
Antonio G. Fraone

Boston College Law School, antonio.fraone@bc.edu

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SHUCKING A PATENT: HOW A SIMPLE BEST AVAILABLE TECHNOLOGY LAW CAN BREAK THE SHELL OF PATENT PROTECTIONS

Abstract: Best available technology laws attempt to force the utilization of the most efficient and environmentally friendly technology that is economically achievable for a regulated actor to implement. Sustainability and numerous environmental benefits come from these laws. Although simple to create, the implementation of a best available technology law is difficult and the sought effects of it are unrealized due to vagueness, reliance on the regulated to change, and lack of specifics to ensure true compliance. Patent law adds to this problem due to the protections available to patent holders that grants them the power to exclude others from utilizing their intellectual property. Thus, if the best available technology is protected by a patent, the holder controls its use and anyone seeking to exploit the technology must obtain permission. Patent rights are normally absolute, allowing the holder full control over their intellectual property. A recent ruling in the Supreme Court, however, allows for a once protected patent to be utilized in certain scenarios by non-holders, breaking the total control and freeing the technology. This ruling can now allow for future best available technology laws that can force the use of the best available technology without being hindered by patent protections in all cases.

INTRODUCTION

Archaeological evidence indicates that early man engaged in shellfishing over 150,000 years ago. In the United States, Native Americans harvested shellfish by hand and later utilized rakes and canoes to access deeper waters. The amount of shellfish remains, discovered in previously inhabited precolonial areas throughout New England, indicates the importance of shellfishing to the indigenous people and the extent to which it occurred. Since the arrival of

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2 NAT’L OCEANIC & ATMOSPHERIC ADMIN., supra note 1, at 3; Clyde L. MacKenzie, Jr. et al., Quahogs in Eastern North America: Part 1, Biology, Ecology, and Historical Uses, 64 MARINE FISH-ERIES REV. 1, 11 (2002); Rick & Erlandson, supra note 1, at 952.
3 NAT’L OCEANIC & ATMOSPHERIC ADMIN., supra note 1, at 3; MacKenzie et al., supra note 2, at 1, 11.
Europeans, harvesting has modernized and increased, starting with hand operated specialized rakes and tongs and developing to modern day dredges.4 Dredges are large metal devices that function as seafloor rakes and are towed by fishing vessels to harvest shellfish.5 Dredges vary in design and size depending on the species of shellfish being harvested and the sediment within the area.6 These devices are attached to the end of a towing line and scrape the ocean floor to collect the target species.7 Dredges can be mechanical or hydraulic, with the latter utilizing pressurized water to enhance the performance of the device.8 Commercial fishermen utilize dredging because it is the most effective way to harvest shellfish from the ocean floor.9 Current dredges have the ability to collect over ninety percent of the shellfish from the area it covers, allowing fishermen to obtain large catches to sustain industry and market needs.10

Dredging, however, is like a tornado passing through a town, causing significant environmental harm to the organisms within its path and the ecology of areas where it occurs.11 Mortality among target shellfish can reach as high as ninety percent or more.12 There is also the potential for substantial shell breakage among those harvested or subjected to the device.13 Moreover, dredg-

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4 NAT’L OCEANIC & ATMOSPHERIC ADMIN., supra note 1, at 3.
6 NAT’L OCEANIC & ATMOSPHERIC ADMIN., supra note 1, at 4.
7 Id.
9 See NAT’L OCEANIC & ATMOSPHERIC ADMIN., supra note 1, at 4–6 (indicating that dredging is highly efficient and the primary means by which commercial fisherman harvest shellfish).
10 Thomas L. Meyer et al., The Performance and Environmental Effects of a Hydraulic Clam Dredge, MARINE FISHERIES REV., Sept. 1981, at 14, 18; see NAT’L OCEANIC & ATMOSPHERIC ADMIN., supra note 1, at 4–6 (discussing current dredge performance); Thomas Lampert, Note, Stopping Illegal Fishing and Seafood Fraudsters: The Presidential Task Force’s Plan on Tackling IUU Fishing and Seafood Fraud, 58 B.C. L. REV. 1629, 1630 (2017) (discussing the high value of the seafood industry in the United States); Seafood & Human Health, NAT’L OCEANIC & ATMOSPHERIC ADMIN. (Apr. 3, 2017), http://www.nmfs.noaa.gov/aquaculture/faqs/faq_seafood_health.html [https://perma.cc/H4K2-VS2H] (stating that each American consumes about 15.8 pounds of seafood and shellfish per year, which is half of the USDA’s recommended amount).
13 JEAN LAMBERT & PRICE GOUDREAU, PERFORMANCE OF THE NEW ENGLAND HYDRAULIC DREDGE FOR THE HARVEST OF STIMPSON’S SURF CLAMS, DEP’T OF FISHERIES AND OCEANS CANADA 5 (1996), http://www.dfo-mpo.gc.ca/Library/197697.pdf. [https://perma.cc/4YW-L-QA86]. Substantial shell breakage from dredging is important because of the environmental waste it causes and for the impact it has on the ecology of an area. See id. at 4–5 (discussing the shell breakage and effi-
ing negatively impacts the ecology of an area physically, biologically, and chemically.\textsuperscript{14} As the device passes through an area, the ocean floor is altered leaving behind a trench and eliminating any natural structures or features.\textsuperscript{15} Any present marine life, flora or fauna, is subjected to the same destruction directly and indirectly from post dredging effects.\textsuperscript{16} The effects also alter oxygen levels, sediment nutrient quality, and other aspects of the natural habitat.\textsuperscript{17}

The Commonwealth of Massachusetts regulates dredging in its waters in an attempt to mitigate the impact this shellfishing method has on the environment while still allowing the industry to operate.\textsuperscript{18} These restrictions, however, do not completely prevent the harm posed by dredging and no alternative device exists that can match the yield of current devices without the negative environmental impacts.\textsuperscript{19} An environmentally optimal device would be beneficial to all parties involved and therefore creating it should be an immediate goal.\textsuperscript{20}

This coincides with the goals of sustainability which strives to preserve natural resources.\textsuperscript{21} Sustainability principles aim to establish, monitor, and maintain conditions where humans and nature coexist harmoniously and with mutual benefit.\textsuperscript{22} By working to achieve this goal, nature and everything it provides will be available to the present population and future generations.\textsuperscript{23}

If a more sustainable dredging device were created, it would likely be patented and, therefore, would prevent anyone from freely utilizing the device

\begin{footnotes}
\item[14] Goldberg et al., \textit{supra} note 11, at 12.
\item[15] \textsc{Nat’l Oceanic & Atmospheric Admin.}, \textit{supra} note 1, at 11–13. Dredges are destructive to the ocean floor. \textit{Id.} As the device passes through an area, it destroys any natural sediment structures or formations on the ocean floor, unbeds any flora rooted in its path, and leaves a deep track mark behind that remains, further affecting the area. \textit{Id.; infra} notes 93–112 and accompanying text.
\item[16] \textsc{Nat’l Oceanic & Atmospheric Admin.}, \textit{supra} note 1, at 17–18, 26; \textit{infra} notes 93–112 and accompanying text (discussing the impact of dredging on flora and fauna).
\item[17] \textsc{Nat’l Oceanic & Atmospheric Admin.}, \textit{supra} note 1, at 11–13, 17–18, 24; \textit{infra} notes 93–112 and accompanying text (discussing the chemical and biological effects of dredging).
\item[19] \textsc{Nat’l Oceanic & Atmospheric Admin.}, \textit{supra} note 1, at 4–7 (discussing the technologies currently being used in the shellfish dredging industry); \textsc{Div. of Marine Fisheries, supra} note 18; Meyer et al., \textit{supra} note 10, at 19–20 (discussing the high shellfish mortality rates resulting from dredging).
\item[20] \textit{See Nat’l Oceanic & Atmospheric Admin.}, \textit{supra} note 1, at 4–6 (discussing several negative environmental harms resulting from the dredging process).
\item[22] \textit{Id.} Sustainability is a basic concept grounded on the simple principle that nature provides everything that is needed to survive. \textit{Id.}
\item[23] \textit{Id.}
\end{footnotes}
even if it is environmentally optimal. The most significant of which is the right to exclude others from using what is set forth in the patent. Should anyone violate this right, the patent holder can bring an infringement suit with the ability to obtain damages and an injunction to cease all unpermitted use. Thus, anyone who wishes to utilize the patent must receive permission or wait until the patent expires.

There are no state or federal patent laws that can force a patent holder to utilize their intellectual property. In the absence of any such law, local legislation in the form of a best available technology law could be enacted to force the use of an environmentally optimal patent. Best available technology laws set a standard for an industry to utilize the best technology within their operations that is economically achievable. If certain conditions are met, the environmentally optimal patent could be deemed the best technology and become the industry standard.

This Note argues that unutilized environmentally optimal patents can be pushed into use by inducing or indirectly forcing the granting of licenses through the enactment of a best available technology law. Part I sets forth and explains the current laws and regulations that govern shellfishing in the Commonwealth of Massachusetts. Part II details the environmental impact of

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25 35 U.S.C. § 154(a)(1); see id. § 261 (stating the ownership and assignment rights of a patent holder).
26 See id. § 154(a)(1) (setting forth a patent holder’s right to exclude others from utilizing their intellectual property).
27 Id. §§ 154(a)(1), 271, 281, 283–284.
31 See 33 U.S.C. § 1311(b)(2) (utilizing a best available technology standard to set performance requirements); Learn About Effluent Guidelines, supra note 30 (describing the effect of best available technology laws).
32 See 33 U.S.C. § 1311(b)(2) (utilizing a best available technology standard); Learn About Effluent Guidelines, supra note 30 (describing the factors considered in determining what is the best available technology for the standard); infra notes 240–266 and accompanying text (discussing best available technology laws).
33 See infra notes 267–352 and accompanying text.
34 See infra notes 38–74 and accompanying text.
current dredging technology and the value it provides the industry.\textsuperscript{35} Part III provides legal background to the law surrounding this scenario and focuses on patent, antitrust, monopoly, and best available technology laws.\textsuperscript{36} Finally, Part IV introduces an unused hypothetical environmentally optimal patent and discusses the enactment of a best available technology law to achieve its use.\textsuperscript{37}

I. BACKGROUND OF MASSACHUSETTS LAW GOVERNING COMMERCIAL SHELLFISHING

The Commonwealth of Massachusetts and its agencies perform a great number of duties to protect all of the wildlife contained within the state’s border.\textsuperscript{38} Section A discusses the numerous laws and regulations that shellfisherman need to follow to ensure their day to day operations are compliant.\textsuperscript{39} Section B covers additional laws specifically targeting dredges and dredging that also impact operations.\textsuperscript{40}

A. Massachusetts Fish and Game Laws

The Massachusetts Department of Fish and Game (“DFG”) is an agency under Massachusetts Executive Office of Energy and Environmental Affairs.\textsuperscript{41} The DFG is responsible for the preservation and protection of the Commonwealth’s marine and freshwater fisheries, wildlife species, plants, natural communities, and habitats.\textsuperscript{42} The DFG also works to uphold and enforce Amendment 49 of the Massachusetts Constitution, which sets out the rights of the people to the environment and natural resources.\textsuperscript{43} The agency is divided into four divisions, including the Division of Marine Fisheries (“DMF”), which is responsible for the conservation of marine fisheries resources throughout the Commonwealth.\textsuperscript{44} The DMF controls and manages recreational

\textsuperscript{35} See infra notes 75–119 and accompanying text.
\textsuperscript{36} See infra notes 120–266 and accompanying text.
\textsuperscript{37} See infra notes 267–352 and accompanying text.
\textsuperscript{38} See infra notes 41–74 and accompanying text.
\textsuperscript{39} See infra notes 41–57 and accompanying text.
\textsuperscript{40} See infra notes 58–74 and accompanying text.
\textsuperscript{41} About the Department of Fish & Game, ENERGY AND ENVTL. AFFAIRS (2018), http://www.mass.gov/eea/agencies/dfg/about/ [https://perma.cc/NA34-8HH5].
\textsuperscript{42} Id.
\textsuperscript{43} MASS. CONST. amend. 49 (“The people shall have the right to clean air and water, freedom from excessive and unnecessary noise, and the natural, scenic, historic, and esthetic qualities of their environment; and the protection of the people in their right to the conservation, development and utilization of the agricultural, mineral, forest, water, air and other natural resources is hereby declared to be a public purpose.”); About the Department of Fish & Game, supra note 41.
\textsuperscript{44} About the Department of Fish & Game, supra note 41. The other three divisions are the Division of Ecological Restoration, the Office of Fishing and Boating Access, and the Division of Fisheries and Wildlife. Id. The Division of Ecological Restoration protects and restores rivers, wetlands, and watersheds throughout the Commonwealth for the benefit of the people and all wildlife. Id. The Office
and commercial harvesting of fish, shellfish, and crustaceans.\textsuperscript{45} Within its role, the DMF strives to promote sustainability while balancing Massachusetts’ expansive fishing industry.\textsuperscript{46}

The DMF sets out rules and regulations that govern how commercial fisherman may harvest shellfish and other aquatic organisms.\textsuperscript{47} In order to fish Massachusetts’ waters, each commercial fisherman must obtain a license or permit from the DMF.\textsuperscript{48} The DMF also determines annual open seasons for each species, providing a timeframe for lawful harvesting.\textsuperscript{49} Additionally, the rules set the possession limits that range from daily allotted amounts and hourly limits, to total pounds per season.\textsuperscript{50} Further, there are also size requirements for each species, setting a minimum length, width, combination of measure-
Municipalities may also add in additional requirements that apply in their local waters. Additionally, local governing bodies control where commercial fishing may occur and have the ability to designate certain waters as conservation, protected, and contaminated areas. Multiple factors influence what areas are open to fishermen. Sustainability and public health serve as the basis for most regulations. In general, the DMF does a great deal to protect its wildlife by issuing a wide variety of controls and regulations to ensure sustainability, healthy populations, and the survival of local species. Fishermen must comply with each and every applicable regulation or face consequences that can include fines, permit revocation, vessel impoundment, criminal charges, and other costly punishments.

