Oyster Bay experienced an average daily temperature of 12.85 +/- 4.16 C. Minimum observed temperature was 2.517 C, Maximum observed temperature was 31.88 C. The coefficient of variation (CV) was 0.3233341.

Fidalgo experienced an average daily temperature of 10.87 +/- 3.13 C. Minimum observed temperature was 3.05 C, maximum observed temperature was 24.06 C. The CV was 0.3049562.

Manchester experienced an average daily temperature of 11.33 +/- 2.21 C. Minimum observed temperature was 5.45 C, maximum observed temperature was 18.05 C. The CV was 0.1947315.

Dabob experienced an average daily temperature of 10.64 +/- 3.69 C. Minimum observed temperature was -3.32 C, maximum observed temperature was 27.67 C. The CV was 0.3470937.



Figure 1. Oyster Bay Temperature Data in Celsius (August 2013 to September 2014) Blue line is minimum daily temperature, red line is maximum daily temperature, orange line is median daily temperature, red horizontal line is 12.5C spawning threshold.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Month** | **Mean Temperature** | **Std. Dev.** | **Maximum (Obs)** | **Minimum (Obs)** |
| **2013-08** | 18.02976 | +/-1.101268 | 31.88 | 16.903 |
| **2013-09** | 17.06694 | +/-1.04821 | 20.043 | 14.421 |
| **2013-10** | 13.34995 | +/-0.918077 | 15.282 | 5.86 |
| **2013-11** | 10.67302 | +/-0.91295 | 12.594 | 8.182 |
| **2013-12** | 7.770806 | +/-0.812125 | 9.768 | 2.517 |
| **2014-01** | 7.810293 | +/-0.209897 | 8.182 | 6.674 |
| **2014-02** | 6.898092 | +/-0.776371 | 8.978 | 4.415 |
| **2014-03** | 8.9183 | +/-0.568242 | 11.236 | 7.682 |
| **2014-04** | 10.73237 | +/-0.695753 | 14.421 | 9.275 |
| **2014-05** | 13.47825 | +/-1.113377 | 20.901 | 11.236 |
| **2014-06** | 15.51379 | +/-0.74385 | 19.187 | 13.75 |
| **2014-07** | 17.88636 | +/-0.971264 | 23.1 | 15.569 |
| **2014-08** | 18.49966 | +/-0.566504 | 21.569 | 17.379 |
| **2014-09** | 17.5186 | +/-0.515754 | 19.948 | 16.523 |

Table 1. Monthly Temperature Statistics for Oyster Bay.



Figure 2. Fidalgo BayTemperature Data in Celsius (August 2013 to October 2014) Blue line is minimum daily temperature, red line is maximum daily temperature, purple line is median daily temperature, red horizontal line is 12.5C spawning threshold.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Month** | **Mean Temperature** | **Std. Dev.** | **Maximum (Obs)** | **Minimum (Obs)** |
| **2013-08** | 16.34317 | +/-1.240026 | 24.062 | 13.558 |
| **2013-09** | 15.31694 | +/-2.011672 | 19.948 | 11.139 |
| **2013-10** | 11.31524 | +/-1.048088 | 14.517 | 5.141 |
| **2013-11** | 8.720549 | +/-1.015041 | 10.259 | 6.573 |
| **2013-12** | 6.037887 | +/-1.173657 | 8.481 | 3.049 |
| **2014-01** | 7.24692 | +/-0.478899 | 7.882 | 5.347 |
| **2014-02** | 6.114322 | +/-1.000087 | 7.582 | 3.261 |
| **2014-03** | 7.943623 | +/-0.610812 | 9.472 | 6.268 |
| **2014-04** | 9.514967 | +/-0.745366 | 13.558 | 8.282 |
| **2014-05** | 11.40334 | +/-0.979874 | 15.569 | 9.866 |
| **2014-06** | 12.85314 | +/-1.324983 | 16.999 | 10.651 |
| **2014-07** | 13.84214 | +/-1.588132 | 19.092 | 11.334 |
| **2014-08** | 14.4142 | +/-1.272037 | 20.234 | 12.497 |
| **2014-09** | 13.3386 | +/-0.807058 | 16.237 | 11.722 |
| **2014-10** | 12.14833 | +/-0.474714 | 13.269 | 11.139 |

Table 2. Monthly Temperature Statistics for Fidalgo Bay.



