

Monitoring Alewife Runs in the South Shore Estuary Reserve

Report on the 2006 Volunteer Survey

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Alewives spawning in the lower Carmans River.

Summary

- The alewife is a socially and ecologically important species of fish that lives at sea but spawns in freshwater, including small coastal streams like those found across Long Island.
- Environmental Defense and the South Shore Estuary Reserve (SSER) organized a volunteer survey to document existing spawning runs of alewives to guide protection and restoration projects.
- A total of 68 volunteers from the community, along with numerous high school and college students, participated in a series of workshops to learn about alewives and the survey.
- Data sheets were returned by 42 individuals, although total participation in the survey was even greater as many volunteers worked in teams.
- On many tributaries, effort was greatest in March, less in April, and significantly less in May.
- There were confirmed sightings of small numbers of alewives in the Swan River and Howells Creek, and of a significant spawning run in the tidal section of the Carmans River.
- The Carmans River run began in early April and continued through mid-May.
- Alewives were present in the Carmans River during all stages of the tidal cycle.
- Although abundance estimates from visual observations are not highly accurate, counts suggest the overall size of the Carmans River run is on the order of hundreds to perhaps a few thousand fish.
- Future surveys should begin in early April rather than March so that effort is concentrated when fish are more likely to be present, and effort should be distributed more evenly through May.
- Also, the survey should focus on fewer tributaries with the aim of increasing effort on each so that adequate observation time is achieved and not spread too thinly.

About alewives

The alewife (*Alosa pseudoharengus*) is a member of the herring family that spends most of its life at sea but migrates up rivers to spawn. This anadromous life history is seen in other species of herring as well, including the blueback herring (which, together with alewives, are commonly collectively known as ‘river herring’), American shad and hickory shad. However, on Long Island most if not all anadromous herrings are likely to be alewives. American shad prefer larger rivers than the coastal streams that cover Long Island, and blueback herring prefer warmer and faster moving waters. Hickory shad are reportedly becoming more common on Long Island, however.

Alewives range from the Canadian maritime provinces to North Carolina. At sea, they spend most of their time north of Long Island and Cape Cod, mixing with other small, pelagic fish over the continental shelf. They return to spawn between the ages of 3 and 5, presumably to the river in which they were born or one nearby, and can live 8 to 10 years. Spawning runs occur in the spring, and fish can make multiple spawning runs over their lifetime. Offspring remain in freshwater for the summer and into early fall of their first year before migrating downstream to overwinter in the estuary.

A small fish (around 12 inches maximum length) of humble appearance, alewives are incredibly important ecologically. They are perhaps most important as a forage fish, serving as prey for numerous predators while at sea (e.g., tuna, cod, dolphins, billfish), in estuaries (e.g., striped bass, bluefish, weakfish, harbor seals), and in rivers (e.g., ospreys, white perch, herons, river otters). Also, alewives help deliver carbon and energy up against river flow to upstream freshwater habitats, thereby replenishing what is lost as water moves matter out to sea.

In addition to their ecological importance, these small fish have tremendous social value. Alewives support both commercial and recreational fisheries. In the South, alewives are a regional delicacy. Further north they are popular bait for lobster traps, and along the coast they are popular for catching striped bass. Many of the predators that feed on alewives support sport fishing or passive recreation such as bird watching and wildlife viewing, so alewives help to sustain those industries. Also, an alewife run itself is a unique natural phenomenon enjoyed by local communities from North Carolina to Maine. Sadly, this aspect of our natural heritage has been largely lost or forgotten on Long Island. But it can be regained.

Efforts are underway to restore alewives by addressing lost access to historical spawning grounds due to dams, restoring habitat, improving water quality, and improving fisheries management, both in rivers and at sea. This report describes a volunteer survey of alewife runs that was conducted in 2006 to improve our knowledge of these fish on Long Island and to help guide restoration efforts.

