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How Can States Outside the Gulf of Mexico Regulate Offshore Finfish Aquaculture?

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— Note —

HOW CAN STATES OUTSIDE THE
GULF OF MEXICO REGULATE
OFFSHORE FINFISH AQUACULTURE?

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INTRODUCTION

San Diego, California, may soon be home to not only the largest fish farm in the United States, but also to the first one located in

federal waters.¹ Hubbs-SeaWorld Research Institute (HSWRI), a non-profit research arm of SeaWorld, has paired up with Cuna Del Mar, a private equity firm primarily funded by Wal-Mart billionaire Christy Walton,² to form Rose Canyon Fisheries (RCF), a group dedicated to pioneering offshore aquaculture in the United States.³ RCF desires to permit, establish, and operate the first finfish aquaculture project located in the federal waters of the United States.⁴ The proposed RCF Sustainable Aquaculture Project would be located approximately 3.6 miles off the coast of San Diego,⁵ just west of popular tourist areas, including Sunset Cliffs and Mission Beach. With an ocean footprint of 1.3 square miles, RCF would be roughly the size of Central Park in New York City and could eventually produce up to 5,000 metric tons—or 11 million pounds—of yellowtail jack, white seabass, and striped bass per year.⁶

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1. Currently, no finfish or shellfish farming occurs in U.S. federal waters—fish farming only exists in state waters. U.S. NAT'L OCEANIC & ATMOSPHERIC ADMIN., NOAA FISHERIES' FINAL RULE TO IMPLEMENT THE FISHERY MANAGEMENT PLAN FOR AQUACULTURE IN FEDERAL WATERS OF THE GULF OF MEXICO: FREQUENTLY ASKED QUESTIONS 2 (2016), http://sero.nmfs.noaa.gov/sustainable_fisheries/gulf_fisheries/aquaculture/documents/pdfs/aquaculture_gulf_fmp_faqs_jan2016.pdf [https://perma.cc/5CDN-LTYA] [hereinafter NOAA FINAL RULE FAQs].
 2. Editorial, *A Solid Proposal for Growing Fish in the Sea Off San Diego*, THE SAN DIEGO UNION-TRIBUNE (Oct. 7, 2014, 5:00 PM), <http://www.sandiegouniontribune.com/news/2014/oct/07/fish-farm-mission-beach-hubbs-seaworld/> [https://perma.cc/D565-87PM].
 3. *About*, ROSE CANYON FISHERIES, <http://rosecanyonfisheries.com/rosecanyon-fisheries/> [https://perma.cc/F7TJ-XFRZ] (last visited May 18, 2017). Aquaculture, also known as fish farming, is a “form of agriculture devoted to the propagation, cultivation, maintenance, and harvesting of aquatic plants and animals in marine, brackish, and fresh water.” CAL. FISH & GAME CODE § 17 (West 2016).
 4. *The Project*, ROSE CANYON FISHERIES, <http://rosecanyonfisheries.com/the-project/> [https://perma.cc/98MP-5MBT] (last visited May 18, 2017).
 5. Matt O'Malley, San Diego Coastkeeper Comments on NEPA Scoping for Rose Canyon Aquaculture Project (Jan. 13, 2016), <https://assets.documentcloud.org/documents/2703992/SD-Coastkeeper-EPA-NEPA-Scoping-Comments-1-13-16.pdf> [https://perma.cc/7BCK-TVJ4].
 6. Claire Trageser, *Huge Fish Farm Planned Near San Diego Aims To Fix Seafood Imbalance*, NPR (Sept. 1, 2015, 5:50 PM), <http://www.npr.org/sections/thesalt/2015/09/01/436414230/huge-fish-farm-planned-near-san-diego-aims-to-fix-seafood-imbalance> [https://perma.cc/8UEX-D3YU]; *Rose Canyon Fisheries Facts: The Project*, ROSE CANYON FISHERIES, <http://>

The proposed placement of RCF in federal waters poses unique and unanswered regulatory questions for the United States. Although the Gulf Aquaculture Plan, which regulates offshore aquaculture exclusively in the Gulf of Mexico, recently went into effect on February 12, 2016,⁷ no regulatory framework for offshore finfish aquaculture currently exists for the rest of the United States. While RCF claims that offshore aquaculture is necessary in the United States to ensure a safe, secure, domestic supply of seafood, such activity nonetheless poses many environmental and socio-economic issues.

As no federal laws regulate aquaculture in the federal waters off of California, what guidelines or standards are available to ensure that RCF farms fish in a safe, environmentally sound way? The Coastal Zone Management Act (CZMA) creates a cooperative federalism program where coastal states assume most of the federal administrative and enforcement responsibilities to manage and protect their coastal zones and resources.⁸ Based on this substantial coastal management power, this Note outlines how offshore finfish aquaculture, in a region outside the Gulf of Mexico, can be regulated by coastal states to sufficiently protect states's coastal zone and marine resources.

Part I of this Note provides background information on aquaculture and its potential environmental and socio-economic effects. Part II discusses the regulation of offshore finfish aquaculture and explains the state-federal waters delineation, the CZMA's role in regulating offshore aquaculture through a cooperative federalism program, and the regulation of offshore aquaculture in the Gulf of Mexico under the Gulf Aquaculture Plan.

Part III outlines specifics of the proposed RCF Sustainable Aquaculture Project and examines what a hypothetical federal consistency review of the project could look like by applying the enforceable policies of the California Coastal Act of 1976 and California state laws. Reviews of two past aquaculture projects, KZO Sea Farms and Platform Grace, will be analyzed and compared to the proposed RCF project through six main factors: the size and location of the aquaculture project, commercial and recreational fishing impacts,

rosecanyonfisheries.com/the-project/fact-sheet/ [<https://perma.cc/EV5U-TSVP>] (last visited May 18, 2017).

7. Fisheries of the Caribbean, Gulf, and South Atlantic; Aquaculture, 81 Fed. Reg. 1762 (Jan. 13, 2016) (to be codified at 50 C.F.R. pts. 600 and 622). Offshore aquaculture refers to aquaculture occurring in the federal waters of the United States.
8. Edward M. Cheston, Comment, *An Overview and Analysis of the Consistency Requirement Under the Coastal Zone Management Act*, 10 U. BALT. J. ENVTL. L. 135, 136 (2003).

economic impacts, impacts on marine resources, water quality impacts, and scenic impacts. This Note argues that RCF, as proposed, is not consistent with the enforceable Coastal Act policies and, therefore, should not be granted a consistency certification, meaning the project should not proceed. Significant alterations to the project, however, could make RCF consistent with the Coastal Act policies. In Part IV, the nationwide effects of the recently published Gulf Aquaculture Plan are discussed, as well as lessons other coastal states can learn from the RCF situation in California to ensure that they are protected from adverse offshore aquaculture effects.

I. AQUACULTURE

Aquaculture, or fish farming, involves the breeding, rearing, and harvesting of animals in the ocean.⁹ Typical offshore aquaculture facilities consist of cages or net pens that are placed on the seafloor, float on top of the water, or are suspended in the water column, anchored to the ocean floor.¹⁰ These cages are stocked with young fish, generally reared in hatcheries, which live in the cage until they grow to market size.¹¹ The farmed fish are then sold to consumers all around the world.

Large aquaculture operations typically farm shellfish or finfish.¹² Shellfish—oysters, mussels, and scallops—grow out on the ocean floor or on long line cultures.¹³ Shellfish can take as little as one year to grow to market size after being reared in hatcheries.¹⁴ As filter-feeders,

9. *What is Aquaculture?*, NOAA FISHERIES, http://www.nmfs.noaa.gov/aquaculture/what_is_aquaculture.html [<https://perma.cc/DF49-LRGU>] (last visited May 18, 2017).

10. *Id.*

11. Hope M. Babock, *Grotius, Ocean Fish Ranching, and the Public Trust Doctrine: Ride 'Em Charlie Tuna*, 26 STAN. ENVTL. L.J. 3, 17 (2007).

12. Plant aquaculture, or the harvesting of plants such as seaweed and algae, is another form of aquaculture and is becoming more popular in the United States as it may help fight ocean acidification. *Seaweed in the Spotlight*, NOAA FISHERIES, http://www.nmfs.noaa.gov/aquaculture/homepage_stories/paul_allen_grant.html [<https://perma.cc/565W-RETU>] (last visited May 18, 2017). Plant aquaculture, however, is not discussed in this Note because only shellfish and finfish aquaculture farms have been proposed for offshore California.

13. NORTHERN ECONOMICS, PACIFIC SHELLFISH INST., *THE ECONOMIC IMPACT OF SHELLFISH AQUACULTURE IN WASHINGTON, OREGON AND CALIFORNIA* (2013), http://www.pacshell.org/pdf/economic_impact_of_shellfish_aquaculture_2013.pdf [<https://perma.cc/UX73-TC98>].

14. *Sustainable Solutions for Maine's Growing Future: FAQ*, MAINE AQUACULTURE ASS'N, http://www.maineaquaculture.com/F_A_Q/f_a_q.html

shellfish filter water by removing particulates, such as nitrogen, organic material, silt, and other nutrients, from the surrounding water as their food source.¹⁵ No additional food is needed to feed shellfish—the only food required is that which the ocean already provides.¹⁶

“Finfish” refers to fish such as salmon, steelhead trout, cod, red drum, Hawaiian yellowtail, and cobia.¹⁷ Finfish are generally bred and reared in hatcheries, spend time as juveniles in grow-out facilities, and are then moved to net pens or cages in the open ocean where they grow to market size.¹⁸ Unlike shellfish, finfish must be fed external food, and any uneaten food falls into the surrounding water along with fish excretory products.¹⁹ Also, chemicals are frequently used in finfish operations to maintain fish health, disinfect and improve water quality, and control nuisance organisms.²⁰ These differences between shellfish and finfish generate widely different environmental and socio-economic impacts.

A. Environmental Effects of Aquaculture

HSWRI’s current aquaculture project in Southern California—the White Seabass Enhancement Plan—highlights various environmental

[<https://perma.cc/LJM6-ZD5E>] (last updated Jan. 1, 2006). “Oysters spend about 3 months in the hatchery then 7–8 months in juvenile culture systems, and a further 1 ½–2 ½ years growing to market size. Blue mussels can grow to market size in as little as 1 year and take up to 3 years depending on seed size, water temperatures and culture techniques.” *Id.*

15. Sandra E. Shumway et al., *Shellfish Aquaculture—In Praise of Sustainable Economies and Environments*, 34 *WORLD AQUACULTURE* 15 (2003).
16. *Id.* at 16. Maintaining clean environments is of the utmost importance for shellfish aquaculturists because if the water does not meet the National Shellfish Sanitation Program standards, none of the shellfish can be harvested or sold. Failure to meet water quality standards requires immediate closure of the water for any harvesting of shellfish, and the ban on harvesting remains effective until water quality monitoring data shows that the water meets the standards again. *Id.*
17. *Basic Questions About Aquaculture*, NOAA FISHERIES, http://www.nmfs.noaa.gov/aquaculture/faqs/faq_aq_101.html [<https://perma.cc/5STP-2F28>] (last visited May 18, 2017).
18. MAINE AQUACULTURE ASS’N, *supra* note 14.
19. AUSTRALIAN GOV’T: DEP’T OF THE ENV’T & ENERGY, *IMPACT OF AQUACULTURE* 7 (2001), <http://www.environment.gov.au/system/files/resources/47456586-e529-4b99-8ad0-098e14851777/files/impacts-aquaculture.pdf> [<https://perma.cc/M7KU-SJ7S>].
20. *Id.*

concerns that surround aquaculture farms.²¹ The white seabass program is currently being audited by the California Department of Fish and Wildlife because over the years, hundreds of thousands of juvenile white seabass have died at the hands of HSWRI.²²

Diseases, developmental deformities, and human errors have led to multiple major die-offs of HSWRI's juvenile white seabass.²³ At the Redondo Beach grow-out facility, almost 7,000 juvenile white seabass died in 2012 after household bleach leaked into the system's intake water,²⁴ and in 2015, 3,000 juvenile white seabass died due to a power outage.²⁵ At other grow-out facilities, panicked fish have slammed themselves to death against tank walls and over 100,000 fish have been euthanized due to issues such as fish herpes outbreaks.²⁶

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21. The White Seabass Enhancement Plan is part of the Ocean Resources Enhancement and Hatchery Program (OREHP). CALIFORNIA DEPARTMENT OF FISH AND GAME: MARINE REGION, WHITE SEABASS ENHANCEMENT PLAN i (2010). OREHP is a research program investigating the artificial propagation, rearing, and stocking of marine finfish species established by the California Legislature in 1983. *Id.* OREHP's goal is to analyze the "economic and ecological feasibility of releasing hatchery-reared fish to restore depleted, endemic, marine fish populations to a higher, sustainable level." *Id.* at iii.
 22. Ry Rivard, *State Probing Experimental Hubbs Fish Breeding Program That's Spawned Deformities, Mixed Results*, VOICE OF SAN DIEGO (Jan. 19, 2016), <http://www.voiceofsandiego.org/topics/science-environment/state-probing-experimental-hubbs-fish-breeding-program-thats-spawned-deformities-mixed-results/> [https://perma.cc/E9Q3-EJWU]. Thirteen grow-out facilities—facilities where white seabass are grown until they reach the size at which they can be released into the wild—exist from Santa Barbara to San Diego, California. WHITE SEABASS ENHANCEMENT PLAN, *supra* note 21, at 4-3.
 23. WHITE SEABASS ENHANCEMENT PLAN, *supra* note 21, at 7-3 to 7-6. Just from 2011 to 2012, over 168,000 juvenile fish died due to such infections, deformities, and human errors. Rivard, *supra* note 22.
 24. Philip Friedman, *6,900 White Sea Bass Perish at SEA Lab*, PATCH (Feb. 11, 2012, 2:12 AM), <http://patch.com/california/redondobeach/more-than-6000-white-sea-bass-perish-at-sea-lab-in-re624ad6e9b5> [https://perma.cc/GH5A-W6RS].
 25. Daniel Powell, *Thousands of White Seabass Die in Power Outage at Redondo Captive Breeding Program*, SAN DIEGO READER (Mar. 11, 2015), <http://www.sandiegoreader.com/news/2015/mar/11/fish-report/#> [https://perma.cc/6B74-C23P]. Although the facility had a backup power source for the tanks, no one was aware of the power outage and so it was never turned on. *Id.*
 26. Rivard, *supra* note 22. When HSWRI euthanizes fish, it sometimes kills whole groups of fish by filling their tanks with carbon dioxide. *Id.*

Such problems persist after juveniles leave the hatchery. Although HSWRI tries to euthanize all deformed fish before they leave the hatchery, deformed fish are still found outside the hatchery.²⁷ Common deformities include blindness, commonly caused by captivity conditions, “BAD heart,” where fish hearts are the wrong size, color, or texture, or leak blood, and “horn head,” where bumps form on top of fish heads and appear as horns.²⁸ A 2015 sample of fifty HSWRI white seabass revealed that every single fish had at least one deformity, and the average fish had four deformities.²⁹ White seabass raised in the hatchery do not survive as well as wild white seabass, and the farmed fish have not been improving, even after over twenty years of experimentation.³⁰

Although not all aquaculture farms face the same breeding and rearing challenges HSWRI does, there are numerous environmental challenges commonly experienced by all aquaculture farms. The most obvious challenge is that raising millions of pounds of fish creates copious soluble and solid waste. The size of the aquaculture farm, husbandry methods used, and site hydrography influence the amount of waste discharge that flows into the surrounding water column and falls to the benthic seafloor.³¹ Discharges include uneaten food, fish

27. *Id.*

28. *Id.* (noting that horns have not been seen on wild white seabass and that the cause of the horn head deformity in HSWRI hatchery raised white seabass is still unknown).

