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Calling All Oysters: An Analysis of Living Shorelines, Legal Impediments, and Louisiana's Land Loss Crisis

Alyssa Craton

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Calling All Oysters: An Analysis of Living Shorelines, Legal Impediments, and Louisiana’s Land Loss Crisis

*Alyssa Craton**

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INTRODUCTION

Driving down Highway 1 toward Grand Isle, Louisiana is a somber experience. In front stretches the last remaining sliver of land supporting a single two-lane road. Extending as far as the eye can see in every other direction is nothing but open water, broken only by patches of scattered old pilings and lonely specks of brown marsh grass. Areas that once boasted abundant marsh and wildlife now sit eerily still—the land on which they stood since condemned to the Gulf. Drive a little further toward the tip of the boot, and the atmosphere becomes almost apocalyptic: low-lying homes sit untouched and abandoned, while those still in use wobble on 15-foot stilts or stand on hills surrounded by steel flood walls. To a newcomer’s eye, this landscape seems peculiar. But to a local, this scene serves as a constant reminder of the potential for devastation by the Gulf—an unfortunate characteristic of life on the coast. While years of relentless erosion and storms have forced some to relocate, this area is still home to many who cannot fathom leaving behind such an indispensable part of who they are. The connection to the coastal landscape is ingrained in south Louisiana culture and all who call it home. As the coast disappears, a way of life disappears with it.

Coastal Louisiana has been at war with the Gulf of Mexico since the 1930s,¹ each fighting for seizure of the state's dwindling coastal territory.² The war is far from over, however. Louisiana is trying to prevent a catastrophic loss of its entire coastal ecosystem and the accompanying economic activity and culture that it holds.³ While Louisiana's coast makes up only 40% of all coastal wetlands in the contiguous United States ("U.S."), it accounts for over 80% of the coastal marsh loss in those 48 states.⁴ Many factors have contributed to this alarming loss, but significant causation can be attributed to the levying of the Mississippi River as well as oil and gas infrastructure.⁵ Although natural processes like invasive species, hurricanes, and rising sea levels have contributed significantly, human intervention is the leading cause of Louisiana's coastal erosion, and human intervention is now required to restore the damage.⁶

This Comment discusses an innovative and sustainable solution to aid in mitigating coastal erosion in south Louisiana and illuminates the dire need for such projects to be undertaken in the near future. The current state of these projects, however, is both small in scale and ultimately incomplete due to existing legal obstacles. This Comment addresses these legal

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1. U.S. Geological Survey scientists estimate that Louisiana has been losing coastal wetlands since at least the 1930s. *See infra* note 2.

2. *See USGS: Louisiana's Rate of Coastal Wetland Loss Continues to Slow*, U.S. GEOLOGICAL SURV. (July 12, 2017), <https://www.usgs.gov/news/usgs-louisiana-s-rate-coastal-wetland-loss-continues-slow> [<https://perma.cc/4FQR-M5F9>].

3. *See* LA. COASTAL WETLANDS CONSERVATION & RESTORATION TASK FORCE, THE 2018 EVALUATION REPORT TO THE U.S. CONGRESS ON THE EFFECTIVENESS OF COASTAL WETLANDS PLANNING, PROTECTION AND RESTORATION ACT PROJECTS 3 (2018) [hereinafter 2018 EVALUATION REPORT], https://www.lacoast.gov/reports/program/Report%20to%20Congress_FINAL.PDF [<https://perma.cc/JWF3-VLVP>].

4. *Louisiana Coastal Wetlands: A Resource at Risk*, U.S.G.S. COASTAL & MARINE GEOLOGY PROGRAM, <https://pubs.usgs.gov/fs/la-wetlands/> [<https://perma.cc/2FZR-NL23>] (last visited Aug. 30, 2021).

5. *See Our Coastal Crisis: Land Loss*, RESTORE THE MISS. RIVER DELTA, <https://mississippiriverdelta.org/our-coastal-crisis/land-loss/> [<https://perma.cc/Z2HK-RV8D>] (last visited Aug. 30, 2021).

6. Marc C. Hebert, *Coastal Restoration Under CWPPRA and Property Rights Issues*, 57 LA. L. REV. 1166, 1167 (1997).

impediments and provides potential solutions that would allow Louisiana's legal system to play a more efficient role in coastal erosion mitigation with regard to the state's dynamic and ever-changing landscape.

Part I of this Comment lays the foundation as to why this "land loss crisis" continues to occur, how it has worsened over time, and what both the state and country are at risk of losing if Louisiana's coast continues to erode at its current rate. Part II analyzes a viable and cost-effective potential solution to the Louisiana land loss crisis—living shorelines. Finally, Part III addresses the legal obstacles that currently inhibit living shoreline projects from successful and large-scale implementation in the Louisiana coastal zone.

BACKGROUND

A. Nature's Contributions to the Coastal Erosion Process in Louisiana

Between 1932 and 2016, Louisiana suffered a devastating loss of 2,006 square miles of land, an area roughly the size of Delaware.⁷ This measurement was calculated through a study conducted by researchers at the United States Geological Survey (USGS).⁸ The study found that over the 84 years observed, the rate of Louisiana's land loss ranged from a high of 32 square miles per year to a low of 10.8 square miles per year.⁹ The average rate of loss equates to losing a football field worth of land every 100 minutes.¹⁰ When the land loss rate was at its highest, a football field disappeared every 34 minutes.¹¹ Although the rate at which Louisiana loses its coastal lands to the Gulf has decreased in recent years, the reduction is only temporary and is on track to increase again.¹² The decrease in the rate of Louisiana's land loss is partly attributable to the fact that the state has already lost its most vulnerable areas.¹³ However, the primary cause for the reduced rate is that prior to the 2020 hurricane

7. USGS: *Louisiana's Rate of Coastal Wetland Loss Continues to Slow*, *supra* note 2.

8. *Id.*

9. *Id.*

10. *Id.*

11. *Id.*

12. See Amanda Ruggeri, *Louisiana is Disappearing Under Water – Can Oysters Save it?*, BBC FUTURE (Aug. 27, 2018), <https://www.bbc.com/future/article/20180822-recycled-shells-of-louisiana-oyster-reef-protect-new-orleans> [<https://perma.cc/TNM4-DAZD>].

13. *Id.*

season, Louisiana had not been impacted by a major hurricane since Hurricane Gustav in 2008.¹⁴

Hurricanes exacerbate coastal erosion through their accompanying storm surges and flooding, which are particularly harmful for the low-lying coastal areas of Louisiana.¹⁵ Storm surges not only inundate these low-lying areas with floods; they also destroy the marsh and everything else in their path. The unprecedented nature of the recent Hurricane Laura proves that the slowdown is not an accurate portrayal of the state's land loss crisis.¹⁶ Slamming into the Louisiana-Texas border with 150 mile per hour winds, Hurricane Laura was the fifth most powerful hurricane to ever strike the U.S. and the strongest to hit Louisiana in over 150 years.¹⁷ Two days after Hurricane Laura ravaged a path of destruction through the state, researchers at Louisiana State University surveyed the coastal marshes approximately 40 miles from Laura's landfall.¹⁸ These researchers measured wetland recession at sites that were marked at the marsh's edge prior to Laura,¹⁹ and the findings were alarming to say the least—Hurricane Laura increased erosion in the region 63 times faster than its normal long-term rates.²⁰ In the four-year survey period, the marshes had diminished on average by 0.35 centimeters per day.²¹ Comparatively, during Hurricane Laura those same marshes lost 22 centimeters in one

14. See USGS: *Louisiana's Rate of Coastal Wetland Loss Continues to Slow*, *supra* note 2.

15. See Megan K. La Peyre et al., *Comparison of Oyster Populations, Shoreline Protection Service, and Site Characteristics at Seven Created Fringing Reefs in Louisiana*, LIVING SHORELINES: THE SCIENCE AND MGMT. OF NATURE-BASED COASTAL PROT. 363 (2017).