Overview of the survey

Environmental Defense and the South Shore Estuary Reserve (SSER) organized the volunteer survey to locate alewife runs during the spring of 2006. The last formal survey of alewife runs was conducted as part of the 1938 State survey of biological resources on Long Island, which documented at least 14 tributaries with an alewife run in the SSER. Anecdotal reports suggest that some tributaries still teemed with alewives as recently as the 1960s and 1970s, and that a few runs linger today.

The survey was organized to support to a major multi-stakeholder effort to restore diadromous fish populations to the south shore, and to implement recommendations in the SSER Comprehensive Management Plan. The survey was also conducted to help evaluate the success of forthcoming fish

passage projects by providing baseline information on the location and size of spawning runs, and to prioritize sites for future barrier mitigation projects. The survey aimed primarily to document presence or absence of alewife runs in select tributaries, and secondarily to document the timing of any spawning runs located. Estimating numbers of fish was also a goal, although a much lower priority, in part due to the lack of the more basic presence-absence and timing information, and in part due to the limitations of visual observation in producing abundance estimates.

Survey tributaries were selected in consultation with the SSER Diadromous Fish Work Group based on the location of planned and potential fish passage projects, and other factors listed below:

Massapequa Creek - Nassau County manages Massapequa Preserve along the downstream part of the river, and is planning a fish passage project at Massapequa Lake.

Carlls River – The Carlls River is the third longest river in the SSER, and has a well-protected watershed providing potential spawning habitat for alewives.

Connetquot River – Connetquot River is a unique, highly managed system, but it has extensive upstream habitat inside a well-protected watershed. Connetquot River State Park staff have not observed alewives in quite some time, but there have been anecdotal reports from others.

Patchogue River – Anecdotal reports suggest that Patchogue River may contain an alewife run.

Swan River – The Swan River has a known population of native brook trout, and anecdotal reports suggest an alewife run exists there as well. A fish ladder will be installed at the Swan Lake dam through an award to the Town of Brookhaven from the State's 1996 Clean Air/Clean Water Bond Act.

Mud Creek – Suffolk County and the US Army Corps of Engineers is interested in fish habitat restoration in Mud Creek to complement their Gallo Duck Farm clean-up efforts. A fish ladder will be installed at the Robinson Pond dam through an award to Suffolk County DPW from the State's 1996 Clean Air/Clean Water Bond Act.

Carmans River – The Carmans River is the longest river on the South Shore, second longest on Long Island overall, and has one of the best protected watersheds with four Suffolk County parks and the Wertheim National Wildlife Refuge along its length. A fish ladder will be installed at the Hards Lake dam in South Haven County Park in 2007, and additional fish passage projects are planned for the C-gate dam, Lower Lake dam, and Upper Lake dam through awards to Suffolk County and the Town of Brookhaven from the State's 1996 Clean Air/Clean Water Bond Act. DEC staff also monitor an eel weir in the river.

Beaverdam Creek - The Students for Environmental Quality at Bellport High School expressed interest in monitoring at this site nearby the high school.

Quantuck Creek – DEC staff at Quogue Wildlife Refuge also monitor an eel weir in Quantuck Creek, and were available to look for alewives. There have been reports of blueback herring in Quantuck Creek by DEC staff, suggesting that it may provide suitable alewife habitat as well.

Participants were encouraged to survey on additional tributaries of interest, either due to logistical convenience or personal affinity. These included Howells Creek (Bellport Golf Course Canal), Motts Brook, Peconic River and Nissequogue River. Although the last two rivers are not in the SSER,

several work group members are involved in projects in those watersheds, and local volunteers were interested in monitoring each site.

