Global climate change affects large-scale phenomena, such as the North Atlantic Oscillation (NAO), which is known to influence the climate in Europe. Considering the tendency from the last 30 years and the scenarios proposed by the IPCC, the dominance of NAO+ situations, characterized by long drought periods, is foreseen for southern Europe and particularly for the Mediterranean region. In addition, an increase of freshwater retention due to the construction of more dams or to higher retention in the existing dams is also expected. Such decrease in freshwater inflow affect the functioning and productivity of estuarine and coastal waters. In this study we have analysed the impact of the modification in the freshwater inflow on the functioning and productivity at the Guadiana river estuary, in south Portugal, as well as the fisheries in adjacent coastal areas. The results showed a decrease in primary productivity, the impact on estuarine nursery conditions and the increase in abundance and spatial distribution of invasive species. Moreover, coastal fish assemblages changed with the decrease in river discharge and impacted on the landings of coastal fisheries. We suggest that an integration of the timing and volume of discharges by dams is needed to minimize the effects of climate change and sustain estuarine functions and coastal fisheries.