

She Sells Seawalls Down by the Seashore

TRICIA LEE*

TABLE OF CONTENTS

I.	INTRODUCTION	210
II.	CALIFORNIA SEA LEVELS AND COASTAL ARMORING	212
	A. <i>California Sea Levels</i>	212
	B. <i>Current State of Armoring Along the Coast</i>	213
	C. <i>The Costs of Armoring</i>	214
III.	PROBLEMS WITH CURRENT COASTAL ARMORING REGULATIONS	215
	A. <i>California Coastal Commission</i>	216
	B. <i>Coastal Act of 1976</i>	217
	1. <i>Section 30253 of the Coastal Act of 1976</i>	217
	2. <i>Section 30235 of the Coastal Act of 1976</i>	218
	C. <i>Changing the Coastal Act Through the Legislature</i>	218
IV.	ASSEMBLY BILL 2943	219
	A. <i>Assembly Bill 2943's Proposed Changes</i>	219
	B. <i>Assembly Bill 2943's Legislative History</i>	220
V.	A LAW SIMILAR TO AB 2943 SHOULD NOW BE CONSIDERED	221
	A. <i>Three Environmental Developments</i>	221
	B. <i>California Climate Adaptation Strategy</i>	222
	1. <i>Cost of Maintaining Existing Armoring</i>	223
	2. <i>California Climate Adaptation Strategy</i> <i>Guidelines and Principles</i>	224
	C. <i>Studies That Will Affect Coastal Armoring Policies</i>	224
	1. <i>California Statewide Sediment Management</i> <i>Master Plan</i>	225

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2. Erosion Mitigation Alternatives for Southern Monterey Bay.....	226
VI. CONCLUSION	228

I. INTRODUCTION

“Scientists learned long ago that the earth’s climate has powerfully shaped the history of the human species- biologically, culturally, and geographically. But only in the last few decades has research revealed that humans can be a powerful influence on the climate, as well.”¹

The legitimacy of global warming is no longer shrouded in skepticism. What was once considered a hypothetical threat has now become a legitimate concern with noticeable effects.² One of the most apparent consequences of climate change to those living along the California coast has been rising sea levels.³ Global warming contributes to rising sea levels in two fundamental ways: First, as air temperature increases, glaciers, ice sheets, and ice caps melt and contribute to the ocean’s mass.⁴ Second, as oceans warm, their water molecules expand causing the sea levels to rise.⁵

California has responded to this global warming effect by an adaptation strategy known as shoreline protection or coastal armoring.⁶ One common shoreline protection device is the construction of seawalls which act as barriers that ultimately holds back the sea.⁷ Though seawall construction adequately prevents inundation and coastal erosion, this adaptation strategy is far from harmless.⁹ Seawalls are costly, restrict public access to the beach, and contribute to beach erosion.¹⁰

Once people started to realize the harmful effect seawalls had on the coastal environment, scientists and legislatures decided to try and curb the overwhelming approval of seawall construction through regulation.¹¹ The

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1. Andrew C. Revkin, *Global Warming Basics*, N.Y. TIMES (Nov. 23, 2009, 2:45 PM), http://dotearth.blogs.nytimes.com/2009/11/23/globalwarming-basics/?_r=0.
 2. Mark Herstgaard, *On the Front Lines of Climate Change*, TIME MAG. (Mar. 28, 2007), <http://content.time.com/time/magazine/article/0,9171,1604879,00.html>.
 3. GARY GRIGGS, KIKI PATSCH & LAURET SAVOY, *LIVING WITH THE CHANGING CALIFORNIA COAST* 33 (2005).
 4. ROBERT G. WATTS, *GLOBAL WARMING AND THE FUTURE OF THE EARTH* 96 (Frank Kreith ed., 2007).
 5. *Id.*
 6. GRIGGS, *supra* note 3, at 108.
 7. *See id.*
 8. *See* JAMES G. TITUS, *GREENHOUSE EFFECT AND SEA LEVEL RISE: THE COST OF HOLDING BACK THE SEA*, 179–84 (1991).
 9. *Id.*
 10. GRIGGS ET AL., *supra* note 3, at 138.
 11. *Id.*

California Coastal Act of 1976 addresses shoreline protection construction in two Sections.¹² Section 30253 prohibits new developments in the coastal region that would necessitate the construction of a seawall and Section 30235 permits seawall construction for existing developments.¹³ While these regulatory policies seem relatively straightforward, they have been difficult to implement.¹⁴ The strange interpretation of Section 30235 has left Section 30253 without any real regulatory power, which leaves the legislature's policy goals relatively unenforced.¹⁵

Attempting to address these interpretational blunders, assembly member Wiggins introduced Assembly Bill 2943 in February 2002.¹⁶ This proposed law intended to give the California Coastal Commission ("commission"), the regulatory body charged with enforcing the bill, more discretion and to bring the Coastal Act in line with the legislature's original intent.¹⁷ Despite the bill's potential to cure these interpretational problems, Assembly Bill 2943 died on the Senate floor in 2002.¹⁸

This Comment argues that a bill similar to Assembly Bill 2943 should be proposed today because there has been a drastic shift towards a general acceptance of global warming since 2002. In addition, new environmental studies support the idea of curbing seawall construction along the California coast.

Section I will provide data regarding rising sea levels and the current state of seawall construction along the California coast. It will then explain why seawall construction is not a viable adaptation strategy and delve into its negative social, environmental, and economic impacts.

