Chapter 25 • CLIMATE CHANGE, SUSTAINABLE DEVELOPMENT, AND ECOSYSTEMS
2016 Annual Report[1]

2016 followed 2015 as another momentous year of new environmental protections regarding climate change, sustainable development, and ecosystems, particularly on the international level. Nations took great strides in committing to climate measures outside the scope of the Paris Agreement – in particular, establishing new regimes under the Montreal Protocol to phase down hydrofluorocarbons, and under the International Civil Aviation Organization (ICAO) to curb greenhouse gas (GHG) emissions from international aviation. The Obama administration continued to promulgate new climate regulations (i.e. methane, mobile sources), although its signature Clean Power Plan (CPP) was stayed by the Supreme Court pending litigation. The fate of the CPP, other regulations, and even United States participation in the Paris Agreement remain uncertain under the Trump administration. Even with the CPP stayed, several U.S. states remain on the forefront of efforts to combat climate change and adapt to its effects, while others – including the new EPA Administrator Scott Pruitt – have led the opposition to the Obama administration's regulatory efforts. Nations took significant steps to protect the world's ecosystems, establishing the two largest protected areas ever around Hawaii and Antarctica's Ross Sea, in addition to many smaller ones. While it is unclear how much of President Obama's environmental legacy will be undone by President Trump's administration, 2016 marked a resounding conclusion to one of the most environmentally-protective administrations in United States history.

I. CLIMATE CHANGE

A. Mitigation

1. International Activities

a. United Nations Framework Convention on Climate Change (UNFCCC)

At the Twenty-First Session of the Conference of the Parties (COP) to the UNFCCC, held in December 2015 in France, parties adopted the Paris Agreement,[2] aimed at limiting the increase in global average temperatures to well below 2°C above pre-

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[2]U.N. Framework Convention on Climate Change (UNFCCC), Conference of the Parties on its Twenty-First Session, Adoption of the Paris Agreement, Decision 1/CP.21, U.N. Doc. FCCC/CP/2015/L.9/Rev.1 (Dec. 12, 2015) [hereinafter COP21 Decision].

industrial levels. The conditions for entry into force of the Paris Agreement were met on October 5, 2016, with its approval by more than fifty-five countries accounting for 55% of global greenhouse gas (GHG) emissions.[3] The Agreement entered into force thirty days later on November 4, 2016.

The First Session of the Meeting of the Parties to the Paris Agreement (CMA1) was held in conjunction with the Twenty-Second Session of the COP (COP22) from November 7 to 18, 2016, in Marrakech, Morocco. Discussions at CMA1 / COP22 focused on implementing the Paris Agreement, with parties agreeing to accelerate completion of the work program therefor.[4] Parties agreed that the work program should be completed "as soon as possible" and, at the latest, by the Twenty-Fourth Session of the COP in December 2018.[5] A joint meeting of the COP and CMA will be held at the Twenty-Third Session of the COP in November 2017 to review progress under the work program.[6]

The work program specifies various climate finance activities, including establishing processes so developed countries can meet their commitments under the Paris Agreement to provide financing to assist developing countries with climate mitigation and adaptation.[7] The Paris Agreement set a target for developed countries to collectively mobilize at least US$100 billion per year from 2020. A roadmap for achieving this target was agreed to in August 2016 by the European Commission and thirty-eight individual countries. These and other countries made various pledges with respect to financing in the lead up to, and at, COP22.[8] However, these pledges are not enforceable, and political developments in the United States suggest that countries may cancel their financial pledges and indeed their participation in international climate agreements with few legal (as opposed to diplomatic) consequences. It remains to be seen whether Donald Trump will follow through on his campaign promises to withdraw the United States from the Paris Agreement and halt funding to UN climate programs.[9]

COP22 welcomed the progress made by the Green Climate Fund (GCF) in the last year, including its approval of US$1.17 billion for twenty-seven projects in thirty-nine countries.[10] The COP identified a number of focus areas for the GCF over the next year, including simplifying its project application and approval procedures, addressing measures that are delaying implementation of projects, promoting private sector involvement in least-developed and small island developing states, and finalizing its work on funding for forests.[11] The GCF will report on progress in these areas at the next COP in 2017.[12]

The next COP will be held at the headquarters of the UNFCCC Secretariat in Bonn, Germany from November 6 to 17, 2017.[13] CMA1 will be reconvened at that time.

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[3]UNFCCC, Paris Agreement Entry Into Force, UN Doc. C.N.735.2016.TREATIES-XXVII.7.d (Oct. 5, 2016).

[4]UNFCCC, Conference of the Parties on its Twenty-Second Session, Preparations for Entry into Force of the Paris Agreement, Decision -/CP.22, UN Doc. FCCC/CP/2016/L.12 (Nov. 18, 2016) [hereinafter COP22 Decision].

[5]*Id.* at cl. II.12.

[6]*Id.* at cl. II.11.

[7]COP21 Decision, *supra* note 2, at annex art. 9.

[8]For a list of all pledges, see *List of Recent Climate Funding Announcements*, UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE (last visited Nov. 28, 2016).

[9]Alister Doyle, *Trump Win Threatens Climate Funds for Poor, A Key to Paris Accord*, REUTERS (Nov. 12, 2016).

[10]UNFCCC, Conference of the Parties on its Twenty-Second Session, Guidance to the Green Climate Fund, Draft Decision -/CP.22, U.N. Doc. FCCC/CP/2016/L.5, cl. 2(a), (Nov. 16, 2016).

[11]*Id.* at cl. 4, 7, 10, 11.

[12]*Id.* at cl. 16.

[13]*Calendar*, U.N. Framework Convention on Climate Change (last visited Nov. 28, 2016).

b. Montreal Protocol and Hydrofluorocarbons (HFCs)

The global community took one of the biggest steps ever to combat climate change under the auspices of the Montreal Protocol on Substances that Deplete the Ozone Layer (Montreal Protocol). Following seven years of negotiations, on October 15, 2016, at the Twenty-Eighth Meeting of the Parties (MOP28) in Kigali, Rwanda, 197 countries adopted the Kigali Amendment to the Montreal Protocol to regulate global consumption of hydrofluorocarbons (HFCs) – a powerful GHG chemical used primarily in air conditioning and refrigeration that has fifty-three to 14,800 times the global warming potential of carbon dioxide (CO_2). [14] The amendment adds HFCs to the list of substances controlled under the Montreal Protocol and establishes a legally binding plan for nearly all countries to reduce their HFC consumption to 15-20% of baseline levels by mid-century.[15] The Kigali Amendment is expected to avoid seventy to eighty billion tons of CO_2-equivalent emissions by 2050 and 0.5 degree Celsius of global warming by the end of the 21st Century.[16]

Under the Kigali Amendment, Parties to the Montreal Protocol are required to freeze and gradually phase-down their consumption of HFCs.[17] It establishes four different timetables for developed and developing countries. The vast majority of developed countries will reduce their HFC consumption by 10% by 2019 and 85% by 2036, relative to production and consumption levels in 2011-2013.[18] Most developing countries, including China, Brazil, South Africa, and Argentina, will follow with a freeze of HFC consumption in 2024 and then reduce by 80% by 2045, relative to 2020-2022 levels.[19] A group of the world's hottest countries – India, Pakistan, and eight Persian Gulf States – will reduce HFC consumption starting with a freeze in 2028 and reaching 85% reductions in 2047.[20] The amendment contains trade restrictions with non-Parties and a funding mechanism. Developed nations committed to provide additional funds to the Protocol's Multilateral Fund (MLF) to help developing countries achieve their commitments and to support energy efficiency improvements.

The Kigali Agreement is scheduled to enter into force January 1, 2019, provided at least twenty Parties to the Montreal Protocol ratify the amendment.[21] HFC trade restrictions with non-Parties go into effect in 2030 as long as seventy Parties ratify the amendment.

c. Aviation & Shipping

The United Nations' International Civil Aviation Organization (ICAO) took the world's first step to curb GHG emissions from international aviation, which accounts for two percent of global emissions. On October 6, 2016, in Montreal, Canada, at ICAO's 39th Assembly, representatives from 191 countries, industry, and civil society agreed to maintain GHG emissions from international aviation (excluding domestic flights) at 2020

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[14] Amendment to the Montreal Protocol on Substances that Deplete the Ozone Layer, Kigali, Oct. 15, 2016, United Nations, C.N.872.2016.TREATIES-XXVII.2.f (Adoption of amendment).

[15] *Id.*

[16] ENVTL. INVESTIGATION AGENCY, KIGALI AMENDMENT TO THE MONTREAL PROTOCOL: A CRUCIAL STEP IN THE FIGHT AGAINST CATASTROPHIC CLIMATE CHANGE (Nov. 2016).

[17] *Id.* at 1.

[18] *Id.* at 2.

[19] *Id.*

[20] *Id.*

[21] U.N. ENVTL. PROGRAMME, FREQUENTLY ASKED QUESTIONS RELATING TO THE KIGALI AMENDMENT TO THE MONTREAL PROTOCOL (Nov. 24, 2016).

levels and improve average fuel efficiency by 2% per year from 2021 to 2050.[22]

Recognizing that improved technology, operational improvements, and the use of sustainable alternative fuels alone will be insufficient to meet these goals, ICAO adopted Resolution A39-3, creating a Global Market-Based Measure (GMBM), known as the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA), which will allow airlines to offset their emissions with carbon credits or equivalent reductions.[23] The GMBM will begin in January 2021, with voluntary participation by all countries from 2021-2026 and mandatory participation for almost all countries from 2027-2035 (excluding Least Developed Countries, Small Island Developing States, Landlocked Developing Countries and States with low levels of international aviation activity).[24] As of October 12, 2016, sixty-six countries, representing 86.5% of international aviation activity are expected to voluntarily participate, including the United States and China.[25] In the next few years, technical bodies under ICAO will decide what types of activities (i.e. project, sectoral, REDD+) will be eligible as offsets under CORSIA.

