

Climate Change, Sustainable Development, and Ecosystems Committee Newsletter

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MESSAGE FROM THE CO-CHAIRS

Emily Fisher and Stephen Smithson

Our committee represents diverse interests. We're pleased this newsletter addresses ecosystems, one of our three core focuses. The articles in this newsletter address a range of ecosystem topics: from innovative, market-based strategies to incentivize sustainable land-use practices to public-private partnerships to address environmental issues, to how standing requirements may need to adapt to address the public's interest in environmental protection. This edition also includes an informative look at induced seismicity resulting from oil and gas operations and an update on the most recent cases addressing climate change, ecosystems, and sustainable development.

The Section held its 46th Spring Conference in Los Angeles last month. Many of the panels addressed CCSDE's three core focuses. Couldn't make it to Los Angeles for the Spring Conference? The Section made available a video recording of the keynote speech by California Attorney General Xavier Becerra and of the first plenary session, "Energy and Environment Priorities of the New Administration and the 115th Congress." Visit the highlights section of the Section home page at www.americanbar.org/environ to watch.

Emily Fisher and Stephen Smithson are the co-chairs of the Climate Change, Sustainable Development, and Ecosystems Committee.

THE LIVING LAND BANK—AN INNOVATIVE MARKETPLACE TO RESTORE ECOSYSTEMS AND ECONOMIC HEALTH IN A RAPIDLY CHANGING ENVIRONMENT

Arthur E. Smith Jr., Esq.

In response to the limited legal protections for natural areas (ecosystems) and the meager incentives to restore them, this article introduces a new Internet data-driven market system with the potential to reassemble ecosystems and their critical community services. A nonprofit organization dedicated to expanding native plant habitats on private property, Chicago Living Corridors, has proposed such an ecosystem market called the Living Land Bank.

An Ecosystem Tragedy

In William Forster Lloyd's 1833 historical essay "The Commons," the town square was used collectively for grazing, grounded in the principle of a shared resource. Without management of the grazing resource, the shared resource did not fare well. It appears the same fate may be occurring with our ecosystems that collectively function to sustain human life. In a recent study published in *Science* on July 14, 2016, the University College London found that the levels of global biodiversity loss may negatively impact ecosystem function and sustainability of human societies. The greatest changes are happening in populated areas.

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**AMERICAN BAR ASSOCIATION
SECTION OF ENVIRONMENT,
ENERGY, AND RESOURCES**

CALENDAR OF SECTION EVENTS

April 19, 2017

**Practice Building Blocks: Energy Infrastructure
Siting**

Non-CLE Webinar

April 20, 2017

**A New Era of Environmental Law: Foundations and
Principles Colloquium**

The Elisabeth Haub School of Law at Pace
University
White Plains, NY

April 21-23, 2017

Earth Day Texas Legal Symposium

Dallas, TX
Primary Sponsor: Earth Day Tex

May 18-19, 2017

2017 Petroleum Marketing Attorneys' Meeting

Marriott Marquis
Washington, DC

October 18-21, 2017

25th Fall Conference

Baltimore Waterfront Marriott
Baltimore, MD

April 16-18, 2018

36th Water Law Conference

Hilton Bonnet Creek
Orlando, FL

April 18 - 20, 2018

47th Spring Conference

Hilton Bonnet Creek
Orlando, FL

October 17- 20, 2018

26th Fall Conference

Marriott Marquis San Diego Marina
San Diego, CA

**For full details, please visit
www.ambar.org/EnvironCalendar**

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Up to this point, society has funded engineered projects to substitute for these lost services. However, as we witness with recent storms, the increasingly expensive and ineffective public works projects, such as sea walls and storm water collection/treatment systems, are insufficient to protect our communities. As one observer commented on this unsustainable path:

Our sewerage and water treatment plants are increasingly falling short of what natural systems do to manage and cleanse water. Conventional thinking and action will not deliver scalable solutions to global declining soil health, declining pollinators, or addressing climate change risks. Enabling nature, by re-assembling, restoring, repairing, reclaiming land and our relationship with the earth, at previously inconceivably large landscape-scales is essential.¹

This observation on how a healthy natural system supports human life is becoming more broadly recognized. Much of this public awareness comes from witnessing examples of lost ecosystem “services” negatively impacting communities. Ecosystem services include drainage, coastline protection, water quality, agricultural pollination, genetic resources, carbon sequestration, aquifer recharge, soil fertility, pest and disease control, air quality, outdoor experiences, material decomposition, etc. Increasing population and climate change stresses have produced more examples of lost ecosystem services in many parts of the world, thereby increasing awareness of the correlation between the health of human communities and land usage. The collective benefits of natural systems are just as fundamental as clean air and water to the planet’s ability to sustain life, yet there is no adequate protective mechanism to reestablish and sustain functioning ecosystems in most parts of the world.

Society needs a pathway to work with nature and get nature working again to restore ecosystem services. Unlike the other shared resources of

air and water, the domestic legal system has not evolved to protect or restore ecosystems to provide services such as helping prevent flooding, protecting water quality, buffering coastal areas, and pollinating food crops.

Legal Systems Protect Air and Water Resources, Not Ecosystems

In the United States we give jurisdictional rights to enforce protective obligations for common resources to states and the federal government. While laws protecting air and water are common, our ecosystems and associated services have been carved up into small diverse deeded private land ownership and left unprotected.

Over the last 50 years the public has supported domestic statutes to protect air and water, motivated largely by the direct correlation with human health. The compliance costs for these air and water protection requirements are ultimately passed on to all citizens. This is not the case with maintaining healthy ecosystems. There is little statutory authority to maintain healthy ecosystems, despite scientific evidence confirming the importance of soil quality, biodiversity, pollinator populations, and plant communities to our food supply, climate, health, and quality of life.

Few restrictions on private land usage exist. Zoning law is the most common, but it is employed to separate broad land-use categories, e.g., residential, commercial, industrial, and associated building characteristics. Besides zoning laws, there are few restrictions on the treatment of plantings on existing privately controlled land, including residential, commercial, industrial, rights-of-ways, and institutional property.

In a few situations the government protects natural features on private land from new development. The Clean Water Act (CWA) protects wetlands by requiring mitigation for wetland loss from new development. The Endangered Species Act has an even narrower focus on protecting listed species from new development. Under these statutes,

developers and third parties can negotiate wetland banks, exchanges, or habitat conservation plans to mitigate loss and smooth the typical project-by-project permit process. However, these protections are burdensome to administrate and largely ease new damage to ecosystems.

Despite the clear value of ecosystems, it is unlikely that domestic legal remedies preventing degradation of air and water resources will be similarly brought to bear on restoring ecosystems. Enacting new laws or significantly increasing government (or philanthropic) funding for preservation is politically and financially unlikely. Given that 90 percent of populated domestic land is privately controlled, any laws to mitigate ecosystem externalities run into the challenge of well-established jurisprudence associated with land ownership rights. Thus, it seems that only an extra-legal system would be capable of coordinating restoration to function as an ecosystem service. Such coordinated restoration is sometimes called green infrastructure.

The lack of legal protection for ecosystems has given rise to various attempts to establish extra-legal voluntary markets and tools to raise public awareness of the societal economic value of healthy ecosystems.

Voluntary Activity Related to Ecosystems on Private Land

Nonprofits have established limited voluntary markets for natural systems. The Nature Conservancy worked with JPMorgan Chase in creating NatureVest to link commercially attractive resources with investor returns, e.g., fisheries, timber, and agriculture. Governmental bodies have created several carbon markets, sometimes including limited natural carbon sequestration options, e.g., in California and the Regional Greenhouse Gas Initiative. Other markets and carbon certificates have been created as voluntary activities in anticipation of mandatory carbon requirements. Most experts believe that only

a mandatory cap will increase carbon value to sufficiently mitigate greenhouse gas levels.

Recognizing the need to generate motivation to turn awareness into action, there are efforts to more broadly quantify ecosystem value. Several academic institutions, NGOs, and others have partnered to create tools to calculate the monetary value of ecological services. One example is the Natural Capital Project, which is designed to increase awareness for decision makers in future land-use decisions. Stanford University and the University of Minnesota combined with two of the largest NGOs, the Nature Conservancy and the World Wildlife Fund, to develop spatial tools and software models (InVEST) that map the monetary value of goods and services that nature produces to sustain human life, including food production and water purification. Similarly, the Economics of Ecosystems and Biodiversity is a global effort to value ecosystem services for decision makers.

Awareness of ecosystem functionality has also prompted NGOs to focus more on private property. On July 19, 2016, the Nature Conservancy announced its investment in Cornell Lab YardMap to engage property owners in several major east coast cities. As our domestic populated areas are 90 percent in private ownership, this investment acknowledges the reality that ecosystem functionality cannot be solely addressed by preserving remaining high quality natural areas.

Thus far these voluntary efforts have had limited impact to stem the pressures on ecosystem integrity. What is lacking is a broad-based market that substantially mobilizes and incentivizes landowner behavior toward sustainable land-use practices. While the combined reference to nature and market seems like a culture clash, a market solution is possible. For such a market to bring together and coordinate landowners to restore and reassemble ecosystems with their associated services, there are two essential components. First, there needs to be entities willing and capable of investing capital. Second, there must be a means to link that capital to private landowner restoration.

Who Would Be Interested in Purchasing Within a Market?