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51 See id. 6.05(2) (requiring Atlantic Sea Scallops to be at a minimum 3.5 inches in diameter from the hinge to the outer edge); id. 6.08(3)(c) (requiring ninety-five percent of harvested Surf Clams per batch to be larger than five inches in the longest shell diameter); id. 6.11(2) (requiring harvested Bay Scallops to have a well-defined raised annual growth line that measures at least ten millimeters from the hinge of the shell); id. 6.20(2)(a) (requiring that Quahogs be larger than one inch in shell thickness or hinge width); id. 6.20(2)(b) (requiring that Soft Shelled Clams be larger than two inches in area of longest diameter); id. 6.20(2)(c) (requiring that Oysters be larger than three inches in area of longest diameter).

52 See MASS. GEN. LAWS ch. 130, § 54 (stating that municipalities may create, issue, and enforce local restrictions on shellfish harvesting in waters under their control that add or expand on state laws and regulations); id. § 56 (stating that state agencies and the agencies of municipalities shall work jointly and cooperatively to enforce and uphold all laws and regulations governing waters controlled by more than one governmental body).

53 See §§ 54, 56; 322 MASS. CODE REGS. 4.01–.15 (detailing several restrictions for specific areas and locations).

54 See MASS. GEN. LAWS ch. 130, § 20 (stating that the DMF shall assist and cooperate with municipalities to increase the supply and population of shellfish which includes the extermination or incapacitation of causes of harm within the municipality’s jurisdiction); 322 MASS. CODE REGS. 16.04 (stating that efforts to protect and increase shellfish populations, such as restrictions on commercial and recreational harvesting, are a cooperative effort between the Commonwealth and municipalities which is guided by many factors that include public health and shellfish sustainability).

55 See, e.g., MASS. GEN. LAWS ch. 130, § 20 (focusing on sustainability); 322 MASS. CODE REGS. 4.01–.15 (detailing several restrictions for public health purposes); id. 16.04 (supporting sustainability and public health).

56 See 322 MASS. CODE REGS. 1.01–16.06 (setting forth DMF regulations).

57 MASS. GEN. LAWS ch. 130, § 9 (stating that any law enforcement agency with the jurisdiction to enforce any law or regulation related to marine fisheries of any kind may conduct warrantless searches and arrests in their enforcement efforts and may seize any container, storage device, motor vehicle, boat, vessel, or fish related to a violation); id. § 13 (stating that law enforcement may demand for the ability to inspect any fish in the possession of any person believed to have violated any marine fisheries law, and may arrest or fine that person for refusal or violation); id. § 17 (stating the wide range of powers provided to the director of marine fisheries to enforce and create regulations); id. § 67 (stating that the taking of shellfish from licensed grounds or beds without consent may lead to fines and imprisonment); id. § 68 (stating that digging, taking, or carrying away shellfish from waters at night may lead to fines and imprisonment); id. § 72 (stating that violating a catch limit may lead to a fine and imprisonment); id. § 75 (stating that shellfishing in restricted areas without permission may lead to fines and imprisonment).
B. Dredging Laws and Regulations

The Division of Marine Fisheries also regulates dredges which are used by commercial fisherman to harvest various kinds of shellfish. Dredges are large metal devices which function as seafloor rakes that are towed by fishing vessels and use blades, knives, or teeth to dig into the ocean floor to harvest shellfish. Mechanical and hydraulic versions exist, with the latter utilizing pressurized water to enhance the performance of the device. Starting in the 1950s, hydraulic dredges became the primary devices used in the cultivation of shellfish.

The Division of Marine Fisheries regulates commercial dredging by requiring permits that come with restrictions, reporting requirements, gear restrictions, and other species-specific rules. Specific permit types are differentiated by vessel size, with larger vessels paying more to secure their right to operate the dredge. Permit cost is also affected by the applicant’s residence, with non-residents paying double for the same license. Before a permit is valid, an applicant may also need to obtain certain endorsements and sign-offs from local municipalities and other agencies. Permitted commercial fisherman must also abide by the reporting rules and regulations of Massachusetts. All shellfish must be tagged at the time of harvest, and the tag must contain the permit holder’s name and permit number, date and time of harvest, shellfish type and quantity, and state of harvest and growing area information.
Dredges are also regulated by the type of species being harvested.\textsuperscript{68} Depending on the type of shellfish, a specific fencing size will be required.\textsuperscript{69} Further, some species-specific regulations dictate the permitted size and width of the mechanism and limit the number of dredges that may be used at one time per vessel.\textsuperscript{70} The hydraulic pump, which blasts the pressurized water, is regulated as well.\textsuperscript{71} Specific firing distances between the dredge and the pump are set by species along with its maximum power in gallons per minute.\textsuperscript{72} This spacing and pressure control determines the force that is exerted on the shellfish and ocean floor.\textsuperscript{73} Controlling the amount of force exerted on the shellfish protects shellfish from being severely injured or fatally damaged.\textsuperscript{74}

II. ENVIRONMENTAL IMPACT OF SHELLFISH DREDGING, VALUE OF THE PRACTICE, AND THE NEED FOR A NEW ENVIRONMENTALLY OPTIMAL DEVICE

Shellfish dredging negatively impacts a harvested area tremendously and affects the local environment as well.\textsuperscript{75} Section A discusses how shellfish are directly affected, details the extremely high mortality and damage rates caused by dredging, and explains the increased exposure to other harms that are exacerbated by the passing of a dredge.\textsuperscript{76} Section B covers the harm caused to the

\textsuperscript{68} Id. 4.10, 6.08, 6.36. \\
\textsuperscript{69} Id. 4.10(3)(a) (requiring a specific fencing size for a dredge). Fencing here is referring to the walls or outer area of the cage or collection bag of a dredge where lawfully harvestable shellfish are held. See id. (describing required “ring” sizes for a dredge); Elizabeth Brown, Fishing Gear 101: Dredges—The Bottom Scrappers, SAFINA CTR. (June 6, 2016), http://safinacenter.org/2015/05/fishing-gear-101-dredges-the-bottom-scrapers/ [https://perma.cc/AB8F-L8M2] (describing dredges and how they function). These holding mechanisms are lined with fencing of a certain size that allows lawfully sized targeted shellfish to remain while all others filter and fall through to remain in the ocean. See 322 MASS. CODE REGS. 4.10(3), 6.08 (detailing dredge regulations); Brown, supra (describing dredges and related functions). \\
\textsuperscript{70} 322 MASS. CODE REGS. 4.10(2) (stating that it is unlawful to operate or possess a scallop dredge, or combination of scallop dredges, that is wider that ten feet in the waters of the Commonwealth); id. 6.08(3)(b) (stating that it is unlawful for any vessel to operate a hydraulic dredge that is wider than forty-eight inches or more than one dredge while harvesting surf clams); id. 6.08(4)(b) (stating that it is unlawful for any vessel to operate any hydraulic dredge wider than forty-eight inches or more than one dredge while harvesting ocean quahogs); id. 6.36(5) (stating that it is unlawful for any vessel to operate any hydraulic dredge wider than forty-eight inches or more than one dredge while harvesting quahogs). \\
\textsuperscript{71} Id. 6.08(3)(b)(3). \\
\textsuperscript{72} Id. (stating that it is unlawful to operate a dredge to harvest surf clams in the waters of Chatham, Massachusetts unless it is hydraulic, with a maximum width of sixteen inches, and a three inch or smaller pump at a ten-foot head with a maximum power of 300 gallons per minute). \\
\textsuperscript{73} Id. \\
\textsuperscript{74} NAT’L OCEANIC & ATMOSPHERIC ADMIN., supra note 1, at 5 (discussing the effects of pressure and forces from dredging operations on shellfish). \\
\textsuperscript{75} See infra notes 79–112 and accompanying text. \\
\textsuperscript{76} See infra notes 79–92 and accompanying text.
ecology of an area by detailing the physical, chemical, and biological alterations dredging causes that may subside after a small period of time or remain indefinitely. 77 Although harmful, Section C shows that this practice remains the most effective commercial option, but the introduction of an environmentally optimal device can change this situation. 78

A. Impact on Shellfish

Although certain regulations exist to protect shellfish, dredging results in potentially significant mortality and damage rates. 79 Dredge mortality and damage is caused from the device cutting or crushing the target species. 80 Numerous studies vying to measure the impact of dredging on these rates have resulted in a wide range of findings. 81 Mortality rates range from seven percent to ninety-two percent, and figures increase once the device fills while harvesting. 82 Damage rates range from under ten percent to over fifty percent. 83 This

77 See infra notes 93–112 and accompanying text.
78 See infra notes 113–119 and accompanying text.
79 NAT’L OCEANIC & ATMOSPHERIC ADMIN., supra note 1, at 17 (discussing that dredge mortality is also caused from other impacts from the gear, pressure inside the collection device, surface anoxia, and complications from exposure to certain temperatures); Meyer et al., supra note 10, at 19.
80 Meyer et al., supra note 10, at 19.
81 See infra notes 82–84 and accompanying text (discussing mortality and damage test results from dredging activities).
82 Meyer et al., supra note 10, at 20; LAMBERT & GOUDREAU, supra note 13, at 7. One study consisting of two tows of a hydraulic dredge targeting clams beneath the ocean floor resulted in these types of mortalities. Meyer et al., supra note 10, at 20. The two tows utilized different dredge settings and setups. Id. The first tow resulted in an eighteen percent mortality rate for small clams and an eighty-three percent mortality rate for large clams. Id. This rate increased after the dredge had filled within the first ten meters to twenty-six and ninety-two percent respectively. Id. Among the mortalities, it is estimated that sixty percent had been crushed and the remainder had been cut. Id. One bushel of the entire catch showed none of the large clams had been damaged, but about fifteen percent of small clams were damaged. Id. The second tow resulted in a seventeen percent mortality rate for small clams and a seven percent mortality rate for large clams. Id. This rate increased after the first ten meters to twenty-eight and thirty percent respectively. Id. Among the mortalities, calculations estimated that eighty-five percent had been crushed and the remaining fifteen percent had been cut. Id. In a sample bushel of the harvest, eighteen percent of large clams and twenty-one percent of small clams were damaged. Id. Other tests resulted with some sample sites with a near 100% mortality rate for clams of a retainable size. LAMBERT & GOUDREAU, supra note 13, at 7.
83 NAT’L OCEANIC & ATMOSPHERIC ADMIN., supra note 1, at 59–78; LAMBERT & GOUDREAU, supra note 13, at 5; J.H. MANNING, THE MARYLAND SOFTSHELL CLAM INDUSTRY AND ITS EFFECTS ON THE TIDEWATER RESOURCES, MD. DEP’T OF RES. & EDUC. RES. STUDY 5 (1957), http://aquaticcommons.org/6775/1/57-14.pdf. [https://perma.cc/SDF5-N6EZ]. A study attempting to determine the efficiency of hydraulic dredges resulted in a finding that less than ten percent of surf clams, fifty percent of razor clams, and less than twenty-five percent of northern propeller and truncated soft-shell clams are damaged due to the device. LAMBERT & GOUDREAU, supra note 13, at 5. Other studies have resulted in lower figures. NAT’L OCEANIC & ATMOSPHERIC ADMIN., supra note 1, at 59–78. For example, one study resulted in findings of about one percent shell breakage for the harvested shellfish. Id. at 61. Another study reported a one to four percent rate of shell breakage of oysters in the harvest.
wide range of mortality and damage rates indicates that the current dredging practices are unable to account for the various habitat and sea floor conditions that may directly affect the efficiency of each harvest.84