16. See Chris Mooney, *Loss of Louisiana Marshes that Protect New Orleans is 'Probably Inevitable,' Study Finds*, WASH. POST (May 22, 2020), <https://www.washingtonpost.com/climate-environment/2020/05/22/new-orleans-wetlands-climatechange/> [<https://perma.cc/Z2V9-TE6R>].

17. Jeff Masters, *'Devastating' Laura is Tied as the Fifth-Strongest Hurricane on Record to Make Landfall in the Continental U.S.*, YALE CLIMATE CONNECTIONS (Aug. 27, 2020), <https://yaleclimateconnections.org/2020/08/devastating-laura-tied-as-fifth-strongest-hurricane-to-make-landfall-in-continent-al-u-s/> [<https://perma.cc/Q3AQ-RQ2L>].

18. Sarah Gibbens, *How Powerful Hurricanes Hasten the Disappearance of Louisiana's Wetlands*, NAT'L GEOGRAPHIC (Sept. 11, 2020), <https://www.nationalgeographic.com/science/article/how-hurricane-laura-hastens-louisiana-wetland-loss#close> [<https://perma.cc/YF3H-WSV3>].

19. *Id.*

20. *See id.*

21. *Id.*

day.²² Louisiana clearly still faces a land loss crisis, and the crisis is only worsening over time. With the looming threat of irreversible climate change impacts, Louisiana is quite literally racing against the clock to save its eroding coastline.

The devastating effects of storms like Hurricanes Katrina and Laura serve as fatal reminders that past attempts to save the Louisiana coast have proven ineffective, and the risks faced by coastal communities are only increasing in both severity and frequency.²³ The 2020 hurricane season hurled five major hurricanes at the Louisiana coast—the most in a single year since the state first began keeping records in 1851.²⁴ Thus, the need for reform in Louisiana’s coastal restoration methods is not only necessary but also more challenging as time runs out.²⁵

B. Man’s Contribution to the Coastal Erosion Process in Louisiana: The Effect of the Levees on the Mississippi River Delta

Louisiana has a plethora of natural resources at its disposal to mitigate coastal erosion, but the resources exist in a fragile equilibrium with the nature of the land.²⁶ A prime example of the effect of man’s interference on this delicate balance is the levying of the Mississippi River.²⁷ Until the levees were built in the 1930s, the Mississippi River ran free and wild, depositing rich sediment in the delta and replenishing the marsh around it.²⁸ However, the construction of the levees disrupted this balance.

The levees were constructed to control the course of the river and protect surrounding communities and infrastructure from its seasonal flooding.²⁹ Confining the river to a single channel, the levees prevented its

22. *Id.*

23. Charles Allen, *Signs of Progress as the Katrina Anniversary Approaches*, RESTORE THE MISS. RIVER DELTA (Aug. 29, 2020), <https://mississippiriverdelta.org/signs-of-progress-as-the-katrina-anniversary-approaches/> [https://perma.cc/V2LY-JAQT].

24. Matthew S. Schwartz, *Now a Hurricane, Zeta Is on Track to Hit Louisiana on Wednesday*, NPR (Oct. 26, 2020, 6:32 PM), <https://www.npr.org/2020/10/26/927996533/now-a-hurricane-zeta-is-on-track-to-hit-louisiana-on-wednesday> [https://perma.cc/W22R-PUF5].

25. Allen, *supra* note 23.

26. See Matthew Campbell & Steven Hall, *Lightweight Oyster Reefs Reduce Coastal Erosion*, GLOB. AQUACULTURE ALL. (June 1, 2003), <https://www.aquaculturealliance.org/advocate/lightweight-oyster-reefs-reduce-coastal-erosion/> [https://perma.cc/L7BN-ZZ7N].

27. See *id.*; see also *Our Coastal Crisis: Land Loss*, *supra* note 5.

28. *Our Coastal Crisis: Land Loss*, *supra* note 5.

29. See *id.*

waters from overflowing or changing course, which in turn also denied the marsh access to sediment and nutrients.³⁰ The sediment, vital for the replenishment and nurturing of marsh growth, is now dumped far into the Gulf away from its initial depository and the starving wetlands whose existence is dependent on it.³¹ Without the vital protection the marshes provide against storm surges, the coastal land behind them is left vulnerable and defenseless. Although the levees were built to prevent catastrophic damage from erosion and flooding, their construction ironically—and unfortunately—resulted in the opposite.³²

Human activity disrupted the balance—and now restoration of that balance necessitates it. Louisiana has lost one quarter of its coastal territories, amounting to losses approximately the size of the State of Delaware.³³ If new, sustainable methods are not implemented to reduce and reverse the effects on the Louisiana coastline, the state can expect to lose more land than contained in the Washington D.C.–Baltimore metropolitan area in the next few decades.³⁴ Although man’s interference is not the sole cause for the coastal erosion crisis in Louisiana, only man can save it now.

I. LOSING LOUISIANA

Losing its coast at an average rate of a football field every 100 minutes, Louisiana is disappearing into the Gulf.³⁵ According to a study recently published in *Science Advances*,³⁶ researchers found that the diminishing wetlands at the base of the Mississippi River have now crossed a critical tipping point.³⁷ Based on hundreds of measurements identifying the fate of ancient marshes in the area, these researchers found that the type of wetlands in present day coastal Louisiana have rarely survived when the rise in sea level exceeds a rate of three millimeters per

30. Hebert, *supra* note 6, at 1167.

31. *Our Coastal Crisis: Land Loss*, *supra* note 5.

32. *See* Ruggeri, *supra* note 12.

33. *Id.*

34. *Why is Louisiana Important?*, COAL. TO RESTORE COASTAL LA., <https://www.crcl.org/why-is-louisiana-important> [<https://perma.cc/UZ6Y-CHHZ>] (last visited Aug. 30, 2021).

35. *See USGS: Louisiana’s Rate of Coastal Wetland Loss Continues to Slow*, *supra* note 2.

36. *Science Advances* is a highly selective, peer-reviewed scientific journal published by the American Association for the Advancement of Science.

