FRACKING-CAUSED EARTHQUAKES: HOW ALLEGED THREATS COULD TRIGGER THE CORPS OF ENGINEERS' SECTION 10 JURISDICTION

BY

JACOB BOOHER*

A growing body of science links hydraulic fracturing (fracking) to damage-causing earthquakes. Scientists and citizen groups fear these earthquakes could critically damage public civil works projects—e.g., dams, locks, and levees—that provide economic, environmental, and recreational benefits to the United States. This Comment argues that the U.S. Army Corps of Engineers (Corps), as caretaker of these public civil works projects and their associated navigable waters, has sufficient legal authority under section 10 of the Rivers and Harbors Act to manage the alleged risks. This Comment analyzes how section 10 has been successfully applied to regulate activities that, like fracking, take place outside of navigable waterways yet threaten the navigable capacity of U.S. waters. This Comment maintains that pursuant to section 10, the Corps could subject certain fracking operations to its existing permit program and seek to enjoin other similar operations. After acknowledging likely resistance to what would be an expansion of federal control over fracking, this Comment concludes that section 10 provides a strong legal foundation upon which the Corps could take action to protect its civil works projects from threats posed by fracking-caused earthquakes.

I. INTRODUCTION 236
II. BACKGROUND 236
III. SECTION 10 OF THE RIVERS AND HARBORS ACT AS A POTENTIAL BASIS FOR AUTHORITY 240
A. *Courts Have Embraced Section 10's Upland Jurisdiction* 243
B. *The Corps' Regulations Acknowledge Section 10's Upland Jurisdiction but the Corps' Administrative Practices Neglect Its Upland Jurisdiction* 245
C. *Triggering Section 10's Upland Jurisdiction* 246
D. *How the Corps Could Prevent Harm Under Section 10* 248

* J.D. and Certificate in Environmental and Natural Resources Law expected May 2015, Lewis & Clark Law School; B.S. 2008, University of Utah.

1. Enjoining Earthquake-Linked Operations.....248
2. Subjecting Certain Fracking Operations to the Department of the Army Permitting Process.....250
E. Likely Resistance to Corps Regulation.....252
IV. CONCLUSION.....254

I. INTRODUCTION

There is growing concern that earthquakes caused by hydraulic fracturing ("fracking") could damage nearby dams, locks, and levees, threatening human lives, the environment, and the integrity of the nation's waterways. The U.S. Army Corps of Engineers (Corps), as the federal agency tasked with protecting and maintaining the navigable capacity of the nation's waters,[1] should evaluate this concern and determine what legal authority it could utilize, if any, to protect these structures from the alleged threats posed by fracking. This Comment examines the viability of one such statutory authority—section 10 of the Rivers and Harbors Act.[2]

Part II provides background information on the Corps and explains the alleged threat that fracking-caused earthquakes pose to the Corps' projects. Part III introduces section 10 as a potential source of legal authority that has been effectively utilized to regulate activities that—like fracking—occur outside of the nation's waterways, yet still effect the waterways. Part III also argues that section 10 provides a strong legal foundation for subjecting certain fracking operations to the Corps' permitting program and for enjoining other operations. Lastly, Part III briefly explores a few potential objections to the Corps' utilization of section 10 to prevent earthquakes. Part IV concludes that if the alleged threats posed by fracking-caused earthquakes are validated, the Corps will have sufficient legal authority under section 10 to address those threats and prevent harm to the nation's waterways.

II. BACKGROUND

The Corps owns and operates more than 670 flood damage reduction and navigation structures throughout the United States.[3] These structures protect life, property, and the environment, and facilitate recreation and

1 U.S. ARMY CORPS OF ENG'RS, REGULATORY: PROTECTING THE INTEGRITY OF AMERICA'S WATERS (2014), *available at* http://www.usace.army.mil/Portals/2/docs/civilworks/budget/strongpt/fy15sp_regulatory.pdf.

2 Rivers and Harbors Appropriations Act of 1899, 33 U.S.C. §§ 401–467n (2012). Section 10 is codified at 33 U.S.C. § 403.

3 U.S. ARMY CORPS OF ENG'RS, BUILDING STRONG, *available at* http://www.usace.army.mil/Portals/2/docs/Media/CommandBrochure.pdf. These structures support some of the 25,000 miles of waterways that are operated and maintained by the Corps for commercial use. U.S. Army Corps of Eng'rs, *2014 Drought*, http://www.usace.army.mil/Missions/EmergencyOperations/Drought.aspx (last visited Feb. 14, 2015).

navigation on the nation's waterways.[4] The Corps is tasked with ensuring the safety and integrity of these projects.[5] By utilizing its regulatory and enforcement authorities, the Corps works to prevent and remedy negative impacts to its projects, as well as punish those who cause damage.[6]

Fracking is a drilling technique used by energy extraction companies that artificially increases the permeability of fuel-bearing geological formations, resulting in faster, more efficient extraction of oil and gas.[7] The process involves pumping millions of gallons of fluid mixtures into wells at such a high pressure that the geological formations fracture, creating expansive networks of small fissures.[8] When the fluid pressure is released, the fissures remain propped open by particles that were suspended in the fluids, allowing oil and gas to flow back to the wellbore with ease.[9]

The use of fracking has expanded rapidly over the last decade, attracting the attention of citizens and environmental organizations concerned that the process may pose unstudied threats to human health and the environment.[10] One of the many concerns is that fracking near civil works projects—such as dams, locks, and levees—could compromise the integrity of those projects.[11] More specifically, there is growing concern that fracking-related activities are causing earthquakes that have the potential to

4 *See* U.S. ARMY CORPS OF ENG'RS, *supra* note 3 ("Our lakes and dams play a critical role in generating power for homes and business, supplying water for nearby communities and farms, preventing or reducing flooding, and providing recreational opportunities for the public.").

5 *See, e.g.*, U.S. Army Corps of Eng'rs, *Dam Safety Program*, http://www.usace.army.mil/Missions/CivilWorks/DamSafetyProgram.aspx (last visited Feb. 14, 2015) ("The Dam Safety Program seeks to ensure that [Corps] owned and operated dams do not present unacceptable risks to people, property, or the environment, with the emphasis on people.").

6 *See* U.S. Army Corps of Eng'rs, *Regulatory Program*, http://www.swf.usace.army.mil/Missions/Regulatory.aspx (last visited Feb. 14, 2015) ("The Regulatory Program of the [Corps] plays a critical role in the protection of the nation's aquatic ecosystem and navigation."); U.S. Army Corps of Eng'rs, *Enforcement*, http://www.swf.usace.army.mil/Missions/Regulatory/Enforcement.aspx (last visited Feb. 14, 2015) (noting that as part of its enforcement authority, the Corps can "prescribe corrective action, impose fines, and/or prescribe removal of the offending fill, work or structure").

7 *See* N.D. STATE WATER COMMISSION, FACTS ABOUT NORTH DAKOTA FRACKING & WATER USE 2 (2014).

8 *See* Hannah Wiseman & Francis Gradijan, *Regulation of Shale Gas Development, Including Hydraulic Fracturing* 13 (Univ. of Tulsa Legal Studies Research Paper No. 11, 2011), *available at* http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1953547.

9 *Id.*

10 *See, e.g.*, Abrahm Lustgarten, *Natural Gas Drilling: What We Don't Know*, PROPUBLICA, Dec. 31, 2009, http://www.propublica.org/article/natural-gas-drilling-what-we-dont-know-1231 (last visited Feb. 14, 2015) (describing the concern of the U.S. Environmental Protection Agency (EPA) "about the environmental risks presented by drilling" and its "possible threats to public health").

