THE BIG "BLUE" NATION: EXPANDING AQUACULTURE IN KENTUCKY

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In 2010, the United Nations' Food and Agriculture Organization reported that approximately 80 percent of the world's fisheries were either fully or overexploited.[1] That is, production levels at these fisheries were increasingly becoming stagnant as the global population and per capita consumption were spurring growth in demand. Consequently, the organization believed that the world needed to produce just under an additional 40 million metric tons of farmed seafood, by 2030, just to maintain production levels.[2] To meet this goal, the United Nations then explained the benefits of large-scale fish farming (i.e., aquaculture) and expressed a need to expand the industry in regions that could support it.

Aquaculture is an increasingly important industry for a world that is growing in population.[3] A population that researchers indicate could reach 9 billion by 2050.[4] With this growing population, the need for fish and fish products continues to increase.[5] Some of this need is met by gathering fish from the wild; however, wild fisheries cannot keep pace with the population growth.[6] Aquaculture can further fulfill this need. Not only does aquaculture present a sustainable solution,[7] but it is also highly

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[1] *Resumed Review Conference on the Agreement Relating to the Conversation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks*, U.N. DEP'T. OF PUB. INFO. (May 2010), http://www.un.org/depts/los/convention_agreements/reviewconf/FishStocks_EN_A.pdf.

[2] MONTEREY BAY AQUARIUM, TURNING THE TIDE: THE STATE OF SEAFOOD 18 (2d ed. 2011).

[3] *See What is aquaculture?*, NAT'L OCEANIC AND ATMOSPHERIC ADMIN. (June 2011), http://www.noaa.gov/stories/what-is-aquaculture.

[4] JAMES H. TIDWELL & GEOFF ALLAN, THE ROLE OF AQUACULTURE IN AQUACULTURE PRODUCTION SYSTEM 3 (James H. Tidwell ed., 1st ed. 2012).

[5] *Id.*

[6] *Id.* at 5.

[7] *Id.* at 13.

efficient. Fish-farming is the best way to produce a protein-rich food that does not require more food than it produces.[8] For example, while nearly seven pounds of food is required to produce one pound of beef and nearly three pounds of food for one pound of pork, only one pound is required to produce one pound of fish.[9] Furthermore, current technology allows fish-farming to be done in nearly any location, including impoverished areas.[10] Because of these basic facts, aquaculture is being used throughout the world to combat hunger and create jobs. The rapid growth of aquaculture around the world has been likened to the "Green Revolution" of the 1950's, where grain production was increased and developed to meet higher demands, and titled the "Blue Revolution."[11]

Generally, aquaculture is the breeding, rearing, and harvesting of plants and animals in a water environment.[12] There are two basic types: marine and freshwater.[13] Marine aquaculture is the rearing of oceanic animal life that occurs either in open ocean enclosures or on land, in tanks and ponds.[14] Alternatively, freshwater aquaculture refers to raising animals that are native to fresh bodies of water.[15] The benefits of aquaculture include producing food for human consumption, restoring endangered species, and enhancing natural environments.[16]

In the United States, aquaculture primarily occurs on land, in tanks and ponds, where the most widely cultivated animal is the catfish.[17] Catfish are primarily produced in southern coastal states and generate $1.37 billion in sales.[18] Other major species of food-fish raised in the United States include trout, salmon, tilapia, sturgeon, walleye, and yellow perch;[19] nonfood species include

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[8] Joel K. Bourne, Jr., *How to Farm a Better Fish,* NAT'L GEOGRAPHIC, http://www.nationalgeographic.com/foodfeatures/aquaculture/ (last visited Sept. 5, 2017).

[9] *Id.*

[10] *See Aquaculture*, NAT'L OCEANIC AND ATMOSPHERIC ADMIN., https://www.fisheries.noaa.gov/topic/aquaculture (last visited April 10, 2018).

[11] Jeffrey D. Sachs, *The Promise of the Blue Revolution*, SCI. AMERICAN (June 1, 2007), https://www.scientificamerican.com/article/promise-of-the-blue-revolution-aquaculture/.

[12] *Aquaculture*, *supra* note 10.

[13] *See* Robert R. Stickney & Granvil D. Treece, *History of Aquaculture, in* AQUACULTURE PRODUCTION SYSTEMS 18 (James H. Tidwell ed., 1st ed. 2012).

[14] *Id.*; s*ee Aquaculture*, *supra* note 10.

[15] *Id.*

[16] *What is aquaculture?*, *supra* note 3.

[17] *Aquaculture Data*, U.S. DEP'T OF AGRIC. ECON. RESEARCH SERV., https://www.ers.usda.gov/data-products/aquaculture-data/ (last updated Apr. 6, 2018).

