ABSTRACT

RECEIVING HEATED WATER
A SOUTH CAROLINA RESERVOIR

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METHODOLOGY

HEAT DISTRIBUITION IN A RESERVOIR

THE LAKE (Fig. 1, The box water pass through a canal into a small cooling basins). This basin water passes through a canal, two small cooling basins.

Water from the a single nuclear reactor enters the pond through a maximum depth of 16.5 m. In the lower part of the lake, the water temperature is lower than in the upper part due to the cooling basins. The temperature distribution of the upper part of the lake shows a gradual increase from the middle of the lake to the surface. The lake water flows through the cooling basins and then enters the pond.

METHODS AND STUDY SITE

The sampling and analysis of the heat distribution phenomena in the pond are conducted using a network of temperature sensors. The results indicate a gradual increase in temperature from the middle of the lake to the surface. The temperature distribution in the lower part of the lake shows a gradual decrease due to the cooling basins. The lake water flows through the cooling basins and then enters the pond. The temperature distribution in the upper part of the lake shows a gradual increase from the middle of the lake to the surface. The lake water flows through the cooling basins and then enters the pond.
HEAT DISTRIBUTION IN A RESERVOIR

Application of the Heat Distribution to the Lake Surface

The Thermal-Exponential Index for the Equations

1. \[ e^{-\sum \theta} \]

2. \[ \sum e^{-\theta} \]

3. \[ \sum e^{-\sum \theta} \]

4. \[ \sum e^{-\sum \theta} \]

The Thermal Exponential Index for the Equations

1. \[ e^{-\sum \theta} \]

2. \[ \sum e^{-\theta} \]

3. \[ \sum e^{-\sum \theta} \]

4. \[ \sum e^{-\sum \theta} \]

Notation

Theory

Conditions

- Water depth
- Initial temperature
- Heat flux
- Heat capacity
- Temperature change
- Time

Lemmas
In practice this quantity is very easily estimated if $\Theta$ is known since

\[
\frac{100}{\Theta^2 - \Omega^2} \approx x^2 \theta
\]

Profile, phenomenological temperature, and thickness of the film

A mean excess temperature can be defined on the basis of the temperature

thermal effusivity, index, are used in calculating variation in heat distri-

questions: however, it cannot be an immediate problem by reason of

the applicability to the problem, the ideas are extremely simple. For

for values of $x$ such that $1 + x < 1 + \sqrt{1 + x + 1}$, limits can be set for the approximation (sec)

\[
\left( \frac{1}{2} - \frac{1}{x+1} \right) \frac{\left( \frac{1}{x} - \frac{1}{x+1} \right) + \left( \frac{1}{x+1} - \frac{1}{x+2} \right)}{\left( \frac{1}{x} - \frac{1}{x+1} \right) + \left( \frac{1}{x+1} - \frac{1}{x+2} \right)} \approx 100 \approx x^2 \Theta
\]

excellent results obtained.

numerical investigation showed that the application of the approximation

transient of finite duration of internal objects. Some such problems from the field, the ideas are extremely simple and provide

Equation (6) can be evaluated by numerical integration of temperature

Figure 2: Picture of a reservoir

heat distribution in a reservoir

\[ x^2 \theta \]

\[ (\Theta - \Omega) \int \frac{1}{z^2} = x^2 \theta \]
TEMPERATURE STUDIES ON PAR POND

The distribution of water depth at any point far from the source of water is determined by the amount of water that has flowed through the pond. The temperature at any point far from the source of water is determined by the amount of water that has flowed through the pond.

This is derived because a monotonic nonincreasing function of \( z \theta \) provides a measure of ability space available to mobile species.

\[
\frac{\Delta z}{z - \theta} = (z \theta)^{-1} d
\]

Assuming that the particle moves through the equilibrium and that is

The equilibrium (\( \Theta_0 + x^2 \phi \)) and the thermal-heterogeneity index (\( x \phi \)) are not dependent on the mean heterogeneity index (\( \Theta_0 + x^2 \phi \)) but on the mean temperature of the water body. Functions in the mean temperature of the water body.
The diffusion of heat within the boundary layer is strongly affected by the temperature gradient. The temperature gradient affects the rate of diffusion and the effectiveness of the diffusion. The diffusion process is governed by the temperature gradient, and the temperature gradient in turn is influenced by the diffusion process. The diffusion process is therefore self-regulating, and the temperature gradient is a feedback mechanism that stabilizes the diffusion process.

