

# 2009 Rainbow Smelt Report

The annual spawning migration in streams throughout the Lake  
George Watershed



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Photo: Birds eye view of smelt in Indian Brook, Town of Bolton. Cover Photo: Underwater photo of smelt swimming in Hague Brook, Town of Hague. Opposite Photo: Underwater photo of a streambed.

**The collection or possession of rainbow smelt in the Lake George watershed is prohibited by the New York State Department of Environmental Conservation who continue to be concerned about the stability of smelt populations in Lake George in the face of abundant predator fish populations and variable spawning success.**

# 2009 Rainbow Smelt Report

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by Dawn Keppler  
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## About the Author

Dawn Kepler is the Stream Assessment Project Director for the Lake George Waterkeeper. Dawn received her Master’s degree in biology from Buffalo State College and published her thesis “Short-term predator avoidance behavior by invasive and native amphipods in the Great Lakes” in the journal of Aquatic Ecology. Prior to accepting the position with the Lake George Waterkeeper, she worked with the New Hampshire Department of Environmental Services, where she conducted extensive stream surveys and coordinated the Volunteer Biomonitoring Assessment Program. Dawn has a BA in environmental science and policy from the University of Southern Maine.



# Executive Summary

The Lake George Waterkeeper is a program of the FUND for Lake George and defends the lake's natural resources. In 2006, the Lake George Waterkeeper initiated the Stream Assessment Project (SAP), with a two fold purpose:

- 1) to monitor the condition of streams in the Lake George watershed; and,
- 2) to compile data into educational and scientific documents for the public.

The SAP collects chemical, physical, and biological data in over 60 sample sites throughout the Lake George watershed. All data is made available to the public in annual summary reports, which are available online at [www.lakegeorgewaterkeeper.org](http://www.lakegeorgewaterkeeper.org).

In 2009, the Stream Assessment Project began monitoring the annual spawning migration of rainbow smelt in Lake George streams. Rainbow smelt are a silver, slender fish that are anadromous and they live in saltwater environments, but enter freshwater streams to spawn. Smelt have also been introduced into numerous freshwater lakes throughout the United States, including Lake George. These landlocked populations also migrate into streams to spawn. In Lake George, smelt begin to enter streams to spawn just after ice-out in mid-April for a couple of weeks.

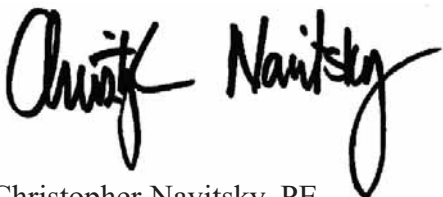
The Stream Assessment Project began monitoring the annual migration of smelt in Lake George streams for three reasons. First, smelt have become an important component of the Lake George fishery. Smelt were likely introduced into Lake George as a fish food resource for larger game fish like the lake trout. Although it is unclear when exactly smelt were first introduced into Lake George, they have likely been in the lake for quite some time and have become an extremely important component of the Lake George fishery as a fish food resource.

Second, there has been and continues to be concern over rainbow smelt populations in Lake George. In the late 1980s these concerns resulted in a ban on the collection or possession of smelt in the Lake George watershed by the New York State Department of Environmental Conservation (NYSDEC), which remains in effect today. The NYSDEC continues to be concerned about the stability of the smelt population in Lake George in the face of abundant predator fish populations and variable spawning success.

Third, little data exist on smelt populations in Lake George except for anecdotal observations. Therefore, the Stream Assessment Project, in collaboration with NYS DEC Senior Aquatic Biologist Emily Zollweg, initiated efforts to monitor the 2009 smelt migration in streams tributary to Lake George. Sixteen streams along the west shoreline of Lake George were monitored during this study. Observations on the presence and estimated abundance of smelt and smelt eggs were made during the daytime and after dark on two days in April. Chemical and physical data were also collected at the beginning of the spawning period.

Data indicated that rainbow smelt migrated into approximately 75% of the 16 streams observed in this study. Relatively strong runs were observed in 4 streams. It is difficult to assess whether smelt populations have changed over the years because little historical data exists. It is reasonable to assume that the number of smelt has increased since the ban was implemented in the 1980s, but many long-time observers state the number of rainbow smelt is still not what it used to be. A variety of factors may be affecting smelt populations in Lake George including structural impedance in streams, siltation of the streambed, foraging pressure from other fish, competition for food or habitat, poaching, and natural or human alterations to the environment.

The Stream Assessment Project will continue to monitor the annual spawning migration of rainbow smelt in tributaries to Lake George. It is hoped the number of observations and sample sites will increase as this effort develops. All data will be included in an annual report and made available to the public. We encourage the application of this data to be used for land-use and policy decisions for better management in the Lake George watershed.



Christopher Navitsky, PE  
Lake George Waterkeeper

# Abstract

In 2009 the Stream Assessment Project initiated a study of the annual spawning migration of streams tributary to Lake George in New York state in collaboration with Emily Zollweg the NYSDEC Senior Aquatic Biologist. Accessible streams along the west shoreline of Lake George were monitored during the daytime and after dark on two days during the spawning period. Observations on the presence and estimated abundance of smelt and smelt eggs were made during each site visit. Physical parameters were a one-time measurement during the spawning period and included the stream wetted width, depth, velocity, streambed composition, and water temperature. Chemical parameters were also a one-time measurement during the spawning period and included pH and specific conductance. Data indicated rainbow smelt migrate in roughly 75% of the 16 streams observed in this study. These results differed from historical accounts in three distinct ways: (1) no smelt were observed in Northwest Bay Brook; (2) a relatively strong run was observed in English Brook after dark; and, (3) smelt were observed in Smith Brook. Although previous anecdotal observations have identified smelt runs in certain streams, no real data exists on the extent of these runs or real-time instream water conditions. Therefore, it is difficult to assess (1) the smelt spawning migration and (2) how environmental conditions affect the migration. Future data is required for additional insight into the annual spawning migration of rainbow smelt in streams tributary to Lake George.



Dawn Keppler  
Stream Assessment Project Director  
Lake George Waterkeeper

# Introduction

Rainbow smelt (*Osmerus mordax*) are a slender fish with an average length of 7-8 inches, a long pointed head, protruding lower jaw, deeply forked tail, and a small adipose fin. They are silver with a conspicuous streak running lengthwise



Picture of a rainbow smelt.

along each side. Rainbow smelt are anadromous and live in saltwater, but enter freshwater streams to spawn. However landlocked populations have been established in freshwater environments throughout the United States, including Lake George. Smelt were likely introduced into Lake George as a forage item for larger game fish like the lake trout. It is unclear when rainbow smelt were introduced into Lake George, but recorded stockings date back to 1918 when nearly 3 million smelt were released and in 1921 when 5 million smelt were released (Moore 1930). Smelt have become an important component of the fishery as a fish food resource, among other things.

In Lake George, smelt spawn shortly after ice-out when water temperatures approach 7°C or 45°F (Eichler 2001) and continues for a couple of weeks into mid-April when thousands of smelt swim into its tributaries. During spawning the adult fish will generally move into the stream in the evening and return to the lake the next morning. Typically, females are accompanied by several males when they migrate into streams to spawn (Langlois 1935;

Clayton 1976). In the stream, females hover just above the streambed and move their bodies slowly from side to side releasing small groups of eggs. A single female can produce thousands of eggs in one spawning season. The eggs are deposited on the streambed, which are demersal, adhesive, and are 1.0mm to 1.2mm in size (Crestin 1973). After the female releases her eggs the males fertilize them.

Smelt runs have been recorded in numerous streams in the Lake George watershed (George and Gordon 1976; NYSDEC unpublished data). However, previous concern over the rainbow smelt population resulted in a ban on the collection or possession of smelt in the Lake George watershed in the late 1980s by the NYSDEC. The NYSDEC continues to be concerned about the stability of the smelt population in Lake George in the face of abundant predator fish populations and variable spawning success of smelt.

Regardless of the importance of rainbow smelt to the Lake George fishery and the concern over the stability of the smelt population, little data has been collected on these fish in Lake George aside from anecdotal observations (NYSDEC unpublished data). Therefore, the Lake George Waterkeeper in collaboration with NYSDEC Senior Aquatic Biologist, Emily Zollweg, has initiated efforts to monitor the smelt migration in streams tributary to Lake George.

The Lake George Waterkeeper Stream Assessment Project began in 2006 and monitors over 60 stream sample sites in the watershed. The project collects a variety of different physical, chemical, and biological data according to protocol. These were the first efforts by the Stream Assessment Project to observe the spawning migration of smelt populations in streams tributary to Lake George. As such, data will be used to make general observations and to make recommendations for future data collection efforts.

The initial portion of this report will provide the methodology used for data collection. The subsequent sections include the results and a brief discussion. After which, recommendations for future data collection efforts will be presented. All of the data collected is at the end of this report and arranged by stream name. Please note that many of the streams are referred to according to location and do not necessarily reflect the actual stream name. The NYSDEC tributary numbers are provided.

# Methods

Sixteen accessible streams on the west shoreline of Lake George were monitored during the daytime on 17 April and 19 April, as well as after dark on 17 April and 23 April. Staff walked from the mouth of the stream to either the first noticeable impassable instream structure or until the stream was no longer accessible. Staff noted if smelt or smelt eggs were observed. If observed, the abundance of these was estimated either as (1) low (2) moderate or (3) high. These were categories established to compare the number of smelt or smelt eggs observed within and between streams. Photographs were also taken at each stream.

Physical and chemical parameters were recorded on 17 April between 9:30-17:30 above the first impassable structure. Physical data included width, depth and velocity measurements with the Marsh-McBirney 2000 Flowmeter, which were used to determine flow. Streambed composition was also estimated. Together flow and streambed substrate data were used to estimate the potential spawning capacity of each stream. Temperature and chemical data, including pH and specific conductance, were measured with a YSI 556 MPS.



Photo of Dawn Keppler measuring flow.

# Results

## Smelt Observations

Observational data on smelt varied considerably in streams (Table 1). Smelt were observed in 12 of the 16 streams and included Edmunds Brook (#49), English Brook (#41), Finkle Brook (#56), Hague Brook (#86), Huddle Brook (#53), Indian Brook (#59), Jenkins Brook (#84), the Sabbath Day Point tributary (#78), the Silver Bay tributary (#81), Smith Brook (#46), the Still Bay tributary (#44), and West Brook (#38). The highest numbers of smelt were observed in English Brook (#41), Hague Brook (#86), Indian Brook (#59), and West Brook (#38). Moderate numbers of smelt were observed in Huddle Brook (#53). The lowest numbers of smelt were observed in Edmunds Brook (#49), Finkle Brook (#56), Jenkins Brook (#84), the Sabbath Day Point tributary (#78), the Silver Bay Brook tributary (#81), Smith Brook (#46), and the Still Bay tributary (#44). No smelt were observed in the Basin Bay (A) tributary (#50), Mohican Road tributary (#54), Northwest Bay Brook (#64), and Stewart Brook (#55).

Smelt eggs were observed in 75% of the streams. Relatively high numbers of eggs were observed in Edmunds Brook (#49), English Brook (#41), Hague Brook (#86), Indian Brook (#59), and the Sabbath Day Point tributary (#78). Moderate amounts of eggs were observed in West Brook (#38). Relatively low amounts of eggs were observed in Finkle Brook (#56), Huddle Brook (#53), Jenkins Brook (#84),



Photo of smelt eggs on the streambed of the Sabbath Day Point Tributary, Town of Hague.