At its 70th session meeting in October, 2016, the Marine Environment Protection Committee (MEPC) of the International Maritime Organization (IMO) took two separate actions to address GHG emissions from international shipping. First, the MEPC adopted recordkeeping and reporting requirements for fuel oil consumption. The mandatory regulations require that ships of 5,000 gross tonnage and above will collect consumption data for each type of fuel used, which will assist IMO in making decisions to address GHGs in the future.[26] Second, "MEPC also approved a roadmap (2017 through to 2023) for developing a 'Comprehensive IMO strategy on reduction of GHG emissions from ships', which foresees an initial GHG strategy to be adopted in 2018."[27]

d. Carbon Pricing Programs

Carbon pricing programs – including cap-and-trade systems and carbon taxes – now cover twelve percent of global emissions, and nearly half of the national plans submitted to the UNFCCC reference carbon pricing.[28]

Canadian Prime Minister Justin Trudeau announced on October 3 that all jurisdictions in Canada must implement carbon pricing by 2018, starting at a minimum of CA$10 per tonne (for jurisdictions that choose to implement a price-based system) or targeting at least a 30% reduction in emissions (for those that choose to implement cap-and-trade).[29] The policy builds on programs already in place in four Canadian provinces: British Columbia's CA$30/tonne tax on fuels (in place since 2008)[30]; Alberta's CA$20/tonne tax on fuels (upcoming in 2017)[31]; and Québec and Ontario's cap-and-trade

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[22]Int'l Civil Aviation Org. [ICAO], *Resolutions adopted at the 39th session of the assembly*, at A39-2 (provisional ed. Oct. 6, 2016).
[23]*Id.* at A39-3.
[24]*Id.*; *see also* *Historic Agreement Reached to Mitigate International Aviation Emissions*, ICAO (Oct. 6, 2016).
[25]*Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA)*, ICAO (last visited Nov. 29, 2016).
[26]*New Requirements for International Shipping as U.N. Body Continues to Address Greenhouse Gas Emissions*, ICAO (Oct. 28, 2016).
[27]*Id.*
[28]The World Bank, *Carbon Pricing: Building on the Momentum of the Paris Agreement* (Apr. 15, 2016).
[29]*Pan-Canadian Approach to Pricing Carbon Pollution*, GOV'T OF CAN. (Oct. 3, 2016).
[30]*How the Carbon Tax Works*, B.C. MINISTRY OF FIN. (last visited Dec. 21, 2016).
[31]*Carbon Levy and Rebates*, ALTA. GOV'T (last visited Dec. 21, 2016).

programs (Québec's launched in 2013 and linked with California's in 2014[32]; Ontario's will launch and join the linkage in 2017[33]).

Key economies in Latin America are preparing for carbon pricing: Chile's US$5/tonne carbon tax on power plants is set to begin in 2018[34] and Mexico recently launched a cap-and-trade simulation in anticipation of a national program.[35] Meanwhile, China's nationwide cap-and-trade program, designed to peak China's emissions by 2030 and originally anticipated to go into effect on January 1, 2017,[36] is held up with the State Council.[37] South Africa's carbon tax (of Rand 120/tonne) has also been delayed.

As parties to the UNFCCC iron out the rules for transferring international "mitigation outcomes," it remains to be seen how domestic initiatives – especially linked ones such as California-Québec-Ontario – will function under the Paris Agreement. Some countries are beginning to cooperate through informal carbon market "clubs" that anticipate harmonized markets and emissions units eligible in multiple jurisdictions.[38]

e. International Climate Change Litigation

In November 2015, a Peruvian farmer and mountain guide, Saùl Luciano Lliuya, filed a climate change suit against the German utility RWE (the largest CO_2 emitter in Europe) at the Regional Court in Essen, Germany. The plaintiff argued RWE's emissions threaten his family, his property, and his home city of Huaraz because climate change is melting glaciers and could cause flooding.[39] On December 15, 2016, the Regional Court dismissed the suit for lack of "legal causality," even if there is "scientific causality."[40]

In *VZW Klimaatzaak v. Kingdom of Belgium*, an organization of concerned citizens sued the federal and regional governments of Belgium in the Court of First Instance in Brussels for contributing to climate change, arguing the government's failure to reduce emissions is a violation of human rights laws. The lawsuit seeks to force the government to reduce GHG emissions 40% below 1990 levels by 2020 and 87.5% below 1990 levels by 2050.[41]

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[32] *A Brief Look at the Québec Cap-and-Trade System for Emissions Allowances*, QUE. GOV'T (last visited Dec. 21, 2016).

[33] *Ontario's Cap and Trade Program - Regulatory Overview of O. Reg. 144/16 and O. Reg 143/16*, LEHDER (July 1, 2016).

[34] *ETS Detailed Information: Chile*, INT'L CARBON ACTION P'SHIP (last updated Sept. 26, 2016).

[35] Natalie Schachar, *Mexico Announces Launch of Cap-and-Trade Pilot Program*, REUTERS (Aug. 15, 2016).

[36] INT'L EMISSIONS TRADING ASS'N, CHINA: AN EMISSIONS TRADING CASE STUDY (Sept. 2016).

[37] Stian Reklev, *China's ETS law likely pushed to next year, State Council plans show*, CARBON PULSE (Apr. 14, 2016).

[38] JEFF SWARTZ, INT'L EMISSIONS TRADING ASS'N ET AL., CHINA'S NATIONAL EMISSIONS TRADING SYSTEM: IMPLICATIONS FOR CARBON MARKETS AND TRADE, Issue Paper No. 6 (Mar. 2016).

[39] Stefan Küper, *Saùl Versus RWE – The Case of Huaraz*, GERMANWATCH (Dec. 15, 2016).

[40] Stefan Küper, *Regional Court dismisses climate lawsuit against RWE-Claimant likely to appeal*, GERMANWATCH (Dec. 15, 2016).

[41] Jennifer Klein, *July 2015 Update to Climate Litigation Charts*, CLIMATE L. BLOG, SABIN CTR. FOR CLIMATE CHANGE L. (July 7, 2015).

2. National Activities

a. United States Environmental Protection Agency

i. Clean Power Plan – CAA section 111(d)

In 2015, the EPA finalized the Clean Power Plan (CPP), the first-ever regulation under the Clean Air Act (CAA) section 111(d) addressing CO_2 emissions from existing fossil-based electric generating units (EGUs).[42] The CPP was immediately challenged in the D.C. Circuit Court of Appeals.[43] In *West Virginia v. EPA*, petitioners challenged both the EPA's authority to issue the rule under the CAA, as well as the Agency's technical assessments. In particular, petitioners, which included twenty-seven states, argued that the EPA's reliance on shifting generation from higher emitting to lower emitting generators would fundamentally transform the electricity industry without a clear statement of Congressional intent to provide the Agency with such authority, in violation of the *UARG* doctrine.[44] Some petitioners also raised constitutional claims, asserting that the CPP violated the Tenth Amendment's reservation of certain powers to the states. Petitioners briefed the case before the D.C. Circuit, which held oral argument on September 27, 2016.[45] The en banc court, which devoted nearly seven hours to argument, probed whether the CPP would transform the electricity sector or whether it confirmed market trends toward cleaner generation. A decision is expected in the first quarter of 2017. However, it is possible that the incoming Trump EPA could seek a remand of the CPP to reconsider the regulations before a decision is issued. Any such remand is discretionary.

Petitioners also sought a stay of the CPP in the D.C. Circuit, which was rejected by a three-judge panel on January 21, 2016.[46] Petitioners then sought review of the denial of the stay by the Supreme Court, which issued a 5-4 stay on February 9, 2016.[47] In the order granting the stay, the Supreme Court explicitly noted that the stay applied during the pendency of the litigation, including any review by the Court.[48] As a result, states were not required to submit initial compliance plans on September 6, 2016, as required by the CPP.

ii. New Source Performance Standards for Electric Generating Units – CAA section 111(b)

On the same day it issued the CPP, the EPA finalized regulations addressing CO_2 emissions from new and modified fossil-based EGUs under CAA section 111(b).[49] Among other things, the regulations established emissions limits for new coal-based EGUs predicated on the use of partial carbon capture and storage (CCS).[50] Like the CPP, the

[42]Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units, 80 Fed. Reg. 64,662 (Oct. 23, 2015) (codified at 40 C.F.R. pt. 60).
[43]Petition for Review, West Virginia v. EPA, No. 15-1363 (D.C. Cir. Oct. 23, 2015).
[44]*See* Util. Air Regulatory Grp. v. EPA, 134 S. Ct. 2427 (2014).
[45]Order, West Virginia v. EPA, No. 15-1363 (D.C. Cir. May 16, 2016).
[46]Order, West Virginia v. EPA, No. 15-1363 (D.C. Cir. Jan. 21, 2016).
[47]Order 15A773, West Virginia v. EPA, No. 15-1363 (U.S. Feb. 9, 2016).
[48]*Id.*
[49]Standards of Performance for Greenhouse Gas Emissions from New, Modified, and Reconstructed Stationary Sources: Electric Utility Generating Units, 80 Fed. Reg. 64,510 (Oct. 23, 2015) (codified at 40 C.F.R. pts. 60-71 and 98).
[50]*Id.* at 64,536. The EPA noted that "utility boilers have multiple technology pathways available to comply with the actual emission standard." *Id.*

111(b) regulations were immediately challenged in the D.C. Circuit.[51]

In *North Dakota v. EPA*, petitioners challenged the EPA's determination that CCS has been adequately demonstrated such that it can be the basis for achievable standards for new coal-based EGUs, among other things. Briefing is ongoing, and final briefs are due on February 6, 2017. As with *West Virginia*, it is possible that the incoming Trump EPA could seek a remand of the section 111(b) regulations for reconsideration.

iii. Methane

The EPA took several actions in 2016 to address methane emissions from the oil and gas industry. On June 3, 2016, the EPA finalized amendments to New Source Performance Standards (NSPS) at subpart OOOO and adopted new standards at subpart OOOOa.[52] The NSPS updates the 2012 subpart OOOO rule to add, among other things, requirements for new, modified, or reconstructed sources in the oil and gas industry to reduce emissions of GHGs, specifically methane, in addition to volatile organic compounds.[53] The NSPS also expands the emission sources in the oil and natural gas subcategory subject to the rule as well as the scope of the requirements for Leak Detection and Repair (LDAR).[54]

In November, the EPA issued an Information Collection Request (ICR) to existing oil and natural gas sources.[55] The EPA aims to collect information on existing oil and gas sources "to develop nationally applicable regulations to reduce methane, and, as appropriate, emissions of other . . . oil and gas sources."[56] The EPA gave sixty days to respond to the "operator survey" (Part 1) and 180 days to respond to the more detailed "facility survey" (Part 2).[57]

The Bureau of Land Management (BLM) also finalized rules to address methane emissions from the oil and gas industry. In the rule published November 18, 2016, the BLM issued regulations to reduce waste of natural gas from venting, flaring, and leaks during oil and natural gas production activities on onshore federal and Indian lands.[58] The rule prohibits venting of gas, except in limited circumstances, such as during an emergency or when flaring is not available.[59] It also limits flaring by requiring operators to capture the gas for sale or for use.[60] Finally, the rule addresses leaks through LDAR requirements.[61] The rule is facing a challenge in the United States District Court for the District of

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[51]Petition for Review of Final Action, North Dakota v. EPA, No. 15-1381 (D.C. Cir. Oct. 27, 2015) (challenging the section 111(b) regulations).

[52]Oil and Natural Gas Sector: Emission Standards for New, Reconstructed, and Modified Sources, 81 Fed. Reg. 35,824 (June 3, 2016).

[53]*Id.* at 35,825.

[54]*Id.* at 35,827.

[55]*See* ENVTL. PROT AGENCY, EPA'S ACTIONS TO REDUCE METHANE EMISSIONS FROM THE OIL AND NATURAL GAS INDUSTRY: FINAL INFORMATION COLLECTION REQUEST FOR EXISTING SOURCES (2016) [hereinafter FINAL INFORMATION COLLECTION].