37. Mooney, *supra* note 16.

year over extended periods of time.³⁸ Currently, the rise in sea level has already begun to surpass that three millimeter threshold and is only expected to accelerate due to the changing climate.³⁹

The deteriorating wetlands and insufficient structural protections along Louisiana's coast render it acutely vulnerable to coastal erosion in an area that is already susceptible to hurricanes and destructive storm surges. Bold and innovative measures are required to prevent further degradation of this irreplaceable coastal zone. If such measures are not taken, Louisiana is on track to lose an additional 700 square miles of land—338,800 football fields—in the next 50 years.⁴⁰

A. Louisiana's Seafood Production Is Vital to the Industry Nationwide

Louisiana's coastal landscape plays a critical role in the existence and success of its industries, economy, and culture. If Louisiana's coast continues to subside into the sea, the ecological and economic effects that inevitably follow will reverberate throughout the nation.⁴¹ This crisis is not exclusive to Louisiana and its coastal communities, as the loss of Louisiana's coast presents an economic and existential threat to the entire U.S.⁴²

If Louisiana's land loss rate maintains its current trajectory, the seafood industry will be one of many to face substantial repercussions on a national scale. Louisiana is the largest seafood producer in the continental U.S., second overall only to Alaska.⁴³ The Louisiana oyster industry, valued at \$68.5 million in 2016, supplies more than one-third of the nation's oysters every year.⁴⁴ Louisiana also leads the nation in blue crab landings, holding approximately 40% of the national total.⁴⁵ Even more lucrative is Louisiana's commercial shrimping industry, which supplied the nation with 81 million pounds of shrimp in 2019.⁴⁶ On

38. *Id.*

39. *Id.*

40. *Why is Louisiana Important?*, *supra* note 34.

41. *See* Ruggeri, *supra* note 12.

42. *See* Diego Herrera Garcia & Jim Wyerman, *What Does the Economy Stand to Lose if We Don't Restore Louisiana's Coast?*, RESTORE THE MISS. RIVER DELTA (July 31, 2017), <https://mississippiriverdelta.org/economy-stand-lose-dont-restore-louisianas-coast/> [<https://perma.cc/4VYY-6T84>].

43. Ruggeri, *supra* note 12.

44. 2018 EVALUATION REPORT, *supra* note 3, at 3.

45. Garcia & Wyerman, *supra* note 42.

46. *Study Reveals La's Resilient Seafood Industry Could Use More Support from Economic Development Efforts*, WBRZ 2 (Dec. 4, 2020, 11:25 AM),

average, Louisiana's shrimp landings produce 111.3 million pounds of shrimp every year.⁴⁷ Louisiana's commercial fishing industry contributes billions of dollars to the state's economy and is ranked second highest overall in commercial fishing landings in the U.S.⁴⁸ In its entirety, the Louisiana seafood industry has an economic impact of over \$1.9 billion each year and supports an estimated 33,391 jobs.⁴⁹ Recreational fishing also generates an additional \$1.96 billion and supports almost 17,000 jobs.⁵⁰ As Louisiana's coast disappears, so does its ability to maintain these vital industries upon which the rest of the nation is dependent.

B. Louisiana's Coast Is the Ground on Which the Energy Industry Stands

It is almost impossible to overstate the impact of Louisiana's oil and gas industry on the state's economy.⁵¹ Oil production off Louisiana's coast is the second largest source of U.S. crude oil.⁵² Including its offshore production, Louisiana is also ranked second in total energy production, natural gas production, and refining capacity.⁵³ Further, the Louisiana Offshore Oil Port ("LOOP"), the country's only deep-water oil port, is the largest entry port for waterborne crude oil in the entire U.S.⁵⁴ In 2015 alone, the Louisiana oil and gas industry generated \$17 billion in economic output.⁵⁵ The industry also directly supplies over 76,000 jobs, with more than half belonging to people that reside in Louisiana's coastal parishes.⁵⁶

<https://www.wbrz.com/news/study-reveals-la-s-resilient-seafood-industry-could-use-more-support-from-economic-development-efforts/> [<https://perma.cc/LLD3-TE73>].

47. Garcia & Wyerman, *supra* note 42.

48. 2018 EVALUATION REPORT, *supra* note 3, at 3.

49. Garcia & Wyerman, *supra* note 42.

50. *Id.*

51. See Keith Magill, *Just the Facts: All About Louisiana's Oil-and-Gas Industry*, HOUMA TODAY (Oct. 29, 2009, 9:30 AM), <https://www.houma.today.com/article/DA/20091029/news/608099934/HC> [<https://perma.cc/2NP4-HZVQ>].

52. *Oil and Petroleum Products Explained: Where Our Oil Comes From*, U.S. ENERGY INFO. ADMIN., <https://www.eia.gov/energyexplained/oil-and-petroleum-products/where-our-oil-comes-from.php> [<https://perma.cc/M8FF-FBGN>] (last updated Apr. 8, 2021).

53. Garcia & Wyerman, *supra* note 42.

54. *Louisiana State Profile and Energy Estimates*, U.S. ENERGY INFO. ADMIN., <https://www.eia.gov/state/analysis.php?sid=LA#30> [<https://perma.cc/HB2A-86N6>] (last updated Apr. 15, 2021).

55. Garcia & Wyerman, *supra* note 42.

56. *Id.*

Oil and gas produced along the Louisiana coast are pivotal components of the national economy.⁵⁷ While burning oil and gas does produce greenhouse gasses, the use of natural gas to replace coal in power plants can significantly decrease emissions from electricity generation.⁵⁸ Louisiana is the centerpiece of the U.S. natural gas industry as it contains both the Henry Hub,⁵⁹ where most natural gas derivative contracts are priced,⁶⁰ and some of the largest liquified natural gas export terminals in the nation.⁶¹ The country's transportation, electricity, and production sectors are fueled by oil and gas and would be met with significant issues—if not a total collapse—if Louisiana was rendered unable to produce oil and gas at its current rate.⁶²

Much of the infrastructure keeping this industry running is built in the marshes and low-lying areas of Louisiana's coast.⁶³ If the coast continues to subside into the Gulf, so will the pipelines, refineries, shipyards, and wells that are the backbone of the national oil and gas industry. Thus, it is abundantly clear that the national oil and gas industry would take a huge, potentially unrecoverable hit if the continued degradation of Louisiana's coast is permitted. Restoration of this unique coastal territory is vital to not only the continued existence of these industries but also to the economic security of Louisiana's coastal communities who have called this place

57. JAMES A. RICHARDSON & LOREN C. SCOTT, LA. DEP'T OF NAT. RES., *THE ECONOMIC IMPACT OF COASTAL EROSION IN LOUISIANA ON STATE, REGIONAL, AND NATIONAL ECONOMIES* 33–34 (2004).

58. See *Frequently Asked Questions (FAQs): How Much Carbon Dioxide is Produced When Different Fuels are Burned?*, U.S. ENERGY INFO. ADMIN., <https://www.eia.gov/tools/faqs/faq.php?id=73&t=11> [https://perma.cc/N3ER-75LR] (last updated June 1, 2021).

59. Located strategically along the coast in Erath, Louisiana, the Henry Hub is a natural gas pipeline that serves as the official delivery location and pricing point for all natural-gas futures contracts on the New York Mercantile Exchange. The Henry Hub connects to multiple major intrastate and interstate pipelines, and the settlement prices at Henry Hub are used as benchmarks for the entire North American natural gas market and for portions of the global market as well. See *infra* note 60.

60. *Understanding Henry Hub*, CME GRP., <https://www.cmegroup.com/education/courses/introduction-to-energy/introduction-to-natural-gas/understanding-henry-hub.html> (last visited Aug. 30, 2021).

