

NTO

TIDEPOL POPULATIONS: COLLAPSE OR FLUCTUATION?

A Study of the Davenport Landing
Rocky Intertidal Zone

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SPECIAL THANKS We would like to thank our mentor Professor John Pearse for his invaluable time and experience in the field and lab, as well as for providing us past sampling data from the LIMPETS monitoring location at Davenport Landing, where he has been monitoring with students since 1974.

Davenport Landing Datasheet
Permanent Plot - Random Quadrat

Date: 7/20/10 Schoolteacher: John Pearse
Plots: Beau Braghton, Beau Braghton Date of Last Visit: 2006-04

- Circle permanent area location: MUSSEL BED ANEMONE
- Choose a pair of random numbers from the random number table.
- Use numbers to locate random point inside the permanent area. Center quadrat over point.

4. Record random numbers

Random # 1	7 2	2 7
Random # 2	4 9	1 1

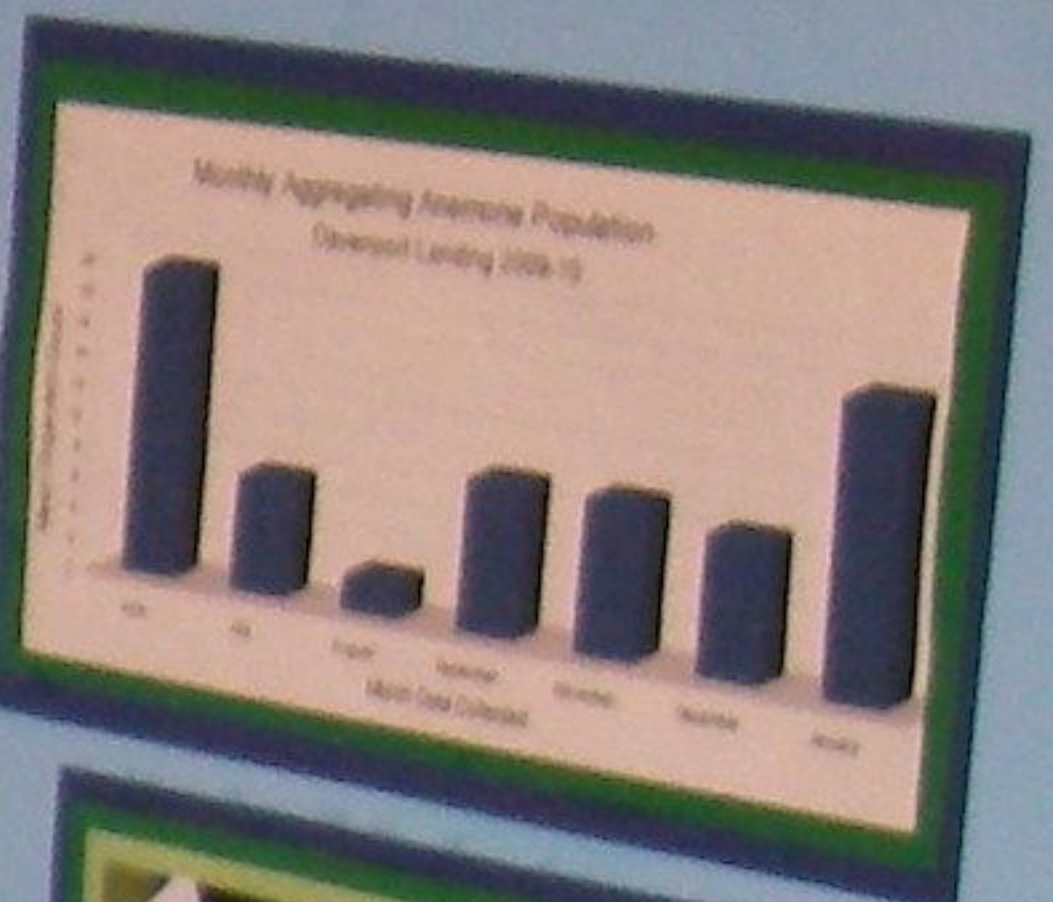
5. Record the # of individuals within the large quadrat