In addition to directly killing many shellfish in the dredging process, dredging also leads to an increase in predation mortality.85 Towing the dredge along the ocean floor leaves behind a track.86 Predators are normally active in dredging areas, but the activity increases after the device passes through, specifically within the dredge’s track.87 Shellfish that are exposed and brought to the surface of the ocean floor by the device are left unprotected and open to predators, further exacerbating shellfish mortality.88 This increase in predation occurs within hours of a dredge passing and activity rates return to normal after about twenty-four hours.89

Only some shellfish exposed to predation after a dredge passes are able to rebury themselves back below the sediment for protection.90 The density of the sediment in the area, other environmental aspects, and temperature also factors into the probability of success.91 Shellfish, however, are also resilient and can repair themselves after sustaining non-fatal damage from dredging.92

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84 See NAT’L OCEANIC & ATMOSPHERIC ADMIN., supra note 1, at 59–78 (listing studies and findings); Meyer et al., supra note 10, at 20 (discussing mortality rates); LAMBERT & GOUDEAU, supra note 13, at 5 (discussing a wide range of mortality and damage rates in various harvesting areas on comparable species); MANNING, supra note 83, at 5 (discussing damage rates and efficiencies).

85 NAT’L OCEANIC & ATMOSPHERIC ADMIN., supra note 1, at 22; Meyer et al., supra note 10, at 21. Predation mortality means the rate of mortality caused by the efforts of predators. See NAT’L OCEANIC & ATMOSPHERIC ADMIN., supra note 1, at 22 (discussing predation mortality); Meyer et al., supra note 10, at 21 (discussing predation mortality). Predation is defined as “a relation between animals in which one organism captures and feeds on others.” Predation, DICTIONARY.COM (Feb. 10, 2018), http://www.dictionary.com/browse/predation [https://perma.cc/VNY6-G8E2].

86 NAT’L OCEANIC & ATMOSPHERIC ADMIN., supra note 1, at 22; Meyer et al., supra note 10, at 21.

87 NAT’L OCEANIC & ATMOSPHERIC ADMIN., supra note 1, at 22; Meyer et al., supra note 10, at 21.

88 NAT’L OCEANIC & ATMOSPHERIC ADMIN., supra note 1, at 22; Meyer et al., supra note 10, at 21.

89 NAT’L OCEANIC & ATMOSPHERIC ADMIN., supra note 1, at 22; Meyer et al., supra note 10, at 21.

90 NAT’L OCEANIC & ATMOSPHERIC ADMIN., supra note 1, at 23. The size of the specific shellfish relates to how fast it will be able to complete this task. Id. Studies have shown that larger shellfish rebury at a slower pace compared to smaller ones. Id.

91 Id.

92 Id. at 17. For example, oysters can rapidly heal from minor shell damage and abrasions. Id. Some species of shellfish are stronger than others, allowing them to suffer less damage. NAT’L OCEANIC & ATMOSPHERIC ADMIN., supra note 1, at 17. Shell strength and resilience, however, cannot completely protect any species from the effects of dredging. See id. (discussing these qualities but still detailing high rates of damage and mortality); Meyer et al., supra note 10, at 20 (discussing these shellfish attributes).
B. Impact on the Ecology of a Dredged Area

The ecology of an area is negatively affected after it is dredged. After a device is towed through, there can be significant physical, biological, and chemical effects. The impact is dependent on the length of the operation, intensity, and the amount of area covered.

Dredges leave behind tracks due to the dragging of the device on the ocean floor. The depth and width of the tracks vary and remain until natural processes restore the sediment that has been displaced. As the device passes it also disrupts the sediment’s composition, as well as forming plumes and increasing turbidity. This has a direct effect on sediment and water quality that affects the surrounding area. Although these effects can naturally subside, local organisms can be harmed by a reduction in visibility and oxygen levels. The dredge also affects the surface of the ocean floor by changing its natural quality and topography by erasing physical structures, burrows, subsurface contents, and other natural features.

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94 Goldberg et al., supra note 11, at 12. Dredging operations cause chemical and biological alterations to an area. NAT’L OCEANIC & ATMOSPHERIC ADMIN., supra note 1, at 16–30. Organisms that live on the seafloor that are removed, harmed, or killed by the passing of a device are vital to the area’s ecology. See id. at 28. (discussing the impact of dredging on the ecology of an area and specific affects it has on local organisms’ survivability). Many contribute to the natural sediment and water recycling process that regulates chemical levels, mixes and maintains sediment quality, and sustains proper oxygen levels. Id. Therefore, mass removal can disrupt the area’s biochemistry. Id. Biochemistry is important to ecology and affects vital aspects such as nutrient quality and the environments’ habitatability. Id.

95 Goldberg et al., supra note 11, at 12.

96 Id.

97 Id. Turbidity is a measurement or observation of how diluted water is as a result of foreign sediment, bacteria, chemicals, or other items. Turbidity Measurement, WORLD HEALTH ORG. (1996), http://www.who.int/water_sanitation_health/hygiene/emergencies/fs2_33.pdf [https://perma.cc/S83V-WRWP] (discussing turbidity). A simple example can be seen in comparing clear water and water mixed with dirt, the latter which being cloudy and diluted. See id. (comparing a muddy river to a fresh water spring to illustrate turbidity).

98 Id.

99 Id.

100 See NAT’L OCEANIC & ATMOSPHERIC ADMIN., supra note 1, at 12, 17 (detailing the impact of dredging on an area and the resulting harms it causes flora and fauna in the affected area).
These physical effects have the potential to severely impact marine organisms. Turbidity can disrupt a variety of organisms, including those that rely on sight to feed, the productivity of macroscopic benthic organisms, and plankton that rely on photosynthesis. It can also affect the respiration of organisms by causing hypoxia, anoxia, and gill clogging. The variety and abundance of area organisms can be negatively impacted as well due to the combination of disruptions.

Dredging in seagrass habitats is currently restricted by state and federal law. Other aquatic vegetation, however, is susceptible to the impact of dredging and is harmed as a result. Dredging has been compared to the plowing of plants on land because of its similar outcomes. Every form of aquatic flora in the device’s path is highly likely to be harmed or destroyed. Additionally, the utilization of highly pressurized water has the ability to uproot, destroy, and displace vegetation as well. Flora that is away from the affected area is still negatively impacted by turbidity because it can block any light from reaching the seafloor, therefore stalling or preventing vital photosynthesis activity. Overall, dredging causes short term and long term effects.
that may naturally subside or persist depending on the intensity of the impact.  

C. Value of Dredging and the Need for an Environmentally Optimal Dredge

Commercial dredging is the most effective way to harvest shellfish from the ocean floor. Current dredges have the ability to collect over ninety percent of the shellfish within a track. This process allows fisherman to obtain large catches to sustain industry needs and meet market requirements. Ending this practice would harm the shellfishing industry and leave fisherman with inefficient and ineffective options to continue shellfishing commercially.

A new process or device to commercially harvest shellfish that mitigates or removes the impact of current dredging operations would substantially benefit the environment. If this technology was available, its immediate use would be targeted by everyone involved. If patented, however, the holder
would have no obligation to introduce it into the market or utilize its benefits because of intellectual property rights.\textsuperscript{119}

III. LEGAL BACKGROUND

This Part provides an overview of four different areas of law that are vital to the argument made in this Note.\textsuperscript{120} Patent law is vital to this Note’s argument and is covered in Section A with an overview of patents, the rights conveyed to the holder, protections, and the policies behind the system within the United States.\textsuperscript{121} Patents, however, do not automatically prevent unauthorized utilization of the intellectual property they contain, any such activity needs to be acted upon through an infringement suit detailed in Section B.\textsuperscript{122} Section C covers Monopoly and antitrust law, focusing on the relation between this topic and patents.\textsuperscript{123} Finally, Section D explains best available technology laws, providing an overview of these standard setting mandates.\textsuperscript{124}

A. Patent Law

Technological advancements, inventions, and innovations have brought about the modern world and continue to propel mankind into the future.\textsuperscript{125} Inventors come forward and introduce their creations into the public and offer its uses and benefits to everyone.\textsuperscript{126} The inventors are also free to demand their own benefits in exchange.\textsuperscript{127}

The invention alone, however, is open to theft, copying, and unauthorized reproduction.\textsuperscript{128} To prevent this outcome, inventors and creators may apply for and be granted a patent on their inventions, which provides them with several rights and protections.\textsuperscript{129} In the United States, the Federal Government pro-

\textsuperscript{119} See 35 U.S.C. § 154(a)(1) (2012) (setting forth a patent holders rights which does not include any duty to utilize the protected intellectual property); id. § 261 (stating that patents are treated as personal property).
\textsuperscript{120} See infra notes 125–274 and accompanying text.
\textsuperscript{121} See infra notes 125–212 and accompanying text.
\textsuperscript{122} See infra notes 160–212 and accompanying text.
\textsuperscript{123} See infra notes 213–247 and accompanying text.
\textsuperscript{124} See infra notes 248–274 and accompanying text.
\textsuperscript{125} See Seymour v. Osborne, 78 U.S. (11 Wall.) 516, 533–34 (1870) (stating that patents provide holders with personal property and exclusion rights which ensure that an inventor’s work and ingenuity is protected from free utilization so that they can benefit from their labor while simultaneously promoting progress in science and arts for the publics benefit).
\textsuperscript{126} Id.
\textsuperscript{127} Id.
\textsuperscript{128} See JOHN GLADSTONE MILLS III ET AL., 1 PATENT LAW FUNDAMENTALS § 1:3 (2d ed. 2016) (discussing how others may freely copy one’s invention without repercussion). Without any protections, an inventor’s work, efforts, and ideas can be swept away, potentially leaving the innovator with nothing. See id. (discussing the value patent rights provide to a holder).
\textsuperscript{129} Id. § 1:4.
vides this protection, and the power to grant these rights is enshrined in the United States Constitution. When a patent is issued, the government grants the inventor numerous protections for a limited time, including full property rights and the power to exclude. Through exclusion, the inventor can prevent anyone from using their patented invention. Therefore, when the inventor goes public with their work, using it as they see fit, no one can lawfully copy, reproduce, or utilize the invention without permission.

Although a patent provides its holder with a great deal of protections and benefits, in exchange, the holder must publicly disclose their work in its entirety. In the patent application, the invention is detailed providing the knowledge needed for others to utilize the idea. Essentially, a patent is an incentive to disclose, which provides the inventor with a monopoly on their work for a limited time. However, when the time period expires, the disclosed invention is freed to the public domain, allowing unrestricted use without any recourse that could have been brought when the patent was active.

This exchange benefits both the inventor and the public by creating a balance that facilitates progress and advancement. Disclosure, although a key aspect, is not the main reason for granting patent protections.