29. *Id.*

30. *Id.* After receiving taxpayer money and over \$28 million from the California Department of Fish and Wildlife, it is still unclear if this white seabass program has had any significant effect on replenishing the local white seabass population. *Id.* Although the OREHP program permits HSWRI to release four million fish through this project, only 2,000 have actually been found in the wild. Andrew Keatts, *Morning Report: Hubbs-SeaWorld Fish Farming Program Spawns Deformed Fish*, VOICE OF SAN DIEGO (Jan. 19, 2016), <http://www.voiceofsandiego.org/topics/news/morning-report-hubbs-seaworld-fish-farming-program-spawns-deformed-fish/> [<https://perma.cc/X3UC-T6DH>]. The California Sea Grant’s formal assessment of OREHP should be completed by August 2017. OREHP Evaluation, *Project Need and Goals*, SEA GRANT CALIFORNIA, <https://caseagrants.ucsd.edu/project/orehp-evaluation> [<https://perma.cc/YVN5-7SPR>] (last visited May 18, 2017).

31. BARRIE FORREST ET AL., REVIEW OF THE ECOLOGICAL EFFECTS OF MARINE FINFISH AQUACULTURE: FINAL REPORT iii (2007); Eleni Mente et al., *Effect of Feed and Feeding in the Culture of Salmonids on the Marine Aquatic Environment: A Synthesis for European Aquaculture*, 14 AQUACULTURE INT’L 499, 514 (2006).

feces, urine, mucus, and dead fish.³² Buildup of these waste particulates can degrade the benthic community by creating anoxic sediments and toxic gases and by decreasing benthic diversity.³³

Benthic impacts are typically greatest beneath cages densely stocked with fish requiring high rates of feed.³⁴ Various studies found that benthic impacts are localized and can be reversed by fallowing,³⁵ while others have measured benthic effects greater than twenty-five meters away from cages and found that it can take twenty-one to twenty-four months for the sediment chemistry and macrofauna to revert to previous unpolluted standards.³⁶ Reducing the sinking rate of feed, controlling stock density, and exercising careful site selection may limit benthic degradation.³⁷ Integrated aquaculture, in which shellfish and macroalgae harvest nutrients generated by marine fish farming, can also alleviate degradation and simultaneously increase shellfish and macroalgae productivity.³⁸ Such methods that convert

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32. REBECCA J. GOLDBURG ET AL., MARINE AQUACULTURE IN THE UNITED STATES: ENVIRONMENTAL IMPACTS AND POLICY OPTIONS 13 (2001). See R. S. S. Wu, *The Environmental Impact of Marine Fish Culture: Towards a Sustainable Future*, 31 MARINE POLLUTION BULL. 159, 159 (1995) (“High organic and nutrient loadings are mainly generated from feed wastage, fish excretion and faecal production.”).
33. OCEAN CONSERVANCY, RIGHT FROM THE START: OPEN-OCEAN AQUACULTURE IN THE UNITED STATES 14 (2011); Mente et al., *supra* note 31, at 501. Nutrient pollution, one of the most widespread, costly, and challenging environmental problems in the U.S., is caused by excess nitrogen and phosphorous in the water. Too much nitrogen and phosphorous causes algae to grow faster than ecosystems can handle, and this can harm water quality, habitats, and food resources, while also decreasing the dissolved oxygen that fish and other animals need to survive. *Nutrient Pollution: The Problem*, EPA, <http://www.epa.gov/nutrientpollution/problem> [https://perma.cc/EB96-JDH4] (last updated March 10, 2017).
34. Mente et al., *supra* note 31, at 513.
35. *Id.* at 514 (“In Scottish West Coast waters, the main effect of benthic enrichment does not extend in excess of a distance of 50 m from the cages of the farm.”).
36. *Id.* Other studies found that the seafloor bottom beneath an aquaculture cage in open ocean water was “grossly affected” after eleven months, and another area eighty meters downstream was found to be “heavily impacted” after twenty-three months. OCEAN CONSERVANCY, *supra* note 33, at 16.
37. Wu, *supra* note 32, at 159, 163.
38. *Id.* at 164; Thierry Chopin et al., *Integrating Seaweeds Into Marine Aquaculture Systems: A Key Toward Sustainability*, 37 J. PHYCOLOGY 975, 976 (2001). Poorly maintained shellfish aquaculture operations, however, would not create such beneficial effects. For example, intense mussel raft culture operations in Spain place too many shellfish in one given area, which leads

wastes into resources, like food or fertilizer, for other marine organisms can be used to help reduce the amount of benthic degradation in areas surrounding aquaculture farms.³⁹

Soluble wastes are also discharged from aquaculture farms, and studies have estimated that 75–85% of carbon, 40–80% of nitrogen, and 65–73% of phosphorous used in marine aquaculture is lost to the surrounding environment as pollution.⁴⁰ This nutrient pollution can over-enrich the water column, add to eutrophication,⁴¹ create algal blooms, lead to habitat loss, and deplete dissolved oxygen levels.⁴²

to an unbalanced ecosystem. Overstocking issues such as this, however, have not yet been documented in the United States. Shumway et al., *supra* note 15, at 15–16.

39. Chopin et al., *supra* note 38, at 976. In integrated aquaculture, shellfish purify water and improve clarity and light transmission by water filtering, while macroalgae help remove nitrogen from the water. Shumway et al., *supra* note 15, at 16. Shellfish help remove nitrogen by increasing bacterial de-nitrification and, because some shellfish remove nitrogen from the water column and incorporate it into their tissues, when the shellfish are harvested substantial amounts of nitrogen are removed along with them. *Id.*; Wu, *supra* note 32, at 164. “Integrating seaweeds into fish/shrimp aquaculture not only counterbalances nutrient inputs but also other metabolic aspects, such as dissolved oxygen, acidity, and CO₂ levels” Chopin et al., *supra* note 38, at 977.
40. JIM C.W. CHU, ENVIRONMENTAL MANAGEMENT OF MARICULTURE: THE EFFECT OF FEED TYPES ON FEED WASTE 103 (2000). Another study “estimated that between 67 and 80% of the [nitrogen] added to cage systems is lost to the environment, of which the majority (50–60% of total [nitrogen]) is lost in dissolved form either directly from the fish or by benthic flux from solid waste beneath the cages.” Mente et al., *supra* note 31, at 511.
41. Mente et al., *supra* note 31, at 512. Eutrophication is “[t]he process by which a body of water acquires a high concentration of nutrients, especially phosphates and nitrates. These typically promote excessive growth of algae. As the algae die and decompose, high levels of organic matter and the decomposing organisms deplete the water of available oxygen, causing the death of other organisms, such as fish.” *Eutrophication*, U.S. GEOLOGICAL SURV., <http://toxics.usgs.gov/definitions/eutrophication.html> [<https://perma.cc/AEC9-M825>] (last updated Aug. 4, 2015).
42. Mente et al., *supra* note 31, at 512. Over-enrichment is “the most widespread and measurable effect of pollution on living marine resources and biodiversity in U.S. coastal waters.” *Id.* DONALD F. BOESCH ET AL., PEW OCEANS COMM’N, MARINE POLLUTION IN THE UNITED STATES iii (2001). Especially when several fish farms are sited in close proximity, increased eutrophication will occur. Mente et al., *supra* note 31 at 504. “A decrease in dissolved oxygen and increases in BOD, nutrients (P, organic and inorganic N and total C) have been generally found in the water column around fish farms.” Wu, *supra* note 32, at 162.

Large algal blooms can discolor the water, produce algae toxic to other marine life, and “prolong recovery after the fish farming activities have ceased.”⁴³ Generally, such impacts are localized to within twenty to fifty meters around the cages, but significant impacts have been discovered as far as 100 meters away.⁴⁴

Moving aquaculture facilities far offshore may reduce adverse environmental effects that coastal aquaculture operations commonly face. Wave currents are typically more powerful farther offshore and can “flush out” pollution released from aquaculture facilities.⁴⁵ Deep, well-flushed areas may help prevent anoxic conditions from occurring in the sediment both near and hundreds of meters beyond the farm’s perimeter, which helps mitigate other adverse impacts.⁴⁶

Aquaculture can affect seabirds and marine mammals, such as seals, dolphins, and whales, by habitat modification and entanglement in structures.⁴⁷ Excess food may attract wild animals to the aquaculture cages where they can easily become entangled in the cages and chains.⁴⁸ In 2007, the Canadian government found 110 drowned sea lions entangled in salmon cages, and similar aquaculture operations have killed sharks, harbor seals, and bottlenose dolphins.⁴⁹ Yet, in New Zealand, only four marine mammals became entangled in aquaculture nets over a twenty-five year period.⁵⁰ Migrating animals,

43. *Mente et al.*, *supra* note 31, at 503, 513–14. “Some algal blooms are harmful to humans because they produce elevated toxins and bacterial growth that can make people sick if they come into contact with polluted water, consume tainted fish or shellfish, or drink contaminated water.” *Nutrient Pollution*, *supra* note 33.

44. *Mente et al.*, *supra* note 31, at 503. Subtle effects of finfish aquaculture have even been found up to 150 meters away. *Id.*

45. *See* NMFS, FINAL SUPPLEMENTAL INFORMATION REPORT TO THE 2009 FINAL PROGRAMMATIC ENVIRONMENTAL IMPACT STATEMENT (FISHERY MANAGEMENT PLAN FOR OFFSHORE MARINE AQUACULTURE IN THE GULF OF MEXICO) 7 (2015) (finding that if measurable effects on water quality are detected at offshore aquaculture facilities, the effects are usually confined to thirty meters).

46. *Id.* (noting that anaerobic conditions—depletion of oxygen—can occur when too much waste from the aquaculture facility gathers on the benthic (bottom) seafloor and bacteria uses up the oxygen to degrade that waste).

47. FORREST ET AL., *supra* note 31, at iii.

48. *Id.* *See* *Mente et al.*, *supra* note 31, at 516 (“Underwater video surveys beneath fish farms in the western and eastern Mediterranean areas showed that fish of various species aggregated under the fish cages during feeding.”).

49. OCEAN CONSERVANCY, *supra* note 33, at 17.

50. FORREST ET AL., *supra* note 31, at iii.

such as whales, can also become entangled as they travel along traditional migratory paths blocked by aquaculture farms.⁵¹ Proper farm design may help avoid some of these consequences, but still little is known about the interactions of aquaculture facilities and wildlife in the open ocean.⁵²

Fish that escape from aquaculture cages may potentially interact with wild fish populations and compete for resources, alter the genetic structure of wild fish, and transmit pathogens to wild fish.⁵³ Escapes can occur during catastrophic weather events, through accidental human error during fish transports or cage maintenance, or when predators or boats damage the cages.⁵⁴ Non-native escaped fish can become invasive species, which can outcompete, displace, or prey on native species.⁵⁵ Through selective breeding, captive native fish can diverge genetically from the wild native species.⁵⁶ If genetically modified fish escape and interbreed with wild populations, the genetic fitness and integrity of wild populations could be compromised.⁵⁷

Chemicals and antibiotics are sometimes used to mitigate the spread of diseases and parasites in aquaculture farms. “[I]ncreased fish population densities, crowding of farming sites in coastal waters, lack of sanitary barriers, and failure to isolate fish farming units with in-

51. OCEAN CONSERVANCY, *supra* note 33, at 17.

52. *Id.*

53. FORREST ET AL., *supra* note 31, at iii.

54. OCEAN CONSERVANCY, *supra* note 33, at 18–19. In 2010, an aquaculture facility near south Coronado Island in Mexico, close to San Diego, was broken due to a large storm event. Bluefin tuna from the cage ended up washing ashore Imperial Beach in San Diego, most likely because the fish were so disoriented and could not swim properly. Photojournalist Robert Benson says the fish “are in that round pen for so long that all they know how to do is make left-hand turns.” Dave Good, *Bluefin Tuna Wash Up on Imperial Beach*, SANDIEGO.COM (Jan. 27, 2010), <http://www.sandiego.com/articles/2010-01-27/bluefin-tuna-wash-imperial-beach> [https://perma.cc/RAE3-R5UF].

55. OCEAN CONSERVANCY, *supra* note 33, at 18. Also, invasive species are second to habitat destruction as a driver of extinction. In 2003, the World Conservation Union classified invasive species “as one of the four greatest threats to the world’s oceans.” *Id.*

56. *Id.* at 19 (stating that intensively bred populations can also diverge from their wild cousins, as seen with broiler chickens and Jersey cows).

57. *Id.* at 18. *See also* Mente et al., *supra* note 31, at 504 (“Escapees from fish farms may interbreed with the wild population, resulting in losses of genetic variability, including the loss of naturally selected adaptations, thus leading to reduced fitness and performance.”).

fectured animals” increases the possibility of rapid infection spreading.⁵⁸ Fish in aquaculture cages are fed food pellets containing antibiotics to prevent this.⁵⁹ As the unconsumed food and fish feces containing antibiotics fall to the ocean seafloor, however, antibiotics diffuse into the sediment and can be washed by currents to distant sites where other organisms can ingest them.⁶⁰ As antibiotic use increases, antibiotic resistance emerges and undermines the effectiveness of antibiotics in aquaculture.⁶¹ This “increases the possibilities for passage not only of these antibiotic-resistant bacteria but also of their antibiotic resistance determinants to bacteria of terrestrial animals and human beings.”⁶²

Intensive aquaculture largely depends on wild fisheries to supply the food for the farmed fish.⁶³ About ten pounds of smaller fish are needed to create just 2.2 pounds of fishmeal used in some aquaculture farms.⁶⁴ Although progress is being made to partially replace fishmeal with alternative plant-based ingredients to reduce reliance on wild fish stocks, whether wild fisheries will continue to meet the aquaculture

58. Felipe C. Cabello, *Heavy Use of Prophylactic Antibiotics in Aquaculture: A Growing Problem for Human and Animal Health and for the Environment*, 8 ENVTL. MICROBIOLOGY 1137, 1138 (2006).

59. *Id.*

60. *Id.* (“These residual antibiotics will remain in the sediment, exerting selective pressure, thereby altering the composition of the microflora of the sediment and selecting for antibiotic-resistant bacteria.” Studies “indicate that the bacterial flora in the environment surrounding aquaculture sites contain an increased number of antibiotic-resistant bacteria.”).