Northwest Bay Brook (#64), the Silver Bay tributary (#81), and Smith Brook (#46). No eggs were observed in the Basin Bay (A) tributary (#50), Mohican Road tributary (#54), Stewart Brook (#55), and the Still Bay tributary (#44).

The suitability of streams for spawning varied considerably and was based on water depth and streambed composition data. Of the 16 streams observed, 6 appeared to have high potential for spawning and included English Brook (#41), Finkle Brook (#56), Hague Brook (#86), Indian Brook (#59), Smith Brook (#46), and West Brook (#38). Four streams appeared to have moderate potential for spawning and included Huddle Brook (#53), Jenkins Brook (#84), Northwest Bay Brook (#64), and the Sabbath Day Point tributary (#78). Six streams appeared to be poorly suited for spawning and included the Basin Bay (A) tributary (#50), Edmunds Brook (#49), the Mohican Road tributary (#54), the Silver Bay tributary (#81), Stewart Brook (#55), and the Still Bay tributary (#44).

**Table 1:** The 2009 smelt migration observational data in 16 streams tributary to Lake George where N = none, L = low, M = moderate, and H = high.

Stream	NYS DEC #	Smelt Observed	Estimated Number of Smelt Observed	Smelt Eggs Observed	Estimated Number of Eggs Observed	Estimated Suitability for Spawning
Basin Bay (A) Tributary	50	No	N	No	N	L
Edmunds Brook	49	Yes	L	Yes	H	L
English Brook	41	Yes	H	Yes	H	H
Finkle Brook	56	Yes	L	Yes	L	H
Hague Brook	86	Yes	H	Yes	H	H
Huddle Brook	53	Yes	M	Yes	L	M
Indian Brook	59	Yes	H	Yes	H	H
Jenkins Brook	84	Yes	L	Yes	L	M
Mohican Road Tributary	54	No	N	No	N	L
Northwest Bay Brook	64	No	N	Yes	L	M
Sabbath Day Point Tributary	78	Yes	L	Yes	H	M
Silver Bay Tributary	81	Yes	L	Yes	L	L
Smith Brook	46	Yes	L	Yes	L	M
Stewart Brook	55	No	N	No	N	L
Still Bay Tributary	44	Yes	L	No	N	L
West Brook	38	Yes	H	Yes	M	H

## Physical and Chemical Data

### Wetted Width (ft)

The wetted width of streams varied considerably and ranged from 1.4 ft to 39.0 ft (Appendix A, Figure 1). The Mohican Road tributary had the lowest measured width and Northwest Bay Brook had the highest. The wetted width of streams where no smelt and no smelt eggs were observed ranged from 1.4 ft to 10.0 ft. The wetted width of streams where low numbers of smelt and smelt eggs were observed ranged from 2.5 ft to 13.0 feet. The wetted width of streams where moderate numbers of smelt were observed was 9 ft. The wetted width of the stream where high numbers of both smelt and smelt eggs were observed ranged from 13 ft to 22 ft.

### Water Depth (ft)

The mean water depth in streams ranged from  $0.25 \pm 0.04$  ft to  $1.35 \pm 0.13$  ft (Appendix A, Figure 2). The Still Bay tributary had the lowest mean depth and Stewart Brook had the highest. The mean depth of streams where no smelt and no eggs were observed ranged from  $0.44 \text{ ft} \pm 0.02$  to  $1.35 \text{ ft} \pm 0.13$ . The mean depth of streams where low amounts of smelt and eggs were observed ranged from  $0.31 \text{ ft} \pm 0.05$  to  $0.68 \text{ ft} \pm 0.09$ . The mean depth of streams where moderate numbers of smelt were observed was  $0.68 \text{ ft} \pm 0.09$ . The mean depth of streams where high amounts of smelt and smelt eggs were observed ranged from  $0.51 \text{ ft} \pm 0.07$  to  $0.64 \text{ ft} \pm 0.13$ .

### Flow (cfs)

Stream flow ranged from 0.35 cfs to 32.34 cfs (Appendix A, Figure 3). Stewart Brook had the lowest recorded flow and Northwest Bay Brook had the highest. The flow of streams where no smelt and no eggs were observed ranged from 0.35 cfs to 0.74 cfs, which were some of the lowest flow values. The flow of streams where low numbers of smelt and smelt eggs were observed ranged from 0.38 cfs to 4.74 cfs. The flow of streams where moderate numbers of smelt were observed was 12.26 cfs. The flow of streams where high amounts of smelt and smelt eggs were observed ranged from 10.93 cfs to 14.89 cfs, which were some of the highest recorded values.

### Streambed Composition (%)

Streambeds consisted of 1% to 78% fine material including silt, clay, and sand (Appendix A, Figure 4). The Sabbath Day Point tributary appeared to have the least amount of fine material and Stewart Brook had the highest. The percent of fine material in streams where no smelt and no eggs were observed ranged from 8% to 78%. The percent of fine material in streams where low numbers of smelt and smelt eggs were observed ranged from 4% to 32%. The percent of fine materi-

als in streams where moderate amounts of smelt or smelt eggs were observed was 9%. The percent of fine material in streams with high numbers of smelt and eggs observed ranged from 2% to 5%.

#### Temperature (°C)

Water temperatures ranged from 4.71°C to 10.45°C (Appendix A, Figure 5). The Still Bay tributary had the lowest recorded water temperature and Indian Brook had the highest. The temperatures in streams where no smelt and no eggs were observed ranged from 7.35°C to 8.71°C. The temperatures of streams where low numbers of smelt and smelt eggs were observed ranged from 5.57°C to 8.02°C. The temperature of streams where moderate numbers of smelt were observed was 7.10°C. The temperatures where high amounts of smelt and smelt eggs were observed ranged from 4.89°C to 10.45°C. The highest recorded temperatures were in both Indian Brook and Hague Brook, which were the only two streams where strong runs were observed during daylight hours.

#### pH (units)

The pH values ranged from 7.11 units to 7.75 units (Appendix A, Figure 6). The Sabbath Day Point tributary had the lowest recorded pH and Hague Brook had the highest. The pH in streams where no smelt and no eggs were observed ranged from 7.23 units to 7.52 units. The pH in streams where low numbers of smelt and smelt eggs were observed ranged from 7.32 units to 7.58 units. The pH in streams where high numbers of smelt and smelt eggs were observed ranged from 7.53 units to 7.75 units, which were some of the highest recorded values.

#### Specific Conductance (µS/cm)

Specific conductance ranged from 43 µS/cm to 551 µS/cm, Northwest Bay Brook appeared to have the lowest recorded conductance and the Mohican Road tributary had the highest (Appendix A, Figure 7). The specific conductance of streams where no smelt and no eggs were observed ranged from 120 µS/cm to 551 µS/cm. The specific conductance of streams where low numbers of smelt and smelt eggs were observed ranged from 80 µS/cm to 266 µS/cm. The specific conductance of the stream where a moderate number of smelt were observed was 122 µS/cm. The specific conductance of streams where the high numbers of smelt and smelt eggs were observed ranged from 106 µS/cm to 224 µS/cm.

# Discussion

Our study found smelt migrated in roughly 75% of the streams observed in this study and indicate that smelt are migrating into a number of streams tributary to Lake George. Most smelt activity occurred after dark, except in Hague Brook and Indian Brook, where substantial runs were observed during the daytime. In 1974, observations also indicated that smelt were migrating into Hague Brook to spawn (NYSDEC unpublished data) and major runs in other unidentified streams apparently occurred the following year (George 1981). In 2001, observations indicated that smelt were migrating into Finkle Brook, Hague Brook, Huddle Brook, Indian Brook, the Sabbath Day Point tributary, and the Silver Bay tributary (NYSDEC unpublished data).

These results differed from historical accounts in three distinct ways, here (1) no smelt were observed in Northwest Bay Brook (2) a relatively strong run was observed in English Brook, and (3) smelt were observed in Smith Brook. Although previous anecdotal observations have identified smelt runs in certain streams, no real data exists on real-time instream water conditions or the extent of these runs. Therefore, it is difficult to assess (1) how environmental conditions affect migration, or (2) the spawning migration. Regarding the former, at this point we are unable to determine what factors are affecting their migration in Lake George because (1) little data exists and (2) this year's data varied considerably in streams where smelt were and were not observed. Previous studies have suggested that water temperature can influence the migration of smelt. Interestingly, here we did find that the only two streams with relatively strong runs during daylight hours and after dark appeared to have considerably higher water temperatures than other streams.

Regarding the latter, it is probable to assume that smelt populations have recovered to a certain degree, at least since the 1980s when a ban was implemented on the collection or possession of the fish in the Lake George watershed. However, through various conversations with observers around the lake, the amount of smelt entering Lake George tributaries to spawn is still not what it used to be. Smelt migration may be affected by a variety of factors including structural impedance, siltation, foraging pressure from other fish, competition for food or habitat, poaching, changes in habitat from natural or human impacts, or others factors. Future data is required for additional insight into the annual smelt migration into streams tributary to Lake George.



Photo of gulls perched on a delta during the smelt run.

Go to YouTube to view an underwater video of smelt during the spawning migration at <http://www.youtube.com/watch?v=uEjcxWV8PUw>.

**The collection or possession of rainbow smelt in the Lake George watershed is prohibited by the New York State Department of Environmental Conservation who continue to be concerned about the stability of smelt populations in Lake George in the face of abundant predator fish populations and variable spawning success.**

# Conclusion

These were the initial data collection efforts by the Stream Assessment Project on the smelt migration in streams tributary to Lake George. Previous data on the smelt migrations in Lake George is extremely limited. Therefore the ability of the Stream Assessment Project to make assertions is limited, but these data will serve as a baseline for future comparisons and to improve monitoring methodology.



Photo: Birds eye view of smelt congregating in Indian Brook, Town of Bolton.

# Recommendations

Monitoring the smelt migration in streams tributary to Lake George is a daunting task, primarily due to the temporal requirements. Regardless, smelt are an important component of Lake George and future data collection is important. The methods used here can be improved for future monitoring efforts by:

1. Establishing a network of volunteers who have access to a local stream to notify the Waterkeeper staff at the beginning of the smelt migration and to collect observational data throughout the spawning period.
2. Monitoring stream water temperature daily after ice-out to potentially increase the staff's ability to identify and predict the beginning of the spawning migration.
3. Monitoring streams daily throughout the spawning period during daylight hours and after dark. The visit should include staff walking along the stream from the mouth to the first obvious impassable structure. Observations should be made regarding whether smelt and/or eggs were seen and the extent of both observed. Pictures should be taken at each site.
4. During each visit pH, dissolved oxygen, specific conductance, and water temperature should be recorded.
5. Stream flow should be measured at the beginning of the spawning migration above the first impassable structure and weekly thereafter. Additionally, flow should be measured after any major storm events.