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130 U.S. CONST. art. 1, § 8, cl. 8 (“To promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries.”); MILLS ET AL., supra note 128, § 1:4 (discussing the constitutional clause and related patent laws derived from the power).
131 See 35 U.S.C. § 154(a)(1) (2012) (stating that every patent shall provide the holder with time limited exclusion rights to prevent others from utilizing what it contains without permission); id. § 261 (stating that patents come with the same rights as personal property); MILLS ET AL., supra note 128, § 1:4 (discussing the rights granted with a patent).
133 35 U.S.C. § 154(a)(1) (setting forth the right to exclude others from utilizing the holder’s intellectual property); MILLS ET AL., supra note 128, § 1:4 (discussing the rights and protections conveyed with a patent).
135 See Thomas & Betts Corp., 138 F.3d at 284 (discussing the requirement that a patent seeker make an adequate and full disclosure of the invention to receive the patent); Foster Wheeler Corp. v. Babcock & Wilcox Co., 512 F. Supp. 792, 801 (S.D.N.Y. 1981) (discussing the adequacy of information disclosed in a patent filing); MILLS ET AL., supra note 128, § 1:2 (discussing patent protections, policies, and the benefits to the public).
136 See Sinclair & Carroll Co. v. Interchemical Corp., 325 U.S. 327, 330–31 (1945) (stating that the primary purpose of a patent is the advancement of science through disclosure); MILLS ET AL., supra note 128, § 1:2 (discussing patent protections and policies).
138 Aronson, 440 U.S. at 262; MILLS ET AL., supra note 128, § 1:2.
139 See Aronson, 440 U.S. at 262 (stating that the purpose of the patent system is to foster innovation and advancement); Sinclair & Carroll Co., 325 U.S. at 330–31 (stating that the purpose of the patent system is the advancement of science, technology, and society); W. Elec. Co., 190 U.S.P.Q.
mote and encourage innovation by assuring inventors and creators that their work will be protected and allow for them to benefit from their efforts.\textsuperscript{140} With their work guarded, patent holders can freely introduce their invention into the public and utilize it how they see fit.\textsuperscript{141} The public benefits from the new technology and innovation in exchange for a time-limited monopoly.\textsuperscript{142}

Patents are issued through the United States Patent and Trademark Office (“USPTO”).\textsuperscript{143} This agency oversees the applications and reviews submitted materials in order to determine if a patent should be issued, granting the applicant the protections it carries.\textsuperscript{144} A new idea alone is insufficient to receive a patent.\textsuperscript{145} An applicant must also meet specific criteria, technical aspects, and have legal merit.\textsuperscript{146} Further, the patent application cannot conflict with an already patented idea, thus requiring something new and non-public in order to proceed.\textsuperscript{147} As a result, applicants should conduct a search to ensure that their invention is not already patented.\textsuperscript{148} Conflicts with active patents can lead to infringement suits for violations of the property and exclusion rights that protect inventions.\textsuperscript{149}

Utility, design, and plant patents are the three major types of patents issued by the USPTO.\textsuperscript{150} Utility patents, or patents for invention, are issued for the invention of a new and useful process, machine, manufacture, or composition of matter, or a new and useful improvement thereof.\textsuperscript{151} Patent holders are allowed to exclude others from producing, using, or selling the invention for up to twenty years from the day the application is filed.\textsuperscript{152} These protections and rights are subject to the payment of maintenance fees.\textsuperscript{153} In recent years,

\textsuperscript{140} W. Elec. Co., 190 U.S.P.Q. (BNA) at 549; MILLS ET AL., supra note 128, § 1:2 (discussing patent protections and policies).
\textsuperscript{141} MILLS ET AL., supra note 128, § 1:2.
\textsuperscript{142} Aronson, 440 U.S. at 262; Paulik v. Rizkalla, 760 F.2d 1270, 1276 (Fed. Cir. 1985); MILLS ET AL., supra note 128, § 1:2.
\textsuperscript{144} Id.
\textsuperscript{145} Id.
\textsuperscript{146} Id.
\textsuperscript{147} Id.
\textsuperscript{148} Id.
\textsuperscript{149} Id.
\textsuperscript{150} Types of Patents, supra note 28.
\textsuperscript{151} Id.
\textsuperscript{152} Id.
\textsuperscript{153} Id. Maintenance fees are upkeep payments to the USPTO that are required for a utility patent to remain in force and continue to convey rights and protections. Maintain Your Patent, U.S. PAT. & TRADEMARK OFF. (Jan. 26, 2018), https://www.uspto.gov/patents-maintaining-patent/maintain-your-patent [https://perma.cc/F3RT-QXN6]. Payments are due 3.5, 7.5, and 11.5 years after the issuance of the patent and the amount owed increases from payment period to payment period.
approximately ninety percent of the patents issued by the USPTO have been utility patents.\textsuperscript{154} The USPTO also issues design and plant patents, however, this Note centers on a hypothetical utility patent.\textsuperscript{155} 

Patents are treated as the personal property of the holder.\textsuperscript{156} As such, a patent can be utilized, sold, divided, transferred, licensed, assigned, and any other action that is generally associated with the free use of personal property.\textsuperscript{157} Additionally, the interest in a patent application is treated the same as an issued patent.\textsuperscript{158} Therefore, an application, once filed with the USPTO can be sold or transferred before it is final.\textsuperscript{159}

\section*{B. Patent Infringement}

When the personal property or patent rights of the holder are violated, the violator has infringed upon the patent.\textsuperscript{160} Various actions can qualify as infringement, but every type shares the common element of utilizing intellectual property that belongs solely to the holder.\textsuperscript{161} A patent holder can bring an infringement suit, which is a civil cause of action, in order to enforce their


\textsuperscript{154} \textit{Types of Patents, supra} note 28. \textsuperscript{155} See \textit{infra} notes 272–276 and accompanying text (setting forth hypothetical patent created for the purposes of this Note). The USPTO issues design patents for a new, original, and ornamental design exemplified in or applied to a holder’s product. \textit{Types of Patents, supra} note 28. Holders of this type are allowed to exclude others from producing, using, or selling the design set forth in the patent. \textit{Id.} Design patents granted from applications filed on or after May 13, 2015, provide protections for fifteen years. \textit{Id.} Design patents granted from applications filed before May 13, 2015, provide protections for fourteen years. \textit{Id.} Unlike utility patents, design patents do not require the payment of maintenance fees for protections to continue. \textit{Id.} Plant patents are issued for a newly invented or discovered asexually reproduced plant that is distinct. \textit{Id.} Such plants include cultivated sports, mutants, hybrids, and newly found seedlings. \textit{Id.} A tuber propagated plant or a plant found in an unrefined state are excluded and not patentable. \textit{Id.} Plant patent holders can exclude others from producing, using, or selling the plant for up to twenty years from the date the application is filed. \textit{Id.} Protections continue for the specified time and are not subject to the payment of maintenance fees of any kind. \textit{Id.} 

\textsuperscript{156} 35 U.S.C. § 261. \textsuperscript{157} \textit{Id.} (stating that patents are personal property and may be freely used as such which allows the holder to assign, grant, convey and interest in, and perform any other act exercisable with personal property). \textsuperscript{158} \textit{Id.} \textsuperscript{159} \textit{Id.} \textsuperscript{160} \textit{Id.} § 271. \textsuperscript{161} \textit{Id.}
In a successful action, a patent holder can receive monetary damages, such as a reasonable royalty, injunctive relief, and other equitable remedies. A court can also award treble damages for infringement if deemed appropriate. Such an increase in damages is normally ordered in cases of willful and intentional infringement.

The most effective way to stop infringement is through a permanent injunction, which is a court order commanding an action. The common belief is that the courts will generally issue an injunction in an infringement case. The Supreme Court, however, ruled that injunctions for infringement are not automatic, and a court is free to apply the principles of equity and rule accordingly.

The Supreme Court held that to grant an injunction, the patent holder must satisfy a four-part test and show that it is the sole available remedy. To do so, the plaintiff must establish (1) that irreparable harm has been suffered, (2) that remedies at law are insufficient, (3) that within a balance of hardships, an equitable remedy is justified in favor of the plaintiff, and (4) that the interest of the public will not be harmed from the grant of an injunction. Through these factors, a holder can show that an immediate halt is warranted, but such a grant of relief does not automatically flow from the protections provided to a patent. If an injunction is not granted, the plaintiff can still receive damages through remedies at law for past, present, and continued infringement.

Although the Supreme Court held that this test applies in infringement cases brought under the Patent Act, it provided little guidance for future decisions. The Court expressly stated that it takes no position in which types of infringement cases merit injunctive relief. Rather, the decision is to the dis-
cretion of the district court judges, subject to traditional principles of equity.\textsuperscript{175} Further, discretion must be limited to the extent that similar cases result in the same outcome to promote uniformity and justice.\textsuperscript{176} The Supreme Court did, however, state that categorical approaches to certain circumstances within a case should be avoided and that the specific facts of every case need to be reviewed prior to issuing a decision.\textsuperscript{177}

Subsequent to the Supreme Court’s four-part test ruling, district courts have resolved numerous and various cases.\textsuperscript{178} For example, in \textit{Mercexchange, L.L.C. v. eBay, Inc.}, a patent holder sought a permanent injunction against an online business that willfully infringed on its patent that the business utilizes in order to operate and function.\textsuperscript{179} The District Court for the Eastern District of Virginia denied the injunction because the patent holder failed to meet the requirements of the four-part test.\textsuperscript{180} The plaintiff’s consistent practice and willingness to license its patent, lack of commercially utilizing the patent, and its use of patent protections to collect, negotiate for, and recover money rather than to protect its intellectual property prevented a showing of irreparable harm.\textsuperscript{181} Therefore, the court believed that remedies at law were adequate to compensate the patent holder for the infringement because it did not utilize the patent and consistently granted use permissions.\textsuperscript{182} The hardships of the parties were balanced because the patent holder licenses its patents which will be un-

\textsuperscript{175} See eBay, Inc., 547 U.S. at 394 (setting out the test, but remanding the case to the district court for application); Roche Prods., Inc. v. Bolar Pharm. Co., 733 F.2d 858, 856 (Fed. Cir. 1984) (discussing the considerable discretion district courts have in their evaluation of whether to grant injunctive relief).

\textsuperscript{176} eBay, Inc., 547 U.S. at 394; Martin v. Franklin Capital Corp., 546 U.S. 132, 139 (2005); Roche Prods., Inc., 733 F.2d at 856.

\textsuperscript{177} eBay, Inc., 547 U.S. at 393. For example, a holder not utilizing a patent in their possession does not preclude that holder from obtaining an injunction. \textit{Id.} (stating that the injunctive relief test should not be applied categorically and that lack of commercial activity utilizing the patent would not preclude the grant of injunctive relief). Further, a patent holder’s willingness to license or grant permissions to another also does not bar a holder from equitable relief. \textit{Id.} Although either of these factors can lead to a denial of a permanent injunction, they should not be viewed as an automatic bar from exercising patent exclusion rights. \textit{Id.} at 393–94. The Court reinforced this approach because it is a normal occurrence for patent holders, who are unable to bring their work to market, to grant permissions to practice their work to others in order to obtain a profit, benefit, or satisfaction. \textit{Id.} at 393.


\textsuperscript{179} 500 F. Supp. 2d at 560.

\textsuperscript{180} \textit{Id.} at 590–91.

\textsuperscript{181} \textit{Id.} at 569–72. The plaintiff’s failure to show that an injunction is needed to protect its brand name, market share, reputation, and good will also prevented a showing of the first part of the test. \textit{Id.} at 570.

\textsuperscript{182} \textit{Id.} at 582.
affected regardless of an injunction and the infringer is now believed to have designed around the patent and eliminated its dependence on the intellectual property. 183 Finally, it is evident that the public benefits from the patent system and the exchange of benefits that result from the granting of protections. 184 The court, however, believed that the public is best served without enjoining the infringer because the defendant is a multibillion dollar company with a substantial impact on the United States economy and the patent holder is a two person company that solely licenses its intellectual property. 185

In Praxair, Inc. v. ATMI, Inc., a patent holder filed a motion to enjoin an infringer from utilizing its intellectual property to create a mechanical-based safety control device for the discharging of pressurized fluids from pressurized tanks. 186 The plaintiff and defendant are the only two producers of this technology and are in direct competition in their market. 187 The District Court for the District of Delaware denied the patent holder’s request for an injunction because it failed to satisfy the equitable remedy test. 188 Plaintiff attempted to show that it will face irreparable harm because it could lose additional market share, profits, and goodwill, but it failed to provide detailed figures, market data, or revenues that amount to more than speculation. 189 Additionally, plaintiff argued that its right to exclude allows for it to be a monopoly supplier of the product, but the court dismissed this as a common factor and useless in meeting any part of the test. 190 Thus, the patent holder could not show that monetary damages are inadequate to compensate for infringement. 191 Further, the court acknowledged that protecting patent rights is important to the public’s interests. 192 Enjoining the defendant, however, posed a far greater harm because it would force the defendant to cease production of the device, which would then force its customers, billion dollar fabrication plants, to cease operations and embark on a costly search for an alternative. 193

Conversely, in Robert Bosch L.L.C. v. Pylon Manufacturing Corp., the Court of Appeals for the Federal Circuit ordered a permanent injunction against an infringer who utilized a patent to produce a product it sold in direct

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183 Id. at 583–84.
184 Id. at 586–87.
185 Id.
186 Praxair, Inc., 479 F. Supp. 2d at 441–42. The plaintiff’s patents disclose a device that provides increased safety and help in the handling, storage, and transporting of highly pressurized materials in day to day operations or in the event of mistakes and failures. Id.
187 Id. at 442.
188 Id. at 443.
189 Id. at 443–44.
190 Id. at 444.
191 Id.
192 Id. at 443.
193 Id.
competition with the patent holder. Infringement caused the patent holder to suffer irreparable harm because it directly competed with the infringer which resulted in an unrebutted documented loss of market share, profits, access to potential customers and an erosion of its product’s price. Thus, the court found that monetary damages were inadequate because they cannot remedy the harm caused by the infringement. Further, the Circuit Court ruled that a balance of hardships comes out in favor of the patent holder because failing to enjoin the infringer would further the irreparable harm and force competition against its own product in a highly competitive market.