[56]ENVTL. PROT. AGENCY, INFORMATION COLLECTION REQUEST SUPPORTING STATEMENT, EPA ICR NO. 2548.01: INFORMATION COLLECTION EFFORT FOR OIL AND GAS FACILITIES 3 (2016).

[57]FINAL INFORMATION COLLECTION, *supra* note 55, at 2.

[58]Waste Prevention, Production Subject to Royalties, and Resource Conservation, 81 Fed. Reg. 83,008 (Nov. 18, 2016).

[59]*Id.* at 83,011.

[60]*Id.*

[61]*Id.*

Wyoming.[62] Given the lateness of the rule, it may be overturned by a new Congress under the Congressional Review Act.

iv. Mobile Source Standards

On July 25, 2016, the EPA finalized a determination that GHG emissions from certain types of aircraft engines contribute to climate change and endanger human health and the environment under CAA section 231(a).[63] The engines implicated by the findings are primarily used on large commercial jets. The EPA did not issue emissions standards for aircraft engines as part of this action. However, the final endangerment and contribution findings for aircraft engine GHG emissions are a first step that the EPA must take prior to adopting domestic GHG engine standards. The EPA stated that any future standards would be at least as stringent as those recently adopted by ICAO.[64]

In 2012, the EPA and the National Highway Traffic Safety Administration (NHTSA) established a coordinated program to address GHG emissions from light-duty vehicles. This program included both corporate average fuel economy (CAFE) standards and GHG emissions standards for model years (MY) 2017-2025.[65] The EPA and the NHTSA are obligated to conduct a mid-term evaluation in order to establish final standards for MY 2022-2025.[66] In July 2016, they began this evaluation by issuing for comment a draft Technical Assessment Report.[67] In November, the EPA sought comment on its proposed determination that the original MY 2022-2025 GHG emissions standards were appropriate.[68]

In August 2011, the EPA and the NHSTA issued CAFE and GHG emissions standards for medium- and heavy-duty trucks for MY 2014-2018.[69] Building on these "Phase I" standards, in August 2016, the EPA and the NHTSA jointly finalized "Phase 2" standards for medium- and heavy-duty vehicles through MY 2027. The vehicle and engine performance standards would cover MY 2018-2027 for certain trailers and MY 2021-2027 for semi-trucks, large pickup trucks, vans, and all buses and work trucks.[70]

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[62]W. Energy All. v. Sec'y of the U.S. Dep't of the Interior, No. 16-280 (D. Wyo. Nov. 15, 2016).

[63]Finding that Greenhouse Gas Emissions from Aircraft Cause or Contribute to Air Pollution that may Reasonably Be Anticipated to Endanger Public Health and Welfare, 81 Fed. Reg. 54,422 (Aug. 15, 2016) (to be codified at 40 C.F.R. pts. 87 and 1068).

[64]*Id.* at 54,434.

[65]2017 and Later Model Year Light-Duty Vehicle Greenhouse Gas Emissions and Corporate Average Fuel Economy Standards, 77 Fed. Reg. 62,624 (Oct. 15, 2012) (codified at 49 C.F.R. pts. 523, 531, 533, and 536-37).

[66]*Id.* at 62,652.

[67]Notice of Availability of Midterm Evaluation Draft Technical Assessment Report for Model Year 2022-2025 Light Duty Vehicle GHG Emissions and CAFE Standards, 81 Fed. Reg. 49,217 (July 27, 2016).

[68]Proposed Determination on the Appropriateness of the Model Year 2022-2025 Light-Duty Vehicle Greenhouse Gas Emissions Standards Under the Midterm Evaluation, 81 Fed. Reg. 87,927 (Dec. 6, 2016).

[69]Greenhouse Gas Emissions Standards and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles, 76 Fed. Reg. 57,106 (Sept. 15, 2011) (codified at 40 C.F.R. pts. 86-86, 600, 1033, 1036-37, 1039, 1065-66, 1068 and 49 C.F.R. pts. 523, 534-35).

[70]Greenhouse Gas Emissions and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles—Phase 2, 81 Fed. Reg. 73,478 (Oct. 25, 2016) (to be codified at 40 C.F.R. pts. 9, 22, 85-86, 600, 1033, 1036-37, 1039, 1042-43, 1065-66, 1068 and 49 C.F.R. 523, 534-35, 538).

v. Prevention of Significant Deterioration

On October 3, 2016, the EPA proposed revisions[71] to amend existing Prevention of Significant Deterioration (PSD) and Title V regulations addressing GHG emissions in response to the Supreme Court's decision in *UARG v. EPA*.[72] In *UARG*, the Court found that the EPA could not require sources that do not trigger CAA PSD or Title V permitting requirements, because of their potential to emit criteria pollutants above certain thresholds, to obtain these permits solely because of their GHG emissions. The Supreme Court found that only sources that required a PSD and Title V permit anyway could be required to include GHG limits in these permits.[73] Under the proposed regulations, sources that trigger PSD permitting would not be required to undergo a GHG Best Available Control Technology review, which would result in enforceable GHG emissions limits, unless they had the potential to emit at least 75,000 tons per year CO_2e.[74]

b. Litigation

In an action seeking to compel federal action to reduce carbon dioxide emissions, the United States District Court for the District of Oregon denied motions to dismiss due process and public trust claims against the United States and federal officials and agencies. The plaintiffs—young people who alleged that excessive carbon emissions were threatening their future, a non-profit group, and "Future Generations" represented by a climate scientist—alleged that the defendants had known for decades of the dangers of carbon dioxide pollution and had nonetheless taken actions that increased emissions. After holding that the action did not raise a nonjusticiable political question and that the plaintiffs had adequately alleged standing, the court found that the plaintiffs had asserted a fundamental right "to a climate system capable of sustaining human life" and that the plaintiffs' allegations regarding the defendants' role in creating the climate crisis were sufficient to state a "danger-creation" due process claim.[75]

Federal courts affirmed federal agencies' consideration of climate change in their decision-making under federal statutes. Under the Endangered Species Act (ESA), two opinions by the Ninth Circuit Court of Appeals reversed district court decisions that undid protections for species and habitat grounded in adverse climate change impacts.[76] Several district courts' decisions found that agencies had not sufficiently taken climate change into account in ESA decision-making.[77] Addressing the United States Department of Energy's

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[71]Revisions to the Prevention of Significant Deterioration (PSD) and Title V Greenhouse Gas (GHG) Permitting Regulations and Establishment of a Significant Emissions Rate (SER) for GHG Emissions Under the PSD Program, 81 Fed. Reg. 68,110 (Oct. 3, 2016) (to be codified at 40 C.F.R. pts. 51-52, 60, 70-71).

[72]Util. Air Regulatory Grp. v. EPA, 134 S. Ct. 2427 (2014).

[73]*Id.* at 2442.

[74]81 Fed. Reg. at 68,113.

[75]Juliana v. United States, 2016 WL 6661146, at *15 (D. Or. Nov. 10, 2016).

[76]Alaska Oil & Gas Ass'n v. Jewell, 815 F.3d 544 (9th Cir. 2016) (upholding designation of polar bear critical habitat, finding that Fish and Wildlife Service properly took future climate change into account), *petition for cert. filed*, Nos. 16-596, 16-610 (U.S. Nov. 4, 2016); Alaska Oil & Gas Ass'n v. Pritzker, 840 F.3d 671 (9th Cir. 2016) (upholding listing of Beringia distinct population segment of the Pacific bearded seal subspecies as threatened, finding that National Marine Fisheries Service acted reasonably based on best available scientific and commercial data when it relied on projections of loss of sea ice through the end of century as basis for listing decision).

[77]Defs. of Wildlife v. Jewell, 176 F. Supp. 3d 975 (D. Mont. 2016) (withdrawal of listing proposal unlawfully ignored best available science by dismissing threat posed by climate

(DOE's) authority to consider environmental benefits when setting efficiency standards, the Seventh Circuit upheld DOE's analysis of the benefits of standards for commercial refrigeration equipment based on the Social Cost of Carbon.[78]

State authority to investigate corporate climate change financial disclosures—Exxon Mobil Corporation's (Exxon), in particular—became an issue in 2016. Massachusetts joined New York and the United States Virgin Islands in investigating Exxon's climate change disclosures. The Massachusetts investigation is based on state laws concerning unfair or deceptive acts or practices in trade or commerce. The Virgin Islands investigation was based on the territory's Criminally Influenced and Corrupt Organizations Act. Exxon filed an action in federal court in Texas to bar Massachusetts from pursuing its investigation and later added the New York attorney general as a defendant.[79] Exxon also sued the Virgin Islands attorney general in Texas, but ultimately dismissed the action after the attorney general withdrew its subpoena.[80] In the Massachusetts action, the federal court in October sua sponte ordered jurisdictional discovery based on its concerns that the Massachusetts attorney general had commenced the investigation in bad faith.[81]

The partial settlement of the United States and California's Clean Air Act enforcement suit against Volkswagen required a $2 billion investment over ten years in the promotion of the use of zero emission vehicles (ZEVs) and ZEV technology.[82]

c. Executive Action

i. Mid-Century Strategy for Deep Decarbonization

In keeping with previously stated carbon emission reduction commitments, including the United States' Intended Nationally Determined Contribution to the Paris Agreement, the Obama Administration presented in early November a mid-century strategy (MCS) that envisions economy-wide net GHG emissions reductions of 80% or more below 2005 levels by 2050.[83] According to the report, the MCS "charts a path that is achievable, consistent with the long-term goals of the Paris Agreement, and an acceleration of existing market trends."[84] The MCS would require a shift to clean energy sources and ambitious reductions across the economy.

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change); Nat'l Wildlife Fed'n v. Nat'l Marine Fisheries Serv., 184 F. Supp. 3d 861 (D. Or. 2016) (biological opinion did not adequately assess climate change effects); Wild Fish Conservancy v. Irving, No. 2:14-CV-0306-SMJ, 2016 WL 6892082 (E.D. Wash. Nov. 22, 2016) (biological opinion did not adequately consider climate change effects).

[78] Zero Zone, Inc. v. U.S. Dep't of Energy, 832 F.3d 654 (7th Cir. 2016).

[79] Plaintiff's Motion for Preliminary Injunction, Exxon Mobil Corp. v. Healey, No. 4:16-CV-469-A (N.D. Tex. June 15, 2016).

[80] Joint Stipulation of Dismissal, Exxon Mobil Corp. v. Walker, No. 4:16-CV-00364-K (N.D. Tex. June 29, 2016).

[81] Exxon Mobil Corp. v. Healey, No. 4:16-CV-469-K, 2016 WL 6091249 (N.D. Tex. Oct. 13, 2016).

[82] *In re* Volkswagen "Clean Diesel" Mktg., Sales Practices, & Prods., No. 16-cv-295, 2016 WL 6442227, at *2 (N.D. Cal. Oct. 25, 2016).