61. *Id.* “This problem has led to undetected consumption of antibiotics by consumers of fish with the added potential alteration of their normal flora that increases their susceptibility to bacterial infections and also selects for antibiotic-resistant bacteria.” *Id.* at 1139.

62. *Id.* at 1137. “The acceleration of this process strongly suggests that heavy antibiotic use in aquaculture needs to be reduced drastically and replaced with improved sanitation in fish husbandry to avoid the emergence of antibiotic resistance in fish pathogens and environmental bacteria and the passing of this resistance to human pathogens, thus endangering effective therapy to treat human bacterial infections.” *Id.* at 1141.

63. Chopin et al., *supra* note 38, at 976; Mente et al., *supra* note 31, at 508 (“Aquaculture continues to expand rapidly worldwide and the usage of both fishmeal and oil is steadily increasing.”).

64. Ken Stier, *Fish Farming’s Growing Dangers*, TIME (Sept. 19, 2007), <http://content.time.com/time/health/article/0,8599,1663604,00.html> [https://perma.cc/KUR7-GN25] (stating that using wild fish for fishmeal poses major ecological risks as it puts wild fisheries at risk for this high demand for fishmeal, which could outstrip the supply of wild fish by 2050).

feed demand depends on management practices and conserving fisheries stocks.⁶⁵

Many factors, such as the size and location of aquaculture farms and feeding and cleaning methods, influence the extent of the above mentioned environmental impacts. Executed correctly, aquaculture operations can be environmentally conscious and lead to sustainable uses of our ocean. But at the same time, there is much reason for concern about expanding aquaculture because it can degrade the surrounding environment and negatively impact wild marine organisms and ecosystems.

B. Socio-Economic Effects of Aquaculture

Finfish aquaculture produces food—and a lot of it. More than 800 million people currently suffer from malnourishment worldwide.⁶⁶ As the current world population of 7.3 billion is projected to reach 9.7 billion by 2050, the number of people suffering from malnutrition is likely to continue increasing.⁶⁷ The Food and Agriculture Organization of the United Nations believes that aquaculture is a solution to eliminating world hunger.⁶⁸ Aquaculture's expansion helps improve diets in poor, rural areas where essential nutrients and protein in food is often scarce.⁶⁹ Increasing global population, coupled

65. Mente et al., *supra* note 31, at 517. “Feed companies are now developing new research and development structures to identify alternative sources of oil and protein to counter diminishing supplies of raw material.” Chopin et al., *supra* note 38, at 976. “[T]he supply of fishmeal and fish oil from conventional sources is limited and cannot be significantly increased.” Mente et al., *supra* note 31, at 508.

66. UNITED NATIONS FAO, THE STATE OF WORLD FISHERIES AND AQUACULTURE 2014 iii (2014), <http://www.fao.org/3/a-i3720e.pdf> [<https://perma.cc/U32F-8AH4>].

67. United Nations Dep't of Econ. and Soc. Affairs, *World Population Projected to Reach 9.7 Billion by 2050*, UNITED NATIONS (July 29, 2015), <https://www.un.org/development/desa/en/news/population/2015-report.html> [<https://perma.cc/WV3P-VWKK>].

68. UNITED NATIONS FAO, *supra* note 66, at iv. *See also* Read Porter & Rebecca Kihslinger, *Federal Environmental Permitting of Offshore Aquaculture: Coverage and Challenges*, 45 ENV'T L. REP. 10875, 10875 (2015) (stating that the World Bank predicts that aquaculture will provide sixty percent of edible seafood by 2030, meaning aquaculture could potentially help solve world hunger).

69. Food and Agric. Org. of the United Nations, *Report Highlights Growing Role of Fish in Feeding the World*, UNITED NATIONS (May 19, 2014), <http://www.fao.org/news/story/en/item/231522/icode/> [<https://perma.cc/XJ54-GF4C>]. Fish now accounts for almost seventeen percent of the global population's

with increased per capita seafood consumption, results in a constant, growing demand for seafood, and aquaculture can help meet this demand.⁷⁰

Finfish aquaculture plays a large economic role globally. Fish is one of the most traded food commodities worldwide with a net value of \$130 billion—a number likely to continue to increase.⁷¹ The United States, instead of profiting from this market, actually has an annual seafood trade deficit of over \$11.2 billion.⁷² The United States is the largest global importer of fish and fishery products, with ninety-one percent of the seafood Americans eat originating abroad—half of which is produced by aquaculture.⁷³ Although the United States plays a major role in global aquaculture by supplying a variety of advanced technology, fish feed, equipment, and investment to aquaculture producers around the world, the United States itself is a small producer, ranking 17th in total aquaculture production.⁷⁴ Asia dominates global aquaculture production, accounting for eighty-nine percent of it, and China alone accounts for sixty-two percent.⁷⁵ Since 2005, aquaculture production in the United States has been

intake of protein. *Id.* Seafood is not only an excellent source of protein, but it is also low in sodium and fat and contains important nutrients, like omega-3 fatty acids, essential to good health. Eating seafood has also been shown to help fight cancer and cardiovascular disease. *U.S. Aquaculture Makes Sense*, NOAA, http://www.noaa.gov/features/resources_0109/aquaculture.html [<https://perma.cc/4YK8-HS66>] (last visited May 18, 2017).

70. *Basic Questions about Aquaculture*, *supra* note 17. In addition, the USDA 2010 Dietary Guidelines suggest Americans more than double their consumption of seafood. In 2010, Americans ate around three ounces of seafood per week, meaning eating six ounces per week is now suggested. Catherine Kastleman, *Environmental Effects of Marine Finfish Aquaculture*, CTR. FOR A LIVABLE FUTURE (Apr. 16, 2015), <http://www.livablefutureblog.com/2015/04/finfish-aquaculture-environmental> [<https://perma.cc/BC7Z-AJ69>].
71. The value of \$130 billion is from 2012. UNITED NATIONS FAO, *supra* note 66, at 7.
72. *Aquaculture in the United States*, NOAA FISHERIES, http://www.nmfs.noaa.gov/aquaculture/aquaculture_in_us.html [<https://perma.cc/3C6Z-KC4N>] (last visited May 18, 2017).
73. *Id.*
74. *Id.*
75. *Id.*

declining,⁷⁶ and this fact is something that RCF and other aquaculture enthusiasts would like to see change.

Increasing aquaculture production in the United States could create new jobs across the country.⁷⁷ Aquaculture jobs include manufacturing cages, equipment, and feed; transporting materials; performing veterinary services; packaging and selling harvested fish; and operating the aquaculture hatcheries, net pens, and cages.⁷⁸ Such jobs are spread over a vast geographic area, reaching well beyond the local community where fish farms are located.⁷⁹ New aquaculture facilities, however, threaten traditional fishing jobs and economic stability in the region because the large size of aquaculture facilities reduces available fishing grounds.⁸⁰ Also, direct competition will occur because fish farms typically farm the same species fishermen catch in the wild and can usually sell the fish at cheaper prices.⁸¹

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76. Porter & Kihlsinger, *supra* note 68, at 10875. In California specifically, about 150 registered aquaculturists account for roughly \$140 million in economic benefit. Carol Singleton, *Aquaculture Awareness Week: 10 Facts About California Aquaculture*, AQUACULTURE MATTERS (Sept. 22, 2015), <http://aquaculturematters.ca.gov/2015/09/22/aquaculture-awareness-week-10-facts-about-california-aquaculture/> [https://perma.cc/L42T-HT77]. In 2013, sixteen shellfish aquaculture farmers created 204 direct jobs and eighty jobs through indirect and induced activity, and about 34 million pounds of oysters, clams, and mussels were produced in 2001. Shellfish farmers were paid \$5.4 million in wages in 2010, and additional labor stemming from this economic activity generated an additional \$4.6 million, bringing in \$10 million in labor income for California. NORTHERN ECONOMICS, *supra* note 13, at 24, 25, 29.
77. NOAA AQUACULTURE PROGRAM, OFFSHORE AQUACULTURE IN THE UNITED STATES: ECONOMIC CONSIDERATIONS, IMPLICATIONS & OPPORTUNITIES 163 (2008), http://www.nmfs.noaa.gov/aquaculture/docs/economics_report/econ_report_all.pdf [https://perma.cc/VNX7-ZW3S].
78. *Id.* at 162.
79. *Id.* at 163. For example, “the company manufacturing the cage or the restaurant selling the fish may be located thousands of miles away.” *Id.* “[T]he potential total economic impacts of offshore fish farming are much larger than those which would occur at the farming operations alone—potentially five to ten times larger.” *Id.* at 165.
80. FOOD & WATER WATCH, OCEAN FISH FARMING CAN HURT COMMERCIAL FISHING (2008), https://www.foodandwaterwatch.org/sites/default/files/ocean_fish_farming_commercial_fs_july_2009.pdf [https://perma.cc/UM5Y-2AG4]. Additionally, fishing can also be banned in areas bordering aquaculture cages to prevent interactions and collisions with the cages. *Id.*
81. *Id.*

Aquaculture has majorly impacted fish markets in the past. In the 1990s, significant economic difficulties hit wild salmon fishermen in the United States when prices decreased dramatically as world farmed salmon production expanded.⁸² On the upside, flooding the market with fish benefits consumers because fish prices are lower.⁸³ Moreover, regardless of whether the United States increases aquaculture production, aquaculture will continue to expand globally and these market impacts will continue.⁸⁴

Coastal scenic views may be impacted if aquaculture cages are visible above the water and if boats used in aquaculture production congest the area.⁸⁵ Scenic impacts can be mitigated, however, if farms are placed far enough offshore and are invisible to the human eye, if cages are entirely submerged, or if aquaculture vessels do not greatly increase the normal vessel traffic.⁸⁶

Finally, ocean activities such as recreational boating, fishing, kayaking, whale watching tours, and U.S. Navy use may also be impacted. If aquaculture cages or net pens float on or near the ocean surface, boats will have to traverse far around to avoid impacting the aquaculture farm and getting caught in the cages or mooring lines. Socio-economic impacts of aquaculture here in the U.S. are difficult to fully assess as U.S. offshore aquaculture is still in its infancy.⁸⁷ As is true of the environmental effects, the extent of such impacts greatly depends on how aquaculture is regulated and the ultimate scale of offshore aquaculture.⁸⁸

II. REGULATION OF OFFSHORE FINFISH AQUACULTURE

A. State-Federal Waters Delineation

The United States has jurisdiction over the ocean that extends from each state's baseline out to 200 nautical miles.⁸⁹ Within these

82. NOAA AQUACULTURE PROGRAM, *supra* note 77, at 175.

83. *Id.*

84. *Id.*

85. CATES INT'L, INC., FINAL ENVIRONMENTAL ASSESSMENT: OFFSHORE FISH FARM COMMERCIAL OPERATION 29 (2000).

86. *Id.*

87. NOAA AQUACULTURE PROGRAM, *supra* note 77, at 162.

88. *Id.*

89. The normal baseline for measuring the breadth of these zones is "the low-water line along the coast as marked on the NOAA nautical charts." The Territorial Sea runs from the baseline to twelve nautical miles offshore, from twelve to twenty-four nautical miles is the Contiguous Zone, and from twenty-four to 200 nautical miles runs the Exclusive Economic Zone

200 nautical miles, U.S. waters are further delineated into state waters and federal waters. The Submerged Lands Act provides coastal states jurisdiction over the seafloor and ocean waters from the baseline to three nautical miles out.⁹⁰ Past the three nautical miles owned by the states, the federal government has sole sovereignty and jurisdiction up until the 200 nautical miles mark.

The division between state and federal waters is important for two reasons. First, where an aquaculture project is sited determines what jurisdiction governs—state or federal. If an aquaculture project is sited at 3.1 nautical miles offshore, just past state waters, federal law governs. Because no federal aquaculture regulations exist outside the Gulf of Mexico region, an aquaculture farm located in the federal waters off of California, for example, would not be governed by any aquaculture regulations. As California has enacted stringent environmental standards for marine finfish aquaculture operating in state waters, any aquaculture farm placed just past the state-federal waters border evades all of California's state laws and regulations.⁹¹ Second, no commercial finfish or shellfish aquaculture farms currently operate in U.S. federal waters.⁹² Although the Gulf Aquaculture Plan now provides a framework to legally build an aquaculture farm in the

(“EEZ”). Office of Coast Surv., *U.S. Maritime Limits & Boundaries*, NOAA, <http://www.nauticalcharts.noaa.gov/csdl/mbound.htm> [<https://perma.cc/GDB5-PGJN>] (last updated Sept. 9, 2013). The United States has the world's largest EEZ, for the United States's EEZ spans over 13,000 miles of coastline and includes 3.4 million square nautical miles of ocean. *The United States is an Ocean Nation*, NOAA, http://www.gc.noaa.gov/documents/2011/012711_gcil_maritime_eez_map.pdf [<https://perma.cc/W8SJ-37UP>] (last visited Jan. 18, 2016).

90. 43 U.S.C. § 1312. The Gulf of Mexico coast of Florida, Texas, and Puerto Rico are exceptions because these states's jurisdiction extends to nine nautical miles past the baseline. The federal government then has jurisdiction from nine to 200 nautical miles out in the Gulf of Mexico region. NOAA Office of Gen. Counsel, *Maritime Zones and Boundaries*, NOAA, http://www.gc.noaa.gov/gcil_maritime.html [<https://perma.cc/GND9-7GX4>] (last visited May 18, 2017).
91. NAT'L SEA GRANT LAW CTR., CALIFORNIA ENACTS SUSTAINABLE OCEANS ACT (2006), <http://nsglc.olemiss.edu/Advisory/CAAquaculture.pdf> [<https://perma.cc/GBN9-WCNA>]. See generally Cal. Dep't of Fish and Wildlife, *Aquaculture*, CA.GOV, <https://www.wildlife.ca.gov/aquaculture#22164164-regulations-guidelines-and-permit-applications> [<https://perma.cc/6DXM-2J2T>] (last visited May 18, 2017) (listing specific California aquaculture regulations, guidelines, and permit applications).
92. NOAA FINAL RULE FAQs, *supra* note 1, at 2.

federal waters of the Gulf of Mexico, no offshore farms currently exist.⁹³ RCF would be the first of its kind.

B. The Coastal Zone Management Act

Congress passed the Coastal Zone Management Act (CZMA) in 1972 to encourage states to manage coastal resources and development.⁹⁴ With a goal to “preserve, protect, develop, and where possible . . . restore or enhance the resources of the nation’s coastal zone,” the CZMA aims to conquer challenges brought on by increasing coastal population and increasing numbers of federal activities near the coast.⁹⁵

To accomplish this goal, the CZMA established the National Coastal Management Program—a cooperative federalism initiative that creates voluntary partnerships between the federal government and states to devise a comprehensive coastal management system.⁹⁶ Thirty-four states currently participate in this program, through which each state designs an individual coastal zone management plan (CZMP) to address their local coastal challenges and concerns.⁹⁷ Once the National Oceanic and Atmospheric Administration (NOAA) approves a state’s CZMP, the program becomes valid and that state can enforce the CZMP policies and begin managing its coastal zone and marine resources.⁹⁸

93. *Id.* It should be noted that three shellfish operations received permits to build farms in the federal waters off of California and Massachusetts, but neither of these three have begun operations yet. *Id.* Further, RCF’s project proposal “is the only fish farm proposal that the federal government has received so far.” Matt Weiser, *The Government Wants More Offshore Fish Farms, But No One is Biting*, THE GUARDIAN (Sept. 25, 2016, 10:00 AM), <https://www.theguardian.com/sustainable-business/2016/sep/25/offshore-fish-farms-imported-seafood-aquaculture> [https://perma.cc/WAY7-TWJY].

