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ARTICLE

Microplastic Pollution in the Great Lakes: State, Federal, and Common Law Solutions

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The world's waterbodies have experienced the effects of plastic pollution for many years. Shorelines and beaches around the world have long been littered with plastic trash. In recent years, the development of large garbage patches in the world's oceans, including the Eastern Pacific Ocean garbage patch, which has received extensive media coverage,¹ and another somewhat smaller one in the Atlantic,² have grabbed our collective attention. Scientists and researchers have recently shifted their focus to the Great Lakes to determine the extent of plastic pollution in the world's largest source of fresh water.

The first major scientific paper on Great Lakes plastic pollution was published in the *Marine Pollution Bulletin*, and the results are deeply troubling. The study, a collaborative effort between the 5 Gyres Institute and State University of New York Fredonia, revealed high concentrations of plastics, particularly microplastics, in the Great Lakes.³ Microplastics are those plastics that are less than one millimeter in diameter.⁴ Microplastics can be separated into two categories. The first category constitutes plastics that are less than five millimeters long and come from

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1. Andrew Turgeon, *Great Pacific Garbage Patch*, NATIONAL GEOGRAPHIC, http://education.nationalgeographic.com/education/encyclopedia/great-pacific-garbage-patch/?ar_a=1.

2. Richard A. Lovett, *Huge Garbage Patch Found In Atlantic Too*, NATIONAL GEOGRAPHIC (Mar. 2, 2010), <http://news.nationalgeographic.com/news/2010/03/100302-new-ocean-trash-garbage-patch/>.

3. Marcus Eriksen et al., *Microplastic pollution in the surface waters of the Laurentian Great Lakes*, 77 *Marine Pollution Bulletin* 177, 1–2 (2013).

4. *Id.*

larger pieces of plastic that have broken down over time.⁵ The second category, and the subject of this paper, is manufactured microplastics, such as plastic pellets used as “micro-scrubbers” in face wash.⁶ These manufactured microplastics comprised 90% of the plastics found in the 5 Gyres Institute study, with an average 43,000 microplastic particles found per square kilometer and the largest concentration of such particles being 466,000 particles per square kilometer.⁷ While microplastics were found in all of the Great Lakes, particularly high concentrations were observed in Lake Erie.⁸

The microplastics identified in the 5 Gyres Institute study share many properties with the plastic microbeads found in common skin care products, particularly exfoliants, indicating that such products are a primary source of the pollution.⁹ Like the plastic exfoliating beads found in skin care products, many of the plastic beads found in Great Lakes waters are colored blue or green.¹⁰ Personal care products are designed to be washed down the drain, and the plastic microbeads are too small to be captured by the 1,400 American and Canadian wastewater treatment plants that discharge 4.8 billion gallons of effluent into the Great Lakes basin every day.¹¹

Microplastic pollution is damaging to waterbodies for a number of reasons and is estimated to cause \$13 billion each year in economic damages worldwide.¹² Perhaps most significantly, once microplastics enter a waterbody, their small size makes it virtually impossible for them to be

5. *Marine Debris Program*, NAT'L OCEANIC AND ATMOSPHERIC ADMIN., <http://marinedebris.noaa.gov/discover-issue/types-and-sources> (last revised Dec. 31, 2015).

6. *Id.*

7. Eriksen, *supra* note 3.

8. Carol Bailey, *Micro-Plastics in High Concentrations found in Lake Erie*, UNCOVER MICHIGAN (Apr. 23, 2015, 1:04 P.M.), <http://uncovermichigan.com/content/23959-micro-plastics-high-concentrations-found-lake-erie>.

9. Ari Phillips, *Tiny Plastic Microbeads Are Being Banned Across The Country For 'Causing Mega-Problems'*, THINK PROGRESS (May 19, 2015, 8:00 A.M.), <http://thinkprogress.org/climate/2015/05/19/3659921/tinyplasticmicrobeadsgettingbannedinnumerousstates/>.

10. *Id.*

11. Brian Bienkowski, *Only half of drugs, other newly emerging contaminants removed from sewage*, ENVTL. HEALTH NEWS (Nov. 22, 2013), <http://www.environmentalhealthnews.org/ehs/news/2013/november/emerging-contaminants-report>.

12. *Plastic Waste Causes Financial Damage of US\$13 Billion to Marine Ecosystems Each Year as Concern Grows over Microplastics*, UNITED NATIONS ENV'T. PROGRAMME (June 23, 2014), <http://www.unep.org/newscentre/Default.aspx?DocumentID=2791&ArticleID=10903&l=en>

removed.¹³ Microplastics draw toxic chemicals such as PCBs from waterbodies and concentrate these compounds in potentially dangerous amounts.¹⁴ Microplastics are often eaten by birds, fish, and aquatic organisms, causing damage not only to the animals themselves but also potentially to humans who consume exposed animals.¹⁵

The scariest threat that microplastics may pose, however, is that many potential dangers are not yet known or are not yet quantifiable because plastics degrade so slowly, remaining in the water for many years.¹⁶ Further, if microplastics become concentrated in surface waters, they could potentially re-enter public drinking water supply and carry with them any chemicals the microplastics absorbed along the way.¹⁷

I. STATE RESPONSES TO THE MICROPLASTIC THREAT

A. Introduction

To date, nine states have enacted bans on the sale of products that contain plastic microbeads, while five other states, and the Canadian government, have proposed legislation to do the same. In June 2014, Illinois became the first state to ban cosmetics that contain microplastics.¹⁸ Products containing microplastics in Illinois have been removed from shelves, including several brands of exfoliating face wash.¹⁹ Other states that have since enacted bans are New Jersey, Colorado, Indiana, Maryland, Maine, Wisconsin, Connecticut, and California.²⁰ Furthermore, many other states, and the Government of Canada, have *proposed* legislation that

13. John Flesher, *Great Lakes teeming with tiny plastic fibres*, CBC NEWS (Jan. 12, 2015), <http://www.cbc.ca/news/canada/thunder-bay/great-lakes-teeming-with-tiny-plastic-fibres-1.2897780>.

