Notropis cornutus</i>	6	
Largemouth Bass	<i>Micropterus salmoides</i>	5	1.6 – 1.8
Smallmouth Bass	<i>Micropterus dolomieu</i>	4	1.4 – 6.5
Chain Pickerel	<i>Esox niger</i>	2	3.7 – 4.1
Brook Trout	<i>Salvelinus fontinalis</i>	1	10.8
Golden Shiner	<i>Notemigonus crysoleucas</i>	1	
Yellow Bullhead	<i>Ameiurus natalis</i>	1	5.5
Redbreast x Green Sunfish Hybrid	<i>Lepomis auritus x cyanellus</i>	1	3.5

Species Identified at Holland Brook (FIBI092)
(Not to Scale)

John Scarola



White Sucker

Konrad Schmidt



Spottail Shiner

John Scarola



Tessellated Darter

Konrad Schmidt



Green Sunfish

John Scarola



Redbreast Sunfish

John Scarola



American Eel

Species Identified at Holland Brook (FIBI092)
(Not to Scale)

John Scarola



Rockbass

John Scarola



Common Shiner

AFS



Largemouth Bass

John Scarola



Smallmouth Bass

John Scarola



Chain Pickerel

Dr. Don Beimborn



Brook Trout

Species Identified at Holland Brook (FIBI092)
(Not to Scale)

John Scarola



Golden Shiner

John Scarola



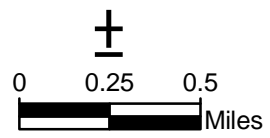
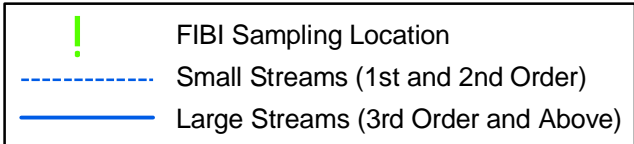
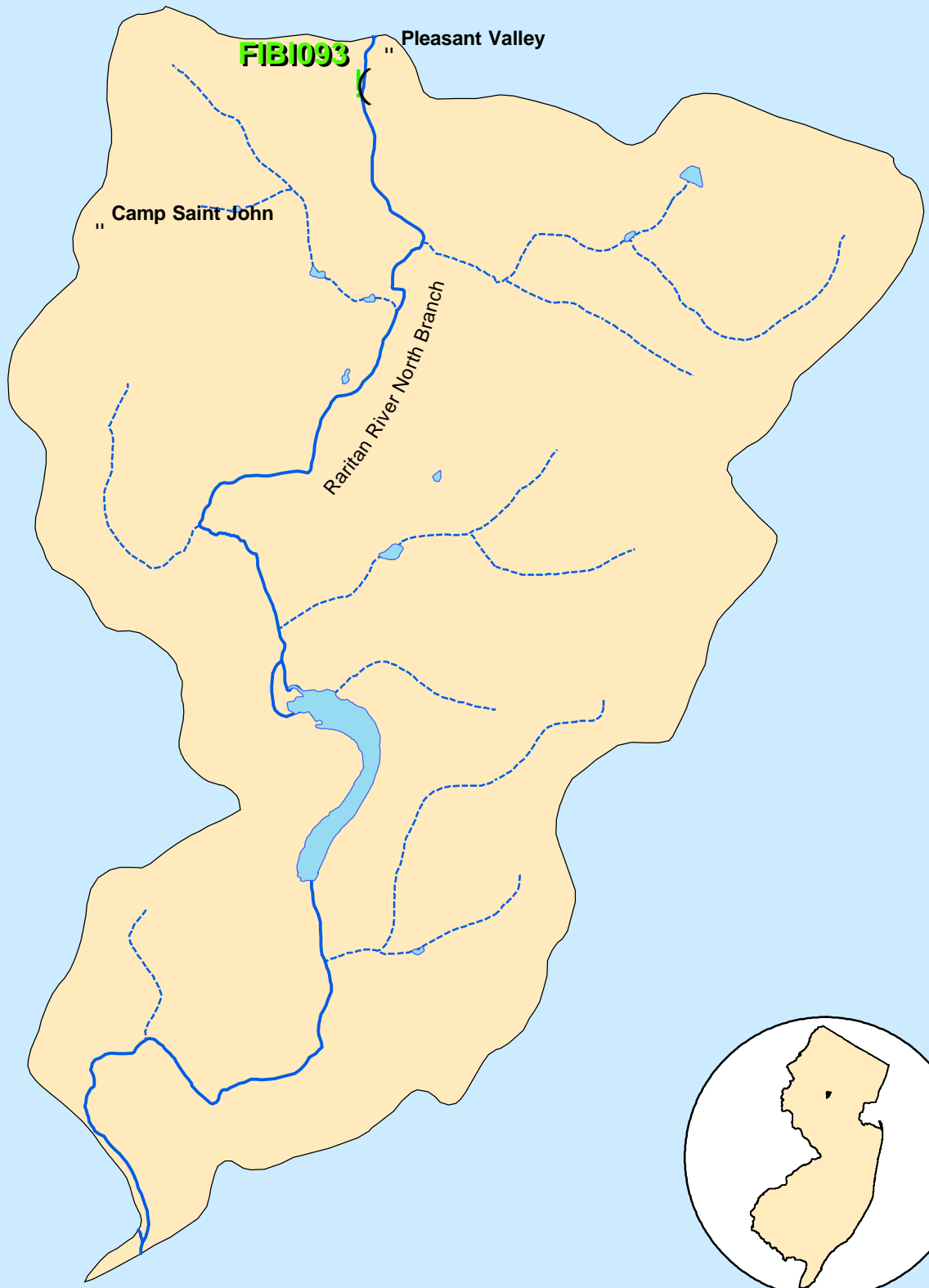
Yellow Bullhead

John Scarola

No Picture Available

Hybrid Redbreast X Green Sunfish

Raritan River North Branch - FIBI093



SUMMARY OF RESULTS

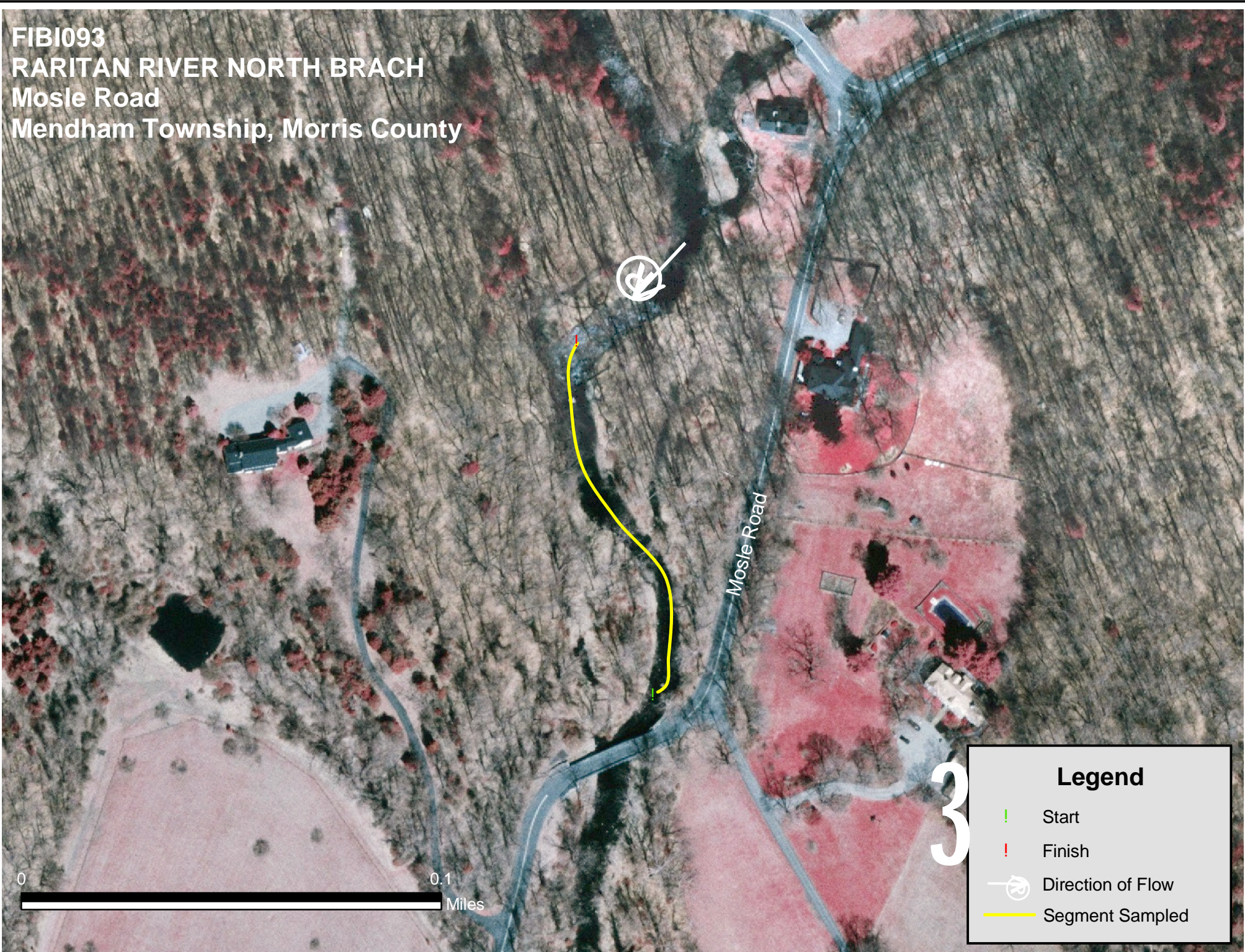
FIBI093 – Raritan River North Branch



1. Stream Name:	Raritan River North Branch
2. Sampling Date:	08-02-2004
3. Sampling Location:	Mosle Road
4. Municipality	Mendham
5. County:	Morris
6. Watershed Management Area:	8
7. Contributing Drainage Area:	21.1 Square Miles
8. Electrofishing Gear:	2 Backpack
9. FIBI Score and Rating:	48 - Excellent
10. Habitat Score and Rating:	165- Optimal
11. Fishable Species Present:	Yes
12. Relevant AMNET ¹ Station Data:	
Proximity of FIBI station to AMNET station:	2.09 mi. downstream AN0346
AMNET Rating:	Round 1 – Non-impaired Round 2 – Non-impaired Round 3 – Non-impaired
13. Stream Chemistries:	
Dissolved Oxygen	8.51 mg/L
Temperature.	21.5 °C
pH	7.97
Conductivity	250 µmhos/cm
14. Number of Fish With Anomalies:	0
15. Length of Stream Segment Sampled	150 Meters
16. Water Clarity:	Clear
17. Average Forest Open Canopy:	15.9%
18. Discharge:	64.0 ft. ³ /sec
19. Substrate:	10% Gravel and Sand, 30% Cobble, 60% Boulder
20. Habitat:	70% Riffle, 20% Run, 10% Pool
21. Snags	Yes
22. Periphyton	Moderate
23. Submerged Aquatic Vegetation	No
24. Other observations:	
25. Number of Fish Species Identified:	16
26. Total Number of Fish Collected:	290

¹ AMNET is the acronym for the DEP's ambient benthic macroinvertebrate monitoring network – a series of 820 monitoring stations located throughout the state's waterways that collects data on the health of bottom dwelling stream fauna which in turn is used to assess general water quality.