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# Thank You

## **Special Thanks To:**

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Lake George Waterkeeper, Field Assistant

Emily Zollweg  
NYS DEC, Senior Aquatic Biologist

Lake George Fishing Alliance

## **Participating Landowners:**

Bob and Ginger Bailey  
Bud and Pam Bressett  
Henry Caldwell  
Ted Caldwell  
Mark Finke  
Lynn and Paul Gollhofers  
Mary Alice Leary  
The O'Connor's  
Rich Osborne  
Mike Rizza  
Till and Mary Salamone  
Tom Wessling

## **Participating Organizations:**

Blue Lagoon Manor  
Cape Cod Village  
Darrin Fresh Water Institute  
Silver Bay Association  
Snug Harbor Cottages  
The O'Conner's Resort Cottages

# Appendices

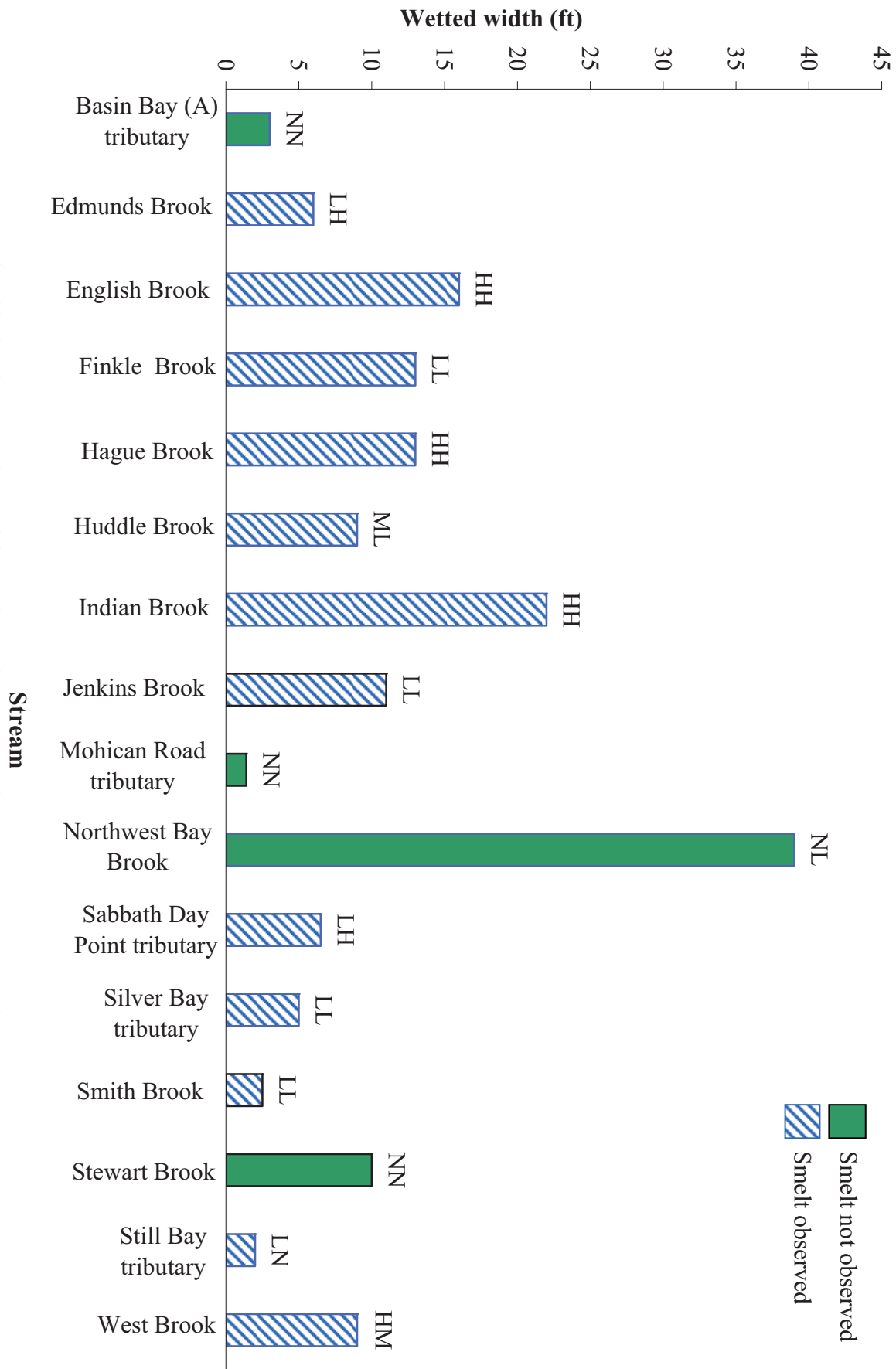
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# Appendix A: Figures

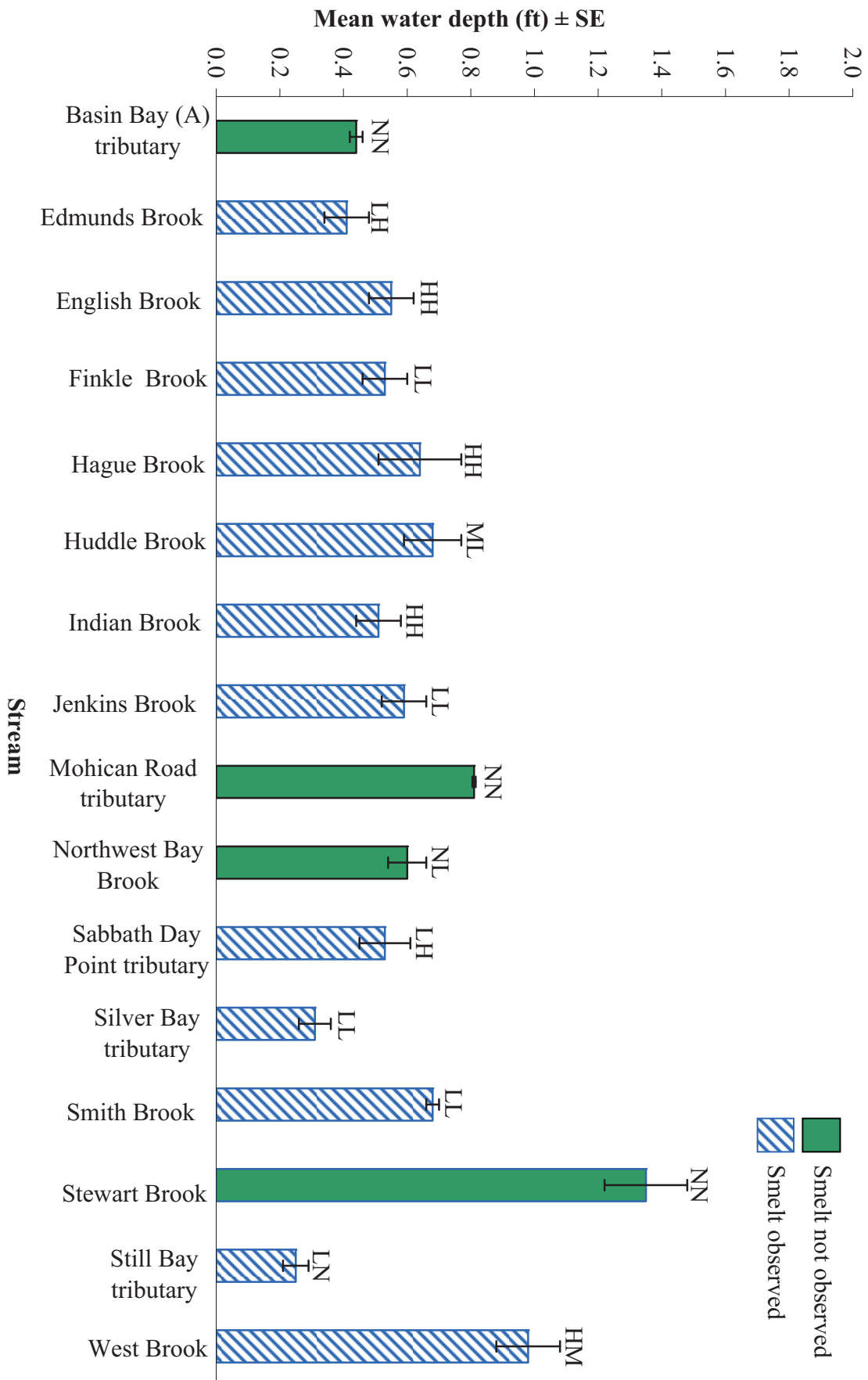
## Appendix A: Figures

- Figure 1: The wetted width (ft) of streams observed during the smelt spawning migration study on 17 April 2009. The estimated number of smelt and smelt eggs observed are included for each stream where: N = none, L = low, M = moderate, and H = high. The first letter above each bar indicates the estimated amount of smelt and the second letter indicates the estimated amount of eggs observed in each stream. For example: LH would indicate low numbers of smelt and a relatively high number of eggs were observed. A-3
- Figure 2: The mean depth  $\pm$  SE (ft) of streams observed during the smelt spawning migration study on 17 April 2009. The estimated number of smelt and smelt eggs observed are included for each stream where: N = none, L = low, M = moderate, and H = high. The first letter above each bar indicates the estimated amount of smelt and the second letter indicates the estimated amount of eggs observed in each stream. For example: LH would indicate low numbers of smelt and a relatively high number of eggs were observed. A-4
- Figure 3: The flow (cfs) of streams observed during the smelt spawning migration study on 17 April 2009. The estimated number of smelt and smelt eggs observed are included for each stream where: N = none, L = low, M = moderate, and H = high. The first letter above each bar indicates the estimated amount of smelt and the second letter indicates the estimated amount of eggs observed in each stream. For example: LH would indicate low numbers of smelt and a relatively high number of eggs were observed. A-5