94. Cheston, *supra* note 8, at 136.

95. Office for Coastal Mgmt., *Coastal Zone Management Act*, NOAA, <http://coast.noaa.gov/czm/act/> [https://perma.cc/8AEL-EHQ3] (last visited May 18, 2017).

96. Office for Coastal Mgmt., *The National Coastal Zone Management Program*, NOAA, <http://coast.noaa.gov/czm/> [https://perma.cc/XVA9-MQVS] (last visited May 18, 2017); Cheston, *supra* note 8, at 136 (noting that through cooperative federalism, “states assume much of the administrative and enforcement responsibilities”). For a discussion of Environmental Federalism, see Daniel L. Millimet, *Environmental Federalism: A Survey of the Empirical Literature*, 64 CASE W. RES. L. REV. 1669 (2014) (discussing the optimal levels of allocation of authority to different levels of government).

97. Cheston, *supra* note 8, at 137.

98. *Id.* at 137.

Out of all of the environmental cooperative federalism programs, the CZMA arguably provides states with the greatest amount of power and control. To implement the objectives of the Clean Water Act—to “prevent, reduce, and eliminate pollution”—Congress uses financial incentives and threatens preemption to force states to participate and comply with the Act.⁹⁹ If states fail to create water pollution plans or create inadequate plans, the EPA can step in and seize this state duty.¹⁰⁰ The Clean Air Act outlines a similar cooperative federalism program to the Clean Water Act. States are allowed to create air pollution control plans, but the plans must comply with ambient air quality standards set by the EPA.¹⁰¹ The Clean Air Act similarly incentivizes states to participate by providing federal funding, but this funding is revocable if the state does not comply with EPA standards and states can even be subject to noncompliance penalties in some cases.¹⁰² Both the Clean Water Act and the Clean Air Act are contingent on federal funding and are continuously threatened by federal preemption.¹⁰³ While the CZMA provides financial assistance for states to develop CZMPs, “the federal government does not induce participation by threatening federal preemption.”¹⁰⁴ If states choose to not participate in the CZMA cooperative federalism program, those states simply relinquish power the statute would otherwise give the state. This power, however, is what incentivizes most states to participate and create their own CZMP.

The CZMA essentially gives coastal states a veto power over federal actions.¹⁰⁵ Section 307 of the CZMA, the federal consistency provision, requires that all federal agency actions, both within and outside the coastal zone, which may have reasonably foreseeable effects on any coastal use or natural resource in the coastal zone, “be

99. Ryan B. Stoa, *Cooperative Federalism in Biscayne National Park*, 56 NAT. RESOURCES J. 81, 87 (2016).

100. *Id.*

101. *Id.* at 88.

102. *Id.*

103. *Id.* at 89.

104. *Id.* at 90.

105. Stephanie Showalter, *Will California Law Apply to Hubbs-SeaWorld Research Institute's Offshore Aquaculture Demonstration Project? An Analysis of the Extraterritorial Application of State Aquaculture Laws*, 16 HASTINGS W.-NW. J. ENVTL. L. & POL'Y 223, 226 (2010). Another incentive is funding—the Secretary of Commerce contributes money to each state every fiscal year to help run state CZMPs. Cheston, *supra* note 8, at 137.

consistent to the maximum extent practicable with the enforceable policies of a state coastal management program.”¹⁰⁶ Even projects located in federal waters, and well outside the state’s coastal zone, can still affect the coastal zone, therefore triggering federal consistency review.¹⁰⁷

Many aquaculture projects attempt to obtain permits through The Rivers and Harbors Act of 1899 (RHA). The RHA requires authorization from the Army Corps of Engineers before any structure can be constructed “in or over any navigable water of the United States.”¹⁰⁸ Permits obtained under Section 10 of the RHA are subject to the certification process for consistency with state CZMPs under Section 307(c)(3) of the CZMA.¹⁰⁹ Therefore, even if a proposed aquaculture project in the federal waters off of California obtains a permit from the Army Corps, that proposed project must also undergo a CZMA consistency review and receive a CZMA consistency certification before the project can proceed.

*C. Federal Regulation of Offshore Finfish Aquaculture:
The Gulf Aquaculture Plan*

There was no federal regulatory framework for offshore aquaculture until 2016. In January 2016, NOAA finalized the Fishery

106. *Federal Consistency*, NOAA OFFICE FOR COASTAL MGMT., <http://coast.noaa.gov/czm/consistency/> [<https://perma.cc/TKV6-ZHDQ>] (last visited May 18, 2017). See also *Our Mission*, CAL. COASTAL COMM’N, <http://www.coastal.ca.gov/whoweare.html> [<https://perma.cc/Y9JS-93E7>] (last visited May 18, 2017) (stating that federal consistency is one of the most important coastal management tools because it is often the “only review authority over federal activities affecting coastal resources given to any state agency”).

107. Projects in federal waters that are *not* federal agency projects require a Consistency Certification if they seek a federal permit or license or federal funding. These projects must be consistent with the CCMP—the state’s certified program. *Federal Consistency*, CAL. COASTAL COMM’N, <http://www.coastal.ca.gov/fedcd/fedcndx.html> [<https://perma.cc/Y6B2-BAWD>] (last visited May 18, 2017). Aquaculture projects located in federal waters, but which exist close to the federal-state border of three nautical miles, are very likely to affect the water uses or natural resources within a state’s coastal zone. Showalter, *supra* note 105, at 226.

108. *Section 10 of the Rivers and Harbors Act*, U.S. ARMY CORPS OF ENG’RS, <http://www.spk.usace.army.mil/Missions/Regulatory/Jurisdiction/RiversHarborsAct.aspx> [<https://perma.cc/E2L8-K2ST>] (last visited May 18, 2017).

109. *California Coastal Management Program: List of Federal Licenses and Permits Subject to Certification for Consistency*, CAL. COASTAL COMM’N, http://www.coastal.ca.gov/fedcd/listlic_2015.pdf [<https://perma.cc/G2KV-QZK3>] (last visited May 18, 2017).

Management Plan for Regulating Offshore Aquaculture in the Gulf of Mexico (Gulf Aquaculture Plan), a framework for authorizing and regulating offshore aquaculture in the Gulf of Mexico.¹¹⁰ Importantly, as this rule only applies to the Gulf of Mexico, there still does not exist a clear framework to regulate aquaculture in the remaining federal waters of the United States.¹¹¹ In the absence of a coordinated framework, an offshore aquaculture project in federal waters off the coast of California, for example, could be subject to numerous, potentially overlapping regulatory requirements, none of which focus on the potential impacts of aquaculture.¹¹² This lack of a clear regulatory framework has discouraged the expansion of U.S. aquaculture for many years, causing many to take their aquaculture

110. *New Rule Greenlights Aquaculture in Gulf of Mexico Federal Waters*, ENVTL. PROT. (Jan. 15, 2016), <https://eponline.com/articles/2016/01/15/new-rule-greenlights-aquaculture-in-gulf-of-mexico-federal-waters.aspx> [<https://perma.cc/XN4T-TWEA>]; *Fishery Management Plan for Regulating Offshore Marine Aquaculture in the Gulf of Mexico (Gulf Aquaculture Plan)*, NOAA FISHERIES SE. REG'L OFFICE, http://sero.nmfs.noaa.gov/sustainable_fisheries/gulf_fisheries/aquaculture/ [<https://perma.cc/T8ZC-EGLE>] (last visited May 18, 2017). This rule was effective February 12, 2016. Fisheries of the Caribbean, Gulf, and South Atlantic; Aquaculture, 81 Fed. Reg. 1762 (Jan. 13, 2016) (to be codified at 50 C.F.R. pts. 600 and 622).
111. "Aquaculture activities may be regulated under regulations implementing fishery management plans for fisheries in the Exclusive Economic Zone (federal waters). Fishery management plans are developed by regional Fishery Management Councils and implemented by NOAA Fisheries, under the authority of the [Magnuson-Stevens Act]." *Federal Aquaculture Regulatory Fact Sheet Series*, DEP'T OF COMMERCE (Feb. 2016), http://www.nmfs.noaa.gov/aquaculture/docs/policy/agency_fact_sheets/noaa_aq_regulatory_fact_sheet_updated.pdf [<https://perma.cc/6QBG-LJTC>]. This fishery management plan (the Gulf Aquaculture Plan) was developed to regulate aquaculture operations in the Gulf of Mexico EEZ exclusively, meaning Gulf aquaculture permits cannot be granted for offshore aquaculture projects outside the Gulf of Mexico region. Fisheries of the Caribbean, Gulf, and South Atlantic; Aquaculture, 81 Fed. Reg. at 1762.
112. With no federal framework, finfish aquaculture projects in federal waters off of California may have to obtain a National Environmental Policy Act certification, a National Pollutant Discharge Elimination System permit from the EPA, an aquaculture registration via the California Department of Fish and Wildlife, a consistency certification from the California Coastal Commission, and an Aids to Navigation permit from the U.S. Coast Guard, as well as having to undergo a Protected Resources review by the National Oceanic and Atmospheric Administration. *Permitting*, ROSE CANYON FISHERIES, <http://rosecanyonfisheries.com/the-project/press-releases/> [<https://perma.cc/92R5-W4C4>] (last visited May 18, 2017).

projects to other countries.¹¹³ NOAA hopes this new rule, the first of its kind for federal waters, will “set an example for successfully expanding sustainable aquaculture in other areas of our federal waters.”¹¹⁴

The Gulf Aquaculture Plan attempts to streamline and simplify the federal permitting process to coordinate offshore aquaculture production in the Gulf of Mexico.¹¹⁵ A Gulf Aquaculture Permit authorizes a permit holder to harvest “wild broodstock of an allowable aquaculture species native to the Gulf” and “possess or transport allowable aquaculture species in, to, or from an offshore aquaculture facility in federal waters of the Gulf.”¹¹⁶ NOAA may issue up to

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113. See Neil Ramsden, *Kampachi Farms: Fighting for Aquaculture*, UNDERCURRENT NEWS (Nov. 8, 2012, 2:57 PM), <https://www.undercurrentnews.com/2012/11/08/seafood-entrepreneurs/> [<https://perma.cc/6LZA-32P7>] (noting that Neil Anthony Sims, owner of Kampachi Farms, is looking to move his aquaculture company to La Paz, Mexico, where the government supports aquaculture. Sims criticizes the lack of a U.S. aquaculture regulatory framework, which makes it extremely difficult to obtain permits.).
114. Kevan Main, *Moving U.S. Marine Aquaculture Forward: The Gulf Aquaculture Plan*, MOTE MARINE LABORATORY & AQUARIUM (Jan. 13, 2016), <https://mote.org/news/article/moving-u.s.-marine-aquaculture-forward-the-gulf-aquaculture-plan> [<https://perma.cc/PAR6-X6DK>]; see also Maddie Oatman, *The Feds Just Approved Offshore Fish Farming*, MOTHER JONES (Jan. 14, 2016, 8:06 PM), <http://www.motherjones.com/blue-marble/2016/01/feds-just-okayed-offshore-fish-farming> [<https://perma.cc/YN7W-WLKN>] (explaining the commercial benefits of offshore agriculture farming).
115. NOAA FINAL RULE FAQs, *supra* note 1, at 3. NOAA has authority to regulate aquaculture in federal waters under the Magnuson-Stevens Fishery Conservation and Management Act. *Gulf of Mexico Aquaculture Fishery Management Plan: Frequently Asked Questions*, NOAA FISHERIES SERVICE OFFICE (Jan. 2013), http://sero.nmfs.noaa.gov/sustainable_fisheries/gulf_fisheries/aquaculture/documents/pdfs/gulf_aquaculture_faqs_jan2013.pdf [<https://perma.cc/9FXS-48FT>] “Landings or possession of species managed under a fishery management plan for purposes of commercial marine aquaculture production in federal waters constitutes ‘fishing’ as defined in the Magnuson-Stevens Act. Fishing includes activities and operations related to the taking, catching, or harvesting of fish,” and, therefore, aquaculture falls within this definition. *Id.* For a review of the application of the Magnuson-Stevens Act to offshore aquaculture, see generally EMMETT ENVTL. LAW & POLICY CLINIC, HARVARD LAW SCHOOL, OFFSHORE AQUACULTURE REGULATION UNDER THE MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT (June 2013).
116. NOAA FINAL RULE FAQs, *supra* note 1, at 3. In addition to the Gulf Aquaculture Permit, other federal permits must also be secured, such as the Environmental Protection Act’s National Pollutant Discharge

twenty Gulf Aquaculture Permits to produce up to a combined 64 million pounds of fish annually.¹¹⁷

The purpose of the Gulf Aquaculture Plan is to develop a regional permitting process for regulating and promoting “environmentally sound and economically sustainable aquaculture” in the Gulf of Mexico’s Exclusive Economic Zone.¹¹⁸ The Gulf Aquaculture Plan includes many environmentally and economically focused goals, such as ensuring ecosystem compatibility and compatibility with other marine environment uses, basing decisions on the best available science and information, providing positive social and economic benefits, holding the industry accountable, and giving the public accurate information about aquaculture development.¹¹⁹ A Programmatic Environmental Impact Statement evaluated potential environmental impacts, such as impacts to water quality, wild stocks, and fishing communities; additionally, EPA drug and chemical use regulations contain many safeguards to prevent or mitigate negative impacts.¹²⁰ Placement of offshore aquaculture farms is heavily regulated—farms cannot be sited in areas of particular concern, such as marine protected areas or areas that pose risk to Essential Fish Habitats, and farms may be denied if the location conflicts with fishing or other marine uses or if the area poses risk of low dissolved oxygen levels, harmful algal blooms, or insufficient currents to disperse wastes.¹²¹ Strict monitoring, recordkeeping, and reporting requirements must be followed to assess environmental impacts, and aquaculture farms will have to be inspected regularly for entanglements or interactions with other animals.¹²²

Elimination System (“NPDES”) permit and the Army Corps’ Section 10 permit. *Id.* at 4.

117. *Id.* at 1. Individual permit holders are limited to producing only 12.8 million pounds of fish annually. *Id.*

118. Fisheries of the Caribbean, Gulf, and South Atlantic; Aquaculture, 81 Fed. Reg. 1762 (Jan. 13, 2016) (to be codified at 50 C.F.R. pts. 600 and 622).

119. *Consistency of Fishery Management Plan (FMP) and Programmatic Environmental Impact Statement (PEIS) for Regulating Offshore Marine Aquaculture in the Gulf of Mexico (GOM) with NOAA Goals for Aquaculture in Federal Waters*, NOAA FISHERIES SE. REGIONAL OFFICE (June 2011), http://sero.nmfs.noaa.gov/sustainable_fisheries/gulf_fisheries/aquaculture/documents/pdfs/aquaculture_fmp_consistency_analysis.pdf [<https://perma.cc/DG44-RCWY>].

