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Advancing the Aquaculture Industry Through the Federal Crop Insurance Program

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ADVANCING THE AQUACULTURE INDUSTRY
THROUGH THE FEDERAL CROP INSURANCE
PROGRAM

Matthew H. Bowen

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ADVANCING THE AQUACULTURE INDUSTRY
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PROGRAM¹

*Matthew H. Bowen*²

Abstract

In recent times, the aquaculture industry has experienced dramatic growth. The growth of the industry is a direct result of an increase in demand for seafood, and a decrease in supply from wild fisheries. The industry, however, is also experiencing growing pains. Aquaculture species, compared to their wild counterparts, are at a higher risk of catastrophic loss from a variety of different perils. These perils make investment in the aquaculture industry significantly risky. The federal crop insurance program could be a tool that mitigates these risks, but the program was designed around terrestrial agriculture, and while aquaculture may be covered by the program, it is not significantly covered. This comment proposes three policy changes to the federal crop insurance program aimed at increasing coverage within the aquaculture industry. These policy changes, however, will increase the cost of the program, but this comment further articulates the economic justification for the taxpayers to internalize these costs.

1. This comment is the by-product of many individuals contributions through the sharing of knowledge. First, I would like to thank Professor Jennifer Wiggins, tenured faculty at the University of Maine School of Law, for her help and guidance while writing this paper. She supported this paper through her class lectures on insurance, as well as the individualized attention she gave to me and this comment. Furthermore, I would like to thank the many experts with whom I consulted, including: marine biologists, crop insurance providers, and employees of the Risk Management Agency. The collective support of this paper by all those involved was invaluable, for which I am extremely grateful.

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I. INTRODUCTION

In 2017, the world fish trade was on track to break the record for the all-time high trade and consumption.³ The growth in supply in the global fish trade is credited to the aquaculture industry, which owes its growth to technological advances.⁴ This rapid growth of the fish trade is a measure to increase the supply to catch up and keep pace with a rising demand.⁵ Seafood, which is known for its health benefits,⁶ saw an increase in demand as a result of the rising incomes in developing countries⁷, which allows individuals and families to consume more seafood.

The aquaculture industry, despite its rapid growth, is not without its problems. Regardless of the increased supply of seafood on the world market, prices remain high, as the industry has experienced some catastrophic losses due to environmental perils.⁸ Furthermore, while technological advances have helped get the industry to where it is today, new technological advances are needed to help deal with the risks inherent in aquaculture. Until said advances come about, a stop gap is necessary to stabilize the industry and promote its growth in a healthy manner. Growth and advancement in the industry are the result of capital investments.⁹ Investors, however, may be wary about investing too heavily in an industry that can be volatile. While the industry overall may be relatively stable, an individual investor's investment could be wiped out with a single incident. Crop insurance, specifically the federal crop insurance program, used in the aquaculture industry, would be the necessary stabilizing agent investors and producers need to mitigate the investment risks in the industry.

This comment explores precisely how federal crop insurance can act as a stabilizing agent for the aquaculture industry. Throughout this

3. Emiko Terazono, *Global fish industry set to scale record in 2017*, FINANCIAL TIMES (Sep. 6, 2017), <https://www.ft.com/content/0a04ff90-9312-11e7-bdfa-eda243196c2c>.

4. *Id.*

5. *Id.*

6. Seafood, particularly fish, are high in protein and low in fat which makes them an ideal choice of meat, that provides many additional health benefits such as helping to reduce cardiovascular disease and neurological development. Environmental Defense Fund, *The benefits of eating fish*, <http://seafood.edf.org/benefits-eating-fish> [<https://perma.cc/R6AQ-G8CX>].

7. *Id.*

8. Terazono, *supra* note 3.

9. Michael J. Coren, *Aquaculture is the latest hotness for Silicon Valley venture capitalist in 2018*, QUARTZ (Apr. 19, 2018), <https://qz.com/1256208/aquaculture-is-the-latest-hotness-for-silicon-valley-venture-capitalists-in-2018/> [<https://perma.cc/8RDP-9JDV>].

comment, different insurance concepts will be introduced and defined. These concepts will be explained both generally and as they apply more specifically to crop insurance. Crop insurance operates on the same fundamental principles as any other insurance product. These principles of insurance, when applied to the agriculture industry (and the aquaculture sub-sector of agriculture), are no different than other types of first-party insurance products.¹⁰ The major distinction between crop insurance and other first-party insurance products are the different types of risks.

In Part II, this comment explores the foundational underpinnings of aquaculture operations and the risks associated with aquaculture production. This section will explore the different types of aquaculture operations and the unique risks that these operations face. In Part III, this comment examines federal crop insurance from both a historical and policy perspective, as well as a thorough dissection of the current law and how aquaculture operates within the current parameters of the law. In Part IV, this comment looks at the current coverage of aquaculture by the federal crop insurance program. In Part V, the comment articulates proposed policy changes to the program to enhance coverage for the aquaculture industry. Lastly, in Part VI, this comment will justify why the aquaculture industry should receive substantial support through the federal crop insurance program. Cumulatively, this comment highlights how and why changes to the Federal Crop Insurance Program will comport with Congressional policy to support the aquaculture industry.

II. THE AQUACULTURE INDUSTRY'S CURRENT STRUGGLES

The common definition of aquaculture is the “breeding, rearing, and harvesting of plants and animals in all types of water environments[,]” which includes ponds, rivers, lakes and the ocean.¹¹ Aquaculture species include “but [are] not limited to, any species of finfish, mollusk, crustacean, or other aquatic invertebrate, amphibian, reptile, or aquatic

10. First-party insurance products are when “the policyholder insures her own interest in a person’s life or property.” Other types of first party insurance include property, life, disability, and health insurance. TOM BAKER & KYLE D. LOGUE, *INSURANCE LAW AND POLICY CASES AND MATERIALS* 25, 133 (2013).

11. National Ocean Service, *What is Aquaculture?*, http://www.nmfs.noaa.gov/aquaculture/what_is_aquaculture.html [https://perma.cc/86LL-49C8]. The legal definition, as defined by the National Aquaculture Act, defines aquaculture as the “propagation and rearing of aquatic species in a controlled or selected environment.” 16 U.S.C. § 2802(1) (2012). This definition is identical in substance under the Federal Crop Insurance Program. *See* 7 U.S.C. § 1518 (2012).

plant propagated or reared in a controlled or selected environment.”¹² The aquaculture industry typically involves the raising of seafood from hatch to market size or the raising of seafood for re-stocking of wild populations.¹³ The primary distinction between aquaculture and commercial fishing is the aspect of control. With aquaculture, the producer exerts some sort of control in the development or rearing of the organism.¹⁴ A simplistic, yet useful, definition of aquaculture is “farming in water.”¹⁵

As an industry, aquaculture is expected to experience substantial growth. While aquaculture has existed on some level for centuries, its existence as an industry has largely been localized and unconnected to the global economy.¹⁶ An increase in the demand for seafood, coupled with technological change, has afforded the aquaculture industry the potential to grow substantially in the years to come.¹⁷ Unlike agriculture, aquaculture has not been the subject of the same amount of research and understanding. Agriculture is a program of study offered by at least one

12. 7 U.S.C. § 1518 (2012); *see also* 16 U.S.C. § 2802(1) (2012) “Propagated,” “reared,” and “controlled” are all key words necessary for the species to be considered aquaculture under the crop insurance program, which would allow for coverage. Instinctively these words all ring of some ambiguity, but it is contended that if the matter was ever litigated, their common or plain definitions would hold which are propagated: “1. to cause (an organism) to multiply by any process of natural reproduction from the parent stock [or] 2. To reproduce (itself, its kind, etc.) as an organism does.” <http://www.dictionary.com/browse/propagate> [<https://perma.cc/LNJ6-STAC>]. Reared: “1. To take care of and support up to maturity 2. to breed and raise (livestock).” <http://www.dictionary.com/browse/reared?s=t> [<https://perma.cc/KN4S-NMMJ>]. Control: “To exercise restraint or direct over; dominate; command.” <http://www.dictionary.com/browse/controlled?s=t> [<https://perma.cc/Q7CM-3TLC>]. A court may begin and end with the plain language if the words of a statute are found to be unambiguous. *Robinson v. Shell Oil Co.*, 519 U.S. 337, 338 (1997). Even if the language of a statute is found to be ambiguous, the context of use would clearly support the dictionary definitions. “[A] word’s usage accords with its dictionary definition. In law as in life, however, the same words, placed in different contexts, sometimes mean different things.” *Yates v. United States*, 135 S.Ct. 1074, 1081-82 (2015).

13. Aquaculture also includes the cultivation of aquatic plants and the rearing of ornamental fish. National Ocean Service, *supra* note 11.