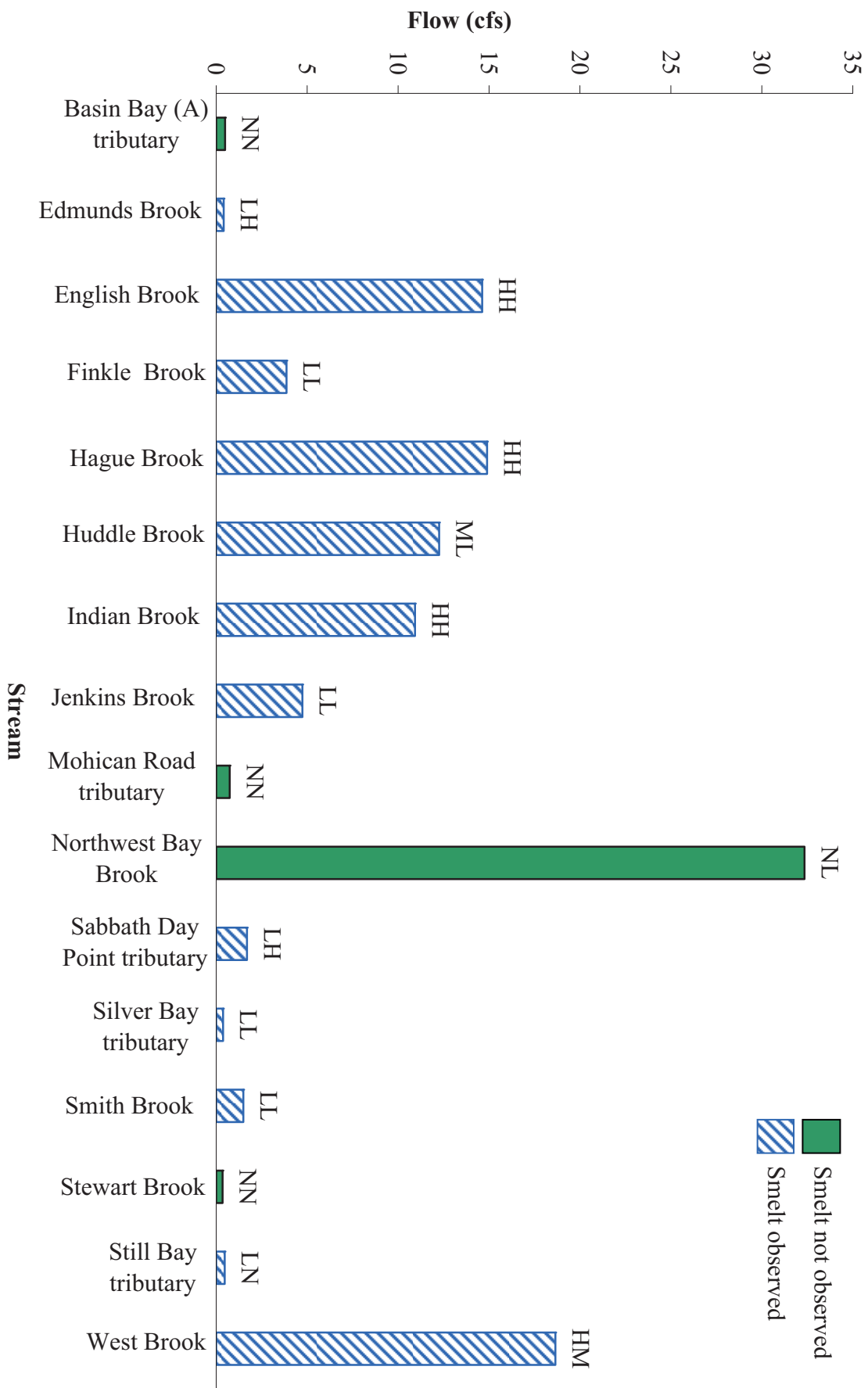
- Figure 4: The percentage of silt/clay and sand in streams observed during the smelt spawning migration study on 17 April 2009. The estimated number of smelt and smelt eggs observed are included for each stream where: N = none, L = low, M = moderate, and H = high. The first letter above each bar indicates the estimated amount of smelt and the second letter indicates the estimated amount of eggs observed in each stream. For example: LH would indicate low numbers of smelt and a relatively high number of eggs were observed. A-6
- Figure 5: The water temperature (°C) of streams observed during the smelt spawning migration study on 17 April 2009. The estimated number of smelt and smelt eggs observed are included for each stream where: N = none, L = low, M = moderate, and H = high. The first letter above each bar indicates the estimated amount of smelt and the second letter indicates the estimated amount of eggs observed in each stream. For example: LH would indicate low numbers of smelt and a relatively high number of eggs were observed. A-7
- Figure 6: The pH (units) of streams observed during the smelt spawning migration study on 17 April 2009. The estimated number of smelt and smelt eggs observed are included for each stream where: N = none, L = low, M = moderate, and H = high. The first letter above each bar indicates the estimated amount of smelt and the second letter indicates the estimated amount of eggs observed in each stream. For example: LH would indicate low numbers of smelt and a relatively high number of eggs were observed. A-8
- Figure 7: The specific conductance ( $\mu\text{S}/\text{cm}$ ) of streams observed during the smelt spawning migration study on 17 April 2009. The estimated number of smelt and smelt eggs observed are included for each stream where: N = none, L = low, M = moderate, and H = high. The first letter above each bar indicates the estimated amount of smelt and the second letter indicates the estimated amount of eggs observed in each stream. For example: LH would indicate low numbers of smelt and a relatively high number of eggs were observed. A-9



**Figure 1:** The wetted width (ft) of streams observed during the smelt spawning migration study on 17 April 2009. The estimated number of smelt and smelt eggs observed are included for each stream where: N = none, L = low, M = moderate, and H = high. The first letter above each bar indicates the estimated amount of smelt and the second letter indicates the estimated amount of eggs observed in each stream. (For example: LH would indicate low numbers of smelt and a relatively high number of eggs were observed.)

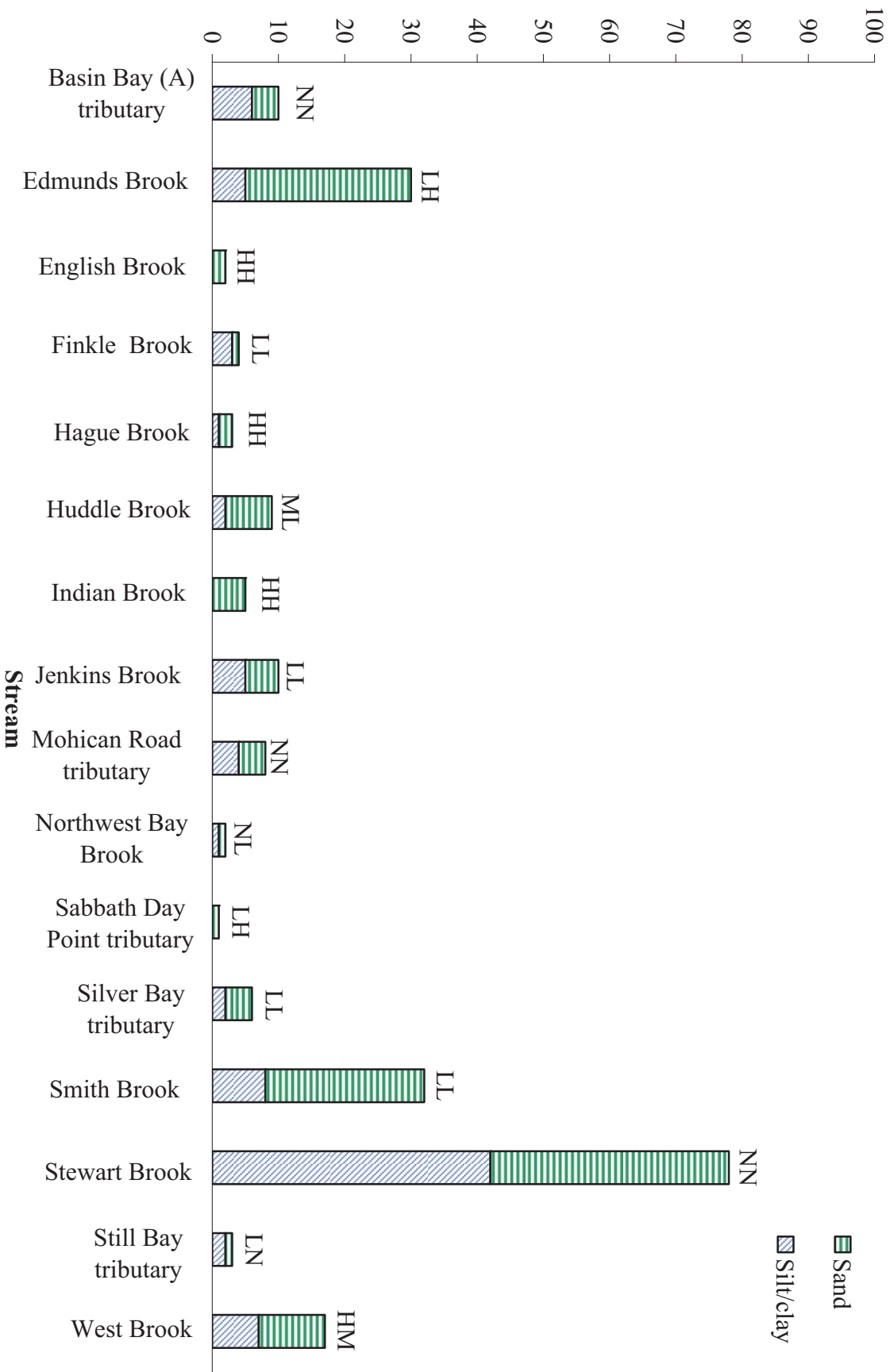


**Figure 2:** The mean water depth  $\pm$  SE (ft) of streams observed during the smelt spawning migration study on 17 April 2009. The estimated number of smelt and smelt eggs observed are included for each stream where: N = none, L = low, M = moderate, and H = high. The first letter above each bar indicates the estimated amount of smelt and the second letter indicates the estimated amount of eggs observed in each stream. For example: LH would indicate low numbers of smelt and a relatively high number of eggs were observed.

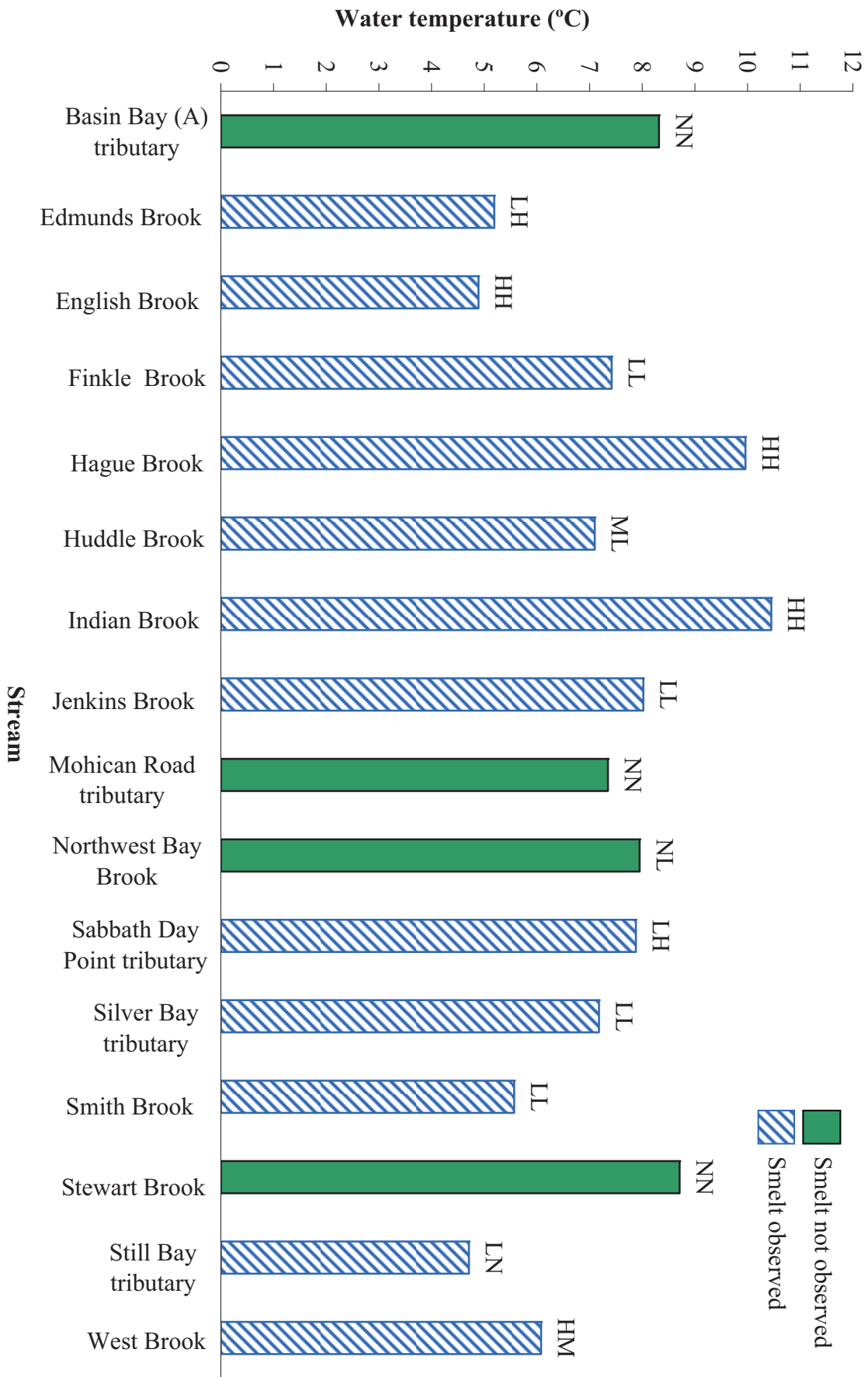


**Figure 3:** The flow (cfs) of streams observed during the smelt spawning migration study on 17 April 2009. The estimated number of smelt and smelt eggs observed are included for each stream where: N = none, L = low, M = moderate, and H = high. The first letter above each bar indicates the estimated amount of smelt and the second letter indicates the estimated amount of eggs observed in each stream. For example: LH would indicate low numbers of smelt and a relatively high number of eggs were observed.