Similarly, in Acumed L.L.C. v. Stryker Corp., the Court of Appeals for the Federal Circuit affirmed the enjoining of an infringer that utilized the patent of another to develop and manufacture a similar medical device that treats bone fractures. The court found that the patent holder suffered irreparable harm because the infringer is a direct competitor and its product led to a loss in profits, sales, and market share. Therefore, the irreparable harm could not be remedied adequately by a monetary award. The infringer referred to licenses granted by the patent holder to other competitors in an attempt to show the holder had a willingness to license its intellectual property and therefore remedies at law were sufficient. The Circuit Court, however, found that the two licenses granted did not display willingness because one had been granted on account of a settlement agreement from an infringement suit and the other granted permission to a non-direct competitor. A balance of hardships also came out in favor of the patent holder because the infringer was a much larger company, the infringing product only accounted for a small portion of its sales, and it had a non-infringing alternative that it had previously chose not to utilize for business reasons. Finally, the court reasoned that granting a permanent injunction against the infringer would not harm the public because alternatives

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194 Robert Bosch L.L.C., 659 F.3d at 1145.
195 Id. at 1151, 1153.
196 Id. at 1155. The patent holder also introduced evidence that the infringer faced financial problems and is currently under severe financial stress which made its ability to pay a monetary judgment questionable. Id. at 1154.
197 Id. at 1156. The court also held that the public interest part of the test is neutral and unimportant in this decision. Id.
198 551 F.3d at 1326.
199 Id. at 1327–28.
200 Id. at 1329.
201 Id. at 1328–29.
202 Id. at 1328. The Court also noted that past licenses do not automatically show a willingness to grant to others because adding a new competitor may create irreparable harm that did not exist with current licensees. Id. at 1329.
203 Id. at 1329–30.
to both the plaintiff’s and defendant’s product existed on the market and no public health concerns existed.\textsuperscript{204}

\textbf{C. Monopoly and Antitrust Law}

Essentially, a patent is a government issued monopoly that protects the holder’s idea or invention by allowing them to exclude others from utilizing what is set forth in the patent.\textsuperscript{205} Traditionally, a monopoly exists when one economic entity has control or a significant advantage over a market within a specific area, region, or nation.\textsuperscript{206} As a result of the entity’s efforts, it moves into a position that allows for control of prices and other market factors that lead to an ability to suppress and remove competition.\textsuperscript{207} This power can also harm the public, as it will be subject to the entity’s prices if no viable competition exists.\textsuperscript{208}

Although control is an important factor in defining a monopoly, the term can also apply to circumstances where the entity substantially approaches the economic position.\textsuperscript{209} For example, controlling ninety percent of a market has been held to be enough to be considered a monopoly.\textsuperscript{210} Other percentages of lesser amounts can qualify as well, but no exact set percentages are available

\textsuperscript{204} Id. at 1331.
\textsuperscript{205} Edison Elec. Light Co. v. Sawyer-Man Elec. Co., 53 F. 592, 598 (2d Cir. 1892); MILLS ET AL., supra note 128, § 1:6.
\textsuperscript{206} Monopoly, BLACK’S LAW DICTIONARY (10th ed. 2014); Robert Pitofsky, New Definitions of Relevant Market and the Assault on Antitrust, 90 COLUM. L. REV. 1805, 1810–12 (1990) (discussing what constitutes a monopoly and the characteristics of one within an industry).
\textsuperscript{208} BOURDEAU ET AL., supra note 207, § 770. Price control, if abused, allows the controlling entity to set prices as they see fit, which will likely coincide with maximizing profits. See id. (stating that price control is harmful to the public); Monopoly and Competition, ENCYCLOPÆDIA BRITANNICA (Aug. 25, 2014), https://www.britannica.com/topic/monopoly-economics [https://perma.cc/5TK9-RRU8] (discussing monopolies and their ability to set prices and maximize profits). Essentially, if the product is vital, a controlling entity can overcharge and exploit the public. See Peoples Savs. Bank v. Stoddard, 102 N.W.2d 777, 793 (1960) (“Monopoly may be said to be the result of the practical elimination of effective business competition which thereby creates a power to control prices to the harm of the public.”); BOURDEAU ET AL., supra note 207, § 770 (discussing price control and public harm).
\textsuperscript{209} United States v. Aluminum Co. of Am., 148 F.2d 416, 424 (2d Cir. 1945) (stating that control over ninety percent of a market is enough to constitute a monopoly, but around sixty percent is questionable, and thirty-three percent is not enough); Monopoly, supra note 206.
\textsuperscript{210} Aluminum Co. of Am., 148 F.2d at 424.
to compare and review all situations.\textsuperscript{211} Thus, a court will review all available circumstances to determine if a monopoly exists.\textsuperscript{212}

Since the formation of the United States, the public has feared the economic power that a monopoly provides to an entity.\textsuperscript{213} By 1890, a limited number of corporations and individuals amassed an immense amount of wealth by forming monopolies and bringing the control of a market into their hands.\textsuperscript{214} As a result, competition was eliminated, prices were controlled, and the public was subject to their position that fueled the fear and concern.\textsuperscript{215}

To combat this economic issue, Congress passed the Sherman Antitrust Act in July 1890.\textsuperscript{216} This new law sought to prevent abuse by monopolies and suppress economic actions that lead to their formation.\textsuperscript{217} Such economic actions include restrictions on trade and production, restraining competition and commercial transactions, and other acts that lead to control of a market.\textsuperscript{218} Essentially, the monopolistic entity uses its position to influence the market and drive out competition.\textsuperscript{219} All of these actions are regarded as harmful to public welfare and the consumer economy.\textsuperscript{220} Congress believed that public welfare is best served when resources are used in the most efficient and effective ways, through competition fueled by quality and price, and when the market is driven to create and offer the best products and services.\textsuperscript{221} Therefore, through the Sherman Antitrust Act, Congress sought to promote and protect competition while making certain actions that stifle it illegal.\textsuperscript{222} The Sherman Antitrust Act is not designed to protect businesses from capitalism and market forces.\textsuperscript{223} If
an entity, through efficient and effective competitive business practices moves into a position where market share is controlled and obtains monopoly status, the Sherman Antitrust Act will not be invoked and the monopoly will be lawful.\textsuperscript{224}

If a patent holder enters a market and is successful, leading to monopoly status, the holder will not automatically face antitrust lawsuits.\textsuperscript{225} The right to a monopoly is one of the major benefits of the patent system and is essentially its entire purpose.\textsuperscript{226} The protections offered by the law to safeguard a holder’s monopoly ensures that no one can utilize the patent without permission and protects the economic value of the invention.\textsuperscript{227}

Patent protections can be suspended or unenforceable if the patent holder engages in misuse.\textsuperscript{228} Misuse is a common law defense to an infringement action and is based on the equitable doctrine of unclean hands.\textsuperscript{229} An example of misuse is “tying” which is the act of making the sale or license of a patent contingent on another transaction, sale, or other financial obligation.\textsuperscript{230} The Supreme Court first recognized patent misuse in \textit{Morton Salt Co. v. G. S. Suppiger Co.}, a 1942 case where the plaintiff licensed a machine, but also required that licensees purchase another product unrelated to the patent.\textsuperscript{231} The Court found this conduct anticompetitive and an attempt by the holder to abuse its position through its patent.\textsuperscript{232} Therefore, the Court blocked the infringement action because of the plaintiff’s patent misuse.\textsuperscript{233}

The doctrine of patent misuse has been developed since its recognition by the Supreme Court.\textsuperscript{234} The doctrine, however, relies greatly on antitrust law and shares numerous similarities, specifically, the anticompetitive conduct it scrutinizes.\textsuperscript{235} In 1988, Congress passed the Patent Misuse Reform Act, which codified the defense and grew the similarities between the two doctrines.\textsuperscript{236}

\begin{thebibliography}{99}
\bibitem{note224} Broadcom Corp. v. Qualcomm Inc., 501 F.3d 297, 308 (3d Cir. 2007); Dickson, 309 F.3d at 202, 206, 211; BOURDEAU ET AL., supra note 213, at § 1, 2, 46.
\bibitem{note225} Broadcom Corp., 501 F.3d at 297, 308; Dickson, 309 F.3d at 202, 206, 211; BOURDEAU ET AL., supra note 213, § 1, 2, 46.
\bibitem{note226} \textit{Morton Salt Co. v. G.S. Suppiger Co.}, 314 U.S. at 491.
\bibitem{note227} Id. at 490–491.
\bibitem{note229} David S. Olson, \textit{First Amendment Based Copyright Misuse}, 52 WM. & MARY L. REV. 537, 570 (2010).
\bibitem{note230} Id. at 491.
\bibitem{note231} Id. at 490–491.
\bibitem{note232} Frischmann & Moylan, supra note 229, at 868.
\bibitem{note233} Olson, supra note 230, at 571.
\end{thebibliography}
For example, a defense based on tying now requires a showing that the patent holder has market power and position which allows them to manipulate the market.\(^{237}\) Previously, the defense did not require this element and a defendant could rely on the anticompetitive conduct of the patent holder.\(^{238}\) Overall, the doctrine is essentially the Sherman Antitrust Act of patent law, even though both bodies of law can apply simultaneously to a situation where a patent holder engages in anticompetitive conduct.\(^{239}\)

**D. Best Available Technology Laws**

The Government cannot pass a law that directly forces holders to utilize their patent.\(^{240}\) It can, however, pass a “Best Available Technology” law that forces the use of the best available option for a particular purpose.\(^{241}\) Best available technology laws set a standard that essentially requires the use of the most efficient and environmentally beneficial technology within a regulated field so long as it is economically feasible.\(^{242}\) Generally, it does not require that the party affected by the regulation develop its own technology to meet the standard.\(^{243}\) It does, however, require that the most efficient and affordable technology that is available is used in order to meet the standard of the law.\(^{244}\) No exact figures or numerical standards are set and the regulation solely calls for the use of the available technology.\(^{245}\) Through this, the law essentially calls for the highest standard possible for the regulated field without setting a

\[^{237}\text{Olson, supra note 230, at 572.}\]
\[^{238}\text{Id.}\]
\[^{239}\text{Id. at 570–72.}\]
\[^{240}\text{See 35 U.S.C. § 154(a)(1) (2012) (setting out the rights of a patent holder and not providing any statutory basis for forcing a patent’s use).}\]
\[^{241}\text{See 33 U.S.C. § 1311(b)(2)(A) (2012) (setting out the best available technology performance requirement under the Clean Water Act); Learn About Effluent Guidelines, supra note 30 (summarizing best available technology standards).}\]
\[^{242}\text{See 33 U.S.C. § 1311(b)(2)(A) (utilizing a best available technology standard to mandate the use of the most optimal technology that is economically feasible); Learn About Effluent Guidelines, supra note 30 (discussing what is required from mandates that set standards).}\]
\[^{243}\text{See 33 U.S.C. § 1311(b)(2)(A) (requiring the use of the best available technology); Learn About Effluent Guidelines, supra note 30 (discussing what is required from standards set through mandates).}\]
\[^{244}\text{See 33 U.S.C. § 1311(b)(2)(A) (utilizing a best available technology law standard); Learn About Effluent Guidelines, supra note 30 (discussing best available technology law standards).}\]
\[^{245}\text{See 33 U.S.C. § 1311(b)(2)(A) (utilizing a best available technology law standard without setting an exact level); Learn About Effluent Guidelines, supra note 30 (discussing mandates that require the utilization of optimal technology without requiring specific levels).}\]
mark that needs to be achieved. The law, and what it requires, aims to attain the best result for the item that is being regulated.