Individuals	Abundance	Relative Abundance
Aggregating Anemone	2	2
Aggregating Anemone	125	76
Turban Snail	4	4
Turban Snail	12	6
Turban Snail	4	4
Turban Snail	0/15	13
Turban Snail	2	2
Turban Snail	0	0



PURPOSE

The purpose of our project is to collect data (biodiversity counts) from Davenport Landing rocky intertidal and compare it to data accumulated from previous years' studies; thus, we can observe and investigate population trends. The objective of our project is to collect reliable data that can be added to the LIMPETS website for the use of future monitors, and that can be used to help confirm a decline in anemones and an increase in turban snail populations.



HYPOTHESIS

Has there been an increase in the turban snail population and a decrease in aggregating anemone population at the Davenport Landing rocky-intertidal zone?



DISCUSSION

Thus far, our data indicates a decrease since 1979 (earliest data collected) in aggregating anemones (*Antheopsis elegans*) and an increase in turban snail (*Turbo* spp.) populations. Our project mentor, John Pearse, Ph.D and professor Emeritus of Biology at UC Santa Cruz, suggested that we look at these two organisms specifically because every other organism that we were monitoring seemed to be possessing a stable population over the years, while both aggregating anemones and turban snails had noticeable population fluctuations. We gathered data through February in order to support our hypothesis that there were population increases and decreases occurring. After entering our data into the LIMPETS website, we created spreadsheets and graphs to note trends in biodiversity and individual organism counts. We then began to speculate as to the potential causes of these population changes.

One possible factor is effluent from the adjacent American Abalone Farm, which has a large water pipe that empties only feet from the tide pool and is located from the manager of the American Abalone Farm at Davenport Landing confirmed that there is algal effluent, which is something that future monitors should test. The increase in turban snails could potentially be due to effluent from the adjacent American Abalone Farm, which cycles and discharges an average of 2 million gallons of sea water daily, water that contains amounts of old seawater and algae from the abalone feeding tanks.

Previous observation from workers at the Abalone Plant suggests the possibility of *Uta* as a factor in population change for aggregating anemones and/or turban snails, as future monitors should also look carefully for patterns in the data collected during the next few Uta seasons.

Another possible contributor to population change is specifically turban snail and aggregating anemones in effluent from the Davenport Creek, which runs into the beach during rainy seasons and has been reported to be frequently turbid from agricultural runoff. The water from the creek, as well as the Abalone Farm pipe effluent should be tested throughout the next few years to further explore if they are actually potential sources of population changes.

Through further monitoring, sampling, testing and observation, future students should be able to see our data and our research to study on the causes and legitimacy of population fluctuations at Davenport Landing. Our project has set up the base for future students to make conclusions about the organisms at Davenport Landing using their data in comparison with ours.