Section II will examine California's current policies for protecting coastal zones as well as discuss current seawall regulations. It will then expose the weak nature of these regulations and explain how the current interpretation of the Coastal Act works against the legislature's original intent.

12. *Id.* at 139.

13. *Id.*

14. *See id.* at 138.

15. *See id.* at 148.

16. Assemb. B. No. 2943, 2002 Leg., Reg. Sess. (2002), available at http://www.leginfo.ca.gov/pub/01-02/bill/asm/ab_2901-2950/ab_2943_bill_20021130_history.html (indicating bill history).

17. S. Rules Comm. Analysis, Assemb. B. No. 2943, 2002 Leg., Reg. Sess (2002), available at http://www.leginfo.ca.gov/pub/0102/bill/asm/ab_2901-2950/ab_2943_cfa_20020827_093207_sen_floor.html (indicating bill analysis).

18. Assemb. B. No. 2943, *supra* note 16.

Section III will describe how Assembly Bill 2943 intended to curb the overwhelming approval of seawall construction and provide a legislative history of the bill before it died on the Senate floor in 2002.

Section IV will argue that a bill similar to Assembly Bill 2943 will have a better chance passing than it did back in 2002 and therefore should be proposed today. This Section will examine California's current environment policies and describe how they have changed since the denial of AB 2943 back in 2002. In addition, it will address what new environmental studies or reports have taken place since 2002 that support the idea of curbing seawall construction.

II. CALIFORNIA SEA LEVELS AND COASTAL ARMORING

This section will discuss predictions of rising sea levels on the California coast. It will then briefly mention how these sea levels will affect developments along California's 1,100 mile coastline. Next, this section will address seawall construction and explore how prolific they have become in the past two decades. Last, it will explain the various social, economic, and environmental costs associated with armoring and identify why it is not a viable adaptation strategy.

A. California Sea Levels

Rising sea levels will be the most visible effect of global warming to residents along the California coast.¹⁹ Although predicting future sea levels depends largely on varying emission scenarios, in the 20th Century alone, the Intergovernmental Panel on Climate Change estimate that the sea level along the California coast rose approximately seven inches.²⁰ This measurement surpassed previous predictions for the 21st century.²¹ The California Adaptation Team's recent analysis of rising sea levels project that California sea levels will rise about 20-55 inches by the year 2100.²² These estimates are a legitimate concern to residents, developers, insurers, and policy-makers alike, and threaten some of the most desirable and expensive real estate in the world.²³

19. See GRIGGS ET AL., *supra* note 3, at 138.

20. See CAL. CLIMATE ACTION TEAM, 2009 CALIFORNIA CLIMATE ADAPTATION STRATEGY, 15, 18 (2009), <http://www.energy.ca.gov/2009publications/CNRA-1000-2009-027/CNRA-1000-2009-027-F.PDF>.

21. See *id.*

22. See *id.* at 18.

23. See GRIGGS ET AL., *supra* note 3, at 138.

Increased water levels threaten the very foundation of these multi-million dollar developments.²⁴ The increased levels cause and contribute to land inundation, increasing coastal erosion, and more powerful storms.²⁵ As sea levels surpass the rate observed over the last century, and storms become stronger and more frequent, existing coastal protection devices will fail more often, which will ultimately cause more damage to the coastal environment.²⁶ 900 miles of the California coast is currently eroding.²⁷ This active threat to coastal developments remains a big problem to resource management agencies within California.²⁸ Realizing that mitigation efforts may not cure the harms of today, California has turned to adaptation strategies in order to preserve these expensive investments.²⁹

B. Current State of Coastal Armoring Along the Coast

The most typical response to rising sea levels has been an adaptation strategy known as shoreline protection or coastal armoring.³⁰ Coastal armoring involves the construction of a seawall or other “hard structure” which acts as a barrier between the land and the sea.³¹ These barriers protect wave-impacted developments and infrastructure by reducing wave impact and landward erosion of the coast.³²

Coastal protection devices are extremely effective in protecting coastal developments and are being implemented at an alarming rate.³³ It is estimated that an astounding 10 percent, or 110 miles of 1,100 miles of California’s coastline is now armored.³⁴ In Southern California’s four

24. *See id.*

25. Meg Caldwell et al., *No Day at the Beach: Sea Level Rise, Ecosystem Loss, and Public Access Along the California Coast*, 34 *ECOL. L.Q.* 533, 534 (2007).

26. *See id.* at 538.

27. REBECCA STAMSKI, MONTEREY BAY NATIONAL MARINA SANCUARY MSD-05-3, MARINA SANCTUARIES CONSERVATION SERIES 15 (2005), available at http://sanctuaries.noaa.gov/special/con_coast/stamski.pdf

28. *See* GRIGGS ET AL., *supra* note 3, at 138.

29. *See id.*

30. *See* Caldwell, *supra* note 25, at 539.

31. McGuire, *supra* note 6, at 101.

32. *See id.*

33. *See* Griggs, *The Effects of Armoring Shorelines- The California Experience*, in PUGET SOUND SHORELINES AND THE IMPACTS OF ARMORING- PROCEEDINGS OF A STATE OF THE SCIENCE WORKSHOP, 77 (Hugh Shipman et. al., 2010), available at http://pubs.usgs.gov/sir/2010/5254/pdf/sir20105254_chap8.pdf.