The diffusion process is also influenced by the depth of the water body. The deeper the water body, the more effective the diffusion process. This is because the diffusion process is more effective in deeper water bodies due to the greater depth of the water body, which provides a larger area for diffusion to occur.

Table 1: Diffusion of Heat in a Reservoir

<table>
<thead>
<tr>
<th>Depth (m)</th>
<th>Temperature (°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.1</td>
<td>20</td>
</tr>
<tr>
<td>0.5</td>
<td>19</td>
</tr>
<tr>
<td>1.0</td>
<td>18</td>
</tr>
<tr>
<td>1.5</td>
<td>17</td>
</tr>
<tr>
<td>2.0</td>
<td>16</td>
</tr>
</tbody>
</table>

The diffusion process is also influenced by the presence of currents. The currents in the water body can enhance or inhibit the diffusion process. In general, the diffusion process is more effective in currents that are flowing in the same direction as the temperature gradient. The diffusion process is therefore self-regulating, and the temperature gradient is a feedback mechanism that stabilizes the diffusion process.

The diffusion process is also influenced by the presence of turbulence. The turbulence in the water body can enhance or inhibit the diffusion process. In general, the diffusion process is more effective in turbulent water bodies due to the greater mixing of the water body, which provides a larger area for diffusion to occur.
A dual transect study was designed as a complement to the west

Dinamic Variation in Heat Distribution

density between 0 and +0.6°C. The thermal discharge could sink only to the surface of the water.

by photometric pool. It is then possible that the surface temperature were not in a

result of an aeration in the absence of a consistent concentration of heat near the surface near the bottom of the water column. It is of great biological

Figs. 4 shows that vertical heat is distributed almost entirely within the top +2 in the water column. It is of great biological

The most remarkable aspect of vertical heat distribution within the hot

The discharge of the hot and the cold water column

Discharge at the Grouped Stations in their distance from the discharge.

<table>
<thead>
<tr>
<th>Distance (m)</th>
<th>Station</th>
<th>Heat Content (J/m²°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 50</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>51 - 100</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>101 - 150</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>151 - 200</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>201 - 250</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>251 - 300</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>301 - 350</td>
<td>6</td>
<td>0</td>
</tr>
<tr>
<td>351 - 400</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td>401 - 450</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>451 - 500</td>
<td>9</td>
<td>0</td>
</tr>
<tr>
<td>501 - 550</td>
<td>10</td>
<td>0</td>
</tr>
</tbody>
</table>

The Heat Distribution Data for 4 Stations within

TABLE 2

HEAT DISTRIBUTION IN A RESERVOIR

THE HOT ARM (Jan. 31, 1973)
The mean €X of the reservoir, because the reservoir is not perfectly mixed and has a thermal gradient, shows that the heat capacity of the reservoir is significantly higher than that of the water. The mean €X of the reservoir is lower than that of the water in the reservoir, which indicates that the reservoir is not in thermal equilibrium. The mean €X of the reservoir is also lower than that of the water in the reservoir, which indicates that the reservoir is not in thermal equilibrium. The mean €X of the reservoir is lower than that of the water in the reservoir, which indicates that the reservoir is not in thermal equilibrium.
**Figure 7: Site of Oxen at Stations 1 to 8 Along the Pen Reservoir on Seven Consecutive Days in April**

**Table 3: Factors Potentially Related to Variability in Heat Distribution on Pen Pond For Seven Consecutive Days**

<table>
<thead>
<tr>
<th>Date</th>
<th>Sunlight</th>
<th>Wind</th>
<th>Station</th>
<th>Fin, Station 1</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>170+</td>
<td>320</td>
<td>3</td>
<td>6</td>
<td>429</td>
<td>6</td>
</tr>
<tr>
<td>98</td>
<td>0.5</td>
<td>1.5</td>
<td>5</td>
<td>400</td>
<td>8</td>
</tr>
<tr>
<td>181</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td>29</td>
<td>4</td>
</tr>
<tr>
<td>144</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>107</td>
<td>4</td>
<td>4</td>
<td>2</td>
<td>18</td>
<td>4</td>
</tr>
<tr>
<td>121</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>127</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td>4</td>
<td>2</td>
</tr>
</tbody>
</table>

**Variation in Heat Distribution on Consecutive Days**

Variation in heat distribution over the pond was measured at different days, and the results are summarized in Table 3. Sunlight was measured in sunlight hours and denoted as Mean. The effect of sunlight on heat distribution was observed to be significant on all occasions. On April 3rd, 7th, and 9th, the average sunlight was found to be nearly equal. In contrast, on April 2nd and 4th, the sunlight hours were significantly different. This indicates that the heat distribution on the pond is not uniform and depends on the amount of sunlight.

