Climate Engineering and the Law

REGULATION AND LIABILITY FOR SOLAR RADIATION MANAGEMENT AND CARBON DIOXIDE REMOVAL

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US Law

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Both federal law and state law play a significant role in governing environmental matters in the United States. Some of these laws, such as the National Environmental Policy Act (NEPA), are generally applicable laws that could be implicated by any geoengineering technique. This chapter first considers these generally applicable laws. Other laws are likely to be relevant only to a limited subset of geoengineering techniques. This latter group of laws includes laws specific to an environmental medium, such as the Clean Air Act, as well as laws governing specific technologies, such as state and local ordinances governing the cultivation of genetically modified organisms.

4.1. GENERALLY APPLICABLE LAWS

Laws that could be triggered by almost any type of geoengineering project include statutes that impose procedural duties and those having substantive effects. Procedural statutes may create obligations to provide notice to the government or public of planned activities, analyze the environmental effects of such activities, allow public comment, and monitor and report on the activities when they are carried out. Substantive statutes include wildlife protection laws and laws providing for extraordinary government powers in emergency situations.

4.1.1. *Procedural Statutes*

NEPA, which was the first law to require environmental impact assessment, is a federal procedural statute that would apply to many geoengineering activities. Some states have adopted laws patterned after NEPA that would apply to geoengineering activities having state involvement or requiring state

the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns."[119] Pertinent regulations further specify that take includes "the doing of any negligent or intentional act which results in disturbing or molesting a marine mammal."[120] Also in contrast to MBTA, MMPA establishes a permitting process for unintentional take. NOAA Fisheries may issue an incidental take authorization if the take would involve a small number of individuals, have no more than a negligible impact on the species at issue, and have no more than an unmitigable adverse impact on the availability of species for subsistence uses.[121]

Civil or criminal penalties may be imposed for violations of MMPA.[122] Although the statute does not explicitly authorize citizen suits, a party with conservationist, economic, or other interests in marine mammal protection may bring suit to challenge the issuance of a permit or the failure to apply for a required permit.[123]

Operational activities that incidentally harm marine mammals, such as Navy sonar operations, fall within the scope of MMPA.[124] At first glance, it may seem unlikely that marine geoengineering activities would affect marine mammals as directly or severely as Navy sonar operations. Nonetheless, efforts to brighten marine clouds, enhance ocean upwelling or downwelling, or fertilize the oceans all could affect marine mammals. Because MMPA's protections extend to individual mammals and prohibit the disruption of their behavioral patterns, some of these geoengineering projects could require an MMPA incidental take authorization.

4.1.3. *Emergency Authorities*

Various authorities grant federal, state, and local governments extraordinary powers to act in emergency situations generally or in emergencies involving environmental hazards. Such powers could enable government actors to regulate or halt geoengineering projects that give rise to emergency circumstances. Conversely, such powers also could be invoked by governments to initiate some types of geoengineering in response to a climate-related emergency.

4.1.3.1. Federal

Federal emergency authority may be based on statutory grants of specified authorities or on the US Constitution. Some statutory grants are restricted, authorizing fairly limited responses in narrow factual circumstances. Other sources of emergency powers are far broader. This section canvasses the sources of federal emergency authority potentially most relevant to geoengineering and considers how they might apply to geoengineering activities.

4.1.3.1.1. STAFFORD ACT The Robert T. Stafford Disaster Relief and Emergency Assistance Act ("Stafford Act") provides an important statutory basis for declaring an emergency.[125] The Stafford Act authorizes the president of the United States, upon the request of the governor of an affected state, to issue a declaration of a major disaster or emergency exceeding a state's capacity to respond.[126] A "major disaster" is defined as "any natural catastrophe … or, regardless of cause, any fire, flood, or explosion … which … causes damage of sufficient severity and magnitude to warrant major disaster assistance."[127] An emergency is defined as "any occasion or instance for which … Federal assistance is needed to supplement State and local efforts and capabilities to save lives and to protect property and public health and safety, or to lessen or avert the threat of a catastrophe."[128] An emergency declaration is typically made in response to and in advance of a recognized threat, whereas a major disaster declaration typically follows a catastrophic event and provides broader authority to recover from damage caused by the event.[129]