120. NOAA FINAL RULE FAQs, *supra* note 1, at 4.

121. *Id.*

122. Fisheries of the Caribbean, Gulf, and South Atlantic; Aquaculture, 81 Fed. Reg. at 1763–64. Copies of all permits, monitoring reports, daily records of

Only species native to the Gulf and managed under the fishery management unit may be cultured, and no genetically engineered or transgenic animals are allowed.¹²³ To reduce the spread of disease from cultured fish to wild fish, permit holders must obtain a health certificate stating that the fish are free of pathogens before stocking an aquaculture cage.¹²⁴ Additionally, only certain aquaculture net pens and cages may be used—systems will be reviewed for factors such as structural integrity on a case-by-case basis.¹²⁵

To address property right concerns, Gulf Aquaculture Permits are only authorized for the use of a particular site for the duration of the permit, and permits may be revoked, suspended, or modified pursuant to enforcement proceedings.¹²⁶ Permittees must also allow National Marine Fisheries Service officers to access their aquaculture facilities and records to conduct inspections and ensure compliance with the Gulf Aquaculture Plan.¹²⁷

fish introduced or removed, and feed purchases must be maintained for three years. *Id.* at 1766.

123. *Id.* at 1765. Technology exists to produce some fish species, such as red drum, cobia, mahi-mahi and certain snapper species, but research is necessary to improve hatchery technology for grouper, red snapper, and amberjack species. Main, *supra* note 114.
124. NOAA FINAL RULE FAQs, *supra* note 1, at 5. Additionally, NOAA may order the removal of all cultured fish if a certified aquatic animal health expert determines that a suspected pathogen exists and poses a threat to wild organisms. *Id.*
125. Fisheries of the Caribbean, Gulf, and South Atlantic; Aquaculture, 81 Fed. Reg. at 1765. As the Gulf experiences major weather events like hurricanes, cage structural integrity is essential to prevent escapes. *Id.*
126. *Id.* at 1769. Permits are effective for ten years and can be renewed for extended increments of five years. These permits initially cost \$10,000, with a \$1,000 annual fee to cover administrative costs and renewal application fees cost \$5,000. *Id.* at 1762. It should be noted that although this Note does not address the public trust doctrine in regards to offshore aquaculture, there are major property right concerns associated with offshore aquaculture. The public trust doctrine stands for the proposition that certain properties are held in trust for use by the public and, thus, these properties cannot be owned privately. *See* Babcock, *supra* note 11, at 52 (discussing the application of the public trust doctrine to offshore aquaculture and noting that fish farming can violate the public trust doctrine in three ways: (1) a fish farm enclosing a portion of the open ocean with net pens claims an exclusive right to use public resources; (2) a fish farm using wild fish as their seed stock for farmed fish, when those fish would otherwise be available to the public, and (3) a fish farm interfering “with traditional public trust activities like fishing and navigation”).
127. Fisheries of the Caribbean, Gulf, and South Atlantic; Aquaculture, 81 Fed. Reg. at 1765.

NOAA hopes the Gulf Aquaculture Plan will reduce U.S. dependency on seafood imports, create jobs, and provide a domestic source of sustainable fish protein in an environmentally sound and economically sustainable way.¹²⁸ The Gulf Aquaculture Plan “accounts for the region’s unique needs and opens the door for other regions to follow suit,” suggesting that if specialized fishery management plans are developed for other regions of the United States, offshore aquaculture may become authorized in regions outside the Gulf of Mexico.¹²⁹

It should be noted, however, that twelve fishing and public interest groups have sued the federal government over the Gulf Aquaculture Plan, arguing that NOAA overextended its “authority in creating a permitting scheme for ocean fish farming.”¹³⁰ Perhaps this is why no aquaculture investors have submitted an application for a Gulf Aquaculture Permit as of July 2016.¹³¹ Other potential concerns

128. Bill Mahan, *NOAA Expands Opportunities for U.S. Aquaculture in Gulf of Mexico*, UNIV. FLA. INST. OF FOOD AND AGRIC. SCI. EXTENSION (Jan. 13, 2016), <http://bay.ifas.ufl.edu/seagrant/2016/01/13/noaa-expands-opportunities-for-u-s-aquaculture-in-gulf-of-mexico/> [<https://perma.cc/R5BL-7QRC>].

129. *Id.* Similar federal regulations for offshore aquaculture may next be developed for the Pacific Islands region, which includes the region around Guam, Hawaii, and Samoa. Weiser, *supra* note 93; Caleb Jones, *NOAA Plans to Open Federal Waters in Pacific to Fish Farming*, ABC NEWS (Jan. 6, 2017, 6:37 PM), <http://abcnews.go.com/US/wireStory/noaa-plans-open-federal-waters-pacific-fish-farming-44592800> [<https://perma.cc/H8HS-59JH>].

130. *Fishing and Public Interest Groups Sue Feds Re: Offshore Aquaculture*, RECIRCULATING FARMS COALITION (Feb. 17, 2016), <http://www.recirculatingfarms.org/fishing-and-public-interest-groups-sue-feds-re-offshore-aquaculture> [<https://perma.cc/PZ5Y-Z2AJ>]. *See, e.g.*, Complaint, *Gulf Fishermen’s Ass’n v. Nat’l Marine Fisheries Serv.*, No. 2:16-cv-01271 (E.D. La. Feb. 12, 2016) (alleging that defendants—including the NMFS—“establish[ed] an unprecedented regulatory permitting scheme”). NOAA’s determination that aquaculture constitutes “fishing” under the Magnuson-Stevens Act is subject to ongoing judicial challenge and is at issue in these current challenges to the Gulf Aquaculture Plan. EMMETT ENVTL. LAW & POLICY CLINIC, *supra* note 115, at 5. The groups are challenging the Gulf Aquaculture Plan under the Magnuson-Stevens Fishery Conservation and Management Act, the Endangered Species Act, the National Environmental Policy Act, and the Administrative Procedure Act. *Fishing and Public Interest Groups Sue Feds on New Rules Allowing Offshore Aquaculture*, RECIRCULATING FARMS COALITION (Feb. 16, 2016), <http://www.recirculatingfarms.org/wp-content/uploads/2011/05/Recirculating-Farms-Coalition-Press-Release-Industrial-Offshore-Aquaculture-01162016.pdf> [<https://perma.cc/XV4N-6MNV>].

131. Hannah Hauptman, *The January 2016 Gulf Aquaculture Plan: A Contested Impact*, ENVTL. LAW INST. (Aug. 12, 2016),

for aquaculture investors include the “relatively short 10-year permits and the unclear requirements for renewal,” which may deter startup capital.¹³² Further, the National Marine Fisheries Service’s “retention of case-by-case authority” may be disastrous because “[i]nvestors would have to work closely with multiple permitting agencies and regulatory bodies.”¹³³ This struggle between concern for lost capital or a poor return on investments in aquaculture farms and the potential for great success will be interesting to watch in the coming years and how that affects not only the Gulf Aquaculture Plan, but any future federal aquaculture regulations.

III. ROSE CANYON FISHERIES SUSTAINABLE AQUACULTURE PROJECT

A. Specifics of the RCF Sustainable Aquaculture Project

At 3.6 miles off the coast of San Diego, the proposed RCF project would be the first finfish aquaculture farm located in U.S. federal waters.¹³⁴ Capable of producing up to 5,000 metric tons (or 11 million pounds) of yellowtail jack, white seabass, and striped bass per year, RCF would also be the largest aquaculture farm in the entire United States.¹³⁵ The RCF project expects to build forty-eight cages, possibly using the Double Rim SeaStation or traditional SeaStation, traditional gravity type surface cages, or Aquapod submersible fish cages.¹³⁶ Taking up 1.3 square miles of ocean seafloor, RCF would be almost the same size as Central Park in New York City.¹³⁷ At peak employment, RCF could directly employ seventy-two people and

<https://www.eli.org/vibrant-environment-blog/january-2016-gulf-aquaculture-plan-contested-impact> [<https://perma.cc/35HF-LZV2>].

132. *Id.*

133. *Id.*

134. O’Malley, *supra* note 5.

135. *Rose Canyon Fisheries Facts: The Project*, ROSE CANYON FISHERIES, <http://rosecanyonfisheries.com/the-project/fact-sheet/> [<https://perma.cc/JUK8-VKV7>] (last visited May 18, 2017); *Rose Canyon Fisheries Sustainable Aquaculture Project: Application for Permit*, U.S. ARMY CORPS OF ENGRS L.A. DIST. (Feb. 9, 2015), http://www.spl.usace.army.mil/Portals/17/docs/publicnotices/SPL-2014-00600-MBT_Rose%20Canyon_PN.pdf [<https://perma.cc/C6P8-RCEP>] [hereinafter *RCF Permit Application*]. At full capacity, RCF’s production would be a landed value of six to seven times the current total in San Diego. *Id.* at 10.

136. *RCF Permit Application*, *supra* note 135, at 5.

137. Trageser, *supra* note 6.

indirectly support more than 300 jobs in the region every year.¹³⁸ RCF believes it will generate over 50 million dollars in total economic impact annually by 2022.¹³⁹ Local consumers would benefit from this year-round supply of high-quality seafood that is a safe and healthy source of protein, and RCF hopes this supply will reduce pressure on wild fisheries.¹⁴⁰

RCF applied for a permit to build this aquaculture farm from the U.S. Army Corps of Engineers,¹⁴¹ and now the Army Corps must decide whether or not to issue the permit under Section 10 of the RHA after it completes a review.¹⁴² Although RCF applied for an Army Corps permit, the Army Corps is not the only agency whose review matters in the regulation of offshore finfish aquaculture projects. The CZMA's federal consistency provision grants California vast power to review projects such as RCF, leaving the fate of RCF to the California Coastal Management Program.

*B. California Regulation under the Coastal Zone Management Act:
The California Coastal Management Program*

NOAA approved California's Coastal Zone Management Plan (CZMP), the California Coastal Management Program (CCMP), in 1978.¹⁴³ The California Coastal Act of 1976 (Coastal Act) is the foundation of the CCMP, and it "defines the State's coastal management goals and policies, establishes boundaries of the State's coastal zone, and creates governmental mechanisms for carrying out the management program."¹⁴⁴ The policies of the Coastal Act include

138. ROSE CANYON FISHERIES, ECONOMIC IMPACT (2015), <http://rose canyonfisheries.com/the-project/economic-impact/> [<https://perma.cc/2RZ6-5XE3>].

139. *Id.*

140. *Id.*

141. *RCF Permit Application*, *supra* note 135, at 1–2.

142. *Id.* at 2. The Army Corps completes a public interest review of all proposed federal aquaculture facilities, through which the Army Corps balances "all reasonably expected benefits and detriments to the public interest, including environmental, economic, aesthetic, navigation, property rights, and international interests." KRISTEN M. FLETCHER & GINGER WESTON, SEA GRANT AQUACULTURE CONSORTIUM, THE LEGAL & REGULATORY ENVIRONMENT: OFFSHORE AQUACULTURE PERMITTING PROCESS IN THE GULF OF MEXICO, <http://masglp.olemiss.edu/Offshore%20Aquaculture.pdf> [<https://perma.cc/CW4C-XV9Q>] (last visited May 18, 2017).

143. CAL. COASTAL COMM'N, DESCRIPTION OF CALIFORNIA'S COASTAL MANAGEMENT PROGRAM (CCMP), http://www.coastal.ca.gov/fedcd/ccmp_description.pdf [<https://perma.cc/3JYQ-VY3E>] (last visited May 18, 2017).

144. *Id.*

statutory standards that are applied to planning and regulatory decisions made by the California Coastal Commission (CCC), including decisions on federal consistency reviews and permit applications.¹⁴⁵ The CCC is one of three designated coastal management agencies that administer the CZMA in California, and the proposed location of RCF—off the coast of San Diego—falls into the CCC’s jurisdiction.¹⁴⁶

The Federal Consistency Unit (FCU) of the CCC completes federal consistency reviews in California.¹⁴⁷ When completing a consistency review of RCF, the FCU can either (1) prevent issuance of the Army Corps permit; (2) issue a conditional concurrence; or (3) negotiate and add conditions that must be met in order to bring RCF into compliance with the CCMP.¹⁴⁸ FCU consistency determinations are based primarily on the Chapter 3 enforceable policies in the Coastal Act, or the “Coastal Resources Planning and Management Policies.”¹⁴⁹ The FCU, however, can examine California state laws—such as the Sustainable Oceans Act and the California Fish and Game Code—as references, for history, and for guidance during its consistency reviews.¹⁵⁰ As California has shown a commitment to preserve its environment and ecosystem by enacting stringent aquaculture regulations, the FCU should strongly consider California’s state aquaculture laws during reviews of offshore aquaculture projects.¹⁵¹

145. *Our Mission*, *supra* note 106.

146. *Id.*

147. *Federal Consistency*, *supra* note 107.

148. Showalter, *supra* note 105, at 226.

149. Chapter 3 of the Coastal Act contains the enforceable policies that are used during all consistency reviews—all documents are reviewed for consistency with these policies. *Federal Consistency*, *supra* note 107.

150. “Local government representatives will be afforded the opportunity to participate in the Commission’s deliberations and to present a determination of the consistency of the proposed activity with the certified local coastal programs for the affected jurisdictions.” CAL. COASTAL COMM’N, *Managing the Coast: The National Interest and the Consistency of Federal Actions*, in CALIFORNIA COASTAL MANAGEMENT PLAN, <http://www.coastal.ca.gov/fedcd/ccmp-ch11.pdf> [<https://perma.cc/4CJP-V2PX>] (last visited May 18, 2017).

151. NAT’L SEA GRANT LAW CTR., *supra* note 91.

*C. How California Regulations Should Apply to the RCF Sustainable
Aquaculture Project: The Federal Consistency Review*

In this Section, the proposed RCF aquaculture project will be assessed against the Chapter 3 enforceable policies of the Coastal Act and California state aquaculture laws. By analyzing how the FCU has made its consistency determinations on past aquaculture projects, this Section will address what Chapter 3 policies the FCU should focus on during its consistency review of RCF and provides an analysis of how RCF may fare during its future consistency review by the FCU. Although the FCU is not required to analyze California state laws during consistency reviews, RCF will also be assessed against California state aquaculture laws in this Section because these state laws provide additional requirements and standards that the FCU could require RCF to meet in order to become consistent with the CCMP.