Figure 3. Manchester Temperature Data in Celsius (August 2013 to October 2014) Blue line is minimum daily temperature, red line is maximum daily temperature, light blue line is median daily temperature, red horizontal line is 12.5C spawning threshold.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Month** | **Mean Temperature** | **Std. Dev.** | **Maximum (Obs)** | **Minimum (Obs)** |
| **2013-08** | 13.53608 | +/-0.608937 | 18.045 | 12.69 |
| **2013-09** | 13.28304 | +/-0.465928 | 14.804 | 12.401 |
| **2013-10** | 12.33953 | +/-0.401881 | 13.365 | 6.37 |
| **2013-11** | 10.89575 | +/-0.799238 | 12.207 | 5.45 |
| **2013-12** | 9.450245 | +/-0.43898 | 10.553 | 5.655 |
| **2014-01** | 8.561135 | +/-0.247711 | 9.077 | 7.882 |
| **2014-02** | 7.892871 | +/-0.218211 | 8.481 | 7.381 |
| **2014-03** | 8.406197 | +/-0.326186 | 9.768 | 7.782 |
| **2014-04** | 9.347956 | +/-0.611378 | 11.528 | 8.282 |
| **2014-05** | 10.66816 | +/-0.858306 | 13.269 | 9.077 |
| **2014-06** | 12.29183 | +/-0.897848 | 15.091 | 10.455 |
| **2014-07** | 13.88773 | +/-0.978905 | 16.808 | 11.625 |
| **2014-08** | 13.99026 | +/-0.578407 | 16.141 | 12.787 |
| **2014-09** | 13.71327 | +/-0.384377 | 14.996 | 12.883 |
| **2014-10** | 13.21767 | +/-0.298188 | 14.038 | 12.304 |

Table 3. Monthly Temperature Statistics for Manchester.



Figure 4. Dabob Temperature Data in Celsius (August 2013 to April 2014) Blue line is minimum daily temperature, red line is maximum daily temperature, light blue line is median daily temperature, red horizontal line is 12.5C spawning threshold.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Month** | **Mean Temperature** | **Std. Dev.** | **Maximum (Obs)** | **Minimum (Obs)** |
| **2013-08** | 18.49337 | +/-2.037215 | 27.075 | 14.134 |
| **2013-09** | 17.12595 | +/-2.475945 | 27.665 | 9.077 |
| **2013-10** | 11.86964 | +/-1.487143 | 20.329 | 6.064 |
| **2013-11** | 9.489874 | +/-1.581117 | 11.916 | 2.837 |
| **2013-12** | 7.710751 | +/-1.680059 | 10.161 | -0.774 |
| **2014-01** | 7.901633 | +/-1.032483 | 10.846 | 2.303 |
| **2014-02** | 6.753191 | +/-1.877149 | 12.401 | -3.316 |
| **2014-03** | 9.752109 | +/-1.616441 | 20.71 | 4.311 |
| **2014-04** | 12.24793 | +/-2.201719 | 23.388 | 7.782 |

Table 4. Monthly Temperature Statistics for Dabob.



Figure 1. Average Daily Temperatures for all 4 sites. Dabob = Green, Manchester = Blue, Fidalgo Bay = Purple, Oyster Bay = Orange, 12.5 C Spawn Threshold = Red

|  |  |  |
| --- | --- | --- |
| Site/Threshold | **>= 20 C** | **<= 5 C** |
| **Manchester** | 0 | 0 |
| **Dabob** | 33 | 52 |
| **Fidalgo** | 4 | 20 |
| **Oyster Bay** | 34 | 5 |

Table 1. Number of Days experiencing maximum or minimum at or beyond temperature extremes.