14. John Schwartz, *Scientists Turn Their Gaze Toward Tiny Threats to Great Lakes*, N.Y. TIMES, Dec. 14, 2013, at A24, http://www.nytimes.com/2013/12/15/us/scientists-turn-their-gaze-toward-tiny-threats-to-great-lakes.html?_r=1.

15. Charlotte Dormer, *Microplastics endanger ocean health*, PLANET EARTH ONLINE (May 17, 2012), <http://planetearth.nerc.ac.uk/news/story.aspx?id=1229&cookieConsent=A>.

16. *Unseen Threat: How Microbeads Harm New York Waters, Wildlife, Health And Environment*, OFFICE OF THE N.Y. STATE ATT'Y. GEN., https://ag.ny.gov/pdfs/Microbeads_Report_5_14_14.pdf.

17. Jeremy Carroll, *Researcher alarmed about microplastics in Great Lakes*, PLASTICS NEWS (Sept. 11, 2013), <http://www.plasticsnews.com/article/20130911/NEWS/130919969/researcher-alarmed-about-microplastics-in-great-lakes>.

18. Melissa Hellmann, *Illinois Bans Cosmetics Containing Microbeads*, TIME (June 24, 2014), <http://time.com/2916132/microbeads-microplastic-cosmetics-illinois-ban/>.

19. *Id.*

20. Assemb. B. 888, 2015-2016 Leg. Reg. Sess. (Cal. 2015); COLO. REV. STAT. ANN. § 25-5-1203(1) (West 2015); CONN. GEN. STAT. ANN. June Sp. Sess., P.A. 15-5, § 50 (2015); IND. CODE ANN. § 13-18-24-5 (West 2015); ME. REV. STAT. tit. 38, § 419-D (2015); MD. CODE ANN., ENVIR. § 9-2002 (West 2015); N.J. STAT. ANN. § 58:10A-70(a) (West 2015); WIS. STAT. ANN. § 299.50 (West 2015).

would ban sales of products containing microbeads.²¹ This section will examine each state ban and analyze their similarities and differences.

B. Illinois

On June 9, 2014, Governor Pat Quinn signed legislation that made Illinois the first state in the country to ban the manufacture and sale of personal care products containing microbeads.²² Codified at ILCS Act 5, Section 52.5, the Illinois General Assembly found that microbeads “pose a serious threat to the State’s environment”²³ and “have been documented to collect harmful pollutants already present in the environment and harm fish and other aquatic organisms that form the base of the aquatic food chain.”²⁴ The statute bans the manufacture-for-sale of a personal care product, except an over-the-counter drug, that contains synthetic plastic microbeads after December 31, 2017,²⁵ and the acceptance for sale of the same after December 31, 2018.²⁶ The exception for over-the-counter drugs ends for manufacturing-for-sale and acceptance-for-sale on December 31, 2017, and 2018, respectively.²⁷ Illinois defines synthetic plastic microbeads as any intentionally added, non-biodegradable, solid plastic particle measured less than five millimeters in size and that is used to exfoliate or cleanse in a rinse-off product.²⁸ Illinois provides for fines of up to \$1,000 for a first violation and a fine of up to \$2,500 for any further violations.²⁹

C. New Jersey

Effective March 23, 2015, New Jersey implemented its own plastic-microbead ban, which prohibits the production or manufacture of a personal care product containing synthetic plastic microbeads, except for an over-the-counter drug, by January 1, 2018.³⁰ By January 1, 2019, the ban also applies to the sale, offer for sale, or offer for promotion of personal care products containing synthetic plastic microbeads, except for over-the-counter drugs, and the production or manufacture of over-the-counter drugs that contain synthetic plastic microbeads.³¹ Finally, by

21. See Doug Farquhar, *States Continue Moves To Ban Microbeads*, NCSL (Oct. 14, 2015), <http://www.ncsl.org/blog/2015/10/14/states-continue-moves-to-ban-microbeads.aspx>; See also Andrea Crossan, *Why Canada is Banning Microbeads*, PRI (Sept. 30, 2015), <http://www.pri.org/stories/2015-09-30/why-canada-banning-microbeads>.

22. Hellmann, *supra* note 18.

23. 415 ILL. COMP. STAT. ANN. 5/52.5(b) (West 2015).

24. *Id.*

25. § 52.5(c).

26. § 52.5(d).

27. § 52.5(e).

28. § 52.5(a).

29. 415 ILL. COMP. STAT. ANN. 5/42(7) (West 2015).

30. N.J. STAT. ANN. § 58:10A-70(a) (West 2015).

31. § 58:10A-71(b).

January 1, 2020, the sale, offer for sale, or offer for promotion of over-the-counter drugs containing synthetic plastic microbeads is forbidden.³² The statute defines synthetic plastic microbeads as any intentionally added, non-biodegradable, solid plastic particle measuring less than five millimeters in size and used to exfoliate or cleanse in a rinse-off product.³³ A person or entity that violates the law is subject to a penalty of not more than \$500 for each offense.³⁴ An earlier version of the bill was rejected by Governor Chris Christie, with the governor stating he would veto the bill if legislators did not agree to amend the cash penalty for noncompliance from \$10,000 to \$500.³⁵

D. Colorado

Effective August 5, 2015, Colorado law banned products containing plastic microbeads. C.R.S.A Section 25-5-1201 defines synthetic plastic microbeads as “an intentionally added, non-biodegradable, solid plastic particle measuring less than five millimeters in size intended to aid in exfoliating or cleansing as part of a rinse-off product.”³⁶ Beginning January 1, 2018, the production or manufacture of personal care products containing synthetic plastic microbeads, except for over-the-counter drugs, is banned.³⁷ Beginning January 1, 2019, this ban is extended to include acceptance for sale of personal care products and the production or manufacture of over-the-counter drugs that contain synthetic plastic microbeads.³⁸ A year later, January 1, 2020, will mark the beginning of the ban on acceptance for sale of over-the-counter drugs containing synthetic plastic microbeads.³⁹ Colorado penalizes violators with fines of not less than \$1,000 and not more than \$10,000 for each offense.⁴⁰

E. Indiana

Indiana’s ban on products containing synthetic plastic microbeads began on July 1, 2015. After December 31, 2017, a person may not manufacture for sale a personal care product, except for an over-the-counter drug, that contains synthetic plastic microbeads.⁴¹ After December

32. § 58:10A-71(c).