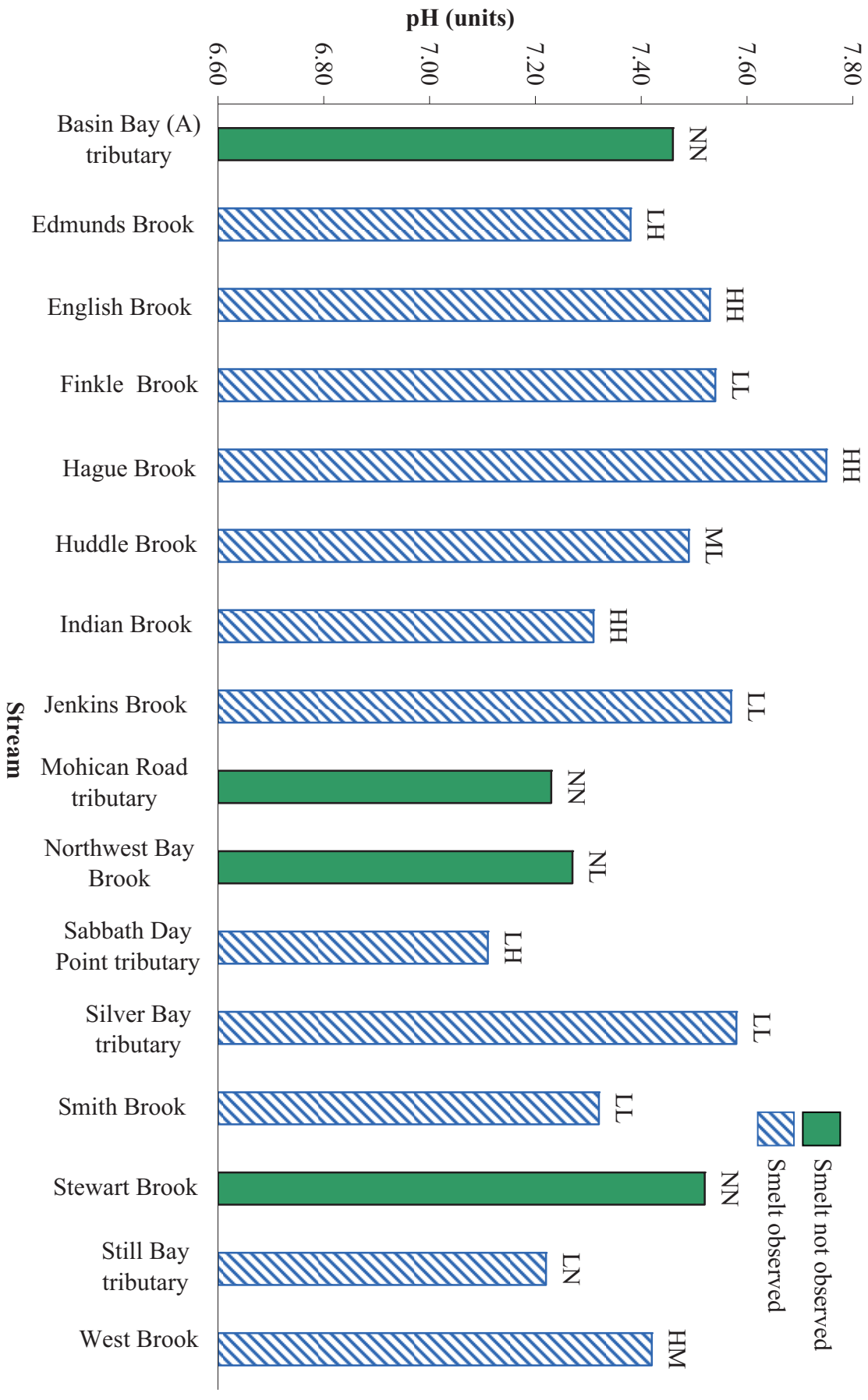
Streambed composition (%)



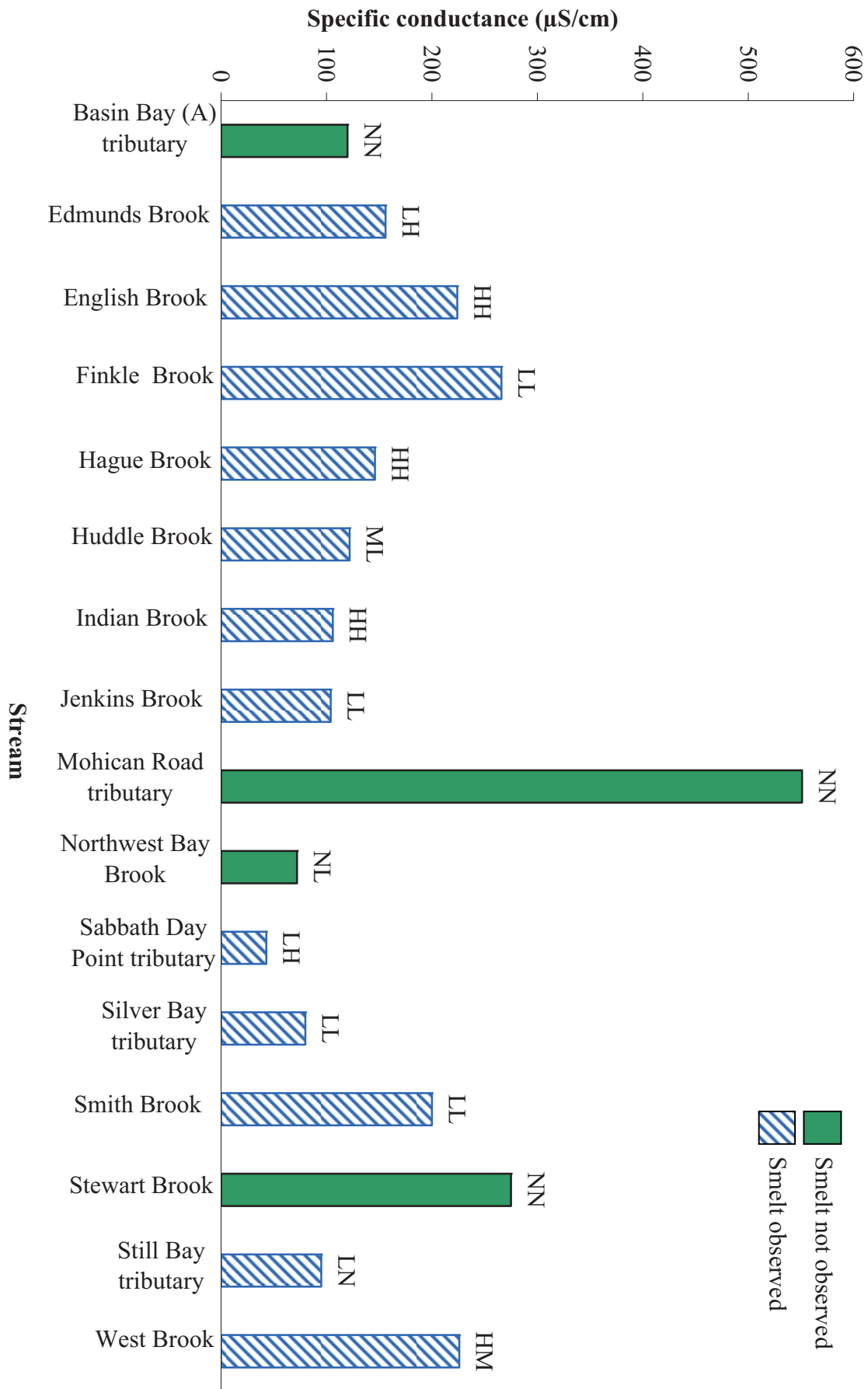
**Figure 4:** The percentage of silt/clay and sand in streams observed during the smelt spawning migration study on 17 April 2009. The estimated number of smelt and smelt eggs observed are included for each stream where: N = none, L = low, M = moderate, and H = high. The first letter above each bar indicates the estimated amount of smelt and the second letter indicates the estimated amount of eggs observed in each stream. For example: LH would indicate low numbers of smelt and a relatively high number of eggs were observed.



**Figure 5:** The water temperature (°C) of streams observed during the smelt spawning migration study on 17 April 2009. The estimated number of smelt and smelt eggs observed are included for each stream where: N = none, L = low, M = moderate, and H = high. The first letter above each bar indicates the estimated amount of smelt and the second letter indicates the estimated amount of eggs observed in each stream. For example: LH would indicate low numbers of smelt and a relatively high number of eggs were observed.



**Figure 6:** The pH (units) of streams observed during the smelt spawning migration study on 17 April 2009. The estimated number of smelt and smelt eggs observed are included for each stream where: N = none, L = low, M = moderate, and H = high. The first letter above each bar indicates the estimated amount of smelt and the second letter indicates the estimated amount of eggs observed in each stream. For example: LH would indicate low numbers of smelt and a relatively high number of eggs were observed.



**Figure 7:** The specific conductance (µS/cm) of streams observed during the smelt spawning migration study on 17 April 2009. The estimated number of smelt and smelt eggs observed are included for each stream where: N = none, L = low, M = moderate, and H = high. The first letter above each bar indicates the estimated amount of smelt and the second letter indicates the estimated amount of eggs observed in each stream. For example: LH would indicate low numbers of smelt and a relatively high number of eggs were observed.

