Defining, Supporting, and Scoping an Impact-Based Approach to *Maui*'s "Functional Equivalence" Standard for Clean Water Act Permitting

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In County of Maui v. Hawai'i Wildlife Fund, *the Supreme Court held that "the statute requires a permit when there is a direct discharge from a point source into navigable waters or when there is the functional equivalent of a direct discharge." The Court thus confirmed that some discharges traveling from point sources to navigable waters via intermediate nonnavigable and non-point-source "conduits" require permitting under the Clean Water Act. However, the meaning of "functional equivalence" was left ambiguous, and the Court's proposed list of factors to determine functional equivalence was incomplete. This standard and its attendant factors, if applied incorrectly, risk undermining the purpose of the Clean Water Act. In this Note, I clarify that functional equivalence should be determined by the potential impact that an indirect point-source discharge can have on a navigable water. This is consistent with the Clean Water Act's purpose and common-law origins and with judicial and regulatory history. The factors identified in* County of Maui v. Hawai'i Wildlife Fund *should be understood as indicia for determining an indirect discharge's potential to impact navigable waters. Using the Clean Water Act's public-nuisance and strict-liability roots, I also propose additional indicia that can determine whether functional equivalence holds for the purposes of permitting under different discharge scenarios.*

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Introduction 352
I. Background 353
A. The CWA and the National Pollutant Discharge Elimination System 353
B. History of the CWA 354
1. The Statutory History of the CWA 354
2. The Common-Law Origins of the CWA 355
a. Public Nuisance 355
b. Strict Liability 356
C. The Scope of the CWA's Permitting Requirements 357
1. The Theoretical Limits of the Meaning of Discharge 357
2. The Evolution of Permitting Requirements in the Supreme Court 358
a. Before *Rapanos*: Defining Navigable Waters and Point Sources 358
b. *Rapanos*: Continuous Surface Connection, Naturally Downstream, and Significant Nexus Standards 360
3. The Evolution of Permitting Requirements in the Circuit Courts 362
a. Traceability 362
b. Traceability Plus De Minimis 362
c. Proximate Cause 364
d. Proximate Cause & Its Relationship to Traceability Plus De Minimis 365
e. Direct Hydrological Connection 367
f. Direct Standard 368
4. The Evolution of CWA Permitting in EPA and Corps Rulemaking 369
a. Direct Hydrological Connection 369
b. The Similarity between the Direct Hydrological Connection & Significant Nexus 370
5. Commonalities among Permitting Standards 371
II. The Functional Equivalence Standard 372
A. The Decision in *Maui* 372
B. The Ambiguity of "Functional Equivalence" 374
1. The Character-Based Approach 375
2. The Impact-Based Approach 376
C. The Merits of an Impact-Based Approach to Functional Equivalence 377
1. The Impact-Based Approach is Consistent with the CWA's Purposes 377
a. Congressional Goals of the CWA 378
b. The Purpose of the CWA's Operational Text 378
c. The Consequences of Narrow Permitting Coverage 379

d. The Differences in Coverage between an Impact-Based and a Character-Based "Functional Equivalence" Standard 380
2. Broader CWA Permitting Standards Do Not Infringe on State Rights 381
a. States' Rights over Water and Land Resources Are Not Infringed by Broader Permitting Requirements 381
b. States' Rights May Be Furthered by Broader Permitting Coverage 382
3. The Impact-Based Approach is Consistent with Prior Uses of the Term "Functional Equivalence" and of Its Factors. 384
a. "Functional Equivalence" in Section 404 Wetland Fill Permits 384
b. The Nexus between "Functional Equivalence" and "Significant Nexus" 385
4. A Character-Based and Determinative Understanding of the "Functional Equivalence" Factors Leads to Absurd Outcomes 386
a. The Potential Arbitrariness of Time and Distance 386
b. Absurdities and Inconsistencies When Applying Other Factors 389
5. An Impact-Based Approach is Consistent with Precedent 391
6. An Impact-Based Approach Accords with the General Terms Canon 393
7. An Impact-Based Standard Accords Better with Common Law 394
a. Public Nuisance, In Detail 395
b. Strict Liability, In Detail 396
III. Using Tort Law To Clarify the Impact-Based Functional Equivalence Standard 397
A. Proximate Cause as a Cognate & Traceability as a Factor of Functional Equivalence 398
1. The Importance of Proximate Cause and of Traceability as a Factor 398
2. The Court Erred in Dismissing Proximate Cause & Traceability 399
B. Requiring Permits Is Always Reasonable When Interference and Proximate Cause Are Clear 401
1. Unreasonable Harms from Indirect Discharges Are Functionally Equivalent to Direct Ones, but Hard to Ascertain without Permits 401
2. Requiring Permits for All Discharges Causing Interference Is Reasonable 402

C. Permit Requirements under Tort-Informed Functional Equivalence in Three Scenarios 405
1. Scenario One: Traceability with Discernible Impacts 406
2. Scenario Two: Traceability without Discernible Impacts 407
3. Scenario Three: No Traceability 408
Conclusion 409

INTRODUCTION

In *County of Maui v. Hawai'i Wildlife Fund* (*Maui*), the Supreme Court held that the Clean Water Act (CWA) "requires a permit when there is a direct discharge from a point source into navigable waters or when there is the *functional equivalent of a direct discharge*."[1] The Court thus confirmed that some discharges traveling from point sources to navigable waters via intermediate nonnavigable and non-point source "conduits" ("indirect discharges") require permitting under the CWA.[2] However, the Court left the meaning of "functional equivalence" ambiguous. What does the indirect discharge need to be equivalent to? How much weight should be given to the Court-identified non-exhaustive list of factors indicative of functional equivalence? Can we use other factors? Answering these questions is important because the CWA's fulfillment of its purpose depends on proper interpretation of its scope.

In this Note, I build upon the *Maui* holding, clearing up ambiguities around the meaning of "functional equivalence" and the weight that should be given to the Court's proposed factors for measuring functional equivalence. To properly interpret "functional equivalence" in a way that both conforms with the purpose and judicial and regulatory history of the CWA, (1) functional equivalence should *not* be understood as requiring indirect discharges to maintain their specific form or "character" from point source to navigable water; (2) functional equivalence should instead be understood with impact in mind, treating indirect discharges as functionally equivalent to direct discharges when these discharges threaten the integrity of navigable waters; (3) the factors used to determine functional equivalence should *not* be understood to be ends in and of themselves, but merely as indicia of an indirect discharge's potential to impact navigable waters; and (4) tort law can help us better define the functional equivalence standard.

1. County of Maui v. Haw. Wildlife Fund, 140 S. Ct. 1462, 1476 (2020).
2. *See id*.

I. BACKGROUND

A. The CWA and the National Pollutant Discharge Elimination System

The purpose of the CWA is "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters," by, among other policies, prohibiting "the discharge of toxic pollutants in toxic amounts."[3] The CWA declares that "the discharge of any pollutant by any person" is "unlawful" unless a permit is obtained or other exceptions apply.[4] The CWA defines a pollutant "discharge" as "any addition of any pollutant to navigable waters from any point source" or an addition "to the waters of the contiguous zone or the ocean from any point source other than a vessel or other floating craft."[5] The CWA defines a "point source" as "any discernible, confined and discrete conveyance, including but not limited to any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation . . . from which pollutants are or may be discharged."[6] "Pollutants" are divided into conventional, toxic, and nonconventional pollutants,[7] and include dredged soils, sewage, radioactive materials, and the like.[8] Finally, "navigable waters" are defined as "waters of the United States" (WOTUS).[9] These include interstate waters that are "navigable in fact" or "readily susceptible of being rendered so,"[10] like streams, rivers, and oceans, as well as significantly or occasionally connected water bodies.[11]

Permitting requirements are primarily established under the National Pollutant Discharge Elimination System (NPDES), under the purview of the Environmental Protection Agency (EPA).[12] The NPDES establishes both technology-based and water-quality-based limits on discharges and gives the EPA broad information-gathering powers to ensure that permitted dischargers

3. 33 U.S.C. § 1251.

4. *Id.* § 1311(a).

5. *Id.* § 1362(12).

6. *Id.* § 1362(14). This excludes agricultural storm-water discharges and return flows from irrigated agriculture. *Id.*

7. WATER PERMITS DIV., EPA, EPA-833-K-10-001, NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT WRITERS' MANUAL 1-1, 1-6 (2010), https://www.epa.gov/sites/default/files/2015-09/documents/pwm_2010.pdf.

8. 33 U.S.C. § 1362(6).

9. *Id*. § 1362(7).

10. Rapanos v. United States, 547 U.S. 715, 723 (2006).

11. Robert W. Adler & Brian House, *Atomizing the Clean Water Act Ignoring the Whole Statute and Asking the Wrong Questions*, 50 ENV'T L. 45, 52–54 (2020); *see also* WATER PERMITS DIV., *supra* note 7, at 1-6 (navigable waters includes waters used or susceptible to use in interstate or foreign commerce; "interstate waters including interstate *wetlands*[;] [o]ther waters that could affect interstate or foreign commerce[;] impoundments of waters[;] tributaries of the above categories of waters[;] territorial seas[;] and wetlands adjacent to [these] waters").

12. *See* 33 U.S.C. §§ 1251(d), 1342. Potential point sources of discharge may also seek permits to discharge dredge or fill material into navigable waters from the U.S. Army Corps of Engineers in accordance with 33 U.S.C. § 1344.

are complying with the limits.[13] Technology-Based Effluent Limitations (TBELs) are applied first and require the adoption of available technology to reduce discharges.[14] If the TBELs are not sufficient to allow affected water bodies to achieve certain water-quality standards, water-quality-based effluent limitations (WQBELs) are then applied.[15] WQBELs are set in two steps. First, the EPA sets the total maximum daily loads (TMDLs) of certain pollutants that an affected body of water can withstand before its integrity and capacity to provide for wildlife and recreation is threatened.[16] Then, working backwards from the TMDLs, WQBELs for a point source discharging into the water body are set such that total pollutants added from all point sources are kept below the TMDLs.[17] If permitted dischargers fail to comply with the permits, the government can pursue "a compliance remedy, a civil penalty remedy, or both."[18]

B. History of the CWA

Discharges that are subject to permitting have varied historically. To understand these variations, we turn to the CWA's statutory, judicial, and regulatory history.

1. The Statutory History of the CWA

The CWA resulted from continuous expansion of federal jurisdiction over water quality. This began with the Rivers and Harbors Act of 1889 (RHA), which exercised federal jurisdiction over waters used for interstate or foreign commerce and over refuse disposal generally.[19] Congress then passed the Federal Water Pollution Control Act (FWPCA) of 1948, broadening the scope of water-quality regulation to include discharges of *any* pollutant in any navigable water and not just those explicitly used for interstate commerce.[20] The CWA took most of its current form with the 1972 amendments to the FWPCA.[21] These amendments established the current structure for regulating discharges and introduced the section making it "unlawful for any person to discharge any pollutant from a

13. David Drelich, *Restoring the Cornerstone of the Clean Water Act*, 34 COLUM. J. ENV'T L. 267, 268 (2009).

14. WATER PERMITS DIV., *supra* note 7, at 5-1.

15. *Id.* at 6-1.

16. 33 U.S.C. §§ 1311(b)(1)(C), 1313(d)(1)(A), (C); *see also* Adler & House, *supra* note 11, at 76–77.

17. *Id.*

18. Drelich, *supra* note 13, at 269–70.

19. Gregory T. Broderick, *From Migratory Birds to Migratory Molecules The Continuing Battle over the Scope of Federal Jurisdiction under the Clean Water Act*, 30 COLUM. J. ENV'T L. 473, 478–79 (2005).

20. *Id.* at 476–84.

21. *History of the Clean Water Act*, EPA, https://www.epa.gov/laws-regulations/history-clean-water-act (last visited Oct. 18, 2020). The FWPCA was further amended in 1977 and renamed the Clean Water Act at that time. Drelich, *supra* note 13, at 268 fn.2.

point source into navigable waters, unless a permit was obtained under its provisions."[22] The amendments also expanded the definition of navigable waters to encompass all WOTUS, "including main streams and their tributaries."[23]

This statutory expansion of the coverage of the CWA over time demonstrates congressional desire for federal regulation over water pollution to be broad and preemptive. The Court has recognized that, "Congress' intent in enacting the Amendments was clearly to establish an all-encompassing program of water pollution regulation."[24] Representative Wilmer Mizell, one of the House sponsors, described the bill as "the most . . . far-reaching water pollution bill [Congress has] ever drafted."[25] Senator Jennings Randolph, Chairman of the responsible Senate Committee, similarly described the CWA as "the most comprehensive legislation ever developed in its field."[26]

2. The Common-Law Origins of the CWA

Common-law concepts of public nuisance and strict liability have been used to formulate CWA permitting requirements and elucidate the broad, impact-based nature of the CWA.

a. Public Nuisance

Most modern environmental law arises from the common-law concept of public nuisance, defined as "related to conduct, performed in a location within the actor's control, which has an adverse effect on a common right."[27] Pollution, fish kills, and obstruction of waterways have long been considered forms of public nuisance.[28] In some states, this is codified into pollution statutes.[29]

The structure and history of the CWA reveal its public-nuisance roots. The CWA protects the interests of navigability, wildlife preservation, and water quality—all once protected by public-nuisance laws.[30] Legislators referred to public nuisance when drafting the CWA.[31] The Court has recognized that the injunctive relief offered under section 309(b)[32] for discharges of any pollutant

22. *History of the Clean Water Act*, *supra* note 21.

23. U.S. GOV'T PRINTING OFF., A LEGISLATIVE HISTORY OF THE WATER POLLUTION CONTROL ACT AMENDMENTS OF 1972, at 250.

24. City of Milwaukee v. Illinois, 451 U.S. 304, 318 (1981).

25. *Id.*

26. *Id.*

27. Drelich, *supra* note 13, at 273 (quoting *In re* Lead Paint Litig., 924 A.2d 484, 499 (N.J. 2007)).

28. *See* KENNETH A. MANASTER & DANIEL P. SELMI, STATE ENVIRONMENTAL LAW § 3:1. PUBLIC AND PRIVATE NUISANCES (2020); RESTATEMENT (SECOND) OF TORTS § 821B, cmt. a, b, g (AM. L. INST. 1979).

29. MANASTER & SELMI, *supra* note 28, at § 3:1.

30. Drelich, *supra* note 13, at 274.

31. *Id.* at 273–74.

32. 33 U.S.C. § 1319(b) ("The Administrator is authorized to commence a civil action for appropriate relief, including a permanent or temporary injunction, for any violation for which he is authorized to issue a compliance order . . . .").

by any person[33] is analogous to injunctive relief available in common-law public-nuisance cases.[34]

b. Strict Liability

Strict liability "is not based upon any intent of the defendant to do harm to the plaintiff . . . nor is it based upon any negligence . . . . The defendant is held liable although he has exercised the utmost care to prevent the [ensuing] harm."[35] Strict lability has been applied in many state cases dealing with discharges, pollution control, and hazardous-waste disposal.[36] For example, in *Wilson v. City of New Bedford*, the court held that "[o]ne who accumulates water artificially on his own land is liable for injuries resulting to adjoining land from percolations through the soil."[37] This liability exists regardless of the defendant's intent or knowledge, the precautions that the defendant had taken to mitigate such risk, or the possibility that the benefits of taking such risk outweighed the harm.[38]

As Justice Samuel Alito recognized in the *Maui* dissent, the CWA "imposes a regime of strict liability backed by criminal penalties and steep civil fines."[39] Discharges not in compliance with CWA permitting requirements are declared per se "unlawful"[40] and subject to at least some penalties and injunctions regardless of intent, level of care, or cost-benefit trade-off.[41] Concepts of foreseeability and strict liability were also used in *United States v. Tex-Tow, Inc.*, where the owner of a fueling gasoline barge was found liable under section 311(b)(3) of the CWA for a one-time, accidental discharge because he was operating a facility in such a way that it was "statistically foreseeable" that pollution of a WOTUS would result.[42]

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33. *Id.* § 1311(a).

34. Drelich, *supra* note 13, at 275–76, 286–87; *see, e.g.*, Tull v. United States, 481 U.S. 412, 420 (1987) ("[T]he subject matter of this Clean Water Act suit—the placement of fill into navigable waters—resembles [] two species of public nuisance."); Weinberger v. Romero-Barcelo, 456 U.S. 305, 314 n.7 (1982) ("The objective of this statute is in some respects similar to that sought in nuisance suits, where courts have fully exercised their equitable discretion and ingenuity in ordering remedies.").

35. RESTATEMENT (SECOND) OF Torts § 518 (AM. L. INST. 1979). Strict liability thus established a principle of continuous legal obligation. Drelich, *supra* note 13, at 276.

36. *See* RESTATEMENT (SECOND) OF Torts*, supra* note 35, at § 4:6.

37. Wilson v. City of New Bedford, 108 Mass. 261, 261 (1871).

38. *Id.* at 266–67.

39. County of Maui v. Haw. Wildlife Fund, 140 S. Ct. 1462, 1489 (2020) (Alito, J., dissenting) (citing 33 U.S.C. §§ 1311, 1342, 1344, 1319).

40. 33 U.S.C. § 1311(a).

41. *Id.* § 1319. Note that intent, gravity, and reasonableness of the violation *do* factor into whether or not criminal penalties are imposed and the size of the civil penalty levied. *Id.* § 1319(c). The point, however, is that a discharger violating section 1311(a) is not *completely* exempt from liability. The Tenth Circuit has previously held that the section 1311 was written "without regard to intentionality," holding pollutant dischargers strictly liable. *See* United States v. Earth Scis., Inc., 599 F.2d 368, 374 (10th Cir. 1979).

42. Drelich, *supra* note 13, at 279–80 (citing United States v. Tex-Tow, Inc., 589 F.2d 1310, 1312–14 (7th Cir. 1978)).

Having discussed the legislative and common law origins of the CWA, I now turn to how courts have interpreted the CWA's permitting requirements broadly.

C. The Scope of the CWA's Permitting Requirements

Despite the CWA's expansive scope, it is unclear if discharges from point sources to WOTUS require permits when pollutants pass through another non-point-source medium in between. Federal courts and regulatory agencies have adopted various standards on the extent to which such indirect discharges are covered by the CWA.[43] After exploring the main standards adopted by the Supreme Court, various circuit courts, the EPA, and the U.S. Army Corps of Engineers (Corps), three main patterns emerge. First, nearly all standards adopt an expansive view of the CWA that includes indirect point-source discharges under its jurisdiction. Second, these standards determine jurisdiction mostly by the impact that discharges have on navigable waters. Third, these standards are more alike than different when operationalized.

1. The Theoretical Limits of the Meaning of Discharge

Several courts' decisions on the extent of the CWA's coverage of discharges hinge on the definition of a discharge.[44] Hence, it is important to understand the broadest and narrowest possible definitions of a point-source discharge.

Justice Alito introduced both extremes in his dissent in *Maui*. The broadest interpretation, which I call the "origin" interpretation, holds that a point-source discharge occurred if a point source *originally* released a pollutant and that pollutant "eventually made its way to" a navigable water.[45] This definition imposes no limits on the nature of the pollutant or on how far or through how many conduits the pollutant travels before it reaches a navigable water.[46] Under the "origin" approach, a miniscule amount of, say, fertilizer carried "through 250 miles of groundwater to a river" over a hundred years would be a point-source discharge and require a permit.[47]

The second approach, which I call the "direct" interpretation, considers point-source discharges to include only those where a pollutant is released from a point source "*directly*" into a navigable water, without passing through intermediaries.[48] Under this definition, a discharge from a pipe traveling "only a few yards" or feet through groundwater, air, or a non-point medium before

43. Adler & House, *supra* note 11, at 50.

44. Recall that a discharge is primarily defined as "any addition of any pollutant to navigable waters from any point source." 33 U.S.C. § 1362(12).