14. Luc De Keyser, *Uncharted Waters: The Evolution of the Aquaculture Industry*, STRATFOR (June 10, 2015) <https://worldview.stratfor.com/article/uncharted-waters-evolution-aquaculture-industry> [<https://perma.cc/BEP9-H7FB>].

15. National Ocean Service, *supra* note 11.

16. *See* De Keyser, *supra* note 14. Historical examples of localized aquaculture include century old seaweed, shrimp and shellfish farms, and the cultivation of sea cucumbers in Southeast Asia to mid-nineteenth century fresh water fish hatcheries in the United States. *Id.*

17. National Ocean Service, *supra* note 11.

university in every state in the United States.¹⁸ The first and second Morrill Acts of 1862 and 1890, respectively, granted public lands for the establishment of these universities, where agriculture has been heavily studied since.¹⁹ Since agriculture has been studied as extensively as it has, agriculture has been able to respond and manage its unique risks.²⁰ Aquaculture, however, has not historically received the same amount of academic attention and thus struggles to manage its unique risks with the same precision.²¹

The risk level varies between the different types of aquaculture facilities used.²² These facilities include ponds, raceways, cages or net systems, and recirculating systems.²³ Ultimately though, they all depend upon water, which ironically is the primary risk for aquaculture. Aquaculture species depend upon water as their ecosystem. Water is the “life support system” for aquaculture, and a precarious one at that; water can carry disease or pollution, is highly temperature sensitive, and prone to fluctuating chemical imbalances.²⁴ In the wild, an aquatic species can self-manage its own exposure to these risks by relocating away from the peril; whereas in aquaculture, the species are confined in the system used to control the species, and faces herd risks.²⁵

Ponds are the most common type of aquaculture facility used in the United States, accounting for 64% of all aquaculture farms.²⁶ The construction and operation of a pond is basic, if it is on flat land and is close to a water source to resupply the pond.²⁷ Ponds do not need access to flowing water for replenishment, which is an advantage, but which also creates its own individual problems.²⁸ The large areas of water in still

18. NATIONAL ACADEMIES OF SCIENCES, ENGINEERING, AND MEDICINE, COLLEGES OF AGRICULTURE AT THE LAND GRANT UNIVERSITIES: A PROFILE, COMMITTEE ON THE FUTURE OF THE COLLEGES OF AGRICULTURE IN THE LAND GRANT UNIVERSITY SYSTEM, 1 (1995).

19. *Id.* at 1-3.

20. National Institute of Food and Agriculture, *Agriculture Technology*, <https://nifa.usda.gov/topic/agriculture-technology> [<https://perma.cc/B268-QTUQ>].

21. P.A.D. SECRETAN, THE AVAILABILITY OF AQUACULTURE CROP (STOCK MORTALITY) INSURANCE 3, http://www.aquacultureinsurance.com/media/Availability_Report.pdf [<https://perma.cc/2X7P-DH6H>].

22. PROMAR INTERNATIONAL, THE FEASIBILITY OF CROP INSURANCE FOR FRESHWATER AQUACULTURE, iv (2011), <https://www.rma.usda.gov/pubs/2012/freshwateraquaculture.pdf> [<https://perma.cc/2R8H-E27Y>] [hereinafter PROMAR INTERNATIONAL, FRESHWATER].

23. *Id.* at 23-34.

24. SECRETAN, *supra* note 21, at 3.

25. *Id.*

26. PROMAR INTERNATIONAL, FRESHWATER, *supra* note 22, at 25.

27. *Id.*

28. *Id.* at 23.

conditions create a climate in which disease can flourish.²⁹ Another risk that comes with ponds is that the surface area of the water makes it susceptible to temperature fluctuations.³⁰ Despite these risks, ponds have their advantages.³¹ Ponds may be organically enriched, which will provide supplemental nutrients, and may not require aeration to stimulate livestock growth.³²

Cages or nets account for about 5% of all aquaculture farms.³³ These facilities operate by using enclosed cages or nets in natural marine environments.³⁴ Unlike ponds, the openness of the nets or cages allows for necessary water exchange for healthy growing conditions.³⁵ However, there is no control over the natural events that aquaculture species would face in the wild such as “algal blooms, low oxygen levels, and adverse water temperatures.”³⁶ The lack of control over the natural risks makes using cages or nets precarious, despite the low cost investment compared to other types of aquaculture production.³⁷

Lastly, aquaculture can also be produced in recirculating systems which account for 11% of aquaculture farms with an additional 9% of aquaculture produced in tanks similar to the recirculation system, but without recirculation of water.³⁸ Recirculating aquaculture systems have a variety of distinct advantages that minimize the risk to the producer.³⁹ They can be optimized for healthy growth of the species with managed waste, by using less water, while being able to produce year-round.⁴⁰ The disadvantage to these systems, though, is that they are extremely

29. *Id.*

30. *Id.*

31. Risk, in the insurance context, is defined as “something that can happen but is not certain to happen.” BAKER & LOGUE, *supra* note 10, at 2. The natural risks that the agriculture and aquaculture industries face are the destruction of crops due to national disaster, disease, and pest infestation. *Id.*

32. PROMAR INTERNATIONAL, FRESHWATER, *supra* note 22, at 26.

33. *Id.*

34. *Id.*

35. *Id.*

36. *Id.*

37. *Id.*

38. *Id.* at 27.

39. *See id.* at 32.

40. *Id.* at 28-29. The advantage of production year-round is in contrast to both ponds and caged aquaculture, as they are exposed to the natural elements and production in both of these settings is seasonal. *Id.* at 29-30. This is similar to as if the species were harvested in the wild. *Id.*

expensive in both initial investments and sustainment, and active management is paramount to preventing loss of the species.⁴¹

The underlying issue of the three major types of systems is how to encourage natural growth conditions while mitigating natural risks. The more control the system exerts the fewer risks it is exposed to from the natural world and; correspondingly, the more risks it creates regarding disease or other artificially enhanced risks. These risks can culminate in a loss to the aquaculture species. Depending on the methodology used, the risks can range from burdensome to catastrophic.⁴² A thorough understanding of each of these risks and the level of risk comparatively between each type of aquaculture system is not only important from a management perspective, but it may prove valuable from an actuarial perspective.

III. AN OVERVIEW OF THE FEDERAL CROP INSURANCE PROGRAM

It would be of no surprise if it was discovered that most Americans have never heard of crop insurance. Most Americans are probably more familiar with other types of insurance such as life or health insurance.⁴³ The insurance industry accounted for 2.7% of the U.S. Gross Domestic Product (GDP) in 2016.⁴⁴ It collected over \$1.15 trillion worth of premiums in 2017,⁴⁵ only \$64.2 million of which were collected from the Federal Crop Insurance Program.⁴⁶ Crop insurance is an insurance product which covers agricultural producers “against either the loss of their crops due to natural disasters, or the loss of revenue due to declines in the prices of agricultural commodities.”⁴⁷ Despite its lack of attention, crop

41. *Id.* at 28-32.

42. The major causes of loss include: disease, whether from natural outbreaks or poor water quality; predators, such as birds, mammals, or reptiles; escape by the species; failure in equipment; severe weather and natural disasters; cannibalism; human error; and culling of weak species for herd development. *Id.* at 39.

43. Life and health insurance account for about 52% of the market share of the insurance industry. The remaining 48% consists of property and casualty insurance, which includes crop insurance. Insurance Information Institute, *Facts + Statistics: Industry Overview*, <https://www.iii.org/fact-statistic/facts-statistics-industry-overview> [https://perma.cc/QE2V-HVRT].

44. *Id.*

45. *Id.*

46. See RISK MANAGEMENT AGENCY, CROP YEAR GOVERNMENT COST OF FEDERAL INSURANCE PROGRAM (Apr. 7, 2017), <https://www.rma.usda.gov/aboutrma/budget/16cygovcost.pdf> [https://perma.cc/M6PT-W5JX].

47. Insurance Information Institute, *Understanding crop insurance*, <https://www.iii.org/article/understanding-crop-insurance> [https://perma.cc/NT3X-WTWG].

insurance is a vital part of the agriculture industry and the economy overall.

A. *History and Policy of the Federal Crop Insurance Program*

The American agriculture industry is one of the dominant industries in the United States. While the agriculture industry only accounts for .9% of the GDP, agricultural products account for 9.2% of all American exports.⁴⁸ Furthermore, the small share of the GDP by the agriculture industry is not a reflection of a shrinking agriculture industry so much as an indication of major growth in other American industries, as the agriculture industry has continued to grow steadily.⁴⁹ Agriculture's contribution to the GDP in 2006 was \$98 billion, compared to \$17 billion in 1929.⁵⁰ Despite the dominance of the agriculture industry, like many other areas of the economy, it suffered during the Great Depression.