33. § 58:10A-70.

34. § 58:10A-72.

35. Susan K. Livio, *Christie signs bill banning production and sale of environment-harming microbeads*, NJ.COM (Mar. 23, 2015), http://www.nj.com/politics/index.ssf/2015/03/christie_signs_bill_banning_production_and_sale_of.html.

36. COLO. REV. STAT. ANN. § 25-5-1202(4) (West 2015).

37. § 25-5-1203(1).

38. § 25-5-1203(2).

39. § 25-5-1203(3).

40. § 25-5-1204.

41. IND. CODE ANN. § 13-18-24-5 (West 2015).

31, 2018, the acceptance for sale of personal care products containing synthetic plastic microbeads is also prohibited,⁴² as is the manufacture for sale of over-the-counter drugs that contain the same.⁴³ After December 31, 2019, a person may not accept for sale over-the-counter drugs that contain synthetic plastic microbeads.⁴⁴ Indiana defines synthetic plastic microbeads as less than five millimeters, not bio-degradable, and intentionally added to a personal care product that is used to exfoliate or cleanse and is subsequently rinsed off.⁴⁵ The statute provides that a violation is a class B infraction with the potential for a class A violation if the person has a prior unrelated judgment for a violation of the same chapter of the statute.⁴⁶ In Indiana, a class B misdemeanor violation is punishable by up to 180 days imprisonment and up to \$1,000 in fines.⁴⁷ A class A misdemeanor can carry imprisonment of not more than one year and a fine of not more than \$5,000.⁴⁸

F. Maryland

Maryland's prohibition on personal care products containing synthetic plastic microbeads became effective October 1, 2015.⁴⁹ Codified at MD Code, Environment, Section 9-2002, Maryland's law bans the manufacturing for sale of personal care products containing synthetic plastic microbeads after December 31, 2017, acceptance for sale of personal care products and manufacture of over-the-counter drugs of products containing synthetic plastic microbeads after December 31, 2018, and acceptance for sale of over-the-counter drugs containing synthetic plastic microbeads after December 31, 2019.⁵⁰ Under Maryland law, a synthetic plastic microbead is any intentionally added plastic particle that is not biodegradable, measures less than five millimeters in size, and is used in a rinse-off personal care product for exfoliation or cleansing purposes.⁵¹ The Maryland statute also defines biodegradable, which means the microbead is capable of decomposing in a marine environment and in wastewater treatment plant processes in accordance with relevant, established guidelines developed by ASTM International, Organisation for Economic Co-operation and Development, International Organization for Standardization, or another comparable organization or authority.⁵²

42. § 13-18-24-6.

43. § 13-18-24-7.

44. § 13-18-24-8.

45. § 13-18-24-8.

46. § 13-18-24-9.

47. IND. CODE ANN. § 35-50-3-3 (West 2015).

48. § 35-50-3-2.

49. MD. CODE ANN., ENVIR. § 9-2002 (West 2015).

50. *Id.*

51. § 9-2001(f).

52. § 9-2001(b).

Finally, Maryland's microbead statute requires that the Department of Environment adopt regulations identifying biodegradable guidelines that are acceptable for use by a wastewater treatment plant⁵³ and that the department periodically review biodegradable guidelines in an effort to ensure the most scientifically effective methods are being utilized to prevent, to the maximum extent practicable, the entrance of synthetic plastic microbeads into the natural aquatic environment of the state.⁵⁴ Maryland's microbead statute is silent on penalties for violators.

G. Maine

Maine's plastic microbead legislation became effective on October 15, 2015.⁵⁵ It prohibits manufacture for sale of a personal care product, except for an over-the-counter drug, that contains synthetic plastic microbeads after December 31, 2017, acceptance for sale of personal care products, except for an over-the-counter drug, that contains synthetic plastic microbeads after December 31, 2018, manufacture for sale of over-the-counter drugs containing synthetic plastic microbeads after December 31, 2018, and acceptance for sale of over-the-counter drugs containing synthetic plastic microbeads after December 31, 2019.⁵⁶ Maine defines "synthetic plastic microbead" as any intentionally added, non-biodegradable, solid plastic particle measuring less than five millimeters in size and used to exfoliate or cleanse in a product intended to be rinsed off.⁵⁷ Maine's microbead statute is silent on penalties for violators.

H. Wisconsin

Wisconsin's microbead ban became effective July 3, 2015,⁵⁸ and bans production or manufacture of personal care products that contain synthetic plastic microbeads beginning December 31, 2017.⁵⁹ Beginning one year after that deadline, December 31, 2018, acceptance for sale of personal care products containing synthetic plastic microbeads, except for over-the-counter drugs, as well as production or manufacture of personal care products that are over-the-counter drugs containing synthetic plastic microbeads is prohibited.⁶⁰ Beginning December 31, 2019, acceptance for sale of a personal care product that is an over-the-counter drug containing synthetic plastic microbeads is prohibited.⁶¹ Wisconsin defines "synthetic

53. § 9-2003(a).

54. § 9-2003(b).