61. Kristen Mosbrucker, *Louisiana Leads Nation in Natural Gas as Net Exports Double, Lake Charles Metro Sees Most Gains*, THE ADVOCATE (Oct. 30, 2019, 9:41 AM), https://www.theadvocate.com/baton_rouge/news/business/article_6e4f95b6-fb23-11e9-891d-9b700d9b3a3a.html.

62. See RICHARDSON & SCOTT, *supra* note 57, at 34.

63. See *Louisiana State Profile and Energy Estimates*, *supra* note 54.

home for hundreds of years.⁶⁴ Acknowledging the harsh realities of this crisis and the significance of its repercussions makes it evident that a sustainable restoration of Louisiana's coast substantially outweighs an alternative where no action is taken at all.⁶⁵

C. Not Just Wetlands: Louisiana's Coast Is Rich in Homelife, Community, and Culture

Coastal Louisiana is home to approximately 70% of the state's residents, two-thirds of its entire population.⁶⁶ Notwithstanding the potential for significant economic, infrastructural, and industrial loss, it often remains undiscussed that the prevention of further degradation and untimely extinction of Louisiana's coast is owed most to the people who call it home. The discussion around Louisiana's land loss crisis can no longer be reduced to just its structural and economic components. Millions of people are at immediate risk of losing their homes, livelihoods, history, and culture—all of which are undoubtedly irreplaceable.

Relentlessly fighting on the frontlines in this unsolicited war with the Gulf is the Pointe-au-Chien Native American tribe, one of the many communities that live in Louisiana's coastal zone.⁶⁷ Located about 40 miles southwest of New Orleans, the Pointe-au-Chien tribe has been forced to adapt or even relocate as their homeland, landmarks, and cultural history subside into the muddy waters of the Gulf.⁶⁸ A particularly painful scene witnessed by the Pointe-au-Chiens is the erosion of one of the tribe's respected mounds.⁶⁹ The mound was hand-built by their ancestors and is a site of honor in the tribe's culture.⁷⁰ On top of this historic mound sits a large oak tree with roots completely exposed—roots that for decades were

64. See Hebert, *supra* note 6, at 1170.

65. See *id.* at 1170–71.

66. *Why is Louisiana Important?*, *supra* note 34.

67. *The Coalition to Restore Coastal Louisiana Builds Second Living Shoreline from Recycled Oyster Shells*, COAL. TO RESTORE COASTAL LA. (Apr. 17, 2019), <https://www.crcl.org/copy-2-of-sab-press-release> [<https://perma.cc/8E33-9PQ9>].

68. Pam Radtke Russel, *Fighting Rising Tides, Coastal Towns Turn to Humble Oysters to Save Their Land and Their Culture*, HUFFPOST (May 24, 2019, 5:45 AM), https://www.huffpost.com/entry/oyster-shells-rising-sea-level-louisiana_n_5ce2c7f2e4b0e69c18efae1a [<https://perma.cc/D25M-UG55>].

69. Halle Parker, *Eroding Mound Just One Impact of Land Loss*, HOUMA TODAY (Apr. 24, 2019, 7:55 PM), <https://www.houmatoday.com/news/20190424/eroding-mound-just-one-impact-of-land-loss> [<https://perma.cc/CZ4F-6KYH>].

70. *Id.*

embedded deep into the land.⁷¹ With almost all of the area around it already converted to open water, a boat ride down the bayou is now the only way to reach the mound, and the water has already begun to carve its way into its base.⁷² In the four years since the water's encroachment on the mound first became evident, the surrounding land lost over three feet.⁷³ The tribe's cemeteries are also threatened by the encroaching waters, and younger generations are forced to move elsewhere as there is no land left upon which to build homes and raise families.⁷⁴

The Pointe-au-Chiens are cognizant the situation is only worsening, but with limited resources, time, and remaining land, many have been forced to relocate, separating the members of the tribe.⁷⁵ The Louisiana coast has been their home for hundreds of years and is deeply embedded in their history and culture.⁷⁶ As a consequence of an unforgiving life on Louisiana's coast, adaptability is ingrained in their nature. They cannot, however, adapt to a complete loss of their homeland. Every passing day that Louisiana's land loss crisis remains under-acknowledged and unresolved, the Pointe-au-Chiens watch another piece of their history wash away.⁷⁷

II. LIVING SHORELINES CAN RESTORE AND REBUILD LOUISIANA'S COAST

Having exhausted many different forms of man-made solutions to mitigate coastal erosion—the levees being a prime example—Louisiana is now turning to a more environmentally friendly alternative. Using its naturally occurring resources as a primary line of defense, the state is experimenting with the construction of living shorelines.⁷⁸ Living shorelines provide sustainable coastal protection and encourage healthy ecosystem growth through recreation of the coast's natural processes.⁷⁹ While traditional restoration methods such as seawalls, breakwaters, and levees provide protection for an individual section of the shoreline, they exacerbate erosion elsewhere along the coast and cause disruption to

71. *Id.*

72. *Id.*

73. *Id.*

74. *Id.*

75. *Id.*

76. *Id.*

77. *Id.*

78. Allen, *supra* note 23.

79. La Peyre et al., *supra* note 15.

surrounding ecosystems.⁸⁰ The multitude of problems inherent in these constructions expose the need for an innovative and environmentally conscious approach to mitigating coastal erosion, and thus the concept of living shorelines emerged.⁸¹

Instead of using the more traditional materials of concrete or steel, the living shoreline method utilizes living things and their natural environments to develop a natural and sustainable approach to combating coastal erosion.⁸² Benefits accompanying living shorelines include coastline stabilization, resistance to subsidence and sea level rise, and an enhancement of surrounding ecosystems and water quality.⁸³ Implementing a living shoreline encourages ecological growth and provides a sustainable and cost-effective means to mitigate coastal erosion—a win for mankind and the environment, which is a rare opportunity to have.⁸⁴ Although there are a variety of materials that can create a living shoreline and aid in coastal protection, one method—or creature—in particular presents a promising solution to the coastal erosion process in Louisiana.

A. One Living Shoreline Method in Particular Presents a Viable Solution to Louisiana's Land Loss Crisis

The building of artificial oyster reefs is one living shoreline method with the potential to streamline the long-overdue restoration of Louisiana's coast.⁸⁵ Typically composed of recycled or fossilized oyster shells, the artificial reef is built by stringing shells together and then placing them accordingly on a semi-flat surface to mimic a live oyster reef. The fully constructed reef is then placed onto the seafloor or on an outer portion of the bank to help combat coastal erosion.⁸⁶ Serving as a buffer to incoming waves, the oyster reefs provide protection for the shoreline

80. Matt Shipman, *How Living Structures Can Better Protect Our Coastline*, PHYS.ORG (Mar. 15, 2017), <https://phys.org/news/2017-03-coastline.html> [<https://perma.cc/L3V3-VNRH>].

81. *Id.*

82. *Id.*

83. La Peyre et al., *supra* note 15.

84. Elizabeth Ashby Nix, *Developing a Gulf-wide Oyster Reef Restoration Plan: Identification of Spatial, Socio-Economic and Geo-Political Constraints* (2011) (Master's thesis, Louisiana State University) (on file with the LSU Digital Commons).