The Great Depression arguably impacted farmers harder than other occupations in the economy.⁵¹ Not only was the agricultural industry reeling from the overall depressed state of the United States' economy, but the agricultural industry was also plagued by extreme weather and insect infestations that intensified the economic distress to the agriculture industry.⁵² In 1938, Congress passed the Federal Crop Insurance Act (FCIA) to help the agriculture industry recover from its economic blight.⁵³

Originally, the stated purpose of the act was to “promote the national welfare by alleviating the economic distress caused by wheat-crop failures due to drought and other causes...” but, in 1941, the purpose substituted “crop” for “wheat-crop” with the intention of expanding the program to other commodities.⁵⁴ Of note, the stated purpose of the crop insurance

48. *The World Factbook: North America the United States*, CENTRAL INTELLIGENCE AGENCY <https://www.cia.gov/library/publications/the-world-factbook/geos/us.html> [<https://perma.cc/C4PB-MW2V>].

49. JULIAN M. ALSTON ET. AL., PERSISTENCE PAYS: U.S. AGRICULTURAL PRODUCTIVITY GROWTH AND THE BENEFITS FROM PUBLIC R&D SPENDING, 9-10 (David Zilberman et. al 2010). The agricultural economy continues to shrink as a share of the economy but continues to grow in real value. *Id.*

50. *Id.* at 10.

51. For a historically accurate, yet fictional account, of the farmers plight during the Great Depression, *see generally* JOHN STEINBECK, *THE GRAPES OF WRATH* (1939).

52. THEODORE SALOUTOS, *THE AMERICAN FARMER AND THE NEW DEAL*, 205 (1982).

53. National Crop Insurance Services, *History*, <https://cropinsuranceinamerica.org/about-crop-insurance/history/> [<https://perma.cc/9GWZ-6P3G>] [hereinafter National Crop Insurance Service, *History*]; *see also* 7 U.S.C. § 1502 (1940).

54. *Compare* 7 U.S.C. § 1502 (1940), *with* 7 U.S.C. § 1502 (1940 & Supp. 1941). *See also* SALOUTOS, *supra* note 52, at 205. (The program was considered an experiment to

program is no longer the “alleviation” of economic distress, but instead is for “the economic stability of agriculture....”⁵⁵ This change in wording, while small, is significant. Previously, crop insurance was meant to be a safety net upon which producers could rely. The change in purpose, however, reflects a proactive policy of promoting economic stability. Furthermore, the change from “wheat-crop” to crop reflected the first policy measure of expanding access to the program.

Crop insurance as an insurance product existed in the U.S. prior to the passage of the act, but private insurers struggled to market an affordable product.⁵⁶ Beginning in the 1880s, interest in crop insurance began to take hold in the Great Plain states as a public-private partnership,⁵⁷ but that idea evolved into a pure public program.⁵⁸ The program has continued to evolve since its initial creation in 1938 with subsequent bills aimed at increasing both participation in the program and the insurance coverage of agricultural commodities. In 1944, the definition of commodity was expanded to include a plethora of commodities as opposed to the original limitations of wheat and cotton (cotton was added in 1941).⁵⁹ Despite this change, crop insurance was still limited to the major crops of the agriculture industry.⁶⁰

which expansion to other crops would come later, if successful. Wheat was selected as the commodity to experiment with based on the large amount of actuarial data the USDA had accrued.)

55. Compare 7 U.S.C. § 1502 (1934 & Supp. 1938), with 7 U.S.C. § 1502 (1946 & Supp. 1947).

56. National Crop Insurance Services, *History*, *supra* note 53.

57. SALOUTOS, *supra* note 52, at 205.

58. The federal government’s intervention or creation of a public insurance product is not unique to crop insurance. The government has a long history of intervening when the markets are unable to provide insurance products at a reasonable rate or without the assistance of the federal government. Flood insurance, like crop insurance, was created to manage the financial impact of natural disasters. The agricultural communities of the Mississippi Delta were plagued by recurrent floods that resulted in recurring disaster relief for the affected communities starting in 1927. These communities continued to rely on the disaster relief packages until the passage of the National Flood Insurance Act of 1968 (NFIA). The passage of the NFIA was aimed at curbing the expense of the ad hoc disaster relief packages while filling the void in flood damage coverage that regular home-owner policies did not cover. Jennifer Wriggins, *Flood Money: The Challenge of U.S. Flood Insurance Reform in a Warming World*, 119 Penn St. L. Rev. 361, 372-73 (2014).

59. Compare 7 U.S.C. § 1508 (1940 & Supp. 1941), with 7 U.S.C. § 1508 (1940 & Supp. 1944).

60. 7 U.S.C. § 1508 (1940 & Supp. 1944); Risk Management Agency, *History of the Crop Insurance Program*, <https://www.rma.usda.gov/aboutrma/what/history.html> [<https://perma.cc/C9LC-CJEW>].

In 1980, the crop insurance program underwent its most significant overhaul since its inception. First, consistent with the previous bills, the 1980 changes to the act expanded the definition of agricultural commodity to which the program applied, including the addition of aquaculture to the definition.⁶¹ Second, another major change of the program was the creation of the public-private partnership for the insurance of the commodities.⁶² Since the program's inception, crop insurance was purely funded, insured, and managed by the government. After the 1980 changes, private insurers provided the insurance in coordination with the government.

The Crop Insurance Reform Act of 1994 created the Risk Management Agency, a sub-set of the United States Department of Agriculture, to administer the program.⁶³ The creation of this agency, along with new subsidies for premiums, led to a massive increase in participation in the program. Specifically, there was a three-fold increase of coverage with over 180 million acres of land covered.⁶⁴

The passage of the Crop Insurance Reform Act, like the original passage of the FCIA, was a response to extreme weather events and the subsequent economic impact. In 1988, parts of the U.S. experienced a major drought and in 1993 the industry faced a cool and wet growing season.⁶⁵ Congress responded to each event with ad hoc disaster assistance bills. These ad hoc disaster assistance bills helped alleviate the financial loss of crops by affected producers after the weather event but also created a moral hazard⁶⁶ by competing with the Federal Crop Insurance Program.⁶⁷ While the ad hoc disaster relief bills did compete with the crop insurance program for coverage of commodities, farmers would have to wait, sometimes for months, to find out if they would receive coverage. This instability of coverage was the reason that the Reform Act was passed to incentivize farmers to not rely on ad hoc disaster coverage.⁶⁸

61. 7 U.S.C. § 1518 (1982); H.R. REP. No. 96-430 pt. III, at 10-11 (1980).

62. National Crop Insurance Services, *History*, *supra* note 53.

63. *Id.*

64. *Id.*

65. Risk Management Agency, *History of Crop Insurance Program*, *supra* note 60.

66. A moral hazard in the insurance context refers to a “theoretical tendency for [the coverage of] insurance to reduce incentives (1) to protect against loss or (2) to minimize the cost of a loss.” BAKER & LOGUE, *supra* note 10, at 6. In this sense, since the ad hoc disaster assistance programs acted as ad hoc insurance, producers had incentive to not purchase crop insurance for protection against loss.

67. Risk Management Agency, *History of Crop Insurance Program*, *supra* note 60.

68. Presidential Statement on Signing the Federal Crop Insurance Reform and Department of Agriculture Reorganization Act of 1994, 30 WEEKLY COMP. OF PRES. DOC. 41 (1994).

While the program has continued to evolve into the twenty-first century with changes made by passage of the 2008 and 2014 Farm Bills, the last major change to the program was in 2000.⁶⁹ The Agricultural Risk Protection Act of 2000 altered the program by creating new types of insurance programs that producers could access, including revenue insurance and insurance protection based on individual historic yields.⁷⁰

As noted, crop insurance is used to manage the financial risk a producer faces by engaging in agricultural production. Beyond this stated purpose though, crop insurance has many additional benefits. Since crop insurance helps reduce the potential for financial failure of a producer, the rural economies, where agricultural production tends to dominate, are stabilized.⁷¹ The health of the rural economies is essential to maintaining a healthy national economy overall.⁷² Crop insurance also has the additional benefit of being used as collateral for lending, which can help new or young farmers enter the market.⁷³

B. *The Mechanics of the Federal Crop Insurance Program*

Crop insurance operates on the same fundamental principles of any insurance product. A risk adverse individual⁷⁴ pays a premium to an insurance company to minimize the loss experienced from the risk that caused loss.⁷⁵ The payment of the premium for the certainty for the

69. National Crop Insurance Services, *History*, *supra* note 53.

70. *Id.*

71. National Crop Insurance Services, *How Does Crop Insurance Benefit the Public*, <https://cropinsuranceinamerica.org/about-crop-insurance/how-does-crop-insurance-benefit-the-public/> [<https://perma.cc/W23E-62YX>]. [hereinafter National Crop Insurance Services, *How Does Crop Insurance Benefit the Public*].