55. ME. REV. STAT. tit. 38, § 419-D (2015).

56. § 419-D(2).

57. § 419-D(1).

58. WIS. STAT. ANN. § 299.50 (West 2015).

59. § 299.50(2)(a).

60. § 299.50(2)(b).

61. § 299.50(2)(c).

plastic microbeads” as any intentionally added, non-biodegradable, solid plastic particle measuring less than five millimeters at its largest dimension that is used to exfoliate or cleanse in a product that is intended to be rinsed off.⁶² The Wisconsin legislation also provides that penalty and enforcement may include a fine of up to \$500 for each violation as well as temporary or permanent injunctive relief brought by the department or state.⁶³

I. Connecticut

Effective June 30, 2015, Connecticut enacted its microbead ban.⁶⁴ In Connecticut, “on and after December 31, 2017, no person shall manufacture for sale any personal care product, except for an over-the-counter drug, that contains any intentionally added microbead.”⁶⁵ On and after December 31, 2018, it will be illegal to import, sell, or offer for sale any personal care product, except for an over-the-counter drug, that contains any intentionally added microbead,⁶⁶ and no person shall manufacture for sale any over-the-counter drug that contains an intentionally added microbead.⁶⁷ On and after December 31, 2019, it will be illegal to import, sell, or offer for sale any over-the-counter drug that contains any intentionally added microbead.⁶⁸ In Connecticut, a “microbead” is “any intentionally added synthetic solid plastic particle measured to be five millimeters or less in size that is used to exfoliate or cleanse and is intended to be rinsed off or washed off the body and consequently deposited into a sink, shower, or bathtub drain.”⁶⁹ The Connecticut statute allows the Commissioner of Energy and Environmental Protection to request a study be conducted to determine whether a biodegradable microbead used in a personal care product adversely affects the environment or publicly owned treatment works.⁷⁰ If a study described above is not completed on or before December 15, 2017, a manufacturer may not manufacture, sell, import, or offer for sale any personal care product containing biodegradable microbeads on or after July 1, 2018.⁷¹ Violation of the statute will result in a fine of not more than \$5,000 for the first violation and not more than \$10,000 for any subsequent violation.⁷²

62. § 299.50(1)(e).

63. § 299.50(3).

64. CONN. GEN. STAT. ANN. June Spec. Sess., P.A. 15-5, § 50 (West 2015).

65. § 50(b).

66. § 50(c).

67. § 50(d).

68. § 50(e).

69. *Id.*

70. CONN. GEN. STAT. ANN. June Spec. Sess., P.A. 15-5, § 50(g)(1) (West 2015).

71. § 50(g)(3).

72. § 50(h).

J. California

The most recent of the micro-bead banning states, California adopted microbead-prohibition legislation on October 8, 2015.⁷³ The statute states, “on and after January 1, 2020, a person shall not sell or offer for promotional purposes in this state any personal care products containing plastic microbeads that are used to exfoliate or cleanse in a rinse-off product, including, but not limited to, toothpaste.”⁷⁴ This prohibition does not apply to (1) a person that sells or offers for promotional purposes a personal care product containing plastic microbeads in an amount less than one part per million by weight⁷⁵ or (2) prescription drugs.⁷⁶ Violation may result in the violator being enjoined in any court of competent jurisdiction⁷⁷ or may result in a monetary fine not to exceed \$2,500 per day for each violation in addition to any other penalty established by law.⁷⁸ The California legislation defines a plastic microbead as “an intentionally added solid plastic particle measuring five millimeters or less in every dimension.”⁷⁹

II. ANALYSIS OF STATE MICROBEAD BANS

As is readily apparent from examining each state’s iteration of microbead bans, most are nearly identical in language. Some, like Connecticut and Maryland, expand on the definition of plastic microbead to include more detailed regulations as to what standards future microbead alternatives must meet. Other states differ slightly in what products or activities are covered by the ban, such as manufacturing for sale, offering for sale, and accepting for sale, and when the bans take effect.

Microbead bans appear, at first glance, to be effective tools in restricting or eliminating the problem; however, this may not necessarily be accurate. By far, the largest potential loophole evidenced in many of the state bans discussed above lies in the definition of plastic microbead. While the statutes ban non-biodegradable plastic particles, most fail to adequately define a biodegradable alternative. In Michigan, some lawmakers fear that the proposed microbead ban legislation, House Bill 4345, does not go far enough in protecting against microplastic pollution.⁸⁰

73. Assemb. B. 888, 2015-2016 Leg. Reg. Sess. (Cal. 2015).

74. *Id.*

75. *Id.*

76. *Id.*

77. *Id.*

78. *Id.*

79. Assemb. B. 888, 2015-2016 Leg. Reg. Sess. (Cal. 2015).

80. Rebecca Williams, *Michigan lawmakers consider banning microbeads in consumer products*, MICHIGAN RADIO (Oct. 13, 2015), <http://michiganradio.org/post/michigan-lawmakers-consider-banning-microbeads-consumer-products#stream/0>.

Michigan's proposed legislation, like numerous currently enacted state bans, declares, "a person shall not manufacture for sale a personal care product, except for an over-the-counter drug, that contains plastic microbeads."⁸¹ Michigan's proposed ban has also adopted the standard language defining plastic microbead as "an intentionally added non-biodegradable solid plastic particle less than five millimeters in all dimensions."⁸² The difficulty arises in defining acceptable *biodegradable* versions of microbeads. While Connecticut and Maryland were careful to provide for the adoption of further regulations determining suitable biodegradable alternatives to ensure effective methods of pollution prevention, most state bans lack similar provisions. Notably, Maryland's statute provides that a biodegradable microbead must be capable of degrading in a marine environment although there is no requirement for how long a microbead has to degrade.⁸³ There is currently no definition of "biodegradable" within Michigan's proposed law, which has critics worried.⁸⁴ Democratic Representative John Kivela from Marquette has suggested that "without a definition of biodegradable there's no guarantee that anything would change."⁸⁵ Additionally, John Kivela supposes that "with no definition something that degrades in decades or hundreds of years could be considered biodegradable."⁸⁶