The monitoring protocol was based on the Massachusetts Division of Marine Fisheries Volunteer River Herring Counting of 2005, and was developed in consultation with the Diadromous Fish Work Group. Volunteers were provided with maps of the selected observation site on each tributary and copies of the data sheet appended to this report. Volunteers were encouraged to begin observing in mid-March when the spawning run in the Peconic River began. Observations continued through early June. Volunteers were asked to scan the water and stream bank for alewives or evidence of alewives (e.g., surface disturbance due to spawning activity, carcasses left by raccoons or other predators). Volunteers were also asked to report alewife sightings immediately rather than at the end of the survey so the sighting could be confirmed by an experienced biologist.

Alewives are reported to migrate into small coastal streams between mid tide rising and mid tide falling, or three hours before and after peak high tide. Therefore, volunteers were urged to focus their effort in two periods of 15 minutes each, one from mid tide rising to peak high tide, and one from peak high tide to mid tide falling. Tidal calendars were provided to volunteers to help them determine when to observe during the presumed optimal periods. Longer observation periods were encouraged to increase the chances of observing fish, but 15 minutes was defined as the minimum duration that would qualify as a valid observation period.

Participation in the survey

Volunteers included private citizens, members of environmental and fishing organizations (e.g., The Nature Conservancy and Trout Unlimited), DEC staff, local municipality staff, and high school and university students. Volunteers were encouraged to attend training sessions where a presentation was given providing background information on alewife ecology and conservation, and instruction on where, when and how to visually survey for migrating and/or spawning fish. Survey materials were also distributed at these training sessions.

Training sessions were held on March 2, 2006 at the Post Morrow Foundation meeting room in Brookhaven, and on March 4, 2006 at Dowling College in Oakdale. The March 2 session had 19 attendees, and 49 people attended on March 4. Training sessions for students were also held at Suffolk County Community College, Bellport High School, William Floyd High School, and Smithtown High School. Instructions and materials were provided via email or telephone for those who were unable to attend the training sessions. Data sheets were

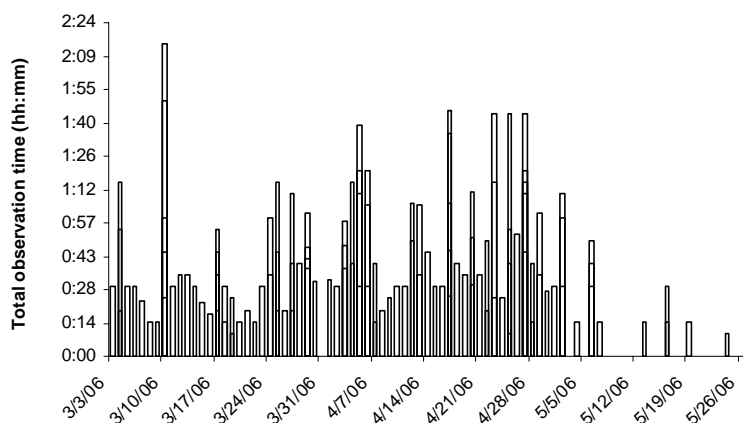


Figure 1. Observation time on the Carmans River by day. Breaks within bars represent observations by different observers.

submitted by 42 volunteers, including 23 Suffolk County Community College students. The actual number of participants was greater than 42 because many observations involved two or more people working together and sharing a single data sheet.

The total observation time, number of observers, and average observation time per day at each river in each month are provided in Table 1. Data were submitted for 15 tributaries. For many of these, the total observation time was greatest in March, less in April, and much less in May. The Carmans River had the greatest amount of volunteer effort, with more than 50 total hours of observations. Within March and April, effort was spread fairly evenly on the Carmans with volunteers looking for fish nearly every day (see Figure 1). Effort dropped drastically in May, with just over four hours of observation after 18 and nearly 28 hours in March and April, respectively. Beyond the Carmans, the rivers with the greatest volunteer monitoring effort were the main stem of the Connetquot River (Bubble Falls) and the Carlls River.