72. The agriculture sector, which operates primarily in rural America, is credited with a net increase in international trade. After the passage of several free trade acts, American exports grew from agriculture products which contributed to a healthy national economy. Furthermore, the health of the local rural economies led to a decline in rural poverty which has furthered the health of the national economy. Council of Economic Advisers, *Strengthening the Rural Economy- The Current State of Rural America*, THE WHITE HOUSE <https://obamawhitehouse.archives.gov/administration/eop/cea/factsheets-reports/strengthening-the-rural-economy/the-current-state-of-rural-america> [<https://perma.cc/NNG2-Z92V>].

73. National Crop Insurance Services, *How Does Crop Insurance Benefit the Public*, *supra* note 71.

74. A risk adverse individual is “someone who prefers a certain cost to an uncertain possibility of equal expected value.” BAKER & LOGUE, *supra* note 10, at 3.

75. Risk aversion is “the preference that most individuals have for certainty over uncertainty with regard to future losses.” *Id.*

coverage of the risk is known as risk transfer.⁷⁶ The insurer's willingness to accept the risk is married with aggregation of the different risks they have accepted into a pool or group of pools. These pools reduce the risk to everyone in the pool since not everyone is exposed to the same risk at the same time, which offsets the collective risks and costs.⁷⁷

For crop insurance, the pools are based on the type of crop and the county in which the crop is produced.⁷⁸ Crop insurance uses only these two factors to decide coverage rather than individual farming factors or practices to minimize the effect of adverse selection⁷⁹ in deciding whether to contract for coverage.⁸⁰ A producer may only insure their insurable interest in a crop.⁸¹ A producer may not be indemnified for a loss that exceeds his/her insurable interest.⁸² A producer must insure all of his/her "insurable acreage in the county" when contracting for coverage unless the producer waives their right to any eligibility for emergency crop loss assistance.⁸³

To effectuate the goal of the Federal Crop Insurance Act, the Federal Crop Insurance Corporation (FCIC) was created within the Department of Agriculture.⁸⁴ The FCIC is managed by a board of directors (the Board) under the general supervision of the Secretary of Agriculture.⁸⁵ The Risk Management Agency (RMA), administers the federal crop insurance program and the RMA derives its authority from the Board.⁸⁶ The FCIC

76. *See id.* at 4.

77. *Id.*

78. 7 C.F.R. § 457.2(a) (2018).

79. Adverse selection is when the insured person has better knowledge of the relative riskiness of a particular situation than the insurance provider does. BAKER & LOGUE, *supra* note 10, at 12-13.

80. Risk Management Agency, *History of Crop Insurance*, *supra* note 60.

81. 7 U.S.C. § 1520 (2012). Generally, an insurable interest is defined as "a legal interest in another person's life or health or in the protection of property from injury, loss, destruction, or pecuniary damage." BLACK'S LAW DICTIONARY (10th ed. 2014). In the crop insurance program, the insurable interest is defined as "the value of the producer's interest in the crop that is at risk from an insurable cause of loss...." 7 C.F.R. § 400.651 (2018).

82. 7 C.F.R. § 400.51(2018).

83. 7 C.F.R. § 400.652 (2018).

84. 7 U.S.C. § 1503 (2012).

85. *Id.* § 1505 (2012); *see also id.* § 1502(b)(4) (2012 & Supp. 2016). The composition of the board is expressly prescribed. The composition includes senior members within the Department of Agriculture as well as private citizens in the crop insurance business, insurance generally, and policy holders from different geographic regions and commodity types. *Id.* § 1505(a)(2) (2012).

86. "The manager of the Corporation shall be its chief executive officer, with such power and authority as may be conferred by the Board." *Id.* § 1505(d) (2012); *see also*

and Secretary of Agriculture are vested with the right to “issue such regulations as are necessary to carry out [the federal crop insurance program].”⁸⁷

The RMA establishes the “premium rates, production guarantees or amounts of insurance, coverage levels, and price at which indemnities shall be computed for the insured crop... for the county and which may be changed from year to year.”⁸⁸ The “FCIC’s mission is to encourage the sale of crop insurance.”⁸⁹ While the goal of the FCIC is administered by the RMA, the agriculture producer contracts with one of fifteen “approved insurance providers (AIPs),” private insurers who are approved to provide insurance coverage, to receive coverage.⁹⁰ Since 1998, private insurance companies have sold and serviced all of the plans authorized by the FCIA.⁹¹ These contracts are reinsured by the FCIC.⁹² The FCIC also subsidizes the cost of the premiums that the producer pays.⁹³ The premiums and coverage choices of the FCIC are required to be based on actuarial soundness and may not exceed a certain loss ratio.⁹⁴

The typical policy issued is a Multiple Peril Crop Insurance policy (multi-peril policy). The multi-peril policy provides coverage for “loss that adversely affect[s] production or revenues, from natural disasters, such as hail, drought, and floods.”⁹⁵ The individual policies issued to producers

id. § 6933 (2012) (appointing the manager of the Corporation to be the manager of the Risk Management Agency).

87. *Id.* § 1506(o) (2012). This is the primary enabling statute that grants the delegation of power from Congress to the FCIC and RMA. The delegation of such power does not violate the Constitution so long as “Congress ‘lay[s] down by legislative act an intelligible principle to which the person or body authorized to [act] is directed to conform.’” *Touby v. United States*, 500 U.S. 160, 165 (1991) (quoting *J.W. Hampton, Jr., & Co. v. United States*, 276 U.S. 394, 409 (1928)).

88. 7 C.F.R. § 457.3(a) (2018); *see also* National Crop Insurance Services, *How It Works*, <https://cropinsuranceinamerica.org/about-crop-insurance/how-it-works/> [<https://perma.cc/ED8E-PK3L>].

89. Risk Management Agency, *History of Crop Insurance Program*, *supra* note 60.

90. 7 U.S.C. § 1502(b)(2) (2012 & Supp. 2016); 7 C.F.R. § 457.2 (2018).

91. Risk Management Agency, *History of Crop Insurance Program*, *supra* note 60.

92. 7 U.S.C. § 1508 (2012 & Supp. 2016); 7 C.F.R. § 457.2 (2018). “Reinsurance is insurance for insurance companies.” It is the transfer of some of the insured risk to a different insurer. Insurance Information Institute, *Background on: Reinsurance*, <https://www.iii.org/article/background-on-reinsurance> [<https://perma.cc/463T-SHTC>].

93. 7 U.S.C. § 1516(b)(1)(A) (2012 & Supp. 2016). Individual state governments, if they so desire, may enter into an agreement with the corporation to further subsidize the premiums. *Id.* § 1508(c)(8) (2012 & Supp. 2016).

94. *Id.* § 1506(n)(2) (2012 & Supp. 2016).

95. 7 C.F.R. § 400.701 (2018).

name the exact causes of loss covered.⁹⁶ The limitation of these policies to only expressly contracted risks makes these policies “named risk” policies as opposed to “all risk” policies.⁹⁷

While these policies are “named risk” policies, the policies are required to explicitly exclude coverage of losses due to “neglect or malfeasance of the producer; [and] the failure of the producers to follow good farming practices, including scientifically sound sustainable and organic farming practices.”⁹⁸ The agency determines what constitutes “good farming practice” and is afforded deference in their decision unless the agency is “arbitrary or capricious.”⁹⁹

Coverage by policies is not limited to the policies that currently exist or those that the Corporation promulgates. It is possible for a private individual, such as “an approved insurance provider, a college or university, a cooperative or trade association, or any other person” to submit a policy or premium rate to the Board of the Corporation for consideration.¹⁰⁰ The Board, at its sole discretion, may consider the creation of a new policy, but will consider several factors to ensure adoption would be appropriate. The creation of new policies may be for coverage of a commodity under the existing insurance programs, such as the multi-peril program, or the new policies may be created under the FCIC’s pilot authority.¹⁰¹ This process could be pivotal for the aquaculture industry as it would not have to wait for the FCIC to react to a changing economy, but instead can request the promulgation of policies that the industry feels it needs to succeed.¹⁰²

IV. THE CURRENT AND SUGGESTED COVERAGE OF AQUACULTURE BY

96. FED. CROP INS. CORP., U.S. DEP’T OF AGRIC., 17-BR, COMMON CROP INSURANCE POLICY, 20 (2016) <https://www.rma.usda.gov/policies/2017/17-br.pdf> [<https://perma.cc/MRP3-N7AB>].

97. Named risk policies only cover those risks expressly named. All risk policies cover all risks unless explicitly excluded. BAKER & LOGUE, *supra* note 10, at 134.

98. 7 U.S.C. § 1508(a)(3)(A) (2012 & Supp. 2016).

99. *Id.* § 1508(a)(3)(B) (2012 & Supp. 2016); *see also Chevron Inc. v. Nat. Res. Def. Council*, 467 U.S. 837, 844 (1984) (holding that “legislative regulations are given controlling weight unless they are arbitrary, capricious, or manifestly contrary to the statute.”)

100. 7 U.S.C. § 1508(h)(1)(A) (2012 & Supp. 2016); *Id.* § 1508(a)(3)(B)(i)-(ii) (2012 & Supp. 2016).