34. *Id.*

most urbanized counties, 33 percent of the entire 224 miles of shoreline is now armored.³⁵

C. The Costs of Armoring

Coastal armoring fails as an adaptation strategy because it comes with major social, environmental, and financial costs.³⁶ These negative impacts range from visual or aesthetic loss, reduction of sand supply, restrictions on access to the beach, placement loss, increased beach erosion, and high financial costs.³⁷ Of these adverse effects, the four that this Article will address are the visual and aesthetic impacts, the restrictions to public access to the beach, the seawall's contribution to beach loss, and the high financial cost of seawall construction and maintenance.

One of the public's most obvious concerns regarding seawall construction is its negative visual impact.³⁸ Cement walls lining the coast does not require scientific explanation or analysis and can be directly observed by all.³⁹ In the past, coastal armoring projects were allowed to be implemented with no environmental review.⁴⁰ Because of this, projects were permitted to dump concrete slabs or cylinders at the base of a cliff in an unorganized haphazard manner.⁴¹ These makeshift seawalls protected the few individuals whose homes were threatened by wave impact but created a huge negative impact on the entire public.

Another dramatic impact of coastal armoring is its contribution to beach loss.⁴² Seawalls contribute to beach or placement loss either immediately or gradually. Immediate beach loss occurs when a seawall is placed directly onto the beach.⁴³ When seawalls cover the sand they immediately reduce the size of accessible beach area.⁴⁴ The second way shoreline protection devices cause beach loss is through a gradual erosion of the beach's sand.⁴⁵ When a wave hits a shoreline protection device like a seawall, the wave's energy does not simply dissipate.⁴⁶ Rather, the wave's energy is reflected back toward the ocean.⁴⁷ When this occurs, the

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35. *Id.*
36. *See id.* at 78–83.
37. *See id.* at 78.
38. *Id.*
39. *Id.*
40. *Id.* at 78.
41. *See id.*
42. *Id.* at 80.
43. *See id.*
44. *See id.*
45. GRIGGS ET. AL., *supra* note 3, at 134–35.
46. *See id.* at 134.
47. *See id.*

reflected wave, or the backwash, takes the beach's sand with it, contributing to beach loss.⁴⁸

Constructing a seawall on the beach can also restrict public access (vertical access) or along the beach (lateral access).⁴⁹ Loss of lateral access can change depending on the time of year or width of the beach.⁵⁰ For example, loss of lateral access will be more apparent in the winter months when the beach has been lowered and narrowed, than in the summer months.⁵¹ Loss of vertical access is a more serious issue because seawalls can totally cut off access to the beach.⁵²

Constructing or maintaining any type of shoreline protection device is extremely costly.⁵³ For seawalls, it is estimated that construction costs can range from \$2,000/\$8,000 per ft. or \$10–40 million per mile.⁵⁴ On average, however, the capital cost per linear foot (in 2000 dollars) is \$5,300 for a new seawall.⁵⁵ In conjunction with these high construction costs, shoreline protection devices also require constant maintenance or upkeep.⁵⁶ Though the state's budget often overlooks these maintenance costs, it is estimated that annual upkeep for seawalls are approximately ten percent of the initial capital investment, or around \$1.4 billion per year (in year 2000 dollars).⁵⁷ Failing to maintain these structures could have a negative impact such that it could “lead to structural failures or catastrophic damages.”⁵⁸

III. PROBLEMS WITH CURRENT COASTAL ARMORING REGULATIONS

Before addressing the problems plaguing current coastal armoring regulations, this section will first discuss who the primary regulatory actor in this policy arena is. It will then go into detail as to what guidelines these

48. *See id.*

49. GRIGGS, *supra* note 33, at 81.

50. *Id.*

51. *Id.*

52. *See id.*

53. PowerPoint: The Effects of Armoring the Coastline: The California Experience 8 (Gary Griggs May 12–14, 2012), *available at* <http://wa.water.usgs.gov/SAW/presentations/griggs.pdf>.

54. MATTHEW HEBERGER ET AL., *THE IMPACTS OF SEA-LEVEL RISE ON THE CALIFORNIA COAST* 35 (2009).

55. *See id.* at 35.

56. *See id.* at 36.

57. *See id.*

58. *Id.* at 37.

regulatory actors are supposed to follow, and explain how these policies are relatively weak. Lastly, it will argue that though there are many ways to solve weak regulatory issues, the best would be to propose a new law through the legislative system.

A. California Coastal Commission

The commission was created in 1972 by voter initiative through the passage of Proposition 20.⁵⁹ The passage of this initiative illustrated Californian's direct concern of the use and regulation of the California coastline.⁶⁰ The commission is composed of twelve voting members who are appointed by the Governor, Senate Rules Committee, and the Speaker of the Assembly.⁶¹ Six of the voting commissioners are locally elected officials and six are appointed from the public.⁶² The commission is considered an independent, quasi-judicial state agency that together with coastal cities and counties, plan and regulate all developmental activities that affect California's coast and ocean.⁶³ This includes the construction of buildings, divisions of land, and any other event that may change the use or access to the beach.⁶⁴

The commission regulates coastal developments through the use of a permit system.⁶⁵ This system does not allow coastal construction to begin without a permit issued by either the commission or a certified local coastal program ("LCP").⁶⁶ Even if a development is approved the commission retains original permit jurisdiction over certain coastal areas.⁶⁷ It further has appellate authority over developments approved by LCP's in certain areas.⁶⁸

Lastly, the commission holds monthly meetings and welcomes public participation through public hearings.⁶⁹ It is their policy to gain feedback from the public in order to "protect, conserve, restore, and enhance environmental and human-based resources of the California coast and