It may be possible to exploit the relatively loose definition of synthetic plastic microbead in another way. Illinois's use of the standard definition, "any intentionally added non-biodegradable solid plastic particle measured less than five millimeters in size and is used to exfoliate or cleanse in a rinse-off product," includes an additional loophole concerning the qualifier "rinse-off product." It is foreseeable that a manufacturer of personal care products containing plastic microbeads that are *not* meant to be rinsed off could argue that its product does not fall under the ban. Failing to define "rinse-off product" provides another ambiguity where manufacturers may argue that the law does not apply to them.⁸⁷

The question as to what each state's ban actually encompasses is worth further exploration. Most states' language includes a prohibition, at

81. H.B. 4345, 98th Leg. Reg. Sess. (Mich. 2015).

82. *Id.*

83. MD. CODE ANN., ENVIR. § 9-2002 (West 2015).

84. Emily Lawler, *Microbeads in the Great Lakes: Legislators butt heads over whether current legislation would help*, MLIVE.COM, (Oct. 6, 2015, 3:32 P.M.), http://www.mlive.com/lansing-news/index.ssf/2015/10/microbeads_in_the_great_lakes.html.

85. *Id.*

86. *Id.*

87. Adam Reich, *New Laws Forcing Companies to Phase Out Microbeads*, YOUNG ADVOCATES: AMERICAN BAR ASS'N. SECTION OF LITIGATION (June 10, 2014), <http://www.paulhastings.com/docs/default-source/PDFs/new-laws-forcing-companies-to-phase-out-microbeads.pdf>.

staggered dates, on the manufacture for sale, as well as the acceptance for sale, of personal care products and over-the-counter drugs containing plastic microbeads. However, this prohibition is not included across the board; only Illinois, New Jersey, Colorado, Indiana, Maryland, Maine, Wisconsin, and Connecticut have language prohibiting the manufacture, and sometimes the production, for sale of personal care products and over-the-counter drugs that contain plastic microbeads. The states that have language banning the acceptance for sale of both personal care and over-the-counter drug products containing plastic microbeads are Illinois, Colorado, Indiana, Maryland, Maine, and Wisconsin. Finally, only New Jersey, Connecticut, and California included language in their legislation that prohibited the offer for sale on such products.

While the differences in wording may seem insignificant, there are potential consequences down the road. What if a state, such as Colorado, bans the manufacture for sale as well as the acceptance for sale but does not ban the offering for sale of products containing plastic microbeads? Is a loophole available for those who import, or otherwise simply distribute, products containing microbeads? Similarly, what are the consequences for consumers in New Jersey who purchase contraband products in the absence of legislation disallowing the acceptance for sale of products containing plastic microbeads?

Another potential loophole concerns the types of products that fall within the ban. Currently, no ban includes products other than personal care products and over-the-counter drugs. Most states have almost identical definitions as to what constitutes a personal care product. Wisconsin's statute defines a personal care product as "any article, or a component of any article, that is intended to be rubbed, poured, sprinkled, or sprayed on, introduced into, or otherwise applied to the human body for cleansing, beautifying, promoting attractiveness, or altering appearance, except that 'personal care product' does not include a prescription drug."⁸⁸ In each state, prescription drugs are either absent from the microbead law or specifically exempted as well as any other product that does not fall under the personal care product definition. This exemption could open the door to any other industrial product or other consumer good that contains small plastic microbeads.

Each state ban also has nearly identical definitions for over-the-counter drugs. In Illinois, an over-the-counter drug is "a drug that is a personal care product that contains a label that identifies the product as a drug as required by 21 CFR 201.66."⁸⁹ An over-the-counter drug label includes either a drug facts panel or a statement of the active ingredients with a list of those ingredients contained in the compound, substance, or

88. WIS. STAT. ANN. § 299.50(1)(b) (West 2015).

89. 415 ILL. COMP. STAT. ANN. 5/52.5(a) (West 2015).

preparation.⁹⁰ The other variation on this definition leaves out the personal care product requirement.⁹¹ The remaining states, except for California, adopted one of these definitions, which make no mention of over-the-counter drugs in their plastic microbead bans and explicitly exclude prescription drugs from the ban.⁹²

Finally, and as noted above, Maryland and Maine do not include penalties as part of their microbead prohibition laws, which raises the question of adequate enforcement.

III. FEDERAL RESPONSES TO MICROBEAD POLLUTION

A. Introduction

At the federal level, the strategies for combating plastic microbead pollution could include either Congress passing a national ban similar to the state bans or federal agency action. The Environmental Protection Agency (EPA) administers the National Environmental Policy Act (NEPA)⁹³ and the Federal Water Pollution Control Act,⁹⁴ more commonly known as the Clean Water Act (CWA), while the Food and Drug Administration (FDA) administers the Federal Food, Drug, and Cosmetics Act.⁹⁵ Each of these instruments may provide relief in its own way and is worth more detailed exploration.

B. Federal Microbead Ban

Recently, Congress enacted a federal microbead ban. The Microbead-Free Waters Act of 2015 prohibits the sale or distribution of rinse-off cosmetics containing plastic microbeads.⁹⁶ By adding an amendment to the U.S. Federal Food, Drug, and Cosmetic Act, the ban prohibits the sale or distribution of cosmetics containing synthetic plastic microbeads.⁹⁷ The federal ban adds the clause “if it contains synthetic plastic microbeads” to section 361 of the Act, which lists the cosmetics deemed to be adulterated and thus prohibited under Section 331.⁹⁸ While the federal microbead ban is an important step forward, there are remaining environmental concerns that should be addressed at the national level.