45. County of Maui v. Haw. Wildlife Fund, 140 S. Ct. 1462, 1483 (Alito, J., dissenting).

46. *See id.*

47. *Id.* at 1471 (majority opinion).

48. *Id.* at 1482 (Thomas, J., dissenting) (emphasis added).

reaching the sea, even if intact in quantity and toxicity when reaching the navigable waters, would not fall under NDPES regulation.[49]

2. The Evolution of Permitting Requirements in the Supreme Court

The Supreme Court has historically understood the CWA as covering indirect point-source discharges.

a. Before *Rapanos*: Defining Navigable Waters and Point Sources

The Supreme Court has tended to address point-source discharges reaching navigable waters through intermediary bodies of water by expanding the definition of point sources or the definition of navigable waters to incorporate these intermediary bodies.

S. Fla. Water Mgmt. Dist. v. Miccosukee Tribe of Indians (*Miccosukee*) expanded the definition of point source.[50] Groundwater and rainwater near a reclaimed portion of the Florida Everglades was being collected in a canal and pumped via a pump station through levees into an undeveloped wetland, altering its ecosystem.[51] The Court held that conveyances like the pump station that merely transport but do not produce pollutants can still be considered point sources.[52] Moreover, the Court held that traditional non-point sources, like groundwater, are not exempt from the NPDES program "if they also fall within the [CWA's] 'point source' definition" of discernable, discrete, and confined conveyances.[53]

The Supreme Court has also expanded the scope of what constitutes a water of the United States to regulate traditionally nonnavigable bodies of water through three Supreme Court cases: *United States v. Riverside Bayview Homes, Inc.* (*Riverside Bayview*),[54] *Solid Waste Agency of N. Cook County v. U.S. Army Corps of Engineers* (*SWANCC*),[55] and *Rapanos v. United States*.[56]

In *Riverside Bayview*, a housing developer was enjoined from filling "80 acres of . . . marshy land near the shores of Lake St. Clair in . . . Michigan" by the Corps.[57] This was because the Corps in 1975 had "issued interim final

49. *Id.* at 1473 (majority opinion).

50. *See* S. Fla. Water Mgmt. Dist. v. Miccosukee Tribe of Indians, 541 U.S. 95, 104 (2004).

51. *Id*. at 99–101.

52. *Id.* at 104–05.

53. *Id.* at 106. The Ninth Circuit referred to this reasoning in its *Maui* opinion. Hawai'i Wildlife Fund v. County of Maui, 886 F.3d 737, 750–51 (9th Cir. 2018), *vacated*, 140 S. Ct. 1462 (2020); *see also* Kaela Shiigi, *Underground Pathways to Pollution The Need for Better Guidance on Groundwater Hydrologically Connected to Surface Water*, 46 ECOLOGY L.Q. 519, 525–26 (2019).

54. United States v. Riverside Bayview Homes, Inc., 474 U.S. 121 (1985).

55. Solid Waste Agency of N. Cook Cnty. v. U.S. Army Corps of Eng'rs (*SWANCC*), 531 U.S. 159 (2001).

56. For a detailed account of these three cases, *see generally* James Pollack & Frank Sturges, *Struggling to Find a* Rapanos *Nexus* Maui *and the Expansion of Clean Water Act Regulation*, 48 ECOLOGY L.Q. 49 (2021).

57. *Riverside Bayview*, 474 U.S. at 124.

regulations redefining 'the waters of the United States' to include . . . tributaries of [navigable] waters, interstate waters and their tributaries, and nonnavigable intrastate waters whose use or misuse could affect interstate commerce."[58] This included "all 'freshwater wetlands' that were adjacent to other covered waters."[59] The Court found that it was reasonable for the Corps to consider wetlands adjacent to navigable waterways as WOTUS[60] and to, therefore, require permits for the discharge of dredge material into wetlands pursuant to CWA section 404.[61] The Court explained that this was reasonable because the CWA's objective described in section 101 "incorporated a broad, systemic view of the goal of maintaining and improving water quality."[62] This allowed for an expansive interpretation of WOTUS that included "at least some waters that would not be deemed 'navigable' under the classical understanding of that term" because those waters formed part of an "aquatic system" that included traditionally navigable waters.[63] Wetlands adjacent to traditionally navigable waters "play a key role in protecting and enhancing water quality" of WOTUS and are thus subject to permitting requirements.[64]

Nearly twenty years later, the Court in *SWANCC* clarified the core of *Riverside Bayview*. There, the Petitioner sought to fill in ponds that used to be mining pits, but the Corps determined that such action required a permit under section 404 of the CWA because of the impact this would have on migratory birds.[65] The Court did not uphold the Corps' decision, concluding that an "abandoned gravel pit" that is "*not* adjacent to open water" did not fall under CWA jurisdiction even if it was a migratory-bird habitat.[66] The Court explained that "[i]t was the significant nexus between the wetlands and 'navigable waters' that informed" *Riverside Bayview*.[67] The Court did not clarify what constitutes a significant nexus, but it did state that the *Riverside Bayview* decision was based on "Congress' concern for the protection of water quality and aquatic ecosystems."[68]

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58. *Id.* at 123 (citing Permits for Activities in Navigable Waters or Ocean Waters, 40 Fed. Reg. 31,320 (July 25, 1975) (to be codified at 33 C.F.R. pt. 209)).

59. *Id.* at 124.

60. *Id.* at 131.

61. *Id.* at 139.

62. *Id.* at 132.

63. *Id.* at 133–34; *see also id.* at 137 ("Congress rejected measures designed to curb the Corps' jurisdiction in large part because of its concern that protection of wetlands would be unduly hampered by a narrowed definition of 'navigable waters.'").

64. *Id.* at 133–34 (citing Regulatory Programs of the Corps of Engineers, 42 Fed. Reg. 37,122, 37,128 (July 19, 1977) (to be codified at 33 C.F.R. pt. 209, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329)).

65. The Corps had categorized intrastate bodies of water (including ponds) whose destruction could affect interstate commerce, or which served as habitat for endangered species or migratory birds that either were protected by "Migratory Bird Treaties" or crossed state lines as "waters of the United States." Solid Waste Agency of N. Cook Cnty. v. U.S. Army Corps of Eng'rs (*SWANCC*), 531 U.S. 159, 164–65 (2001).

66. *Id.* at 167.

67. *Id*.

68. *Id*.

The aftermath of *Miccosukee*, *Riverside Bayview*, and *SWANCC* was twofold. First, *SWANCC* introduced the concept of "significant nexus," a standard later adopted in *Rapanos*.[69] Second, all three decisions reinforced the idea that whether the discharge passes *only* and *exclusively* though point sources or navigable waters is *not* what matters in determining whether a point-source discharge requires permitting. Instead, what matters is whether requiring a permit could "play a key role in protecting and enhancing water quality" of the affected water body.[70]

b. *Rapanos*: Continuous Surface Connection, Naturally Downstream, and Significant Nexus Standards

In *Rapanos v. United States*, the Court delivered a split opinion with a four-vote plurality by Justice Scalia, a one-vote concurrence in the judgment by Justice Kennedy, and a four-vote dissent by Justice Stevens.[71] Scalia rejected the assertion that Petitioners required a permit under section 404 of the CWA to backfill these wetlands because the wetlands maintained only an "intermittent, physically remote hydrologic connection to 'waters of the United States'" and as such lacked a "significant nexus."[72] Scalia reasoned that, for wetlands to be covered by the CWA, they must be adjacent to a "relatively permanent body of water connected to traditional interstate navigable waters" and have "a continuous surface connection with that water, making it difficult to determine where the 'water' ends and the 'wetland' begins."[73] I call this the "continuous surface connection" standard. Scalia added that the CWA "does not forbid the 'addition of any pollutant *directly* to navigable waters from any point source,' but rather the 'addition of any pollutant *to* navigable waters.'"[74] Thus, "the discharge into intermittent channels of any pollutant that naturally washes downstream" into navigable waters "likely violates § 1311(a), even if the pollutants discharged from a point source do not emit 'directly into' covered waters, but pass 'through conveyances' in between."[75] I call this the "naturally downstream" standard.

Scalia's "naturally downstream" standard is limited in two ways. First, Scalia's opinion does not have the force of stare decisis.[76] Second, the "naturally downstream" standard was not essential to Scalia's holding, so it is considered

69. *See id; see also* Rapanos v. United States, 547 U.S. 715, 742 (2006).
70. United States v. Riverside Bayview Homes, Inc., 474 U.S. 121, 133 (1985).
71. *See Rapanos*, 547 U.S. at 718.
72. *Id.* at 742.
73. *Id*.
74. *Id.* at 743 (emphasis in original) (quoting 33 U.S.C. § 1362(12)(A)).
75. *Id.* (emphasis omitted) (quoting United States v. Velsicol Chemical Corp., 438 F. Supp. 945, 946–47 (W.D. Tenn. 1976)).
76. *See* Marks v. United States, 430 U.S. 188, 193 (1977) ("When a fragmented Court decides a case and no single rationale explaining the result enjoys the assent of five Justices, 'the holding of the Court may be viewed as that position taken by those Members who concurred in the judgments on the narrowest grounds.'").

dictum.[77] Still, several lower courts have used Scalia's reasoning in *Rapanos* in their own decision making.[78] The Supreme Court even references this reasoning twice in *Maui*.[79] These citations indicate agreement with the idea that permits can still be required for indirect point-source discharges.

Justice Kennedy's concurrence found that Scalia's "continuous surface connection" standard read limitations into the CWA not supported by its language or purpose.[80] Kennedy argued that intermediate bodies of water having a "significant nexus" with traditionally navigable waterways should still be considered navigable waters for the purposes of the CWA because of the impact they have on covered waterways.[81] According to Kennedy, wetlands

> come within the statutory phrase "navigable waters," if the wetlands . . . significantly affect the chemical, physical, and biological integrity of other covered waters more readily understood as "navigable." When, in contrast, wetlands' effects on water quality are speculative or insubstantial, they fall outside the zone fairly encompassed by the statutory term "navigable waters."[82]

Kennedy also noted that permits could be required for point-source discharges that ended up in navigable waters via a series of nonnavigable waters linked by several "significant nexuses."[83]

All three of these standards share something in common: point-source discharges into nonnavigable intermediary bodies of water still require CWA permitting if those intermediary bodies of water still share some sort of significant connection to the navigable water, even if the connection required varies among the three standards. Moreover, the Kennedy opinion in *Rapanos*, considered the holding under *Marks*, emphasizes the importance of measuring

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77. Adler & House, *supra* note 11, at 83–84.

78. *Id.*

79. Justice Breyer, writing for the majority in *Maui*, cited to this standard when noting that the CWA "does not say 'directly' from or 'immediately' from." County of Maui v. Haw. Wildlife Fund, 140 S. Ct. 1462, 1475. Justice Kavanaugh's concurrence directly quotes Scalia's reasoning. *Id.* at 1478 (Kavanaugh, J., concurring).

80. *Rapanos*, 547 U.S. at 768–69 (Kennedy, J., concurring in the judgment).

81. *Id.* at 772–74, 779 ("The required nexus must be assessed in terms of the statute's goals and purposes"); *see also* Adler & House, *supra* note 11, at 56. The Tenth Circuit in *United States v. Hubenka* also clarified the broad meaning of significant nexus, holding that control requirements applied "to the navigable waters, portions thereof, *and their tributaries*." United States v. Hubenka, 438 F.3d 1026, 1034 (10th Cir. 2006) (emphasis added).

82. *Rapanos*, 547 U.S. at 780 (Kennedy, J., concurring in the judgment).

83. Kennedy states the following:

> *Riverside Bayview*'s reasoning . . . could apply equally to wetlands adjacent to certain [non-navigable] major tributaries . . . that, due to their volume of flow (either annually or on average), their proximity to navigable waters, or other relevant considerations, are significant enough that wetlands adjacent to them are likely, in the majority of cases, to perform important functions for an aquatic system incorporating navigable waters.

Id. at 780–81. Kennedy determined that, "[a]bsent more specific regulations," the Corps should determine whether such wetlands adjacent to "nonnavigable tributaries" have a significant nexus "on a case-by-case basis." *Id.* at 782.

this connection by the impact that the nonnavigable intermediate waters can have on the recipient navigable water.

3. The Evolution of Permitting Requirements in the Circuit Courts

Unlike the Supreme Court, circuit courts avoided redefining point sources or WOTUS and instead drew boundaries on just how remote the point source of a discharge had to be from the receiving navigable water for CWA jurisdiction to apply. Like the Supreme Court, circuit courts for the most part focused on impact when drawing these boundaries.

a. Traceability

The traceability standard requires a permit if a pollutant reaching a navigable water can be traced back to some point source, regardless of how many conduits that pollutant traveled through or how small the pollutant reaching the end navigable water is, and if the traced discharge causes or contributes to some modicum of impact "on water quality and the aquatic ecosystem."[84] For example, in *Trustees for Alaska v. EPA*, the Ninth Circuit upheld the issuance of permits regulating pollutants released by gold placer mines, stating that pollutants traceable to "identifiable point[s] of discharge . . . are subject to NPDES regulation."[85]

Similarly, the Fourth Circuit never questioned the fact that pollutants had to travel six miles through a nonnavigable water before reaching the navigable Savannah River for CWA jurisdiction to apply and applied the "fairly traceable" standard, in *Natural Resources Defense Council v. Watkins*.[86]

The "fairly traceable" standard described here is thus broader in coverage than the "significant nexus" standard, which seems to put a limit on CWA jurisdiction when the impact of a point-source discharge on an indirectly connected navigable water is insubstantial or uncertain. The "fairly traceable" standard puts no limit on how remote the point source can be from the navigable water and no minimum threshold on how harmful the pollutant discharged must be to the navigable water, as long as there is potential for a nonzero amount of harm.

b. Traceability Plus De Minimis

The "traceability plus de minimis" standard is like the "traceability" standard in that it does not matter how remote the point source is from the affected navigable water for a discharge from this point source to be covered under CWA jurisdiction. The main difference between the two is that, under "traceability plus de minimis," there needs to be some minimum (or de minimis)

84. *Id.* at 773.
85. Trs. for Alaska v. EPA, 749 F.2d 549, 559 (9th Cir. 1984).
86. Nat. Res. Def. Council, Inc. v. Watkins, 954 F.2d 974, 980 (4th Cir. 1992).

amount of pollutant or harm being caused by the pollutant at the navigable water (*more* than just nonzero) for CWA jurisdiction to apply.

For example, in *United States v. Earth Sciences, Inc*., the Tenth Circuit found that discharges from mining operations into nonnavigable reservoirs and streams could be covered under CWA jurisdiction because the affected waters were used for agricultural irrigation and thereby affected interstate commerce.[87] The impact on water quality sufficient to affect interstate commerce was thus the de minimis requirement.

Similarly, in *Quivira Mining Company v. EPA*, the Tenth Circuit held that having groundwater as a conduit through which a pollutant travels between point source and navigable water did not disqualify the discharge from falling under CWA jurisdiction as long as the pollutant was traceable from navigable water to point source and it caused some impact on interstate commerce, even if it could take centuries for groundwater to discharge into navigable waters.[88] The court held that such an outcome was consistent with "the clear intent of Congress to regulate waters of the United States to the fullest extent possible under the commerce clause" and the CWA.[89]

The "traceability plus de minimis" standard was also used by the Ninth Circuit in *Maui*.[90] Here, the Lahaina Wastewater Reclamation Facility (LWRF), which partially treats sewage, pumped about four million gallons of partially treated effluent into "four wells hundreds of feet underground."[91] A tracer dye conclusively established that 64 percent of this partially treated effluent would travel about half a mile through groundwater and into the Pacific Ocean, a "navigable water,"[92] in as fast as three months' time,[93] posing threats to the health of visitors to the affected popular beach areas.[94] The Ninth Circuit held that the County's wastewater-injection wells violated the CWA because "(1) the County discharged pollutants from a point source, (2) the pollutants are fairly traceable from the point source to a navigable water such that the discharge is

87. United States v. Earth Scis., Inc., 599 F.2d 368, 374–75 (10th Cir. 1979).

88. Quivira Mining Co. v. EPA, 765 F.2d 126, 129–30 (10th Cir. 1985); *see also* Shiigi, *supra* note 53, at 531–32.

89. *Id.*

90. Haw. Wildlife Fund v. County of Maui, 886 F.3d 737, 749 (9th Cir. 2018).

91. County of Maui v. Haw. Wildlife Fund, 140 S. Ct. 1462, 1469 (2020); *see also* Haw. Wildlife Fund v. County of Maui, 886 F.3d 737, 742 (9th Cir. 2018) ("The LWRF receives approximately 4 million gallons of sewage per day" and "injects approximately 3 to 5 million gallons of treated wastewater per day into the groundwater via its wells").

92. *Maui*, 140 S. Ct. at 1469.

93. CRAIG R. GLENN ET AL., LAHAINA GROUNDWATER TRACER STUDY: LAHAINA, MAUI, HAWAI'I ES-3 (2013) (original tracer study report); *see also* Patricia Tummons, *Reports Show Maui County Sewage Plants Are Polluting Waters at Popular Beaches*, ENV'T HAW. (May 2010), https://www.environment-hawaii.org/?p=1063 (talking about "two or three weeks").

94. Meghan L. Dailer et al., *Using δ15N Values in Algal Tissue to Map Locations and Potential Sources of Anthropogenic Nutrient Inputs on the Island of Maui, Hawai'i, USA*, 60 MARINE POLLUTION BULL. 655, 668; Tummons, *supra* note 93.

the functional equivalent of a discharge into the navigable water, and (3) the pollutant levels reaching navigable water are more than *de minimis*."[95]

Though the Supreme Court later overturned what it calls the "fairly traceable" standard, the Ninth Circuit referred to "functional equivalence" when describing a pollutant that is fairly traceable from point source to navigable water.[96] This reveals that functional equivalence does not necessarily apply to how similar an indirect point-source discharge, once it reaches navigable waters, is in amount or composition to a direct point-source discharge into navigable waters.

c. Proximate Cause

Proximate cause exists when "the injury was the natural and probable consequence of the . . . act, and . . . it ought to have been foreseen in light of the attending circumstances."[97] This is a two-part test.[98] "Causation-in-fact" requires that the defendant's act be a necessary or sufficient cause of the harm, or otherwise be a substantial factor causing the harm.[99] "Foreseeability" limits liability only to actions that would result in harms that were at least somewhat predictable or are otherwise not unusual consequences of the conduct that caused the harm.[100]

Under the proximate-cause standard, a point-source discharge would thus seem to need CWA permitting when the discharged pollutant was a necessary, sufficient, or substantial cause of an impact on the water quality or hydrological ecosystem of a navigable water, and this harm would have to have been foreseeable.[101]

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95. *Maui*, 886 F.3d at 749.

96. *Id.*

97. Milwaukee & St. Paul Ry. Co. v. Kellogg, 94 U.S. 469, 475 (1877).

98. CSX Transp., Inc. v. McBride, 564 U.S. 685, 701 (2011).

99. Peter Nash Swisher, *Causation Requirements in Tort and Insurance Law Practice Demystifying Some Legal Causation "Riddles"*, 43 TORT TRIAL & INS. PRAC. L.J. 1, 3–7 (2007). Note that the sufficiency standard only applies for multiple concurrent causation, such as when "two, or more causes concur to bring about an event and either one of them, operating alone, would have been sufficient to cause the identical result." *Id*. In that case, it is treated as though "each cause-in-fact has played so important a part in producing the result that legal responsibility should be imposed upon it as a substantial factor of the ultimate result." *Id.* at 4.

