

Rescued from the Brink: Eelgrass Restoration to NY Harbor

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Credit: B. Chezar, 2012)

Background

- Declined by 90-99% in 1930s due to *Labyrinthula zostera* induced wasting disease (Muehlstein, 1989).
- Eelgrass: A sub-aquatic vegetation requiring total submersion, light penetration, and temperatures not far exceeding 20°C (Muehlstein, 1989).
- Used as food, shelter, and nursery by species of bivalve, invertebrate, mollusk, and waterfowl (Cole, et.al 2012; Muehlstein, 1989; Schott, 2012).

Background cont.

- Dampens currents, protecting coast lines from erosion from waves, storms, and hurricanes (Lynch, 2012; Heck Jr., et al. 2012).
- Created a fishing industry due to associated organisms and harvesting (Muehlstein, 1989; Schott, 2012).

Eelgrass Biology

- Grows similar to terrestrial grass; horizontal to the surface.
- Blades must be <75% buried to survive (Mills; Fonseca, 2003).

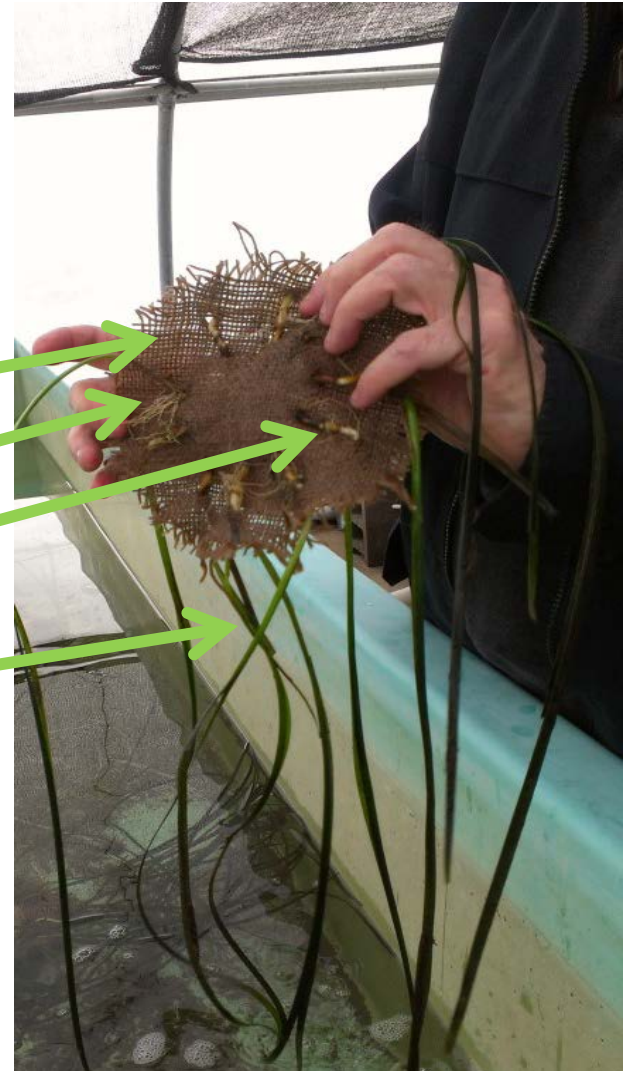
8" Burlap "tortilla"

Roots

Rhizome

Blade

- Is tolerant of nearly all parameters with the exception of light and temperature (Muehlstein, 1989; Schott, pers comm. 2012; Hauxwell et al., 2003).



Project Design Chart

Problem:

- Can Eelgrass be planted successfully at Pier 5, Sunset Brooklyn?
- Will the Eelgrass successfully survive? (Success is defined as coverage of at least 20% over at least 2 months.)

Hypothesis:

- Eelgrass planting will be successful.
- Eelgrass will survive with at least 20% coverage over 2 months.

Risks and Limitations:

- Access to pier is limited, inhibiting the ability to visit the site often.
- Access to Eelgrass is restricted to low-tide.

Objectives:

- Monitor the spread or declination of eelgrass using percent coverage.
- Monitor temperature and light changes at the planting location.