90. *Id.*

91. *See* N.J. STAT. ANN. § 58:10A-70 (West 2015).

92. *Assemb. B. 888, 2015-2016 Leg. Reg. Sess. (Cal. 2015).*

93. *See* 42 U.S.C. § 4321 *et seq.*

94. *See* 33 U.S.C. § 1251 *et seq.*

95. *See* 21 U.S.C. ch. 9 § 301 *et seq.*

96. Microbead-Free Waters Act of 2015, Pub. L. No. 114-114 (2015).

97. H.R. 1321, 114th Cong. (2015); S. 1424, 114th Cong. (2015).

98. *Id.*

C. *Petition the EPA*

1. *National Environmental Policy Act*

The National Environmental Policy Act (NEPA) provides a potential framework for preventing future releases of microbeads and other microplastics.⁹⁹ NEPA provides specific environmental decision-making processes that all federal agencies must follow. The statutory prerequisites include the preparation of an environmental assessment (EA) or environmental impact statement (EIS) regarding major federal actions that could potentially affect the human environment.¹⁰⁰ The EPA is obliged to follow NEPA procedures, set out in 40 C.F.R. Section 6.200, whenever it issues a National Pollutant Discharge Elimination System (NPDES) permit under Section 402 of the Clean Water Act.¹⁰¹ The EPA must consider whether the desired action normally would require an environmental impact statement (EIS). If the EPA finds that the proposed action meets the criteria for categorical exclusion under 40 C.F.R. Section 6.200, then no EA or EIS is required.¹⁰² Categorical exclusions are a category of actions that does not individually or cumulatively have a significant effect on the human environment.¹⁰³ However, a normally excluded action may still require an EA or EIS if it is determined that the situation involves extraordinary circumstances.¹⁰⁴ Extraordinary or unusual circumstances can include actions that carry substantial environmental controversy and actions that are inconsistent with federal, state, or local law requirements or administrative determinations.¹⁰⁵ Furthermore, categorical exclusions are also based on past experience with similar actions that were found not to create significant environmental impacts.¹⁰⁶ These actions include, among other things, actions that do not have a significant impact on any natural or recreational resource and do not involve significant impact on water quality.¹⁰⁷

As mentioned above, federal agencies, including the EPA, are required to prepare an EIS for major federal actions significantly affecting the quality of the human environment.¹⁰⁸ While many EPA actions are exempt from the requirements of NEPA, the applicable federal regulations specifically state that EPA decisions to issue NPDES permits must comply

99. 42 U.S.C. § 4332(c) (2009).

100. 42 U.S.C. § 4322(2)(c) (2009).

101. 40 C.F.R. § 6.101 (2007).

102. 40 C.F.R. § 1508.4 (1977).

103. *Id.*

104. *Id.*

105. 23 C.F.R. § 771.117(b)(2) (2014).

106. §771.117(a).

107. *Id.*

108. 40 C.F.R. § 6.207 (2014).

with the provisions of NEPA.¹⁰⁹ Therefore, whenever EPA issues an NPDES permit or authorizes a state to administer such a permitting system, these actions must be evaluated to determine if they result or will result in significant impacts on the quality of the human environment.

Because it has been shown that microbeads and microplastics have entered the Great Lakes through wastewater treatment plants,¹¹⁰ the CWA authorizes NPDES permits pursuant to the EPA or EPA authorized state programs.¹¹¹ Utilizing these permits, citizens and environmental groups could potentially petition the EPA to take action. Officials must prepare an EIS for major federal actions significantly affecting the quality of the human environment, including actions for which the EA analysis demonstrates that significant impacts will occur that will not be reduced or eliminated by changes to or mitigation of the proposed action.¹¹² A proposed action requires an EIS if it meets certain criteria, including an action that would result in a discharge of treated effluent from a new or modified existing facility into a body of water that is likely to have a significant effect on the quality of the receiving waters.¹¹³

Microplastic pollution is a serious threat to the health of the Great Lakes basin and to the ecosystems and communities of the Great Lakes region. Therefore, a petitioner could effectively petition EPA to conduct an EIS with respect to microplastic pollution resulting from its decisions to grant NPDES permits to wastewater treatment facilities or authorizing state programs to grant such permits.

2. *Clean-Water State Revolving Fund*

Another tool that could force an EIS for microplastics is investment from the Clean Water State Revolving Fund (CWSRF) into a state's publicly owned treatment works. With the 1987 amendments to the Clean Water Act (CWA), the CWSRF was established as a financial assistance program for a wide range of water infrastructure projects.¹¹⁴ A partnership between EPA and the states, the CWSRF uses a combination of federal and

109. *Id.*

110. *Unseen Threat: How Microbeads Harm New York Waters, Wildlife, Health And Environment*, OFFICE OF THE N.Y. STATE ATT'Y. GEN., https://ag.ny.gov/pdfs/Microbeads_Report_5_14_14.pdf; see also, *Discharging Microbeads to our Waters: An Examination of Wastewater Treatment Plants in New York* 6, OFFICE OF THE N.Y. STATE ATT'Y. GEN., http://www.ag.ny.gov/pdfs/2015_Microbeads_Report_FINAL.pdf.

111. *NPDES Wastewater & Stormwater Permits*, UNITED STATES ENVTL. PROT. AGENCY (Nov. 12, 2015, 10:32 P.M.), <http://www3.epa.gov/region9/water/npdes/>.

112. 40 C.F.R. § 6.207(a)(2014).

113. § 6.207(a)(3)(i).

114. *Learn about the Clean Water State Revolving Fund (CWSRF)*, UNITED STATES ENVTL. PROT. AGENCY. <http://www2.epa.gov/cwsrf/learn-about-clean-water-state-revolving-fund-cwsrf> (last updated Aug. 2, 2015).

state funds to provide loans for, among other things, construction of municipal wastewater facilities.¹¹⁵ Because the federal government provides funds for these projects, it could be argued that it constitutes a “major federal project” under NEPA. As a result, any wastewater treatment plants that have participated in the CWSRF program could also require an EIS for microbeads.