100. *Id.* at 9–10; RESTATEMENT (SECOND) OF Torts*, supra* note 35, at § 281 cmt. g; *see also* Staub v. Proctor Hosp., 562 U.S. 411, 419–20 (2011) ("Proximate cause . . . excludes only those 'link[s] that [are] too remote, purely contingent, or indirect." (alterations in original)); Paroline v. United States, 572 U.S. 434, 444–45 (2014) ("Proximate cause is often explicated in terms of foreseeability or the scope of the risk created by the predicate conduct. . . . [precluding] liability in situations where the causal link between conduct and result is so attenuated that the consequence is more aptly described as mere fortuity."); County of Los Angeles v. Mendez, 137 S. Ct. 1539, 1548–49 (2017) ("[P]roximate cause question[s] require[] consideration of the 'foreseeability or the scope of the risk created by the predicate conduct' and require the court to conclude that there [is] 'some direct relation between the injury asserted and the injurious conduct alleged.'" (quoting *Paroline*, 572 U.S. at 444)).

101. See discussion of Waterkeeper All., Inc. v. EPA, 399 F.3d 486 (2d Cir. 2005) and United States v. Lucas, 516 F.3d 316, 322 (5th Cir. 2008) below.

For example, in *Waterkeeper Alliance, Inc. v. EPA*, the Second Circuit held that manure from concentrated animal feeding operations (CAFOs) dispersed into land and making its way into navigable waters was considered a point-source discharge subject to CWA regulation.[102] The court held that

> CAFOs are unquestionably 'the proximate source' of any discharge of pollutants from land application areas under their control to surface waters . . . . But for the application of manure by the CAFO to the land, there could never be a discharge of pollutants from the land to the surface waters.[103]

A court applying the "proximate cause" standard can also hold liable those who merely create conditions leading to discharges without having caused the discharges themselves. For example, in *United States v. Lucas*, the Fifth Circuit found developers criminally liable for violating section 1311(a) of the CWA for residents' discharges caused by septic-system failures, even though the developers did not themselves discharge but caused the conditions under which it would be foreseeable that discharges of pollutants would happen.[104]

d. Proximate Cause & Its Relationship to Traceability Plus De Minimis

When a discharge is a necessary, sufficient, or substantial factor in either adding a pollutant to a navigable water or in impacting water quality, the "traceability plus de minimis" standard is an example of proximate cause with the de minimis criterion satisfied. This means that the proximate cause standard can be satisfied once a pollutant has been traced from navigable water to point source and once that pollutant has been shown to threaten water quality. The similarity in the two standards is important for establishing traceability as a key factor of "functional equivalence."

Tracer dye studies can be used to establish proximate cause.[105] If causation-in-fact simply means the addition of a pollutant to a navigable water, tracing pollutants from point source to navigable water establishes but-for causation because that particular flow would not have happened *but for* an action at the point source. If multiple point sources are releasing the same type of pollutant into the same body of water, then one can still trace these individual flows to all point sources and hold the owners and operators of these point sources legally responsible since any one of them would have sufficiently caused an addition of

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102. *Waterkeeper All*., 399 F.3d at 510.

103. *Id.*

104. *Lucas*, 516 F.3d at 322.

105. Tracer dye studies work by adding a tracer dye to a point source and then tracking the outflow by sampling across space and time to track the size of the tracer dye plume and the rate at which it approaches surface waters. Shiigi, *supra* note 53, at 548 (citing Glenn et al., *supra* note 93, at ES-15 to ES-16). Moreover, tracer studies can map specific flow paths and confirm inferred flow directions and speeds. Brief for Aquatic Scientists and Scientific Societies as Amici Curiae in Support of Respondents at 18, County of Maui v. Haw. Wildlife Fund, 140 S. Ct. 1462 (2020) (No. 18-260), 2019 WL 3494040. Tracer dyes are widely accepted by geologists and have been in use for over a century. Shiigi, *supra* note 53, at 548.

the pollutant to the body of water on its own.[106] However, if causation-in-fact is defined as the discharge in question being a sufficient, necessary, or substantial contributor to *impacts* on water quality or hydrological ecosystems, tracing technology might not definitively establish causation, but tracing can narrow down the list of possible causes in terms of the pollutants and the point sources contributing the pollutants. Tracer dye studies can be combined with knowledge of the physical and chemical properties of the discharged pollutants to derive a causal mechanism showing how the discharge in question is likely harming the affected navigable water.

If the path of a pollutant reaching a navigable water can be traced all the way back to its point source, then discharges from this point source are foreseeable: One can easily expect a pollutant released from the same point source under similar conditions to reach the affected navigable water in a similar manner. Foreseeability can also be established if one uses tracing technology to *predict* whether an emission from a point source *could* reach a navigable water. Tracers can map the paths that a pollutant *could* take, capturing both the average and variance in groundwater and surface water flow speeds, travel paths, and interactions.[107]

Tracer dyes have been used by courts to help establish causation and foreseeability. In the Ninth Circuit *Maui* opinion, a tracer dye study "conclusively establish[ed] that pollutants discharged from all four wells emerged at discrete points in the Pacific Ocean."[108] In *Sierra Club v. El Paso Gold Mines, Inc.*, the Tenth Circuit noted that a tracer dye test may have been more persuasive in determining whether a pollutant detected in navigable waters had come from the mining shaft in question.[109] In *Kentucky Waterways Alliance*, tracer dyes were admitted into evidence and, while the court did not use the dyes in its decision making on what constituted a point source, it did acknowledge that "dye traces can roughly and occasionally track the flow of groundwater."[110]

Other kinds of tracing technologies have also been used in courts. In *Oklahoma v. Tyson*, genotypic microbial source tracking (MST) methods were admitted into evidence to demonstrate that a broiler chicken operation was contaminating the watershed, but the court did not find the evidence to be convincing because, according to it, MST methods had not been peer-reviewed or published.[111] However, this finding was likely a factual error because at the

106. *See* Swisher, *supra* note 99. For discussion examples of how multiple sufficient causation applies, see *id.* at 4.

107. Brief for Aquatic Scientists and Scientific Societies as Amici Curiae in Support of Respondents, *supra* note 105, at 18–22.

108. Haw. Wildlife Fund v. County of Maui, 886 F.3d 737, 749 (9th Cir. 2018), *vacated*, 140 S. Ct. 1462 (2020).

109. Shiigi, *supra* note 53, at 549 (citing Sierra Club v. El Paso Gold Mines, Inc., 421 F.3d 1133, 1146–50 (10th Cir. 2005)).

110. *Id.* at 550 (citing Ky. Waterways All. v. Ky. Utils. Co., 905 F.3d 925, 933 (6th Cir. 2018)).

111. Tarah Heinzen & Abel Russ, *Using Emerging Pollution Tracking Methods to Address the Downstream Impacts of Factory Farm Animal Welfare Abuse*, 31 PACE ENV'T L. REV. 475, 495 (2014)

time of the decision there had already been twenty-seven peer-reviewed publications on the method.[112] Since then, over seventy peer-reviewed articles using genotypic MST with low rates of error have been published.[113]

Other methods have been developed to trace pollutants entering water bodies back to their point sources, including natural tracer studies[114] and wireless sensors.[115] Thus, the opportunities to use tracing technology to establish traceability and proximate cause are ever-expanding.

e. Direct Hydrological Connection

After *Rapanos*, the Fourth Circuit adopted the "direct hydrological connection" standard in *Upstate Forever v. Kinder Morgan Energy Partners*.[116] The "direct hydrological connection" standard, like Justice Kennedy's "significant nexus" standard, is a fact-based inquiry that does not clearly define what constitutes a "direct hydrological connection."[117] Factors used to determine whether a "direct hydrological connection" exists include traceability, extent of dilution or diversion of the pollutant, time and distance, and physical factors like geology, flow, and slope of the subsurface groundwater substrate.[118] The Fourth Circuit held that discharges of pollutants "reaching navigable waters located 1000 feet or less from the point source by means of ground water with a direct hydrological connection to such navigable waters" fall "within the scope of the CWA,"[119] even when the pollutant in question was reaching navigable waters

(citing Att'y Gen. of Okla. v. Tyson Foods, Inc., 565 F.3d 769, 774–75 (10th Cir. 2009)). MST uses either the DNA/RNA (genotypic MST) or physical and biochemical characteristics (phenotypic MST) of bacteria found in waste to identify host species including cattle, pigs, horses, chickens, and humans. *Id.* at 490–93. Tracers then use this information to track waste back to where it came from. *Id*. MST can be combined with measurements of nitrates, metals, antibiotics, hormones, and other typical agricultural waste products to track contamination from CAFOs. *Id*.

112. *Id.* at 496–97.

113. *Id.* at 497–99. MST has been used to differentiate groundwater contamination due to septic tanks (down to the household level) from that due to surface scat, and to differentiate groundwater contamination of monitoring wells due to a nearby swine lagoon from contamination due to other animals. Donald M. Stoeckel, *Selection and Application of Microbial Source Tracking Tools for Water-Quality Investigations*, *in* COLLECTION OF ENV'T DATA 7–9 (2016), https://pubs.usgs.gov/tm/2005/tm2a3/.

114. Natural tracer studies use naturally occurring water quality properties, including heat, dissolved solutes, and microorganisms, to understand water sources, travel paths, and interactions. Brief for Aquatic Scientists and Scientific Societies as Amici Curiae in Support of Respondents, *supra* note 105, at 19–21. One study combining hydrogeochemical indicators with a natural tracer (SF_6) was able to trace and measure the extent of pollution from a liquidated chemical plant that was reaching a nearby aquifer. *See generally* Sabina Jakóbczyk-Karpierz et al., *Tracing Multiple Sources of Groundwater Pollution in a Complex Carbonate Aquifer (Tarnowskie Góry, Southern Poland) Using Hydrogeochemical Tracers, TCE, PCE, SF6, and CFCs*, APPLIED GEOCHEMISTRY, May 5, 2020.

115. *See generally* Yu-Pin Lin et al., *Real-Time Identification of Irrigation Water Pollution Sources and Pathways with a Wireless Sensor Network and Blockchain Framework*, SENSORS, June 28, 2020.

116. Upstate Forever v. Kinder Morgan Energy Partners, L.P., 887 F.3d 637, 651–52 (4th Cir. 2018), *vacated*, 140 S. Ct. 2736 (2020) (mem.).

117. *Id.*

118. *Id.*

119. *Id.* at 652.

after several years.[120] The Fourth Circuit cited Justice Scalia's "naturally downstream" standard, emphasizing that "from" merely indicates a "starting point" and as such, point sources "need not also convey the discharge directly to navigable waters."[121] The Fourth Circuit qualified this conclusion by stating that indirect discharges "must be sufficiently connected to navigable waters to be covered under the Act."[122]

Notably, the Fourth Circuit stated that it "see[s] no functional difference between the Ninth Circuit's fairly traceable concept and the direct hydrological connection concept developed by EPA."[123] The Fourth Circuit also reiterated the purpose of the CWA in its interpretation, noting that

> if the presence of a short distance of soil and ground water were enough to defeat a claim, polluters easily could avoid liability under the CWA by ensuring that all discharges pass through soil and ground water before reaching navigable waters . . . greatly undermin[ing] the purpose of the Act.[124]

f. Direct Standard

The Sixth Circuit has adopted a "direct" approach to the meaning of discharges. In *Tennessee Clean Water Network* and *Kentucky Waterways Alliance*, the Sixth Circuit rejected the idea that point sources releasing pollutants into underground channels that reached navigable waters could be covered under the CWA's permitting requirements, regardless of whether there was a hydrological connection between groundwater and navigable surface waters.[125] In both cases, the Sixth Circuit reasoned that "when the pollutants are discharged" into navigable waters, "they are not coming *from* a point source; they are coming from groundwater which is a nonpoint source conveyance" over which the CWA has no say.[126] The Sixth Circuit acknowledges that this interpretation of "from" as applying only to the most recent medium through which pollution traveled diverges from that applied in *Rapanos*.[127] Thus, it is questionable how much weight should be given to this reasoning.

Thus, all circuit courts except for the Sixth Circuit have adopted an interpretation of the CWA that has favored permitting indirect point-source discharges.

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120. *Id.* at 643–45.

121. *Id.* at 649–50.

122. The Fourth Circuit referred to the EPA's "direct hydrological connection" standard, described *infra* Subpart I.4.a, to determine "whether there is a clear connection between the discharge of a pollutant." *Upstate Forever*, 887 F.3d at 651.

123. *Id.* at 651 n.12.

124. *Id.* at 652.

125. Ky. Waterways All. v. Ky. Utils. Co., 905 F.3d 925, 933 (6th Cir. 2018); Tenn. Clean Water Network v. Tenn. Valley Auth., 905 F.3d 436, 444 (6th Cir. 2018); *see also* Shiigi, *supra* note 53, at 521, 526.

126. *Tenn. Clean Water Network*, 905 F.3d at 444 (citing *Ky. Waterways All.*, 905 F.3d at 934).

127. *Id.* at 444–45.

4. The Evolution of CWA Permitting in EPA and Corps Rulemaking

EPA has provided guidance on the kinds of point-source discharges that require permits.[128] The EPA has held that indirect point-source discharges require a permit if they fall under the "direct hydrological standard."[129] This standard bears many similarities to the "significant nexus" standard, demonstrating a consistency between Supreme Court rulings, circuit court rulings, and agency guidance on the interpretation of the CWA.

a. Direct Hydrological Connection

The direct hydrological standard was first mentioned in EPA's final rule for the *NPDES Permit Application Regulations for Storm Water Discharges,* released in 1990.[130] The EPA again mentioned the standard in *Amendments to the Water Quality Standards Regulation That Pertains to Standards on Indian Reservations*,[131] where it asserted that the "direct hydrological connection" standard was consistent with the legislative history of the CWA and that discharges of pollutants to groundwater hydrologically connected to navigable surface waters were "effectively discharges to the directly connected surface waters."[132]

The "direct hydrological connection" was again cited in proposed NPDES rulemaking released in 2001, arguing that "the goals of the CWA can only be fulfilled" if discharges conveyed through groundwater to surface waters "are regulated."[133] Even though the final rule did not promulgate the "direct hydrological connection" standard as an official standard, the EPA nonetheless stated its intent to regulate "discharges to hydrologically connected groundwater on a case-by-case basis."[134] The EPA reiterated this intent in a 2008 rule.[135] Notably, the EPA in its 2001 rule cited traceability as a key factor in establishing a direct hydrologic connection, stating that "pollutants must be traced from their

128. National Pollutant Discharge Elimination System Permit Application Regulations for Storm Water Discharges, 55 Fed. Reg. 47,990, 47,997 (Dec. 2, 1990) (to be codified at 40 C.F.R. pt. 122, 123, 124).

129. *Id.*

130. *Id.*

131. Amendments to the Water Quality Standards Regulation That Pertain to Standards on Indian Reservations, 56 Fed. Reg. 64,876, 64,892 (Dec. 12, 1991) (to be codified at 40 C.F.R. pt. 131).

132. Shiigi, *supra* note 53, at 528 (citing Amendments to the Water Quality Standards Regulation That Pertain to Standards on Indian Reservations, 56 Fed. Reg. at 64,892).

133. National Pollutant Discharge Elimination System Permit Regulation and Effluent Limitations Guidelines and Standards for Concentrated Animal Feeding Operations, 66 Fed. Reg. 2960, 3018 (proposed Jan. 12, 2001) (to be codified at 40 C.F.R. pt. 122, 412).

134. James W. Hayman, *Regulating Point-Source Discharges to Groundwater Hydrologically Connected to Navigable Waters An Unresolved Question of Environmental Protection Agency Authority Under the Clean Water Act*, 5 BARRY L. REV. 95, 117 (2005); *see also* Shiigi, *supra* note 53, at 529.

135. Revised National Pollutant Discharge Elimination System Permit Regulation and Effluent Limitations Guidelines for Concentrated Animal Feeding Operations in Response to the Waterkeeper Decision, 73 Fed. Reg. 70,418, 70,420 (Nov. 20, 2008) (to be codified at 40 C.F.R. pt. 9, 122, 412).

source to surface waters, in order to come within the purview of the CWA."[136] The "direct hydrological connection" standard adopted in *Upstate Forever* was based on these rulings from the EPA.[137]

b. The Similarity Between the Direct Hydrological Connection & Significant Nexus

In 2008, the EPA and the Corps published a Memorandum on the *Rapanos* decision. In it, both agencies sorted waters into three categories: waters whose discharges clearly fell within the scope of the CWA permitting requirements, those whose discharges fell outside this scope, and those whose discharges would be subject to "fact-specific analysis" as to "whether they have a significant nexus with a traditional navigable water."[138]

This Memo revealed two important facts. First, in their fact-based inquiry, the agencies analyzed both the flow characteristics and the functions of the nonnavigable tributaries with the goal of determining whether these waters significantly affected "the chemical, physical and biological integrity of downstream traditional navigable waters."[139] This analysis emphasized the role of impact on navigable waters in analyzing the significance of the nexus.[140]

Second, in order to determine whether a significant nexus existed, the agencies determined that they would consider hydrological factors including "volume, duration, and frequency of flow," "proximity to the traditional navigable water," "size of the watershed," "average annual rainfall" and "winter snow pack," the "potential of tributaries to carry pollutants and flood waters to traditional navigable waters," the "provision of aquatic habitat that supports a traditional navigable water," the "potential of wetlands to trap and filter pollutants or store flood waters," and "maintenance of water quality in traditional navigable waters."[141] These factors seem directly correlated to those measured under the "direct hydrological connection" standard. Thus, the "direct hydrological connection" standard and the "significant nexus" standard both seemingly share the same purpose of using these factors as proxies for measuring the potential for a discharge into nonnavigable waters to affect downstream navigable waters.

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136. National Pollutant Discharge Elimination System Permit Regulation and Effluent Limitations Guidelines and Standards for Concentrated Animal Feeding Operations, 66 Fed. Reg. at 3017 (citing Wash. Wilderness Coal. v. Hecla Mining Co., 870 F. Supp. 983 (E.D. Wash. 1994)).

137. Upstate Forever v. Kinder Morgan Energy Partners, L.P., 887 F.3d 637, 651 (4th Cir. 2018), *vacated*, 140 S. Ct. 2736 (2020) (mem.).

138. Memorandum, EPA & Army Corps, Clean Water Act Jurisdiction Following the U.S. Supreme Court's Decision in *Rapanos v. United States* & *Carabell v. United States*, (Dec. 2, 2008) [hereinafter Memo on *Rapanos & Carabell*], https://www.epa.gov/sites/default/files/2016-02/documents/cwa_jurisdiction_following_rapanos120208.pdf.

139. *Id*. at 1.

140. *See id.*

141. *Id.* at 8.

In 2015, the EPA again indicated that surface waters impacted by hydrologically connected groundwater would fall under CWA regulations, acknowledging that groundwater is a "conduit" and that pollutants added to surface waters from point sources via this conduit would still require permitting, even if groundwater itself was not a navigable water.[142] It was not until April 2019 that the EPA changed its "decades-long stance" on the "direct hydrological connection standard" by stating that "the CWA excludes all 'releases of pollutants from a point source to groundwater from NPDES program coverage, regardless of a hydrologic connection.'"[143] Thus, for at least thirty years, including during *Maui*, the EPA explicitly adhered to the "direct hydrological connection" standard.[144] Given the transition from the Trump to the Biden administration, it is likely that the EPA will change its stance again or revert to using the "direct hydrological connection" standard.

5. Commonalities among Permitting Standards

Three main themes emerge from this analysis of judicial and regulatory standards used to determine the scope of CWA jurisdiction over indirect point-source discharges. First, the Supreme Court, the EPA, the Corps, and all circuit courts, except for the Sixth Circuit, adopted an interpretation of the CWA that favored permitting indirect point-source discharges, with most standards allowing several steps of removal from point source to navigable water.[145] Second, most standards, most notably the "significant nexus" standard, have

142. EPA, TECHNICAL SUPPORT DOCUMENT FOR THE CLEAN WATER RULE: DEFINITION OF WATERS OF THE UNITED STATES 17 (2015) [hereinafter CLEAN WATER RULE TECHNICAL SUPPORT DOCUMENT], https://www.epa.gov/sites/production/files/2015-05/documents/technical_support_document_for_the_clean_water_rule_1.pdf ("EPA's longstanding interpretation is that point source discharges of pollutants to 'waters of the United States' via groundwater with a direct hydrologic connection to surface waters are discharges subject to the CWA . . . . The exclusion for groundwater in the rule does not affect this longstanding interpretation as the agency has never considered the groundwater itself to be a 'water of the United States'"); *see also* Shiigi, *supra* note 53, at 530–31.

