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Preparing for the Aftermath of Drilling on Arctic Lands

Barrett Ristroph

Martin Robards

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* Dr. E.B. Ristroph, Esq., proprietor of Ristroph Law, Planning, and Research, works with tribes and agencies in Louisiana on climate change adaptation and coastal management planning.

** Dr. Martin Robards is Regional Director for the Wildlife Conservation Society, bringing over 25 years of research experience to protecting wildlife and wild places.

INTRODUCTION

For many years, two landscapes on Alaska's North Slope have remained mostly intact, serving as essential habitats for Arctic plants, animals, and people.[1] One of these landscapes is the Arctic National Wildlife Refuge (ANWR). The size of South Carolina, it is the largest of the national system of refuges managed by the U.S. Fish and Wildlife

1. GEORGE M. DURNER ET AL., U.S. GEO. SERVS. DATA SERIES 568, CATALOGUE OF POLAR BEAR (URSUS MARITIMUS) MATERNAL DEN LOCATIONS IN THE BEAUFORT SEA AND NEIGHBORING REGIONS, ALASKA, 1910–2010 (2010) (stating Coastal Plain is one of the most important land-denning areas for polar bears in the United States); Stephen Brown et al., *Shorebird Abundance and Distribution on the Coastal Plain of the Arctic National Wildlife Refuge*, 109 CONDOR: ORNITHOLOGICAL APPLICATIONS 1 (2007) (mentioning important habitat for imperiled birds); DON RUSSELL & ANNE GUNN, VULNERABILITY ANALYSIS OF THE PORCUPINE CARIBOU HERD TO POTENTIAL DEVELOPMENT OF THE 1002 LANDS IN THE ARCTIC NATIONAL WILDLIFE REFUGE, ALASKA (2019) (this report was prepared for Environment Yukon, Canadian Wildlife Service and GNWT Department of Environment and Natural Resources); RICHARD J. WILSON, A MORAL CHOICE FOR THE UNITED STATES, THE HUMAN RIGHTS IMPLICATIONS FOR THE GWICH'IN OF DRILLING IN THE ARCTIC NATIONAL WILDLIFE REFUGE (2005), http://ourarcticrefuge.org/wp-content/uploads/2012/10/GSChumanrightsreport.pdf [https://perma.cc/J8EM-YUBU] (describing the importance of the area for the Porcupine Caribou Herd and the Gwich'in People); Brad A. Andres et al., *Shorebirds Breeding in Unusually High Densities in the Teshekpuk Lake Special Area, Alaska*; 65 ARCTIC 411 (2012); Jonathan Bart et al., *Importance of the National Petroleum Reserve-Alaska for Aquatic Birds*, 27 CONSERVATION BIOLOGY 1304 (2013).

Service.[2] Its biologically abundant Coastal Plain along the Beaufort Sea is about the size of Delaware.[3] While large portions of ANWR outside of the Coastal Plain are designated as Wilderness,[4] where development is prohibited,[5] the Coastal Plain has a different status. The 1980 Alaska National Interest Lands Conservation Act (ANILCA)[6] permitted a single round of exploration that was completed in the 1980s. Until recently, pursuant to ANILCA Sections 1002 and 1003, additional drilling was prohibited on the Coastal Plain.[7]

West of ANWR, past the lands held by the State of Alaska, lies another important unit of federal lands—the National Petroleum Reserve-Alaska (NPRA). NPRA extends southward from its Coastal Plain along the Beaufort and Chukchi Seas toward the Brooks Range, covering an area about the size of the State of Indiana.[8] President Harding set aside the area in 1923, recognizing its potential for oil development.[9] The U.S. Navy and its contractor drilled 136 test holes in this area before Congress transferred

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2. U.S. FISH & WILDLIFE SERV., ARCTIC NATIONAL WILDLIFE REFUGE REVISED COMPREHENSIVE CONSERVATION PLAN, VOL. 1-1 (2015).

3. *The 2,000-Acre Footprint Myth*, AUDUBON, http://ak.audubon.org/news/2000-acre-footprint-myth [https://perma.cc/6NCA-6DEC] (last visited Sept. 10, 2019).

4. Alaska National Investment Land Conservation Act of 1980, Pub. L No. 96-487, § 702, 94 Stat. 2371; 43 U.S.C. § 1618.

5. Wilderness Act of 1964, ch. 23, 78 Stat. 890 (1964) (codified as amended at 16 U.S.C. §§ 1131–1136); Alaska National Investment Land Conservation Act of 1980, Pub. L No. 96-487, § 1003, 94 Stat. 2371; *see, e.g.,* 16 U.S.C. § 3143 (2016).

6. 16 U.S.C. § 3143 (2016).

7. *See* 16 U.S.C. § 3142(i) (2016) ("Until otherwise provided for in law enacted after December 2, 1980, all public lands within the Coastal Plain are withdrawn from all forms of entry or appropriation under the mining laws, and from operation of the mineral leasing laws, of the United States."); *see also* 16 U.S.C. § 3143 (2016) ("Production of oil and gas from the Arctic National Wildlife Refuge is prohibited and no leasing or other development leading to production of oil and gas from the range shall be undertaken until authorized by an Act of Congress."). As discussed *infra*, Congress revised ANILCA in 2017 to allow leasing of the Coastal Plain.

8. GEORGE GRYC, THE NATIONAL PETROLEUM RESERVE IN ALASKA EARTH-SCIENCE CONSIDERATIONS U.S. GEOLOGICAL SURVEY PROFESSIONAL PAPER 1240-C, C6 (1985), https://pubs.usgs.gov/pp/1240c/report.pdf [https://perma.cc/HL4C-6EB9].

9. *Frequently Asked Questions of the Integrated Activity Plan/Environmental Impact Statement*, BUREAU LAND MGMT., https://eplanning.blm.gov/epl-front-office/eplanning/planAndProjectSite.do?methodName=dispatchToPatternPage&currentPageId=14709 [https://perma.cc/CAR2-FSFW] (last visited Sept. 11, 2019) (citing and discussing the history and purpose of Executive Order 3797 of 1923).

jurisdiction of this land to the Bureau of Land Management (BLM) in 1976.[10]

The 1968 discovery of oil at Prudhoe Bay, situated on state lands between NPRA and ANWR,[11] started an intense period of development on state lands[12] that peaked in 1988.[13] Oil exploration and production on NPRA has been much more limited by comparison, with relatively few lease tracts receiving bids during annual sales.[14]

Two processes, both initiated by a 2018 Interior Secretary Order,[15] are expected to open up biologically important coastal areas of NPRA and ANWR for development. One of these processes is BLM's discontinuing the 2012 Integrated Activity Plan,[16] governing where and how development takes place in NPRA.[17] The 2012 plan struck a balance

10. Naval Petroleum Reserves Production Act, Pub. L. 94-258, 90 Stat. 303, (Apr. 5, 1976).

11. *March 13, 1968: Oil Discovered on Alaska's North Slope*, U.S. DEP'T ENERGY, https://www.energy.gov/management/march-13-1968-oil-discovered-alaskas-north-slope [https://perma.cc/875N-D9V4] (last visited Sept. 10, 2019).

12. U.S. GOV'T ACCOUNTABILITY OFFICE (GAO), GAO-02-357, ALASKA'S NORTH SLOPE, REQUIREMENTS FOR RESTORING LANDS AFTER OIL PRODUCTION CEASES 3 (2002); Elwood Brehmer, *NPR-A Sale Draws Limited Interest, but One New Company*, ALASKA J. COMM. (Dec. 12, 2018), http://www.alaskajournal.com/2018-12-12/npr-sale-draws-limited-interest-one-new-company#.XG7eJehKjZs [https://perma.cc/NH25-XDNY] (limited lease sale bids on federal compared to nearby state lands).

13. ALASKA DEP'T OF REVENUE & TAXATION, PRODUCTION HISTORY AND FORECAST BY PRODUCTION AREA FROM FALL 2017 RSB (2017), http://www.tax.alaska.gov/sourcesbook/AlaskaProduction.pdf [https://perma.cc/XDF5-E9DC].

14. *Alaska Oil and Gas Lease Sales*, BUREAU LAND MGMT., https://www.blm.gov/programs/energy-and-minerals/oil-and-gas/leasing/regional-lease-sales/alaska [https://perma.cc/Q3SJ-XQYX] (last visited Oct. 5, 2019); Yereth Rosen, *Alaskan Oil Lease Sale Brings Few Bids Despite Vast Territory Offered*, REUTERS (Dec. 6, 2017, 8:49 PM), https://www.reuters.com/article/us-usa-alaska-oil/alaskan-oil-lease-sale-brings-few-bids-despite-vast-territory-offered-idUSKBN1E109Q [https://perma.cc/969X-4D8D].

15. Dep't of the Interior, Secretarial Order No. 3352, National Petroleum Reserve-Alaska (May 31, 2017).

16. Bureau of Land Management, National Petroleum Reserve-Alaska Final Integrated Activity Plan/Environmental Impact Statement (2012) [hereinafter NPRA EIS/IAP 2012].

17. BLM Notice of Intent to Prepare the NPRA IAP/EIS 83 Fed. Reg. 58785, 58785 (Nov. 20, 2018) [hereinafter BLM, Notice of Intent]; *see also* Dep't of the Interior Secretarial Order No. 3360, Rescinding Authorities Inconsistent with Secretary's Order 3349, "American Energy Independence" (calling for

between development and conservation, leaving the most biologically important areas of land ("Special Areas") off limits to development. But many of the tracts with the greatest potential for development are included in the Teshekpuk Lake Special Area.[18] A new plan, if completed under the Trump Administration, will likely open additional areas for leasing, shrink the special area boundaries, and change the stipulations associated with leases.[19]

The second process, initiated by the Oil and Gas Program Tax Cuts and Jobs Act of 2017, involves opening ANWR to oil and gas lease sales. The 2017 Act required BLM to "establish and administer a competitive oil and gas program for the leasing, development, production, and transportation of oil and gas in and from the Coastal Plain," with management similar to lease sales for NPRA.[20]

Oil and gas development on the North Slope has significantly declined since its peak in the 1980s,[21] and many in Alaska and elsewhere are hailing the prospect of increasing future production.[22] Yet agencies with

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reconsideration of BLM's Draft Regional Mitigation Strategy for the Northeastern National Petroleum Reserve in Alaska (Sept. 2016)).

18. BUREAU LAND MGMT., NATIONAL PETROLEUM RESERVE IN ALASKA, 2018 SALE RESULTS (2018), https://www.blm.gov/sites/blm.gov/files/uploads/OilandGas_Alaska_2018_NPR-A_SaleResultsMap_12122018.pdf [https://perma.cc/C76C-J25B].

19. BLM, Notice of Intent, *supra* note 17.

20. Pub. L. No. 115-97, Title II, § 2001, 131 Stat. 2235 (Dec. 22, 2017).

21. *Alaska's Oil and Gas Industry*, RESOURCE DEV. COUNCIL, https://www.akrdc.org/oil-and-gas [https://perma.cc/R2R6-2SMD] (last visited Sept. 11, 2019); Kim Murphy, *The Flow Has Slowed Through the Trans-Alaska Oil Pipeline*, L.A. TIMES (Aug. 10, 2010, 12:00 AM), https://www.latimes.com/archives/la-xpm-2010-aug-10-la-na-alaska-oil-20100810-story.html [https://perma.cc/G7AA-85KN].

22. *Development of Alaska's ANWR Would Increase U.S. Crude Oil Production After 2030,* U.S. ENERGY INFO. ADMIN. (June 14, 2018), https://www.eia.gov/todayinenergy/detail.php?id=36472 [https://perma.cc/MN7X-2EH6]; ALASKA OIL & GAS ASS'N & AM. PETROLEUM INST., COMMENTS OF THE ALASKA OIL AND GAS ASSOCIATION AND AMERICAN PETROLEUM INSTITUTE ON THE BUREAU OF LAND MANAGEMENT'S DRAFT ENVIRONMENTAL IMPACT STATEMENT FOR THE COASTAL PLAIN OIL AND GAS LEASING PROGRAM (2019); Elizabeth Harball, *Interior Official: 'Millions' More Acres in NPR-A to Open for Oil Development*, ALASKA PUB. MEDIA (Aug. 9, 2018), https://www.alaskapublic.org/2018/08/09/interior-official-millions-more-acres-in-npr-a-to-open-for-oil-development/ [https://perma.cc/45AY-A2CA]; Letter from Albert Fogle, Vice President, Alaska Chamber, to State Director, BLM (Jan. 22, 2019), https://eplanning.blm.gov/epl-front-office/projects/nepa/117408/168485/205021/Alaska_Chamber_-_NPR-A_IAP_Scoping_Comments.pdf [https://perma.cc/5MZA-JG6C]

jurisdiction over this development are not adequately prepared for the long-term costs of restoring these lands once the oil and gas are no longer economically viable. The current health and ecological intactness of these areas support astounding numbers of wildlife, including mammals, birds, and fish. These species, in turn, support vibrant mixed economies of the region's communities.[23]

As experience elsewhere clearly demonstrates, the costs of plugging and abandoning wells (P&A) and dismantlement, removal, and restoration (collectively here, DR&R)[24] are substantial. If these costs are not set aside before development, the result may be abandonment by primary producers, bankruptcy of subsequent operators, and costs deferred to the State and local communities. This Article considers the damage that may result, especially to ecologically sensitive and important areas like the Coastal Plain and NPRA's Special Areas, absent adequate assurances to properly abandon and restore North Slope oil and gas fields.

The Government Accountability Office (GAO) previously addressed this topic in 2002,[25] where it found bond amounts and DR&R requirements to be inadequate. Since then, the Congressional Research Service,[26] the

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(discussing NPRA Scoping Comments); *Positions and Priorities 2019*, ALASKA CHAMBER, http://www.alaskachamber.com/priorities-and-positions [https://perma.cc/5MZA-JG6C] (last visited Sept. 11, 2019).

23. Shauna BurnSilver et al., *Are Mixed Economies Persistent or Transitional? Evidence Using Social Networks from Arctic Alaska*, 118 AMER. ANTHROPOLOGIST 121 (2016); E. Barrett Ristroph, *Still Melting: How Climate Change and Subsistence Laws Constrain Alaska Native Village Adaptation*, 30 COLO. NAT. RESOURCES, ENERGY, & ENVTL. L. REV. 246 (2019).

24. The authors use term the "DR&R" to refer collectively to all the costs associated with plugging and abandoning wells, as well as the costs of removing oilfield infrastructure and restoring the landscape to pre-drilling condition. Elsewhere, plugging and abandonment of wells (P&A) is often distinguished from removal of non-well infrastructure and land restoration, with only the latter being referred to as DR&R. In many jurisdictions, including the State of Alaska, separate agencies regulate P&A and other aspects of DR&R.

25. U.S. GOV'T ACCOUNTABILITY OFF., GAO-02-357, ALASKA'S NORTH SLOPE: REQUIREMENTS FOR RESTORING LAND AFTER OIL PRODUCTION CEASES 54 (2002).

26. R. ELIOT CRAFTON, LAURA B. COMAY & MARC HUMPHRIES, CONG. RESEARCH SERV., RL45192, OIL AND GAS ACTIVITIES WITHIN THE NATIONAL WILDLIFE REFUGE SYSTEM (2018).

Department of the Interior Inspector General,[27] and GAO[28] have continued to document the inadequacies of existing law to provide for DR&R. Also, the State of Alaska's Department of Natural Resources (ADNR) commissioned a "Decommissioning, Removal, and Restoration Regulatory Review" for Alaska's oil and gas operations, in order to better understand how other jurisdictions balance the need to attract investment in the oil and gas (or mining) sector while managing the financial risks associated with potential DR&R liabilities.[29] This Article adds to the existing literature by considering the unique ecology and high costs related to DR&R on the North Slope of Alaska, projecting the damage that recent development plans could cause, evaluating the full range of current laws applicable to DR&R, and suggesting specific DR&R standards that should be considered in the overall costs of operations. Such an understanding is crucial *prior* to drilling in sensitive areas of the North Slope that, up until now, have largely been protected from drilling. Not only would there be significant damage to important ecological areas, the potential that DR&R efforts will be absent or minimal is high given the declining prices of oil and increasing number of oil company asset transfers and bankruptcies.