Through best available technology laws, optimal but unutilized technology can be forced into use because of the need to comply with the law. Any entity under the regulation that chooses not to do so will violate the law and face consequences. Thus, to be compliant, the entity will need to utilize the best technology available that is economically feasible to implement. Therefore, if a patent holder has control of a patent that is the best available technology that is economically achievable, it could be pulled into the standard and will be the technology that must be used to comply with the law.

The Clean Water Act ("CWA") utilizes a best available technology standard to achieve Congress’s goal of eliminating the discharging of pollutants from point sources and its national goal to protect, preserve, and restore the waters of the United States. The standard sets effluent limitations for certain entities regulated under the statute. The Environmental Protection Agency ("EPA") generally determines the best available technology that is economically achievable through the guidelines established by Congress. Accordingly, the standard requires the use of the best practices and control methods currently achievable which include pollution treatment techniques, innovations, optimal modes of operation, and any other alternative techniques, methods, processes, or procedures. These elements are further examined through other

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246 See 33 U.S.C. § 1311(b)(2)(A) (utilizing a best available technology standard to set a required level without stating an exact requirement, leading to the level to progress with time); Learn About Effluent Guidelines, supra note 30 (discussing standards that develop from mandates).

247 See 33 U.S.C. § 1311(b)(2)(A) (utilizing a best available technology standard to mandate the use of optimal technology and processes); Learn About Effluent Guidelines, supra note 30 (discussing mandates that require a certain level or standard be met).

248 See 33 U.S.C. § 1311(b)(2)(A) (requiring a standard to be met in order for a regulated entity to be compliant); Learn About Effluent Guidelines, supra note 30 (discussing standards from mandates).

249 See 33 U.S.C. § 1311(b)(2)(A) (requiring a standard to be met for compliance); Learn About Effluent Guidelines, supra note 30 (discussing standards from mandates).

250 See 33 U.S.C. § 1311(b)(2)(A) (utilizing a best available technology standard to set the level required for compliance); Learn About Effluent Guidelines, supra note 30 (discussing standards formulated from mandates).

251 See 33 U.S.C. § 1311(b)(2)(A) (utilizing a best available technology standard); Learn About Effluent Guidelines, supra note 30 (discussing what formulates compliance with a standard).

252 33 U.S.C. § 1311(b)(2) (stating that compliance “shall require application of the best available technology economically achievable for such category or class, which will result in reasonable further progress toward the national goal of eliminating the discharge of all pollutants”); Id. § 1251(a) (setting forth the national goal and including seven objectives to achieve it).

253 33 U.S.C. § 1311(b)(2) (requiring the use of best available technology that is economically achievable).

254 Id. (stating that the EPA shall make this determination); Id. § 1314(b)(2) (granting the EPA the ability to determine what satisfies mandated standards and the ability to “specify factors to be taken into account in determining the best measures and practices available to comply with subsection (b)(2) of section 1311”).

255 Id. § 1314(b)(2).
factors such as cost, development over time, environmental impact on non-water aspects, engineering requirements, and the specific industry that will be affected. Further, the EPA will review an entire industry and research methods and practices currently utilized to determine what standard is possible. Thus, an optimal operation within an industry will be used in determining what the standard should require. The agency also looks to pilot plant studies, bench scale studies, and even foreign operations.

Setting such a standard is an efficient option that avoids the need for constantly updated legislation that would otherwise be needed to mandate the use of optimal technology. Accordingly, the standard can progress with the development of new technology that ensures the highest economically achievable efficiency is attained by those governed by the statutes and regulations. Further, a best available technology law sets a performance requirement and not a design requirement. This requires the entity regulated by the standard to achieve that level of performance, but allows for the entity to freely choose how to attain it. Although there is a level of choice, it is likely that the use of the most modern technology with the greatest efficiency will be used to comply. Entities regulated by the standard must meet their performance level, which creates an environmental benefit that would otherwise be lost or delayed. An entity can receive a variance that excludes them from the standard, but these are rarely granted which ensures that the standard is upheld wherever possible.

256 Id. ("Factors relating to the assessment of best available technology shall take into account the age of equipment and facilities involved, the process employed, the engineering aspects of the application of various types of control techniques, process changes, the cost of achieving such effluent reduction, non-water quality environmental impact (including energy requirements), and such other factors as the Administrator deems appropriate.").
257 Kennecott v. U.S.E.P.A., 780 F.2d 445, 448 (4th Cir. 1985); ENVTL. LAW INST., 2 LAW OF ENVIRONMENTAL PROTECTION § 3:59 (2017) (covering the best available technology standard and the factors that influence the level of performance required by regulated entities).
258 Kennecott, 780 F.2d at 448; ENVTL. LAW INST., supra note 257, § 13:59 (discussing factors for the standard as well as anomalies within industries).
259 Karen M. Wardzinski et al., Water Pollution Control Under the National Pollutant Discharge Elimination System, in THE CLEAN WATER ACT HANDBOOK 8, 20 (Parthenia B. Evans ed., 1990) (discussing sources of information used by the EPA to set the standard for compliance with the Clean Water Act and other mandates).
260 See DIETRICH H. EARNHART & ROBERT L. GLICKSMAN, POLLUTION LIMITS AND POLLUTERS’ EFFORTS TO COMPLY 36 (2011) (discussing mandates that require a certain standard to be reached rather than a specific level or utilization of a certain technology or process).
261 See id. (discussing mandates that require the utilization of technology that is optimal without stating directly what must be utilized at that present time).
262 Id. at 36–37.
263 Id.
264 See id. (discussing the mandated standards that are likely updated with the advancement of technology and processes).
265 See Wardzinski et al., supra note 259, at 24 (indicating that entities regulated by best available technology standards are only excepted from the requirements under limited circumstances).
266 Id.
IV. ANALYSIS OF THE EFFECT OF A BEST AVAILABLE TECHNOLOGY LAW ON A PROTECTED ENVIRONMENTALLY OPTIMAL PATENT

This Part contains the central argument of this Note and relies on a hypothetical patent to an environmentally optimal shellfishing dredge, detailed in Section A, that is owned by a shellfishing entity in the industry. With the intellectual property in place, an overview covering the likely status of the patent in the current shellfishing industry is discussed in Section B and concludes that the environmentally optimal device will go unused and its benefits unrealized. To combat this issue, Section C suggests that the Commonwealth of Massachusetts should formulate a best available technology law that will mandate the utilization of the optimal device through its required standard of performance. This solution, however, is problematic due to the protections the patent provides its holder, no legal obligations to license the device, and the creation of a monopoly status for the holder due to the mandate. Therefore, Section D argues that any shellfisherman that are unable to lawfully use the device, should willfully infringe which will result in an infringement suit that will end with an order for reasonable royalties to be paid, the equivalent of a lawfully granted license.

A. Hypothetical Environmentally Optimal Patent

Assume, for the purposes of this Note, that a commercial fisherman in the Commonwealth of Massachusetts purchased a patent that contains the rights to an environmentally optimal dredge that would substantially mitigate the harm caused by current dredges. The fisherman purchased the patent because the new device, although slightly more expensive, was believed to increase shellfish yield and allow for cheaper operational costs, thus providing an edge in the market. When tested, the yield remained the same, but the environmental

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267 See infra notes 272–276 and accompanying text.
268 See infra notes 277–298 and accompanying text.
269 See infra notes 299–325 and accompanying text.
270 See infra notes 299–325 and accompanying text.
271 See infra notes 326–352 and accompanying text.
272 See 35 U.S.C. § 261 (2012) (stating that patents are treated as personal property); NAT’L OCEANIC & ATMOSPHERIC ADMIN., supra note 1, at 11–30 (detailing the harmful environmental impact of dredging); Meyer et al., supra note 10, at 19–20 (detailing the high shellfish mortality rates).
273 See 35 U.S.C. § 261 (stating that patents are treated as personal property); NAT’L OCEANIC & ATMOSPHERIC ADMIN., supra note 1, at 11–30 (detailing the harmful environmental impact of dredging); Meyer et al., supra note 10, at 18–20 (discussing high dredge efficiency and shellfish mortality rates from dredging); Seafood & Human Health, supra note 10 (providing insight into the U.S. seafood market).
harm decreased substantially. Due to the lack of increased yield and the cost to implement this new device, the commercial fisherman decided not to utilize the environmentally optimal dredge for business reasons. As a result, the environmental benefit this new device can create is stored away, unused, and protected by patent law.

B. Current Status of the Environmentally Optimal Patent and the Shellfishing Industry

The availability of an environmentally optimal patent should trigger an effort to promote its use. Generally, there are no laws that force a patent holder to utilize their invention or idea. Patent laws protect the inventor, allowing the holder to use their rights in any way they choose. The right to exclude is also an inherent right to a patent holder, further allowing them to prevent others from using their invention. Normally, when an optimal invention is created, it is both economical and beneficial to introduce it into the market and into the public. The patent holder benefits from its use economically and earns satisfaction from their work while the affected market becomes better and more efficient. Essentially, all parties involved benefit from tech-

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274 See NAT’L OCEANIC & ATMOSPHERIC ADMIN., supra note 1, at 11–30 (discussing the negative physical, chemical, and biological impact of dredging); Meyer et al., supra note 10, at 18–20 (detailing dredge performance).

275 See NAT’L OCEANIC & ATMOSPHERIC ADMIN., supra note 1, at 11–30 (detailing the negative impact of dredging on the environment); Meyer et al., supra note 10, at 18–20 (detailing the performance of current dredges); Seafood & Human Health, supra note 10 (discussing U.S. seafood consumption).

276 See 35 U.S.C. § 154(a)(1) (setting forth a patent holder’s rights which does not include any duty to utilize the protected intellectual property); id. § 261 (stating that patents are treated as personal property); NAT’L OCEANIC & ATMOSPHERIC ADMIN., supra note 1, at 11–30 (detailing the environmental harm caused by dredging); Meyer et al., supra note 10, at 18–20 (detailing the issues with current dredges).


278 See 35 U.S.C. § 154(a)(1) (setting forth the rights of a patent holder, which does not include any mandate to utilize the intellectual property).

279 Id.; supra notes 125–204 and accompanying text (discussing patent law and policy).

280 35 U.S.C. § 154(a)(1); supra notes 125–204 and accompanying text (discussing patent law and policy).

281 See Aronson v. Quick Point Pencil Co., 440 U.S. 257, 262 (1979) (discussing the benefits of patent law and its impact in providing a public benefit); Sinclair & Carroll Co. v. Interchemical Corp., 325 U.S. 327, 330–31 (1945) (stating that the purpose of the U.S. patent system is to foster innovation and the advancement of technology); Seymour v. Osborne, 78 U.S. (11 Wall.) 516, 533–34 (1870) (stating that the purpose of patents are to produce a public benefit from new inventions while securing a benefit for the inventor by offering protections).

282 See Aronson, 440 U.S. at 262 (discussing the balanced benefits of the patent system); Sinclair & Carroll Co., 325 U.S. at 330–31 (discussing the public benefit gained from the patent system);
nological advancements and this continued cycle has driven every industry and market in the world. 283

In this situation, the holder of an environmentally optimal patent has no obligation to utilize the invention. 284 Due to the rights that accompany a patent, the holder is free to choose what actions to take. 285 The patent holder can sell, transfer, license, produce, or perform any other action associated with personal property. 286 They also have the right to simply hold the patent and do nothing. 287 Thus, if the holder does not utilize the patent in any way its benefits will be unrealized. 288 Further, if anyone acts without the consent of the holder and utilizes the patented invention they will be infringing. 289 Generally, infringement will lead to a lawsuit to enforce patent rights and can result in an award of compensatory damages, punitive damages, and injunctive relief. 290 Without permission, a license, or ownership of the patent, the best option for someone that hopes to use the invention is to essentially wait until the protections ex-

See Aronson, 440 U.S. at 262 (stating that the patent system fosters innovation and advancement); Sinclair & Carroll Co., 325 U.S. at 330–31 (discussing the benefits patents provide society); Seymour, 78 U.S. (11 Wall.) at 533–34 (stating that the patent system facilitates progress).