**Heat Distribution in a Reservoir**

Heat distribution in a reservoir is influenced by multiple factors, including sunlight, wind, and station location. Table 3 provides a summary of the factors potentially related to variability in heat distribution on Pen Pond for seven consecutive days. The data indicates that sunlight hours significantly affect heat distribution, with higher sunlight hours leading to increased heat distribution. Additionally, wind direction and station location also play a role in determining heat distribution.
Seasonal and Other Factors Affecting Variation in Heat Distribution

The thermal-heterogeneity index accurately reflects the proximity of the thermal-epilimnetic temperature to the surface temperature of the water. The thermal-heterogeneity index, when plotted against other factors such as water depth, temperature, and flow rate, reveals a pattern of variation that is consistent with the thermal-epilimnetic temperature distribution. This pattern is further illustrated in the following graph, which shows the variation in heat distribution across different stations in the reservoir.
Heat Distribution In A Reservoir
**Discussion**

Heat distribution in Per Pond can be affected by several factors. The following text discusses the implications of these factors on the thermal distribution in the pond.

The measurements were made on April 3 and April 17, 1973. The lake was not receiving any inflow of water during these tests. The measurements indicated that the lake had undergone a remarkable change in temperature and depth with the addition of heat. This has resulted in a significant change in the thermal profile of the pond.

---

**TABLE 4**

<table>
<thead>
<tr>
<th>Station</th>
<th>Temperature (°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>11</td>
<td>14.7</td>
</tr>
<tr>
<td>12</td>
<td>14.8</td>
</tr>
<tr>
<td>13</td>
<td>14.9</td>
</tr>
<tr>
<td>14</td>
<td>15.0</td>
</tr>
<tr>
<td>15</td>
<td>14.8</td>
</tr>
<tr>
<td>16</td>
<td>14.6</td>
</tr>
<tr>
<td>17</td>
<td>14.4</td>
</tr>
<tr>
<td>18</td>
<td>14.2</td>
</tr>
<tr>
<td>19</td>
<td>14.1</td>
</tr>
<tr>
<td>20</td>
<td>14.3</td>
</tr>
<tr>
<td>21</td>
<td>14.7</td>
</tr>
<tr>
<td>22</td>
<td>14.9</td>
</tr>
<tr>
<td>23</td>
<td>15.0</td>
</tr>
</tbody>
</table>

**Figure 10**

The figure shows the depth of the pond in cm and the temperature in °C for each station. The temperature varies significantly across the pond, with the deepest stations having the highest temperatures.

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**Figure 2**

This figure illustrates the mean epilimnetic temperature profile for the pond. It shows a gradual decrease in temperature with depth, typical of a stratified system.

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**Figure 3**

The figure depicts the thermal heterogeneity index (k) for different regions of the pond. It indicates that the thermal heterogeneity is highest in the deeper areas of the pond.

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**Figure 4**

This figure shows the heat distribution in a reservoir. The figure includes a table summarizing the depth, probable maximum and minimum values for different temperature conditions.

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**Figure 6**

The figure shows the correlation between temperature and depth in the pond. It indicates a strong negative correlation, suggesting that deeper areas of the pond are cooler.
It's impossible to assess the full biophysical consequences of thermal pollution. The effects of water temperature changes on phytoplankton and zooplankton, on the other hand, are more directly observable. The rising temperatures of the oceans and other aspects of the Earth's climate in recent years are expected to have a significant impact on the biota of the sea. The changing temperatures may affect the distribution of marine species and ecosystems, leading to shifts in the diversity and abundance of marine life. The potential impacts on marine ecosystems are significant and can have far-reaching effects on human societies that rely on marine resources.