A declaration of emergency or major disaster under the Stafford Act makes federal assistance – technical, financial, and otherwise – available to state and local governments. Under such a declaration, the president or the Federal Emergency Management Agency (FEMA) may coordinate disaster relief assistance and provide federal assistance and support to save human lives, prevent suffering, or mitigate severe damage.[130] In addition, the president or FEMA may direct any federal agency to use its authorities and resources to support state and local responses and recovery efforts. Typically, FEMA issues a mission assignment to another federal agency to undertake such efforts, and that agency is subsequently reimbursed through the Disaster Relief Fund.[131] Most actions taken under the Stafford Act – including the provision of general federal assistance, provision of assistance essential to meeting immediate threats to life and property, removal of debris, and repair of damaged facilities – is statutorily exempt from NEPA compliance.[132]

4.1.3.1.2. ENVIRONMENTAL STATUTES CONTAINING EMERGENCY AUTHORITIES Several environmental laws contain grants of federal emergency authority to respond to environmentally hazardous situations. The Comprehensive Environmental Response, Compensation, and Liability Act authorizes the president to respond to any release or threat of release of a hazardous substance or pollutant that "constitutes a public health or environmental emergency" if no other person will respond in a timely manner.[133] The Clean Air Act authorizes the EPA to seek a court order or issue an administrative order against any person causing or contributing to air pollution that presents "an imminent and substantial endangerment to public health or welfare, or

the environment."[134] Similarly, the Clean Water Act authorizes the EPA to bring suit to restrain any person causing or contributing to water pollution that presents "an imminent and substantial endangerment to the health of persons or to the welfare of persons where such endangerment is to the livelihood of such persons."[135] And the Resource Conservation and Recovery Act authorizes the EPA to seek a court order or issue an administrative order against any person who has contributed or is contributing to the "handling, storage, treatment, transportation or disposal of solid waste or hazardous waste [that] may present an imminent and substantial endangerment to health or the environment."[136] Each of these statutes could empower the United States to halt or control an environmental emergency created by geoengineering activities.

Other emergency statutes, in contrast, might be invoked in support of government geoengineering efforts. The Flood Control and Coastal Emergency Act, for instance, establishes an emergency fund to be expended by the Army Corps of Engineers for various purposes, including "preparation for emergency response to any natural disaster," "flood fighting and rescue operations," and "emergency protection of federally authorized hurricane or shore protection."[137] Activities authorized under the statute typically include flood fighting and management projects such as levee protection or dam maintenance. However, one can imagine an argument that geoengineering projects aimed at decreasing the severity or scope of climate-related disasters also qualify as appropriate emergency response measures. Such projects might include cloud brightening intended to provide relief from a heatwave, or cloud seeding intended to supply water in a drought.

4.1.3.1.3. NATIONAL EMERGENCIES ACT The Stafford Act and environmental emergency authorities address emergencies or disasters that are not necessarily national in scope. The National Emergencies Act (NEA), in contrast, governs "national emergencies" declared by the president. The NEA is a procedural statute that requires the president to transmit to Congress and publish in the *Federal Register* a proclamation specifying the legal basis for such an emergency declaration.[138] The statute also requires that Congress meet every six months "to consider a vote on a joint resolution to determine whether [an] emergency shall be terminated."[139] Notwithstanding this latter requirement, Congress rarely votes on whether a declared emergency should continue, and courts essentially have held the requirement unenforceable.[140]

A declaration of national emergency under the NEA may lead to the exercise of various emergency powers, including the conduct of military operations, imposition of trade restrictions, freezing of assets, suspension of minimum

wage requirements in public contracts, and seizure of radio and TV stations and telecommunications networks.[141] In recent years, national emergencies have been declared almost exclusively to respond to terrorist threats or to advance specific foreign policy objectives.[142]

Although the NEA governs the procedures to be followed in declaring a national emergency, the statute itself provides no authority to declare a national emergency.[143] Rather, an emergency declaration must have an independent basis in some other statute or the US Constitution.[144] One statute frequently cited as the basis for a national emergency declaration is the International Emergency Economic Powers Act (IEEPA). The IEEPA defines a national emergency as "any unusual and extraordinary threat, which has its source in whole or substantial part outside the United States, to the national security, foreign policy or economy of the United States," and it authorizes the freezing of assets and prohibition of financial transactions with persons designated by executive order.[145]