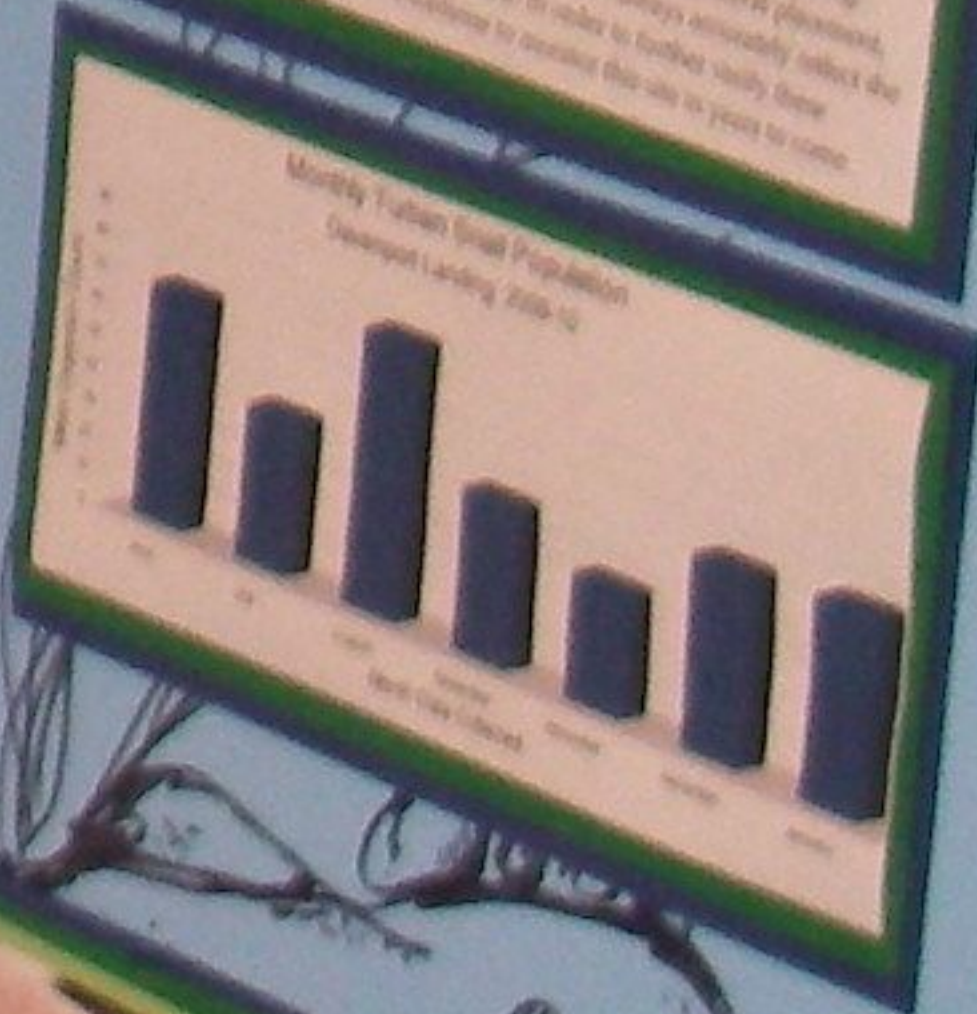


PROCEDURE

We used protocols from the LIMPETS website in order to maintain consistency with data from previous years. LIMPETS is a website in collaboration with the Farallones Marine Sanctuary Association, National Marine Fisheries Service, and the National Oceanic and Atmospheric Administration that promotes Long-term Monitoring and Experimental Training for students, and compiles all of the data from monitors along the West Coast into a single website.

- Mark the boundaries of the area with meter tapes.
- Place a quadrat inside the area using a series of two three-digit numbers, selected at random. Use the random number table for your numbers.
- Using a meter tape and coordinate I, locate the position along the base of the area.
- Use a second meter tape perpendicular to the first, to find the location specified by coordinate 2.
- Center the quadrat over the meter tape.
- Record species abundance within the quadrat as directed on the datasheet.
- Repeat the above procedure until 8 to 16 random quadrats have been completed.

*In some cases, the random numbers will place the quadrat in a deep pool or deep crevice. When this happens, place the quadrat on a level area as close to the original location as possible.
**Amount of data collected dependent on how low the tide is, amount of light, and weather/wave conditions.



CONCLUSION

Over the course of this project, we have observed a decrease in aggregating anemone populations and an increase in turban snail populations at Davenport Landing. This trend is consistent with our hypothesis and previous data from the LIMPETS website. The primary cause of these changes is likely effluent from the adjacent American Abalone Farm, which discharges large amounts of old seawater and algae into the intertidal zone. Future monitors should test for algal effluent and Uta presence to further investigate these population changes.



Beau A.
Rocky

Tidepool
Monitoring

of PLO