Fish sightings

Alewife sightings that were confirmed by an experienced biologist took place in the Carmans River, Swan River and Howells Creek, while unconfirmed sightings were also reported in the Carlls River and Connetquot River. Of the confirmed sightings, two fish were seen in the Swan River, and a small group of 5-10 fish were seen in Howells Creek. Neither is a sufficient number of fish to constitute a true spawning run. Whether these fish had strayed to Swan River and Howells Creek from a run elsewhere or whether they were part of a larger run that was not observed is unclear.

The alewives seen in the Carmans River, on the other hand, constituted a true spawning run (see cover photo of fish in the Carmans River). Observers estimated seeing anywhere from 1 to 150 fish from the

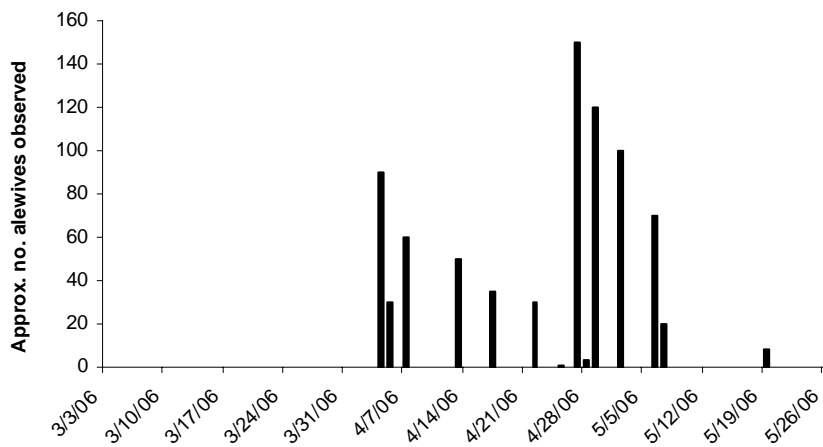


Figure 3. Approximate number of alewives observed by day in the Carmans River.

observation site on the bridge over the river on Montauk Highway on 14 different days from early April through mid-May (see Figure 2). When 150 fish are present in the immediate area of the observation site, this could mean that several hundred or perhaps even a few thousand fish were present over the stretch of river downstream of the Hards Lake dam. However, better quantitative methods will be needed to estimate actual population size. It is unknown whether fish seen on different

dates were the same fish making repeat movements between the bay and the river, or new groups of fish moving upriver to spawn once before moving back out to sea.

In contrast to reports from other locations, most alewives were not observed in the Carmans River at the peak high tide (see Table 2). Instead, fish were observed throughout the tidal cycle, with the majority observed while the tide was moving (i.e., during the flood and ebb). Although abundance

estimates from visual observations can be highly variable among observers, which could bias this result, the same patterns holds when examined in terms of simple presence or absence of fish. The flood and ebb stages each had seven distinct sightings, representing 33% and 47% of all observations during those stages, respectively. In contrast, the peak low and high tide stages each had two sightings, representing 13% and 18% of all observations, respectively.

Table 2. Sightings of alewives in the Carmans River during different tide stages. High and low tides are defined as the time of the peak or minimum tide height \pm 1.5 hours. Flood and ebb are defined as all time in between these periods when the tide is rising or falling. Therefore, each stage is approximately 3 hours in duration. These figures only include observations from the Montauk Highway bridge, so the total time does not equal the total observation time reported for the Carmans River in Table 1, which includes other vantage points.

Tidal Stage	Number of Fish	Number of Observations with Fish	Total Observations	Total Hours (hrs:min)
Low	160	2	15	6:45
Flood	340	7	21	6:55
High	155	2	11	3:12
Ebb	429	7	15	4:50

The implications of failing to see significant spawning runs or even any fish at all on most rivers are ambiguous, and could reflect the true absence of a run or simply too little effort and therefore too low of a probability of encountering the run. The two rivers that received the most attention after the Carmans – the Carlls and Connetquot – only received overall averages of 14 and 16 minutes of effort, respectively, with greatest effort in March before fish had arrived. Therefore, the results do not allow discounting the possibility of additional spawning runs in the SSER.