[18] *Id.*

[19] *Id.*

baitfish and ornamental fish.[20] The United States aquaculture industry also produces crawfish, shrimp, mollusk species, alligators, turtles, aquatic plants, and algae.[21]

Despite these many applications, aquaculture has been slow to spread in the United States.[22] In fact, the United States is consistently ranked as one of the lowest producers of such products while it is the number one importer of fish and fishery products, and one of the highest consumers of seafood.[23] But with such a high demand for fish and job creation, the aquaculture market is ripe for development in the country. Studies show that the United States, by doubling its aquaculture efforts, could add 50,000 jobs and over $1 billion in farm gate value to the economy.[24] This effort could also reduce the extent to which the United States imports fish and fish products—currently at over ninety percent—to a much lower and sustainable level.[25]

Although it may seem obvious that the country should incentivize state investment in the aquaculture industry by removing legal barriers, the United States has failed to do so. In fact, there are significant barriers stifling state investment in aquaculture. These barriers include antiquated statutory and regulatory schemes that do not contemplate the current realities facing the world's fisheries. Improving such schemes and providing incentives for sound, environmentally conscious fish-farming practices could lead to greater state investment throughout the country.[26]

Admittedly, in a landlocked state like Kentucky, aquaculture may seem like an unnatural fit regardless of the legal framework in place. Kentucky State University, however, is already producing research to demonstrate that aquaculture is a sustainable industry that should be further developed in

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[20] *Id.*

[21] *Id.*

[22] *U.S. Aquaculture*, NAT'L OCEANIC AND ATMOSPHERIC ADMIN., https://www.fisheries.noaa.gov/national/aquaculture/us-aquaculture (last visited Apr. 10, 2018).

[23] *Id.*

[24] *Id.* (the farm gate value of a product is the net value of a product when it leaves the farm, after marketing, shipping, and production costs have been subtracted)

[25] *Id.*

[26] Rebecca J. Goldburg et al., *Marine Aquaculture in the United States: Environmental Impacts and Policy Options*, PEW OCEANS COMM'N, http://www.iatp.org/files/Marine_Aquaculture_in_the_United_States_Enviro.htm (last visited Sep. 13, 2017).

Kentucky.[27] Despite the university's research, Kentucky currently only has approximately twenty to thirty aquaculture farms in operation.[28] The state continues to import over ninety percent of the fish it consumes and consequently loses opportunities for economic development.[29] As an alternative, Kentucky should look to the research of Kentucky State University and develop the infrastructure needed to foster growth in this industry. And if the proper infrastructure is developed—statutory protections coupled with tax incentives for growth—then aquaculture will flourish in Kentucky, leading to an increase in job creation and tax revenues.

This Note defends the thesis that, with proper infrastructural development, aquaculture is a viable industry in Kentucky. It would not only spur job growth, particularly in economically depressed areas of the state, but would also provide fresh, locally sourced protein to a landlocked region. To make aquaculture sustainable, Kentucky must first adopt a comprehensive statutory scheme protecting and supporting the industry. This includes protections for new ventures and incentives for growing producers. Second, Kentucky must create an agency to oversee and manage the marketing of aquaculture. Third, the state needs to support the industry by creating interagency partnerships between the aforementioned agency and other similarly situated agricultural agencies. Creating these cooperative partnerships will help insure the success of the aquaculture industry during its infancy. Collectively, these actions will serve to further legitimize the aquaculture industry in the state and help provide a market for fish and fish products. These actions will also inform farmers as to where they stand in relation to farm and environmental law.

These arguments will be addressed in two parts: Part I discusses the impact of national regulations on Kentucky. It reviews the ways in which other states have approached aquaculture, experienced success, and faced legal challenges. The advantages of the aquaculture industry extend to Kentucky farmers in the form of job creation, revenue, and reduction of import costs. Alternatively, the disadvantages consist primarily of

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[27] *About Us*, KY. ST. U., http://www.ksuaquaculture.org/AboutUs.htm#vision (last visited Jan. 4, 2017).

[28] Interview with Dr. James Tidwell, Professor and Chair Div. of Aquaculture, Ky. State Univ., in Frankfort, Ky. (Jan. 4, 2017).

[29] *Id.*

environmental ramifications. In balancing the two, courts consider the impact of waste from the organisms themselves as well as the bi-products from the farms. This section predicts how courts will address environmental issues if they were to arise in Kentucky as a result of aquaculture activities. Aside from litigation, acquaculturists also face other dilemmas such as transporting fish and fish products. In response, this part discusses solutions available within the national market for fish and fish products and how Kentucky can help its farmers participate in this market. Part II will discuss the particular challenges to implementing aquaculture legislation and how entrance into the market could be hindered by lack of infrastructure as well as small market demand. Finally, this section critiques the aquaculture industry in Kentucky to show the weaknesses that have held back the industry in the past. Please note that although an analysis of all federal environmental regulations are beyond the scope of this review, it nevertheless focuses on the Clean Water Act and the Lacey Act as predictors of the legal ramifications of this industry.