FIBI093
RARITAN RIVER NORTH BRACH
Mosle Road
Mendham Township, Morris County



0 0.1 Miles

3

Legend

- ! Start
- ! Finish
- ↻ Direction of Flow
- Segment Sampled

FIBI093- @ Raritan River North Branch
Date Sampled - 8/02/2004

Excellent Good Fair Poor

	Score
# of Fish Species	5
# of Benthic Insectivorous Species (BI)	3
# of Trout and Centrarchid Species (trout, bass, sunfish, crappie)	5
# of Intolerant Species (IS)	5
Proportion of Individuals as White Suckers	5
Proportion of Individuals as Generalists (carp, creek chub, banded killifish, goldfish, fathead minnow, green sunfish)	5
Proportion of Individuals as Insectivorous Cyprinids (I and BI)	5
Proportion of Individuals as Trout OR Proportion of Individuals as Piscivores (Excluding American Eel)*	5
Number of Individuals in Sample	5
Proportion of Individuals w/disease/anomalies (excluding blackspot)	5
Total	48

Stream Rating	
45-50	Excellent
37-44	Good
29-36	Fair
10-28	Poor

HABITAT ASSESSMENT FOR HIGH GRADIENT STREAMS Raritan River NB (FIBI093) – 8/2/04

	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
1. Epifaunal Substrate /Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
SCORE 18	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.					
SCORE 14	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
3. Velocity/Depth Regimes	All 4 velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (slow is <0.3 m/s, deep is >0.5 m)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity / depth regime (usually slow-deep).					
SCORE 15	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
SCORE 13	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
SCORE 19	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. In stream habitat greatly altered or removed entirely.					
SCORE 19	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.					
SCORE 17	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.					
SCORE <u>8</u> (LB)	Left	10	9			8	7	6			5	4	3			2	1	0			
SCORE <u>8</u> (RB)	Right	10	9			8	7	6			5	4	3			2	1	0			
9. Bank Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, under story shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
SCORE <u>9</u> (LB)	Left	10	9			8	7	6			5	4	3			2	1	0			
SCORE <u>10</u> (RB)	Right	10	9			8	7	6			5	4	3			2	1	0			
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.					
SCORE <u>6</u> (LB)	Left	10	9			8	7	6			5	4	3			2	1	0			
SCORE <u>9</u> (RB)	Right	10	9			8	7	6			5	4	3			2	1	0			

HABITAT SCORE

165

HABITAT SCORES	VALUE
OPTIMAL	160 – 200
SUB-OPTIMAL	110 – 159
MARGINAL	60 – 109
POOR	< 60

FIBI093

08-02-2004

Raritan River North Branch

LISTED IN ORDER OF ABUNDANCE

COMMON NAME	SCIENTIFIC NAME	# FOUND	SIZE RANGE (INCHES)
Longnose Dace	<i>Rhinichthys cataractae</i>	65	
Blacknose Dace	<i>Rhinichthys atratulus</i>	53	
Brown Trout	<i>Salmo trutta</i>	45	3.0 – 11.8
White Sucker	<i>Catostomus commersoni</i>	39	
Tessellated Darter	<i>Etheostoma olmstedii</i>	10	
Smallmouth Bass	<i>Micropterus dolomieu</i>	9	2.6 – 7.5
Fallfish	<i>Semotilus corporalis</i>	8	
Rock Bass	<i>Ambloplites rupestris</i>	8	5.5 – 7.9
Green Sunfish	<i>Lepomis cyanellus</i>	7	2.4 – 5.1
Redbreast Sunfish	<i>Lepomis auritus</i>	5	1.6 – 5.1
Rainbow Trout	<i>Oncorhynchus mykiss</i>	4	8.6 – 11.0
American Eel	<i>Anguilla rostrata</i>	2	
Sea Lamprey	<i>Petromyzon marinus</i>	2	
Pumpkinseed	<i>Lepomis gibbosus</i>	2	2.4
Bluegill	<i>Lepomis macrochirus</i>	1	3.4 – 6.5
Creek Chub	<i>Semotilus atromaculatus</i>	1	

Species Identified at Raritan River N.B. (FIBI093)
(Not to Scale)

John Scarola



Longnose Dace

Konrad Schmidt



Blacknose Dace

John Scarola



Brown Trout

John Scarola



White Sucker

John Scarola



Tessellated Darter

John Scarola



Smallmouth Bass

Species Identified at Raritan River N.B. (FIBI093)
(Not to Scale)

John Scarola



Fallfish

John Scarola



Rockbass

Konrad Schmidt



Green Sunfish

John Scarola



Redbreast Sunfish

John Scarola



Rainbow Trout

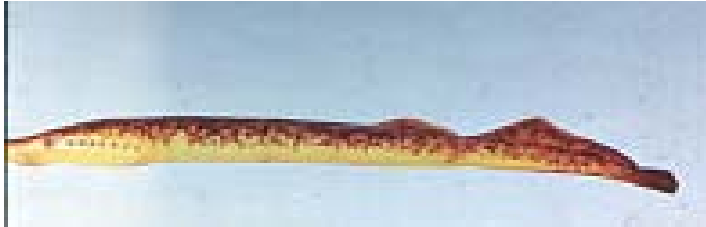
John Scarola



American Eel

Species Identified at Raritan River N.B. (FIBI093)
(Not to Scale)

John Scarola



Sea Lamprey

John Scarola



Pumpkinseed

John Scarola



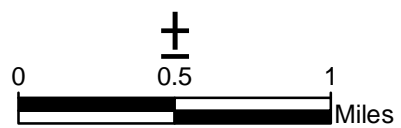
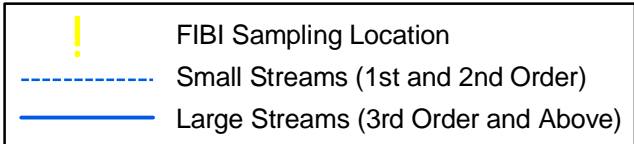
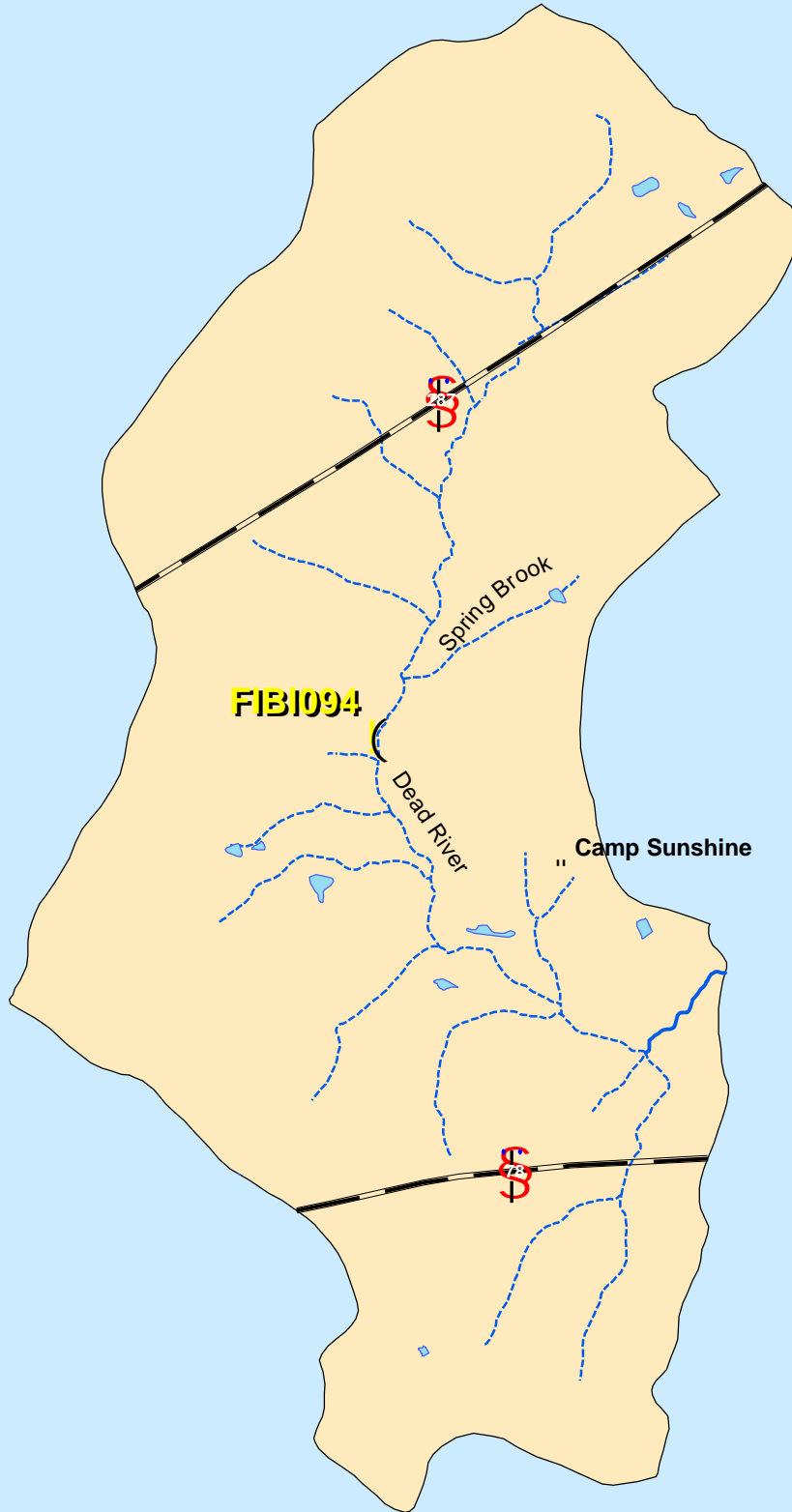
Bluegill

Konrad Schmidt



Creek Chub

Dead River - FIBI094



SUMMARY OF RESULTS

FIBI094 – Dead River¹



1. Stream Name:	Dead River
2. Sampling Date:	07-22-2004
3. Sampling Location:	Liberty Corner Road
4. Municipality	Bernards
5. County:	Somerset
6. Watershed Management Area:	6
7. Contributing Drainage Area:	3.6 Square Miles
8. Electrofishing Gear:	2 Backpack
9. FIBI Score and Rating:	38 - Good
10. Habitat Score and Rating:	166- Optimal
11. Fishable Species Present:	Yes
12. Relevant AMNET ² Station Data:	
Proximity of FIBI station to AMNET station:	0.54 mi. upstream AN0266
AMNET Rating:	Round 1 – Moderate Round 2 – Non-impaired Round 3 – Non-impaired
13. Stream Chemistries:	
Dissolved Oxygen	8.4 mg/L
Temperature.	21.0 °C
pH	7.40
Conductivity	400 µmhos/cm
14. Number of Fish With Anomalies:	1 Creek chub with a lesion
15. Length of Stream Segment Sampled	150 Meters
16. Water Clarity:	Clear
17. Average Forest Open Canopy:	18.7%
18. Discharge:	2.1 ft. ³ /sec
19. Substrate:	35% Gravel and Sand, 50% Cobble, 5% Boulder, 10% Silt
20. Habitat:	20% Riffle, 10% Run, 70% Pool
21. Snags	Yes
22. Periphyton	Moderate
23. Submerged Aquatic Vegetation	No
24. Other observations:	
25. Number of Fish Species Identified:	15
26. Total Number of Fish Collected:	474

¹ Site has been eliminated from the Fish IBI Monitoring Network due to a contributing drainage area of less than 5 square miles.

² AMNET is the acronym for the DEP's ambient benthic macroinvertebrate monitoring network – a series of 820 monitoring stations located throughout the state's waterways that collects data on the health of bottom dwelling stream fauna which in turn is used to assess general water quality.