Multiple institutions are likely to be interested in purchase transactions in this new market. Federal, state, and local governmental entities spend billions of dollars on projects associated with lost ecosystem services. In addition, government regulations impose obligations on businesses to control water pollution. Much of these costs are associated with water quality issues exacerbated by lost natural system functions. Those costs are often inflated, as investment must be channeled to select recipients (point sources with CWA permits) with pollution controls limited to publicly owned or business facilities. An independent market would provide a new opportunity to engage third-party landowners to install more cost-effective green infrastructure, rather than at fixed facilities. Additionally, smaller entities can use the market to achieve environmental results, from community associations protecting water quality in a local lake to farm co-ops transacting for local pollination as an alternative to importing pollinating bees to increase crop productivity.

There is substantial evidence that natural landscaping often provides cost-effective solutions for water quality and drainage issues. The U.S. Environmental Protection Agency (EPA) provides technical support and encourages utilization of cost-effective green infrastructure. Because of limits to EPA's regulatory reach to implement/fund green infrastructure projects, the agency often resorts to regulating point sources where there are diminishing environmental returns from cleanup investment. Even where EPA cannot directly transact for restoration, it could potentially use existing statutory authority to provide compliance alternatives for regulated entities to transact for such cost-effective solutions if an ecosystem market existed. One such class of regulated entities consists of sewer districts with CWA discharge permits. For example, the sewer district responsible for Cook County, Illinois, the Metropolitan Water Reclamation District (MWRD), has found that green infrastructure can play a significant role

in minimizing flooding and additional water treatment. The MWRD has published technical support manuals, approved ordinances, and hired staff for green infrastructure build-out. Both EPA and MWRD have concluded that in many cases green infrastructure is more cost-effective in achieving water quality and drainage objectives than traditional engineered infrastructure. Therefore, an ecosystem market system could both expand a shared resource and help the economy.

Even without an existing market tool, potential purchasers are enhancing authorities and funding for green infrastructure. Creating a market tool and verifying the effectiveness would likely increase interest in establishing additional programs and authorities. For example, Congress established the Clean Water State Revolving Fund to finance a broad range of infrastructure projects. In 2014, Congress expanded the types of eligible projects under the Water Resources Reform and Development Act. Unfortunately, there have been few examples of state utilization of this authority to establish green infrastructure programs under this legal framework.² With emerging storm water and other water problems, and with a viable market mechanism, states are more likely to create green infrastructure programs to be eligible for federal funding. An example of entities already pursuing new legal authority for green infrastructure has occurred in Illinois. The MWRD in mid-2016 sought legislation (H.B. 4659, amending 70 Ill. Comp. Stat. 2605) to authorize bonding authority to cost-share for green infrastructure on private land.

Another example of potential market purchasers is smaller governmental bodies that use bonding authority to finance local flood reduction projects. These entities are potential investors in projects on private land that could achieve the same environmental objective, likely at a lower cost. Over the last few years, states and localities have significantly increased issuance of "green bonds" to finance projects that benefit the environment. Like tax-exempt municipal bonds that have financed most domestic infrastructure, these bonds

are issued for sustainable investments, including land acquisition, habitat preservation, and climate adaptation. According to Bloomberg New Energy Finance, the amount of such financing has grown from \$500 million in 2010 to \$3.8 billion in 2015. Creating marketable contracts for ecosystem restoration related to vital community services could provide an attractive investment option to meet specific objectives financed through such green bond funds.

How Can This Potential Interest Link to Restoration?

New Internet data-driven technology, called blockchain technology has created new markets for linking capital with goods and services. Blockchain technology uses cryptography that follows each transaction to verify the transaction details and then publishes the transaction on a distributed tamper-proof public ledger. These transactions have applications beyond cash and cash-associated market systems. There are already hundreds of such secure markets in the world using blockchain technology with various “currency,” including tokens and “smart contracts.” These markets successfully operate with similar characteristics that can transfer to an ecosystem application. Smart contract terms already exist for financial instruments, art works, real estate, and music copyrights. Similar terms can be developed for green infrastructure. Developing and verifying ecosystem smart contracts can be a game changer in capturing ecological service opportunities.

The technology and implementation methods have significantly improved since the introduction of the blockchain-based bitcoin to become more trustworthy and flexible. These markets do not depend on new government authority. Any entity can create the software application, audit smart contracts, post smart contracts, or purchase smart contracts. Once the market is established, the transaction costs are low and the transaction can be completed immediately. Due to the public openness the ledger’s smart contracts can be readily audited to ensure trustworthiness. This ledger access and low cost allow both small and large transactions in real time on publicly available websites.

Although this technology is rapidly expanding in sophisticated and developing financial centers, the system is spreading to many different applications, including land ownership.

Blockchain technologies are already being developed for real estate title transactions. In addition to title ownership, transactions can involve identification and verification of restoration details contained in a smart contract. With precision airborne, satellite, and GIS technologies, smaller parcels within titled property can be precisely located and tracked for continued ecosystem service. Furthermore, unlike conservation easements that permanently protect existing natural areas, these transactions can involve more flexible restoration for willing market participants that cumulatively foster a net increase in healthy ecosystems. Potentially, smart contracts can become an efficient tool to protect specific species within habitat conservation plans to reduce the current overhead for engaging participants interested in advance mitigation under the Endangered Species Act. A smart contract could provide the approved terms and would be the “currency” to achieve desired environmental results.

No such blockchain ecosystem market currently exists. It would take a large initial investment to establish the market and verify that it can produce environmental results that would attract potential capital. Whether blockchain technology can be used in a biodiversity application seems less of a question than who will participate and invest in its implementation. Our natural systems are fast approaching a tipping point, necessitating innovation to cost-effectively transform landowner action. Because of the obstacles to create a replicable ecosystem market, this innovative market needs an initial funding mechanism to prove the system and foster its sustainability.

The Living Land Bank Proposal for an Ecosystem Market Mechanism

On October 3, 2016, Chicago Living Corridors (aka Chicago Area Living Corridors Alliance)

submitted an ambitious application for the MacArthur Foundation's 100&Change "big idea" grant to create such a unique market system, called the Living Land Bank, that incentivizes landowners to restore natural plantings on their property. Under this system, anyone seeking environmental results ("buyers") can publicly post their criteria and price for restoration. Such buyers may include environmental agencies, regulated businesses, sewer districts, municipalities, nonprofits, etc. Buyers in the market would offer purchase prices sufficient to cumulatively encourage adequate restoration to reassemble lost ecosystem functional "services," e.g., water quality, storm and flood protection, and pollination. Interested landowners ("sellers") can elect to restore their property with natural plantings (green infrastructure) for sale in the market. Extensive testing in the proposed pilot will verify the market's effectiveness to achieve environmental results and the correlation of price to landowner activity. This market performance data will create confidence that the market is a viable methodology to achieve environmental results. Such confidence will attract venture capital to replicate the system, domestically and internationally.

With grant funding the Living Land Bank can jump-start an innovative market platform for private transactions. The market will employ blockchain or ledger technology to facilitate payment for smart contracts related to ecosystem services. Interested parties can pay for verified ecosystem "currency" smart contracts. Smart contracts would contain terms that define land restoration criteria to address targeted environmental results. For example publicly owned treatment works or municipalities might pay for plantings on private property that is beyond current regulatory authority to prevent flooding or reduce storm water entering sewer collection systems. Offers for purchase/sale and resulting sale transactions are posted on a public ledger, thereby disclosing prices for subsequent transactions. Such a market system is made possible by this new Internet data-driven technology.

With a public ledger of transactions, potential market participants will see the listed prices and completed transactions. This knowledge and participant behavior would ultimately determine the cost and value of green infrastructure projects. Both large institutions and small investors can invest in ecological services. One example of the diversity of potential investors is the increased interest in protecting threatened species like the monarch butterfly. Businesses whose operations would be affected by new development restrictions might want to invest in smart contracts to keep the monarch butterfly off the Endangered Species Act list. At the other end of the size range, school children can use bake sale proceeds to buy a smart contract to protect monarch butterfly habitat.

The Living Land Bank Can Unlock the Potential for Soil Carbon Mitigation Offsets

While the Living Land Bank focuses on cost-effectively reproducing ecosystem services, there are co-benefits for general ecosystem resiliency and opportunities to use the system for other values, such as carbon sequestration. Thus the market could play a critical role in climate change mitigation, as well as in adaption. Native plants with very deep root systems sequester soil carbon. Research is under way utilizing existing technologies to quantify net increases in soil carbon. Standardized methods for accurately measuring soil carbon stocks and accruals have been approved by voluntary carbon registries. (See Approved Verified Carbon Standard Methodology VM0021.) Smart contracts can be developed under a system like the Living Land Bank to substantiate and verify the carbon for sale in a public ledger system. That incremental value can be potentially "layered" on the proposed ecosystem smart contract as an incremental value for the landowner's restoration activity. Since a soil carbon smart contract in a blockchain system can be efficiently tracked and verified, such a contract could successfully compete with other carbon registries that rely on procedurally burdensome review and auditing. Once a smart contract and market system are established, the

cost for individual private transactions would be substantially lowered for use in present and future carbon offset markets.

Conclusion

Without a legal framework that advances restoration on private land, there is little to prevent further ecosystem fragmentation and decline in naturally derived services. Increasing population and climate change are accelerating stresses on remaining natural areas to provide ecosystem services. As a result, relying on the status quo and incremental progress through public awareness efforts is currently not an adequate solution to produce a net increase of ecosystems or reestablish services they provide.

