10. RECOMMENDATIONS

1. ***Continue Investing in Beaches:*** Past beach nourishment experience in California has shown that continued funding for sand is justified by the economic benefits from tourism and beach recreation associated with wide sandy beaches (including $4.6 billion in tax revenue for the State). Continue funding the Public Beach Restoration Program and invest in opportunistic beach replenishment.

2. ***Plan Regionally:*** The California coastal environment is diverse. As a result, beach restoration and sediment supply improvement concepts applied to one region may not be appropriate for another. Potential projects should be evaluated on a regional basis to identify the most effective solutions. The California Coastal Sediment Management Master Plan, funded through the Resources Agency, will be instrumental in enabling regional planning of sediment-related projects. As part of the Master Plan, some of the studies this report has identified as necessary to attain the goals of replenishing beaches and increasing natural sediment supply to the coast will be initiated. Identified studies include:

   - *Analysis of Sediment Reduction***:** A detailed study should be performed of historic beach widths and volumes to determine the extent to which any systematic reduction in beach width has taken place, and if so, how this reduction relates spatially and temporally, to the reduction in natural sediment supply.

   - *Analysis of Environmental Impacts:* Environmental limits on sediment removal from individual reservoirs and debris basins should be investigated; these explorations should include grain size analysis to assess the size distributions of impounded sediments, identification of sediment transport alternatives, and assessment of impacts to estuaries due to increased fluvial sediment loads.

   - *Assessment of Impacts from Increasing Sediment Transport Rates:* Fluvial systems are in quasi-equilibrium with existing sediment loads. To understand the implications of altering these loads, the geomorphological, sedimentological, and ecological impacts of increasing sand transport rates in coastal systems should be modeled.

   - *Establishment of Data Collection Standards:* Better records of the number of channelized streams, miles of channelization in streams, volumes of sediment extracted from stream channels and debris basins, and the grain size distribution of the extracted sediments should be kept by local government agencies to identify opportunistic sand sources.

3. ***Remove or Bypass Dams***: Substantial increases in sand volume to local sediment budgets, resulting in wider beaches, could be realized by removing those dams that are no

longer serving any useful function, and bypassing sediment around those that are functional but impound significant volumes of sand.

4. ***Promote Opportunistic Sand Nourishment:*** At a number of sites, "sand of opportunity" has been utilized as beach nourishment material with great success. However, under current guidelines, the cost and complexity of regulatory compliance often precludes the use of opportunistic material from sources such as debris basins and wetlands. The regulatory process for beach nourishment with opportunistic sand should be simplified to the maximum extent possible without compromising environmental safeguards.

5. ***Monitor Projects:*** Beach nourishment projects should be monitored to accomplish the following objectives:

   - Determine if the project meets design expectations;
   - Develop an appropriate maintenance schedule;
   - Assess environmental impacts; and
   - Quantify the economic benefits of the project.

   An increased understanding of the performance of nourishment projects in California will lead to more effective solutions to beach erosion.