1. Hypothetical Consistency Review of the RCF Sustainable Aquaculture
Project: Comparison to KZO Sea Farms and Platform Grace

The FCU has reviewed two past aquaculture projects in California that were proposed to be built in federal waters—KZO Sea Farms (an offshore shellfish aquaculture project) and Platform Grace (a proposed, but never executed offshore finfish aquaculture project). The FCU completed a consistency review of KZO Sea Farms and an analysis of Platform Grace when it requested permission to review Platform Grace in case the project ever materialized.¹⁵² By analyzing how the FCU has reviewed KZO Sea Farms and Platform Grace, this Section examines a hypothetical FCU consistency review of RCF.

a. Background on KZO Sea Farms and Platform Grace

To date, the FCU has only approved one aquaculture farm located in federal waters off of California—KZO Sea Farms. Once built, KZO Sea Farms, also known as Catalina Sea Ranch, will be located 8.5 miles offshore of Long Beach, California.¹⁵³ Importantly, this is a shellfish aquaculture project, producing mussels, shellfish, and oysters,¹⁵⁴ which has very different characteristics than finfish farms.

152. KZO Sea Farms and Platform Grace are the only aquaculture projects that have ever been proposed to be placed in the federal waters off of California, which is why they are chosen for comparison to the proposed RCF project.

153. CAL. COASTAL COMM'N, ADOPTED ACTION ON CONSISTENCY CERTIFICATION FOR KZO SEAFARMS (2013) [hereinafter KZO CONSISTENCY CERTIFICATION].

154. *Id.* See Porter & Kihlsinger, *supra* note 68, at 10887 (stating that once operations begin, KZO Sea Farms will culture about 25,000 pounds of

As KZO Sea Farms is the only permitted aquaculture facility in the federal waters off of California to date, it is important to analyze the FCU's consistency review of KZO Sea Farms to determine what Chapter 3 policies are relevant to aquaculture farms and how environmental and socio-economic impacts can be mitigated.

Similar to RCF, KZO Sea Farms applied for a Section 10 RHA permit from the Army Corps.¹⁵⁵ Because this is an activity outside of the coastal zone, the FCU needed permission from NOAA's Office of Coastal Resource Management (OCRM) before it could review the activity for consistency.¹⁵⁶ Receiving OCRM approval, the FCU focused its review attention on how KZO Sea Farms could affect marine resources, including marine wildlife and benthic habitats, recreational and commercial fishing, and access and recreation.¹⁵⁷ KZO Sea Farms minimized these potential issues by reducing the aquaculture farm's size and relocating it further offshore.¹⁵⁸ By making these changes and agreeing to thirteen special conditions the FCU laid out to bring KZO Sea Farms into compliance with its CCMP, KZO Sea Farms was deemed consistent with the Coastal Act policies and was issued a consistency certification.¹⁵⁹

Platform Grace Aquaculture Project was an earlier HSWRI venture, which hoped to build an offshore finfish aquaculture farm ten miles offshore of Ventura County, California.¹⁶⁰ Platform Grace desired to culture white seabass, halibut, Bluefin tuna, and striped bass.¹⁶¹ Although the Platform Grace project ultimately did not proceed, the FCU wanted to complete a consistency review because

Mediterranean mussels and Pacific oysters each year on submerged long lines).

155. KZO CONSISTENCY CERTIFICATION, *supra* note 153, at 13.

156. *Id.* at 13.

157. *Id.* at 1.

158. Porter & Kihlslinger, *supra* note 68, at 10886.

159. *Id.* at 10887. After the FCU completed its review and received public comments, the FCU deemed KZO as consistent if KZO complied with thirteen special conditions, including: an offshore mariculture monitoring program, notice to mariners, a spill prevention and control plan, updated NOAA charts, and conditions about the discharge of biological materials, marine debris, invasive species, and marine wildlife entanglement. *Id.* After KZO accepted all of these conditions, KZO's permit was finalized and issued by the Army Corps. *Id.*

160. Letter from Peter M. Douglas, Exec. Dir., Cal. Coastal Comm'n, to Donald Kent, Hubbs-SeaWorld Research Inst. (Mar. 11, 2004) (on file with author) [hereinafter Platform Grace Review].

161. *Id.* at 2.

Platform Grace would have reasonably foreseeably affected water quality, habitat and wildlife, recreational and commercial fishing, and coastal zone resources.¹⁶² OCRM permitted the FCU to review Platform Grace if the project ever materialized based on these concerns.¹⁶³ Because Platform Grace was another HSWRI venture and also a finfish aquaculture project, the FCU's review of RCF will likely be similar to its review of Platform Grace.

b. Comparison of the RCF Sustainable Aquaculture Project to KZO Sea Farms and Platform Grace

The FCU can apply any of the enforceable Chapter 3 policies of the Coastal Act during federal consistency reviews. Based on the FCU's past consistency reviews of KZO Sea Farms and Platform Grace, however, the FCU focuses on these six main factors when aquaculture projects are being reviewed: (1) the size and location of the aquaculture farm; (2) commercial and recreational fishing impacts; (3) economic impacts; (4) impacts on marine resources; (5) water quality impacts; and (6) scenic impacts. The FCU's analysis of these six factors during its reviews of KZO Sea Farms and Platform Grace will be assessed against the proposed RCF project in the following Sections.

i. Size and Location of the Aquaculture Farm

The size and location of shellfish and finfish aquaculture farms are two of the most important aspects analyzed during consistency reviews. Larger aquaculture farms pose greater environmental risks and foreclose more ocean space to fishing, boating, and other recreational activities. Furthermore, if the farm is located in an area where these activities frequently occur, the impacts can be greater.

KZO Sea Farms's initial plan was to build a 1076 acre aquaculture farm, but to mitigate environmental impacts, KZO Sea Farms reduced the size to 100 acres.¹⁶⁴ The FCU indicated that the original 1076 acres size could adversely impact fisheries, marine mammals, and the marine environment.¹⁶⁵ These impacts could be caused by entanglement of marine mammals, collisions between project vessels and marine mammals, marine debris discharge, the exclusion or deterrence of marine predators, and the loss of recreational and commercial fishing grounds.¹⁶⁶ Even at 100 acres,

162. *Id.*

163. *Id.* at 2–4.

164. KZO CONSISTENCY CERTIFICATION, *supra* note 153, at 8.

165. *Id.* at 10.

166. *Id.*

KZO Sea Farms would still be the largest aquaculture farm in California and has the potential to adversely affect California's coastal uses and resources.¹⁶⁷

RCF's proposed size would occupy at least 1.3 square miles of ocean floor.¹⁶⁸ RCF's total footprint may further increase because a restricted access zone, where all fishing is prohibited, is likely to be established around RCF to prevent fishermen's nets and boats from becoming entangled in the net pens and cages.¹⁶⁹ KZO Sea Farms's original size of 1076 acres (1.68 square miles) is similar to RCF's proposed size (1.3 square miles). If the FCU believed KZO Sea Farms's original size would negatively impact the coastal zone because it was too large and, thus, required KZO to reduce its size to 100 acres, the FCU may likewise make RCF reduce its size unless other substantial mitigation efforts reduce the proposed farm size's impact on the coastal zone.¹⁷⁰

Access and recreation are protected under Section 30210 of the Coastal Act, which states that maximum access and "recreational opportunities shall be provided for all the people consistent with public safety needs and the need to protect public rights, rights of private property owners, and natural resource areas from overuse."¹⁷¹ Additionally, Section 30211 states that "[d]evelopment shall not interfere with the public's right of access to the sea."¹⁷² Recreational activities around KZO's permitted site include fishing, sailing, whale watching, boating, and other water sports.¹⁷³ Although KZO will consist of 1350 shellfish floats, the structures will be submerged about twenty to thirty feet, meaning most vessels could freely pass above the structures with little risk of collision or entanglement.¹⁷⁴ Additionally, because KZO moved farther offshore and outside heavy traffic areas, KZO does not greatly restrict access or ocean waters for

167. *Id.* at 10–11.

168. Claire Trageser, *Massive Fish Farm Proposed Off San Diego's Coast*, KPBS (Sept. 2, 2015), <http://www.kpbs.org/news/2015/sep/02/massive-fish-farm-proposed-san-diegos-coast/> [<https://perma.cc/A7U8-S2A8>].

169. Restricted access zones typically prohibit all recreational and commercial fishing in the zone. Fisheries of the Caribbean, Gulf, and South Atlantic; Aquaculture, 81 Fed. Reg. 1762, 1766 (Jan. 13, 2016) (to be codified at 50 C.F.R. pts. 600 and 622).

170. RCF's size of 1.3 square miles does not include the additional restricted access zone.

171. CAL. PUB. RES. CODE § 30210 (West 2016).

172. CAL. PUB. RES. CODE § 30211 (West 2016).

173. KZO CONSISTENCY CERTIFICATION, *supra* note 153, at 44.

174. *Id.*

recreational use.¹⁷⁵ Unlike KZO, RCF's cages may have poles rising sixteen feet out of the water, meaning boaters would not be able to traverse over the RCF site—they would have to circumnavigate it. Also, as RCF's proposed placement is much closer to shore than KZO's, RCF would be in a much heavier traffic area.

Section 30220 of the Coastal Act protects “certain water-oriented activities,” stating that “[c]oastal areas suited for water-oriented recreational activities that cannot readily be provided at inland water areas shall be protected for such uses.”¹⁷⁶ RCF's proposed placement does not protect water-oriented recreational activities because RCF would occupy 1.3 square miles of ocean space where recreational activities currently take place.¹⁷⁷ Additionally, Section 30224 states that “[i]ncreased recreational boating use of coastal waters shall be encouraged.”¹⁷⁸ If RCF is built, all vessels may be forced to take different routes to avoid the aquaculture farm, discouraging recreational boating as well as commercial activities. Three main categories of vessels traverse the project area: large commercial vessels, local work boats, such as fishing and tour boats, and recreational boats.¹⁷⁹ Boaters trying to reach the San Clemente and Santa Catalina Islands may be affected as the main navigational paths to the islands run very close to RCF's proposed site.¹⁸⁰ San Diego also has nine launch ramps, two commercial wharves, numerous commercial fishing wharves, and heavy vessel traffic from the U.S. Navy.¹⁸¹ Countless people and industries in San Diego use the ocean—and all of them may have to change their navigational paths to compensate for RCF's use of their public ocean, which may greatly affect the economic, commercial, and recreational importance of this ocean region.

To mitigate negative effects on recreational ocean use, the KZO Sea Farms project was relocated further offshore and moved out of heavily used ocean pathways. RCF could impart similar negative

175. *Id.*

176. CAL. PUB. RES. CODE § 30220 (West 2016).

177. Trageser, *supra* note 6.

178. CAL. PUB. RES. CODE § 30224 (West 2016).

179. *RCF Permit Application*, *supra* note 135, at 3.

180. *Id.* at 2.

181. *Id.* at 3. See Dep't of the Navy, Comment Letter on the Environmental Assessment pursuant to NEPA Process for the Rose Canyon Sustainable Aquaculture Project (Dec. 17, 2015), <https://www.documentcloud.org/documents/2703988-Navy-Rose-Canyon-Scoping-Letter-17Dec2015.html> [<https://perma.cc/FEH7-43QH>] (outlining the U.S. Navy's serious concerns about the RCF proposed aquaculture project, focusing on the siting of the facility because the proposed placement is inside a Navy Testing area).

effects on recreational and commercial use unless RCF's size is reduced and its location changed to prevent fewer boating interferences. RCF's structure and location pose a great threat to ocean access for recreation and water-oriented activities, and unless changes are made to reduce interference, RCF likely will not be found consistent with this Coastal Act policy.

ii. Commercial and Recreational Fishing Impacts

Sections 30234 and 30234.5 of the Coastal Act support protection of commercial and recreational fishing. Section 30234 states that “[f]acilities serving the commercial fishing and recreational boating industries shall be protected and, where feasible, upgraded.”¹⁸² Section 30234.5 states that “[t]he economic, commercial, and recreational importance of fishing activities shall be recognized and protected.”¹⁸³ As Southern California fishermen have already lost significant ocean space to area closures, marine protection initiatives, and renewable energy development, any additional loss of fishing grounds would have significant impacts.¹⁸⁴

Fishing catch and effort data gathered by the California Department of Fish and Wildlife indicates that the region where KZO Sea Farms will be located is an area of local, regional, and statewide importance for both quantity and value of fisheries.¹⁸⁵ In fact, several fishing groups submitted letters indicating that the installation of the KZO facility would restrict commercial and recreational fishing around the project site due to risks of loss and damage to fishing gear and/or catch resulting from contact with the aquaculture structure.¹⁸⁶ Despite this, KZO Sea Farms is not likely to significantly affect fishing in this area. The 100-acre KZO Sea Farms site is located a half-mile from Platform Edith, where a fishing exclusion zone already exists.¹⁸⁷ KZO's original location would have added up to nine square miles of a no-fishing zone, but KZO's new location now only adds a 1.2 square mile fishing exclusion zone.¹⁸⁸ Changing the location greatly

182. CAL. PUB. RES. CODE § 30234 (West 2016).

183. *Id.* § 30234.5.

184. KZO CONSISTENCY CERTIFICATION, *supra* note 153, at 36.

185. *Id.*

186. *Id.* at 35.

187. *Id.* at 40.

188. *Id.* Common fishing practices in the area include use of large nets which are deployed around large schools of fish or squid and during these practices, fishing vessels commonly drift with the currents when retracting their nets filled with fish. Because of this, boundaries of aquaculture sites must be expanded by about two to three miles all around to help minimize

reduced the amount of ocean space fishermen would have lost.¹⁸⁹ Because of these facts, the FCU determined that KZO Sea Farms adequately minimized adverse economic impacts to commercial and recreational fishermen and to coastal fisheries as a whole.¹⁹⁰

Platform Grace's potential impacts on recreational and commercial fishing also concerned the FCU.¹⁹¹ Commercial and recreational fishing were popular activities in Platform Grace's proposed location, and if built, Platform Grace would preclude these activities in that area.¹⁹² Even though "the existing platform already prevents recreational use of the area, the proposed project could expand the area of preclusion for recreational activities."¹⁹³ Platform Grace's potential effect on fishing was a major reason the FCU requested to complete a consistency review if the project materialized.

RCF, as proposed, could similarly negatively impact recreational and commercial fishing in the surrounding region. As mentioned above, RCF would occupy at least 1.3 square miles of the ocean—which would likely increase with a restricted access zone. Restricted access zones reduce the risk and associated costs of damage caused by fishing gear, equipment, or a vessel striking the cages, but may cost fishermen potential revenue and pleasure from fishing by taking away fishing ground.¹⁹⁴ The CCC was specifically concerned that RCF may conflict with existing uses, notably commercial and recreational fishing, in its comment letter to the EPA regarding RCF's Environmental Assessment.¹⁹⁵ San Diego fishermen, already upset at losing precious fishing grounds to marine protected areas and renewable energy development, will be even more frustrated if RCF materializes and more of their space is deemed a "no-fishing zone."

potential net interference. This expansion is why KZO's first site would have added an additional nine square miles of a no-fishing zone. *Id.* at 39.

189. *Id.* at 40.

190. *Id.*

191. Platform Grace Review, *supra* note 160, at 4.

192. *Id.*

193. *Id.*

194. GULF OF MEXICO FISHERY MGMT. COUNCIL, FISHERY MANAGEMENT PLAN FOR REGULATING OFFSHORE MARINE AQUACULTURE IN THE GULF OF MEXICO: ENVIRONMENTAL IMPACT STATEMENT 326 (2009).