Locality

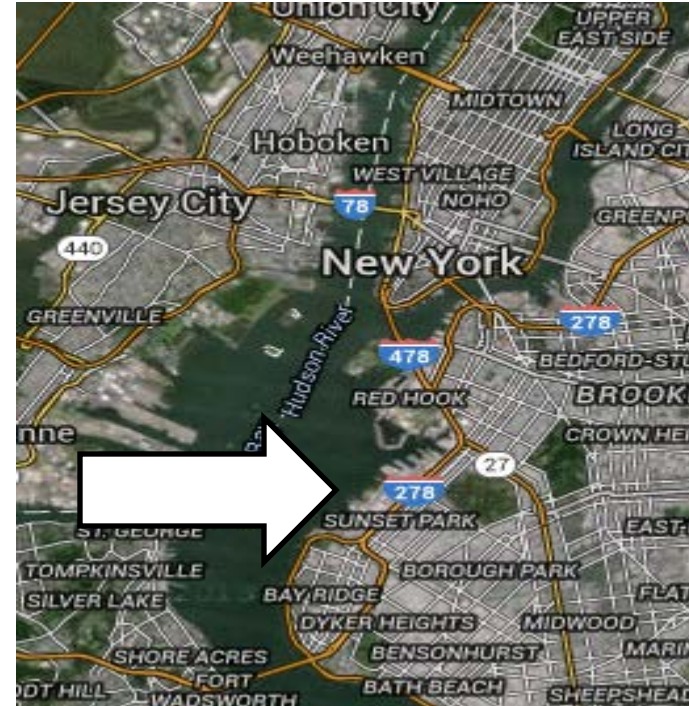
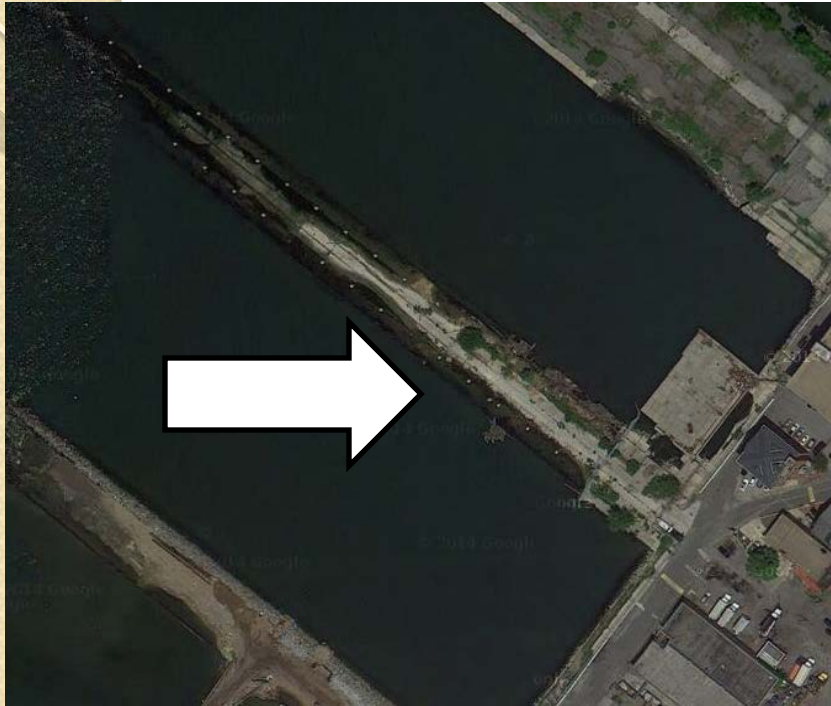


Figure 1: Location of restoration is Pier 5, Sunset, Brooklyn.

Coordinates are: 40.6553819 °N , 74.0179321°W

Results

Monthly Average Temperature (°C)

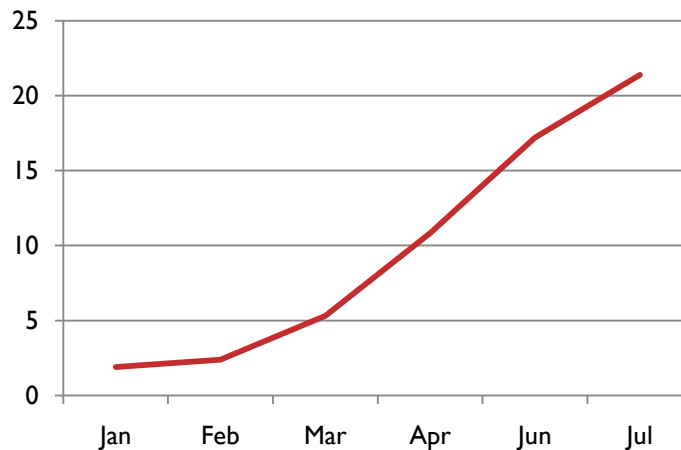


Figure 2: Average Monthly Temperature (°C). The highest temperature exceeded the tolerance level of 20°C.

