Storage Capacity, Sedimentation, and End-of-Life

The original storage capacity of Lago La Plata was 35 million cubic meters in 1974. In 2006, the live storage was about 33.69 million cubic meters, and the dead storage was 1.77 million cubic meters (table 1). These values represent long-term storage losses corresponding to approximately 4.5 percent and 0.6 percent, respectively, of the live and dead storage capacities. The Lago La Plata original storage capacity was 40.21 million cubic meters in 1974, which decreased by about 0.83 million cubic meters (1.77 - 0.94 = 0.83; table 1). The inter-survey loss of capacity (1998-2006) was 0.20 million cubic meters per year. The long-term loss of capacity (1974-2006) corresponds to an annual rate of 0.52 million cubic meters per year, which is 2.6 times higher than the previous rate of 0.20 million cubic meters per year. Averaged over the period of 50 years, the long-term annual loss of capacity is 1.04 million cubic meters per year. The long-term sedimentation rate of 1.04 million cubic meters per year is equivalent to about 34 cubic meters per second. This represents a total reduction between 1974 and 2006 of 8.94 million cubic meters (22 percent in 32 years) for an annual storage capacity loss rate of about 0.28 million cubic meters. The sedimentation rate, however, for the period 1998-2006 of about 0.52 million cubic meters per year is 2.6 times higher than the previous 1974-1998 rate of about 0.20 million cubic meters per year. The accelerated sedimentation rate also contributes to a long-term reduction of water storage capacity. This is a consequence of being disabled by sediment accumulation (Soler-López and others, 2000). The 2006 data indicate the Río de La Plata segment has been most affected by sediment accumulation, whereas the Guadiana and Río Cañas branches, the average sediment accumulation is about 2 meters in thickness, per year.

Table 1. Long-term sedimentation of Lago La Plata, Puerto Rico, 1974-2006

<table>
<thead>
<tr>
<th>Year</th>
<th>Live Storage (MCM)</th>
<th>Dead Storage (MCM)</th>
<th>Annual Loss of Capacity (%)</th>
<th>Long-term Annual Loss of Capacity (MCM/year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1974</td>
<td>35.0</td>
<td>1.77</td>
<td>0.5</td>
<td>0.20</td>
</tr>
<tr>
<td>2006</td>
<td>33.69</td>
<td>1.77</td>
<td>0.7</td>
<td>0.52</td>
</tr>
<tr>
<td>Change</td>
<td>1.31</td>
<td></td>
<td>0.2</td>
<td>0.32</td>
</tr>
<tr>
<td>Inter-survey Loss of Capacity (MCM/year)</td>
<td>0.20</td>
<td></td>
<td></td>
<td></td>
</tr>
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<td>Long-term Loss of Capacity (MCM/year)</td>
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</tbody>
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Table 2.

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Summary

Storage capacity has declined from 35 million cubic meters in 1974 to 33.69 million cubic meters in 2006 (table 1). The long-term (1974-2006) sediment yield is about 689 cubic meters per year, which is about 0.52 million cubic meters per year. The inter-survey (1998-2006) loss of capacity is 0.20 million cubic meters per year. Between 1998 and 2006, the annual storage loss rate is about 0.52 million cubic meters per year, which is 2.6 times higher than the long-term (1974-1998) rate of about 0.20 million cubic meters per year. This represents a total reduction between 1974 and 2006 of 8.94 million cubic meters (22 percent in 32 years) for an annual storage capacity loss rate of about 0.28 million cubic meters. The sedimentation rate, however, for the period 1998-2006 of about 0.52 million cubic meters per year is 2.6 times higher than the previous 1974-1998 rate of about 0.20 million cubic meters per year. Averaged over the period of 50 years, the long-term annual loss of capacity is 1.04 million cubic meters per year. The long-term sedimentation rate of 1.04 million cubic meters per year is equivalent to about 34 cubic meters per second. This represents a total reduction between 1974 and 2006 of 8.94 million cubic meters (22 percent in 32 years) for an annual storage capacity loss rate of about 0.28 million cubic meters. The sedimentation rate, however, for the period 1998-2006 of about 0.52 million cubic meters per year is 2.6 times higher than the previous 1974-1998 rate of about 0.20 million cubic meters per year. Averaged over the period of 50 years, the long-term annual loss of capacity is 1.04 million cubic meters per year. The long-term sedimentation rate of 1.04 million cubic meters per year is equivalent to about 34 cubic meters per second. This represents a total reduction between 1974 and 2006 of 8.94 million cubic meters (22 percent in 32 years) for an annual storage capacity loss rate of about 0.28 million cubic meters. The sedimentation rate, however, for the period 1998-2006 of about 0.52 million cubic meters per year is 2.6 times higher than the previous 1974-1998 rate of about 0.20 million cubic meters per year. Averaged over the period of 50 years, the long-term annual loss of capacity is 1.04 million cubic meters per year. The long-term sedimentation rate of 1.04 million cubic meters per year is equivalent to about 34 cubic meters per second. This represents a total reduction between 1974 and 2006 of 8.94 million cubic meters (22 percent in 32 years) for an annual storage capacity loss rate of about 0.28 million cubic meters. The sedimentation rate, however, for the period 1998-2006 of about 0.52 million cubic meters per year is 2.6 times higher than the previous 1974-1998 rate of about 0.20 million cubic meters per year. Averaged over the period of 50 years, the long-term annual loss of capacity is 1.04 million cubic meters per year. The long-term sedimentation rate of 1.04 million cubic meters per year is equivalent to about 34 cubic meters per second. This represents a total reduction between 1974 and 2006 of 8.94 million cubic meters (22 percent in 32 years) for an annual storage capacity loss rate of about 0.28 million cubic meters. The sedimentation rate, however, for the period 1998-2006 of about 0.52 million cubic meters per year is 2.6 times higher than the previous 1974-1998 rate of about 0.20 million cubic meters per year. Averaged over the period of 50 years, the long-term annual loss of capacity is 1.04 million cubic meters per year. The long-term sedimentation rate of 1.04 million cubic meters per year is equivalent to about 34 cubic meters per second. This represents a total reduction between 1974 and 2006 of 8.94 million cubic meters (22 percent in 32 years) for an annual storage capacity loss rate of about 0.28 million cubic meters.