FIBI094
DEAD RIVER
Liberty Corner Road
Bernards Township, Somerset County



0 0.1 Miles

Legend

- ! Start
- ! Finish
- ↻ Direction of Flow
- Segment Sampled

FIBI094- @ Dead River
Date Sampled - 7/22/2004

Excellent **Good** Fair Poor

	Score
# of Fish Species	5
# of Benthic Insectivorous Species (BI)	5
# of Trout and Centrarchid Species (trout, bass, sunfish, crappie)	5
# of Intolerant Species (IS)	1
Proportion of Individuals as White Suckers	5
Proportion of Individuals as Generalists (carp, creek chub, banded killifish, goldfish, fathead minnow, green sunfish)	1
Proportion of Individuals as Insectivorous Cyprinids (I and BI)	3
Proportion of Individuals as Trout OR Proportion of Individuals as Piscivores (Excluding American Eel)*	3
Number of Individuals in Sample	5
Proportion of Individuals w/disease/anomalies (excluding blackspot)	5
Total	38

<u>Stream Rating</u>	
45-50	Excellent
37-44	Good
29-36	Fair
10-28	Poor

	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
1. Epifaunal Substrate /Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
SCORE 18	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.					
SCORE 16	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
3. Velocity/Depth Regimes	All 4 velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (slow is <0.3 m/s, deep is >0.5 m)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity / depth regime (usually slow-deep).					
SCORE 12	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
SCORE 18	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
SCORE 9	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. In stream habitat greatly altered or removed entirely.					
SCORE 19	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.					
SCORE 18	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.					
SCORE <u>8</u> (LB)	Left	10	9			8	7	6			5	4	3			2	1	0			
SCORE <u>8</u> (RB)	Right	10	9			8	7	6			5	4	3			2	1	0			
9. Bank Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, under story shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
SCORE <u>10</u> (LB)	Left	10	9			8	7	6			5	4	3			2	1	0			
SCORE <u>10</u> (RB)	Right	10	9			8	7	6			5	4	3			2	1	0			
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.					
SCORE <u>10</u> (LB)	Left	10	9			8	7	6			5	4	3			2	1	0			
SCORE <u>10</u> (RB)	Right	10	9			8	7	6			5	4	3			2	1	0			

HABITAT SCORE

166

HABITAT SCORES	VALUE
OPTIMAL	160 – 200
SUB-OPTIMAL	110 – 159
MARGINAL	60 – 109
POOR	< 60

FIBI094

07-22-2004

Dead River

LISTED IN ORDER OF ABUNDANCE FOUND

COMMON NAME	SCIENTIFIC NAME	# FOUND	SIZE RANGE (INCHES)
Green Sunfish	<i>Lepomis cyanellus</i>	203	2.6 – 6.1
Creek Chub	<i>Semotilus atromaculatus</i>	158	
Tessellated Darter	<i>Etheostoma olmstedii</i>	26	
Blacknose Dace	<i>Rhinichthys atratulus</i>	22	
Bluegill	<i>Lepomis macrochirus</i>	21	1.6 – 3.7
White Sucker	<i>Catostomus commersoni</i>	14	
Pumpkinseed	<i>Lepomis gibbosus</i>	7	3.4 – 4.1
Redfin Pickerel	<i>Esox americanus americanus</i>	6	6.5 – 8.3
Largemouth Bass	<i>Micropterus salmoides</i>	4	1.4 – 2.2
Redbreast Sunfish	<i>Lepomis auritus</i>	4	1.4 – 3.4
Longnose Dace	<i>Rhinichthys cataractae</i>	3	
Common Shiner	<i>Notropis cornutus</i>	3	
Spottail Shiner	<i>Notropis hudsonius</i>	1	
Yellow Bullhead	<i>Ameiurus natalis</i>	1	3.2
Redbreast x Pumpkinseed Hybrid	<i>Lepomis auritus x gibbosus</i>	1	

Species Identified at Dead River (FIBI094)
(Not to Scale)

Konrad Schmidt



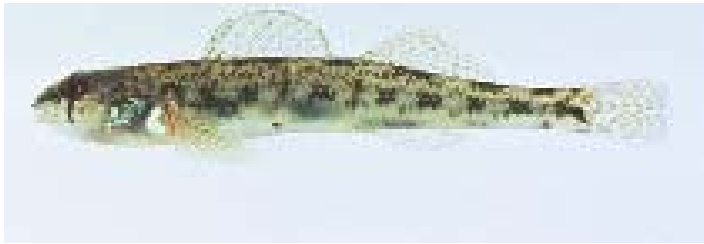
Green Sunfish

Konrad Schmidt



Creek Chub

John Scarola



Tessellated Darter

John Scarola



Blacknose Dace

John Scarola



Bluegill

John Scarola



White Sucker

Species Identified at Dead River (FIBI094)
(Not to Scale)

John Scarola



Pumpkinseed

Jenkins, Burkhead



Redfin Pickerel

AFS



Largemouth Bass

John Scarola



Redbreast Sunfish

John Scarola



Longnose Dace

John Scarola



Common Shiner

Species Identified at Dead River (FIBI094)
(Not to Scale)



Spottail Shiner

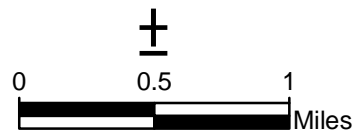
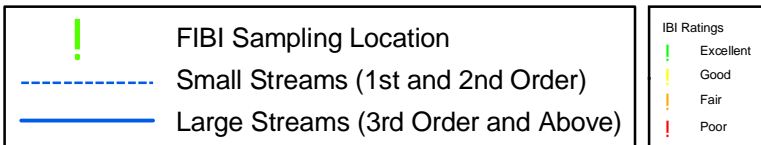
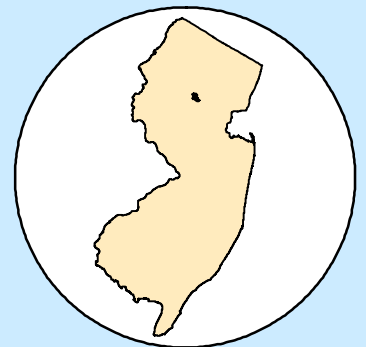


Yellow Bullhead

No Picture Available

Hybrid Redbreast X Pumpkinseed

Passaic River - FIBI095



SUMMARY OF RESULTS

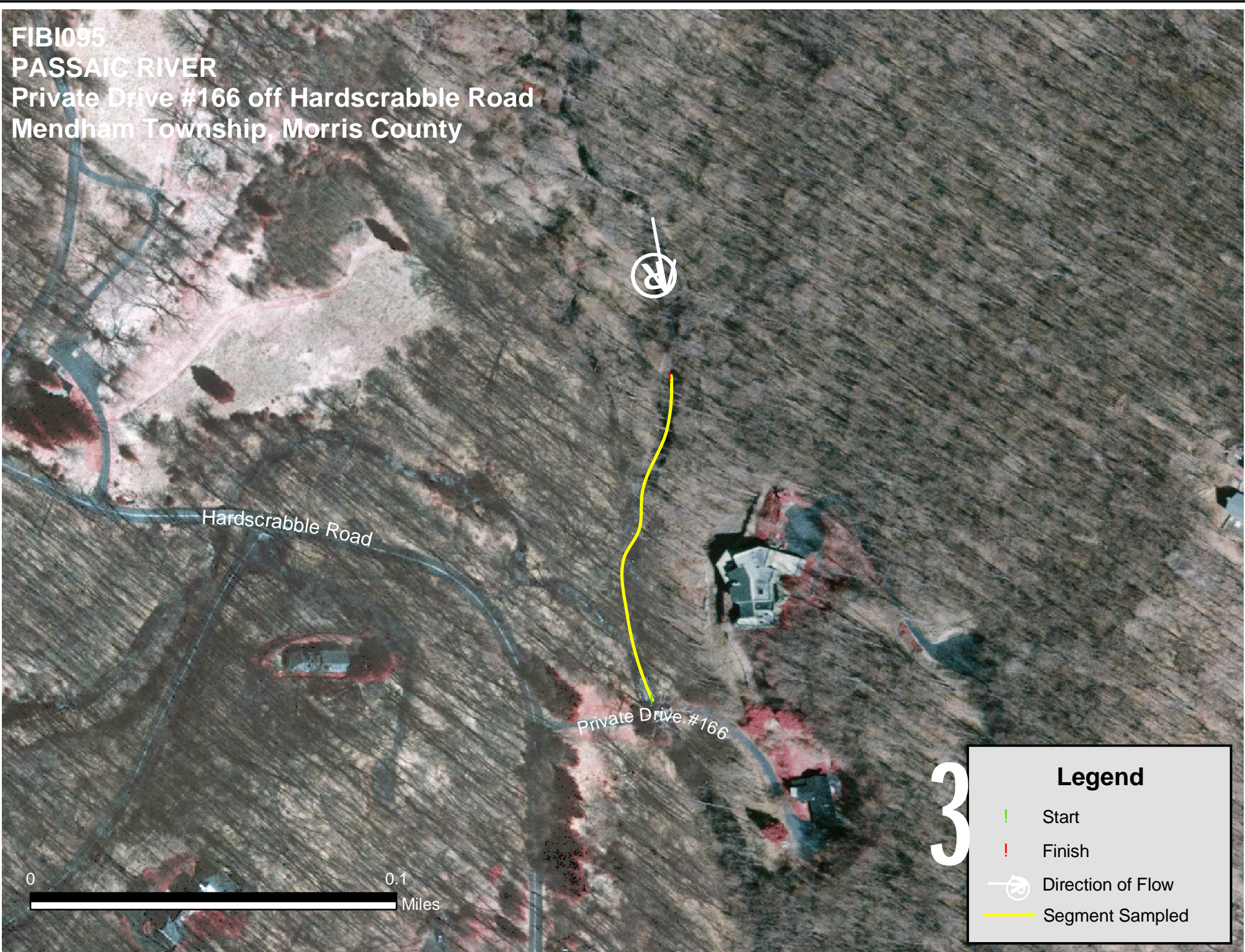
FIBI095 – Passaic River



1. Stream Name:	Passaic River
2. Sampling Date:	08-03-2004
3. Sampling Location:	Private Drive #166 off Hardscrabble Road
4. Municipality	Mendham
5. County:	Morris
6. Watershed Management Area:	6
7. Contributing Drainage Area:	7.8 Square Miles
8. Electrofishing Gear:	2 Backpack
9. FIBI Score and Rating:	48 - Excellent
10. Habitat Score and Rating:	161- Optimal
11. Fishable Species Present:	Yes
12. Relevant AMNET ¹ Station Data:	
Proximity of FIBI station to AMNET station:	0.80 mi. upstream AN0213
AMNET Rating:	Round 1 - Moderate Round 2 – Non-impaired Round 3 – Non-impaired
13. Stream Chemistries:	
Dissolved Oxygen	8.64 mg/L
Temperature.	21.8 °C
pH	7.53
Conductivity	172 µmhos/cm
14. Number of Fish With Anomalies:	0
15. Length of Stream Segment Sampled	150 Meters
16. Water Clarity:	Clear
17. Average Forest Open Canopy:	3.9%
18. Discharge:	36.5 ft. ³ /sec
19. Substrate:	30% Gravel and Sand, 60% Cobble, 10% Boulder
20. Habitat:	60% Riffle, 20% Run, 20% Pool
21. Snags	Yes
22. Periphyton	Moderate
23. Submerged Aquatic Vegetation	No
24. Other observations:	
25. Number of Fish Species Identified:	9
26. Total Number of Fish Collected:	265

¹ AMNET is the acronym for the DEP's ambient benthic macroinvertebrate monitoring network – a series of 820 monitoring stations located throughout the state's waterways that collects data on the health of bottom dwelling stream fauna which in turn is used to assess general water quality.