# Appendix B: Lake George Tributary Smelt Inventory

Basin Bay (C) Tributary	B-2
Edmunds Brook	B-3
English Brook	B-4
Finkle Brook	B-5
Hague Brook	B-6
Huddle Brook	B-7
Indian Brook	B-8
Jenkins Brook	B-9
Mohican Road Tributary	B-10
Northwest Bay Brook	B-11
Sabbath Day Point	B-12
Silver Bay	B-13
Smith Brook	B-14
Stewart Brook	B-15
Tributary to Still Bay	B-16
West Brook	B-17

## Lake George Tributary Smelt Inventory

<b>Stream:</b>	<u>Basin Bay (A) tributary</u>	
<b>NYS DEC trib. #:</b>	<u>50</u>	
<b>Latitude:</b>	<u>0607192</u>	
<b>Longitude:</b>	<u>4819279</u>	
<b>Sample date:</b>	<u>4/17/09</u>	
<b>Sample time:</b>	<u>16:34</u>	
<b>Smelt observed:</b>	<u>N</u>	
<b>Estimated amount of smelt:</b>	<u>N</u>	
<b>Eggs observed:</b>	<u>N</u>	
<b>Estimate amount of eggs:</b>	<u>N</u>	
<b>Spawning capacity:</b>	<u>L</u>	
<b>Water temperature:</b>	<u>8.32</u>	°C
<b>Specific conductance:</b>	<u>120</u>	µS/cm
<b>pH:</b>	<u>7.46</u>	units



### Estimated streambed composition:

<b>Silt/clay (&lt;0.062 mm)</b>	<u>6</u>	%
<b>Sand (0.062 – 1.9 mm)</b>	<u>4</u>	%
<b>Fine gravel (2 – 24 mm)</b>	<u>18</u>	%
<b>Coarse gravel (25 – 64 mm)</b>	<u>22</u>	%
<b>Cobble (65 – 256 mm)</b>	<u>34</u>	%
<b>Boulder (256 – 1096 mm)</b>	<u>16</u>	%
<b>Bedrock</b>	<u>0</u>	%
<b>Flow:</b>	<u>0.49</u>	cfs
<b>Stream width:</b>	<u>3.00</u>	ft
<b>Mean depth of stream:</b>	<u>0.44</u>	ft

**Notes:** The stream appeared to have suitable substrate for spawning. However, the mouth of the stream did not appear to be passable and the upstream reach appeared to be relatively constrained. No fish or eggs were observed in this stream.

## Lake George Tributary Smelt Inventory

<b>Stream:</b>	<u>Edmunds Brook</u>	
<b>NYS DEC trib. #:</b>	<u>49</u>	
<b>Latitude:</b>	<u>0606759</u>	
<b>Longitude:</b>	<u>4816189</u>	
<b>Sample date:</b>	<u>4/17/09</u>	
<b>Sample time:</b>	<u>10:28</u>	
<b>Smelt observed:</b>	<u>Y</u>	
<b>Estimated amount of smelt:</b>	<u>L</u>	
<b>Eggs observed:</b>	<u>Y</u>	
<b>Estimate amount of eggs:</b>	<u>H</u>	
<b>Spawning capacity:</b>	<u>L</u>	
<b>Water temperature:</b>	<u>5.19</u>	°C
<b>Specific conductance:</b>	<u>156</u>	µS/cm
<b>pH:</b>	<u>7.38</u>	units



**Estimated streambed composition:**

<b>Silt/clay (&lt;0.062 mm)</b>	<u>5</u>	%
<b>Sand (0.062 – 1.9 mm)</b>	<u>25</u>	%
<b>Fine gravel (2 – 24 mm)</b>	<u>25</u>	%
<b>Coarse gravel (25 – 64 mm)</b>	<u>30</u>	%
<b>Cobble (65 – 256 mm)</b>	<u>15</u>	%
<b>Boulder (256 – 1096 mm)</b>	<u>0</u>	%
<b>Bedrock</b>	<u>0</u>	%
<b>Flow:</b>	<u>0.41</u>	cfs
<b>Stream width:</b>	<u>6.00</u>	ft
<b>Mean depth of stream:</b>	<u>0.41</u>	ft

**Notes:** The streambed consisted of finer sediment and was relatively shallow. No smelt were observed during the day, but a few were observed after dark. Numerous eggs were observed in a 20 foot reach upstream of the mouth and downstream of the first impassable riffle.

## Lake George Tributary Smelt Inventory

<b>Stream:</b>	<u>English Brook</u>	
<b>NYS DEC trib. #:</b>	<u>41</u>	
<b>Latitude:</b>	<u>0604579</u>	
<b>Longitude:</b>	<u>4809610</u>	
<b>Sample date:</b>	<u>4/17/09</u>	
<b>Sample time:</b>	<u>9:06</u>	
<b>Smelt observed:</b>	<u>Y</u>	
<b>Estimated amount of smelt:</b>	<u>H</u>	
<b>Eggs observed:</b>	<u>Y</u>	
<b>Estimate amount of eggs:</b>	<u>H</u>	
<b>Spawning capacity:</b>	<u>H</u>	
<b>Water temperature:</b>	<u>4.89</u>	°C
<b>Specific conductance:</b>	<u>224</u>	µS/cm
<b>pH:</b>	<u>7.53</u>	units



**Estimated streambed composition:**

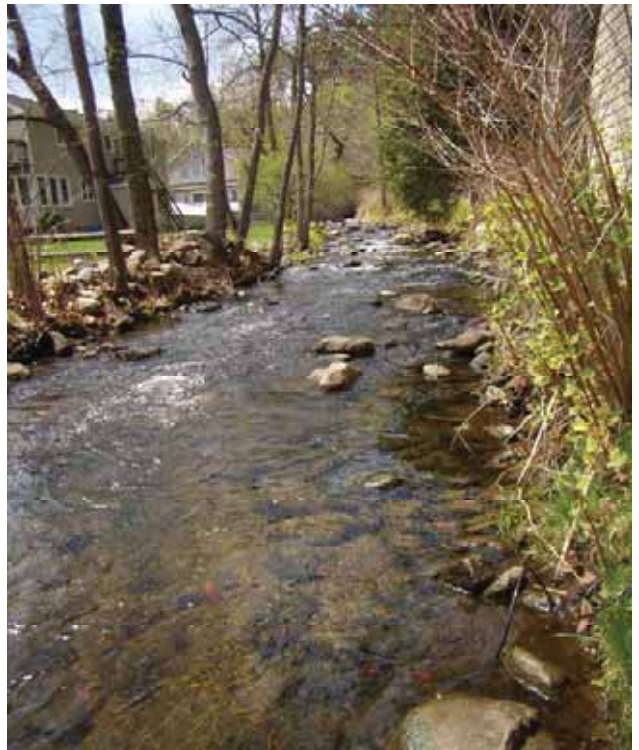
<b>Silt/clay (&lt;0.062 mm)</b>	<u>0</u>	%
<b>Sand (0.062 – 1.9 mm)</b>	<u>2</u>	%
<b>Fine gravel (2 – 24 mm)</b>	<u>15</u>	%
<b>Coarse gravel (25 – 64 mm)</b>	<u>29</u>	%
<b>Cobble (65 – 256 mm)</b>	<u>34</u>	%
<b>Boulder (256 – 1096 mm)</b>	<u>20</u>	%
<b>Bedrock</b>	<u>0</u>	%

<b>Flow:</b>	<u>14.62</u>	cfs
<b>Stream width:</b>	<u>16.00</u>	ft
<b>Mean depth of stream:</b>	<u>0.55</u>	ft

**Notes:** The stream reach appeared to have suitable substrate and depth regimes for spawning. Substantial amount of smelt were observed only after dark and were noted throughout the stream. Migration is likely limited upstream by the high gradient reach just downstream of Route 9N culvert.

## Lake George Tributary Smelt Inventory

<b>Stream:</b>	<u>Finkle Brook</u>	
<b>NYS DEC trib. #:</b>	<u>56</u>	
<b>Latitude:</b>	<u>0608868</u>	
<b>Longitude:</b>	<u>4824280</u>	
<b>Sample date:</b>	<u>4/17/09</u>	
<b>Sample time:</b>	<u>12:42</u>	
<b>Smelt observed:</b>	<u>Y</u>	
<b>Estimated amount of smelt:</b>	<u>L</u>	
<b>Eggs observed:</b>	<u>Y</u>	
<b>Estimate amount of eggs:</b>	<u>L</u>	
<b>Spawning capacity:</b>	<u>H</u>	
<b>Water temperature:</b>	<u>7.42</u>	°C
<b>Specific conductance:</b>	<u>266</u>	µS/cm
<b>pH:</b>	<u>7.54</u>	units



**Estimated streambed composition:**

<b>Silt/clay (&lt;0.062 mm)</b>	<u>3</u>	%
<b>Sand (0.062 – 1.9 mm)</b>	<u>1</u>	%
<b>Fine gravel (2 – 24 mm)</b>	<u>6</u>	%
<b>Coarse gravel (25 – 64 mm)</b>	<u>15</u>	%
<b>Cobble (65 – 256 mm)</b>	<u>38</u>	%
<b>Boulder (256 – 1096 mm)</b>	<u>37</u>	%
<b>Bedrock</b>	<u>0</u>	%

<b>Flow:</b>	<u>3.87</u>	cfs
<b>Stream width:</b>	<u>13</u>	ft
<b>Mean depth of stream:</b>	<u>0.53</u>	ft

**Notes:** The stream reach appeared to have suitable substrate/depth regimes for spawning. A few smelt were observed only after dark. Numerous suckers were observed.

## Lake George Tributary Smelt Inventory

<b>Stream:</b>	<u>Hague Brook</u>	
<b>NYS DEC trib. #:</b>	<u>86</u>	
<b>Latitude:</b>	<u>0620876</u>	
<b>Longitude:</b>	<u>4844744</u>	
<b>Sample date:</b>	<u>4/17/09</u>	
<b>Sample time:</b>	<u>14:57</u>	
<b>Smelt observed:</b>	<u>Y</u>	
<b>Estimated amount of smelt:</b>	<u>H</u>	
<b>Eggs observed:</b>	<u>Y</u>	
<b>Estimate amount of eggs:</b>	<u>H</u>	
<b>Spawning capacity:</b>	<u>H</u>	
<b>Water temperature:</b>	<u>9.96</u>	°C
<b>Specific conductance:</b>	<u>146</u>	µS/cm
<b>pH:</b>	<u>7.75</u>	units



### Estimated streambed composition:

<b>Silt/clay (&lt;0.062 mm)</b>	<u>1</u>	%
<b>Sand (0.062 – 1.9 mm)</b>	<u>2</u>	%
<b>Fine gravel (2 – 24 mm)</b>	<u>11</u>	%
<b>Coarse gravel (25 – 64 mm)</b>	<u>19</u>	%
<b>Cobble (65 – 256 mm)</b>	<u>20</u>	%
<b>Boulder (256 – 1096 mm)</b>	<u>47</u>	%
<b>Bedrock</b>	<u>0</u>	%
<b>Flow:</b>	<u>14.89</u>	cfs
<b>Stream width:</b>	<u>13</u>	ft
<b>Mean depth of stream:</b>	<u>0.64</u>	ft

**Notes:** The stream reach appeared to have suitable substrate and depth regimes for spawning. Substantial numbers of smelt were observed during daylight and similar amounts were seen after dark. Smelt were not observed upstream of the culvert. Numerous suckers were observed.