85. Ruggeri, *supra* note 12.

86. Nix, *supra* note 84.

behind them.⁸⁷ Along with providing adequate risk reduction against erosion, the artificial reefs set the foundation for the emergence of a healthy and sustainable ecosystem.⁸⁸ The reefs have been shown to improve both the water quality and the local economy, as their environment for ecological growth provides habitats for fish, oysters, and other commercially-used resources.⁸⁹

The world loses oyster reefs faster than it loses wetlands.⁹⁰ Since 1900, an estimated 64–71% of the world’s wetlands have been eradicated.⁹¹ Conversely, 85% of the world’s oyster reefs have either been completely lost or severely diminished due to overharvesting, disease, pollution, and habitat degradation.⁹² These numbers render oyster reefs one of the most imperiled marine habitats in the world.⁹³

The alarming loss of the world’s oyster reefs is not confined solely to a decline in oyster population.⁹⁴ As the only hard substrate available in many areas, oyster reefs also serve as a habitat for over 300 other species that either directly or indirectly rely on them to survive.⁹⁵ A recent assessment of the imperiled state of global oyster reefs and the threat of losing the associated benefits illuminate the need for their restoration.⁹⁶ Accordingly, the following section in this Comment addresses the symbiotic relationship between the restoration of Louisiana’s coast and oyster populations.

B. A Multi-Factor Approach: Oyster Reefs Supply a Wide Range of Benefits to the Coastal Restoration Process

Oyster reefs serve as critical ecosystems due to their multifunctionality in providing a habitat for aquatic creatures, aiding in shoreline protection, encouraging marsh growth through water filtration, supporting commercial and recreational activities, and more.⁹⁷ In

87. *Id.*

88. *Id.*

89. *Oyster Shell Recycling Program*, COAL. TO RESTORE COASTAL LA., <https://www.crcl.org/oyster-shell-recycling> [<https://perma.cc/BD8P-2QZ8>] (last visited Aug. 30, 2021).

90. Ruggeri, *supra* note 12.

91. *Id.*

92. *Id.*

93. Nix, *supra* note 84.

94. *Id.*

95. *Id.*

96. *Id.*

97. *Id.*

comparison to more traditional materials like concrete and granite, the unique shape and texture of the oyster shell provides extra surface area, which aids in absorbing wave energy, rendering it a more effective buffer for the coastal land behind it.⁹⁸ The shells also allow vital substances such as water, bacteria, and algae to flow through them.⁹⁹ This “flow” is a crucial aspect of marsh growth as it allows the tide to “breathe” and subsequently nourishes the marsh to grow.¹⁰⁰ As a strong and healthy marsh is critical to a successful restoration of Louisiana’s coastline, implementation of oyster reef projects would fulfill an indispensable role—restoring the oyster reefs would help to restore Louisiana’s coast as well.

The placement of artificial oyster reefs in Louisiana’s coastal marshes creates an opportunity for a new ecosystem to develop.¹⁰¹ Before the reef is built, the individual oyster shells are strategically seeded with oyster larvae known as “spat”; this establishes a suitable foundation for new oysters to grow and flourish once the reef is situated at its new location in the marsh.¹⁰² The spat also attracts live oysters in the surrounding waters to the reef.¹⁰³ The mature oysters then attach to the reef for their new habitat and grow vertically over time at a rate faster than sea level is expected to rise.¹⁰⁴

The new, live oysters also provide the surrounding area with an abundance of “the ocean’s most effective water filters” as each live oyster has the ability to clean 50 gallons of water per day.¹⁰⁵ This provides even more protection for the coastal lands because the oyster reefs capture and absorb pollutants such as nitrogen and phosphorus before they reach the Gulf. Additionally, the filtration process also fosters plant and animal growth by cleaning and rehabilitating the water.¹⁰⁶ While the oyster reefs provide this filtration service free of charge, construction of a water treatment plant to perform the same function as a single reef would cost anywhere from \$35,000–\$150,000.¹⁰⁷

98. Ruggeri, *supra* note 12.

99. *Id.*

100. *Id.*

101. Nix, *supra* note 84.

102. Ruggeri, *supra* note 12.

103. *Id.*

104. *Id.*

105. *Id.*

106. *Id.*

107. *Id.*

C. Small-Scale Oyster Reef Projects Are Already Underway and Have Proven Successful

Recognizing the wide range of benefits the reefs provide along with the urgent need for oyster reef restoration, scientists and environmental groups in Louisiana and a handful of other states have already begun implementing small-scale versions of these projects to determine their success in mitigating erosion in their respective coastal areas.¹⁰⁸

One example of such a project was conducted along Louisiana's coast by the Coalition to Restore Coastal Louisiana ("CRCL") and The Nature Conservancy in Louisiana.¹⁰⁹ Completed in November of 2016, the oyster reef extends a half-mile down the Louisiana coast protecting the coast from further erosion, storm surge, and sea level rise.¹¹⁰ Creating a peculiar black "wall" along a large portion of Louisiana's Biloxi Marsh shoreline, the oyster reef is unlike any of its man-made predecessors. It is alive—or at least it was alive at one time.¹¹¹ To construct the reef, an estimated 1.7 million pounds of oyster shells were collected from 26 local restaurants, 12 of which were from New Orleans.¹¹² The practice of collecting used oyster shells from restaurants is akin to recycling as a majority of oyster shells coming from Louisiana restaurants meet their final destination as waste buried in a landfill.¹¹³ As one CRCL coastal scientist stated, "Usually, we are taking [a] shell out of the water and not putting it back, which is ridiculous."¹¹⁴

After the requisite amount was acquired, the shells were bleached in the sun for six months in order to cure them of bacteria and other disruptive particles.¹¹⁵ The reef was then constructed and placed at a specified location in the marsh.¹¹⁶ A pole marked the edge of the marsh which would later be used to determine how much the land receded at that location.¹¹⁷

After several months of gathering data from their oyster reef sites, the CRCL reported that the four protected locations lost an average of 0.81 meters of land.¹¹⁸ The coast at the four control sites, on the other hand,

108. *Id.*

109. *Id.*

110. Ruggeri, *supra* note 12.

111. *Id.*

112. *Id.*

113. *Id.*

114. *Id.*

115. *Id.*

116. *Id.*

117. *Id.*

118. *Id.*

eroded 1.54 meters.¹¹⁹ Although the land still eroded at the reef sites, the rate of erosion presented a positive result: the oyster reefs cut the rate of erosion in half.¹²⁰

D. Put a Dollar Sign on It: Cost-Benefit Analysis of Oyster Reefs Produces Profound Results

The use of oyster reefs in coastal restoration capitalizes not only on the natural benefits of a living shoreline but also on the economic feasibility of these projects.¹²¹ Published in April of 2018, a team of scientists conducted a cost-benefit analysis of coastal restoration projects implemented across the Gulf—from nature-based projects to the construction of levees and dykes.¹²² The analysis compared a project's construction and maintenance costs to its effectiveness at protection against storms and floods.¹²³ As with most cost-benefit analyses, anything with a benefit-to-cost ratio above one rendered the project cost effective.¹²⁴

In terms of flood and storm protection alone, the experts discovered that an oyster reef provides more value for money compared to levees or dykes—Louisiana's past preferred methods of coastal restoration.¹²⁵ Looking solely at risk reduction, dykes and levees had a benefit-to-cost ratio of 0.26.¹²⁶ Restoration of oyster reefs procured a ratio of 7.34 rendering the reefs 28 times more beneficial than levees and dykes at reducing the risk of further erosion.¹²⁷ In addition, wetland restoration in general, using an ecosystem's natural features for coastal protection, was calculated to be 33 times more beneficial than levees and dykes with a benefit-to-cost ratio of 8.72.¹²⁸ The only coastal restoration project with a higher benefit-to-cost ratio was sandbags but only due to their extremely

119. *Id.*

120. *Id.*

121. La Peyre et al., *supra* note 15.

122. Borja G. Reguero et al., *Comparing the Cost Effectiveness of Nature-Based and Coastal Adaptation: A Case Study from the Gulf Coast of the United States*, PLOS ONE (Apr. 11, 2018), <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0192132> [<https://perma.cc/CB5W-JNPT>]. Although there are other materials and methods that constitute living shoreline projects, this Comment focuses specifically on the building and restoration of oyster bed reefs.