59. PROGRAM OVERVIEW, CAL. COASTAL COMM'N, <http://www.coastal.ca.gov/who-weare.html> (last visited Nov. 30, 2013).

60. *See id.*

61. *See id.*

62. *See id.*

63. *See id.*

64. *See id.*

65. *See id.*

66. *See id.*

67. *See id.*

68. *See id.*

69. *See id.*

ocean for environmentally sustainable and prudent use by current and future generations.”⁷⁰

B. Coastal Act of 1976

Although the commission began as a four-year interim planning agency, it was extended through the adoption of the California Coastal Act of 1976.⁷¹ In addition to making the commission a permanent agency, the Coastal Act also included specific policies that addressed issues such as public access, recreation, terrestrial and marine habitat protection and more.⁷² The California Coastal Act of 1976 requires strict regulation of proposed seawall construction.⁷³ There are two sections that specifically address shoreline protection regulation.⁷⁴ These sections provide the commission with planning and regulation guidelines for proposed seawall construction.⁷⁵

1. Section 30253 of the Coastal Act of 1976

Section 30253 of the Coastal Act states in pertinent part that:

“new developments shall . . . assure stability and structural integrity, and neither create nor contribute significantly to erosion, geologic instability, or destruction of the site or surrounding area or in any way require the construction of protective devices that would substantially alter natural landforms along the bluffs and cliffs.”⁷⁶

This policy reflects the legislature’s expressed intention to deny seawalls for new developments.⁷⁷ It forces the property owner to consider and assume the potential risks for building on a foundation that is susceptible to coastal erosion.⁷⁸ Though this regulatory scheme seems relatively straightforward, individuals evade the strict regulations set forth in Section 30253 through the exception stipulated in Section 30235.⁷⁹

70. *Id.*

71. *See id.*

72. *See id.*

73. GRIGGS ET. AL., *supra* note 3, at 139.

74. *See id.*

75. *See id.*

76. *See id.*

77. *See id.*

78. *See id.*

79. *See* Caldwell, *supra* note 25, at 567.

2. Section 30235 of the Coastal Act of 1976

The Coastal Act included what was supposed to be a narrow carve-out exception to Section 30253.⁸⁰ This exception, found in Section 30235, states that, “seawalls, cliffs, retaining walls, and other construction that alters natural shoreline processes shall be permitted when required to serve coastal-dependent uses or to protect existing structures. . . .”⁸¹

Though a reasonable person would likely interpret existing developments to mean existing prior to the 1976 Coastal Act, it is regularly interpreted to mean any developments that exist currently.⁸² For example, an individual could construct a new development claiming no need for a seawall. The Commission would approve the development pursuant to Section 30253. A few years later, the same individual could come to the Commission asking for a seawall pursuant to Section 30235. Because the development would be considered an already existing development, the seawall would be granted. The Commission would grant the seawall, because the regulation says that the Commission *shall* permit it.

The strange interpretation of the Coastal Act along with the lack of scientific data proving seawall’s negative effects have both contributed to the overwhelming approval rates of seawall permits.

C. Changing the Coastal Act Through the Legislature

There are two ways to modify Section 30235 to reflect the legislature’s true intent. The first would be redefining “existing structures,” thereby avoiding the need for statutory amendment.⁸³ Though this option sounds promising, it is not as feasible as it may seem.⁸⁴ After all, the Commission has had the inherent ability to provide more clarity to the term existing for more than twenty years and yet has chosen not to do so.⁸⁵

When Gary Griggs, a leading expert on coastal development, was asked why the Commission had yet to define “existing structures,” he said:

[T]his single oversight, although realizing that the act was written in the 1970s in a calmer climatic period when coastal erosion and protection wasn’t the obvious issue that it is today, has been so problematic and has led to so many hearings, challenges, etc. Many have suggested that clarifying or defining “existing” once and

80. See GRIGGS ET. AL., *supra* note 3, at 139.

81. See Caldwell & Segall, *supra* note 25, at 561.

82. See *id.*

83. See *id.*

84. See *id.*

85. See *id.*

for all, False[which]. . . would make life easier for the commission and deal with some of the armoring issues.⁸⁶

The other way in which Section 30235 could be changed would be through adopting remedial legislation. This Article will explore this as a possible remedy to the proliferation of seawalls along the coast.

IV. ASSEMBLY BILL 2943

This section explores previous attempts to change the Coastal Act through proposed legislation. It will explain what changes this bill attempted to make, and talk briefly about its legislative history. It will then conclude by briefly discussing possible reasons as to why the bill did not pass but rather died on the Senate floor.

A. Assembly Bill 2943's Proposed Changes

Assembly Bill 2943 sought to update Section 30235 of the Coastal Act.⁸⁷ This piece of legislation, pushed in February 2002, intended to “close loopholes in the Coastal Act that have allowed reckless armoring of the California coast.”⁸⁸ Overall, it sought to define “existing structure,” and modify the language of requiring the Commission to issue coastal development permits from mandatory to permissive.⁸⁹

The remedial legislation would need to target Section 30235 of the Coastal Act.⁹⁰ Proponents of Assembly Bill 2943 wanted Section 30235 to read, “seawalls, cliffs, retaining walls, and other construction that alters natural shoreline processes may be permitted,” instead of, “shall be permitted.”⁹¹ This way, the commission would have more discretion in deciding whether a seawall was necessary or not.⁹²

86. E-mail from Gary Griggs to Tricia Lee, student at the University of San Diego School of Law (Nov. 27, 2012) (verification email on file with author).