## Lake George Tributary Smelt Inventory

<b>Stream:</b>	<u>Huddle Brook</u>	
<b>NYS DEC trib. #:</b>	<u>53</u>	
<b>Latitude:</b>	<u>0607909</u>	
<b>Longitude:</b>	<u>4821257</u>	
<b>Sample date:</b>	<u>4/17/09</u>	
<b>Sample time:</b>	<u>11:13</u>	
<b>Smelt observed:</b>	<u>Y</u>	
<b>Estimated amount of smelt:</b>	<u>M</u>	
<b>Eggs observed:</b>	<u>Y</u>	
<b>Estimate amount of eggs:</b>	<u>L</u>	
<b>Spawning capacity:</b>	<u>M</u>	
<b>Water temperature:</b>	<u>7.10</u>	°C
<b>Specific conductance:</b>	<u>122</u>	µS/cm
<b>pH:</b>	<u>7.49</u>	units



**Estimated streambed composition:**

<b>Silt/clay (&lt;0.062 mm)</b>	<u>2</u>	%
<b>Sand (0.062 – 1.9 mm)</b>	<u>7</u>	%
<b>Fine gravel (2 – 24 mm)</b>	<u>10</u>	%
<b>Coarse gravel (25 – 64 mm)</b>	<u>30</u>	%
<b>Cobble (65 – 256 mm)</b>	<u>25</u>	%
<b>Boulder (256 – 1096 mm)</b>	<u>26</u>	%
<b>Bedrock</b>	<u>0</u>	%
<b>Flow:</b>	<u>12.26</u>	cfs
<b>Stream width:</b>	<u>9</u>	ft
<b>Mean depth of stream:</b>	<u>0.68</u>	ft

**Notes:** An instream sediment basin is located just upstream of the mouth, which is dominated by fine sediment and organic debris. The reach upstream of the sediment basin appeared to have suitable substrate and depth regimes for spawning activities. A waterfall approximately 300 feet upstream of the basin is impassable. Smelt were observed only after dark. Suckers were abundant in stream.

## Lake George Tributary Smelt Inventory

<b>Stream:</b>	<u>Indian Brook</u>	
<b>NYS DEC trib. #:</b>	<u>59</u>	
<b>Latitude:</b>	<u>0609427</u>	
<b>Longitude:</b>	<u>4826998</u>	
<b>Sample date:</b>	<u>4/17/09</u>	
<b>Sample time:</b>	<u>16:08</u>	
<b>Smelt observed:</b>	<u>Y</u>	
<b>Estimated amount of smelt:</b>	<u>H</u>	
<b>Eggs observed:</b>	<u>Y</u>	
<b>Estimate amount of eggs:</b>	<u>H</u>	
<b>Spawning capacity:</b>	<u>H</u>	
<b>Water temperature:</b>	<u>10.45</u>	°C
<b>Specific conductance:</b>	<u>106</u>	µS/cm
<b>pH:</b>	<u>7.31</u>	units



### Estimated streambed composition:

<b>Silt/clay (&lt;0.062 mm)</b>	<u>0</u>	%
<b>Sand (0.062 – 1.9 mm)</b>	<u>5</u>	%
<b>Fine gravel (2 – 24 mm)</b>	<u>5</u>	%
<b>Coarse gravel (25 – 64 mm)</b>	<u>15</u>	%
<b>Cobble (65 – 256 mm)</b>	<u>30</u>	%
<b>Boulder (256 – 1096 mm)</b>	<u>45</u>	%
<b>Bedrock</b>	<u>0</u>	%
<b>Flow:</b>	<u>10.93</u>	cfs
<b>Stream width:</b>	<u>22.00</u>	ft
<b>Mean depth of stream:</b>	<u>0.51</u>	ft

**Notes:** Stream appeared to have suitable substrate and depth regimes for spawning. There were substantial amounts of smelt and eggs observed during the day and after dark. Indian Brook appeared to have some of the highest numbers of smelt when compared to other streams. Spawning lasted for several days. Falls located 300 to 400 feet upstream of the mouth appeared to be impassable. Smelt congregated in a variety of instream habitat.

## Lake George Tributary Smelt Inventory

<b>Stream:</b>	<u>Jenkins Brook</u>	
<b>NYS DEC trib. #:</b>	<u>84</u>	
<b>Latitude:</b>	<u>0620891</u>	
<b>Longitude:</b>	<u>4843051</u>	
<b>Sample date:</b>	<u>4/17/09</u>	
<b>Sample time:</b>	<u>14:05</u>	
<b>Smelt observed:</b>	<u>N</u>	
<b>Estimated amount of smelt:</b>	<u>N</u>	
<b>Eggs observed:</b>	<u>Y</u>	
<b>Estimate amount of eggs:</b>	<u>L</u>	
<b>Spawning capacity:</b>	<u>M</u>	
<b>Water temperature:</b>	<u>8.02</u>	°C
<b>Specific conductance:</b>	<u>104</u>	µS/cm
<b>pH:</b>	<u>7.57</u>	units



### Estimated streambed composition:

<b>Silt/clay (&lt;0.062 mm)</b>	<u>5</u>	%
<b>Sand (0.062 – 1.9 mm)</b>	<u>5</u>	%
<b>Fine gravel (2 – 24 mm)</b>	<u>15</u>	%
<b>Coarse gravel (25 – 64 mm)</b>	<u>15</u>	%
<b>Cobble (65 – 256 mm)</b>	<u>45</u>	%
<b>Boulder (256 – 1096 mm)</b>	<u>15</u>	%
<b>Bedrock</b>	<u>0</u>	%
<b>Flow:</b>	<u>4.74</u>	cfs
<b>Stream width:</b>	<u>11</u>	ft
<b>Mean depth of stream:</b>	<u>0.59</u>	ft

**Notes:** The stream reach appeared to have suitable substrate and depth regimes for spawning. There is an instream sediment basin near the mouth of the stream, which is dominated by finer sediment and debris. A minor riffle approximately 200 to 300 feet upstream of the sediment basin appeared to be impassable. No smelt were observed during the day or after dark, but some eggs were observed on the streambed.

## Lake George Tributary Smelt Inventory

<b>Stream:</b>	<u>Mohican Road tributary</u>	
<b>NYS DEC trib. #:</b>	<u>54</u>	
<b>Latitude:</b>	<u>0608654</u>	
<b>Longitude:</b>	<u>4822815</u>	
<b>Sample date:</b>	<u>4/17/09</u>	
<b>Sample time:</b>	<u>13:15</u>	
<b>Smelt observed:</b>	<u>N</u>	
<b>Estimated amount of smelt:</b>	<u>N</u>	
<b>Eggs observed:</b>	<u>N</u>	
<b>Estimate amount of eggs:</b>	<u>N</u>	
<b>Spawning capacity:</b>	<u>L</u>	
<b>Water temperature:</b>	<u>7.35</u>	°C
<b>Specific conductance:</b>	<u>551</u>	µS/cm
<b>pH:</b>	<u>7.23</u>	units



**Estimated streambed composition:**

<b>Silt/clay (&lt;0.062 mm)</b>	<u>4</u>	%
<b>Sand (0.062 – 1.9 mm)</b>	<u>4</u>	%
<b>Fine gravel (2 – 24 mm)</b>	<u>15</u>	%
<b>Coarse gravel (25 – 64 mm)</b>	<u>47</u>	%
<b>Cobble (65 – 256 mm)</b>	<u>19</u>	%
<b>Boulder (256 – 1096 mm)</b>	<u>11</u>	%
<b>Bedrock</b>	<u>0</u>	%
<b>Flow:</b>	<u>0.74</u>	cfs
<b>Stream width:</b>	<u>1.40</u>	ft
<b>Mean depth of stream:</b>	<u>0.81</u>	ft

**Notes:** The stream is channelized, lacks streamside buffers, and is embedded with fine sediment. No smelt or eggs were observed in the stream during daylight or after dark. A pond constructed east of Route 9N appeared to be impassable.

## Lake George Tributary Smelt Inventory

<b>Stream:</b>	<u>Northwest Bay Brook</u>	
<b>NYS DEC trib. #:</b>	<u>64</u>	
<b>Latitude:</b>	<u>0612397</u>	
<b>Longitude:</b>	<u>4832272</u>	
<b>Sample date:</b>	<u>4/17/09</u>	
<b>Sample time:</b>	<u>15:45</u>	
<b>Smelt observed:</b>	<u>N</u>	
<b>Estimated amount of smelt:</b>	<u>N</u>	
<b>Eggs observed:</b>	<u>Y</u>	
<b>Estimate amount of eggs:</b>	<u>L</u>	
<b>Spawning capacity:</b>	<u>H</u>	
<b>Water temperature:</b>	<u>7.95</u>	°C
<b>Specific conductance:</b>	<u>72</u>	µS/cm
<b>pH:</b>	<u>7.27</u>	units



**Estimated streambed composition:**

<b>Silt/clay (&lt;0.062 mm)</b>	<u>1</u>	%
<b>Sand (0.062 – 1.9 mm)</b>	<u>1</u>	%
<b>Fine gravel (2 – 24 mm)</b>	<u>9</u>	%
<b>Coarse gravel (25 – 64 mm)</b>	<u>12</u>	%
<b>Cobble (65 – 256 mm)</b>	<u>29</u>	%
<b>Boulder (256 – 1096 mm)</b>	<u>48</u>	%
<b>Bedrock</b>	<u>0</u>	%
<b>Flow:</b>	<u>32.34</u>	cfs
<b>Stream width:</b>	<u>39.00</u>	ft
<b>Mean depth of stream:</b>	<u>0.60</u>	ft

**Notes:** The stream appeared to have suitable substrate and depth regimes for spawning. The first culvert at Route 9N appeared to be impassable. Numerous suckers were observed.

## Lake George Tributary Smelt Inventory

<b>Stream:</b>	<u>Sabbath Day Point</u>	
<b>NYS DEC trib. #:</b>	<u>78</u>	
<b>Latitude:</b>	<u>0619806</u>	
<b>Longitude:</b>	<u>4835896</u>	
<b>Sample date:</b>	<u>4/17/09</u>	
<b>Sample time:</b>	<u>13:26</u>	
<b>Smelt observed:</b>	<u>Y</u>	
<b>Estimated amount of smelt:</b>	<u>L</u>	
<b>Eggs observed:</b>	<u>Y</u>	
<b>Estimate amount of eggs:</b>	<u>H</u>	
<b>Spawning capacity:</b>	<u>M</u>	
<b>Water temperature:</b>	<u>7.88</u>	°C
<b>Specific conductance:</b>	<u>43</u>	µS/cm
<b>pH:</b>	<u>7.11</u>	units



### Estimated streambed composition:

<b>Silt/clay (&lt;0.062 mm)</b>	<u>0</u>	%
<b>Sand (0.062 – 1.9 mm)</b>	<u>1</u>	%
<b>Fine gravel (2 – 24 mm)</b>	<u>9</u>	%
<b>Coarse gravel (25 – 64 mm)</b>	<u>13</u>	%
<b>Cobble (65 – 256 mm)</b>	<u>35</u>	%
<b>Boulder (256 – 1096 mm)</b>	<u>42</u>	%
<b>Bedrock</b>	<u>0</u>	%
<b>Flow:</b>	<u>1.69</u>	cfs
<b>Stream width:</b>	<u>6.50</u>	ft
<b>Mean depth of stream:</b>	<u>0.53</u>	ft

**Notes:** The stream reach appeared to have suitable substrate and depth regimes for spawning. Only a few smelt were observed in the stream, but substantial numbers of eggs were noted along the left bank. Riffles just downstream of the Route 9N culvert appeared to be impassable.