123. Ruggeri, *supra* note 12.

124. Reguero et al., *supra* note 122.

125. Ruggeri, *supra* note 12.

126. *Id.*

127. *Id.*

128. Reguero et al., *supra* note 122.

low cost; in terms of overall protection, the benefits were significantly less.¹²⁹

As one CRCL scientist on the oyster reef project stated, “We can’t just build levees and hide behind them. We need to have a healthy marsh and healthy wetlands to provide us with adequate risk reduction.”¹³⁰ The findings from the CRCL study demonstrate that Louisiana’s past methods of protecting its coast have been neither adequate nor efficient, but fortunately it also proved that a better solution exists since the oyster reefs cut the rate of erosion in half.¹³¹ Adopting this new approach that focuses on rebuilding and recreating the natural balance between the land and water will provide significant aid in reaching a resolution for Louisiana’s land loss crisis.

III. LEGAL IMPEDIMENTS TO THE IMPLEMENTATION OF OYSTER REEFS TO COMBAT EROSION IN LOUISIANA’S COASTAL ZONE

A. Nationwide Permits (“NWP”) and Louisiana-Specific Permits for Implementing Living Shorelines

Although living shorelines—specifically the building of oyster reefs—provide a viable solution to Louisiana’s eroding coast, there are legal impediments inhibiting the state’s ability to successfully implement these natural coastal restoration projects. In 2020, the National Wildlife Federation produced a report based on its research from June 2018 to October 2019 on 18 different states’ permitting methods for the implementation of living shorelines.¹³² The research exposed many regulatory disparities in the states’ permitting requirements and concluded that such disparities continue to serve as fatal barriers to the large-scale adoption of living shoreline projects.¹³³

In general, most living shoreline projects require approval from the Army Corps of Engineers (“Army Corps”).¹³⁴ The Army Corps has authority under the Rivers and Harbors Act of 1899 to regulate activities

129. Ruggeri, *supra* note 12.

130. *Id.*

131. *Id.*

132. C. HILKE ET AL., NAT’L WILDLIFE FED’N, SOFTENING OUR SHORELINES: POLICY AND PRACTICE FOR LIVING SHORELINES ALONG THE GULF AND ATLANTIC COASTS 6 (2020), <https://nwf.org/-/media/Documents/PDFs/NWF-Reports/2020/Softening-Our-Shorelines.ashx> [<https://perma.cc/8AMS-SZY9>].

133. *Id.*

134. *Id.*

that could impede navigation or obstruct navigable waterways.¹³⁵ Section 404 of the Clean Water Act gives the Army Corps authority to “permit any activities that will impact ‘waters of the United States,’ including navigable waters, tributaries, and adjacent wetlands.”¹³⁶ Because of the Army Corps’s broad authority under these Acts, most living shoreline projects require either an individual permit or a general permit from the Army Corps.¹³⁷ Permits are granted at the Army Corps district level, and states have the ability to impose additional requirements on the Army Corps permits to adequately serve that state’s coastal landscape and public interest concerns.¹³⁸

Nationwide Permits (“NWP”) are a category of general permits issued by the Army Corps which authorize activities that “will result in no more than minimal individual and cumulative adverse environmental effects.”¹³⁹ For an NWP to have any authority in a state, the state must first have certified its use.¹⁴⁰ Any state has the ability to deny certification of an NWP.¹⁴¹

In 2017, the Army Corps added a permit specifically for living shoreline projects: Nationwide Permit 54.¹⁴² Louisiana, however, has not approved NWP 54,¹⁴³ stating that “[i]n Louisiana, all NWPs are deemed inconsistent with the state’s coastal zone management plan, as LDNR-OCM requires an opportunity to thoroughly review all activities occurring in the coastal zone.”¹⁴⁴ The Louisiana Department of Natural Resources’ (“LDNR”) Office of Coastal Management (“OCM”) regulates coastal wetlands and the use thereof in Louisiana’s coastal zone.¹⁴⁵ The Army Corps subsequently coordinated with the OCM to develop a Programmatic General Permit for activities in the Louisiana coastal zone.¹⁴⁶ Accordingly,

135. See 33 U.S.C. § 403.

136. HILKE ET AL., *supra* note 132.

137. *Id.*

138. See Reissuance and Modification of Nationwide Permits, 86 Fed. Reg. 2744 (Jan. 13, 2021) (to be codified at 33 C.F.R. ch. II).

139. *Id.* at 2744–45.

140. HILKE ET AL., *supra* note 132, at 7.

141. *Id.*

142. See *id.*

143. See generally Reissuance and Modification of Nationwide Permits, 86 Fed. Reg. at 2744.

144. HILKE ET AL., *supra* note 132, at 38–39.

145. *Id.* at 38.

146. *Id.* at 39.

the LDNR-OCM is the agency with authority to issue Coastal Use Permits for shoreline modification projects.¹⁴⁷

Louisiana Administrative Code title 43, part 1, section 709, Guidelines for Shoreline Modification states that “[n]onstructural methods of shoreline protection shall be utilized to the maximum extent practicable.”¹⁴⁸ According to the National Wildlife Federation’s 2020 report on living shorelines, this language reveals Louisiana’s preference for living shorelines over a hard approach as interpreted by applicable state law and regulations.¹⁴⁹ This is clearly indicative of a disparity between Louisiana’s stated objective for its approach to shoreline protection and its approval and issuance of permits. Thus, even with a state-specific permitting system and the policy approach stated above, Louisiana’s agencies, researchers, and scientists are met with legal impediments that continuously obstruct living shoreline projects’ implementation, progress, and ultimate success.¹⁵⁰ The discrepancies existing between Louisiana’s stated policy objective and the applicable laws and regulations in the area of coastal restoration must be reconciled and improved before the coast will be able to meet any real progress.

B. Private Landowner Concerns Regarding Liability Currently Impede Any Chance for Successful Restoration Through Oyster Reef Projects

Because approximately 80% of Louisiana’s coast is privately owned, it is not uncommon for state restoration projects along coastal properties to be met with difficulties in their implementation.¹⁵¹ Louisiana’s current operation of living shoreline projects as a means of coastal protection is limited only to research and scientific purposes.¹⁵² Further, the lifespan of a research permit to construct an oyster reef as a living shoreline is not perpetual, as the permits typically expire after five or ten years.¹⁵³ When the research grant or project is completed, private landowners and corporations are determined to remove the oyster reefs as soon as possible in light of potential liability concerns.¹⁵⁴ Thus, the current projects are characterized by an unripe expiration date. Not only does this preclude

147. *Id.* at 38.