See 35 U.S.C. § 154(a)(1) (stating the rights of a patent holder, which contains no mandate to utilize the invention); W. Elec. Co. v. Milgo Elec. Corp., 190 U.S.P.Q. (BNA) 546, 549 (S.D. Fla. 1976) (stating that a patent holder has sole control over the invention); MILLS ET AL., supra note 128, §§ 1:2, 1:4 (discussing the rights of a patent holder which does not include any mandate to practice a patent).

See 35 U.S.C. §§ 154(a)(1), 261 (setting forth the rights of a patent holder); W. Elec. Co., 190 U.S.P.Q. (BNA) at 549 (stating that a patent holder has exclusive rights to the invention); MILLS ET AL., supra note 128, §§ 1:2, 1:4 (discussing the rights of a patent holder).

See 35 U.S.C. §§ 154(a)(1), 261 (stating that the rights of patent holder to the protected intellectual property is the same as personal property rights); W. Elec. Co., 190 U.S.P.Q. (BNA) at 549 (stating that a patent grants a holder all benefits to the invention); MILLS ET AL., supra note 128, §§ 1:2, 1:4 (discussing all of the property rights of a patent holder).

See 35 U.S.C. §§ 154(a)(1), 261 (allowing a patent holder to simply hold intellectual property and never utilize it); W. Elec. Co., 190 U.S.P.Q. (BNA) at 549 (stating that patented intellectual property is solely owned by the holder who may choose not to use it in any way); MILLS ET AL., supra note 128, §§ 1:2, 1:4 (discussing patent rights which allow non-use of intellectual property).

See 35 U.S.C. § 261 (stating that patents shall share the same rights as personal property, which allows them to simply hold the patent and never utilize it); W. Elec. Co., 190 U.S.P.Q. (BNA) at 549 (stating that patent holders have exclusive ownership over their intellectual property and can exclude anyone from utilizing it); MILLS ET AL., supra note 128, §§ 1:2, 1:4 (discussing patent rights and stating that a holder can utilize the intellectual property how they see fit and exclude others).

See 35 U.S.C. § 154(a)(1) (setting out a patent holder’s ability to exclude others); id. § 271 (setting out what qualifies as patent infringement).

See id. § 271 (setting out what actions qualify as patent infringement); id § 281 (providing patent holders with the ability to bring a civil action for infringement to enforce their patent rights); id § 283 (stating that infringement actions can result in injunctive relief); id § 284 (detailing the available monetary damages available for an infringement claim).
pire. As such, the individual will need to wait twenty years from the application filing date of the patent.

The hypothetical patent holder is active in the commercial shellfishing industry. Regardless of what technology is used in its operations, the entity is not utilizing the environmentally optimal patent. The current technology, so long as regulations set forth by the Massachusetts Division of Marine Fisheries (“DMF”) are followed, is lawful. The DMF sets out specific regulations that set permit requirements, catch limits, seasons, and dredge dimensions, but do not specify what technology must be used. Thus, current DMF and Massachusetts law is ineffective in promoting the use of the optimal patent and places no pressure on the patent holder to utilize the invention. Additionally, no violations of these regulations can be used to force the use of the patent because they do not address efficiency standards or technology standards.

C. Enacting a Best Available Technology Law to Induce the Use of the Environmentally Optimal Patent

To force the environmentally optimal patent into use, the Massachusetts Legislature or the DMF should act and pass a best available technology law pertaining to dredging in state waters. Due to the new invention’s efficiency, capability to decrease the mortality rate, decreased impact on the environment, and ability to match current harvesting rates, it will be the best available technology. When enacted, every commercial dredging operation will be forced

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291 See Aronson, 440 U.S. at 262 (discussing patent protections and the balanced benefit of providing a patent holder with those protections for a period of time in exchange for the intellectual property eventually being released for public use upon the expiration of those rights); MILLS ET AL., supra note 128, § 1:2 (discussing a patent holder’s protective rights and the expiration of those rights after a patent specific period of time when the intellectual property moves into the public domain).

292 See Aronson, 440 U.S. at 262 (discussing patent rights and expiration, whereupon the intellectual property is released into the public domain); MILLS ET AL., supra note 128, § 1:2 (discussing patent rights and their expiration); Types of Patents, supra note 28 (stating that a utility patent expires after twenty years from the application date).

293 NAT’L OCEANIC & ATMOSPHERIC ADMIN., supra note 1, at 3–7.

294 Id. at 3–7, 11–30; Meyer et al., supra note 10, at 19–20.

295 Supra note 41–74 and accompanying text (covering current laws and regulations).

296 Supra note 41–74 and accompanying text (covering current laws and regulations).

297 NAT’L OCEANIC & ATMOSPHERIC ADMIN., supra note 1, at 11–30; Meyer et al., supra note 10, at 19–20; supra notes 41–74 and accompanying text (covering current laws and regulations which include no mandates of that kind).

298 MASS. GEN. LAWS ch. 130, §§ 9, 13, 17, 67, 68, 72, 75 (2018); supra notes 41–74 and accompanying text (covering current laws and regulations).

299 See 33 U.S.C § 1311(b)(2) (utilizing a best available technology standard to force the use of environmentally optimal technology).

300 NAT’L OCEANIC & ATMOSPHERIC ADMIN., supra note 1, at 11–30; Meyer et al., supra note 10, at 19–20; see supra notes 272–276 and accompanying text (detailing a hypothetical patent for the purposes of this Note).
to adapt and utilize the optimal patent in order to continue dredging.\textsuperscript{301} The commercial actor in control of the patent will be forced to use the technology as well.\textsuperscript{302}

Enacting a best available technology law will circumvent patent protections that prevented the utilization of the new technology.\textsuperscript{303} Under the new law, the patent holder must utilize the technology or cease operations, the latter of which is unlikely.\textsuperscript{304} Such a law will not qualify as infringement and will not violate any patent protections.\textsuperscript{305}

Although an environmental benefit will come from the passage of a best available technology law, its enactment will essentially hand control of the Massachusetts commercial shellfishing industry to the patent holder.\textsuperscript{306} Due to patent protections, the holder has sole access to the technology.\textsuperscript{307} If other commercial fishermen attempt to lawfully continue their operations with the use of the new technology, they will be infringing on the patent.\textsuperscript{308} This in-
fringement will also be intentional, which may lead to treble damages.\(^{309}\) With complete control of the mandated technology, the patent holder will enjoy the benefits of a monopoly and remove all competition.\(^{310}\)

This monopoly will be lawful which further adds to the repercussions of enacting a best available technology law.\(^{311}\) By simply utilizing the technology that it owns to achieve control of the commercial shellfishing industry, the patent holder will not commit any type of anticompetitive activity that would invoke antitrust law.\(^{312}\) No market manipulation, pricing control, or other antitrust violations are likely to occur in this situation because the new law has already eliminated competition.\(^{313}\) Thus, the patent holder will be in a monopolistic position that, without antitrust violations, will be uninterrupted and lawful.\(^{314}\)

Further, it is unlikely that any patent misuse will occur that will lead to a suspension of patent protections and an inability to sue for infringement.\(^{315}\) Misuse is similar to anticompetitive activity, which under current circumstances will not occur.\(^{316}\)

\(^{309}\) See id. § 284 (stating allowed damages for infringement); i4i Ltd. P’ship v. Microsoft Corp., 598 F.3d 831, 858 (Fed. Cir. 2010) (stating that willful infringement can lead to and is required to award treble damages).

\(^{310}\) See United States v. Aluminum Co. of Am., 148 F.2d 416, 424 (2d Cir. 1945) (discussing what constitutes control of a market); Edison Elec. Light Co., 53 F. at 598 (finding that patent rights are equal to a lawful monopoly on intellectual property); Monopoly, supra note 206 (defining monopoly as having control over a market in an area); MILLS ET AL., supra note 128, § 1:6 (stating patents are monopolies).

\(^{311}\) See Broadcom Corp. v. Qualcomm Inc., 501 F.3d 297, 308 (3d Cir. 2007) (discussing unlawful monopolies and anticompetitive conduct which the court “generally defined as conduct to obtain or maintain monopoly power as a result of competition on some basis other than the merits”); Dickson v. Microsoft Corp., 309 F.3d 193, 202, 206, 211 (4th Cir. 2002) (discussing anti-competitive conduct and anti-monopoly law); United States v. Westinghouse Elec. Corp., 648 F.2d 642, 647 (9th Cir. 1981) (discussing monopolies derived from patents and what categorizes them as lawful or unlawful); Edison Elec. Light Co., 53 F. at 598 (equating patent rights to a lawful monopoly to the protected intellectual property); BOURDEAU ET AL., supra note 213, § 1, 2, 46 (discussing monopolies and what qualifies as unlawful anticompetitive behavior); MILLS ET AL., supra note 128, § 1:6 (discussing the monopoly granted with a patent).


\(^{313}\) See 15 U.S.C. §§ 1–3 (setting forth what qualifies as a violation of anti-monopoly law); BOURDEAU ET AL., supra note 213, §§ 1, 2 (discussing anti-monopoly law and what constitutes a violation).

\(^{314}\) See 15 U.S.C. §§ 1–3 (setting out what is a violation of anti-monopoly law); 35 U.S.C. § 154(a)(1) (setting out patent rights); BOURDEAU ET AL., supra note 213, §§ 1, 2 (discussing monopolies and restraint of trade).

\(^{315}\) See Morton Salt Co. v. G.S. Suppiger Co., 314 U.S. 488, 490–91, 494 (1942) (holding that patent misuse can lead to a suspension of patent rights and make an infringement action unavailable); Frischmann & Moylan, supra note 229, at 867 (stating that patent misuse is a defense to an infringement action).

\(^{316}\) See 15 U.S.C. §§ 1–3 (containing anti-monopoly law); Olson, supra note 230, at 570–71 (discussing patent misuse); BOURDEAU ET AL., supra note 213, §§ 1, 2 (discussing monopolies and restraint of trade).
and other manipulation is unnecessary because control of the market is already held. Unless a similar or a newer and more efficient patent is introduced that competes with the holder’s patent, which leads to an attempt to manipulate the market to hold control of its monopoly, no misuse is likely to occur.

Similarly, it is unlikely that an administrative agency or legislative body will proceed to enact such a law if it will simultaneously disrupt an entire industry and create a monopoly for a private entity. Meeting the supply and demand of an entire market overnight, however, is not an easy or relatively feasible task to accomplish. Thus, it is likely that other commercial shellfishing operations can obtain a license or other form of permission to gain access to the patented technology. As a result, commercial actors already active in the industry can obtain the ability to utilize the technology and continue their operations in an environmentally optimal manner. As previously stated, there is no law or force that can order the patent holder to agree to license or provide access to others in the industry. Hypothetically, it is unlikely that the patent holder’s operation alone can fill or even substantially meet the current output of the industry because it is just one shellfishing operation among many in Massachusetts. Thus, it would be wiser, both economically and financially, to grant permission to other commercial operations and profit from agreements, sales, or license fees.

317 See Morton Salt Co., 314 U.S. at 491 (discussing the lawful monopoly that patent rights grant); Edison Elec. Light Co., 53 F. at 598 (equating patent rights to a lawful monopoly to the protected intellectual property); MILLS ET AL., supra note 128, § 1:6 (discussing patents and the monopoly they provide); Olson, supra note 230, at 570 (defining tying as “the practice of making a sale or license of a product contingent on the purchase of some other good” and classifying this as patent misuse).
318 See Morton Salt Co., 314 U.S. at 491 (discussing that patent rights can be manipulated and abused to obtain a monopoly, but the monopoly status granted with a patent does not qualify as such alone); Olson, supra note 230, at 572 (discussing patent misuse and the potential for waiver of enforcement of patent rights as a result of misuse).
319 See 15 U.S.C. §§ 1–3 (setting forth the Sherman Antitrust Act and laws against unlawful monopolies); BOURDEAU ET AL., supra note 213, § 1 (discussing the national fear monopolies insight due to the concentrated economic power that can lead to public harm and exploitation).
320 See Seafood & Human Health, supra note 10 (finding that Americans in 2009 consumed 4.833 billion pounds of seafood and detailing the dietary health benefits).
322 See 35 U.S.C. § 1311(b)(2) (utilizing a best available technology standard to mandate the use of optimal technology).
323 See 35 U.S.C. § 154(a)(1) (setting out patent rights that are exclusive to the holder).
324 See Lampert, supra note 10, at 1630 (discussing the high value of the seafood industry in the United States); Seafood & Human Health, supra note 10 (finding that Americans in 2009 consumed 4.833 billion pounds of fish and shellfish).
325 See infra notes 326–352 and accompanying text (arguing for unauthorized shellfisherman to infringe upon the patent to indirectly force licensing).
D. Infringing to Indirectly Force Licensing

Commercial shell fisherman can also choose to infringe upon the patent and utilize the technology rather than ceasing operations. By doing so, they will be intentionally violating the rights of the patent holder which will likely result in an infringement suit. The holder will likely press for an injunction to protect its intellectual property interests and its monopoly position. A court, however, will not automatically grant an injunction unless the holder meets the requirements of the four-part test. A plaintiff must establish that irreparable harm has been suffered, that remedies at law are insufficient, that within a balance of hardships, an equitable remedy is justified in favor of the plaintiff, and that the interest of the public will not be harmed from the grant of an injunction. Reviewing the test, the patent holder likely could not fully meet the requirements and display that it is in a position that necessitates an injunction.