An independent market such as the Living Land Bank can fill this protective void and drive net ecosystem increases to reassemble their services. This market would provide a tool to incentivize green infrastructure in private land locations where it can produce specific environmental results, such as clean a stream, reduce community flooding, or protect coastal areas. This type of a focused market approach could restore and protect ecosystems more effectively and at a lower cost than total reliance on engineered public works projects driven by regulation.

Arthur E. Smith Jr., Esq., *Chicago Living Corridors, Executive Committee; Sustainable Futures L3C, President. For more information see ChicagoLivingCorridors.org.*

Endnotes

¹ Steven Apfelbaum, chairman, Applied Ecological Services, Inc., Brodhead, Wis.

² Michael Curley & Lindsay Haislip. “Fix Title VI.” *The Environmental Forum* 33.6 (2016): 36-40 at 38

GOLD AND GREEN TOGETHER: SOLVING THE CHALLENGES OF CORPORATE-NGO PARTNERSHIPS

George Wyeth, William Ascher, and Garry Brewer

Not long ago, it would have been considered unconventional for a business to enter into a joint endeavor with a nongovernmental or advocacy organization to work together on an environmental problem. Today it is increasingly common. Businesses partner with NGOs for many reasons, ranging from the development of new products to the greening of their operations. At the same time, experience has shown that these arrangements present challenges and risks for both parties that they may not fully anticipate. Those considering such partnerships need to become familiar with these challenges—not to avoid partnerships but to choose them carefully and design them in a way that is most likely to lead to successful outcomes for all involved.

The complexities of business-NGO partnerships have been analyzed in depth for the first time in a recent report from the Pacific Basin Research Center at Soka University of America and the Roberts Environmental Center at Claremont McKenna College. This report, “Gold and Green Together”: The Search for Business and Environment Partnerships” (hereinafter, cited as “report” and available at http://www.pbrc.soka.edu/publications/taskforce-reports/envirnment_report.aspx), finds that businesses can benefit from the expertise that NGOs bring, and that NGOs can use partnerships to bring about concrete environmental improvement more quickly and at less cost than through lobbying or litigation. At the same time, it states that “corporate-NGO partnerships are not a panacea, nor are they always advisable” (report at 1). The report therefore seeks to spell out the issues that the parties need to anticipate and address to maximize the chances of joint success. A particularly valuable resource is the report’s practical, step-by-step “Partnership Guide,” designed for use by practitioners.

Lawyers can play a critical role in this process by helping business and NGO clients navigate these challenges to set up effective partnerships. Lawyers can also create valuable resources, such as developing model agreement language. This article concludes with recommendations on the role that lawyers can play in this emerging arena.

I. Examples

A few examples illustrate the kinds of partnerships that the report studied:

- In 2011, the Sierra Club agreed to solicit its supporters to lease their solar installations from Sungevity; for each such arrangement the Sierra Club receives \$1000 for its clean energy campaign.
- The Environmental Defense Fund, beginning in 2000, worked with Federal Express to convert the FedEx delivery truck fleet to diesel-electric hybrids, both to reduce carbon emissions and for fuel-cost savings. To develop an appropriate engine, the parties brought the Eaton Corporation into the collaboration. The partnership progressed to develop all-electric and alternative-fuel trucks.
- From 2005 to 2007, Dupont and the Environmental Defense Fund collaborated on the “Nano Risk Framework” for managing the potential risks of the manufacture and use of nanotechnology materials.
- In 2010 Volvo joined the World Wildlife Fund’s Climate Savers program to reduce the carbon emissions of Volvo trucks, as well as explore hybrids and alternative fuels.

II. Benefits from Corporate-NGO Partnerships

Businesses and NGOs form or join partnerships such as these for a variety of reasons:

A. Promoting Positive Environmental Impact

The core of almost all business-NGO partnerships is some shared goal promoting enhanced

environmental protection. The motivations of the partners for doing so differ, as do their contributions to the effort, but their common aims are what drive the relationship. The shared goal needs to be made explicit and revisited often during the course of the partnership, to maintain focus and ensure that the efforts of the partners remain fully aligned.

For the NGO, the positive environmental impact links to its core mission. The report identifies a variety of reasons businesses may pursue an environmentally friendly strategy, including the following:

B. Efficiency

Greener operations are often more efficient operations: they consume less energy and material, and waste less of what they consume. This reduces costs, making the business more profitable and competitive. Both McDonald’s and Walmart reduced their costs by reducing the materials they used, in collaboration with the Environmental Defense Fund.

C. Legitimacy, Reputation, and Credibility

A business may also seek to enhance its public reputation by becoming known for being environmentally responsible. Reputation can account for a substantial part of a business’s total market value. Although in some cases the business can do this on its own, partnering with an environmental group can give its effort greater visibility and credibility. Some efforts, such as contributing to environmental quality in a particular location or region, can only be carried out in conjunction with public or nongovernmental groups also working in that area.

D. Long-Term Stability

Becoming green can also be a way for a business to make itself more resilient in the long term. At a minimum, partnerships can help ensure compliance with laws and regulations, and reduce external risks that can lead to litigation. Cutting energy or water use can reduce the company’s exposure to shortages or price increases. Identifying and

anticipating long-term climate risk are also an existential challenge for some businesses, and for others at least a significant risk that cannot be lightly ignored.

In some cases, the partnership can also enhance the NGO's financial security and stability. The Sierra Club has received substantial financial support from its partnerships. This is especially true where the partnership involves a long-term effort such as providing environmental education. In contrast, the Environmental Defense Fund (EDF) is not compensated for its involvement with corporations, and widely publicizes this fact.

E. Employee Involvement

Many businesses have found that greater employee satisfaction and commitment are valuable side benefits of environmental initiatives. To some extent, this can be true for employee projects that benefit the local community, but the impact is greatest when environmental considerations are integrated into the job itself. An NGO can suggest options and help the business execute such projects, which are likely not part of the company's core expertise. Many smaller environmental NGOs organize activities for corporate employees to engage in environmental voluntarism.

F. Access to New Markets

Businesses may use environmental initiatives to gain entry to the growing market for sustainable products. Home Depot publicizes the fact that its lumber is provided by logging companies that adhere to the stringent Forest Stewardship Council standards for sustainable timber harvesting. While it can also do so without an outside partner, involving an NGO can enhance the credibility of its claims in a competitive space. If an NGO is involved in the development of a new product, and can endorse it, the potential appeal of the product to consumers is greatly enhanced.

NGOs can also gain access to new markets in a different way. For example, EDF's partnership with FedEx gave it added exposure to the field of fuel efficiency. By working with Procter and Gamble,

the World Wildlife Fund obtained access to the vast supply chain of a large multinational.

G. Mediation/Conflict Resolution

An often-overlooked capability of NGOs is an ability to mediate between the corporation and others to help resolve disputes or bring about agreements. The NGO's expertise and credibility can help close deals between otherwise mismatched parties. For example, the Nature Conservancy may act as a third party in a land deal between a timber company and a smaller nonprofit created to own and preserve the land for public use.

H. Regulatory Compliance

Failing to comply with environmental laws and regulations can be costly and damaging to a company's reputation. Partnerships, either with NGOs or with governmental partnership programs, can help firms comply by providing information on current or anticipated regulations, and what to do to meet those requirements. Partnerships may also serve as laboratories for new best practices that may either be adopted in new regulations, or may even make regulation unnecessary if they are widely copied in the industry. The DuPont-Environmental Defense Fund collaboration solicited input from government agencies, as well as universities and the public, probably reducing the risk of onerous regulation on firms producing nanomaterials.

III. Why a Partnership?

It still may not be clear why a business would choose to pursue these goals through a partnership. Many of the benefits described above could be pursued by the company acting alone, or by using a consultant. For their part, NGOs prize their independence and do not want to be seen as selling out to industry. Why, then, do some companies choose to partner with an environmental organization, and vice versa? Some of the reasons include:

A. Business Motivations

Visibility and credibility. Working with an environmental group can greatly enhance the

visibility and credibility of the effort. The public is likely to be skeptical of the company's own assertions about what it is doing to protect the environment. Bringing in an independent partner provides assurance that the work is real, and that the claims are valid.

Unique knowledge and expertise. An NGO may have specialized knowledge and expertise relating to a problem that the business is trying to solve, that others do not. Environmental groups have often been working on an issue in depth for a long time, giving them expertise and insights that a purely technical consultant would not bring to the table.

Enhancement opportunities for corporate employees. NGOs can provide volunteer opportunities efficiently in many cases.

B. NGO Motivations

Tangible results in real time. NGOs have traditionally relied on litigation and legislation to advance their goals. However, they often find that these strategies are time-consuming and expensive, with mixed results. They may see a partnership as a way of getting a concrete environmental benefit in a shorter period of time. That result can also be used as an example for others, leveraging the NGO's original investment.

Funding. NGOs continually face the challenge of fund-raising. Partnerships can help them obtain funding in a number of ways. In some cases, they may receive direct compensation if they are providing expertise or other tangible services. Less directly, a partnership may lead to contributions from the partner business, or their willingness to partner may help win support from other potential donors who encourage collaboration. It is important, however, to emphasize that partnership goes beyond philanthropy and involves generating co-created value of the kind described above, and the active involvement of the corporate donor beyond cash contributions.

Opportunities to gain greater adherence to environmental causes. This can arise from both the publicity of partnerships and the participation of corporate employees.