101. *Id.* § 1508(h)(1)(A) (2012 & Supp. 2016); *Id.* § 1522(c) (2012 & Supp. 2016); *Id.* § 1523 (2012 & Supp. 2016).

102. The Board already has the enumerated power by statute to create pilot programs specific to aquaculture. *Id.* § 1523 (2012 & Supp. 2016).

FEDERAL CROP INSURANCE

In 1980, coinciding with the passage of an amendment to the Federal Crop Insurance Act, which added aquaculture to the definition of commodities, Congress passed the National Aquaculture Act (NAA).¹⁰³ The Congressional findings in the NAA found that the United States' demand for seafood "exceeds optimum sustainable yield" which causes a "dependence on imports [and] adversely affects the national balance [of trade]"¹⁰⁴ Congress also found, though, that the aquaculture industry was inhibited by economic and legal facts such as inadequate credit and lack of supportive Government policies.¹⁰⁵ Despite these findings, and the fact that aquaculture was now a listed commodity under the definition of crop insurance, the Board did not issue any crop insurance policies for aquaculture until after 1990.¹⁰⁶

The aquaculture industry presently lacks mainstream coverage. Currently, only two species can be insured under the traditional crop insurance policies: clams and oysters.¹⁰⁷ Other aquaculture species, however, still can qualify for other programs such as the Whole-Farm Pilot program¹⁰⁸ or Noninsured Crop Disaster Assistance.¹⁰⁹ Both of these programs offer the aquaculture some opportunity for risk management, but they also have limitations that may make them less than ideal.

The Whole-Farm insurance program is a statutorily authorized pilot program.¹¹⁰ Whole-Farm Revenue Protection (WFRP) is different from

103. *See id.* § 1518 (2012); 16 U.S.C. § 2801 (2012).

104. 16 U.S.C. § 2801 (2012).

105. *Id.* § 2801(a)(7) (2012). While economic and legal considerations are not the only reasons Congress listed for the inhibition of the aquaculture industry, they are the primary ones this comment focuses on.

106. In *Petzoldt v. Glickman*, 983 F.Supp. 873, 875 (E.D. Mo. 1997), the Plaintiff was an aquaculture producer who lost his crop due to flooding. He submitted for disaster relief under the 1990 Farm Bill, which entitled individuals to disaster relief if their crop was "one which crop insurance was available through the FCIC for the 1990 crop year...." *Id.* The Plaintiff argued that since 7 U.S.C. § 1518 included aquaculture in the definition that he should be entitled to relief. *Id.* However, the Court held that since the FCIC had not issued any aquaculture policies pursuant to its authority to do so, insurance was not available, and therefore neither was the eligibility for disaster relief. *Id.* at 876.

107. Risk Management Agency, *2018 Crop Policies and Pilots*, <https://www.rma.usda.gov/policies/2018policy.html> [<https://perma.cc/X6ZW-TJL4>] [hereinafter Risk Management Agency, *2018 Crop Policies and Pilots*].

108. *See* U.S. DEP'T OF AGRIC., *WHOLE-FARM REVENUE PROTECTION GUIDANCE FOR LENDERS* (2017) [hereinafter U.S. DEP'T OF AGRIC., *GUIDANCE FOR LENDERS*].

109. 7 U.S.C. § 7333(2)(B) (2012 & Supp. 2016).

110. *Id.* § 1522(c) (2012 & Supp. 2016). The FCIC is authorized to "research and [develop]" policies and create pilot programs to increase participation. The creation of

traditional crop insurance in that it is available in all counties in all fifty states.¹¹¹ WFRP indemnifies the producer for a loss of income due to a covered occurrence rather than solely the loss of crop,¹¹² whereas, with traditional crop insurance, the production history of the crop is used to compute the loss.¹¹³

One drawback for WFRP is that it requires a revenue history. To be eligible for WFRP, a producer must have filed and be able to provide five consecutive years of tax forms or three consecutive years if the individual qualifies as a beginning farmer or rancher.¹¹⁴ This restriction in availability inhibits a brand-new producer from receiving WFRP. Traditional federal crop insurance plans use an assigned yield as an alternative for farms that lack individual yield history.¹¹⁵

A second major limitation to WFRP is that a producer is ineligible for coverage at all if their revenue from animal and animal products is one million dollars or more.¹¹⁶ The definition of animals under the WFRP includes aquaculture.¹¹⁷ Here the policy doesn't just cap coverage for animal products at one million dollars, it completely denies eligibility.¹¹⁸ Fortunately, revenue is computed after the deduction of qualifying expenses.¹¹⁹ Nonetheless, this denial of coverage completely based on the million-dollar animal provision makes WFRP an ineffective solution to the lack of traditional crop insurance policies for aquaculture producers.

Despite its limitations, WFRP still offers aquaculture producers some level of protection. The policy protects the revenue of the producer from "unavoidable natural causes."¹²⁰ Furthermore, the WFRP offers incentives

these pilots is to serve underserved areas and commodities "including specialty crops." *Id.* § 1522(c)(1) (2012 & Supp. 2016); *Id.* § 1522(c)(2) (2012 & Supp. 2016).

111. U.S. DEP'T OF AGRIC., GUIDANCE FOR LENDERS, *supra* note 108.

112. *Id.*

113. 7 U.S.C. § 1508 (g)(2)(A) (2012 & Supp. 2014). The yield history can be determined by the actual production history for the crop, an assigned yield of not less than 65 percent of the yield for of crop in the county as determined by the Risk Management Agency or the National Agricultural Statistics Service.

114. U.S. DEP'T OF AGRIC., WHOLE-FARM REVENUE PROTECTION PILOT HANDBOOK 2018 AND SUCCEEDING YEARS, FCIC-18160, 9-10 (2017) [hereinafter U.S. DEP'T OF AGRIC., HANDBOOK].

115. 7 U.S.C. § 1508(g)(2)(B) (2012 & Supp. 2016).

116. U.S. DEP'T OF AGRIC., HANDBOOK, *supra* note 114 at 11.

117. *Id.* at 92.

118. *Id.* at 11.

119. *Id.* at 22-23.

120. FED. CROP INS. CORP., U.S. DEP'T OF AGRIC., WHOLE-FARM REVENUE PROTECTION PILOT POLICY, 18-0076, 31-32 (2017) [hereinafter FED. CROP INS. CORP., WHOLE-FARM POLICY]. The covered losses include adverse weather conditions, fire, insects and plant diseases not caused by insufficient or improper application of control measures,

to producers to diversify their commodities and thus lower the risk.¹²¹ The lowered risk would come from the fact that some risks would be higher to one commodity than another, and a producer might not experience a total loss to their revenue if, for example, a disease broke out but only affected the shrimp population but not the salmon. As such, the lower risk in the risk pool overall might create the actuarial soundness needed for the FCIC to migrate the WFRP into a full-fledged insurance product, where some of the limitation may be able to be addressed and altered.

The Noninsured Crop Disaster Assistance Program (NAP) acts similarly to insurance offered by the FCIC, but with significantly less restrictions to enrollment. The primary restriction for enrollment is that the commodity cannot be one for which insurance offered by the FCIC is available.¹²² Instead, the Farm Service Agency administers NAP as a basic safety net for agriculture producers who would not qualify for crop insurance.¹²³ NAP provides a payment for “catastrophic loss” of eligible commodities.¹²⁴ The basic coverage without any buy-up is indemnified at fifty-five percent of the average market price.¹²⁵ To acquire coverage, a producer only needs to pay a service fee of “\$250 per crop per administrative county, up to \$750 per producer per administrative county, not to exceed \$1,875.”¹²⁶

Aquaculture, under NAP, is considered a “value loss crop,” which are crops that “because of [the] unique nature do not lend themselves to yield calculations ... [and the] value loss shall be determined based on a loss of dollar value at the time of the disaster, as determined by the FSA.”¹²⁷ To receive coverage, NAP requires: the aquaculture facility be a commercial enterprise on private property; owned or leased by the producer, with readily indefinable boundaries; and managed and maintained using good aquaculture growing practices.¹²⁸ Furthermore, aquaculture species are

earthquakes, volcanic eruption, failure of irrigation water supply if caused by an insured peril, and wildlife unless control measures have not been taken. *Id.*

121. The coverage levels range from fifty to eight-five percent. To purchase eighty percent coverage or more though, a producer is required to have at least three separate commodities. U.S. DEP’T OF AGRIC., GUIDANCE FOR LENDERS, *supra* note 108.

122. 7 U.S.C. § 7333 (a)(2)(B) (2012 & Supp. 2016).

123. *Id.* § 7333 (a)(1)(B) (2012 & Supp. 2016).