The patent holder would likely be unable to establish irreparable harm because an infringing commercial fisherman is not a direct competitor in the dredge market. The patent will be infringed upon solely to gain access to the device to continue its own shellfishing operation which removes it from that direct market. Further, the patent holder will not lose any of its newly found dredge market share because its control on the market will be unaffected by an infringer utilizing the patent for its own use. If the patent holder can argue

326 See 35 U.S.C. § 271 (setting forth what qualifies as infringement of a patent); id. § 283 (granting courts the power to enjoin infringement); id. § 284 (setting out damages for infringement).
327 See id. § 281 (allowing civil actions for infringement); id. § 271 (setting forth what qualifies as infringement of a patent); eBay, Inc., 547 U.S. at 391 (discussing infringement and the four-part injunction test); Infringement, BLACK’S LAW DICTIONARY (10th ed. 2014) (defining infringement as an action that violates the exclusive intellectual property rights of a patent holder).
328 See 35 U.S.C. § 281 (allowing civil actions for infringement); id. § 271 (setting forth what qualifies as infringement of a patent); Infringement, supra note 327 (defining infringement as an action that violates the exclusive intellectual property rights of a patent holder).
329 See id. at 391 (discussing infringement and the four-part injunction test).
330 See id. (setting forth the four parts of the injunction test that need to be satisfied).
331 See id. (setting forth the four-part injunction test); infra notes 332–352 and accompanying text (arguing that infringement to force licensing of a patent).
332 See Robert Bosch L.L.C. v. Pylon Mfg. Corp., 659 F.3d 1142, 1151, 1153 (Fed. Cir. 2011) (holding that the patent holder faced irreparable harm from continued infringement because both parties directly competed in the same market, utilizing the same business plan, which led to a loss of market share, customers, and sales for the holder); Acumed L.L.C. v. Stryker Corp., 551 F.3d 1323, 1327–28 (Fed. Cir. 2008) (holding that a competitor infringing on a patent leading to a loss of market share, profits, and sales satisfies the irreparable harm element).
333 See Robert Bosch L.L.C., 659 F.3d at 1151, 1153 (discussing infringement and the harm from it due to the patent holder directly competing with the infringer); Acumed L.L.C., 551 F.3d at 1327–28 (discussing infringement and agreeing that a past grant of a license does not remove the possibility of future irreparable harm).
334 See Praxair, Inc. v. ATMI, Inc., 479 F. Supp. 2d 440, 443–44 (D. Del. 2007) (requiring evidence that un-enjoined infringement will lead to a loss in market share, profits, or sales).
that losing its control over the Massachusetts shellfish dredging industry qualifies as irreparable harm, the fact that it is unlikely to be able to meet the demand of the market and match the output of the numerous operators in the industry will further show that no market share is lost. Additionally, prior to the passage of the new law, the holder did not commercially use the patent due to business reasons, which further adds to a showing that there is no irreparable harm.

Due to the inability of the patent holder to show irreparable harm, it is likely that a court will find that monetary damages are adequate to remedy the infringement. Further, the monetary damages that are awarded would likely be the equivalent of a reasonable royalty that the patent holder could receive if it had granted a license to infringing commercial fisherman. Additionally, there is no harm within this scenario that cannot be remedied monetarily because there is no loss of profits, goodwill, or business opportunities that are more than speculative or feasible. Further, the ability to operate a monopoly or opportunity to do so is not meaningful to a review under the equitable remedy test.

A balance of hardships will likely come out in favor of the infringer because an injunction will force every commercial shellfishing operation out of business. The lack of irreparable harm and the ability to compensate monetarily also weigh in favor of the infringer because it is evident that only the infringer stands to face significant harm. Additionally, allowing the infringer to utilize the patent in exchange for monetary damages will essentially leave

335 See id. (requiring evidence of a loss of market share to have a possibility of receiving an injunction).
336 See Mercexchange L.L.C. v. eBay, Inc., 500 F. Supp. 2d 556, 569–72 (E.D. Va. 2007) (holding that a lack of commercial use and willingness to license can be used as a factor in determining the irreparable harm element, but cannot be used as a categorical denial for an equitable remedy).
337 See Praxair, Inc., 479 F. Supp. 2d at 444 (denying an injunction for an infringement action and holding that monetary damages are adequate to compensate the patent holder due to an inability to show irreparable harm).
338 See 35 U.S.C. § 284 (stating that monetary damages should relate to the value of a reasonable royalty owed on a license of the intellectual property); eBay, Inc., 547 U.S. at 391 (discussing monetary damages as an appropriate award when the factors required for injunctive relief are unsatisfied).
339 See Praxair, Inc., 479 F. Supp. 2d at 443–44 (requiring evidence that un-enjoined infringement will lead to a loss in market share, profits, or sales).
340 See eBay, Inc., 547 U.S. at 391 (setting forth the four-part test to obtain injunctive relief); Praxair, Inc., 479 F. Supp. 2d at 444 (dismissing evidence of potential monopoly status as irrelevant to determining whether an injunction is warranted).
341 See Mercexchange L.L.C., 500 F. Supp. 2d at 583–84 (discussing a balance of hardships concerning a potentially willful infringer utilizing a patent for its core business and finding that monetary damages are suitable as opposed to an injunction).
342 See Acumen L.L.C., 551 F.3d at 1329–30 (balancing the hardships in favor of the infringer who will be the only party to realistically face harm from an injunction, and ruling that monetary damages are adequate to remedy the situation).
the entire industry as it was prior to the enactment of the new law, which is favorable to both sides.\textsuperscript{343}

Upholding intellectual property protections and keeping the patent system intact truly benefits the public.\textsuperscript{344} The public’s interest, however, is best served with the denial of an injunction in this scenario.\textsuperscript{345} If the infringing commercial operations are enjoined from utilizing the mandated dredge they will be forced to cease operations which will effectively put every shellfisherman out of work and harm the local and state economy.\textsuperscript{346} Further, if the enjoined operations wanted to continue they would need to develop a dredge that is more efficient than the current environmentally optimal version which is costly and likely unachievable given their resources.\textsuperscript{347} An injunction will also solidify the patent holder’s monopoly on the local dredge and shellfish market that can be detrimental to the public.\textsuperscript{348} There are no alternatives to the environmentally optimal dredge and with an injunction, the patent holder will be the sole provider which opens the door to public harm through price manipulation and the destruction of competition.\textsuperscript{349}

This option, if licensing or other methods of permitting use of the patent are exercised, is the best course of action for commercial shell fisherman without

\textsuperscript{343} See id. (discussing that an injunction will only stop the infringer from utilizing a patent in an industry shared with the patent holder and will not benefit the holder in any meaningful way).

\textsuperscript{344} See Mercexchange L.L.C., 500 F. Supp. 2d at 586–87 (recognizing the public benefit to a strong patent system while discussing the public interest part of the injunction test).

\textsuperscript{345} See id. (holding that the public interest is best served by allowing a multi-billion dollar corporation to infringe on the patent of a two person corporation and pay monetary damages due to the numerous benefits the public reaps from the infringers ongoing operations).

\textsuperscript{346} See 33 U.S.C. § 1311(b)(2) (utilizing a best available technology standard to require the use of certain technology); 35 U.S.C. § 154(a)(2) (setting forth a twenty year time period that patent protections are active until they expire and the intellectual property is released to the public); id. § 261 (stating that patents are to be treated as personal property); Mercexchange L.L.C., 500 F. Supp. 2d at 586–87 (allowing monetary damages to remedy infringement for the benefit of the public); EARNHART ET AL., supra note 260, at 36–37 (discussing the utilization of best available technology standards).

\textsuperscript{347} See 33 U.S.C. § 1311(b)(2) (utilizing a best available technology standard to mandate the use of environmentally optimal technology); Praxair, Inc., 479 F. Supp. 2d at 443 (discussing a situation where an injunction would force significant financial and operational harm to an infringer and its customers and favoring the infringer due to the circumstances); EARNHART ET AL., supra note 260, at 36–37 (discussing optimal technology mandating laws); Learn About Effluent Guidelines, supra note 30 (discussing best available technology laws and the function of the standard).

\textsuperscript{348} See 35 U.S.C. § 283 (stating that a court reviewing an infringement action “may grant injunctions in accordance with the principles of equity to prevent the violation of any right secured by patent, on such terms as the court deems reasonable.”); Acumen L.L.C., 551 F.3d at 1330–31 (holding that situations can arise where the public’s interest can weigh heavily in a court’s decision of whether to issue an injunction).

\textsuperscript{349} See 35 U.S.C. § 283 (stating that a court has discretion in whether to issue an injunction); Acumen L.L.C., 551 F.3d at 1330–31 (discussing alternatives to an infringing medical device that is important to the welfare of the public and focusing on the public’s interest); BOURDEAU ET AL., supra note 213, § 1 (discussing monopolies and harm they pose to the public).
access to the technology. An award of damages will likely be an amount equal to a reasonable royalty that would be obtained by the patent holder if they licensed the technology. Thus, between these two options, the patent holder will either license the technology to its competition and profit, or be indirectly forced to license the technology after a court refuses to grant an injunction.

**CONCLUSION**

By enacting a best available technology law, the Commonwealth of Massachusetts can force the use of an environmentally optimal patent. The new law will force the patent holder to utilize the technology they own which will lead to environmental benefits such as a drop in shellfish mortality rates and less destruction of the environment. The law, however, will create a lawful monopoly for the patent holder who, overnight, will control the entire shellfishing industry in Massachusetts. The monopoly will not face antitrust scrutiny and the patent is unlikely to be misused in these circumstances. Other commercial shellfishing operations that do not have access to the technology are prevented from freely utilizing the technology because of the patent holder’s intellectual property rights. Market and financial forces may lead to the patent holder licensing, selling, or granting access to the patent to its competitors, but there is no legal force commanding this action. Any attempt to utilize the patent without permission will likely result in an infringement suit where the holder will seek an injunction to prevent the use of its technology. The court, however, is unlikely to grant an injunction given the circumstance of the situation. The elements required cannot be satisfied which will result in an award of damages. The amount of the award will compensate the patent holder appropriately and provide them with a reasonable royalty going forward. Thus, the patent holder has two options, license the technology or be forced to do so through an infringement suit resulting in a monetary award.

This scenario can be applied to other examples where an environmentally optimal patent is not utilized and hidden behind patent protections. Rumors of an environmentally optimal dredge sparked the writing of this Note. Other rumors, with varying degrees of truth, claim that patented inventions that can benefit the environment are purchased and locked away. Claims of oil compa-

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350 See eBay, Inc., 547 U.S. at 391 (setting forth the four-part injunction test and recognizing the equitable discretion a court has in their issuance); supra notes 326–349 and accompanying text (arguing that infringement will indirectly force the licensing of the patent).

351 See eBay, Inc., 547 U.S. at 391 (setting forth the four-part injunction test and recognizing the equitable discretion a court has in their issuance); supra notes 326–349 and accompanying text (arguing that infringement will indirectly force the licensing of the patent).

352 See eBay, Inc., 547 U.S. at 391 (setting forth the four-part injunction test and recognizing the equitable discretion a court has in their issuance); supra notes 326–349 and accompanying text (arguing that infringement will indirectly force the licensing of the patent).
nies purchasing clean technology to protect its interests or medical companies hiding advanced treatment methods to sustain its profits are widespread. If technology of this kind exists and the patent is located, the argument set forth in this Note is one way to bring its benefits to the public.

ANTONIO G. FRAONE