143. Shiigi, *supra* note 53, at 531 (quoting Interpretive Statement on Application of the Clean Water Act National Pollutant Discharge Elimination System Program to Releases of Pollutants from a Point Source to Groundwater, 84 Fed. Reg. 16,810, 16,810 (Apr. 23, 2019)).

144. Brief of Amici Curiae Former EPA Officials in Support of Respondents at 3, County of Maui v. Haw. Wildlife Fund, 140 S. Ct. 1462 (2020) (No. 18-260), 2019 WL 3317323 ("For at least thirty years, until a few months ago, EPA interpreted the CWA to allow the regulation of point source discharges that pass through hydrologically-connected groundwater to jurisdictional surface waters under the NPDES program. It has repeatedly expressed this interpretation in regulatory preambles, permit writers' manuals, and other guidance documents.").

145. Haw. Wildlife Fund v. County of Maui, 886 F.3d 737, 746–49 (9th Cir. 2018); Greater Yellowstone Coalition v. Lewis, 628 F.3d 1143, 1147, 1153 (9th Cir. 2010) (the Ninth Circuit was only concerned with whether there was a point source *from which* the defendant discharged the pollutants to determine whether an NPDES permit was needed); Concerned Area Residents for the Env't v. Southview Farm, 34 F.3d 114, 119 (2d Cir. 1994) (concluding that there was a point-source discharge because the pollutant was released from a tanker into a field that itself had a connection to a navigable water); Sierra Club v. Abston Constr., 620 F.2d 41, 45 (5th Cir. 1980) (where the fact that groundwater plays a role in delivering the pollutants from the wells to the navigable water does not preclude liability under the statute), *vacated*, 140 S. Ct. 1462 (2020).

focused on the likelihood of impact on navigable waters when determining whether permits are necessary for indirect point-source discharges instead of relying on hardline distinctions. Third, the various standards are more similar than they appear and rely on shared factors when being operationalized. The functional equivalence standard described in *Maui* should be interpreted considering this history.

II. THE FUNCTIONAL EQUIVALENCE STANDARD

In this Part, I explain the "functional equivalence" standard defined in *Maui*. The "functional equivalence" standard is best understood by analyzing the potential for impact that an indirect point source discharge may have on a navigable water, instead of analyzing the consistency of the discharge from point source to navigable water.

A. The Decision in Maui

In *Maui*, Justice Stephen Breyer, writing the opinion of the Court, held that the CWA requires a permit when there is a direct discharge of pollutants into navigable waters or when the addition of pollutants through the groundwater is "the functional equivalent of a *direct* discharge from the point source into navigable waters."[146] I call this the "functional equivalence" standard.

The "functional equivalence" standard was a "middle ground."[147] This decision purportedly overturned the "fairly traceable" standard adopted by the Ninth Circuit and abrogated the "direct hydrological connection" standard adopted by the Fourth Circuit.[148]

The County of Maui's ("County") wastewater reclamation facility (the LWRF) partially treats sewage and pumps it into four wells hundreds of feet underground.[149] Most of the resulting partially treated effluent, averaging about four million gallons daily, would travel about half a mile through groundwater into the Pacific Ocean, a "navigable water."[150] The County argued that the CWA creates a "bright-line test" where the point source itself (in this case, the wells) needs to be "the *means of delivering* pollutants to navigable waters."[151] Therefore, no permit was needed because the pollutant was delivered via a non-point conduit (groundwater).[152] The Hawaii Wildlife Fund argued that the Ninth

146. *Maui*, 140 S. Ct. at 1468 (emphasis added).
147. *See id.* at 1476.
148. *Id.* at 1469–70.
149. *Id.* at 1468.
150. *Id.* at 1469.
151. *Id.* at 1470.
152. *Id*. This argument echoed the "direct" standard applied by the Sixth Circuit. *See* Ky. Waterways All. v. Ky. Utils. Co., 905 F.3d 925, 933 (6th Cir. 2018); Tenn. Clean Water Network v. Tenn. Valley Auth., 905 F.3d 436, 444 (6th Cir. 2018).

Circuit's "fairly traceable" standard, potentially narrowed by a "proximate cause" requirement, was an acceptable interpretation of the CWA.[153]

In rejecting the "fairly traceable" standard, the Court stated that legislative history demonstrated that Congress intended states to have control over groundwater regulation.[154] An approach based on traceability could require permitting in virtually all cases of discharge, since "virtually all water, polluted or not, eventually makes its way to navigable water."[155] This approach would therefore undermine state control over groundwater pollution.

The Court also rejected the "direct" standard.[156] The Court suggested that Congress contemplated *"*at least some" control over point-source pollutants reaching navigable waters via groundwater.[157] The inclusion of wells—which usually release effluent into groundwater—in the Clean Water Act's definition of point source, therefore requiring permitting to discharge, demonstrates this.[158] Breyer also cited Scalia's "naturally downstream" discussion to emphasize that discharges requiring permits need not deposit pollutants into navigable waters "directly" or "immediately" from point sources.[159] Breyer also appealed to both the purposes of the CWA and common sense by asking the reader to "[c]onsider a pipe that spews pollution directly into coastal waters."[160] A "direct" standard embraced by the County would mean that the pipe's owner could avoid permit requirements "simply" by moving the pipe back "only a few yards, so that the pollution must travel through at least some groundwater before reaching the sea[.]"[161] The Court concludes that Congress could not have "intended to create such a large and obvious loophole in one of the key regulatory innovations of the Clean Water Act."[162]

To balance state sovereignty over groundwater with the need to protect federal waters, the Court provided a list of factors to determine when permitting was necessary:

> (1) transit time, (2) distance traveled, (3) the nature of the material through which the pollutant travels, (4) the extent to which the pollutant is diluted or chemically changed as it travels, (5) the amount of pollutant entering the navigable waters relative to the amount of the pollutant that leaves the point source, (6) the manner by or area in which the pollutant enters the navigable waters, [and] (7) the degree to which the pollutant (at that point) has maintained its specific identity.[163]

153. *Maui*, 140 S. Ct. at 1470.
154. *Id.* at 1472.
155. *Id.* at 1470–71.
156. *See id.* at 1474–75.
157. *Id.* at 1474.
158. *Id.* at 1474–75.
159. *Maui*, 140 S. Ct. at 1475.
160. *Id.* at 1473.
161. *Id.*
162. *Id.*
163. *Id.* at 1476–77.

Of these, the Court ruled that time and distance would "be the most important factors in most cases."[164] The Court also stated that the list of factors was non-exhaustive, since "there are too many potentially relevant factors applicable to factually different cases for this Court now to use more specific language."[165]

B. The Ambiguity of "Functional Equivalence"

Some have claimed that the adoption of the "functional equivalence" standard is a victory "for the environment and environmental interests,"[166] partly because it supposedly changed the discourse on CWA jurisdiction from what constitutes a "water of the United States" to determining which indirect discharges fall under CWA jurisdiction.[167] However, these claims disregard two points that can actually cause the "functional equivalence" standard to be a net loss for the environment if it is not interpreted in light of the CWA's purpose and judicial, regulatory, and common-law history.

First, these claims disregard the debates around CWA jurisdiction at the circuit court level. The traceability, traceability plus de minimis, proximate cause, and direct hydrological connection standard adopted at various times by several circuit courts all contemplated indirect point-source discharges without having to categorize traditionally nonnavigable waters as WOTUS. Even Scalia in *Rapanos* acknowledges this with his "naturally downstream" standard.[168]

Second, because several circuits had already adopted expansive views of the kinds of indirect discharges that required permitting, the "functional equivalent" standard may in fact lead to a net narrowing of the scope of CWA jurisdiction depending on how functional equivalence is defined. This can be a net loss for the environment if fewer point source discharges are regulated than otherwise would have been regulated under the circuit court and *Rapanos* standards.

Defining "functional equivalence" is not trivial. As Alito explains, "'[e]quivalent' means 'equal' in some respect, and 'functional' signifies a relationship to a function,"[169] but Justice Breyer never specifies just *how* an indirect discharge needs to be functionally equivalent to a direct one. What function of a direct discharge *does* the indirect discharge have to equally accomplish?

164. *Id.* at 1477.
165. *Maui*, 140 S. Ct. at 1476.
166. Pollack & Sturges, *supra* note 56, at 87.
167. *Id.* at 53, 95.
168. United States v. Rapanos, 547 U.S. 715, 743 (2006).
169. *Maui*, 140 S. Ct. at 1485 (Alito, J., dissenting).

1. The Character-Based Approach

In dissent, Justice Alito defined what could be considered the "equivalent in character" or "character-based" approach:

> [t]he function of a direct discharge from a point source into navigable waters is to convey the entirety of the discharge into navigable waters without any delay. Therefore, the 'functional equivalent' of a direct discharge of a pollutant into navigable waters would seem to be a discharge that is equal to a direct discharge in these respects.[170]

This interpretation of "functional equivalence" would, contrary to attorneys James Pollack's and Frank Sturges' predictions, actually constrain environmental protection because "the test would apply at best to only a small set of situations not involving a direct discharge."[171] Moving a pipe back "any significant distance" would make the discharge "not be exactly equal to a direct discharge" because there "would be some lag from the time of the discharge to the time when the pollutant reaches navigable waters; some of the pollutant might not reach that destination; and the pollutant might have changed somewhat in composition by the time it reached the navigable waters."[172]

A "character-based" approach to "functional equivalence" could thus be summarized as follows: for an indirect discharge reaching a navigable water to fall under CWA jurisdiction, it must have kept many of the same characteristics once it reached navigable waters as it did when it was released. Under this approach, the exemplary factors that Breyer writes as indicative of which indirect discharges are important are given direct weight as variables that directly measure how much the discharged pollutant changed between when it was released from a point source and when it reached navigable waters. Thus, increases in transit time and distance traveled directly reduce the likelihood that an indirect discharge is considered functionally equivalent to a direct discharge. The relative amount of pollution entering navigable waters as compared to the origin becomes more important than the absolute amount of pollution entering navigable waters. Chemical or physical alterations, regardless of whether beneficial or detrimental to receiving waters, decrease the likelihood that an indirect discharge will pass the "functional equivalence" test.

As I discuss below, this "character-based" approach leads to absurd results and goes against the primary purpose of the CWA, judicial and regulatory precedent, and textual canons of construction. Thus, the "functional equivalence" standard should not be taken to mean "equivalent in character." This still leaves open the question: "functional equivalence" to what?

170. *Id.* at 1485–86.
171. *Id.* at 1486.
172. *Id.*

2. The Impact-Based Approach

As an alternative interpretation of functional equivalence, I propose the "equivalent in potential impact" or "impact-based" approach. This alternative approach defines an indirect discharge as functionally equivalent to a direct discharge when the indirect discharge has the potential to jeopardize the "chemical, physical, and biological integrity of the Nation's waters" or to negatively impact the hydrological ecosystem, water quality, and recreational uses of the receiving navigable water.[173] What is important here is not that the indirectly discharged pollutant has maintained the same quantity or chemical identity from point source to navigable water, but rather that it has maintained its capacity to cause harm from point source to navigable waters, just as it would cause harm if it had been directly discharged. Thus, if an indirect discharge is of a sufficient character and quantity to cause harm or otherwise jeopardize the integrity of the receiving water, it falls under jurisdiction of the CWA.

Under the "impact-based" approach, the factors of time, distance, dilution, and degree of chemical or identity change are proxies correlated with capacity to cause harm.[174] Thus, for example, increases in transit time and distance traveled between point source and navigable water can still be used to predict the likelihood and magnitude of harm that a pollutant could cause when entering the navigable water. However, these factors are not determinative; they can be outweighed by case-specific findings showing that even after traveling for a long time and distance, a discharged pollutant still has the capacity to impact the navigable water.

The impact-based approach gives greater meaning to the factors Breyer proposed, and therefore, is more consistent with *Maui*. For example, "the nature of the material through which the pollutant travels" or "the manner by or area in which the pollutant enters the navigable waters"[175] can each affect the impact that the discharge has on the receiving navigable water, but do not necessarily change the characteristics of the pollutant itself. Thus, their inclusion in *Maui* is explained in a way that the character-based approach does not.

The impact-based approach also gives directionality to some of the factors discussed below in a manner that is consistent with the CWA's purpose and with common sense. For example, if an indirect discharge caused more pollutants to enter the navigable water as opposed to fewer, then the impact-based approach would give greater weight to the need for the point source to obtain a permit. A

173. Preserving the hydrological ecosystem, water quality, and recreational uses of navigable waters are the primary purposes of the CWA as identified in 33 U.S.C. § 1251(a). These are discussed further below.

174. With distance, for example, the EPA and the Corps recognized in the 2015 Clean Water Rule that "[s]cience demonstrates that distance is a factor in the . . . strength of connectivity of wetlands and open waters to downstream waters." Clean Water Rule: Definition of "Waters of the United States," 80 Fed. Reg. 37,054, 37,086 (Aug. 28, 2015) (to be codified at 33 C.F.R. pt. 328; 40 C.F.R. pt. 110, 112, 116, 117, 122, 230, 232, 300, 302, 401).

175. *Maui*, 140 S. Ct. at 1476–77.

literal interpretation of the character-based approach, however, would find that this increase was a change in character of the discharged pollutant from when it was first released and would weigh *against* permitting.[176]

Most importantly, an impact-oriented interpretation of "functional equivalence" is more consistent with the purpose of the CWA, prior uses of the phrase, judicial and regulatory precedent, canons of construction, and common law. I explore each of these reasons below.

C. The Merits of an Impact-Based Approach to Functional Equivalence

The merits of interpreting "functional equivalence" as "equivalence in potential impact" instead of "equivalence in character" include the following: (1) the broader coverage of the impact-based approach is more consistent with the purpose of the CWA embodied in its text, structure, and legislative history than is the character-based approach; (2) the impact-based approach does not infringe on state autonomy to regulate groundwater; (3) the impact-based approach is consistent with prior uses of the term "functional equivalence" and prior uses of Breyer's proposed factors; (4) the impact-based approach, with its emphasis on factors as non-determinative proxies with directionality, leads to fewer absurd applications than would an approach treating factors as determinative; (5) the impact-based approach is more consistent with judicial and regulatory precedent than the character-based approach; (6) the impact-based approach is more consistent with the "general terms" canon than the character-based approach; and (7) the impact-based approach is more consistent with common law than the character-based approach.

1. The Impact-Based Approach is Consistent with the CWA's Purposes

The impact-based approach to the "functional equivalence" standard is more consistent than the character-based approach with the purposes of the CWA, as evidenced by documented Congressional intent, as well as by the CWA's language and operative structure. As such, courts should adopt the impact-based approach to "functional equivalence."[177]

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176. Of course, it is unlikely that courts would actually apply the "character-based" approach in this manner, but if the application does not adhere to what the principle would dictate, then this is more evidence that a "character-based" approach would be a poor guide for interpreting "functional equivalence" if we want judicial standards to be consistent and have predictive value. I describe this further below.

177. Interpreting a standard in a manner consistent with the law's purposes as captured by the text, the policy objectives, the operative structure, and background congressional intent is consistent with both canons of construction and with prior case law. *See* Kasten v. Saint-Gobain Performance Plastics Corp., 563 U.S. 1, 7 (2011) (stating that the interpretation of the statutory phrase at hand "depends upon reading the whole statutory text, considering the purpose and context of the statute, and consulting any precedents or authorities that inform the analysis"); Graham Cnty. Soil & Water Conservation Dist. v. United States *ex rel.* Wilson, 559 U.S. 280, 298 (2010) ("The absence of specific legislative history in no way modifies the conventional judicial duty to give faithful meaning to the language Congress adopted in the light of the evident legislative purpose in enacting the law in question . . . ."); General Dynamics Land Sys., Inc.

a. Congressional Goals of the CWA

As discussed above, the CWA was implemented with broad coverage in mind.[178] According to the congressional declaration of goals and policy, the purpose of the CWA and the NPDES is to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters" and to maintain water quality at levels sufficient for "the protection and propagation of fish, shellfish, and wildlife," and the provision "for recreation in and on the water."[179] The Act aimed to achieve this by, among other things, establishing a national goal of eliminating discharges of pollutants into navigable waters by 1985, prohibiting the discharge of toxic pollutants in toxic amounts, and ratcheting down the discharge of pollutants through technological improvements.[180]

Thus, the purpose of the CWA is to maintain the integrity of WOTUS by focusing on the elimination of discharges of harmful pollutants into navigable waters. The policies focus on the point source, the navigable waters' integrity, and the impact and toxicity of the pollutant discharged, and not on how the discharged pollutant reaches navigable waters. The CWA's purpose favors a broader view of "functional equivalence" to ensure greater coverage and less escape of pollutants that could harm the integrity of the nation's waters.

b. The Purpose of the CWA's Operational Text

The CWA's operational text and structure also favors a broader coverage of discharges. Section 301(a) "bans the discharge of *any* pollutant by *any* person absent a permit issued under section 402 or 404 of the Act" or otherwise not in compliance.[181] Thus, any standard that allows more discharges to continue unpermitted is not faithful to section 301(a). Given the inclusion of "well[s]" and "discrete fissure[s]" in the definition of "discharges," banned discharges include indirect point-source discharges that add pollutants into navigable waters via groundwater.[182]

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v. Cline, 540 U.S. 581, 596 (2004) (looking at history and purpose of the Act in question to determine statutory meaning); Crandon v. United States, 494 U.S. 152, 158 (1990) ("In determining the meaning of the statute, we look not only to the particular statutory language, but to the design of the statute as a whole and to its object and policy."); ANTONIN SCALIA & BRYAN A. GARNER, READING LAW: THE INTERPRETATION OF LEGAL TEXTS 72 (2012) (stating that "presumption against ineffectiveness" canon implies that a "textually permissible interpretation that furthers rather than obstructs the document's purpose should be favored").

178. *See supra* Subpart I.B.1.

179. 33 U.S.C. § 1251(a). The CWA also acknowledged that "[i]t is the policy of the Congress to recognize, preserve, and protect the primary responsibilities and rights of States to prevent, reduce, and eliminate pollution" and "to plan the development and use . . . of land and water resources." *Id.* § 1251(b). I address this policy objective in the following Part when arguing that a broader CWA jurisdiction does not undermine states' rights.

180. *Id.* § 1251(a). These goals were reiterated in *City of Milwaukee v. Illinois*, 451 U.S. 304, 318 (1981).