[83] THE WHITE HOUSE, U.S. MID-CENTURY STRATEGY FOR DEEP DECARBONIZATION 6 (Nov. 2016).

[84] *Id.* at 6.

3. Regional and Multi-Jurisdiction Activities

a. Western Climate Initiative

The Canadian province of Ontario launched its economy-wide GHG emissions cap-and-trade program on July 1, 2016. Ontario intends to link its program with similar programs in California and Quebec through the Western Climate Initiative (WCI), a multi-jurisdictional GHG emissions trading collaboration.[85] The Ontario program's first compliance period will begin in January 2017, and the first allowance auction is scheduled for March 2017.[86]

b. The Regional Greenhouse Gas Initiative (RGGI)

The cap-and-trade program covering carbon emissions from the power sector in nine New England and Mid-Atlantic states is conducting a 2016 Program Review.[87] The Program Review is a comprehensive and periodic review to consider program successes, impacts, and design elements.[88] The 2016 Program Review is soliciting stakeholder input on program design elements, including setting emission budget levels beyond 2020.[89]

c. Governors' Accord for a New Energy Future

On February 16, 2016, Governors from seventeen states signed the Governors' Accord for a New Energy Future.[90] The states embraced a shared vision of an energy future that involves expanding energy efficiency and clean energy sources to cost-effectively strengthen the states' economic productivity, reduce air pollution, and meet energy needs. The states committed to work together to diversify energy generation, expand clean energy sources, and encourage clean transportation options.[91]

d. Pacific North American Climate Leadership Agreement

On June 1, 2016, the governors of Oregon, California and Washington, the premier of British Columbia, and the mayors of major west-coast cities signed the Pacific North American Climate Leadership Agreement.[92] The jurisdictions agreed to collaborate on building efficiency benchmarking and disclosure, creation of a comprehensive electric vehicle charging network, and accelerating deployment of distributed renewable energy,

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[85] *Cap and Trade: Program Overview*, MINISTRY OF THE ENV'T AND CLIMATE CHANGE (last visited Nov. 22, 2016). California and Québec conduct joint allowance auctions administered by WCI. (*Auction Information*, CAL. AIR RES. BD. (last visited Nov. 22, 2016)).

[86] *Cap and Trade: Program Overview*, *supra* note 85.

[87] *Program Design*, REG'L GREENHOUSE GAS INITIATIVE (RGGI) (last visited Nov. 14, 2016).

[88] *2016 Program Review*, RGGI (last visited Nov. 14, 2016).

[89] RGGI, KEY ITEMS FOR 2016 PROGRAM REVIEW STAKEHOLDER DISCUSSIONS: PROGRAM ELEMENTS EPA CLEAN POWER PLAN 1 (2015).

[90] The 17 states are California, Connecticut, Delaware, Hawaii, Iowa, Massachusetts, Michigan, Minnesota, Nevada, New Hampshire, New York, Oregon, Pennsylvania, Rhode Island, Vermont, Virginia, and Washington. (GOVERNORS' ACCORD FOR A NEW ENERGY FUTURE (2016)).

[91] *Id.*

[92] PAC. COAST COLLABORATIVE, PACIFIC NORTH AMERICA CLIMATE LEADERSHIP AGREEMENT (2016).

among other issues.[93] The three states and British Columbia—which had previously formed the Pacific Coast Collaborative—also adopted a new Climate Leadership Action Plan, committing to collectively support the international Paris Agreement and Under2MOU, promote carbon pricing, address ocean acidification, create a robust market for low-carbon fuels, and accelerate the transition to zero-emission vehicles.[94]

4. State Activities

a. California

On September 8, 2016, Governor Edmund G. Brown signed legislation that sets a binding 2030 GHG emissions reduction target of forty percent below 1990 levels.[95] The legislation, Senate Bill (SB) 32, authorizes the California Air Resources Board (CARB) to adopt rules and regulations to achieve the new 2030 target.[96] In 2016, CARB proposed amendments to its existing economy-wide cap-and-trade program that would extend the program to 2030 in line with the SB 32 target.[97] A companion piece of legislation to SB 32, AB 197, requires CARB to consider the social costs of GHGs and prioritize direct emissions reductions at large stationary sources and mobile sources in order to protect the "most impacted and disadvantaged communities."[98] In December 2016, CARB recommended using the cap-and-trade-program as the primary mechanism to achieve the target.[99]

California also enacted legislation to address short-lived climate pollutants, SB 1383. The law requires CARB to approve and begin implementing a comprehensive strategy by January 1, 2018, to reduce emissions from these pollutants.[100] The strategy must achieve emissions reductions of "methane by 40 percent, HFC gases by 40 percent, and anthropogenic black carbon by 50 percent below 2013 levels by 2030."[101] In April, CARB released a Proposed Short-Lived Climate Pollutant Reduction Strategy,[102] and in May the agency proposed regulations for methane emissions from both new and existing onshore and offshore oil and gas sources.[103] The proposed rule is projected to reduce

[93] *Id.*
[94] *Id.*
[95] SB-32 § 2, 2016 Reg. Sess. (Cal. 2016). Governor Brown had previously established the state's 2030 GHG emission reduction goal by executive order. (Cal. Exec. Order No. B-30-15 (2015)).
[96] SB-32 § 2.
[97] Cal. Office of Administrative Law, California Regulatory Notice Register, No. 32-Z (Aug. 2, 2016). California's cap-and-trade program is the subject of an ongoing legal challenge in state appellate court. Plaintiffs claim that the proceeds raised from auctioning the program's emissions allowances constitute a tax and are therefore impermissible under California law, which requires any state tax to be approved by a legislative supermajority. (Cal. Chamber of Commerce v. State Air Res. Bd., No. C075930 (Cal. Ct. App. Oct. 17, 2014)).
[98] A.B. 197 § 5, 2016 Gen. Assemb., Reg. Sess. (Cal. 2016).
[99] CAL. AIR RES. BD., 2030 TARGET SCOPING PLAN UPDATE (Dec. 2, 2016).
[100] S.B. 1383 § 2, 2016 Reg. Sess. (Cal. 2016).
[101] *Id.*
[102] CAL. AIR RES. BD., PROPOSED SHORT-LIVED CLIMATE POLLUTANT REDUCTION STRATEGY (Apr. 11, 2016).
[103] CAL. OFFICE OF ADMIN. LAW, CALIFORNIA REGULATORY NOTICE REGISTER, No. 23-Z (June 3, 2016).

methane emissions from the oil and natural gas sector 40-45% by 2025.[104]

b. Illinois

On December 8, 2016, Illinois Governor Bruce Rauner signed the Future Energy Jobs Bill, which authorizes ratepayer funding to support financially struggling nuclear facilities and expands the state's clean energy and energy efficiency programs.[105] The legislation provides $2.4 billion in subsidies over the next decade to keep the Clinton and Quad Cities nuclear plants operating.[106] It also requires Illinois utilities Commonwealth Edison and Ameren to reduce electricity usage in their service areas by 21.5% and 16% by 2030.[107] Additionally, the Future Energy Jobs Bill fixes problems in the state's renewable portfolio standard that prevented investments in new renewable energy projects.[108]

c. Maryland

Maryland Governor Larry Hogan signed the Greenhouse Gas Emissions Reduction Act of 2016 into law in March 2016, requiring Maryland to reduce economy-wide GHG emissions 40% below 2006 levels by 2030.[109] The 2016 legislation also reauthorizes the state's near-term, 2020 requirement to reduce GHG emissions 25% below 2006 levels. The Act, which received bipartisan support, puts into law recommendations of the Maryland Commission on Climate Change.[110]

d. Massachusetts

On August 8, 2016, Governor Charles Baker signed omnibus energy diversification legislation that requires electricity distribution companies in the state to conduct competitive solicitations for 9.45 million megawatt hours of clean energy generation by December 31, 2022,[111] and also requires distribution companies to conduct competitive solicitations for 1,600 megawatts of aggregate nameplate offshore wind energy capacity by no later than June 30, 2027.[112]

On September 16, 2016, Governor Baker issued an executive order requiring the Massachusetts Department of Environmental Protection (MassDEP) by August 11, 2017, to issue regulations necessary to ensure the state meets its 2020 emissions target to reduce GHG emissions by 25% below 1990 levels.[113] The executive order was issued in response to the Massachusetts Supreme Judicial Court decision, *Kain v. Massachusetts Department of Environmental Protection*, which ordered MassDEP to take added measures to implement the state's 2008 Global Warming Solutions Act. The Court held the Act requires

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[104]CAL. AIR RES. BD., STAFF REPORT: INITIAL STATEMENT OF REASONS ES-1 (May 31, 2016).
[105]S.B. 2814, 2016 Reg. Sess. (Ill. 2016); John O'Connor, *Illinois Gov. Rauner Signs Bill Sparing 2 Nuclear Plants*, ST. LOUIS POST-DISPATCH (Dec. 7, 2016).
[106]S.B. 2814 § 1-75(d-5), 2016 Reg. Sess. (Ill. 2016).
[107]*Id.* § 8-103B.
[108]*Id.* § 1-75(c)(1).
[109]S.B. 323, 2016 Reg. Sess. (Md. 2016). The legislation will automatically sunset in 2023 unless reauthorized by the General Assembly. *Id.*
[110]MD. COMM'N ON CLIMATE CHANGE, 2015 MARYLAND COMMISSION ON CLIMATE CHANGE REPORT (Dec. 2015).
[111]H. 4568, § 83D(b), 2016 Gen. Assemb. (Mass. 2016).
[112]*Id.*
[113]Mass. Exec. Order No. 569: Establishing an Integrated Climate Change Strategy for the Commonwealth 1-2 (Sept. 16, 2016).

decreasing volumetric limits on GHG emissions and the state's existing regulations do not satisfy the statutory requirement.[114]

e. Nevada

Governor Brian Sandoval issued Nevada's Strategic Planning Framework, which identified broad state-wide goals and values.[115] The Framework included three objectives intended to help the state achieve its goal of becoming the nation's leading producer and consumer of clean and renewable energy: complete a highway system for electric vehicles that serves the entire state by 2020; significantly reduce the percentage of imported fossil fuels over the next ten years; and reduce carbon emissions to a level at or below accepted federal standards.

f. New Hampshire

Governor Margaret Hassan issued Executive Order 2016-03, which expanded the state's "lead-by-example" initiative.[116] It set updated goals of reducing fossil fuel use at state-owned facilities 30% by 2020 and 50% by 2030 and reducing GHG emissions from the state passenger vehicle fleet 30% by 2030.[117] Governor Hassan also signed legislation that doubles the cap on net metering projects to 100 megawatts, with 80% of the increase allocated to smaller projects of less than 100 kilowatts.[118] Additionally, the New Hampshire Public Utilities Commission established an Energy Efficiency Resource Standard in 2016.[119]

g. New York

On August 1, 2016, the New York Public Service Commission adopted a Clean Energy Standard that requires 50% of the state's electricity to be generated from renewable sources by 2030.[120] The renewable energy requirement is consistent with the goal established in the 2015 New York State Energy Plan and a key strategy towards meeting the state's goal of reducing GHG emissions 40% below 1990 levels by 2030.[121] The Clean Energy Standard also creates a zero emissions credit program for existing nuclear facilities in the state to preserve existing nuclear generation as a "bridge to the clean energy future."[122]

h. Oregon

On March 8, 2016, Oregon Governor Kate Brown signed SB 1547. The law extends the state renewable portfolio standard beginning with a 27% renewable power requirement