87. A.B. 2943, 2001-2002 Reg. Sess. (Cal.) (as amended by Senate, Aug. 26, 2002) available at http://leginfo.ca.gov/pub/01-02/bill/asm/ab_2901-2950/ab_2943_bill_20020826_amended_sen.pdf.

88. Walter F. Crampton, *A Different Perspective on the Concept of Planned Retreat 1*, <http://s3.amazonaws.com/ameravant-friendsofgoletabeachpark-org-production/files/25/original.pdf>.

89. See A.B. 2943, *supra* note 88, at 2.

90. See *id.*

91. See *id.*

92. See A.B. 2943 Senate Floor Analysis, *supra* note 17, at 3.

In addition to giving the commission more discretion, the proposed law also intended to end the “existing structure,” debate by adding the definition of “existing structures,” to the Coastal Act.⁹³ The bill defined an existing structure as “a structure that has obtained a vested right as of January 1, 1977, the effective date of the California Coastal Act of 1976.”⁹⁴

The legislative record supports the idea that Section 30235 of the Coastal Act was a grandfather clause intended to protect only those structures that existed prior to 1976.⁹⁵ The legislative record supports this proposition in many ways.⁹⁶ One way to determine intent is to evaluate the drafters of the Coastal Act.⁹⁷ The Coastal Act was written by environmentalists who opposed industry.⁹⁸ Therefore, the intent of the bill can be read from this perspective.⁹⁹ Additionally, the evolution of the bill support the grandfather clause idea because the term, “existing,” was intentionally inserted into the final version of the bill.¹⁰⁰

B. Assembly Bill 2943's Legislative History

While Assembly Bill 2943 was being debated on the Senate floor, one additional change was added to the proposed law.¹⁰¹ On August 26, 2002, the Senate amended the bill so that it would include a state-wide policy goal of barring seawall construction, regardless of its purpose, after the year 2051.¹⁰² In other words, eliminating coastal armoring is a viable adaptation strategy, whether for a public beach, or for a private beach home, after the year 2051.¹⁰³

During the bill's life, it gained support from the California Beach Advocates, the California Coastal Protection Network, and debated against opponents such as Southern California Contractors Association, or the California Association of Realtors.¹⁰⁴ These opponents disliked the fact that the commission would have discretion on whose permit to grant.¹⁰⁵

93. *See id.* at 1.

94. A.B. 2943, *supra* note 88.

95. Todd T. Cardiff, *Conflict in the California Coastal Act: Sand and Seawalls*, in SAN DIEGO ASSOC. OF GEOLOGISTS, COASTAL PROCESSES AND ENGINEERING GEOLOGY OF SAN DIEGO, CALIFORNIA 41, 43 (Robert C. Stroh ed., 2003).

96. *See id.*

97. *See id.*

98. *See id.*

99. *See id.*

100. *See id.*

101. *See* A.B. 2943 Senate Floor Analysis, *supra* note 17, at 1.

102. *See id.*

103. *See id.*

104. *See id.* at 2.

105. *See id.*

They further claimed that there were no public policy reasons for changing the 1976 law today.¹⁰⁶ One can ascertain the many reasons why contractors and developers would be against a bill like Assembly Bill 2943.

Despite Assembly Bill 2943's potential to resolve the ambiguity of the Coastal Act, the proposed law died on the senate floor on November 30, 2002.¹⁰⁷ There are many possible reasons why this remedial legislation did not pass. One theory is the idea that enacted laws have inertia. This means, that once a law is passed, it is incredibly hard to change. The second possibility has to do with the legislature's overall willingness to overlook what scientific findings they had. This possibility will be further explored in the following sections.

V. A LAW SIMILAR TO AB 2943 SHOULD NOW BE CONSIDERED

Arguably the three most influential environmental reports with regards to the California Coast and shoreline protection are the California Climate Adaptation Strategy, the Sediment Master Plan, and the 2012 Evaluation of Erosion Mitigation Alternatives for Southern Monterey Bay ("Mitigation Alternatives"). The section begins by first explaining each reports' general findings and then argues that these findings would ultimately support the idea of amending the Coastal Act.

A. *Three Environmental Developments*

California's environmental policies have evolved dramatically since Assembly Bill 2943's rejection back in 2002.¹⁰⁸ Not only has California completed a state adaptation plan, but it has also benefitted from many environmental studies. For these reasons, legislation amending section 30235 of the Coastal Act should be considered and approved by the California legislature.

The environmental reports that will have the most substantial influence on future seawall policies are the California Climate Adaptation Strategy, the Sediment Master Plan, and the Mitigation Alternatives. These reports, completed well after 2002, provide new understanding in regards to the negative impact of shoreline protection devices. While these reports focus

106. *See id.* at 3.

107. *See S.*, A.B. No. 2943, *supra* note 18.

108. HARI M. OSOFSKY & LESLEY K. MCALLISTER, CLIMATE CHANGE LAW AND POLICY 294 (Vicki Been et al. eds., 2012).

on different issues, they each support the curtailment of seawall construction along the coast.