181. Adler & House, *supra* note 11, at 69 (emphasis in original); *see* 33 U.S.C. § 1311(a).

182. *See* 33 U.S.C. § 1362(14); County of Maui v. Haw. Wildlife Fund, 140 S. Ct. 1462, 1474 (2020) ("[W]ells most ordinarily would discharge pollutants through groundwater."); Brief for Aquatic Scientists

The function of the permits is to protect downstream navigable waters from upstream pollutant releases, without any apparent limit on intermediary conduits.[183] The permitting requirements of sections 402 and 404 are what allow the EPA and the Corps to "know who is releasing pollutants, to what water bodies, and of what characteristics and amount so they can be monitored, assessed, and properly controlled."[184] This information and control is what allows impacted water bodies to meet the water quality standards set for them.[185]

Permitting helps the EPA and the Corps achieve this end in three ways. First, permits are used to set technology-based controls and effluent limitations that help the affected navigable water maintain water quality levels necessary to meet the Act's purposes.[186] Second, they ensure that the limits implemented and technologies suggested actually meet community needs by requiring a public notice and comment period where those affected by a discharge in question can provide their input to determine a provision's sufficiency.[187] Finally, they further the CWA's goals of ratcheting down to zero pollutants being added from the "outside world" into navigable waters via point sources.[188] The goal of permits is therefore to ensure as wide an assessment and control of discharges as possible, and the limitation of permitting requirements to point source discharges is mostly a matter of practicality.[189] The remoteness of an indirect discharge should therefore play little role in limiting the scope of permitting.

c. The Consequences of Narrow Permitting Coverage

A narrower interpretation of the Act's permit jurisdiction risks exempting more point sources that indirectly add pollutants to navigable waters. These discharges might not be categorized as either point-source or non-point-source discharges, leaving them in a regulatory limbo where they are not measured, monitored, regulated, or otherwise limited.[190] The functional result is more unmitigated pollutants reaching navigable bodies of water, thereby putting them at risk of blowing past their TMDLs and affecting their integrity and capacity to provide for wildlife and recreation.[191] Exempted point sources would have no

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and Scientific Societies as Amici Curiae in Support of Respondents, *supra* note 107, at 32 ("A 'well' in this context includes injection wells . . . 'that penetrate deep, porous and permeable formations that are confined vertically by relatively impermeable beds' . . . . A 'fissure' is a geologic term meaning a 'surface of fracture or a crack in a rock along which there is a distinct separation' . . . . As a scientific matter, indeed as a matter of common sense, pollutants from these types of point sources can only discharge into groundwater.").

183. Adler & House, *supra* note 11, at 84–85.

184. *Id.* at 71, 74; *see* 33 U.S.C. §§ 1342, 1344.

185. Adler & House, *supra* note 11, at 71, 74.

186. *Id.* at 74–76; *see also supra* Subpart I.A.

187. Adler & House, *supra* note 11, at 74.

188. *Id.* at 84–85.

189. Point sources are "discrete and readily identifiable," and discharges from point sources can therefore be "monitored, characterized . . . and . . . assessed for controllability." *Id.* at 88.

190. *Id.* at 74, 77.

191. *Id.* at 90–95.

incentive to reduce their pollutant discharges, thereby also thwarting the CWA's overarching zero-discharge goal.[192]

Narrower interpretations also have unintended equity and efficiency implications. Under a narrow permitting jurisdiction, the only way agencies would be able to limit the amount of pollution entering navigable waters would be to burden point sources that *are* operating under permits with further discharge limitations.[193] However, this narrow interpretation would "create significant inequities among similarly situated sources of pollutants," with permitted point sources making up for the slack of unpermitted point sources.[194] Moreover, these unpermitted point sources might instead be subject to "inappropriate nonpoint source control strategies designed for entirely different kinds of pollution, such as runoff from farm fields or other sources of land disturbance . . . forc[ing] a round point source peg into an ill-fitting square nonpoint source hole."[195]

Thus, a narrower interpretation would create significant inequities among like actors, pose greater risks to the integrity of bodies of water, and make the achievement of some of the CWA's stated goals impossible. As Professor Robert Adler and attorney Brian House describe, such narrow interpretations therefore leave point-source discharges subject to ill-fitting non-point regulations and are in an "indeterminate [regulatory] limbo" where neither point-source nor non-point source discharge regulations apply.[196]

d. The Differences in Coverage between an Impact-Based and a Character-Based "Functional Equivalence" Standard

An impact-oriented approach to "functional equivalence" would lead to much greater permitting of discharges than a character-based approach. A character-based approach would likely allow any point source discharge removed "any significant distance" (say, a mile or two) from navigable waters or involving some time lag to continue unpermitted because it was considered outside the scope of CWA section 301 jurisdiction.[197] We can use prior cases to compare the results.

In *Rapanos*, the sediments in question had to travel "11 to 20 miles away" from its point source to reach the "nearest body of navigable water."[198] The character-based approach to functional equivalence would likely have found the *Rapanos* discharge to fall outside CWA jurisdiction and allowed it to continue unpermitted. However, the impact-based approach to functional equivalence would have likely required the discharge to be permitted under the CWA.

192. *Id.* at 76.
193. Adler & House, *supra* note 11, at 91–92.
194. *Id.* at 76.
195. *Id.* at 89.
196. *Id.*
197. *See* County of Maui v. Haw. Wildlife Fund, 140 S. Ct. 1462, 1473.
198. Rapanos v. United States, 547 U.S. 715, 719 (2006).

Similarly, the six-mile distance from point source to navigable waters in *Watkins*[199] and the years-long lag between when pollutants were released from point sources and when they reached navigable waters in *Earth Sciences*[200] and *Upstate Forever*[201] would likely have been sufficient for a judge applying a character-based approach of functional equivalence to deny the need for permits under sections 402 and 404 of the CWA in these cases. However, under an impact-based approach, permits for these point sources' discharges would have been at least considered, if not required, because of their discharges' alleged impacts on navigable waters.

While it is unclear just how many indirect point-source discharges would require permits under the impact-based approach that would not require permits under the character-based approach, these four cases show that the difference in coverage would be significant and sufficient to hamper the CWA's stated goals if courts adopted the character-based approach. The impact-based interpretation of the "functional equivalence" standard is thus preferable.

2. Broader CWA Permitting Standards Do Not Infringe on State Rights

Of course, broader interpretations of CWA coverage also need to be consistent with the CWA's other stated goal of "[c]ongressional recognition, preservation, and protection of primary responsibilities and rights of States . . . to prevent, reduce, and eliminate pollution" and "plan the development and use . . . of land and water resources."[202] However, broader CWA permitting coverage like that entailed by the impact-based interpretation of the "functional equivalence" standard does not infringe on these states' rights and may in fact help further them.

a. States' Rights over Water and Land Resources Are Not Infringed by Broader Permitting Requirements

Perhaps the "most important" reason why the Court in *Maui* rejected the Ninth Circuit's adoption of the "traceability plus de minimis" standard is because "Congress intended to leave substantial responsibility and autonomy to the States" over groundwater pollution.[203] According to the Court, "the Act envisioned the EPA's role in managing [] groundwater pollution as limited to studying the issue, [information sharing], and issuing monetary grants" to states.[204] Thus, extending a permitting provision to cover groundwater in all

199. Nat. Res. Def. Council, Inc. v. Watkins, 954 F.2d 974, 977 (4th Cir. 1992).

200. United States v. Earth Scis., Inc., 599 F.2d 368, 374–75 (10th Cir. 1979).

201. Upstate Forever v. Kinder Morgan Energy Partners, L.P., 887 F.3d 637, 643–44 (4th Cir. 2018), *vacated*, 140 S. Ct. 2736 (2020) (mem.).

202. 33 U.S.C. § 1251(b). Note that the Supreme Court identified the "major purpose" of the CWA as establishing "a *comprehensive* [] policy for the elimination of water pollution." City of Milwaukee v. Illinois, 451 U.S. 304, 318 (1981) (emphasis in original) (quoting S. REP. NO. 92-414, at 95 (1971)).

203. County of Maui v. Haw. Wildlife Fund, 140 S. Ct. 1462, 1471 (2020).

204. *Id.*

cases where pollutants reaching navigable waters are traceable to a point source would go beyond congressional intent.[205] As evidence, Justice Breyer cited the fact that Congress had rejected the EPA administrator's request that the CWA grant the EPA authority over "ground waters" in order to "maintain control over all the sources of pollution, be they discharged directly into any stream or through the ground water table."[206] The Court held that Congress left groundwater regulation to the states by providing "a set of more specific groundwater-related measures such as those requiring *States* to maintain 'affirmative controls over the injection or placement in wells' of 'any pollutants that may affect ground water.'"[207] Thus, the Court held that the "functional equivalent" standard, supposedly narrower than the "traceability plus de minimis" standard, furthered the aims of regulating "identifiable sources of pollutants entering navigable waters without undermining the States' longstanding regulatory authority over land and groundwater."[208]

However, this reasoning relies on the same kind of logical fallacy that Justice Breyer noted in *Maui*: just as a traveler can be from Baltimore *and* from Europe at the same time,[209] a state can maintain "affirmative control" over groundwater while the EPA concurrently regulates point-source discharges whose pollutants travel to navigable waters via groundwater.[210] It is true that Congress explicitly rejected the EPA's request to be given control over groundwater.[211] However, requiring a permit for point-source additions of pollutants that go into navigable waters via groundwater does not limit the types of regulations that states can uphold for groundwater. States are free to set their own more stringent or lax requirements on the point source in order to protect groundwater. The permits would simply work *around* that state requirement to adjust technology-based standards and water-quality standards as necessary to protect the navigable waters ultimately reached by pollutants discharged from these point sources.

Both requirements can exist side by side. Adherence to one standard should in no way detract from the ability to adhere to the other standard. Thus, it is difficult to see how having permitting requirements for point source discharges traveling through groundwater infringes on states' autonomy over said groundwater.

b. States' Rights May Be Furthered by Broader Permitting Coverage

Because states' current groundwater regulations do not adequately protect navigable waters and allow neighbors' groundwater to be polluted, having the

205. *Id.*
206. *Id.* at 1472 (quoting legislative history).
207. *Id.*
208. *Id.* at 1476.
209. For the relevant discussion, *see id.* at 1475.
210. *Id.* at 1472.
211. *Id.*

federal government as a permitter of last resort may in fact be necessary to both protect navigable waters and keep states from interfering with each other's groundwater.

Groundwater governance across states is "fragmented and inconsistent."[212] Even though all states have legislation related to groundwater, a survey of state agency representatives revealed that several states do not have statutes explicitly protecting groundwater or even recognizing that groundwater and surface water are connected. [213] In fact, only half the state agencies have enough capacity to enforce groundwater laws, with most respondents indicating a shortage of staff and funding.[214] Thus, states' laws are insufficient to prevent polluters from discharging pollutants via groundwater into navigable surface waters, thereby threatening the integrity and productivity of said navigable waters.[215]

If pollutants cross state lines in the journey from the point source through groundwater into navigable waters, there may be even *less* of an incentive for states to address the issue: Mitigating the pollution of such interstate groundwaters would only benefit downstream states. This in turn affects downstream states' abilities to achieve their own groundwater regulatory goals. The EPA and the Corps may be the only entities with the incentive or resources to address these interstate discharges. It is for this reason that in *Rapanos*, thirty-three states and the District of Columbia filed an amicus brief "asserting that the Clean Water Act is important to their own water policies" because of its ability to protect these downstream states from "out-of-state pollution that they cannot themselves regulate."[216]

Thus, more robust federal intervention on point-source discharges may give states greater ability to assert rights over their groundwater resources. The greater the distance a pollutant travels through groundwater before reaching a navigable surface water, the more likely it is that said pollutant might cross state lines. The character-based interpretation of the "functional equivalence" standard would suggest weighing distance *a priori* as a reason *not* to require a permit.[217] This would create barriers to permitting exactly in situations where permits are necessary to ensure the protection of downstream navigable waters and state water resources.

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212. Shiigi, *supra* note 53, at 544.

213. *Id.* at 544–45 (citing Sharon B. Megdal et al., *Groundwater Governance in the United States Common Priorities and Challenges*, 53 GROUNDWATER 677, 679–80 (2014)).

214. *Id.*

215. *Id.* at 544–45.

216. Rapanos v. United States, 547 U.S. 715, 777 (Kennedy, J., concurring in the judgment).

217. *See supra* Subpart II.B.1 for a description of the character-based functional equivalence standard and *infra* Subpart II.C.4 for more on considering time and distance under a character-based functional equivalence standard.

3. The Impact-Based Approach is Consistent with Prior Uses of the Term "Functional Equivalence" and of Its Factors.

The 'prior-construction' canon holds that "if a statute uses words or phrases that have already received authoritative construction by the jurisdiction's court of last resort, or even uniform construction by inferior courts or a responsible administrative agency, they are to be understood according to that construction."[218] Thus, prior uses of the term "functional equivalence" can provide guidance to how the "functional equivalence" standard should apply in the case of indirect point source discharges. As discussed below, the term "functional equivalence" and the "functional equivalence" factors identified in *Maui* have in fact been used in impact-oriented settings, giving further credence to interpreting "functional equivalence" in terms of potential impacts.

a. "Functional Equivalence" in Section 404 Wetland Fill Permits

The term "functional equivalence" is already used in section 404 permitting of wetland filling.[219] When obtaining wetland filling permits, applicants are required to compensate for "unavoidable adverse impacts"[220] in a way that ensures "no net loss" of "wetland acreage and function."[221] Both the compensatory mitigation analysis and the *Maui* "functional equivalence" standard identify distance, the "material that a pollutant flows through, chemical changes to a pollutant, and [the] area where a pollutant enters navigable waters" as relevant factors.[222]

The term "functional equivalence" is thus used with an eye towards maintaining and restoring the hydrological and ecological functions of the filled wetland and not just restoring surface characteristics like acreage.[223] The factors used by the EPA to determine the replacement ratio to apply for ecological restoration further demonstrate the focus on impact. These factors include:

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218. SCALIA & GARNER, *supra* note 177, at 266.

219. Pollack & Sturges, *supra* note 56, at 104. In Florida, for example, wetlands are defined as "areas that are inundated or saturated by surface water or ground water at a frequency and a duration sufficient to support, and under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soils." *See, e.g.*, *Wetland Evaluation and Delineation*, FLA. DEP'T OF ENV'T PROT., https://floridadep.gov/water/submerged-lands-environmental-resources-coordination/content/wetland-evaluation-and (last updated Mar. 30, 2020). The filling of a wetland involves depositing materials like sand into wetlands to create dry areas in the wetland. *ERP Dredging and Filling*, FLA. DEP'T OF ENV'T PROT., https://floridadep.gov/water/submerged-lands-environmental-resources-coordination/content/erp-dredging-and-filling (last updated Apr. 11, 2018). These acts can detrimentally impact wetland functions that provide for flood protection, pollution filtration, wildlife habitat, etc. *Id.*

220. EPA, EPA-843-F-08-002, WETLANDS COMPENSATORY MITIGATION, https://www.epa.gov/sites/default/files/2015-08/documents/compensatory_mitigation_factsheet.pdf.

221. Compensatory Mitigation for Losses of Aquatic Resources, 73 Fed. Reg. 19,594, 19,594 (Apr. 10, 2008) (to be codified at 33 C.F.R. pt. 325, 332; 40 C.F.R. pt. 230).

222. Pollack & Sturges, *supra* note 56, at 105.

223. *See id.* at 104–05. Acreage may correlate with functionality, but it is not an end in itself. *Id.*

> [1] differences between the functions lost at the impact site and the functions expected to be produced by the compensatory mitigation project, [2] temporal losses of aquatic resource functions, [3] the difficulty of restoring or establishing the desired aquatic resource type and functions, and/or [4] the distance between the affected aquatic resource and the compensation site.[224]

The overlap in language and factors between the *Maui* "functional equivalence" standard and the impact-oriented section 404 compensation requirements suggests that, for consistency, the *Maui* "functional equivalence" standard should also be impact-based.

b. The Nexus between "Functional Equivalence" and "Significant Nexus"

The "functional equivalence" factors identified in *Maui* also overlap significantly with those relevant to the "significant nexus" standard described by Justice Kennedy in *Rapanos*. Both *Maui* and the "significant nexus" standard as described in the Memo on *Rapanos* & *Carabell* identified distance as an important factor.[225] Moreover, in the subsequent 2015 Clean Water Rule, both the EPA and the Corps identified the aquatic functions of "[p]ollutant trapping, transformation, filtering, and transport" as factors important for determining whether traditionally nonnavigable waters qualified as WOTUS under the "significant nexus" standard.[226] Pollack and Sturges analogize these to the *Maui* "functional equivalence" factors of "dilution, chemical change, amount, and material through which the pollutant travels."[227] Thus, Pollack and Sturges conclude that "[i]mplementing the functional equivalent test will therefore likely involve a remarkably similar analysis to the implementation of the significant nexus test."[228]

As I discuss above, the "significant nexus" standard is inherently impact-based.[229] It requires permitting of indirect point-source discharges when such discharges risk "significantly affect[ing] the chemical, physical, and biological integrity" of navigable waters.[230] The similarity between "functional equivalence" factors and the "significant nexus" factors, therefore, supports an impact-oriented interpretation of "functional equivalence."

Equally important, this similarity also supports the idea that the factors identified in *Maui* should be treated as indicia or proxies for measuring potential for impact, and not constitutive or determinative of "functional equivalence" themselves. This is exemplified in how the Memo on *Rapanos* & *Carabell*

224. *Id.* at 105 (citing 40 C.F.R. § 230.93(f)(2) (2019)).

225. Memo on *Rapanos* & *Carabell*, *supra* note 138, at 11.

226. Pollack & Sturges, *supra* note 56, at 103–04, citing Clean Water Rule: Definition of "Waters of the United States," 80 Fed. Reg. 37,053, 37,093 (June 29, 2015).

227. *Id.*

228. *Id.*

229. *See supra* Subpart I.C.2.b.

230. *See* Rapanos v. United States, 547 U.S. 715, 780 (2006) (Kennedy, J., concurring in the judgment).

described the importance of distance as a factor: "[a]s the distance from the tributary to the navigable water increases, it will become increasingly important to document whether the tributary and its adjacent wetlands have a significant nexus rather than a speculative or insubstantial nexus with a traditional navigable water."[231] The Memo does not say that a greater distance necessarily led to a decrease in the strength of the "significant nexus" claim. It instead suggests that more evidence is needed to establish a significant nexus. Thus, distance is a second-order proxy correlated with and predictive of the existence of a significant nexus, rather than a first-order factor that creates a significant nexus.

4. A Character-Based and Determinative Understanding of the "Functional Equivalence" Factors Leads to Absurd Outcomes

If the objectives of the CWA's permitting requirements are to "restore and maintain the . . . integrity of the Nation's waters,"[232] factors addressing the *impact* that an indirect point source discharge would have on navigable waters would be truer to the CWA's intent. As described above, factors such as time, distance, dilution, and changes in chemical composition can be useful indicia for predicting the impact of a discharge. However, they cannot be treated as constitutive of what defines "functional equivalence." Applying these factors directly in a character-based manner can lead to conclusions that are illogical and create "loopholes that undermine the statute's basic federal regulatory objectives" of protecting the integrity and productivity of the WOTUS.[233]

a. The Potential Arbitrariness of Time and Distance

Even though the Supreme Court declares time and distance to be "the most important factors in most cases,"[234] they can be the most arbitrary if treated as constitutive and determinative of "functional equivalence" and not just indicia for predicting likely impact.

The Court's own reasoning reveals this. In criticizing the County's "means-of-delivery" test,[235] Justice Breyer emphasized that such a standard could create "a large and obvious loophole" that Congress could not have intended, because pipe owners could simply avoid permit requirements by moving pipe emitting pollutants back "only a few yards" so that pollution had to travel through at least

231. Memo on *Rapanos & Carabell*, *supra* note 138, at 11.

232. County of Maui v. Haw. Wildlife Fund, 140 S. Ct. 1462, 1468 (2020).

233. *Id.* at 1477.