This Article first considers the legacy of damage associated with inadequate assurances and improper DR&R in places like Louisiana,[30] the known and potential for damage in Arctic Alaska, and the potential costs of proper DR&R. Second, it outlines the current legal regime for DR&R on the North Slope. While clearly inadequate to assure proper DR&R, some aspects of this regime are better than regimes for oil and gas development in other U.S. jurisdictions. Based on oil and gas laws in non-

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27. OFF. INSPECTOR GEN. U.S. DEPARTMENT OF THE INTERIOR, CR-EV-FWS-0002-2014, U.S. FISH AND WILDLIFE SERVICE'S MANAGEMENT OF OIL AND GAS ACTIVITY (2015) [hereinafter OIG].

28. U.S. GOV'T ACCOUNTABILITY OFF., GAO-03-517, NATIONAL WILDLIFE REFUGES, OPPORTUNITIES TO IMPROVE THE MANAGEMENT AND OVERSIGHT OF OIL AND GAS ACTIVITIES ON FEDERAL LANDS (2003); U.S. GOV'T ACCOUNTABILITY OFF., GAO-10-245, OIL AND GAS BONDS, BONDING REQUIREMENTS AND BLM EXPENDITURES TO RECLAIM ORPHANED WELLS (2010); U.S. GOV'T ACCOUNTABILITY OFF., GAO-11-292, OIL AND GAS BONDS, BLM NEEDS A COMPREHENSIVE STRATEGY TO BETTER MANAGE POTENTIAL OIL AND GAS WELL LIABILITY (2011).

29. *See* ALASKA DEP'T NAT. RES, ARCADIS, DECOMMISSIONING, REMOVAL, AND RESTORATION REGULATORY REVIEW 2 (2014); MARY KOKS, ALL GOOD THINGS MUST END DECOMMISSIONING OIL AND GAS FACILITIES AND BANKRUPTCY IMPACTS 9 (2017), http://www.cailaw.org/media/files/IEL/ConferenceMaterial/2017/oilgas/koks-paper.pdf [https://perma.cc/GZQ2-UJVR].

30. While no state requires a bond adequate to ensure full DR&R, Louisiana is a good study for reasons indicated in Part I.A, *infra*.

U.S. jurisdictions and the regime applicable to mining and offshore oil, this Article recommends some legal changes. Third, it provides recommendations that BLM and the U.S. Fish and Wildlife Service (FWS) could impose under existing laws. Finally, this Article acknowledges and incorporates the interest by regional government, made up primarily of indigenous residents, to maintain some level of infrastructure (e.g., roads) beyond the life of the oil fields.

I. BACKGROUND ON DAMAGES AND RESTORATION: ONGOING FAILURES, POTENTIAL FAILURES, AND COSTS

A. Examples of Damages Associated with Inadequate DR&R

Local impacts on wildlife and the environment related to oil and gas development include habitat modification, facility development, transportation corridors (pipelines and roads), wildlife mortality and displacement, and the introduction of invasive species.[31] Without a regime ensuring proper DR&R, the number of improperly abandoned oil and gas wells increases overtime and can continue to negatively impact the surrounding landscapes.[32] The presence of inactive and suspended wells

31. Pedro Ramirez, Jr. & Sherri Baker Mosley, *Oil and Gas Wells and Pipelines on U.S. Wildlife Refuges: Challenges for Managers*, 10 PLoS ONE S1 (2015), https://doi.org/10.1371/journal.pone.0124085 [https://perma.cc/8ZDU-WL36]; NAT'L RESEARCH COUNCIL, CUMULATIVE ENVIRONMENTAL EFFECTS OF OIL AND GAS ACTIVITIES ON ALASKA'S NORTH SLOPE (2003) [hereinafter NRC]; Terry Z. Riley et al., *Impacts of Crude Oil and Natural Gas Developments on Wildlife and Wildlife Habitat in the Rocky Mountain Region*, WILDLIFE SOC'Y TECH. REVIEW 12-02 (2012); THE WILDERNESS SOC'Y, BROKEN PROMISES**,** THE REALITY OF OIL DEVELOPMENT IN AMERICA'S ARCTIC (2d ed.) (2009). Oil and gas activity also contribute to greenhouse gas emissions, which in turn contribute to climate change impacts. INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 2014: SYNTHESIS REPORT. CONTRIBUTION OF WORKING GROUPS I, II AND III TO THE FIFTH ASSESSMENT REPORT OF THE INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE 2 (2014); Carl Markon et al., *Alaska*, *in* IMPACTS, RISKS, AND ADAPTATION IN THE UNITED STATES: FOURTH NATIONAL CLIMATE ASSESSMENT, VOLUME II (D.R. Reidmiller et al (eds.) 25–26 (2018).

32. Edith Allison & Ben Mandler, The American Geosciences Institute, *Abandoned Wells What happens to Oil and Gas Wells When They Are no Longer Productive? Petroleum and the Environment*, PETROLEUM & ENVT., June 2018, 7-1, https://www.americangeosciences.org/sites/default/files/AGI_PE_Abandoned Wells_web_final.pdf [https://perma.cc/KC3F-4FZJ].

can increase the risk of contamination to surface water, groundwater, and soil; these wells may release methane or other gas.[33]

This Part begins with an example of an inadequate regime—that of Louisiana, which has continually developed onshore oil and gas since 1901.[34] While laws controlling Louisiana's oilfield operations have been in place since 1906,[35] enforcement has been underfunded and, therefore, ineffective.[36] This problem worsened when major operators moved offshore, and small independent firms with limited financial resources began taking over onshore leases.[37] Louisiana did not utilize financial security requirements until 2000, and those only applied to select categories of drillers.[38] For wells drilled onshore prior to 2016, a bond of $25,000 plus a charge for depth sufficed for ten wells.[39]

In 2015, there were 2,830 oil and gas wells drilled in Louisiana's National Wildlife Refuges alone.[40] The status of many of these wells has not been tracked to ensure that they are not damaging the environment.[41]

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33. Benjamin Dachis, Blake Shaffer & Vincent Thivierge, *All's Well that Ends Well: Addressing End-of-Life Liabilities for Oil and Gas Wells*, 492 CD HOWE INST. COMMENT. 7 (2017); JACQUELINE HO ET AL., PLUGGING THE GAPS IN INACTIVE WELL POLICY, RESOURCES FOR THE FUTURE REPORT (2016).

34. *History of the Industry,* LA. MID-CONTINENT OIL & GAS ASS'N, http://www.lmoga.com/resources/oil-gas-101/history-of-the-industry/ [https://perma.cc/6NJQ-L6GL] (last visited Sept. 11, 2019); AMERICAN OIL AND GAS HISTORICAL SOCIETY FIRST OIL DISCOVERIES, https://aoghs.org/petroleum-discoveries/ [https://perma.cc/A2CY-EY5P] (last visited May 20, 2019); KOKS, *supra* note 29, at 24; J. Michael Veron, *Oilfield Contamination Litigation in Louisiana: Property Rights on Trial*, 25 TUL. ENVTL. L.J. 1, 6 (2011).

35. Act 71 of 1906 prohibited setting wells on fire and required gas wells to be plugged and abandoned. The state legislature enacted various laws until the 1930s, when what is now the Department of Natural Resource assumed regulatory control. Veron, *supra* note 34, at 6.

36. *Id.*

37. MINERALS MGMT. SERV., MMS 2008-042, HISTORY OF THE OFFSHORE OIL AND GAS INDUSTRY IN SOUTHERN LOUISIANA VOLUME I: PAPERS ON THE EVOLVING OFFSHORE INDUSTRY 13 (2008), https://www.boem.gov/ESPIS/4/4530.pdf [https://perma.cc/RJB4-B9HL].

38. Sue Lincoln, *DeSoto Parish Emergency: All Out Of Funds*, BAYOU BRIEF, (Feb. 28, 2019), https://www.bayoubrief.com/2019/02/28/desoto-parish-emergency-all-out-of-funds/ [https://perma.cc/8TYN-7B38].

39. The amount has since been raised to $50,000 for up to 10 wells, $250,000 for up to 99 wells, and $500,000 for 100 or more wells, plus a charge related to well depth. Onshore wells in waterbodies have higher rates, and offshore wells have rates that are higher still. *See* LA. ADMIN. CODE tit. 51, pt. 19 § 104 (2016).

40. Ramirez, Jr. & Mosley, *supra* note 31.

41. *Id.*

There are chronic oil and brine leaks and spills at oil production sites, with dead vegetation due to oilfield brine spills, trash, and abandoned wells and oilfield equipment.[42]

As of 2019, there are nearly 4,000 abandoned, unplugged wells throughout Louisiana.[43] Many of them have been deteriorating for decades and some of them are leaking.[44] In 2014, the rapid decline in oil prices led to a spike in abandonment.[45] Small operators operating on thin margins have tended to abandon wells without plugging them, knowing that the state will not seek reimbursement for expenses under $250,000 per well.[46] No agency has studied the environmental impacts of these abandoned wells.[47]

Damages associated with drilling in Louisiana are not limited to abandoned wells. Dredging canals into Louisiana's wetlands has been a long-standing practice to provide access to drill sites.[48] The resulting saltwater incursion has destroyed coastal wetlands and hastened coastal erosion.[49] Added to these coastal impacts is the phenomenon of land

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42. *Id.*

43. *Orphan Wellsite List*, LA. DEP'T OF NAT. RESOURCES, http://www.dnr.louisiana.gov/index.cfm?md=pagebuilder&tmp=home&pid=155 [https://perma.cc/GJP7-RUUH] (last updated Mar. 28, 2019).

44. Lee Zurik & Tom Wright, *Zurik: Orphan Wells and the Deadbeats Who Leave Them*, FOX 8 WVUE-TV, (Nov. 3, 2017), www.fox8live.com/story/36750057/zurik-orphan-wells-and-the-deadbeats-who-leave-them/ [https://perma.cc/75YM-Q3LZ].

45. Sam Karlin, *What's an 'Orphan well?' Louisiana Oil Recession Leaves Plenty of Them Behind*, ADVOCATE, (Jul. 15, 2018, 11:00 PM), https://www.theadvocate.com/baton_rouge/news/business/article_a8fcdd26-7ed4-11e8-91ba-a71945c9252c.html https://perma.cc/9QN3-QUYB; *see also* Ronald Oran Jr. & David Reiner, *Who Is Responsible for Decommissioning Costs for Oil and Gas Assets Abandoned or Sold in Bankruptcy?* AM. BAR ASS'N ENERGY LITIG. (Feb. 26, 2016), https://www.americanbar.org/groups/litigation/committees/environmental-energy/articles/2016/winter2016-energy-who-is-responsible-for-decommissioning-costs-for-oil-and-gas-assets-abandoned-or-sold-in-bankruptcy/ [https://perma.cc/8U67-NTNS].

46. Zurik &Wright, *supra* note 44.

47. *Id.*

48. Donald Wayne Davis, Louisiana Canals and Their Influence on Wetland Development 122–146 (Apr. 9, 1973) (Ph.D. dissertation, Louisiana State University) (on file with author, available at http://digitalcommons.lsu.edu/gradschool_disstheses/2386 [https://perma.cc/MH83-PLME]).

49. John Carey, *Louisiana Wetlands Tattered by Industrial Canals, Not Just River Levees*, SCI. AM. (Dec. 1, 2013), https://www.scientificamerican.com/article/carey-louisiana-wetlands-tattered-by-industrial-canals/ [https://perma.cc/VRM7-FFH5]; Joseph Baustian, Restoration Success of Backfilling Canals in

subsidence, which has various causes in Louisiana, including the removal of oil and gas and the resulting decrease in reservoir pore pressure.[50] These phenomena have contributed to extreme land loss along Louisiana's coast—with an area greater than the size of Delaware lost between 1932 and 2016.[51]

Louisiana has typically addressed oilfield damage after the fact, if at all, by allowing private landowners to litigate DR&R. Even this has been curtailed by state legislation, requiring landowners to engage in a mini-trial with the Louisiana Department of Natural Resources before a court trial. This reduces financial incentives for landowners to seek DR&R.[52]

While Louisiana appears to have more oil and gas wells located in National Wildlife Refuges than any other state,[53] it is not the only state where drilling takes place in refuges.[54] Alaskans need look no further than

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Coastal Louisiana Marshes 1 (May 1, 2005) (Master's Thesis, Louisiana State University) (on file with author, available at https://digitalcommons.lsu.edu/gradschool_theses/749 [https://perma.cc/UXS9-HBWY]).

50. Brendan Yuill, Dawn Lavoie & Denise J. Reed, *Understanding Subsidence Processes in Coastal Louisiana*, 54 J. COASTAL RESEARCH 23, 32 (2009); DONALD F. BOESCH, DOUGLAS LEVIN, DAG NUMMEDAL & KEVIN BOWLES, U.S. FISH & WILDLIFE SERV., DIV. OF BIOLOGICAL SERVS., FWS/OBS-83/26 SUBSIDENCE IN COASTAL LOUISIANA: CAUSES, RATES, AND EFFECTS ON WETLANDS 17 (1983).

51. BRADY R. COUVILLION, HOLLY BECK, DONALD SCHOOLMASTER & MICHELLE FISHER, LAND AREA CHANGE IN COASTAL LOUISIANA 1932 TO 2016: U.S. GEOLOGICAL SURVEY SCIENTIFIC INVESTIGATIONS MAP 3381, at 16 (2017), https://doi.org/10.3133/sim3381 [https://perma.cc/73YS-U4D9]; *Size of States, National (U.S.) States: Size in Square Miles*, STATE SYMBOLS USA, https://statesymbolsusa.org/symbol-official-item/national-us/uncategorized/states-size [https://perma.cc/CX7W-T5C4] (last visited Sept. 24, 2019).

52. Act No. 1166, 2006, La. Acts 3511 (amended by Act No. 312, 2006 La. Acts 1472).

53. CRAFTON, COMAY & HUMPHRIES, *supra* note 26, at 15. It also has the highest number of refuges with oil and gas activity. *Id.*

54. Other states include Arizona, New Mexico, Oklahoma, Texas, Indiana, Michigan, Missouri, Alabama, Arkansas, Florida, Mississippi, New York, Pennsylvania, West Virginia, Colorado, Kansas, Montana, North Dakota, Utah, Wyoming, Alaska, California, and Nevada. *Id.* The number of refuges differs depending on source. *See, e.g.*, OIG, *supra* note 27, at 4 (over 200 wells within 110 Refuges); U.S. GOV'T ACCOUNTABILITY OFF., GAO-03-517, NATIONAL WILDLIFE REFUGES, OPPORTUNITIES TO IMPROVE THE MANAGEMENT AND OVERSIGHT OF OIL AND GAS ACTIVITIES ON FEDERAL LANDS (2003) (155 refuges have past or present oil and gas activity; 105 contain a total of 4,406 oil and gas wells—2,600 inactive wells and 1,806 active wells); Ramirez, Jr. & Mosley, *supra* note 31 (5,002 wells in 107 Refuges).

their Kenai Refuge, where, as of 2016, FWS has identified 191 nonfederal wells and 92 federal wells.[55] This has resulted in fragmentation of wildlife habitats for brown bears and other wildlife,[56] disturbance of denning bears, wolves, and lynx during seismic exploration,[57] and contamination of soils and groundwater with toxic substances such as mercury and polychlorinated biphenyls.[58]

In 2003, GAO found that FWS lacked information on the number and location of abandoned wells throughout the refuge system and regarding the damage associated with these wells.[59] This lack of information hinders FWS's ability to require responsible parties to undertake needed DR&R.[60] The Office of the Inspector General of the Interior Department raised similar concerns in a 2015 report,[61] finding that some refuge managers had not even attempted to exercise authority over oil and gas operations on their refuges.[62] Managers that have enforced regulations and guidance

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55. U.S. FISH & WILDLIFE SERV., NON-FEDERAL OIL & GAS ACTIVITIES ON NATIONAL WILDLIFE REFUGE SYSTEM LANDS (2016), https://www.fws.gov/refuges/oil-and-gas/pdfs/Oil-Gas-Fact-sheet.pdf [https://perma.cc/R2YT-ZBSG].

56. Lowell H. Suring et al., *Analysis of Cumulative Effects on Brown Bears on the Kenai Peninsula, Southcentral Alaska*, 10 URSUS 107 (1998).

57. W.R. Staples & T.N. Bailey, Disturbance of and a Human Fatality Related to Brown Bears in Dens During Winter Seismic Exploration on the Kenai National Wildlife Refuge, Alaska (U.S. Fish and Wildlife Service, Kenai National Wildlife Refuge, Alaska, 1998).