I. REGULATING AN INDUSTRY ON THE RISE

A. Aquaculture on the Federal Level

Although several federal agencies regulate aquaculture, the resulting regulatory framework is nevertheless loose if not muddled to incoherence. These regulations are consequently difficult for even a seasoned farmer to understand.[30]

Somewhat surprisingly, federal regulation of aquaculture actually dates back to the 1954 passage of the Saltonstall-Kennedy Act.[31] This Act permitted the National Oceanic and Atmospheric Administration the authority to award grants to fisheries engaged in the research and development of aquaculture.[32] Today, regulations regarding aquaculture come from the Army Corps of Engineers, the Environmental Protection Agency, the Department

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[30] Thomas R. Head, III, *Fishy Business-Regulating Aquaculture Operations in the United States*, 18 NAT. RES. & ENV'T 21, 23 (Summer 2003).

[31] *U.S. Federal Aquaculture Legislative History*, NAT'L OCEAN ECON. PROGRAM, http://www.oceaneconomics.org/LMR/Aquaculture/fedPolicy.aspx (last updated Aug. 1, 2007) [https://perma.cc/48XX-R458].

[32] *Id.*

of Agriculture, the Food and Drug Administration, and the Department of Commerce's National Marine Fisheries Service.[33]

In recent years, these agencies have passed many regulations concerning off-shore aquaculture operations that inherently do not apply to states like Kentucky. Other regulations, however, concerning the transportation of commerce over state lines do apply. These federal regulations can make transporting animals classified as food products difficult and should consequently be of high concern to Kentucky farmers and producers.

For Kentucky to encourage greater investment in aquaculture, the state must develop a clearer and comprehensive set of regulations that comply with those at the federal level. Moreover, these regulations must keep the unique concerns of the state in mind. While Kentucky farmers and producers should be concerned, they should not be deterred; their counterparts in other states have successfully navigated these regulations and developed thriving firm farming industries.

B. Legal Concerns

As aquaculture begins to take hold in the United States, environmental protection agencies and private citizens have continued to keep a close eye on the waste and pollution generated by these facilities.[34] Similar to other farming operations, aquaculture farmers must find ways to deal with the waste produced by fish. Additionally, however, they must control the water temperature, its chemical content, and determine how to transport their aquatic goods across state lines. Each of these additional duties and specific concerns has led to criticism of the industry and, in some cases, even legal action against aquaculture operations.

These regulations are accompanied by a great deal of contention. The last factor, determining how to transport aquatic goods, is one of the most litigated issues in the aquaculture industry. Although this illustrates the need for state regulation to

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[33] Head, *supra* note 30; *See also* CTR. FOR EPIDEMIOLOGY AND ANIMAL HEALTH, OVERVIEW OF AQUACULTURE IN THE UNITED STATES 23 (1995), https://www.aphis.usda.gov/animal_health/nahms/aquaculture/downloads/AquacultureOverview95.pdf [https://perma.cc/HSQ4-4229].

[34] *See* Head, *supra* note 30.

encompass the standards of federal law with clarity regarding state and regional issues, there are several recently decided cases that may inform how Kentucky courts will deal with the above-mentioned concerns.

i. The Clean Water Act

The Clean Water Act, 33 U.S.C. § 1311, has been the basis of much of the controversy surrounding aquaculture. The Clean Water Act (CWA) broadly states "the discharge of any pollutant by any person shall be unlawful."[35] It further provides that "any addition of any pollutant to navigable waters from any point source."[36] As a result of this definition, a "discharge of a pollutant" occurs when: "(1) a pollutant [is] (2) added (3) to navigable waters (4) from (5) a point source."[37] The CWA would only be an issue for farmers operating within close proximity to navigable waterways such as rivers or wetlands and, consequently, only applies to a small population of farmers in Kentucky. Nevertheless, the breadth of the CWA makes it an important consideration for the state.

In *United States Public Interest Research Group v. Heritage Salmon, Inc.*, a federal district court in Maine detailed the implications of the CWA on aquaculture operations.[38] USPIRG argued that Heritage was discharging salmon and salmon feces, urine, and feed, as well as copper, antibiotics, parasites, and other toxic substances into Maine waters.[39] The court held that the fish raised by Heritage constituted biological pollutants because they were not native to Maine waters.[40] The feces, feed, copper, antibiotics, parasites, and other substances were considered to be either biological material or chemical waste and therefore also qualified as "pollutants" under the Act.[41] Though the court further held that the discharge occurred in navigable waters, it discussed the point source element of the CWA at length.

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[35] 33 U.S.C. § 1311 (2017).

[36] 33 U.S.C. § 1362 (2017).

[37] U.S. Pub. Interest Research Grp. v. Heritage Salmon, Inc., No. CIV.00-150-B-C., 2002 WL 240440, at *6 (D. Me. Feb. 19, 2002) (citing Nat'l Wildlife Fed'n v. Gorsuch, 693 F.2d 156, 165 (D.C.Cir. 1982)).

[38] *Id.* at *6.

[39] *Id.* at *7.