11 *See, e.g.*, Randy Lee Loftis, *Dallas Proposal Would Allow Drilling Near Levees*, DALLAS MORNING NEWS, May 28, 2012, http://www.dallasnews.com/news/community-news/dallas/headlines/20120528-dallas-proposal-would-allow-drilling-near-levees.ece?action=reregister (last visited Feb. 14, 2015) (describing a Dallas City Council member's concerns about the "lack of specific protection for dams, levees, floodgates, pumping stations and other safeguards for life and property").

destabilize civil works projects to the point of failure, resulting in loss of life, property, and the use of navigable channels.[12]

A growing body of science supports a causal connection between fracking processes and earthquakes.[13] Multiple studies released within the last few years link wastewater injection wells,[14] and fracking wells,[15] to measurable earthquakes. The studies note the increased fluid injection associated with these fracking processes has resulted in a significant increase in the number of earthquakes rattling the United States.[16] Although most fracking-linked earthquakes have been relatively small, some earthquakes have been large, causing significant damage.[17] For example, in November 2011, a 5.6 magnitude, injection-induced earthquake in Oklahoma injured two people and damaged as many as 200 homes and businesses.[18] Links between injection wells and earthquakes have caused state regulators in Arkansas and Ohio to shut down well sites near fault lines, and a Texas

12 *See* Mike Soraghan, *Drilling-Related Quakes Have Warning Signs—Study*, E&E NEWS PM, July 11, 2013, http://www.eenews.net/eenewspm/stories/1059984264 (last visited Feb. 14, 2015); Mike Lee & Mike Soraghan, *Shaking in Texas Makes Officials Worry About Injection from Drilling*, E&E NEWS, Dec. 5, 2013, http://www.eenews.net/stories/1059991334 (last visited Feb. 14, 2015). There is also growing concern that fracking causes severe subsidence, threatening the integrity of civil works projects. *See* John Kemp, *Sinking City's Lessons for Fracking*, REUTERS, Feb. 20, 2013, http://www.reuters.com/article/2013/02/20/column-kemp-oil-california-idUSL6N0BKD8P20130220 (last visited Feb. 14, 2015). For the purposes of this Comment, only earthquake-related damage is used as a vehicle for exploring section 10's viability. However, the legal conclusions of this Comment would also likely apply to the factual circumstances surrounding subsidence.

13 *See* William L. Ellsworth, *Injection-Induced Earthquakes*, SCI., July 12, 2013, http://www.sciencemag.org/content/341/6142/1225942.full (last visited Feb. 14, 2015); Bryan Walsh, *Deep Disposal Wells from Oil and Gas Drilling Linked to Earthquakes*, TIME, July 12, 2013, http://science.time.com/2013/07/12/deep-disposal-wells-from-oil-and-gas-drilling-linked-to-earthquakes/#ixzz2kwGG9qXk (last visited Feb. 14, 2015). Fracking often includes two fluid-injection processes. First, the fracking itself, as described above. Ellsworth, *supra*. Second, the disposal of used fracking fluids in deep wastewater wells. *Id.* Both of these injection processes have been linked to earthquakes. *See id.*; Walsh, *supra*.

14 *E.g.*, Katie M. Keranen et al., *Potentially Induced Earthquakes in Oklahoma, USA: Links Between Wastewater Injection and the 2011 M_w 5.7 Earthquake Sequence*, 41 GEOLOGY 699, 700 (2013).

15 *E.g.*, AUSTIN A. HOLLAND, OKLA. GEOLOGICAL SURVEY, OPEN FILE REPORT OF1-2011, EXAMINATION OF POSSIBLY INDUCED SEISMICITY FROM HYDRAULIC FRACTURING IN THE EOLA FIELD, GARVIN COUNTY, OKLAHOMA 25 (2011), *available at* http://www.ogs.ou.edu/pubsscanned/openfile/OF1_2011.pdf.

16 *See, e.g.*, Ellsworth, *supra* note 13 ("Within the central and eastern United States, the earthquake count has increased dramatically over the past few years . . . . More than 300 earthquakes with [a magnitude greater than or equal to] 3 occurred in the 3 years from 2010 through 2012, compared with an average rate of 21 events/year observed from 1967 to 2000.").

17 *Id.* Although both injection processes associated with fracking have been linked to earthquakes, the two processes are not considered equal. *Id.* Fracking has been linked to primarily small earthquakes, with the largest being a 3.6 magnitude earthquake. *Id.* Wastewater injection has been linked to larger earthquakes, including a 5.7 magnitude earthquake. *Id.*

18 Mike Soraghan, *Okla. Officials Ignore Advice About Injecting into Faults*, E&E NEWS, July 25, 2012, http://www.eenews.net/special_reports/deep_underground/stories/1059967787 (last visited Feb. 14, 2015).

company to shutter wells that were causing earthquakes near the Dallas-Fort Worth Airport.[19]

Although scientists have established a relationship between fluid injection wells and earthquakes, they have yet to directly analyze whether these earthquakes could cause damage to civil works projects, like those managed by the Corps.[20] Natural earthquakes have caused significant damage to dams and levees in the past.[21] Those natural earthquakes, however, were of significantly higher magnitude than the human-induced earthquakes experienced to date. Fracking and wastewater injection have been documented as causing mostly small earthquakes, with the largest reaching magnitudes of 3.6 and 4.8, respectively.[22]

According to the U.S. Geological Survey, earthquakes above magnitude 5.0 have the potential to cause structural damage to homes.[23] Significant damage is generally associated with earthquakes above magnitude 6.0.[24] The magnitude at which the Corps' projects could experience damage is highly variable and dependent on a multitude of factors, including the project's foundation material, proximity to the epicenter of the earthquake, architectural design, and amount of stress on the project at the time of the earthquake.[25] In 2005, the State of California Department of Water Resources released a study evaluating what impact a 6.5 magnitude earthquake would have on the levees in its Central Valley.[26] The study found that more than

19 Mike Soraghan, *'Do Not Operate' Quake-Linked Disposal Wells—EPA Draft Report*, E&E NEWS, July 22, 2013, http://www.eenews.net/stories/1059984752 (last visited Feb. 14, 2015).

20 *But see* Presentation by Anita Branch, Senior Geotechnical Eng'r, U.S. Army Corps of Eng'rs, *Potential Impacts of Hydrofracturing on Dam & Levee Safety* 10 (Jan. 29, 2013), *available at* http://www.astm.org/COMMIT/images/6C_Branch_2013-01-29_ASTM.pdf (discussing risks of induced seismicity caused by fracking); Suzanne Pritchard, *Fracking and Water Supplies*, INT'L WATER POWER & DAM CONSTR., June 19, 2014, http://www.waterpowermagazine.com/features/featurefracking-and-water-supplies-4297599/ (last visited Feb. 14, 2015) (discussing the Corps' studies "assessing the potential impact and risks associated with hydro fracturing on dam and levee safety," including "the risk of induced seismicity").

21 *E.g.*, Int'l Comm'n on Large Dams, *Dam Safety and Earthquakes*, INT'L WATER POWER & DAM CONSTR., Sept. 20, 2010, http://www.waterpowermagazine.com/features/featuredam-safety-and-earthquakes (last visited Feb. 14, 2015) ("During the Richter magnitude 8 Wenchuan earthquake of 12 May 2008, 1803 concrete and embankment dams and reservoirs and 403 hydropower plants were damaged. Likewise, during the 27 February 2010 Maule earthquake in Chile of Richter magnitude 8.8, several dams were damaged. However, no large dams failed due to either of these two very large earthquakes.").