58. U.S. GOV'T ACCOUNTABILITY OFF., GAO-03-517, NATIONAL WILDLIFE REFUGES, OPPORTUNITIES TO IMPROVE THE MANAGEMENT AND OVERSIGHT OF OIL AND GAS ACTIVITIES ON FEDERAL LANDS 24 (2003); TIFFANY A.S. PARSON, U.S. FISH AND WILDLIFE SERV., KENAI NATIONAL WILDLIFE REFUGE CONTAMINANT ASSESSMENT (2001), https://www.sciencebase.gov/catalog/item/572a2a62e4b0b13d391a092e [https://perma.cc/X93S-89A6]; NAT'L AUDUBON SOC'Y AND DEF. OF WILDLIFE, TOXIC TUNDRA: OIL DRILLING IN AN ALASKAN WILDLIFE REFUGE LEAVES A TOXIC LEGACY OF OIL SPILLS AND POLLUTION (2002), http://www.protectthearctic.com/studies_toxicdrilling.html [https://perma.cc/4GL2-SYVB].

59. U.S. GOV'T ACCOUNTABILITY OFF., GAO-03-517, NATIONAL WILDLIFE REFUGES, OPPORTUNITIES TO IMPROVE THE MANAGEMENT AND OVERSIGHT OF OIL AND GAS ACTIVITIES ON FEDERAL LANDS 29 (2003).

60. *Id.* at 30.

61. OIG, *supra* note 27, at 5, 11. Of the 5000 wells OIG documented on refuge lands, the status of about 3000 were identified as inactive or unknown, such that it was unclear whether they had been plugged and properly abandoned. *Id.* at 12.

62. This inaction was apparently based on a 1986 Solicitor's opinion. *See id.* at 4. FWS has since found this opinion to be inapplicable. Management of Non-Federal Oil and Gas Rights, 81 Fed. Reg. 79948, 79950 (Nov. 14, 2016) [hereinafter FWS 2016 Rule].

have not consistently done so.[63] In short, there are many landscapes, even within the Refuge system, where wells remain improperly abandoned without the prospect of adequate DR&R.

B. Impacts of Past Oil and Gas Development on the North Slope of Alaska

Since the mid-twentieth century, thousands of wells have been drilled on the North Slope,[64] and a great deal of infrastructure has been installed to support oil and gas development. This Subpart gives an overview of the damage that oil and gas development has already caused on North Slope lands.

Seismic exploration surveys have gridded the North Slope, with over 32,000 miles of seismic trails made from 1990 to 2001.[65] Seismic exploration conducted in ANWR in the 1980s resulted in significant impacts on tundra vegetation that persisted for decades.[66] Even in recent times, some sections of the 1980s seismic trails are still visible.[67]

When oil and gas exploration began on the North Slope, knowledge about its effects on permafrost was limited.[68] Trails were often cut directly into frozen ground, and summer travel with heavy vehicles left deep ruts that destroyed the vegetative mat protecting the permafrost.[69] Many of the early exploration wells were drilled without gravel pads, and in some cases drilling wastes were deposited directly on the tundra.[70] Later, drilling

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63. OIG, *supra* note 27, at 5, 11. Of the 5,000 wells OIG documented on Refuge lands, the statuses of about 3,000 were identified as inactive or unknown, such that it was unclear whether they had been plugged and properly abandoned. *Id.* at 12.

64. As of June 2019, the number of wells on the North Slope is as follows: 169 suspended, 2,308 plugged, 617 idle, and 3,095 active. Email from Winston Hughes (AOGCC) to Barrett Ristroph, (June 12, 2019) (on file with author).

65. NRC, *supra* note 31, at 86.

66. Janet Jorgensen et al., *Long-term Recovery Patterns of Arctic Tundra After Winter Seismic Exploration*, 20(1) ECOLOGICAL APPLICATIONS, 205–21 (2010).

67. Alaska Wilderness League et al., Comments on the Notice of Availability of the Draft Environmental Impact Statement for the Coastal Plain Oil and Gas Leasing Program and Announcement of Public Subsistence-Related Hearings, 83 Fed. Reg. 67,337 (Dec. 28, 2018) at 49 [hereinafter Conservation Comments on ANWR DEIS 2019]. As of 2003, some seismic trails from the 1940s are still visible on the North Slope. *See* NRC, *supra* note 31, at 81.

68. NRC, *supra* note 31, at 77.

69. *Id.*

70. *Id.*

wastes were contained in reserve pits, which often leaked.[71] Although there have been improvements in waste management over time, large amounts of scrap metal and other solid waste have accumulated.[72] There is no comprehensive plan for the disposal of scrap metal and abandoned rigs, and the problem will likely become more serious as facilities age and more infrastructure accumulates.[73] Even with reduced footprints in future development, there is a substantial web of existing infrastructures that will be added to over time.

An example of the solid waste problem is the abandoned site referred to as Service City, consisting of about 60 acres located on state lands. Beginning in the mid-1960s, operators used the site for staging, servicing, and storing oil field equipment and supplies.[74] Over 12 lessees made use of the area prior to abandonment in 1986, leaving behind metal buildings, equipment, lead acid batteries, and tons of other debris and waste.[75] The state did not revoke the area leases until 1990.[76] At that time, the state entered a cooperative agreement with three operators (BP, ARCO, and ExxonMobil) to clean up the site.[77] As of 2002, about $2 million had been spent on this relatively small site as compared to the existing oil and gas operating areas.[78] The site is still not fully restored.[79]

As mentioned in the Introduction, the federal government was responsible for many wells drilled in NPRA between 1944 and 1981. These wells, referred to as the "legacy wells," were never properly plugged and abandoned. Between 2002 and 2015, BLM and the U.S. Army Corps of Engineers spent approximately $90 million remediating 18 of these 136 "legacy wells" (about $5 million per well).[80] In 2014, Senator Lisa Murkowski was able to get $50 million allocated through the Helium Act

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71. *Id.*

72. *Id*. at 93.

73. *Id.*

74. U.S. GOV'T ACCOUNTABILITY OFF., GAO-02-357, ALASKA'S NORTH SLOPE: REQUIREMENTS FOR RESTORING LAND AFTER OIL PRODUCTION CEASES 54 (2002).

75. *Id*.

76. *Id*.

77. *Id*.

78. *Id*.

79. *Site Report: Service City Pad*, ALASKA DEP'T OF ENVTL. CONSERVATION, http://dec.alaska.gov/Applications/SPAR/PublicMVC/CSP/SiteReport/1175 [https://perma.cc/4CB3-LT9Q] (last updated Apr. 9, 2019).

80. *Alaska Legacy Wells Program*, BUREAU LAND MGMT. https://www.blm.gov/programs/energy-and-minerals/oil-and-gas/alaska-legacy-wells [https://perma.cc/ZCX5-GCQS] (last visited Sept. 11, 2019).

to clean up legacy wells that BLM has determined to be in need of remediation.[81]

Cathy Foerster, of the Alaska Oil and Gas Conservation Commission (AOGCC), the Alaska entity with the authority to require bonds for wells, repeatedly testified before Congress and the media regarding the inadequacy of federal DR&R for legacy wells.[82] Foerster testified before Congress that BLM's cleanup efforts using Helium Act funding did not follow AOGCC requirements for well closure and were unsuccessful at plugging the two worst wells.[83] BLM "ended up leaving both in such a compromised condition that, when they go back to fix them, it will cost a whole lot more money and may not be doable."[84] According to BLM, it spent $10 million of the Helium Act funding in 2015 to plug only three legacy wells in one location and conduct surface clean up at well sites in another location.[85] BLM indicated that it planned to spend the remaining $40 million in federal funding to plug and clean up an additional 18 of the remaining 47 wells that it assessed as in need of remediation.[86] This would be a little more than $2 million per well, which may be insufficient if the

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81. *Id.*; Helium Stewardship Act of 2013, Pub. L. No. 113-40, § 10(b), 127 Stat. 545 (Oct. 2, 2013).

82. *See, e.g., Provide Oversight on Remediation of Federal Legacy Wells in the National Petroleum Reserve-Alaska, Hearing Before the S. Comm. on Energy and Natural* Resources, 112th Cong. 11-27 (2012) (statement of Cathy Foerster, Engineering Commissioner and Chair, Alaska Oil and Gas Conservation Commission), https://www.gpo.gov/fdsys/pkg/CHRG-112shrg76612/html/CHRG-112shrg76612.htm [https://perma.cc/PSM3-7S44]; Elizabeth Harball, *State Regulator Pushes for Stronger Laws to Deal With Abandoned Oil Wells*, ALASKA PUB. MEDIA (Mar. 6, 2018), https://www.alaskapublic.org/2018/03/06/state-regulator-pushes-for-stronger-laws-to-deal-with-abandoned-oil-wells/ [https://perma.cc/86E5-TPAV]; Nick Snow, *US House Considers Moving Federal Onshore Oil, Gas Oversite to States*, OIL & GAS J. (Nov. 27, 2017), http://digital.ogj.com/ogjournal/20171127?pg=23#pg23 [https://perma.cc/Q3RG-BPC7].

83. Cathy Foerster, *Alaska Oil and Gas Conservation Commission*, PowerPoint Presentation for the Alaska State Legislature House Resources Standing Committee, (Feb. 8, 2017), http://www.akleg.gov/basis/Meeting/Detail?Meeting=HRES%202017-02-08%2013:00:00#tab3_4 [https://perma.cc/Q6FQ-L5N7].

84. *Id.*

85. Press Release, Bureau of Land Management, BLM Announces Major Clean-Up Effort of Legacy Wells in the National Petroleum Reserve in Alaska (Feb. 17, 2016), https://www.blm.gov/press-release/blm-announces-major-clean-effort-legacy-wells-national-petroleum-reserve-alaska [https://perma.cc/HDM6-XFGE].

86. *Id.*

previous three wells are any indication. These remediation processes can be long and complex, as the wells are old and poorly documented, and some obstacles may not be anticipated in advance—issues that likely expand over time.

More recently, Foerster has referred to the phenomenon of smaller, financially unstable operators taking over leases, not unlike what happened in Louisiana decades before.[87] This phenomenon is already coming to pass in Alaska; in 2019, BP sold all of its upstream and midstream assets (around $5.6 billion) to a small company known as Hilcorp Energy.[88] Such takeovers are problematic because the smaller operators are less likely to have the resources to pay for DR&R when production ceases. For example, in 2018, the bankruptcy of Aurora Gas left the state financially responsible for cleaning up three wells left on state land.[89]

Blowouts (uncontrolled releases from wells) and spills associated with North Slope exploration and production have resulted in additional damage requiring remediation. BP had two blowouts from exploration wells in April 2017 and December 2018, and Repsol had a blowout in February 2012 from an exploration well.[90] For Fiscal Year 2018, the Alaska Department of Environmental Conservation (ADEC) documented 2,069 new spill cases throughout the state, including 40,299 gallons that spilled on the North Slope. Yet ADEC only billed responsible parties for cleanup in 294 cases, and only took legal action in three cases.[91]

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87. Harball, *supra* note 82; *cf.* ARCADIS, *supra* note 29, at ES-2; NRC *supra* note 31, at 95 (as leases on the North Slope are transferred from the large multinational companies to smaller independent firms, the smaller concerns are less likely to have the resources to pay for DR&R when production ceases).

88. Brian Scheid, *Does BP's Alaska Exit Spell Trouble for Trump Administration's Oil, Gas Plans for State?* S&P GLOBAL (Aug. 28, 2019, 9:31 PM), https://www.spglobal.com/platts/en/market-insights/latest-news/oil/082819-does-bps-alaska-exit-spell-trouble-for-trump-administrations-oil-gas-plans-for-state [https://perma.cc/7JXP-3UTB].

89. Harball, *supra* note 82. A similar example is the 2009 bankruptcy of Pacific Energy Resources, which owned the Osprey platform in Cook Inlet, Alaska. A new operator resumed operations on Osprey, saving the state from spending tens of millions of its own funds to address the remaining platform. Kristen Nelson, *Bonding for DR&R for Platforms? DNR Considering Changes to Regs,* 18 PETROLEUM NEWS (Sept. 01, 2013), http://www.petroleumnews.com/pntruncate/817883809.shtml [https://perma.cc/SX5R-VFNF].

90. Conservation Comments on ANWR DEIS 2019, *supra* note 67, at 93.

91. ALASKA DEP'T OF ENVTL. CONSERVATION, SPILL PREVENTION AND RESPONSE ANNUAL REPORT, FISCAL YEAR 2018 25 (2019).

In short, even though the oil and gas industry may be modernizing with more efficient and environmentally sound technology, the problem of ensuring DR&R remains. The next Subpart provides specific examples of costs related to inadequate DR&R.

C. Examples of DR&R Costs

Costs of DR&R can differ based on a variety of factors, including the depth, age, and condition of wells; the concentration of wells in a given area; the difficulty of site access; the nature of support infrastructure at the site (i.e., roads, buildings, pipelines, and other structures, as well as the gravel pads they are built upon); the availability of plugging services; regulatory requirements; and any long-term damage done to the site as a result of operations (including spills).[92] Agencies have done relatively little to evaluate the true costs of DR&R and match bonds to these costs. The following are some examples of what agencies have spent in recent decades plugging orphaned (improperly abandoned) wells,[93] as compared to bond values:

(a) A review of the costs to plug abandoned wells and reclaim the sites in Wyoming between 1997 and 2007 found that costs averaged approximately $29,000 per well, while the bond amount per well was approximately $6,000 (or $1.79 per foot).[94] The Wyoming Oil and Gas Conservation Commission plugged 452 wells between 1997 and 2014. The cheapest well cost $569 to plug, while the most expensive cost $527,829.[95]

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92. Jacqueline S. Ho et al., *Managing Environmental Liability: An Evaluation of Bonding Requirements for Oil and Gas Wells in the United States,* 52 ENVTL. SCI. TECH. 3908, 3910 (2018); Matt Andersen & Roger Coupal, *Economic Issues and Policies Affecting Reclamation in Wyoming's Oil and Gas Industry*, Paper at National Meeting of the American Society of Mining and Reclamation, Billings, MT 40, 42 (2009).

93. Information on these costs is relatively limited. *See* ARCADIS, *supra* note 29, at ES2; Erovie-OgheneUyoyou-karo Afieroho et al., *From Declared Asset Retirement Obligations to a Decommissioning Cost Estimate for Onshore Crude Oil Fields in Nigeria*, J. ENVT'L MGMT. 207, 208 (2017). Thus, this Part simply collects whatever information the authors could find with an Internet search. Since the costs depend on so many different factors, the authors did not attempt to come up with a definitive cost per well or lease.

94. Andersen & Coupal, *supra* note 92, at 11.

95. Stephanie Joyce & Jordan Wirfs-Brock, *The Rising Cost of Cleaning Up After Oil and Gas*, WYO. PUB. RADIO (Oct. 1, 2015), http://insideenergy.org/2015/10/01/the-rising-cost-of-cleaning-up-after-oil-and-gas/ [https://perma.cc/36FN-LM5Y].

(b) In 2010, the General Accounting Office estimated an average reclamation cost of $12,788 per well (more than $1 billion total) for the 88,537 wells on federal land.[96] At that time, the operators of those wells had posted only $162 million in bonds, about 10% of the costs of proper P&A.[97]
(c) In 2011, plugging a 3,000 foot-deep abandoned well and restoring the site in western Pennsylvania was estimated to cost approximately $60,000, although the bonding amount for such a well could be as little as $2,500.[98]
(d) In Texas, the revenue from required bonds covered just 15.9% of the cost to plug wells in fiscal year 2015.[99]
(e) A 2017 comparison of well plugging costs and bonds in 13 states found that costs exceeded bonds in all states except Oklahoma. In Pennsylvania, 98% of the wells (2,824 out of 2,866) cost more to plug than the average bond, with the costliest 1% of wells exceeding the bond by more than $64,000 for each project.[100]
(f) P&A costs for gas wells located in Alaska's Cook Inlet were estimated by a private contractor to be $100,000 to $250,000 per well, and by the State to be as much as $1 million per well.[101] P&A costs for another well in the same area (the Shadura well) were estimated at about $500,000 (including the cost of constructing an ice road to access the well).[102]

While there is some guidance on costs for plugging orphaned wells, there is a dearth of information available on the full costs of DR&R—a process

96. U.S. GOV'T ACCOUNTABILITY OFF., GAO-10-245, OIL AND GAS BONDS, BONDING REQUIREMENTS AND BLM EXPENDITURES TO RECLAIM ORPHANED WELLS (2010).