[40] *Id.*

[41] *Id.*

To determine what constituted a point source, the court sought guidance from the Environmental Protection Agency (EPA).[42] The EPA provides that aquaculture operations are "aquatic animal production facilities" (AAPFs), and are generally considered nonpoint sources.[43] AAPFs, however, may also classify as "concentrated aquatic animal production facilities" (CAAPFs), which are considered point sources.[44] CAAPFs include large cold and warm water farms that discharge at least thirty days per year.[45] Under some circumstances, the EPA has determined that even AAPFs that do not classify as CAAPFs could be point sources, but this is fact intensive and must be determined on a case-by-case basis.[46] Once classified as a point source, the aquaculture operation must by properly authorized to discharge pollutants by obtaining a National Pollution Discharge Elimination System (NPDES) permit.[47] Heritage did not have that permit and was classified as a CAAPF and therefore violated the CWA.[48]

This case is noteworthy for any aquaculture farmer attempting to use or operate near waterways. It clearly outlines: (1) the five criteria required to constitute a violation of the CWA; and (2) how each aspect of an aquaculture operation could lead to that violation. If a CWA complaint was brought in a Kentucky court, the aforementioned case demonstrates the kind of analysis that should be performed.

No Kentucky court has addressed the CWA's application to any aquaculture operation. The CWA, however, and its Kentucky counterpart, KRS 224.70-110, have been addressed in regard to hog farming. In that context, the Kentucky Court of Appeals held that the state's statute was broader than the Act.[49] The court also concluded that the statute was generally prohibitive in nature, rather than regulatory.[50] The court reasoned that the statute served only to "generally prohibit activities which are in violation of other specific statutory or regulatory requirements."[51] As a

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[42] *Id.* at *9.
[43] *Id.*
[44] *Id.*
[45] *Id.* at *10.
[46] *Id.*
[47] *Id.* at *4.
[48] *Id.* at *14.
[49] Ky. Energy and Env't Cabinet v. Sharp, Nos. 2009—CA—002283-MR, 2009—CA—002326-MR, 2012 WL 1889307, at *9 (Ky. Ct. App. Jan. 11, 2013).
[50] *Id.*
[51] *Id.*

result, the court concluded that KRS 224.70-110 does not address any way to impose regulatory requirements on activities.[52] The petitioner argued that the hog farmer was required to obtain a Kentucky Pollution Discharge Elimination System (KPDES). That is, the Kentucky counterpart to the above-mentioned NPDES.[53] The court disagreed, it concluded that KRS 224.70-110 did not require the issuance of KPDES permits.[54] The KPDES program cannot be more stringent than the NPDES program and thus the court used the federal definition of CAFO.[55] Concluding that the farm in question did not require a KPDES permit.[56]

This holding could be problematic for aquaculture farms operating close to streams, lakes, wetlands, or rivers because the case law applying the statue here is ambiguous. Do other statutes regulate permits to protect clean water? Where could a farmer find this information? Will permits required for other farm operations be applicable? How are aquaculture operations classified in Kentucky? This case brings up more questions than it answers for those starting out in aquaculture. As a result, fish farms are vulnerable to complicated questions regarding permitting in Kentucky and these questions are not clarified by current law. To remedy this problem, statutes pertaining to aquaculture should be clarified to come within the bounds of federal law.

ii. Lacey Act

The Lacey Act was the first federal regulation passed intended to protect wildlife.[57] Due to its comprehensiveness, the Lacey Act is problematic for members of the aquaculture industry who could potentially be prosecuted for violating state or federal law as well as technical, administrative rules and regulations.[58]

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[52] *Id.*

[53] *Id.* at *5.

[54] *Id.*

[55] *Id.* at *10.

[56] *Id.* at *11.

[57] Elizabeth R. Rumley, *Aquaculture and the Lacey Act*, NAT'L AGRIC. L. CTR. (Mar. 2010), http://nationalaglawcenter.org/wp-content/uploads/assets/articles/Rumley_lacey.pdf [https://perma.cc/E955-CYM7].

[58] Victor J. Rocco, *Wildlife Conservation Under the Lacey Act: International Cooperation or Legal Imperialism?*, 80 N.Y. ST. B. J. 10, 11 (May 2008).

> A violation of the Lacey Act occurs when there is a predicate violation of some state, foreign, federal, or Indian tribal law in the taking, possessing, transporting, or selling of fish or wildlife, and the defendant imports, exports, transports, sells, receives, acquires, or purchases the product of the underlying violation in interstate or foreign commerce.[59]

The Act has a scienter requirement that calls on the government to prove merely that the defendant had knowledge that the fish were transported in violation of some state law or regulation.[60] The breadth of the Act encompasses criminal, civil, administrative, national, and local regulations.[61]

The Lacey Act is an incredibly powerful law that has served to protect endangered species from illegal trafficking across state lines and international waters.[62] Nevertheless, the Act has been unsuccessfully challenged, on constitutional and non-constitutional grounds, for being both too broad and impermissibly delegating legislative power to state and foreign governments.[63] The breadth of the Act has led to the prosecution of trivial and arcane regulations regarding shipping mechanisms.[64]

In *United States v. Lee*, the court acknowledged the Lacey Act's potency and capacity to be abused; however, the court's concerns were assuaged by the Act's scienter requirement.[65] Because the law enforces criminal penalties, Congress inserted a culpability requirement.[66] This does not change the fact that one may be held strictly liable for a violation of any law or regulation at any level.[67] The court contends that this protects those who would make a mistake unwittingly.[68] However, since this is a strict liability act, there is punishment for even the smallest violation.