124. COMMODITY CREDIT CORP., U.S. DEP’T OF AGRIC., NONINSURED CROP DISASTER ASSISTANCE 2015 AND SUBSEQUENT YEARS BASIC PROVISIONS, CCC-471 NAP BP, 6 (2014). A catastrophic loss occurs when fifty percent of the commodity or more is lost due to a qualifying event either in terms of yield or value. *Id.* at 2.

125. *Id.* at 6-7.

126. 7 C.F.R. § 1437.7(b) (2018).

127. COMMODITY CREDIT CORP, *supra* note 124 at 6.

128. 7 C.F.R. § 1437.303(b) (2018).

required to be “placed in the facility and not be indigenous to the facility; and kept in a controlled environment; and planted or seeded in containers, wire baskets ... or similar device[s] designed for the protection and containment of the seeded aquaculture species.”¹²⁹ Similar to crop insurance, NAP only indemnifies an eligible cause of loss.¹³⁰ Eligible causes of loss include damaging weather, adverse natural occurrences, heat, insect infestation, disease, or insufficient chill hours.¹³¹ A loss of an aquaculture commodity due to drought or failure to provide water, however, is specifically not covered.¹³² Nor is any man made, or caused, loss such as negligence, mismanagement, failure to follow good farming practices, or breakdown of equipment.¹³³

Unlike crop insurance, NAP does not require yield or revenue history to qualify. This removes an entry barrier for new producers. As the aquaculture industry is expanding, this lack of barrier may entice new aquaculture producers to purchase bare minimum coverage through NAP. However, this basic safety net has its limitations. Once a producer’s adjusted gross income exceeds \$900,000, they will become ineligible for the program.¹³⁴ This cap could complicate a producer’s risk management strategy as they may be able to get NAP coverage until their adjusted gross income reaches \$900,000, but must also keep their animal revenue minus expenses under one million dollars to be eligible for WFRP. These financial caps articulate the reason the aquaculture industry should receive the same sort of support as the rest of the agriculture industry. Access to the federal crop insurance program may prove to be pivotal in the financial success and stability of the industry.

Despite the limited coverage offered by WFRP, and the basic protection offered by NAP, two aquaculture commodities have their own independent insurance products: clams and oysters. Cultivated clams, which began as a pilot project, will be a permanent insurance product

129. *Id.* § 1437.303(d) (2018). An exception is made for mollusks that are not planted or seeded in a container. For mollusks that are planted and seeded outside of container, a claim may still be made for a loss caused by a tropical storm, typhoon, or hurricane, as defined by the National Oceanic and Atmospheric Administration. *Id.* § 1437.303(e) (2018).

130. *Id.* § 1437.10(a) (2018).

131. *Id.* § 1437.10(b) (2018). Enumerated examples include, but are “not limited to,” “drought,” “hail,” “excessive moistures,” “freeze,” “tornado,” “hurricane,” “excessive wind,” “earthquake,” “flood,” and “volcanic eruptions.” *Id.*

132. *Id.* § 1437.10(d)(11) (2018).

133. *Id.* § 1437.10(d) (2018).

134. *Id.* § 1437.15(a) (2018); *see id.* § 1410.44 (2018).

starting in 2019.¹³⁵ Oyster insurance products are still a pilot program¹³⁶ but one that looks very promising for its actuarial soundness.¹³⁷ Both clams and oysters were researched for their actuarial soundness as required by the Food, Conservation, and Energy Act of 2008.¹³⁸ Congress required that the FCIC research offer three aquaculture insurance products, one which must be a bivalve species from the list; one which must be a freshwater species from the list; and one which must be a saltwater species from the list.¹³⁹ The FCIC collaborated with Promar International and Promar did a comprehensive assessment on the feasibility of crop insurance for various freshwater and saltwater aquaculture commodities.¹⁴⁰

From this assessment though, only the two insurance products were created. As such, aquaculture is severely underinsured by the Federal Crop Insurance Program. If aquaculture is going to flourish as an industry, access to the program must be a priority for the FCIC and RMA.

V. SPECIFIC POLICY PROPOSALS FOR AQUACULTURE COVERAGE

It is not enough to say that access to the Federal Crop Insurance Program must be a priority without articulating ways in which the coverage can be expanded. This section will propose the various policy

135. *Id.* § 457.176 (2018).

136. U.S. DEP'T OF AGRIC., A RISK MANAGEMENT AGENCY STATE PROFILE LOUISIANA CROP INSURANCE, (2017) <https://legacy.rma.usda.gov/pubs/2017/stateprofiles/louisiana16.pdf> [<https://perma.cc/42ZJ-VW79>].

137. While there has not been a large quantity of oyster policies issued, the commodity has had a perfect actuarial soundness ratio (loss ratio) of 0 since its inception in 2010 compared to clams at 1.59; the Whole-Farm Revenue Program at 1.24; and the original staples of crop insurance; wheat at 1.09; barley at 1.03; corn at .82; cotton 1.21; and rice at 1.43. Risk Management Agency, SUMMARY OF BUSINESS, <https://prodwebnlb.rma.usda.gov/apps/SummaryofBusiness/ReportGenerator> [<https://perma.cc/N869-96AV>] [hereinafter Risk Management, Agency, SUMMARY OF BUSINESS](These loss ratios are average loss ratios from 1989 to 2017. To run the report, select the desired years and the desired commodities and then generate the report. The report generates all of the information with respect to the commodity, but can filter the information by excluding any information that doesn't need to be displayed. The relevant information used was Commodity Year; Commodity Name; Liabilities; Total Premium; Indemnity; and Loss Ratio.)

138. 7 U.S.C. § 1522 (c)(11)(B)(i) (2012 & Supp. 2016).

139. *Id.* § 1522(c)(11)(B)(ii)-(iv) (2012 & Supp. 2016).

140. *See generally* PROMAR INTERNATIONAL, FRESHWATER, *supra* note 22; PROMAR INTERNATIONAL, THE FEASIBILITY OF CROP INSURANCE FOR SALTWATER AQUACULTURE (2011), <https://www.rma.usda.gov/pubs/2012/saltwateraquaculture.pdf> [<https://perma.cc/4ZA5-3Q4S>] [hereinafter PROMAR INTERNATIONAL, SALTWATER].

changes that could be the vehicle for additional coverage within the aquaculture industry, including the removal of the artificial barriers for salmon to be covered, implementing a phased actuarial soundness requirement, and custom policy creation. Each one of these proposals will enhance the aquaculture industry's ability to insure their commodities.

The primary barrier for salmon to be included under the crop insurance program is the "well-established international private insurance sector."¹⁴¹ This was one of the few factual findings in the Promar analysis that was completed on behalf of the RMA. The presence of an international private insurance sector, however, should not be a dominant factor for consideration for coverage. While the federal crop insurance program began in order to fill the void that private insurance could not, it is now well founded and established, and efforts should be made to expand it. First, unlike international private insurance, federal crop insurance is subsidized. These subsidies come in two forms: the underwriting and administrative cost subsidy that the RMA internalizes and the direct subsidies for the producers.¹⁴² If a producer were to utilize federal crop insurance and internalize the production cost savings from lower premiums, then the producer could either lower prices and pass on the savings to the consumer while gaining a greater market share, or capitalize on their additional profits.¹⁴³

A second reason to insure salmon, despite the presence of international private insurance, is that reinsurance agreements are structured by American insurance companies, or American based divisions of larger companies.¹⁴⁴ Thus, the policies these AIPs issue, and the profits they accrue as a result of the policies, will contribute to the GDP and the overall strength of the United States economy. Even when an international company contracts with the RMA as an AIP, they still create a presence

141. PROMAR INTERNATIONAL, SALTWATER, *supra* note 140 at 126.

142. Keith Coble & Barry Barnett, *Why Do We Subsidize Crop Insurance*, Am. J. of Agric. Econ., 498, 500-01 (2013).

143. It is unlikely that consumers would see a substantial price change in the short-term. Consumers are more likely to see greater price changes in highly inelastic goods, of which salmon are not. As such, a change in price would likely come over the long-term, as products (in this case salmon) tend to be more elastic in the long-term. *See generally* Lumen Learning, *Reading: Elasticity, Costs, and Customers*, <https://courses.lumenlearning.com/microeconomics/chapter/reading-elasticity-costs-and-customers/> [<https://perma.cc/XG22-WPR9>].