97. ARCADIS, *supra* note 29, at ES-13.

98. Austin L. Mitchell & Elizabeth A. Casman, *Economic Incentives and Regulatory Framework for Shale Gas Well Site Reclamation in Pennsylvania*, 45 ENVT'L. SCI. & TECH. 9506, 9508 (2011).

99. R.R. COMM'N OF TEX. SUNSET, ADVISORY COMMISSION STAFF REPORT 2016−2017 (2016), https://www.sunset.texas.gov/public/uploads/files/reports/Railroad%20Commission%20of%20Texas%20Staff%20Report_4-29-16.pdf [https://perma.cc/7K3R-P3JV].

100. Ho et al., *supra* note 92, at 52.

101. Alan Bailey, *A Bonding Challenge Aurora Exploration Appeals AOGCC's $6 Million Order for Nicolai Creek,* 22 PETROLEUM NEWS (Sept. 24, 2017), http://www.petroleumnews.com/pntruncate/864924693.shtml [https://perma.cc/6B9S-RAUH].

102. *Id.*

that goes beyond just properly plugging and abandoning wells. A few examples are notable:

(a) A 2003 GAO report indicates that FWS spent $387,100 to clean up 14 oil- or gas-related sites between fiscal years 1991 and 2002.[103]
(b) In 2001, Phillips Petroleum estimated the average DR&R cost for removing existing infrastructure and restoring the landscape at one North Slope drilling site (Alpine) to be between $500,000 and $1 million per acre.[104]
(c) As of 2003, the Army Corps of Engineers estimated that the average cost of gravel decontamination, reuse, and revegetation on the North Slope is approximately $1 million per acre of gravel picked up.[105]
(d) A 2017 estimate based on costs stated in financial reports put the average cost of DR&R for one onshore "facility" in Nigeria (presumably a unit operated by a single operator) at $30 million.[106]
(e) A 2018 article on DR&R in the North Sea near the United Kingdom reported that the company Oil and Gas UK expects oil companies to spend $22.05 billion on removing around 1,600 wells, 100 platforms, and 5,500 km of pipelines over seven years.[107]

Despite recognition of the detriment that can result from inadequate bonds and DR&R policies, there are few model policies among state agencies. States generally require bonds between around $5,000 and $10,000 per well, and allow a "blanket" (statewide) bond from around $50,000 to $150,000 once an operator reaches a certain number of wells.[108] California

103. U.S. GOV'T ACCOUNTABILITY OFF., GAO-03-517, NATIONAL WILDLIFE REFUGES, OPPORTUNITIES TO IMPROVE THE MANAGEMENT AND OVERSIGHT OF OIL AND GAS ACTIVITIES ON FEDERAL LANDS 29 (2003).

104. NRC, *supra* note 31, at 94.

105. *Id.*

106. Afieroho et al., *supra* note 93, at 214.

107. Shadia Nasralla, *Dismantling the Oil Industry: Rough North Sea Waters Test New Ideas,* REUTERS (Nov. 26, 2018, 1:11 AM), https://www.reuters.com/article/us-north-sea-oil-decommissioning-analysi/dismantling-the-oil-industry-rough-north-sea-waters-test-new-ideas-idUSKCN1NW0IL [https://perma.cc/HQ37-UPJK?type=image].

108. INTERSTATE OIL & GAS COMM'N, STATE FINANCIAL ASSURANCE REQUIREMENTS, (2016), http://iogcc.ok.gov/Websites/iogcc/images/Financial_Assurances_FINAL_web.pdf.

has one of the highest blanket bonds, at $3,000,000 for any number of wells beyond 10,000.[109] North Carolina and North Dakota are among the few jurisdictions not to have a blanket bond.[110]

D. Potential for Damage to the North Slope's Coastal and Special Areas

This Subpart provides an overview of the long-term damage to the North Slope, particularly to the Coastal Plain, which bonds and DR&R policies should address in order to allow these areas to resume healthy ecological function. In the Environmental Impact Statement (EIS) for ANWR leasing, BLM acknowledges that there will be permanent change as a result of gravel mining, gravel placement (even if gravel is subsequently removed), degradation of permafrost, loss or degradation of wildlife habitat, and loss of subsistence use.[111] Yet, the EIS does little to offer solutions for minimizing these changes.

While the 2017 Tax Act theoretically limited the area for surface development to 2,000 acres,[112] the EIS interprets this limit to exclude seismic survey trails, barge landings, or pipelines (except for the footprint of the posts holding the pipeline in the air).[113] Thus, the 200 to 240 miles of anticipated pipelines are not counted toward the limit—only the 8.4 to 10 acres taken up by the vertical supports for the pipelines are considered.[114] Likewise, seismic activity, which may cover the entire Coastal Plain, does not count toward the limit.[115] Further, BLM has interpreted the 2,000-acre limit to be a "rolling limit," rather than a

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109. CAL. PUB. RES. CODE § 3205.

110. N.C. GEN. STAT. § 113-378; N.D. ADMIN. CODE 43-02-03-15(2). North Dakota does allow a "blanket bond" of $100,000 to cover up to six wells within the state, but if the operator would like to operate more than six wells, it must pay an additional bond for the individual wells or set of six.

111. BUREAU OF LAND MGMT., FINAL ENVIRONMENTAL IMPACT STATEMENT FOR THE COASTAL PLAIN OIL AND GAS LEASING PROGRAM, Vol. 1, 3-63, 3-69, 3-348 (2019), https://eplanning.blm.gov/epl-front-office/eplanning/planAndProjectSite.do?methodName=dispatchToPatternPage&currentPageId=152110 [https://perma.cc/Z2SL-XH5N] [hereinafter ANWR FEIS].

112. 16 U.S.C. § 3143(c)(3).

113. ANWR FEIS, *supra* note 111, at Vol. 1, 1-7.

114. *Id.* at Vol. 2, B-25.

115. The proposal of one company alone would directly impact 150,000 acres and would involve around 37,800 miles of seismic lines. SA EXPL., INC., MARSH CREEK 3D PLAN OF OPERATIONS WINTER SEISMIC SURVEY (2018), https://eplanning.blm.gov/epl-front-office/projects/nepa/111085/153349/187888/Marsh_Creek_Plan_of_Operations_Submitted_May2018.pdf [https://perma.cc/24BK-CJUS].

cumulative limit, such that lands no longer in use do not count toward the limit.[116] It is not clear how and when BLM will track and tally the 2,000-acre limit to ensure it is followed and lands no longer in use have been restored, or what that benchmark of restoration is.[117] There are no requirements to limit the 2,000 acres to a centralized place, meaning that habitats across the entire leasing area could ultimately be impacted and fragmented, or left in a compromised state.

Gravel pads and roads directly cover and kill tundra vegetation, but their effects extend beyond their footprints. Road dust, especially within 100 feet of a road, can settle onto surrounding permafrost and cause it to melt.[118] This dust, depending on the origin, can contain contaminants (e.g., lead and zinc around the Red Dog port access road; asbestos on the prospective Ambler road). Roads can displace wildlife, change hydrological patterns, and assist in the dispersal of nonnative plants.[119]

The DR&R of Arctic landscapes is complicated where gravel and other surface activity have disturbed the insulating vegetative mat, because the melting of the underlying permafrost is extremely difficult to reverse and can continue long after the initial disturbance ends.[120] Areas where gravel has been poorly placed retain moisture and nutrients, slowing the recovery processes.[121] The potential cumulative effects to soils and permafrost can extend well beyond the limited footprint of the program area.[122] Natural recovery of tundra vegetation may occur on a timeframe that could take millennia or may never occur.[123] There is not a single tundra rehabilitation site that has returned to its original state in thirty-plus years of tundra rehabilitation. Even with intensive rehabilitation efforts, the recovery process takes at least decades.[124] For areas where there has been thermal slumping or subsidence, rehabilitation is very expensive and

116. ANWR FEIS *supra* note 111, at Vol. 1, 3-58.

117. Conservation Comments on ANWR DEIS 2019, *supra* note 67, at 13–14.

118. BENJAMIN SULLENDER, AUDUBON ALASKA, ECOLOGICAL IMPACTS OF ROAD AND AIRCRAFT-BASED ACCESS TO OIL INFRASTRUCTURE 17 (2017), https://ak.audubon.org/sites/g/files/amh551/f/road_aircraft_access_report_final.pdf [https://perma.cc/5GBQ-3NMF].

119. NRC, *supra* note 31, at 77.

120. *Id*. at 90.

121. *Id.*

122. Martha K. Raynolds et al., *Cumulative Geoecological Effects of 62 Years of Infrastructure and Climate Change in Ice-Rich Permafrost Landscapes, Prudhoe Bay Oilfield, Alaska*, 20 GLOBAL CHANGE BIO. 1211 (2014).

123. SULLENDER, *supra* note 118, at 16–17.

124. *Id.* at 17.

likely impossible.[125] The North Slope Science Initiative found that even when gravel structures are removed and native species are transplanted to the reclaimed area, plants cover only 10% of the area after 10 years.[126] In some instances, it may never be possible to restore an area to its previous condition, particularly where disturbance has contributed to permafrost melt.[127] In the ANWR FEIS, BLM acknowledges that "[r]eclamation has not been proven for gravel removal in the arctic environment once operations have ceased."[128]

The impacts of ice roads are substantially less than those of gravel roads and pads but more severe than those of seismic trails.[129] Ice roads can persist into other seasons and can severely alter hydrology, natural thermal regimes, and cause a wide variety of ecological impacts on tundra vegetation.[130]

Seismic activity, while less harmful than roads, may still contribute to permafrost melt and water quality impacts.[131] Three-dimensional seismic studies conducted with 56,000-pound "thumper" trucks, bulldozers and dozens of heavy vehicles, can result in even more damage than the previous two-dimensional studies in ANWR, as the seismic lines are much closer together.[132]

To summarize this Part, oil and gas development has already left significant marks on the North Slope, even with a history that is relatively short compared to other states. Precise DR&R costs are largely unknown, but there are many examples of well plugging costs in the Lower 48 states. DR&R costs on the North Slope would be higher given the remoteness and Arctic conditions. Even if wells are properly plugged, numerous buildings and gravel infrastructures remain, and a great deal of damage associated with permafrost melt if not fully restored. Given these stakes, it would seem logical to impose appropriate bonds and other safeguards to avoid permanent damage. Yet, as discussed in the next Part, the current legal regime for DR&R fails to provide such safeguards.

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125. *Id*.

126. NORTH SLOPE BOROUGH DEP'T OF PLANNING & COMMUNITY SERVICES, OIL AND GAS TECHNICAL REPORT: PLANNING FOR OIL & GAS ACTIVITIES IN THE NATIONAL PETROLEUM RESERVE – ALASKA 139 (2014) [hereinafter NSB].

127. *Id.* at 141.

128. ANWR FEIS, *supra* note 111, at Vol. 1, 3-71.

129. *Id.* at 88.

130. SULLENDER, *supra* note 118, at 17.

131. NPRA EIS/IAP 2012, *supra* note 16, at Vol. 1, 115.

132. Jorgensen et al., *supra* note 66, at 219 (citing BUREAU LAND MGMT., ENVIRONMENTAL ASSESSMENT #93476: CONDUCT 3-D SEISMIC, ANADARKO (2008)).

E. Potential for Restoring the North Slope's Coastal and Special Areas

Some restoration efforts have already taken place on the North Slope. These efforts shed light on what tactics are likely to be successful and the time frames in which land can be restored, although many unknowns remain. An important example of restoration work relates to the 1999 agreement providing for the merger of BP and ARCO.[133] BP and Phillips Petroleum (which bought ARCO's assets in Alaska) agreed to spend $10,000,000 (or more if needed) to assess and clean up (under the direction of ADEC) 14 orphan sites on the North Slope by 2007.[134] ADEC determined that this obligation was satisfied in 2005, with total expenditures of approximately $10,100,000.[135] A second requirement, which is ongoing through the life of the merger, is to inventory and remove abandoned barrels encountered as part of seismic or exploration activities.[136]

A third requirement, which had not been satisfied as of the most recent publicly available ADEC report on the subject, is to cleanup existing BP and ARCO sites.[137] A fourth requirement, satisfied in 2004, is to close inactive reserve pits.[138] Additional requirements include financial support over 10 years for a North Slope spill response organization, development of a corrosion monitoring program (ongoing), and payment of $500,000 each year for 10 years for additional cleanup and spill response research. Although BP's work has not resulted in complete DR&R for all of the relevant sites, it has demonstrated the potential for and ability to improve DR&R through research and long-term monitoring. It is unclear whether this DR&R will continue in light of BP's transfer of assets to the smaller Hilcorp Energy.

A comprehensive DR&R plan that encompasses more than a few isolated sites will require close attention to the level of *restoration* (the replacement of lost habitat features, species, and processes that were present prior to disturbance) versus *rehabilitation* (the conversion of a

133. STATE OF ALASKA, BRITISH PETROLEUM & ATL. RICHFIELD CO., CHARTER FOR DEVELOPMENT OF THE ALASKAN NORTH SLOPE (1999) [hereinafter BP Charter]; U.S. GOV'T ACCOUNTABILITY OFFICE (GAO), GAO-02-357, ALASKA'S NORTH SLOPE, REQUIREMENTS FOR RESTORING LANDS AFTER OIL PRODUCTION CEASES 53 (2002).

134. BP Charter, *supra* note 133, at 7.

135. ALASKA DEP'T OF ENVTL. CONSERVATION, CHARTER FOR DEVELOPMENT OF THE ALASKAN NORTH SLOPE, THE ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION'S 2008–2009 REPORT 3 (2008).

136. BP Charter, *supra* note 133, at 7.

137. ALASKA DEP'T OF ENVTL. CONSERVATION, *supra* note 135, at 3.

138. *Id.* at 4.

disturbed site into functional habitat for plants and animals without necessarily restoring the original species and processes).[139] Such a plan will need to address issues raised in the National Research Council's (NRC) Cumulative Environmental Effects of Oil and Gas Activities on Alaska's North Slope Report.[140] In 2003, NRC reported that only 1% of the roughly 3,733 hectares of tundra habitat on the North Slope covered by gravel roads, pads, airstrips, and other facilities, has been rehabilitated, either naturally or from revegetation efforts.[141] NRC attributed this lack of restoration to challenges related to "technical and natural constraints imposed by the harsh environment of the North Slope; lack of clear regulatory requirements governing the level and timing of restoration; uncertainty about whether currently used sites will be required in the future; contamination and liability concerns; and the high cost of removing facilities and restoring sites in the region"[142] The latter note to high costs is central to our review here.

Substantial costs and time are needed to develop a specific plan for each site within an operating area, implement the necessary corrective actions, monitor progress over decades, and adjust key targets as necessary over such long timelines.[143] Establishing plant cover alone can provide insulation and stop erosional processes associated with thermokarst,[144] but restoring former (or comparable) plant assemblages that provide equivalently good habitat for wildlife remains challenging. Furthermore, the long-term impacts of installing and removing infrastructure alter the landscape both physically (e.g., provision of vertical structures; thermokarst) and biologically (e.g., destroying vegetation communities).[145] Such alteration leads to impacts on

139. NRC, *supra* note 31, at 90.

140. *Id.*

141. *Id*.

142. *Id*.

143. Janet G. Kidd, Bill Streever, Michael R. Joyce & Lloyd Fanter, *Wetland Restoration of an Exploratory Well on Alaska's North Slope: A Learning Experience*, 22 Ecological Restoration 30 (2004); Bill Streever et al., *Environmental Change and Potential Impacts: Applied Research Priorities for Alaska's North Slope* 64 ARCTIC 390 (2011); Bill Streever et al., *Evaluation of Percent Cover Requirements for Revegetation of Disturbed Sites on Alaska's North Slope*, 56 ARCTIC 234 (2003).

144. Bruce C. Forbes & Robert L. Jefferies, *Revegetation of Disturbed Arctic Sites: Constraints and Applications*, 88 BIOLOGICAL CONSERVATION 15 (1999).