22 Ellsworth, *supra* note 13. Wastewater injection may have also been responsible for a 2011 earthquake in central Oklahoma measuring 5.7, but no scientific consensus has formed as to that earthquake's cause. *See id.*; G. RANDY KELLER & AUSTIN HOLLAND, OKLA. GEOLOGICAL SURVEY, EVALUATION OF THE PRAGUE EARTHQUAKE SEQUENCE OF 2011 (2013), *available at* http://www.okgeosurvey1.gov/media/OGS_PragueStatement201303.pdf.

23 U.S. Geological Survey, *Earthquake Hazards Program: Magnitude/Intensity Comparison*, http://earthquake.usgs.gov/learn/topics/mag_vs_int.php (last visited Feb. 14, 2015).

24 *Id.*

25 *See* U.S. Geological Survey, *USGS FAQs: Earthquake Effects & Experiences*, http://www.usgs.gov/faq/taxonomy/term/9829 (last visited Feb. 14, 2015).

26 Press Release, Cal. Dep't of Water Res., DWR Director Says 6.5 Magnitude Earthquake Would Cause Catastrophic Delta Levee Failures (Nov. 1, 2005), *available at* http://www.water.ca.gov/news/newsreleases/2005/110105flood.pdf.

thirty levee breaches could occur, causing major flooding, jeopardizing California's economy, and threatening public safety.[27] Repairing the damage would take at least fifteen months, and cost the state at least thirty billion dollars.[28] It is yet to be determined whether fracking could trigger a damage-causing earthquake of such high magnitude. Scientists, vested industries, and concerned citizens will continue to explore the connection between injection-induced earthquakes and vulnerable civil works projects. As that connection is examined, the Corps—as the caretaker of civil works projects—should investigate what legal authority, if any, it could harness to regulate hydraulic fracturing near its projects, should a genuine threat be found.

III. SECTION 10 OF THE RIVERS AND HARBORS ACT AS A POTENTIAL BASIS FOR AUTHORITY

Section 10 of the Rivers and Harbors Act is one of the Corps' many legal authorities that should be evaluated for its potential use to abate risks if concerns that fracking-induced earthquakes could compromise Corps civil works projects are validated.[29] Section 10 is the Corps' primary authority to regulate actions that interfere with the navigable capacity of the nation's waterways.[30] Section 10 reads:

> The creation of any obstruction not affirmatively authorized by Congress, to the navigable capacity of any of the waters of the United States is prohibited; and it shall not be lawful to build or commence the building of any . . . structures in any . . . water of the United States . . . except on plans recommended by the Chief of Engineers and authorized by the Secretary of the Army; and it shall not be lawful to excavate or fill, or in any manner to alter or modify the course, location, condition, or capacity of . . . any navigable water of the United States, unless the work has been recommended by the Chief of Engineers and authorized by the Secretary of the Army prior to beginning the same.[31]

---

27 *Id.*

28 *Id.*; *see also* Boonsri Dickinson, *Earthquake Could Threaten California's Water Supply*, SMARTPLANET, Apr. 21, 2011, http://www.smartplanet.com/blog/science-scope/earthquake-could-threaten-californias-water-supply/ (last visited Feb. 14, 2015) (quoting John Barbieri, founder of the Natural Resources Corporation: "I truly believe the main issue is the vulnerability of the levees to even a moderate earthquake say 4.5, centered near the Delta. . . . An earthquake could cause its catastrophic failure . . . caus[ing] southern California to lose 80 percent of its [water] supply").

29 Another authority prime for consideration is section 13 of the Rivers and Harbors Act, 33 U.S.C § 408, which "prohibits any person from injuring, obstructing, or impairing the usefulness of a structure built by the United States for the improvement of navigable waters or flood prevention." United States v. Fed. Barge Lines, Inc., 573 F.2d 993, 996 (8th Cir. 1978).

30 Neil J. Barker, *Sections 9 and 10 of the Rivers and Harbors Act of 1899: Potent Tools for Environmental Protection*, 6 ECOLOGY L.Q. 109, 131 (1976).

31 33 U.S.C. § 403 (2012). It is noteworthy that "waters of the United States" and "*navigable* waters of the United States" are terms of art with distinct meanings under the Clean Water Act and the Rivers and Harbors Act. As applied to the Rivers and Harbors Act: "Navigable waters of the United States are those waters that are subject to the ebb and flow of the tide and/or are

Section 10 is best understood if broken down into its three clauses. The first clause contains a general prohibition against obstructing navigable waters without congressional approval.[32] The second clause is more specific, making it unlawful to build any structure within navigable waters without permission from the Corps.[33] The last clause makes it unlawful to excavate or deposit fill within navigable waters, or in any way modify the "course, location, condition, or capacity" of a navigable water without the Corps' permission.[34]

The first two clauses, as well as the first half of the third clause, are generally considered the basis for the section 10 permit program operated by the Corps.[35] The section 10 permit program, as it is commonly understood, generally requires that individuals who build structures, fill, or excavate in navigable waters, apply for and receive a permit before starting their activity.[36] The second half of clause three contains an often-overlooked prohibition of any activity that affects the navigable capacity of navigable waters without a permit.[37] This clause is significant because it is a catchall for all navigation-affecting activities that are not specifically enumerated in

presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce." 33 C.F.R. § 329.4 (2013). Waters of the United States, as defined in the Clean Water Act, is much broader, including far more water bodies than navigable waters. *Id.* § 328.3. Although the definition of waters of the United States has been the subject of much controversy, the definition of navigable waters of the United States is relatively settled. *See* Miami Valley Conservancy Dist. v. Alexander, 692 F.2d 447, 449–50 (6th Cir. 1982) ("The test of navigability has been stated and restated by the federal courts for the last one hundred years."). The Rivers and Harbors Act predates the government's need to distinguish navigable waters from waters of the United States and uses the terms interchangeably. *Compare* 33 U.S.C. § 403 (discussing "waters of the United States") *with id.* § 407 (discussing "navigable water"). References to navigable waters *and* waters of the United States in the Rivers and Harbors Act, as well as in this Comment, refer only to navigable waters over which the Corps exercises traditional jurisdiction. *See* United States v. Cumberland Farms of Conn., Inc., 826 F.2d 1151, 1158 (1st Cir. 1987). For the purposes of this Comment, the civil works projects presumably threatened are located in or presumed to significantly affect navigation on navigable waters.

32 33 U.S.C. § 403.

33 *Id.*

34 *Id.*

35 *See* 33 C.F.R. § 322.1 (2013). The section 10 permit program is part of the Department of the Army regulatory program. *See* 33 C.F.R. §§ 320.1–2 (2013). The section 10 permit program also implements the permitting provisions contained in section 404 of the Clean Water Act, 33 U.S.C. § 1344; section 13 of the Rivers and Harbors Act, 33 U.S.C. § 407; and section 103 of the Marine Protection, Research, and Sanctuaries Act, 33 U.S.C. § 1401. *See* 33 C.F.R. § 322.1 (2013). Persons undertaking activities subject to section 10 must obtain a permit from the Department of the Army. *See* 33 C.F.R. § 325.8 (2013). For more information on the Department of the Army permit process, see U.S. Army Corps of Eng'rs, *Obtain a Permit*, http://www.usace.army.mil/Missions/CivilWorks/RegulatoryProgramandPermits/ObtainaPermit.aspx (last visited Feb. 14, 2015).

36 *See* 33 C.F.R. § 320.2(b) (2013) ("The instrument of authorization is designated a permit.").

