Excerpt from “Cape Ann, Its Physical and Environmental Geology”, Martin Ross, 2015.

The Long Beach seawall. As described in Chapter 1, Long Beach is a barrier beach backed by a salt marsh. About 150 cottages are located on land behind the concrete seawall at the back of Long Beach (Figure 6.2). The land is leased to cottages owners by the Town of Rockport and are not occupied in winter when utilities are shut off by the town. At least 40 of these homes were seriously damaged during the 1991 Perfect Storm. Storms have seriously damaged the seawall and its predecessor, a timber bulkhead, numerous times, the most notable being in 1931, 1933, and 1958. The 1933 storm seriously weakened two sections of the newly built concrete wall, requiring the addition of 800 feet of riprap along its base. The 1958 storm seriously damaged 330 foot and 1280 foot sections of the wall requiring the placement of rip rap along its entire 3350 length.

This is a classic example of how seawalls encourage development in hazardous areas by creating a false sense of security. The velocity zone (at least 3 foot high waves) of the 100 year flood is currently 5 to 10 inches higher than the wall. A comparison of Long Beach with Good Harbor Beach is instructive in that it reveals what has been lost by allowing homes and the seawall to be built at Long Beach. Without this development, Long Beach would likely have been broader and backed by a foredune similar to Good Harbor Beach. A DPW presentation at a public meeting in 2012 included a claim that, in addition to the cottages and a street, the seawall protects the sand dunes and 45 acres of coastal salt marsh behind it. This simply is not accurate. The wall itself and the first row of cottages have replaced what, under natural conditions, would have been a foredune similar to that at Good Harbor Beach. Foredunes are built of sand blown landward from the beach. During storms, some of this sand is returned to the beach, completing a cycle of deposition and erosion that sustains both. A seawall such as that at Long Beach prohibits this natural exchange and, combined with the wall-induced scour described below, typically greatly reduced the size of a beach.

To claim that the seawall protects the salt marsh behind it ignores the fact that a healthy foredune accomplishes the same thing naturally, as it does at Good Harbor Beach. The foredune at Good Harbor Beach suffered severe erosion during the Perfect Storm but was not completely removed attesting to its functioning as a protective barrier to the marsh and shoreline behind it. To build a sea wall to protect this dune would only do damage to the beach by interfering with the exchange of sand between the foredune and the beach. The foredune at Good Harbor Beach waxes and wanes in size depending on the frequency and size of storms. At the time of this writing it is more fully formed than I have observed over the past 30 years.

Besides isolating beaches from foredune sand supplies, sea walls contribute to erosion of beaches in two additional ways. Waves concentrate their energy at the blunt ends of seawalls by bending or refracting around them as well as by increasing in turbulence. This results in the accelerated erosion of the unprotected neighboring shorefront. Geologists call this nearly ubiquitous process the "end effect". Seawalls also cause beach erosion by reflecting waves back seaward. These reflected waves and the water diverted downward, scour sand from the beach in front of a sea wall. Besides removing beach sand, this often eventually undermines a seawall itself. For example, a two foot thick blanket of sand was removed from atop Front Beach in Rockport by the Perfect Storm of 1991. This represents an estimated 510,500 cubic feet of sand removed by waves. The entire beach is backed by seawalls, some of which act as foundations for buildings. As mentioned above, the riprap along the base of the Long Beach sea wall (Figure 6.2) was placed in an attempt to prevent such scour. It is clear that with no sea wall, Long Beach would be considerably broader, including a complete beach profile grading up into a foredune farther landward than the present wall allows.

The town of Rockport is currently considering an estimated $10.6 to $12.4 million repairs to the entire seawall. Ideally none of the cottages should ever have been built which would have eliminated the perceived need for a seawall in the first place. The disheartening aspect of this development is that the land is publicly owned and could have been left natural like at Good Harbor Beach and provided an even more appealing recreational resource for the entire town to enjoy. As it stands, tax payers will likely foot the bulk of the bill for repairing a seawall that only functions to protect private homes while degrading the beach and dune environment.