145. Jorgensen et al., *supra* note 62; Raynolds et al., *supra* note 122.

wildlife, including birds[146] and caribou.[147] All of these impacts are exacerbated by a warming climate.[148] While larger companies, such as BP and ConocoPhillips, may be willing to invest in research to improve restoration, smaller operators likely will not. In short, the costs of research and monitoring must be considered in determining the actual costs of DR&R on Alaska's North Slope.[149] Such consideration, which should involve the co-creation of restoration objectives with local experts, could provide long-term economic opportunities associated with a comprehensive return of operating areas to healthy ecological conditions.[150]

II. LEGAL REGIME FOR DR&R FOR THE NORTH SLOPE

This Part outlines the range of agencies and laws that govern North Slope oil and gas activity. Despite the authority for requiring adequate bonds and DR&R plans at multiple levels, government entities have waited to take meaningful action until after all oil production in a unit has ceased.[151] Some of the reluctance to take such action relates to a desire to leave infrastructure in place for future use.[152] This is a practical consideration for wells and equipment if there are sufficient oil and gas reserves remaining to allow additional development. Likewise, leaving

146. Rebecca Bentzen et al., *Assessing Development Impacts on Arctic Nesting Birds Using Real and Artificial Nests*, 40 POLAR BIOLOGY 1527 (2017).

147. Robert Rodrigues, *Microhabitat Variables Influencing Nest-site Selection by Tundra Birds,* 4 ECOLOGICAL APPLICATIONS 110 (1994).

148. Raynolds et al., *supra* note 122.

149. *See* Sharon J. Riley, *Many of Alberta's 'Reclaimed' Wells Aren't Actually Reclaimed: Government Presentation*, NARWHAL (Dec. 6, 2018), https://thenarwhal.ca/many-of-albertas-reclaimed-wells-arent-actually-reclaimed-government-presentation/ [https://perma.cc/5MU5-U872].

150. Yadav Uprety et al., *Contribution of Traditional Knowledge to Ecological Restoration: Practices and Applications* 19 ECOSCIENCE 225 (2012); Victoria Reyes-García et al., *The Contributions of Indigenous Peoples and Local Communities to Ecological Restoration*, 27 RESTORATION ECOLOGY 3 (2019); Timothy C. Cater, Charles Hopson & Bill Streever, *The Use of the Iñupiaq Technique of Tundra Sodding to Rehabilitate Wetlands in Northern Alaska*, 68 ARCTIC 435 (2015).

151. U.S. GOV'T ACCOUNTABILITY OFFICE (GAO), GAO-02-357, ALASKA'S NORTH SLOPE, REQUIREMENTS FOR RESTORING LANDS AFTER OIL PRODUCTION CEASES 10 (2002)**.** GAO's finding in 2002 appears to hold true in 2019. U.S. GOV'T ACCOUNTABILITY OFF., GAO-18-250, OIL AND GAS WELLS, BUREAU OF LAND MANAGEMENT NEEDS TO IMPROVE ITS DATA AND OVERSIGHT OF ITS POTENTIAL LIABILITIES (2018). *See infra* Part II; *See generally* NSB, *supra* note 126.

152. ARCADIS, *supra* note 29, at ES-14; NSB, *supra* note 126, at 134–35.

roads and gravel pads in place may be practical if nearby communities intend to use them. But where future use is unlikely, DR&R should begin as soon as possible. Problematically, under the current regime, there are no firm requirements for oil and gas operators to ensure adequate DR&R prior to undertaking exploration and production on the North Slope.

A. Federal Laws Applicable Across the North Slope

1. Army Corps Wetlands Mitigation Policy

Section 404 of the Clean Water Act authorizes the U.S. Army Corps of Engineers to issue permits for the discharge of any type of fill material into waters of the United States, including wetlands, regardless of land ownership. In 1990, the Environment Protection Agency (EPA) and the Army Corps developed a policy to avoid net losses of wetlands, establishing a permitting protocol for avoidance and minimization of wetland destruction, and allowing compensatory mitigation for unavoidable impacts.[153] Regulations issued in 2008 revised and clarified requirements for compensatory mitigation.[154]

Because virtually all of the Arctic Coastal Plain consists of wetlands, nearly all earth-disturbing construction should require Army Corps permits that avoid or mitigate wetland loss.[155] But historically, permit requirements for North Slope projects have been weak.[156] In 2018, the EPA and Army Corps signed an agreement to provide for "flexibilities" in the permitting process given the abundance of wetlands in Alaska.[157] The agreement stated that avoiding and restoring wetlands in a given

153. U.S. ENVTL. PROT. AGENCY, MEMORANDUM OF AGREEMENT BETWEEN THE DEPARTMENT OF THE ARMY AND THE ENVIRONMENTAL PROTECTION AGENCY CONCERNING THE DETERMINATION OF MITIGATION UNDER THE CLEAN WATER ACT SECTION 404(B)(1) GUIDELINES (1990).

154. Army Corps & EPA, Compensatory Mitigation for Losses of Aquatic Resources, 73 Fed. Reg. 19594, 19595 (Apr. 10, 2008). 33 C.F.R. § 332 (2008); 40 C.F.R. § 230 (2008).

155. NRC, *supra* note 31, at 91.

156. *Id.*

157. U.S. ENVTL. PROT. AGENCY, MEMORANDUM OF AGREEMENT BETWEEN THE DEPARTMENT OF THE ARMY AND THE ENVIRONMENTAL PROTECTION AGENCY CONCERNING THE DETERMINATION OF MITIGATION UNDER THE CLEAN WATER ACT SECTION 404(B)(1) GUIDELINES (2018). The agreement (June 15, 2018) updates and replaces previous agreements—Clarification of the Clean Water Act Section 404 Memorandum of Agreement on Mitigation (Jan. 24, 1992), and Statements on the Mitigation Sequence and No Net Loss of Wetlands in Alaska (May 13, 1994).

watershed may not be practical, such that compensatory mitigation could occur elsewhere or in a different format ("out-of-kind compensatory mitigation.") Further, "[a]pplying a less rigorous permit review for small projects with minor environmental impacts is consistent with the Section 404 program regulations." The Army Corps identifies the requirement for compensatory mitigation on a case-by-case basis during permit review.[158] Thus, there is no overarching Army Corps policy that requires wetland restoration following oil and gas development on the North Slope. Indeed, in its 2018 approval of the Greater Mooses Two development project in NPRA, the Army Corps did not require any compensatory mitigation at all.[159]

Under the Obama Administration, Secretarial Order 3330 expanded the idea of wetlands compensation by initiating an overarching strategy to compensate for landscape-wide impacts from industrial development.[160] Based on this guidance, BLM developed a draft regional mitigation strategy to guide oil and gas activity in the northeastern portion of NPRA,[161] but some of the essential stakeholders in the region, represented by the Native entity Arctic Slope Regional Corporation (ASRC), felt that BLM did not adequately involve local indigenous voices.[162] The Trump

158. ARMY CORPS, ALASKA DISTRICT COMPENSATORY MITIGATION THOUGHT PROCESS (2018), https://www.poa.usace.army.mil/Portals/34/docs/regulatory/2018MitigationThoughtProcess.pdf [https://perma.cc/XG7L-BU72].

159. BUREAU LAND MGMT., PROPOSED GREATER MOOSES TOOTH TWO DEVELOPMENT PROJECT SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT FOR THE ALPINE SATELLITE DEVELOPMENT PLAN, JOINT RECORD OF DECISION AND PERMIT EVALUATION WITH THE U.S. ARMY CORPS OF ENGINEERS 56 (2018) [hereinafter GMT2 ROD].

160. Dep't of the Interior, Secretarial Order 3330, Improving Mitigation Policies and Practices of the Department of the Interior (Oct. 31, 2013).

161. BUREAU OF LAND MGMT., DRAFT REGIONAL MITIGATION STRATEGY FOR THE NORTHEASTERN NATIONAL PETROLEUM RESERVE IN ALASKA (2016).

162. ASRC and the ASRC-sponsored entity Voice of the Arctic have published criticisms regarding Obama decisions curtailing oil and gas activity on the North Slope, arguing that these decisions did not adequately involve Native stakeholders. *See Climate and Energy Agreement with Canada Concern for Voice of the Arctic Inupiat*, UQALUGAANICH (Arctic Slope Reg'l Corp., Barrow, Alaska), Feb. 25, 2016, at 23. https://issuu.com/iaminupiaq/docs/1q_2016_newsletter_final [https://perma.cc/5CUG-S9CH]. Federal government consultation with Alaska Native Villages, Alaska Native Corporations, and tribes regarding projects that may affect them is required by Executive Order 13,175. Executive Order 13,175, Consultation and Coordination with Indian Tribal Governments (Nov. 6, 2000).

Administration revoked Secretarial Order 3330,[163] and compensatory mitigation on public lands is now entirely voluntary.[164]

2. Bureau of Land Management DR&R Regulations

The Federal Land Policy and Management Act of 1976 is BLM's "organic act" that establishes the agency's multiple-use land management mandate.[165] The Act does not have a general provision related to DR&R, but BLM has issued regulations applicable to wells on BLM-managed lands across the nation. The regulations require an operator to plug and abandon a well in which oil or gas is not encountered in paying quantities, unless the well is approved for use for injection or disposal.[166] DR&R requirements are vague: "Upon the conclusion of operations, the operator shall reclaim the disturbed surface in a manner approved or reasonably prescribed by the authorized officer."[167] DR&R plans are not necessarily required, although the authorized officer may request "a contingency plan . . . describing procedures to be implemented to protect life, property, and the environment."[168] Thus, there are no clear expectations regarding DR&R outcomes and monitoring of these outcomes.

BLM regulations generally require operators to have one of the following types of bond coverage: (1) individual lease bonds of at least $10,000 covering all of an operator's wells under one lease;[169] (2) statewide bonds of at least $25,000 covering all of an operator's leases in one state;[170] or (3) nationwide bonds of at least $150,000 covering all of an operator's leases in the United States.[171] BLM also allows an operator to obtain a unit-wide bond for an approved unit agreement.[172] Bond

163. Dep't of the Interior, Secretarial Order No. 3360, Rescinding Authorities Inconsistent with Secretary's Order 3349, "American Energy Independence."

164. BUREAU OF LAND MGMT., INSTRUCTION MEMORANDUM NO. 2019-018, COMPENSATORY MITIGATION (2018), https://www.blm.gov/policy/im-2019-018 [https://perma.cc/47KC-K5DG].

165. Pub. L. No. 94-579, 94th Cong. (Oct. 21. 1976), 43 U.S.C. 1701–1785.

166. 43 C.F.R. § 3162.3-4 (1982).

167. 43 C.F.R. § 3162.5-1(b) (1982).

168. 43 C.F.R. § 3162.5-1(c) (1988).

169. 43 C.F.R. § 3104.2 (1988).

170. 43 C.F.R. § 3104.3(a) (1988).

171. 43 C.F.R. § 3104.3(b) (1988).

172. 43 C.F.R. § 3104.4 (1988).

amounts have not increased since 1988,[173] and there has never been a policy requiring funds received for bonds to be set aside for DR&R.[174]

Regulations give the authorizing officer some degree of flexibility to increase the bond amount or change its format. As an alternative to a bond, insurance is an allowable financial guarantee.[175] The officer may increase the amount if an operator poses a risk due to a history of previous violations, unpaid royalties, or the officer's determination that the costs of DR&R exceeds the present value of the bond.[176] During a transfer of a lease, the officer may increase the amount of the lessee's statewide or nationwide bond,[177] or the officer may refuse to transfer the lease if the bond covering activities on that lease is "insufficient."[178]

In 2011, GAO found that BLM was not adequately implementing its policies for reviewing bond adequacy and managing idle and orphan wells.[179] BLM issued a 2012 well review policy and a 2013 bond adequacy review policy. The 2012 policy has general guidelines for evaluating whether wells and leases are active, but does not provide for DR&R other than stating that the agency "will require the operator to immediately plug and abandon all the wells and reclaim all associated surface disturbance" once the lease terminates.[180] The 2013 policy gives the agency's authorizing official broad discretion to determine an appropriate bond. A bond "in an amount equal to the actual costs to plug and abandon the subject well and adequately reclaim the lands" is required if BLM has demanded payment under a bond for the same operator within the last five years.[181]

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173. BLM, 53 Fed. Reg. 22839 (June 17, 1988); BLM, 53 Fed. Reg. 31958 (Aug. 22, 1988).

174. U.S. GOV'T ACCOUNTABILITY OFF., GAO-18-250, OIL AND GAS WELLS, BUREAU OF LAND MANAGEMENT NEEDS TO IMPROVE ITS DATA AND OVERSIGHT OF ITS POTENTIAL LIABILITIES 26 (2018).

175. 43 C.F.R. § 3809.555 (2000).

176. 43 C.F.R. § 3104.5 (1988).

177. 43 C.F.R. § 3106.6-2 (1988).

178. 43 C.F.R. § 3106.7-1 (1988).

179. U.S. GOV'T ACCOUNTABILITY OFF. GAO-11-292, OIL AND GAS BONDS: BLM NEEDS A COMPREHENSIVE STRATEGY TO BETTER MANAGE POTENTIAL OIL AND GAS WELL LIABILITY (2011).

180. BUREAU OF LAND MGMT., INSTRUCTION MEMORANDUM NO. 2012-181, IDLE WELL REVIEW AND DATA ENTRY INTO THE AUTOMATED FLUID MINERALS SUPPORT SYSTEM (2012).

181. *Id.*; *see also* 30 U.S.C. §226(g) (indicating that BLM shall not grant a lease to an applicant that has previously failed to comply with DR&R requirements).

Problematically, an officer may lack information regarding an operator's noncompliance in other jurisdictions.[182] Once a bond is in place, it may be difficult for BLM to recover any additional costs from the operator. Operators may not respond to violation notices, and BLM has little leverage when operators go bankrupt or reorganize in an effort to avoid reclamation.[183] Even in situations where an officer is aware of noncompliance, the officer may reduce the bond if the operator is "undertaking normal operating practices, such as plugging and abandoning a well(s)."[184]

BLM updated its oil and gas rules in 2015 but opted not to increase bond amounts. BLM reasoned that its regulations already allow the authorizing official to set a higher bond rate if deemed necessary.[185] In 2018, GAO issued another report critical of BLM's DR&R policies.[186] In response, a 2018 BLM instructional memo added more details regarding factors that trigger review of an operator's bond.[187] Yet the memo does not require the officer to actually raise a bond, and continues to provide discretion to reduce bonds. It is not clear how often BLM actually acts on its authority to require an operator to pay a higher bond. In short, BLM does not have a meaningful system to impose bond amounts above the minimum standards in the regulations. Thus, under the current regulations, an operator may pay as little as $150,000 for all its wells across the nation, even if this may not fully address a single well.

3. Policies Specific to the National Petroleum Reserve-Alaska

The regulatory regime for NPRA differs somewhat from other BLM-managed land, since the Naval Petroleum Reserves Production Act[188] requires BLM to hold regular lease sales[189] while also giving "maximum

182. U.S. GOV'T ACCOUNTABILITY OFF., GAO-18-250, OIL AND GAS WELLS, BUREAU OF LAND MANAGEMENT NEEDS TO IMPROVE ITS DATA AND OVERSIGHT OF ITS POTENTIAL LIABILITIES 28 (2018).

183. *Id.* at 30; BUREAU LAND MGMT., INSTRUCTION MEMORANDUM NO. 2019-014, OIL AND GAS BOND ADEQUACY REVIEWS (2018) [hereinafter BLM Memo 2018].

184. BUREAU OF LAND MGMT., INSTRUCTION MEMORANDUM NO. 2013-151, OIL AND GAS BOND ADEQUACY REVIEWS (2013).

185. Bureau of Land Mgmt., Oil and Gas; Hydraulic Fracturing on Federal and Indian Lands, 80 Fed. Reg. 16127, 16128 (citing 3104.5(b)).

186. *Id.*

187. BLM Memo 2018, *supra* note 183.

188. Pub. L. No. 94-258, 90 Stat. 303, 94th Cong. (Apr. 5, 1976), 42 U.S.C. §§ 6501–6508.

189. 42 U.S.C. § 6505a.

protection" to areas with significant subsistence, recreational, fish and wildlife, and historical values.[190] Specifically designated areas—Special Areas—include the Teshekpuk Lake and Utukok River Uplands,[191] the upper Colville River,[192] the Kasegaluk Lagoon,[193] and Peard Bay.[194] Leases and permits must "include or provide for such conditions, restrictions, and prohibitions as the Secretary deems necessary or appropriate to mitigate reasonably foreseeable and significantly adverse effects on the surface resources."[195]

BLM has specific regulations governing oil and gas leases in NPRA that provide for higher bonding amounts than for other BLM lands:[196] $100,000 per lease, or $300,000 NPRA-wide (the lessee may satisfy the latter amount by raising its cheaper nationwide bond of $150,000 to $300,000). There are no NPRA-specific regulations regarding DR&R absent unitization,[197] although stipulations for protecting surface resources and special areas may be imposed at the time a surface use plan and permit to drill are approved.[198]

BLM's Environmental Impact Statement (EIS) for the 2012 plan for NPRA indicated that the overall restoration goal after oil and gas production ceases is to return the reserve to its previous condition and use,

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190. 42 U.S.C. §§ 6504(a), 6506a(n)(2).