195. Letter from Cassidy Teufel, Senior Env'tl. Scientist, Cal. Coastal Comm'n, to Elizabeth Sablad, U.S. Env'tl. Prot. Agency (Jan. 14, 2016), <https://assets.documentcloud.org/documents/2703985/CCC-Comments-Rose-Canyon-Scoping-Notice.pdf> [<https://perma.cc/X2LW-U4SY>].

iii. Economic Impacts

Economic impacts are referenced in Section 30234.5 of the Coastal Act, which states that “[t]he economic, commercial, and recreational importance of fishing activities shall be recognized and protected.”¹⁹⁶ Importantly, the CCC “has historically considered effects on commercial and recreational fishing to constitute coastal zone impacts, due to their importance to the regional coastal economy.”¹⁹⁷

To prevent economic harm, KZO Sea Farms relocated its farm to an oil platform site already designated as a no-fishing zone because of the possibility of fishermen’s gear getting tangled in the platform.¹⁹⁸ KZO’s relocation greatly reduced potential harm to fishing because only a small area was added to the no-fishing zone.¹⁹⁹

Recently, marine protected areas have been greatly expanded in San Diego waters, setting aside about fifteen percent of Southern California’s offshore habitat.²⁰⁰ Marine protected areas typically prohibit the taking of all marine resources (living, geologic, and cultural) and restrict boating activities.²⁰¹ Fishermen greatly protested expanding marine protected areas because it “would place a stranglehold on their trade” since they were not allowed to fish in those areas.²⁰²

In 2008, commercial fishing in California brought in \$113 million, with \$7 million from San Diego alone.²⁰³ Further, commercial fisheries jobs in San Diego are expected to increase more than 30% by 2016.²⁰⁴

196. CAL. PUB. RES. CODE § 30234.5 (West 2016).

197. Platform Grace Review, *supra* note 160, at 4.

198. KZO CONSISTENCY CERTIFICATION, *supra* note 153, at 1, 12–13.

199. *Id.* at 13.

200. Deborah Sullivan Brennan, *San Diego: Hundreds of People Weigh in on Marine Life Plan*, SAN DIEGO UNION-TRIBUNE (Oct. 20, 2010, 8:45 PM), <http://www.sandiegouniontribune.com/news/2010/oct/20/san-diego-hundreds-of-people-weigh-in-on-marine/> [<https://perma.cc/66L5-LTCH>]; *Southern California Marine Protected Areas*, CAL. DEP’T OF FISH & WILDLIFE, <https://www.wildlife.ca.gov/Conservation/Marine/MPAs/Network/Southern-California> [<https://perma.cc/LE92-79W9>] (last updated Mar. 1, 2016). Marine protected areas are created to help protect and conserve marine life, habitats, and marine resources. The fifty marine protected areas in Southern California cover approximately 356 square miles. *Id.*

201. *Southern California Marine Protected Areas*, *supra* note 200.

202. Brennan, *supra* note 200.

203. *Commercial Fisheries Revitalization Plan*, UNIFIED PORT OF SAN DIEGO, <https://www.portofsandiego.org/commercial-fisheries.html> [<https://perma.cc/KYS8-Q7HC>] (last visited May 18, 2017).

204. *Id.*

Many citizens rely on these jobs, and if RCF is built, fishermen will have less space to fish and may face market competition once RCF begins selling its fish. RCF's current proposed size and location poses a great economic threat to fishermen, and the FCU will likely find that RCF does not protect the economic importance of fishing called for by the Coastal Act.²⁰⁵

iv. Impacts on Marine Resources

The Coastal Act protects marine resources through Section 30230, which states that “[m]arine resources shall be maintained, enhanced, and, where feasible, restored.”²⁰⁶ Marine resources include living marine organisms, plants, oil, and gas.²⁰⁷ KZO's long lines may impact marine animals, such as sea turtles and whales, by entanglement, collisions with project vessels, and interferences from operational activities.²⁰⁸ Located in the midst of grey whale migrations, KZO's aquaculture farm greatly risks entangling whales and interfering with their migration.²⁰⁹ KZO, however, worked with the FCU to develop mitigation measures to reduce such impacts on marine resources, in order to bring KZO into consistency with this policy.²¹⁰

Platform Grace's proposed location provided “habitat for several federally listed threatened and endangered species” and was near marine reserves—areas “intended to protect and preserve” the local habitats.²¹¹ Potential impacts from Platform Grace's farm included destruction of benthic habitats from anchors and mooring lines, entanglement of animals in fish net pens and lines, “[a]lteration of benthic communities due to fish food and feces deposition,” “[i]ntroduction of invasive species,” and transfer of diseases.²¹² Because

205. RCF should examine other sites so that not as much of the valuable ocean space would be off-limits to all of the fishermen, workers, and U.S. Navy employees who use this space. A different location may help bring RCF into compliance with the CCMP regarding the economic impact on fishing.

206. CAL. PUB. RES. CODE § 30230 (West 2016).

207. Genny Anderson, *Marine Natural Resources*, MARINE SCI., <http://www.marinebio.net/marinescience/06future/olres.htm> [<https://perma.cc/CS28-MCZB>] (last updated June 2, 2009).

208. KZO CONSISTENCY CERTIFICATION, *supra* note 153, at 21.

209. *See id.* at 21–26 (discussing whale migrations in Southern California and the risk of entanglement in net pens, estimating that “entanglement in fishing gear results in the death of some 300,000 marine mammals per year”).

210. *Id.* at 26, 34.

211. Platform Grace Review, *supra* note 160, at 3.

212. *Id.*

it was reasonably foreseeable that Platform Grace would negatively affect marine resources this way, the FCU strongly wanted to review Platform Grace if the project proceeded.²¹³

RCF's proposed location is currently a thriving benthic habitat, home to numerous organisms including brittle stars, California Lizardfish, Hornyhead Turbot, sea urchins, and sea cucumbers.²¹⁴ As noted previously, scientific studies have found that aquaculture facilities in open-ocean environments can cause great destruction and modification to benthic seafloor habitats located directly beneath the farm.²¹⁵ While RCF claims there is no risk of disturbing kelp or hard-bottom habitats because the project location has a sandy bottom, RCF, if built, will disturb the habitats of the animals currently living there.²¹⁶ The FCU was worried about the impacts Platform Grace would have on marine resources. As RCF is much larger than Platform Grace would have been, the potential for negative impacts on marine resources is even greater. Instead of enhancing or restoring marine resources, RCF will likely have the opposite effect, making it unlikely that RCF will be found consistent with this Coastal Act policy.

v. Water Quality Impacts

Section 30231 of the Coastal Act protects water quality, stating that the quality of water shall "maintain optimum populations of marine organisms" and shall be restored by minimizing waste water discharges.²¹⁷ Additionally, Section 30240 explains that "[e]nvironmentally sensitive habitat areas shall be protected against any significant disruption of habitat values"²¹⁸

Originally, KZO's water quality impacts to the benthic community from organic enrichment could have been destructive in the farm's immediate area and up to two additional acres beyond the

213. *Id.* at 4.

214. CITY OF SAN DIEGO OCEAN MONITORING PROGRAM, POINT LOMA OCEAN OUTFALL: ANNUAL RECEIVING WATERS MONITORING & ASSESSMENT REPORT 2014, at 3-4 (2015), http://www.sandiego.gov/mwwd/pdf/pl2014_fullrpt.pdf [<https://perma.cc/5WZY-J4G8>].

215. OCEAN CONSERVANCY, *supra* note 33, at 14.

216. *Specific Location*, ROSE CANYON FISHERIES, <http://rosecanyonfisheries.com/the-project/fact-sheet/specific-location> [<https://perma.cc/5T8Z-99V5>] (last visited May 18, 2017).

217. CAL. PUB. RES. CODE § 30231 (West 2016).

218. *Id.* § 30240(a).

farm's outer limits.²¹⁹ KZO, however, ultimately chose a location with "deep waters, moderate currents, and high flushing rates," meaning organic material will likely be dispersed and will less likely impact the benthic community.²²⁰ Platform Grace would have potentially impacted surrounding water quality because organic waste and discharges—including antibiotics, antifouling chemicals, uneaten fish food, and fish feces—would be released into the water column.²²¹ These discharges could deplete oxygen in the surrounding waters, change the local ecosystem, and possibly harm the marine animals and resources in the area.²²² This discharge could additionally create toxic algal blooms, increase water turbidity and cloudiness, and alter the benthic sediment chemistry and the entire benthic community.²²³ Although the project would have been located far offshore with strong currents to help flush out the discharges, all the wastes could still have significantly affected the wildlife and local habitats.²²⁴ Importantly, EPA aquaculture effluent guidelines still do not provide numeric standards for aquaculture facilities located in federal waters.²²⁵ Without these effluent limitations, the FCU has no guidelines to determine if offshore aquaculture farms are discharging too much effluent or not.

RCF's biggest potential water quality issues include "oxygen depletion in surrounding waters, degradation of benthic . . . ecosystems," and toxic algae blooms created by nutrient loading.²²⁶ The gravity of these impacts depends heavily on the level of production, the intensity of the current flow, the depth of the water, and the assimilative capacity of ambient receiving waters.²²⁷ Algae blooms

219. KZO CONSISTENCY CERTIFICATION, *supra* note 153, at 20. KZO's project had the potential to interfere with numerous marine species and habitats, but the crucial ones will be discussed here.

220. *Id.*

221. Platform Grace Review, *supra* note 160, at 2–3. Early reports state that the aquaculture project could discharge up to 2,766,558 gallons of effluent each day. *Id.* at 2.

222. *Id.* at 3. Platform Grace could discharge 165 metric tons of uneaten food and fish feces. *Id.*

223. *Id.*

224. *Id.*

225. EMMETT ENVT'L LAW & POLICY CLINIC, *supra* note 115, at 29.

226. MARINE RESEARCH SPECIALISTS, FINAL REPORT: ROSE CANYON FISHERIES SUSTAINABLE AQUACULTURE PROJECT 50 (2014). Marine Research Specialists analyzed potential environmental impacts that the proposed RCF project may create in September 2014. *Id.* at 1.

227. *Id.* at 50.

may be the most concerning because algae blooms can produce toxins that kill fish and other organisms, and pose health risks to humans.²²⁸ RCF's potential to discharge extensive nutrient pollution greatly increases the chance of algae blooms, which could be harmful to RCF's own fish as well as wild fish. Further, such aquaculture pollution can potentially disrupt significant habitats like marine protected areas. As San Diego has worked hard to protect its marine protected areas, water quality in the entire region should be strongly preserved and protected. Unless RCF can guarantee minimal or no water quality degradation, RCF will likely not be found consistent with this Coastal Act policy.

Another related issue is that RCF's proposed location may impact water quality sampling associated with the Point Loma Ocean Outfall (PLOO) facility. San Diego's Point Loma sewage treatment plant is outdated, but the city has avoided spending \$2 billion to upgrade the facility by reducing "its reliance on the plant by building inland water recycling plants" and by ensuring the plant works adequately by monitoring the local coastal water quality.²²⁹ As the proposed RCF location lies directly on top of one PLOO water quality sampling location and is close by other sampling sites, the waste from RCF's 11 million fish may greatly decrease the water quality in these PLOO sampling sites.²³⁰ And "[i]f the water quality deteriorates, the city might not be able to prove that it's because of the fish, not the treatment plant" and this "could force the city to build a new treatment plant," costing San Diegans a lot of money.²³¹

vi. Scenic Impacts

Scenic and visual qualities are protected under Section 30251, which states that "[t]he scenic and visual qualities of coastal areas shall be considered and protected as a resource of public importance."²³² Owners of coastal homes and real estate "fear that

228. *Id.* at 52–53. The diatom *Chaetoceros concavicornis* can irritate fish gills and can cause blood hypoxia and death. *Id.* at 53. The relative abundance of *A. catenella*, a dinoflagellate that causes shellfish poisoning, was highest at sites in San Diego counties—where RCF is proposing to build its farm. *Id.*

229. Ry Rivard, *Navy, Water Department Wary of Massive Fish Farm Project*, VOICE OF SAN DIEGO (Feb. 8, 2016), <http://www.voiceofsandiego.org/topics/science-environment/navy-water-department-wary-of-massive-fish-farm-project/> [<https://perma.cc/GB6Z-3TML>].

230. Letter from Halla Razak, Dir. of Pub. Utilities, City of San Diego, to the U.S. Env'tl. Prot. Agency (Dec. 17, 2015), <https://www.documentcloud.org/documents/2704239-EPA-Comment-Binder-Rose-Canyon.html#document/p8/a275995> [<https://perma.cc/AT8J-62JB>].

231. Rivard, *supra* note 229.

232. CAL. PUB. RES. CODE § 30251 (West 2016).

aquaculture will spoil the view, reduce property values, or interfere with their recreational experience.”²³³ RCF cages may have poles that extend sixteen feet above the water, which would be visible above the horizon.²³⁴ At 3.6 miles offshore, these RCF poles would be visible from Sunset Cliffs and Mission Beach, popular tourist areas.²³⁵ Once all forty-eight RCF cages are built, anyone looking at the ocean may see a grid of forty-eight 16-foot poles.²³⁶ Not only would homeowners’ views be disrupted, but tourists would likely notice the RCF farm. As tourism is a huge business in San Diego, RCF’s potential impacts on tourism should be strongly considered.²³⁷ While boats and aquaculture cages are visible at four miles offshore, projects built further offshore would not be. Both KZO, at 8.5 miles offshore, and Platform Grace, proposed for ten miles offshore, are much farther offshore than RCF’s proposed location, partially to avoid disrupting scenic views. RCF’s current proposed location does not value the scenic and visual qualities of the coastal areas and, therefore, will likely not be found consistent with this Coastal Act provision.

* * *

Analysis of these six factors, which the FCU focuses on during consistency reviews of aquaculture projects, suggests that RCF, as currently proposed, would not be found to be consistent with the enforceable Chapter 3 policies in the California Coastal Management Plan. RCF emulates many of the same concerns as KZO Sea Farms and Platform Grace. KZO, after many significant changes, became consistent with the CCMP. With major changes of its own, RCF potentially could also become consistent with the CCMP and not negatively affect the California coastal zone or marine resources.

2. California State Aquaculture Laws Applicable to the Hypothetical
Consistency Review of the RCF Sustainable Aquaculture Project

In addition to the above-mentioned six-factor analysis based on the enforceable Chapter 3 policies of the Coastal Act, the FCU should

233. Gunnar Knapp & Michael C. Rubino, *The Political Economics of Marine Aquaculture in the United States*, 24 *REVIEWS IN FISHERIES SCI. & AQUACULTURE* 213, 217 (2016).

234. Trageser KPBS, *supra* note 168.

235. Looking back at land from RCF’s proposed location, one can “clearly see houses on the shore.” Trageser, *supra* note 6.