37 *See* Leah Rindner, *Forcing Adaptation Through the Rivers and Harbors Act*, 38 ECOLOGY L.Q. 341, 349 (2011) (discussing the second half of clause three as an "alternative basis" for liability).

the other clauses.[38] This portion of clause three is also important because it contains no explicit geographical limitation. It does not say, as clause two does, that actions *within* navigable waters that alter or modify navigable waters are unlawful.[39] This raises the question of whether the Corps, through this third clause, has the authority to reach beyond waterways and regulate activities on uplands that, despite occurring outside of navigable waters, alter or modify navigable waters.[40]

Concluding that section 10 allows the Corps to extend its regulatory reach to uplands would be a novel assertion. As the administrator of navigable waters, the Corps' regulatory authority is commonly thought of as confined by the jurisdictional limits of navigable waters.[41] In fact, the Corps' own regulations describe the Corps' jurisdiction as limited to lands and waters below jurisdictional waters' high water marks.[42] Reading section 10 to permit the Corps to reach upland activities would likely be seen as an unnecessary and troubling expansion of the Corps' jurisdiction, and would be vehemently opposed by local governments and industry members.[43]

This question of jurisdiction is of critical importance in determining whether section 10 is a viable legal tool for regulating earthquake-causing fracking operations that threaten Corps projects. Concerned citizens are worried about fracking activities that generally take place on dry land, well beyond the traditional jurisdictional limits of the Corps.[44] It is the fracking of upland wells that could allegedly result in the impacts feared by the public.[45] Considering this, section 10 can be a useful tool for abating the risks in question only if it allows the Corps to reach beyond its traditional

38 *See id.* (explaining that the Corps can find liability under the second half of clause three even where structures are legally constructed and regardless of whether the Corps deems structures "obstructions").

39 33 U.S.C. § 403 (2012).

40 The term "upland" refers to lands above the legally defined extent of waterways. *See* 96 AM. JUR. PROOF OF FACTS 3D, NAVIGABILITY DISPUTES INVOLVING NON-TIDAL WATERS ABOVE PRIVATE LANDS § 17 (2007) (indicating variations in the definition of uplands, depending on the jurisdiction and type of waterway boundary).

41 33 C.F.R. §§ 329.11–.12 (2013).

42 *Id.* (explaining that the Corps' "regulatory jurisdiction, and powers of improvement for navigation, extend" to lands and waters "below the ordinary high water mark" of rivers and lakes and the "mean (average) high water" of oceanic and tidal waters.). The ordinary high water mark and the mean high water mark are collectively referred to in this Comment as the Corps jurisdictional limits. As the Fifth Circuit described in *United States v. Sexton Cove Estates. Inc.*, the ordinary high water mark has traditionally marked the limit of admiralty jurisdiction in tidal waters, the point at which the federal government's navigational servitude ends, and the boundary of tidal lands for property law purposes. 526 F.2d 1293, 1296–97 (5th Cir. 1976).

43 *See* discussion *infra* Part III.2.E.

44 CIVIL SOC'Y INST., "FRACKING" AND CLEAN WATER: A SURVEY OF AMERICANS 3 (2010), *available at* http://www.civilsocietyinstitute.org/media/pdfs/122110%20CSI%20ORC%20national%20fracking%20survey%20report%20final1.pdf (reporting that 40% of Americans are "very concerned" about fracking as it relates to water quality).

45 NATURAL RES. DEF. COUNCIL, POLICY BASIS: FRACKING (2013), *available at* http://www.nrdc.org/legislation/policy-basics/files/policy-basics-fracking-FS.pdf (asserting major concerns about what consequences fracking may have on the environment).

jurisdictional limits and regulate those fracking operations that are outside of navigable waters, but near enough to civil works projects that the operations threaten the integrity of those projects.

A. Courts Have Embraced Section 10's Upland Jurisdiction

Although there have been relatively few cases directly exploring clause three's jurisdictional implications, the cases that do evaluate it seem to paint clause three's jurisdiction as unencumbered by the Corps' traditional jurisdictional limits. In one of the first cases applying section 10, *United States v. Rio Grande Dam and Irrigation Co.* (*Rio Grande*),[46] the Supreme Court was asked to rule on whether the Rivers and Harbors Act's prohibition of obstructions is limited only to activities conducted in jurisdictional waters, or if jurisdiction reaches upstream, even to activities on non-jurisdictional waters.[47] Specifically, the Court was asked whether a dam built on a nonnavigable tributary of the Rio Grande River was subject to section 10.[48] The Supreme Court, following the intent of Congress and the statutory language, determined that section 10 prohibits "anything, *wherever* done or however done . . . which tends to destroy the navigable capacity of one of the navigable waters of the United States . . . ."[49] Applying that logic to the facts before it, the Court ruled that, should construction substantially affect the downstream river, jurisdiction would be warranted.[50] Ever since this broad holding, courts across the country have labored to contour the jurisdictional limits of section 10 as it relates to upstream actions and—more important to the question at hand—upland actions above the traditional jurisdictional limits of navigable waters.

Building upon the holding in *Rio Grande*, the Eighth Circuit decided *Northern Pacific Railway Company v. United States* (*Northern Pacific*),[51] which applied section 10 against a company whose actions were conducted entirely on uplands.[52] In *Northern Pacific*, the railroad company built a railway hundreds of feet away from a navigable water.[53] Despite the distance, the construction activities put pressure on a unique clay stratum that then shifted, causing the portion of the stratum under the river to bulge and create a bar that impeded navigation in the river.[54] The Court ruled that

46 174 U.S. 690 (1899).

47 *Id.* at 690, 707.

48 *Id.* at 708.

49 *Id.* (emphasis added).

50 *Id.* at 709–10 ("[I]f the [defendant] should, even at a place above the limits of navigability, by appropriation for any domestic purposes, diminish the volume of waters, which, flowing into the Hudson, make it a navigable stream, to such an extent as to destroy its navigability, undoubtedly the jurisdiction of the National Government would arise and its power to restrain such appropriation be unquestioned; and within the purview of this section it would become the right of the Attorney General to institute proceedings to restrain such appropriation.").

51 104 F. 691 (8th Cir. 1900).

52 *Id.* at 692, 694–95.

53 *Id.* at 692.

54 *Id.*

although the railroad company's actions were conducted entirely landward of the river, the company's actions impermissibly affected the navigability of the waterway in violation of section 10.[55]

The broad applicability of section 10 was reiterated in two cases decided by the Supreme Court in the mid-1920s.[56] Those two cases evaluated whether the Corps had section 10 jurisdiction over a massive engineering project that connected the Chicago River to the Great Lakes by way of a manmade, non-jurisdictional channel.[57] In both cases, the Court found that although the activities in question did not take place in jurisdictional waters, the projects significantly affected navigable waters by changing the Chicago River's flow and the water levels of the lakes.[58] The Court held those indirect alterations obstructed navigation and triggered section 10 jurisdiction.[59]

In 1960, the Supreme Court, in *United States v. Republic Steel Corp.*,[60] built upon its earlier precedent by expressing the need to interpret section 10 "charitably in light of [its] purpose."[61] In writing for the Court, Justice Douglas followed a philosophical statement of Justice Holmes: "A river is more than an amenity, it is a treasure . . . ."[62] To interpret the law in such a way "forbids a narrow, cramped reading . . . of [section] 10."[63] Applying this approach to the facts before it, the Court ruled that the industrial activities in question, although conducted entirely above the jurisdictional limits of navigable waters, were subject to section 10 jurisdiction because the activities resulted in a substantial amount of material being washed into the river, altering the riverbed and obstructing navigation.[64] In making this ruling the Court summarized its precedent, explaining that the lesson "is that the term 'obstruction' as used in [section] 10 is broad enough to include diminution of the navigable capacity of a waterway by means not included in the second or third clauses" of section 10.[65]

Four years later, in *United States v. Perma Paving Co.* (*Perma Paving*),[66] the Second Circuit likewise applied section 10 broadly.[67] In *Perma Paving*, the Second Circuit found the City of New York City and its lessee liable for obstructing navigation on the Bronx River.[68] The court held the defendants

55 *Id.* at 694–95.