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[114]Kain v. Dep't of Envtl. Prot., 49 N.E.3d 1124 (Mass. 2016).
[115]OFFICE OF THE GOVERNOR, NEV.'S STRATEGIC PLANNING FRAMEWORK 2016-2020 (2016).
[116]N.H. Exec. Order No. 2016-03 (May 2016).
[117]*Id.* at 14.
[118]H.B. 1116, 2016 Leg., 164th Sess. (N.H. 2016).
[119]N.H. Pub. Utils. Comm'n, Order 25,932, Energy Efficiency Resource Standard (Aug. 2, 2016).
[120]Proceeding on Motion of the Commission to Implement a Large-Scale Renewable Program and a Clean Energy Standard, 15-E-0302 2 (N.Y. Pub. Serv. Comm'n Aug. 1, 2016).
[121]*Id.*
[122]*Id.* at 1.

in 2025 and increasing to 50% in 2040.[123] The law also requires the state's investor-owned electric utilities—Portland General Electric and PacifiCorp—to phase out coal generation from the state's electricity supply for retail customers by 2030, including power imported from out of state.[124] Finally, SB 1547 requires electric utilities to submit plans to the Oregon Public Utilities Commission to increase transportation electrification.[125]

i. Pennsylvania

Plaintiffs in Pennsylvania state court unsuccessfully asserted that the Environmental Rights Amendment of the Pennsylvania Constitution compelled the state to develop and implement a comprehensive plan to regulate GHGs.[126]

j. Vermont

Vermont's 2016 Comprehensive Energy Plan establishes energy and GHG reduction goals to help Vermont achieve a clean energy future.[127] These include reducing total energy consumption per capita by more than one third by 2050 and meeting 90% of the state's energy needs from renewable sources by 2050.[128]

k. Virginia

In July 2016, Governor Terence McAuliffe issued an executive order directing the Secretary of Natural Resources to convene a working group to recommend steps to reduce carbon emissions from Virginia's power plants.[129] The work group will provide the Governor with recommendations for action under existing state authority by May 31, 2017, including the possible establishment of regulations for the reduction of carbon pollution from existing power plants.[130]

l. Washington

In September 2016, the Washington Department of Ecology enacted the state Clean Air Rule, a regulatory program requiring economy-wide GHG emission reductions that came into effect in October 2016.[131] Beginning in 2017, covered sources that emit more than 100,000 metric tons of GHGs will be required to reduce emissions 1.7% annually or offset those emissions.[132] The GHG threshold will be lowered every three years until 2035 to bring more emitters into the program.[133] Covered entities may earn tradable credits for over compliance, and offset programs are also allowed.[134]

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[123]S.B. 1547 § 5, 2016 Leg., 78th Sess. (Or. 2016).
[124]*Id.* § 1.
[125]*Id.* § 20.
[126]Funk v. Wolf, 144 A.3d 228 (Pa. Commw. Ct. 2016).
[127]VT. DEP'T OF PUB. SERV. COMPREHENSIVE ENERGY PLAN 2016 at 1 (2016).
[128]*Id.* at 4.
[129]Va. Exec. Order No. 57 pt. 1 (2016).
[130]*Id.* pt. 2.
[131]Press Release, Wash. Dep't of Ecology, Washington Adopts First-of-its-Kind Rule to Combat Climate Change (Sept. 15, 2016).
[132]WASH. ADMIN. CODE §§ 173-442-030(3), 173-442-060(1)(b)(i), and 173-442-100(1) (2016).
[133]WASH. ADMIN. CODE § 173-442-030(3) (2016).
[134]WASH. ADMIN. CODE § 173-442-110(1)-(2) (2016).

B. Adaptation

1. International Activities

Adoption of the Paris Agreement accelerated the need for practical approaches in support of climate adaptation and to scale up action in strengthening climate resilience. Significantly, the Paris Agreement acknowledged that adaptation, which had lagged behind mitigation in attention and resources, would now be addressed on a par with mitigation. Of the submitted INDC's, 121 countries (86% of those who submitted INDCs) included an adaptation component in their plans. Since adaptation in INDCs was optional, the fact that most countries did so reflects the growing importance that nations are placing on adaptation as part of their climate action response.[135]

At COP-22 in Marrakech, the Parties focused on creating a "rulebook" for implementation of the Paris Agreement, including its adaptation provisions.[136] Although both formal and informal discussions occurred on key adaptation issues – for example, the need for Parties to report on adaptation under the rubric "adaptation communication" – no consensus guidelines emerged. Instead, in the instant example, the UNFCCC Secretariat was tasked create a note, to be followed by comments from the Parties, the preparation of a synthesis document, and the convening of a workshop in May 2017.[137] In parallel, the UNFCCC Adaptation Committee began considering how developing country adaptation efforts will be recognized, and how to regularly assess the adequacy and effectiveness of adaptation efforts and support.[138]

Loss and damage, which post-Paris is viewed by many as a topic separate from adaptation, progressed in Marrakech with agreement on a five-year workplan for the executive committee of the Warsaw International Mechanism (WIM) on loss and damage and agreement for subsequent periodic reviews of the WIM.[139] Climate-induced migration, understood as an extreme adaptation measure, was discussed on the margins at Marrakech as a follow-up to the Hugo Conference in Liege, Belgium, which focused on migration, displacement and human rights issues during the week preceding the COP.[140]

The International Organization for Standardization (ISO) has undertaken efforts to advance a set of voluntary international standards for adaptation. Working group meetings on the subject were held in 2016 in Yogyakarta, Indonesia and in Seoul, South Korea. The ISO standards for adaptation, beginning with a high-level framework standard, will include a suite of standards covering vulnerability assessment, planning, implementation and monitoring and evaluation. Recognizing that the framework established with the Paris Agreement requires more detailed elaboration for implementation purposes, these international voluntary standards will be context-specific and are being developed in coordination with UNFCCC.[141]

Climate adaptation finance has emerged as an urgent and complex topic. Adaptation finance pathways include existing mechanisms such as the Green Climate Fund

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[135]Kathleen Mogelgaard & Heather McGray, *With New Climate Plans, Adaptation Is No Longer an Overlooked Issue*, WRI BLOG (Nov. 24, 2015).

[136]IISD, SUMMARY OF THE MARRAKECH CLIMATE CHANGE CONFERENCE, VOL. 12 NO. 698, EARTH NEGOTIATIONS BULLETIN 36 (Nov. 21, 2016).

[137]*Id.* at 21.

[138]CTR. FOR CLIMATE AND ENERGY SOLUTIONS, OUTCOMES OF THE UN CLIMATE CHANGE CONFERENCE IN MARRAKECH (Nov. 2016).

[139]IISD, *supra* note 136, at 37.

[140]*See, e.g.*, COSMIN CORENDA THE HUGO CONFERENCE, HUMAN RIGHTS, EQUITY AND OTHER LEGAL ASPECTS OF CLIMATE CHANGE AND MIGRATION (Nov. 2016).

[141]Int'l Org. for Standardization [ISO], *Draft Strategic Plan*, ISO/TC 207/SC7 (Aug. 2015).

and the multilateral development banks (MDBs), and now the increasing engagement of private sector financial community, including insurers, lenders and other investors. For example, the Global Adaptation & Resilience Working Group (GARI) brings together private investors and other stakeholders focusing on how to practically invest in the face of climate adaptation and resilience needs.[142] The European Investment Bank (EIB) is developing standards to promote a low-carbon and climate resilient economy in its investments, eventually harmonizing the standards with other international financial institutions in support of the Paris Agreement.[143] A working group of MDBs prepared a note summarizing its findings in order to help practitioners assess climate change risks and vulnerabilities and integrate adaptation measures into project planning, design and implementation.[144] The recognition that public sector funds will be insufficient for the challenge of adaptation has fueled interest in blended finance, including public-private partnerships (PPPs).[145]

2. National Activities

In 2016, new federal policies emphasized climate change implications for national security. In January, the Department of Defense issued a directive establishing the Department's policy relating to climate change adaptation and assigning responsibilities for incorporating adaptation into operations and planning efforts.[146] In September, President Obama issued a memorandum directing twenty agencies with national security-related missions to consider climate change impacts in planning and policies.[147]

In December 2016, President Obama issued an executive order establishing the Northern Bering Sea Climate Resilience Area, which aims to protect the sensitive ocean ecosystem and creates a task force to coordinate federal resilience activities, including a study by the Coast Guard on the impact of increased shipping through the Bering Strait.[148]

Under rules finalized by the Federal Highway Administration in May and October respectively, state transportation agencies will be required to incorporate resilience considerations in long-range planning and develop risk-based asset management plans that consider future climate and extreme weather risks.[149] Final guidance issued in August by the Council on Environmental Quality (CEQ) also sets out a framework for federal agencies to consider the effects of climate change on proposed actions and associated

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[142]GLOB. ADAPTATION & RESILIENCE WORKING GRP. (GARI), BRIDGING THE ADAPTATION GAP: APPROACHES TO MEASUREMENT OF PHYSICAL CLIMATE RISK AND EXAMPLES OF INVESTMENT IN CLIMATE ADAPTATION AND RESILIENCE (Nov. 2016).

[143]*See, e.g.*, *EIB Standards on Climate Action: Update on Climate Finance Tracking and Carbon Footprinting*, EUROPEAN INV. BANK (Dec. 13, 2016).

[144]EUROPEAN FIN. INSTS. WORKING GRP. ON ADAPTATION TO CLIMATE CHANGE, INTEGRATING CLIMATE CHANGE INFORMATION AND ADAPTATION IN PROJECT DEVELOPMENT: EMERGING EXPERIENCE FROM PRACTITIONERS (May 2016).

[145]Ira Feldman, *Partnerships and Partnerships: A brief guide to the evolving PPP Landscape*, 45 Int'l L. News (2016).

[146]U.S. DEP'T OF DEFENSE, DOD DIRECTIVE 4715.21, CLIMATE CHANGE ADAPTATION AND RESILIENCE (Jan. 14, 2016).

[147]Presidential Memorandum on Climate Change and National Security, 2016 DAILY COMP. PRES. DOC. 621 (Sept. 21, 2016).

[148]Exec. Order 13754, 81 Fed. Reg. 90,669 (Dec. 9, 2016).