234. *Id.*

235. *See id.* at 1473 ("Reading 'from' and 'conveyance' together, Maui argues that the statutory meaning of 'from any point source' is not about *where* the pollution originated, but about *how* it got there. Under what Maui calls the means-of-delivery test, a permit is required only if a point source itself ultimately delivers the pollutant to navigable waters."). This is the same as the "direct" standard that Justice Alito describes in the dissent. *Id.* at 1487–89 (Alito, J. dissenting).

some groundwater before reaching the sea.[236] Interpretations like these "facilitate 'evasion of the law'" and should therefore be rejected.[237]

Justice Breyer also rejected Justice Thomas' argument favoring the "direct" approach.[238] According to Justice Thomas, if pollutants went from a point source to groundwater and then to a navigable water, "[o]ne would not naturally say that the pollutants are added to the navigable waters from the original point source."[239] Instead, Thomas argued, "they are added *to* the navigable waters *from* the second point source or the groundwater."[240] Justice Breyer, writing for the majority, acknowledged that pollutants were described as being added "from the groundwater," but he asserted that they could *also* be described as being added "from the point source."[241] Justice Breyer analogized this to a traveler named John arriving at a hotel, writing

> [w]hen John comes to the hotel, John might have come from the train station, from Baltimore, from Europe . . . or from all three. A sign that asks all persons who arrive *from* Baltimore to speak to the desk clerk includes those who took a taxi *from* the train station. There is nothing unnatural about such a construction.[242]

Thus, any "functional equivalence" standard is superior to the "direct" standard in its consistency with the Act's purposes and the natural-language interpretation of "from," "to," and "add."

However, while the "functional equivalence" standard is preferable to the "direct" standard, it can *still* fall short of a natural interpretation if applied uncritically. This is because of the potential arbitrariness of the factors of time and distance. As Justice Alito noted,

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236. *Id.* at 1473 (majority opinion)

237. *See id.* (quoting The Emily, 22 U.S. 381, 390 (1824)).

238. *See id.* at 1475–76.

239. *Id.* at 1480 (Thomas, J., dissenting).

240. *Id.* In other words, that "augmentation . . . occurs with pollutants from the groundwater" and not "with pollutants from the point source." *Id.* at 1479–80. It is unclear how Justice Thomas reaches the conclusion that "one would naturally say" that an addition starting at A, going to B, and ending at C would be read as an addition from B to C but not from A to C. *See id.* at 1479. In many contexts, one hears of pollutants being added to waters C from source A, and *not* "from" conduit B. *See, e.g.*, Tummons, *supra* note 93 (stating that "injected effluent *from* the three sewage treatment plants operated by the county . . . is released into the ocean," when discussing the release of effluent plumes that are released underground, travel through groundwater, and eventually reach ocean (emphasis added)); Dailer et al., *supra* note 94, at 655–671 (indicating that nitrogen released by three Wastewater Reclamation Facilities (WWRFs) into wells and cesspools, then into reefs, and afterwards into coastal waters further south was variously described as "transport *from* the WWRF *to* the ocean" or as "effluent from the Lahaina WWRF . . . flowing *through* the reef at Kahekili and then subsequently . . . *to* the south" instead of "*from* the cesspools *to* the ocean" or "*from* the reef *to* the south" (emphasis added)); Marko Šrajbek et al., *Assessment of Average Contributions of Point and Diffuse Pollution Sources to Nitrate Concentration in Groundwater by Nonlinear Regression*, 19 ENV'T ENG'G & MGMT. J. 95 (2020) (treating groundwater not as a source but as a recipient of pollution and using the term "from" when describing active agents that add pollutants from land activities into water streams).

241. *Maui*, 140 S. Ct. at 1475.

242. *Id.* (emphasis in original).

> [i]f we apply the Court's interpretation of § 1362 to [John's] journey, he would be 'from' Europe for the first part of the flight, but at some point he might cease to be 'from' Europe and would then be from someplace else, maybe Greenland or geographical coordinates in the middle of the Atlantic.[243]

While this would seem like a strange interpretation of "to" and "from" for many readers, by Justice Breyer's own acknowledgement it is exactly what would happen by factoring in time and distance as constitutive, rather than predictive, of "functional equivalence."[244] As Justice Breyer explained, part of the reason the Court opted for the functional equivalence standard was that the Ninth Circuit's "focus on traceability" might have required permits in "bizarre" circumstances such as "the 100-year migration of pollutants through 250 miles of groundwater to a river."[245]

While this permitting requirement might sound bizarre at first, it is less so when framed with impact in mind. For example, the LWRF in *Maui* was injecting about four million gallons of partially treated effluent into underground wells daily,[246] over half of which would travel about half a mile through groundwater and reach the ocean[247] in three to fifteen months,[248] posing threats to beachgoers' health.[249] Should a permit be any less necessary for the LWRF if it were relocated ten miles away from the coast, but was otherwise discharging the same kind and amount of effluent daily, with the same proportion reaching the ocean as before and creating the same impacts? What if the LWRF were instead 100 miles away, discharging the same amount, maintaining the same levels of traceability, and causing the same harm? What if the pollutant took three years to reach the ocean, but caused the same harms just three years later? Each of these scenarios pose the same threat to the water's integrity and would likely benefit from the same interventions that permits require. Yet, a character-based approach to "functional equivalence," treating time and distance as determinative, might dismiss the latter three scenarios.[250] A point source might not escape regulation under a character-based functional equivalence interpretation by moving a pipe a few yards back, but it might escape regulation by moving the pipe a few thousand yards back. This loophole, while smaller, seems just as obvious and contrary to the CWA.

I do not mean to dismiss the importance of time and distance. In the absence of other information, and holding other proxy variables equal, it makes sense to

243. *Id.* at 1485 (Alito, J., dissenting).
244. *Id.* at 1471 (majority opinion).
245. *Id.*
246. *Id.* at 1469.
247. *Id.*
248. Glenn et al., *supra* note 93, at ES-3.
249. Dailer et al., *supra* note 94, at 668; Tummons, *supra* note 93.
250. Even if the LWRF were discharging twice the amount of effluent in the 200-mile case, the character-based approach might still say permits are not necessary because of distance, even though the 200-mile case seems to pose a greater risk to the ocean's integrity than the half-mile case.

use time and distance as predictive of impact and not require permits for indirect discharges when the impact of said discharge is too remote to be measured or predicted with any reliability.[251] However, when information on impact is available, it does not make sense to give this information less weight than the second-order variables of time and distance.

b. Absurdities and Inconsistencies When Applying Other Factors

Using other "functional equivalence" factors uncritically and in a character-oriented approach can also lead to absurd outcomes. For example, one factor the Court flagged is "the amount of pollutant entering the navigable waters relative to the amount of the pollutant that leaves the point source."[252] Applying character-based logic to this factor could lead to harmful results. Imagine two otherwise equal wastewater facilities. One injects four million gallons of effluent underground, 50 percent of which eventually reaches the ocean. The other injects one million gallons of effluent underground, 100 percent of which reaches the ocean. The first facility contributes more effluent to the ocean than the second and is therefore more likely to pose a risk to the ocean's integrity. However, it would be less likely to require a permit under a character-based framework.

Other factors the Court recognizes as important are the degree to which the pollutant at the point of entering the affected navigable water "has maintained its specific identity" or has otherwise been "chemically changed" since it was released from the point source.[253] If the release of a pollutant from a point source into groundwater causes that pollutant to undergo some chemical reaction that makes it even more dangerous before it reaches the navigable water, that release is paradoxically less likely to be considered a discharge in need of permitting under a character-based approach because it did not maintain its original form. Yet, it was the initial discharge that led this more dangerous new compound to be deposited into the navigable body of water in the first place.

Readers might claim that courts would not accept such absurd implications. For example, a court might conclude that the need for a permit is only decreased when the chemical reaction makes the discharged pollutant less toxic. In doing so, however, the court would reveal that it is considering something else besides the consistency of the pollutant from start to finish. A court would only care about directionality of this factor if, for example, it cared about the impact the

251. For example, distance can help predict "the strength of connectivity of wetlands and open waters to downstream waters" since "waters that are more distant generally have less opportunity to be connected to downstream waters." Clean Water Rule: Definition of "Waters of the United States", 80 Fed. Reg. 37,054, 37,086 (June 29, 2015) (to be codified at 33 C.F.R. pt. 328; 40 C.F.R. pt. 110, 112, 116, 117, 122, 230, 232, 300, 302, 401). All else being equal, time can also be useful because "under similar slope and velocities, water traveling from more distant points and with a longer flowpath will—because of the length of time in transit—have greater potential for evapotranspiration and soil infiltration losses before reaching a stream." CLEAN WATER RULE TECHNICAL SUPPORT DOCUMENT, *supra* note 142, at 297.

252. *Maui*, 140 S. Ct. at 1476.

253. *Id.*

pollutant would have on the navigable water. Thus, a court purportedly applying a character-based "functional equivalent" standard would either have to apply directionality in a manner inconsistent with the character-based approach, thereby weakening the standard's predictive value, or it would have to accept the standard's absurd outcomes on occasion.

These examples are more than just hypotheticals. The "path of groundwater is difficult to predict," as pollutants released into groundwater may follow a winding path that bypasses nearby bodies of water and ultimately releases pollutants into a body of water further away and later in time.[254] This has commonly occurred with discharges from oil wells, where, "[p]etroleum engineers . . . have found that when they pump fluid into one end of an oil reservoir to push oil out the other, the injected fluid sometimes flows around the reservoir, completely missing the targeted zone," instead bubbling up in surface waters miles away or contaminating drinking water several thousand feet away.[255] A character-based interpretation of "functional equivalence," with no regard to impact and with strict distance cutoffs, would allow these discharges to continue unpermitted and unabated just because the deposition of the pollutant into surface waters is far from the point source. This is even if that circuitous route is clearly identifiable.

Similarly, the release of naturally occurring radioactive materials (NORMs) because of unconventional oil and gas development (UOGD) also poses a challenge to the strict use of the "chemically changed" factor for permitting purposes.[256] Hydraulic fracturing ("fracking") can "open pathways for the migration of [naturally occurring] radioactive materials" that exist in drilled shale layers.[257] A 2018 study of the Marcellus Shale region by Dartmouth College researchers "showed that extreme salinity, as well as the chemical composition of fracking fluid, interacts with the shale during the fracking process in ways that mobilize radium and make fracking wastewater radioactive."[258] Indeed, radium, along with thorium and uranium, has been detected in fracking wastewater in quantities roughly 3,600 times the regulatory limit for drinking water established by the EPA.[259] "Radium emits gamma rays leading to

254. Shiigi, *supra* note 53, at 543–44.

255. Abrahm Lustgarten, *Injection Wells The Poison Beneath Us*, PROPUBLICA (June 21, 2012, 8:20 AM), https://www.propublica.org/article/injection-wells-the-poison-beneath-us.

256. *Maui*, 140 S. Ct. at 1476.

257. CONCERNED HEALTH PROS. OF N.Y. & PHYSICIANS FOR SOC. RESP., COMPENDIUM OF SCIENTIFIC, MEDICAL, AND MEDIA FINDINGS DEMONSTRATING RISKS AND HARMS OF FRACKING (UNCONVENTIONAL GAS AND OIL EXTRACTION) 44 (7th ed. 2020), https://concernedhealthny.org/compendium/.

258. *Id.* at 45 (citing Joshua D. Landis et al., *Rapid Desorption of Radium Isotopes from Black Shale During Hydraulic Fracturing. 1. Source Phases That Control the Release of Ra from Marcellus Shale*, 496 CHEM. GEOLOGY 1 (2018)); *see also How Slick Water and Black Shale in Fracking Combine to Produce Radioactive Waste Research Papers Explain the Transfer of Radium During Hydraulic Fracturing for Oil and Gas*, ScienceDaily, (Sept. 18, 2018), https://www.sciencedaily.com/releases/2018/09/180918154831.htm.

259. CONCERNED HEALTH PROS. OF N.Y. & PHYSICIANS FOR SOC. RESP., *supra* note 257, at 149.

lymphoma, bone cancer, and leukemia."[260] Drinking radium-contaminated water has been linked to incidences of these three disorders.[261]

Depending on where a discharge is defined as beginning, nonradioactive wastewater that is released into the ground, combines with radioactive materials as it traverses through shale, and eventually reaches navigable waters may be considered less likely to require a permit because of its changed chemical composition under a strict-interpretation of the character-based approach. This is even when the "changed composition" poses a greater risk to the integrity of the Nation's waters and the organisms dependent on it. Ruling otherwise would be inconsistent with said approach and would indicate that what we fundamentally care about is harm.

5. An Impact-Based Approach is Consistent with Precedent

An impact-based approach is more consistent with judicial precedent. As discussed above, most standards determining whether an indirect discharge falls under CWA jurisdiction have been significantly broader than the "direct" standard, and, in most cases, maintain a focus on impact.[262] An impact-based approach to the equivalence-standard would thus be more in line with circuit court and Supreme Court decisions. Conversely, a character-based interpretation of the "functional equivalence" standard would "at best" apply to "only a small set of situations not involving a direct discharge."[263] Such a standard would adopt a view of CWA jurisdiction over indirect discharges that is narrower than the views of the Supreme Court and nearly every circuit court that has spoken on the matter.[264] Such an interpretation goes against stare decisis.

An impact-based approach is also more consistent with regulatory precedent. The Supreme Court in *Maui* dismissed the EPA's embrace of the "direct" approach in its 2019 Interpretive Statement because such an approach would unreasonably "open a loophole allowing easy evasion of the statutory provision's basic purposes," therefore making the EPA's interpretation unreasonable.[265] Under the *Skidmore* standard, administrative judgement should not be given deference if its reasoning is invalid or if such reasoning is inconsistent with earlier administrative decision making.[266] Given the EPA's departure from at least twenty-eight years of precedent and the unreasonable

260. Saranya Naraentheraraja et al., *Quantitative Analysis of Ra-226 Biomagnification Near Fracking Sites A Research Protocol*, UNDERGRADUATE RSCH. NAT. & CLINICAL SCI. & TEC. J., Dec. 6, 2018, at 1.

261. Elizabeth Ann Glass Geltman & Nichole LeClair, *Regulation of Radioactive Fracking Wastes*, 19 VT. J. ENV'T L. 1, 9 (2018).

262. *See supra* Subpart I.C.5. These cases include the "traceability," "traceability plus *de minimis*," "proximate cause," "significant nexus," and arguably "direct hydrological connection" standards.

263. County of Maui v. Haw. Wildlife Fund, 140 S. Ct. 1462, 1485–86 (2020) (Alito, J., dissenting).

264. Excluding only the Sixth Circuit. *See supra* Subpart I.C.

265. *Maui*, 140 S. Ct. at 1474.

266. Skidmore v. Swift & Co., 323 U.S. 134, 140 (1944).

loopholes it created, the Court was right to disregard the 2019 Statement. *Skidmore* conversely calls for giving greater weight and deference to the EPA's consistent twenty-eight-year application of the "direct hydrological connection" standard.[267] Moreover, as the Court noted, attention should still be paid to agency expertise.[268]

Deference to the "direct hydrological connection" standard is also supported by the *Chevron* standard. According to *Chevron*, the Court should defer to an agency's permissible construction of the statute when the statute is silent or ambiguous with respect to a particular issue.[269] In this case, the definition of discharge is clearly ambiguous, so the Court should defer to the permissible construction of the definition of discharge by the EPA, even if the Court does not believe it to be the best interpretation.[270] An agency's statutory construction is more likely to be permissible when it (1) is consistent with previously held views,[271] (2) does not conflict with Congress's expressed intent,[272] and (3) is not arbitrary, capricious, or manifestly contrary to the statute.[273]

The EPA has been consistent in applying the "direct hydrological connection" standard, satisfying prong one. The standard is consistent with the purpose of protecting the integrity of the nation's waters (at least when compared to the "direct" approach later adopted by the EPA in 2019), satisfying prong two. Finally, the "direct hydrological connection" standard's similarity to the "significant nexus" standard and science-based approach dependent on fact-finding around tangible and measurable factors makes it seem far from arbitrary or capricious, satisfying prong three.[274] Thus, the "direct hydrological connection" could be seen as a permissible construction of the CWA permitting requirements deserving deference.

Thus, a construction of the meaning of "functional equivalence" should attempt to approximate the "direct hydrological connection" standard. As established above, an impact-based interpretation of the "functional equivalence" standard is compatible and consistent with the "significant nexus" standard.[275] Moreover, the "significant nexus" standard is compatible with the

267. *See supra* Subpart I.C.4.

268. *Maui*, 140 S. Ct. at 1474.

269. Chevron, U.S.A., Inc. v. Nat. Res. Def. Council, Inc., 467 U.S. 837, 842–43 (1984).

270. *See* Nat'l Cable & Telecomms. Ass'n v. Brand X Internet Servs., 545 U.S. 967, 980 (2005).

271. 2 AM. JUR. 2D *Administrative Law* § 469 (2020).

272. Rapanos v. United States, 547 U.S. 715, 766 (2006).

273. 2 AM. JUR. 2D *Administrative Law* § 470. An agency interpretation is arbitrary, capricious, or manifestly contrary to the statute if the agency considers factors that Congress did not intend for it to consider; fails to consider the relevant data and evidence or provides an explanation for its rulemaking that runs counter to the evidence; fails to consider important aspects of the question at hand; or provides an explanation so implausible that it cannot be justified. *See* Motor Vehicle Mfrs. Ass'n of the U.S., Inc. v. State Farm Mut. Auto. Ins. Co., 463 U.S. 29, 30, 43 (1983).

274. Examples of tangible, measurable, and science-based factors include geology, flow, and scope. *See supra* Subpart I.C.3.e.

275. *See supra* Subpart II.C.3.

"direct hydrological connection" standard.[276] By the transitive property,[277] an impact-based interpretation of the "functional equivalence" standard is therefore consistent with the "direct hydrological connection" standard. The same cannot be said of the character-based approach.

6. An Impact-Based Approach Accords with the General Terms Canon

The general terms canon holds that "[w]ithout some indication to the contrary, general words . . . are to be accorded their full and fair scope" and "are not to be arbitrarily limited."[278] Thus, given two permissible constructions of discharge (the "origin" standard and the "direct" standard),[279] the broader "origin" standard is preferable. This is because the "direct" approach covers only a narrow subset of those discharges covered by the "origin" approach. Thus, the "direct" approach limits the more general interpretation of "from" and "to." By the same logic, a broader interpretation of "functional equivalence," like the impact-based approach, is preferable because it is less restrictive on the definitions of "from" and "to" and better approximates the "origin" standard. Conversely, the character-based approach to the "functional equivalent" standard is adjacent to the "direct" standard and covers a smaller subset of discharges than those covered by the impact-based approach. Thus, the character-based approach limits the "full and fair scope" of what the terms "from" and "to" mean.

These limitations on "from" and "to" are arbitrary. According to Justice Alito, the Court's "functional equivalent" standard tried to read too much into the language.[280] As Alito explains, the CWA "says nothing about 'the functional equivalent' of a direct discharge," such that courts and other regulatory decision makers have to make a second-order decision of what kinds of discharges are similar enough to direct discharges to be "functionally equivalent."[281] Alito's dissent, however, reveals another first-order assumption that the Court read into the CWA. In finding that a possible defendant needs a permit "when there is a *direct* discharge from a point source into navigable waters or when there is the functional equivalent of a *direct* discharge,"[282] the Court also assumes that Congress only had *direct* discharges in mind when prohibiting discharges from point sources to navigable waters. If Congress meant to limit permitting only to point sources that added pollutants *directly* into navigable waters without passing through non-point conduits, they probably would have added this qualifier. Yet, Congress has not added any qualifier even after nearly forty years of the EPA and courts applying permitting standards that cover indirect point-source

276. *See supra* Subpart I.C.4.b.

277. As a reminder, the transitive property of equality states that if A = B and B = C, then A = C. *See, e.g.*, "Equal" at https://mathworld.wolfram.com/Equal.html.

278. SCALIA & GARNER, *supra* note 177, at 99.

279. County of Maui v. Haw. Wildlife Fund, 140 S. Ct. 1462, 1483 (2020) (Alito, J., dissenting).

280. *Id.*

281. *Id.* at 1477–78, 1485–86.