FIBI095
PASSAIC RIVER
Private Drive #166 off Hardscrabble Road
Mendham Township, Morris County



3

Legend	
!	Start
!	Finish
→	Direction of Flow
—	Segment Sampled

FIBI095- @ Passaic River
Date Sampled - 8/03/2004

Excellent Good Fair Poor

	Score
# of Fish Species	5
# of Benthic Insectivorous Species (BI)	5
# of Trout and Centrarchid Species (trout, bass, sunfish, crappie)	5
# of Intolerant Species (IS)	5
Proportion of Individuals as White Suckers	5
Proportion of Individuals as Generalists (carp, creek chub, banded killifish, goldfish, fathead minnow, green sunfish)	5
Proportion of Individuals as Insectivorous Cyprinids (I and BI)	3
Proportion of Individuals as Trout *whichever gives better score OR	
Proportion of Individuals as Piscivores (Excluding American Eel)*	5
Number of Individuals in Sample	5
Proportion of Individuals w/disease/anomalies (excluding blackspot)	5
Total	48

<u>Stream Rating</u>	
45-50	Excellent
37-44	Good
29-36	Fair
10-28	Poor

	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
1. Epifaunal Substrate /Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
SCORE 16	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.					
SCORE 13	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
3. Velocity/Depth Regimes	All 4 velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (slow is <0.3 m/s, deep is >0.5 m)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity / depth regime (usually slow-deep).					
SCORE 15	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
SCORE 17	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
SCORE 19	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. In stream habitat greatly altered or removed entirely.					
SCORE 20	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.					
SCORE 19	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.					
SCORE <u>7</u> (LB)	Left	10	9			8	7	6			5	4	3			2	1	0			
SCORE <u>8</u> (RB)	Right	10	9			8	7	6			5	4	3			2	1	0			
9. Bank Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, under story shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
SCORE <u>8</u> (LB)	Left	10	9			8	7	6			5	4	3			2	1	0			
SCORE <u>6</u> (RB)	Right	10	9			8	7	6			5	4	3			2	1	0			
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.					
SCORE <u>8</u> (LB)	Left	10	9			8	7	6			5	4	3			2	1	0			
SCORE <u>5</u> (RB)	Right	10	9			8	7	6			5	4	3			2	1	0			

HABITAT SCORE

161

HABITAT SCORES	VALUE
OPTIMAL	160 – 200
SUB-OPTIMAL	110 – 159
MARGINAL	60 – 109
POOR	< 60

FIBI095

08-03-2004

Passaic River

LISTED IN ORDER OF ABUNDANCE FOUND

COMMON NAME	SCIENTIFIC NAME	# FOUND	SIZE RANGE (INCHES)
Rainbow Trout	<i>Oncorhynchus mykiss</i>	108	2.4 – 8.7
Blacknose Dace	<i>Rhinichthys atratulus</i>	55	
Brown Trout	<i>Salmo trutta</i>	27	2.8 – 10.0
Creek Chub	<i>Semotilus atromaculatus</i>	24	
Longnose Dace	<i>Rhinichthys cataractae</i>	24	
White Sucker	<i>Catostomus commersoni</i>	13	
Tessellated Darter	<i>Etheostoma olmstedii</i>	10	
Largemouth Bass	<i>Micropterus salmoides</i>	2	2.2 – 2.8
Redbreast Sunfish	<i>Lepomis auritus</i>	2	2.6

Species Identified at Passaic River (FIBI095)
(Not to Scale)

John Scarola



Rainbow Trout

John Scarola



Blacknose Dace

John Scarola



Brown Trout

Konrad Schmidt



Creek Chub

John Scarola



Longnose Dace

John Scarola



White Sucker

Species Identified at Passaic River (FIBI095)
(Not to Scale)

John Scarola



Tessellated Darter

AFS



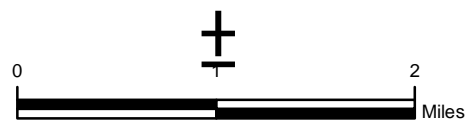
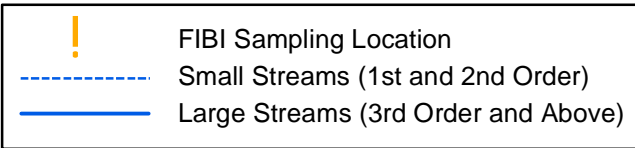
Largemouth Bass

John Scarola



Redbreast Sunfish

Wanaque River - FIBI096



SUMMARY OF RESULTS

FIBI096 – Wanaque River



1. Stream Name:	Wanaque River
2. Sampling Date:	08-24-2004
3. Sampling Location:	Hamburg Turnpike
4. Municipality	Pompton Lakes
5. County:	Passaic
6. Watershed Management Area:	3
7. Contributing Drainage Area:	1368.2 Square Miles
8. Electrofishing Gear:	2 Backpack
9. FIBI Score and Rating:	30 - Fair
10. Habitat Score and Rating:	129- Sub-Optimal
11. Fishable Species Present:	Yes
12. Relevant AMNET ¹ Station Data:	
Proximity of FIBI station to AMNET station:	0.74 mi. downstream AN0257
AMNET Rating:	Round 1 - Moderate Round 2 – Non-impaired Round 3 - Moderate
13. Stream Chemistries:	
Dissolved Oxygen	8.3 mg/L
Temperature.	20.2 °C
pH	7.35
Conductivity	302 µmhos/cm
14. Number of Fish With Anomalies:	0
15. Length of Stream Segment Sampled	150 Meters
16. Water Clarity:	Slightly Turbid
17. Average Forest Open Canopy:	27.8%
18. Discharge:	20.9 ft. ³ /sec
19. Substrate:	15% Gravel and Sand, 70% Cobble, 10% Mud, 5% Silt
20. Habitat:	5% Riffle, 50% Run, 45% Pool
21. Snags	No
22. Periphyton	Moderate
23. Submerged Aquatic Vegetation	No
24. Other observations:	
25. Number of Fish Species Identified:	13
26. Total Number of Fish Collected:	238

¹ AMNET is the acronym for the DEP's ambient benthic macroinvertebrate monitoring network – a series of 820 monitoring stations located throughout the state's waterways that collects data on the health of bottom dwelling stream fauna which in turn is used to assess general water quality.

FIBI096
WANAQUE RIVER
Paterson Hamburg Turnpike
Pompton Lakes Boro, Passaic County



Legend

- Start
- Finish
- Direction of Flow
- Segment Sampled

3

FIBI096- @ Wanaque River
Date Sampled - 8/24/2004

Excellent Good **Fair** Poor

	Score
# of Fish Species	3
# of Benthic Insectivorous Species (BI)	3
# of Trout and Centrarchid Species (trout, bass, sunfish, crappie)	3
# of Intolerant Species (IS)	1
Proportion of Individuals as White Suckers	3
Proportion of Individuals as Generalists (carp, creek chub, banded killifish, goldfish, fathead minnow, green sunfish)	5
Proportion of Individuals as Insectivorous Cyprinids (I and BI)	1
Proportion of Individuals as Trout *whichever gives better score OR	
Proportion of Individuals as Piscivores (Excluding American Eel)*	3
Number of Individuals in Sample	3
Proportion of Individuals w/disease/anomalies (excluding blackspot)	5
Total	30

<u>Stream Rating</u>	
45-50	Excellent
37-44	Good
29-36	Fair
10-28	Poor

	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
1. Epifaunal Substrate /Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
SCORE 10	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.					
SCORE 18	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
3. Velocity/Depth Regimes	All 4 velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (slow is <0.3 m/s, deep is >0.5 m)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity / depth regime (usually slow-deep).					
SCORE 14	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
SCORE 13	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
SCORE 17	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. In stream habitat greatly altered or removed entirely.					
SCORE 11	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.					
SCORE 9	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.					
SCORE <u>8</u> (LB)	Left	10	9			8	7	6			5	4	3			2	1	0			
SCORE <u>6</u> (RB)	Right	10	9			8	7	6			5	4	3			2	1	0			
9. Bank Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, under story shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
SCORE <u>7</u> (LB)	Left	10	9			8	7	6			5	4	3			2	1	0			
SCORE <u>8</u> (RB)	Right	10	9			8	7	6			5	4	3			2	1	0			
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.					
SCORE <u>2</u> (LB)	Left	10	9			8	7	6			5	4	3			2	1	0			
SCORE <u>6</u> (RB)	Right	10	9			8	7	6			5	4	3			2	1	0			

HABITAT SCORE

129

HABITAT SCORES	VALUE
OPTIMAL	160 – 200
SUB-OPTIMAL	110 – 159
MARGINAL	60 – 109
POOR	< 60

FIBI096

08-24-2004

Wanaque River

LISTED IN ORDER OF ABUNDANCE FOUND

COMMON NAME	SCIENTIFIC NAME	# FOUND	SIZE RANGE (INCHES)
Tessellated Darter	<i>Etheostoma olmstedii</i>	73	
White Sucker	<i>Catostomus commersoni</i>	60	
Creek Chub	<i>Semotilus atromaculatus</i>	25	
Smallmouth Bass	<i>Micropterus dolomieu</i>	25	2.0 – 3.9
Green Sunfish	<i>Lepomis cyanellus</i>	20	1.8 – 4.9
Redbreast Sunfish	<i>Lepomis auritus</i>	13	3.0 – 6.9
Eastern Mudminnow	<i>Umbra pygmaea</i>	6	
Blacknose Dace	<i>Rhinichthys atratulus</i>	4	
Bluegill	<i>Lepomis macrochirus</i>	4	1.6 – 2.8
Brown Trout	<i>Salmo trutta</i>	4	3.9 – 12.2
Yellow Perch	<i>Perca flavescens</i>	2	2.2 – 2.6
Rockbass	<i>Ambloplites rupestris</i>	1	5.7
Yellow Bullhead	<i>Ameiurus natalis</i>	1	5.9

Species Identified at Wanaque River (FIBI096)
(Not to Scale)

John Scarola



Tessellated Darter

John Scarola



White Sucker

Konrad Schmidt



Creek Chub

John Scarola



Smallmouth Bass

Konrad Schmidt



Green Sunfish

John Scarola



Redbreast Sunfish

Species Identified at Wanaque River (FIBI096)
(Not to Scale)