B. California Climate Adaptation Strategy

California, a well-known leader in responding to climate change was the first state ever to complete a state adaptation plan pursuant to an executive order by Governor Arnold Schwarzenegger.¹⁰⁹ This order required the California Resources Agency to, “understand the importance of addressing climate impacts today.”¹¹⁰ It was through this 2009 plan, that a variety of adaptation strategies were studied across seven sectors: Public Health, Biodiversity and Habitat, Oceans and Coastal Resources, Water, Agriculture, Forestry, and Transportation and Energy.¹¹¹

The California Climate Adaptation Strategy begins its report by first recognizing adaptation as a relatively new concept in California policy.¹¹² That is, a relatively new policy in 2009.¹¹³ Prior to this time, studies that focused on adaptation generally took a back seat to those focused on mitigation.¹¹⁴ Mitigation was seen as the better of the two theories as it dealt with combating climate change, rather than merely responding to its effects.¹¹⁵ While the two methods were seen as alternatives for many years, the value of the California Climate Adaptation Strategy stemmed from its acceptance of adaptation as a complementary approach to mitigation.¹¹⁶

In order to accurately ascertain why remedial legislation like Assembly Bill 2943 did not pass, one must consider the legislature’s mentality during that time. In 2002, there was no California Climate Adaptation Strategy report recognizing adaptation strategies as an “equally necessary” approach to mitigation.¹¹⁷ As a matter of fact, many believed that focusing on adaptation strategies as a viable option was not only a waste of time, but rather shifted valuable efforts away from the more appropriate strategy, mitigation.¹¹⁸ Because of this, the legislature may have felt like it was

109. See CAL. NATURAL RES. AGENCY, CALIFORNIA CLIMATE ADAPTATION STRATEGY, 4 (2009), available at http://resources.ca.gov/climate_adaptation/docs/Statewide_Adaptation_Strategy.pdf.

110. See *id.*

111. See *id.* at 5.

112. See *id.* at 4.

113. See *id.* at 4.

114. See, OSOFSKY & MCALLISTER *supra* note 109, at 297.

115. See *id.*

116. See *id.*

117. See CAL. NATURAL RES. AGENCY, *supra* note 110, at 4.

118. Leslie K. McAllister, Address at University of San Diego School of Law Climate Change Law and Policy Lecture (Oct. 17, 2012).

unnecessary to debate remedial legislation to seawall regulations, as it was mainly an adaptation response rather than an important mitigation strategy.¹¹⁹

If a bill similar to Assembly Bill 2943 was proposed today, the discussion would likely focus on seawall construction rather than a debate between adaptation and mitigation strategies. The California Climate Adaptation Strategy puts the adaptation and mitigation strategy debate to rest.¹²⁰ Because both strategies are seen as complimentary, the debate can focus on the whether seawall construction should be curtailed along the California coast.

1. The Cost of Maintaining Existing Armoring

An important observation made by the California Climate Adaptation Strategy was its estimation of the additional costs necessary to keep protection devices in line with current sea levels.¹²¹ “[E]xisting barriers will need to be raised. . . [and] both new and old infrastructure will likely require more frequent and costly maintenance . . .” as the intensity and duration of the sea level increases as projected.¹²² The California Climate Adaptation Strategy report estimates that 1,070 miles of new or upgraded seawalls would be needed by 2100 to protect the bay and the open coastline against inundation.¹²³ This type of construction would cost over \$14 billion and would require maintenance that could add an annual cost of 10 percent to the capital cost.¹²⁴ Further, the California Climate Adaptation Strategy report provides that the burden of construction costs would be disproportionate along the California coast with Southern California would requiring the greatest investment.¹²⁵

In 2002, opponents of Assembly Bill 2943 felt that “there was no public policy reason for changing the 1976 Coastal Act.”¹²⁶ However, with support from the California Climate Adaptation Strategy report, advocates seeking to curtail seawall construction now have the data necessary to rebut those beliefs. For instance, advocates could claim that it would be wrong to

119. *See id.*

120. *See* CAL. NATURAL RES. AGENCY, *supra* note 110, at 4.

121. *See id.* at 127.

122. *See id.*

123. *See id.* at 128.

124. *See id.*

125. *See id.* at 128.

126. *See* A.B. 2943 Senate Floor Analysis, *supra* note 17.

approve more seawalls at the current rate because the State lacks sufficient funds to maintain existing seawalls as is.¹²⁷ Lastly, the California Climate Adaptation Strategy report stresses the fact that adaptation strategies are not direct solutions to climate change.¹²⁸ It would be a mistake to view an adaptation method, such as shoreline protection devices, as a solution to rising sea levels.¹²⁹

2. California Climate Adaptation Strategy Guidelines and Principles

The California Adaptation Strategy requires the commission to make decisions using the following principles for guidance: First, “California must protect, restore, and enhance ocean and coastal ecosystems, on which our economy and well being depend.”¹³⁰ Second, “California must ensure public access to coastal areas and protect beaches, natural shoreline, and park and recreational resources,”¹³¹ Third, “[n]ew development and communities must be planned and designed for long-term sustainability in the face of climate change.”¹³² These policies contradict current interpretations of Section 30235 because seawalls do not promote any of these three principles. Seawalls have major social, environmental, and economic costs and are not solutions to climate change by any means.¹³³

California Assembly member Wiggins attempted to push Assembly Bill 2943 in hopes of bringing section 30235 closer to the legislature’s original intent.¹³⁴ Though this was not enough to ensure the bill’s passage in 2002, it still remains a highly relevant factor. Not only can a new bill bring the Coastal Act closer to the original intent of the drafter’s but it will now have the support of the California Climate Adaptation Strategy report which is a summary of the “best known science on climate change impacts in the state.”¹³⁵