IV. Ingredients for Success

As the report shows, not every partnership is a success. A shared goal in the abstract, and good intentions at the outset, are rarely sufficient to guarantee a good outcome for both parties. Some of the additional factors that contribute to success include:

A. Top Executive Commitment and Involvement

Partnerships involve delicate strategic decisions and sustained support. Therefore, endorsement by the top leadership of each organization (especially on the business side) is important.

B. Clear Goals and Responsibilities

As in most partnerships, it is important to spell out in advance, as clearly as possible, what the parties hope to achieve and what each partner is expected to provide. It is especially important to establish realistic expectations; a partnership may accomplish everything the company hoped for, but fall apart because the NGO thought that more had been promised.

Often it may not be possible to define long-term expectations at the outset of the effort. To address this challenge, the parties may need to explicitly plan on interim checkpoints at which they assess progress and establish expectations for the next phase.

C. Personal Relationships

Close working relationships at the personal level are often essential. The report states that "[e]stablishing and sustaining communication, understanding, and cooperation by people and organizations having different goals, cultures, expertise and resources is very difficult" (report at 13). Personal relationships can help overcome these barriers. It can be particularly valuable for

the NGO if it has an individual within the business who can serve as an advocate for the partnership.

Depending too heavily on personal relationships, however, can also be risky. Individuals may leave, or be reassigned, or be replaced as a result of a merger or takeover. The value of the partnership to the business must be tangible enough to survive a change in personnel in either organization.

D. Trust

Perhaps the key ingredient for any business-NGO partnership is a basic level of trust between the parties. A relationship in which the parties harbor suspicion is at risk of falling apart even over minor disagreements. Creating and maintaining trust can be difficult because “the potential partners think, act, and even speak different languages” (report at 13). Building trust requires a significant investment; it is “a two-way street paved with honesty, respect, transparency, and a commitment to one another” (report at 14).

V. Risks and Pitfalls

Business-NGO partnerships present risks that are different from those of more typical commercial arrangements. Some of these risks are potentially very damaging for one or both parties. An understanding of these risks is very important for both sides before entering into a partnership.

A. Loss of Credibility

Gaining credibility for its environmental efforts is one of the chief motivations for a business in partnering with an NGO. If the partnership goes bad, it not only loses that benefit, but also may find its reputation damaged so that it is worse off than when it started. Having tried to develop a reputation for being “green,” it may find itself perceived as the opposite.

The NGO faces a similar risk. In attempting to establish credibility as an organization willing to work with business, it risks being perceived as a sellout. If that happens, its value to the business is greatly diminished.

A sobering example of how a partnership can go wrong, harming the reputation of both parties, was the Sierra Club’s endorsement of a new line of green products being marketed by Clorox. While the Sierra Club saw this as an opportunity to encourage the use of environmentally friendly cleansers, it had not counted on the long-standing hostility to Clorox in the environmental community because of its much better known mainstream products, and the impact of its production facilities. The Sierra Club came under a great deal of criticism from its own membership and other environmentalists, and ultimately withdrew. For Clorox, the net effect of the failed partnership was to make its new “green” line less popular among some potential consumers than it might have been otherwise.

B. Failing to Meet Agreed-On Goals

As in all partnerships, there is the risk that the hoped-for goal will not be achieved. What is of greater concern is that the parties will find, down the road, that they had different expectations for success. If the business feels it has achieved what it hoped for, and the NGO is disappointed, there may be a falling out that greatly undermines the value of the effort for the company.

Failing to achieve the goal may not ruin the partnership if the risks and uncertainties of obtaining that result were known in advance and the parties are satisfied that good faith efforts were made by all. A robust partnership may survive an initial setback and move ahead to eventual success. However, this requires a very high degree of confidence by both parties to the relationship.

C. Greenwashing and Green-Bashing

Two things that can rapidly undermine trust and credibility are greenwashing and “green-bashing.” Greenwashing means making claims about environmental accomplishments that are unfounded, excessive, or misleading. This may occur without any conscious intention to misrepresent; a business risks crossing this line if it overhypes an environmental partnership, trumpeting success prematurely, or exaggerating

its accomplishments. When it does so, it risks undermining its entire relationship with its NGO partner, and the entire partnership may fall apart.

Conversely, environmental groups may feel the need to be critical of business to maintain the support of their “green faithful” (report at 17). While it is appropriate for NGOs to reaffirm their independence and commitment to their core goals, they also need to be aware that zealous attacks on corporations they are working with will make collaboration extremely difficult.

VI. The Lawyer’s Role

As this report shows, both businesses and NGOs will need advice on how to mitigate the risks presented by potential partnerships, without foregoing important opportunities. Lawyers can play a critical role in this regard. Attorneys advising businesses should in particular consult the eight-page “Partnership Guide,” appended to the report, which contains a detailed guide to working with NGOs and working with government in partnership arrangements. The guide examines the characteristics and qualities of a prospective partner that should be considered in deciding whether to work with it, including its mission, the knowledge and skills it brings to the table, its constituents, and its finances. The guide also summarizes key elements to consider at the point of actually entering into the partnership—for example clarity about goals, and what can be realistically accomplished, and the need to have clear understandings about personnel commitments, lines of authority, and communication protocols. It suggests negotiating a nondisclosure agreement for information shared with the NGO.

An additional contribution that lawyers could make is to capture what has been learned to date in a form that can be adopted by businesses and NGOs who are entering into similar arrangements. Those who worked on the report have expressed a need for standard agreement language for corporate-NGO partnerships. Attorneys working in the field of sustainability, and particularly those who

have counseled organizations involved in such partnerships, could benefit others by developing model language, checklists of issues that should be addressed, and other practice guides based on their experience. By doing so they can help increase the likelihood that future agreements will be successful. This is another area where lawyers can make a valuable contribution to building robust, effective, and ultimately successful collaboration that harnesses the strengths of both business and environmental groups in achieving their shared goals.

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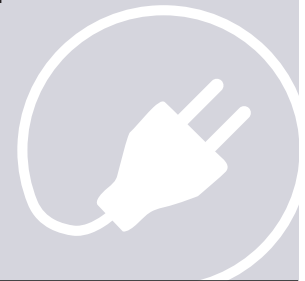
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INDUCED SEISMICITY AND THE OIL AND GAS INDUSTRY¹

Keith B. Hall

I. Introduction

From 1978 through 2008, Oklahoma averaged 1.6 earthquakes per year with a magnitude of 3.0 or greater. In 2009, however, Oklahoma had 20 earthquakes of magnitude 3.0 or higher. In 2013, it had 109. In 2014, it had 584. And in 2015, Oklahoma had approximately 907 earthquakes with a magnitude of 3.0 or greater. Thus, the average number of earthquakes in Oklahoma with a magnitude of 3.0 or greater increased from fewer than two per year to *more than two per day*. Many geologists believe that the increase in the frequency of earthquakes is the result of “induced seismicity” that has been caused by certain oil and gas activities.

During 2016, the rate of seismic activity has declined significantly in Oklahoma, but the frequency of earthquakes with a magnitude of 3.0 or greater is still at historically high levels. As of late 2016, Oklahoma is on pace for more than 680 such earthquakes. Further, an earthquake that occurred in September 2016 near Pawnee, Oklahoma, had a magnitude of 5.8, making it the strongest earthquake that the state has recently seen. Thus, seismic activity is still a problem.

These earthquakes, along with possibly induced seismic events in other locations, have led to litigation and new regulations. Additional litigation and regulations likely will be forthcoming, and many lawyers will be involved. Most of these lawyers will not have backgrounds in science, but they will need a basic understanding of induced seismicity. This article seeks to explain induced seismicity to readers who are not scientists.

II. Induced Seismicity

A. Background

“Induced seismicity” refers to earthquakes that are triggered by human activity. Scientists have long

recognized that various activities have the potential to induce seismicity. As early as the 1920s, they recognized that pumping fluids underground had the potential to induce earthquakes. Over time, scientists have concluded that seismicity can be triggered by a variety of human activities, including mining, the impoundment of water behind dams, the construction of skyscrapers, fluid withdrawals from the subsurface, fluid injections into the subsurface, and underground explosions.

Of particular interest for this article are earthquakes triggered by the injection of fluids into the subsurface of the earth. Various industries inject fluid into the subsurface for one purpose or another, with one of the most common purposes being the disposal of waste fluids. The United States is home to hundreds of thousands of injection wells. The vast majority of these wells never trigger an earthquake, but the clear consensus amongst scientists is that fluid injections occasionally trigger earthquakes. One of the most famous examples of induced seismicity occurred more than 50 years ago. At that time the U.S. military operated a chemical weapons manufacturing facility in Commerce City, not far from downtown Denver. The facility used an injection well to dispose of liquid wastes. After a series of earthquakes in the early and mid-1960s, a scientist concluded that the military’s injection disposal operations were triggering the earthquakes. He published a paper that included an illustration that demonstrated a pronounced correlation between injection rates and the frequency of nearby seismic events.² The military eventually halted the injections and earthquake activity subsided.

The injection of water for geothermal operations appears to have caused earthquakes in several locations, with a famous example occurring at Basel, Switzerland. In addition, operations at the Geysers geothermal power facilities in northern California appear to be responsible for triggering several small earthquakes a year.