Jenkins, Burkhead



Eastern Mudminnow

John Scarola



Blacknose Dace

John Scarola



Bluegill

John Scarola



Brown Trout

John Scarola



Yellow Perch

John Scarola



Rockbass

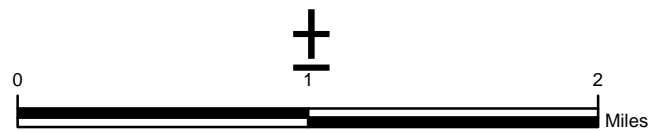
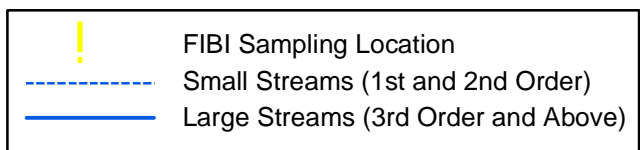
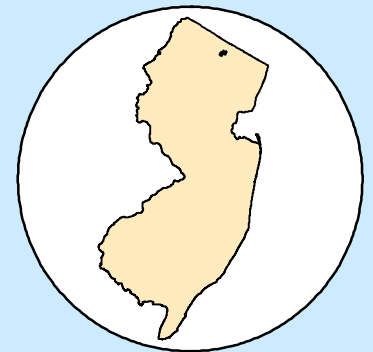
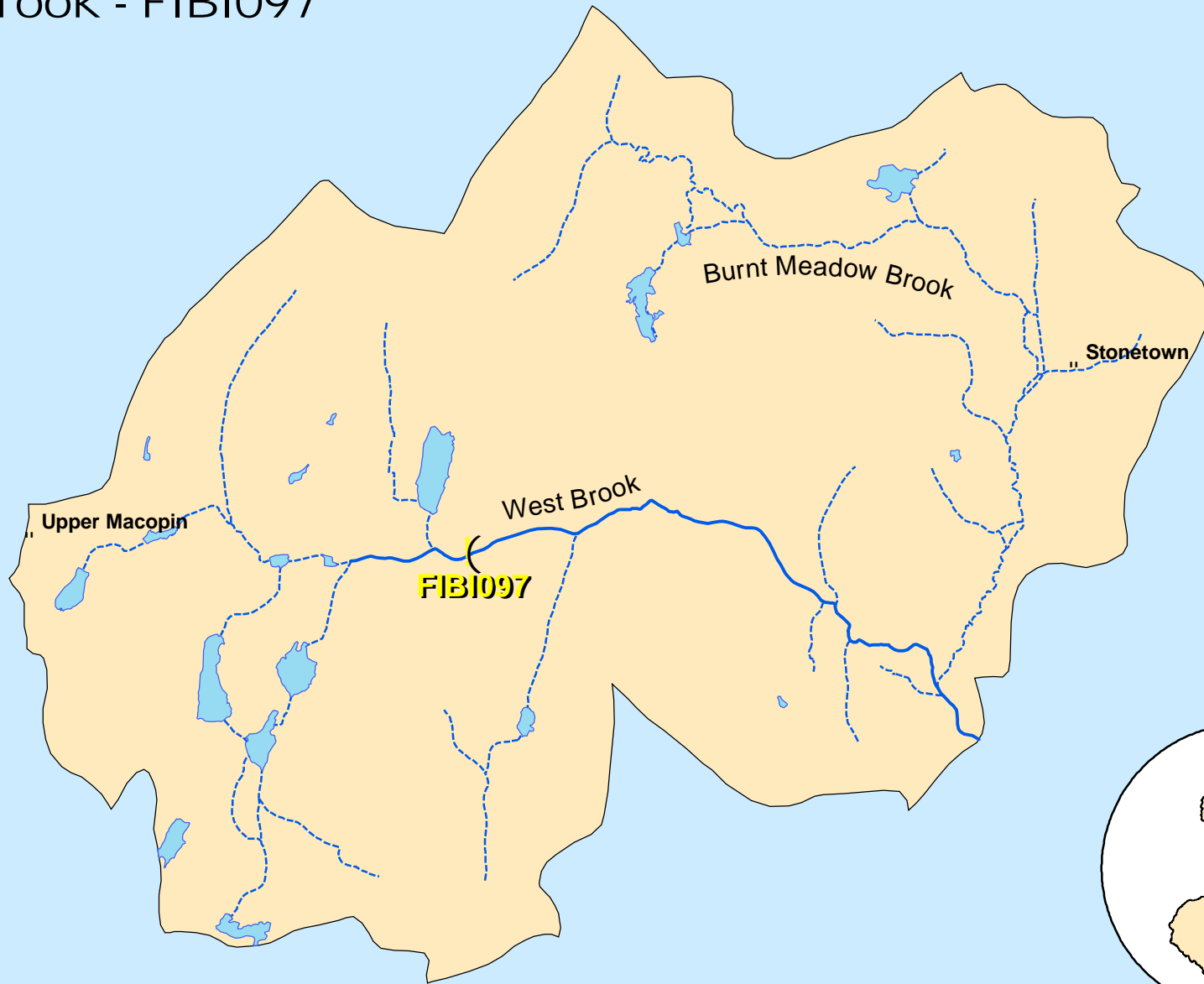
Species Identified at Wanaque River (FIBI096)
(Not to Scale)

John Scarola



Yellow Bullhead

West Brook - FIBI097



SUMMARY OF RESULTS

FIBI097 – West Brook¹

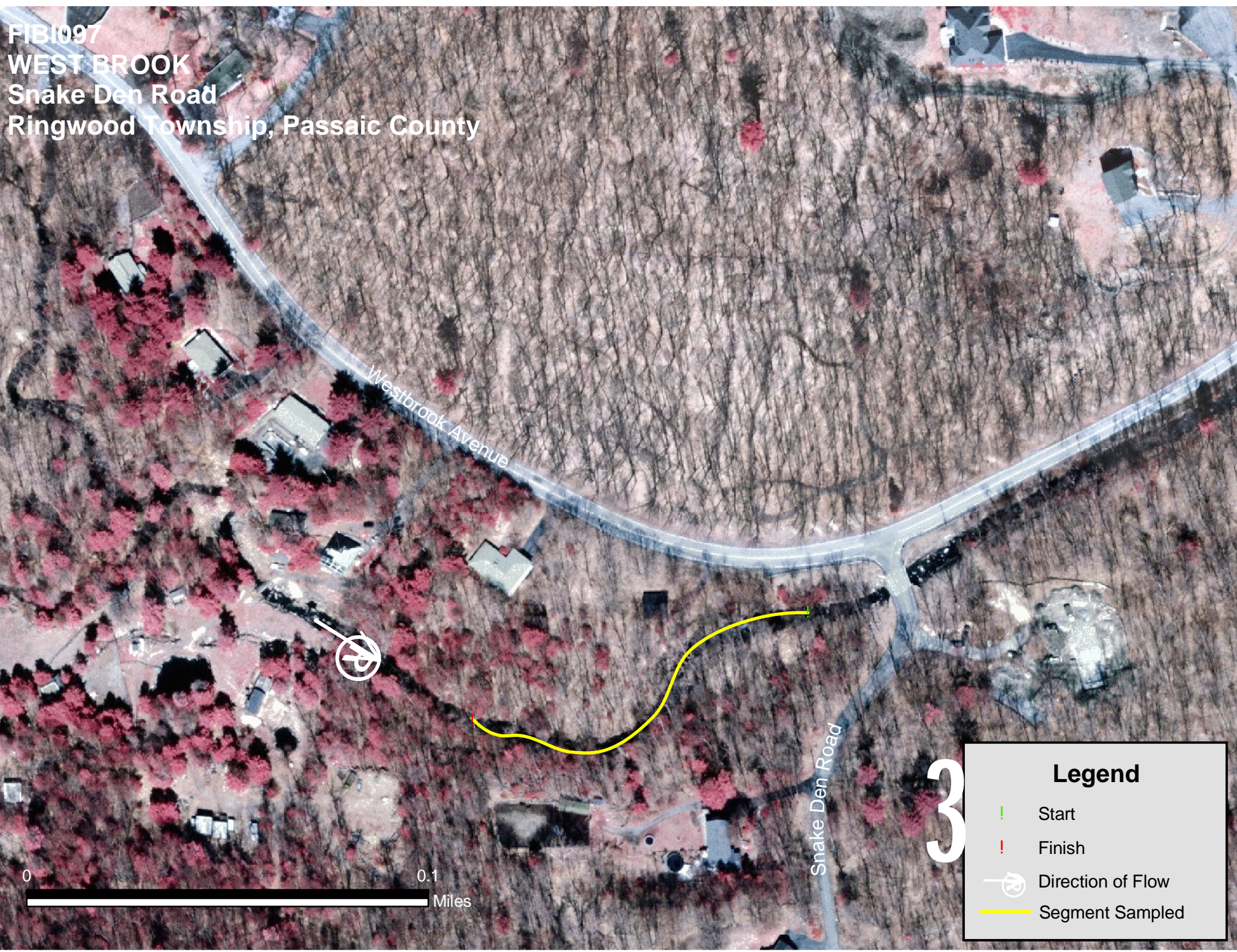


1. Stream Name:	West Brook
2. Sampling Date:	08-25-2004
3. Sampling Location:	West Brook Avenue
4. Municipality:	Ringwood
5. County:	Passaic
6. Watershed Management Area:	3
7. Contributing Drainage Area:	3.8 Square Miles
8. Electrofishing Gear:	2 Backpack
9. FIBI Score and Rating:	42 - Good
10. Habitat Score and Rating:	151- Sub-Optimal
11. Fishable Species Present:	Yes
12. Relevant AMNET ² Station Data:	
Proximity of FIBI station to AMNET station:	N/A
AMNET Rating:	N/A
13. Stream Chemistries:	
Dissolved Oxygen	7.88 mg/L
Temperature.	20.0 °C
pH	6.92
Conductivity	196 µmhos/cm
14. Number of Fish With Anomalies:	1 Bluegill with a lesion
15. Length of Stream Segment Sampled	150 Meters
16. Water Clarity:	Turbid
17. Average Forest Open Canopy:	13.5%
18. Discharge:	12.1 ft. ³ /sec
19. Substrate:	20% Gravel and Sand, 5% Cobble, 70% Boulder, 5% Mud
20. Habitat:	80% Riffle, 15% Run, 5% Pool
21. Snags	Yes
22. Periphyton	Heavy
23. Submerged Aquatic Vegetation	No
24. Other observations:	
25. Number of Fish Species Identified:	10
26. Total Number of Fish Collected:	124

¹ Site has been eliminated from the Fish IBI Monitoring Network due to a contributing drainage area of less than 5 square miles.

² AMNET is the acronym for the DEP's ambient benthic macroinvertebrate monitoring network – a series of 820 monitoring stations located throughout the state's waterways that collects data on the health of bottom dwelling stream fauna which in turn is used to assess general water quality.

FIBI097
WEST BROOK
Snake Den Road
Ringwood Township, Passaic County



3

Legend	
—	Start
—	Finish
↻	Direction of Flow
—	Segment Sampled

0 0.1 Miles

FIBI097- @ West Brook
Date Sampled - 8/25/2004

Excellent **Good** Fair Poor

	Score
# of Fish Species	5
# of Benthic Insectivorous Species (BI)	1
# of Trout and Centrarchid Species (trout, bass, sunfish, crappie)	5
# of Intolerant Species (IS)	5
Proportion of Individuals as White Suckers	5
Proportion of Individuals as Generalists (carp, creek chub, banded killifish, goldfish, fathead minnow, green sunfish)	5
Proportion of Individuals as Insectivorous Cyprinids (I and BI)	3
Proportion of Individuals as Trout OR Proportion of Individuals as Piscivores (Excluding American Eel)*	5
Number of Individuals in Sample	3
Proportion of Individuals w/disease/anomalies (excluding blackspot)	5
Total	42

<u>Stream Rating</u>	
45-50	Excellent
37-44	Good
29-36	Fair
10-28	Poor

	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
1. Epifaunal Substrate /Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
SCORE 13	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.					
SCORE 19	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
3. Velocity/Depth Regimes	All 4 velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (slow is <0.3 m/s, deep is >0.5 m)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity / depth regime (usually slow-deep).					
SCORE 14	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
SCORE 17	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
SCORE 16	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. In stream habitat greatly altered or removed entirely.					
SCORE 15	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.					
SCORE 19	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.					
SCORE <u>8</u> (LB)	Left	10	9			8	7	6			5	4	3			2	1	0			
SCORE <u>6</u> (RB)	Right	10	9			8	7	6			5	4	3			2	1	0			
9. Bank Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, under story shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
SCORE <u>9</u> (LB)	Left	10	9			8	7	6			5	4	3			2	1	0			
SCORE <u>9</u> (RB)	Right	10	9			8	7	6			5	4	3			2	1	0			
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.					
SCORE <u>4</u> (LB)	Left	10	9			8	7	6			5	4	3			2	1	0			
SCORE <u>2</u> (RB)	Right	10	9			8	7	6			5	4	3			2	1	0			