--

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Group | *Fidalgo Bay* | *Manchester* | *Oyster Bay* | *Dabob\** |
| Fidalgo | 29.1+/-5.14 | 24.4+/-5.77 | 34.7+/-6.53 | 14.4 |
| Dabob | 24.4+/-4.48 | 21.5+/-4.96 | 28.0+/-5.60 | 13.4 |
| Oyster Bay | 28.9+/-5.14 | 24.0+/-4.98 | 28.0+/-5.2 | 13.4 |

Table xx. Average Size for each group at each site after 8 (Dabob Bay), 13 (Oyster Bay), or 14 (Fidalgo/Manchester) months post outplant. Sizes in mm.

|  |  |  |  |
| --- | --- | --- | --- |
| Group/Site | Fidalgo Bay | Manchester | Oyster Bay |
| Fidalgo | 29.9+/-4.97 | 25.5+/-3.87 | 29.9+/-3.96 |
| Dabob | 22.9+/-4.29 | 19.1+/-3.72 | 26.2+/-2.80 |
| Oyster Bay | 28.9+/-3.60 | 22.4+/-3.12 | 27.5+/-3.61 |

Table xx. Average Size at Brooding per group per site. Sizes in mm.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Site/Pop | 1N | 1H | 1S | 2N | 2H | 2S | 4N | 4H | 4S |
| 1N | -------------- | **0.0051464** | 0.0606544 | 1.0000000 | **0.0000767** |  0.9666700 |  0.3534660 | **0.0000000** |  **0.0000001** |
| 1H | **0.0051464** | -------------- | 0.8283448 | 0.2364509 | 0.3744056 | 0.0801646 | 0.9999927 | **0.0000377** | 0.0583953 |
| 1S | 0.0606544 | 0.8283448 | -------------- | 0.7124328 | **0.0227243** | 0.5711141 | 0.9784194 | **0.0000000** | **0.0002118** |
| 2N | 1.0000000 | 0.2364509 | 0.7124328 | -------------- | **0.0049557** |  0.9990434 | 0.5702244 | **0.0000002** |  **0.0002760** |
| 2H | **0.0000767** | 0.3744056 | **0.0227243** | **0.0049557** | -------------- |  **0.0009451** | 0.9601763 |  0.4564115 |  0.9999980 |
| 2S |  0.9666700 | 0.0801646 | 0.5711141 |  0.9990434 |  **0.0009451** | -------------- | 0.6871788 | **0.0000000** | **0.0000024** |
| 4N | 0.3534660 |  0.9999927 | 0.9784194 | 0.5702244 | 0.9601763 | 0.6871788 | -------------- | 0.0895671 | 0.8554460 |
| 4H | **0.0000000** | **0.0000377** | **0.0000000** | **0.0000002** |  0.4564115 | **0.0000000** | 0.0895671 | -------------- | 0.4931960 |
| 4S |  **0.0000001** | 0.0583953 | **0.0002118** |  **0.0002760** |  0.9999980 | **0.0000024** | 0.8554460 |  0.4931960 | -------------- |

Table xx. Associated P-Value for Size per Population by Site. Numbers are sites (1 = Oyster Bay, 2 = Fidalgo Bay, 4 = Clam Bay). Letters are populations (N = Fidalgo Bay, H = Dabob Bay, S = Oyster Bay).

|  |  |  |  |
| --- | --- | --- | --- |
| Group/Site | Fidalgo Bay | Manchester | Oyster Bay |
| Fidalgo | 19 | 22 | 20 |
| Dabob | 19 | 15 | 19 |
| Oyster Bay | 21 | 16 | 19 |

Table xx. Minimum Observed Size at Brooding per group per site. Sizes in mm.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | 12.5 C Threshold | Oyster Bay Peak Brooding | DabobPeak Brooding | Fidalgo Peak Brooding |
| Oyster Bay | 133 DD | 307.894 DD | 453.021 DD | 453.021 DD |
| Manchester | 113 DD | 377.561 DD | 377.561 DD | 175.322 DD |
| Fidalgo Bay | 143 DD | 354.156 DD | 512.99 DD | 512.999 DD |

Table 3. Degree Days from 8C minimum at each Site for each population as well as 12.5 C spawning threshold.