148. LA. ADMIN. CODE tit. 43, pt. 1, § 709 (2021).

149. HILKE ET AL., *supra* note 132, at 38.

150. Interview with Niki Pace, Sustainability Coordinator, Louisiana Sea Grant Law and Policy Program, in Baton Rouge, La. (Sept. 23, 2020).

151. *See* HILKE ET AL., *supra* note 132, at 38.

152. Interview with Niki Pace, *supra* note 150.

153. *Id.*

154. *Id.*

living shoreline projects' implementation on a larger scale, but it also denies Louisiana's coast a pivotal component of the restoration process.

Private landowners' concerns over the potential for liability caused by the oyster reefs is not entirely unwarranted. The liability concerns are most prevalent when the reefs are built in areas where the wetlands have already significantly retreated, as this increases the potential for recreational sportsmen and boaters to crash into the hidden reef.¹⁵⁵ If oyster reef restoration projects potentially jeopardize the safe navigation of the water, then that project's construction and maintenance must adhere to the federal regulations of the U.S. Coast Guard, the agency with authority over commercial and recreational mobility in the nation's waters.¹⁵⁶ Although there are regulations on how far from the coast the oyster reefs can be built and limitations on the impacts of project construction, the regulations vary at the state level.¹⁵⁷

Alabama, for example, requires signage and pilings wherever oyster reefs are built or restored for commercial purposes; this provides landowners with some security against potential liability.¹⁵⁸ In Louisiana, however, that is not the case—and thus explains the resistance to oyster reef projects' construction in front of private coastal property. Because Louisiana does not require private property to be posted,¹⁵⁹ private landowners in Louisiana are primarily concerned that if a boat were to strike a partially submerged oyster reef and consequently someone is ejected from the boat and injured, the injured individual could sue the landowner for damages sustained.¹⁶⁰ A viable solution that would help to reduce apprehension over potential liability in these and other similar situations will be addressed in the following section of this Comment.

C. A Solution on the Rise: Extending Liability Protections Under Louisiana's Recreational Use Statute to Private Coastal Landowners

Louisiana harbors a strong public policy of supporting and rewarding the use and cultivation of land.¹⁶¹ Louisiana's Recreational Use Statute purports to limit the liability of landowners who own property used for

155. Nix, *supra* note 84.

156. *Id.*

157. *Id.*

158. *Id.*

159. Louisiana Revised Statutes section 14:63(J) does not require that private property be posted or marked to assert a claim for criminal trespass.

160. Interview with Niki Pace, *supra* note 150.

161. See, e.g., John A. Lovett, *Good Faith in Louisiana Property Law*, 78 LA. L. REV. 1163 (2018).

recreational purposes; it also applies to property owned by the Department of Wildlife and Fisheries.¹⁶² Louisiana Revised Statutes section 9:2795 provides:

An owner, except in certain circumstances, who permits any person to use his land for recreational purposes, with or without charge, does not thereby: (1) assure that the premises are safe for any purposes, (2) grant the person the legal status of an invitee or licensee to whom a duty of care is owed, or (3) incur liability for any injury to person or property caused by any defect in the land regardless of whether naturally occurring or man-made.¹⁶³

Therefore, if these liability protections afforded to property owners under the Recreational Use Statute were extended to private landowners on the coast, the liability concerns that currently impede the state's oyster reef and living shoreline projects would be eradicated, or significantly minimized at the very least.¹⁶⁴

Extending liability protections under the Recreational Use Statute to promote the successful facilitation of coastal restoration projects is not a novel concept. In the 2020 Regular Session, Senate Bill No. 94 was proposed, in pertinent part, to amend Louisiana Revised Statutes section 9:2795(A)(1) to provide for more specific definitions.¹⁶⁵ Specifically, the bill purported to include the term "water bottoms" within the meaning of "land" in the statute.¹⁶⁶ Senate Bill No. 94 became effective as of August 1, 2020.¹⁶⁷ The new definitions enacted in the statute should be interpreted broadly to extend liability protections to coastal landowners in regard to state projects implementing oyster reefs and living shorelines in front of or on their coastal property.¹⁶⁸ If the liability protections are extended, the state could go forward with successfully implementing the oyster reefs to mitigate coastal erosion, and the property owners' concerns will no longer impede their efforts.

162. LA. REV. STAT. § 9:2795 (2020).

163. *Id.*

164. *Id.*

165. S.B. 94, 2020 Leg., Reg. Sess. (La. 2020).

166. *Id.*

167. *Id.*

168. *Id.*

D. Louisiana's Duty to Its Citizens Under the Public Trust Doctrine

Because the topography of coastal Louisiana is so intricately complex and ever-changing, it is difficult to apply permanent laws to attempt to regulate and protect such a dynamic landscape.¹⁶⁹ To perfectly sum up this controversy: “[L]aw is not at its best when applied to nature’s whims.”¹⁷⁰ But because a comprehensive restoration of Louisiana’s coast is of paramount importance, legislators, legal scholars, researchers, and the like must continue to apply legal order to this “dynamic geographical area.”¹⁷¹ One way of doing so is through application of the Louisiana public trust doctrine.¹⁷²

Both the state of Louisiana and the federal government recognize that “a state holds title to land under navigable waters within its limits and that the title is held in trust for the people of the state that they may enjoy and use the waters free from obstruction or interference.”¹⁷³ This concept is the foundation for the public trust doctrine.¹⁷⁴ Many are unaware of its existence as there is no straightforward definition in any state statute, and the doctrine’s elements are scattered throughout the Louisiana Civil Code, Revised Statutes, Louisiana Constitution of 1974, and the jurisprudence.¹⁷⁵ The Louisiana Constitution outlines the notion of the public trust doctrine in article IX, section 1:

The natural resources of the state, including the air and water, and the healthful, scenic, historic, and esthetic quality of the environment shall be protected, conserved, and replenished insofar as possible and consistent with the health, safety, and welfare of the people. The legislature shall enact laws to implement this policy.¹⁷⁶

169. See James G. Wilkins & Michael Wascom, *The Public Trust Doctrine in Louisiana*, 52 LA. L. REV. 861, 861 (1992).

170. *Id.*

171. *Id.*

172. *Id.*

173. *Save Ourselves, Inc. v. La. Env’t Control Comm’n*, 452 So. 2d 1152, 1154 (La. 1984) (citing *Ill. Cent. R. Co. v. Illinois*, 146 U.S. 387, 13 S. Ct. 110, 36 L. Ed. 1018 (1892)).

174. Anais M. Jaccard, *Article 450 to the Rescue: How the Louisiana Civil Code Promotes and Prevents Comprehensive Coastal Restoration*, 93 TUL. L. REV. 681, 683 (2019).