The Lacey Act also enforces laws that are antiquated. In *United States v. McNab*, the National Marine Fisheries Service

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[59] *Id.* at 12.
[60] *Id.*
[61] *Id.*
[62] *Id.*
[63] *Id.* at 12-13.
[64] *Id.*
[65] United States v. Lee, 937 F.2d 1388, 1394 (9th Cir. 1991).
[66] *Id.* at 1395.
[67] *Id.*
[68] *Id.*

received an anonymous tip that a vessel from Honduras was carrying lobsters packed in plastic as opposed to cardboard—a violation of Honduran law. In further violation, some of the lobsters being transported had tails that were less than 5.5 inches in length.[69] The court upheld these Honduran packing regulations.[70] However, between the time of the arrest and trial, the Honduran government shifted its position and declared the law invalid. The defendants consequently argued for exoneration.[71] In response, the court held that once an international law was deemed valid, the court was not required to revise its determination.[72] This holding requires only fish farmers to be up to date on all local, state, federal, and international law; alternatively, courts are excused because if they "were required to maintain compliance with a foreign government's position, [they] would be caught up in the endless task of re-determining foreign law."[73] The dissent points out that the determination of whether the Honduran law was valid was not up to the expert witnesses called by the United States; instead, the validity of the law was to be determined by the court of Honduras.[74] The Honduran court concluded that the resolution under which the defendants were convicted was held to be null and void.[75] Nonetheless, the Eleventh Circuit determined that it was its duty to convict defendants under the Lacey Act. This once again shows just how powerful this Act can be not only to United States citizens but to foreign citizens as well.

Kentucky's state version of the Lacey Act is 301 KAR 1:122. This administrative regulation prohibits a person from buying, selling, possessing, importing, or releasing "any aquatic species not native or established in Kentucky waters, except as established in Sections 2, 4, or 5 of this administrative regulation."[76] It is important for all who are interested in fish farming to be familiar with this particular set of regulations; it gives a list of species that are prohibited as well as introduces the idea of licensing and approval for certain types of fish. The only way for those in the

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[69] United States v. McNab, 331 F.3d 1228, 1232-33 (8th Cir. 2003).
[70] *Id.* at 1233.
[71] *Id.* at 1240-41.
[72] *Id.* at 1241.
[73] *Id.*
[74] *Id.* at 1247.
[75] *Id.*
[76] 301 KY. ADMIN. REGS. 1:122 (2017).

aquaculture business in Kentucky to eliminate the risk of running afoul of the Lacey Act and its state equivalent would be to only ship products in-state.[77] This is not an option for many producers. Farmers must be familiar with state-specific regulations, that pertain to particular species, including awareness of labeling laws, sanitary regulations, packing regulations, and shipping.[78]

C. States with Successful Aquaculture Infrastructure

Although aquaculture regulations vary widely by state,[79] permitting and regulatory oversight are generally governed by state agriculture or natural resource agencies.[80] Though Kentucky lacks the infrastructure to support a robust aquaculture market, other similarly situated states have provided a roadmap as to how one can be developed; Indiana and Illinois have encouraged interagency partnerships and embraced comprehensive legislative and regulatory reform to cultivate growth in their state's aquaculture industries.

i. Aquaculture in Indiana

Permitting in Indiana is mainly controlled by the Department of Natural Resources and the Indiana Board of Animal Health.[81] A key feature of the Indiana system is the partnership between the Indiana Aquaculture Association and the Soybean Alliance.[82] It is a great model for how interagency cooperation can be mutually beneficial. This partnership provides more affordable feed for fish farmers and a new market for soybean farmers.[83] The Soybean Alliance has provided research and support to Indiana's soybean industry, and in turn helped fuel Indiana's thriving aquaculture industry which includes the world's

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[77] *See* Rumley, *supra* note 57.

[78] *Id.*

[79] CTR. FOR EPIDEMIOLOGY AND ANIMAL HEALTH, *supra* note 33, at 17.

[80] *Id.*

[81] *Permits and Other Regulations*, IND. SOYBEAN ALL., http://indianasoybean.com/strategic-programs/indiana-aquaculture/42-strategic-programs-aquaculture/251-permits-and-other-regulations [https://perma.cc/838F-TD4T].

[82] *Indiana Aquaculture Facts,* IND. SOYBEAN ALL., http://indianasoybean.com/strategic-programs/indiana-aquaculture/42-strategic-programs-aquaculture/75-indiana-aquaculture-facts [https://perma.cc/G97P-NNHM].