HABITAT SCORE

151

HABITAT SCORES	VALUE
OPTIMAL	160 – 200
SUB-OPTIMAL	110 – 159
MARGINAL	60 – 109
POOR	< 60

FIBI097

08-25-2004

West Brook

LISTED IN ORDER OF ABUNDANCE FOUND

COMMON NAME	SCIENTIFIC NAME	# FOUND	SIZE RANGE (INCHES)
Black Crappie	<i>Pomoxis nigromaculatus</i>	36	2.2
Blacknose Dace	<i>Rhinichthys atratulus</i>	34	
Rainbow Trout	<i>Oncorhynchus mykiss</i>	19	2.6 – 10.6
Creek Chub	<i>Semotilus atromaculatus</i>	11	
Pumpkinseed	<i>Lepomis gibbosus</i>	11	3.2 – 4.3
Bluegill	<i>Lepomis macrochirus</i>	4	3.0 – 7.3
Brown Trout	<i>Salmo trutta</i>	3	2.6 – 3.4
Yellow Perch	<i>Perca flavescens</i>	3	2.6 – 3.7
Golden Shiner	<i>Notemigonus crysoleucas</i>	2	
Largemouth Bass	<i>Micropterus salmoides</i>	1	2.8

Species Identified at West Brook (FIBI097)
(Not to Scale)

William Pflieger



Black Crappie

John Scarola



Blacknose Dace

John Scarola



Rainbow Trout

Konrad Schmidt



Creek Chub

John Scarola



Pumpkinseed

John Scarola



Bluegill

Species Identified at West Brook (FIBI097)
(Not to Scale)

John Scarola



Brown Trout

John Scarola



Yellow Perch

John Scarola



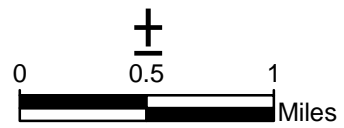
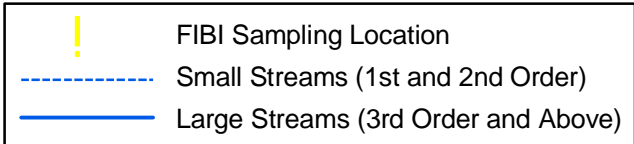
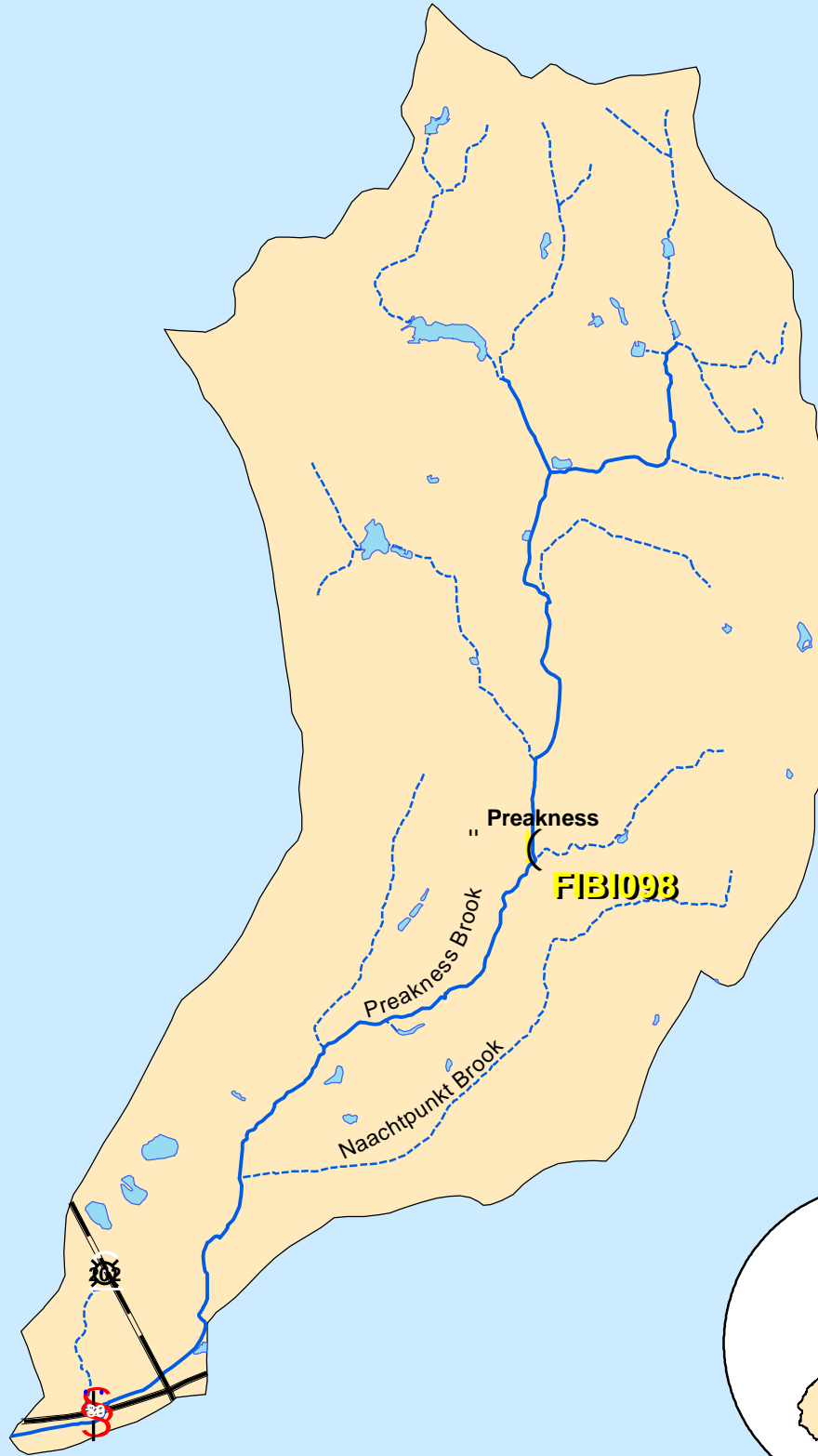
Golden Shiner

AFS



Largemouth Bass

Preakness Brook - FIBI098



SUMMARY OF RESULTS

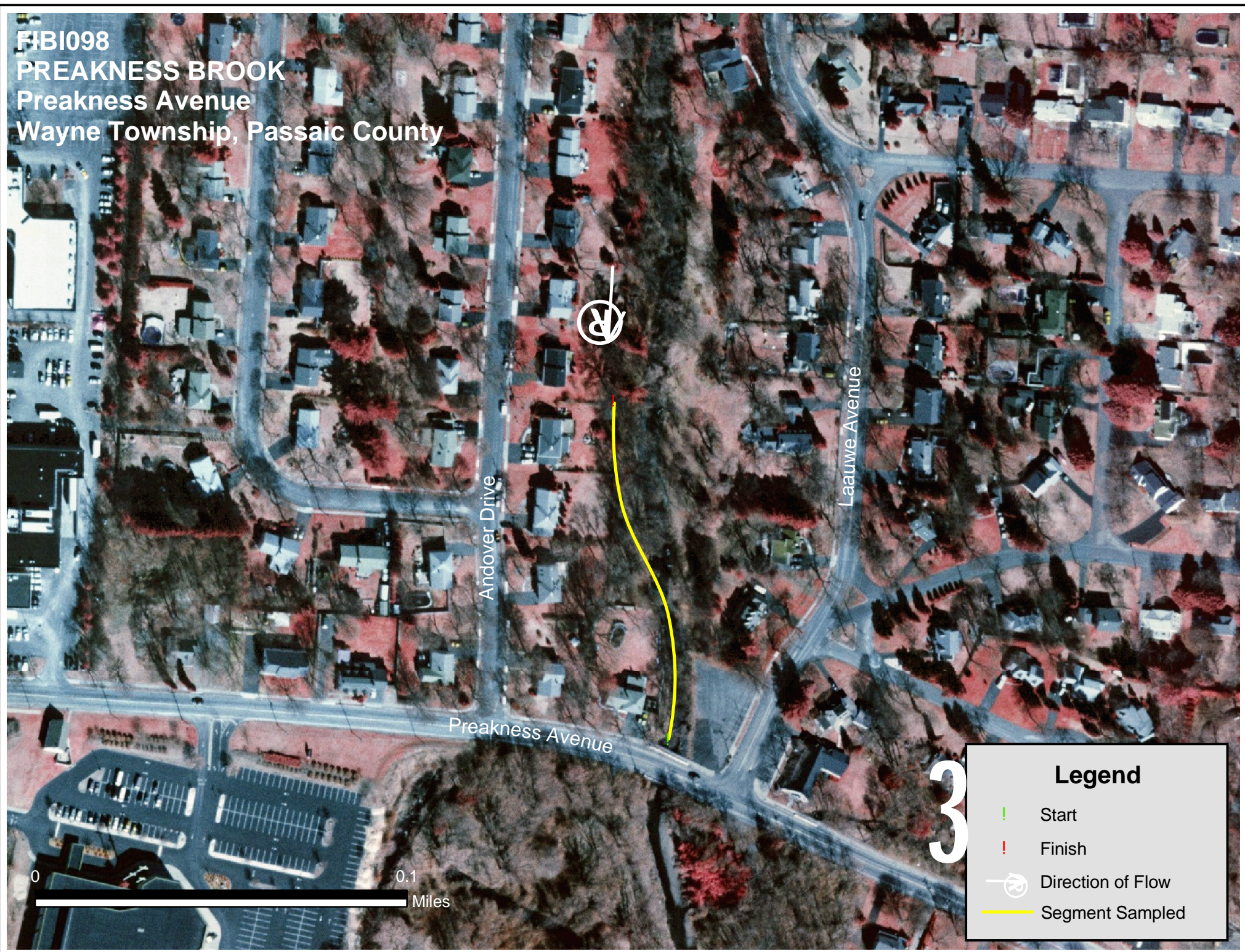
FIBI098 – Preakness Brook



1. Stream Name:	Preakness Brook
2. Sampling Date:	08-18-2004
3. Sampling Location:	Preakness Avenue
4. Municipality	Wayne
5. County:	Passaic
6. Watershed Management Area:	4
7. Contributing Drainage Area:	6.1 Square Miles
8. Electrofishing Gear:	2 Backpack
9. FIBI Score and Rating:	42 - Good
10. Habitat Score and Rating:	94- Marginal
11. Fishable Species Present:	Yes
12. Relevant AMNET ¹ Station Data:	
Proximity of FIBI station to AMNET station:	1.7 mi. US AMNET AN0273
AMNET Rating:	Round 1 - Moderate Round 2 – Moderate Round 3 - Moderate
13. Stream Chemistries:	
Dissolved Oxygen	7.95 mg/L
Temperature.	19.2 °C
pH	7.86
Conductivity	527 µmhos/cm
14. Number of Fish With Anomalies:	0
15. Length of Stream Segment Sampled	150 Meters
16. Water Clarity:	Clear
17. Average Forest Open Canopy:	9.6%
18. Discharge:	22.8 ft. ³ /sec
19. Substrate:	35% Gravel and Sand, 60% Cobble, 5% Boulder
20. Habitat:	25% Riffle, 65% Run, 10% Pool
21. Snags	Yes
22. Periphyton	Slight
23. Submerged Aquatic Vegetation	No
24. Other observations:	
25. Number of Fish Species Identified:	12
26. Total Number of Fish Collected:	531

¹ AMNET is the acronym for the DEP's ambient benthic macroinvertebrate monitoring network – a series of 820 monitoring stations located throughout the state's waterways that collects data on the health of bottom dwelling stream fauna which in turn is used to assess general water quality.