C. Studies That Will Affect Coastal Armoring Policies

As public awareness with respect to global warming grows, so will regularly conducted studies and reports. Two important studies completed after 2002 that would likely support amending current coastal protection policies are the 2012 Sediment Master Plan and the 2012 Mitigation

127. See CAL. NATURAL RES. AGENCY, *supra* note 110, at 128.

128. See *id.* at 4.

129. See *id.*

130. See *id.* at 72.

131. See *id.*

132. See *id.*

133. See GRIGGS, *supra* note 33, at 77–78.

134. See Cardiff, *supra* note 95, at 78.

135. CAL. NATURAL RES. AGENCY, *supra* note 110, at 4.

Alternatives study. Both studies have taken novel approaches to the study of shoreline protection devices and support the decision to limit overall seawall construction.

1. California Statewide Sediment Management Master Plan

Coastal sediment supplying-related imbalances have only been a policy concern within the past several years.¹³⁶ In fact, there have only been three California Sediment Management Plans beginning as late as 2006.¹³⁷ These studies, made possible by a \$1,200,000 grant from the California Resources Agency, was one of the first that categorized sediments as a valuable resource rather than a waste product.¹³⁸

As previously mentioned, beaches require a constant source of sediment supply in order to maintain their width.¹³⁹ However, many beaches along California's coast have lost their width over time because of an insufficient supply of sand.¹⁴⁰ The Sediment Master Plan's objective is to study human activities and document their effect on the natural supply of sediments to and along the California coast.¹⁴¹ In order to accomplish this goal, the CSMW has taken on a multi-year effort to compile a study identifying regional coastal managements needs.¹⁴²

Engineers and environmentalist have known that shoreline protection devices may cause beach loss.¹⁴³ However, it has not been until recently, that studies have documented seawalls' contribution to pervasive erosional trends of natural sand supply.¹⁴⁴

This Sediment Master Plan seeks to learn more about California's erosion problems by combining federal, state, and local agencies to evaluate the coastal sediment needs on a statewide system.¹⁴⁵ It's the objective of the Sediment Management Plan to develop a comprehensive strategy for the

136. See CAL. COASTAL SEDIMENT MGMT. WORKGROUP, THE CALIFORNIA COASTAL SEDIMENT MASTER PLAN STATUS REPORT iii (June 2012), available at http://dbw.ca.gov/csmw/pdf/SMPJune_2012_StatusReport.pdf.

137. See *id.* at vi.

138. See *id.* at i, iii.

139. See *id.*

140. See *id.* at ii.

141. See *id.* at 2.

142. See *id.* at v.

143. See *id.* at ii.

144. See *id.* at ii.

145. See *id.* at iii.

“conservation, restoration, and preservation of valuable sediment resources along the coast of California to reduce shoreline erosion. . .increase natural sediment supply to the coast, [and] restore and preserve beaches”¹⁴⁶

One could argue that with this plan, the commission would have the necessary scientific information to decide what regions could maintain a seawall or not. Therefore, if the language of section 3235 were to change from the mandatory word “shall,” to permissive word, “may,” the commission would not have to become worried about having too much discretion, because it would be able to rely on this plan for advice. The Sediment Master Plan’s is valuable because it measures sand supply on a regional basis.¹⁴⁷ It provides “better knowledge of regional and site-specific erosion trends [that] would support more specific planning for necessary shoreline response.”¹⁴⁸

2. Erosion Mitigation Alternatives for Southern Monterey Bay

The second study that will have a dramatic effect on future coastal armoring policies in California is the 2012 Monterey Bay National Marine Sanctuary led-study, “Evaluation of Erosion Mitigation Alternatives for Southern Monterey Bay.” Although the Mitigation Alternatives study was conducted in Southern Monterey and not along the entire California coast, it nevertheless aids in our understanding of the costs, benefits, and effectiveness of various environmental strategies.¹⁴⁹

It is important to note that trends found in Monterey counties are typical to that of the state.¹⁵⁰ The environmental impact of coastal armoring within the Monterey Bay National Marine Sanctuary (“MBNMS”) has been a large concern.¹⁵¹ There is an apparent fear that natural sediments, loss of public beaches, hindrance to public access to the coast will change, going to the beach forever.¹⁵² In response to these growing concerns the MBNMS decided to face coastal erosion head on and to document the impacts of armoring on the beach as close as they could.¹⁵³

146. CALIFORNIA COASTAL SEDIMENT MASTER PLAN (2012), available at http://www.dbw.ca.gov/CSMW/PDF/SMP_Brochure.pdf.

147. COASTAL SEDIMENT MGMT. WORKGROUP, <http://dbw.ca.gov/csmw/default.aspx> (last visited Dec. 3, 2013).

148. GRIGGS, *supra* note 3, at 161.

149. *See Resources Issues: Coastal Armoring and Erosion*, MONTEREY BAY NATIONAL MARINE SANCTUARY, <http://montereybay.noaa.gov/resourcepro/resmanissues/coastal.html> (last visited Dec. 3, 2013).