[149]Statewide and Nonmetropolitan Transportation Planning; Metropolitan Transportation Planning, 81 Fed. Reg. 34,050 (May 27, 2016) (codified at 23 C.F.R. pts. 450 and 771; 49 C.F.R. pt. 613) (final rule); Asset Management Plans and Periodic Evaluations of Facilities Repeatedly Requiring Repair and Reconstruction Due to Emergency Events, 81 Fed. Reg. 73,196 (Oct. 24, 2016) (codified at 23 C.F.R. pts. 515 and 667) (final rule).

environmental impacts when conducting reviews under the National Environmental Policy Act.[150] In January 2016, the Department of Housing and Urban Development (HUD) announced the winners of the $1 billion National Disaster Resilience Competition, awarding funding for climate resilience initiatives to eight states and five local jurisdictions.[151]

Federal agencies also acted to implement Executive Order 13690, the Federal Flood Risk Management Standard, which was issued in January 2015.[152] The Federal Emergency Management Agency (FEMA) and HUD issued proposed rules in August and October 2016, respectively, that would increase the vertical flood elevation and hazard area used in siting, design, and construction of federal or federally-funded projects.[153] In December 2016, HUD also issued a final rule that would require jurisdictions to consider climate change and natural hazard resilience in their Consolidated Plan processes,[154] which help inform housing and community development investments utilizing HUD's formula block grant programs.[155]

3. State Activities

In 2016, states took steps to improve adaptation planning, promote resilience in state infrastructure and land conservation, and support local communities.

New Hampshire passed legislation in May requiring an update of the state's coastal flood risk projections – including sea-level rise and storm surge – every five years starting in July 2019.[156] The state also passed a bill in June requiring state agencies to audit laws, regulations, and policies relating to coastal regions and make recommendations that would better enable the state to prepare for future flood risks.[157] In Massachusetts, under Executive Order 569 issued in September, the state commits to developing a Climate Adaptation Plan that will be updated every five years.[158]

In September, California passed bills relating to resilient infrastructure investments and planning and investing in disadvantaged communities. A.B. 2800[159] requires state agencies to consider climate change impacts in state infrastructure decision-making through June 2020; the bill also creates a Climate-Safe Infrastructure Working Group to develop recommendations on how to integrate climate change projections into the

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[150]Final Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in National Environmental Policy Act Reviews, 81 Fed. Reg. 51,866 (Aug. 1, 2016).

[151]*HUD Awards $1 Billion Through National Disaster Resilience Competition*, HUD EXCH. (Jan. 29, 2016).

[152]Exec. Order No. 13,690, 80 Fed. Reg. 6425 (Jan. 30, 2015).

[153]Updates to Floodplain Management and Protection of Wetlands Regulations To Implement Executive Order 13,690 and the Federal Flood Risk Management Standard, 81 Fed. Reg. 57,402 (Aug. 22, 2016) (to be codified at 44 C.F.R. pt. 9); Floodplain Management and Protection of Wetlands; Minimum Property Standards for Flood Hazard Exposure; Building to the Federal Flood Risk Management Standard, 81 Fed. Reg. 74,967 (Oct. 28, 2016) (to be codified at 24 C.F.R. pts. 50, 55, 58, and 200).

[154]Modernizing HUD's Consolidated Planning Process to Narrow the Digital Divide and Increase Resilience to Natural Hazards, 81 Fed. Reg. 90,997 (Dec. 16, 2016) (to be codified at 24 C.F.R. pt. 91).

[155]*See Consolidated Plan Process, Grant Programs, and Related HUD Programs*, HUD EXCH. (last visited Nov. 1, 2016).

[156]S.B. 374, 2016 Reg. Sess. (N.H. 2016).

[157]S.B. 452, 2016 Reg. Sess. (N.H. 2016).

[158]Mass. Exec. Order No. 569: Establishing an Integrated Climate Change Strategy for the Commonwealth, 1-2 (Sept.16, 2016).

[159]A.B. 2800, 2015-2016 Sess. (Cal. 2016).

engineering of state infrastructure. A.B. 2722[160] created the Transformative Climate Communities Program, which will award grants for planning and projects that reduce emissions and benefit disadvantaged communities.

Maryland and Delaware took actions to improve the effectiveness of land conservation and restoration. Maryland passed a bill to remove barriers to mitigation banking for non-tidal wetlands disturbed by development.[161] Delaware amended its Land Protection Act to encourage permanent protection of certain lands, including land that would allow natural systems to adapt to climate change.[162]

New York increased support for local communities, creating a new Climate Smart Communities program to award grants for projects that will increase resilience or help reduce emissions.[163] The state also launched an online Climate Change Clearinghouse to provide a single source of climate science and information for decision-makers.[164]

4. Local/Regional Activities

Local jurisdictions continue to innovate in preparing for climate change, and in funding resilient investments. In May, voters in the nine-county San Francisco Bay Area approved a $12 parcel tax that will fund wetlands restoration and help adapt to sea-level rise through nature-based flood protection.[165] In June, New York City updated its Local Waterfront Revitalization Program, requiring development and redevelopment projects to consider and mitigate climate change and sea-level rise risks.[166] The City is also working with FEMA to update floodplain maps, including maps accounting for sea-level rise and storm surge to inform planning and building.[167] In September, D.C. Water issued an environmental impact bond to fund green infrastructure improvements that can help mitigate flooding from heavy rainfall events,[168] and in November, Washington, D.C. released Climate Ready D.C., the District's plan for adapting to climate change impacts.[169]

II. SUSTAINABLE DEVELOPMENT

A. International Activities

1. United Nations Initiatives

The United Nations Statistical Commission approved 230 indicators to measure

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[160]A.B. 2722, 2015-2016 Sess. (Cal. 2016).
[161]H.B. 797, 2016 Sess. (Md. 2016).
[162]House Substitute 1 for H.B. 262, 148th Gen. Assemb., Reg. Sess. (Del. 2016).
[163]Press Release, Governor Andrew M. Cuomo, State of N.Y., Governor Cuomo Announces $11 Million in Climate Smart Community Grants Available to Municipalities (Apr. 18, 2016).
[164]Press Release, N.Y. State Energy Res. and Dev. Auth., NYSERDA Launches One-Stop Climate Change Science Clearinghouse Website with Tools to Help Communities Prepare for Extreme Weather (May 6, 2016).
[165]*Parcel Tax Information*, S.F. BAY RESTORATION AUTH. (last visited Nov. 2, 2016).
[166]N.Y. STATE DEP'T OF STATE, THE NEW YORK CITY WATERFRONT REVITALIZATION PROGRAM (June 2016).
[167]Press Release, Fed. Emergency Mgmt. Agency, Mayor De Blasio and FEMA Announce Plan to Revise NYC's Flood Maps (Oct. 17, 2016).
[168]Press Release, Pamela Mooring, D.C. Water & Sewer Auth., DC Water, Goldman Sachs and Calvert Foundation pioneer environmental impact bond; $25 million bond sale to fund initial DC Water green infrastructure project (Sept. 29, 2016).
[169]DISTRICT OF COLUMBIA, CLIMATE READY DC (2016).

progress on the seventeen new global sustainable development goals for 2015-2030, set by the UN last year. The new goals and indicators address a wide array of topics, including poverty, education, gender equality, climate change, sustainable cities and consumption, and access to justice.[170]

Moody's, S&P, and other credit rating institutions joined over 100 major investors in signing a statement of the UN-supported Principles of Responsible Investment (PRI) calling on credit firms, debt underwriters, and investors to conduct robust analyses of environmental, social and governance factors that could affect investment risk.[171]

2. CSR/Sustainability Initiatives by Foreign Governments and Stock Exchanges

The European Union (EU) collected public comments on its proposed non-binding guidance on reporting sustainability information and other non-financial data by certain large companies.[172]

Following the example set by the Dodd-Frank law in the United States, the EU Commission, Parliament and Council agreed to issue a conflict minerals requirement, mandating due diligence for importers of conflict minerals from all conflict-affected and high-risk areas (not just central Africa, as covered by Dodd-Frank). This rule is designed to discourage the flow of gold and other metals used to fund armed conflicts or produced under conditions that violate human rights. Under the new rules, starting on January 1, 2021, almost all of the tin, tungsten, tantalum, gold, and other ores processed in smelters or refiners within the EU will be subject to the due diligence process.[173]

Stock exchanges in Australia, Mexico, Morocco, Spain, Singapore, Botswana, Namibia, Tanzania, Dubai, Seychelles, Belarus, Nairobi, and Qatar, Luxembourg, Sweden, Norway, Denmark, Iceland, Latvia, Jordan, Lithuania, Estonia, and Kazakhstan joined the UN's Sustainable Stock Exchanges (SSE) initiative, bringing to sixty the number of exchanges around the world, including the United States' Nasdaq and NYSE, committing to promote long term sustainable investment and improved environmental, social and corporate governance (ESG) disclosure and performance among companies listed on their exchanges (through dialogue with investors, companies and regulators).[174]

3. Non-governmental Voluntary Initiatives

The Global Reporting Initiative (GRI) converted its G4 Sustainability Reporting Guidelines to a standard that includes three "universal" standards (Foundation, General Disclosures, and Management Approach) and thirty-five economic, social, and environmental "topic-specific" standards. The transition to standards was done to improve the quality and comparability of sustainability reporting, make it easier for GRI to update its standards and for countries and stock exchanges to incorporate the GRI provisions in their financial reporting rules.[175]

The Sustainability Accounting Standards Board (SASB), chaired by former New York Mayor Michael Bloomberg, is a nonprofit organization formed in 2011 to develop

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[170]G.A. Res. 70/1, ¶ 18 (Sept. 25, 2015).

[171]*Now is the Time to Act on ESG in Credit Ratings*, PRINCIPLES FOR RESPONSIBLE INV. (last visited Feb. 25, 2017).

[172]Council Directive 2014/95/EU (Oct. 22, 2014).

[173]Dynda A. Thomas & Christina Economides, *The New EU Conflict Minerals Regulation — Is It Something To Be Thankful For?*, CONFLICT MINERAL COMPLIANCE, NEWS & ANALYSIS (Nov. 23, 2016).

[174]*The Sustainable Stock Exchange initiative welcomes its 60th partner exchange*, SUSTAINABLE STOCK EXCHS. INITIATIVE (SSEI) (Sept. 16, 2016).

[175]*GRI Standards*, GRI (last visited Mar. 4, 2017).

sustainability accounting standards to be used by publicly listed corporations for disclosing material sustainability issues in financial reports. In 2016, SASB issued reporting guidelines for Infrastructure (utilities, waste management companies, construction and engineering firms, and real estate owners, developers and managers).[176]

The International Standards Organization (ISO) has completed the second draft of ISO 20400, *Sustainable procurement – Guidance*, which offers guidance on how organizations can integrate sustainability into their procurement processes. Final publication is expected in 2017.[177]

B. National Activities

Federal agencies began implementing Executive Order 13693, on "Planning for Federal Sustainability in the Next Decade," which was issued in 2015. Among other things, the Order directed federal agencies to take a variety of steps to reduce GHG emissions, improve water use efficiency and stormwater management, and pursue sustainable acquisition and procurement. The CEQ now maintains a scorecard for major federal suppliers, indicating whether they have set GHG reduction goals, disclose their emissions, and disclose information on their exposure to risks from climate change.[178]

1. Securities and Exchange Commission Rules

In April, the Securities Exchange Commission published a "concept release proposal" seeking input on modernizing reporting requirements under Regulation S-K.[179] Among the topics addressed in the proposal was "Public Policy and Sustainability Matters." The Commission requested input on what sustainability information might be material or relevant to a company's business and financial condition, and might constitute a matter of value to investors and shareholders making corporate voting decisions.