56 Wisconsin v. Illinois, 278 U.S. 367 (1929); Sanitary Dist. of Chi. v. United States, 266 U.S. 405 (1925).

57 *Wisconsin*, 278 U.S. at 404–05, 410; *Sanitary Dist.*, 266 U.S. at 423–24.

58 *Wisconsin*, 278 U.S. at 412–13; *Sanitary Dist.*, 266 U.S. at 431–32.

59 *Wisconsin*, 278 U.S. at 412–13; *Sanitary Dist.*, 266 U.S. at 431–32.

60 362 U.S. 482 (1960).

61 *Id.* at 491.

62 *Id.* (internal quotation marks omitted).

63 *Id.* (internal quotation marks omitted).

64 *Id.* at 489, 491.

65 *Id.* at 489.

66 332 F.2d 754 (2d Cir. 1964).

67 *See id.* at 757–58 (discussing the Supreme Court's application of section 10 and establishing that it should not be read narrowly).

68 *See id.* at 755–56 (affirming the district court's ruling that Perma Paving Company and the City of New York were joint and severally liable to the United States because the United States had to dredge a portion of the Bronx River).

had caused the obstruction by overloading riverside property, which resulted in a mudslide that pushed a large amount of material into the river.[69] This obstruction, even if unintentional and indirect, was held to be a violation of section 10.[70]

While most courts have broadly interpreted section 10, few courts over the years have interpreted section 10 as having more limited applicability. For example, in *United States v. Burns*,[71] a West Virginia court held that the obstructions prohibited by section 10 are those "permanent in their nature, as are created for special purposes, by the usual modes of construction," and the law does not, therefore, apply to the lumber industry's practice of floating logs down rivers, even when it is at the expense of navigation.[72] This and other dissenting opinions have been thoroughly superseded by multiple higher courts and more recent decisions. As summarized by the Fifth Circuit in *United States v. Sexton Cove Estates, Inc.*,[73] "[t]here is not the slightest intimation [in section 10] that an alteration or modification whose source is above [the jurisdictional limit of a navigable water] is any less an alteration or modification," or any less susceptible to prosecution.[74]

In total, section 10 precedent illuminates a law unencumbered by strict geographical limits. Courts have explicitly acknowledged the applicability of section 10 to upland activities. Further, courts have successfully applied section 10 to a diverse array of upland activities. It is evident that the Corps can reach beyond the traditional jurisdictional limits of navigable waters. The case law makes clear that any action—whether in navigable waters or on uplands—is subject to section 10, if the action would "modify the course, location, condition, or capacity of . . . any navigable water of the United States . . . ."[75]

B. The Corps' Regulations Acknowledge Section 10's Upland Jurisdiction but the Corps' Administrative Practices Neglect Its Upland Jurisdiction

The Corps' regulations corroborate the case law described above. The authoritative regulation states: "Structures or work outside [navigable waters as defined in 33 C.F.R. § 329] are subject to [section 10 jurisdiction] if these structures or work affect the course, location, or condition of the waterbody in such a manner as to impact . . . its navigable capacity."[76]

Despite this explicit acknowledgement of section 10's applicability to activities outside of navigable waters, the Corps' permitting materials and

69 *See id.* at 756 (discussing how a "large shoal of mud" placed on the marsh pushed mud further into the river).

70 *See id.* (affirming the district court's ruling that the City of New York and Perma Paving Company had violated section 10).

71 54 F. 351 (C.C.D.W. Va. 1893).

72 *Id.* at 363.

73 526 F.2d 1293 (5th Cir. 1976).

74 *Id.* at 1298.

75 33 U.S.C. § 403 (2012).

76 33 C.F.R. § 322.3(a) (2013).

informational websites are silent about when section 10 permits are required for activities conducted on uplands. The instructions for preparing a section 10 permit application are nearly silent on upland activities.[77] The Corps' websites offer no information about what activities conducted on uplands, if any, would require permits.[78] The Corps' websites seem to simply ignore section 10's more expansive reach to uplands. The only other explicit acknowledgement of upland jurisdiction is contained in 33 C.F.R. § 322.3, which states, in essence, that structures built directly above or below a water body are presumed to have an effect on navigable waters and therefore require a permit.[79]

Without guidance from the Corps, individuals conducting upland activities that have the potential to affect navigable waters will remain unaware of their obligation to seek a permit and will be unlikely to consult the Corps about the risks their activities may pose to navigable waters. These individuals are also unaware that, should their activity cause an obstruction, they could be liable under the Rivers and Harbors Act.[80]

C. Triggering Section 10's Upland Jurisdiction

Having established that case law and Corps regulations acknowledge section 10's applicability to certain activities conducted on uplands, this Comment next analyzes what facts and circumstances trigger section 10 jurisdiction. Section 10 makes it unlawful to obstruct the navigable capacity of navigable waters.[81] An obstruction, as described in section 10, is an activity that will "alter or modify the course, location, condition or capacity" of a navigable water.[82] As the Fifth Circuit described in *United States v. Joseph G. Moretti* (*Moretti*),[83] the prerequisite for section 10 jurisdiction is simply "showing some effect upon navigable waters, some alteration or modification of either course, location, condition or capacity of those

77 *See, e.g.*, U.S. ARMY CORPS OF ENG'RS, INSTRUCTIONS FOR PREPARING A DEPARTMENT OF THE ARMY PERMIT APPLICATION, *available at* http://www.usace.army.mil/Portals/2/docs/civilworks/permitapplicationinstructions.pdf (demonstrating that the Corps' instructions for applying for a section 10 permit are nearly silent on upland activities because the exclusive reference to upland activities relates to the discharge of dredged materials).

78 The Corps' headquarters and district websites contain no useful information concerning upland activities that may be subject to section 10 permitting requirements. *See* U.S. Army Corps of Eng'rs: Headquarters, *Regulatory Program and Permits*, http://www.usace.army.mil/missions/civilworks/regulatoryprogramandpermits.aspx (last visited Feb. 14, 2015). *See, e.g.*, U.S. Army Corps of Eng'rs: Sacramento Dist., *Apply for a Permit*, http://www.spk.usace.army.mil/Missions/Regulatory/Permitting/ApplyforaPermit.aspx (last visited Feb. 14, 2015); U.S. Army Corps of Eng'rs: Galveston Dist., *Permit Application*, http://www.swg.usace.army.mil/BusinessWithUs/Regulatory/Permits/PermitApplication.aspx (last visited Feb. 14, 2015).

79 33 C.F.R. § 322.3(a).

80 *See* 33 U.S.C. § 406 (2012) (containing the enforcement provisions of the Rivers and Harbors Act).

81 *Id.* § 403.

82 *Id.*

83 526 F.2d 1306 (5th Cir. 1976).

waters."[84] Acknowledging that these terms are broad and undefined, the Fifth Circuit held: "So long as activities fall within this generous scope, those activities are subject to the jurisdiction of the Corps."[85]

This liberal description of section 10's jurisdiction is tempered by practical limitations that prevent its illogical and extreme application. Section 10 does not, as described in *Moretti*, provide jurisdiction over every activity causing "*some* alteration or modification."[86] Such a low threshold would illogically provide the Corps jurisdiction over an individual drinking water from a river—which is a removal of water that technically causes a change to its surface level—and skipping a rock into a lake—which technically changes the topography of the lake's bed. Instead, section 10's jurisdiction is more refined, as clarified by decades of case law. One clarification came from the Supreme Court's first interpretation of section 10 in *Rio Grande*.[87] There the Court held that section 10 "is not a prohibition of *any* obstruction [modification or alteration] . . . but any obstruction to the navigable capacity" of navigable waters.[88] In so holding, the Court identified a more accurate jurisdictional question—whether the activity "substantially interferes with the navigable capacity" of a navigable water.[89] This reading of the law ensures that de minimis alterations of navigable waters are not subject to section 10 jurisdiction.