150. *See id.*

151. *See id.*

152. *See id.*

153. *See id.*

Shoreline protection devices, up until now, have been discussed as a type of adaptation strategy to rising sea levels.¹⁵⁴ However, these devices can also be characterized as the “status quo strategy for mitigating coastal erosion.”¹⁵⁵ It is with this perspective that the Mitigation Alternative conducted their study. The study concluded that coastal armoring problems are incompatible with maintaining a natural shore.¹⁵⁶

This report took twenty-two erosion mitigation measures and evaluated them based on their effectiveness of protecting the land as well as beach.¹⁵⁷ The most promising mitigation measures were then compared to coastal armoring through a cost benefit analysis.¹⁵⁸ Overall, the study found that adaptation strategies not previously considered, were substantially more beneficial than shoreline protection devices.¹⁵⁹ More specifically, the study discovered that if Southern Monterey Bay allowed coastal erosion to occur, as opposed to constructing shoreline protection devices like seawalls, they would gain a net benefit of \$1.25 billion dollars over the next century.¹⁶⁰

The Mitigation Alternative then explored the most promising alternatives to coastal armoring.¹⁶¹ Of these alternatives, one of the most promising approaches included beach nourishment.¹⁶² Beach nourishment has recently been identified as a plausible solution to coastal erosion.¹⁶³ Advocates of this method contend that this alternative maintains the width of the beach and buffers some of the wave energy.¹⁶⁴ Federal, state, and local government agencies have already begun to pursue this method to protect property from natural coastal erosion, however the costs can be very high.¹⁶⁵

This study could be groundbreaking for perpetuating change in future seawall regulations. This report forces those who oppose amending section 30235 of the Coastal Act to provide some indicia that seawalls should still

154. *See id.*

155. *Evaluation of Erosion Mitigation Alternatives for Southern Monterey Bay*, MONTEREY BAY NATIONAL MARINE SANCTUARY, <http://montereybay.noaa.gov/research/tech-reports/tresapwa2012.html> (last visited Dec. 3, 2013).

156. ESA PWA, EVALUATION OF EROSION MITIGATION ALTERNATIVES 3 (2012).

157. *See id.* at 1.

158. *See id.*

159. *See id.* at 11.

160. *See supra* note 150.

161. *See* ESA PWA, *supra* note 157, at 11.

162. *See id.*

163. *See id.*

164. *See id.* at 38.

165. *See id.* at 128.

be considered the status quo response to coastal erosion. This will be a tall order for opponents. After all, one conclusion the Mitigation Alternative Study found was that some regions are actually better off allowing coastal erosion than they would be if they constructed a seawall.¹⁶⁶ For example, the study found that for Southern Monterey Bay, it was estimated that there would be a \$1.25 billion net benefit over the next century by allowing coastal erosion to occur as opposed to building a seawall.¹⁶⁷

Another issue opponents will face will be combatting the Mitigations Alternative Study's conclusion that alternatives to seawall construction are not only effective but also less harmful than coastal armoring.¹⁶⁸ These two findings will be a large burden for the opposition to combat.

VI. CONCLUSION

The most obvious global warming affect to those living along the California coast will be rising sea levels.¹⁶⁹ Rising sea levels will contribute to inundation, stronger storms and coastal erosion.¹⁷⁰ To combat these warming effects, California has turned to an adaptation strategy known as shoreline protection devices.¹⁷¹ Though shoreline protection devices are effective, they also contribute to negative visible effects, beach loss, and placement loss.¹⁷² Despite these negative impacts on the social, economic, and coastal environments, coastal armoring is being approved at an alarming rate.¹⁷³

The rate to which these seawalls are being approved directly stems from the interpretation of the language set forth in the Coastal Act of 1976.¹⁷⁴ Section 30253 maintains that no development will be approved along the coast if it requires shoreline protection except under one condition. That condition is espoused in Section 30235.¹⁷⁵ This Section provides that shoreline protection shall be permitted for existing

166. *Coastal Erosion Study*, MONTEREY BAY NATIONAL MARINE SANCTUARY, <http://montereybay.noaa.gov/new/2012/erosion.html> (last visited Dec. 3, 2013).

167. *See id.*

168. *See id.*

169. GRIGGS ET. AL., *supra* note 3.

170. *See* Caldwell, *supra* note 25, at 534.

171. CHAD J. MCGUIRE, *supra* note 6.

172. GRIGGS, *supra* note 33, at 78.

173. GRIGGS, *supra* note 3, at 138.

174. *See id.* at 147–48.

175. *See id.* at 139.

developments.¹⁷⁶ Interpretational issues regarding this language however, has led to exploitation of these two parts of the Coastal Act.¹⁷⁷

Assembly Bill 2934, initiated in early 2002 sought to clarify the Coastal Act to bring it in line with the legislature's intent.¹⁷⁸ However, despite its good intentions, the bill died on the senate floor later that same year.¹⁷⁹ Ten years later, California is still left with weak shoreline protection device regulations. This Article has argued that because California environmental policies have changed drastically since 2002, with the adoption of the 2009 California Climate Adaptation Strategy as well as studies proffered by the Sediment Plan and Erosion Mitigation Alternatives.

Together, these reports and studies have been able to provide more scientific knowledge as to the negative impacts of coastal armoring. It places those who do not want to update the Coastal Act with the burden of providing some kind of indicia that coastal armoring is still worth it. With studies showing the various alternatives to coastal armoring and singling shoreline protection out for its adverse effects, it will be hard for these opponents to prove that seawall construction is the logical conclusion. Therefore, a bill similar to Assembly Bill 2943 should now be considered and approved by the California legislature.

176. *See id.*

177. *See id.* at 148.

178. *See Cardiff, supra* note 95, at 45.

179. *See A.B. 2943, supra* note 18.