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SANTA CRUZ

An Assessment of Coastal Protection Structures
Between San Francisco and Carmel, California

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AN ASSESSMENT OF COASTAL PROTECTION STRUCTURES
BETWEEN SAN FRANCISCO AND CARMEL

I. INTRODUCTION

A. THE PROBLEM

Many of California's coastal bluffs, dunes, and beaches have been intensively developed over the last twenty years. During this period, and particularly in the last six years (1978-1984), the construction of seawalls and other coastal protection devices has rapidly increased (see Figure 2). Yet property damage during severe storm conditions has continued.

Storms in early 1978 caused approximately \$18 million in damage to public and private coastal property in California (Howe, 1978). Coastal damage during the 1983 storms, which were more severe, has been estimated at over \$100 million (G. Griggs, personal communication). Although they took many people by surprise, these storms were by no means "freak" events. The Central California coast experienced similar widespread damage in 1926, 1931, 1940-41, and 1960; storms causing localized damage have occurred even more frequently.

Severe storms have been attacking the California coast for millennia, but the amount of damage has increased as coastal land uses have changed in the last two or three decades. Small beach bungalows and fishing shacks have given way to million-dollar beach mansions and expensive condominiums — sites of high capital investment. Because of the ever-rising value of coastal real estate, if present building trends continue, all sites of coastal development will soon be fronted by

extensive protective structures.

Coastal protective structures have increased in size and expense over the years, through cycles of development, destruction, and reconstruction. During calm years (or decades) between major storms, coastal development accelerates: new houses, parking lots, and commercial and recreational facilities are built within reach of the waves. When intense storms batter the coast, some developments and seawalls are badly damaged, while others escape harm, due to local differences in wave exposure or structure design. After each storm, new seawalls are built — some larger than before, and others of exactly the same design. Gradually, the old storms, seawalls, and damage are forgotten, especially after new residents move into the area. Often, these residents will point to the new, as-yet-untested seawalls, and observe how well they are performing. And so the cycle continues.