## Lake George Tributary Smelt Inventory

<b>Stream:</b>	<u>Silver Bay</u>	
<b>NYS DEC trib. #:</b>	<u>81</u>	
<b>Latitude:</b>	<u>0620434</u>	
<b>Longitude:</b>	<u>4839164</u>	
<b>Sample date:</b>	<u>4/17/09</u>	
<b>Sample time:</b>	<u>13:47</u>	
<b>Smelt observed:</b>	<u>Y</u>	
<b>Estimated amount of smelt:</b>	<u>L</u>	
<b>Eggs observed:</b>	<u>Y</u>	
<b>Estimate amount of eggs:</b>	<u>L</u>	
<b>Spawning capacity:</b>	<u>L</u>	
<b>Water temperature:</b>	<u>7.18</u>	°C
<b>Specific conductance:</b>	<u>80</u>	µS/cm
<b>pH:</b>	<u>7.58</u>	units



### Estimated streambed composition:

<b>Silt/clay (&lt;0.062 mm)</b>	<u>2</u>	%
<b>Sand (0.062 – 1.9 mm)</b>	<u>4</u>	%
<b>Fine gravel (2 – 24 mm)</b>	<u>10</u>	%
<b>Coarse gravel (25 – 64 mm)</b>	<u>24</u>	%
<b>Cobble (65 – 256 mm)</b>	<u>38</u>	%
<b>Boulder (256 – 1096 mm)</b>	<u>22</u>	%
<b>Bedrock</b>	<u>0</u>	%
<b>Flow:</b>	<u>0.38</u>	cfs
<b>Stream width:</b>	<u>5.00</u>	ft
<b>Mean depth of stream:</b>	<u>0.31</u>	ft

**Notes:** The stream reach appeared to have suitable substrate, but was relatively shallow. Riffles approximately 10 feet upstream of the mouth appeared to be impassable. A couple of smelt were observed in the stream after dark.

## Lake George Tributary Smelt Inventory

<b>Stream:</b>	<u>Smith Brook</u>	
<b>NYS DEC trib. #:</b>	<u>46</u>	
<b>Latitude:</b>	<u>0606235</u>	
<b>Longitude:</b>	<u>4814816</u>	
<b>Sample date:</b>	<u>4/17/09</u>	
<b>Sample time:</b>	<u>10:11</u>	
<b>Smelt observed:</b>	<u>Y</u>	
<b>Estimated amount of smelt:</b>	<u>L</u>	
<b>Eggs observed:</b>	<u>Y</u>	
<b>Estimate amount of eggs:</b>	<u>L</u>	
<b>Spawning capacity:</b>	<u>M</u>	
<b>Water temperature:</b>	<u>5.57</u>	°C
<b>Specific conductance:</b>	<u>200</u>	µS/cm
<b>pH:</b>	<u>7.32</u>	units



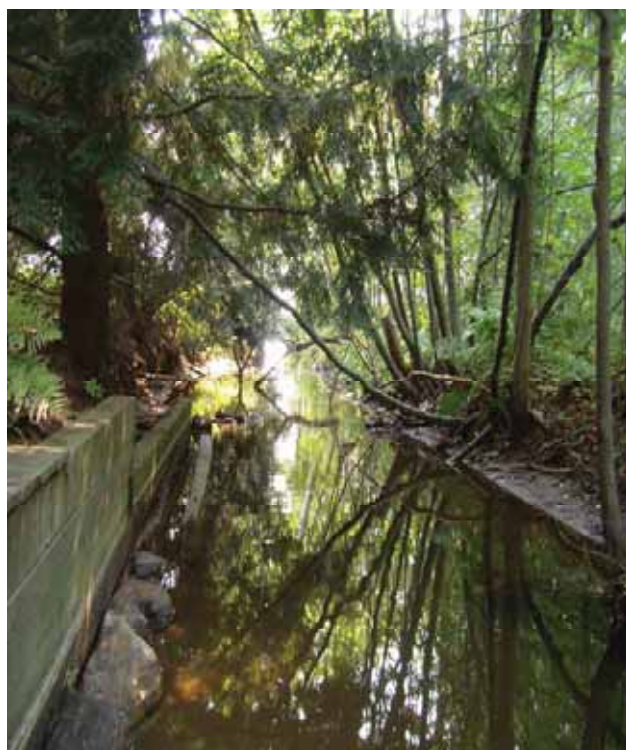
### Estimated streambed composition:

<b>Silt/clay (&lt;0.062 mm)</b>	<u>8</u>	%
<b>Sand (0.062 – 1.9 mm)</b>	<u>24</u>	%
<b>Fine gravel (2 – 24 mm)</b>	<u>36</u>	%
<b>Coarse gravel (25 – 64 mm)</b>	<u>24</u>	%
<b>Cobble (65 – 256 mm)</b>	<u>8</u>	%
<b>Boulder (256 – 1096 mm)</b>	<u>0</u>	%
<b>Bedrock</b>	<u>0</u>	%
<b>Flow:</b>	<u>1.49</u>	cfs
<b>Stream width:</b>	<u>3.00</u>	ft
<b>Mean depth of stream:</b>	<u>0.68</u>	ft

**Notes:** The stream reach consisted mostly of finer substrate. The Route 9N culvert appeared to be impassable. A few fish were observed in the stream after dark. According to the adjacent landowner on the right bank of the stream the smelt run was extremely weak this year.

## Lake George Tributary Smelt Inventory

<b>Stream:</b>	<u>Stewart Brook</u>	
<b>NYS DEC trib. #:</b>	<u>55</u>	
<b>Latitude:</b>	<u>0608654</u>	
<b>Longitude:</b>	<u>4823161</u>	
<b>Sample date:</b>	<u>4/17/09</u>	
<b>Sample time:</b>	<u>13:00</u>	
<b>Smelt observed:</b>	<u>N</u>	
<b>Estimated amount of smelt:</b>	<u>N</u>	
<b>Eggs observed:</b>	<u>N</u>	
<b>Estimate amount of eggs:</b>	<u>N</u>	
<b>Spawning capacity:</b>	<u>L</u>	
<b>Water temperature:</b>	<u>8.71</u>	°C
<b>Specific conductance:</b>	<u>275</u>	µS/cm
<b>pH:</b>	<u>7.52</u>	units



### Estimated streambed composition:

<b>Silt/clay (&lt;0.062 mm)</b>	<u>42</u>	%
<b>Sand (0.062 – 1.9 mm)</b>	<u>36</u>	%
<b>Fine gravel (2 – 24 mm)</b>	<u>10</u>	%
<b>Coarse gravel (25 – 64 mm)</b>	<u>11</u>	%
<b>Cobble (65 – 256 mm)</b>	<u>1</u>	%
<b>Boulder (256 – 1096 mm)</b>	<u>0</u>	%
<b>Bedrock</b>	<u>0</u>	%
<b>Flow:</b>	<u>0.35</u>	cfs
<b>Stream width:</b>	<u>10.00</u>	ft
<b>Mean depth of stream:</b>	<u>1.35</u>	ft

**Notes:** The reach near the outflow of the stream is relatively deep and nearly stagnant. The streambed consists mostly of fine sediment and clay. No smelt or eggs were observed.

## Lake George Tributary Smelt Inventory

<b>Stream:</b>	<u>Still Bay tributary</u>	
<b>NYS DEC trib. #:</b>	<u>44</u>	
<b>Latitude:</b>	<u>0606088</u>	
<b>Longitude:</b>	<u>4813209</u>	
<b>Sample date:</b>	<u>4/17/09</u>	
<b>Sample time:</b>	<u>9:46</u>	
<b>Smelt observed:</b>	<u>Y</u>	
<b>Estimated amount of smelt:</b>	<u>L</u>	
<b>Eggs observed:</b>	<u>N</u>	
<b>Estimate amount of eggs:</b>	<u>N</u>	
<b>Spawning capacity:</b>	<u>L</u>	
<b>Water temperature:</b>	<u>4.71</u>	°C
<b>Specific conductance:</b>	<u>95</u>	µS/cm
<b>pH:</b>	<u>7.22</u>	units



### Estimated streambed composition:

<b>Silt/clay (&lt;0.062 mm)</b>	<u>2</u>	%
<b>Sand (0.062 – 1.9 mm)</b>	<u>1</u>	%
<b>Fine gravel (2 – 24 mm)</b>	<u>10</u>	%
<b>Coarse gravel (25 – 64 mm)</b>	<u>25</u>	%
<b>Cobble (65 – 256 mm)</b>	<u>38</u>	%
<b>Boulder (256 – 1096 mm)</b>	<u>24</u>	%
<b>Bedrock</b>	<u>0</u>	%
<b>Flow:</b>	<u>0.47</u>	cfs
<b>Stream width:</b>	<u>2.00</u>	ft
<b>Mean depth of stream:</b>	<u>0.25</u>	ft

**Notes:** The reach appeared to have suitable substrate and depth regimes for spawning. However, substantial riffles approximately 10 feet upstream of the outlet appeared to be impassable by smelt. A few smelt were noted, but no eggs were observed.

## Lake George Tributary Smelt Inventory

<b>Stream:</b>	<u>West Brook</u>	
<b>NYS DEC trib. #:</b>	<u>38</u>	
<b>Latitude:</b>	<u>0604323</u>	
<b>Longitude:</b>	<u>4808060</u>	
<b>Sample date:</b>	<u>4/17/09</u>	
<b>Sample time:</b>	<u>8:28</u>	
<b>Smelt observed:</b>	<u>Y</u>	
<b>Estimated amount of smelt:</b>	<u>H</u>	
<b>Eggs observed:</b>	<u>Y</u>	
<b>Estimate amount of eggs:</b>	<u>M</u>	
<b>Spawning capacity:</b>	<u>H</u>	
<b>Water temperature:</b>	<u>6.08</u>	°C
<b>Specific conductance:</b>	<u>226</u>	µS/cm
<b>pH:</b>	<u>7.42</u>	units



### Estimated streambed composition:

<b>Silt/clay (&lt;0.062 mm)</b>	<u>7</u>	%
<b>Sand (0.062 – 1.9 mm)</b>	<u>10</u>	%
<b>Fine gravel (2 – 24 mm)</b>	<u>19</u>	%
<b>Coarse gravel (25 – 64 mm)</b>	<u>31</u>	%
<b>Cobble (65 – 256 mm)</b>	<u>25</u>	%
<b>Boulder (256 – 1096 mm)</b>	<u>8</u>	%
<b>Bedrock</b>	<u>0</u>	%
<b>Flow:</b>	<u>18.65</u>	cfs
<b>Stream width:</b>	<u>9.00</u>	ft
<b>Mean depth of stream:</b>	<u>0.98</u>	ft

**Notes:** The streambed consisted of finer substrate. Substantial amounts of smelt were observed only after dark for several consecutive nights. No smelt were observed during the day.

## MISSION

The FUND for Lake George is a not-for-profit, privately funded organization dedicated to the protection of Lake George and its nine surrounding communities. Formed in 1980, the FUND implements a science-based approach to the protection of Lake George water quality and the overall health of the Lake George watershed. The FUND seeks to use lake and watershed monitoring and scientific best practices to continuously benchmark the quality of Lake George. The FUND pursues its mission through grants to fund long-term scientific research on the lake, launching new initiatives, advocacy for new protections, and partnerships with other organizations and local governments. The FUND is the sponsor of the Lake George Waterkeeper, among other programs on Lake George. The FUND for Lake George is managed by a Board of Trustees and maintains an office in Lake George.

The mission of the Lake George Waterkeeper is to defend the natural trust resources of Lake George and its basin for the good of the community and its watershed

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