FIBI098
PREAKNESS BROOK
Preakness Avenue
Wayne Township, Passaic County



Legend

- Start
- Finish
- Direction of Flow
- Segment Sampled

FIBI098- @ Preakness Brook
Date Sampled - 8/18/2004

Excellent **Good** Fair Poor

	Score
# of Fish Species	5
# of Benthic Insectivorous Species (BI)	5
# of Trout and Centrarchid Species (trout, bass, sunfish, crappie)	5
# of Intolerant Species (IS)	1
Proportion of Individuals as White Suckers	5
Proportion of Individuals as Generalists (carp, creek chub, banded killifish, goldfish, fathead minnow, green sunfish)	5
Proportion of Individuals as Insectivorous Cyprinids (I and BI)	5
Proportion of Individuals as Trout	
OR	
Proportion of Individuals as Piscivores (Excluding American Eel)*	1
Number of Individuals in Sample	5
Proportion of Individuals w/disease/anomalies (excluding blackspot)	5
Total	42

<u>Stream Rating</u>	
45-50	Excellent
37-44	Good
29-36	Fair
10-28	Poor

HABITAT ASSESSMENT FOR *HIGH GRADIENT STREAMS* Preakness Brook (FIBI098) – 8/18/04

	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
1. Epifaunal Substrate / Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
SCORE 12	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.					
SCORE 11	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
3. Velocity/Depth Regimes	All 4 velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (slow is <0.3 m/s, deep is >0.5 m)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity / depth regime (usually slow-deep).					
SCORE 18	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
SCORE 14	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
SCORE 7	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. In stream habitat greatly altered or removed entirely.					
SCORE 6	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.					
SCORE 16	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.					
SCORE <u>3</u> (LB)	Left	10	9			8	7	6			5	4	3			2	1	0			
SCORE <u>2</u> (RB)	Right	10	9			8	7	6			5	4	3			2	1	0			
9. Bank Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, under story shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
SCORE <u>1</u> (LB)	Left	10	9			8	7	6			5	4	3			2	1	0			
SCORE <u>2</u> (RB)	Right	10	9			8	7	6			5	4	3			2	1	0			
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.					
SCORE <u>1</u> (LB)	Left	10	9			8	7	6			5	4	3			2	1	0			
SCORE <u>1</u> (RB)	Right	10	9			8	7	6			5	4	3			2	1	0			

HABITAT SCORE

94

HABITAT SCORES	VALUE
OPTIMAL	160 – 200
SUB-OPTIMAL	110 – 159
MARGINAL	60 – 109
POOR	< 60

FIBI098

08-18-2004

Preakness Brook

LISTED IN ORDER OF ABUNDANCE FOUND

COMMON NAME	SCIENTIFIC NAME	# FOUND	SIZE RANGE (INCHES)
Longnose Dace	<i>Rhinichthys cataractae</i>	276	
Blacknose Dace	<i>Rhinichthys atratulus</i>	84	
Creek Chub	<i>Semotilus atromaculatus</i>	71	
White Sucker	<i>Catostomus commersoni</i>	37	
Tessellated Darter	<i>Etheostoma olmstedii</i>	33	
Common Shiner	<i>Notropis cornutus</i>	11	
Green Sunfish	<i>Lepomis cyanellus</i>	6	2.0 – 4.3
Pumpkinseed	<i>Lepomis gibbosus</i>	6	3.0
Largemouth Bass	<i>Micropterus salmoides</i>	3	2.8 – 4.1
Yellow Bullhead	<i>Ameiurus natalis</i>	2	3.9 – 4.7
Bluegill	<i>Lepomis macrochirus</i>	1	2.4

Species Identified at Preakness Brook (FIBI098)
(Not to Scale)

William Pflieger



Longnose Dace

John Scarola



Blacknose Dace

Konrad Schmidt



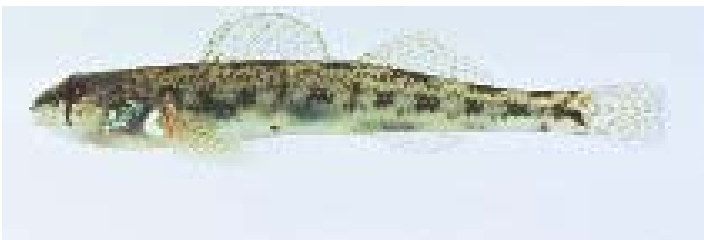
Creek Chub

John Scarola



White Sucker

John Scarola



Tessellated Darter

John Scarola



Common Shiner

Species Identified at Preakness Brook (FIBI098)
(Not to Scale)

Konrad Schmidt



Green Sunfish

John Scarola



Pumpkinseed

AFS



Largemouth Bass

John Scarola



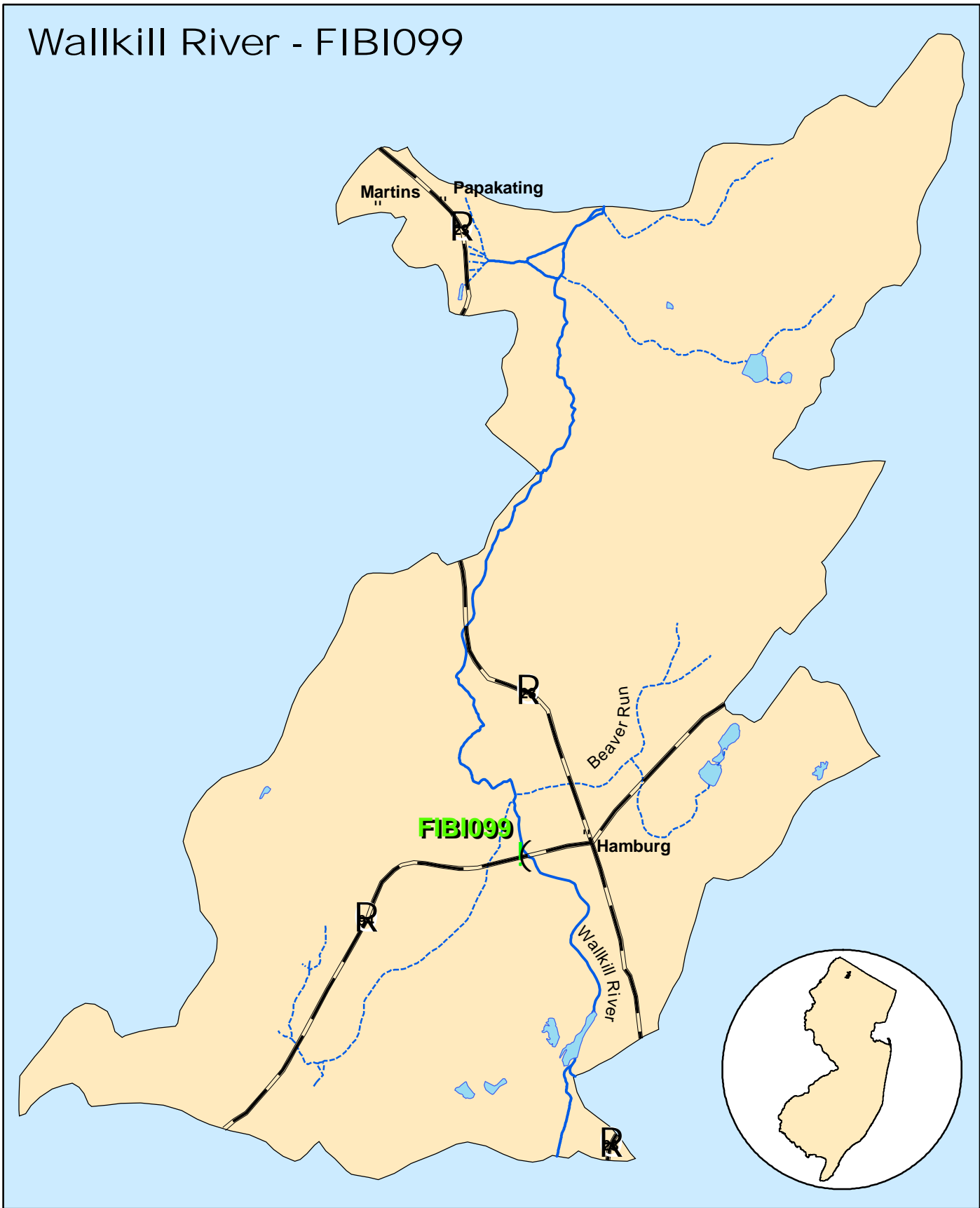
Yellow Bullhead

John Scarola



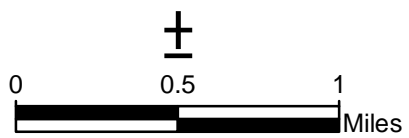
Bluegill

Wallkill River - FIBI099



	FIBI Sampling Location
	Small Streams (1st and 2nd Order)
	Large Streams (3rd Order and Above)

IBI Ratings	
	Excellent
	Good
	Fair
	Poor



SUMMARY OF RESULTS

FIBI099 – Walkkill River



1. Stream Name:	Walkkill River
2. Sampling Date:	08-04-2004
3. Sampling Location:	Route 94
4. Municipality	Hamburg
5. County:	Sussex
6. Watershed Management Area:	2
7. Contributing Drainage Area:	46.0 Square Miles
8. Electrofishing Gear:	2 Backpack
9. FIBI Score and Rating:	46 - Excellent
10. Habitat Score and Rating:	151- Sub-Optimal
11. Fishable Species Present:	Yes
12. Relevant AMNET ¹ Station Data:	
Proximity of FIBI station to AMNET station:	AN0300
AMNET Rating:	Round 1 – Non-impaired Round 2 – Moderate Round 3 – Non-impaired
13. Stream Chemistries:	
Dissolved Oxygen	8.00 mg/L
Temperature.	25.4 °C
pH	8.40
Conductivity	489 µmhos/cm
14. Number of Fish With Anomalies:	0
15. Length of Stream Segment Sampled	150 Meters
16. Water Clarity:	Slightly turbid
17. Average Forest Open Canopy:	65.7%
18. Discharge:	164.8 ft. ³ /sec
19. Substrate:	5% Gravel and Sand, 80% Cobble, 5% Boulder, 5% Mud, 5% Silt
20. Habitat:	60% Riffle, 30% Run, 10% Pool
21. Snags	Yes
22. Periphyton	Heavy
23. Submerged Aquatic Vegetation	Yes
24. Other observations:	
25. Number of Fish Species Identified:	17
26. Total Number of Fish Collected:	483

¹ AMNET is the acronym for the DEP's ambient benthic macroinvertebrate monitoring network – a series of 820 monitoring stations located throughout the state's waterways that collects data on the health of bottom dwelling stream fauna which in turn is used to assess general water quality.