Determining whether an activity substantially interferes with navigable capacity does not require evaluating actual or realized impacts of the activity. As explained by the district court in *Sierra Club v. Morton*,[90] there is no jurisdictional requirement that an activity have a substantial effect on *actual* navigation; it need only affect the navigable *capacity* of the waterway.[91] Consequently, there is no need to show that a specific ship or commercial use is, or will be, affected. One need show only that the activity has the "potential or capacity to obstruct navigation currently or in the future."[92]

The cases described in previous sections, as well as dozens of cases not enumerated here, illustrate the types of modifications and alterations to navigable waters that have been characterized by courts as obstructions to navigation, triggering section 10 jurisdiction.[93] Most often, the triggering

84 *Id.* at 1309.

85 *Id.*

86 *See id.* (emphasis added).

87 174 U.S. 690 (1899).

88 *Id.* at 708 (emphasis added).

89 *Id.* at 709.

90 400 F. Supp. 610 (N.D. Cal. 1975), *aff'd in part, rev'd in part sub nom.* Sierra Club v. Andrus, 610 F.2d 581 (9th Cir. 1979), *vacated sub nom.* Sierra Club v. Watt, 451 U.S. 965, *rev'd sub nom.* California v. Sierra Club, 451 U.S. 287 (1981).

91 *Id.* at 629 (emphasis added).

92 *Id.*

93 *Supra* Part III.A; *see* 78 AM. JUR. 2D *Waters* §§ 171, 177–180 (2013) (citing cases addressing houseboats, bridges, deposits of solids, deposits of refuse and waste, and sunken vessels).

alteration is a change in water level,[94] or augmentation of a lake or river bottom.[95]

Evaluated in light of these case precedents, the feared impacts of fracking would trigger section 10 jurisdiction. If a fracking-induced earthquake caused a levee, lock, or dam to fail, it is highly likely that the waterway the project was built to support would experience a dramatic change in water level or significant augmentation of its bed, if not both. For example, if a fracking-induced earthquake caused an impoundment dam to slump significantly and fail, water behind the dam would quickly drain, drastically altering the reservoir's water level and—due to released sediment—the riverbed downstream. Such a dramatic alteration would surely impair the navigable capacity of both the reservoir and the river. When judged against those alterations deemed jurisdictionally significant in the past, the alterations that would result from the failure of a civil works project would surely trigger section 10 jurisdiction. Therefore, if scientists find that fracking threatens to cause earthquakes capable of jeopardizing civil works projects, the Corps' section 10 jurisdiction would be triggered.

D. How the Corps Could Prevent Harm Under Section 10

If scientists find that earthquakes associated with fracking threaten the Corps' projects, the Corps would need to take immediate action to abate those risks. The Corps, equipped with section 10 jurisdiction, could either seek injunctive relief from individual operations shown to pose a threat to civil works projects or subject certain fracking operations to the Department of the Army permitting process.[96]

1. Enjoining Earthquake-Linked Operations

It is a violation of section 10 to initiate activity that results in, or threatens to result in, the obstruction of the navigable capacity of a navigable water without first obtaining a permit from the Corps.[97] A company or individual found to be in violation of section 10 may be prosecuted and enjoined under section 12 of the Rivers and Harbors Act.[98] Section 12 reads:

94 *See, e.g.*, United States v. Rio Grande Dam & Irrigation Co. (*Rio Grande*), 174 U.S. 690, 709 (1899); Sanitary Dist. v. United States, 266 U.S. 405, 423 (1925); Wisconsin v. Illinois, 278 U.S. 367, 417 (1929).

95 *E.g.*, United States v. Republic Steel Corp., 362 U.S. 482, 489 (1960); United States v. Perma Paving Co., 332 F.2d 754, 757 (2d Cir. 1964); N. Pac. Ry. Co. v. United States, 104 F. 691, 694 (8th Cir. 1900).

96 Although the Corps could likely take many other enforcement actions, this Comment will address only the two enumerated here.

97 Huron Mountain Club v. U.S. Army Corps of Eng'rs, No. 2:12-CV-197, 2012 WL 3060146, *4 (W.D. Mich. 2012), *appeal dismissed* (Oct. 2, 2012), *aff'd*, 545 Fed. Appx. 390 (6th Cir. 2013).

98 33 U.S.C § 406 (2012).

> Every person and every corporation that shall violate any of the provisions of [section 10] . . . shall be deemed guilty of a misdemeanor, and on conviction thereof shall be punished by a fine not exceeding $2,500 nor less than $500, or by imprisonment (in the case of a natural person) not exceeding one year, or by both such punishments, in the discretion of the court. And further, the removal of any structures or parts of structures erected in violation of the provisions of the said sections may be enforced by the injunction of any district court exercising jurisdiction in any district in which such structures may exist, and proper proceedings to this end may be instituted under the direction of the Attorney General of the United States.[99]

The Ninth Circuit, in *Sierra Club v. Andrus*,[100] held: "Although this section expressly mentions enjoining only the erection of structures in violation of section 10, it is now settled that a District Court may enjoin any obstruction that violates section 10."[101] Therefore, on behalf of the Corps, the Department of Justice could initiate enforcement proceedings against hydraulic fracturing companies whose operations threaten civil works projects. To successfully enjoin a fracking operation, the Department of Justice would need to show that operators failed to obtain permits for those activities that cause or threaten to cause obstructions to navigable waters.[102] Of course, once "such proceedings are instituted it becomes a question of fact whether the act sought to be enjoined is one which fairly and directly tends to obstruct—that is, interfere with or diminish—the navigable capacity of a stream."[103] That question of fact would be difficult to answer, especially considering the highly complex circumstances surrounding induced earthquakes. The Corps would need to establish a causal connection between a company's injection activities and earthquakes—threatened or actual—as well as show that those earthquakes pose a real threat to a civil works project.[104] Although this burden would be heavy, it would not be impossible to meet. As discussed previously, scientists have established causal connections between fluid injection operations and earthquakes in the past.[105] Those connections have spurred state regulators to halt

99 *Id.* This enforcement clause is coupled with section 17, which provides: "The Department of Justice shall conduct the legal proceedings necessary to enforce [section 10]; and it shall be the duty of United States attorneys to vigorously prosecute all offenders against the same whenever requested to do so by the Secretary of the Army . . . ." 33 U.S.C § 413 (2012).

100 610 F.2d 581 (9th Cir. 1979), *vacated sub nom.* Sierra Club v. Watt, 451 U.S. 965, *rev'd sub nom.* California v. Sierra Club, 451 U.S. 287 (1981).

101 *Id.* at 589 (citing United States v. Republic Steel Corp., 362 U.S. 482, 491–92 (1960)) (internal quotation marks omitted).

102 *See supra* Part III.D.1.

103 *Rio Grande*, 174 U.S. 690, 709 (1899).

104 *See* United States v. Commodore Club, Inc., 418 F. Supp. 311, 313 (E.D. Mich. 1976) ("[I]t was the Government's burden to prove the three elements of a [section 10] violation beyond a reasonable doubt. The three elements here are (1) that defendants caused a fill to occur (2) in navigable waters of the United States (3) without prior authorization (by permit) by the Army Corps of Engineers.").