Lessons for 2007 and beyond

The 2006 alewife survey was the first year such an effort was conducted on Long Island, and an additional goal beyond learning about alewife runs themselves was to learn how to improve the survey in subsequent years. Several key lessons arose from the survey, including:

1. Observations should begin later to avoid a surge of effort before fish are in the rivers. Based on the timing of the Carmans River run in 2006, observations really do not need to begin until April.
2. Effort needs to spread more evenly over the survey, striving to have total observation time in May be more similar to that in April.
3. Effort was spread too thinly over 13 SSER tributaries. Future observations should focus on a smaller subset of target tributaries, aiming to achieve greater total time on each and increasing the likelihood of finding fish.
4. The Carmans River received a great deal of observer attention. It was known before the survey that a run existed in the Carmans River, but the survey provided useful information on its timing. More of that information should be gathered, but some of the Carmans effort could be redistributed to other tributaries where even the presence or absence of a run needs to be established.
5. Observations on several tributaries were hindered by the lack of an effective vantage point. Future efforts should consider supplementing visual observations with more active sampling using non-destructive methods such as fish traps or weirs to intercept migrating fish and more definitively establish presence or absence.

For additional information, please contact the SSER office at (516) 470-BAYS or sser@dos.state.ny.us

Table 1. Summary of observation effort on each tributary included in the alewife survey.

River	March			April			May			Season Total		
	Total Hours Observed (hrs:min)	Total Number of Observers	Average Observation Time per day (min:sec)	Hrs (h:m)	Obs	Avg (m:s)	Hrs (h:m)	Obs	Avg (m:s)	Hrs (h:m)	Obs	Avg (m:s)
Massapequa Creek	6:13	6	12:00	3:35	5	7:10	0:30	1	13:52	10:18	12	6:42
Carlls River	14:20	5	27:45	10:14	4	20:25	0:16	1	0:30	24:50	10	16:11
Connetquot: West Brook	1:51	3	3:30	3:36	4	7:12	1:13	2	2:21	6:40	9	4:20
Connetquot: Bubble Falls	12:53	6	24:54	7:21	6	14:42	1:27	3	2:48	21:41	15	14:08
Rattlesnake Creek	3:10	3	6:36	1:45	4	3:30	0:15	1	0:24	5:10	8	3:21
Patchogue River	8:14	2	15:54	3:21	3	6:42	1:21	2	2:36	12:56	7	8:24
Swan River	1:15	1	2:24	1:48	4	3:36	1:50	4	3:30	4:53	9	3:10
Mud Creek	4:51	3	9:18	3:25	4	6:48	0:15	1	0:24	8:31	8	5:30
Howells Creek	0:00	0	0:00	0:30	1	1:00	1:21	1	2:36	1:51	2	1:12
Motts Brook	0:20	1	0:36	0:20	1	0:36	0:00	0	0:00	0:40	2	0:26
Beaverdam Creek	5:10	6	10:00	6:27	5	12:54	2:05	4	4:02	13:42	15	8:55
Carmans River	18:05	8	35:00	27:51	11	55:42	4:10	6	8:03	50:06	25	32:40
Quantuck Creek	0:55	1	1:43	3:29	1	6:54	0:00	0	0:00	4:24	2	2:54
Peconic River	3:25	3	6:36	0:30	1	1:00	0:30	2	0:57	4:25	6	2:52
Nissequoge River	5:35	3	10:48	7:30	3	15:00	2:15	3	4:21	15:20	9	10:00

Appendix: Data sheet used for the alewife survey.

**South Shore Estuary Reserve
Spring 2006 Alewife Monitoring Survey**

Name: _____

River: _____

Observation Site: _____

Date	Start Time	End Time	Tide Stage	Water Temp	Weather Conditions	Alewives Present (Y/N)	Alewife Count (approx.)	Notes