4.1.3.1.4. CONSTITUTIONAL SOURCES OF EMERGENCY FEDERAL EXECUTIVE AUTHORITY Presidential assertions of authority in an emergency may rest not only on statutory powers, but also on powers expressed or implied by the US Constitution.[146] Constitutional sources of emergency authority may include specific clauses in the Constitution such as the Commander-in-Chief Clause and the Executive Power Clause. Emergency authority may also rest on broader notions of presidential power to conduct foreign affairs and a presidential duty to defend the nation.

Emergency authority derived from the Constitution largely involves presidential power over the military and foreign affairs. Most prominently, the Commander-in-Chief Clause states: "The President shall be Commander in Chief of the Army and Navy of the United States."[147] Though the precise scope of the president's powers as commander in chief is contested, the clause is commonly understood to confer broad substantive war powers on the president.[148] Further, the clause implies presidential authority over foreign affairs, a power also reflected in his or her constitutionally enumerated powers to make treaties and receive foreign representatives.[149] Presidential authority over foreign affairs is broad but somewhat overlapping with congressional authority.[150] A related – and somewhat contested – notion is the asserted presidential duty to defend the nation.[151] The argument for the existence of this duty is rooted in the presidential oath to preserve, protect, and defend the Constitution.[152] Defending the Constitution, proponents contend, necessarily implies a broader obligation to defend the nation. However, even if one assumes the existence of this obligation, it could justify only those measures necessary to preserve the nation and the Constitution.[153] It is uncertain how

grave an environmental threat would need to be in order to implicate this demanding standard.

Presidential power over the military and foreign affairs, whether grounded in the Commander-in-Chief Clause or otherwise, could support US efforts to block geoengineering activities by a foreign state or entity. At present, it may seem unlikely that foreign geoengineering efforts would be so contrary to US interests as to warrant a military response. US scientists have played a leading role in geoengineering research to date, and the United States is sometimes perceived as more receptive to geoengineering than other nations because of the country's technological bent and its reluctance to address climate change by mitigating greenhouse gas (GHG) emissions with sufficient vigor.[154] Furthermore, direct use of geoengineering as a weapon is unlikely, given the existence of more effective, more reliable, and cheaper weapons.[155] Nonetheless, international conflict over whether, when, and how geoengineering should be deployed is a real possibility, and the potential for unilateral deployment only heightens this conflict.[156]

Constitutionally grounded presidential authority to act in an emergency is not limited to matters involving the military and foreign affairs. The Executive Power Clause, found in Article II, Section 1 of the Constitution, provides that "[t]he executive Power shall be vested in a President of the United States of America."[157] Much debate surrounds the specific powers, if any, that this provision grants.[158] Under a narrow reading, the clause "merely designates the President as the holder of a certain office" and itself confers no authority.[159] In contrast, a broader interpretation of the clause suggests not only the power to execute and enforce laws enacted by Congress, but also the power to address national emergencies and other situations.[160] Indeed, one commentator describes the clause as "perhaps … the most important constitutional power for government crisis management."[161] The text of the clause sets out no obvious limits to such power, but there is historical support for subjecting any power granted by the clause to a requirement of reasonableness.[162] Simply put, a reasonably defined general executive power should be exercised in a manner that reflects efficacy, proportionality, and respect for background constraints.[163]

4.1.3.1.5. **Geoengineering and Federal Emergency Authorities** Could an emergency declaration under the Stafford Act, National Emergencies Act, or other authority serve as a legal foundation for geoengineering deployment? On the one hand, various weather-related disasters, such as a heatwave, flood, or drought, could trigger a presidential emergency or disaster declaration. Such a declaration in turn might lead to proposals to deploy certain SRM techniques, which would presumably be faster-acting than CDR techniques.[164]