But the main reason that induced seismicity is attracting so much attention now is a recent

increase in seismicity in the central United States that many scientists believe is attributable to oil and gas activities. The most dramatic increase has occurred in Oklahoma. As noted in the opening paragraph of this article, the average frequency of seismic events in Oklahoma with a magnitude of 3.0 or greater increased from an average of fewer than two per year from 1978 through 2008 to *more than two per day* in 2015, and nearly two per day in 2016. The Oklahoma Geological Survey and U.S. Geological Survey have each concluded that “Class II” injection disposal wells are probably the cause of this increase. (“Class II” is a classification that federal Safe Drinking Water Act regulations give to injection wells used to support oil and gas activities.)

In recent years, other states have also experienced earthquakes that may have been triggered by oil and gas activities. For example, a series of earthquakes occurred near Guy, Arkansas, from 2010 to 2011, and state regulators concluded that the earthquakes may have been induced by the operation of Class II injection disposal wells. In Kansas, the number of earthquakes increased significantly in 2014 and 2015, and state regulators expressly noted that the counties that had experienced the majority of the seismic events were counties in which the pace of Class II injection disposal operations had increased. Ohio experienced earthquakes near Youngstown in 2011 that regulators believe were induced by the operation of a Class II injection disposal well. Ohio also experienced seismic activity near Poland Township in 2014 that may have been induced by hydraulic fracturing. In addition, Texas has had several earthquakes that scientists suspect were triggered by Class II injection disposal wells, including earthquakes in the Dallas-Fort Worth area. And finally, the United Kingdom, Alberta, and British Columbia have each experienced seismic events that are believed to have been triggered by oil and gas activities.

B. How Could Human Activities Trigger Earthquakes?

A geologic fault is a fracture in the earth’s subsurface. The vast majority of the time, the

masses of rock on opposite sides of a fault do not move or “slip” relative to one another. The rocks often are being pushed by “shear stresses” that could cause the masses of rock to slip, but the rocks do not slip because other, stronger forces resist such movement. Typically, the main force that resists such movement is friction. If, however, shear stresses grow large enough to exceed friction, the rocks can suddenly slip. An earthquake is a shaking of the ground that is caused by the sudden slippage of a portion of the earth’s crust at the location of a fault.

Although faults are stable most of the time, even a stable fault may be “critically stressed.” A critically stressed fault is a fault at which the shear forces pushing the rock are nearly sufficient to overcome friction and thereby trigger slippage that might be felt as an earthquake. Scientists have suggested various mechanisms by which human activities can trigger seismic events at critically stressed faults. The two main mechanisms are (1) an increase in pressure within a subsurface formation; and (2) alterations in the subsurface stresses. When an earthquake is triggered by injection disposal, the more important of these two mechanisms is usually an increase in pressure. An increase in pressure makes slippage more likely because the increased pressure has the effect of reducing friction at the fault.

But why would an increase in pressure reduce friction? It all comes down to the two factors that determine the amount of friction between any two surfaces. The first factor is the “coefficient of friction” (think of this as a measure of the relative roughness of the two surfaces). This factor does not depend on pressure. But the second factor can. The second factor is the amount of force that is pressing the two surfaces together. The larger that the force pressing two surfaces together is, the greater the amount of friction. For example, if you place an empty cardboard box on a hardwood floor, gravity will press the bottom of the box against the floor, but not with very much force because the empty box has relatively little mass. If you slide the empty box across the floor, there will be some frictional resistance, but not very much. On the other hand,

if you fill the box with books, gravity will press the heavier, book-filled box against the floor with greater force. And if you slide the book-filled box across the floor there will be more frictional resistance than when you slid the empty box.

A similar principle applies at a fault. Two walls of rock face each other on opposite sides of the fault. When the pressure within the fault increases, the pressure attempts to push the two sides of the fault away from one another. The increased pressure may not actually push the two rock faces apart, but the pressure partly counteracts whatever force is pressing the rocks together. This reduces the so-called effective force that is pressing the two surfaces together and thereby reduces friction in the same way that you would reduce the friction between a cardboard box and a hardwood floor by removing books from the box. Accordingly, when fluid injections cause an increase in subsurface pressure, friction goes down and it is easier for slippage to occur at a critically stressed fault. The relative magnitude of the change in friction may be small, but if the fault is critically stressed a small change can sometimes induce seismicity.

III. Induced Seismicity and the Injections Associated with Oil and Gas Activity

A. Injection Disposal

Approximately 30 to 35 thousand injection wells in the United States are permitted for the disposal of wastewater generated by oil and gas activities. Only a relatively small fraction of these wells are suspected of ever having induced seismicity, and in many places the operation of such wells poses virtually no risk of triggering seismicity. Nevertheless, the number of seismic events has increased significantly in recent years and this has become a matter of concern. Further, these wells, which are classified as “Class II” wells under Safe Drinking Water Act regulations, are believed to be the main cause of the increased seismicity.

There are multiple sources of the wastewater that oil and gas companies send to these injection disposal wells. One of the sources is

wastewater from hydraulic fracturing operations (such operations are also known as “fracing” or “fracking”). But notwithstanding the impression given by many articles in the mainstream media, hydraulic fracturing wastewater (also known as “flowback”) is only a small portion of the water that goes to injection disposal. For example, in Oklahoma, which has seen the greatest amount of seismicity that is suspected of having been induced, scientists estimated that only about 5 percent of the wastewater that was being sent to Class II injection disposal wells was flowback. And that estimate was made at a time when the pace of drilling activity and hydraulic fracturing was at a higher level than at present. Now, produced water is likely an even smaller portion of the total volume of water sent to Class II wells.

The vast majority of the water that is sent to Class II injection disposal wells is “produced water.” Produced water is not hydraulic fracturing wastewater. Instead, it is water that is naturally found in many of the same underground formations that contain oil or gas. Whenever a well is drilled to such a formation, the well produces a mixture of oil and water (or gas and water), even if the well has never been hydraulically fractured. The water-to-oil and water-to-gas production ratios vary considerably from one formation to another, but the average water-to-oil ratio nationwide is somewhere in the 7-to-10 range—that is, on average, an oil well may produce 7 to 10 barrels of water for each barrel of oil. This water tends to be very salty and typically it is considered wastewater. Injection disposal usually is the most economic method of managing such water.

B. Hydraulic Fracturing

There is a consensus amongst scientists that hydraulic fracturing can induce seismicity, but only in unusual circumstances. It is commonly estimated that more than one million wells have been hydraulically fractured, but there are only about two locations in the United States, and a few areas outside the United States, where evidence suggests that hydraulic fracturing may have induced seismicity. This includes specific sites in

Oklahoma, Ohio, and the United Kingdom, and three areas of Canada—one in Alberta and two in British Columbia. Scientists have suggested that the reason hydraulic fracturing so seldom triggers seismicity is that hydraulic fracturing operations last only a matter of hours and affect a smaller volume of rock than do injection disposal operations, which can continue for years and inject much higher volumes of fluids.

Consistent with the belief that hydraulic fracturing rarely triggers earthquakes, scientists have stated very clearly that they do not believe that hydraulic fracturing itself is responsible for the significant increase in seismicity that has been observed in the United States. As noted previously, scientists attribute the increase to injection disposal, rather than hydraulic fracturing. Interestingly, although very few earthquakes appear to have been induced by seismicity in the United States, regulators in Canada believe that hydraulic fracturing itself has induced a significant number of seismic events in certain areas of British Columbia and Alberta.

IV. What Harm Has Induced Seismicity Caused?

The main potential harm from induced seismicity is damage to buildings or other infrastructure, and potentially injuries or death that could result from such damage. To date, a large majority of the induced seismic events in the United States (and elsewhere) have been small in magnitude—often too small to be felt. Most of these events have not caused any damage, but some have caused minor damage to property. It is not clear that any major damage has been caused by induced seismic events in the United States, but an earthquake that occurred near Prague, Oklahoma, in 2011 is noteworthy. Some scientists have concluded that it probably was induced by Class II injection disposal wells, but the Oklahoma Geological Survey concluded that the Prague earthquake likely had natural causes and some other scientists have likewise been skeptical regarding whether this earthquake was induced. In any event, the Prague earthquake caused substantial damage to numerous

homes, even destroying several according to a *Wall Street Journal* report; and one woman was injured by rocks that fell from her stone chimney. Also, an earthquake caused damage in Cushing, Oklahoma, in 2016, but as of the time this article is being written the author has not seen any scientific analysis regarding whether that earthquake was induced.

V. Scientists' Recommendations for Mitigation of Induced Seismicity Risks

Scientists make two basic types of recommendations for mitigating the risk of induced seismicity. The first type relates to the selection of the location and the depth for injection disposal operations. Given that the dominant method by which injections can induce seismicity is by causing an increase in pressures along critically stressed faults, companies should avoid injecting into or near such faults. Often, there is not sufficient information to know whether critically stressed faults are present in a particular area, but past seismic activity can be a proxy for the possible existence of such faults. Accordingly, a company planning to construct an injection disposal well in a particular area should examine the available geologic information regarding faults and subsurface stresses in the area, and should consider checking whether the area has experienced significant seismicity in the past.

If a critically stressed fault is known to exist in the area, or if the area has a history of seismic activity at some fault, the company should evaluate whether the planned injection activity could potentially destabilize the fault. This evaluation might include an effort to determine whether there is a potential pathway by which the increased pressures that will occur at the proposed injection point might be transmitted to the critically stressed fault. If one or more impermeable rock layers are located between the injection point and a critically stressed fault, those layers might act as pressure seals that would prevent the increased pressure caused by the injection disposal operations from being transmitted to the critically stressed fault. But

if such impermeable layers do not exist, or if some additional fault cuts through those layers, thereby providing a pathway for fluids to flow between the injection point and the critically stressed fault, the injection disposal operations could potentially destabilize the fault. Therefore, it might be prudent to choose a different location.