191. 42 U.S.C. § 6504; 43 C.F.R. § 2361.1; Bureau of Land Mgmt., 42 Fed. Reg. 1 (Jan. 3, 1977).

192. 43 C.F.R. § 2361.1; Bureau of Land Mgmt., 42 Fed. Reg. 1 (Jan. 3, 1977).

193. BUREAU OF LAND MGMT., NORTHWEST NATIONAL PETROLEUM RESERVE-ALASKA INTEGRATED ACTIVITY PLAN/ ENVIRONMENTAL IMPACT STATEMENT, RECORD OF DECISION (2004); Bureau of Land Mgmt., Designation of Addition to Special Areas in National Petroleum Reserve-Alaska, Kasegaluk Lagoon, 70 Fed. Reg. 9096 (Feb. 24, 2005).

194. BUREAU OF LAND MGMT., NATIONAL PETROLEUM RESERVE-ALASKA INTEGRATED ACTIVITY PLAN/ENVIRONMENTAL IMPACT STATEMENT, RECORD OF DECISION (2013) [hereinafter NPRA ROD 2013].

195. 42 U.S.C. § 6506a(b). BLM's regulations similarly indicate that BLM should take any actions deemed "necessary to mitigate or avoid unnecessary surface damage and to minimize ecological disturbance" and that BLM is obligated to provide maximum protection measures for all areas identified as having significant subsistence, recreational, fish and wildlife, or historical or scenic values. 43 C.F.R. § 2361.1(a), (c).

196. 43 C.F.R. Part 3130.

197. *See* 43 C.F.R. § 3137.135 (within three months after unit termination, the unit operator must submit to BLM for approval a plan and schedule for plugging and abandonment and surface restoration operations; the unit operator must then comply with the BLM-approved plan and schedule).

198. 43 C.F.R. § 3131.3.

which largely concerns fish and wildlife habitat.[199] Stipulation G-1 in the Record of Decision for this plan requires the lessee, upon conclusion of operations, to remove facilities and reclaim the land;[200] however, the Record of Decision allows for future projects in NPRA to deviate from these standards.[201] Thus far, BLM has opted not to impose any more specific DR&R standards for NPRA developments.[202] Further, the EIS recognizes that NPRA may not be returned to its previous condition.[203] For example, gravel roads and pads could be left in place, which could contribute to flooding and erosion[204] and slow vegetation regrowth.[205]

4. Policies for the Arctic National Wildlife Refuge

Unlike BLM, FWS does not have a multi-purpose mandate for land management. Nationwide, FWS's management mission under the National Wildlife Refuge System Administration Act is to conserve and restore "the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans."[206] When considering if a particular use of a refuge should be allowed, the FWS administrator must first determine whether the use would be compatible with the overall purpose of conservation.[207] As discussed above, a number of Refuges allow seemingly incompatible oil and gas development. This generally occurs where FWS has acquired surface rights to Refuge lands without acquiring the underlying mineral rights.[208] BLM is responsible for administering oil and gas leases on Refuge lands, using the same regulations applicable to BLM lands.[209] Prior

199. NPRA EIS/IAP, *supra* note 16, at Vol. 77.

200. NPRA ROD 2013, *supra* note 194, at 67.

201. *Id.* at 44.

202. *See* BUREAU OF LAND MGMT., SUPPLEMENTAL ENVIRONMENTAL IMPACT STATEMENT FOR THE ALPINE SATELLITE DEVELOPMENT PLAN FOR THE PROPOSED GREATER MOOSES TOOTH ONE DEVELOPMENT PROJECT: RECORD OF DECISION (2015); GMT2 ROD, *supra* note 159.

203. GMT2 ROD, *supra* note 159 at Vol. 2, 159. Lease Stipulation G-1 only provides broad guidance for oil and gas field abandonment, requiring that the final disposition of the land must meet the current and future needs of the public.

204. *Id.* at Vol. 2, 122.

205. *Id.* at Vol. 2, 132, 140.

206. 16 U.S.C. § 668dd(a)(2).

207. 16 U.S.C. § 668dd(a)(3).

208. CRAFTON, COMAY & HUMPHRIES, *supra* note 26, at 2.

209. Mineral Leasing Act of 1920, 30 U.S.C. § 189; *see also* 50 C.F.R. § 29.31 ("Where mineral rights to lands in wildlife refuge areas are vested in the United States, the provisions of 43 CFR 3101.3-3, 3109.4, 3201.1-6 and 3501.2-2 govern.").

to drilling or leasing, BLM is supposed to get concurrence from FWS "as to the time, place and nature of such operations in order to give complete protection to wildlife populations and wildlife habitat on the areas leased."[210] FWS's Refuge administration manual does not have specific DR&R requirements,[211] and no additional bond is required on top of what BLM would require.[212]

In 2016, FWS issued regulations for non-federal oil and gas activity in Refuges.[213] The regulations exempted Refuges in Alaska, although the performance-based standards may be used as guidance.[214] Additionally, FWS has not issued regulations specific to Alaska Refuges.

While Alaskan Refuges are subject to the National Wildlife Refuge System Administration Act and other national acts, ANILCA modifies management to some degree. ANILCA has a provision similar to the National Wildlife Refuge System Administration Act requiring compatibility with Refuge purposes.[215] The Refuge purposes for ANWR are:

> (i) to conserve fish and wildlife populations and habitats; (ii) to fulfill the international treaty obligations of the United States with respect to fish and wildlife and their habitats; (iii) to provide, in a manner consistent with the purposes set forth above in (i) and (ii), the opportunity for continued subsistence uses by local residents; and (iv) to ensure, to the maximum extent practicable and in a manner consistent with the purposes set forth in (i), water quality and necessary water quantity win the refuge.[216]

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210. 43 C.F.R. § 3101.5-1.

211. *See* Natural and Cultural Resources Management Part 612 Minerals Management, 1.7(D)(3) (c, d), Fish & Wildlife Services (requiring operators to "[r]emove structures and equipment from the area when they are no longer needed" and "[w]hen operations end, restore the area as nearly as possible to its condition prior to when operations began.").

212. A previous version of this manual did require a bond. *See* Policy 612 FW 2, Oil and Gas, Part 2.9, Procedural Requirements for Permitting Oil and Gas Activities, Subpart C, Performance Bond, Fish & Wildlife Services; *see also* FWS 2016 Rule at 79951.

213. *Id.*

214. *Id.*

215. Alaska National Investment Land Conservation Act of 1980, Pub. L No. 96-487, § 304(b), 94 Stat. 2371 ("the Secretary may not permit any use, or grant easements . . . unless such use (including but not limited to any oil and gas leasing permitted under paragraph (2)) or purpose is compatible with the purposes of the refuge.").

216. *Id.* § 303(2).

The Tax Cuts and Jobs Act of 2017 added an additional purpose: "to provide for an oil and gas program on the Coastal Plain."[217]

The 2017 Tax Act directs the Interior Department to manage ANWR's oil and gas lease program "in a manner similar to how [BLM manages] lease sales under the Naval Petroleum Reserve Production Act of 1976 [] (including regulations)."[218] Theoretically, BLM should identify and designate special areas with significant subsistence, recreational, fish and wildlife, historical or scenic values, as it has done for NPRA, although it has yet to do so. BLM regulations dating back to 1983 (prior to the first round of ANWR exploration) provide that: "No lands within a refuge in Alaska open to leasing shall be available until the Fish and Wildlife Service has first completed compatability [sic] determinations."[219] To date, FWS has not prepared a compatibility determination for leasing ANWR.

In 2018, to comply with the National Environmental Policy Act (NEPA),[220] BLM worked with FWS and other agencies to prepare a draft environmental impact statement (EIS) for leasing ANWR.[221] As discussed above, BLM has interpreted the 2017 Tax Act in a manner that allows a great deal of development to avoid the 2,000-acre development limit.[222] The EIS contains general promises of restoration, but does not provide strong Required Operating Procedures (ROPs) to ensure this restoration.

The objective of ROP 35 is to "[e]nsure ongoing and long-term reclamation of land to its previous condition and use."[223] For Alternatives B and C, the standard is the following:

> Before final abandonment, land used for oil and gas infrastructure—including well pads, production facilities, access roads, and airstrips—would be reclaimed to ensure eventual restoration of ecosystem function. The leaseholder would develop and implement a BLM-approved abandonment and reclamation plan. The plan would describe short-term stability, visual, hydrological, and productivity objectives and steps to be taken to ensure eventual ecosystem restoration to the land's previous hydrological, vegetation, and habitat condition. The BLM

217. 2017 Tax Act, Pub. L. No. 115-97 (2017), § 20001(b)(2)(B) (amending Section 303(2)(B) of ANILCA).
218. *Id.* § 20001(b)(3).
219. 43 C.F.R. §3101.5-3.
220. 42 U.S.C. § 4321–4347 (1970). 40 C.F.R. §§ 1500–1518 (1970).
221. ANWR FEIS, *supra* note 111.
222. *See supra* Part II.D.
223. ANWR FEIS, *supra* note 111, at Vol. 1, 2-35.

> Authorized Officer may grant exceptions to satisfy stated environmental or public purposes.[224]

The standard for Alternative D contains an additional requirement: "Oil and gas infrastructure, including gravel pads, roads, airstrips, wells and production facilities, would be removed and the land restored on an ongoing basis, as extraction is complete."[225] ROP 24 addresses gravel mining and reclamation of mining sites but contains no specific standards on reclamation.[226] As with ROP 35, BLM simply requires a plan for restoration. But both of these ROPs, like the rest of the stipulations in this document, may be waived at the discretion of the BLM Authorized Officer.[227] In short, the EIS is a missed opportunity to fill in gaps in DR&R policies for Alaska Refuges.

B. State Laws Applicable Across the North Slope

The State of Alaska has generally taken the approach that DR&R requirements can be addressed after oil production has already ended.[228] Other than well plugging and abandonment regulations implemented by AOGCC, there is little in the way of proactive DR&R policy. This Part explains the laws and regulatory authority of state agencies that could potentially apply to DR&R on the North Slope.

1. Oil Spill Policy

After the disastrous Exxon-Valdez oil spill in 1989, Alaska took steps to better prevent and prepare for oil spills.[229] But the focus was almost entirely on spills in Alaskan waters—there is relatively little in place to address onshore spills other than a reporting system.[230]

The Alaskan State Legislature has adopted a statute similar to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), administered by the Alaska Department of Environmental

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224. *Id.*
225. *Id.* at 2-36.
226. *Id.* at 2-31.
227. *Id.* at 2-31, 2-36.
228. U.S. GOV'T ACCOUNTABILITY OFFICE (GAO), GAO-02-357, ALASKA'S NORTH SLOPE, REQUIREMENTS FOR RESTORING LANDS AFTER OIL PRODUCTION CEASES 79 (2002).
229. *See* ALASKA STAT. § 46.04.030 (2014).
230. *Report a Spill*, ALASKA DEP'T OF ENVTL. CONSERVATION, https://dec.alaska.gov/spar/ppr/spill-information/reporting [https://perma.cc/HVG5-JDBN] (last visited Sept. 8, 2019).

Conservation, that makes owners and operators liable for "damages, for the costs of response, containment, removal, or remedial action" resulting from unpermitted release of hazardous substances.[231] Unlike CERCLA,[232] the Alaskan statute's definition of hazardous substances includes oil, associated products and byproducts.[233] The Alaska statute does not specifically address DR&R and generally has been applied in the context of chemical releases into water systems rather than oil field DR&R.[234]

2. Well Regulation by AOGCC

The Alaska Oil and Gas Conservation Commission is a quasi-judicial agency whose three commissioners are appointed by the governor and confirmed by the legislature.[235] AOGCC regulates P&A for wells across Alaska, regardless of land ownership.[236] AOGCC requirements aim to prevent vertical movement of fluids in the wellbore and limit water contamination.[237] Operators must file annual reports regarding wells that have been shut-in for more than a year.[238] Wells generally must be plugged and abandoned before the expiration of the lease,[239] although an operator can apply for and continually renew extensions to suspend closure if able to demonstrate future utility and mechanical soundness.[240] There are minimal requirements for restoring the land around the well: within one year of abandonment or at the end of the lease the operator generally must remove all structures and fill in all pits.[241]

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231. ALASKA STAT. § 46.03.822 (effective Jan. 15, 2019).

232. 42 U.S.C. § 9601(1980); 40 C.F.R. §302.4 (2011).

233. ALASKA STAT. § 46.03.826 (1986).

234. *E.g.*, Flint Hills Res. Alaska, LLC v. Williams Alaska Petroleum, Inc. 377 P.3d 959 (Alaska 2016); Berg v. Popham, 412 F.3d 1122 (9th Cir. 2005). An interesting use of the law is Kodiak Island Borough v. Exxon Corp. 991 P.2d 757 (Alaska 1999) (following Exxon-Valdez spill, municipalities who contributed to cleanup alleged strict liability for discharge to recover compensation).

235. ALASKA STAT. § 31.05.005 (2006).

236. ALASKA STAT. § 31.05.027 (1980). BLM has not always submitted to this jurisdiction; *see* Snow, *supra* note 82, at 23.

237. ALASKA ADMIN. CODE tit. 20, § 25.112 (2009).

238. ALASKA ADMIN. CODE tit. 20, § 25.115.

239. ALASKA ADMIN. CODE tit. 20, § 25.105(a).

240. ALASKA ADMIN. CODE tit. 20, § 25.110.

241. ALASKA ADMIN. CODE tit. 20, § 25.170 (2009). Current AOGCC regulations do not fully cover land restoration. *See* ALASKA ADMIN. CODE tit. 20, § 25.047(b) ("Upon completion, suspension, or abandonment of the well, the operator shall proceed with diligence to leave the reserve pit in a condition that does not constitute a hazard to freshwater.").

Until recently, AOGCC's bond levels were comparable with those of BLM for NPRA: at least $100,000 for P&A for one well or at least $200,000 for all the operator's wells in the state.[242] These amounts are inadequate for wells in remote locations on the North Slope that can cost millions of dollars to permanently close.[243] Commissioner Foerster herself testified in 2017 that she was "not sure $200,000 would even pay for the engineering study needed to plan the plugging operations, much less any of the actual plugging costs."[244]

In 2019, AOGCC was able to revise bond amounts as follows: $400,000 per well for up to 10 wells; $6,000,000 for up to 40 wells; $10,000,000 for up to 100 wells; $20,000,000 for up to 1,000 wells; and $30,000,000 for any number of wells over 1,000.[245] AOGCC may increase or decrease these amounts based on evidence that engineering, geotechnical, environmental, or location conditions warrant an adjustment.[246] Operators with existing bonds are not "grandfathered in," they must increase bond levels to the new amounts by 2022 with the option of paying in installments.[247] Bonds remain in effect until the wells have been permanently plugged and abandoned and AOGCC approves final clearance of the locations.[248] AOGCC will not approve an operator's application for a permit to drill if the operator has not complied with these requirements.[249]

The Alaska Oil and Gas Association strongly protested the revised bonding regulations, urging Alaska to retain the same low and ineffective bond levels as other states.[250] AOGCC's sister agency, the Alaska

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242. ALASKA ADMIN. CODE tit. 20, § 25.025 (2018).

243. U.S. GOV'T ACCOUNTABILITY OFFICE (GAO), GAO-02-357, ALASKA'S NORTH SLOPE, REQUIREMENTS FOR RESTORING LANDS AFTER OIL PRODUCTION CEASES 6 (2002); Alex DeMarban, *Hundreds of Unused Oil and Gas Wells Dot Alaska. The State Wants Many Closed*, ANCHORAGE DAILY NEWS (June 12, 2017), https://www.adn.com/business- economy/energy/2017/06/12/alaska-regulators-plan-to-tackle-hundreds-of-unused-oil-and-gas-wells/ [https://perma.cc/6HCE-7NJJ].

