Microbial Processes
Distribution of Microbes

- Bacterial numbers much higher at sediment surface than in overlying waters

- Bacterial numbers much higher in sediments of littoral zone than in sediments of the profundal zone
## Productivity & Bacterial Numbers

<table>
<thead>
<tr>
<th>Type</th>
<th>Bacterial Numbers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crater Lake (Ultraoligotrophic)</td>
<td>$0.1 \times 10^6$/ml</td>
</tr>
<tr>
<td>Oligotrophic</td>
<td>$0.5 \times 10^6$/ml</td>
</tr>
<tr>
<td>Mesotrophic</td>
<td>$1.0 \times 10^6$/ml</td>
</tr>
<tr>
<td>Eutrophic</td>
<td>$3.7 \times 10^6$/ml</td>
</tr>
<tr>
<td>Spirit Lake (summer 1980)</td>
<td>$3.0 \times 10^8$/ml</td>
</tr>
</tbody>
</table>
Vertical Distribution of Microbes

- Highest in epilimnion
- Low in metalimnion and upper hypolimnion
- Increase in lower hypolimnion - especially where hypolimnion is anaerobic
Seasonal Distribution of Microbes

- Seasonal distribution is highly variable
- Close correlation with algal numbers and productivity - sometimes lags 5-10 days
- Temperature also somewhat correlated
Bacterial Numbers in Water and Sediments

Moderately productive, stratified lake

- High in epilimnion
- Low in metalimnion & upper hypolimnion
- High in lower hypolimnion
- Very high in upper sediments
Bacterial Productivity

- Normally a small percentage of phytoplankton productivity

- Mirror Lake (NH) - oligotrophic (8-22%)

- Lawrence Lake (MI) - oligotrophic (13%)