236. Trageser KPBS, *supra* note 168.

237. *San Diego Tourism Industry Research*, SANDIEGO.ORG, <http://www.sandiego.org/industry-research.aspx> [<https://perma.cc/CRB4-KGZD>] (last visited May 18, 2017). Tourism generates more than \$743 million in state and local taxes each year. *Id.* San Diego has over 34.9 million visitors each year, who spend \$10.4 billion annually. *Id.*

look to California state laws that regulate aquaculture in state waters for reference, guidance, and historical background on aquaculture within this particular state and assess how RCF meets these additional standards.²³⁸ As RCF would be located just 0.6 miles away from California state waters, an analysis of California state laws is significant in this situation. California has passed some of the strictest laws governing aquaculture, and, thus, California ideals regarding aquaculture should be acknowledged during every aquaculture consistency review. California state laws applicable during consistency reviews of aquaculture projects include the Sustainable Oceans Act, the California Fish and Game Code, and NPDES general permit requirements for aquaculture in California state waters.

First, it is important to note that the CCC agrees that California state laws should be acknowledged during reviews of offshore aquaculture farms. In a letter to the EPA regarding the RCF aquaculture project, the CCC stated that although the Sustainable Oceans Act (SOA) “applies only to finfish aquaculture facilities in state waters – and thus the Rose Canyon project is exempt from its requirements,” it is a common-sense baseline “for evaluating the potential impacts of such projects in the marine environment” and, thus, is worth consideration.²³⁹

The California Legislature enacted the SOA in 2006, hoping to prevent unnecessary harm to the environment.²⁴⁰ The SOA amends and adds to the California Fish and Game Code, specifically focusing on aquaculture regulation.²⁴¹ The SOA prohibits finfish aquaculture operations in California state waters unless a lease is obtained from the California Fish and Game Commission (FGC).²⁴² Per Section 15400 of the California Fish and Game Code, the FGC may lease

238. Although the California state laws are not explicitly stated in the CCMP and are not part of the Chapter 3 enforceable policies of the Coastal Act, they portray California’s ideals in ensuring environmentally sound aquaculture production and the FCU should recognize this. *See* Showalter, *supra* note 105, at 225–28 (discussing how states can use the Coastal Zone Management Act to exert authority over aquaculture in federal waters).

239. Teufel, *supra* note 195, at 2.

240. Sustainable Oceans Act, 2006 Cal. Stat. ch. 36, § 1; NAT’L SEA GRANT LAW CTR., *supra* note 91; Kelly O. Thomas, *The Sustainable Oceans Act: Will Fish Farmers Take the Bait?*, 38 MCGEORGE L. REV. 149, 150 (2007).

241. Thomas, *supra* note 240, at 149–50. Fish and Game Code §§ 54.5 and 15008 are new, while §§ 15400, 15405, 15406, 15406.5, and 15409 are amended per the SOA. *Id.* at 149.

242. CAL. FISH & GAME CODE § 15400(b) (West 2016); Thomas, *supra* note 240, at 153.

state water bottoms or the water column for marine finfish aquaculture to the highest responsible bidder.²⁴³ Leases may only be issued if the FGC determines that leases are in the public interest following a public hearing.²⁴⁴ Factors analyzed during this review include: the lease shall not unreasonably interfere with fishing, public trust values, wildlife, or harm the environment; the use of drugs, antibiotics, fish meal, and oil must be minimized; and water quality standards must be met.²⁴⁵ If a lease is obtained, aquaculture operations must regularly monitor and inspect their facilities, limit fish populations in the cages, and tag all farmed fish.²⁴⁶

The SOA also requires aquaculture farms to pay fees for use of ocean space. Fish and Game Code Section 15003 states that “[t]he department may assess a fee on persons growing aquaculture products on public lands and in public waters based on the price per pound of the products sold.”²⁴⁷ Aquaculture operations must also pay the FGC financial assurances, which guarantee that any damage the aquaculture operation causes will be remediated and restored to the site’s original condition at the end of the lease term.²⁴⁸

Further, the CCC identified ten specific factors outlined by the SOA that may be considered during environmental reviews of coastal marine finfish projects.²⁴⁹ These ten factors are:

- (1) appropriate areas for siting marine finfish aquaculture operations to avoid adverse impacts, and minimize any unavoidable impacts, on user groups, public trust values, and the marine environment;
- (2) the effects on sensitive ocean and coastal habitats;
- (3) the effects on marine ecosystems, commercial and recreational fishing, and other important ocean uses;
- (4) the effects on other plant and animal species, especially species protected or recovering under state and federal law;
- (5) the effects of the use of chemical and biological products and pollutants and nutrient wastes on human health and the marine environment;
- (6) the effects of interactions with marine mammals and birds;
- (7) the cumulative effects of a number of similar finfish aquaculture projects on the ability of the marine environment to support ecologically significant flora and fauna;

243. FISH & GAME § 15400.

244. *Id.* § 15400(a).

245. *Id.* § 15400(b)(2)–(3), (7), (10).

246. *Id.* § 15400(b)(4), (8)–(9); Thomas, *supra* note 240, at 153.

247. FISH & GAME § 15003(a).

248. *Id.* § 15409(a)–(c); Thomas, *supra* note 240, at 153–54.

249. Teufel, *supra* note 195, at 2.

(8) the effects of feed, fish meal, and fish oil on marine ecosystems; (9) the effects of escaped fish on wild fish stocks and the marine environment; and (10) the design of facilities and farming practices so as to avoid adverse environmental impacts, and to minimize any unavoidable impacts.²⁵⁰

These ten factors are the minimum of what the SOA calls for in environmental reviews.²⁵¹ While many of these factors are already addressed by the six factors mentioned in the previous Section under a CCMP consistency review, restating some factors suggests that the CCC highly values California state laws and will address all potential issues that may harm the California coastal zone.

In addition to the SOA and the California Fish and Game Code, California Regional Water Quality Control Boards have established NPDES General Permits that regulate discharges from aquaculture facilities in state waters.²⁵² Although the CCC has not specifically stated that NPDES guidelines should be used in aquaculture reviews, these permits provide useful regulations that the CCC may find helpful in aquaculture reviews in the future. NPDES permits regulate pollutants including fish food, feces, and drug and chemical residuals that are used for animal health, to enhance water quality, or for cleaning purposes.²⁵³ NPDES permits establish effluent numeric limitations that aquaculture facilities must meet or else the facilities may lose their permit.²⁵⁴ Importantly, the EPA has not established

250. *Id.*

251. *Id.*

252. CENT. COAST REG'L WATER QUALITY CONTROL BD., WASTE DISCHARGE REQUIREMENTS: NPDES GENERAL PERMIT FOR DISCHARGES FROM AQUACULTURE FACILITIES AND AQUARIUMS 6 (Dec. 13, 2013), http://www.waterboards.ca.gov/centralcoast/board_decisions/adopted_orders/2013/2013_0041_final_aquaculture_gp.pdf [https://perma.cc/6CVN-M6LF].

253. *Id.* at 4.

254. Such effluent restrictions include limits for: oil and grease, total suspended solids (TSS), settleable solids, turbidity, and pH. *Id.* at 11. Additionally, there are receiving water limits that are based on water quality objectives in the California Ocean Plan, including limits on: total coliform density, fecal coliform density, and enterococcus density. *Id.* Further, under the California Ocean Plan: undesirable discoloration of the ocean surface is prohibited, natural light shall not be significantly reduced outside the initial dilution zone, benthic communities cannot be degraded, pH shall not, at any time, be more than 0.2 units away from normal pH levels, discharges shall not exceed the water quality objectives for ocean waters of the state, and marine communities, including vertebrate, invertebrate, and plant species, shall not be degraded. *Id.* at 12.

numeric effluent limitations for aquaculture facilities in federal waters, meaning offshore aquaculture farms avoid having to comply with any stringent discharge requirements.²⁵⁵

RCF would evade all of the regulations and requirements set out in the SOA, the Fish and Game Code, and the NPDES permit by being located at 3.6 miles offshore, just 0.6 miles past state waters where these laws govern. RCF would not have to competitively bid for an aquaculture lease, would not have to undergo a FGC review, would not have to pay fees that aquaculture operations in state waters must pay, and RCF would not have to follow the NPDES discharge guidelines. RCF would have a major advantage over all state aquaculture farms by evading all of these requirements that farms in state waters must meet.

While the FCU is not required to analyze California state laws during federal consistency reviews, the state has shown a strong dedication to protect its coastal zone, resources, and citizens from unnecessary environmental and socio-economic harm due to aquaculture production. Hence, these stringent California state aquaculture laws should be used as references and background information during RCF's consistency review. As the CCC agrees that the SOA is important for aquaculture reviews, this legislation and other state laws should be implemented in a model review process for the CCC to use when reviewing other similar aquaculture projects in the future.

* * *

After examining the Chapter 3 policies of the Coastal Act and California state aquaculture laws, the FCU should not issue a consistency certification to the proposed RCF aquaculture project. HSWRI's poor track record with the current white seabass program does not support a conclusion that RCF, an even larger aquaculture farm, would be consistent with the CCMP policies nor would RCF meet the high standards set out in California state aquaculture laws. KZO Sea Farms, the only shellfish aquaculture project permitted to be built in federal waters off of California, underwent many modifications to ensure that it would not negatively impact the surrounding environment or local socio-economic factors. Unless significant changes are made, RCF would likely negatively affect California's coastal zone and resources and, therefore, should not be issued a consistency certification.

255. EMMETT ENVT'L LAW & POLICY CLINIC, *supra* note 115, at 29 (stating that to date, only technology-based effluent limitation guidelines for federal waters have been adopted, and these are much easier to meet than numeric effluent limitations that state aquaculture facilities must meet).

IV. NATIONWIDE IMPACTS:
COASTAL ZONE MANAGEMENT LESSONS

This Note has focused on how California could regulate a finfish aquaculture project located in federal waters that would reasonably affect California's coastal zone and resources. The CZMA applies to all coastal states, and thus, all coastal states that are faced with the same issue—a finfish aquaculture facility off their coast in federal waters—could conduct a consistency review similar to what was outlined above in Section III(C). This, however, all depends on the strength of the enforceable policies other coastal states have established in their Coastal Zone Management Plans.

If other coastal states are concerned about aquaculture projects located in federal waters negatively impacting their coastal zone and resources, they should re-examine their own CZMPs and ensure that stringent environmental and socio-economic safeguards are instituted. If the plan lacks strong aquaculture policies, states should update their CZMPs to better protect their citizens, coastal zone, and marine resources.²⁵⁶

All coastal states should update their CZMPs, since their plans could greatly affect and influence a future federal aquaculture regulation for their region. The Gulf Aquaculture Plan is the first comprehensive regulatory program for aquaculture in federal waters. The Gulf Aquaculture Plan had to be “consistent to the maximum extent practicable with the enforceable policies of the approved coastal management program of Florida, Alabama, Mississippi, Louisiana, and Texas.”²⁵⁷ Each of these five states's consistency review agencies had the opportunity to review the Gulf Aquaculture Plan to ensure

256. Washington, home to a relatively large amount of aquaculture, also developed a CZMP. The terms and features of Washington's approved CZMP are provided in the CZM Program Document, and, overall, it provides great protection to Washington's coastal zone, resources, and citizens. WASH. STATE DEP'T OF ECOLOGY, MANAGING WASHINGTON'S COAST: WASHINGTON STATE'S COASTAL ZONE MANAGEMENT PROGRAM (Therese Swanson ed., Feb. 2001), <https://fortress.wa.gov/ecy/publications/documents/0006029.pdf> [<https://perma.cc/2LX9-E6HG>]. Even with a fairly stringent CZMP, Washington should strengthen some policies to better protect against negative aquaculture impacts. For example, one Washington CZMP policy states that activities are allowed as long as no long-term, significant adverse impacts on marine resources occur, whereas California's CZMP calls to maintain, enhance, and where feasible, restore marine resources. *Id.* at 153.

257. Fisheries of the Caribbean, Gulf, and South Atlantic; Aquaculture, 81 Fed. Reg. 1762, 1785 (Jan. 13, 2016) (to be codified at 50 C.F.R. pts. 600 and 622).

that it was consistent with their CZMP.²⁵⁸ If NOAA decides to create a similar federal regulation for aquaculture in the federal waters off the west coast of the United States, for example, California, Washington, and Oregon should ensure that their CZMPs include every safeguard and regulation they think best protects their citizens and coastal zone because NOAA's regulation will have to be consistent with each of their CZMPs. Eventually, NOAA could create similar federal regulations like the Gulf Aquaculture Plan for the rest of the United States's federal waters, so all coastal states should review, revise, and update their CZMP to protect against negative offshore aquaculture impacts.

CONCLUSION

California has taken advantage of the broad power given to states through the CZMA cooperative federalism program by developing one of the strongest and most stringent CZMPs in the United States. Under the CZMA, aquaculture projects proposed for the federal waters—waters past the three nautical mile mark—must be consistent with the state's CZMP in order to proceed. California's CZMP, the CCMP, essentially allows the state to veto such projects in federal waters if the projects are not consistent with the CCMP. With such tough standards, the RCF Sustainable Aquaculture Project, as currently proposed, is not consistent with the policies of California's CCMP and does not meet California's strict state aquaculture laws. It is possible, however, that with significant changes, similar to how KZO Sea Farms's project was modified, RCF could become consistent with California's enforceable Coastal Act policies.²⁵⁹ Major changes could include (1) moving further offshore, which would decrease the chance of negatively impacting California's coastal zone and marine resources and would also protect scenic views by moving beyond the horizon, and (2) reducing the overall size, which would protect fishing and recreational activities by reducing the amount of ocean space consumed by the project. Unless RCF makes such changes, as it stands, the FCU likely will not find RCF's project consistent with its

258. *Id.* After completing a consistency review, Florida, Alabama, Mississippi, and Louisiana responded that the measures in the Gulf Aquaculture Plan are consistent with their coastal management programs. Texas no longer reviews fishery management issues and, therefore, did not complete a consistency review. Per 15 C.F.R. § 930.41, NOAA presumed the Gulf Aquaculture Plan was concurrent with Texas's CZMP. *Id.*

259. KZO Sea Farms had to meet thirteen conditions the FCU laid out in order to come into compliance with California's Coastal Act policies. Porter & Kihlsinger, *supra* note 68, at 10887.

CZMP, meaning RCF will not be issued a consistency certification and, therefore, will not be allowed to proceed.

Although no aquaculture currently exists in the federal waters of the United States, the Gulf Aquaculture Plan may be the beginning of intensive offshore aquaculture development in the United States. The framework to regulate aquaculture in the federal waters off the Gulf of Mexico is the only framework currently in existence. If future aquaculture farms are proposed in the federal waters anywhere outside the Gulf, the adjacent coastal states will face a similar problem as the RCF project poses for California. This issue in California teaches all other coastal states a lesson: how to use the CZMA to sufficiently protect state's coastal zone and resources. Coastal states outside the Gulf of Mexico should (1) ensure they have a CZMP in place, and (2) review and revise their CZMP to ensure it has strict policies protecting their coastal zone and marine resources from negative aquaculture effects. Additionally, if NOAA develops a federal regulatory framework similar to the Gulf Aquaculture Plan for other regions of our country, the states affected will have the opportunity to review the federal law for consistency with their CZMP. States have great power to ensure that environmentally sound and economically sustainable development of aquaculture occurs in the United States.

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