Average Monthly Irradiance (W/m²)

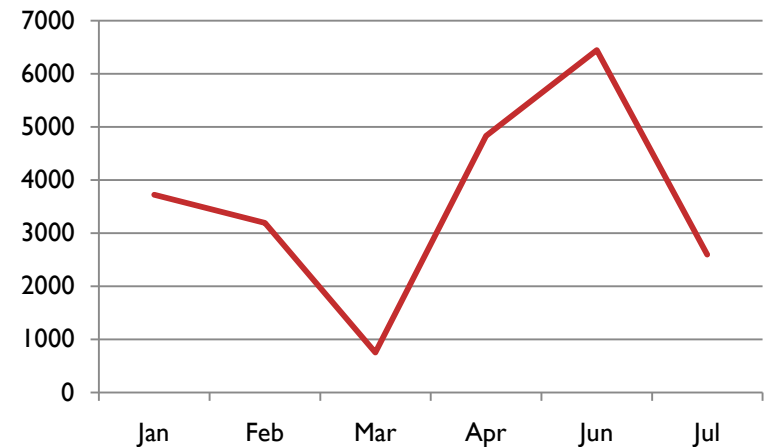


Figure 3: Average Monthly Light. Data was originally measured in Lux, but was then converted to Irradiance using a conversion factor of 4.02 and has a unit of Watts per meter squared of surface.

Results cont.



Figure 4: Mudsnail egg casings on Eelgrass. Credit: B. Chezar



Figure 5: Juvenile Striped Bass. Credit: B. Chezar

Results cont.

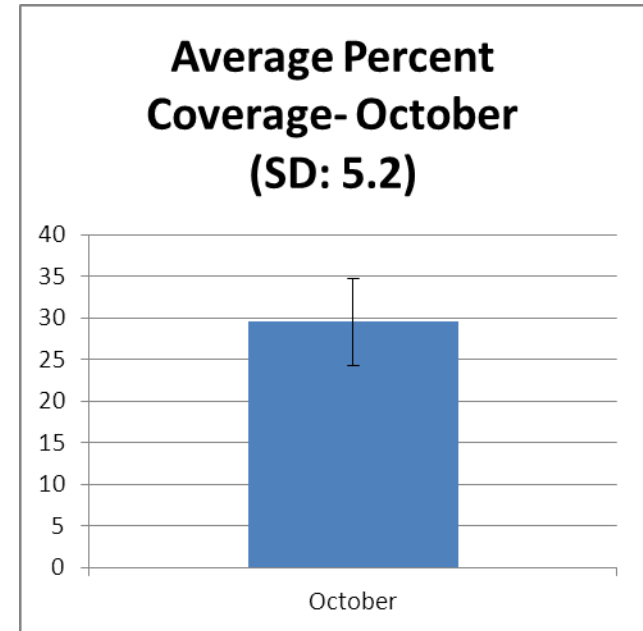
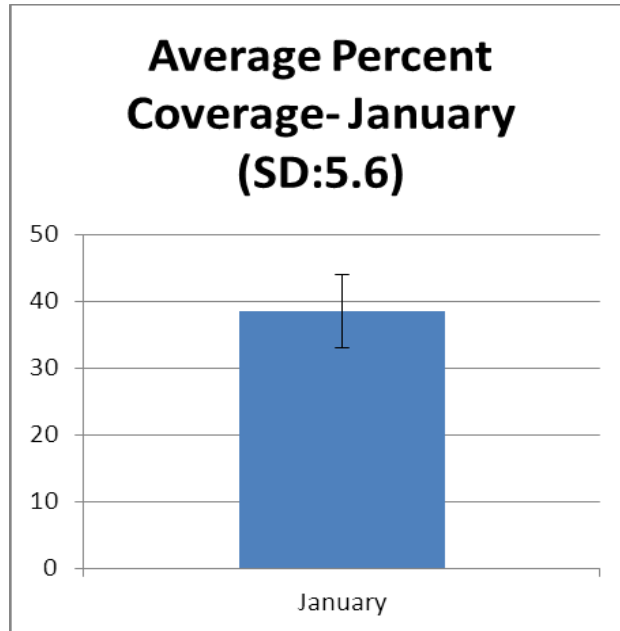


Figure 6: Average Percent Coverage as determined by the use of the quadrat. January had approximately 38.5% cover (SD: 5.6) and the following October has approximately 29.5% cover (SD:5.2)

Conclusions

- Temperature remained near the tolerance level of 20°C despite exceeding it, reaching as high as 24°C.
- The 72cm depth was optimal for the survival of eelgrass at this site. Indicates an ability to survive at the site long-term.
- Having maintained upwards of 20% coverage for a period of time exceeding 2 months, the eelgrass planting was a success.

Suggestions for Improvement

- Sampling more often.
- Continuous video/picture data.
- Larger “tortillas”.
- More blades of Eelgrass per “tortilla”.
- Long term water quality sensor.
- Marking quadrat location with nylon ribbon or flags.
- Assessing the impact of glyphosate.

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