THE EFFECTS OF LIGHT ON EELGRASS (ZOSTERA MARINA) GROWTH RATES IN SEQUIM BAY

Allie Simpson
Seagrasses form meadows that provide many ecological services ranging from supplying food and habitat for economically important species to sediment stabilization. Yet, seagrasses are experiencing worldwide decline largely driven by anthropogenic stressors. Increased turbidity is one major stressor contributing in their decline and remains a major concern in seagrass restoration. Seagrasses demand higher levels of light to support their growth and survival than other marine plants such as seaweeds. Here, we focus on the connection between the net primary productivity (NPP) of eelgrass (Zostera marina) populations at Sequim Bay and the corresponding light levels over a two-week growing period at three sites within the bay (Washington Harbor, on the beach, off the laboratory dock). To do so, we measured irradiance and the growth rate to determine approximately how much growth occurred during certain light levels. These results will aid in the management of eelgrass in the Washington Harbor restoration site.
What is the connection between the net primary productivity (NPP) of eelgrass (Zostera marina) populations at Sequim Bay and the corresponding light levels over a two week growing period?
- 3 quadrats
- Mark above sheath
- Left to grow for 2 weeks

Photo Credit: Ron Thom
HARVESTING

Photo Credit: Ron Thom
Processing

Step 1: [Image of step 1]

Step 2: [Image of step 2]

Step 3: [Image of step 3]

Step 4: [Image of step 4]

Step 5: [Image of step 5]

Step 6: [Image of step 6]
Odyssey PAR Light Sensor, LI-COR Spherical Quantum Sensor, HOBO temperature gauge off the south side of the dock

Odyssey PAR Light Sensor in eelgrass meadow next to plots
Odyssey PAR Light Sensor readings for eelgrass meadow

Courtesy of Odyssey Data Logging Software
### RESULTS

<table>
<thead>
<tr>
<th></th>
<th>Eelgrass Meadow</th>
<th>Laboratory Dock</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Time Period</strong></td>
<td>1   2   3   4</td>
<td>1   2   3   4</td>
</tr>
<tr>
<td><strong>Number of days/period</strong></td>
<td>14  14  13  15</td>
<td>14  14  13  15</td>
</tr>
<tr>
<td><strong>Average quadrat shoot density</strong></td>
<td>55.7 61.3 54.0 52.7</td>
<td></td>
</tr>
<tr>
<td><strong>Mean growth (g/shoot/period)</strong></td>
<td>0.082 0.072 0.088 0.112</td>
<td></td>
</tr>
<tr>
<td><strong>Mean growth (g/shoot/day)</strong></td>
<td>0.006 0.005 0.006 0.008</td>
<td></td>
</tr>
<tr>
<td><strong>Mean temperature/period (°C)</strong></td>
<td>11.4 12.6 12.1 12.9</td>
<td>12.2 11.9 13.7</td>
</tr>
<tr>
<td><strong>Minimum temperature/period (°C)</strong></td>
<td>9.8 9.7 10.1 10.3</td>
<td>9.6 10.0 10.2</td>
</tr>
<tr>
<td><strong>Maximum temperature/period (°C)</strong></td>
<td>25.2 33.2 27.3 27.9</td>
<td>31.7 16.1 26.9</td>
</tr>
<tr>
<td><strong>Average daily integrated PAR (mol/m²/day)</strong></td>
<td>n/a 93.5 72.3 71.3</td>
<td>n/a 57.9 32.0 26.8</td>
</tr>
<tr>
<td><strong>LI-COR (mol/m²/day)</strong></td>
<td>n/a  n/a  n/a  n/a</td>
<td>n/a 13.9 10.1 12.8</td>
</tr>
<tr>
<td><strong>NPP (g dry wt/m²/period)</strong></td>
<td>47.6 43.8 44.2 63.2</td>
<td></td>
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</tbody>
</table>
What’s next...

- Restoration
  - Washington Harbor
- More light, NPP and temperature data


Questions?

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