[83] *Id.*

largest Yellow Perch farm.[84] This is an ideal model of how an established agricultural branch can use its institutional memory to aid the growth of a partner agency overseeing aquaculture. Similar to Indiana's soybean industry, the knowledge and resources of a well-established Kentucky industry could provide a support system for greater development in aquaculture.

ii. Aquaculture in Illinois

Illinois' aquaculture industry also serves as a model for states looking to both promote interagency cooperation and develop their own regulations.[85] To promote interagency cooperation, the state created the Aquaculture Advisory Committee. The committee addresses all questions regarding permitting and is made up of representatives from the Department of Conservation, the president of the Illinois Aquaculture Industry Association, the aquaculture coordinator for the Department of Agriculture, the director of Southern Illinois University Fisheries Research Laboratory, and the Department of Public Health.[86] It is the collection of these agencies that creates a comprehensive, balanced approach to permitting. A permit is required for application of pesticides and the slaughter and sale of fish, though producers are not required to report sales or production.[87] This system allows for oversight while also giving protections for new ventures.

As a key feature, the permits distributed by the Aquaculture Advisory Committee grants farmers licenses to culture fish and legal title to the fish he produces.[88] Illinois's permitting process not only creates autonomy for the farmers, but also allows for easier access to development funds when they own their products.[89] In many other states, the fish are retained by the

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[84] *Production Research*, IND. SOYBEAN ALL., http://www.indianasoybean.com/strategic-programs/production-and-research/45-strategic-programs-production/104-production-research-research [https://perma.cc/G2H4-EYTM]; s*ee also* Cris Goode, *Bell Aquaculture Farms a Fish-Fry Favorite*, MY IND. HOME (Feb 11, 2011), http://www.my-indiana-home.com/farm/bell-aquaculture-farms-fish-fry-favorite/ [https://perma.cc/PCV9-NVQX].

[85] CTR. FOR EPIDEMIOLOGY AND ANIMAL HEALTH, *supra* note 33, at 19.

[86] *Id.*

[87] *Id.*

[88] *Id.*

[89] *Id.*

natural resource agencies of the state, limiting the amount of development funds that individual farms can receive.[90]

II. ESTABLISHING AQUACULTURE IN KENTUCKY

In addition to the infrastructural deficits, there remain more, mostly economic, challenges to making aquaculture a viable option for Kentucky farmers. Simply put, Kentucky is a land-locked state surrounded by other land-locked states. Admittedly, such geography does not evoke visions of fresh seafood and inherently causes problems with marketing products and moving them to larger regional markets. These challenges have led some to flatly reject aquaculture as a viable option for Kentucky's economy, despite the growth that the industry has experienced in other similarly situated states.[91] Nevertheless, although challenges remain regarding market access, demand, and general industry knowledge,[92] Kentucky can overcome these challenges through infrastructure development.

A. Market Access

The current lack of aquaculture infrastructure in Kentucky, particularly from a regulatory standpoint, makes market access difficult. As of now, it is difficult to determine what permits farmers need to even begin their operations. What is worse, however, is that simply finding information about starting an aquaculture operation in Kentucky requires hours of research. Although general information exists, there is still little to no practical information for a farmer beginning his own farm. This deficit is especially devastating to an industry in its infancy that cannot rely on the generational guidance enjoyed by other agricultural fields.[93]

Additionally, Kentucky's entry into the overall fish market could only be accomplished with inexpensive shipping, high quality products, and a stable external market for these products. Access to the national and international market would require an organized governmental effort that demands financial investment.

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[90] *Id.*
[91] *Id.*
[92] *Id.*
[93] *Id.*

It would also demand higher vigilance on permitting, as the cost and danger of transporting food or animals across state lines is a highly regulated area of commerce.

B. Consumer Demand

Kentucky's consumption of fish and use of fish products is low. As Director of the Aquaculture program at Kentucky State University put it, Kentucky is a "meat and potatoes state."[94] To many, this would indicate that it would be difficult for farmers to be able to market their products within the state at a rate that would be cost efficient and profitable. This concern is exacerbated by the fact that aquaculture has an unproven track record in Kentucky.[95]

C. Suggestions and Potential structure for Legislation

In order to genuinely develop the industry, Kentucky needs to better support aquaculture through simple permitting, concerted marketing efforts, financial support, and state and corporate partnerships.

i. Permitting

States boasting the most success in their aquaculture industries have also had the most user-friendly start-up systems.[96] In Kentucky, the Department of Fish and Wildlife requires a permit to start an aquaculture venture because it needs to know where and how aquaculture is occurring, and how many fish are in the state at any given time.[97] Unlike terrestrial farming in Kentucky, aquaculture requires a different set of permits and regulations—most of which are governed by the Department of Fish and Wildlife as opposed to the Department of Agriculture.[98] For this reason, getting a permit to obtain the eggs and fish to start an aquaculture operation can be difficult and confusing.