144. For a list of currently approved AIPs, *see* National Crop Insurance Services, *Insurance Providers*, CROP INSURANCE, <https://cropinsuranceinamerica.org/about-crop-insurance/insurance-providers-list/> [<https://perma.cc/W5H8-8FD7>].

in the US that might not otherwise exist, as the company would be required to have employees in the US who are eligible to sell insurance.¹⁴⁵

One possible policy change that could affect the aquaculture industry as a whole, as opposed to just salmon producers, would be to alter the requirements for actuarial soundness. As established, the aquaculture industry historically has not had the same amount of research and study devoted to it as terrestrial agriculture. Terrestrial agriculture was thus able to adapt to the subsequent actuarial soundness requirements mandated in the Omnibus Budget Reconciliation Act of 1993.¹⁴⁶ This act levied the requirement for the FCIC to “take actions necessary to improve the actuarial soundness ... [to] an overall projected loss ratio of not greater than 1.1.”¹⁴⁷ Prior to this requirement by Congress, the loss ratios from 1980-1990 averaged 1.88.¹⁴⁸

While it is perfectly rational that Congress wanted to mandate actuarial soundness requirements, as to keep the program from becoming too expensive, this requirement inhibits entry of new commodities and products that desperately need the security in case of loss of capital investments. Congress could lessen this restriction without undermining the actuarial soundness of the whole program by allowing new insurance products to be created with a phased requirement for actuarial soundness. From a technical application, the change in policy could look something like this: a new product would only be required to have a predicted actuarial ratio of 2.5. The first three years of coverage would be required to maintain an average ratio of 2.5. The policies would then continue each additional year, provided that on average the ratio declines at a pace of 2.25 at year five; 2.0 at year seven; 1.5 at year ten; and 1.1 at year fifteen.

While this timeline seems long, it is important to note that aquaculture’s history is distinct from agriculture in two ways. First, aquaculture does not have the historical data on yields and losses to predict actuarial soundness to the same degree as terrestrial agriculture, and second, aquaculture has not received the same amount of research and study as agriculture. The combination of these two factors should be the basis for which aquaculture is given the opportunity to create stability. The Federal Crop Insurance Program has existed for several decades and it has

145. See 7 C.F.R. § 400.164 (2018). This regulation requires that an insurer be licensed or “admitted in any state, territory, or possession of the United States.” *Id.*

146. See Omnibus Budget Reconciliation Act of 1993, Pub. L. No. 103-66, § 1403, 107 Stat. 312; Risk Management Agency, SUMMARY OF BUSINESS *supra* note 137.

147. *Id.*

148. Barry K. Goodwin, *Premium Rate Determination in the Federal Crop Insurance Program: What Do Averages Have to Say About Risk*, 19 J. of Agric. And Res. Econ. 382, 382 (1994).

only been in the past twenty years that it became as robust as it is now. To expect aquaculture, a fledgling major industry, to meet the requirements of a robust program would be tantamount to assuming that the program has always been this robust. The American public propped up agriculture through crop insurance with varying actuarial ratios throughout the twentieth century, and is better for it. The aquaculture industry should be given the same opportunity to adjust to the robust requirements levied by current law.

A third policy proposal, and one in which Congress would not need to act upon, is to create policies that are specific to the types of aquaculture systems already employed. As noted in Part I, the different aquaculture facilities all come with different inherent risks. It would stand then, that customizing the policies to the type of aquaculture facility would allow policy makers to accurately account for the risks and create an actuarially sound policy.

Creating a custom policy, indeed, would be unique compared to the policy creation within terrestrial agriculture. This uniqueness, however, is precisely the kind of novel proposals needed to deal with the differences between terrestrial agriculture and aquaculture. The differences of agricultural crops is binary, dryland production, or irrigation.¹⁴⁹ Regardless of the methodology used in agricultural crops, though, the risks to these crops (fire, adverse weather conditions, insects, plant disease, wildlife, earthquake, and volcanic eruption) are substantially the same.¹⁵⁰ The only major difference in risk between dryland and irrigated crops is the risk of drought may be more pronounced in non-irrigated crops.¹⁵¹ With aquaculture, however, the risks vary depending on the type of production methodology, which is why aquaculture policies should not be created with the same generalizations as agriculture.

To a degree, this customization for aquaculture has already been accomplished. Oysters and clams have distinctly different policies. For example, oysters are covered against “unavoidable loss of oyster landings directly caused by drought, flood, hurricane, and other natural disasters.”¹⁵² Clams, on the other hand, are covered against losses including oxygen depletion, disease, freeze, hurricane, decrease in

149. See Jose Pavero & Ahmad Khalilan, *Comparison of Irrigated and Dryland Crop Production In SC*, AGRONOMICS CROPS, Oct. 2017, at 1.

150. FED. CROP INS. CORP., U.S. DEP’T OF AGRIC., 17-0011, SMALL GRAIN CROP PROVISIONS, 5 (2016).

151. Pavero & Khalilan, *supra* note 149 at 1-2.

152. FED. CROP INS. CORP., U.S. DEP’T OF AGRIC., GROUP RISK PLAN OYSTERS POLICY BASIC PROVISION, 09-GRP OYSTERS, 4 (2017).

salinity, tidal waves, storm surge, or ice floes.¹⁵³ Even with the coverage distinctions between these two policies, though, the policies do not distinguish between the ways that the species are reared or propagated. Oysters and clams are typically raised in a hatchery and then transported to a sea-based environment for finishing.¹⁵⁴ While different techniques may be used in either the hatchery or finishing, these techniques don't have any real differences in terms of risk exposure between each other. In this sense, oyster and clam insurance policies are more akin to the terrestrial agriculture policies which do not distinguish the risk between the management techniques.

Other aquaculture species, though, such as fin fish or shrimp, are typically raised entirely in an artificial environment. As such, it may be difficult to try and create an actuarial sound insurance program that encompasses all of the different types of risk in the different aquaculture systems. However, if the RMA were to create an insurance policy for just ponds or just cages, specific to a particular species, they might be able to more accurately pinpoint the risks to the species and create an actuarial sound policy.

The combination of these three policies, collectively or individually, would be a major boon to the aquaculture industry's ability to manage its risk. This risk management is necessary for investors and lenders when determining the likelihood of success of a prospective venture, and as such, the lack of these policy changes may be the cause of stunted investment in the industry. Naturally, an influx in capital investment could prove pivotal for the research and technological advancement of the industry as well, which would lead to a continuous growth business cycle.

VI. WHY AQUACULTURE MATTERS AND WHY IT SHOULD BE

153. FED. CROP INS. CORP., U.S. DEP'T OF AGRIC., CULTIVATED CLAM INSURANCE PROVISIONS, 2018-0116, 6 (2017).

154. For oysters, the seeds go from the larval tanks into an "on-bottom culture" setting in the sea, and then upon growth into an off-bottom culture or suspended culture. If planted as seeds instead of larva, the oyster will harden in a nursery before being planted in the on-bottom culture. Food and Agriculture Organization of the United Nations, *Crassostrea gigas*, http://www.fao.org/fishery/culturedspecies/Crassostrea_gigas/en [https://perma.cc/2W6Q-ZBAN]. Similarly, clams are initially raised in hatcheries and are transferred into the growth areas after being raised in enclosed environments. Clam hatcheries use different methods to get the clam ready for sea-based hardening, but mesh-covered fields are the primary method for growth in the sea. Food and Agriculture Organization of the United Nations, *Mercenaria mercenaria*, http://www.fao.org/fishery/culturedspecies/Mercenaria_mercenaria/en [https://perma.cc/77KR-7H4E].

SUPPORTED BY THE FEDERAL CROP INSURANCE PROGRAM

An increase in capital investment for the aquaculture industry would be the primary effect of the policy changes. As such, it is important to note the secondary effects that a healthy industry would have. After all, if the American public is going to be asked to partially subsidize the industry, the public should realize the benefits of the subsidies. There are four ways in which the public would benefit from a boon in the aquaculture industry: sustainable fish supply; better disease management techniques in the industry and the limiting of the disease spreading to wild herds; a revitalization of coastal communities; and a decrease in the trade deficit.

One of the major concerns internationally is the sustainability of wild fish populations. The world population is expected to be 9.8 billion by 2050.¹⁵⁵ Likewise, the demand for food, and seafood, will continue to increase as the world population grows.¹⁵⁶ To meet the current demands of seafood, an additional “27 million metric tons of production will be needed to maintain the present level of per capital consumption in 2030.”¹⁵⁷ This additional seafood, however, cannot sustainably come from wild populations. It is estimated that, currently, 29 percent of fish stocks are already overfished.¹⁵⁸ If the answer to a seafood shortage can’t come from captured fisheries, it must then come from aquaculture.

NOAA, recognizing the importance that aquaculture will play in food security, enumerated three goals in which the aquaculture industry can be supported. Its first goal is to “[d]evelop coordinated, consistent, and efficient regulatory processes for the marine aquaculture sector.”¹⁵⁹ While the primary focus of this goal is regulatory conservation and management across federal and state governments, it could be reasoned that the broader text of the goal should be coordination of all regulatory policies which affect aquaculture. As such, the proposed policy changes would effectuate

155. *World population projected to reach 9.8 billion in 2050, and 11.2 billion in 2100 – says UN*, UNITED NATIONS (June 21, 2017), <http://www.un.org/sustainabledevelopment/blog/2017/06/world-population-projected-to-reach-9-8-billion-in-2050-and-11-2-billion-in-2100-says-un/> [https://perma.cc/QX4U-7GZF].