244. Foerster, *supra* note 83; Ben Boettger, *State Reduces Fine for NordAq Wells*, PENINSULA CLARION (July 2, 2018, 3:24 AM), https://www.peninsula clarion.com/news/state-reduces-fine-for-nordaq-wells/ [https://perma.cc/9MWU-SVAX].

245. ALASKA ADMIN. CODE tit. 20, § 25.025(b) (amended May 18, 2019).

246. *Id.*

247. ALASKA ADMIN. CODE tit. 20§ 25.025(c).

248. ALASKA ADMIN. CODE tit. 20§ 25.025(d).

249. ALASKA ADMIN. CODE tit. 20§ 25.025(g).

250. Letter Re: Proposed Revisions to 20 AAC 25.025 – Bonding Regulations, from Kara Moriarty, President & CEO, Alaska Oil and Gas Ass'n (AOGA), to

Department of Natural Resources (ADNR) asked AOGCC to rescind the regulations, calling them "unduly burdensome."[251] In the face of this resistance, AOGCC's actions are laudable. As suggested later in this Article, however, there are additional steps AOGCC might take to ensure adequate DR&R, including regulations addressing the area around wells.

C. Regulation of State Lands

ADNR is the state entity in charge of leasing state lands for oil and gas development.[252] Prior to exploration, ADNR generally must approve a plan of operations that includes "plans for rehabilitation of the affected leased or licensed area after completion of operations or phases of those operations."[253] Before operations commence on a state oil and gas lease, ADNR requires a DR&R bond for at least $10,000 per lease, or $500,000 for statewide activities.[254]

ADNR annually holds lease sales on state lands on the North Slope. For these to take place, the ADNR commissioner must find that the sale is in the best interest of the state.[255] ADNR updates its "Best Interest Findings" every ten years, consistently finding North Slope lease sales to be in the best interest of the state.[256] The DR&R standard for 2018, which has been in place for at least ten years, is: "Upon abandonment of material sites, drilling sites, roads, buildings or other facilities, such facilities must be removed and the site rehabilitated to the satisfaction of the Director, unless the Director and any non-state surface owner, determines that such removal and rehabilitation is not in the state's interest."[257]

Comm'r Hollis French, Chair, Alaska Oil & Gas Conservation Comm'n (Oct.16, 2018), https://www.aoga.org/sites/default/files/news/10_16_18_aoga_commenbts_to_aogcc_on_2018_bonding_final.pdf [https://perma.cc/VH9C-TZT7] [hereinafter AOGA].

251. Letter from Sara W. Longan, Deputy Comm'r, Dep't of Nat. Res., to Comm'rs Dan Seamount & Jessie Chmielowski, Alaska Oil & Gas Conservation Comm'n (May 1, 2019) (on file with author).

252. ALASKA STAT. § 38.05.131 (2018).

253. ALASKA ADMIN. CODE tit. 11, § 83.158 (2018).

254. ALASKA ADMIN. CODE § 83.160. Additional bonding may be required under Alaska Administrative Code title 11, § 82.465, § 82.600, § 82.615, § 83.390, and § 96.060.

255. ALASKA STAT. § 38.05.180(a)(2)(B) (2018).

256. *See Best Interest Findings and Lease Sale*, ALASKA DEP'T OF NAT. RESOURCES DIVISION OF OIL & GAS, http://dog.dnr.alaska.gov/Services/BIFAndLeaseSale [https://perma.cc/JY84-F2NE] (last visited Sept. 8, 2019).

257. ALASKA DEP'T OF NAT. RESOURCES DIVISION OF OIL & GAS, NORTH SLOPE AREAWIDE OIL AND GAS LEASE SALES, WRITTEN FINDING OF THE DIRECTOR 9-3

There are no criteria to determine if a site has been adequately rehabilitated. In short, there is little in place to ensure that state lands will be restored at the end of a lease.

D. North Slope Borough Laws

The North Slope Borough is a municipality nearly the size of the state of Oregon, covering much of Arctic Alaska.[258] As a "home rule borough," under the Alaskan Constitution, it has broad authority to impose DR&R requirements so long as they do not directly conflict with state or federal laws and federal law has not "occupied the field."[259] But the Borough has done little to develop requirements and generally defers to the state in this area of law.[260] The Borough has been reluctant to require operators to abandon facilities if there is a prospect of future development that could contribute to the Borough's property tax base.[261] Decisions about DR&R are generally not made until facilities are truly abandoned.[262]

The Borough's land use ordinances governing DR&R have changed little since the 1990s, although stipulations attached to leases have strengthened over time. The Borough has the authority to require a DR&R plan and a surety or bond of 100% of the potential costs of DR&R prior to approving operations,[263] but this is not generally done. Instead, the Borough tends to require DR&R plans to be submitted 12 months after operations have ceased.[264] In summary, the North Slope Borough, like

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(2018), https://dog.dnr.alaska.gov/Documents/Leasing/BestInterestFindings/20180418_NS_Final_BIF_Signed.pdf [https://perma.cc/9JAH-6KV6]. Essentially, the same language appeared in the 2008 best interest findings. NSB, *supra* note 126.

258. *Your Government*, NORTH SLOPE BOROUGH, https://www.north-slope.org/your-government https://perma.cc/8PJJ-UJAF (last visited Sept. 12, 2019).

259. *See* U.S. CONST., art. VI, cl. 2; ALASKA CONST. art. X, §11 ("A home rule borough or city may exercise all legislative powers not prohibited by law or by charter."); *see also* Walleri v. City of Fairbanks, 964 P.2d 463 (Alaska 1998); English v. Gen. Elec. Co., 496 U.S. 72, 78–79 (1990) (setting forth the three-part test for federal preemption; preemption can take place even when there is no direct conflict if the federal law occupies the field or there is an implied conflict); Cipollone v. Liggett Group, Inc., 505 U.S. 504, 517 (1992).

260. U.S. GOV'T ACCOUNTABILITY OFFICE (GAO), GAO-02-357, ALASKA'S NORTH SLOPE, REQUIREMENTS FOR RESTORING LANDS AFTER OIL PRODUCTION CEASES 8 (2002).

261. NSB, *supra* note 126, at 135.

262. *Id.* at 141.

263. NORTH SLOPE BOROUGH, ALASKA, CODE § 19.30.070 (1990).

264. NSB, *supra* note 126, at 148.

other entities with authority over North Slope drilling, does not have clear requirements for DR&R.

Table 1 summarizes laws applicable to DR&R for the North Slope, with BLM and AOGCC setting bonds for all wells, and BLM and ADNR setting bonds for leases on lands they manage.[265] The AOGCC's bonds are significant, though overall bonds are inadequate to fully compensate for damage. Laws and guidance on restoration are so minimal as to be practically meaningless. Given these policy conditions, it is unlikely that developers of oil wells and infrastructure will adequately fund DR&R. Elsewhere, this has resulted in state government and local communities shouldering the responsibilities and costs of the process and/or litigating for damages.

III. RECOMMENDATIONS

This Part provides a range of suggestions to increase the likelihood that North Slope lands will be restored after drilling has ceased. The first Subpart describes what agencies could do with little to no policy change, while the second Subpart offers policy recommendations based on other jurisdictions. The recommendations here are just a summary of what might be achievable; additional research and details are needed to develop meaningful standards. While each circumstance is different and standards may need to be adaptable, this Article argues that performance standards should be imposed prior to drilling, rather than relying on the operator or lessee to submit their own DR&R plan.

A. Improved Management Under Existing Law

1. Monitoring and Enforcement

This Article and reporting by GAO and others[266] have demonstrated the weaknesses in FWS and BLM's system for tracking wells to ensure

265. *See infra* Appendix.

266. U.S. GOV'T ACCOUNTABILITY OFFICE (GAO), GAO-02-357, ALASKA'S NORTH SLOPE, REQUIREMENTS FOR RESTORING LANDS AFTER OIL PRODUCTION CEASES 3 (2002); U.S. GOV'T ACCOUNTABILITY OFF., GAO-03-517, NATIONAL WILDLIFE REFUGES, OPPORTUNITIES TO IMPROVE THE MANAGEMENT AND OVERSIGHT OF OIL AND GAS ACTIVITIES ON FEDERAL LANDS (2003); U.S. GOV'T ACCOUNTABILITY OFF., GAO-11-292, OIL AND GAS BONDS, BLM NEEDS A COMPREHENSIVE STRATEGY TO BETTER MANAGE POTENTIAL OIL AND GAS WELL LIABILITY (2011).; U.S. GOV'T ACCOUNTABILITY OFF., GAO-18-250, OIL AND

proper closure. There is a need for a nationwide database tracking the number and location of wells for each operator within the United States, the status of each well, and the history of violations and spills associated with each operator. Within this system, a well should be classified as "shut-in" or "temporarily abandoned" only for a limited time (for example, two years) before the operator must properly plug and abandon the well and restore the site.[267] At the ground level, if drilling in acknowledged ecologically unique or productive Special Areas and ANWR takes place, there is a need to increase BLM and ANWR agency staff to monitor activity and ensure compliance.[268] Given the decades, and even centuries, required for a landscape to recover, monitoring will need to be in place indefinitely.[269] While cases can be made that the dirty practices of the past are just that, there is little recent evidence to support the conclusion that well or field abandonment practices are or will be any different without significant regulatory changes.

State government should also step up its enforcement, particularly in terms of ADEC's responsibility for addressing spills. ADEC has a robust database of spills but has shown great reluctance to pursue monetary compensation or legal action in regard to spills.

2. Bond Levels

Bond levels set by BLM and AOGCC can be adjusted on a case-by-case basis for various reasons, such as operator non-compliance.[270] Agencies should exercise their authority to require higher bonds in sensitive Arctic areas where risks are greater and restoration is more difficult.

GAS WELLS, BUREAU OF LAND MANAGEMENT NEEDS TO IMPROVE ITS DATA AND OVERSIGHT OF ITS POTENTIAL LIABILITIES 42 (2018).

267. U.S. GOV'T ACCOUNTABILITY OFF., GAO-18-250, OIL AND GAS WELLS, BUREAU OF LAND MANAGEMENT NEEDS TO IMPROVE ITS DATA AND OVERSIGHT OF ITS POTENTIAL LIABILITIES 42 (2018).

268. Two refuges in Louisiana have collected fees from operators to help pay for staff. U.S. GOV'T ACCOUNTABILITY OFF., GAO-03-517, NATIONAL WILDLIFE REFUGES, OPPORTUNITIES TO IMPROVE THE MANAGEMENT AND OVERSIGHT OF OIL AND GAS ACTIVITIES ON FEDERAL LANDS 34 (2003).

269. *See* Riley, *supra* note 149.

270. 43 C.F.R. § 3104.5 (2011); 43 C.F.R. § 3106.6-2 (2011); 43 C.F.R. § 3106.7-1 (2011); ALASKA ADMIN. CODE tit. 20, § 25.025(b) (2019).

3. Standards for ANWR Leasing

The current Required Operating Procedures (ROPs) 24 and 35 for ANWR provided limited detail on DR&R and allowed for exemptions on DR&R requirements. BLM has the authority to strengthen ROPs to provide more specific land restoration policies, akin to those proposed in the next Part. BLM should remove (or at least qualify) the provision that allows it to grant exceptions to any DR&R requirements.

DR&R standards should better consider what the landscape will look like once permafrost inevitably melts under disturbed areas. BLM should require that permafrost core samples be taken at a site at sufficient intervals to calculate the volume of massive and pore ice in the underlying permafrost.[271] There may be a need to leave a certain amount of gravel at the site to maintain elevation.[272] For the gravel that is removed, BLM should specify where it will be placed to avoid the potential for contamination.[273]

BLM should clarify how revegetation will take place in disturbed areas (those where gravel has been placed as well as those impacted by dust). Locally collected seeds of forbs and sedges or sprig with willows are more likely to take root than grass seeds.[274] Better still would be to save and preserve the surface vegetative mat to use for rehabilitation.[275]

Additionally, BLM should clarify timelines for implementation of DR&R, particularly if it is relying on a "rolling" 2,000-acre development footprint that allows for new development as developed areas are restored.[276] There must be indicators (or at least a monitoring method) to demonstrate that is site is fully rehabilitated before additional acreage beyond the 2,000-acre limit can be developed.[277]

BLM should clearly explain what bonding requirements apply in ANWR and why. New bonds should be filed by operators who have already satisfied the national blanket bond requirement. BLM should

271. Conservation Comments on ANWR DEIS 2019, *supra* note 67, at 96.
272. *Id.*
273. *Id.*
274. *Id.*
275. *Id.* at 97.
276. *Id.*
277. *See, e.g.,* N.M. CODE R. § 19.15.29.13(D)(3) (2018) ("The division will consider reclamation of all disturbed areas complete when uniform vegetative cover has been established that reflects a life-form ratio of plus or minus fifty percent of pre-disturbance levels and a total percent plant cover of at least seventy percent of pre-disturbance levels, excluding noxious weeds.").

clarify that the bond must be furnished "prior to the issuance of an oil and gas lease," as required of lessees in NPRA.[278]

Finally, BLM should designate Special Areas in the Coastal Plain that are off limits to leasing due to their particular ecological significance. To the extent that BLM's environmental review process fails to address these inadequacies, FWS should do so in the compatibility determination required by ANILCA and the 2017 Tax Act.[279] Such a determination could find the leasing compatible with ANWR purposes only if clear stipulations for DR&R are imposed.

4. Cleanup of Abandoned Wells and Orphaned Sites

There remain a few legacy wells that have not been fully remediated,[280] as well as sites on the North Slope requiring additional cleanup (including those not cleaned up through the BP Charter). Since there may be no clearly responsible party for these wells and sites (other than the government), Congress and the State of Alaska Legislature should fund BLM and DNR (respectively) to conduct DR&R on remaining sites and wells. Among the legacy wells in NPRA, 18 wells require additional downhole P&A work.[281] Near NPRA, there are five wells owned by Arctic Slope Regional Corporation that may need additional work.[282] Four wells on the North Slope are on a watchlist, as AOGCC is not exactly sure where they are.[283] Finally, there are 15 wells on the North Slope with no downhole casing that still need surface cleanup.[284] Given the unlikelihood of getting a Congressional or State legislative appropriation, entities such as AOGCC or the North Slope Borough could consider imposing a small fee to fund cleanup for existing and future orphan wells.[285]

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278. 43 C.F.R. § 3134.1(a) (2018).

279. 43 C.F.R. § 3101.5-3 (2018).

280. *See Opportunities for the Nation and States to Harness Onshore Resources (ONSHORE) Act: Hearing on Discussion Draft of H.R. 4239 Before the Subcomm. on Energy & Mineral Res. of the H. Comm. on Nat. Res*., 115th Cong. (2017) (written statement of Cathy Foerster, Engineering Commissioner and Chair, Alaska Oil & Gas Conservation Commission).

281. Hughes, *supra* note 64.

282. *Id.*

283. *Id.*

284. *Id.*

285. For example, the state of Michigan has an Orphan Well Program funded by a severance tax on the oil and gas industry. On a monthly basis, each producer pays 5% (for gas) or 6.6% (for oil) of the gross cash market value of the total production from the preceding month. Two percent of the severance tax revenue, but not less than $1 million, is credited to the fund annually. *See* MICH. COMP. LAWS §§

B. Proposed Policies

This Subpart proposes standards that agencies could adopt to ensure DR&R. As indicated in footnotes, standards are based on recommendations in the literature, onshore drilling requirements for National Parks, Refuges in the Lower 48 States, and Canadian provinces, as well as U.S. requirements for mining and offshore drilling.

1. Land Restoration

There is a need for clear landscape-level DR&R requirements prior to development. Waiting until sites are abandoned to impose specific requirements results in unrealistic expectations, since by this point the site is no longer profitable and is potentially managed by a small operator, long separated from the original developer.[286] This is particularly problematic for smaller companies that may not have funds available at the time cleanup is needed.[287]

Policies applicable to the North Slope generally do not require DR&R until the end of a lease. DR&R should begin when any part of development infrastructure is no longer used and the operator cannot demonstrate the potential for future use.[288] The area should be restored in a manner consistent with the habitat, ecosystem, and subsistence use of surrounding

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205.301–205.303; *Orphan Well Program Overview*, MICH.GOV, https://www.michigan.gov/egle/0,9429,7-135-3311_4231-112026--,00.html [https://perma.cc/W5U5-83LA] (last visited Sept. 12, 2019).