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[94] *Id.*
[95] *Id.*
[96] Tidwell, *supra* note 28.
[97] *Id.*
[98] *Id.*

This difficulty and confusion often stems from a governmental lack of knowledge about the industry—often promoting regulations not based in science—which has in turn led to excessive permitting. To alleviate this struggle, especially for new farmers, the permitting process could be confined to one government agency, either the Department of Fish and Wildlife or the Department of Agriculture, which can be better educated on the needs of the farmers looking to participate in the industry. Similar to the Illinois system, the agency would include an oversight committee to resolve questions regarding permits and reduce the excessive regulations the Department of Fish and Wildlife imposes on certain fish species.[99] This would make the permitting and regulatory process much smoother and promote better relationships between producers and regulators.

ii. Marketing Office

To better support the aquaculture industry in Kentucky, the Department of Agriculture should dedicate funds to an aquaculture marketing department. Steps were taken in this direction when the Kentucky House passed Joint Resolution 72, which created the Aquaculture Task Force.[100] The task force offered clear rationale for this necessity: "[c]hoosing an appropriate marketing strategy is often the difference between success and failure for most aquaculture ventures."[101] In order to implement the suggestions of the Task Force, there should be dedicated marketing personnel at the Department of Agriculture. The planning and strategy developed by this task force, however, has yet to be implemented in a functional way.

Kentucky has already proven that such efforts in marketing can lead to great benefits. The state has done a wonderful job of encouraging agritourism by creating a marketing office to promote the efforts of agriculture activities in the state.[102] This has helped to create awareness and encourage local production of farm products and activities through farm to table events and pick-your-

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[99] *Id.*

[100] KY. DEP'T OF AGRIC., COMMONWEALTH OF KENTUCKY AQUACULTURE PLAN 8, http://www.kyagr.com/Marketing/documents/AQ_Aquaculturepleplan.pdf [https://perma.cc/4QT8-9P36].

[101] *Id.* at 57.

[102] *Agritourism,* KY. DEP'T OF AGRIC., http://www.kyagr.com/marketing/agritourism.html [https://perma.cc/BT4R-8FWX].

own-produce programs. The same kind of marketing could influence the growth of aquaculture.

As outlined by the Task Force, one way that Kentucky can lead the way in the aquaculture industry is by mandating country-of-origin labeling on fish produced within the state.[103] In order to label this way, the farm raised fish must be "hatched, raised, harvested, and processed in the United States."[104] Although there is no law currently requiring farmers to label their product with the country or state of origin, this step would create an incentive for buyers to purchase local products.[105] With the modern trend toward conscious food purchasing and local sustainability, labeling aquaculture products as "Kentucky Grown" could create a marketing tool that propels the fish market to new heights in the state and around the country. Kentucky is perfectly situated to market its products in a region that has limited access to fresh fish. By marketing to surrounding states, Kentucky could create a niche in the Midwest that replaces imported frozen fish with fresh local fish.

iii. Tax incentives and financial protection

Generating farmer interest in expanding into the world of aquaculture will require ease of access to funding as well as tax incentives for entrepreneurs.[106] Currently, the only access to funding for a start-up aquaculture farmer is a revolving loan provided from the Tobacco Settlement Fund.[107] This money is difficult to get and is only a drop in the bucket of start-up costs.[108] To truly support aquaculture, there must be additional funding available for entrepreneurs who are willing to take a risk on this growing industry.

There also must be greater tax incentives. Currently, there is only one agricultural provision in the tax code that includes an exemption for aquaculture sales and operations.[109] Broadly, this

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[103] *See* KY. DEP'T OF AGRIC., *supra* note 100, at 59.

[104] Barry Krissoff et al., *Country-of-Origin Labeling: Theory and Observation,* U.S. DEP'T OF AGRIC. 3 (Jan. 2004), https://www.ers.usda.gov/webdocs/publications/40388/15801_wrs0402_1_.pdf?v=41057 [https://perma.cc/GP7F-8T5G].

[105] *See* KY. DEP'T OF AGRIC, *supra* note 100, at 7.

[106] *See* Tidwell, *supra* note 28.

[107] *Id.*

[108] *Id.*

[109] KY. REV. STAT. ANN. § 139.480(30) (LEXIS through 2017 Sess.).

section protects producers from tax on livestock and products.[110] These protections are insufficient with regard to aquaculture operations. Start-up operations must be afforded additional protection to help decrease their financial vulnerabilities. Only with increased support, through greater funding and tax incentives, can start-up farmers gain and maintain the capital that is required to invest in an agriculture venture.

iv. State and corporate partnerships

One of the largest hurdles for new farmers to overcome has been entering the market to sell their crops. Kentucky farmers continue to operate under the tobacco mentality.[111] Tobacco farmers grow their crop and take it to a tobacco warehouse to be sold. Similarly, a grain farmer will take his crop to a grain elevator and sell it at fair market value. But this is not the method of the fish market;[112] rather, to sell fish, the farmer must make and maintain his own direct contacts with restaurants and supermarkets, market his goods, and deliver his own product.[113] This type of farming and requisite skillset is completely foreign to traditional Kentucky farmers who primarily work with plants and animals.[114] This aspect of aquaculture—entering the market to sell fish products—could be alleviated by the introduction of partnerships between the state and corporations.

By creating such partnerships, Kentucky could help its farmers by giving them a head start on marketing their products. This could be done by including local aquaculture as a Kentucky Proud program, which provides individualized incentives.[115] It could also be done through the cooperation of farmers and businesses in Kentucky, helping to set up contacts of sale for fish. This effort could be maintained through the suggested marketing office at the Department of Agriculture or a third-party organization of aquaculture cooperative farmers. Although this suggestion may seem unconventional, it could be an important part of encouraging aquaculture production in the state. This

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[110] *Id.*

[111] *See* Tidwell, *supra* note 28.

