

Environmental Factors that may Trigger Migration of Striped Bass.

“The Water Rat was restless, and he did not exactly know why. To all appearance the summer’s pomp was still at fullest height, and although in the tilled acres green had given way to gold, though rowans were reddening, and the woods were dashed here and there with a tawny fierceness, yet light and warmth and colour were still present in undiminished measure, clean of any chilly premonitions of the passing year. But the constant chorus of the orchards and hedges had shrunk to a casual evensong from a few yet unwearied performers; the robin was beginning to assert himself once more; and there was a feeling in the air of change and departure. The cuckoo, of course, had long been silent; but many another feathered friend, for months a part of the familiar landscape and its small society, was missing too, and it seemed that the ranks thinned steadily day by day. Rat, ever observant of all winged movement, saw that it was taking daily a southing tendency; and even as he lay in bed at night he thought he could make out, passing in the darkness overhead, the beat and quiver of impatient pinions, obedient to the peremptory call.” Wind in the Willows by Kenneth Grahame, Chapter IX, Wayfarers All.

Background

A group of striped bass assemble in Eel Pond, Woods Hole, MA during the spring/early summer. The fish remain in shallow water during the day and can be counted. The first striped bass generally appears in early May and the last leaves in late October or early November. In August the number of fish remains relatively constant until the southward migration begins. The database provides fish counts generally taken between 7:00 and 9:00am every day between May and November of 2017, 2018, 2019 and 2020.

Many environmental factors may provide a trigger for striped bass migration in the fall. Although many believe that the water temperature is the final trigger, a few other possibilities include day length, barometric pressure, and availability of food. Fish were fed daily to reduce the possibility that availability of food triggers migration. However, it is not possible to know how much food each fish ingested due to competition for food between fishes.

Database

There are four tabs, one for each year between 2017-2020. Columns from left to right include date, time of day, # of fish, water temperature, day length and barometric pressure.

To determine what factor(s) may be important in triggering migration, you can graph the relationship between fish counts and three environmental parameters provided on the database. Any correlations will help you develop hypotheses and experiments to test them. Create graphs using Google Sheets; see (<http://www.stripedbassmagic.org/lesson-plan-environmental-triggers-for-striped-bass-migration/>) for instructions on how to graph using this program (Excel can also be used). You may wish to condense the data for graphing purposes by averaging and plotting weekly values.

Questions:

1. List other environmental factors that might trigger migration? Check: (<https://www.timeanddate.com/sun/usa/falmouth?month=11&year=2017>) for some ideas. Add these factors to your dataset and plot them.
2. What environmental factor(s) best correlate with fish counts?
3. Design an experiment to test whether this factor(s) is/are important to trigger migration.
4. Each striped bass generally arrives and leaves Eel Pond separately on different days from others. Since striped bass school, why do you think they leave separately? Could more than one factor be responsible for the timing of their migration?
5. Are there differences in fish counts between years or is the general pattern the same?
6. The fish are fed daily to reduce hunger as a factor that triggers migration. The fish compete for the food and, as a result, it is not possible to know how much food each fish ingests. How might feeding be better controlled? Do you have other ideas for controls?

Suggested reading:

Wind in the Willows by Kenneth Grahame, Chapter IX, Wayfarers All

“Nature’s Grand Hotel has its Season, like the others. As the guests one by one pack, pay, and depart, and the seats at the table-hôte shrink pitifully at each succeeding meal; as suites of rooms are closed, carpets taken up, and waiters sent away; those boarders who are staying on, en pension, until the next year’s full re-opening, cannot help being somewhat affected by all these flittings and farewells, this eager discussion of plans, routes, and fresh quarters, this daily shrinkage in the stream of comradeship. One gets unsettled, depressed and inclined to be querulous. Why this craving for change? Why not stay on quietly here, like us, and be jolly? You don’t know this hotel out of the season, and what fun we have among ourselves, we fellows who remain and see the whole interesting year out. All very true, no doubt, the others always reply; we quite envy you—and some other year perhaps—but just now we have engagements—and there’s the bus at the door—our time is up! So they depart, with a smile and a nod, and we miss them, and feel resentful. The Rat was a self-sufficing sort of animal, rooted to the land, and, whoever went, he stayed; still, he could not help noticing what was in the air, and feeling some of its influence in his bones.” Wind in the Willows by Kenneth Grahame, Chapter IX, Wayfarers All.

