The aim of this study was to determine the effects of the tidal dynamics and physical forcing on phytoplankton distribution and photosynthesis dynamics in the Chubut River estuary, Argentina. Physical, chemical, and biological variables measured at the surface and at the bottom of the water column (variable between 0.5-m and 6-m depth) were made every 30-45 d during tidal cycles (13 h of duration) from June 2007 to November 2008 (11 tidal cycles). There was a remarkable consistency among different tidal cycles throughout the year, with strong stratification during the flood and almost complete mixing during the period high tide-ebb-low tide. Strong stratification during the flood resulted in significant inhibition of photosynthesis of mostly nanoplankton cells at the surface, while microplankton sank out of this upper layer and, thus, were less inhibited. Mixing conditions during the ebb, together with relatively high concentration of dissolved organic matter and particulate material, resulted in partial protection for phytoplankton against solar radiation stress and, therefore, relatively high maximum electron transport rate values were determined under this condition. However, the lowest photoinhibition and higher maximum rate of production ($P_{>max}$) values occurred at depth during stratified conditions, probably due to relatively low solar radiation in this condition. Tidal dynamics together with physical forcing are key factors that condition the distribution, dynamics, and photoinhibition of phytoplankton in the Chubut River estuary.