[112] *Id.*

[113] *Id.*

[114] *Id.*

[115] *See Kentucky Proud Programs*, KY. PROUD, http://www.kyproud.com/programs-2.html [https://perma.cc/7T8Z-L9HA].

would be similar to the Indiana model of a partnership with another agricultural industry. By creating state-corporate partnerships, the aquaculture industry could gain the institutional knowledge that it is lacking by working closely with other well-established industries, both private and governmental.

State-corporate partnerships could also provide greater access to feed mills.[116] This is essential because aquaculture requires specialized feed mills, that produce a buoyant feed that most fish species need to survive, that are unavailable in Kentucky.[117] This forces farmers to either create their own feed or purchase it from out of state, which stifles industry growth by bogging it down with higher costs.[118] A corporate partnership should be created between the aquaculture industry and the University of Kentucky College of Agriculture state feed mills to produce the kind of feed needed for the species raised in the state.

Clearly, there are several missing pieces to cultivating a robust aquaculture industry in Kentucky. Without implementing each of these pieces, aquaculture could become a significant opportunity that completely passes Kentucky by. Kentucky needs a new industry to create jobs, sustain food sources, and enhance community health. Aquaculture is poised and ready to be that industry. Kentucky should be on the forefront of the "Blue Revolution" instead of waiting until it is too late to enter the market as a major player.

D. Current Kentucky Activity

Kentucky State University (KSU) has taken the lead in performing the research and development necessary for advancing aquaculture in Kentucky.[119] With the assistance of a grant from the Kentucky Department of Agriculture, KSU is providing hatchery and nursery production, as well as researching freshwater shrimp and paddlefish.[120] The university's research is currently primarily focused on finding species that are suitable for Kentucky; creating diets and nutrition plans for a variety of species, and experimenting with aquaponic systems connecting the

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[116] *See* Tidwell, *supra* note 28.
[117] *Id.*
[118] *Id.*
[119] KY. DEP'T OF AGRIC., *supra* note 100.
[120] *Id.*

growth of vegetables and fish.[121] Notably, the university's work has already been applied to an aquaponics facility in West Louisville, an urban community, providing fresh produce and fish to a local soup kitchen and other low-income individuals.[122] The facility is also experimenting with Biofloc technology (a sustainable method of cleaning slow moving tank water), domestication and genetic selection practices, and feed efficiency.[123] This work, however, is not only providing research-based information and benefits to Kentucky farmers and consumers.[124] Rather, with thirty-three research ponds, an aquaponics research facility, indoor shrimp farms, and development labs, KSU is one of the most valuable aquaculture research facilities in the country and around the world.[125]

KSU is currently partnering with the University of California to research the effects of schistosomiasis on native fish breeds in Senegal.[126] Schistosomiasis is a water borne disease affecting the liver and intestines that is pervasive in parts of Africa, Asia, and South America.[127] This research is not only vital to the people of Senegal, but also to restoring the natural, healthy environment of the river community.[128]

Nevertheless, despite maintaining world-class facilities and tremendous research, aquaculture in the Bluegrass state has decreased.[129] Although there are many reasons for this decline, the primary reason is due to a lack of infrastructure and support from the state's government.[130] The current regulations in Kentucky regarding aquaculture states:

> The State Department of Agriculture shall promote the development of markets for aquacultural products. The department shall work cooperatively with Kentucky State University's aquaculture program utilizing its expertise in the area of

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[121] *See* Tidwell, *supra* note 28.
[122] *Id.*
[123] *Id.*
[124] *Id.*
[125] *Id.*
[126] *Id.*
[127] *Schistosomiasis*, MERRIAM-WEBSTER, www.Merriam-Webster.com/dictionary/schistosomiasis (last updated Mar. 22, 2018).
[128] *Id.*
[129] *Id.*
[130] *Id.*

> aquaculture. The department also shall work cooperatively with other state agencies in assisting aquaculture producers to obtain the necessary permits.[131]

This falls short of the kind of support necessary to grow the aquaculture industry in the Kentucky.

CONCLUSION

As domestic and foreign populations increase, the amount of food we produce must do likewise. The best way to efficiently and effectively do so is through farming. As a state built on agriculture, Kentucky is uniquely positioned to take advantage of the growing market of aquaculture. By creating a more comprehensive statutory scheme, which could also be backed by its own office for marketing and information, aquaculture could potentially become the answer to Kentucky's employment crisis. With this in mind, the General Assembly should consider placing more emphasis on making it easier for farmers to enter the aquaculture market. This will allow for better oversight and less ambiguity for farmers working in the business. Kentucky agriculture has the means and ability to grow all of our industries to not only aid farmers but also to create a more diverse food system of the citizens of this state.

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[131] KY. REV. STAT. ANN. § 260.960(3) (West 2017).