3. *Total Maximum Daily Load for Plastics*

The EPA also has the ability to set a Total Maximum Daily Load (TMDL) for microplastics under the provisions set forth in Section 303(d) of the Clean Water Act.¹¹⁶ Under 303(d), states are required to list impaired waters that do not meet water quality standards after the applicable levels of pollution control technology have been installed on all point sources of pollution.¹¹⁷ For these impaired waters, a TMDL of listed pollutants is required to achieve the applicable water quality standards. It is possible for citizens to play a role in the process of TMDL development if a pollutant is not currently listed.¹¹⁸ Section 130.7 of the Code of Federal Regulations sets out the process by which TMDLs are set.¹¹⁹ The section states that each state shall establish TMDLs for which current pollution control requirements are not stringent enough.¹²⁰ For pollutants other than heat, TMDLs shall be established at levels necessary to attain and maintain the applicable narrative and numerical water quality standards with seasonal variations and a margin of safety, which takes into account any lack of knowledge concerning the relationship between effluent limitations and water quality.¹²¹ Determinations of TMDLs shall take into account critical conditions for stream flow, loading, and water quality parameters.¹²² While states are given the power to establish TMDLs, the EPA must approve those TMDLs set by the states.¹²³ Furthermore, the Clean Water Act gives the EPA Administrator power to identify those pollutants that are suitable for daily load measurement.¹²⁴

A petition to the EPA to identify plastics as a pollutant suitable for daily load measurement and to either set a TMDL for plastics or condition EPA approval of any new Great Lakes TMDL by a state on the

115. *Id.*

116. 33 U.S.C. § 1313(d) (2012).

117. *Id.*

118. *Total Maximum Daily Loads (TMDLs)*, MICH. DEP’T. OF ENVTL. QUALITY, http://www.michigan.gov/deq/0,4561,7-135-3313_3681_3686_3728-12464--,00.html (last visited Nov. 12, 2015).

119. 40 C.F.R. § 130.7 (2015).

120. § 130.7(b)(1).

121. § 130.7(c)(1).

122. *Id.*

123. 33 U.S.C. § 1314(l)(2) (2012).

124. § 1314(l)(3).

identification of plastics as a pollutant is a potential tool for citizens and environmental groups. Plastic pollution, including microplastics, has the potential to severely impact the already impaired waters of the Great Lakes and, as such, could further impede any progress towards meeting water quality standards. Setting a TMDL for plastics in the Great Lakes basin would help prevent any further degradation of the Great Lakes due to plastics pollution and could be an effective method to address the microplastic problem.

D. *Petition the Food and Drug Administration*

While the Food and Drug Administration (FDA) does not have authority to approve cosmetic products and ingredients before they enter the market (other than color additives),¹²⁵ thereby most likely precluding application of NEPA's EIS requirement, it may be possible to petition the FDA for a rulemaking pertaining to the use of microbeads in various cosmetic products. Most legislation and policy from the FDA regarding safety of cosmetics pertains to safety in the context of how the product is supposed to be used. A manufacturer or distributor of a cosmetic is legally responsible for ensuring that a product is safe "when consumers use it according to the directions in the labeling or in the customary or expected way."¹²⁶ The FDA can only take action against a manufacturer or distributor if it has reliable information to show that the law has been broken.¹²⁷ If this is the case, the FDA can pursue action through the Department of Justice in the federal court system by removing or preventing further shipment of the product.¹²⁸ The Federal Food, Drug, and Cosmetics Act prohibits "the introduction or delivery for introduction into interstate commerce of any food, drug, device, tobacco product, or cosmetic that is adulterated or misbranded"¹²⁹ and prohibits the "adulteration or misbranding of any food, drug, device, tobacco product, or cosmetic in interstate commerce."¹³⁰ A cosmetic is adulterated "if it bears or contains any poisonous or deleterious substance which may render it injurious to users under the conditions of use prescribed in the labeling thereof, or under such conditions of use as are customary or usual"¹³¹ or "(d) if its container is composed, in whole or in part, of any poisonous or

125. *FDA Authority Over Cosmetics*, U.S. FOOD AND DRUG ADMIN., (Mar. 3, 2005), http://www.fda.gov/Cosmetics/GuidanceRegulation/LawsRegulations/ucm074162.htm#Doe_s_FDA_approve.

126. *Product Testing*, U.S. FOOD AND DRUG ADMIN., <http://www.fda.gov/Cosmetics/ScienceResearch/ProductTesting/default.htm> (last updated Nov. 6, 2015).

127. *Id.*

128. U.S. FOOD AND DRUG ADMIN., *supra* note 124.

129. 21 U.S.C. § 331(a) (2012).

130. § 331(b).

131. § 361(a).

deleterious substance which may render the contents injurious to health.”¹³² It is clear that this legislation’s main purpose is to regulate safety of the product as it is meant to be used for cosmetic purposes; however, subsection (d) seems to open the door to regulation based on a generalized health threat. It may be successfully argued that FDA has an obligation to investigate all forms of health threats stemming from cosmetic products and a rulemaking on the issue would be appropriate.