175. See Wilkins & Wascom, *supra* note 169, at 862.

176. LA. CONST. art. IX, § 1.

Further, a national study of the public trust doctrine in general provides this definition:

The Public Trust Doctrine provides that public trust lands, waters and living resources in a State are held by the State in trust for the benefit of all of the people, and establishes the right of the public to fully enjoy public trust lands, waters and living resources for a wide variety of recognized public uses. The Public Trust Doctrine is applicable whenever navigable waters or the lands beneath are altered, developed, conveyed, or otherwise managed or preserved. It applies whether the trust lands are publicly or privately owned. The doctrine articulates not only the public rights in these lands and waters. It also sets limitations on the States, the public, and private owners, as well as establishing duties and responsibilities of the States when managing these public trust assets. The Public Trust Doctrine has been recognized and affirmed by the United States Supreme Court, the lower federal courts and State courts from the beginning days of this country to the present.¹⁷⁷

The public trust doctrine made its way into Louisiana through the French and Spanish civil law traditions.¹⁷⁸ In *Save Ourselves, Inc. v. Louisiana Environmental Control Commission*, the Louisiana Supreme Court noted that article IX, section 1 imposed a duty on the legislature to enact laws that protect, conserve, and replenish natural resources such as air and water.¹⁷⁹ In furtherance of that notion, the Court observed that state agencies are “public trustee[s] required to ‘act with diligence, fairness and faithfulness to protect [the] public interest in the resources.’”¹⁸⁰ Most notably, the Court illustrated that the state’s obligation to preserve natural resources is paramount and that “the public must receive active and affirmative protection” from the government.¹⁸¹ Under Louisiana’s public trust doctrine, the government thus has a duty to control, protect, and preserve certain natural resources for the public’s use and benefit.¹⁸² It follows that if the state fails to adequately control, protect, and preserve its natural resources in the best interest of the public, then the state has breached its duty to its citizens.

177. Wilkins & Wascom, *supra* note 169, at 862.

178. *See id.* at 863.

179. Jaccard, *supra* note 174, at 690–91 (citing *Save Ourselves, Inc. v. La. Env’t Control Comm’n*, 452 So. 2d 1152, 1154 (La. 1984)).

180. *Id.* at 691 (quoting *Save Ourselves*, 452 So. 2d at 1157).

181. *Id.* (quoting *Save Ourselves*, 452 So. 2d at 1157).

182. *See id.* at 692.

Further, in *Avenal v. State*, the Louisiana Supreme Court ruled that environmental protection qualified as a “public interest” for purposes of the application of the public trust doctrine.¹⁸³ In *Avenal*, the Court demonstrated that “the public trust doctrine gives the state extensive authority to act on behalf of the public and protect public resources such as the coastline, even at the expense of private property rights.”¹⁸⁴ The Court further reiterated that environmental protection is a vital component of preserving public health, safety, and welfare, and in that case, the state had fulfilled its public trust obligations by implementing it.¹⁸⁵

Regarding the doctrine’s application, the Court in *Save Ourselves* emphasized that upholding the public trust commands a balance of “environmental costs and benefits . . . with economic, social, and other factors.”¹⁸⁶ Oyster reef restoration projects satisfy both sides of this equation; the projects are not only categorically more beneficial for the environment than other coastal protection methods but also provide adequate protection for public health, safety, and welfare through their efficient and cost-effective nature. Thus, relying on the public trust obligation it owes to the public, the state has a duty to capitalize on this publicly and environmentally beneficial opportunity.¹⁸⁷

These illustrations from Louisiana jurisprudence demonstrate that there is also a possibility for the state to *not* fulfill its public trust obligations and *not* adequately preserve and protect the natural resources in the best interest of the public. So, what is the consequence if Louisiana fails to uphold this responsibility? It follows that the state would be in violation of the public trust doctrine if it failed to employ the most effective and economically feasible coastal protection measures, as such inaction would not qualify as the public’s best interest. More specifically, it represents a failed opportunity to take advantage of both cost-effectiveness and risk reduction by ignoring a restoration method scientifically proven to be successful in critical areas. Thus, if the state remains fixed to its past inadequate methods of coastal protection measures while a more sustainable and cost-effective option is feasible, then the state would fail to adequately protect the public’s interest in the state’s coastal territories. And if the state is not adequately protecting the public from environmental harms, is it not in violation of the public trust doctrine as outlined in the Louisiana Constitution?¹⁸⁸

183. *Avenal v. State*, 886 So. 2d 1085, 1101–02 (La. 2004).

184. Jaccard, *supra* note 174, at 692 (citing *Avenal*, 886 So. 2d at 1101–02).

185. *Avenal*, 886 So. 2d at 1101.

186. *Save Ourselves*, 452 So. 2d at 1154.

187. *See* Jaccard, *supra* note 174, at 693.

188. LA. CONST. art. IX, § 1.

To ensure that the purpose of the public trust doctrine is fulfilled, there should be a cause of action permitting Louisiana citizens to hold the state accountable for land loss if the state's efforts continue down their current inadequate path. One party in particular that would appear to have standing in such a case is the Pointe-au-Chien Native American tribe mentioned earlier in this Comment.¹⁸⁹ In addition to the potential for such a claim to exist, the Louisiana legislature and judiciary should reevaluate how its property doctrines could more adequately serve the dynamic coastal landscape and the urgent need for its comprehensive reform.¹⁹⁰

CONCLUSION

Accounting for over 80% of the coastal marsh loss in the lower 48 states, Louisiana is disappearing into the Gulf.¹⁹¹ The state will continue to face this unprecedented collapse of its entire coastal ecosystem, culture, and economy if drastic measures are not taken to restore its coast.¹⁹² The ramifications of this crisis will not be borne by this state alone. Louisiana's coast is critical to the health and prosperity of the entire nation, as its rich culture, traditions, cuisine, and economy are all embedded into its unique coastal topography. That landscape is among the country's top commercial fishing, oyster, and crab industries and is also the root of our country's oil and gas production and exports. All of this economic activity in the Louisiana coastal zone accounts for hundreds of thousands of jobs and billions of dollars in revenue every year—all of which are at risk.

The conversation surrounding the land loss crisis in Louisiana remains largely undiscussed and uneventful. The time to take affirmative action is running out, and permitting the continuation of the land loss crisis in Louisiana is both unjust and self-destructive. Understanding what is at stake here should make it abundantly clear that more must be done to save Louisiana's coast. Bold, sustainable, and intuitive measures are demanded since efforts in the past have proven time and time again to be inadequate. The implementation of living shorelines, specifically the building of oyster reefs, is a prime example of the comprehensive coastal reform that Louisiana requires. Although oyster reef projects have already made their way into the state through individual and group research grants, there are legal obstructions precluding them from being implemented on a large-

189. *The Coalition to Restore Coastal Louisiana Builds Second Living Shoreline from Recycled Oyster Shells*, *supra* note 67.

190. Jaccard, *supra* note 174.

191. *See Louisiana Coastal Wetlands: A Resource at Risk*, *supra* note 4.

192. *See* 2018 EVALUATION REPORT, *supra* note 3.

scale in the Louisiana coastal zone. The state's failure to resolve the discrepancies in living shoreline permitting represents a wasted opportunity and a violation of the state's obligation to uphold the public trust doctrine. Applying feasible solutions—such as extending liability protections for private landowners and enabling accountability against the state for the lack of comprehensive coastal restoration—will help to resolve these issues and encourage the implementation of living shorelines along the Louisiana coast.