2. Business Initiatives

In 2016, United States investors filed 370 corporate shareholder resolutions on environmental and social issues—primarily on climate change and corporate political activity–down from a record 433 filed the year before. Environmental and sustainable governance resolutions together represented 40% of all resolutions.[180]

C. State and Local Activities

Ohio, Michigan, Georgia, Kentucky, Iowa, Oklahoma, and Alaska are drafting legislation authorizing "benefit corporations," which allow companies to go beyond the fiduciary duty of maximizing value for stockholders to address social, environmental and employee benefit. Currently thirty states and the District of Columbia have such laws.[181]

The City of Chicago began installation of up to 500 sensors in public locations, which will track and report a variety of environmental and social indicators ranging from

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[176] *Infrastructure Standards Download*, SUSTAINABILITY ACCOUNTING STANDARDS BD. (last visited Mar. 4, 2017).
[177] ISO/PRF 20400, INT'L ORG. FOR STANDARDIZATION (last visited Mar. 4, 2017).
[178] COUNCIL FOR ENVTL. QUALITY, FEDERAL SUPPLIER GREENHOUSE GAS MANAGEMENT SCORECARD (2016).
[179] Business and Financial Disclosure Required by Regulation S-K, 81 Fed. Reg. 23,916 (Apr. 22, 2016) (to be codified at 17 C.F.R. pts. 210, 229-30, 232, 239-40, and 249).
[180] *2016 Report*, PROXYPREVIEW (last visited Mar. 4, 2017).
[181] *State by State Status of Legislation*, THE BENEFIT CORP. (last visited Mar. 4, 2017).

temperature and humidity to traffic congestion and noise and pollution levels. Described as a "Fitbit for the city," the program will generate data that can be used by individuals to track their environmental exposures and by the city to respond to changing conditions. It might be used, for example, to identify, measure, and address peak congestion points.[182]

III. ECOSYSTEMS

A. International Activities

1. Convention on Biological Diversity

The 196 Parties to the Convention on Biological Diversity (CBD)[183] convened from December 4-17, 2016 in Cancun, Mexico for the Thirteenth Meeting of the Conference of the Parties (COP13). The Parties noted that virtually all member States had incorporated the biodiversity targets established at COP10 for 2011-2020 (the so-called Aichi Biodiversity Targets) in their respective national biodiversity strategies and action plans.[184] However, they also concluded (as did a new study by Conservation International[185]) that only a minority had established plans that were sufficiently ambitious to comport with its goals, while many 2015 targets – such as minimizing stressors contributing to coral reef degradation and ocean acidification and universal adoption of updated national biodiversity strategy and action plans – had not been achieved.[186] As noted in Sections III.A.4 and B.1. *infra*, 2016 saw Parties and the United States make significant contributions to Aichi Target 11, which seeks to conserve 17% of terrestrial and inland water and 10% of coastal and marine areas as effectively managed protected areas. The Parties also recognized new ecologically or biologically significant areas (EBSAs) designed to ensure protection of areas of special importance in open-ocean waters and deep-sea habitats.[187] Recognizing the important nexus between climate change and biodiversity, the Parties passed a resolution advocating the need to incorporate an ecosystem approach into climate policymaking.[188] The Parties also sought to continue COP12's efforts to mobilize financial resources (doubling biodiversity-related funding to developing countries), while noting a lack of information reporting on countries' financial needs.[189] They also established a detailed three-year action plan to build capacity for the implementation of the Convention and its protocols, including provisions for specific Aichi Biodiversity Targets.[190]

It is lamentable that biodiversity continues to decline despite the CBD's express goal to arrest such declines.[191] However, COP13 was laudable for continuing to develop a systematic approach to measure and effectively implement programs.

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[182]Aamer Madhani, *Chicago begins building 'fitness tracker' to check its vitals*, USA TODAY (Aug. 29, 2016).

[183]The United States is not a Party to the Convention on Biological Diversity. (*List of Parties*, CONVENTION ON BIOLOGICAL DIVERSITY (last visited Feb. 24, 2017)).

[184]Convention on Biological Diversity [CBD], Decision XIII/1, ¶ 2 (Dec. 12, 2016).

[185]CONSERVATION INT'L ET AL., CONVENTION ON BIOLOGICAL DIVERSITY: PROGRESS REPORT TOWARDS THE AICHI BIODIVERSITY TARGETS 1-8 (2016).

[186]CBD, Decision XIII/1, *supra* note 184, at ¶ 2.

[187]CBD, Decision XIII/12, ¶ 2 (Dec. 17, 2016).

[188]CBD, Decision XIII/4, ¶ 1-2 (Dec. 10, 2016).

[189]CBD, Decision XIII/20, ¶ 3-4 (Dec. 15, 2016).

[190]CBD, Decision XIII/23, Annex (Dec. 16, 2016).

[191]*Global Biodiversity Outlook,* CBD (last visited Feb. 24, 2017); Gerardo Ceballos et al., *Accelerated Modern Human-Induced Species Loss: Entering the Sixth Mass Extinction*, 1 SCI. ADVANCES (2015).

2. IUCN World Conservation Congress

In September, the International Union for the Conservation of Nature (IUCN) held its quadrennial World Conservation Congress in Hawaii. The theme of this year's Congress, "Planet at the Crossroads," encouraged debate on how to meet the immediate needs of human civilization while considering the long-term impacts doing so may have on the planet's capacity to support life. IUCN's 1,300 members – including governments, international, private, and non-profit organizations – adopted over 121 resolutions, recommendations, and decisions, including a four-year program that sets priorities for the global conservation community.[192] Notably, the Congress adopted The Hawaii Commitments, which seek to, among other things, promote nature-based solutions to combat and adapt to climate change, conserve biodiversity, support sustainable livelihoods, and provide ecosystem services to enhance human health and well-being.

3. Antarctica Marine Reserve (Ross Sea)

After years of negotiations, in October, twenty-four nations and the European Union reached an agreement to establish the Ross Sea Region Marine Protected Area (MPA) in Antarctica's Ross Sea, the world's largest marine sanctuary.[193] The agreement, which will come into force December 2017, occurred at a meeting of the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) in Hobart, Australia. At 600,000 square miles, the sanctuary is reported to cover an area twice the size of Texas. Seventy-two percent of the sanctuary will be a "no-take" zone, which forbids all fishing, while other sections will permit some harvesting of fish and krill for scientific research. Located well south of New Zealand, the region contains nutrient-rich waters, largely untouched by humans, and is home to 16,000 species, including plankton, krill, fish, seals, penguins, and whales.[194] A key focus of the Ross Sea Region MPA will be improving collaborative marine research by CCAMLR members.[195]

4. Protected Area Conservation

2016 saw a myriad of international and country-level initiatives to conserve the global commons, including oceans, freshwater, and terrestrial protected areas.

At the third Our Ocean conference, held September 15-16 in Washington, D.C., more than 20 countries and charitable organizations announced over 136 new marine conservation initiatives valued at $5.24 billion, in addition to commitments to protect approximately 4 million square kilometers (1.5 million square miles) of ocean.[196] To date, the three Our Ocean conferences have spawned commitments worth $9.2 billion and covering 3.8 million square miles of ocean – an area the size of the United States. Participant commitments focused on marine protected areas, sustainable fisheries, marine

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[192]Anan Ahmed, *Planet at the Crossroads: Insights from IUCN's World Conservation Congress*, THE WILSON CTR. (Dec. 12, 2016).

[193]*CCAMLR to create world's largest Marine Protected Area*, (CCAMLR) (last visited Dec. 6, 2016).

[194]Brian Howard, *World's Largest Marine Reserve Created Off Antarctica*, NAT'L GEOGRAPHIC (Oct. 27, 2016).

[195]CCAMLR, CONSERVATION MEASURE 91-05 (2016): ROSS SEA REGION MARINE PROTECTED AREA (2016).

[196]*Our Ocean 2016 Commitments*, U.S. DEP'T OF STATE (last visited Sept. 16, 2016) (source is no longer available on the internet); *Our Ocean, Commitments* (last visited March 6, 2017).

pollution, and climate-related ocean impacts. Notable commitments include: the Seychelles' plan to create a 400,000 square kilometer marine protected area (30% of its EEZ) by 2020 through a $27 million debt swap agreement; the United Kingdom's designation of a sustainable use marine protected area covering all of St. Helena's 445,000 square kilometer maritime zone; France's expansion of the marine reserve in the French Southern Lands in the Indian Ocean by 550,000 square kilometers; and the Federate States of Micronesia's expansion of its marine protected area by 184,948 square kilometers prohibiting commercial fishing within twenty-four nautical miles around each of its islands.[197] Prior to the conference, the presidents of Costa Rica, Colombia, and Ecuador announced the expansion of three UNESCO World Heritage Sites – the Cocos, Malpelo, and Galápagos Islands – further restricting fishing, seeking to save declining shark species (amongst others), and bringing the marine reserves to 83,600 square miles.[198] These efforts complement the three nations' 2003 commitment with Panama to conserve the 750,000 square mile Eastern Tropical Pacific Seascape ocean wildlife corridor.

On solid ground, the Canadian province of British Colombia reached a historic agreement with environmentalists, the logging industry, and First Nations communities to protect the Great Bear Rainforest – the largest coastal temperate rainforest in the world.[199] After twenty years of negotiations, the parties agreed to conserve 85% of the forest as protected with the other 15% subject to the "most stringent" logging standards in North America. Farther south, Peru and Bolivia signed a $500 million deal to restore and preserve Lake Titicaca, the largest freshwater lake in South America.[200]

5. U.S.-Canada Arctic Oil & Gas Development Restrictions

Only one month before leaving office, President Obama declared "the vast majority of U.S. waters in the Chukchi and Beaufort Seas north of Alaska as indefinitely off limits to offshore oil and gas leasing."[201] The designation would ban drilling in about 98 percent of federally-owned Arctic waters, constituting 115 million acres.[202] President Obama also announced similar measures to ban drilling in 3.8 million acres of the Atlantic Ocean surrounding coral canyons stretching from Norfolk, Virginia to the Canadian border. President Obama relied on a rarely used provision of the 1953 Outer Continental Shelf Lands Act, which gives the President the authority to "'withdraw from disposition any of the unleased lands of the Outer Continental Shelf'", and arguably cannot be reversed by a future Trump administration.[203] At a joint statement, Prime Minster Trudeau announced Canada will also designate "all Arctic Canadian waters as indefinitely off limits to future offshore Arctic oil and gas licensing, to be reviewed every five years through a climate and marine science-based life-cycle assessment."[204]

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[197] *Our Ocean, Commitments*, *supra* note 196.