105 *See, e.g.*, Charles Q. Choi, *Fracking Practices to Blame for Ohio Earthquakes*, LIVESCIENCE, Sept. 4, 2013, http://www.livescience.com/39406-fracking-wasterwater-injection-caused-ohio-earthquakes.html (last visited Feb. 14, 2015); *see also* Matthew Philips, *More*

operations at individual sites,[106] as well as suspend all injection operations within larger geographical areas.[107]

While establishing these connections before a federal court may be more difficult than before a state's regulatory agency, a similar body of scientific research would presumably be needed. The Corps would likely need to produce scientific reports and testimony that establish a causal connection between the operator's injection activities and threatened or actual earthquakes of a certain magnitude. Similarly, the Corps would need to show that the civil works project is vulnerable to earthquakes of the magnitude experts have deemed the injection process capable of causing. Assuming the Corps could produce reports that soundly establish both of these connections, as well as produce evidence that the operation failed to receive a permit under section 10, the Corps may have the chance at succeeding in suit to enjoin the fracking operation.[108]

Although a well-by-well, litigation-based approach to halting fracking operations that pose risks to the Corps' projects would be resource intensive, it could prove successful at mitigating threats. The Corps could target its resources on geographical and geological regions prone to induced earthquakes—e.g., near fault lines—as well as areas where civil works projects are especially vulnerable. The enforcement actions that are initiated could not only halt the most threatening operations, they could have resounding deterrent effects on fracking operators as a whole. Companies, hoping to avoid federal enforcement under section 10, may choose to halt earthquake-causing wells on their own accord, and actively avoid fracking operations that they know have the potential of causing earthquakes.

2. Subjecting Certain Fracking Operations to the Department of the Army Permitting Process

The Corps could utilize the permitting and rulemaking powers granted to it pursuant to section 10 to proactively prevent fracking operations that threaten its projects.[109] By subjecting certain fracking operations to the Department of the Army (DA) permitting process, the Corps could have the

Evidence Shows Drilling Causes Earthquakes, BUSINESSWEEK, Apr. 1, 2013, http://www.businessweek.com/articles/2013-04-01/more-evidence-that-fracking-causes-earthquakes (last visited Feb. 14, 2015) (reporting on a recent scientific study concluding that fracking wastewater injection caused earthquakes in Oklahoma and other places without historical seismic activity).

106 *See, e.g.*, Choi, *supra* note 105 (reporting on the Ohio Department of Natural Resources' decision to shutter one earthquake-linked wastewater injection well).

107 *See, e.g.*, Associated Press, *Natural Gas: Arkansas Commission Votes to Shut Down Wells*, THE HUFFINGTON POST, Nov. 11, 2011, http://www.huffingtonpost.com/2011/07/27/natural-gas-arkansas-commission-shut-down-wells_n_911541.html (last visited Feb. 14, 2015) (explaining that the Arkansas Oil & Gas Commission adopted a permanent ban on wastewater injection wells in a 1,150 square mile section of Arkansas linked with a swarm of earthquakes).

108 Notably, intent to obstruct navigation is not required. *See, e.g.*, United States v. Bowen, 428 F. Supp. 754, 755 (D.C. Md. 1976) (holding there is no scienter requirement for the obstruction of waterways).

109 The Corps has the authority to promulgate regulations. 33 C.F.R. § 209.200 (2013). Congress granted that authority in section 7 of the River and Harbor Act of 1917. *Id.*

opportunity to thoroughly evaluate each proposed project's likelihood of triggering damage-inducing earthquakes before the projects are constructed and operational.

The DA permitting process would provide a well-tested forum for evaluating threats posed by fracking operations. The DA permitting process involves subjecting proposed projects to interagency commenting, environmental impact analysis, and public interest review.[110] This robust process allows the Corps to make informed permitting decisions in the interest of the public.[111] Subjecting a proposed fracking operation to this process would result in thorough public and government risk analyses and equip the Corps with the information necessary to evaluate the earthquake-related risks posed by the fracking operation to Corps' projects before granting a permit.

The Corps would need to assert its permitting power over fracking operations through rulemaking in accordance with the Administrative Procedure Act.[112] A rule promulgated pursuant to section 10 would survive judicial review only if it were narrowly tailored to address realized threats to civil works projects, and were supported by necessary facts.[113] A rule that was too broad could be thrown out as being in excess of statutory authority or as arbitrary and capricious.[114] Similarly, a rule promulgated without sufficient factual support would be likely to be thrown out as unwarranted by the facts or as arbitrary and capricious.[115]

A rule promulgated pursuant to section 10 that subjects certain fracking activities to the DA permitting process could take many forms. One approach would be to subject all fluid-injection processes within a certain number of feet of the Corps' civil works projects to the DA permitting process. A more precise approach would require permits for only those fluid-injection activities that meet certain criteria enumerated in the rule. Those criteria could include: 1) the proximity of an operation to the Corps projects known to be vulnerable to earthquakes, 2) the siting of an operation in geological formations prone to induced-earthquakes, 3) the volume of fluid to be injected, 4) the rate at which fluids will be injected, 5) the depth

110 *See* 33 C.F.R. §§ 325.1–.10 (2013). For a thorough description of the permitting process and associated analyses, see U.S. Army Corps of Eng'rs, *U.S. Army Corps of Engineers Permitting Process Information*, http://www.lrl.usace.army.mil/Portals/64/docs/regulatory/Permitting/PermittingProcessInformation.pdf (last visited Feb. 14, 2015).

111 *Id.*

112 *Id.* The Administrative Procedure Act prescribes mandatory procedures for rulemaking as well as standards for judicial review. 5 U.S.C. §§ 553, 701–706 (2012). Some could argue that the Corps' decision to subject some fracking operations to the DA permitting process would not need to be made through rulemaking proceedings. Although this argument may have some merit, this Comment takes a cautious approach, assuming the decision would be considered legislative in nature.

113 The scope of judicial review under the Administrative Procedure Act is codifed at 5 U.S.C. § 706(2).

114 *Id.*

115 *Id.*

of the well, and 6) any other factors the Corps correlates with the inducement of earthquakes.

Whatever the form, such a rule would provide the Corps an institutionalized process for evaluating risks posed by fracking to its civil works projects. Should the permit review process reveal that a proposed operation poses undue risk, the Corps could choose to deny the permit.[116] Alternatively, the Corps could issue the permit with conditions that ensure the operation will not negatively affect navigable waters.[117] This permitting authority, in conjunction with its enforcement authority, would provide the Corps the legal strength and flexibility necessary to protect its projects from foreseeable harm.[118]

E. Likely Resistance to Corps Regulation

Any attempt by the Corps to regulate hydraulic fracturing would likely be met with significant resistance from state regulators and companies involved with hydraulic fracturing. Although the purpose of this Comment is to evaluate the viability of section 10 as a legal tool to be utilized by the Corps, it is important to mention a few arguments in opposition to the Corps exercising this regulatory authority under section 10.

First, the Corps' assertion of oversight and permitting authority over fracking operations would likely be opposed as a major expansion of federal control over hydraulic fracturing, and as a usurpation of states' rights.[119] Currently, fracking is primarily regulated by the states.[120] Although some

116 33 C.F.R. § 322.5 (2013).

117 Zabel v. Tabb, 430 F.2d 199, 207 (5th Cir. 1970) ("The administrator may grant permission on conditions and conversely deny permission when the situation does not allow for those conditions.").

118 Subjecting certain fracking operations to the DA permitting process would have significant consequences not addressed at length here. For example, all permits would be subject to the Corps' public interest review as well as reviewed under the National Environmental Policy Act (NEPA). *See* 33 C.F.R. § 320.4 (2013) (requiring public interest review for all permit applications); Sierra Club v. Morton, 400 F. Supp. 610, 645 (N.D. Cal. 1975) (requiring an environmental impact statement under NEPA before the Corps can issue a section 9 or section 10 permit).