IV. COMMON LAW SOLUTIONS TO GREAT LAKES MICROPLASTICS

Finally, it is important never to forget the common law when approaching vexing environmental problems. Under the ancient legal theory known as the Public Trust Doctrine, the state holds in trust for the benefit of its citizens the surface waters, submerged lands, and living resources subject to the trust.¹³³ While each state’s public trust laws can vary, this paper will focus on the doctrine as it has been applied in Michigan. A variety of recognized uses can be found to be held in trust for the public,¹³⁴ and in Michigan those uses include fishing, hunting, and boating for commerce or pleasure.¹³⁵

A waterbody must be navigable for it to be protected by the public trust,¹³⁶ and in Michigan, navigability is determined by the “log floatation test.”¹³⁷ This test is at its sound: if you can float a log for commerce purposes, it is a navigable body of water.¹³⁸ The Great Lakes obviously fall within this designation. However, if there was any doubt, the U.S. Supreme Court in *Illinois Central Railroad* affirmed this position in 1892, holding that the public trust doctrine, as it was understood in English common law, was “applicable to lands covered by fresh water in the Great Lakes, over which is conducted an extended commerce with different states and foreign nations.”¹³⁹ The Supreme Court of Michigan has similarly held, “accordingly, under longstanding principles of Michigan’s common law, the state, as sovereign, has an obligation to protect and preserve the waters of the Great Lakes and the lands beneath them for the public.”¹⁴⁰ The majority of public trust cases have dealt with the public trust doctrine

132. § 361(d).

133. Bertram C. Frey & Andrew Mutz, *The Public Trust in Surface Waterways and Submerged Lands of the Great Lakes States*, 40 U. MICH. J. L. REFORM 907, 910 (2007).

134. *Id.* at 982.

135. *Glass v. Goeckel*, 703 N.W.2d 58, 64–65 (Mich. 2005).

136. *Mich. Citizens for Water Conservation v. Nestle Waters N. Am. Inc.*, 709 N.W.2d 174 (2005) *aff’d in part, rev’d in part*, 737 N.W.2d 447 (2007), *overruled by* *Lansing Schools Educ. Ass’n. v. Lansing Bd. of Educ.*, 487 Mich. 349 (2010).

137. *Id.*

138. *Bott v. Comm’n of Natural Res. of State of Mich. Dep’t of Natural Res.*, 327 N.W.2d 838, 843 (Mich. 1982).

139. *Ill. Cent. R. Co. v. State of Illinois*, 146 U.S. 387, 435 (1892).

140. *Glass*, 703 N.W.2d at 64.

and private property rights.¹⁴¹ In *Bott*, for example, the Michigan Supreme Court ruled that non-navigable creeks that were too small to meet Michigan's log floatation test for navigability were private property and subject to trespass actions by the owners.¹⁴² In 2005, the court expanded the scope of public trust to include beach walking, ruling that the boundary of the trust is at the waterbody's high water mark.¹⁴³ This expansion, nonetheless, maintains the public trust doctrine's status quo as predominantly pertaining to property rights.

However, there is some hope for those who wish to see the public trust doctrine expanded further. In *Grosse Ile Twp. v. Dunbar & Sullivan Dredging Co.*, the Michigan Court of Appeals found that the public trust doctrine protected an area of the Detroit River frequently used for boating and fishing from a potential fill operation.¹⁴⁴ This expansion of the public trust to include the public's right to fish is an affirmative grant of protection that transcends issues relating to private property rights. The court's application of the public trust doctrine in *Grosse Ile Twp.* is notable for two reasons. First, it provides an example of an expanded public trust doctrine beyond issues over its physical boundaries. Second, its protection of the right to fish may be a useful tool in combating microbead and other forms of plastic pollution in the Great Lakes.

While there is no existing case law that illustrates how the public trust doctrine specifically regulates or prevents pollution of a water resource, the ruling in *Grosse Ile Twp.* may provide a "back door" approach to solving the issue of plastic pollution. Since water quality has not traditionally been protected under the public trust doctrine, a successful public trust case in the microbead context will most likely require application of the public trust right to fish. As discussed above, hydrophobic pollutants such as polychlorinated biphenyls (PCBs), DDT, and polycyclic aromatic hydrocarbons (PAHs) collect on the surface of plastic¹⁴⁵ and accumulate in the bodies of animals, such as fish.¹⁴⁶ This chemical pollution can cause health problems for fish and through bioaccumulation may work its way up the food chain into a variety of species that humans traditionally consume.¹⁴⁷ Consuming these pollutants can lead to numerous health problems including birth defects, cancer, and learning and growth deficits

141. See *Bott*, 327 N.W.2d 838; *Glass*, 703 N.W.2d 58.

142. *Bott*, 327 N.W.2d 838.

143. *Glass v. Goeckel*, 703 N.W.2d 58, 64–65 (Mich. 2005).

144. *Grosse Ile Twp. v. Dunbar & Sullivan Dredging Co.*, 167 N.W.2d 311, 316 (Mich. Ct. App. 1969).

145. *Unseen Threat: How Microbeads Harm New York Waters, Wildlife, Health And Environment*, OFFICE OF THE N.Y. STATE ATT'Y. GEN., https://ag.ny.gov/pdfs/Microbeads_Report_5_14_14.pdf.

146. *Id.*

147. *Id.*

in children.¹⁴⁸ This ever-growing body of research illustrates the harmful effects that plastics in our waterbodies can have on the fish and wildlife population and, by extension, on human health. Because of this harm, it is possible that the public-trust right of fishing could be another tool aimed at curbing the influx of plastic pollution in the Great Lakes.

CONCLUSION

Regardless of bans or other action taken today, microplastic pollution will be a continuous threat to the Great Lakes for years to come due to the existing prevalence of plastics in the Lakes and the large number of products containing plastic microbeads being used in homes and businesses daily. This article has analyzed some potential strategies and solutions that can be utilized in addressing the ongoing threat from plastic microbeads to human health, wildlife, and our Great Lakes ecosystem. Plastic microbead bans at the state and federal level, as well as administrative action by agencies like the EPA and FDA, can be effective in tackling the issue from the front end, placing restrictions on what can and cannot enter our waterbodies, while common law approaches may be effective as a retroactive solution. . The strategies analyzed here, if implemented responsibly and in coordination with each other, could have an enormous positive impact in helping to keep future microplastic pollution out of our Great Lakes waters.

148. *Id.*