286. NSB, *supra* note 126, at 150.

287. KOKS, *supra* note 29, at 16.

288. For oil and gas leases outside of Alaska, NPS requires "partial reclamation of areas that are no longer necessary to conduct operations," 50 C.F.R. § 29.117 (2016), and "[s]tructures and equipment must be removed when the need for them has ended." 50 C.F.R. § 29.32(a)(4) (2016). *See also* NSB, *supra* note 126, at 159; N.M CODE R. § 19.15.29.13 (2018):

> B. Areas reasonably needed for production operations or for subsequent drilling operations must be compacted, covered, paved or otherwise stabilized and maintained in such a way as to minimize dust and erosion to the extent practical.
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> * * *
>
> D. Reclamation of areas no longer in use. The responsible party shall reclaim all areas disturbed by the remediation and closure, except areas reasonably needed for production operations or for subsequent drilling operations, as early and as nearly as practical to their original condition or their final land use and maintain those areas to control dust and minimize erosion to the extent practical.

land areas, unless the authorizing entity determines that restoration would cause greater adverse impact to the environment than leaving the area unrestored, or there is a strong likelihood that the facilities will be re-used in the near future.[289]

The likelihood of future use should be determined by either (1) information provided by the operator or lessee demonstrating that future use is more likely than not, based on development plans and oil prices; or (2) consultation with local communities regarding their preferences, which could be clarified in the form of a tribal or municipal resolution. Restoration should involve returning the site to the approximate original contour, restoring the hydrological flow, taking actions to prevent erosion and the invasion of new species, and restoring native vegetation and soil material.[290]

Gravel should be removed from the area unless it will serve as a base for a future structure, is needed to level the ground, or will exacerbate the existing damage.[291] Any contaminated soil, as well as muds and cutting, should also be removed. Exposed areas should be covered with sod if available or seeded. Pits and trenched areas should be backfilled and seeded.[292] All wells should be permanently plugged and all platforms and

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289. *See* NSB, *supra* note 126, at 159.

290. *See, e.g.*, 50 C.F.R. § 29.117 (2016) (FWS's DR&R requirements for refuges outside Alaska); FLA. ADMIN. CODE ANN. R. 62C-29.009(2)(d)(2) (1996):

> The operator shall remove all waste, debris, and equipment and shall restore the site as necessary to prevent erosion, invasion of exotic species, interruption of sheetwater flow or other similar impacts. Land drilling sites and access roads shall be restored to the approximate original contour of the surface and revegetated with native vegetation.

See also N.M. CODE R. § 19.15.29.13 (2018):

> A. The responsible party must substantially restore the impacted surface areas to the condition that existed prior to the release or their final land use. Restoration of the site must include the replacement of removed material and must be replaced to the near original relative positions and contoured to achieve erosion control, long-term stability and preservation of surface water flow patterns.
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> * * *
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> C. The responsible party must construct the soil cover to the site's existing grade and prevent ponding of water and erosion of the cover material.

291. *See* NSB, *supra* note 126, at 139 ("Rehabilitation efforts have been more successful when gravel is removed to near-tundra level, and beginning in 2000, removal of all or part of gravel from abandoned roads, pads and airstrips became more common.").

292. *See id.* at 140.

other facilities must be removed within one year after a lease terminates (if not removed earlier due to non-use), unless permission is received to maintain a structure to conduct other activities.[293] The lessee should have to verify that the site has been restored within 60 days of well plugging or platform removal by video or other means.[294]

Land managers (i.e., ADNR and BLM, and to some degree FWS) are in the best position to issue and implement the above requirements for leases and units, while AOGCC may be able to require some of these measures for the area in the immediate vicinity of a well. The North Slope Borough may also be able to impose some of these requirements as a condition of approving an operator's application to rezone lands reserved for conservation to lands where development is allowed.[295]

2. Joint and Several Liability

Regulations governing offshore oil and gas operations provide for joint and several liability, whereby each lessee of offshore oil and gas is liable for all decommissioning obligations that accrue on the lease during its ownership, including those that accrued prior to its ownership but had not been performed.[296] For example, if *Company A* sells its lease interest to *Company B*, who in turn sells it to *Company C*, each of these companies could be liable for the entire amount of damage associated with the lease, regardless of when it occurred. There should be a similar provision for onshore leases managed by BLM and ADNR.[297]

293. This is based on Bureau of Ocean and Energy Management regulations. 30 C.F.R. § 250.1710 (2011). C.F.R. § 250.1725 (2011).

294. *See* 30 C.F.R. § 250.1740.

295. NORTH SLOPE BOROUGH, ALASKA, CODE § 19.60.060 (2013) (showing the procedure for rezoning).

296. 30 C.F.R. § 250.1701 (2011).

297. In many states, an intermediate assignee of an oil and gas lease may not be liable for obligations that arose before or after assignment, unless the assignee signed an agreement with the obligee or the obligee can enforce the assignment agreement as a third-party beneficiary. 4 PATRICK H. MARTIN & BRUCE M. KRAMER, WILLIAMS & MEYERS, OIL AND GAS LAW § 403 (LexisNexis Matthew Bender 2018).

3. Financial Security

GAO recommended (and BLM concurred) that bonds should better account for risks at the statewide and national level.[298] Higher bond levels may be needed for development in NPRA Special Areas and ANWR's Coastal Plain, given their ecological value, the high costs of transporting fuel and materials to and from the sites, the likelihood that reclamation will extend over multiple seasons since some reclamation may have to take place during frozen conditions, and reduced productivity of people and equipment in winter conditions.[299] While some have made the argument that it unfairly disadvantages small and emerging companies to have to pay large bonds,[300] it is perhaps more unfair to leave taxpayers with the expense of cleaning up the mess created by an insolvent company. If BLM is unwilling to pursue policy change, FWS could implement regulations specifically addressing refuges in Alaska. These regulations could provide additional bonding requirements on top of what BLM requires.

Rather than setting a flat bond rate per well, a standard formula should be set that computes the bond for a particular well or set of wells based on well depth and location, the number of wells, assets available for cleanup, and the operator's past non-compliance.[301] A contingency factor should be built into the cost of the bond to account for spills and unforeseen costs.[302] An assessment could take place annually (like a property tax assessment) or once every few years,[303] since bonds lose value due to inflation and

298. U.S. GOV'T ACCOUNTABILITY OFF., GAO-18-250, OIL AND GAS WELLS, BUREAU OF LAND MANAGEMENT NEEDS TO IMPROVE ITS DATA AND OVERSIGHT OF ITS POTENTIAL LIABILITIES 43 (2018).

299. GOV'T OF N.W.T., CAN., RECLAIM 7.0 USER MANUAL, MINING VERSION 3 (2017).

300. *See* AOGA, *supra* note 250.

301. *See, e.g.*, ALTA. ENERGY REGULATOR, DIRECTIVE 011: LICENSEE LIABILITY RATING (LLR) PROGRAM: UPDATED INDUSTRY PARAMETERS AND LIABILITY COSTS (2015) (providing a formula); 36 C.F.R. § 9.141 (2016) (outside of Alaska, NPS requires financial assurance in an amount equal to the estimated cost of reclamation; it does not set minimum amounts).

302. *See, e.g.*, GOV'T OF N.W.T., CAN, *supra* note 299, § 4.4.4, at 11 ("A contingency is added to cover both the uncertainty in the costing estimate (i.e., variability in quantity of work, Unit Costs and required scope of activities) and the possibility that some aspects of the closure and reclamation activities may be more difficult to perform.").

303. *See, e.g.*, B.C. MINISTRY OF THE ENV'T, PROTOCOL 8 FOR CONTAMINATED SITES § 8, at 10 (2007):

> 8.1. A Director shall carry out a review of the security for a site at least every five years and no more than once per year.

increasing cost of DR&R.[304] The assessment could take into account the financial wellbeing of a company and recent violations, and raise security for companies with higher risk.[305] The bond could increase as the scope of activity is increased,[306] and it could be adjusted for inflation.[307] Bonds could be reduced as reclamation is completed,[308] but the agency should retain some portion of the bond until all reclamation, including revegetation, is complete.[309]

Similar to the systems for North Carolina and North Dakota, there should not be a maximum bond that applies once a certain number of wells are installed.[310] While greater numbers of wells may allow lower marginal

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> 8.2. A person providing security for a site shall be required to forward to a Director annually a copy of his or her firm's most recently audited annual financial statements along with a copy of the firm's signed annual report.
>
> 8.3. For projects where costs are changing significantly, a Director shall perform a security review more frequently than every five years. The review shall include an analysis of the adjusted projected costs of the project in relation to the actual costs incurred to date, and shall analyse these costs in relation to the current value of the security provided.

304. *See* ARCADIS, *supra* note 29, at 3. (projecting DR&R costs to grow 540% between 2015 and 2040).

305. An example is the British Columbia, Canada system, which increases security if a company's liability management rating (LMR) is less than 1.0. LMR is calculated by dividing (deemed assets + security deposit) by (deemed liabilities). BC OIL & GAS COMM'N, LIABILITY MANAGEMENT RATING PROGRAM MANUAL, Ver. 2.10, at 6 (2017). Another example is the National Park Service's regulation, 36 C.F.R. § 9.142 ("The Regional Director may require, or you may request, an adjustment to the financial assurance amount because of any circumstance that increases or decreases the estimated costs established under § 9.141.").

306. This is based on Surface Mining Control and Reclamation Act, 30 U.S.C. § 1259(e) (1977), 30 C.F.R. § 800.20(b). Another example concerns Bureau of Ocean Energy Management (BOEM), which requires a lessee to maintain a $50,000 lease bond or a $300,000 area-wide bond (which would cover all offshore Alaska waters). *See* 30 C.F.R. § 556.900 (2018). Prior to exploration, the bond is raised to $200,000 per lease or $1 million area-wide; and prior to production, the bond is raised to $500,000 per lease or $3 million area-wide. 30 C.F.R. §556.901 (2018).

307. *See, e.g.*, GOV'T OF N.W.T., CAN., *supra* note 299, § 4.6.1, at 13 (adjustments to mining financial security).

308. *Id.* § 3.2.2, at 4 (progressive reclamation considerations).

309. This is based on Surface Mining Control and Reclamation Act, 30 U.S.C. § 1259(b).

310. As mentioned above, neither North Carolina nor North Dakota have a maximum limit for bonds.

costs per well, each well abandonment will always impose an additional cost.

In addition to the previously discussed weaknesses associated with most bonding policies, another problem with bonds is the inability to address contamination that emerges after the bond has been released.[311] Legal commentators Dana and Wiseman proposed an alternative regime to address some of the weaknesses of bonds: the regulatory agency could require operators to purchase insurance for liabilities resulting from inadequate DR&R.[312] Insurance could be required in lieu of or in addition to bond requirements, so as to protect against a worst-case scenario.[313] As indicated above, insurance is already allowed as an alternative to a bond under current BLM regulations[314] as well as for companies engaged in offshore activity[315] and for operators in Texas.[316] Insurance could be required at a federal, state, or local level. The North Slope Borough could require insurance along the lines of what it has required commercial recreation operators.[317] To ensure adequate coverage, "self-insurance" should not be allowed, although small insurers could be allowed to buy coverage as a pool.[318]

One advantage of environmental liability insurance is that insurers responsible for the ultimate costs may have more incentive than agencies

311. David A. Dana & Hannah J. Wiseman, *A Market Approach to Regulating the Energy Revolution: Assurance Bonds, Insurance, and the Certain and Uncertain Risks of Hydraulic Fracturing*, 99 IOWA L. REV. 1523, 1562–63 (2014).

312. *Id.*

313. For offshore drilling, in addition to bond requirements, BOEM requires any applicant seeking to drill offshore to have "oil spill financial responsibility" insurance. 30 C.F.R. §553.11 (2018). The amount of insurance required is based on the volume of the worst-case spill scenario. 30 C.F.R. § 553.13. Insurance must be maintained continuously for all the applicant's leases and permits. 30 C.F.R. §553.15.

314. *See* 43 C.F.R. § 3809.555 (2018).

315. *See* 33 U.S.C. § 2716 (2012); 33 C.F.R. §138.80 (2018); *see also* 30 C.F.R. § 585.526(a)(6) (2018) (insurance in lieu of a bond as a security for offshore leases for renewable energy projects).

316. TEX. NAT. RES. CODE ANN. § 91.104 (West 2005); 16 TEX. ADMIN. CODE § 3.78(a)(11) (2016).

317. *See* NORTH SLOPE BOROUGH, FORM 200—COMMERCIAL RECREATION PERMIT APPLICATION (2010), http://www.north-slope.org/ assets/images/uploads/ Form_200_Application_NSB_Commercial_Recreation_sept_2012.pdf [https://perma.cc/H9FG-JD6T].

318. *See* Dana & Wiseman, *supra* note 311, at 1581. Self-bonding is currently not authorized by BLM and should not be authorized. *See also* 43 C.F.R. § 3809.555 (2018).

to gather information regarding exposure to risks.[319] Also, insurers can adapt more easily to changing circumstances by adopting new rules outside of a regulatory process, and insurers are more insulated from politics than regulators.[320]

CONCLUSION

While AOGCC has made great strides in matching bond levels to the costs of DR&R in Arctic Alaska, regulations remain inadequate to ensure restoration of sensitive landscapes impacted by oil and gas activity. BLM could use the NEPA process to do much more to protect ANWR from destructive impacts. To the extent BLM fails to do so, FWS should step up and issue a compatibility determination for ANWR with stipulations for DR&R. Assuming that BLM rewrites the plan for NPRA to open more areas to leasing, this would be an opportunity to implement better standards for DR&R.

There are few model jurisdictions in terms of DR&R and bonding requirements, although there are examples of good policies within the U.S. regimes for offshore drilling and mining and the regulations of some U.S. states and Canadian provinces. Agencies responsible for oil and gas activity on Arctic lands should consider policies that impose more tailored and adjustable financial insurance requirements as well as more specific DR&R standards, monitoring and enforcement of restoration effort, and long-term monitoring of effectiveness. While BLM and FWS may be the primary regulators for federal lands on the North Slope, the State of Alaska and the North Slope Borough have significant power that could be used to help ensure the long-term health and viability of these ecosystems and mixed economies when the oil and gas has dried up. The Borough could implement policies through zoning regulations, and AOGCC and ADEC could exercise their statewide authority for controlling wells and spills.

Without such policies, junkyards on the North Slope will not be limited to pockets like Service City. The Coastal Plain will be dotted with abandoned wells and rotting buildings. Tundra where roads and building pads are no longer needed will bear permanent scars from gravel placement. Hydrology, wildlife, and ecosystem processes will be irreparably altered. Existing bonds do not address these damages, and without adequately addressing these damages, the costs of oil production for new developments are vastly underestimated.

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319. *See* Dana & Wiseman, *supra* note 311, at 1565.
320. *Id.* at 1568.

APPENDIX

Table 1: Summary of Key Agency DR&R Requirements Applicable to the North Slope

Agencies	U.S. Army Corps/ EPA	BLM	FWS	ADEC	AOGCC	ADNR
Scope	All wetlands regard-less of owner-ship	Federal lands managed by BLM and drilling in Refuges	General authority over Refuges	Hazardous waste and oil spills	All wells regardless of land ownership	State lands
Permitting Requirements	Clean Water Act Sec. 404 Permit	FLPMA and NPRPA regulations control leases and permits	None in Alaska, but drilling must be compatible with Refuge purpose	None relevant	Regulations require permits for well drilling	Leasing require-ments
Bonding Requirements	None	$100,000 per lease in NPRA, or $300,000 NPRA-wide	None in Alaska	None	$400,000 per well for up to 10 wells; $6,000,000 for up to 40 wells; $10,000,000 for up to 100 wells; $20,000,000 for up to 1000 wells, and $30,000,000 for any number of wells over 1000	$10,000 per lease, or $500,000 for state-wide activities

Agencies	U.S. Army Corps/ EPA	BLM	FWS	ADEC	AOGCC	ADNR
Restoration Requirements	Case-by-case	P&A requirement; vague general requirement in BLM regulations for reclamation, case-by-case plan requirement; some protections for leases in NPRA Special Areas; NPRA 2012 ROD general stipulation for reclamation	None in Alaska	Spill response requirements	P&A requirements in immediate vicinity of well	General lease language requiring reclamation, requirement for reclamation plan