119 *See* Sorrell E. Negro, *Fracking Wars: Federal, State and Local Conflicts over the Regulation of Natural Gas Activities*, 35 ZONING & PLANNING LAW REP. 1, 3 (2012) (ascribing the failure of federal fracking legislation to opposition from groups who believe regulation should remain with the states).

120 *See* William J. Brady & James P. Crannell, *Hydraulic Fracturing Regulation in the United States: The Laissez-Faire Approach of the Federal Government and Varying State Regulations*, 14 VT. J. ENVTL. L. 39, 43 (2012) (explaining that fracking is exempt from most federal regulation under environmental laws, including the Safe Drinking Water Act, Clean Water Act, Solid Waste Disposal Act, and the Emergency Planning and Community Right-to-Know Act); Ross A. Hammersley & Kate E. Redman, *Local Government Regulation of Large-Scale Hydraulic Fracturing Activities and Uses*, MICH. B. J., June 2014, at 36, 37. The federal government's most direct involvement with fracking is the product of the government's role as manager of federal lands upon which many wells are constructed. *See* U.S. BUREAU OF LAND MGMT., OIL AND GAS; HYDRAULIC FRACTURING ON FEDERAL AND INDIAN LANDS, *available at* http://www.blm.gov/pgdata/etc/medialib/blm/wo/Communications_Directorate/public_affairs/hydraulicfracturing.Par.91723

organizations and individuals have advocated for expanded federal control of fracking,[121] others have vehemently opposed proposals to expand the federal government's oversight.[122] Considering this history, it is likely that the Corps' utilization of section 10 would be celebrated by some, and opposed—through political and legal means—by many others.

Second, the Corps' utilization of section 10 to regulate hydraulic fracturing on private lands would likely be challenged on the grounds that such regulation would result in the taking of private property in violation of the constitutional rights of affected mineral rights owners.[123] The Fifth Amendment of the U.S. Constitution prohibits the government from "taking" private property for public use without compensating the property owner.[124] Government regulations, when implemented by the government for the benefit of the public, may result in compensable takings of private property when the regulation destroys or diminishes the economic value of private property.[125] Applied here, challengers would argue that the Corps' utilization of section 10 would prevent many mineral rights owners from accessing their mineral rights through fracking and thereby deprive those owners of the economic value of their property.

Lastly, the Corps' regulation of hydraulic fracturing would be challenged on the grounds that the Corps' efforts would be misplaced and redundant. Specifically, challengers could argue that existing federal regulatory programs are already in place to manage the risks in question, or that programs are already poised to do so. For example, challengers might argue that the Underground Injection Control (UIC) program, which is

.File.tmp/HydFrac_SupProposal.pdf ("Supplemental Notice of Proposed Rulemaking and Request for Comment"); Paula Cotter, *Draft Federal Rules on "Fracking,"* NAAGAZETTE, http://www.naag.org/publications/naagazette/volume-6-number-5/draft-federal-rules-on-fracking.php (last visited Feb. 14, 2015) (stating that proposed rules have been published and are being reviewed); Timothy Cama, *White House Reviews Federal-Land Fracking Rules*, THE HILL, Aug. 29, 2014, http://thehill.com/policy/energy-environment/216249-white-house-reviews-federal-land-fracking-rules (last visited Feb. 14, 2015) (stating that the White House's review of the proposed rules necessary for them to become final is expected to be completed in September of 2014); Tim Devaney, *Business Groups Brace for Deluge of Regs*, THE HILL, Sept. 11, 2014, http://thehill.com/regulation/223769-biz-groups-brace-for-deluge-of-regulation (last visited Feb. 14, 2015) (stating that the final version of the proposed rules is expected "any day").

121 *See* Hannah Wiseman, *Untested Waters: The Rise of Hydraulic Fracturing in Oil and Gas Production and the Need to Revisit Regulation*, 20 FORDHAM ENVTL. L. REV. 115, 184–87 (2009) (describing the need for Congress to repeal the fracking exemption from the Safe Drinking Water Act).

122 *See* Matt Willie, *Hydraulic Fracturing and "Spotty" Regulation: Why the Federal Government Should Let States Control Unconventional Onshore Drilling*, 2011 BYU L. REV. 1743, 1746 (2011).

123 *See* Patrick C. McGinley, *Regulatory Takings in the Shale Gas Patch*, 19 PENN ST. ENVTL. L. REV. 193, 239 (2011).

124 *See, e.g.*, Pa. Coal Co. v. Mahon, 260 U.S. 393, 415 (1922) (holding that under the Fifth Amendment, the State cannot mine under private property without providing the owners just compensation).

125 *See id.* (holding that while property may be regulated to a certain extent, a government regulation making it commercially impracticable to mine certain coal has the same effect as appropriating or destroying it, and thus is recognized as a taking).

overseen by the U.S. Environmental Protection Agency (EPA), provides sufficient federal control over the potentially earthquake-causing operations.[126] Proponents of this argument may argue that although the UIC program's purpose is to protect drinking water,[127] its robust permitting program already applies to all underground injection wells, including the wastewater injection wells that have been linked to the strongest injection-induced earthquakes to date,[128] and could therefore be more easily utilized to address the most substantial threats.

Those opposed to the Corps' utilization of section 10 to regulate hydraulic fracturing would likely raise these objections—as well as many others—during the Corps' administrative rulemaking proceedings, or in court. Although the objectors' arguments may have merit, a narrowly tailored rule and well-targeted enforcement proceedings would likely survive judicial review. Although the outcomes of these potential challenges are unpredictable, there is no doubt that the debate over the Corps' assertion of section 10 authority to regulate fracking would be exhaustive, public, and vibrant.

IV. CONCLUSION

Section 10 of the Rivers and Harbors Act provides the Corps with sufficient legal authority to regulate hydraulic fracturing activities that induce earthquakes capable of compromising its civil works projects. Case law shows that traditional jurisdictional limits of waterways do not constrain the Corps' enforcement or permitting authority. If the Corps—supported by a sufficient factual record—finds that hydraulic fracturing activities conducted on uplands pose a significant threat to its dams, locks, and levees, it could utilize section 10 to avert harm caused by hydraulic fracturing. Pursuant to section 10, the Corps could subject certain fracking operations to the DA permitting process and also initiate enforcement proceedings against companies whose activities trigger damage-causing earthquakes. In short, section 10 could empower the Corps to protect its

126 Rebecca Jo Reser, *State and Federal Statutory and Regulatory Treatment of Hydraulic Fracturing*, 80 DEF. COUNS. J. 90, 96 (2013) (discussing the implementation of the UIC program under the Safe Drinking Water Act to protect underground sources of drinking water for fracking purposes). The UIC program was established under the Safe Drinking Water Act. 42 U.S.C. § 300h(a) (2012).

127 Reser, *supra* note 126; *see also* Bruce M. Kramer, *Federal Legislative and Administrative Regulation of Hydraulic Fracturing Operations*, 44 TEX. TECH L. REV. 837, 840–41 (2012) (describing the statutory framework of the Safe Drinking Water Act and the UIC program's role in regulating surface water discharge).

128 Markus G. Puder & Michel J. Paque, *Tremors in the Cooperative Environmental Federalism Arena: What Happens When a State Wants to Assume Only Portions of a Primacy Program or Return a Primacy Program?—The Underground Injection Control Program Under the Safe Drinking Water Act as a Case Study*, 24 TEMP. J. SCI. TECH. & ENVTL. L. 71, 73–75 (2005) (explaining EPA's regulatory controls under the UIC program in requiring authorization for all underground injection wells based on well classification).

projects from the alleged threats of fracking, should those threats be realized.