[198] Jane Braxton Little, *Three Nations Create Giant Reserves for Ocean Life*, NAT'L GEOGRAPHIC (Sept. 9, 2016).

[199] Justine Hunter, *Final Agreement Reached to Protect B.C.'s Great Bear Rainforest*, THE GLOBE AND MAIL (Feb. 1, 2016).

[200] Suman Varandani, *Lake Titicaca Cleanup: Bolivia, Peru Sign $500M Deal To Improve Lake's Biodiversity Through 2025*, INT'L BUS. TIMES (Jan. 8, 2016).

[201] Press Release, The White House, United States-Canada Joint Arctic Leaders' Statement (Dec. 20, 2016).

[202] Coral Davenport, *Obama Bans Drilling in Parts of the Atlantic and the Arctic*, THE N.Y. TIMES (Dec. 20, 2016).

[203] *Id.*

[204] United States-Canada Joint Arctic Leaders' Statement, *supra* note 201.

B. State and National Activities

1. Protected Area Conservation

On August 26, President Obama expanded the Papahānaumokuākea Marine National Monument (PMNM) off the northwest coast of the Hawaiian Islands, creating the world's largest marine protected area (until the Ross Sea Region MPA two months later).[205] The expansion nearly quadrupled the PMNM's size from about 140,000 to 582,578 square miles. The PMNM was recognized as a UNESCO World Heritage Site in 2010 and is home to coral reefs, deep sea marine habitats, and 7,000 marine species.[206]

President Obama also used his authority under the 1906 Antiquities Act to create the Northeast Canyons and Seamounts Marine National Monument (NCSMNM), the first marine national monument in the Atlantic Ocean.[207] The NCSMNM is divided into two territories covering 4,900 square miles – together about the size of Connecticut – and lies 100 to 200 miles southeast of Cape Cod, stretching along the edge of the United States Exclusive Economic Zone and the continental shelf.[208] The monument covers a series of deep sea canyons, extinct undersea volcanoes, and biodiversity hotspots.[209] Commercial resource extraction (i.e. fishing and mineral extraction) are prohibited in both the PMNM and NCSMNM – although red crab and lobster fisheries will have seven years before being required to exit the NCSMNM area.[210] Recreational fishing and scientific research are allowed by permit in both areas.

On December 28, President Obama added to his conservation legacy, creating new national monuments in Utah and Nevada, over the objection of development interests.[211] In southeastern Utah, Obama created the 1.35-million acre Bears Ears National Monument, which will be co-managed with five Native American tribes. In the southeastern Nevada desert, the President declared the 300,000 acre Gold Butte National Monument. In total President Obama has set aside nearly 555 million acres of land and (mostly) water under the Antiquities Act – more than all other Presidents combined.[212]

2. Mitigating Impacts on Natural Resources

In 2015, the White House adopted a memorandum requiring all natural resource management agencies to adopt consistent policies for avoiding and minimizing impacts to natural resources.[213] In 2016, the Fish & Wildlife Service and Forest Service made

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[205] Press Release, The White House, Fact Sheet: President Obama to Create the World's Largest Marine Protected Area (Aug. 26, 2016).
[206] *Id.*
[207] Press Release, The White House, FACT SHEET: President Obama to Continue Global Leadership in Combatting Climate Change and Protecting Our Ocean by Creating the First Marine National Monument in the Atlantic Ocean (Sept. 15, 2016) [hereinafter NCSMNM Fact Sheet].
[208] Cynthia Barnett, *Obama Creates Connecticut-Size Ocean Park, First in Atlantic*, NAT'L GEOGRAPHIC (Sept. 15, 2016).
[209] NCSMNM Fact Sheet, *supra* note 207.
[210] *Id.*
[211] Juliet Eilperin & Brady Dennis, *With New Monuments In Nevada, Utah, Obama Adds To His Environmental Legacy*, WASH. POST (Dec. 28, 2016).
[212] *Id.*
[213] Presidential Memorandum on Mitigating Impacts on Natural Resources from Development and Encouraging Related Private Investment, 2015 DAILY COMP. PRES. DOC. 780 (Nov. 3, 2015).

substantial progress in developing new mitigation policies,[214] while other agencies still have much work to do.[215] The new policies promise to alter permitting obligations, timelines, and procedures,[216] but it is unclear whether they will be finalized—or even rescinded—under the incoming administration.

3. Clean Water Rule

In June 2015, the EPA and the Army Corps of Engineers adopted the Clean Water Rule: Definition of "Waters of the United States,"[217] to clarify the jurisdictional limits of the Clean Water Act. It is estimated to place roughly 3% more waterways under federal jurisdiction.[218] Since its release, the Clean Water Rule has been mired in litigation, winding its way to the Sixth Circuit Court of Appeals where the rule was stayed pending a judicial review. [219] Meanwhile, a petition pending in the United States Supreme Court raises the issue of whether the Sixth Circuit, as opposed to the federal district courts, has jurisdiction over the case.[220] The Clean Water Rule may be vulnerable on yet another front: President Trump has pledged to repeal it.[221]

4. Landscape-Level Planning

In 2016, the United States Bureau of Land Management (BLM) began overhauling how it develops and adopts resource management plans and policies, utilizing a more integrative, collaborative, and flexible planning scheme called "Planning 2.0." One specific goal is to "improve the BLM's ability to address landscape-scale resource issues and use landscape-level management approaches to more efficiently and effectively manage the public lands."[222] BLM released a proposed rule in February 2016.[223]

BLM's new planning effort is part of a larger shift by the Department of Interior towards landscape-level and ecosystem-based management. Multiple agencies within the Department made progress in developing new "landscape-scale" mitigation policies.[224]

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[214]*See, e.g.*, Endangered and Threatened Wildlife and Plants; Endangered Species Act Compensatory Mitigation Policy, 81 Fed. Reg. at 61,032 (Sept. 2, 2016); *Forest Service Mitigation Policy*, U.S. FOREST SERV. (Apr. 1, 2016).

[215]*See, e.g.*, Memorandum from Neil G. Kornze, Dir. Bureau of Land Mgmt. on Interim Policy, Regional Mitigation Manual Section - 1794 to State Dirs., Bureau of Land Mgmt. (June 13, 2013).

[216]Thomas C. Jensen, Sandra A. Snodgrass & Bailey Schreiber, *The Presidential Memorandum and Interior Department Policy on Mitigation: Their Content and Implications*, HOLLAND & HART (Nov. 9, 2015).

[217]Clean Water Rule: Definition of "Waters of the United States," 80 Fed. Reg. 37,054 (June 29, 2015) (to be codified at 33 C.F.R. pt. 328 and 40 C.F.R. pts. 110, 112, 116, 117, 122, 230, 232, 300, 302, and 401).

[218]Brent Kendall & Amy Harder, *U.S. Appeals Court Blocks EPA Water Rule Nationwide*, WALL ST. J. (Oct. 9, 2015, 4:34 PM) (subscription).

[219]*In re* EPA, 803 F.3d 804, 806 (6th Cir. 2015).

[220]Writ of Certiorari at i, Nat'l Assoc. of Mfrs. v. Dep't. of Def., No. 16-299 (Sept. 7, 2016).

[221]Todd Shields, *Trump Bodes Well for Farms and Coal Mines; Trade Deals in Peril*, BLOOMBERG L.P. (Nov. 9, 2016).

[222]BUREAU OF LAND MGMT., FACT SHEET: BLM'S PROPOSED PLANNING RULE (2016).

[223]Resource Management Planning, 81 Fed. Reg. 9674 (Feb. 25, 2016) (to be codified at 43 C.F.R. pt. 1600).

[224]Joel Clement & Tomer Hasson, *Landscape-Scale Management and Mitigation at the Department of the Interior*, PUB. LAND AND RES. COMM. NEWSLETTER, (A.B.A. SECTION OF ENV'T, ENERGY & RES.) (Feb. 2016); *see also* Endangered and Threatened Wildlife and

The United States Fish & Wildlife Service and other agencies continued to implement the 2015 Greater Sage-Grouse Conservation Strategy through new resource management policies, habitat conservation agreements, and better data collection efforts.[225] And BLM and the State of California finalized the Desert Renewable Energy Conservation Plan (DRECP), a regional land use management plan designed to guide large-scale renewable energy development in the California desert for the foreseeable future.[226] However, the emphasis on landscape-level and ecosystem-based planning—and on the accompanying bent towards conservation, rather than development, under President Obama—seems likely to change under the incoming administration.

5. Klamath Dam Removal

While the largest dam removal project in United States history—the removal of four dams along the Klamath River in Oregon and California—remains a proposal, it saw significant progress in 2016. In April, the Departments of Commerce and Interior, the states of Oregon and California, PacifiCorp (the dams' owner), and other stakeholders signed two agreements to remove the dams and restore the Klamath Basin.[227] The agreements supersede earlier deals that had required, but failed to secure, congressional authorization and funding, and rely instead on the Federal Energy Regulatory Commission (FERC) for decommissioning approval and on nonfederal funding for removal costs.[228] In September, the Klamath River Renewal Corporation, the nonprofit to which PacifiCorp will transfer the dams for removal, filed transfer and decommissioning applications with the FERC. If the FERC approves the applications, dam removal will begin in 2020.[229]

Plants; Designation of Critical Habitat for Kentucky Arrow Darter, 80 Fed. Reg. 61,030, 61,033 (Oct. 8, 2015) (to be codified At 50 C.F.R. pt. 17) (discussing importance of focus on landscape-level mitigation).

[225]Press Release, Bureau of Land Mgmt., BLM Issues Guidance for Implementing Greater Sage-Grouse Plans (Sept. 1, 2016); *BLM and Joint Venture Adopt Partnership, $5 Million Agreement*, INTERMOUNTAIN W. JOINT VENTURE (July 25, 2016); U.S. DEP'T OF THE INTERIOR ET AL., GREATER SAGE-GROUSE CONSERVATION & THE SAGEBRUSH ECOSYSTEM 14-15 (2016).

[226]*What is DRECP?*, DESERT RENEWABLE ENERGY CONSERVATION PLAN (last visited Feb. 25, 2017).

[227]Press Release, U.S. Dep't of the Interior, Two New Klamath Basin Agreements Carve out Path for Dam Removal and Provide Key Benefits to Irrigators (Apr. 6, 2016).

[228]Will Houston, *Klamath River dam removal deal signed by top federal, state officials*, SAN JOSE MERCURY NEWS (Apr. 7, 2016) (updated Aug. 11, 2016).

[229]Press Release, Klamath River Renewal Corp., The Klamath River Renewal Corporation Begins Implementation of Klamath Hydroelectric Settlement Agreement (Sept. 23, 2016).