282. *Id.* at 1476 (emphasis altered).

discharges.[283] As explained above, Congress intended for the CWA to have broad coverage.[284] Thus, the "origin" interpretation of the CWA requires the fewest assumptions and sticks to the plain meaning of the text. This is because it does not require adding any qualifiers to the broad phrase "from point sources to navigable waters" to reach that same meaning, while the narrower "direct approach" requires implicitly reading "directly" into the "from . . . to" phrase.[285]

Alito defends the "direct" standard over the "origin" standard by explaining how the "direct" standard "respects Congress' decision to treat point-source pollution differently from non-point-source pollution" and "provides a measure of fair notice" that "promotes good-faith compliance."[286] However, as discussed above, narrow interpretations of "functional equivalence" undermine the purpose of the CWA, thereby failing to respect Congress's overarching policy goals. Moreover, it is unclear how a narrower approach encourages compliance and provides fair notice when one could imagine a broader standard encouraging *greater* compliance by forcing point sources to take more preemptive measures to avoid penalties. Thus, the rationale that Justice Alito provides for choosing the "direct" standard over the "origin" standard seems arbitrary, and the meaning of the terms "to" and "from" seems arbitrarily limited under the "direct" and character-based "functional equivalence" standards.

7. An Impact-Based Standard Accords Better with Common Law

The presumption against change in common law canon holds that a statute "will be construed to alter the common law only when that disposition is clear."[287] The Supreme Court has traditionally looked to background principles of tort law "as a guide in discerning the meaning of statutory language that invokes a causal relationship."[288]

As discussed above, various circuit courts have used common-law concepts to clarify the extent of CWA jurisdiction and liability.[289] Knowing that the CWA evolved from principles of public nuisance and strict liability,[290] the Court

283. The definition of the "discharge of a pollutant" as "any addition of a pollutant to navigable waters from any point source" or "any addition of any pollutant to the waters of the contiguous zone or the ocean from any point source other than a vessel or other floating craft," has remained consistent since at least 1972. Federal Water Pollution Control Act Amendments of 1972, Pub L. No. 92-500, 86 Stat. 816, 886 (Oct. 18, 1972).

284. *See supra* Subpart II.C.1.

285. For a refresher on the "origin" and "direct" standards, *see supra* Subpart I.C.1. The "origin" interpretation of "to" and "from" is also more in line with the everyday, conversational meaning of the phrase.

286. *Maui*, 140 S. Ct. at 1488–89.

287. SCALIA & GARNER, *supra* note 177, at 263.

288. Brief of Amici Curiae Law Professors in Support of Respondents at 32–33, *Maui*, 140 S. Ct. 1462 (No. 18-260).

289. *See, e.g.*, *Waterkeeper Alliance,* 399 F.3d 486 (2d Cir. 2005), *United States v. Lucas*, 516 F.3d 316 (5th Cir. 2008), and *United States v. Tex-Tow, Inc.*, 589 F.2d 1310 (7th Cir. 1978) (using proximate cause and strict liability concepts).

290. *See supra* Subpart I.B.2.

should give greater weight to the interpretation of "functional equivalence" more in line with these two areas of tort law. The impact-based approach to "functional equivalence" is most consistent with how liability would have been determined under public nuisance and strict liability and should be preferred to the character-based approach.

a. Public Nuisance, In Detail

The Second Restatement on Torts defines a public nuisance as an "*unreasonable* interference with a right common to the general public."[291] The reasonableness of an interference with a public right is determined on a case-by-case basis.[292]

Relatively minor, intentional invasions of common interests are unreasonable if "the gravity of the harm outweighs the utility of the actor's conduct" or "the harm caused by the conduct is serious" but can be financially compensated.[293] More severe intentional interferences with public rights are considered per se unreasonable.[294] These include significant interferences with public health, safety, peace, comfort, or convenience, as well as conduct "of a continuing nature" or producing "permanent or long-lasting" effects, either of which "the actor knows or has reason to know" has "a significant effect upon the public right."[295] For unintentional interferences, negligence, recklessness, and strict liability standards apply.[296] Negligence is characterized by failure to prevent risk when the magnitude of the risk outweighs the burden of risk prevention.[297] For a plaintiff to recover under negligence or nuisance cases, there must also be evidence that the defendant's actions were the legal or proximate cause of the plaintiff's injury.[298]

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291. RESTATEMENT (SECOND) OF Torts, *supra* note 35, at § 821B (emphasis added). Examples of what constitute a common right are discussed in Subpart I.B.2, *supra*, and may include the right to fish, water quality, and water navigability. Examples of interferences with a water-related public right include the killing of fish in a navigable stream, depriving community members of the right to fish, oil spills, pollution of state water generally, and the obstruction of navigable streams by bridges. *Id.* § 821B cmt. a, b, g.

292. *See id.* § 821B cmt. e.

293. *Id.* § 826 cmt. a; *see also* Manaster & Selmi, *supra* note 28, at § 3:10.

294. RESTATEMENT (SECOND) OF Torts, *supra* note 35, at § 821B cmt. e.

295. *Id.* § 821B(2). Violations of statutes, ordinances, or administrative regulations may also be considered public nuisances *per se*. *Id.*; *see also* Manaster & Selmi, *supra* note 28, § 3:8.; *Tiegs v. Watts*, 135 Wash. 2d 1 (1998) ("When a permit has been granted . . . [d]ischarges in violation of permit requirements constitute a nuisance which subjects violators to damages . . . .").

296. RESTATEMENT (SECOND) OF Torts, *supra* note 35, at § 821B cmt. e. Since recklessness arguably has a higher burden of proof than negligence and I explore strict liability below, I focus only on negligence here. *See id.* § 282 cmt. e.

297. *Id.* § 282; RESTATEMENT (THIRD) OF TORTS: LIABILITY FOR PHYSICAL & EMOTIONAL HARM § 3 (AM. L. INST. 2010). The magnitude of risk is itself measured by the foreseeable likelihood and foreseeable severity of the harm. Thus, conduct is negligent and therefore unreasonable if its expected disadvantages outweigh its expected advantages. *Id.*

298. Manaster & Selmi, *supra* note 28, at § 3:12.50; 74 AM. JUR. 2D *Torts* § 26; RESTATEMENT (SECOND) OF Torts, *supra* note 35, at § 281. As a reminder, proximate cause exists if it appears "that the

Liability in public nuisance thus seems focused on questions of harm: whether the harm outweighs the benefits of the action that caused the harm and whether the harm was proximately caused. The relevant questions in a public nuisance case on discharges might therefore be: (1) Did a discharge pollute or otherwise impede the navigability of a navigable water? (2) Was the discharge a necessary, sufficient, or significant cause of this harm? (3) Did the benefits of such discharge outweigh the negative impacts? (4) Were the negative impacts too significant or long-lasting to be permissible, regardless of the benefits accrued? (5) Was it foreseeable that the discharge would result in harm? (6) Did the person causing the discharge know that the resulting harm would happen or otherwise intend it to happen?

None of these questions involve looking at *how* pollutants move *from* point sources *to* navigable waters, other than to the extent necessary to determine likelihood, extent, and foreseeability of harm once the discharged pollutants reached the navigable water in question. Such questions do not involve looking at how similar the discharged pollutant was the moment it reached navigable waters to the moment it was released from a point source, other than to the extent necessary to determine harm or foreseeability. The impact-based approach to "functional equivalence" is thus more consistent with the public nuisance origins of the CWA than is the character-based approach, which disregards likelihood and causation of harm altogether.

b. Strict Liability, In Detail

Like under negligence and public nuisance, strict liability requires some harm to have occurred.[299] However, unlike under nuisance, where liability may require intent, repeat behavior, or unreasonableness, strict liability only requires a single occurrence and neither intent nor reasonableness matters.[300] In *Wilson*, described above, the court held that defendants needed to prevent the pollutants on their properties from going *from* these (point) sources *to* other places.[301] The existence or nature of an intermediate conduit did not factor into establishing liability.[302] Nor was it important to measure how far or for how long the emitted pollutants traveled before reaching their destination,[303] or how similar in quantity or composition they were upon reaching their destination as compared

injury was the natural and probable consequence of the negligence or wrongful act, and that it ought to have been foreseen in [] light of the attending circumstances." Milwaukee & Saint Paul Ry. Co. v. Kellogg, 94 U.S. 469, 475 (1876); *see also supra* Subpart I.C.3.c.

299. Manaster & Selmi, *supra* note 28, at § 4:5.

300. *Id.*

301. Wilson v. City of New Bedford, 108 Mass. 261, 266–67 (1871).

302. *Id.*

303. In fact, it is "well-settled" in tort law "that a tortfeasor can be held responsible for the foreseeable consequences of his actions even if the chain of factual causation is indirect." Brief of Amici Curiae Law Professors in Support of Respondents, *supra* note 288, at 37.

to upon their departure.[304] All that mattered was that the pollution was released from the defendants' property, reached the plaintiffs' property, and caused a harm.[305]

The character-based approach disregards harm and treats extended causal chains as likely falling outside the scope of CWA jurisdiction, so it is inconsistent with the CWA's strict liability roots. An impact-based interpretation of "functional equivalence," focusing on harm and using remoteness as a mere proxy for harm, is more consistent with the CWA's strict-liability roots.

III. USING TORT LAW TO CLARIFY THE IMPACT-BASED FUNCTIONAL EQUIVALENCE STANDARD

While Justice Breyer's factors provide a useful starting point for measuring functional equivalence, these factors are non-exhaustive, not always relevant, and ambiguous as to how "middle instances" should be treated.[306] We can use tort law, consistent with an impact-based functional equivalence standard, to flesh out when indirect point-source discharges can be considered functionally equivalent to direct point-source discharges for CWA permitting purposes.

Synthesizing public nuisance and strict liability case law with the CWA's purpose[307] and definition of discharge,[308] the following questions can be used to determine whether an indirect point source discharge requires permitting under an impact-based functional equivalence standard:

> **(1) Was there an interference with a right common to the general public?** In this case, the rights common to the general public are the maintenance of the chemical, physical, and biological integrity of WOTUS, access to fish and wildlife on WOTUS, and access to recreation on WOTUS. Whether something constitutes an interference depends on whether one considers the mere addition of a pollutant to a navigable water an interference or whether interference requires a demonstrable impact to the water's integrity or capacity to provide for wildlife propagation and recreation.
>
> **(2) Was a point source the proximate cause of this interference?** Was the point source's release of a pollutant a necessary, sufficient, or substantial factor that led to the interference (either the addition of the pollutant into a navigable water or the impact on the water's integrity linked to the pollutant)? If so, was it foreseeable?
>
> **(3) Was the interference per se unreasonable?** Did the point source cause an interference that was continuous, long-lasting, or permanent? Was the interference such that the owner should have known it would be significant?

304. *Wilson v. City of New Bedford*, 108 Mass. at 266–67.
305. *Id.*
306. County of Maui v. Haw. Wildlife Fund, 140 S. Ct. 1462, 1486 (2020) (Alito, J., dissenting).
307. *See supra* Subpart II.C.1.a.
308. *See* 33 U.S.C. § 1362(12) for the definition of "discharge."

> Did the interference significantly threaten public health, safety, or peace? Was the interference otherwise intentional and significant?
>
> **(4) Was the interference otherwise unreasonable?** If the circumstances in question three above do not apply, did the costs of interference outweigh the burden of avoiding interference, or put differently, did the costs of interference outweigh the benefits? Could the costs of interference have been compensated for without risking the feasibility of continued interference and obtaining the benefits?

Determining when an indirect point-source discharge requires permitting under the CWA should boil down to answering those four questions. If the first and second, and either of the third or fourth questions are answered affirmatively, then an impact-based "functional equivalence" standard grounded in common law should require permitting for those discharges.

A. Proximate Cause as a Cognate & Traceability as a Factor of Functional Equivalence

As indicated above, proximate cause is integral to the application of an impact-based "functional equivalence" standard rooted in tort law. However, the Court in *Maui* rejected both proximate cause and traceability as too broad.[309] This section attempts to reconcile this discrepancy by demonstrating how proximate cause and traceability can actually help determine when impact-based functional equivalence exists without leading to excessive CWA coverage.

1. The Importance of Proximate Cause and of Traceability as a Factor

Proximate cause is central to the public nuisance and strict liability concepts on which the CWA is based; it is the standard used to determine whether a point-source discharge caused an interference.[310] Thus, proximate cause should be considered a cognate for an impact-based "functional equivalence" standard. Once you establish that an indirect discharge can foreseeably cause interference to a navigable water body, you have also established that such discharge is functionally equivalent to a direct discharge in its potential to interfere with a navigable water body. An impact-based approach to functional equivalence would therefore dictate that, when proximate cause is established, permitting may be required. The remaining question (which I address later) is whether the identified interference can cause enough harm to warrant permitting.

As described above, tracing technology can be extremely useful in determining proximate cause.[311] Traceability should thus be considered a key factor of an impact-based "functional equivalence" standard. The traceability

309. *Maui*, 140 S. Ct. at 1470–71.

310. *See supra* Subpart I.B.2.a; *infra* Subpart III.C.7.a.

311. *See supra* Subpart I.C.3.d; *see also* Brief for Aquatic Scientists and Scientific Societies as Amici Curiae in Support of Respondents, *supra* note 105, at 35 (tracer dye studies can be used to determine whether a particular point source "is more likely than not . . . the cause in fact of the pollution").

factor is in fact more integral to "functional equivalence" than the Court seemed to appreciate in *Maui*. The Court downplayed the role of traceability altogether *exactly because* as the science advances and causal chains can be better established, more permitting would be required under this standard.[312] However, dismissing a standard, even as a factor, for being *too* useful in identifying and potentially limiting indirect point source discharges of harmful pollutants seems absurd when the goal of the CWA is *precisely* to identify, monitor, and limit such discharges.[313]

Lower courts have implicitly acknowledged the role of traceability in establishing functional equivalence. The Ninth Circuit stated that "pollutants [] fairly traceable from the point source to a navigable water" indicate that "the discharge is the *functional equivalent* of a [direct] discharge into the navigable water."[314] The district court held that "[i]f the point of emission is readily identified, and the transmission path to the ocean is clearly ascertainable, the discharge is functionally one into navigable water."[315] Breyer seemed to acknowledge the use of traceability to determine functional equivalence by citing the district court's finding.[316]

Thus, proximate cause is fundamental to an impact-based "functional equivalence" standard. Traceability, as an operationalization of proximate cause, should be considered a factor that can help determine whether functional equivalence exists.

2. The Court Erred in Dismissing Proximate Cause & Traceability

The Court explicitly rejected adopting a "proximate cause" requirement because it did not significantly narrow the statute beyond the "fairly traceable" standard.[317] However, the Court erred in rejecting the proximate cause and traceability standards as too broad. First, as discussed above, narrowing CWA interpretive standards to protect state autonomy is not necessary, since broader standards do not interfere with state autonomy of water rights and may in fact protect it.[318]

Second, the Court's rejection of the proximate cause standard as too broad seems inconsistent with the factors it puts forth as important for determining and constraining functional equivalence. Time, distance, dilution, and conservation

312. *See Maui*, 140 S. Ct. at 1470 ("Given the power of modern science, the Ninth Circuit's limitation, 'fairly traceable,' may well allow EPA to assert permitting authority over the release of pollutants that reach navigable waters many years after their release . . . and in highly diluted forms.").

313. *See supra* Subpart II.C.1.

314. Haw. Wildlife Fund v. County of Maui, 886 F.3d 737, 749 (9th Cir. 2018) (emphasis added), *vacated*, 140 S. Ct. 1462 (2020).

315. Haw. Wildlife Fund v. County of Maui, 24 F. Supp. 3d 980, 998 (D. Haw. 2014), *aff'd*, 886 F.3d 737 (9th Cir. 2018), *vacated*, 140 S. Ct. 1462 (2020).

316. Pollack & Sturges, *supra* note 56, at 87 (citing *Maui*, 140 S. Ct. at 1469).

317. *Maui*, 140 S. Ct. at 1470–71.

318. *See supra* Subpart II.C.2.

of original composition, indicia that the Court identified as important for determining functional equivalence, are in fact useful for determining proximate cause since they speak to foreseeability. Why then can these factors sufficiently constrain the scope of "functional equivalence," but not the scope of proximate cause?

Finally, traceability is naturally self-limiting. As the Court correctly identifies, "virtually all water" is hydrologically connected.[319] Thus, absent traceability, the "functional equivalence" standard depends to some extent on where regulatory decision makers and the courts decide to draw the line. Traceability, properly utilized, is empirical in nature and depends on how far along the hydrological connections scientists can reliably follow a specific pollutant. If a pollutant "could not reliably be predicted to arrive in" a particular surface water, "or reliably be traced to a point source," then no permitting requirement would result.[320] The traceability factor would certainly evolve as the technology evolved, but even this can provide certainty to courts and to point-source owners and operators. All these actors would need to do is keep up with the steadily advancing tracing science and technology rather than try to decipher changing and occasionally conflicting regulatory, judicial, and political priorities.[321]

Traceability can be further limited by imposing reliability requirements on trace methods. Any method implemented should be able to satisfy most if not all the factors set forth in *Daubert v. Merrell Dow Pharmaceuticals* for determining the scientific validity of new techniques: the technique should (1) be testable, (2) be subject to peer review, (3) have a known or potential rate of error and standards controlling for this error, and (4) have general acceptance in the relevant scientific community.[322] A preliminary review of case law seems to indicate that error rates of 0 to 10 percent are acceptable.[323] Once a method passes muster, a particular use of that method to trace pollutants back to a point source could be considered reliable if it is at least "reasonably likely" that the pollutant was released from the point source in question.[324] A trace study satisfying all these requirements could be considered reliable.

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319. *Maui*, 140 S. Ct. at 1470.

320. Brief of Amici Curiae Law Professors in Support of Respondents, *supra* note 105, at 34–35.

321. *See* Shiigi, *supra* note 53, at 548 ("Having guidance on scientific testing establishes clear expectations that polluters should carefully evaluate the underlying geology of the area and consider either dye testing or NPDES permits for any proposed projects that involve underground disposal of pollutants near navigable bodies of water.").

322. Daubert v. Merrell Dow Pharms., 509 U.S. 579, 593–94 (1993). *See* Heinzen & Russ, *supra* note 111, at 494–95. *Daubert* established new standards, still in use today, to determine "the admissibility of novel scientific evidence at trial." *Id.* at 494.

323. Heinzen & Russ, *supra* note 111, at 497–98.

324. *See* Haw. Wildlife Fund v. County of Maui, 886 F.3d 737, 747 (9th Cir. 2018) (quoting Sierra Club v. Abston Constr. Co., Inc., 620 F.2d 41, 45 (5th Cir. 1980)), *vacated*, 140 S. Ct. 1462 (2020). What counts as reasonably likely may differ, but one could imagine that this determination would include ensuring that the study in question is subject to peer review and establishes that the point source identified as the originator crosses some likelihood threshold.

B. Requiring Permits Is Always Reasonable When Interference and Proximate Cause Are Clear

As described above, when an indirect point source has been established as the proximate cause of an interference with a navigable water, the only question remaining is whether the interference poses a threat of harm sufficient for it to be considered functionally equivalent in potential harm to a direct discharge. This raises two questions: what threshold level of potential harm is sufficient to trigger functional equivalence, and how do we know we have reached it? I argue that, since uncontrolled discharges pose unknown, significant risks, all discharges where proximate cause and interference have been established should require permitting.

1. Unreasonable Harms from Indirect Discharges Are Functionally Equivalent to Direct Ones, but Hard to Ascertain without Permits

One way to frame the question of which potential harms cross the threshold of functional equivalence would be to ask which harms to navigable waters would be considered unacceptable regardless of whether they were the result of direct or indirect discharges. Tort law suggests that unreasonable harms should be considered unacceptable regardless of source. Thus, indirect discharges posing public health risks would be per se unreasonable and therefore functionally equivalent to direct discharges, as would discharges resulting in continuous, long-lasting, or permanent impacts on the integrity of navigable waters or their capacity to provide for wildlife and recreation. Discharges leading to minor interferences with the integrity of navigable waters or their capacity to provide for wildlife and recreation would be covered if their negative impacts outweighed overall benefits that might result from letting discharges continue unabated.