FIBI099
WALLKILL RIVER
State Route 94
Hamburg Township, Sussex County



0 0.1 Miles

Legend

- Start
- Finish
- Direction of Flow
- Segment Sampled

3

FIBI099- @ Walkill River
Date Sampled - 8/04/2004

Excellent Good Fair Poor

	Score
# of Fish Species	5
# of Benthic Insectivorous Species (BI)	5
# of Trout and Centrarchid Species (trout, bass, sunfish, crappie)	5
# of Intolerant Species (IS)	3
Proportion of Individuals as White Suckers	5
Proportion of Individuals as Generalists (carp, creek chub, banded killifish, goldfish, fathead minnow, green sunfish)	5
Proportion of Individuals as Insectivorous Cyprinids (I and BI)	5
Proportion of Individuals as Trout OR Proportion of Individuals as Piscivores (Excluding American Eel)*	3
Number of Individuals in Sample	5
Proportion of Individuals w/disease/anomalies (excluding blackspot)	5
Total	46

<u>Stream Rating</u>	
45-50	Excellent
37-44	Good
29-36	Fair
10-28	Poor

	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
1. Epifaunal Substrate /Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are <u>not</u> new fall and <u>not</u> transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
SCORE 20	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.					
SCORE 17	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
3. Velocity/Depth Regimes	All 4 velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (slow is <0.3 m/s, deep is >0.5 m)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity / depth regime (usually slow-deep).					
SCORE 7	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
SCORE 16	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
SCORE 18	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. In stream habitat greatly altered or removed entirely.					
SCORE 16	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.					
SCORE 17	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.					
SCORE <u>2</u> (LB)	Left	10	9			8	7	6			5	4	3			2	1	0			
SCORE <u>7</u> (RB)	Right	10	9			8	7	6			5	4	3			2	1	0			
9. Bank Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, under story shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
SCORE <u>9</u> (LB)	Left	10	9			8	7	6			5	4	3			2	1	0			
SCORE <u>10</u> (RB)	Right	10	9			8	7	6			5	4	3			2	1	0			
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.					
SCORE <u>7</u> (LB)	Left	10	9			8	7	6			5	4	3			2	1	0			
SCORE <u>5</u> (RB)	Right	10	9			8	7	6			5	4	3			2	1	0			

HABITAT SCORE

151

HABITAT SCORES	VALUE
OPTIMAL	160 – 200
SUB-OPTIMAL	110 – 159
MARGINAL	60 – 109
POOR	< 60

FIBI099

08-04-2004

Wallkill River

LISTED IN ORDER OF ABUNDANCE FOUND

COMMON NAME	SCIENTIFIC NAME	# FOUND	SIZE RANGE (INCHES)
Longnose Dace	<i>Rhinichthys cataractae</i>	262	
Cutlips Minnow	<i>Exoglossum maxillingua</i>	43	
Redbreast Sunfish	<i>Lepomis auritus</i>	32	3.5 – 6.3
White Sucker	<i>Catostomus commersoni</i>	31	
Blacknose Dace	<i>Rhinichthys atratulus</i>	25	
Common Shiner	<i>Notropis cornutus</i>	21	
Tessellated Darter	<i>Etheostoma olmstedii</i>	18	
Spottail Shiner	<i>Notropis hudsonius</i>	14	
Creek Chub	<i>Semotilus atromaculatus</i>	11	
Margined Madtom	<i>Noturus insignis</i>	6	
Pumpkinseed	<i>Lepomis gibbosus</i>	6	3.9 – 4.3
Redfin Pickerel	<i>Esox americanus americanus</i>	4	5.1 – 7.9
Yellow Bullhead	<i>Ameiurus natalis</i>	3	1.2 – 8.3
Golden Shiner	<i>Notemigonus crysoleucas</i>	3	
Largemouth Bass	<i>Micropterus salmoides</i>	2	2.0 – 2.4
Bluegill	<i>Lepomis macrochirus</i>	1	3.7
Smallmouth Bass	<i>Micropterus dolomieu</i>	1	8.3

Species Identified at Walkill River (FIBI099)
(Not to Scale)

John Scarola



Longnose Dace

Jenkins, Burkhead



Cutlips Minnow

John Scarola



Redbreast Sunfish

John Scarola



White Sucker

John Scarola



Blacknose Dace

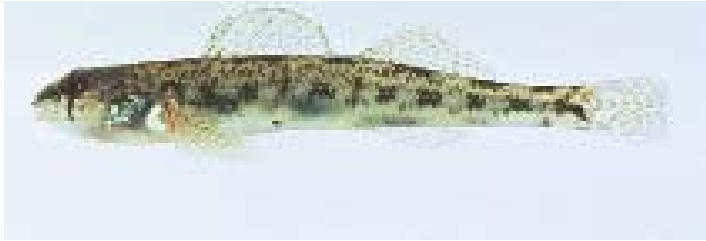
John Scarola



Common Shiner

Species Identified at Walkill River (FIBI099)
(Not to Scale)

John Scarola



Tessellated Darter

Konrad Schmidt



Spottail Shiner

Konrad Schmidt



Creek Chub

Shute



Margined Madtom

John Scarola



Pumpkinseed

Jenkins, Burkhead



Redfin Pickerel

Species Identified at Walkill River (FIBI099)

John Scarola



Yellow Bullhead

John Scarola



Golden Shiner

AFS



Largemouth Bass

John Scarola



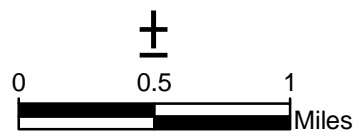
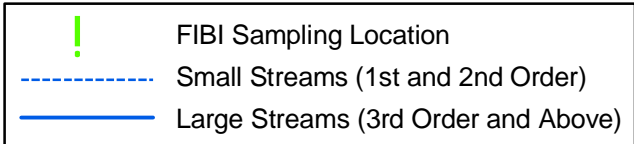
Bluegill

John Scarola



Smallmouth Bass

Dry Brook - FIBI100



SUMMARY OF RESULTS

FIBI100 – Dry Brook



1. Stream Name:	Dry Brook
2. Sampling Date:	07-26-2004
3. Sampling Location:	Mill Road
4. Municipality:	Branchville
5. County:	Sussex
6. Watershed Management Area:	1
7. Contributing Drainage Area:	16.2 Square Miles
8. Electrofishing Gear:	2 Backpack
9. FIBI Score and Rating:	46 - Excellent
10. Habitat Score and Rating:	130- Sub-Optimal
11. Fishable Species Present:	Yes
12. Relevant AMNET ¹ Station Data:	
Proximity of FIBI station to AMNET station:	0.25 mi. upstream AN0020
AMNET Rating:	Round 1 – Non-impaired Round 2 – N/A Round 3 – Non-impaired
13. Stream Chemistries:	
Dissolved Oxygen	10.63 mg/L
Temperature.	20.1 °C
pH	8.24
Conductivity	299 µmhos/cm
14. Number of Fish With Anomalies:	0
15. Length of Stream Segment Sampled	150 Meters
16. Water Clarity:	Clear
17. Average Forest Open Canopy:	9.9%
18. Discharge:	3.6 ft. ³ /sec
19. Substrate:	5% Gravel and Sand, 20% Cobble, 75% Boulder
20. Habitat:	85% Riffle, 10% Run, 5% Pool
21. Snags	Yes
22. Periphyton	Moderate
23. Submerged Aquatic Vegetation	No
24. Other observations:	
25. Number of Fish Species Identified:	11
26. Total Number of Fish Collected:	218

¹ AMNET is the acronym for the DEP's ambient benthic macroinvertebrate monitoring network – a series of 820 monitoring stations located throughout the state's waterways that collects data on the health of bottom dwelling stream fauna which in turn is used to assess general water quality.

FIBI100
DRY BROOK
Mill Road
Branchville Township, Sussex County



3

Legend

- ! Start
- ! Finish
- ↻ Direction of Flow
- Segment Sampled



FIBI100- @ Dry Brook
Date Sampled - 7/26/2004

Excellent Good Fair Poor

	Score
# of Fish Species	5
# of Benthic Insectivorous Species (BI)	5
# of Trout and Centrarchid Species (trout, bass, sunfish, crappie)	5
# of Intolerant Species (IS)	5
Proportion of Individuals as White Suckers	5
Proportion of Individuals as Generalists (carp, creek chub, banded killifish, goldfish, fathead minnow, green sunfish)	5
Proportion of Individuals as Insectivorous Cyprinids (I and BI)	5
Proportion of Individuals as Trout OR Proportion of Individuals as Piscivores (Excluding American Eel)*	3
Number of Individuals in Sample	3
Proportion of Individuals w/disease/anomalies (excluding blackspot)	5
Total	46

Stream Rating	
45-50	Excellent
37-44	Good
29-36	Fair
10-28	Poor

	Condition Category																				
	Optimal					Suboptimal					Marginal					Poor					
1. Epifaunal Substrate /Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).					40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).					20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.					Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.					
SCORE 18	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.					Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.					Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.					Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.					
SCORE 15	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
3. Velocity/Depth Regimes	All 4 velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (slow is <0.3 m/s, deep is >0.5 m)					Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).					Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).					Dominated by 1 velocity / depth regime (usually slow-deep).					
SCORE 17	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% (<20% for low-gradient streams) of the bottom affected by sediment deposition.					Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% (20-50% for low-gradient) of the bottom affected; slight deposition in pools.					Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% (50-80% for low-gradient) of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.					Heavy deposits of fine material, increased bar development; more than 50% (80% for low-gradient) of the bottom changing frequently; pools almost absent due to substantial sediment deposition.					
SCORE 19	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.					Water fills >75% of the available channel; or <25% of channel substrate is exposed.					Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.					Very little water in channel and mostly present as standing pools.					
SCORE 8	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.					Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.					Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.					Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. In stream habitat greatly altered or removed entirely.					
SCORE 16	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.					Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.					Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.					Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.					
SCORE 19	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.					Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.					Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.					Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.					
SCORE <u>5</u> (LB)	Left	10	9			8	7	6			5	4	3			2	1	0			
SCORE <u>3</u> (RB)	Right	10	9			8	7	6			5	4	3			2	1	0			
9. Bank Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, under story shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.					70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.					50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.					Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.					
SCORE <u>3</u> (LB)	Left	10	9			8	7	6			5	4	3			2	1	0			
SCORE <u>5</u> (RB)	Right	10	9			8	7	6			5	4	3			2	1	0			
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.					Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.					Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.					Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.					
SCORE <u>0</u> (LB)	Left	10	9			8	7	6			5	4	3			2	1	0			
SCORE <u>2</u> (RB)	Right	10	9			8	7	6			5	4	3			2	1	0			

HABITAT SCORE

130

HABITAT SCORES	VALUE
OPTIMAL	160 – 200
SUB-OPTIMAL	110 – 159
MARGINAL	60 – 109
POOR	< 60

FIBI100

07-26-2004

Dry Brook

LISTED IN ORDER OF ABUNDANCE

COMMON NAME	SCIENTIFIC NAME	# FOUND	SIZE RANGE (INCHES)
Blacknose Dace	<i>Rhinichthys atratulus</i>	152	
Longnose Dace	<i>Rhinichthys cataractae</i>	40	
Pumpkinseed	<i>Lepomis gibbosus</i>	6	3.0 – 3.2
Chain Pickerel	<i>Esox niger</i>	4	3.4 – 4.5
Redbreast Sunfish	<i>Lepomis auritus</i>	4	2.8
White Sucker	<i>Catostomus commersoni</i>	4	
Bluegill	<i>Lepomis macrochirus</i>	2	3.0 – 5.1
Golden Shiner	<i>Notemigonus crysoleucas</i>	2	
Tessellated Darter	<i>Etheostoma olmstedii</i>	2	
Brown Trout	<i>Salmo trutta</i>	1	10.8
Rainbow Trout	<i>Oncorhynchus mykiss</i>	1	12.0

Species Identified at Dry Brook (FIBI100)
(Not to Scale)

John Scarola



Blacknose Dace

John Scarola



Longnose Dace

John Scarola



Pumpkinseed

John Scarola



Chain Pickerel

John Scarola



Redbreast Sunfish

John Scarola



White Sucker

Species Identified at Dry Brook (FIBI100)
(Not to Scale)

John Scarola



Bluegill

John Scarola



Golden Shiner

John Scarola



Tessellated Darter

John Scarola



Brown Trout

John Scarola



Rainbow Trout