On the other hand, any relief provided by SRM schemes – assuming that they work – may be of limited value in addressing the circumstances of a specific emergency. Stratospheric aerosols, for example, would take months to have any cooling effect, may not prevent or directly counter specific weather disasters, and may be unable to halt processes that have passed critical tipping points.[165] Marine cloud brightening offers the prospect of rapid cooling in some coastal regions, but with more geographically limited effects.[166] It is debatable, moreover, whether these sorts of measures would qualify as properly authorized emergency assistance. Under the Stafford Act, for example, "assistance authorized by an emergency declaration is limited to short-term assistance, essential to save lives, to protect property and public health and safety, or to lessen or avert the threat of a catastrophe."[167] In some circumstances – such as a heatwave – marine cloud brightening might lessen or avert a catastrophe. Stratospheric aerosol deployment, in contrast, is generally framed as a long-term rather than a short-term response to climate change, and thus would be difficult to justify as an emergency response.

More generally, there are various practical and philosophical difficulties involved in defining a climate emergency and in considering geoengineering as an emergency response. Climate change itself does not fall squarely within some conceptions of emergency because of the long time scales on which it operates, though New York courts have construed "emergencies" under that state's Environmental Quality Review Act to include slow-acting and long-anticipated events, such as homelessness and prison overcrowding.[168] Catastrophic weather events more obviously represent emergencies, but the absence of clear causal links between particular weather disasters and climate change weakens the case for using geoengineering to respond to weather disasters (though the science of attributing the magnitude of particular weather events to climate change is rapidly improving). Furthermore, the framing of geoengineering as a potential response to future climate emergencies has been widely criticized.[169] For one, it makes heroic assumptions regarding decision-makers' ability to define, recognize, and respond to a climate emergency.[170] For another, it discounts or distracts from other policy options for combating climate change, particularly mitigation of GHG emissions.[171] As geoengineering commentators widely concede, achieving the collective cooperation necessary to decrease GHG emissions may be difficult but is ultimately essential.[172] Finally, the framing of geoengineering as an emergency response utilizes emotionally charged rhetoric that may encourage irrational and undemocratic decision-making.[173] The resulting concern is that an emergency declaration could be used to justify the suspension of ordinary processes and protections of civil society in favor of pressing forward with an inadequately vetted geoengineering project.[174]

4.1.3.2. State and Local Emergency Authorities

State and local governments, like the federal government, possess emergency authorities. In general, state executives have the authority to declare emergencies and to exercise broad emergency powers.[175] Although state law governs the authority and role of state institutions in emergencies, state institutions often must coordinate their actions with federal actions and institutions.[176]

The discussion here considers California law regarding emergency authorities as an example. The California Emergency Services Act authorizes the governor to declare an emergency when conditions of disaster or extreme peril are likely to exceed the resources of any local jurisdiction, thereby requiring mutual aid.[177] Such a declaration authorizes the governor to expend emergency funds and use state resources, such as the National Guard, and releases financial assistance to local agencies.[178] An emergency declaration also has the effect of legally immunizing state and local officials responding to the emergency.[179] During a state of emergency, the governor may suspend any regulatory statute or state regulation if strict compliance with the statute or regulation would prevent, hinder, or delay mitigation of the emergency's effects.[180] In addition, the governor may also "commandeer or utilize any private property or personnel deemed by him necessary" to carry out his responsibilities.[181]

The California Emergency Services Act also authorizes local governments to declare a local emergency. Such a declaration enables local officials to issue "orders and regulations necessary for the protection of life and property."[182] In a local emergency, state agencies may provide aid to local governments.[183]

Like their federal counterparts, state and local emergency authorities could be invoked in response to geoengineering-related hazards. In addition, climate change-related disasters or threats also might prompt state and local officials to consider geoengineering deployment as an emergency response. In either circumstance, federal involvement is likely because of the relatively limited resources available to state and local governments and because of the potential national or international implications of any government actions initiating or responding to geoengineering.

4.1.4. *Public Trust Doctrine*

One additional body of law that could be relevant to almost any type of geoengineering is the public trust doctrine. The public trust doctrine imposes a duty on states to protect public rights to natural resources. Rooted in state constitutions, statutes, and common law, the doctrine "represents a fundamental, inherent attribute of state sovereignty."[184] Resources subject to the doctrine include tidal and submerged lands, inland navigable waters,