The second recommendation applies once a company has begun injection operations. This recommendation is that companies use a so-called traffic light system. Under such a system, the company monitors injection rates and pressures, and also monitors the surrounding area for seismic activity. If no seismic activity occurs, or if the only seismic activity that is detected is low magnitude seismicity that is common to the area, the company has a “green light” to continue its injection operations as normal.

But if the company detects seismic events above a certain magnitude, it gets a “yellow light.” The company may continue operations, but it must take precautions that include some combination of reduced injection rates, reduced injection pressures, and increased monitoring for seismicity. If the company detects seismic events above some higher magnitude (or perhaps if the company detects multiple seismic events of a “yellow light” magnitude), the company gets a “red light” and must cease operations. The cessation might be permanent or for a specified period or for an indefinite period—perhaps until subsurface pressures fall below a certain level or until a regulator evaluates whether the observed seismicity was related to injection operations and whether it is safe to resume injections at the original or some lower rate.

The use of such “traffic light” systems appears to have originated with a geothermal project in El Salvador, and the potential utility of such systems is now well accepted for use with geothermal energy projects. For example, the International Energy Agency has recommended a traffic light system as a method for reducing the risk that geothermal operations will induce seismicity.

Similarly, the U.S. Department of Energy states that a “‘traffic light’ system may be appropriate for many [enhanced geothermal system] operations.” Some scientists have suggested that the traffic light systems that have been designed for geothermal projects could be adopted for use in managing risks associated with induced seismicity at Class II injection disposal wells. And perhaps regulators have taken the scientists’ recommendations into account. So far, most of the regulatory responses to the recent increase in seismicity in the central United States have been generally consistent with a traffic light approach.

VI. Conclusion

Various human activities, including the injection of fluids into the subsurface, can trigger earthquakes under certain circumstances. The vast majority of injection operations, including those associated with the oil and gas industry, do not trigger earthquakes. But there has been a significant increase in seismicity in the central United States in recent years and scientists believe that the increase has been caused by injections associated with oil and gas activity.

Scientists do not believe that hydraulic fracturing itself has played much of a role in the increased seismicity. They believe that hydraulic fracturing can induce seismicity, but that it very rarely does so. Geologists believe that the recent increase in seismicity is caused by injection disposal, not by hydraulic fracturing. The wastewater that the oil and gas industry sends to injection disposal wells is primarily produced water. Hydraulic fracturing wastewater is also sent to injection disposal wells, but such “flowback” is only a small part of the overall wastewater stream sent to such wells—often 5 percent or less.

To date, induced seismicity has not caused much damage in the United States, but such events are a matter of concern, in part because of the potential for damage. To address the risk of induced seismicity, scientists make certain recommendations. First, as part of the process

of selecting sites for injection disposal wells, companies should evaluate an area's geology and past seismicity to estimate the likelihood that injection operations in a particular area would induce seismicity. That way, companies may be able to avoid locating wells in higher risk areas. And second, once an injection well is in operation, companies should consider using a traffic light system. Such a system provides for monitoring of seismic activity in the vicinity of the well; a reduction in injection rates if seismic activity exceeds a "yellow light" level; and a halt in operations if higher, "red light" levels of seismicity are detected.

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Endnotes

¹ This article is based in part on prior articles and presentations by the author, including Keith B. Hall, *Induced Seismicity: An Energy Lawyer's Guide to Legal Issues and the Causes of Man-Made Earthquakes*, Proceedings of the Rocky Mountain Mineral Law Sixty-First Annual Institute (2015).

² David M. Evans, *The Denver Area Earthquakes and the Rocky Mountain Arsenal Disposal Well*, 3 MOUNTAIN GEOLOGIST 23, 27 (1966), available at <http://archives.datapages.com/data/rmag/mg/1966/evans.pdf>.



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"THE RIVER AS PLAINTIFF": CLIMATE CHANGE LITIGATION AND CONTEMPORARY ENVIRONMENTAL VALUES PROVE THE *SIERRA CLUB V. MORTON* DISSENTS WERE RIGHT ALL ALONG

Michael Zielinski

A major shortcoming of current environmental law stems from the doctrine of standing—the power to bring a legal action under one's own name. Standing was at the center of one of the most celebrated environmental cases of all time, *Sierra Club v. Morton*, where the U.S. Supreme Court held 4-3 that the Sierra Club did not have standing to sue to oppose development in California's Mineral King Valley because none of the club's members used the disputed area, and thus could not be affected by the development. 405 U.S. 727, 728–32 (1972) (plurality opinion).¹ Though environmentalists lost the battle, they ultimately won the war since the Court's holding meant that to assert standing an environmental group simply needed to have at least one member with a particularized interest—that is, someone who hikes, fishes, hunts, camps, etc., near the affected area. *Id.* at 734–42. Moreover, in response to the decision in *Sierra Club*, Congress included citizen suit provisions in later environmental statutes that conferred standing upon private parties who could demonstrate only injury in fact that was noneconomic.²

But the real reason environmentalists love *Sierra Club*—indeed, the real reason the case has lasting fame—is for Justice Douglas's colorful dissent. Asserting that federal and state agencies' mandates to protect the public interest in the environment are flawed because the term "'public interest' has so many differing shades of meaning as to be quite meaningless on the environmental front," *id.* at 745 (Douglas, J., dissenting), Justice Douglas proposed an alternative theory of standing:

[F]or the purposes of the adjudicatory process . . . valleys, alpine meadows, rivers, lakes, estuaries, beaches, ridges, groves of trees, swampland, or even air that feels the

destructive pressures of modern technology and modern life [should be considered a “person”]. The river, for example, is the living symbol of all the life it sustains or nourishes—fish, aquatic insects, water ouzels, otter, fisher, deer, elk, bear, and all other animals, including man, who are dependent on it or who enjoy it for its sight, its sound, or its life. The river as plaintiff speaks for the ecological unit of life that is part of it.

Id. at 743. Less well remembered, though no less persuasive, was Justice Blackmun’s dissent, where he warned that the Court’s decision to deny standing made the doctrine “so inflexible that we render ourselves helpless when the existing methods and the traditional concepts do not quite fit and do not prove to be entirely adequate for new issues.” *Id.* at 755–56 (Blackmun, J., dissenting).

Though celebrated by environmentalists, Douglas’s dissent was dismissed by legal scholars as either mere eccentricity or environmental sentiment disguised as legal opinion, whereas Blackmun’s dissent was simply forgotten. Recent developments, however, suggest that the Justices were actually ahead of their time. For instance, growing awareness of the dangers of climate change and the consequent shift in American public values toward recognition of “the end of the division between people and nature”³ reflects Douglas’s appreciation for the “[c]ontemporary public concern for protecting nature’s ecological equilibrium.” *Id.* at 743 (Douglas, J., dissenting). Moreover, Douglas’s observation that “[t]hose people who have a meaningful relation to [a natural entity] . . . must be able to speak for the values which [it] represents and which are threatened with destruction,” *id.*, finds support in the fact that climate change initiatives began not on the federal or state level, but on the local level, because that is where the best chance for lasting impact remains. Small communities are closely attuned to environmental changes that directly affect them, and their members’ shared sense of identity manifests in their shared values.⁴ Accordingly, because they are better positioned to identify both the environmental

problems they face and the solutions to those problems, such communities should be allowed to bring legal action against parties acting in a way that threatens their well-being.

Furthermore, courts are seeing an increasing number of climate change-related cases not only against federal and state agencies under citizen suit provisions,⁵ but also against emitters of greenhouse gases (GHGs) under nuisance theories.⁶ These cases have illustrated that the Court’s failure to establish a consistent approach to standing in climate change litigation vindicates both Douglas’s criticism of “public interest” as too vague a concept to be of any help in environmental litigation, 405 U.S. at 745 (Douglas, J., dissenting), and Blackmun’s concern that an inflexible standing doctrine renders the Court helpless in the face of new issues, *id.* at 755–56 (Blackmun, J., dissenting). The consonance of the Justices’ opinions with the public’s evolving environmental values and the prescience with which they foresaw the dilemmas that existing standing doctrine would create therefore indicate that the reasoning of the *Sierra Club* dissents is better equipped to provide just and practical answers to questions of standing in climate change litigation than traditional approaches.

Though the law has been slow to catch up to society’s changing environmental values, a major step forward came in 2007 with *Massachusetts v. EPA*, where the Supreme Court held that an injury common to all—such as the effects of global warming—may also constitute a specific injury to a party sufficient to confer standing. 549 U.S. 497, 522 (2007). The Court, however, took an immediate half-step backward with its murky reasoning for *why* it found Massachusetts had standing to sue the Environmental Protection Agency for not regulating GHGs. Specifically, the Court did not clarify whether Massachusetts had standing by virtue of its *parens patriae* capacity, or because it satisfied the standard injury-causation-redressability test, or both. *See id.* at 518–26. The Court thus left unresolved the question of whether various types of litigants or states alone could seek

redress of climate change-related injuries in federal court.