Identifying the potential impacts of discharges poses a chicken-and-egg problem, however. Identification requires regular monitoring and reporting of the pollutants released (or to be released) and analyzing how these pollutants might then impact a water body's adherence to its TMDL ceiling as well as adherence to other water quality criteria.[325] However, it is through the permitting process that the EPA establishes the monitoring and reporting infrastructure necessary to obtain this data.[326] Thus, measuring a discharge's potential harm to determine whether it requires permitting paradoxically depends on going through the permit process in the first place.

325. *See* WATER PERMITS DIV., *supra* note 7, at 6-2 to 6-9.
326. *See id.* at 3-1.

2. Requiring Permits for All Discharges Causing Interference Is Reasonable

Nonetheless, the flexible and relatively low-cost nature of the permitting process, the cost-effectiveness of the permit limitations themselves, and the risks of not going through the permitting process all make it reasonable to have a point source that is a known proximate cause of an interference of unknown impact to nonetheless go through the permitting process.

Permit limits are structured such that the costs of implementing them should be outweighed by the benefits of maintaining a water's integrity and wildlife and recreational functions. As discussed above,[327] TBELs are based on widely available technologies. For example, standards for publicly owned treatment works purposely avoid the need for expensive advanced treatment processes and other non-cost-effective filtration.[328] TBELs for other existing direct dischargers are set after stakeholder consultation and consideration of the cost of implementing the technology in relation to the pollutant-reduction benefits.[329]

WQBELs are also reasonable. These are only set when TBELs are not sufficient to ensure that affected water bodies comply with water quality standards (WQS).[330] WQS are set to ensure continued protection and propagation of fish, shellfish, wildlife, and recreational opportunities and require consideration of other public benefits that a water body can provide.[331] These standards are revised to accurately reflect the latest scientific knowledge on the impact of pollutants on health and welfare and the stability of the biological community.[332] WQBELs are thus only necessary if a discharge threatens long-term damage to the health of the water or the public using it.

Even the expected costs of applying for a permit are likely outweighed by the expected benefits of even marginal increases in water quality resulting from permit implementation. The average costs of applying for and maintaining a permit are low and scale with point source size.[333] Such costs might be infeasible

327. *See supra* Subpart I.A.

328. Secondary Treatment Regulation, 50 Fed. Reg. 23,382, 23,383–84 (June 3, 1985) (to be codified at 40 C.F.R. pt. 133).

329. 33 U.S.C. § 1314(b) (describing how effluent limitations are set after consultation with "interested persons" and how effluent limitations are set and revised after considering "the total cost of application of technology in relation to the effluent reduction benefits to be achieved from such application"). TBELs for new dischargers also take costs into account. 33 U.S.C. § 1316 ("[i]n establishing . . . [f]ederal standards of performance for new sources . . . the Administrator shall take into consideration the cost of achieving such effluent reduction, and any non-water . . . requirements"); *see also* WATER PERMITS DIV., *supra* note 7, at 5-15 to 5-17 (describing these standards).

330. WATER PERMITS DIV., *supra* note 7, at 6-1 to 6-2; *see also* 33 U.S.C. § 1311(b)(1)(C) (emphasizing that more stringent limitations are implemented as necessary to meet water quality standards).

331. WATER PERMITS DIV., *supra* note 7, at 6-1 to 6-2.

332. *Id.* at 6-4.

333. *See, e.g.*, *NPDES Fees*, ILL. ENV'T PROT. AGENCY, https://www2.illinois.gov/epa/topics/forms/fees/Pages/npdes.aspx (last visited Oct. 17, 2021) (prices scaling by average daily flow rate and capping at $50,000); *Fact Sheet Getting a National Pollutant Discharge Elimination System (NPDES) Permit*, S.C. DEP'T OF HEALTH & ENV'T CONTROL, https://scdhec.gov/fact-sheet-getting-national-pollutant-

for smaller actors like households with septic waste disposal systems, but these actors are not required to get permits by statute and regulatory practice anyway.[334] Conversely, there are many significant, quantifiable benefits to maintaining and enhancing the integrity of navigable bodies of water by limiting the discharges that reach them.[335]

Conversely, allowing point-source discharges to continue unpermitted, and therefore unabated, poses a high risk of unreasonable harm. The CWA specifically requires states to adopt numeric criteria (thresholds) for toxic pollutants that a body of water cannot exceed.[336] These thresholds are established in part to prevent significant short-term and long-term health effects that greater concentrations of these toxic pollutants would have on aquatic organisms and on humans.[337] Currently, 126 toxic pollutants are subject to numeric limits,[338] including heavy metals and organic compounds that can severely harm human health when ingested.[339] Even conventional and

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discharge-elimination-system-npdes-permit (last visited Oct. 17, 2021) ("[a] general NPDES permit costs $75-$100 each year" and "[a]n individual NPDES permit costs from $530 to a couple of thousand dollars yearly"). By contrast, a single modification in 2017 for the LWRF had a budget of $12.5 million. COUNTY OF MAUI, FISCAL YEAR 2017: MAYOR'S BUDGET PROPOSAL 711 (2016), https://www.mauicounty.gov/DocumentCenter/View/102622/FY2017-Budget-and-Capital-Program-Proposed-Combined?bidId=.

334. *See* WATER PERMITS DIV., *supra* note 7, at 4-1 to 4-2 (exceptions from permitting requirements include "introduction of sewage, industrial wastes or other pollutants into publicly owned treatment works (POTWs) by indirect dischargers"); *see also* Interpretive Statement on Application of the Clean Water Act National Pollutant Discharge Elimination System Program to Releases of Pollutants From a Point Source to Groundwater, 84 Fed. Reg. 16,810, 16,812 (Apr. 23, 2019) ("Over 26 million homes in the United States employ septic systems to treat and dispose of household waste. . . . [t]o date, neither EPA nor states have generally required NPDES permits for these types of activities . . . .").

335. For example, wetland ecosystems provide a range of ecosystem services including fish, fiber, water supply and purification, climate regulation, flood regulation, coastal protection, and recreational and tourism opportunities. The total economic value of unconverted wetlands is often greater than that of converted ones. MILLENNIUM ECOSYSTEM ASSESSMENT, ECOSYSTEMS AND HUMAN WELL-BEING: WETLANDS AND WATER: SYNTHESIS 2, https://www.millenniumassessment.org/documents/document.358.aspx.pdf. In Minnesota, adherence to WQS has also led to significant increases in lakefront property values and in recreational use of lakes. *Water Quality Standards Costs and Benefits*, MINN. POLLUTION CONTROL AGENCY, https://www.pca.state.mn.us/water/water-quality-standards-costs-and-benefits (last visited July 15, 2021). These benefits may be underestimated, since the negative impacts of nonstandard pollutants and the positive existence values and health benefits associated with enforcement are often excluded or discounted. *See* David A. Keiser et al., *The Low but Uncertain Measured Benefits of US Water Quality Policy*, 116 PROC. NAT'L ACAD. SCIS. 5262, 5267 (2019); B. Grizzetti et al., *Assessing Water Ecosystem Services for Water Resource Management*, 61 ENV'T SCI. & POL'Y 194 (2016).

336. WATER PERMITS DIV., *supra* note 7, at 6-4. See 33 U.S.C. §§ 1313(c)(2)(B) and 1317(a) for the pollutants for which numeric criteria are required.

337. WATER PERMITS DIV., *supra* note 7, at 6-5 to 6-7; OFF. OF WATER, EPA, WATER QUALITY STANDARDS HANDBOOK CHAPTER 3: WATER QUALITY CRITERIA 7–13 (2017), https://www.epa.gov/sites/production/files/2014-10/documents/handbook-chapter3.pdf.

338. 40 C.F.R. § 401.15 (2021).

339. Heavy metals include arsenic, which can cause lung, liver, and bladder cancer; cadmium, which can damage the kidney, lungs, and bones; lead, which can hamper brain and kidney functions; and mercury, which can cause renal issues. Inyinbor Adejumoke A. et al., *Water Pollution Effects, Prevention, and Climatic Impact*, *in* WATER CHALLENGES OF AN URBANIZING WORLD 33, 36 (Matjaž Glavan ed., 2018), https://www.researchgate.net/publication/323925120_Water_Pollution_Effects_Prevention_and_Climatic_Impact. Organic compounds include naphthalene, which contributes to kidney

nonconventional pollutants subject to limitations[340] can cause long-lasting health impacts.[341]

Unfortunately, most of the assessed WOTUS are already failing or at risk of failing to meet the applicable water quality standards because of the presence of harmful pathogens and toxic and nonconventional pollutants.[342] The health of those consuming these impaired waters or the wildlife in these waters is already threatened. Any addition of pollutants from point sources into these navigable waters not mitigated through permits can only increase the risk or magnitude of these already significant and long-lasting threats to public health. Even the addition of pollutants into water bodies currently in compliance with water quality standards risks pushing them into threatened or impaired status, thereby also threatening public health.[343] Since public health harms are per se unreasonable, it would seem per se unreasonable to allow such discharges to continue unpermitted and unabated even if we do not know the exact quantity, composition, or ultimate impact of the unpermitted pollutant.[344] Thus, if we knew that a point source was releasing a pollutant in some amount that did or could foreseeably reach navigable waters and had some sort of discernible impact, we could estimate that the expected harm of this pollutant was unreasonable. An impact-based "functional equivalence" standard would therefore require permitting in this case.

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and liver failure and has been found in drinking water. Jessica D. Rogers et al., *A Framework for Identifying Organic Compounds of Concern in Hydraulic Fracturing Fluids Based on Their Mobility and Persistence in Groundwater*, 2 ENV'T SCI. & TECH. LETTERS 158 (2015).

340. *See* WATER PERMITS DIV., *supra* note 7, at 1-6, 5-15, 6-11.

341. For example, nitrogen is a nonconventional pollutant. *Id.* at 1-6. The presence of too much nitrogen in water consumed by infants is associated with infant mortality and decreased adult height, which is itself a "well-known indicator of overall health and productivity." ESHA ZAVERI ET AL., THE NITROGEN LEGACY: THE LONG-TERM EFFECTS OF WATER POLLUTION ON HUMAN CAPITAL 1–2 (2019).

342. U.S. Environmental Protection Agency, *Water Quality Assessment and TMDL Information*, NATIONAL SUMMARY OF STATE INFORMATION, https://ofmpub.epa.gov/waters10/attains_nation_cy.control (last visited Dec 16, 2020). These bodies of water are considered either "threatened" (showing deteriorating water quality trends) or "impaired" (failing to meet one of its designated uses). *See tooltip that shows up when clicking on "Threatened Waters" or "Impaired Waters"*. I determine the quantity threatened or impaired by adding up the total miles, square miles, or acres of water fitting either of these conditions. Thousands of acres are impaired by pathogens, harmful nutrients like nitrogen, and heavy metals like arsenic, cadmium, and lead, which cause long-term health impacts.

343. See 33 U.S.C. § 1313(d) for descriptions of attainment and nonattainment. This is especially true when a significant share of point sources is discharging the very kinds of pollutants that have already been identified as both harmful to health and causing impairment of water bodies. *See* Heinzen & Russ, *supra* note 111, at 478 (describing how "[a]gricultural operations, including CAFOs, now account for a significant share of the remaining water pollution problems in the United States" and are "the leading contributor of pollutants to identified water quality impairments in the Nation's rivers and streams[,]" and how factory farm waste streams "are a toxic brew of. . .nitrogen, phosphorus, and bacteria, as well as. . .toxic metals").

344. In a cost-benefit analysis, the cost of a per se unreasonable action could be considered infinite. Thus, increasing the probability of a per se unreasonable health threat occurring by any tiny, nonzero amount instantly leads to an expected negative outcome. This is just one sample approach to this calculus.

C. Permit Requirements under Tort-Informed Functional Equivalence in Three Scenarios

In sum, proximate cause is integral to helping establish when the "functional equivalence" standard applies. Therefore, traceability should be considered a key factor for determining functional equivalence. When proximate cause of an interference is discernible, the question becomes one of how much harm is occurring. In the absence of this information, permits should be required. Given the above, I present three scenarios through which to analyze the application of the "functional equivalence" standard: (1) a pollutant added to a navigable water can be traced from a point source to a navigable water, and the pollutant causes visible and measurable impacts to the integrity of the water; (2) a pollutant added to a navigable water can be traced from a point source to a navigable water, but there are no discernible impacts on the water; (3) no pollutant can be or has been reliably traced from a point source to a navigable water.

1. Scenario One: Traceability with Discernible Impacts

When a pollutant added to a navigable water can be traced from a point source to a navigable water and discernibly impacts the integrity of the water or its ability to propagate wildlife and recreational opportunities, then a discharge subject to liability under the CWA has occurred, and a permit should be required for such a discharge to continue.

This was the case in *Maui* and *Upstate Forever*. In *Maui*, the effluent traced from LWRF to the Pacific Ocean caused "significant ecological changes, including warmer than usual waters and algal blooms along the coast,"[345] and threatened human health and recreation.[346] In *Upstate Forever*, "local residents 'discovered dead plants, a petroleum odor, and pools of gasoline' around the ruptured pipeline."[347] In both cases, the circuit courts found that a discharge had occurred,[348] consistent with what the functional equivalence standard would entail.

Other evidence of impacts could include declines of fish stocks, changes in species present, sustained changes in pH, salinity, or temperature, increased incidences of cancer or other health issues, decreases in tourism due to changes in the water quality, and the like. Since interference and proximate cause can be clearly established via traceability and evidence of impacts, it is per se reasonable to require a permit. If a pollutant has been reliably traced from a point source to a navigable water, then the owner or operator of the point source has reason to know they are causing an interference with a public right. If they let it continue

345. Shiigi, *supra* note 53, at 551 (citing GLENN ET AL., *supra* note 93, at ES-5).

346. Dailer et al., *supra* note 94, at 668; Tummons, *supra* note 93.

347. Shiigi, *supra* note 5353, at 551 (quoting Upstate Forever v. Kinder Morgan Energy Partners, L.P., 887 F.3d 637, 643 (4th Cir. 2018), *vacated*, 140 S. Ct. 2736 (2020) (mem.)).

348. Haw. Wildlife Fund v. County of Maui, 886 F.3d 737, 752 (9th Cir. 2018), *vacated*, 140 S. Ct. 1462 (2020); *Upstate Forever*, 887 F.3d at 652–53.

for some time after traceability has been reliably established, then their interference is of a continuing nature. Since the interference is significant enough to cause visible or measurable changes in the integrity of the affected waters and/or their capacity to provide for wildlife and recreation, it likely has a significant effect upon the public right. All this points to per se unreasonableness under public nuisance doctrine.[349]

2. Scenario Two: Traceability without Discernible Impacts

When a pollutant added to a navigable water can be traced from a point source to a navigable water, but there are no discernible impacts to the integrity of the water or to its ability to propagate wildlife and recreational opportunities, then two approaches can result. Traceability establishes that the point source was the proximate cause of the pollutant reaching the navigable water, but this only qualifies as an interference if the mere addition of a pollutant is viewed as an interference. Otherwise, the discharge could be considered "too attenuated" to be considered an interference—this is the situation that occurred in *Greater Yellowstone Coal. v. Larson*.[350]

One approach could be to check whether the addition of the pollutant at its current rate, if left unchecked, would almost certainly continue. The question would be not *if* an interference with the integrity of the of the body of water was going to happen, but rather *when* it would happen. Given that permitting requirements are meant to preempt such degradation, requiring a permit in this case would make sense. Determining the conditions that must hold for an interference leading to degradation to be near certain is an inquiry better left to scientific experts and regulatory bodies. However, one could imagine that this inquiry would involve determining whether allowing the discharge to continue unabated would result in the body of water exceeding its TMDLs or other water quality standards. Relevant factors to consider in this case might include: (1) whether the impacted water body is impaired or threatened; (2) the rate at which the pollutant is being added by the point source in question versus the rate at which it is being removed; (3) the rate at which other point sources are adding the pollutant in question and whether this rate is accelerating or decelerating; (4) how close the total levels of the pollutant are to the established TMDL; and (5) whether the pollutant in question has known synergistic effects that might exacerbate other pollutants present. Here, the factors identified by Breyer of time, distance, nature of the material through which pollutants traveled, the extent to which pollutants were diluted or changed, and the way they entered the recipient water body[351] can both inform the above five factors and stand on their own as proxies for measuring likelihood of harm if the discharge remains unabated.

349. *See* RESTATEMENT (SECOND) OF Torts*, supra* note 35, at § 821B.
350. Greater Yellowstone Coal. v. Larson, 641 F. Supp. 2d 1120, 1139 (D. Idaho 2009).
351. County of Maui v. Haw. Wildlife Fund, 140 S. Ct. 1462, 1476–77 (2020).

Alternatively, permitting could also be required if the discharge in question involves a pollutant with known serious health risks, such as those identified as priority toxic pollutants,[352] and the body of water to which the pollutant was being added was already impaired because of an excess of that pollutant. Because of how numeric limits are set for toxic pollutants, one could be certain that this addition, if left unchecked, would increase the risk of significant public health impacts occurring. This kind of discharge would be per se unreasonable and require permitting.

3. Scenario Three: No Traceability

When no pollutant can be or has been reliably traced from a point source to a navigable water, then proximate cause cannot be established. However, deciding that permits would never be needed for point sources in such circumstances would be detrimental to the purpose of the CWA. For the CWA to best meet its goals of continuously protecting a water body's integrity, permitting of a point source before discharges occur may be necessary. To approximate adherence to the proximate cause requirement, one can instead ask whether a point source in question is *likely* to be a proximate cause of interference. In these situations, the factors like geology, flow, slope, and distance from water bodies, used under the "direct hydrological connection" and "significant nexus" standards, are useful. Predictions could be augmented by groundwater flow models.[353]

Functional equivalence would require that the risk posed by the predicted discharge not be too attenuated. In this case, factors to consider may include: (1) quantity and kind of pollutants that might be released from the point source; (2) how likely these are to decompose into inert matter or get trapped before reaching a navigable water; and (3) how likely these are to impact hydrologically connected water bodies once added. These factors can be approximated by looking at: (1) the pollution profile of discharges of other similar point sources; (2) whether the water bodies directly hydrologically connected to the point source are impaired or threatened; and (3) whether there is overlap between the expected pollution profile of the point source and the pollutants impairing or threatening the hydrologically connected water bodies. The factors identified by Breyer of the material through which pollutants are expected to travel or expected time and distance to water bodies can also be helpful indicia of the second and third factors.

352. 40 C.F.R. § 401.15 (2021).

353. *See* Brief for Aquatic Scientists and Scientific Societies as Amici Curiae in Support of Respondents, *supra* note 105, at 22–28.

CONCLUSION

The decision in *Maui* reconciled various standards defining the scope of CWA permitting into one: "functional equivalence." However, what "functional equivalence" means was left ambiguous, and the list of factors the Court proposed to help determine functional equivalence was incomplete. The stated purpose of the CWA, its common-law roots, and its judicial and regulatory history help clarify that functional equivalence should be determined by the risk of potential impact that an indirect point source discharge poses to navigable waters. I call this the "impact-based" functional equivalence standard. Tort law in which the CWA is grounded also provides a framework for establishing other factors useful for determining functional equivalence. I provide three scenarios where different factors can be applied to determine impact-based functional equivalence. By defining what an impact-based "functional equivalence" standard entails, and other factors useful in determining it, I hope that this Note provides fertile ground on which to further develop an understanding of "functional equivalence" in a manner that helps maintain the integrity of our nation's waters while staying true to the purpose and origins of the CWA.

We welcome responses to this Note. If you are interested in submitting a response for our online journal, Ecology Law Currents, please contact cse.elq@law.berkeley.edu. Responses to articles may be viewed at our website, http://www.ecologylawquarterly.org