156. See OFFICE OF AQUACULTURE, U.S. DEP’T OF COMMERCE, MARINE AQUACULTURE STRATEGIC PLAN FY 2016-2020, 2 (2015). A current uptick in demand is credited to the growing populations and the emergence of a larger middle class in China, India, and Brazil. *Id.*

157. *Id.* (quoting the United Nations Food and Agriculture Organization).

158. *Id.*

159. *Id.* at 10.

NOAA's goals for the need of consistent regulatory policies to support aquaculture.

A related concern to the sustainability of wild populations is the disease management of aquaculture and its impact on wild populations. Regardless of the type of aquaculture production system used, disease is the primary concern for any aquaculture producer. "Water, the medium of culture, greatly facilitates the inadvertent transmission and spread of wastes, disease, and genetic material. . . ." ¹⁶⁰ These disease outbreaks in aquaculture pose a risk to the wild populations of the respective species as well as the farmed populations. ¹⁶¹ As such, the danger of disease not only creates a risk to aquaculture producers, but to the fishing industry and coastal communities that currently rely upon the capture of wild species.

Thankfully, technology transfer ¹⁶² and research can mitigate the risk. However, research and advancement in technology requires capital investments. As NOAA has articulated, because the aquaculture industry "is new and dynamic . . . innovation based on robust science and technology development is one of the strongest drivers for continuous industry improvement." ¹⁶³ As repeatedly articulated, the mitigation of risk through federal crop insurance will increase capital investment in the industry, and thus the innovation in research and technology. ¹⁶⁴

The aquaculture industry is also vital to the economic health of coastal communities. Coastal communities account for 37% the U.S. population

160. THE WORLD BANK, AQUACULTURE: CHANGING THE FACE OF THE WATERS MEETING THE PROMISE AND CHALLENGE OF SUSTAINABLE AQUACULTURE, Report No. 3622, 13 (2006).

161. *Id.* at 35.

162. "Technology transfer refers to the movement of know-how, skills, technical knowledge, procedures, methods, expertise or technology from one organizational setting to another." The World Bank Group, *Technology Transfer and Commercialisation: Overview*, THE INNOVATION POLICY PLATFORM, <https://www.innovationpolicyplatform.org/content/technology-transfer-and-commercialisation> [<https://perma.cc/AKV5-6SGC>]. It is often the process of commercialization of research conducted by a research institutions or universities. *Id.* Researchers are able to sell or license their research to entities that can generate economic value from the research, in turn creating more support for the research institutions. See *Id.*

163. OFFICE OF AQUACULTURE, *supra* note 156, at 14.

164. One possible way innovation might occur from an increase in aquaculture is through the concentration of the aquaculture producers. Since aquaculture is limited to where it can be feasibly located, an increase in facilities may lead to a concentration of the industry in certain areas. The concentrations could be of value for research based on the agglomeration theory. This theory poses that the concentration of firms and people within the same industry increases the speed in which information and knowledge is shared. See EDWARD L. GLAESER, *AGGLOMERATION ECONOMICS*, 9 (2010).

and economy.¹⁶⁵ The economy of these coastal communities often includes the “living resources” sector of the “ocean economy.”¹⁶⁶ “The living resources sector comprises [of] four industries: fish hatcheries & aquaculture, commercial fishing, seafood markets, and seafood processing.”¹⁶⁷ While the majority of the ocean economy has grown at above average rates, the living resources sector has experienced a slight decline.¹⁶⁸ The sector as a whole has declined despite aquaculture’s growth and contribution to the sector.¹⁶⁹

What is concerning for communities that depend on this industry is the seafood markets and processing plants are secondary industries who rely on strong capture fishing and aquaculture. If, for example, the wild population of a species is depleted or becomes protected to prevent complete depletion, the secondary industries will suffer along with the fishermen who are unable to harvest a catch. Aquaculture, however, can either offset the effects to the secondary industries, or, where necessary, even supplant the capture fisheries to allow the species to recover. By doing so, aquaculture may be able prevent the decimation that could occur to a community if the fishing industry were to close shop.¹⁷⁰

Not only can aquaculture be a boon for individual economies, but it could become critical in advancing the national economy and narrowing the trade deficit. Within the fish trade, the United States has a trade deficit of more the \$14 billion as ninety percent of all seafood consumed domestically are imports.¹⁷¹ One of the key reasons that the fish trade deficit is so high in the US is that demand for seafood has not matched the decline in domestic production.¹⁷² Instead, the demand is being met by importing seafood to accommodate the US consumption. The decline in domestic production is a result of the conservation efforts and limitations

165. KILDOW ET. AL, STATE OF U.S. OCEAN AND COASTAL ECONOMIES 2016 UPDATE, 5.

166. *Id.* at 2-3. The ocean economy is the “direct or indirect input of goods and/or services to an economic activity: A) an industry whose definition explicitly ties the activity to the ocean, or B) which is partially related to the ocean and is located in a shore-adjacent zip code.” *Id.*

167. *Id.* at 13.

168. *Id.* at 11.

169. *Id.* at 15.

170. When an industry experiences a plant closing or permanent layoffs, local communities suffer greatly as a whole from a decline in the standard of living, higher than normal unemployment, lost tax revenue, and increased social safety net spending. Robert Ginsburg, *What Plant Closing Costs a Community: The Hard Data*, 1 CORNELL U. LAB. RES. REV., 72-73 (1994).

171. OFFICE OF AQUACULTURE, *supra* note 156 at 3.

172. KILDOW ET. AL, *supra* note 165, at 14.

from over-fishing in previously prime fishing regions.¹⁷³ The growth of the aquaculture industry within the US may be able to stabilize and even reduce the trade deficit.

While there is not a comprehensive agreement on the severity of a trade deficit, some of the impact cannot be ignored.¹⁷⁴ The US trade deficit has reached a nine-year high and the trend does not indicate that is likely to change anytime soon.¹⁷⁵ A prolonged trade deficit hurts the economy in two major ways. First, the trade deficit is debt financed, which has ramifications on the nation's monetary policies.¹⁷⁶ Second, a trade deficit in a particular sector can cause a "brain drain" on that industry.¹⁷⁷ As the experts in a certain industry aggerate in other countries, those companies still in the US lose their competitiveness.

VII. CONCLUSION

As evidenced, the aquaculture industry could prove to be of great value to the US economy. While aquaculture has a deep history, its presence as a major industry is relatively recent. Furthermore, while Congress has supported this industry through the changes of regulations, the full support of the federal government has yet to be effectuated. A handful of substantial changes to the current regulatory framework could be the boost that the industry needs. This industry deserves the same support the terrestrial agriculture has received throughout US history. This

173. Bryan Walsh, *Can the U.S. Close Its Seafood Trade Deficit?*, TIME MAGAZINE, (July 8, 2011), 1 <http://science.time.com/2011/07/08/can-the-u-s-close-its-seafood-trade-deficit/> [<https://perma.cc/AW39-ZK2S>].

174. Dr. Econ, *Is the U.S. trade deficit a problem? What is the link between the trade deficit and exchange rates?*, FEDERAL RESERVE BANK OF SAN FRANCISCO, (June 2007), <https://www.frbsf.org/education/publications/doctor-econ/2007/june/trade-deficit-exchange-rate/> [<https://perma.cc/CQM7-C5AF>]. Part of the disagreement amongst economists about the severity of a trade deficit is that these trade issues do not happen in a vacuum, and there are a lot of other factors that are important to understand prior to making a dispositive statement of the impact of a trade deficit. See Salvatore Babones, *The U.S. Economy Is Booming, Which Is Why The U.S. Trade Deficit With China Grew in 2017*, FORBES, (Jan. 12, 2018), <https://www.forbes.com/sites/salvatorebabones/2018/01/12/the-u-s-trade-deficit-with-china-grew-in-2017-because-the-u-s-economy-is-booming/#3fb73bf841de> [<https://perma.cc/ALG3-RNF9>].

175. Lucia Mutikani, *U.S. trade deficit races to more than nine-year high*, REUTERS (Mar. 7, 2018), <https://www.reuters.com/article/us-usa-economy/u-s-trade-deficit-races-to-more-than-nine-year-high-idUSKCN1GJ1W0> [<https://perma.cc/WZ6Q-Y997>].

176. Kimberly Amadeo, *The U.S. Trade Deficit and How it Hurts the Economy*, THE BALANCE (Mar. 5, 2018), <https://www.thebalance.com/u-s-trade-deficit-causes-effects-trade-partners-3306276> [<https://perma.cc/F3ZB-KNUC>].

177. *Id.*

support is vital to the US and world's sustainable fish supply, disease management, technological innovation, and the economic health of both regional coastal economies and the US economy. As such, policy makers should act to evolve the Federal Crop Insurance program to stabilize the risk inherent in the emerging, but critical, industry.