Frustratingly, the Court dropped the ball again when presented with the same issue several years later in *American Electric Power Co. v. Connecticut*, 564 U.S. 410 (2011). In that case, several states, land trusts, and New York City sued a group of power companies, alleging that their emissions of GHGs contributed to global warming, and therefore constituted a public nuisance under federal law. *Id.* at 418–20. With Justice Sotomayor recused, however, an equally divided Court was forced to affirm the court of appeals’ exercise of jurisdiction, *id.* at 420 (noting that on the issue of plaintiffs’ Article III standing, half of the sitting Justices adhered to the majority opinion in *Massachusetts* and half adhered to the dissenting opinion), thereby missing an opportunity to clear up lingering confusion.⁷

In contrast to the Supreme Court’s struggles with the standing doctrine, a recent groundbreaking case in Washington took an approach that jibes with Douglas’s and Blackmun’s *Sierra Club* dissents. Last November, a King County Superior Court judge ordered the Washington Department of Ecology to establish a statewide policy to limit carbon dioxide emissions, marking the first time a court has ordered a state agency to consider the most current and best available climate science when deciding to regulate greenhouse gas emissions. *Foster v. Washington Department of Ecology*, No. 14-2-25295-1, slip op. at 6–7 (Sup. Ct. King. Cnty. Wash. Nov. 19, 2015), http://ourchildrenstrust.org/sites/default/files/15.11.19.Order_FosterV.Ecology.pdf.⁸ The most notable aspect of the case, however, was the plaintiffs: a group of teenagers who alleged that the department’s refusal to curb GHG emissions despite clear scientific evidence of the dangers of climate change threatened their and future generations’ safety. *Id.* at 4. The court agreed with the teens, finding not only that, “[the youths’] very survival depends upon the will of their elders to act now, decisively and unequivocally, to stem the tide of global warming by accelerating the reduction of

emission of GHG’s [sic] before doing so becomes first too costly and then too late,” *id.* at 5, but also that the state’s “mandatory duty” to “[p]reserve, protect and enhance the air quality for current and future generations” must be understood within the context of the public trust doctrine. *Id.* at 6 (quoting Wash. Rev. Code Ann. § 70.94.011 (LexisNexis 2015)).

The public trust doctrine is the principle that the government has a constitutional duty to protect the public’s interest in natural resources held in “trust” for the benefit of citizens. While the doctrine traditionally has applied only to “navigable waters”—waters in which the government owns the beds and banks—the Washington court’s finding that navigable waters and the atmosphere are so ineluctably connected that greenhouse gases effects on one necessarily affect the other, *id.* at 8, exemplifies the burgeoning notion of an “ecological public trust.”⁹ A recent development in environmental law, an ecological public trust appears to be exactly what Justice Douglas had in mind when he wrote his dissent. Rather than couching the governmental duty to protect and preserve natural resources in the “public interest,” a term so polysemic as to be meaningless within an environmental context, an ecological public trust expands the traditional public trust doctrine, averring that preservation of the natural resources the government holds in trust for its citizens requires that the government also preserve the atmospheric conditions directly affecting the integrity of those resources. An ecological public trust therefore encapsulates a values system for the environment and its ecosystems that is long-term in focus, comprehensive in its considerations, and willing to preserve the voice of “environmental wonders” “existing beneficiaries”. *Sierra Club v. Morton*, 405 U.S. 727, 750 (1972) (Douglas, J., dissenting).

Admittedly, even an ecological public trust, by itself, does not expand public interest in healthy ecosystems so far as to impose duties on private individuals as well as governments, but shifting public values indicate that major changes to existing legal doctrines could be on the horizon. Perhaps inspired by the plaintiffs in the Washington case, another group of young citizens has brought suit in a U.S. district court in Eugene, Oregon, in an attempt to force the government to phase out fossil fuel emissions and “stabilize the climate for the benefit of present and future generations.” Complaint at ¶ 3, *Juliana v. United States*, No. 6:15-cv-01517-TC (D. Or. filed Aug. 12, 2015), http://www.eenews.net/assets/2015/11/13/document_gw_03.pdf. The lawsuit alleges that the nation’s “climate system,” including its atmosphere and oceans, is critical to the plaintiffs’ rights to “life, liberty and property,” *id.* ¶ 8, and that the climate system “has been and will continue to be negatively impacted by the impacts of climate change and ocean acidification caused by Defendants,” *id.* ¶ 69. The defendants in the case include President Obama, U.S. EPA chief Gina McCarthy, and a host of other government officials. *Id.* ¶¶ 99–130.

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Endnotes

¹ Justices Powell and Rehnquist took no part in the consideration or decision of the case.

² See *Fairview Township v. EPA*, 773 F.2d 517, n.10 (3d Cir. 1985) (citing 118 Cong. Rec. 33,756 (1972) (remarks of Rep. Dingell)) (explaining that Congress’s enactment of the citizens’ suit provision of the Federal Water Pollution Control Act Amendments of 1972 “was a response to the Supreme Court’s decision in *Sierra Club v. Morton* that citizens alleging aesthetic injury could not bring a suit under the waiver of sovereign immunity provided by the Administrative Procedure Act” (citations omitted)).

³ Jedidiah Purdy, *AFTER NATURE: A POLITICS FOR THE ANTHROPOCENE* 3 (2015).

⁴ See Sarah Krakoff, *Planetarian Identity Formation and the Relocalization of Environmental Law*, 64 *FLA. L. REV.* 87, 106–08 (2012) (explaining that small communities’ “affinities of value, politics, and culture” allow them to overcome the “political and psychological barriers” that can inhibit larger public concern about climate change).

⁵ See, e.g., *Am. Elec. Power Co. v. Connecticut*, 564 U.S. 410 (2011); *Massachusetts v. EPA*, 549 U.S. 497 (2007).

⁶ See, e.g., *Native Village of Kivalina v. Exxon Mobil Corp.*, 696 F.3d 849 (9th Cir. 2012); *Comer v. Murphy Oil USA*, 585 F.3d 855 (5th Cir. 2009), *reh’g en banc granted*, 598 F.3d 208 (5th Cir. 2010), *appeal dismissed en banc*, 607 F.3d 1049 (5th Cir. 2010).

⁷ See David S. Green, *Massachusetts v. EPA Without Massachusetts: Private Party Standing in Climate Change Litigation*, 36 *ENVIRONS ENVTL. L. & POL’Y J.* 35, 56 n.148, 56–57 (2012) (citing *Am. Elec. Power Co.*, 564 U.S. at 429) (explaining that “Justice Sotomayor recused herself because she sat on the Second Circuit panel that heard the case below, though she was appointed to the Supreme Court before the Second Circuit actually decided the case,” but noting commentators’ speculations that if Sotomayor had not recused herself, the resulting majority would have found for plaintiffs on the question of standing).

⁸ See also James Conca, *Future Lives Matter—Seattle Judge Rules for Children on Climate Change*, *FORBES* (Nov. 24, 2015, 6:00 AM), <http://www.forbes.com/sites/jamesconca/2015/11/24/future-lives-matter-judge-rules-for-children-on-climate-change/#563248735eae> (reporting on the unprecedented nature of the case).

⁹ Robin Kundis Craig, *A Comparative Guide to the Western States’ Public Trust Doctrines: Public*

JUDICIAL DEVELOPMENTS

L. Margaret Barry

Challenges to State Actions

Supreme Court Said Federal Law Preempted Maryland Program That Subsidized New Power Generation, But Indicated Other New or Clean Energy Incentives Could Pass Muster

The U.S. Supreme Court ruled that a Maryland program that subsidized new electricity generation in the state was preempted because it impermissibly adjusted an interstate wholesale rate set in an auction approved by the Federal Energy Regulatory Commission (FERC). FERC has exclusive jurisdiction over interstate wholesale sales of electricity pursuant to the Federal Power Act. Maryland instituted the program because its electricity regulators believed that the long-term interstate wholesale rates determined in the FERC-approved capacity auction operated by PJM Interconnection—the entity that oversees the regional electricity grid for Maryland, 12 other states, and the District of Columbia—were not providing adequate incentives for development of new in-state power generation. Maryland’s solution required “load serving entities” (LSEs)—the entities that sell electricity to consumers—to enter into 20-year bilateral contracts with a new electric generator to purchase electricity for a specified price. The generator was then required to sell capacity in the PJM auction. In the auction, PJM accepted generators’ bids for capacity, starting with the lowest price, until it had accepted enough bids to meet its estimated electricity demand. The highest accepted bid became the “clearing price” that all LSEs were required to pay PJM for capacity. Under the Maryland program, however, the generator would have to pay the LSE if the clearing price exceeded the bilateral contract price, while the LSE would be required to pay the generator if the clearing price was less than the contract price. The Supreme Court said this arrangement impermissibly guaranteed the new generator a price for interstate sales of

capacity other than the wholesale price determined through the FERC-regulated capacity auction. The Court made a point of noting, however, that states were not foreclosed from adopting other programs to encourage development of new or clean energy generation. The Court indicated that such incentives would be permissible so long as they were “untethered” from the generators’ participation in the wholesale electricity market. *Hughes v. Talen Energy Marketing, LLC*, No. 14-614 (U.S. Apr. 19, 2016).

Eighth Circuit Panel Agreed That Minnesota Low-Carbon Power Law Was Unlawful But Disagreed as to Why

The Eighth Circuit Court of Appeals affirmed a district court’s conclusion that Minnesota’s Next Generation Energy Act (NGEA) was unlawful. The NGEA barred importing energy from a “new large energy facility” outside Minnesota or entering into new long-term power purchase agreements, where such activities would contribute to statewide carbon dioxide emissions. Only one judge on the Eighth Circuit panel agreed with the district court conclusion that the statute constituted impermissible extraterritorial regulation under the dormant Commerce Clause. The other two judges concluded that the law was preempted by the Federal Power Act, with one of the two judges also concluding that the law conflicted with the Clean Air Act. *North Dakota v. Heydinger*, Nos. 14-2156, 14-2251 (8th Cir. June 15, 2016).

Massachusetts High Court Ordered State to Impose Limits on Annual Aggregate Greenhouse Gas Emissions

The Massachusetts Supreme Judicial Court ordered the Massachusetts Department of Environmental Protection (MassDEP) to take additional measures to implement the Global Warming Solutions Act, a state law enacted in 2008. Specifically, the court held that the act required MassDEP to impose volumetric limits on aggregate greenhouse gas emissions from certain types of sources and that these limits were required to decline on an annual basis. The court was not persuaded by MassDEP’s argument that it had complied with

the act's requirements by implementing several regulatory initiatives, such as the Regional Greenhouse Gas Initiative cap-and-trade program and a low emission vehicle program. The court said that these other initiatives were "important to the Commonwealth's overall scheme of reducing greenhouse gas emissions over time," but that more must be done to attain the "actual, measurable, and permanent emissions reductions" required by the act. *Kain v. Department of Environmental Protection*, No. SJC-11961 (Mass. May 17, 2016).

NEPA Challenges

In Two Challenges to LNG Terminals, D.C. Circuit Upheld FERC's Environmental Reviews, Left Door Open for Challenges of Energy Department Authorizations of Natural Gas Export

The D.C. Circuit Court of Appeals ruled against environmental groups in two challenges to FERC authorizations of liquefied natural gas (LNG) export facilities. The environmental groups had argued that FERC's review of the projects under the National Environmental Policy Act (NEPA) did not fully consider the environmental consequences of FERC's authorizations of the facilities' construction, including impacts of induced natural gas production. In one case, in which Sierra Club and Galveston Baykeeper challenged FERC's authorization of modifications to facilities in Texas to support LNG export, the D.C. Circuit held that Sierra Club had established standing, rejecting FERC's argument that petitioners were required to tie their injury to the increase in natural gas production allegedly caused by FERC's actions. The court also said that the challenge to FERC's approvals was not mooted by reports prepared by the Department of Energy (DOE) on environmental consequences of LNG production and export. On the merits, however, the D.C. Circuit held that FERC did not have to consider the indirect effects—including potential increases in domestic natural gas production—of exporting LNG because only DOE had authority to license the export of LNG from the facilities. The court

said that FERC had "reasonably explained that the asserted linkage [between induced production and the FERC approvals] was too attenuated to be weighed" in FERC's NEPA review. The court also upheld FERC's analysis of cumulative impacts, rejecting the contention that FERC should have conducted a "nationwide analysis" of other pending or approved LNG export terminals, and declined to consider the petitioners' argument that emissions from the LNG facilities' electricity use should have been disclosed in pounds per megawatt-hour instead of in tons per year. The D.C. Circuit said it was without jurisdiction to consider this argument because it had not been raised in the underlying FERC proceeding.

In the second case, in which Sierra Club challenged FERC's authorization of increased production at a Louisiana LNG terminal, the D.C. Circuit again held that Sierra Club had standing. The court said Sierra Club had satisfied the causation and redressability requirements for standing based on harm to a member's aesthetic and recreational interests if the volume of tanker traffic to and from the terminal increased. As with the FERC authorizations for the Texas LNG facility, the D.C. Circuit concluded, however, that FERC's authorization of increases in production capacity were "not the legally relevant cause of the indirect effects Sierra Club raises." The court stated: "Sierra Club, of course, remains free to raise these issues in a challenge to the Energy Department's NEPA review of its export decision. Nothing in our opinion should be read to foreclose that challenge or predetermine its outcome." The court concluded that it lacked jurisdiction to consider Sierra Club's arguments regarding FERC's cumulative impacts analysis because Sierra Club had not raised the issue in its motion for rehearing before FERC. It also rejected the cumulative impact argument on the merits for the same reasons given in the decision on the Texas facility. *Sierra Club v. Federal Energy Regulatory Commission*, No. 14-1275 (D.C. Cir. June 28, 2016); *Sierra Club v. Federal Energy Regulatory Commission*, No. 14-1249 (D.C. Cir. June 28, 2016).

Federal Court Ordered Federal Defendants to Redo Biological Opinion and EIS for Federal Columbia River Power System

The federal District Court for the District of Oregon ruled that the National Marine Fisheries Service (NOAA Fisheries), the U.S. Army Corps of Engineers (Corps), and the U.S. Bureau of Reclamation (BOR) had acted arbitrarily and capriciously when they undertook reviews of the Federal Columbia River Power System (FCRPS) pursuant to the Endangered Species Act and NEPA. The FCRPS is a system of hydroelectric dams, powerhouses, and reservoirs on the Columbia and Snake Rivers, which are also home to 13 species or populations of endangered or threatened salmon and steelhead. In 2014, NOAA Fisheries issued a Biological Opinion (BiOp) that concluded the FCRPS would avoid jeopardy to listed species based on implementation of 73 “reasonable and prudent alternatives.” No new environmental impact statement (EIS) was prepared in connection with the records of decisions issued by the Corps and BOR that implemented the reasonable and prudent alternatives. The court identified a number of deficiencies in the agencies’ determinations. Among other shortcomings, the court found that the 2014 BiOp had not adequately assessed the effects of climate change. The court said that NOAA Fisheries had not applied the best available science, had overlooked important aspects of the problem, and had failed to analyze climate change effects, including the “additive harm” of climate change, its impacts on the effectiveness of reasonable and prudent alternative actions, particularly long-term habitat actions, and the increased chances of an event that would be catastrophic for protected species. The court said that NOAA Fisheries had apparently failed to consider information indicating that climate change could diminish or eliminate the effectiveness of habitat mitigation efforts and that the agency had not explained why a “warm ocean scenario” it rejected was less representative of expected future climate conditions than the scenario on which it relied. With respect to the NEPA review, the court found that the Corps and the BOR could not continue to rely on EISs prepared in the 1990s and

some more recent narrowly focused documents. The court said that there had been “significant developments in the scientific information relating to climate change and its effects” that lead[ed] to the conclusion that the relevant physical environment has changed.” *National Wildlife Federation v. National Marine Fisheries Service*, No. 3:01-cv-00640 (D. Or. May 4, 2016).

Endangered Species Act

Reversing District Court, Ninth Circuit Upheld Critical Habitat Designation for Polar Bears

The Ninth Circuit Court of Appeals upheld the U.S. Fish and Wildlife Service’s (FWS) designation of critical habitat for polar bears. The Ninth Circuit reversed a decision by the District Court for the District of Alaska that vacated the entire designation. The Ninth Circuit said that the district court had improperly required that FWS identify specific elements within the designated critical habitat areas that were essential to polar bear conservation and currently in use by polar bears. According to the Ninth Circuit, this requirement was directly counter to the Endangered Species Act’s conservation purposes. The appellate court instead considered whether the designated areas “contained the constituent elements required for sustained preservation of polar bears,” and found that FWS’s designation of terrestrial denning habitat and barrier island habitat was not arbitrary and capricious. In reaching this conclusion, the Ninth Circuit said that FWS had properly taken future climate change into account in designating the critical habitat. The Ninth Circuit also said that FWS had satisfied its obligations to consider concerns raised by the State of Alaska. *Alaska Oil & Gas Association v. Jewell*, No. 13-35619 (9th Cir. Feb. 29, 2016).

Montana Federal Court Said Fish and Wildlife Service Ignored Science When It Withdrew Proposal to List North American Wolverine as Threatened

The federal District Court for the District of Montana vacated the withdrawal by FWS of a

proposal to list the distinct population segment (DPS) of the North American wolverine as threatened under the Endangered Species Act (ESA). The court described at length the 20-year period over which FWS considered whether to list the DPS. The process culminated in the withdrawal of the proposed listing 18 months after it was proposed. In withdrawing the proposal, FWS reversed course on its previous determinations regarding climate change's impacts on the wolverine and said it did not have sufficient information to suggest the wolverine population would be at risk of extinction due to climate change. The court agreed with the plaintiffs that FWS unlawfully ignored the best available science by dismissing the threat to the wolverine posed by climate change and also by dismissing the threat posed by genetic isolation and small population size. The court remanded the matter to FWS, stating: "It is the undersigned's view that if there is one thing required of the [FWS] under the ESA, it is to take action at the earliest possible, defensible point in time to protect against the loss of biodiversity within our reach as a nation. For the wolverine, that time is now." *Defenders of Wildlife v. Jewell*, Nos. CV 14-246-M-DLC, CV 14-247-M-DLC, CV 14-250-M-DLC (D. Mont. Apr. 4, 2016).

Federal Court Said Information on Impact of Sea Ice Loss on Ringed Seals Was Too Speculative to Support Listing as Threatened Species

The federal District Court for the District of Alaska struck down the listing of the Arctic subspecies of ringed seal as threatened under the Endangered Species Act. The court said that the listing was not reasonable because the subspecies population was currently strong and healthy and the listing was grounded primarily in "speculation as to what circumstances may or may not exist 80 to 100 years from now." The court said that the National Marine Fisheries Service had acknowledged that it lacked reliable data regarding the impacts of loss of sea ice due to climate change in that extended time frame. *Alaska Oil & Gas Association v. National Marine Fisheries Service*, No. 4:14-cv-00029 (D. Alaska Mar. 17, 2016).

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